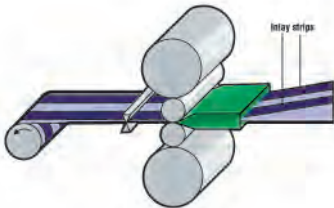


# Design Features of C&K Smart Card Connectors

C&K Components has a successful track record of manufacturing innovative interconnect devices with a strong emphasis on reliability and flexibility. As a long established supplier of such devices for Smart Cards in a wide range of applications, we have extensive experience matching performance with the need to remain cost sensitive. We consider the true cost of the interconnect to be a function not just of price, but also the ease with which the device can be integrated into the customer's production process and its performance in the field. We have built in a number of features which set our products apart, such as:



## Inlay contact finish

A means of applying precious metal to the contact area utilizing pressure as opposed to conventional plating. We have found this to be the most durable finish available without compromising the electrical performance of the contact. Our research has shown that our inlay finish lasts over ten times as long as standard gold plating. Where we state the life of the precious metal this is intended to be the "worst case" scenario, because the test has been made using the most abrasive smart card that we can find on the market (given that the equipment maker can rarely control which smart cards are used). Note that the inlay finish is silver in color, being an alloy of gold, silver, and palladium.



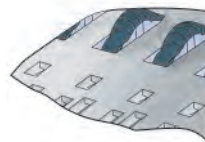
## Card detection switches

As a manufacturer of switches as well as interconnects, we have been able to integrate high performance dome switches into many of our devices. These are variants of switch products which are already in high volume production as stand alone components.



## Mechanical robustness

Four metal pegs, to be soldered in PCB metalized holes at the same time than the SMT terminals, have been designed on the smart card connectors in order to increase the resistance of the connector to card insertion force. This participates to the life time and to the overload resistance.



## Contact design

The geometry of the contact has an important bearing on its electrical performance. Our contacts are designed to give an efficient wiping action and to maximize the stress between contact and card, thus minimizing the contact resistance. The "spooned" contact area is also shaped so as to protect it from damage during card insertion.



## PCI (security standard for POS applications)

Two levels of PCI compatibility level are available:

PCI ready:

Specific features are designed in the connector in order to ease the integration of security devices around and below the connector.

PCI:





Additional accessories are integrated on the connector in order to avoid access to the data contacts and to detect any connection attempt.

## Materials

The contact material has been chosen because of its resistance to atmospheric pollution, solderability and performance over time in giving a consistent normal force. Since all of our new interconnects are designed for surface mounting, the plastic materials used must withstand high temperature soldering processes without deforming or adversely affecting performance.



## FULL SIZE CARD CONNECTORS

				
<b>Series</b>	<b>CCM01</b>	<b>CCM02</b>	<b>CCM04</b>	
<b>Applications</b>	Professional	Professional	Consumer/Professional	
<b>PCI*</b>	PCI ready	PCI/PCI ready		
<b>EMV</b>	•	•		
<b>Insertion force</b>	40N max	40N max	10N max	
<b>Overload</b>	250N	180N	40N	
<b>Card guide</b>	•	•		
<b>Sealed switch</b>	•	•		
<b>Operating life</b>	100,000 cycles	500,000 cycles	>50,000 cycles	
<b>Contact plating</b>	inlay	inlay	gold	
<b>Number of contacts</b>	8	8	6 or 8	
<b>Contact type</b>	friction	friction	friction/vandal proof	
<b>Page No.</b>	7	12	17	

## SIM / SAM CARD CONNECTORS

			
<b>Series</b>	<b>CCM03</b>	<b>CCM04</b>	
<b>Applications</b>	Consumer/Professional	Consumer/Professional	
<b>Cover</b>	hinged / fixed	hinged / fixed	
<b>Operating life</b>	10,000 to 50,000 cycles	30,000 cycles	
<b>Sealed switch</b>	•		
<b>Contact plating</b>	inlay / gold	inlay / gold	
<b>Card end travel switch</b>	with / without	without	
<b>Number of contacts</b>	6 or 8	6 or 8	
<b>Page No.</b>	24	43	

\* PCI

**PCI ready:** specific features are designed into the connector in order to ease the integration of security devices around and below the connector.

**PCI:** specific additional accessories are integrated on the connector in order to avoid access to the data contacts and to detect any connection attempt.

The logo for C&K, featuring the letters 'C' and 'K' in a bold, red, sans-serif font, with an ampersand '&' in a smaller, black, sans-serif font between them. The logo is set against a white circular background that is part of a larger red graphic element.

## Full Size Cards



ANY BANK CARD

1234 5678 9000  
00/00 00/00

# CCM01 MK2 Series

## Features

- Operating life up to 100,000 cycles
- 40N card insertion force
- EMV
- PCI ready
- Card detection sealed switch

## Typical Applications

- Transaction
- Identification
- POS



Full Size

## Mechanical

Number of Contacts	8
Mechanical life	Up to 500,000 cycles
Card insertion force	40N max.
Card extraction force	1 N min / 10 N max
Contact force	0,2N / 0,50 N max
Card detection switch	0,8 N max for actuation (end travel switch actuation force actuates when card is 0,9mm from card stop)
	1,8 N max for complete depression
Vibration Frequency	10 to 500 Hz. Acceleration 50m/s <sup>2</sup> Duration 6 hours - amplitude 0,35mm
Max elect. discontinuity	1µs
Shock	Peak value 500 m/s <sup>2</sup> – Duration 11 ms 3 shocks in each direction of each axis

## Packaging

Tray 30 parts / Cartons 300 parts  
Reel 200 parts / Cartons 1,000 parts

## Soldering

Compatible with lead free SMT reflow soldering process

## Contact Electrical Data

Insulation resistance	1,000 MΩ min
Resistance	100 mΩ max
Current rating	10 µA min / 1 A max
Dielectric strength	750 Vrms min

## Switch Electrical Data

Card detection switch	Normally open
Contact resistance	100 mΩ max
Dielectric strength	250 Vrms min
Current rating	1 mA min / 10 mA max
Maximum power	0.2 VA

## Environmental Data

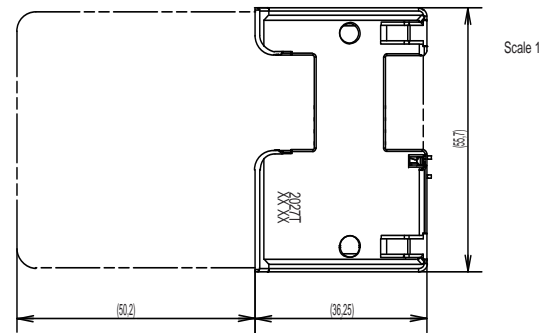
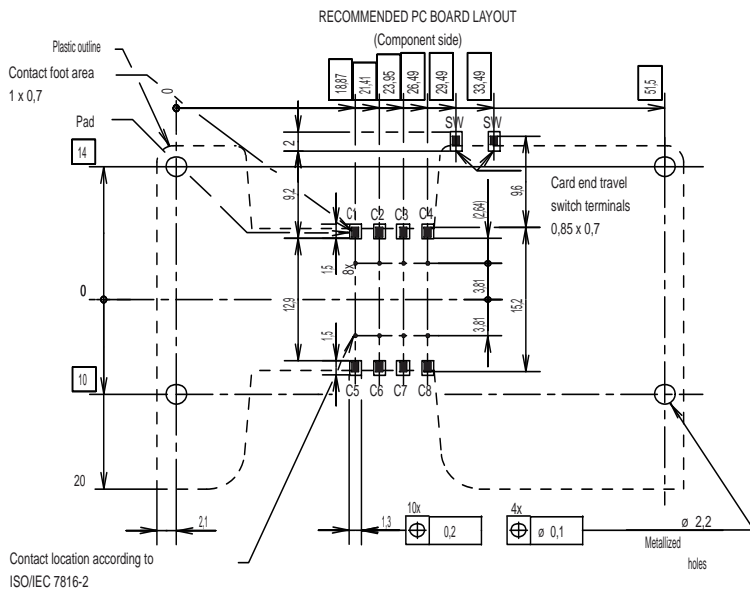
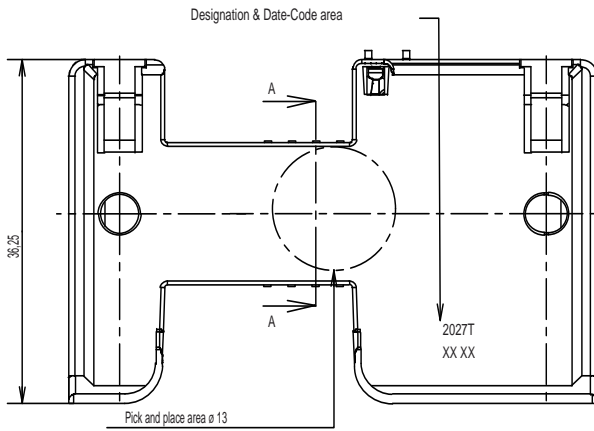
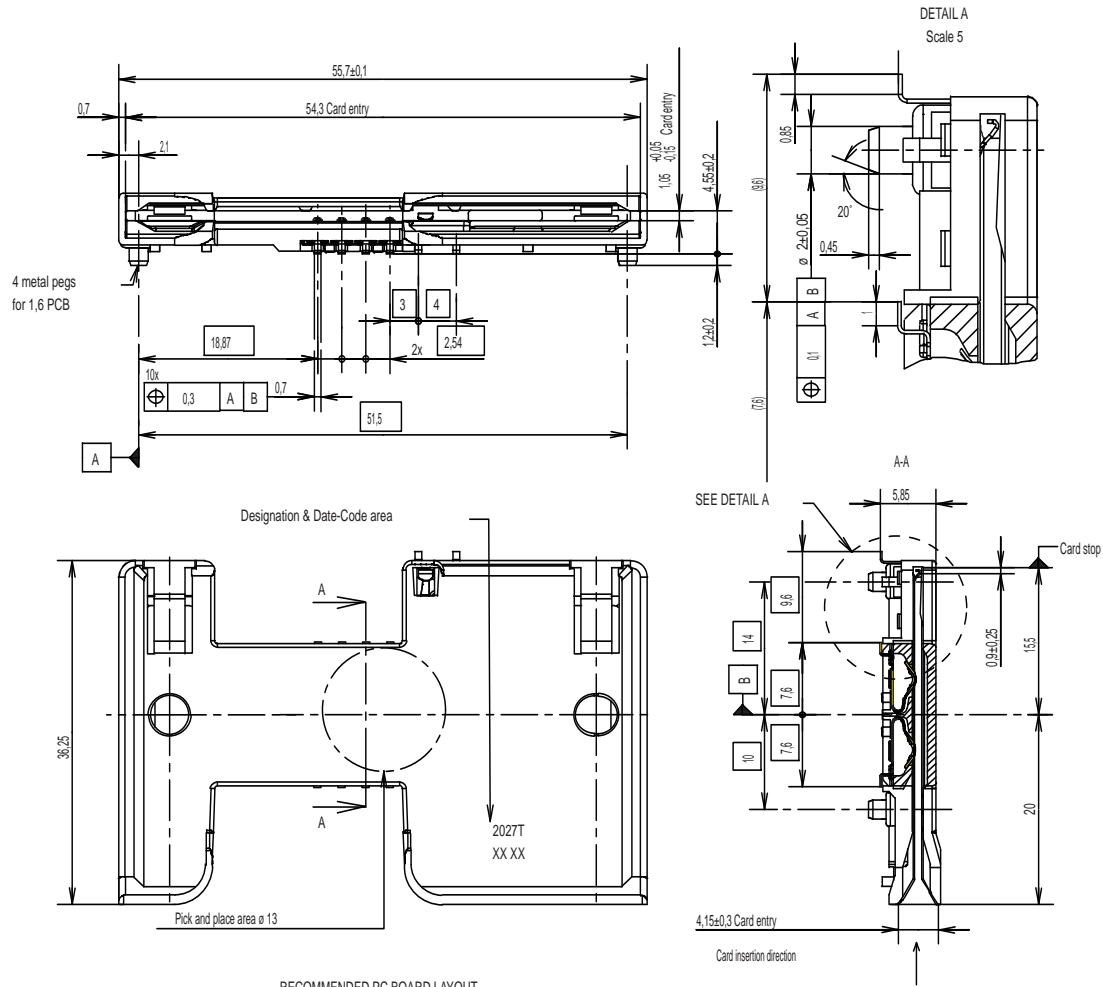
Operating temperature	-40°C to +85°C
Damp heat	IEC 512 test number 11c (10 days)
Salt mist	IEC 512 test number 11f (96 hours)
Card detection switch	Sealed against dust
RoHS compliant	

Designation	Termination	Operating Life	Card Insertion Force
CCM01-2027LFT	SMT	100,000 cycles	40N

# CCM01 MK2 Series

## CCM01-2027 LFT

Full Size



Dimensions are shown in mm  
Specifications and dimensions subject to change

www.ck-components.com

## Features/Benefits

- Operating life 500,000 cycles
- Low profile 4 mm and 3.2 mm height
- PCI ready
- Card detection sealed switch

## Typical Applications

- Transaction
- Identification
- POS
- MPOS



Full Size

## Mechanical

NUMBER OF CONTACTS:	8
MECHANICAL LIFE:	500,000 cycles
CARD INSERTION FORCE:	10 N max.
CARD EXTRACTION FORCE:	1 N min. / 10 N max.
CONTACT FORCE:	0,2 N / 0,60 N max.

## Packaging

Tray 25 parts or Reel 350 parts

## Soldering

Compatible with lead free SMT reflow soldering process

## Contact Electrical Data

INSULATION RESISTANCE:	1,000 M $\Omega$ min.
CONTACT RESISTANCE:	100 m $\Omega$ max.
CURRENT RATING:	10 $\mu$ A min. / 1A max.
DIELECTRIC STRENGTH:	750 Vrms min.

## Switch Electrical Data

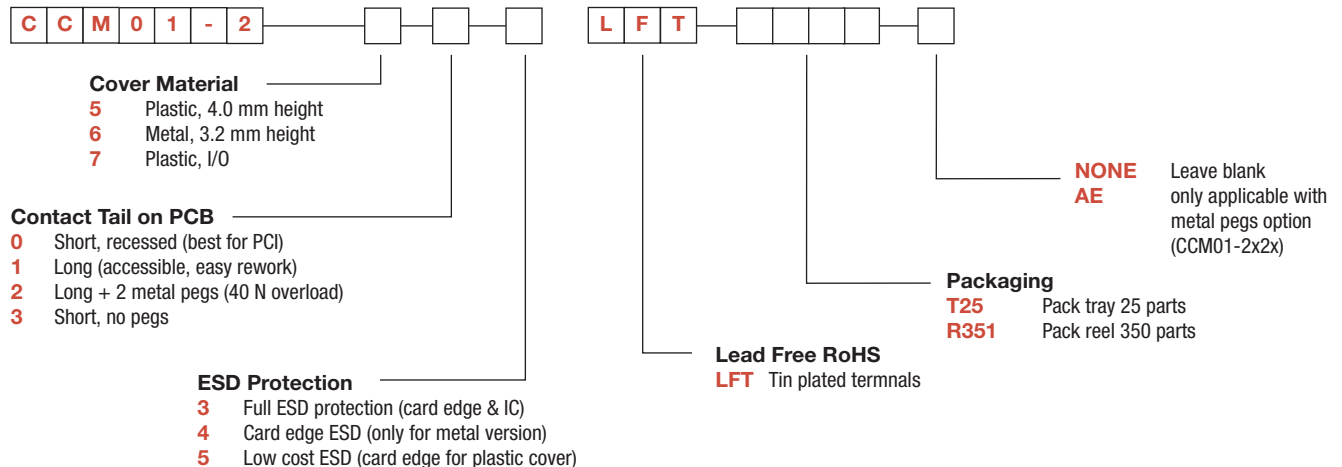
CARD DETECTION SWITCH:	Normally open
CONTACT RESISTANCE:	100 m $\Omega$ max.
DIELECTRIC STRENGTH:	250 Vrms min.
CURRENT RATING:	1 mA min. / 10 mA max.
MAXIMUM POWER:	0.2 VA

## Environmental Data

OPERATING TEMPERATURE:	-40°C to + 85°C
CARD DETECTION SWITCH:	Sealed against dust
RoHS compliant	

## How To Order

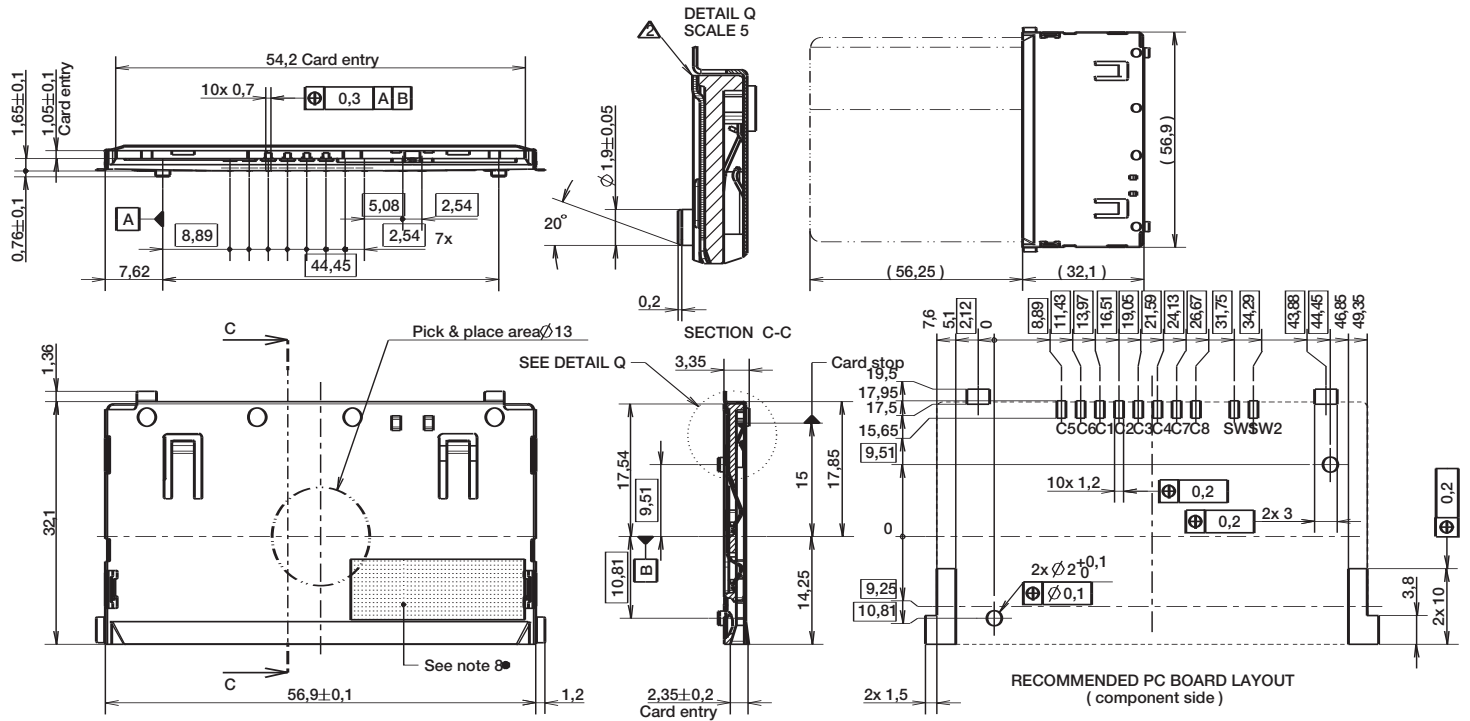
To order, simply select desired option from each category and place in the appropriate box. For additional options not shown in catalog, consult our Customer Service Center.



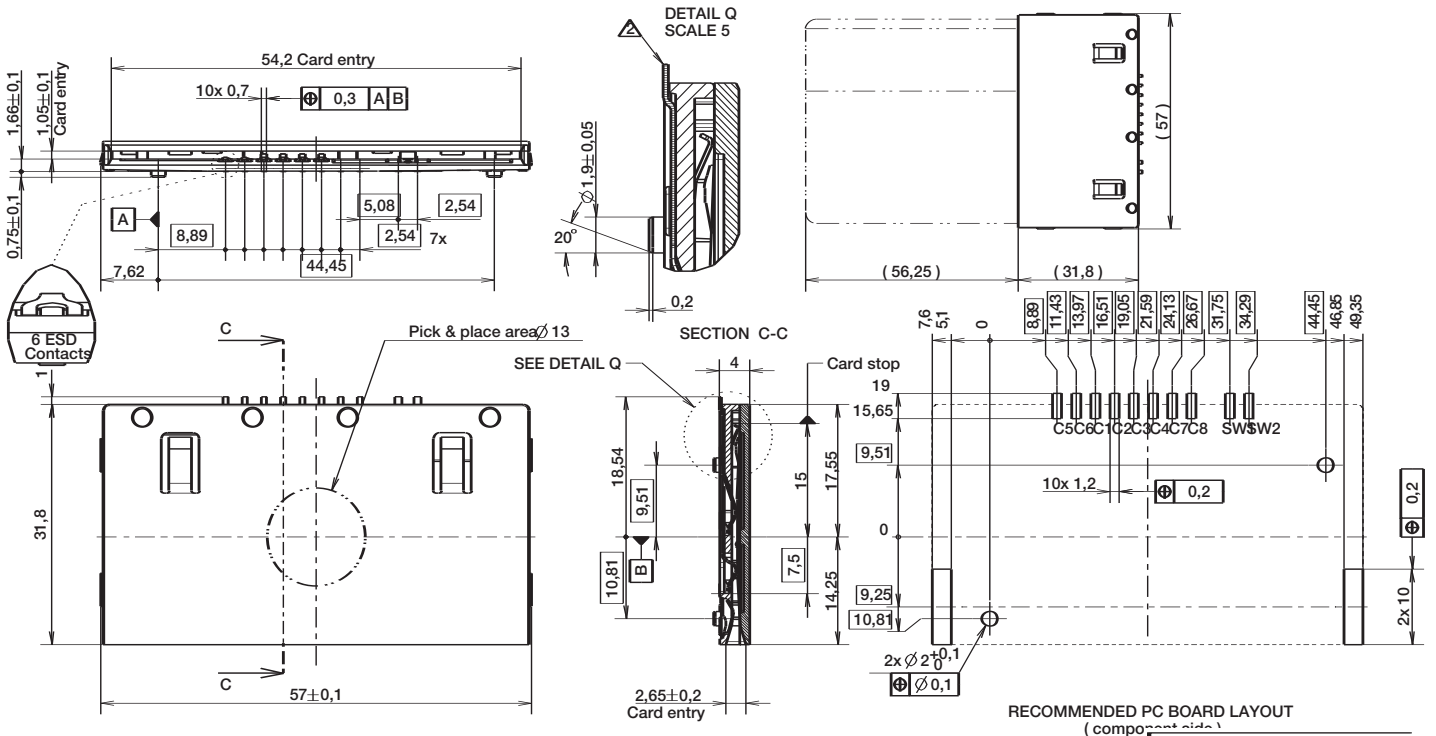
Dimensions are shown in mm  
Specifications and dimensions subject to change

# CCM01 MK5 Series

**CCM01-2604 LFT T25** Metal cover, short tails



**CCM01-2513 LFT T25** Plastic cover, long tails, full ESD protection

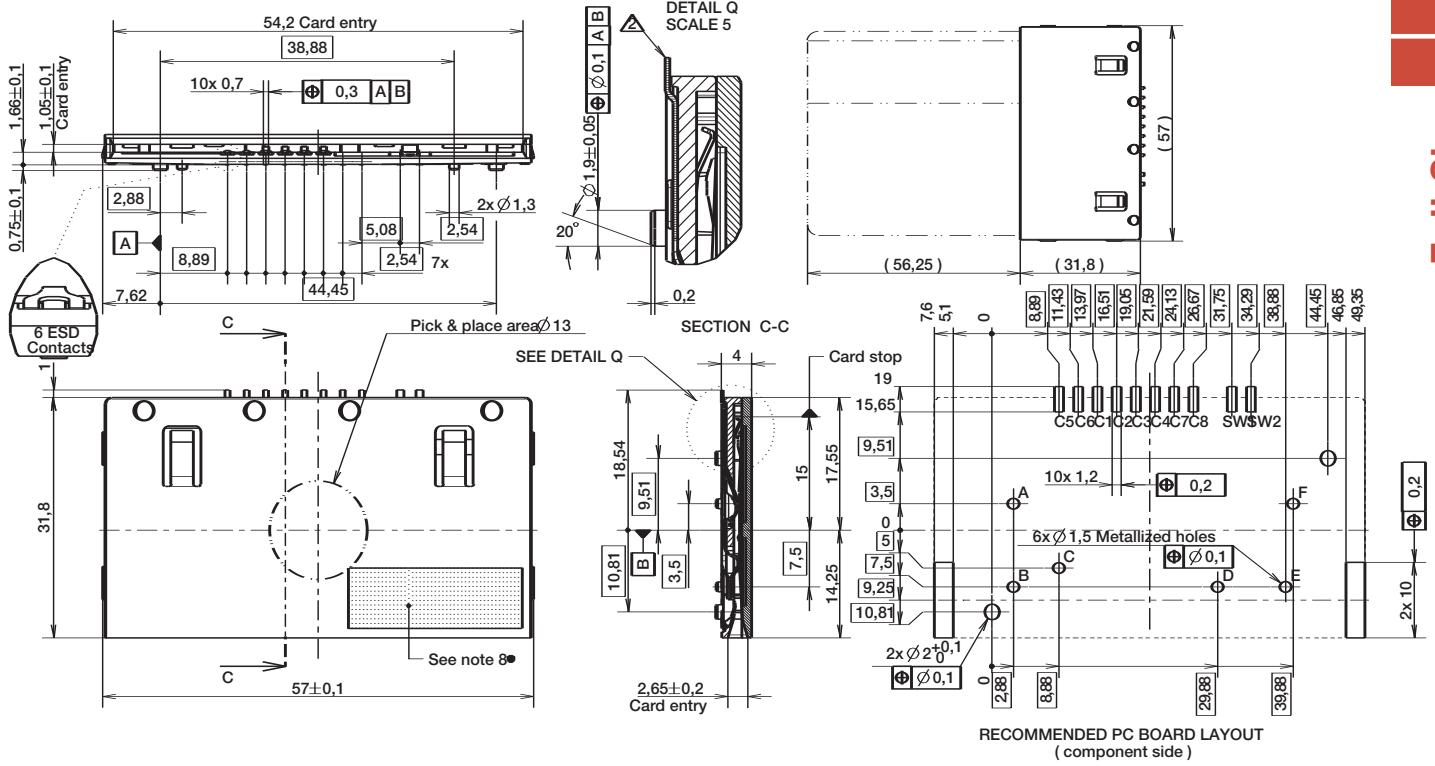


Dimensions are shown in mm  
Specifications and dimensions subject to change

[www.ck-components.com](http://www.ck-components.com)

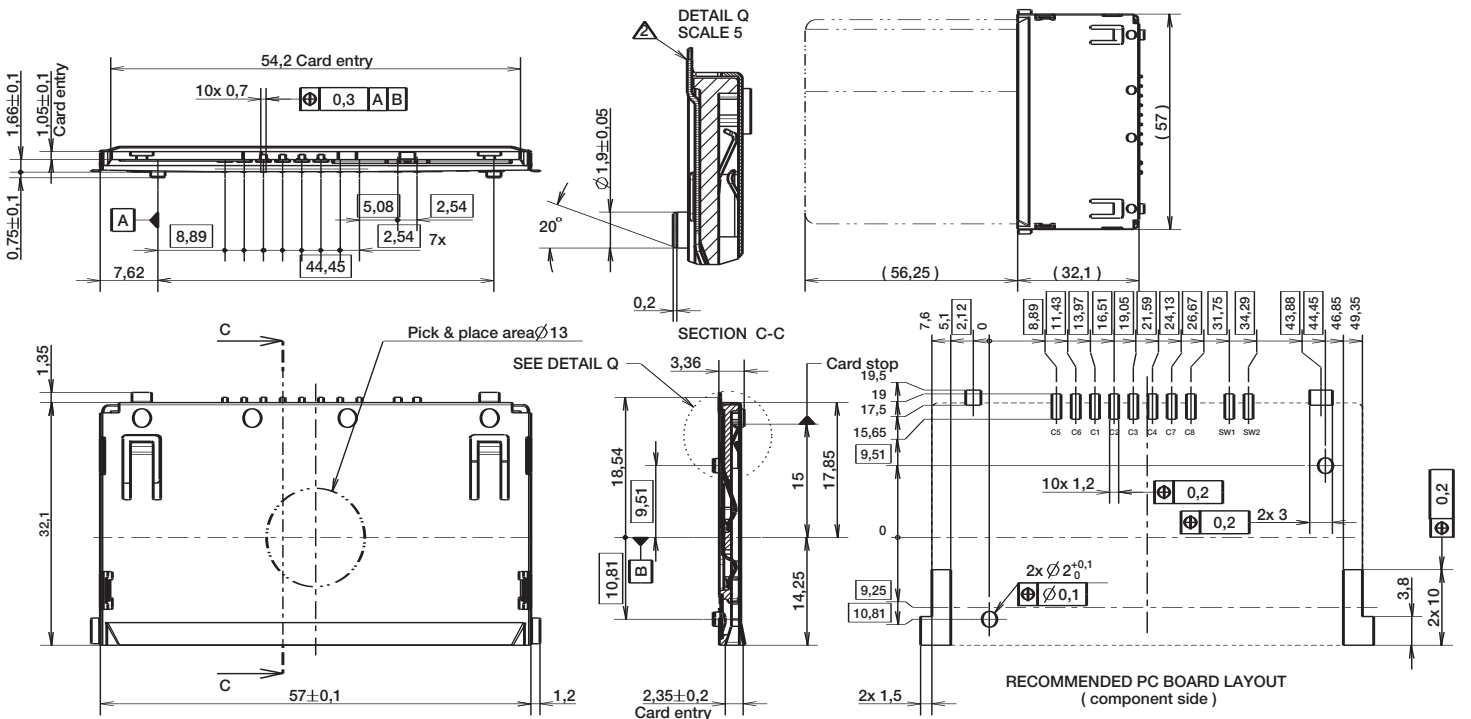
# CCM01 MK5 Series

## CCM01-2523 LFT T25 Plastic cover, long tails, metal pegs



Full Size

## CCM01-2614 LFT T25 Metal cover, long tails, no ESD protection



Dimensions are shown in mm  
Specifications and dimensions subject to change

www.ck-components.com



# CCM02 MK2 Series



## Features

- Operating life 500,000 cycles
- Insertion force 40N
- EMV
- PCI & PCI ready
- Card detection sealed switch

## Typical Applications

- Transaction
- Identification
- POS

## Mechanical

Number of Contacts	8
Mechanical life	500,000 cycles min
Card insertion force	10N to 40N
Card extraction force	1N min / 10N max
Contact force	0,2N / 0,50N max
Card detection switch	0,8 N max for actuation (end travel switch actuation force actuates when card is 0,9mm from card stop) 1,8 N max for complete depression
Vibration Frequency	10 to 500 Hz. Acceleration 50m/s <sup>2</sup> Duration 6 hours - amplitude 0,35mm
Max elect. discontinuity	1µs
Shock	Peak value 500 m/s <sup>2</sup> – Duration 11 ms 3 shocks in each direction of each axis

## Packaging

Tray 30 parts / Cartons 300 parts  
Reel 120 parts

## Soldering

Compatible with lead free reflow soldering process  
For version with security cover, please contact Customer Service for soldering recommendations.

## Contact Electrical Data

Insulation resistance	1,000 MΩ min
Resistance	100 mΩ max
Current rating	10 µA min / 1 A max
Dielectric strength	750 Vrms min

## Switch Electrical Data

Card detection switch	Normally open
Contact resistance	100 mΩ max
Dielectric strength	250 Vrms min
Current rating	1 mA min / 10 mA max
Maximum power	0.2 VA

## Environmental Data

Operating temperature	-40°C to +85°C
Damp heat	IEC 512 test number 11c (10 days)
Salt mist	IEC 512 test number 11f (96 hours)
Card detection switch	Sealed against dust
RoHS compliant	

Designation	Termination	Contact Type	PCI Features		Total Height (mm)	Dimension	PCB version
			I/O Protect	Security Cover			
CCM02-2503LFT	THT	landing			6,25	38,5 X 55,6	4 clips
CCM02-2504LFT	SMT	landing			6,25	38,5 X 55,6	4 clips
CCM02-F503LFT	THT	friction			6,25	38,5 X 55,6	4 clips
CCM02-F504LFT	SMT	friction			6,25	38,5 X 55,6	4 clips
CCM02-F844LFT	SMT	friction	Yes	Yes	6,6	40,5 X 58	4 metal pegs

## PCI: I/O Protect

### Definition

Special accessory in order to avoid and detect frontal access to data contact. It is electrically connected to the PCB through spring finger contacts.

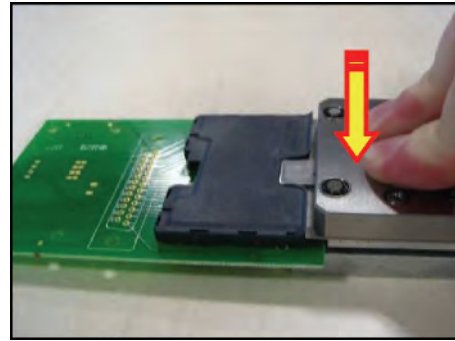
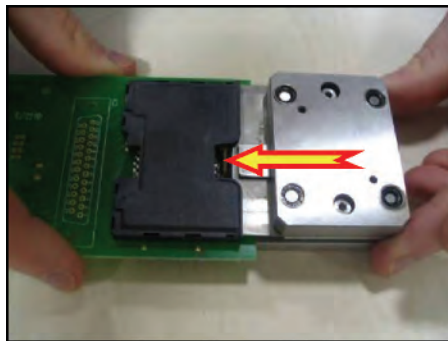
### Process

It must be in open position during the reflow soldering of the connector and has to be locked in closed position after soldering.



### I/O Protect locking tool

C&K is proposing a manual tool to lock the I/O protect accessory after soldering.  
Ordering code: C-CM02-E50



## PCI: Security Cover



### Definition

It is a multilayer cover placed over the connector to avoid and detect data contact access, especially from the top. It is connected to the PCB through 6 SMT terminals that are soldered at the same time as the other smart card terminals.

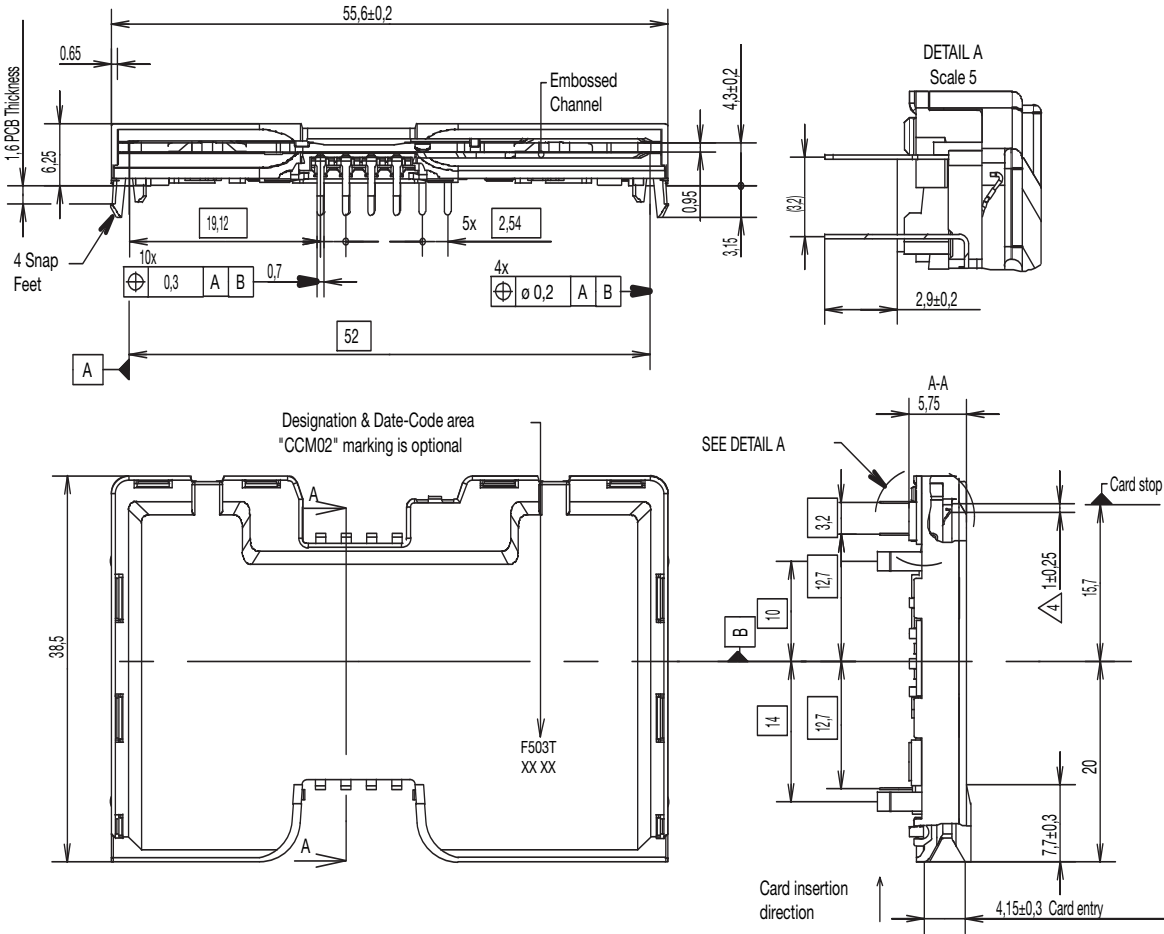
### Process

Please contact your Sales Representative for advice and recommendations about soldering this version.

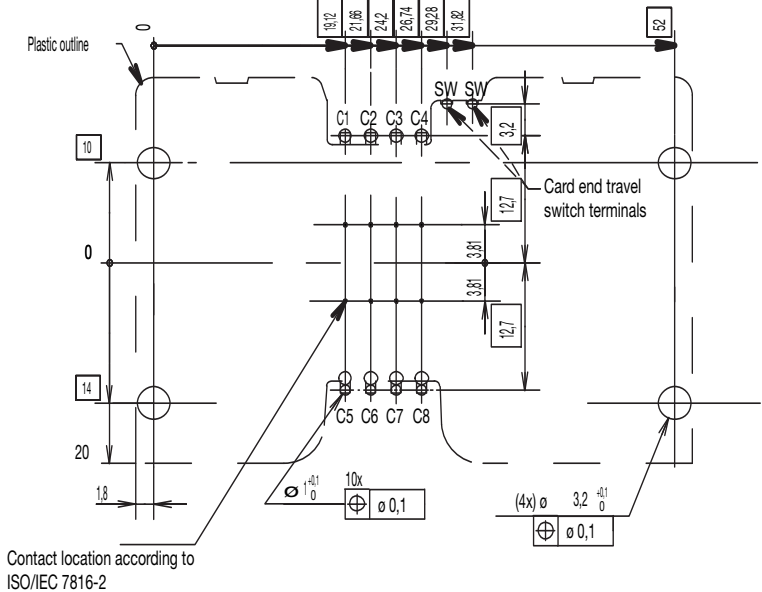
# CCM02 MK2 Series

CCM02-2503 LFT / CCM02-F503 LFT

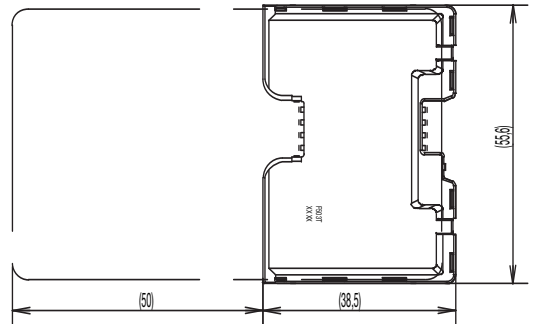
Full Size



RECOMMENDED PC BOARD LAYOUT  
(Component side)



Contact location according to ISO/IEC 7816-2



First Angle Projection

Dimensions are shown in mm  
Specifications and dimensions subject to change

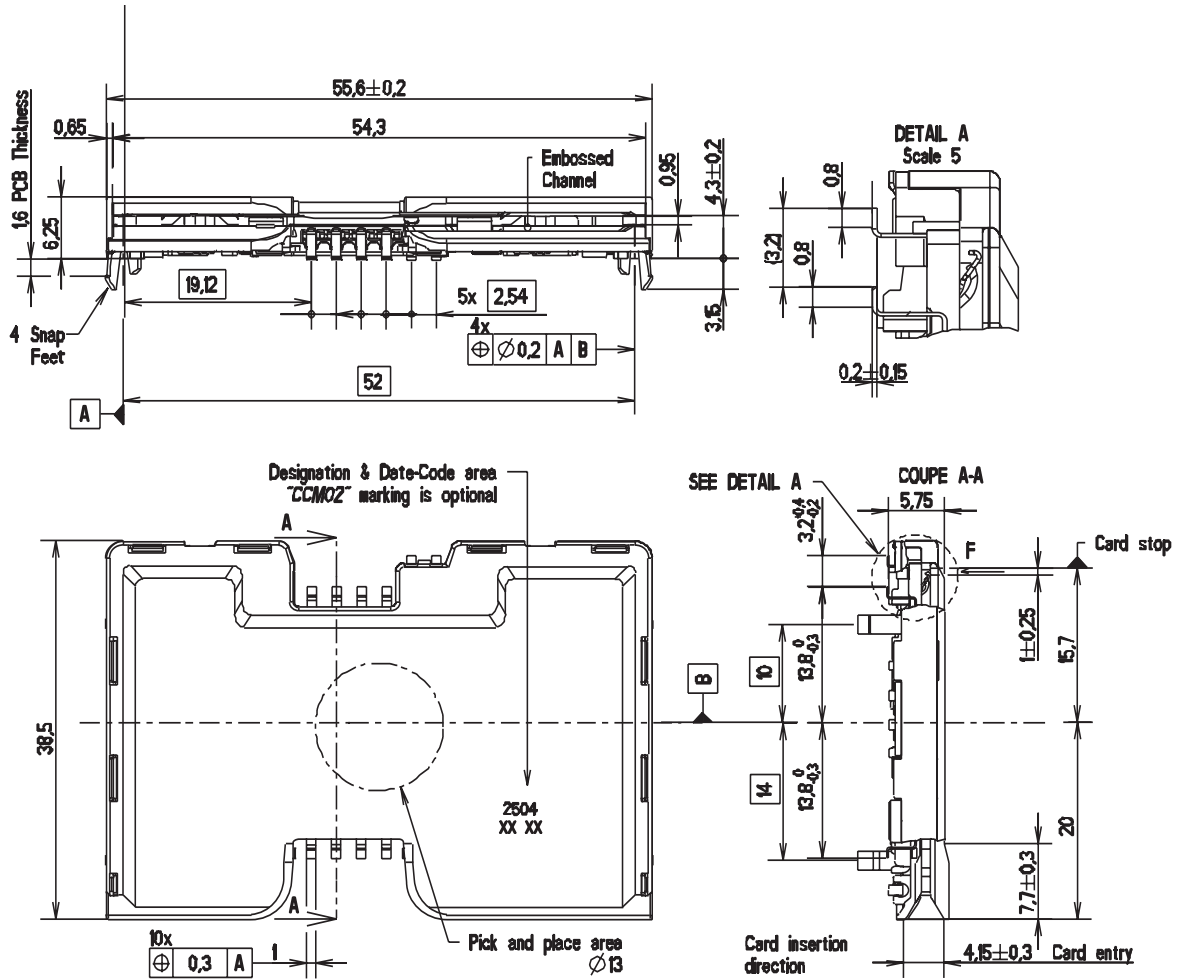
www.ck-components.com



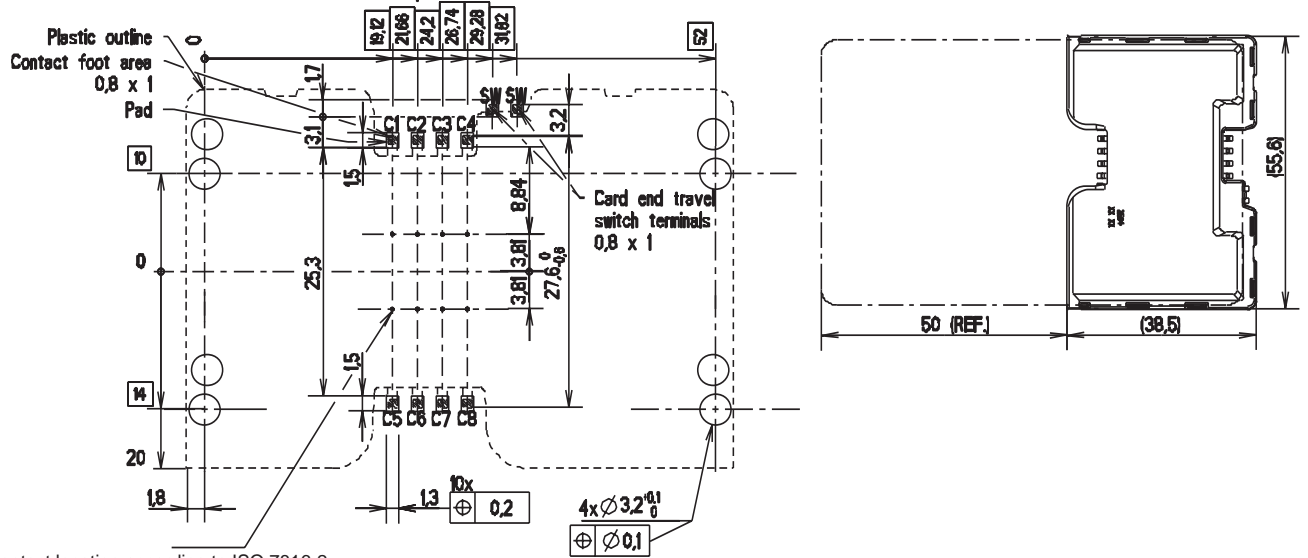
# CCM02 MK2 Series

## CCM02-2504 LFT / CCM02-F504 LFT

Full Size



### RECOMMENDED PC BOARD LAYOUT (Component side)



Contact location according to ISO 7816-2



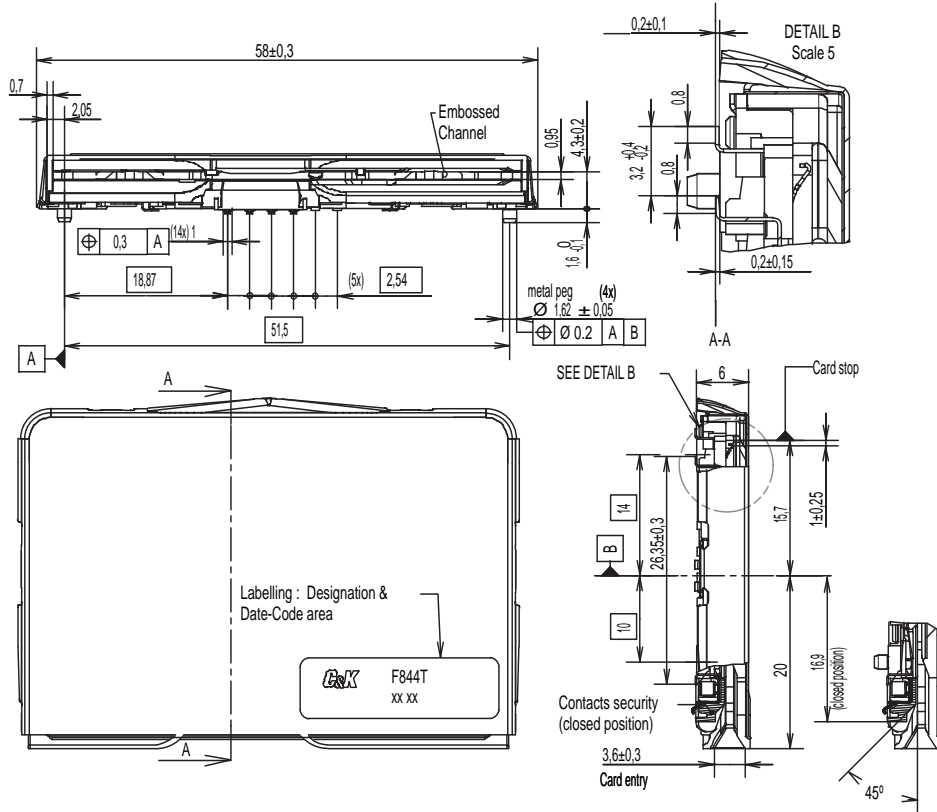
Dimensions are shown in mm  
Specifications and dimensions subject to change

www.ck-components.com

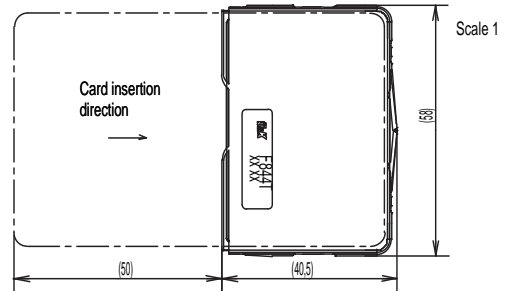
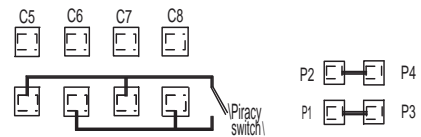
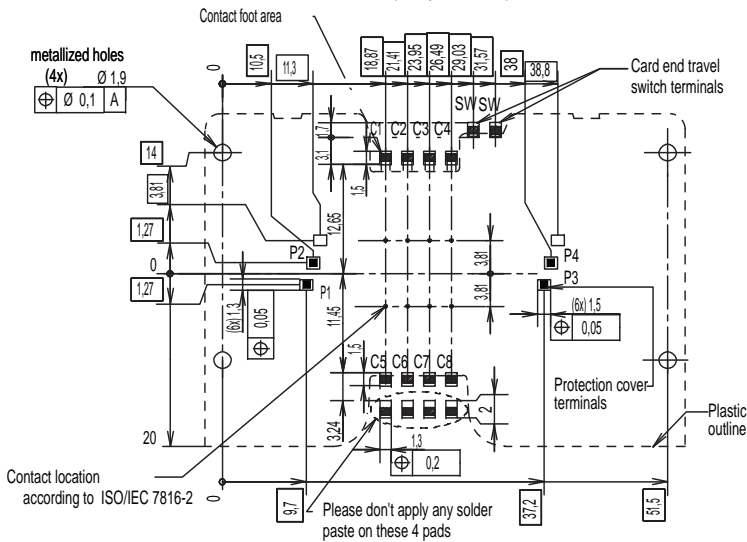
# CCM02 MK2 Series

CCM02-F844A LFT / CCM02-F844B LFT

Full Size



RECOMMENDED PC BOARD LAYOUT  
(Component side)



Dimensions are shown in mm  
Specifications and dimensions subject to change

www.ck-components.com

## Features

- ID1 full size card acceptance
- Card detection sealed switch
- Compatible with pick and place and lead free soldering

## Typical Applications

- Transaction
- POS
- Identification



## Mechanical

Number of contacts	6 or 8
Mechanical life	50,000 cycles
Card insertion force	10N max
Card extraction force	1N min / 10N max
Contact force	0,4N to 0,7N
Card detection switch	0,8 N max for actuation (end travel switch actuation force actuates when card is 0,9mm from card stop)
	1,8 N max for complete depression
Vibration Frequency	10 to 500 Hz. Acceleration 50m/s <sup>2</sup> Duration 6 hours - amplitude 0,35mm
Shock	Peak value 500 m/s <sup>2</sup> – Duration 11 ms 3 shocks in each direction of each axis
Max elect. discontinuity	1µs

## Packaging

See table below

## Soldering Process

Compatible with lead free SMT reflow soldering process

## Contact Electrical Data

Insulation resistance	1000 MΩ min
Contact resistance max	100 mΩ max
Switching current	10 µA min / 1 A max
Dielectric strength	750 Vrms min

## Switch Electrical Data

Card detection switch	Normally open
Rc card detection switch	100 mΩ max
Dielectric strength	250 Vrms min
Switch current rating	1 mA min / 10 mA max
Maximum switch power	0.2 VA

## Environmental Data

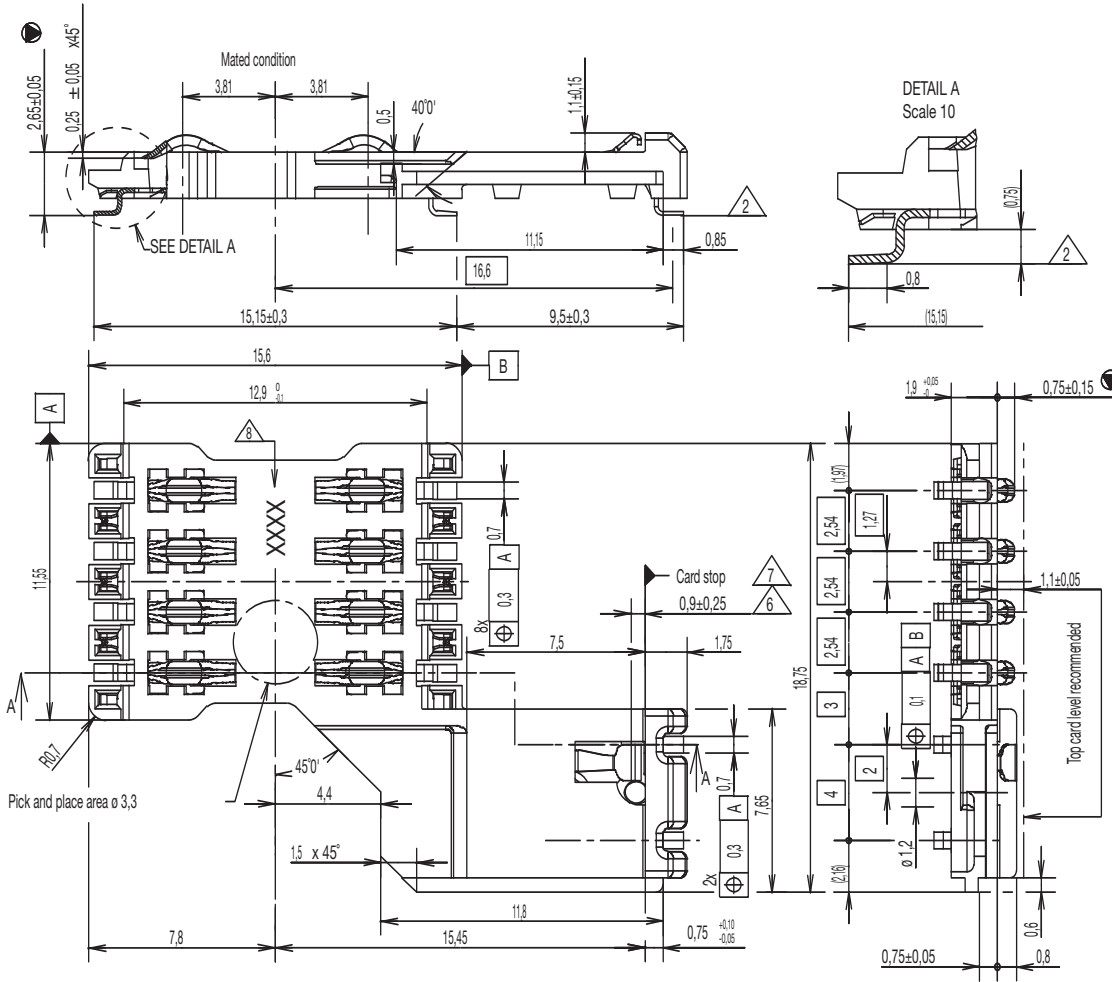
Operating temperature	-40°C to +85°C
Salt mist	IEC 512 test number 11f (96 hours)
Damp heat	IEC 512 test number 11c (10 days)
Card detection switch	Sealed against dust
RoHS compliant	

Designation	Housing Type	# of Contacts	Contact Force	Total Height (mm)	Total Dim. (mm)	Packaging
CCM04-5427LFT	standard	8	0,4N to 0,7N	2,65	18,75 X 25	reels of 1,000 pcs
CCM04-5436LFT	standard	8	0,4N to 0,7N	0,90	18,75 X 26,9	reels of 1,000 pcs
CCM04-5468LFT	stand-off	8	0,4N to 0,7N	3,5	18,75 X 24	reels of 1,000 pcs
CCM04-5454LFT	standard	8	0,4N to 0,7N	0,90	18,75 X 26,9	reels of 1,000 pcs
CCM04-5455LFT	standard	8	0,4N to 0,7N	0,90	18,75 X 26,9	reels of 1,000 pcs

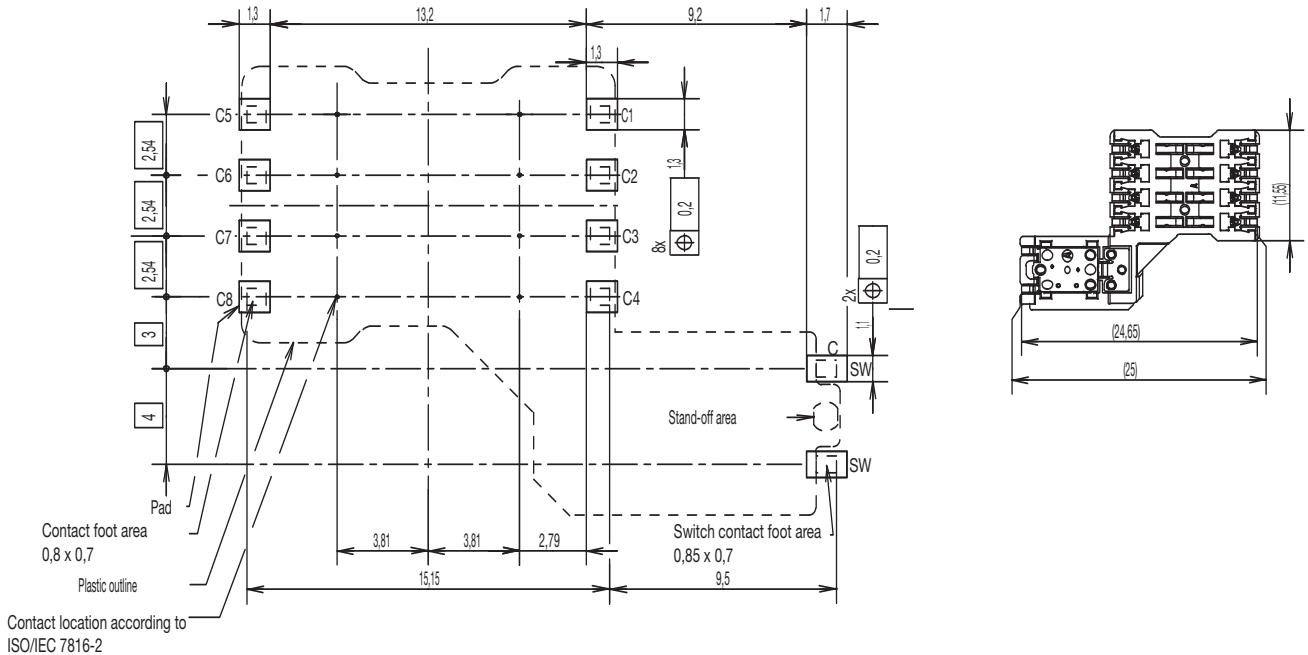
# CCM04 MK4 Series

## CCM04-5427 LFT

Full Size



RECOMMENDED PC BOARD LAYOUT  
(Component side)

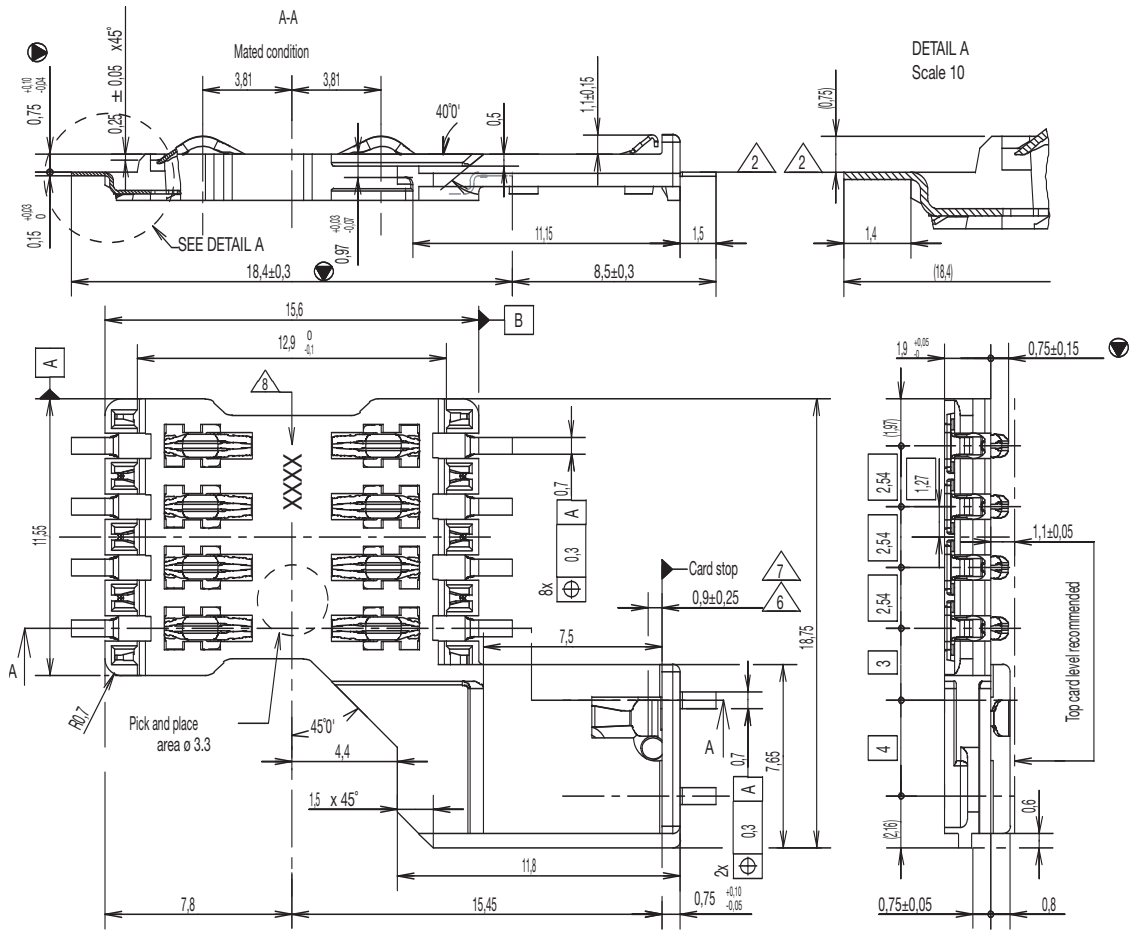


Dimensions are shown in mm  
Specifications and dimensions subject to change

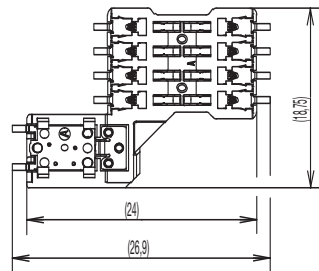
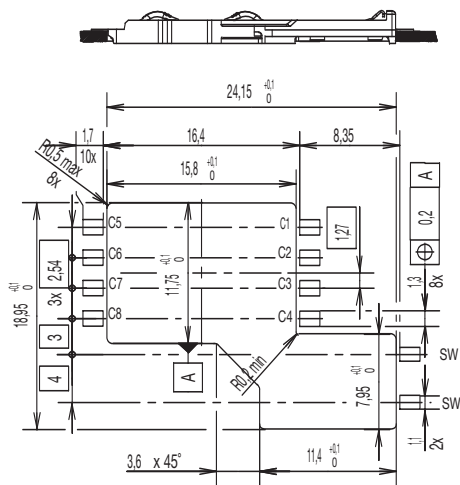
www.ck-components.com

# CCM04 MK4 Series

## CCM04-5436 LFT



RECOMMENDED PC BOARD LAYOUT  
(Component side)



Dimensions are shown in mm  
Specifications and dimensions subject to change

[www.ck-components.com](http://www.ck-components.com)

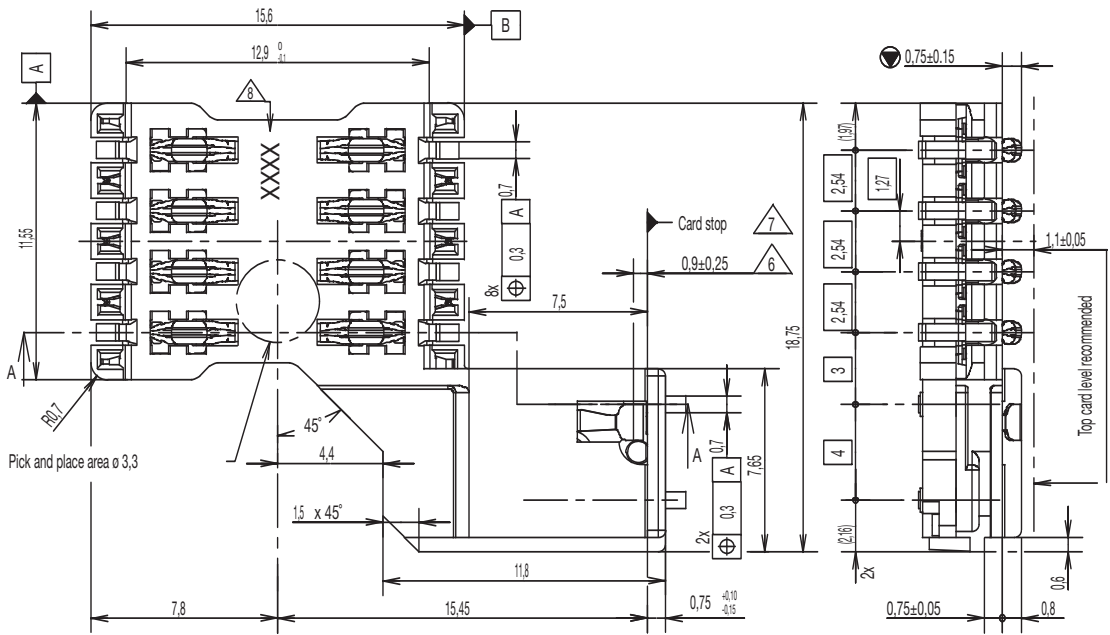
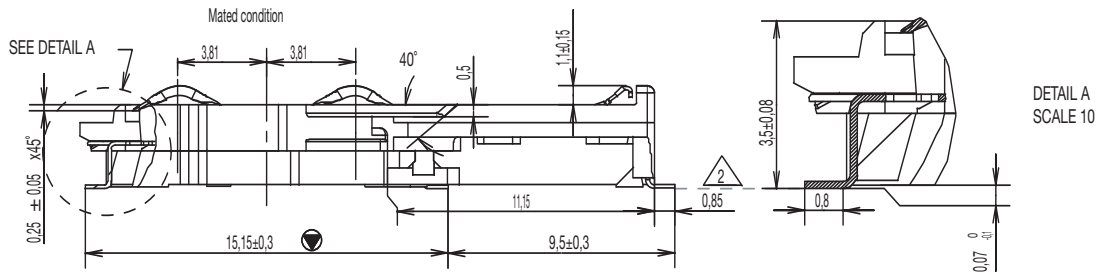
Full Size



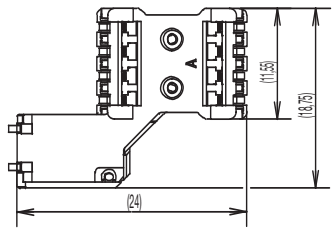
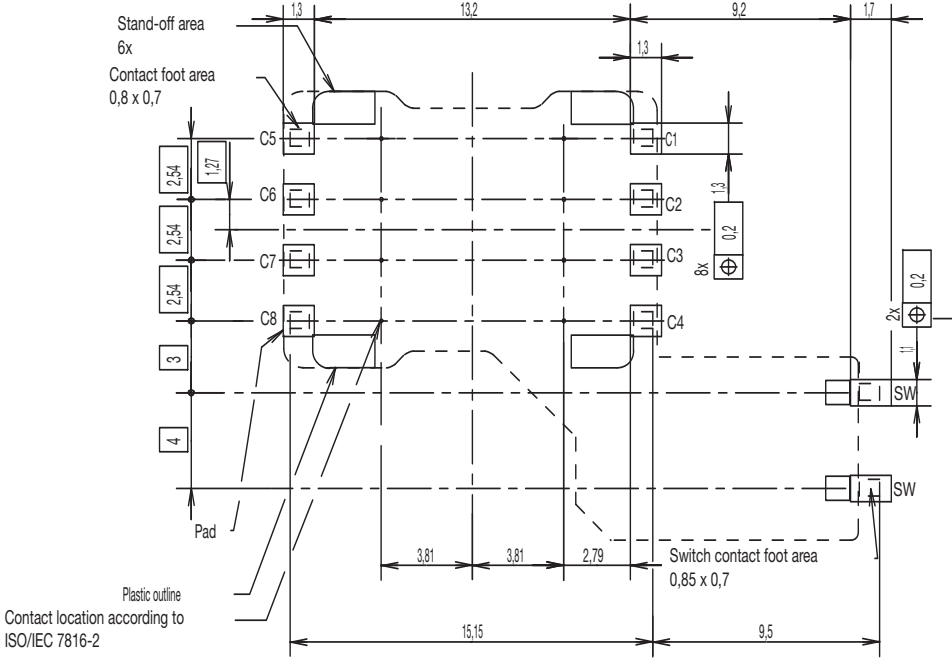
# CCM04 MK4 Series

CCM04-5468 LFT

Full Size



RECOMMENDED PC BOARD LAYOUT  
(Component side)



Plastic outline  
Contact location according to  
ISO/IEC 7816-2



First Angle  
Projection

Dimensions are shown in mm  
Specifications and dimensions subject to change

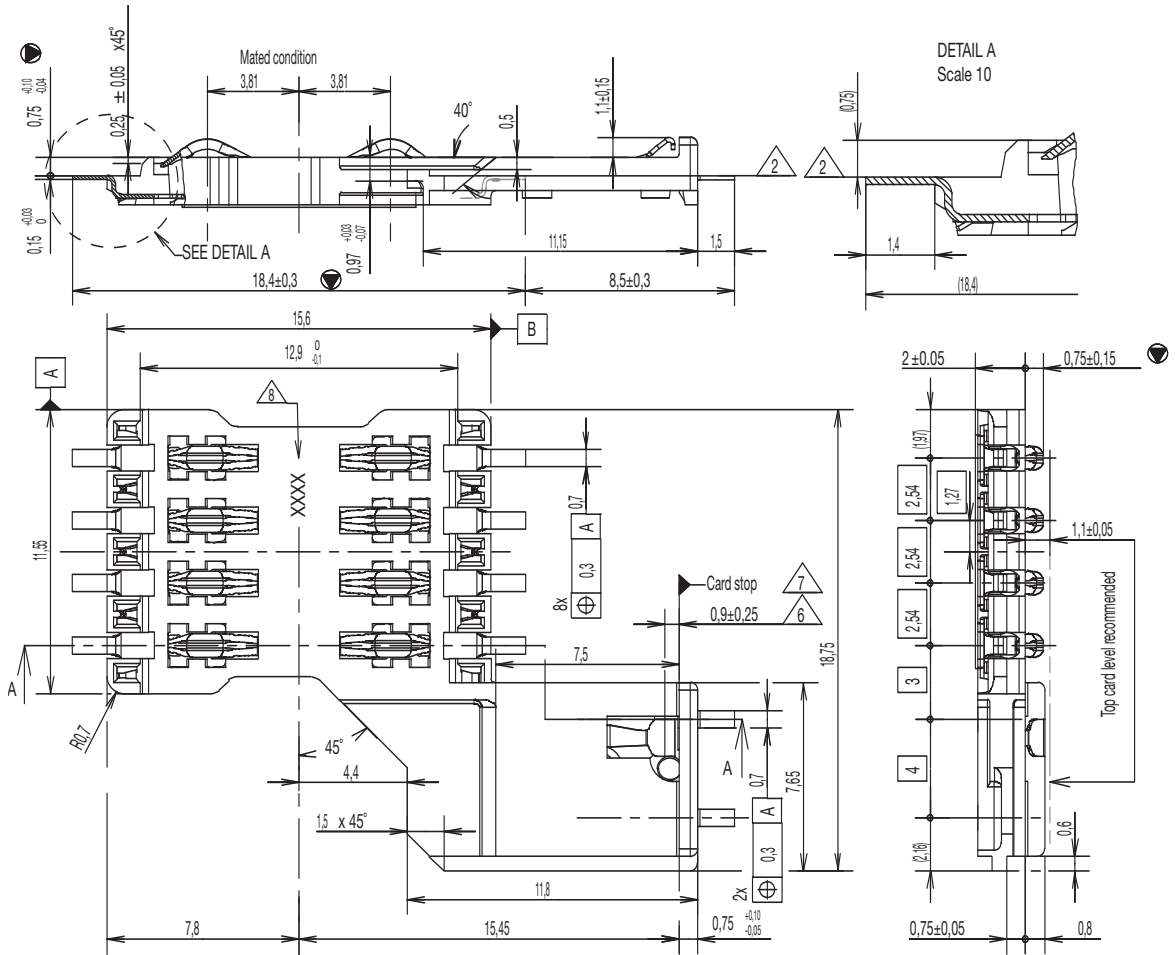
www.ck-components.com



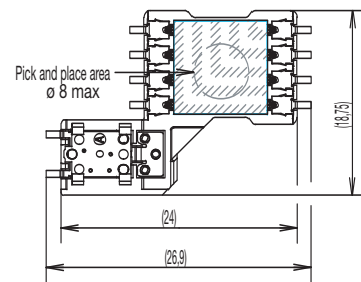
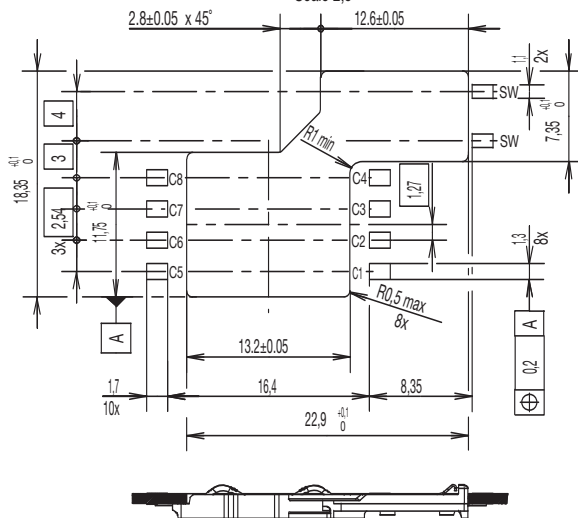
# CCM04 MK4 Series

## CCM04-5454 LFT

Full Size



RECOMMENDED PC BOARD LAYOUT  
(Component side)  
Scale 2,5



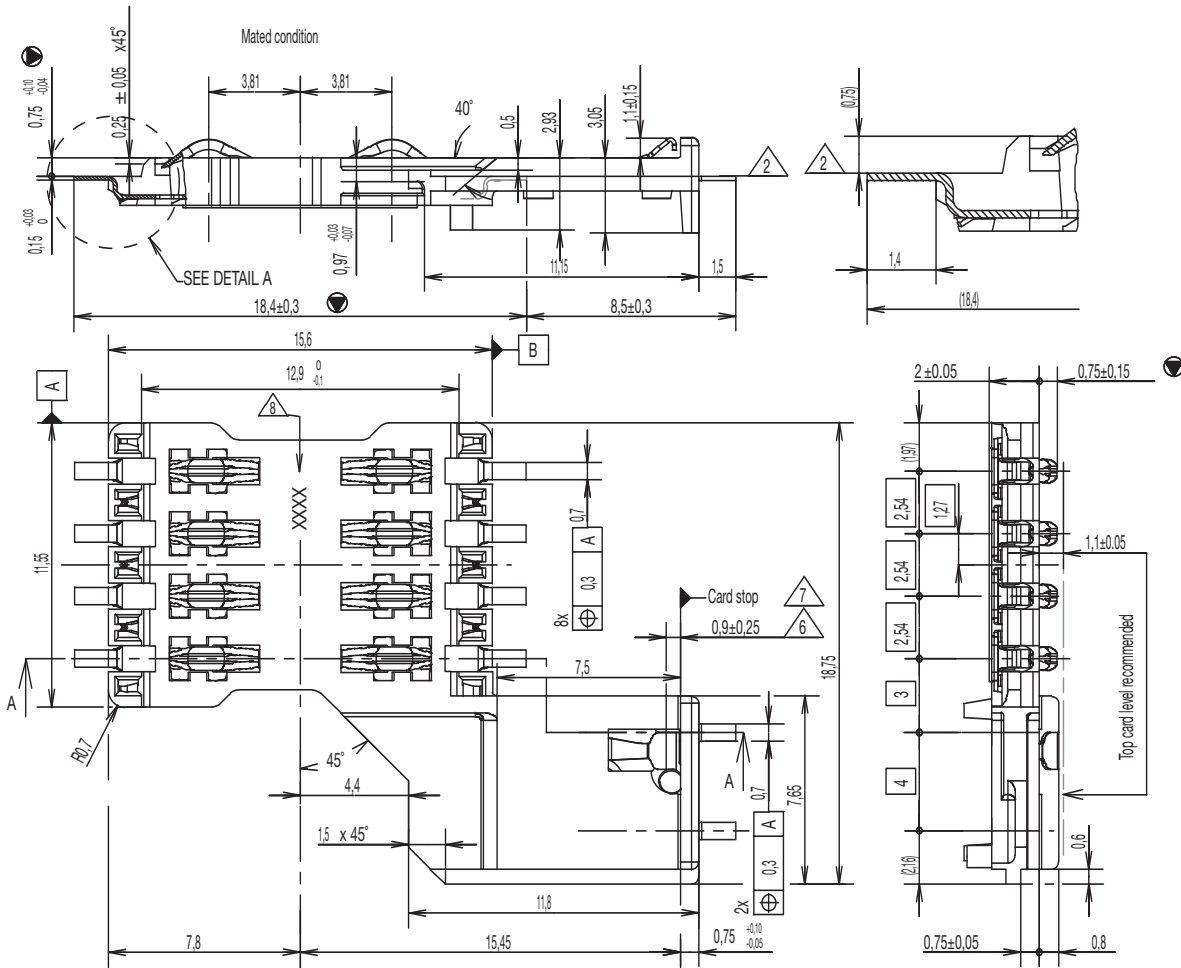
Dimensions are shown in mm  
Specifications and dimensions subject to change

www.ck-components.com

# CCM04 MK4 Series

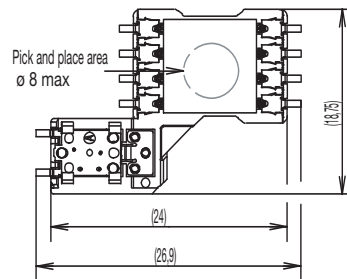
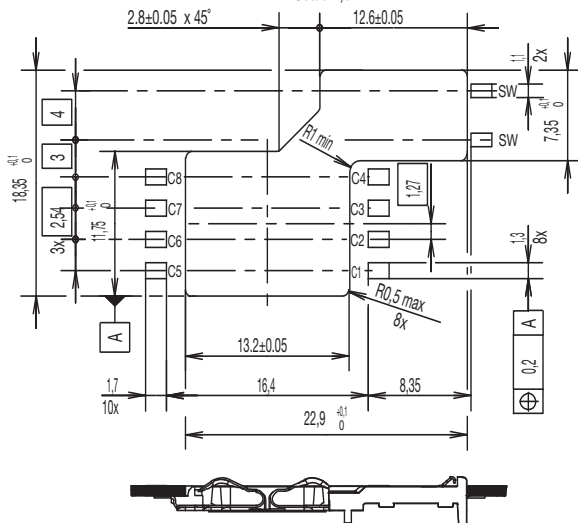
CCM04-5455 LFT

Full Size



RECOMMENDED PC BOARD LAYOUT  
(Component side)

Scale 2,5



First Angle Projection

Dimensions are shown in mm  
Specifications and dimensions subject to change

www.ck-components.com



The logo for C&K, featuring the letters 'C' and 'K' in a bold, red, italicized font, with an ampersand '&' in a black, bold font between them. A registered trademark symbol (®) is located at the top right of the 'K'.

**C&K**

A red horizontal bar containing the text 'SIM / SAM Cards' in white, bold, sans-serif font.

**SIM / SAM Cards**



# CCM03 MK2 Series



## Features

- SIM/SAM card acceptance
- Hinged and fixed covers
- Compatible with pick and place and lead free soldering

## Typical Applications

- Handheld products
- Identification
- POS
- Automotive

## Mechanical

Number of Contacts	6 or 8
Mechanical life, hinged cover	10,000 cycles min
Mechanical life, fixed cover	50,000 cycles
Card insertion force	Hinged cover: 1N max Fixed cover: 3N max
Card extraction force	Hinged cover: 1N max Fixed cover: 0,80N min / 3N max
Contact force	0,25N min / 0,50N max
Slide locking force	2N min / 6N max
Vibration Frequency	1,8N max. for complete depression 10 to 500 Hz. Acceleration 50m/s <sup>2</sup> Duration 6 hours - amplitude 0,35 mm
Max electrical discontinuity	1µs
Shock	Peak value 500 m/s <sup>2</sup> – Duration 11 ms 3 shocks in each direction of each axis

## Switch Electrical Data

Card detection switch	Normally open
Contact resistance	100 mΩ max
Dielectric strength	250 Vrms min
Current rating	1 mA min / 10m A max
Maximum power	0.2 VA

## Environment Data

Operating temperature	-40°C to +85°C
Damp heat	IEC 512 test number 11c (10 days)
Salt mist	IEC 512 test number 11f (96 hours)
RoHS compliant	

## Soldering Process

Compatible with lead free SMT soldering process



## Contact Electrical Data

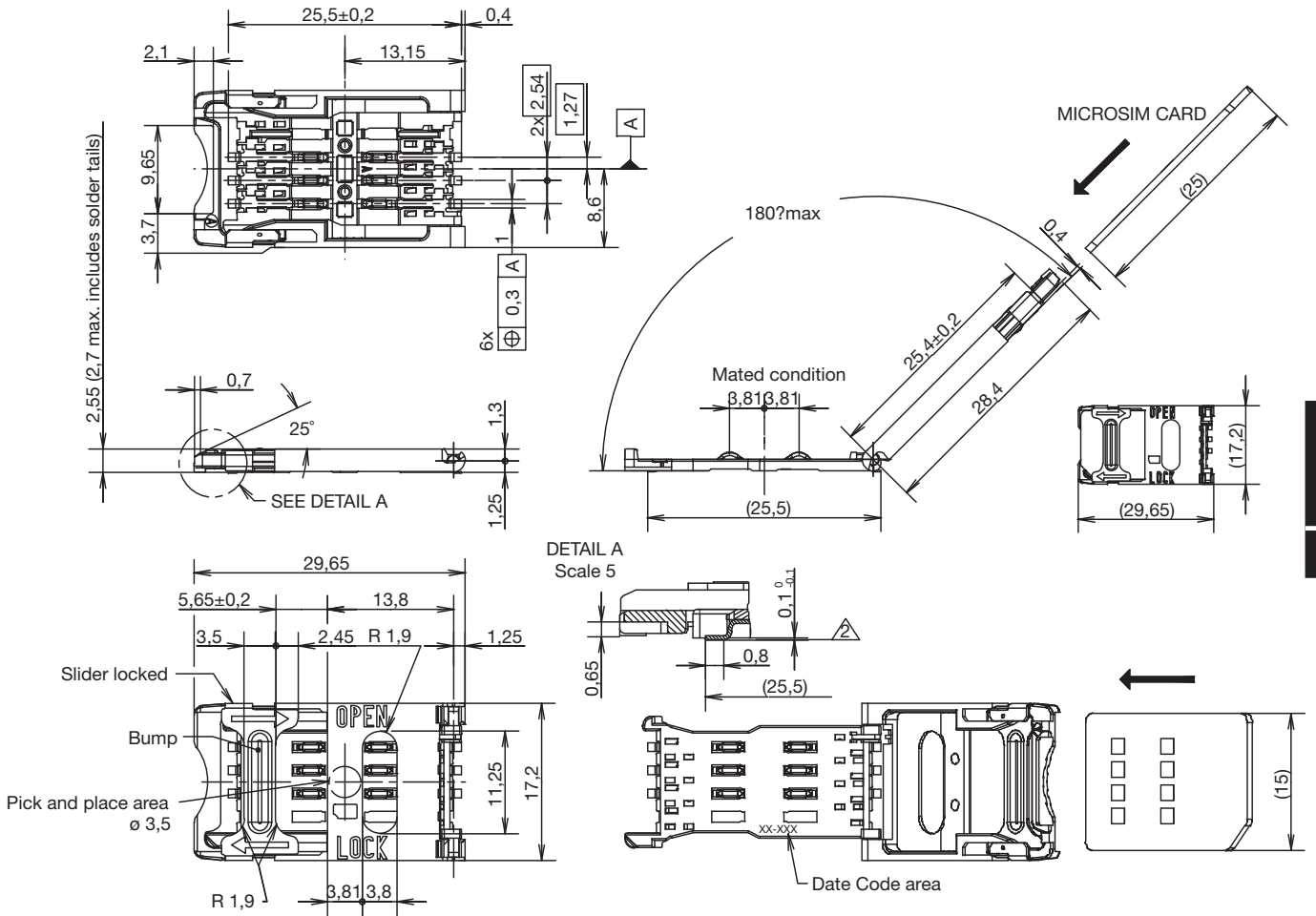
Insulation resistance	1,000 MΩ min
Resistance	100 mΩ max
Current rating	10 µA min / 1 A max
Dielectric strength	750 Vrms min

Designation	Contact Plating	Cover	# of Contacts	PCB Version	Card Presence Switch	Operating Life	Total Height (mm)	Dim. (mm)	Packaging
CCM03-3001LFT	inlay	hinged	6		without	10,000	2,55	17,2 x 29,65	reels of 1,000 pcs
CCM03-3002LFT	inlay	hinged	6	2 plastic pegs	without	10,000	2,55	17,2 x 29,65	reels of 1,000 pcs
CCM03-3003LFT	inlay	hinged	8		without	10,000	2,55	17,2 x 29,65	reels of 1,000 pcs
CCM03-3004LFT	inlay	hinged	8	2 plastic pegs	without	10,000	2,55	17,2 x 29,65	reels of 1,000 pcs
CCM03-3009LFT	gold	hinged	6		without	10,000	2,55	17,2 x 29,65	reels of 1,000 pcs
CCM03-3010LFT	gold	hinged	6	2 plastic pegs	without	10,000	2,55	17,2 x 29,65	reels of 1,000 pcs
CCM03-3011LFT	gold	hinged	8		without	10,000	2,55	17,2 x 29,65	reels of 1,000 pcs
CCM03-3012LFT	gold	hinged	8	2 plastic pegs	without	10,000	2,55	17,2 x 29,65	reels of 1,000 pcs
CCM03-3013LFT	gold	hinged	6		with	10,000	2,55	17,2 x 29,65	reels of 1,000 pcs
CCM03-3512LFT	gold	hinged	6	Large soldering pads*	without	10,000	2,55	17,2 x 29,65	reels of 1,000 pcs
CCM03-3504LFT	gold	fixed	8		without	50,000	2,85	17,2 x 25,5	reels of 1,000 pcs
CCM03-3505LFT	gold	fixed	6		without	50,000	2,85	17,2 x 25,5	reels of 1,000 pcs
CCM03-3754LFT	inlay	fixed	6		with	10,000	3,5	16,5 x 18,05	reels of 1,000 pcs
CCM03-3760LFT	inlay	fixed	6		without	10,000	3,45	16,5 x 15,85	reels of 1,000 pcs
CCM03-3764LFT	inlay	none	6		with	10,000	2,9	16,5 x 15,85	reels of 1,000 pcs

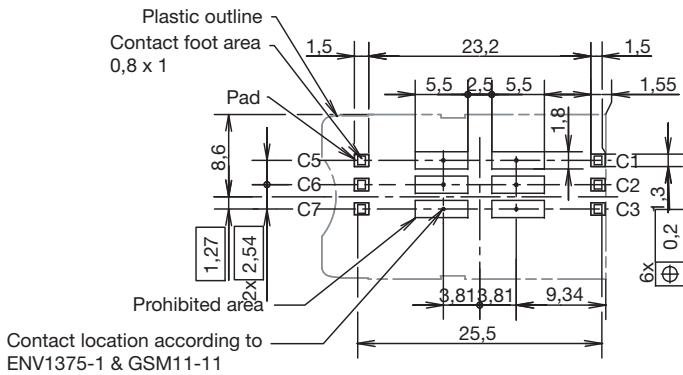
\* Can go through reflow upside down

# CCM03 MK2 Series

## CCM03-3001 LFT / CCM03-3009 LFT



RECOMMENDED PC BOARD LAYOUT  
(Component side)



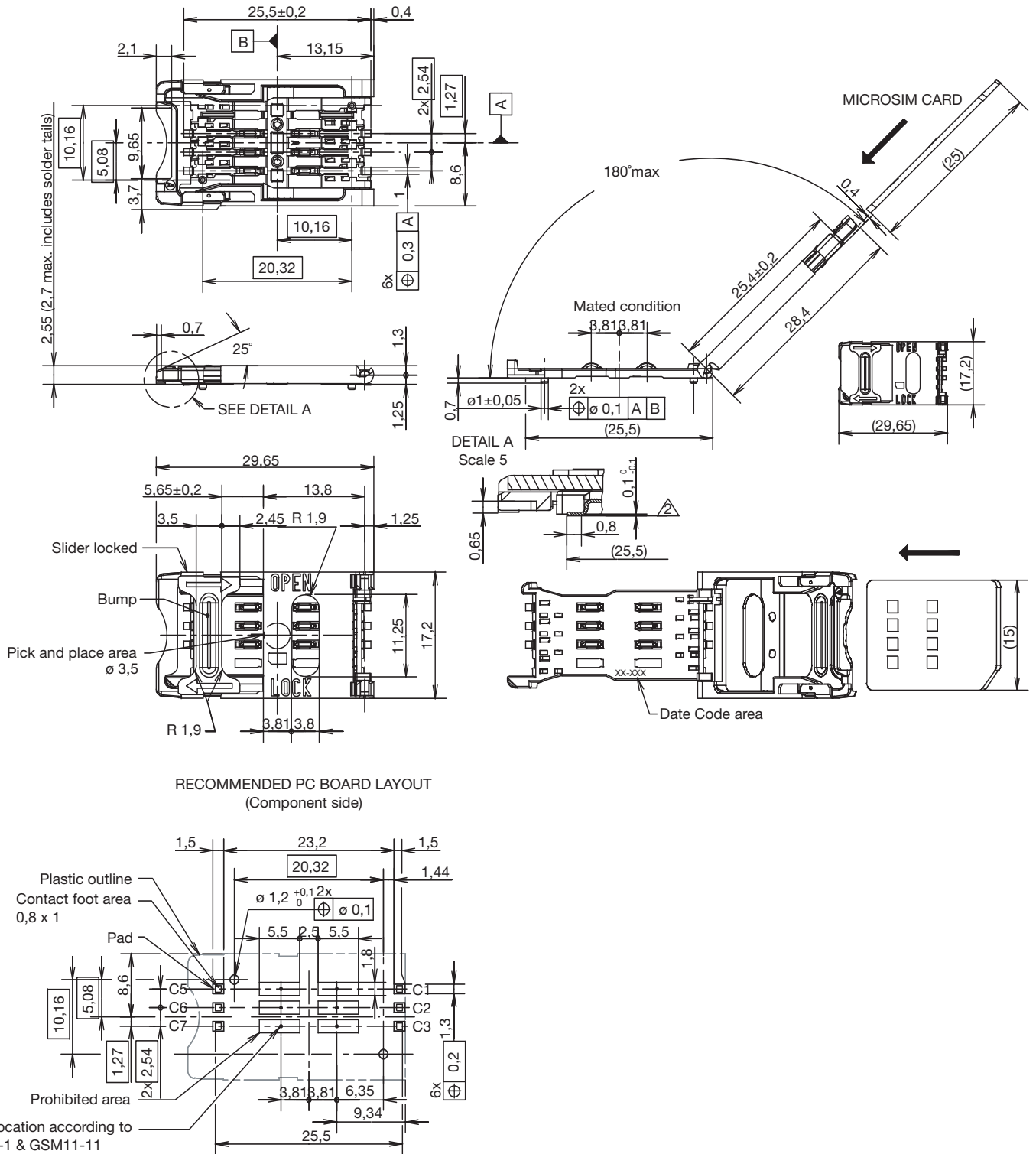
Dimensions are shown in mm  
Specifications and dimensions subject to change

www.ck-components.com

# CCM03 MK2 Series

## CCM03-3002 LFT / CCM03-3010 LFT

SIM/SAM

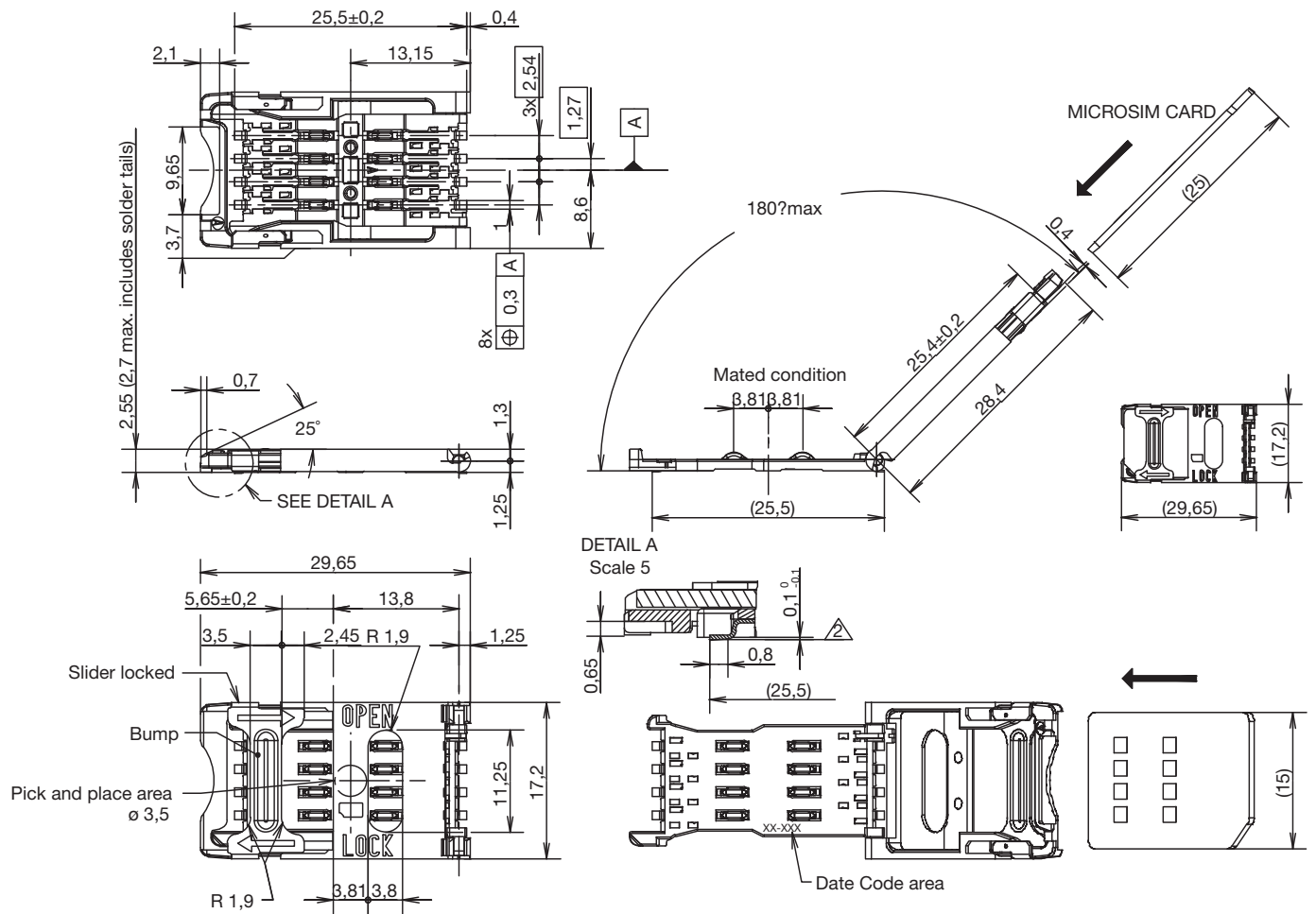


Dimensions are shown in mm  
Specifications and dimensions subject to change

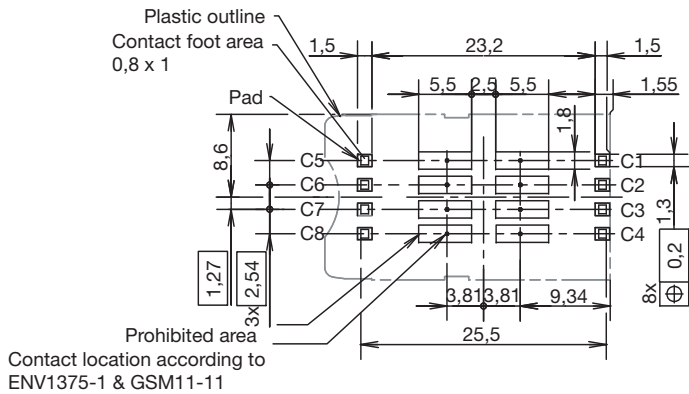
[www.ck-components.com](http://www.ck-components.com)

# CCM03 MK2 Series

## CCM03-3003 LFT



RECOMMENDED PC BOARD LAYOUT  
(Component side)



SIM/SAM



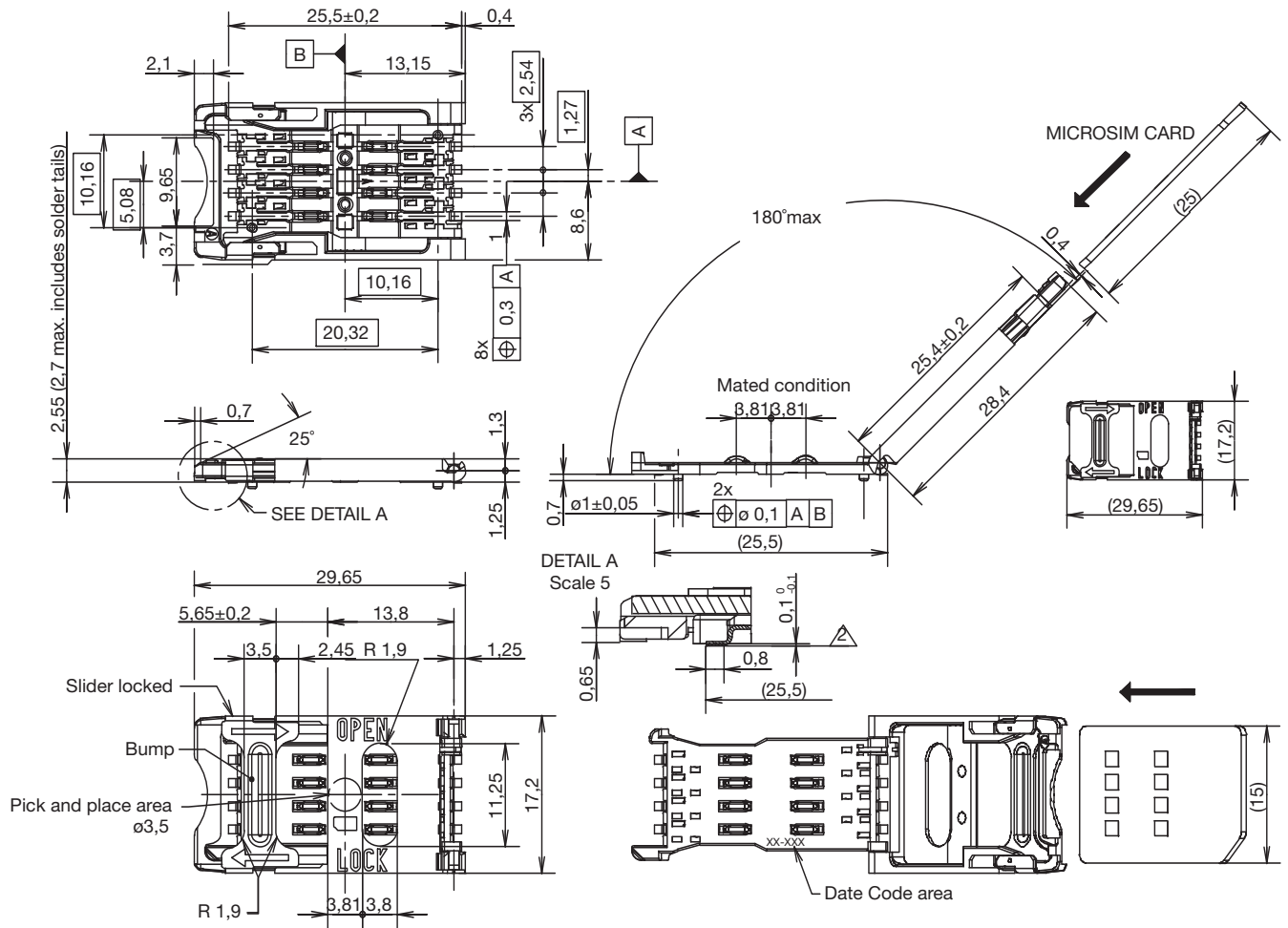
Dimensions are shown in mm  
Specifications and dimensions subject to change

www.ck-components.com

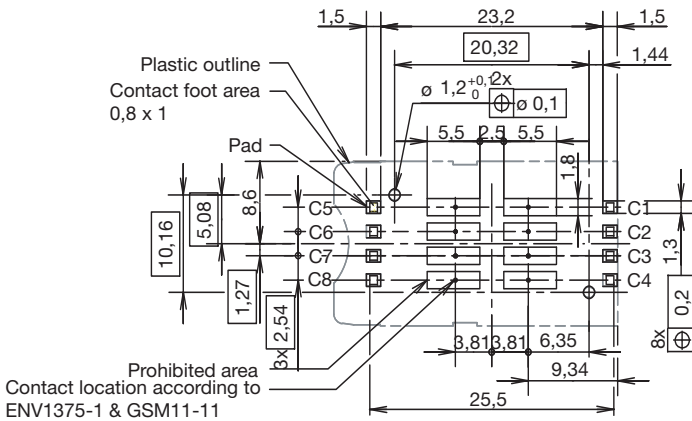


# CCM03 MK2 Series

CCM03-3004 LFT



RECOMMENDED PC BOARD LAYOUT  
(Component side)



First Angle Projection

Dimensions are shown in mm

Specifications and dimensions subject to change

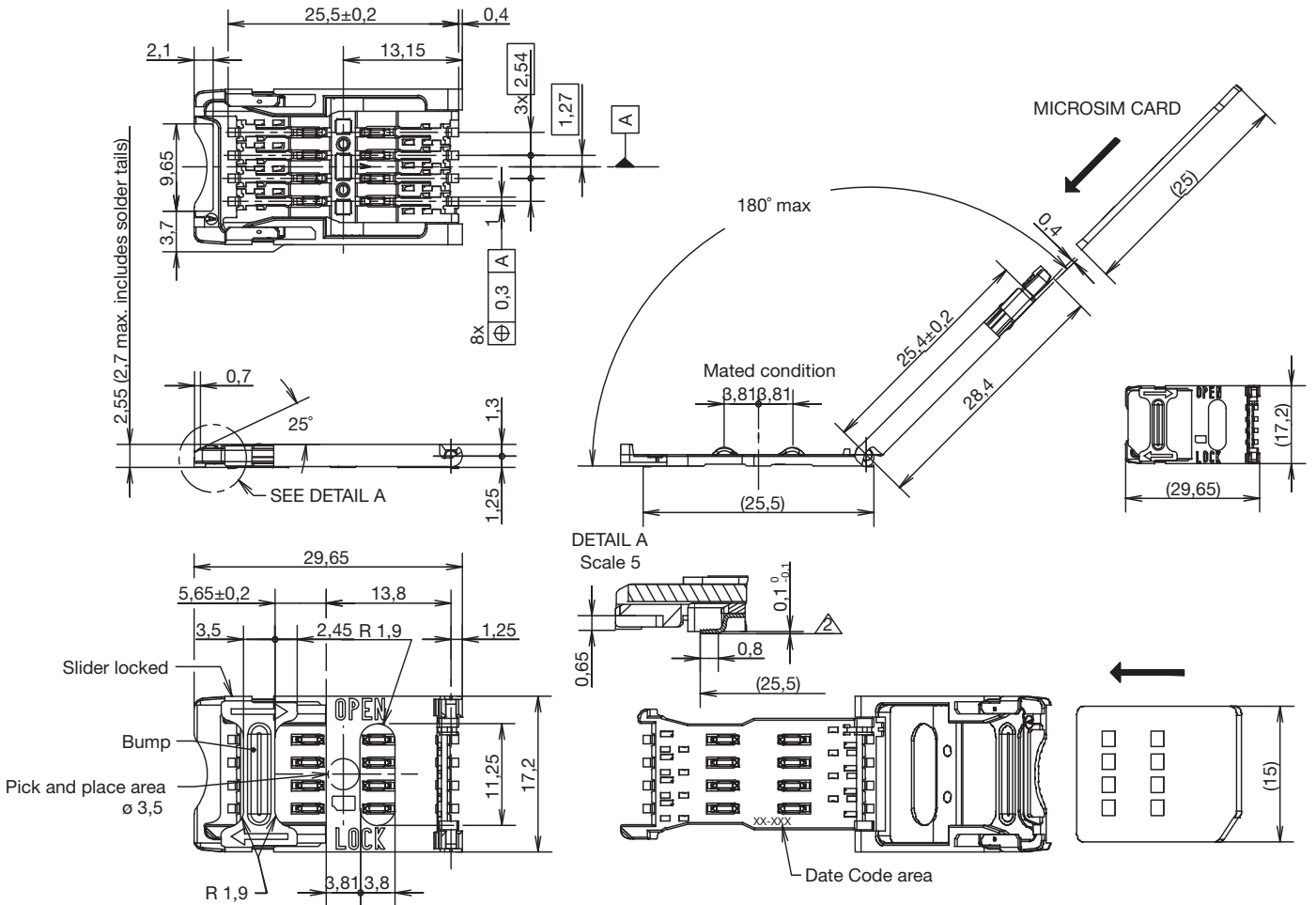
[www.ck-components.com](http://www.ck-components.com)

SIM/SAM

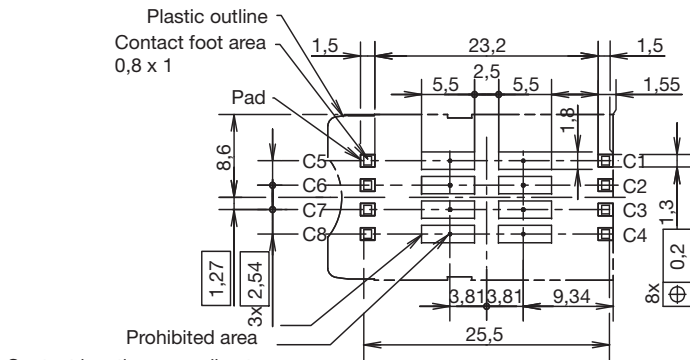


# CCM03 MK2 Series

## CCM03-3011 LFT



RECOMMENDED PC BOARD LAYOUT  
(Component side)



Contact location according to  
ENV1375-1 & GSM11-11



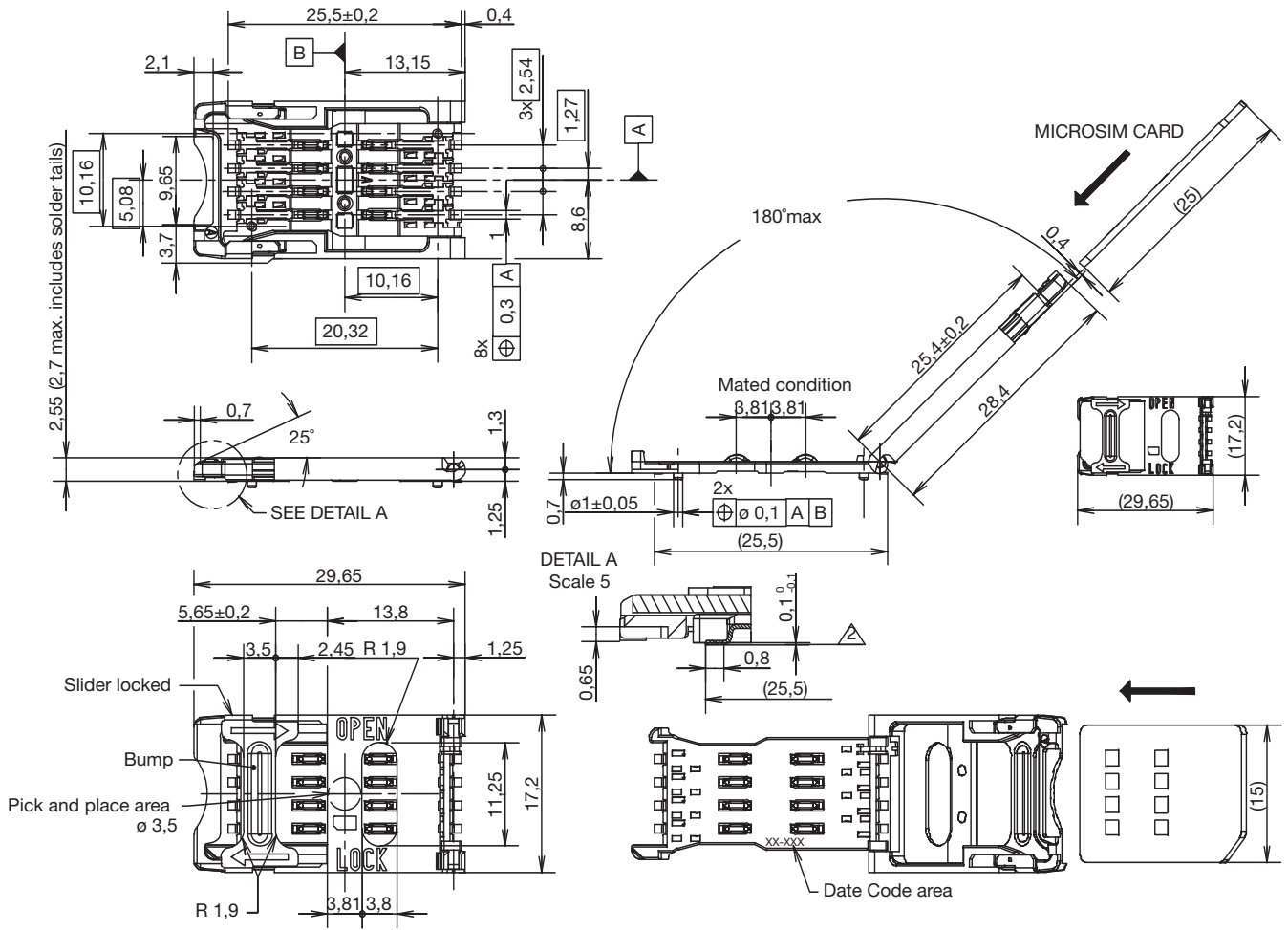
Dimensions are shown in mm  
Specifications and dimensions subject to change

www.ck-components.com

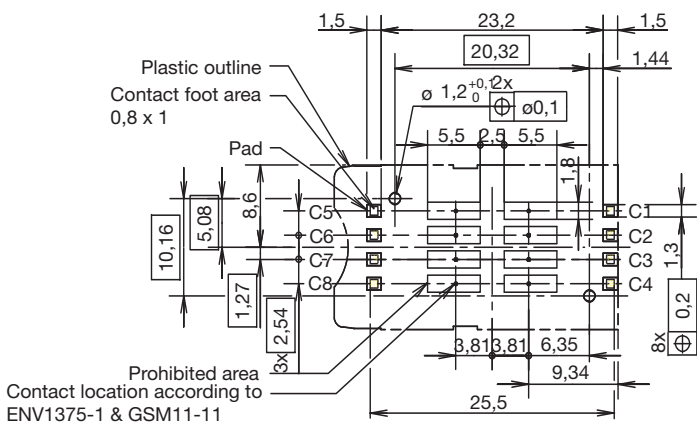
# CCM03 MK2 Series

CCM03-3012 LFT

SIM/SAM



RECOMMENDED PC BOARD LAYOUT  
(Component side)

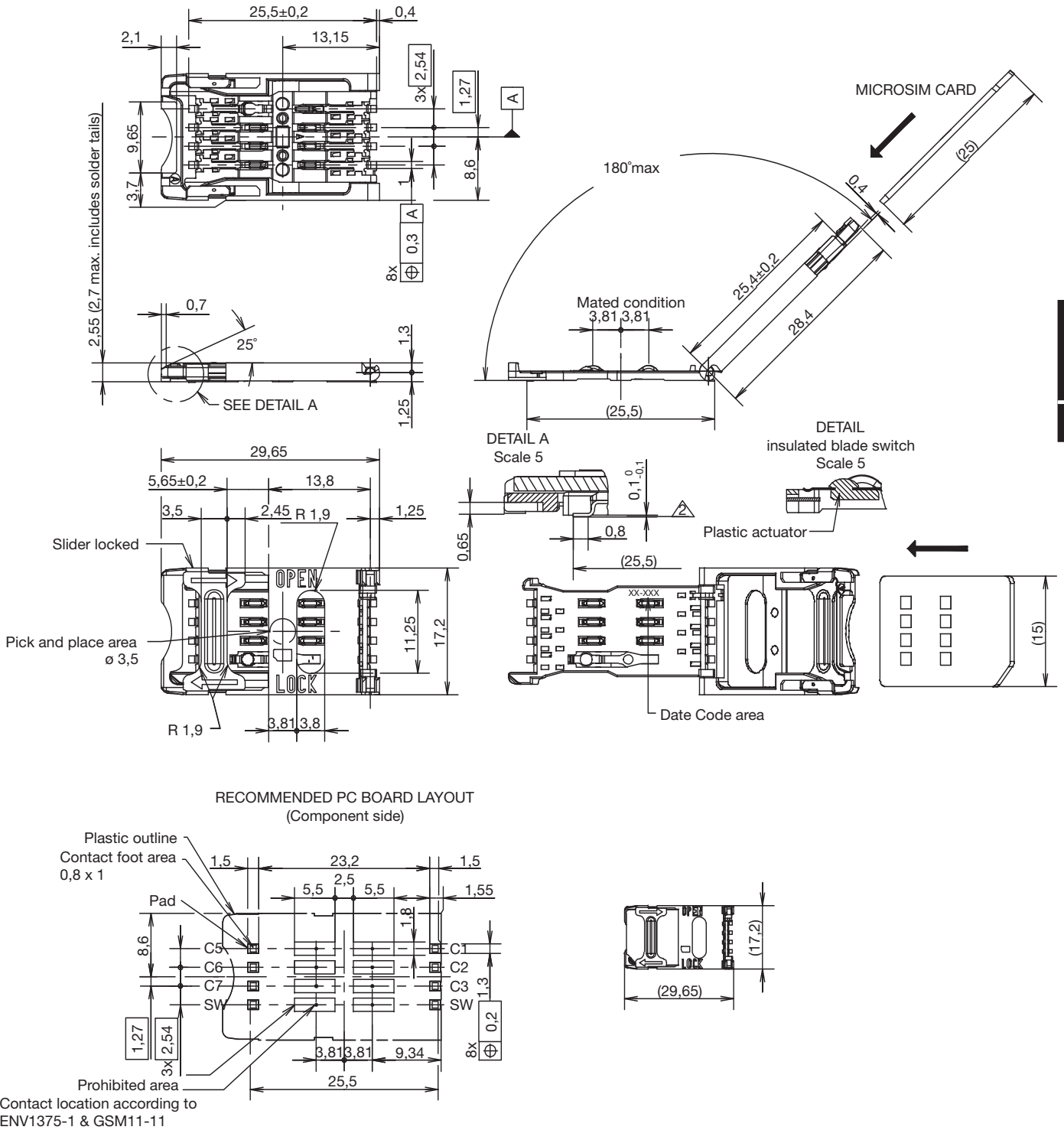


Dimensions are shown in mm  
Specifications and dimensions subject to change



# CCM03 MK2 Series

## CCM03-3013 LFT



SIM/SAM



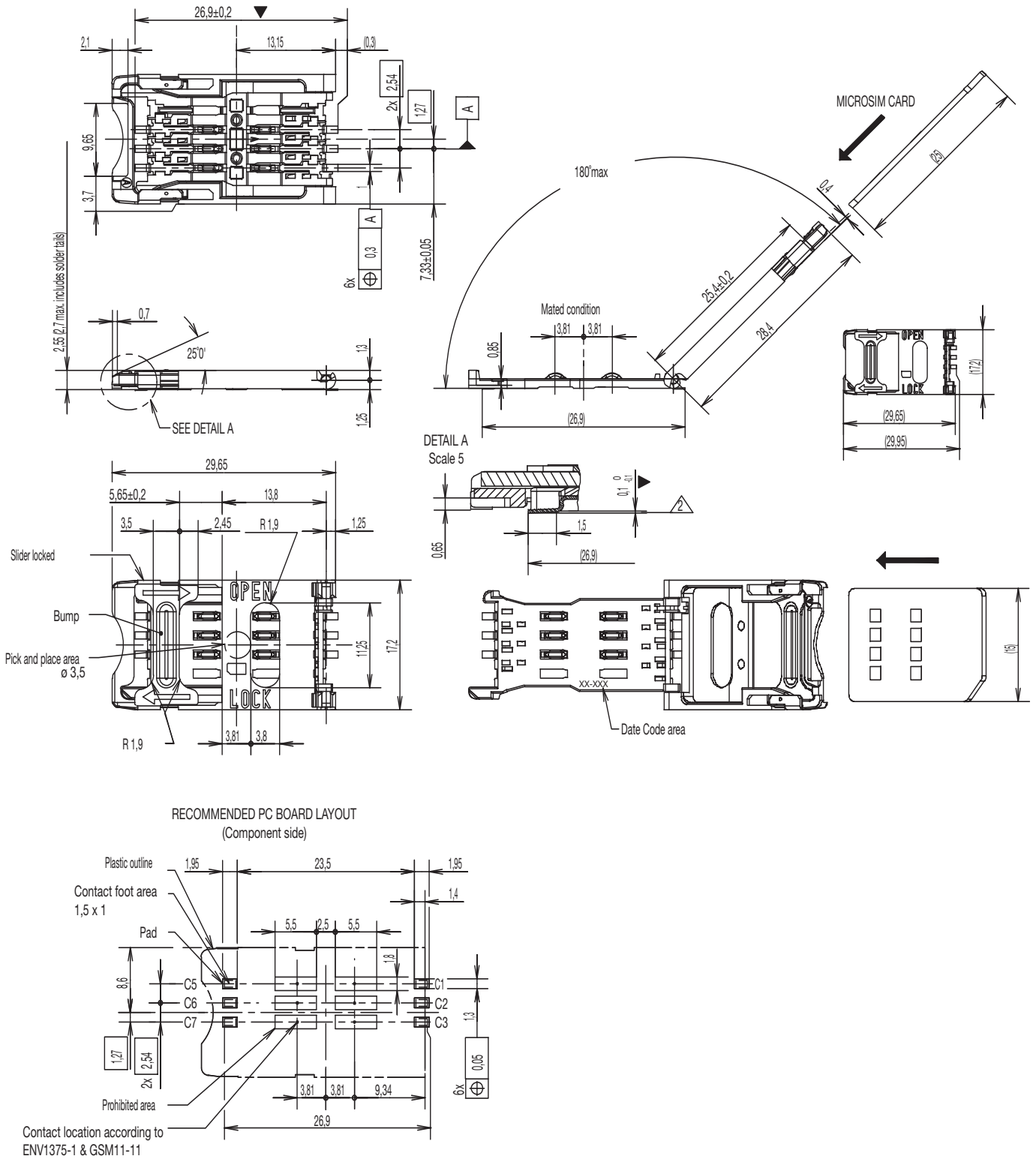
Dimensions are shown in mm  
 Specifications and dimensions subject to change

www.ck-components.com

# CCM03 MK2 Series

CCM03-3512 LFT

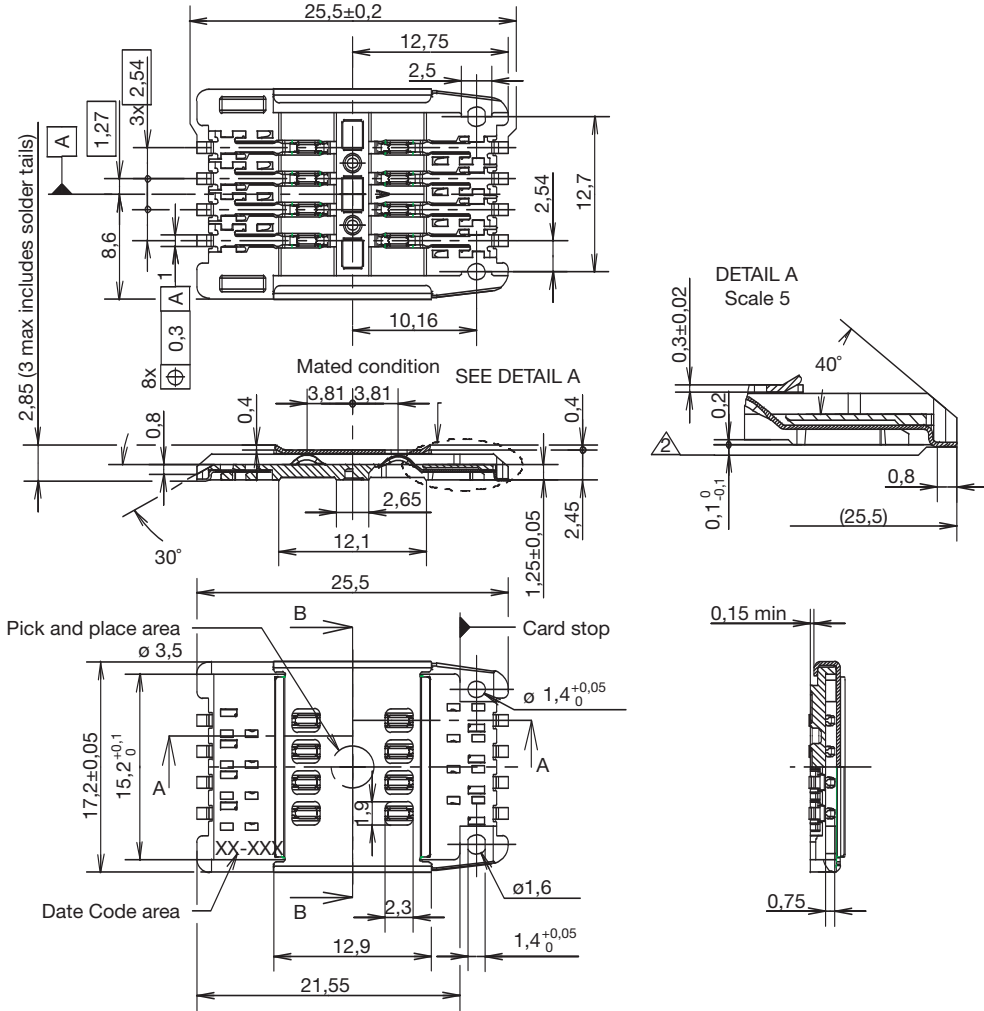
SIM/SAM



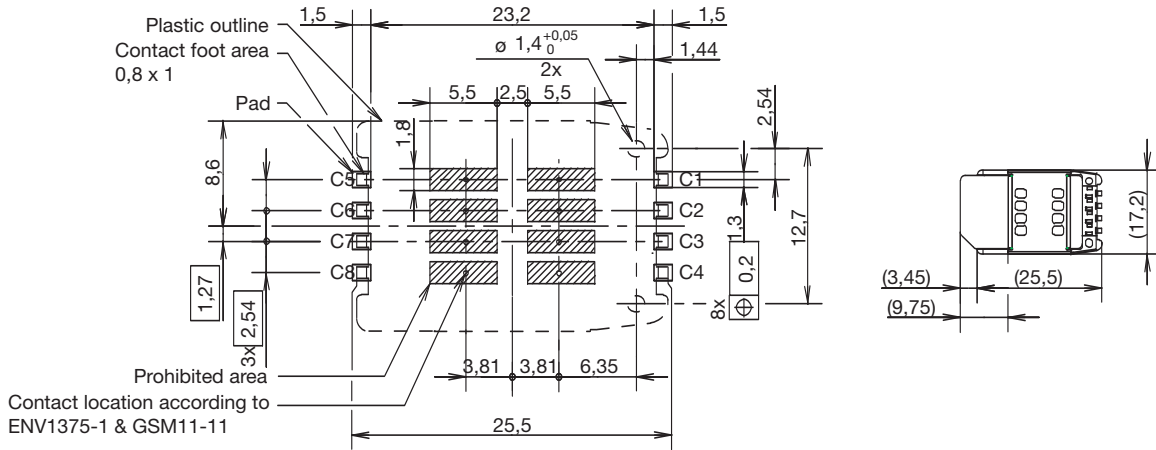
Dimensions are shown in mm  
Specifications and dimensions subject to change

www.ck-components.com





RECOMMENDED PC BOARD LAYOUT  
(Component side)



SIM/SAM



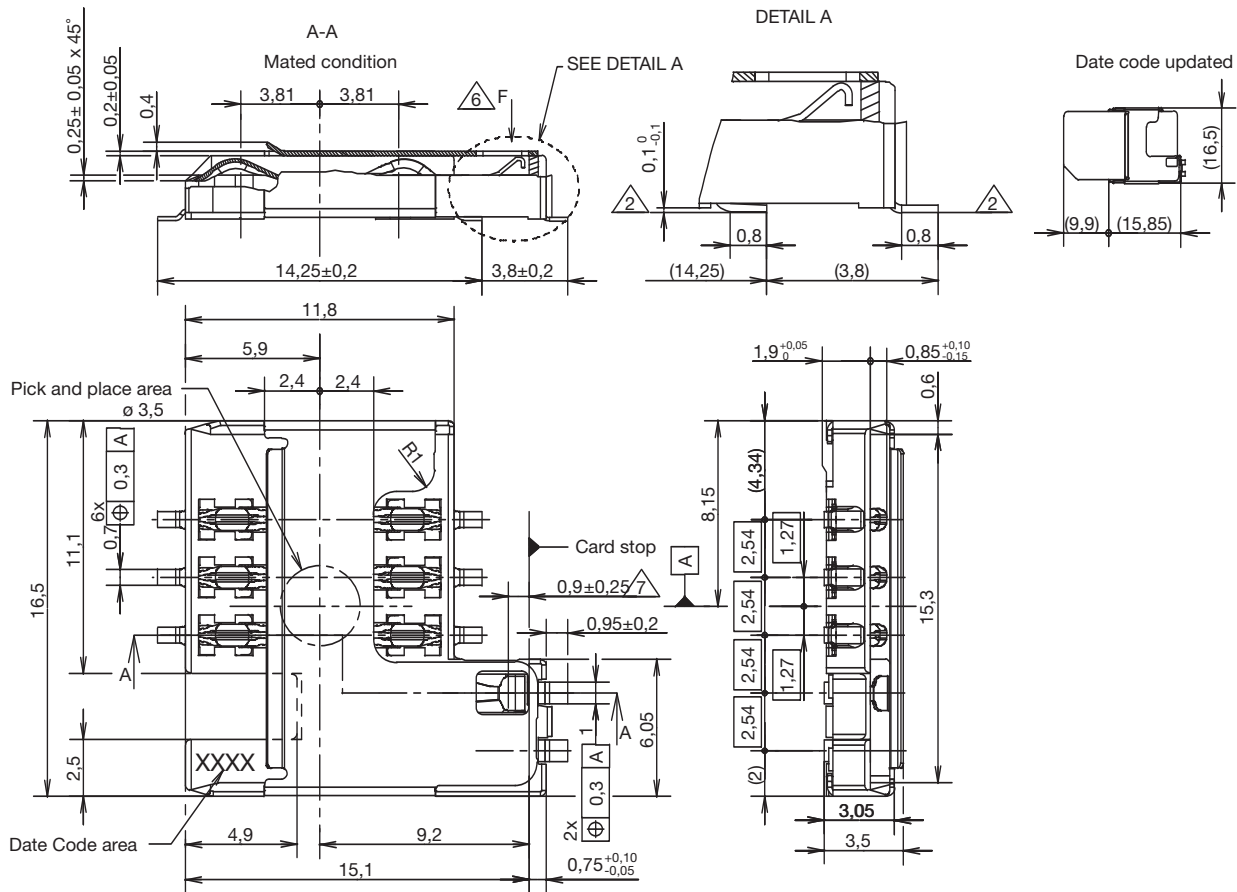
First Angle  
Projection

Dimensions are shown in mm  
Specifications and dimensions subject to change

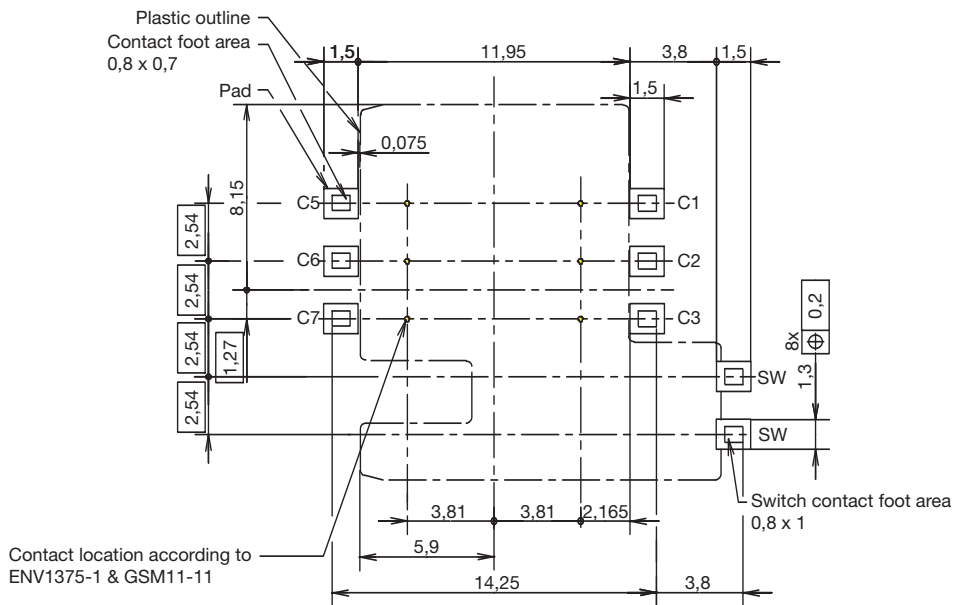
[www.ck-components.com](http://www.ck-components.com)

# CCM03 MK2 Series

## CCM03-3754 LFT



RECOMMENDED PC BOARD LAYOUT  
(Component side)



Dimensions are shown in mm  
Specifications and dimensions subject to change

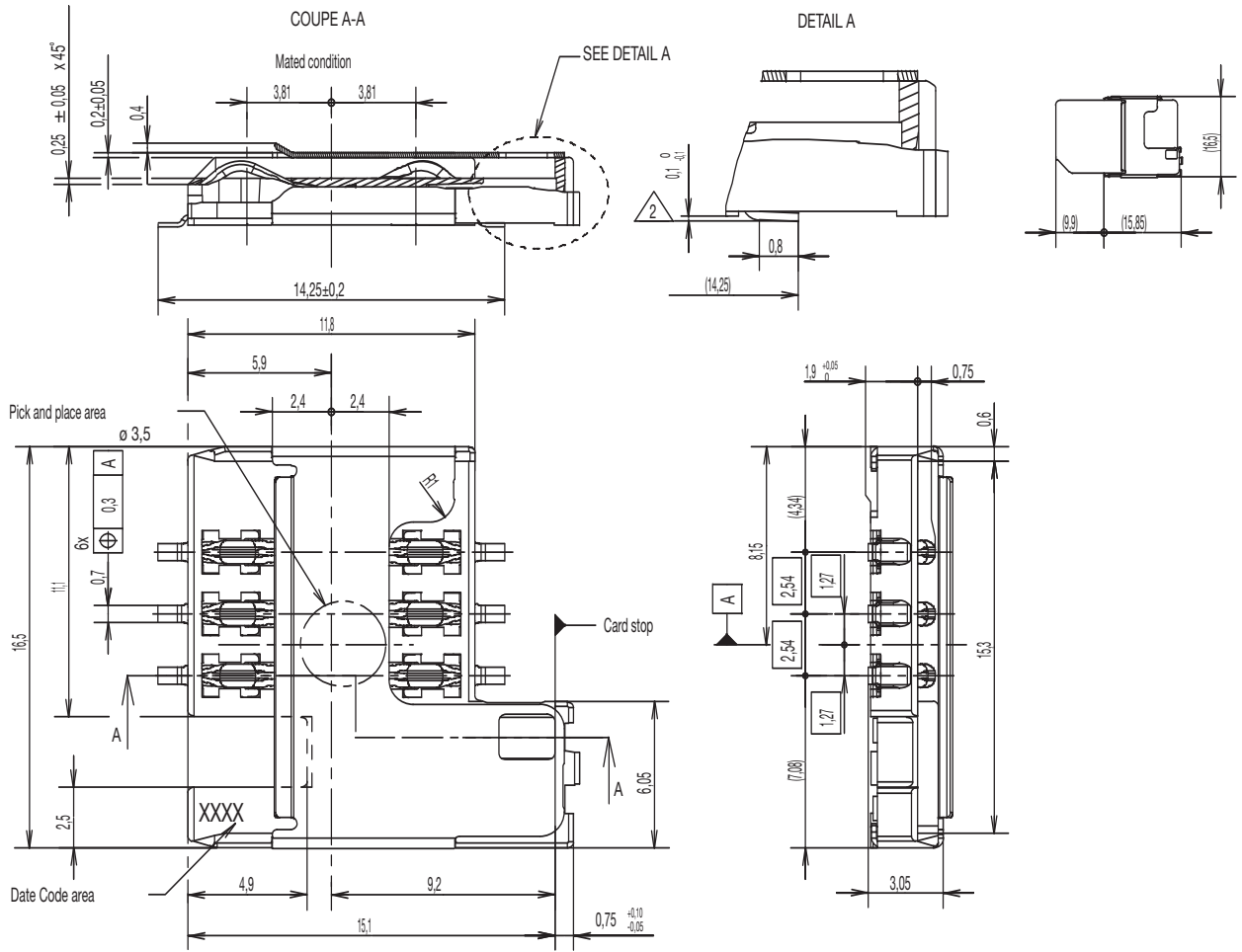
[www.ck-components.com](http://www.ck-components.com)

SIM/SAM

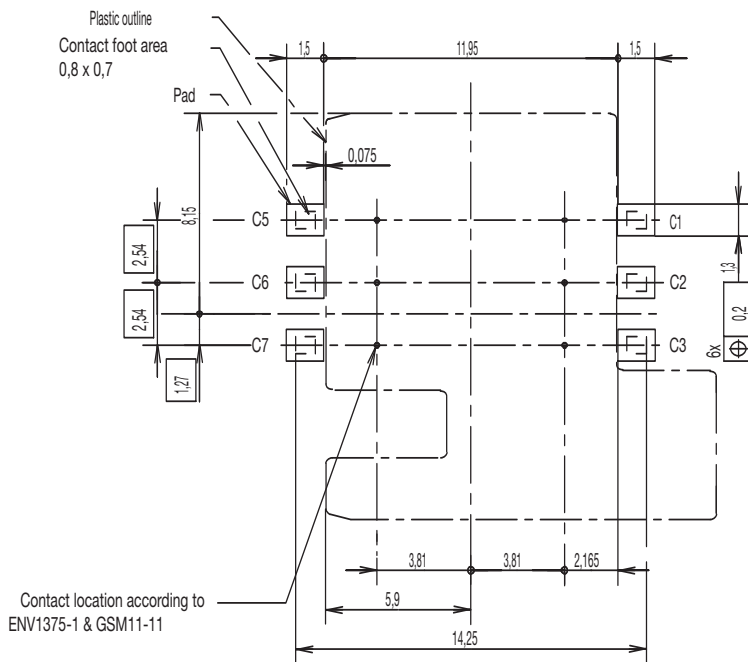


# CCM03 MK2 Series

## CCM03-3760 LFT



RECOMMENDED PC BOARD LAYOUT  
 (Component side)



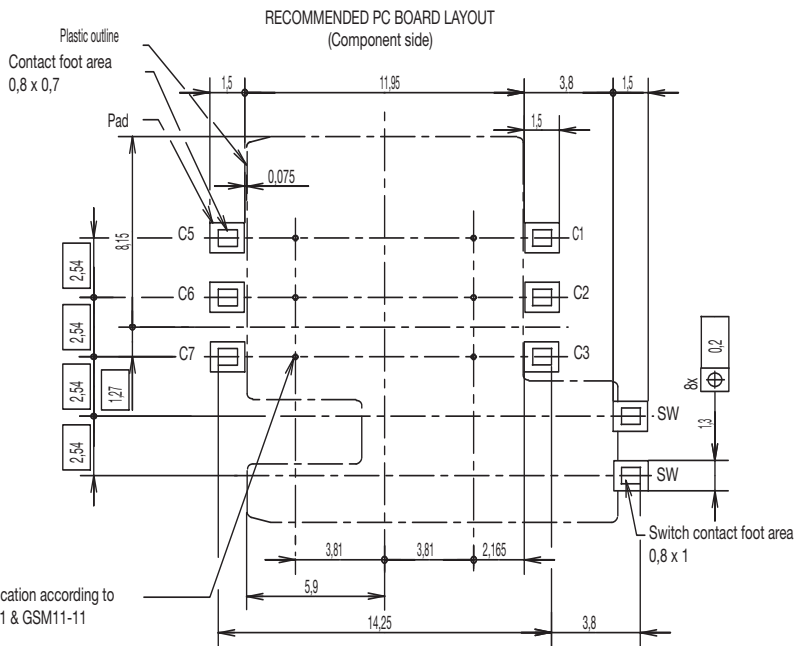
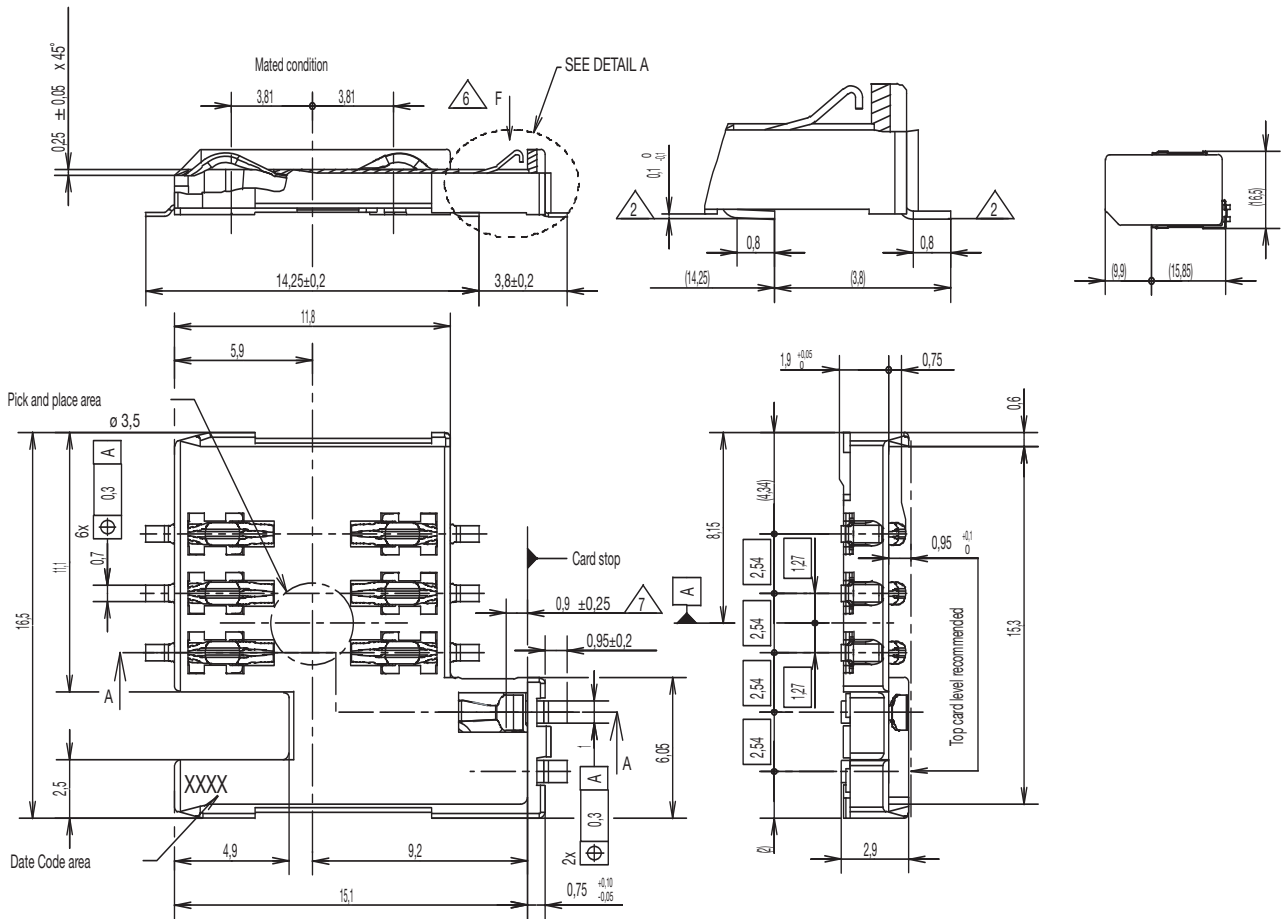
Dimensions are shown in mm  
 Specifications and dimensions subject to change

www.ck-components.com



# CCM03 MK2 Series

CCM03-3764 LFT



Contact location according to ENV1375-1 & GSM11-11



Dimensions are shown in mm  
Specifications and dimensions subject to change

www.ck-components.com

SIM/SAM



# CCM04 MK3 Series



## Features

- SIM and SAM card acceptance
- Compatible with pick and place and lead free soldering

## Typical Applications

- Mobile
- POS
- Identification
- GPS

## Mechanical

Number of contacts	6 or 8
Mechanical life	30,000 cycles
Card insertion force	10N max
Card extraction force	1N min / 10N max
Contact force	0,35N min to 0,65N
Vibration Frequency	10 to 500 Hz. Acceleration 50m/s <sup>2</sup> Duration 6 hours - amplitude 0,35mm
Shock	Peak value 500 m/s <sup>2</sup> – Duration 11 ms 3 shocks in each direction of each axis
Max elect. discontinuity	1µs

## Packaging

See table below

## Soldering Process

Compatible with lead free SMT soldering process

## Contact Electrical Data

Insulation resistance	1000 MΩ min
Contact resistance max	100 mΩ max
Switching current	10 µA min / 1 A max
Dielectric strength	750 Vrms min

## Environmental Data

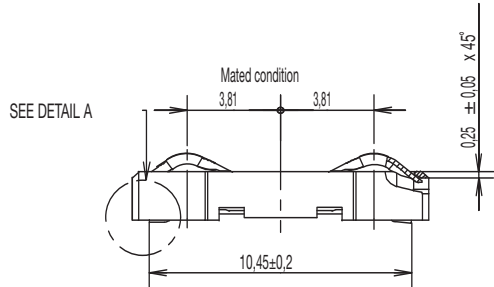
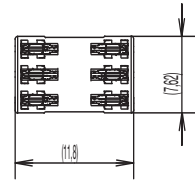
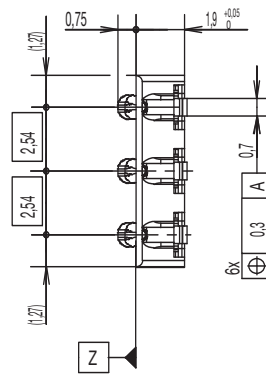
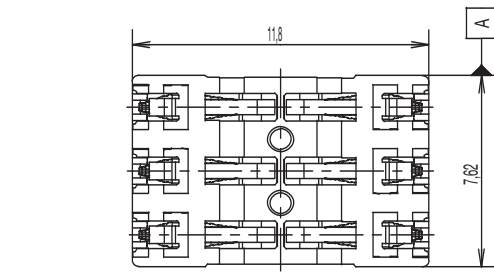
Operating temperature	-40°C to +85°C
Salt mist	IEC 512 test number 11f (96 hours)
Damp heat	IEC 512 test number 11c (10 days)
RoHS compliant	

SIM/SAM

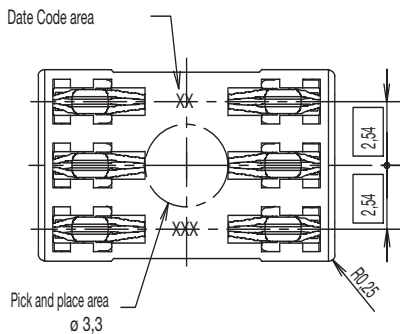
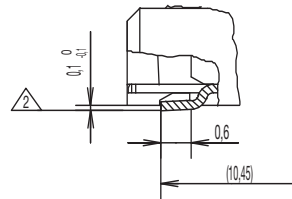
Designation	# of Contacts	Contact Plating	PCB Version	Height (mm)	Dim. (mm)	Packaging
CCM04-5137LFS	6	gold	SMT IN	1,9	8,15 X 10,45	reels of 1,900 pcs

# CCM04 MK3 Series

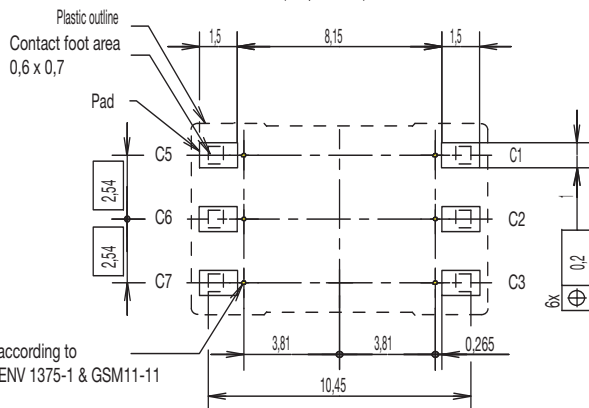
CCM04-5137 LFS



DETAIL A  
Scale 10



RECOMMENDED PC BOARD LAYOUT  
(Component side)



Contact location according to  
ISO 7816-2 & ENV 1375-1 & GSM11-11



First Angle  
Projection

Dimensions are shown in mm  
Specifications and dimensions subject to change

[www.ck-components.com](http://www.ck-components.com)

SIM/SAM



# Tactile Switches



## Product Selection Guide





<b>Surface Mount</b>							
<b>Series</b>	<b>KXT</b>	<b>KMT2</b>	<b>KMT0</b>	<b>KMR2-4</b>	<b>KMS</b>	<b>PTS525</b>	<b>PTS530</b>
<b>Size on PCB L x W (mm)</b>	2 x 3	3 x 2,6	3 x 2,6	4,2 x 2,8	4,2 x 3,55	5,2 x 5,2	4,5 x 4,5
<b>Total Height (mm)</b>	0,58	0,65	0,65	1,9 2,5	1,42	0,8 and 1,5	0,55 and 0,65
<b>Travel (mm)</b>	0,13	0,15	0,15	0,2 to 0,35	0,25 to 0,3	0,3	0,2
<b>Actuation Force (N)</b>	100 gf 180gf 240 gf	1,0 1,6	1,0; 1,6 2,3; 3,4	1,2; 2,0 3,0; 4,0	2,0 3,0	1,6 2,6	1,0; 1,6; 2,0; 2,6; 4,0; 6,0
<b>Contact Type</b>	Silver	Silver	Silver	Silver / Gold	Silver / Gold	Silver	Silver
<b>Max. Voltage (V)</b>	12	32	32	32	32	32	12
<b>Max. Switching Power (VA)</b>	0,5	0,5	0,5	1 / 0,2	1 / 0,2	1	-
<b>Life Cycles</b>	300,000	150,000	300,000/600,000 1,000,000	100,000 300,000	100,000	100,000	150,000 to 1,000,000
<b>IP Rating</b>	IP64	IP54	IP68	IP40	IP40	IP40	-
<b>Page Number</b>	B-5	B-7	B-9	B-11/B-13	B-15	B-17	B-21
<b>Surface Mount</b>							
<b>Series</b>	<b>PTS540</b>	<b>PTS810</b>	<b>PTS820</b>	<b>PTS840</b>	<b>KSR</b>	<b>KSS</b>	<b>KSC4V2</b>
<b>Size on PCB L x W (mm)</b>	3,7 x 3,7	4,2 x 3,2	3,9 x 2,9	3,5 x 3,55	7,15 x 3,8 7,3 x 3,8	5,5 x 4,4	2 holes ø 1,1 2 pads 1,5 x 0,8
<b>Total Height (mm)</b>	0,55 / 0,65	2,5	1,5/2,0/2,5	1,35	2,5	1,7	5,0*
<b>Travel (mm)</b>	0,15	0,15/0,2	0,2	0,2	0,3 to 0,5	0,3	0,7*
<b>Actuation Force (N)</b>	160 gf 230 gf	1,6; 2,6; 4,0; 6,0	1,6 2,5	1,6 2,2	1,2; 2,0; 3,0; 4,5	2 2,5 4	3.5*
<b>Contact Type</b>	Silver	Silver	Silver	Silver	Silver / Gold	Silver / Gold	Silver / Gold
<b>Max. Voltage (V)</b>	12	16	12	12	32	32	32
<b>Max. Switching Power (VA)</b>	-	-	-	-	1 / 0,2	1 / 0,2	1 / 0,2
<b>Life Cycles</b>	300,000 500,000	50,000 to 150,000	100,000 200,000	100,000	100,000 200,000	100,000	300,000
<b>IP Rating</b>	IP40	IP40	IP40	IP40	IP50	IP40	IP67
<b>Page Number</b>	B-23	B-25	B-27	B-30	B-33	B-37	B-51

\* Other options available by request

Dimensions are shown: mm  
Specifications and dimensions subject to change

# Tactile Switches Product Selection Guide

<b>SMT, Thru-hole Sealed High Performance</b>							
<b>Series</b>	<b>KSC 1 - 10</b>		<b>KSE</b>		<b>KT</b>	<b>K5AT</b>	<b>K8</b>
<b>Footprint</b>	J 6,8 x 6,2	G 10 x 6,2	6,8 x 6,2		SA 7,5x5    SA2 7,5x7	G 8,4 x 10,8	G 8,4 x 10,8
<b>Total Height (mm)</b>			3,1 / 4,3		6,6 7,11 with tab	6,1	6
<b>Travel (mm)</b>	0,20 to 0,75 *		0,3		0,3 to 0,5	0,5	0,45
<b>Actuation Force (N)</b>	1,1 to 5,5 *		1,5 2,25		3	4	2,5 4,0
<b>Contact Type</b>	Silver / Gold		Silver		Silver / Gold	Gold	Silver / Gold
<b>Max. Voltage (V)</b>	32		32		50	32	32
<b>Max. Switching Power (VA)</b>	1 / 0.2		1		1 / 0.2	1	1 / 0.2
<b>Life Cycles</b>	100,000 to 1,000,000		300,000		100,000	25,000	300,000
<b>IP Rating</b>	IP67		IP67			IP40	IP40
<b>Page Number</b>	B-39		B-53		B-56	B-61	B-63

<b>Thru-hole</b>							
<b>Series</b>	<b>K5V</b>	<b>KSF/KSI</b>	<b>KSA</b>	<b>KSA MKII</b>	<b>KSA-V</b>	<b>KSL</b>	<b>KSL-V</b>
<b>Footprint</b>	8 x 9 x 17 / 9 x 13	7,62 x 5,08	7,62 x 5,08	7,62 x 5,08	7,62 x 2,54	7,62 x 5,08	7,62 x 2,54
<b>Total Height (mm)</b>	9 / 13	2,6	4,7 button option	4,7	8	9,9	8
<b>Travel (mm)</b>	1,2	0,3 to 0,5	0,3 to 0,5	0,3 to 0,5	0,3 to 0,5	0,3 to 0,5	0,3 to 0,5
<b>Actuation Force (N)</b>	4.0	1.3 3.0    1.6 5.0	1.3 3.0 5.0	1.3 3.0 5.0	1.3 3.0 5.0	1,3 3,0	1,3 3,0
<b>Contact Type</b>	Gold	Silver / Gold	Silver / Gold	Silver / Gold	Silver / Gold	Silver / Gold	Silver / Gold
<b>Max. Voltage (V)</b>	32	32	32	32	32	32	32
<b>Max. Switching Power (VA)</b>	1	1 / 0.2	1 / 0.2	1 / 0.2	1 / 0.2	1 / 0.2	1 / 0.2
<b>Life Cycles</b>	25,000	100,000	100,000	100,000 1,000,000	100,000	100,000	100,000
<b>IP Rating</b>	IP40	IP60	IP60	IP67	IP60	IP60	IP60
<b>Page Number</b>	B-66	B-70	B-72	B-77	B-72	B-72	B-72

\* Other options available by request

# Tactile Switches

## Product Selection Guide

Thru-hole						
Series	KSJ	KSJ-V	PTS635	PTS635-V	PTS641	PTS645
Footprint	7,62 x 5,08	7,62 x 2,54	6 x 3,5	7,0 x 2,5	6,3 x 6,4	6 x 6
Total Height (mm)	6,65	8	2,5 4,3 5,0	4,3	2,5 3,1 3,4	4,3; 5,0; 7,0; 9,5;
Travel (mm)	0,55 to 0,7	0,55 to 0,7	0,25	0,25	0,20 / 0,30	0,25
Actuation Force (N)	2,0 3,0	2,0 3,0	1,3 2,0 2,6	1,3 2,0	160 gf 250 gf 320 gf	1,3; 1,6 2,0; 2,6
Contact Type	Silver Gold	Silver Gold	Silver	Silver	Silver	Silver
Max. Voltage (V)	32 32	32 32	12	12	12	12
Life Cycles	100,000 30,000	100,000 30,000	20,000	20,000	100,000	100,000
IP Rating	IP60	IP60	IP40	IP40	IP40	IP40
Page Number	B-79	B-79	B-81	B-81	B-84	B-86

Thru-hole						
Series	PTS645-V	PTS125	ITS	KSH		
Footprint	7,0 x 2,5	12 x 12	variety of sizes available	6,3 x 6,3		
Total Height (mm)	7,1	4,3 7,3 Sq. 8,5 12,0		5,0		
Travel (mm)	0,25	0,30	0,25	1,3		
Actuation Force (N)	1,3; 1,6 2,0; 2,6	1,6 2,6	160 gf	1,6; 2,0; 2,5 3,0; 3,5		
Contact Type	Silver	Silver	Silver	Silver		
Max. Voltage (V)	12	12	12	12		
Life Cycles	100,000	200,000	50,000	200,000		
IP Rating	IP40	IP40	IP40	IP40		
Page Number	B-91	B-93	B-97	B-105		

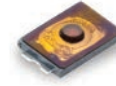
# KXT Series Ultra Low Profile Top Actuated

## Features

- 3.0 x 2.0 mm footprint
- 0.58 mm thickness
- High number of cycle

## Typical Applications

- Wearable electronics
- In-Ear headphones, Earbuds
- Mobile Phones
- Portable Electronics
- Hearing Aids



B

Tactile Switches

## Specification

FUNCTION: momentary action  
 CONTACT ARRANGEMENT: 1 make contact = SPST, N.O.  
 TERMINALS: G type for SMT  
 TRAVEL: 0.13 mm ± 0.05 mm

## Mechanical

	Operating force gf	Operating Life
KXT 111 LHS	100 ± 30	300,000
KXT 121 LHS	180 ± 50	300,000
KXT 131 LHS	240 ± 70	300,000

## Electrical

MAXIMUM VOLTAGE: 12 VDC  
 MAXIMUM CURRENT DC: 50 mA  
 DIELECTRIC STRENGTH: 100 V AC (1mm)  
 CONTACT RESISTANCE: ≤ 500 mΩ  
 INSULATION RESISTANCE: ≥ 100 MΩ  
 BOUNCE TIME: ≤ 10 ms

## Environmental

OPERATING TEMPERATURE: -30°C to 85°C  
 STORAGE TEMPERATURE: -40°C to 90°C

## Process

SOLDERING: This component is suited to the following methods:  
 Infrared Reflow Soldering in accordance with IEC61760-1

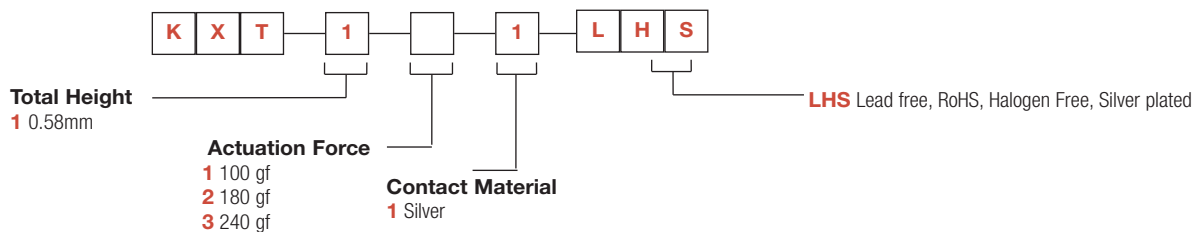
## Packaging

In reels of 17,000 pieces  
 Dimensions of reels according to EIA 481B  
 External diameter 330 mm

**NOTE:** Specifications listed above are for switches with standard options.  
 For information on specific and custom switches, consult Customer Service Center.

## Part Number Description

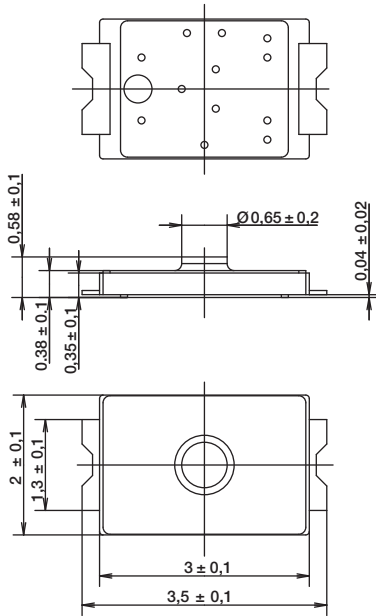
For any part number different from those listed above, please consult your local representative.



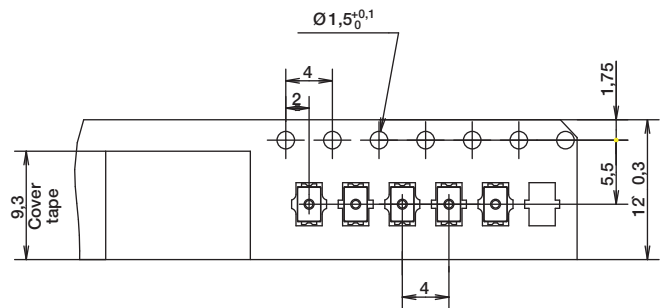
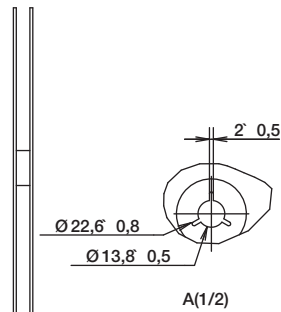
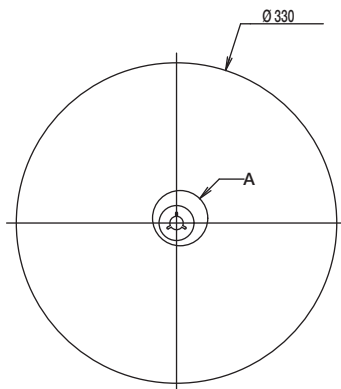
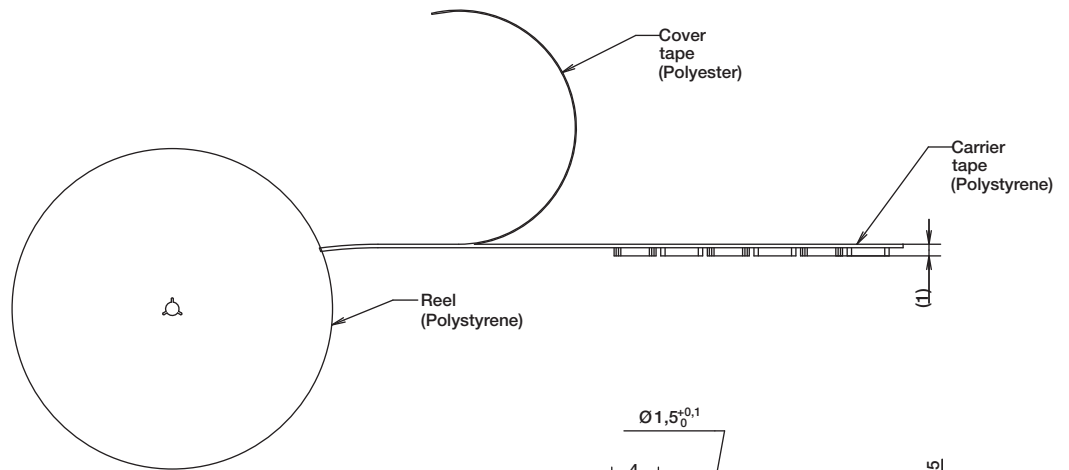
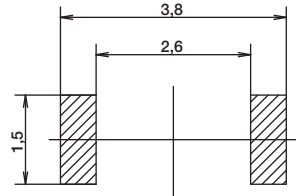
# KXT Series Ultra Low Profile Top Actuated

Tactile Switches

B



SCHEMATIC





# KMT2 Series Nano-Miniature SMT Top Actuated

## Features

- **Smallest footprint**
- **High number of cycles within the smallest packaging**
- **Smallest thickness with integrated actuator**
- **Ground pin option**
- **Halogen free**

## Typical Applications

- **Mobile Phones**
- **Hearing Aids**
- **MP3 accessories**
- **Bluetooth Headset**



B

Tactile Switches

## Specification

FUNCTION: momentary action  
CONTACT ARRANGEMENT: 1 make contact = SPST, N.O.  
TERMINALS: Gullwing type for SMT

## Mechanical

Type G and NG	Operating force Newtons (grams)	Operating Life	Tactile Feeling	Travel mm
KMT 211 HF LFS	1.0 (100) ± 0.25	150,000	≥ 10%	0.15 ± 0.1
KMT 221 HF LFS	1.6 (160) ± 0.40	150,000	≥ 30%	0.15 ± 0.1

## Electrical

	Silver
MAXIMUM POWER:	0.5 VA
MAXIMUM VOLTAGE:	32 VDC
MINIMUM VOLTAGE:	20 mV
MAXIMUM CURRENT DC:	50 mA
MINIMUM CURRENT DC:	1 mA
DIELECTRIC STRENGTH:	≥ 250 Vrms (1mn)
CONTACT RESISTANCE:	≤ 150 mΩ
INSULATION RESISTANCE:	≥ 50 MΩ
BOUNCE TIME:	≤ 6 ms

## Environmental

	Silver
OPERATING TEMPERATURE:	-40°C to 85°C
STORAGE TEMPERATURE:	-55°C (10 days) +85°C (4 days)

## Process

SOLDERING: This component is suited to the following methods:  
– Infrared Reflow Soldering in accordance with IEC61760-1

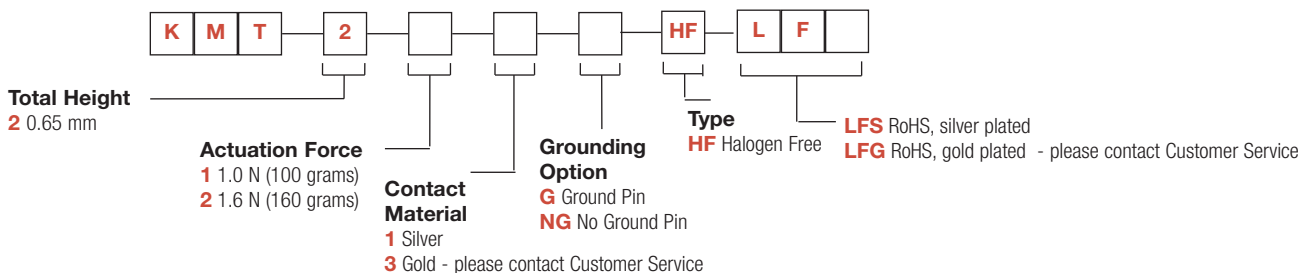
## Packaging

In reels of 4,000 pieces.  
Dimensions of reels according to EIA 481B  
External diameter 180 mm

**NOTE:** Specifications listed above are for switches with standard options.  
For information on specific and custom switches, consult Customer Service Center.

## Part Number Description

For any part number different from those listed above, please consult your local representative.

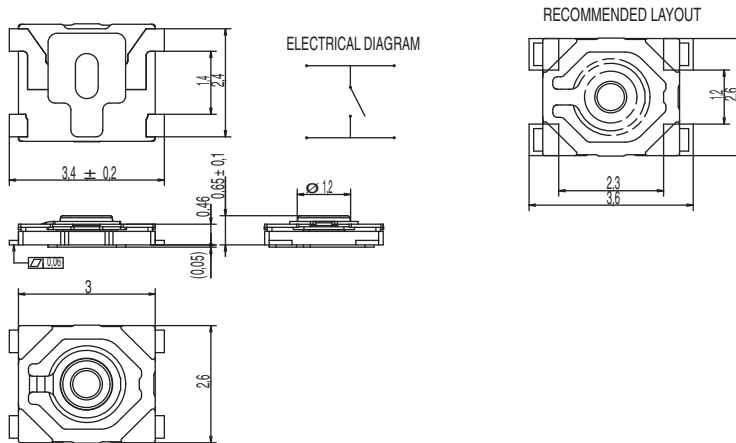


# KMT2 Series Nano-Miniature SMT Top Actuated

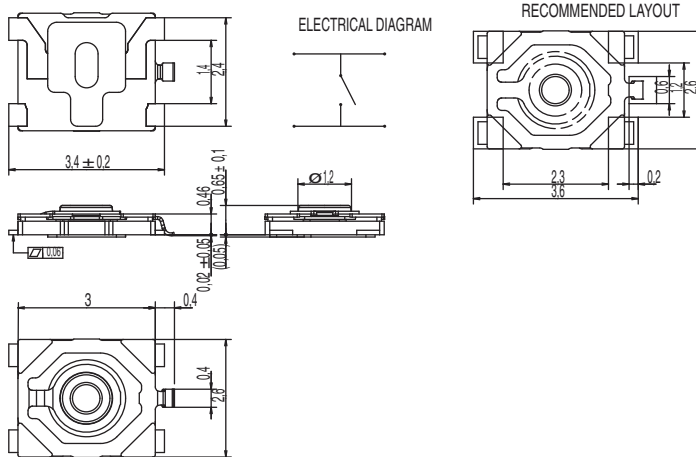
B

Tactile Switches

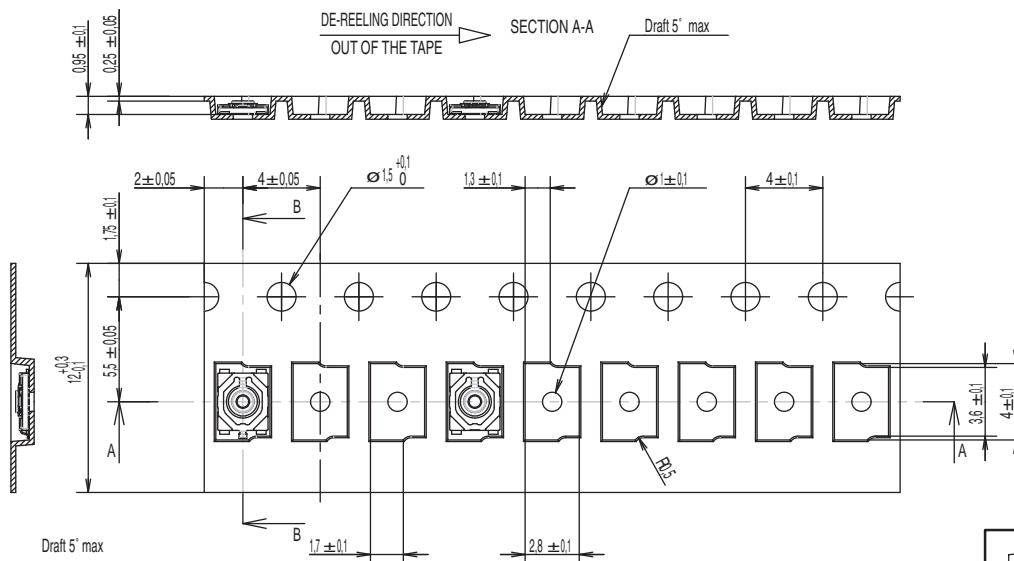
## KMT Series – No Ground Pin



## KMT Series – With Ground Pin



## TAPE & REEL



First Angle  
Projection

Dimensions are shown: mm  
Specifications and dimensions subject to change



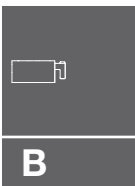
# KMT0 Series Nano-Miniature SMT Top Actuated

## Features

- **Smallest footprint**
- **Smallest thickness with integrated actuator**
- **Extended life cycles**
- **IP68**
- **Ultra low current capabilities**

## Typical Applications

- **Mobile Phones**
- **Hearing Aids**
- **MP3 accessories**
- **Bluetooth Headset**
- **Automotive keyless entry system**
- **Smoke and CO detectors**
- **E-readers**
- **Home automation remote controls**



Tactile Switches

## Specification

FUNCTION: momentary action, normally open  
CONTACT ARRANGEMENT: 1 make contact = SPST, N.O.  
TERMINALS: J lead type for SMT

## Mechanical

TRAVEL (mm): 0.15 ± 0.1

	Operating force Newtons (grams)	Tactile Feeling	Operating Life
KMT011NGJLHS	1.0 (100) ± 25%	≥ 10%	300,000
KMT021NGJLHS	1.6 (160) ± 25%	≥ 30%	300,000
KMT071NGJLHS	2.3 (230) ± 25%	≥ 30%	300,000
KMT031NGJLHS	3.4 (340) ± 25%	≥ 30%	300,000

	Operating force Newtons (grams)	Tactile Feeling	Operating Life
KMT012NGJLHS	1.0 (100) ± 25%	≥ 10%	1,000,000
KMT022NGJLHS	1.6 (160) ± 25%	≥ 30%	600,000
KMT072NGJLHS	2.3 (230) ± 25%	≥ 30%	600,000

## Electrical

MAXIMUM POWER:	0.5 VA
MAXIMUM VOLTAGE:	32 VDC
MINIMUM VOLTAGE:	20 mV
MAXIMUM CURRENT DC:	50 mA
MINIMUM CURRENT DC:	1 mA
DIELECTRIC STRENGTH:	≥ 250 Vrms (1mn)
CONTACT RESISTANCE:	≤ 150 mΩ
INSULATION RESISTANCE:	≥ 50 MΩ
BOUNCE TIME:	≤ 6 ms

## Environmental

OPERATING TEMPERATURE: -40°C to 85°C  
STORAGE TEMPERATURE: -55°C (10 days) +85°C (4 days)

## Process

SOLDERING: This component is suited to the following methods:  
– Infrared Reflow Soldering in accordance with IEC61760-1

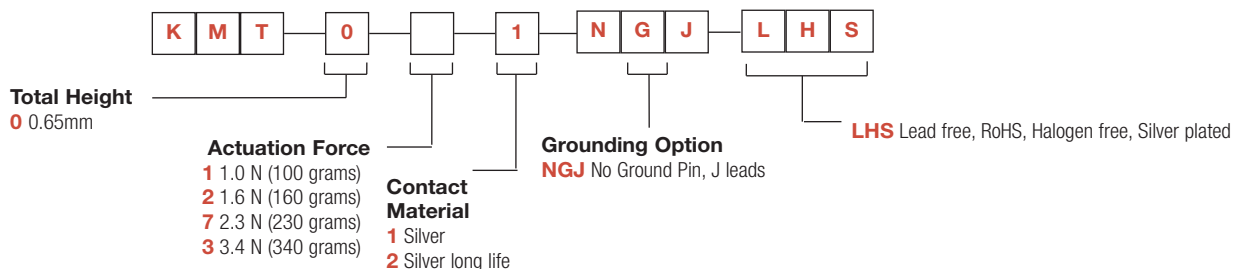
## Packaging

In reels of 5,000 pieces.  
Dimensions of reels according to EIA 481B  
External diameter 180 mm

**NOTE:** Specifications listed above are for switches with standard options.  
For information on specific and custom switches, consult Customer Service Center.

## Part Number Description

For any part number different from those listed above, please consult your local representative.

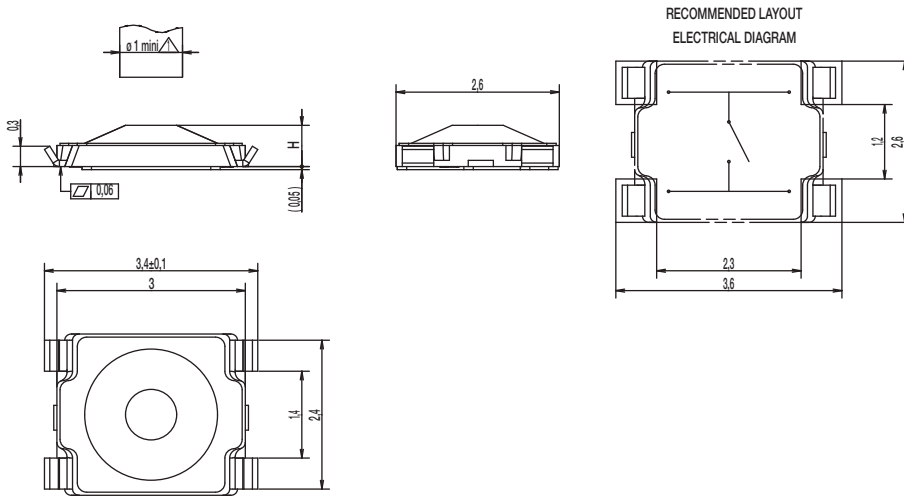


# KMT0 Series Nano-Miniature SMT Top Actuated

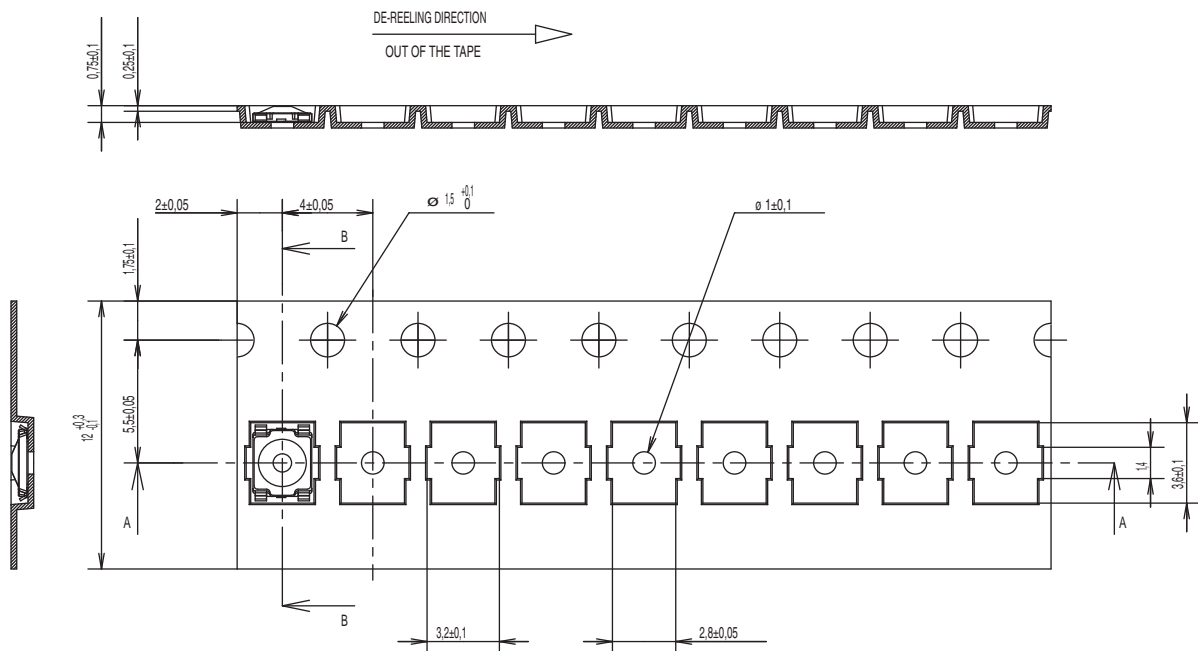
Minimum actuator diameter is 1.0 mm. It is recommended to enlarge this diameter to a full flat surface covering the switch.

Tactile Switches

B



## TAPE & REEL



Dimensions are shown: mm  
Specifications and dimensions subject to change

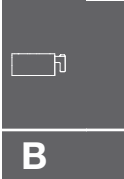
# KMR 2 Series Microminiature SMT Top Actuated

## Features/Benefits

- Small footprint
- 4 actuation forces
- Excellent tactile feel
- Ultra low current capabilities
- IP40

## Typical Applications

- Automotive
- Industrial electronics
- Medical equipment



Tactile Switches

## Specification

FUNCTION: momentary action  
CONTACT ARRANGEMENT: 1 make contact = SPST, N.O.  
TERMINALS: Gullwing type for SMT

## Mechanical

Type G and NG See description below	Operating force N (grs)	Operating life (cycles)	Travel (mm)
KMR211 LFS	1.2 (120) ± 0.30	200,000	0.20 mm ± 0.1
KMR211 ULC LFS	1.2 (120) ± 0.30	200,000	0.20 mm ± 0.1
KMR213 LFG	1.2 (120) ± 0.30	200,000	0.20 mm ± 0.1
KMR213 ULC LFG	1.2 (120) ± 0.30	200,000	0.20 mm ± 0.1
KMR221 LFS	2.0 (200) ± 0.50	200,000	0.25 mm ± 0.1
KMR221 ULC LFS	2.0 (200) ± 0.50	200,000	0.25 mm ± 0.1
KMR223 LFG	2.0 (200) ± 0.50	200,000	0.25 mm ± 0.1
KMR223 ULC LFG	2.0 (200) ± 0.50	200,000	0.25 mm ± 0.1
KMR231 LFS	3.0 (300) ± 0.75	150,000	0.25 mm ± 0.1
KMR231 ULC LFS	3.0 (300) ± 0.75	150,000	0.25 mm ± 0.1
KMR232 LFS	3.0 (300) ± 0.75	300,000	0.25 mm ± 0.1
KMR232 ULC LFS	3.0 (300) ± 0.75	300,000	0.25 mm ± 0.1
KMR233 LFG	3.0 (300) ± 0.75	150,000	0.25 mm ± 0.1
KMR233 ULC LFG	3.0 (300) ± 0.75	150,000	0.25 mm ± 0.1
KMR241 LFS	4.0 (400) ± 1.00	100,000	0.30 mm ± 0.1
KMR241 ULC LFS	4.0 (400) ± 1.00	100,000	0.30 mm ± 0.1
KMR242 LFS	4.0 (400) ± 1.00	200,000	0.30 mm ± 0.1
KMR242 ULC LFS	4.0 (400) ± 1.00	200,000	0.30 mm ± 0.1
KMR243 LFG	4.0 (400) ± 1.00	100,000	0.30 mm ± 0.1
KMR243 ULC LFG	4.0 (400) ± 1.00	100,000	0.30 mm ± 0.1

## Electrical

	Silver	Gold
MAXIMUM POWER:	1 VA	0.2 VA
MAXIMUM VOLTAGE:	32 VDC	32 VDC
MINIMUM VOLTAGE:	20 mVDC	20 mVDC
MAXIMUM CURRENT:	50 mA	10 mA
MINIMUM CURRENT:	1 mA*	1 mA*
DIELECTRIC STRENGTH:	≥ 250 Vrms	
CONTACT RESISTANCE:	≤ 100 mΩ	
INSULATION RESISTANCE:	≥ 1GΩ	
BOUNCE TIME:	≤ 3 ms	

\*For ULC version minimum current is 1µA at 1.8 VDC

## Environmental

	Silver	Gold
OPERATING TEMPERATURE:	-40°C to 85°C	-40°C to 125°C
STORAGE TEMPERATURE:	-55°C to 85°C	-55°C to 125°C

## Process

Infrared Reflow Soldering in accordance with IEC61760-1

## Packaging

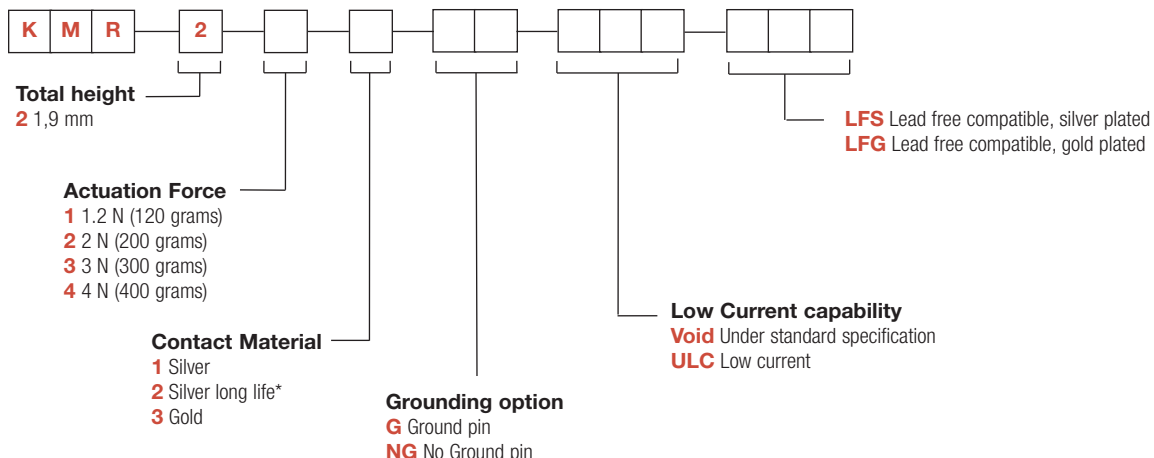
In reels of 7,000 pieces  
External diameter 330 mm ± 2 mm

**NOTE:** Specifications listed above are for switches with standard options.  
For information on specific and custom switches, consult Customer Service Center.

TACTILE FEELING: KMR 2 series with actuation force in 2N - 3N - 4N: ≥ 30%  
KMR 2 series with actuation force in 1.2N: ≥ 20%

## Part Number Description

For any part number different from those listed above, please consult your local representative.



\* Silver long life is available in 3N and 4N actuation force. For other versions, please contact Customer Service.



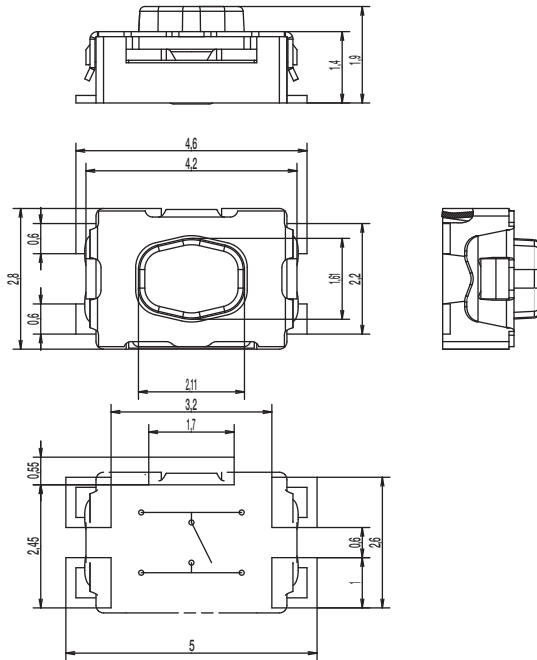
# KMR 2 Series Microminiature Tact Switch for SMT

KMR 2 Series - 1.9 mm height

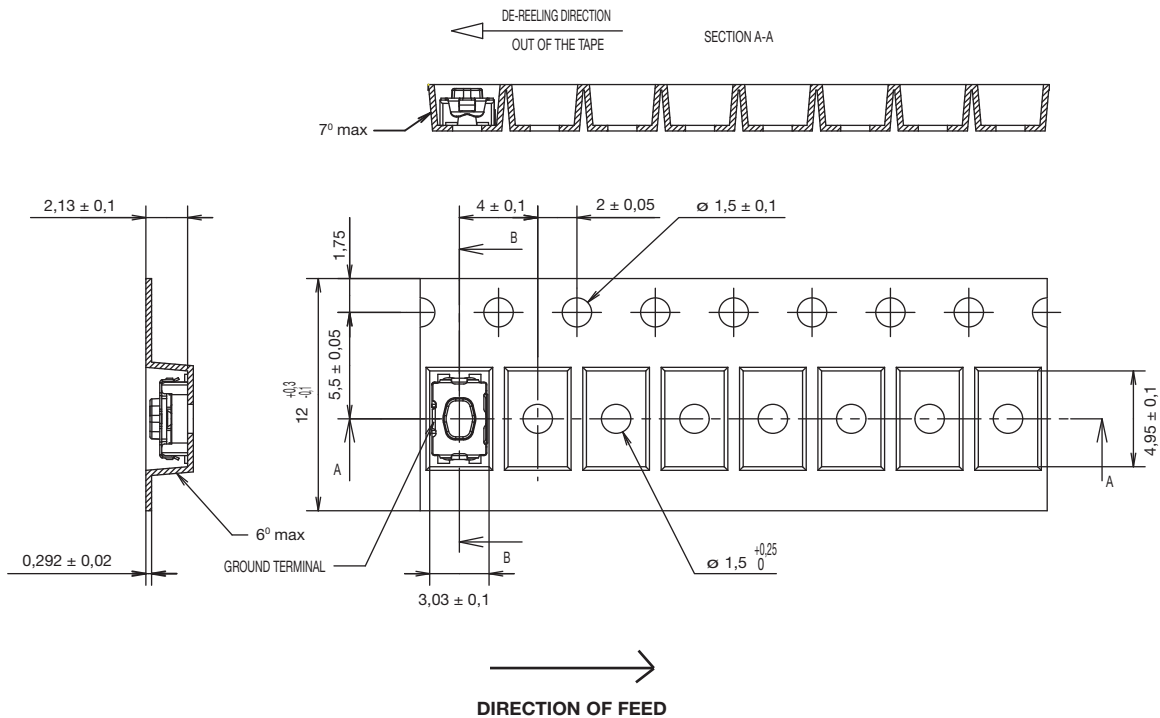
PCB layout shown with ground pin option

B

Tactile Switches



## TAPE & REEL



First Angle  
Projection

Dimensions are shown: mm  
Specifications and dimensions subject to change

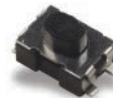
# KMR 4 Series Microminiature SMT Top Actuated

## Features/Benefits

- Small footprint
- 4 actuation forces
- Excellent tactile feel
- Ultra low current capabilities
- IP40

## Typical Applications

- Automotive
- Industrial electronics
- Medical equipment



B

Tactile Switches

## Specification

FUNCTION: momentary action  
CONTACT ARRANGEMENT: 1 make contact = SPST, N.O.  
TERMINALS: Gullwing type for SMT

## Mechanical

Type G and NG See description below	Operating force N (grs)	Operating life (cycles)	Travel (mm)
KMR411 LFS	1.2 (120) ± 0.30	100,000	0.20 mm ± 0.1
KMR411 ULC LFS	1.2 (120) ± 0.30	100,000	0.20 mm ± 0.1
KMR413 LFG	1.2 (120) ± 0.30	100,000	0.20 mm ± 0.1
KMR413 ULC LFG	1.2 (120) ± 0.30	100,000	0.20 mm ± 0.1
KMR421 LFS	2.0 (200) ± 0.50	100,000	0.25 mm ± 0.1
KMR421 ULC LFS	2.0 (200) ± 0.50	100,000	0.25 mm ± 0.1
KMR423 LFG	2.0 (200) ± 0.50	100,000	0.25 mm ± 0.1
KMR423 ULC LFG	2.0 (200) ± 0.50	100,000	0.25 mm ± 0.1
KMR431 LFS	3.0 (300) ± 0.75	100,000	0.25 mm ± 0.1
KMR431 ULC LFS	3.0 (300) ± 0.75	100,000	0.25 mm ± 0.1
KMR432 LFS	3.0 (300) ± 0.75	300,000	0.25 mm ± 0.1
KMR432ULC LFS	3.0 (300) ± 0.75	300,000	0.25 mm ± 0.1
KMR433 LFG	3.0 (300) ± 0.75	100,000	0.25 mm ± 0.1
KMR433ULC LFG	3.0 (300) ± 0.75	100,000	0.25 mm ± 0.1
KMR441 LFS	4.0 (400) ± 1.00	100,000	0.30 mm ± 0.1
KMR441 ULC LFS	4.0 (400) ± 1.00	100,000	0.30 mm ± 0.1
KMR442 LFS	4.0 (400) ± 1.00	200,000	0.30 mm ± 0.1
KMR442 ULC LFS	4.0 (400) ± 1.00	200,000	0.30 mm ± 0.1
KMR443 LFG	4.0 (400) ± 1.00	100,000	0.30 mm ± 0.1
KMR443 ULC LFG	4.0 (400) ± 1.00	100,000	0.30 mm ± 0.1

## Electrical

	Silver	Gold
MAXIMUM POWER:	1 VA	0.2 VA
MAXIMUM VOLTAGE:	32 VDC	32 VDC
MINIMUM VOLTAGE:	20 mVDC	20 mVDC
MAXIMUM CURRENT:	50 mA	10 mA
MINIMUM CURRENT:	1 mA*	1 mA*
DIELECTRIC STRENGTH:	≥ 250 Vrms	
CONTACT RESISTANCE:	≤ 100 mΩ	
INSULATION RESISTANCE:	≥ 1GΩ	
BOUNCE TIME:	≤ 3 ms	

\*For ULC version minimum current is 1µA at 1.8 VDC

## Environmental

	Silver	Gold
OPERATING TEMPERATURE:	-40°C to 85°C	-40°C to 125°C
STORAGE TEMPERATURE:	-55°C to 85°C	-55°C to 125°C

## Process

Infrared Reflow Soldering in accordance with IEC61760-1

## Packaging

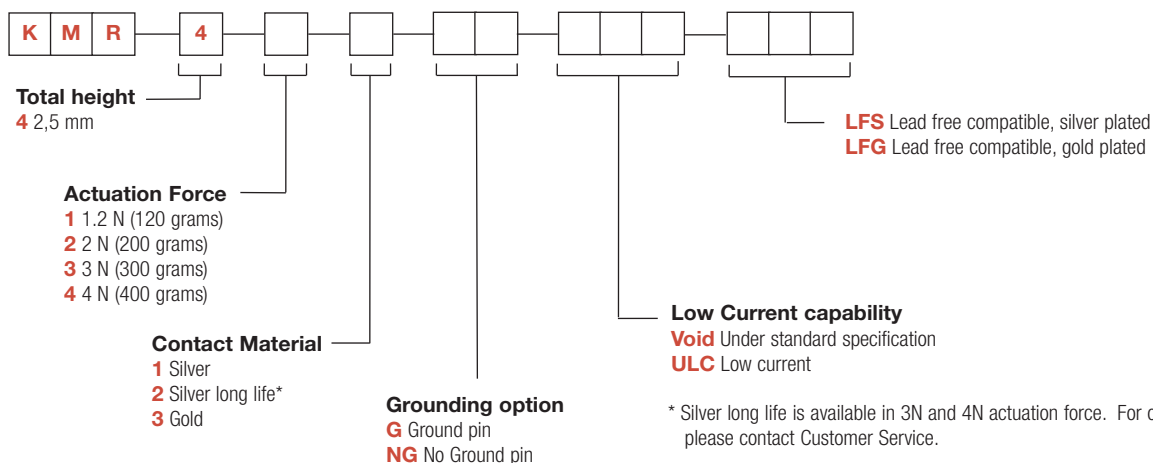
In reels of 6,000 pieces  
External diameter 330 mm ± 2 mm

**NOTE:** Specifications listed above are for switches with standard options.  
For information on specific and custom switches, consult Customer Service Center.

TACTILE FEELING: KMR 4 series with actuation force in 2N - 3N - 4N: ≥ 25%  
KMR 4 series with actuation force in 1.2N: ≥ 20%

## Part Number Description

For any part number different from those listed above, please consult your local representative.



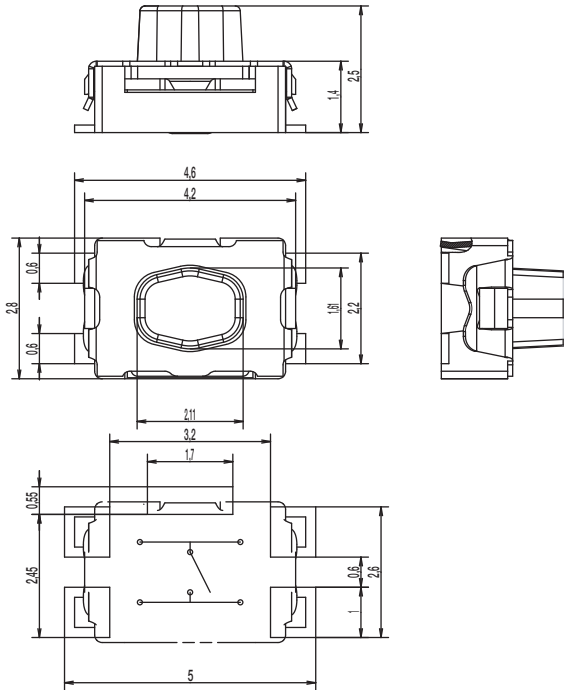
# KMR 4 Series Microminiature Tact Switch for SMT

KMR 4 Series - 2.5 mm height

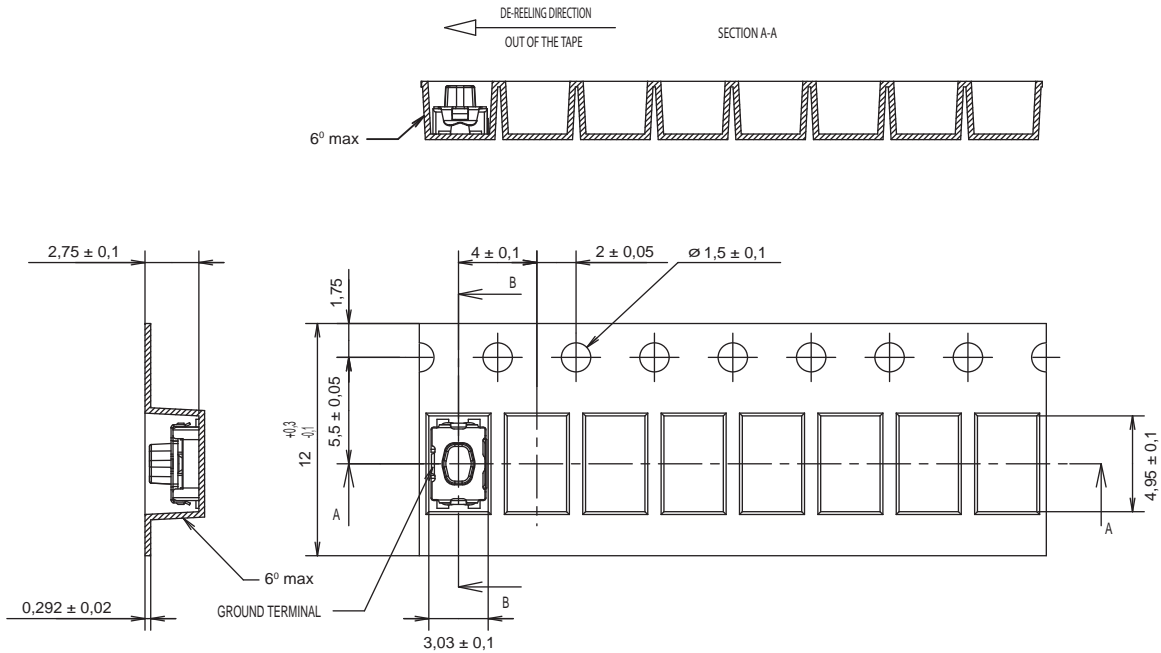
PCB layout shown with ground pin option

B

Tactile Switches



## TAPE & REEL



Dimensions are shown: mm  
Specifications and dimensions subject to change



# KMS Series Microminiature SMT Side Actuated

## Features/Benefits

- Compact size
- Excellent tactile feel
- ESD protection
- Positioning pegs for stability
- RoHS compliant and compatible

## Typical Applications

- Mobile phones
- Medical handheld monitors
- Consumer electronics
- Telecommunication networks



B

Tactile Switches

## Specification

FUNCTION: Momentary  
CONTACT ARRANGEMENT: SPST, N.O.  
TERMINALS: Gullwing type for SMT  
IP40 Sealed

## Mechanical

OVERLOAD: 20N  
TACTILE FEELING: 15% min. for the 2N version  
25% min for the 2.5N version

Type	Operating force Newtons (grams)	Operating life (operations)	Travel
KMS221G/GP	2N (200) ± 0.5	100 K cycles	0,25 ± 0,15
KMS223G/GP	2N (200) ± 0.5	100 K cycles	0,25 ± 0,15
KMS231G/GP	3N (300) ± 0.6	100 K cycles	0,3 ± 0,15
KMS233G/GP	3N (300) ± 0.6	100 K cycles	0,3 ± 0,15

**Note:** Specifications listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

## Packaging

Tape and reels in reels of 3,000 pieces.  
External diameter 330mm ± 2mm.

## Electrical

	Silver	Gold
MAXIMUM POWER:	1 VA	0.2 VA
MAXIMUM VOLTAGE:	32 VDC	32 VDC
MAXIMUM CURRENT DC:	50 mA	10 mA
MINIMUM CURRENT DC:	1 mA	1 mA
DIELECTRIC STRENGTH:	250 VDC	
CONTACT RESISTANCE:	≤100 mΩ	
INSULATION RESISTANCE:	10 <sup>9</sup> Ω	
BOUNCE TIME:	≤ 3 ms	

## Environmental

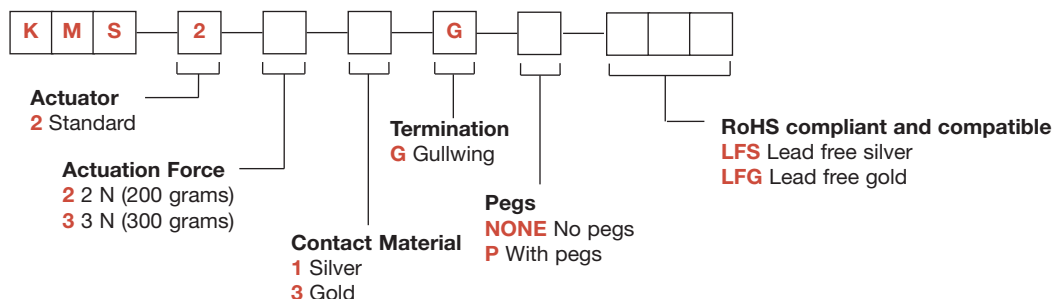
	Silver	Gold
OPERATING TEMPERATURE:	-40°C to 85°C	-40°C to 125°C
STORAGE TEMPERATURE:	-55°C to 85°C	-55°C to 125°C

## Process

Infrared reflow soldering in accordance with IEC 61760-1

## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

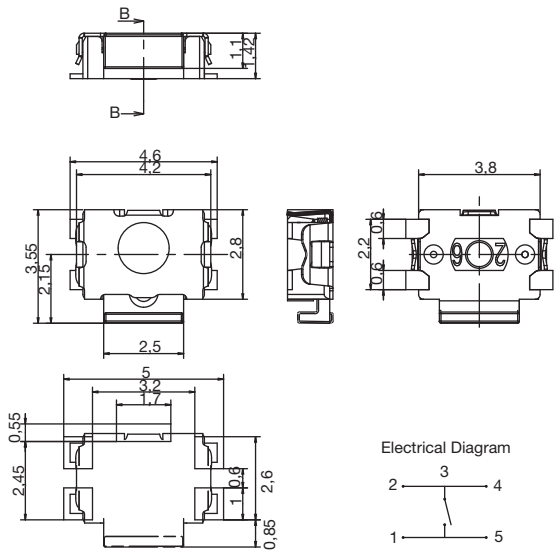


# KMS Series Microminiature SMT Side Actuated

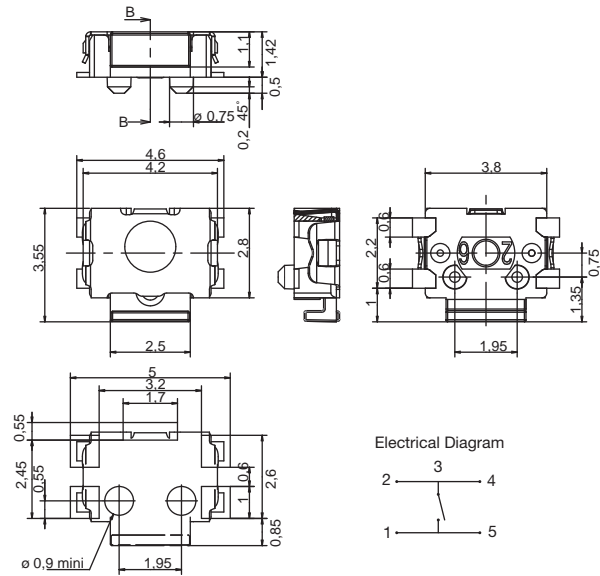
Tactile Switches

B

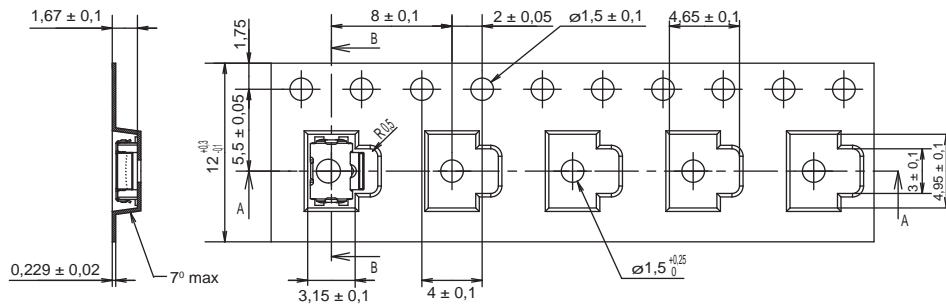
## KMS



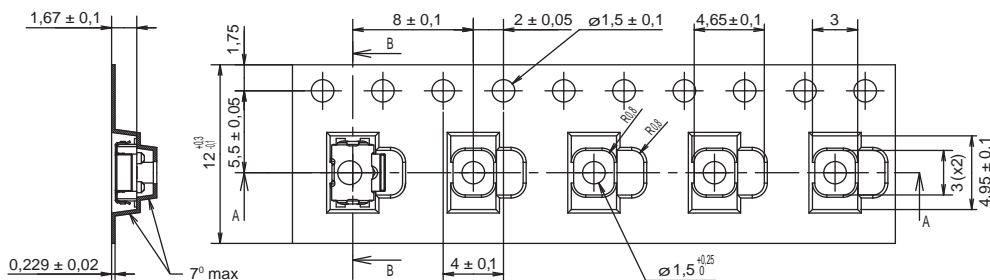
## KMS WITH PEGS



## TAPE & REEL



## WITH PEGS



→  
DIRECTION OF FEED



First Angle  
Projection

Dimensions are shown: mm  
Specifications and dimensions subject to change



# PTS 525 Series Microminiature Tact Switch for SMT

## Features/Benefits

- 0.8 & 1.5 mm actuator height
- Ruggedized package in a compact size
- High number of cycles

## Typical Applications

- Consumer products
- Instrumentation
- Remote controls



B

Tactile Switches

## Specification

FUNCTION: Momentary action  
CONTACT ARRANGEMENT: 1 make contact = SPST, N.O.

## Electrical

MAXIMUM VOLTAGE: 15 VDC  
MAXIMUM CURRENT DC: 20 mA  
DIELECTRIC STRENGTH: 250 VA C (1mn)  
CONTACT RESISTANCE:  $\leq 100 \text{ m}\Omega$   
INSULATION RESISTANCE:  $\geq 100 \text{ M}\Omega$   
BOUNCE TIME:  $\leq 10 \text{ ms}$

## Environmental

OPERATING TEMPERATURE:  $-20^\circ\text{C}$  to  $70^\circ\text{C}$

## Process

SOLDERING: This component is suited to the following methods:  
Infrared Reflow Soldering in accordance with IEC61760-1

## Packaging

Switches in reels of:  
5,000 pieces in 0.8 mm height  
4,000 pieces in 1.5 mm height  
Dimensions of reels according to EIA 481B  
External diameter 330 mm

**NOTE:** Specifications listed above are for switches with standard options.  
For information on specific and custom switches, consult Customer Service Center.

## How To Order

Please see chart below for full part numbers.

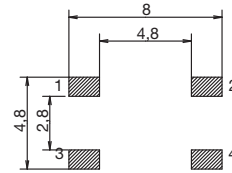
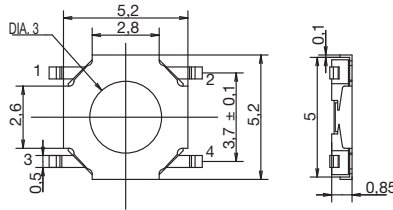
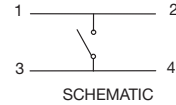
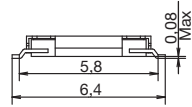
Part Number	Height (mm)	Leads Shape	Ground Pin	Force	Travel (mm)	Operating Life
PTS525 SM08 SMTR 2 LFS	0.8	G	No	160 gf $\pm$ 50 gf	0.25 $\pm$ 0.2	1,000,000
PTS525 SK08 SMTR 2 LFS	0.8	G	No	260 gf $\pm$ 50 gf	0.25 $\pm$ 0.2	200,000
PTS525 SM15 SMTR 2 LFS	1.5	G	No	160 gf $\pm$ 50 gf	0.25 $\pm$ 0.2	1,000,000
PTS525 SK15 SMTR 2 LFS	1.5	G	No	260 gf $\pm$ 50 gf	0.25 $\pm$ 0.2	500,000
PTS525 SMG15 SMTR 2 LFS	1.5	G	Yes	160 gf $\pm$ 50 gf	0.25 $\pm$ 0.2	1,000,000
PTS525 SKG15 SMTR 2 LFS	1.5	G	Yes	260 gf $\pm$ 50 gf	0.25 $\pm$ 0.2	500,000
PTS525 SMG15J SMTR 2 LFS	1.5	J	Yes	160 gf $\pm$ 50 gf	0.25 $\pm$ 0.2	1,000,000
PTS525 SKG15J SMTR 2 LFS	1.5	J	Yes	260 gf $\pm$ 50 gf	0.25 $\pm$ 0.2	500,000



Dimensions are shown: mm  
Specifications and dimensions subject to change

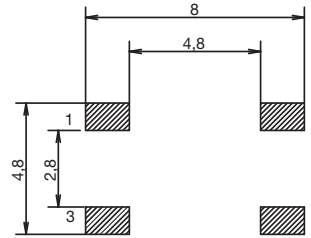
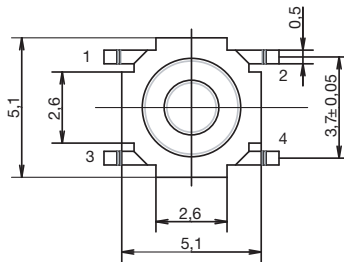
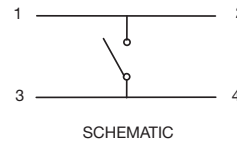
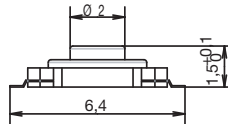
# PTS 525 Series Microminiature Tact Switch for SMT

**PTS525 SM08 SMTR2 LFS**  
**PTS525 SK08 SMTR2 LFS**



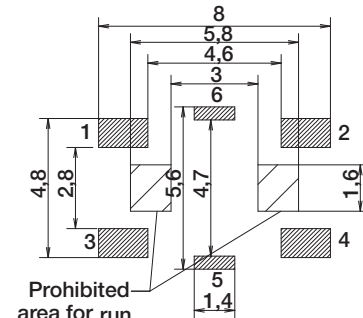
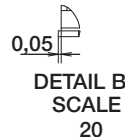
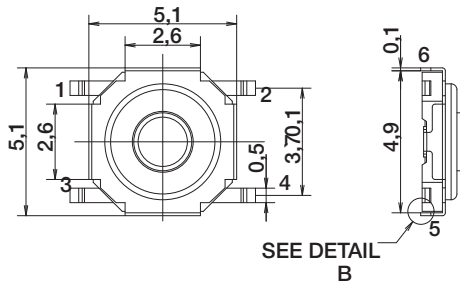
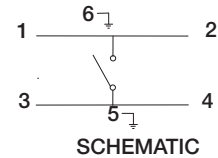
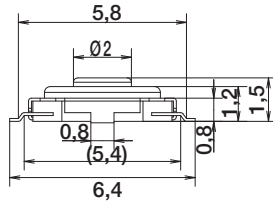
RECOMMENDED PCB LAYOUT

**PTS525 SM15 SMTR2 LFS**  
**PTS525 SK15 SMTR2 LFS**



RECOMMENDED PCB LAYOUT

**PTS525 SMG15 SMTR2 LFS**  
**PTS525 SKG15 SMTR2 LFS**



RECOMMENDED PCB LAYOUT

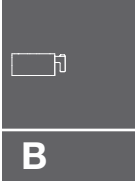
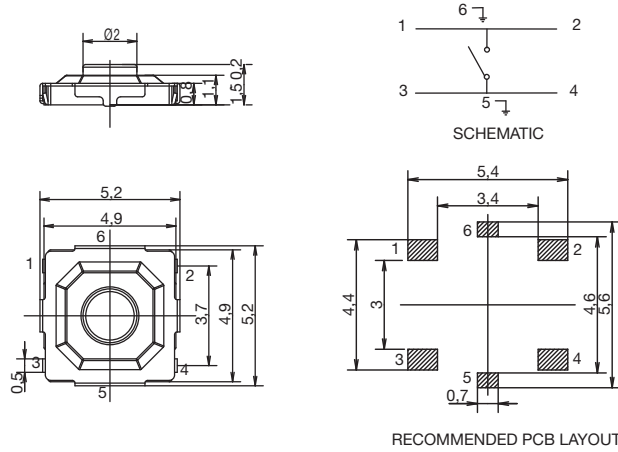
*Dimensions are shown: mm  
Specifications and dimensions subject to change*



B

# PTS 525 Series Microminiature Tact Switch for SMT

PTS525 SMG15J SMTR2 LFS  
PTS525 SKG15J SMTR2 LFS

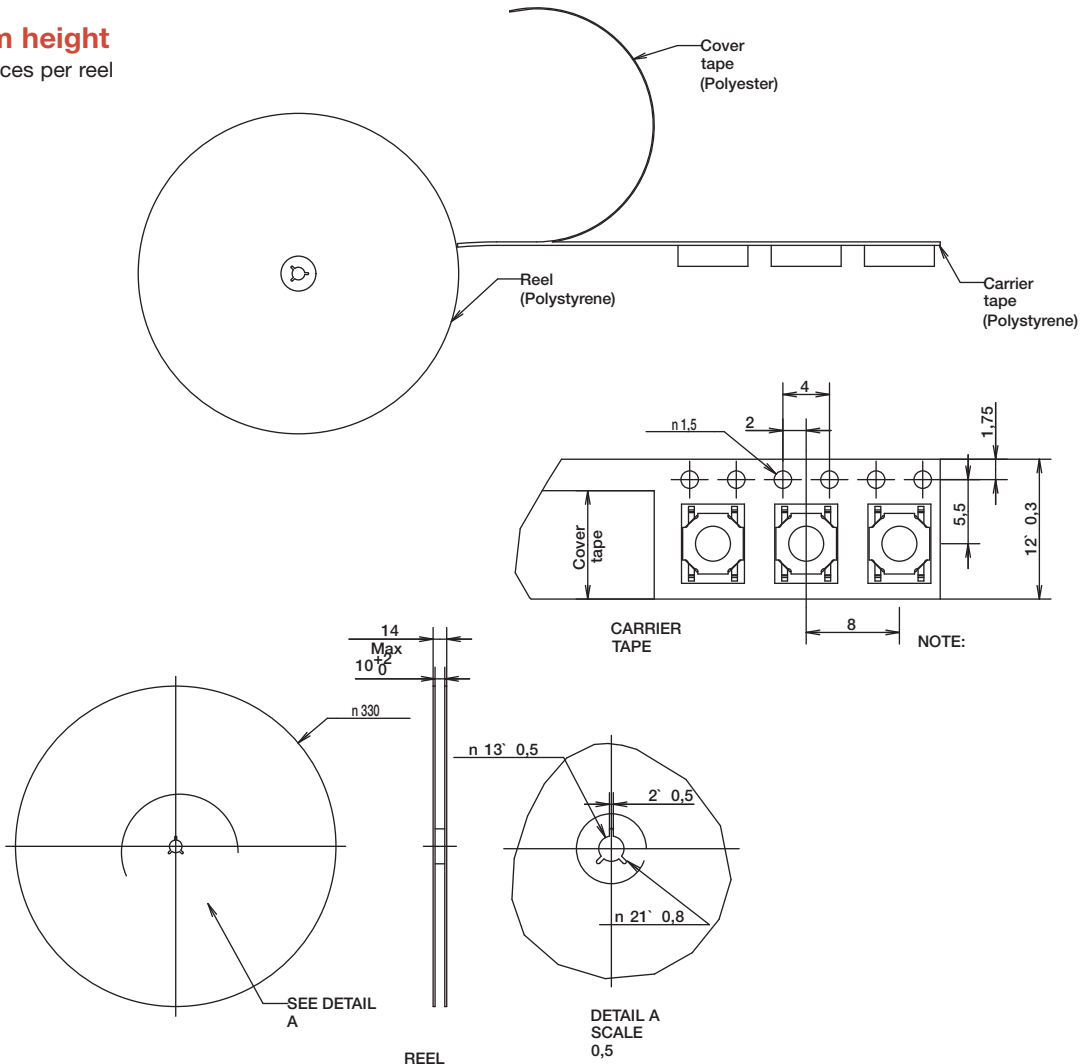


B

Tactile Switches

## TAPE & REEL

**0.8 mm height**  
5,000 pieces per reel



Dimensions are shown: mm  
Specifications and dimensions subject to change

# PTS 525 Series Microminiature Tact Switch for SMT

## TAPE & REEL

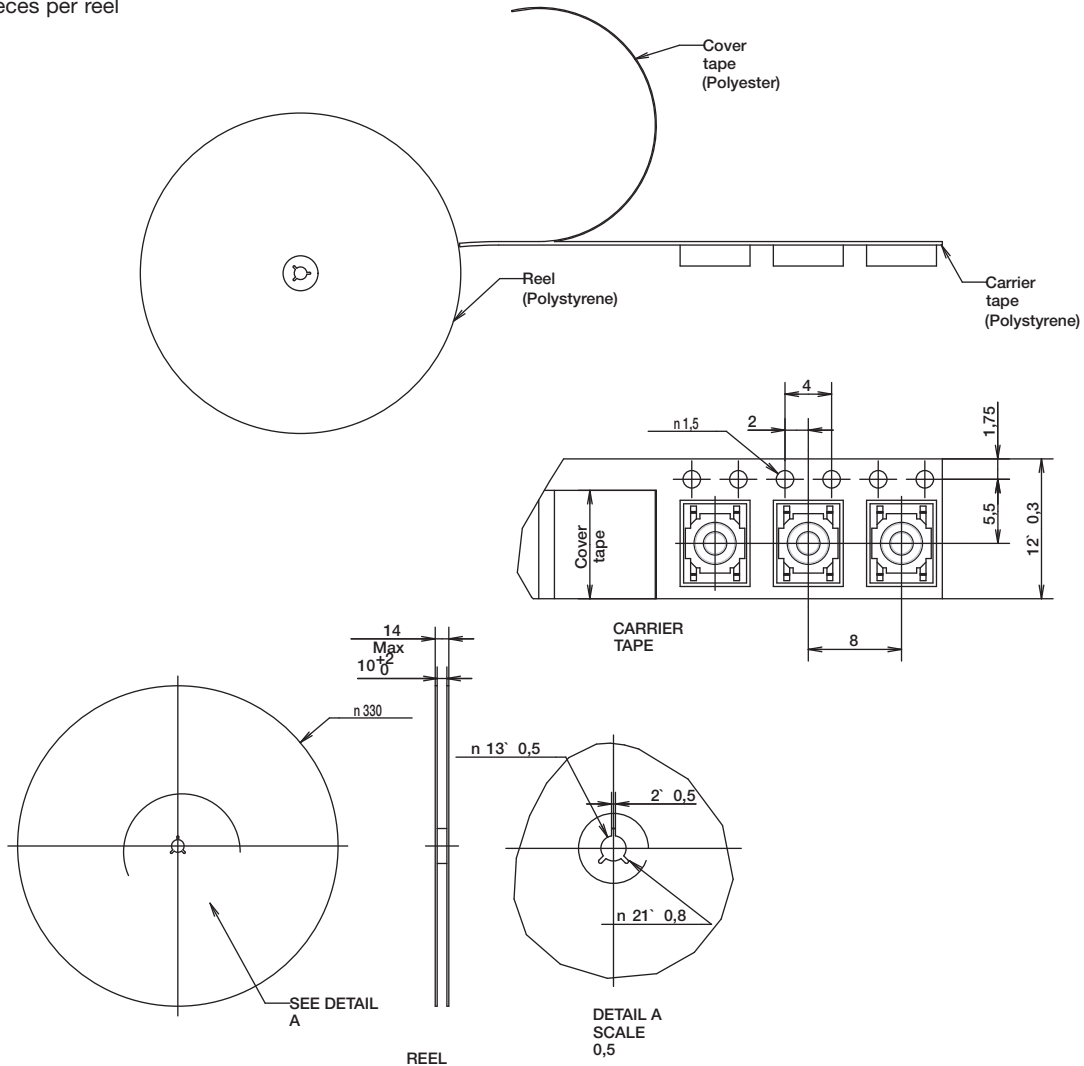
**1.5 mm height**

4,000 pieces per reel



**B**

**Tactile Switches**



Dimensions are shown: mm  
Specifications and dimensions subject to change

# PTS 530 Series Ultra Low Profile SMT Top Actuated

## Features/Benefits

- 4.5 x 4.5 mm footprint
- 0.55 mm thickness
- High number of cycles
- Symbol line identification

## Typical Applications

- MP3 accessories
- Bluetooth headset
- Remote controls
- Garage door opener



## Specifications

FUNCTION: momentary action  
 CONTACT ARRANGEMENT: 1 make contact = SPST N.O.  
 TERMINALS: Gullwing for SMT  
 TRAVEL: 0.2mm - 0.1 /+ 0.15mm

Part Number	Operating Force (gf)	Operating Life (operations)
PTS530 GN055 SMTR LFS	100 ± 30	1,000,000
PTS530 GM055 SMTR LFS	160 ± 30	1,000,000
PTS530 GH055 SMTR LFS	200 ± 30	200,000
PTS530 GK055 SMTR LFS	260 ± 30	200,000
PTS530 GG065 SMTR LFS	400 ± 70	300,000
PTS530 GS065 SMTR LFS	600 - 50/+100	150,000

## Packaging

Switches in reels of 7,000 pieces.  
 Dimensions of reels according to EIA 481B  
 External diameter 330 mm

## Electrical

MAXIMUM VOLTAGE: 12 VDC  
 MAXIMUM CURRENT DC: 50 mA  
 DIELECTRIC STRENGTH: 250 VA C (1mn)  
 CONTACT RESISTANCE: ≤ 100 mΩ  
 INSULATION RESISTANCE: ≥ 100 MΩ  
 BOUNCE TIME: ≤ 10 ms

## Environmental

OPERATING TEMPERATURE: -40°C to 85°C

## Process

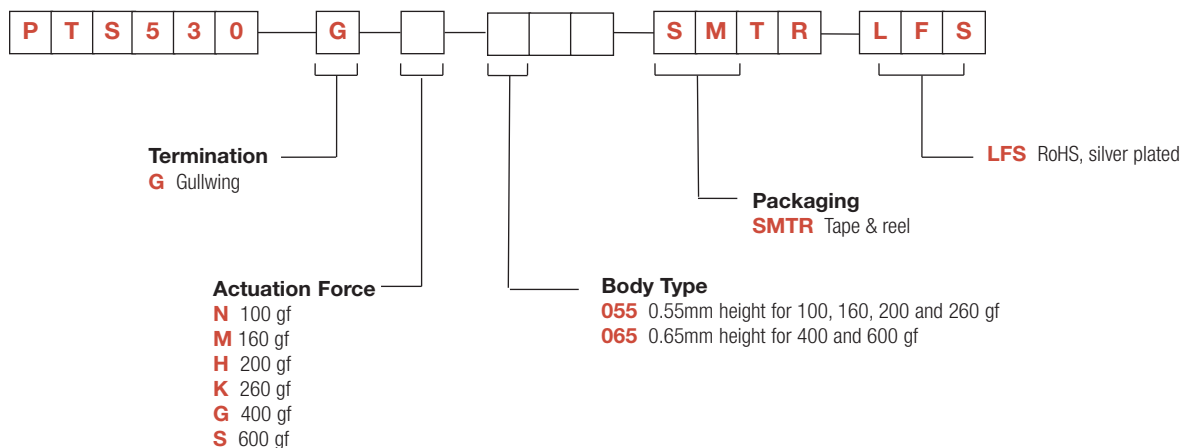
SOLDERING: This component is suited to the following methods:  
 Infrared Reflow Soldering in accordance with IEC61760-1

**NOTE:** Specifications listed above are for switches with standard options.  
 For information on specific and custom switches, consult Customer Service Center.

## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

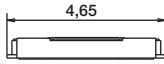
For any part number different from those listed above, please consult your local representative.



# PTS 530 Series Ultra Low Profile SMT Top Actuated

## TERMINATION

**G** GULLWING

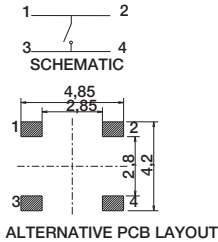
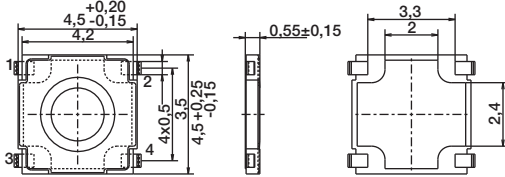


## BODY TYPE / ACTUATION FORCE

**B**

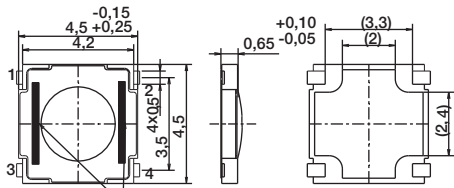
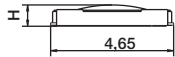
Tactile Switches

**055** 0,55 MM HEIGHT

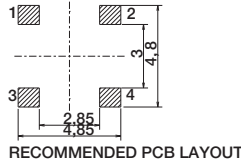
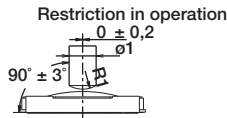


**065** 0,65 MM HEIGHT

PART NUMBER	HEIGHT
PTS 530 GS 065 SMTR LFS	+0.1 -0.05 0.72
PTS 530 GG 065 SMTR LFS	0.68



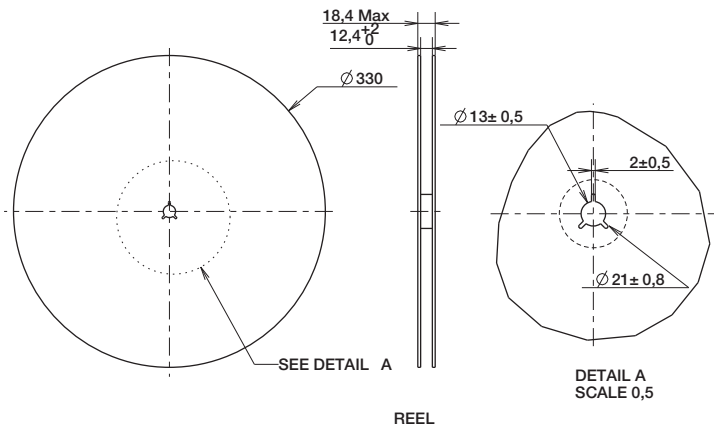
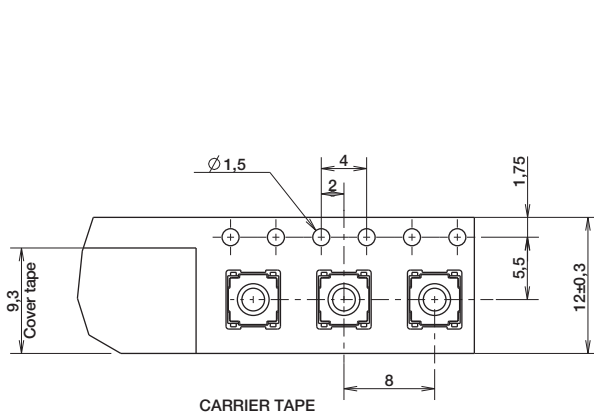
Force symbol lines for 600 gf  
No symbol line for 400 gf



Actuation force identification lines:

N: 100 gf	
M: 160 gf	No Lines
H: 200 gf	
K: 260 gf	
G: 400 gf	No Lines
S: 600 gf	

## TAPE & REEL



Dimensions are shown: mm  
Specifications and dimensions subject to change



# PTS 540 Series Ultra Low Profile SMT Top Actuated

## Features/Benefits

- 3.7 x 3.7 mm footprint
- 0.35 mm thickness
- High number of cycles

## Typical Applications

- MP3 accessories
- Bluetooth headset
- Remote controls



B

Tactile Switches

## Specifications

FUNCTION: momentary action  
CONTACT ARRANGEMENT: 1 make contact = SPST N.O.  
TERMINALS: J type for SMT  
TRAVEL: 0.15 mm ± 0.1 mm

## Mechanical

Part Number	Operating Force (gf)	Operating Life (operations)
PTS540 JM035 SMTR LFS	160 ± 50	500,000
PTS540 JK035 SMTR LFS	230 ± 50	300,000

## Packaging

Switches in reels of 10,000 pieces.  
Dimensions of reels according to EIA 481B  
External diameter 330 mm

## Electrical

MAXIMUM VOLTAGE: 12 VDC  
MAXIMUM CURRENT DC: 50 mA  
DIELECTRIC STRENGTH: 250 VA C (1mn)  
CONTACT RESISTANCE: ≤ 100 mΩ  
INSULATION RESISTANCE: ≥ 100 MΩ  
BOUNCE TIME: ≤ 10 ms

## Environmental

OPERATING TEMPERATURE: -30°C to 85°C

## Process

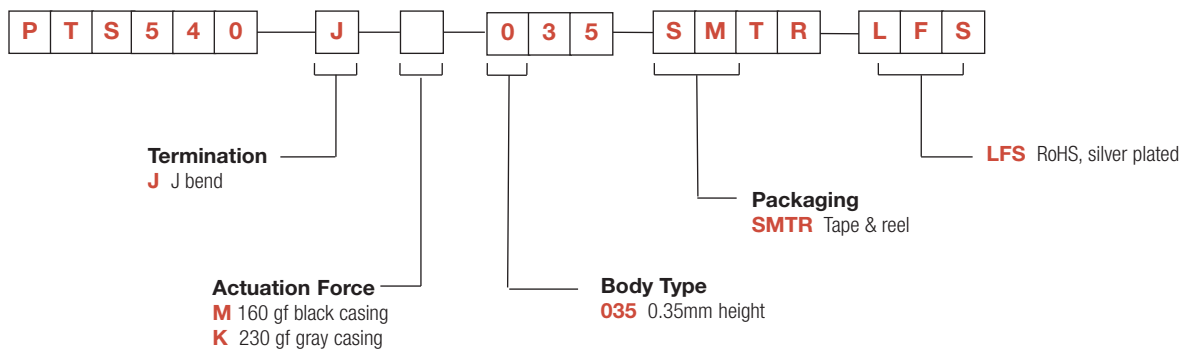
SOLDERING: This component is suited to the following methods:  
Infrared Reflow Soldering in accordance with IEC61760-1

**NOTE:** Specifications listed above are for switches with standard options.  
For information on specific and custom switches, consult Customer Service Center.

## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

For any part number different from those listed above, please consult your local representative.

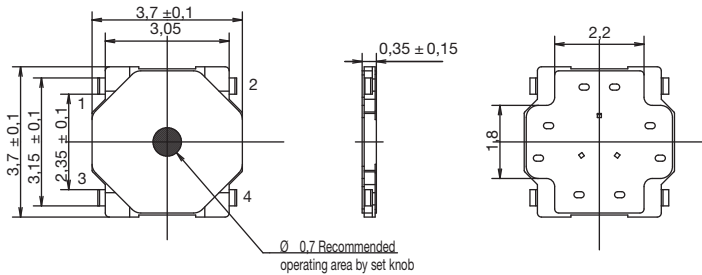


# PTS 540 Series Ultra Low Profile SMT Top Actuated

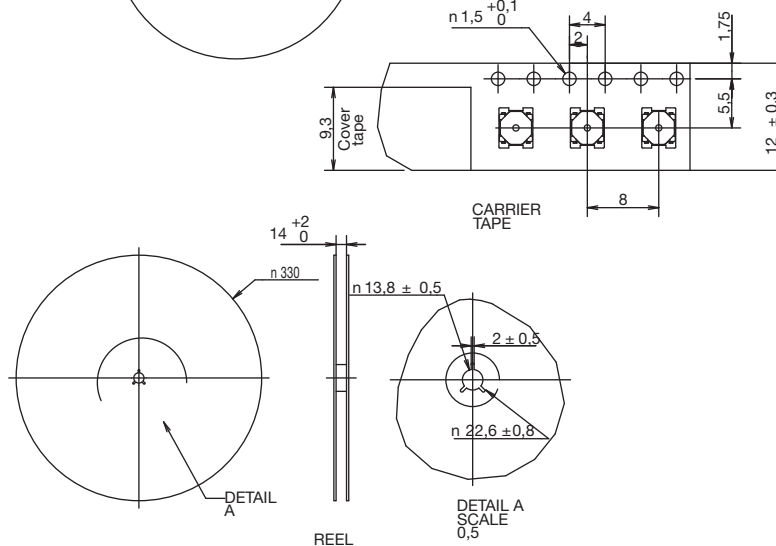
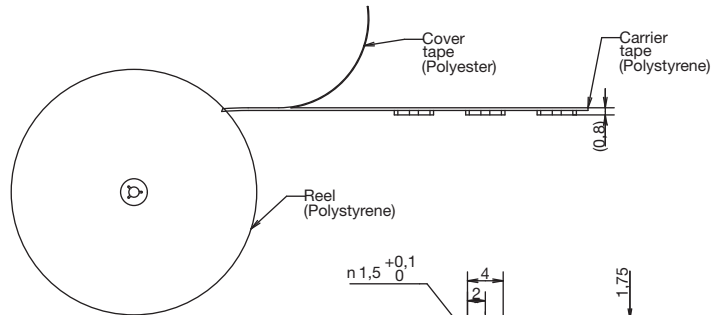
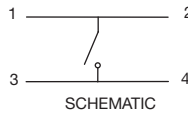
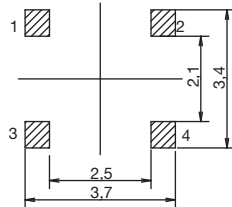
PTS 540

Tactile Switches

B



RECOMMENDED PCB



# PTS 810 Series Microminiature SMT Top Actuated

## Features/Benefits

- 4.2 x 3.2 mm footprint
- 2.5 mm thickness
- High number of cycles
- Color coded actuators

## Typical Applications

- Control panels
- Nomad devices
- Remote controls
- Keyless entry system



## Specifications

FUNCTION: momentary action  
 CONTACT ARRANGEMENT: 1 make contact = SPST N.O.  
 TERMINALS: J type for SMT  
 TRAVEL: 160 & 260 gf: 0.15mm ± 0.1mm  
 400 & 600 gf: 0.20mm ± 0.1mm

	Operating Force (gf)	Operating Life (operations)
PTS810 SJM 250 SMTR LFS	160 ± 50	150,000
PTS810 SJK 250 SMTR LFS	260 ± 70	50,000
PTS810 SJG 250 SMTR LFS	400 ± 100	100,000
PTS810 SJS 250 SMTR LFS	600 ± 150	150,000

## Packaging

Switches in reels of 2,900 pieces.  
 Dimensions of reels according to EIA 481B  
 External diameter 330 mm

## Electrical

MAXIMUM VOLTAGE: 16 VDC  
 MAXIMUM CURRENT DC: 50 mA  
 DIELECTRIC STRENGTH: 250 VA C (1mn)  
 CONTACT RESISTANCE: ≤ 500 mΩ  
 INSULATION RESISTANCE: ≥ 100 MΩ  
 BOUNCE TIME: ≤ 10 ms

## Environmental

OPERATING TEMPERATURE: -40°C to 85°C

## Process

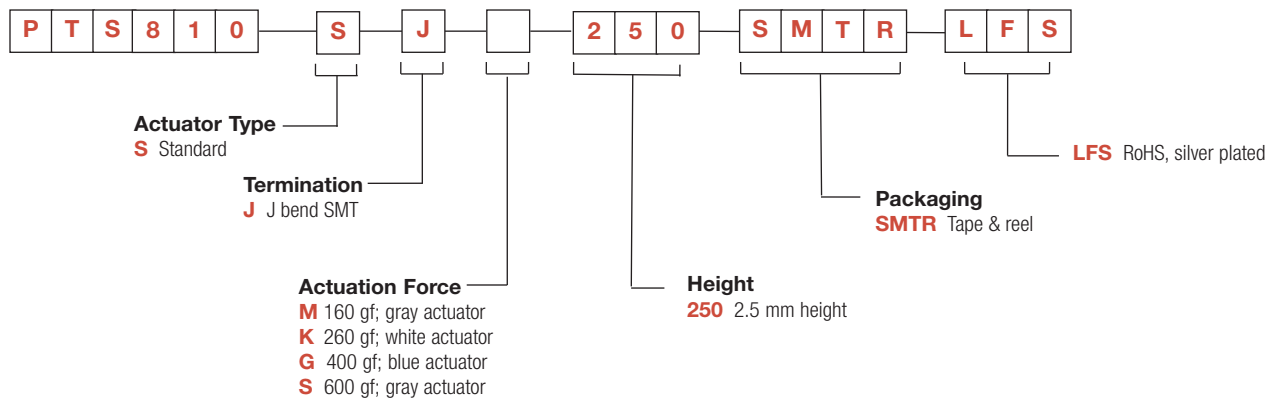
SOLDERING: This component is suited to the following methods:  
 Infrared Reflow Soldering in accordance with IEC61760-1

**NOTE:** Specifications listed above are for switches with standard options.  
 For information on specific and custom switches, consult Customer Service Center.

## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

For any part number different from those listed above, please consult your local representative.

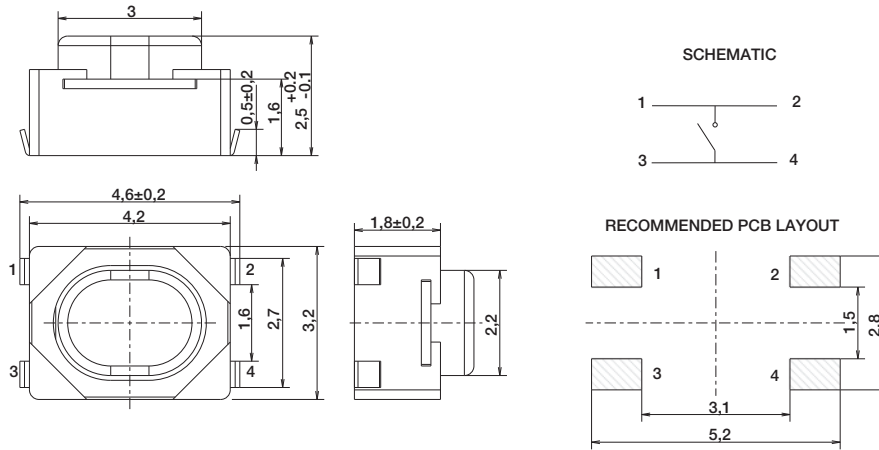


# PTS 810 Series Microminiature SMT Top Actuated

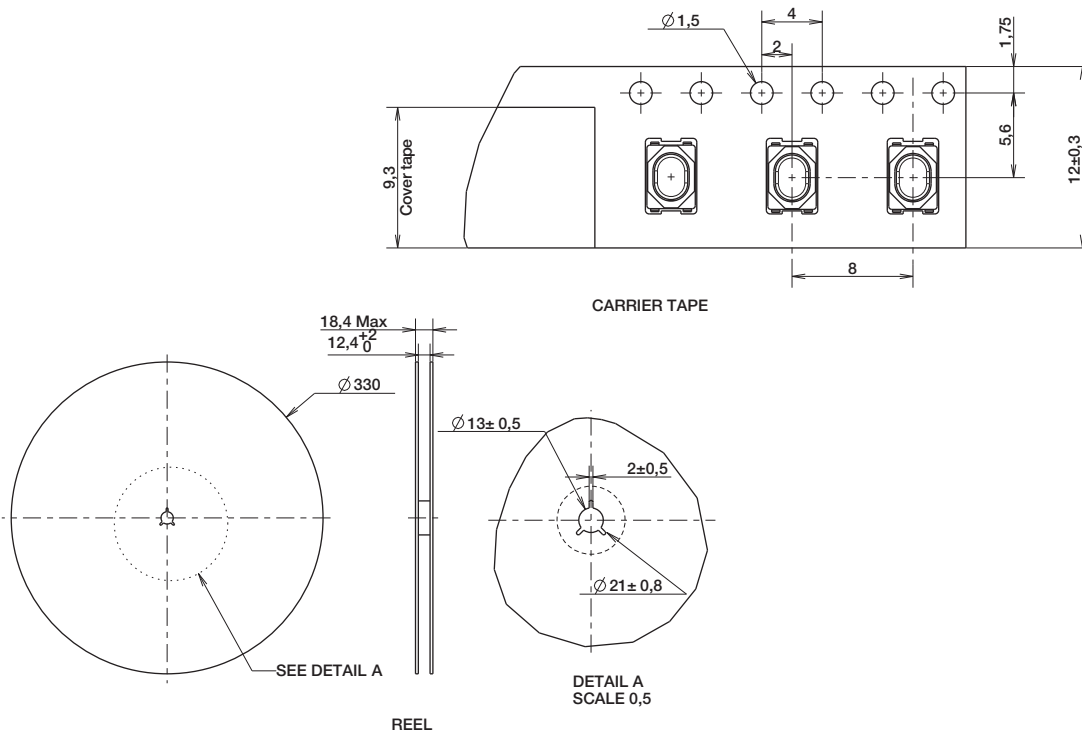
PTS810

Tactile Switches

B



## TAPE & REEL



# PTS 820 Series Microminiature SMT Top Actuated

## Features/Benefits

- 3.9 x 2.9 mm footprint
- Three different heights
- High number of cycles
- Reduced footprint

## Typical Applications

- Control panels
- Nomad devices
- Remote controls
- Keyless entry system



## Specifications

FUNCTION: momentary action  
 CONTACT ARRANGEMENT: 1 make contact = SPST N.O.  
 TERMINALS: J type for SMT  
 TRAVEL: 0.2mm + 0.1mm / -0.05 mm

	Operating Force (gf)	Life Cycles	Height mm	Pegs
PTS820 J25M SMTR LFS	160 ± 50	200,000	2.5	No
PTS820 J25K SMTR LFS	250 ± 50	100,000	2.5	No
PTS820 J25MP SMTR LFS	160 ± 50	200,000	2.5	Yes
PTS820 J25KP SMTR LFS	250 ± 50	100,000	2.5	Yes
PTS820 J20M SMTR LFS	160 ± 50	200,000	2.0	No
PTS820 J20K SMTR LFS	250 ± 50	100,000	2.0	No
PTS820 J20MP SMTR LFS	160 ± 50	200,000	2.0	Yes
PTS820 J20KP SMTR LFS	250 ± 50	100,000	2.0	Yes
PTS820 J15M SMTR LFS	160 ± 50	200,000	1.5	No
PTS820 J15K SMTR LFS	250 ± 50	100,000	1.5	No
PTS820 J15MP SMTR LFS	160 ± 50	200,000	1.5	Yes
PTS820 J15KP SMTR LFS	250 ± 50	100,000	1.5	Yes

## Packaging

Switches in reels of 2,500 pieces for 1.5 and 2.0 mm height  
 Switches in reels of 2,300 pieces for 2.5 mm height  
 Dimensions of reels according to EIA 481B  
 External diameter 330 mm

## Electrical

MAXIMUM VOLTAGE: 12 VDC  
 MAXIMUM CURRENT DC: 50 mA  
 DIELECTRIC STRENGTH: 100 VA C (1mn)  
 CONTACT RESISTANCE: ≤ 100 mΩ  
 INSULATION RESISTANCE: ≥ 100 MΩ  
 BOUNCE TIME: ≤ 10 ms

## Environmental

OPERATING TEMPERATURE: -40°C to 85°C

## Process

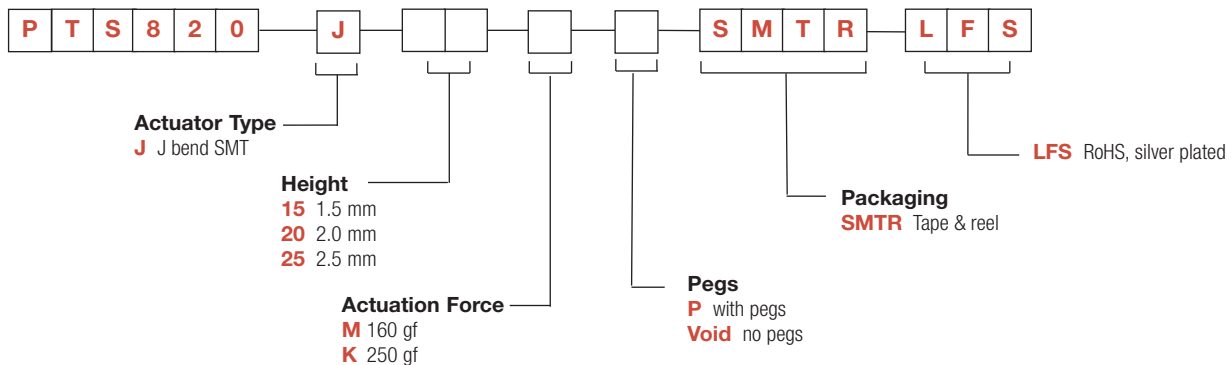
SOLDERING: This component is suited to the following methods:  
 Infrared Reflow Soldering in accordance with IEC61760-1

**NOTE:** Specifications listed above are for switches with standard options.  
 For information on specific and custom switches, consult Customer Service Center.

## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

**For any part number different from those listed above, please consult your local representative.**

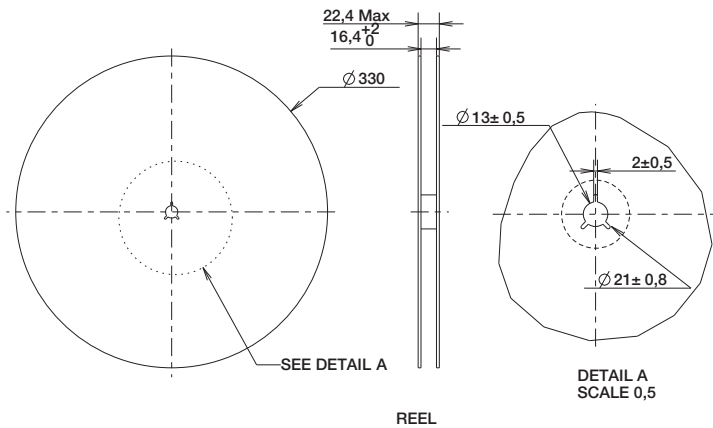
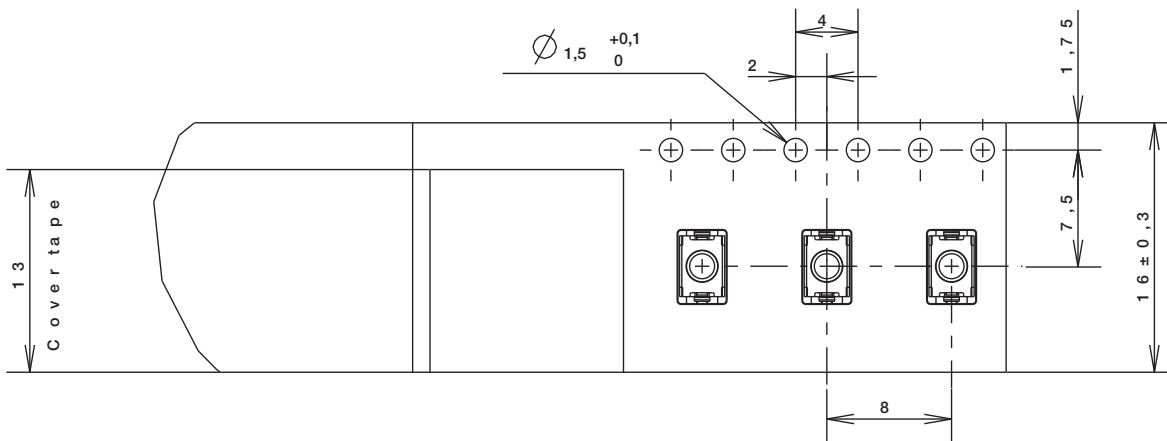
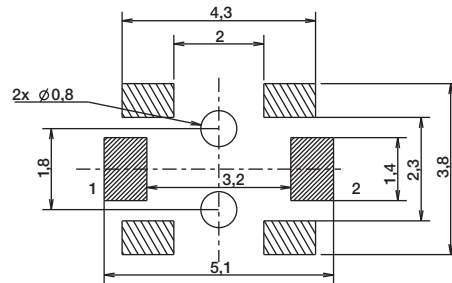
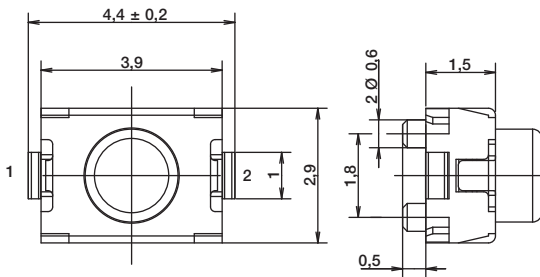
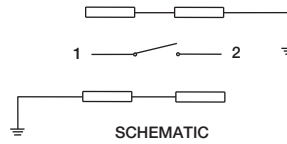
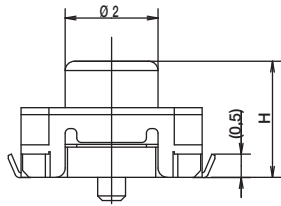


# PTS 820 Series Microminiature SMT Top Actuated

2.5 & 2.0 mm height (H) - version shown here with pegs

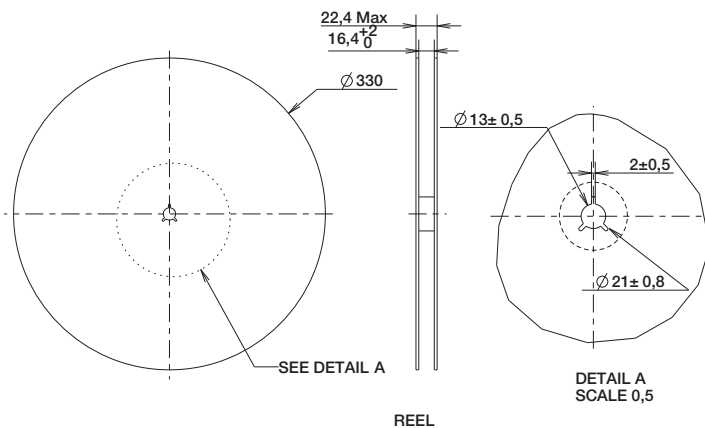
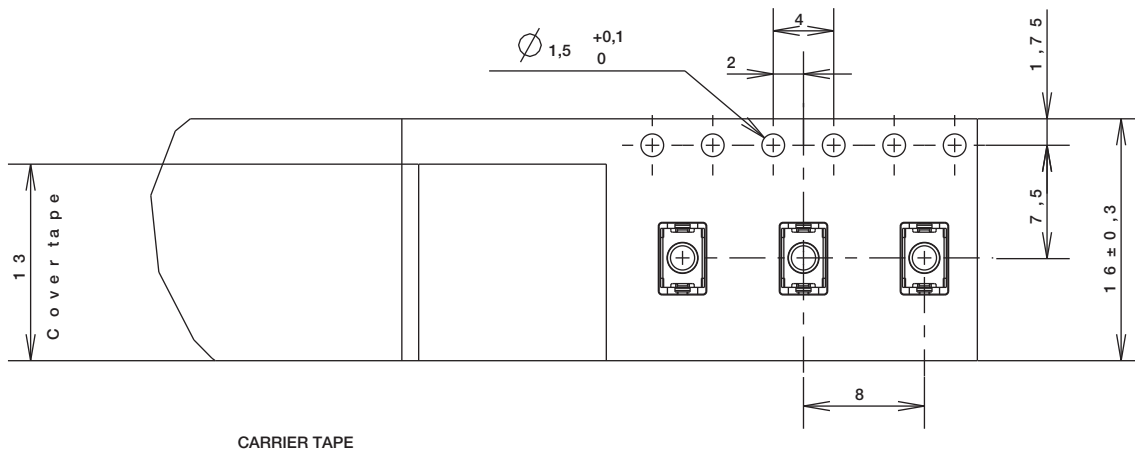
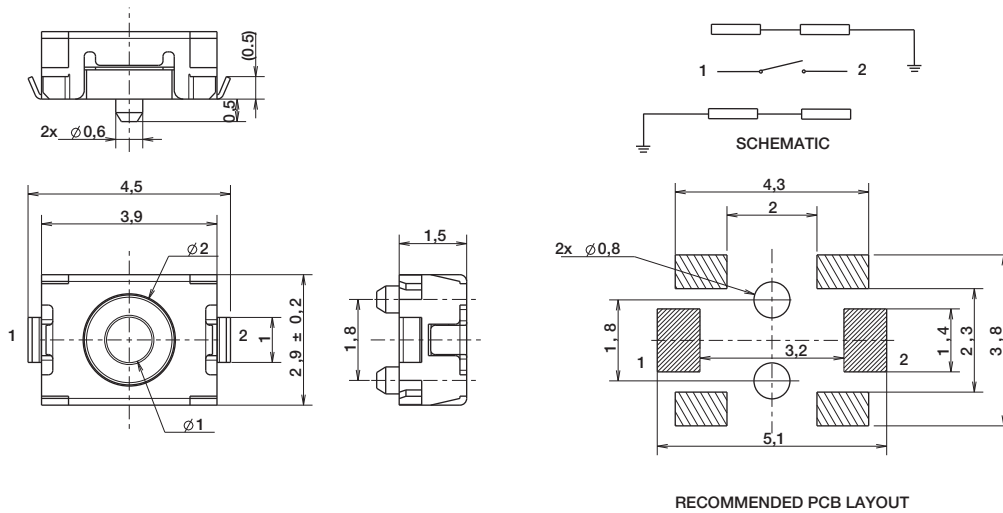
Tactile Switches

B



# PTS 820 Series Microminiature SMT Top Actuated

1.5 mm height (H) - version shown here with pegs



**B**  
Tactile Switches



Dimensions are shown: mm  
Specifications and dimensions subject to change

# PTS 830 Series Microminiature SMT Top Actuated

**NEW**



## Features/Benefits

- 3.5 x 2.6 mm footprint
- High number of cycles
- Optional ground pin

## Typical Applications

- Wearable electronics
- Nomad devices
- Remote controls
- Keyless entry system

**B**

Tactile Switches

## Specifications

FUNCTION: momentary action  
 CONTACT ARRANGEMENT: 1 make contact = SPST N.O.  
 TERMINALS: G type for SMT  
 TRAVEL: 0.15 mm + 0.1 mm

	Operating Force (gf)	Life Cycles	Ground Pin
PTS830 GM140 SMTR LFS	160 ± 50	500,000	No
PTS830 GG140 SMTR LFS	450 ± 80	200,000	No
PTS830 GM140G SMTR LFS	160 ± 50	500,000	Yes
PTS830 GG140G SMTR LFS	450 ± 80	200,000	Yes

## Packaging

Switches in reels of 9,500 pieces  
 Dimensions of reels according to EIA 481B  
 External diameter 330 mm

## Electrical

MAXIMUM VOLTAGE: 12 VDC  
 MAXIMUM CURRENT DC: 50 mA  
 DIELECTRIC STRENGTH: 100 VA C (1mm)  
 CONTACT RESISTANCE: ≤ 100 mΩ  
 INSULATION RESISTANCE: ≥ 100 MΩ  
 BOUNCE TIME: ≤ 10 ms

## Environmental

OPERATING TEMPERATURE: -40°C to 85°C

## Process

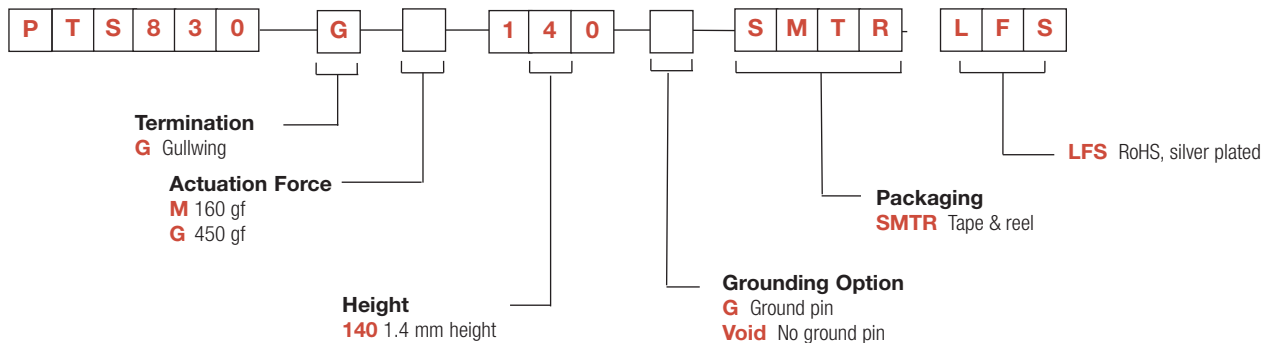
SOLDERING: This component is suited to the following methods:  
 Infrared Reflow Soldering in accordance with IEC61760-1

**NOTE:** Specifications listed above are for switches with standard options.  
 For information on specific and custom switches, consult Customer Service Center.

## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

For any part number different from those listed above, please consult your local representative.



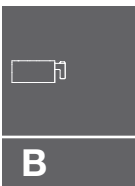
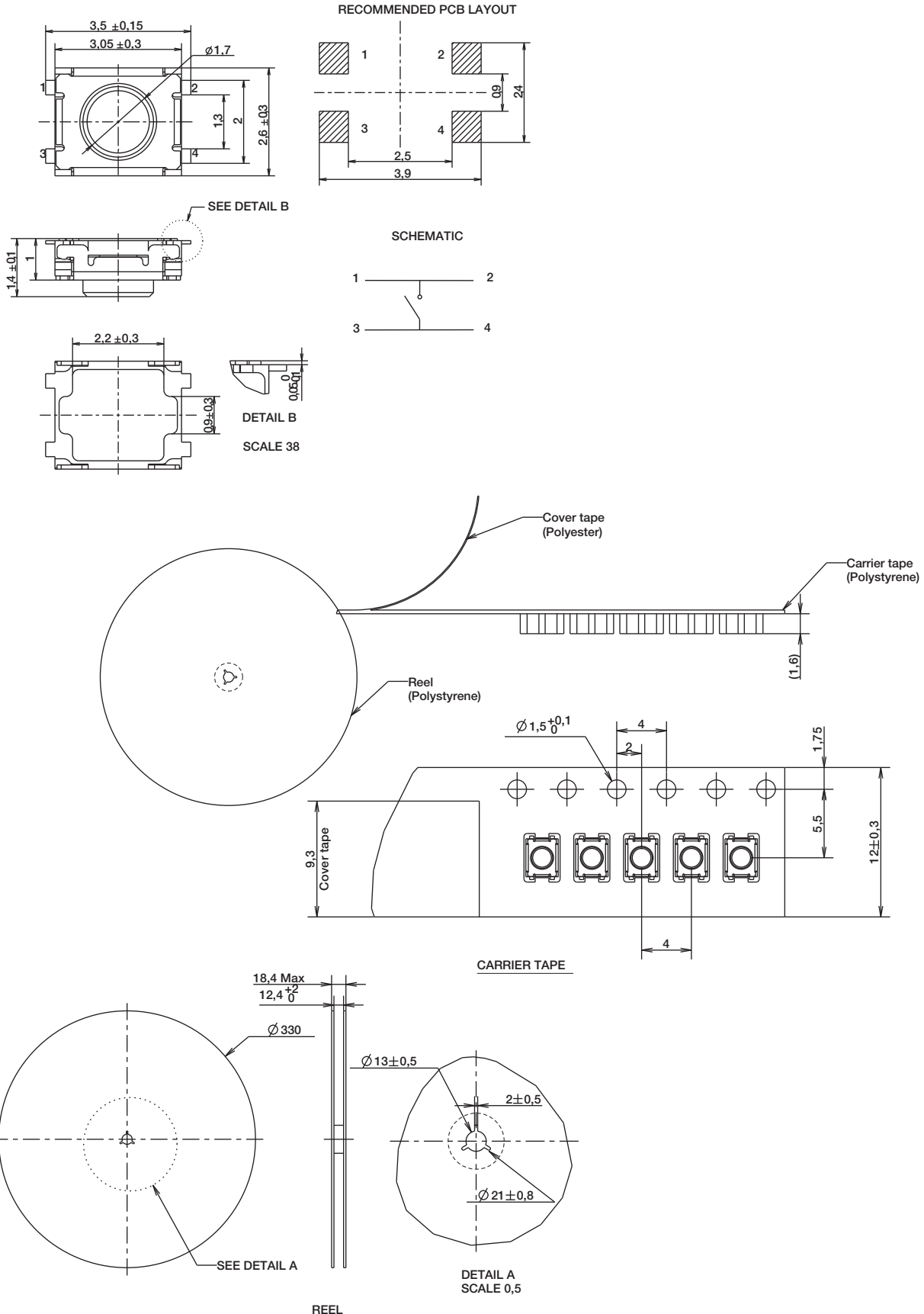
Dimensions are shown: mm  
 Specifications and dimensions subject to change



**NEW**

# PTS 830 Series Microminiature SMT Top Actuated

**PTS830 GX 140 SMTR LFS**



**B**

**Tactile Switches**



Dimensions are shown: mm  
Specifications and dimensions subject to change

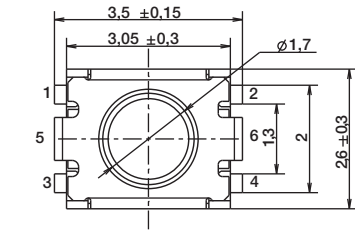
# PTS 830 Series Microminiature SMT Top Actuated

**NEW**

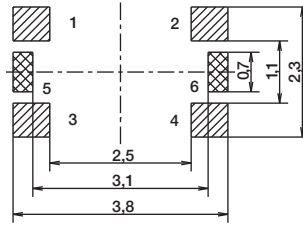
PTS830 GX 140 G SMTR LFS

Tactile Switches

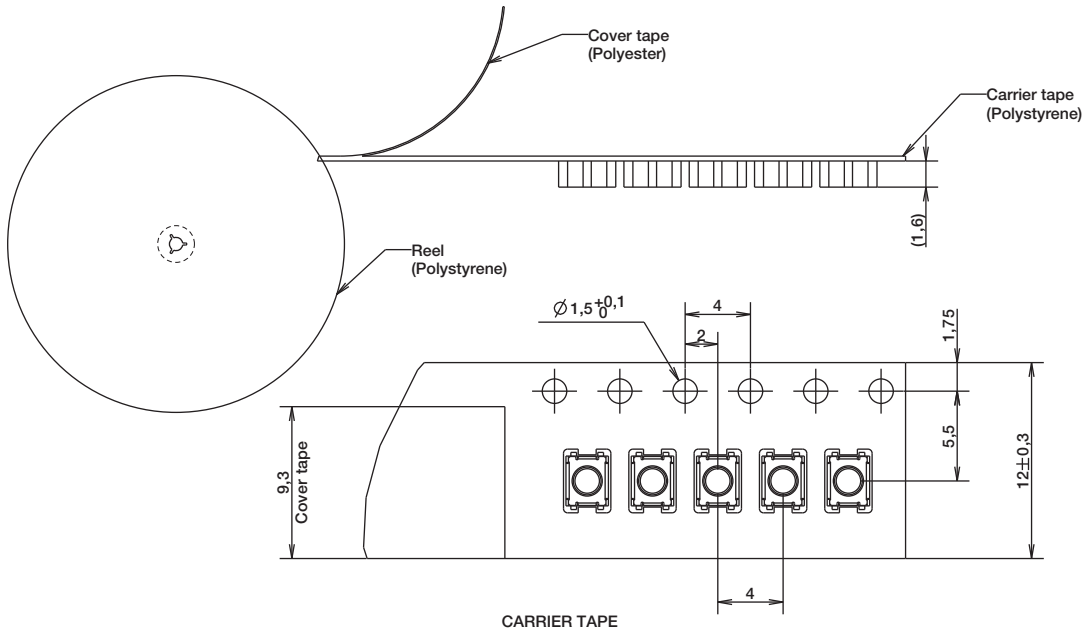
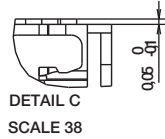
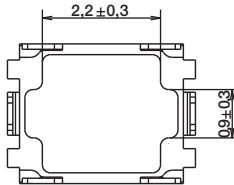
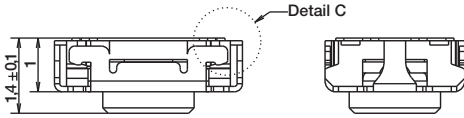
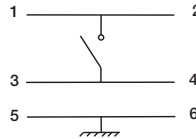
**B**



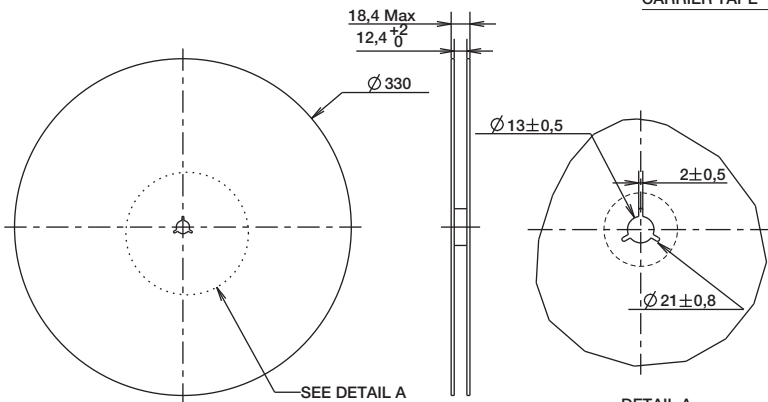
RECOMMENDED PCB LAYOUT



SCHEMATIC



CARRIER TAPE

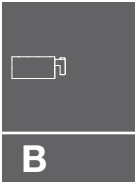


DETAIL A  
SCALE 0,5

REEL



Dimensions are shown: mm  
Specifications and dimensions subject to change



**B**

**Tactile Switches**



*Dimensions are shown: mm (inches)  
Specifications and dimensions subject to change*

# PTS 840 Series

## Microminiature SMT Side Actuated



### Features/Benefits

- 3.5 x 3.55 mm footprint
- Front PIP leads option for strong shear resistance
- ESD pin option
- Reduced footprint

### Typical Applications

- Nomad devices
- Remote controls
- Personal health diagnostics
- Consumer electronics

B

Tactile Switches

### Specifications

FUNCTION: momentary action  
 CONTACT ARRANGEMENT: 1 make contact = SPST N.O.  
 TERMINALS: G and front PIP types for SMT  
 TRAVEL: 0.2mm + 0.2mm / -0.1 mm  
 LIFE: 100,000 cycles

Type	Operating Force (gf)	SMT Leads	Pegs
<b>Without ground pin</b>			
PTS840 GM SMTR LFS	160 -40/+70	G leads	No
PTS840 GK SMTR LFS	220 -70/+80	G leads	No
PTS840 PM SMTR LFS	160 -40/+70	P leads	No
PTS840 PK SMTR LFS	220 -70/+80	P leads	No
PTS840 GMP SMTR LFS	160 -40/+70	G leads	Yes
PTS840 GKP SMTR LFS	220 -70/+80	G leads	Yes
<b>With ground pin</b>			
PTS840 ESDGM SMTR LFS	160 -40/+70	G leads	No
PTS840 ESDGK SMTR LFS	220 -70/+80	G leads	No
PTS840 ESDPM SMTR LFS	160 -40/+70	P leads	No
PTS840 ESDPK SMTR LFS	220 -70/+80	P leads	No
PTS840 ESDGMP SMTR LFS	160 -40/+70	G leads	Yes
PTS840 ESDGKP SMTR LFS	220 -70/+80	G leads	Yes

### Electrical

MAXIMUM VOLTAGE: 12 VDC  
 MAXIMUM CURRENT DC: 50 mA  
 DIELECTRIC STRENGTH: 250 VA C (1mm)  
 CONTACT RESISTANCE: ≤ 500 mΩ  
 INSULATION RESISTANCE: ≥ 100 MΩ  
 BOUNCE TIME: ≤ 10 ms

### Environmental

OPERATING TEMPERATURE: -40°C to 85°C

### Process

SOLDERING: This component is suited to the following methods:  
 Infrared Reflow Soldering in accordance with IEC61760-1

### Packaging

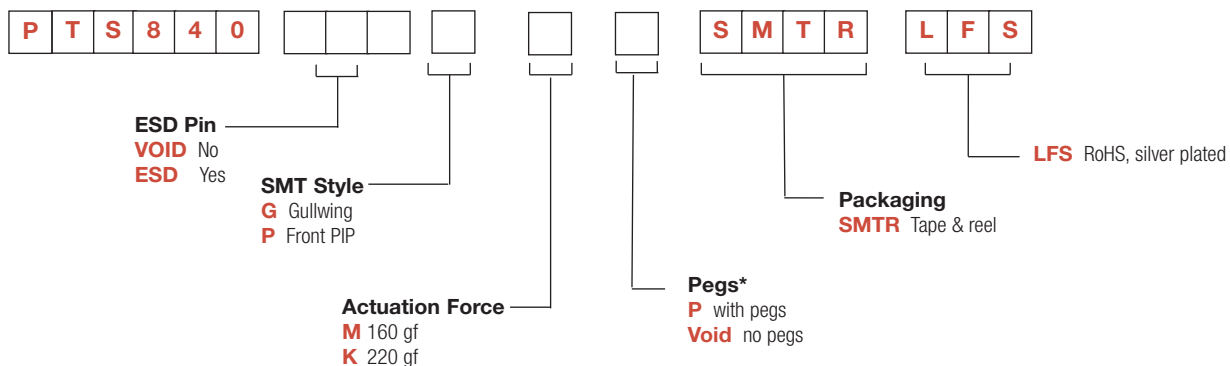
In reels of 3,500 pieces  
 Dimensions of reels according to EIA 481B  
 External diameter 330 mm

**NOTE:** Specifications listed above are for switches with standard options.  
 For information on specific and custom switches, consult Customer Service Center.

### How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

**For any part number different from those listed above, please consult your local representative.**

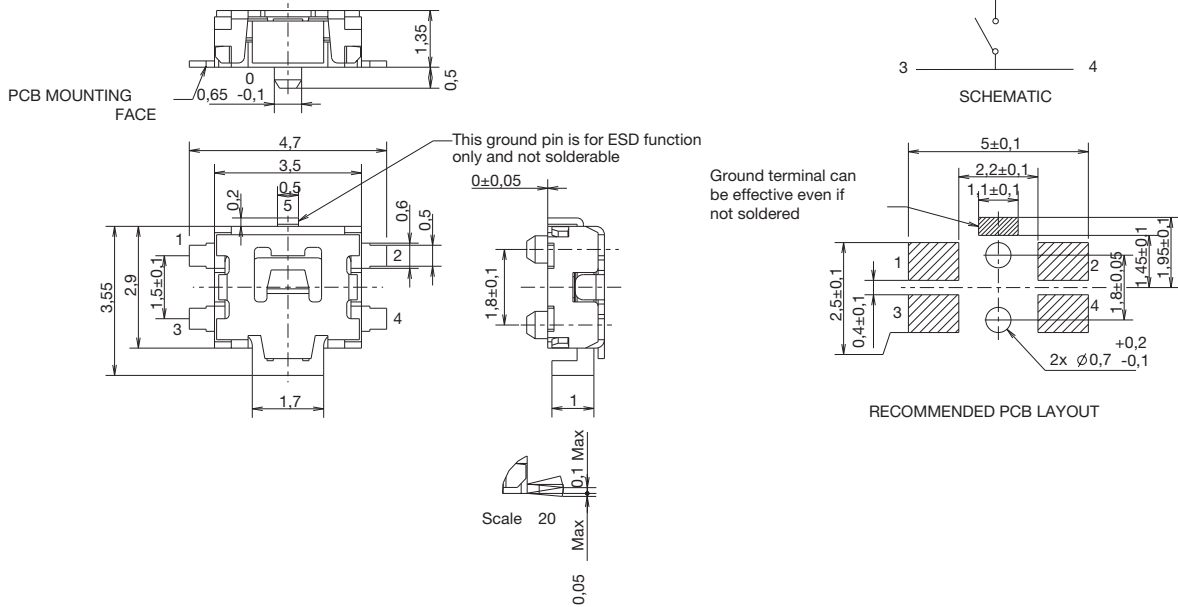


### Design Recommendations

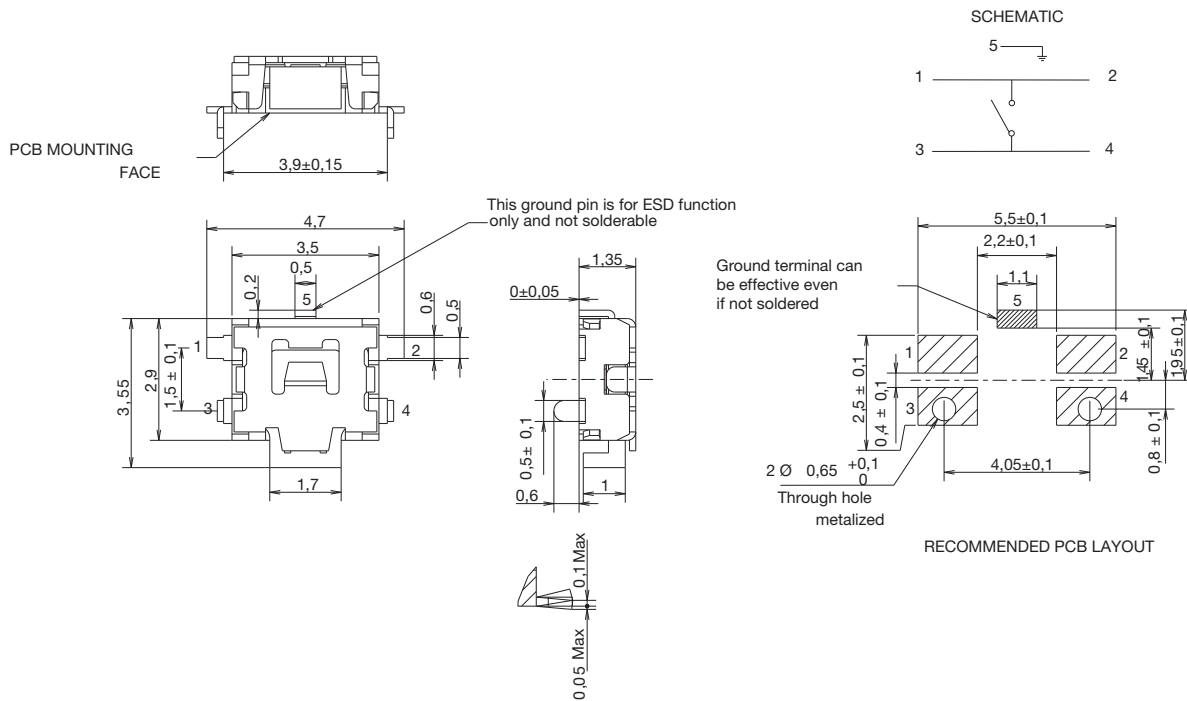
- "P" leads are recommended for applications where shear resistance is of importance
- When a precise alignment between application button and the switch is requested, version with pegs are the right choice to limit the possible floating of the switch during solderability.

# PTS 840 Series Microminiature SMT Side Actuated

## Standard G SMT Leads with ESD and Peg options

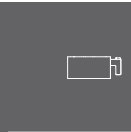


## P SMT Leads with ESD option



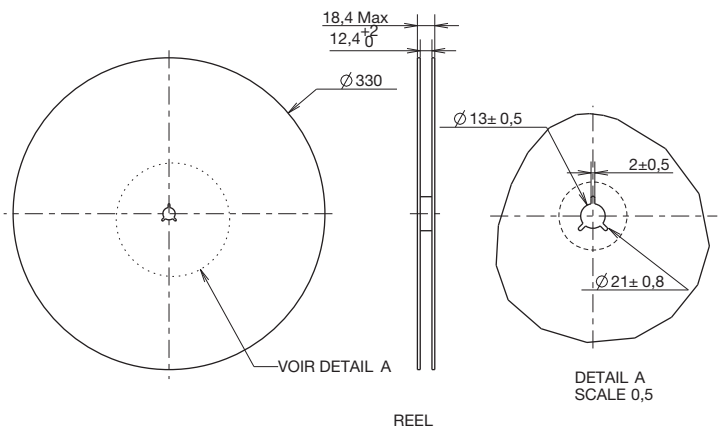
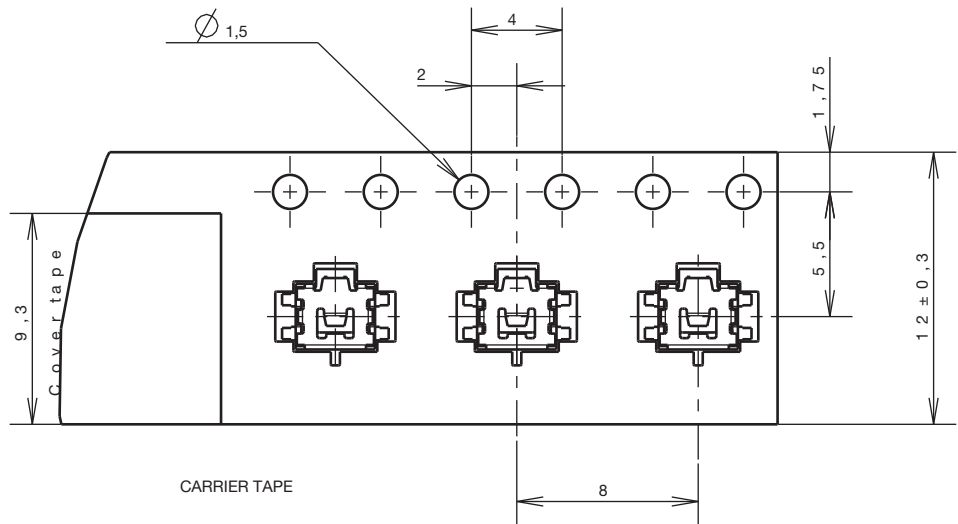
# PTS 840 Series Microminiature SMT Side Actuated

## TAPE & REEL



B

Tactile Switches



Dimensions are shown: mm  
Specifications and dimensions subject to change

# KSR Series Subminiature Tact Switch for SMT

## Features/Benefits

- 4 actuation forces
- G terminations
- N.O. and N.C.
- Detect type available
- Rubber actuator
- IP50 sealed
- RoHS compliant and compatible

## Typical Applications

- Automotive
- Medical equipment
- Industrial electronics
- Smart meters



B

Tactile Switches

## Specification

FUNCTION: momentary action  
CONTACT ARRANGEMENT: Normally Open  
TERMINALS: Gullwing type for SMT

## Mechanical

Type	Operating force Newtons (grams)	Operating life (operations)	Travel (mm)
KSR211G LFS / KSR213G LFG	1,5 < 1,85 (185) < 2,2	100,000	0,25 ± 0,15
KSR221G LFS / KSR223G LFG	1,9 < 2,25 (225) < 2,6	100,000	0,3 ± 0,15
KSR231G LFS /KSR233G LFG	2,25 < 3,00 (300) < 3,75	100,000	0,35 ± 0,15
KSR251G LFS / KSR253G LFG	3,4 < 4,50 (450) < 5,6	100,000	0,5 ± 0,15
KSR221G NC LFS	1,5 < 2,25 (225) < 3	30,000	0,3 ± 0,15
KSR223G NC LFG	1,5 < 2 (200) < 2,5	30,000	0,3 ± 0,15

Overload: 20 Newtons  
Detect switch versions are available. Please see Detect chapter  
KSR2D/M series.

## Packaging

Switches are delivered on continuous tape, in reels of 2,500 pieces.

## Electrical

	Silver	Gold
MAXIMUM POWER:	1 VA	0.2 VA
MAXIMUM VOLTAGE:	32 VDC	32 VDC
MINIMUM VOLTAGE:	20 mV	20 mV
MAXIMUM CURRENT DC:	50 mA	10 mA
MINIMUM CURRENT DC:	1 mA	1 mA

CONTACT RESISTANCE: ≤ 100 mΩ  
INSULATION RESISTANCE: (100 V): 1G Ω (between terminals)  
BOUNCE TIME: 1 ms max.

## Environmental

	Silver	Gold
OPERATING TEMPERATURE:	-40°C to 85°C	-40°C to 125°C
STORAGE TEMPERATURE:	-55°C to 85°C	-55°C to 125°C

## Process

SOLDERING: Compatible with lead free reflow soldering process.

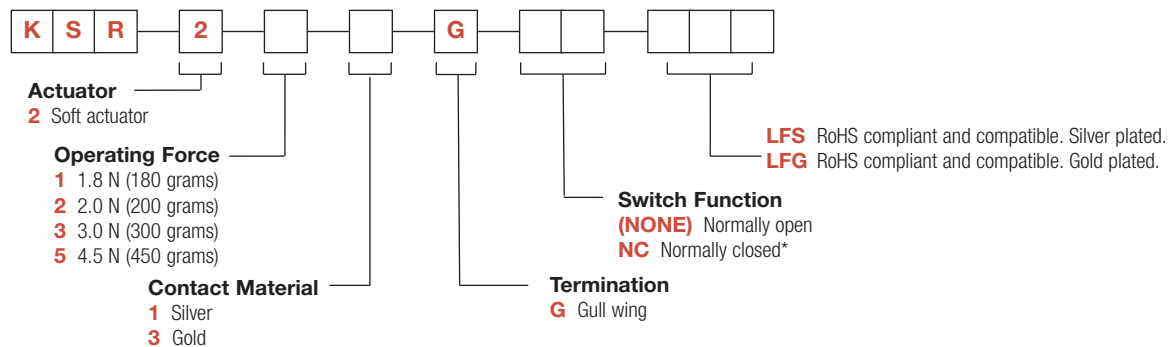
**NOTE:** Specifications listed above are for switches with standard options.  
For information on specific and custom switches, consult Customer Service Center.

## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

However, please note that all the combinations of these options are not feasible.

For any part number different from those listed above, please consult your local representative.



\*Available on KSR223G only.



Dimensions are shown: mm  
Specifications and dimensions subject to change

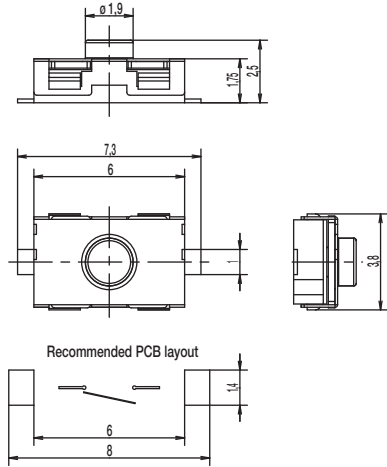
# KSR Series Subminiature Tact Switch for SMT

**KSR**

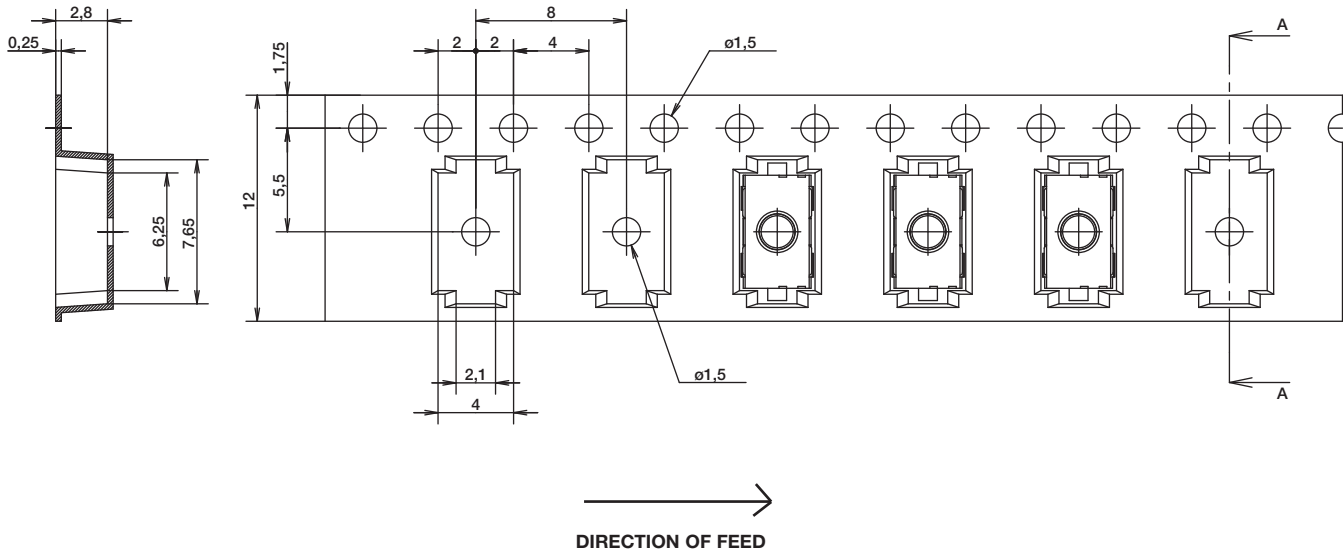


**B**

Tactile Switches



## TAPE & REEL



Dimensions are shown: mm  
Specifications and dimensions subject to change



# KSR Long Life-200,000 cycles-Gold and Silver Series Subminiature Tact Switch for SMT

## Features/Benefits

- 4 actuation forces
- G terminations
- N.O.
- Detect type available
- Rubber actuator
- IP50 sealed
- RoHS compliant and compatible

## Typical Applications

- Automotive
- Medical equipment
- Industrial electronics



Tactile Switches

## Specification

FUNCTION: momentary action  
CONTACT ARRANGEMENT: Normally Open  
TERMINALS: Gullwing type for SMT

## Mechanical

Type	Operating force(Fa) Newtons (grams)	Operating life (operations)	Travel (mm)
<b>Silver versions</b>			
KSR212G LFS	1,5 < 1,85 (185) < 2,2	200,000	0,25 ± 0,15
KSR222G LFS	1,9 < 2,25 (225) < 2,6	200,000	0,3 ± 0,15
KSR232G LFS	2,25 < 3,00 (300) < 3,75	200,000	0,35 ± 0,15
KSR252G LFS	3,4 < 4,50 (450) < 5,6	200,000	0,5 ± 0,15
<b>Gold versions</b>			
KSR214G LFS	1,5 < 1,85 (185) < 2,2	200,000	0,25 ± 0,15
KSR224G LFS	1,9 < 2,25 (225) < 2,6	200,000	0,3 ± 0,15
KSR234G LFS	2,25 < 3,00 (300) < 3,75	200,000	0,35 ± 0,15
KSR254G LFS	3,4 < 4,50 (450) < 5,6	200,000	0,5 ± 0,15

OVERLOAD: 20 Newtons

## Packaging

Switches are delivered on continuous tape, in reels of 2,500 pieces.

## Electrical

	Silver	Gold
MAXIMUM POWER:	1 VA	0.2 VA
MAXIMUM VOLTAGE:	32 V dc	32 V dc
MINIMUM VOLTAGE:	20 m Vdc	20 m Vdc
MAXIMUM CURRENT DC:	50 mA	10 mA
MINIMUM CURRENT DC:	1 mA	1 mA

CONTACT RESISTANCE: ≤ 100 m Ω  
INSULATION RESISTANCE (100 V): 1 G Ω (between terminals)  
BOUNCE TIME: 1 ms max

## Environmental

	Silver	Gold
OPERATING TEMPERATURE:	-40°C to 85°C	-40°C to 125°C
STORAGE TEMPERATURE:	-55°C to 85°C	-55°C to 125°C

## Process

SOLDERING: Compatible with lead free reflow soldering process.

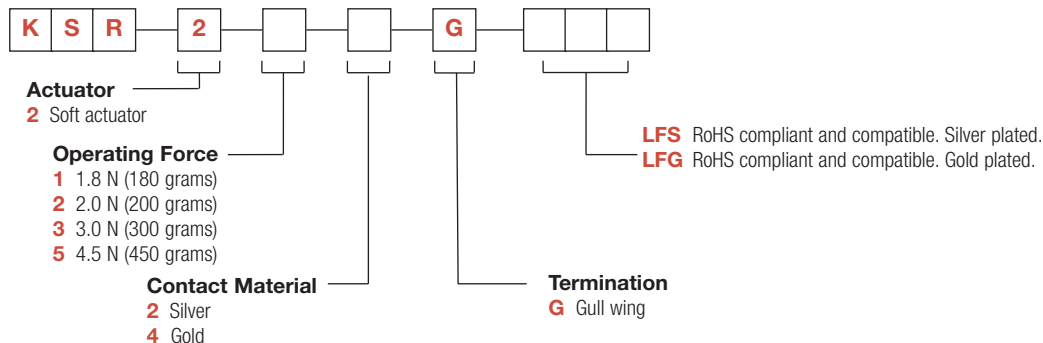
**NOTE:** Specifications listed above are for switches with standard options.  
For information on specific and custom switches, consult Customer Service Center.

## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

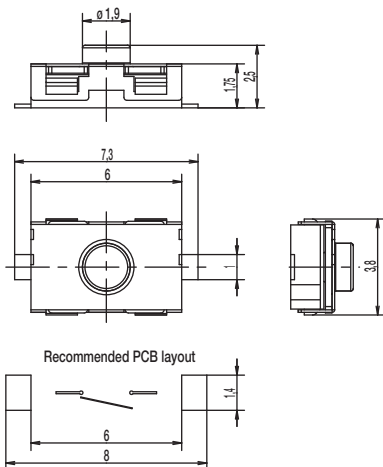
**However, please note that all the combinations of these options are not feasible.**

**For any part number different from those listed above, please consult your local representative.**

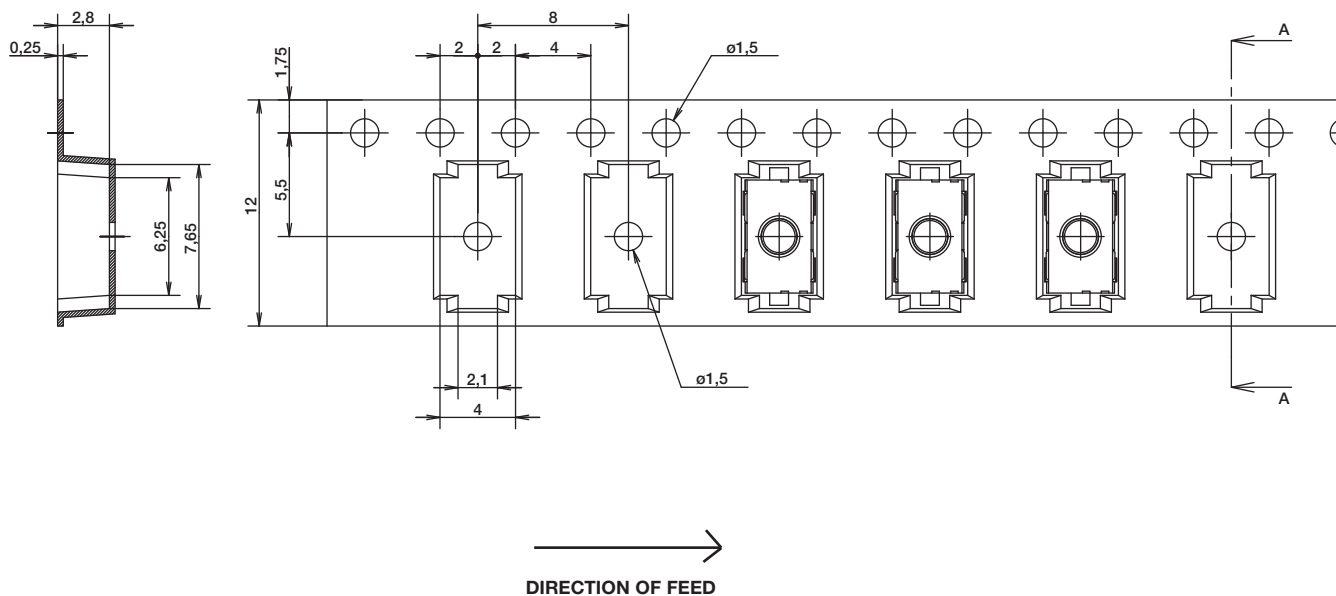


# KSR Long Life-200,000 cycles-Gold and Silver Series Subminiature Tact Switch for SMT

KSR



## TAPE & REEL



# KSS Series Subminiature SMT Side Actuated

## Features/Benefits

- Low profile of 1.7 mm
- Excellent tactile feel
- High shear force
- Range of actuation forces
- Large flat top
- RoHS compliant and compatible

## Typical Applications

- Cellular phone
- Industrial electronics
- Health diagnostic electronics



B

Tactile Switches

## Specification

FUNCTION: momentary action  
CONTACT ARRANGEMENT: N.O.  
TERMINALS: Gullwing  
IP40 sealed

## Mechanical

OVERLOAD: 20N  
TACTILE FEELING: 2 and 4N: 25% min.  
2.5N: 30% min.

Type	Operating force Newtons (grams)	Operating life (operations)	Travel (mm)
KSS221G	2.0 (200) ± 0.5	100,000	0,3 ± 0,15
KSS231G	2.5 (250) ± 0.5	100,000	0,3 ± 0,10
KSS241G	4.0 (400) ± 1.0	100,000	0,3 ± 0,15

**NOTE:** Specifications listed above are for switches with standard options.  
For information on specific and custom switches, consult Customer Service Center.

## Electrical

	Silver	Gold
MAXIMUM POWER:	1 VA	0.2 VA
MAXIMUM VOLTAGE:	32 VDC	32 VDC
MAXIMUM CURRENT:	50 mA	10 mA
MINIMUM CURRENT:	1 mA	1 mA
DIELECTRIC STRENGTH: ≥ 250 VDC		
CONTACT RESISTANCE: < 100 mΩ		
INSULATION RESISTANCE (100 VDC): ≥ 10 <sup>9</sup> Ω		
BOUNCE TIME: < 3 ms		

## Environmental

	Silver	Gold
OPERATING TEMPERATURE:	-40°C to 85°C	-40°C to 125°C
STORAGE TEMPERATURE:	-55°C to 85°C	-55°C to 125°C

## Process

Infrared reflow soldering in accordance with IEC 61760-1

## Packaging

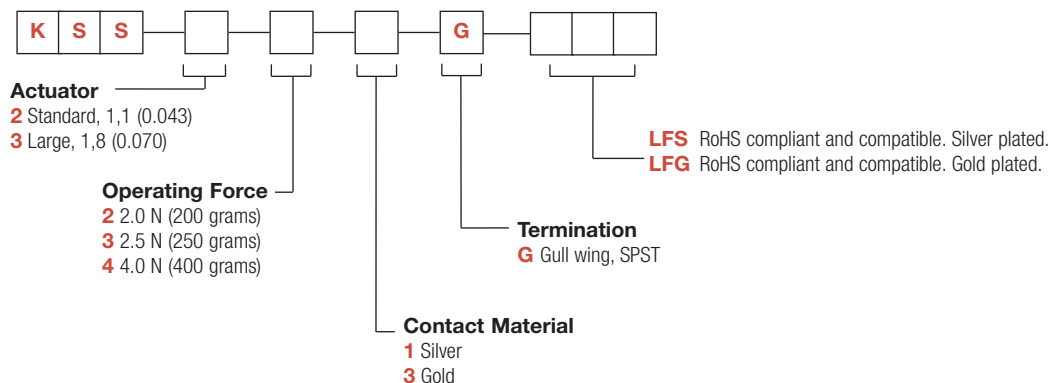
Tape and reels in reels of 3,000 pieces.  
External diameter 330mm ± 2mm.

## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

**However, please note that all the combinations of these options are not feasible.**

**For any part number different from those listed above, please consult your local representative.**



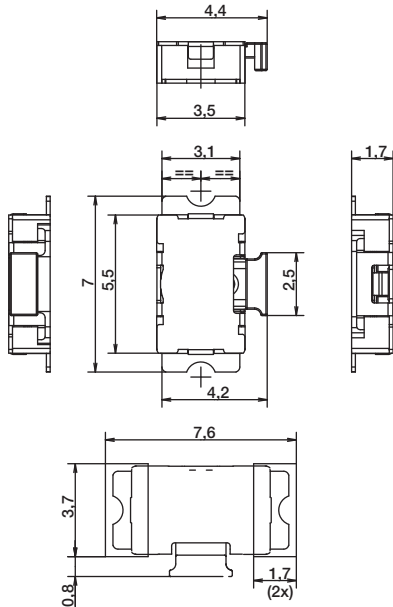
# KSS Series Subminiature SMT Side Actuated

KSS



B

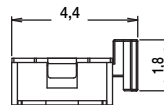
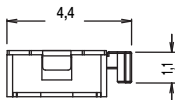
Tactile Switches



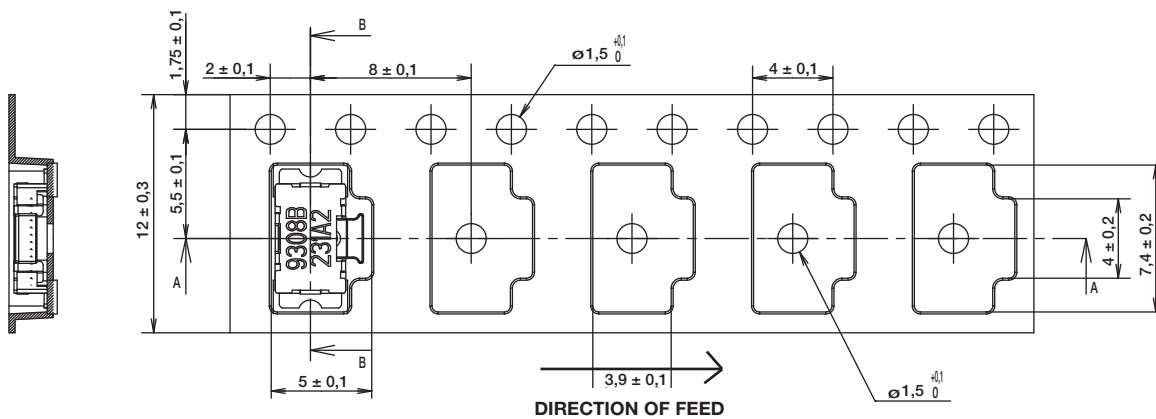
## ACTUATOR

2 STANDARD, 1,1 (0.043)

3 LARGE, 1,8 (0.070)



## TAPE & REEL



First Angle  
Projection

Dimensions are shown: mm  
Specifications and dimensions subject to change

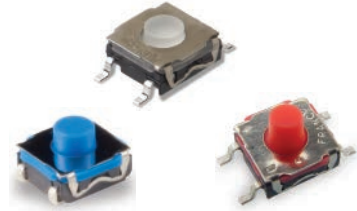
# KSC Series Sealed Tact Switch for SMT

## Features/Benefits

- Positive tactile feeling
- J or G terminations
- Various heights
- IP67

## Typical Applications

- Automotive
- Cellular phones
- Industrial electronics
- Network infrastructure and IT
- Elevator



## Specification

FUNCTION: Momentary action  
 CONTACT ARRANGEMENT: 1 make contact = SPST, N.O.  
 TERMINALS: J bend & Gullwing type for SMT  
 SEALING: IP67 except KSC5 (IP50)

## Liability Limitation

This datasheet does not provide enough information for applications that require a certain level of quality or safety such as automotive, medical systems, or safety equipment. Please contact customer service for the contractual specification package.

## Environmental

	Silver	Gold
OPERATING TEMPERATURE:	-40°C to 85°C	-40°C to 125°C
STORAGE TEMPERATURE:	-55°C to 85°C	-55°C to 125°C

## Process

- SOLDERING: Depending on the application, this component is suited to the following methods:
- Terminals being silver or gold plated over a nickel barrier, the use of slightly activated flux is suitable.
  - Soldering on double wave machine for vertical versions: soldering time ≤ 5 sec.
  - Cleaning according to typical washing processes.
  - Infrared Reflow Soldering in accordance with IEC 61760-1.

## Electrical

	Silver	Gold
MAXIMUM POWER:	1 VA	0.2 VA
MAXIMUM VOLTAGE:	32 VDC	32 VDC
MINIMUM VOLTAGE:	20 mV	20 mV
MAXIMUM CURRENT:	50 mA	10 mA
MINIMUM CURRENT:	1 mA*	0.1 mA

DIELECTRIC STRENGTH (50 Hz, 1 min.): ≥ 250 Vrms  
 CONTACT RESISTANCE: ≤ 100mΩ  
 INSULATION RESISTANCE (100 V): ≥ 10M Ω  
 BOUNCE TIME: ≤ 1 ms

\* Ultra low current with 10 µA - 1 VDC version are available upon request for KSC2 and KSC4

## Packaging

Tape and Reel (see series for quantity information)

**NOTE:** Specifications listed above are for switches with standard options.

## KSC Product Range

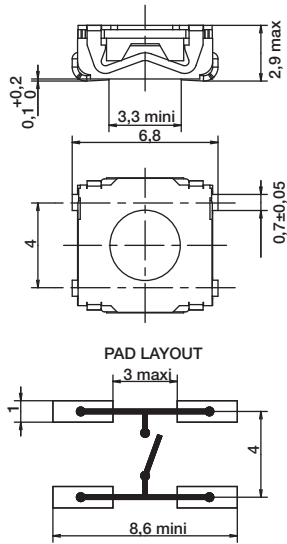
KSC1	KSC2	KSC3	KSC4	KSC5	KSC6	KSC7	KSC8	KSC9	KSC10
Without actuator	Soft actuator	Hard actuator	Soft actuator	Hard actuator	Hard actuator	Soft actuator	Hard actuator	Hard actuator	Soft actuator
H = 2.5 mm	H = 3.5 mm	H = 3.5 mm	H = 5.2 mm	H = 5.6 mm	H = 7.7 mm	H = 4.3 mm	H = 4.9 mm	H = 7.7 mm compatible with button	H = 4.9 mm
IP67	IP67	IP67	IP67	IP50	IP67	IP67	IP67	IP67	IP67



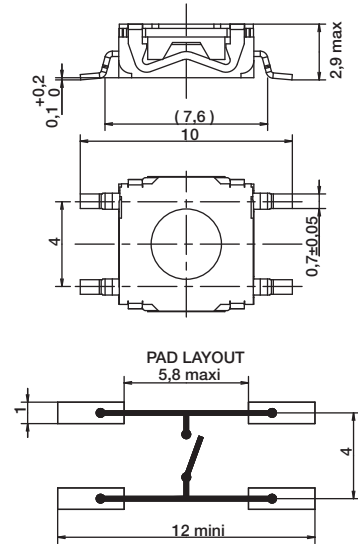
Note: KSC Series is subject to variants. Please contact customer service for other options.

# KSC Series Sealed Tact Switch for SMT

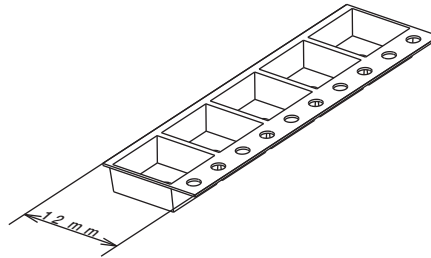
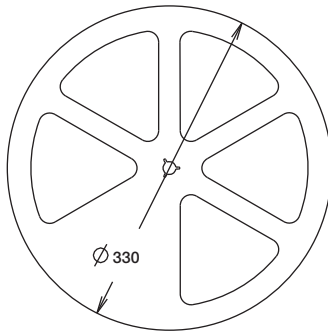
## J BEND



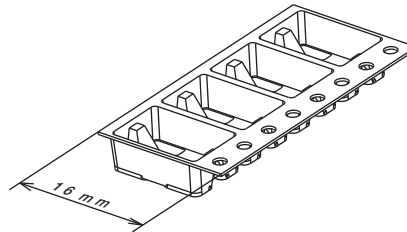
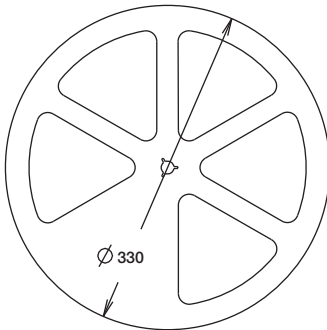
## G GULLWING



### 12 MM



### 16 MM



12 mm	Pieces	16 mm	Pieces
KSC1J	2,000	KSC1G	2,000
KSC2J	2,000	KSC2G	2,000
KSC3J	2,000	KSC3G	2,000
		KSC4J & G	1,000
		KSC5J & G	1,000
		KSC6J & G	750
		KSC7J & G	1,000
		KSC8J & G	1,000
		KSC9J & G	750
		KSC10J & G	1,000



First Angle  
Projection

Dimensions are shown: mm  
Specifications and dimensions subject to change

# KSC1 Series Sealed Tact Switch for SMT

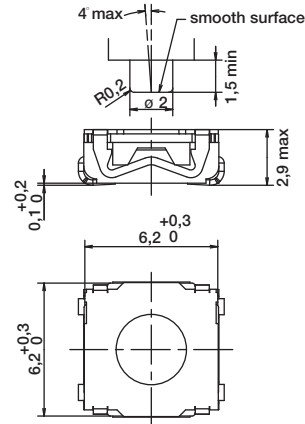
## KSC1 without actuator 2,5 mm high



Type	Operating force FA (Newtons)	Operating life (operations)	Travel (mm)
KSC121	1.8 ± 0.65	200,000	0.3 ± 0.15
KSC141	3 ± 0.75	200,000	0.3 ± 0.15
KSC151	5.5 ± 1.4	100,000	0.35 ± 0.15

### Packaging

Switches delivered on continuous tape & reels of 2,000 pieces  
 Dimensions according to EIA RS-481/ IEC 60286-3 standard  
 External diameter 330 ± 2 mm



B

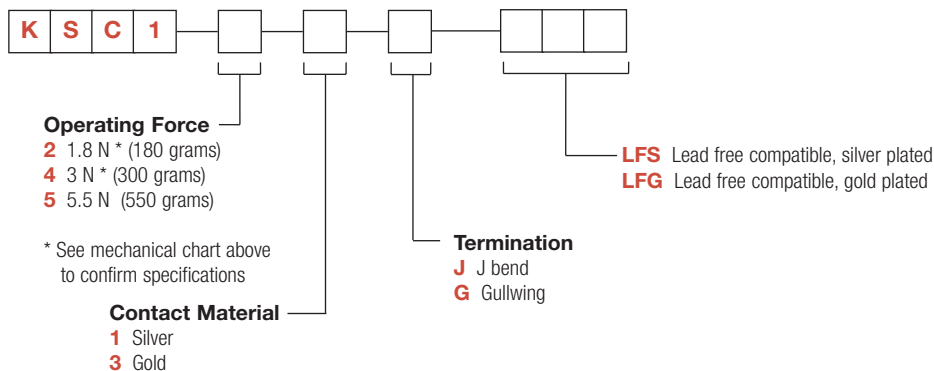
Tactile Switches

### How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

**However, please note that all the combinations of these options are not feasible.**

**For any part number different from those listed above, please consult your local representative.**



Dimensions are shown: mm  
 Specifications and dimensions subject to change

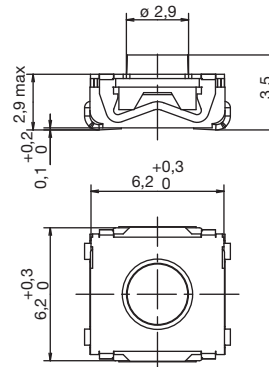
# KSC2 Series Sealed Tact Switch for SMT

## KSC2 soft actuator 3,5 mm high



Tactile Switches

Type	Operating force FA (Newtons)	Operating life (operations)	Travel (mm)
KSC201	1.6 ± 0.6	5,000,000	0.3 ± 0.2
KSC221	2 ± 0.5	500,000	0.35 + 0.3/- 0.1
KSC222	2 ± 0.5	1,000,000	0.35 ± 0.15
KSC241	3.5 ± 0.9	300,000	0.5 ± 0.2
KSC251	5.55 ± 1.45	300,000	0.5 ± 0.2
KSC231 SPD	3.5 ± 0.9	300,000	0.5 ± 0.2
KSC241 SPD	3.55 ± 0.9	300,000	0.5 ± 0.2
KSC251 SPD	6.2 ± 1.55	100,000	0.6 ± 0.2



### Packaging

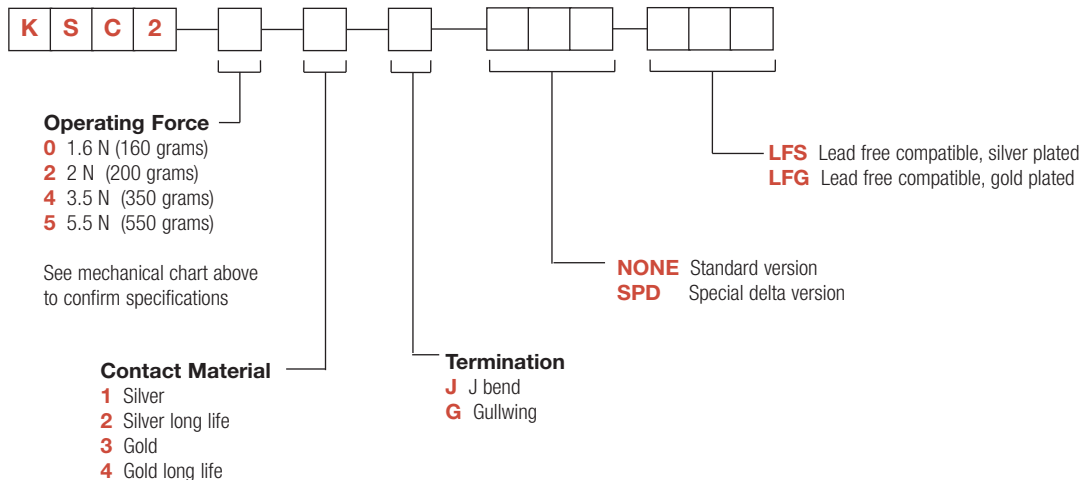
Switches delivered on continuous tape & reels of 2,000 pieces  
 Dimensions according to EIA RS-481/ IEC 60286-3 standard  
 External diameter 330 ± 2 mm

### How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

**However, please note that all the combinations of these options are not feasible.**

**For any part number different from those listed above, please consult your local representative.**



Dimensions are shown: mm  
 Specifications and dimensions subject to change

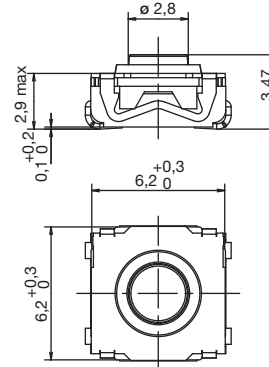


# KSC3 Series Sealed Tact Switch for SMT

## KSC3 hard actuator 3,5 mm high



Type	Operating force FA (Newtons)	Operating life (operations)	Travel (mm)
KSC321	2 ± 0.4	300,000	0.2 + 0.3/- 0
KSC341	3 ± 0.75	300,000	0.2 + 0.3/- 0
KSC351	5 ± 1	100,000	0.25 + 0.3/- 0



## Packaging

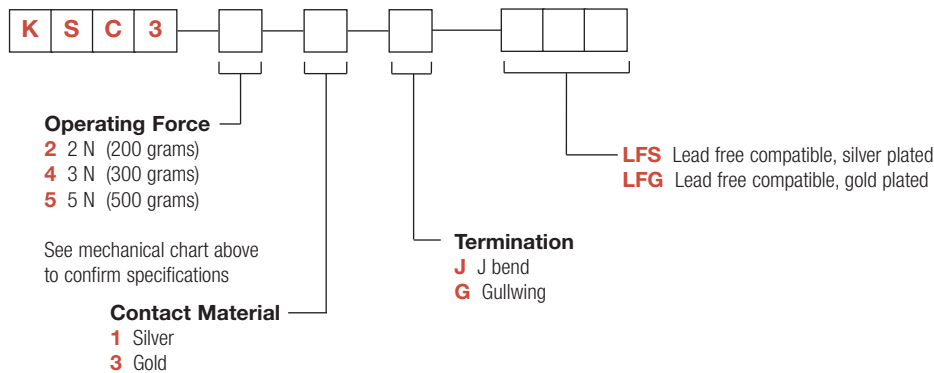
Switches delivered on continuous tape & reels of 2,000 pieces  
 Dimensions according to EIA RS-481/ IEC 60286-3 standard  
 External diameter 330 ± 2 mm

## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

**However, please note that all the combinations of these options are not feasible.**

**For any part number different from those listed above, please consult your local representative.**



# KSC4 Series

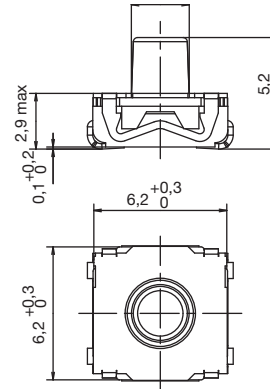
## Sealed Tact Switch for SMT

KSC4 soft actuator 5,2 mm high



Tactile Switches

Type	Operating force FA (Newtons)	Operating life (operations)	Travel (mm)
KSC401 50SH	1.45 ± 0.55	5,000,000	0.5 ± 0.25
KSC411 70SH	1.4 ± 0.35	1,000,000	0.35 ± 0.20
KSC421 70SH	1.7 ± 0.45	300,000	0.5 ± 0.25
KSC422 70SH	1.7 ± 0.45	1,000,000	0.5 ± 0.25
KSC441 70SH	4 ± 1	300,000	0.75 ± 0.25
KSC442 70SH	4 ± 1	1,000,000	0.75 ± 0.25
KSC451 70SH	4.25 ± 0.75	300,000	0.8 ± 0.2
KSC441 SPD	3.5 ± 0.9	300,000	0.7 ± 0.2
KSC441 ST1	3.4 ± 1	300,000	0.7 ± 0.25
KSC441 ST2	3.4 ± 1	300,000	0.35 ± 0.20
KSC461 ST1	6.25 ± 1.75	100,000	1 ± 0.3
KSC461 ST2	6.25 ± 1.75	300,000	0.5 ± 0.2



### Packaging

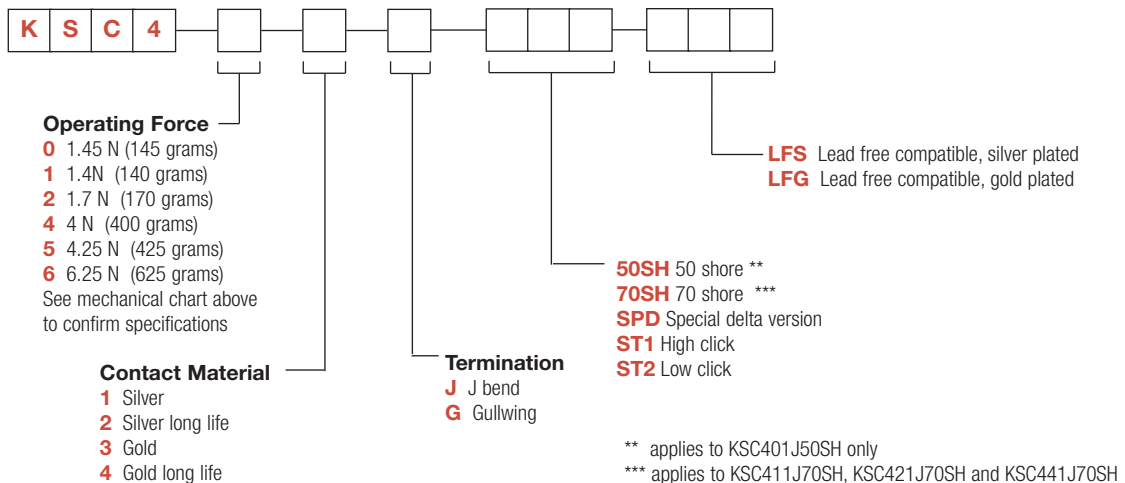
Switches delivered on continuous tape & reels of 1,000 pieces  
 Dimensions according to EIA RS-481/ IEC 60286-3 standard  
 External diameter 330 ± 2 mm

### How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

However, please note that all the combinations of these options are not feasible.

For any part number different from those listed above, please consult your local representative.



Dimensions are shown: mm  
 Specifications and dimensions subject to change

# KSC5 Series Tact Switch with Rocker Option for SMT

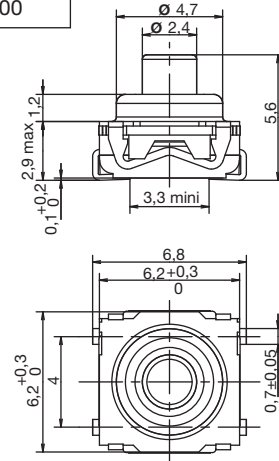
KSC5 hard actuator 5,6 mm high



Type	Operating force axial FA N (grams)	Operating force lateral FL N (grams) ±30%	Travel to make axial (mm)	Travel to make lateral (mm)	Life expectancy cycles, axial	Life expectancy cycles, lateral
KSC521	2 ± 0.5	1.2 - 2.6	0.25 ± 0.15	0.5 ± 0.25	100,000	10,000
KSC541	3 ± 0.75	1.8 - 3.8	0.25 ± 0.15	0.5 ± 0.25	100,000	10,000

## Packaging

Switches delivered on continuous tape & reels of 1,000 pieces, dimensions according to EIA RS-481/ IEC 60286-3 standard  
External diameter 330 ± 2 mm

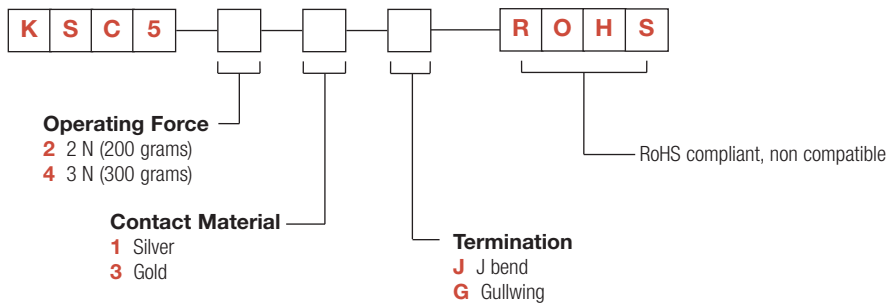


## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

However, please note that all the combinations of these options are not feasible.

For any part number different from those listed above, please consult your local representative.

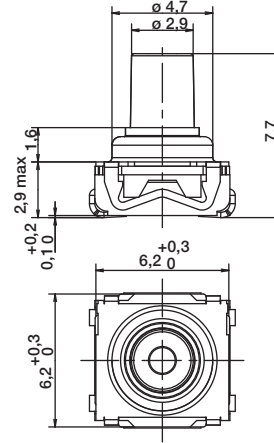


# KSC6 Series Sealed Tact Switch for SMT

KSC6 hard actuator 7,7 mm high



Type	Operating force FA (Newtons)	Operating life (operations)	Travel (mm)
KSC621	1.7 ± 0.5	300,000	0.4 ± 0.2
KSC631	2.55 ± 0.65	300,000	0.4 ± 0.2
KSC641	3.4 ± 0.85	300,000	0.4 ± 0.2



Tactile Switches

## Packaging

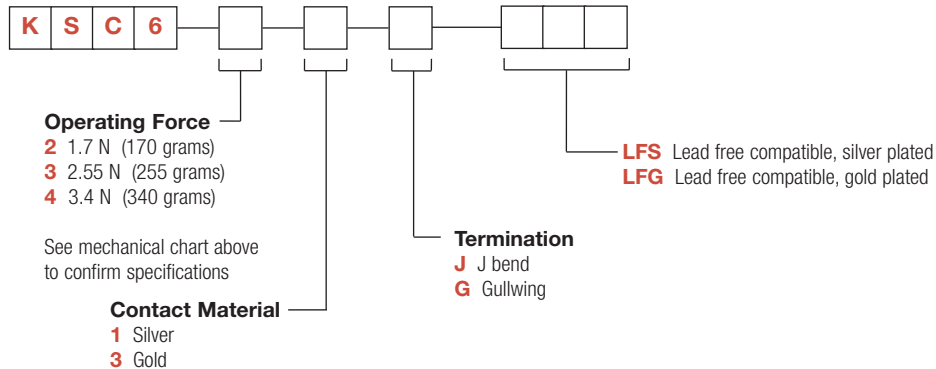
Switches delivered on continuous tape & reels of 750 pieces  
Dimensions according to EIA RS-481/ IEC 60286-3 standard  
External diameter 330 ± 2 mm

## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

**However, please note that all the combinations of these options are not feasible.**

**For any part number different from those listed above, please consult your local representative.**



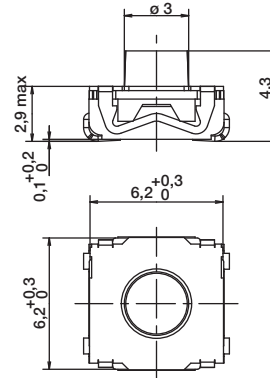
Dimensions are shown: mm  
Specifications and dimensions subject to change

# KSC7 Series Tact Switch with Rocker Option for SMT

## KSC7 soft actuator 4,3 mm high



Type	Operating force FA (Newtons)	Operating life (operations)	Travel (mm)
KSC701	1.6 ± 0.6	5,000,000	0.3 ± 0.2
KSC721	2.25 ± 0.55	300,000	0.3 ± 0.15
KSC741	3.9 ± 1	300,000	0.4 ± 0.2



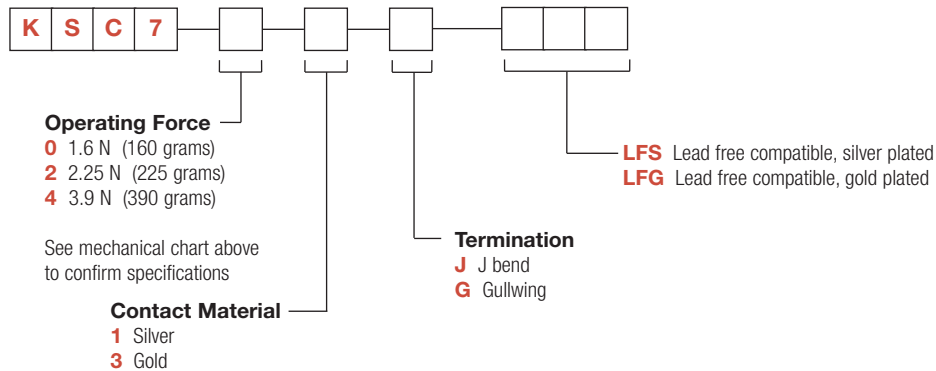
## Packaging

Switches delivered on continuous tape & reels of 1,000 pieces  
Dimensions according to EIA RS-481/ IEC 60286-3 standard  
External diameter 330 ± 2 mm

## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

**However, please note that all the combinations of these options are not feasible.  
For any part number different from those listed above, please consult your local representative.**



# KSC8 Series

## Sealed Tact Switch for SMT

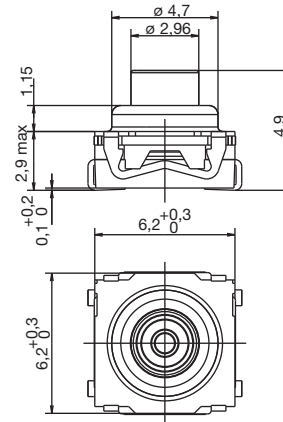
KSC8 hard actuator 4,9 mm high



Type	Operating force FA (Newtons)	Operating life (operations)	Travel (mm)
KSC821	3.15 ± 0.75	300,000	0.65 ± 0.2
KSC821 OL	1.7 ± 0.5	300,000	0.4 ± 0.2
KSC831 OL	2.55 ± 0.65	300,000	0.4 ± 0.2
KSC841 OL	3.4 ± 0.85	300,000	0.4 ± 0.2

### Packaging

Switches delivered on continuous tape & reels of 1,000 pieces  
 Dimensions according to EIA RS-481/ IEC 60286-3 standard  
 External diameter 330 ± 2 mm

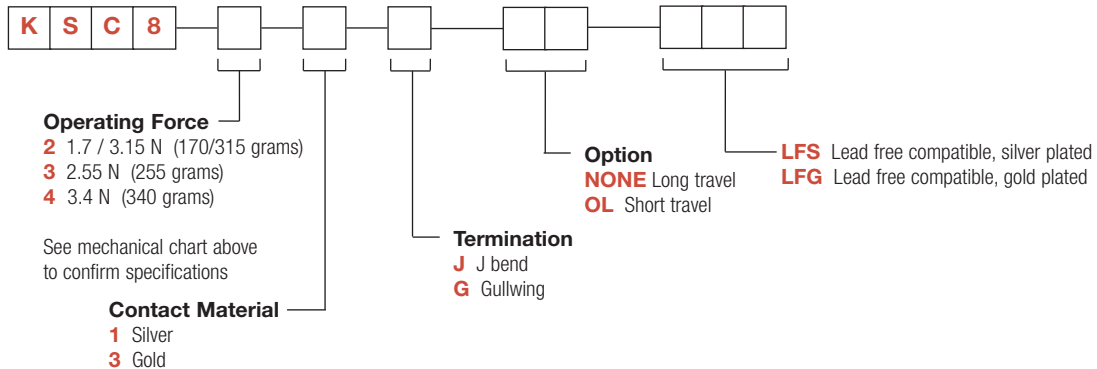


Tactile Switches

### How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

However, please note that all the combinations of these options are not feasible.  
 For any part number different from those listed above, please consult your local representative.



Dimensions are shown: mm  
 Specifications and dimensions subject to change

# KSC9 Series Sealed Tact Switches for SMT

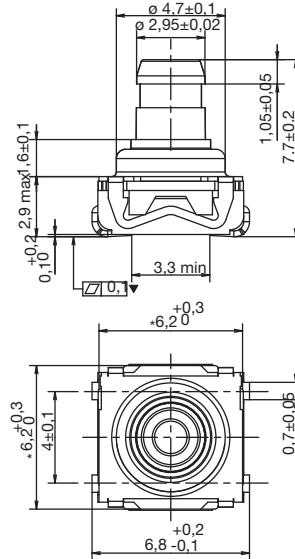
## KSC9 hard actuator 7,7 mm high



Type	Operating force FA (Newtons)	Operating life (operations)	Travel (mm)
KSC921	1.7 ± 0.5	300,000	0.4 ± 0.2
KSC931	2.25 ± 0.65	300,000	0.4 ± 0.2
KSC941	3.4 ± 0.85	300,000	0.4 ± 0.2

### Packaging

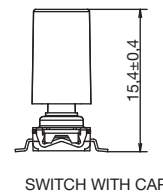
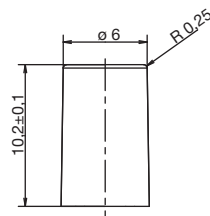
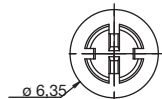
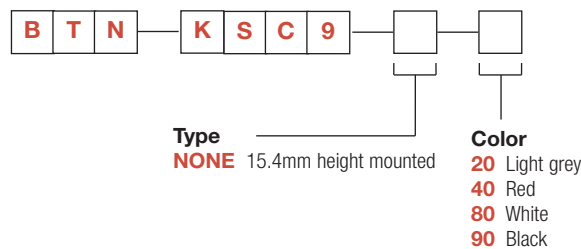
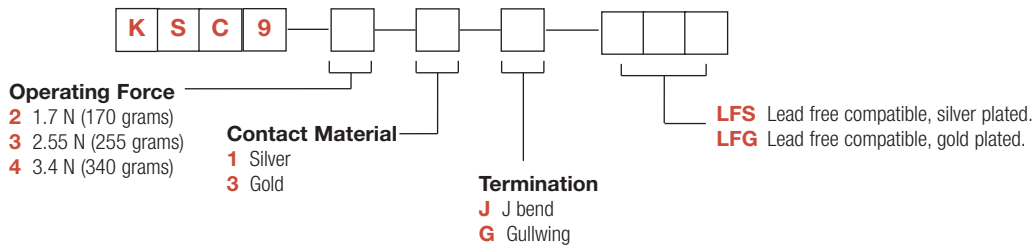
Switches delivered on continuous tape & reels of 750 pieces  
Dimensions according to EIA RS-481/ IEC 60286-3 standard  
External diameter 330 ± 2 mm



### How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

**For any part number different from those listed above, please consult your local representative.**



Dimensions are shown: mm  
Specifications and dimensions subject to change

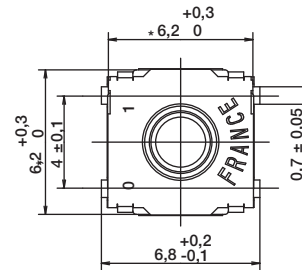
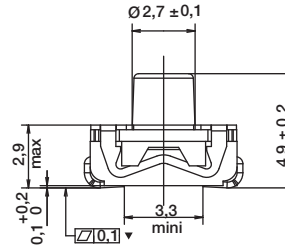
# KSC10 Series Sealed Tact Switches for SMT

KSC10 soft actuator 4,9 mm high



Tactile Switches B

Type	Operating force FA (Newtons)	Operating life (operations)	Travel (mm)
KSC1001	1.45 ± 0.55	5,000,000	0.45 ± 0.25



## Packaging

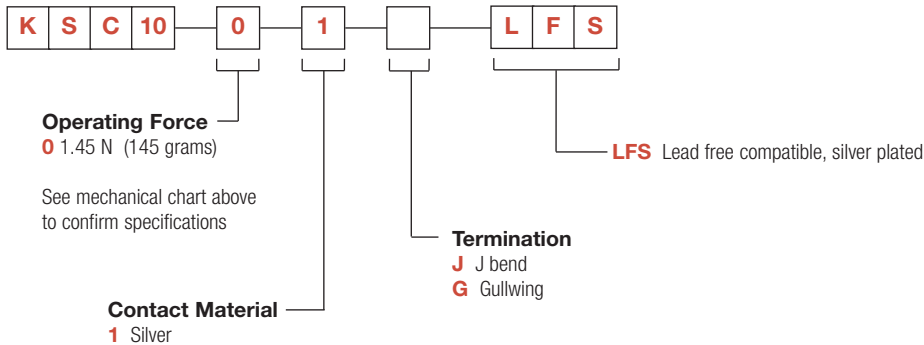
Switches delivered on continuous tape & reels of 1,000 pieces  
Dimensions according to EIA RS-481/ IEC 60286-3 standard  
External diameter 330 ± 2 mm

## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

**However, please note that all the combinations of these options are not feasible.**

**For any part number different from those listed above, please consult your local representative.**



Note: KSC10 offered with yellow actuator as standard, hardness 55 Shore



Dimensions are shown: mm  
Specifications and dimensions subject to change



# KSC4V2 Series Side Actuated Sealed Tact Switch

## Features/Benefits

- Full SMD side actuated
- Haptic adaptability
- Pin in paste terminations
- Tape & reel
- IP67

## Typical Applications

- Automotive
- Industrial electronics
- Network equipment
- Telecommunications



## Specification

FUNCTION: momentary action  
 CONTACT ARRANGEMENT: 1 make contact = SPST, N.O.  
 TERMINALS:  
 2 pin in paste signal terminals  
 3 SMD ground terminals

## Mechanical

Type	Force (N)	Operating Life (operations)	Travel (mm)
KSC441V2SPDLFS	3.5 ± 1.0	300,000	0.7 ± 0.2
KSC421V270SHLFS	1.55 ± 0.45	300,000	0.5 ± 0.2

NOTE: Basic version is based on KSC441V2 SPDELTA LFS.  
 Other configurations of haptics are available upon demand.

MISUSE OVERLOAD: 40N with back support  
 SHEAR FORCE: 10N without back support

## Electrical

	Silver	Gold
MAXIMUM POWER:	1 VA	0.2 VA
MAXIMUM VOLTAGE:	32 VDC	32 VDC
MINIMUM VOLTAGE:	20 mV	20 mV
MAXIMUM CURRENT:	50 mA	10 mA
MINIMUM CURRENT:	1 mA	0.1 mA

DIELECTRIC STRENGTH (50 Hz, 1 min.): ≥ 250 Vrms  
 CONTACT RESISTANCE: ≤ 100 mΩ  
 INSULATION RESISTANCE (100 V, initial stage): > 10<sup>9</sup> Ω  
 BOUNCE TIME: < 1 ms

## Environmental

	Silver	Gold
OPERATING TEMPERATURE:	-40°C to 85°C	-40°C to 125°C
STORAGE TEMPERATURE:	-55°C to 85°C	-55°C to 125°C

## Process

SOLDERING: Depending on the application, this component is suited to the following methods:

- Cleaning according to typical washing processes.
- Infrared Reflow Soldering in accordance with IEC 61760-1.

TERMINALS: pin in paste, silver or gold plated

TOP PLATE: tin plated

MSL level: 1

Vacuum pick head mandatory

## Packaging

In reels of 500 pieces.

Dimensions of reels according to EIA RS481 or IEC 2863.

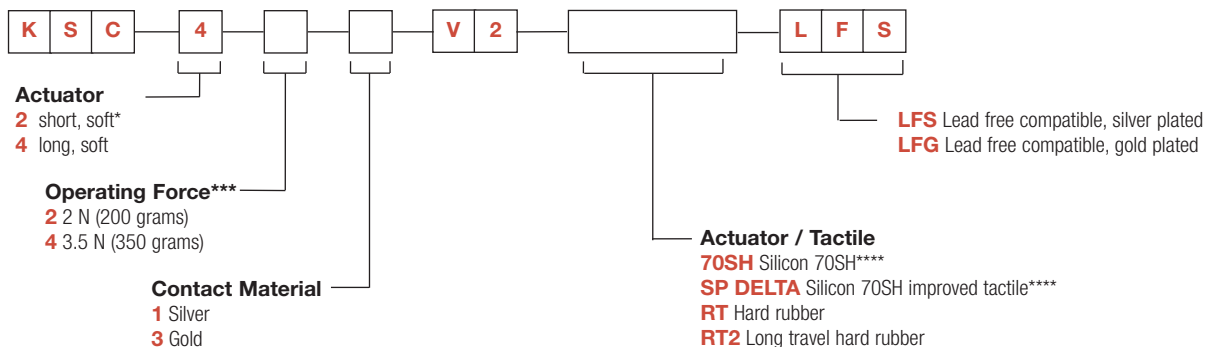
External diameter 330 mm ± 2 mm.

NOTE: This product is designed and manufactured for general electronic devices.  
 For systems where reliability and safety are required, please contact your sales representative to secure product integration and function to secure usage.

## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

**For any part number different from those listed above, please consult your local representative.**

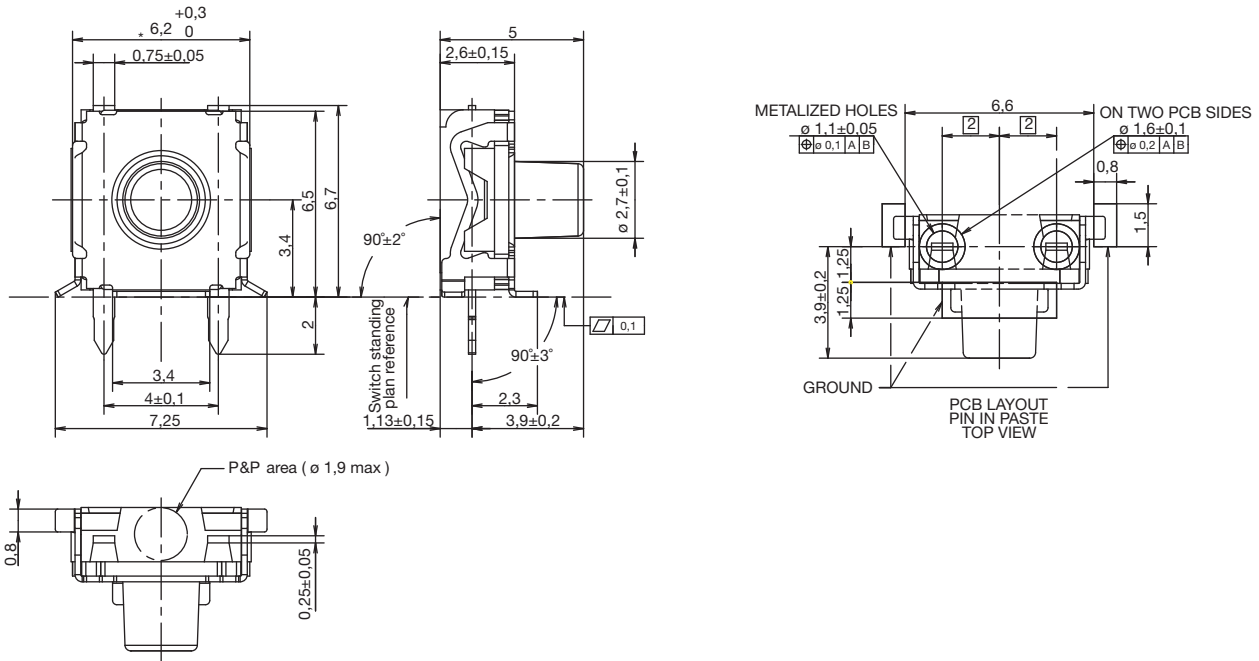


\* KSC2 version available upon demand  
 \*\*\* Force available upon demand (variant version)  
 \*\*\*\* Available for KSC4 only

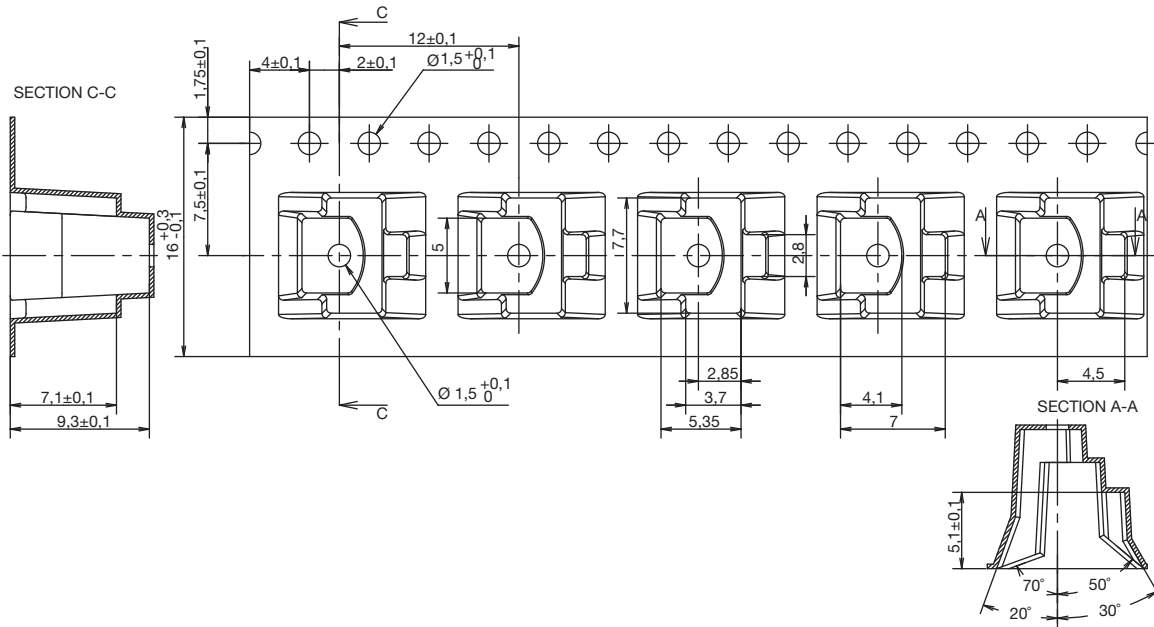
# KSC4V2 Series Side Actuated Sealed Tact Switch

Tactile Switches

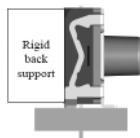
B



## TAPE AND REEL



## INTEGRATION



First Angle  
Projection

Dimensions are shown: mm  
Specifications and dimensions subject to change

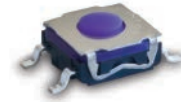
# KSE Series Low Profile Tact Switch

## Features/Benefits

- Low profile
- Cost efficient
- J or G terminations
- Tape and reel
- IP67

## Typical Applications

- Smart meters
- Home appliances
- Consumer electronics
- Industrial electronics
- Telecommunications



## Specification

FUNCTION: momentary action  
CONTACT ARRANGEMENT: 1 make contact = SPST, N.O.  
TERMINALS: J bend & Gullwing type for SMT

## Mechanical

Type	Operating Force FA (Newtons)		Operating Life Operations	Travel (mm)
	Min.	Max.		
KSEM31JLFS	1,6 ± 0,6		300,000	0,3 + 0,1/-0,2
KSEM31GLFS	1,6 ± 0,6		300,000	0,3 + 0,1/-0,2
KSEK43JLFS	2,25 ± 0,75		300,000	0,3 ± 0,2
KSEK43GLFS	2,25 ± 0,75		300,000	0,3 ± 0,2

NOTE: For cost effectiveness the tactile feeling is not specified and can change along production. If your application requires a defined tactile effect, please consider KSC series for your application.

## Packaging

In reels of 2,000 pieces  
Dimensions of reels according to EIA RS481 or IEC 2863.  
External diameter 330 mm ± 2 mm.

## Electrical

MAXIMUM POWER: 1 VA  
MINIMUM/MAXIMUM VOLTAGE: 20 mV / 32 VDC  
MINIMUM/MAXIMUM CURRENT: 1 mA / 50 mA  
DIELECTRIC STRENGTH: (50 Hz, 1 min.): ≥ 250 V  
CONTACT RESISTANCE: ≤ 100 mΩ  
INSULATION RESISTANCE: (100 V): ≥ 10<sup>9</sup> Ω  
BOUNCE TIME: ≤ 1 ms

## Environmental

OPERATING TEMPERATURE: -40°C to 85°C  
STORAGE TEMPERATURE: -55°C to 85°C

## Process

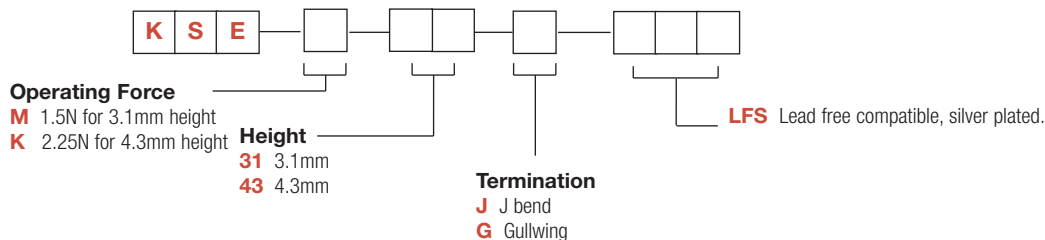
SOLDERING: Depending on the application, this component is suited to the following methods:  
– Cleaning according to typical washing processes.  
– Infrared Reflow Soldering in accordance with IEC 61760-1.

## NOTE:

Specifications listed above are for switches with standard options. KSE series is not subject to adaptation and/or modification for specific use. If you require additional features, please refer to the KSC series. KSE is not recommended for applications requiring high level of performance such as aerospace, automotive and some industrial applications.

## How To Order

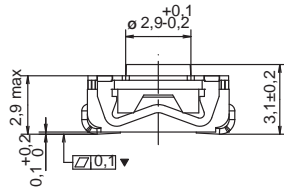
Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.



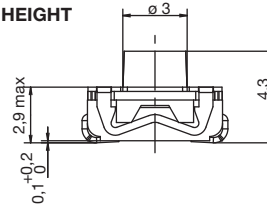
# KSE Series Low Profile Tact Switch

## HEIGHT

**31** 3.1 MM HEIGHT

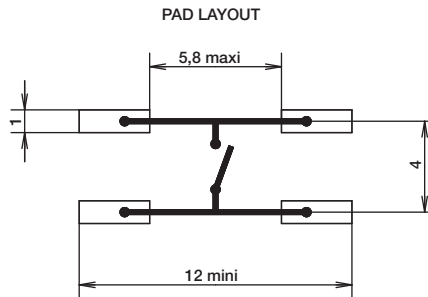
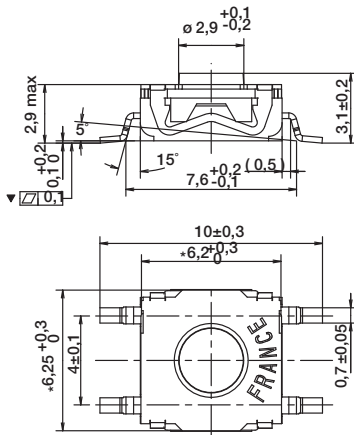


**43** 4.3 MM HEIGHT

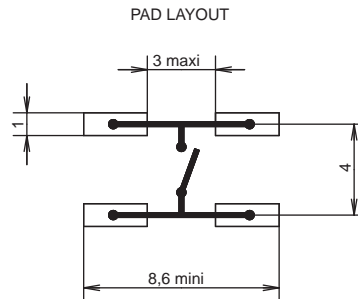
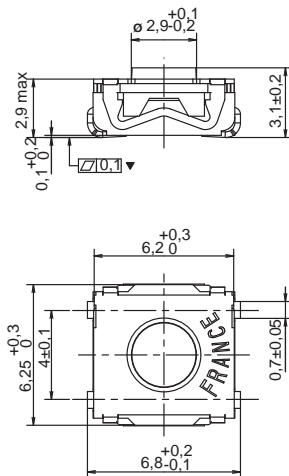


## TERMINATION

**G** GULLWING



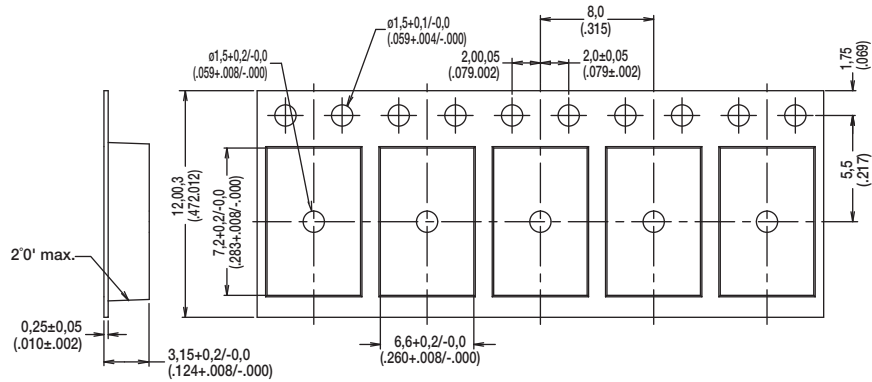
**J** J BEND



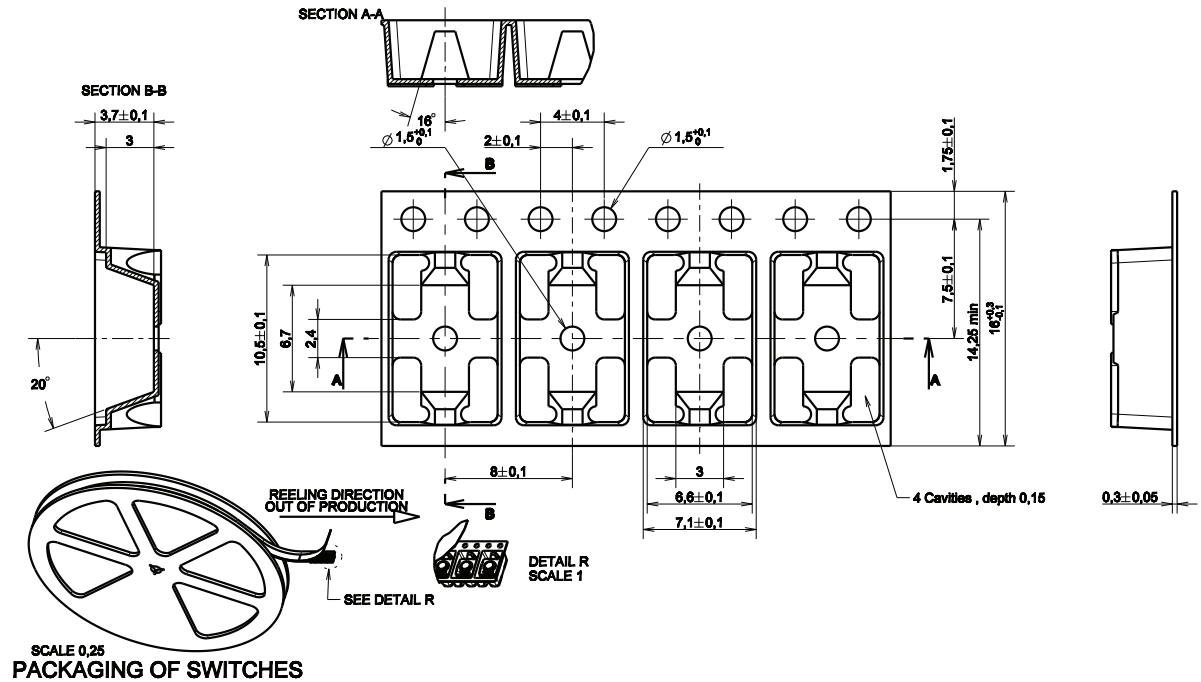
# KSE Series Low Profile Tact Switch

## TAPE & REEL

### 12 mm height



### 16 mm height



**B**  
Tactile Switches

# KT Series

## Full SMT Top & Side Actuated Sealed Tact Switch



### Features/Benefits

- Full SMT side-actuated tact switch
- SMT top-actuated tact switch with G or J terminations
- High shear force with extended bracket
- Easy to pick & place with top plate tab
- Rubber or hard plastic actuator
- Press fit or snap fit caps
- RoHS compliant and compatible

### Typical Applications

- Telecommunications
- Computer products
- Instrumentation
- Power supply

### Specification

CONTACT ARRANGEMENT: SPST, N.O.  
TERMINALS: SMT termination

### Electrical

CONTACT RATING: 1.0 VA max. @ 32 V AC or DC max.  
ELECTRICAL & MECHANICAL LIFE: 100,000 make-and-break cycles at full load.  
DIELECTRIC STRENGTH: 250 Vrms min. @ sea level.  
CONTACT RESISTANCE: Below 50 mΩ typ. initial @ 2-4 V DC, 100 mA.  
INSULATION RESISTANCE: 10<sup>9</sup> Ω min.

### Environmental

OPERATING TEMPERATURES: Ag version: -40°C to 90°C  
Au version: -40°C to 125°C

### Process

SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).  
DEGREE OF PROTECTION: IP57; protection against harmful dust deposits, full-scale voltage protection.

### Packaging

Switches supplied in anti-static tape and reels per EIA 481-2. Tape and cover strip are conductive for use near statically sensitive components.

**NOTE:** Specifications listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

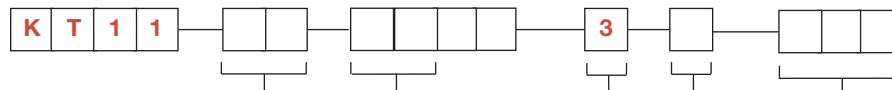
### How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

However, please note that all the combinations of these options are not feasible.

For any part number different from those listed above, please consult your local representative.

### SWITCH



#### Actuator

- B0\*** Soft, flush
- B1\*** Soft, 0,64 mm
- B2\*** Soft, 2,24 mm
- P2\*\*** Hard, 2,36 mm
- P3\*\*** Hard, 1,12 mm
- P4\*\*** Hard, 3,96 mm
- S1\*\*\*** ø0,1" for Press Fit Caps
- S2\*\*\*** ø0,14" for Snap Fit Caps (with anti-rotation)

#### Orientation and Mounting Style

- SM** Top Gullwing
- JM** Top J Bend \*\*\*\*
- SAM** Right angle
- SA1M** Right angle with front solder pad
- SA2M** Right angle with front solder pad and pick & place tab
- SA3M** Right angle with pick & place tab

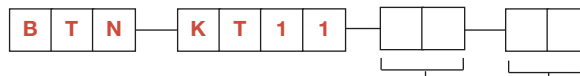
#### Contact Plating

- 4** Silver
- 5** Gold
- LFS** RoHS compliant and compatible. Silver plated
- LFG** RoHS compliant and compatible. Gold plated

\* B0, B1 & B2 available with A, A1 & A3 mounting bracket only.  
\*\* P2, P3, P4 actuators suitable with A1 & A2 mounting bracket only.  
\*\*\* S1 & S2 available with A1 & A2 mounting bracket only.  
\*\*\*\* JM available with B0, B1, B2, P2, P3, P4 without mounting bracket.

### BUTTON

To order buttons in bulk



#### Button Style

- 02** Press fit
- 03** Snap fit, high temperature

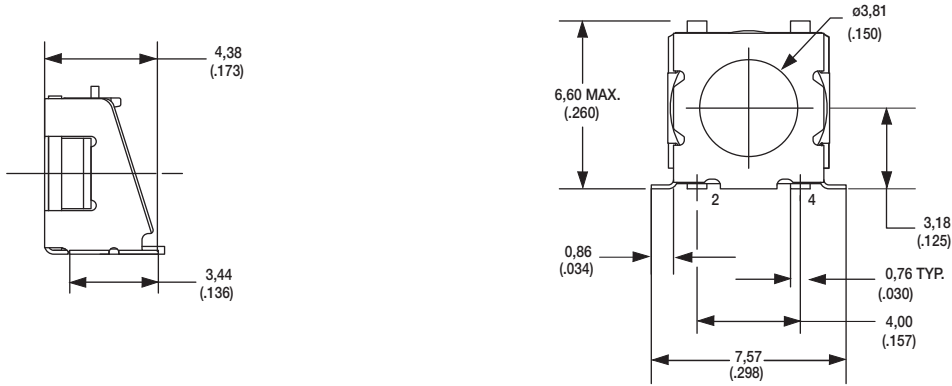
#### Button Color

- 90** Black
- 80** Ivory (natural)
- 40** Red

# KT Series Full SMT Top & Side Actuated Sealed Tact Switch

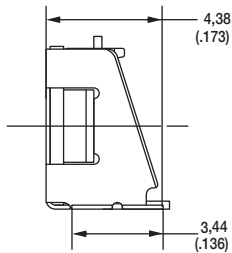
## SERIES

**KT11**

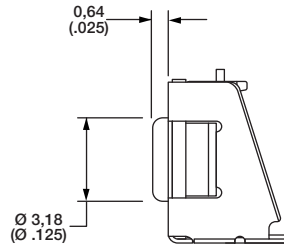


## ACTUATOR

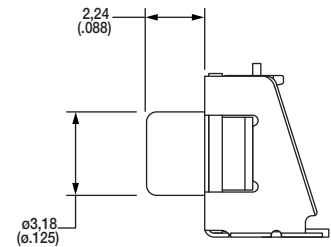
**B0 SOFT, FLUSH\***



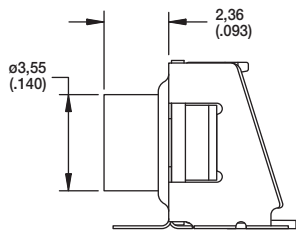
**B1 SOFT, 0,64 mm\***



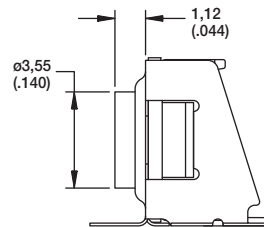
**B2 SOFT, 2,24 mm\***



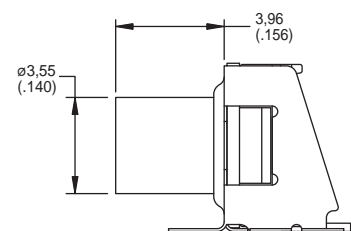
**P2 HARD, 2,36 mm**



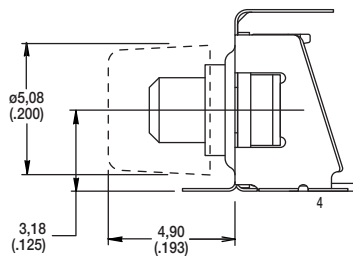
**P3 HARD, 1,12 mm**



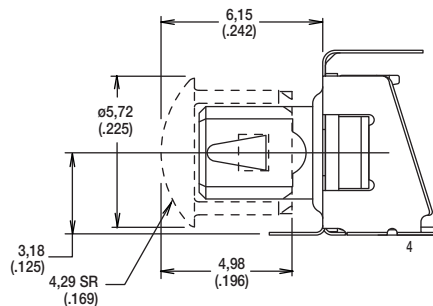
**P4 HARD, 3,96 mm\*\***



**S1  $\phi 0,1$ " FOR PRESS FIT CAPS\*\*\***



**S2  $\phi 0,14$ " FOR SNAP FIT CAPS\*\*\***



\* B0, B1 & B2 available with A, A1 & A3 mounting bracket only.

\*\* P2, P3, P4 actuators suitable with A1 & A2 mounting bracket only.

\*\*\* S1 & S2 available with A1 & A2 mounting bracket only.

\*\*\*\* JM available with B0, B1, B2, P2, P3, P4 without mounting bracket.



*Dimensions are shown: mm (inches)  
Specifications and dimensions subject to change*

B

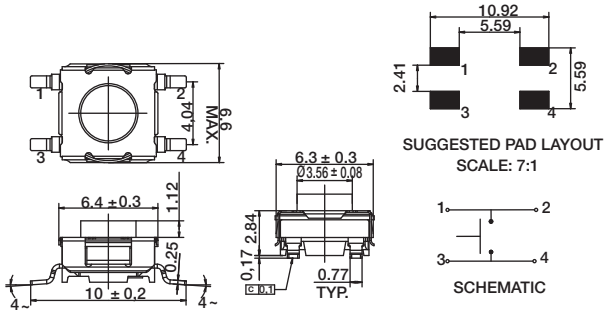
Tactile Switches

# KT Series Full SMT Top & Side Actuated Sealed Tact Switch

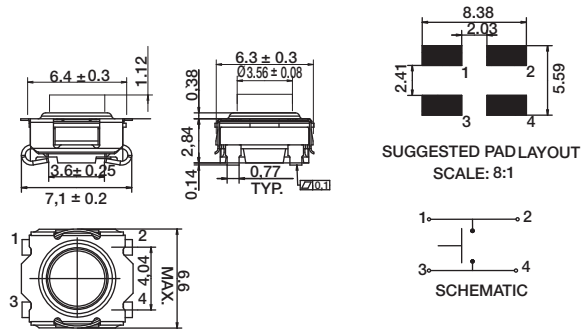
## ORIENTATION & MOUNTING STYLE

Tactile Switches

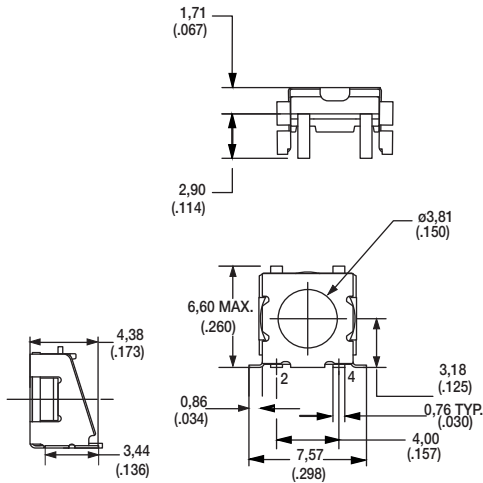
### SM TOP GULLWING



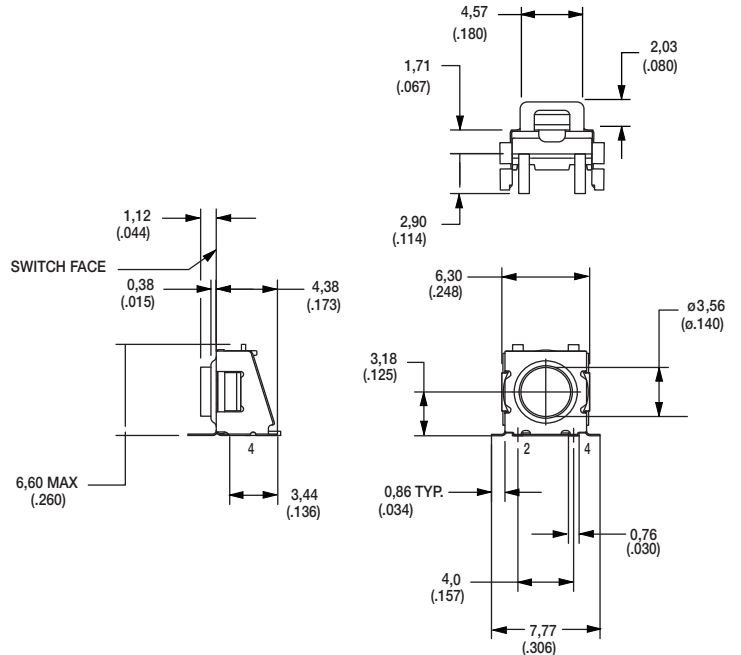
### JM TOP J BEND



### SAM RIGHT ANGLE



### SA1M RIGHT ANGLE WITH FRONT SOLDER PAD



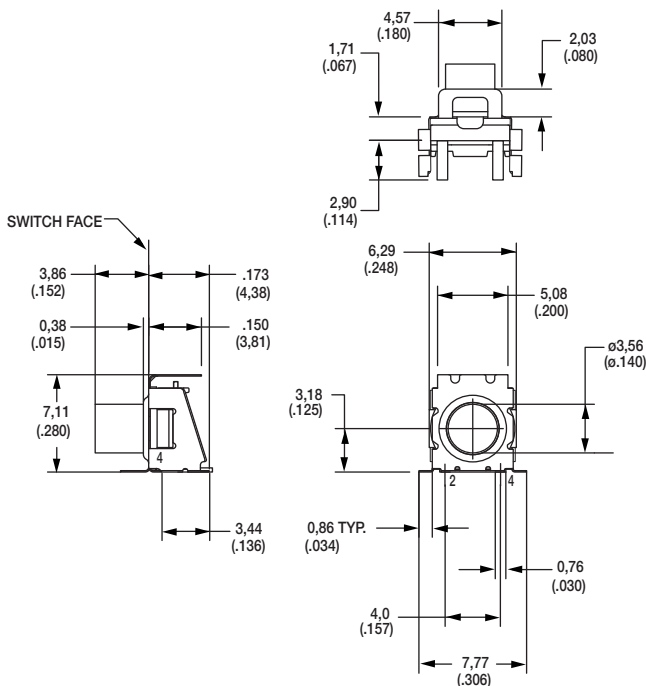
Dimensions are shown: mm (inches)  
Specifications and dimensions subject to change



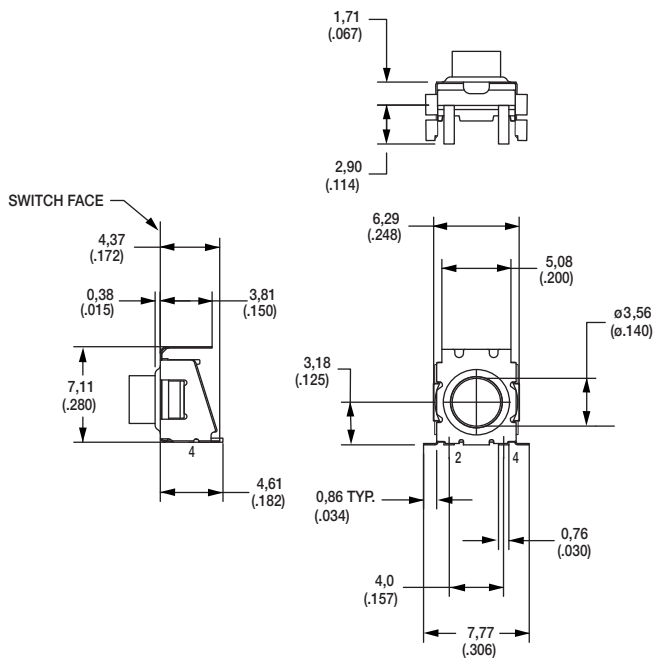
# KT Series

## Full SMT Top & Side Actuated Sealed Tact Switch

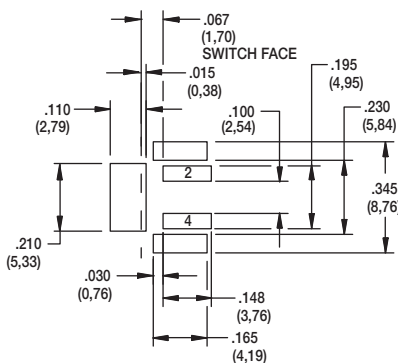
**SA2M** RIGHT ANGLE WITH FRONT SOLDER PAD AND PICK & PLACE TAB



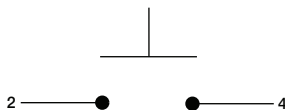
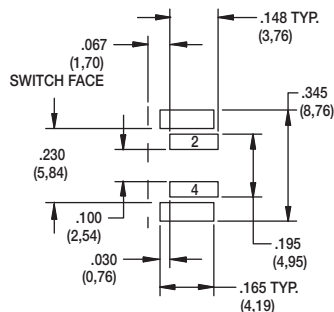
**SA3M** RIGHT ANGLE WITH PICK & PLACE TAB



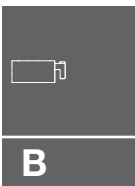
**PAD LAYOUT**  
SA1M & SA2M MOUNTING BRACKET



**PAD LAYOUT**  
SAM & SA3M MOUNTING BRACKET



**SCHEMATIC**



Dimensions are shown: mm (inches)  
Specifications and dimensions subject to change

# KT Series Full SMT Top & Side Actuated Sealed Tact Switch

## BUTTON

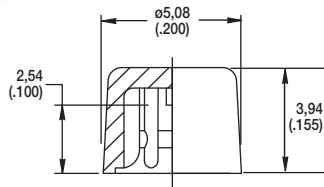
### BUTTON

To order buttons in bulk

#### 02 PRESS FIT

PART NUMBER	Internal Part Number	Button Color
<b>BTN KT11 02 80</b>	5081 01000	Ivory (Natural)
<b>BTN KT11 02 90</b>	5081 02000	Black
<b>BTN KT11 02 40</b>	5081 03000	Red

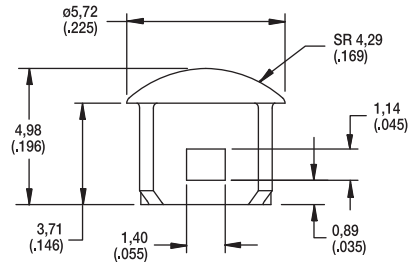
Materials: Nylon  
Finish: Gloss



#### 03 SNAP FIT, HIGH TEMPERATURE

PART NUMBER	Internal Part Number	Button Color
<b>BTN KT11 03 80</b>	685B 01000	Ivory (Natural)
<b>BTN KT11 03 90</b>	685B 02000	Black

Materials: Nylon  
Finish: Gloss



# K5AT Illuminated SMT Tact Switch

## Features

- High bright LED's
- Gold plated dome contact offering superior contact reliability in time
- Excellent ergonomics: sharp tactile feel and audible click
- Reduced space usage on board "2 in 1"
- 40 N overload
- Tape and reel
- RoHS compliant and compatible

## Typical Applications

- Application requiring illumination
- Server, storage
- Network infrastructure
- Telecom
- Medical



B

Tactile Switches

## Specification

FUNCTION: momentary action  
 CONTACT ARRANGEMENT: Normally Open  
 TERMINALS: SMT with positioning pegs;  
 SMT without positioning pegs is available, contact Customer Service

## Mechanical

Type	Operating force FA <sup>1</sup> Newtons (grams)	Operating life (operations)	Travel (total travel) mm(mm)
K5AT WH 43GP	4.0 (400)	100,000	0,5 (0.8)

<sup>1</sup> Tolerances of operating force FA is ± 25%.

## Packaging

Standard: 900 pcs per reel; Reel diameter 380 mm  
 Reduced: 180 pcs per reel; Reel diameter 180 mm

## Electrical

POWER MIN/MAX: 0.02VA / 1.0VA  
 VOLTAGE MIN/MAX: 20mVdc – 32 Vdc  
 CURRENT MIN/MAX: 0.1mA – 100mA  
 CONTACT RESISTANCE: <100m Ω  
 INSULATION RESISTANCE: >1G Ω initial, >10M Ω after damp heat  
 BOUNCE TIME: <10ms

## Environmental

OPERATING TEMPERATURE: -40°C to 125°C  
 STORAGE TEMPERATURE: -55°C to 125°C  
 RELATIVE HUMIDITY: 90 to 96% according to NF EN 60068-2-30  
 PROTECTION: dust protection and flux tight (IP 40)  
 OVERLOAD: 40N min

## Process

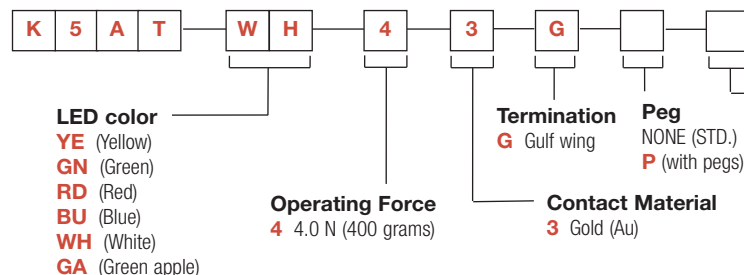
SOLDERING: Compatible with the lead free soldering profile.  
 No washing

## Materials

CONTACTS: Au over Ni  
 SOLDERING: Au over Ni  
 HOUSING: Thermoplastic UL94 V0

## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.



## Packaging

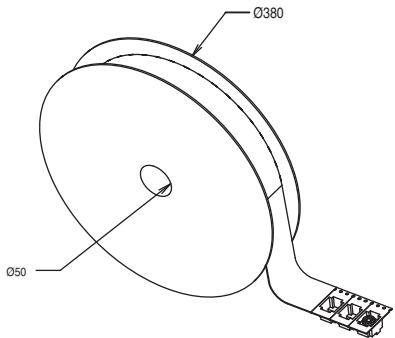
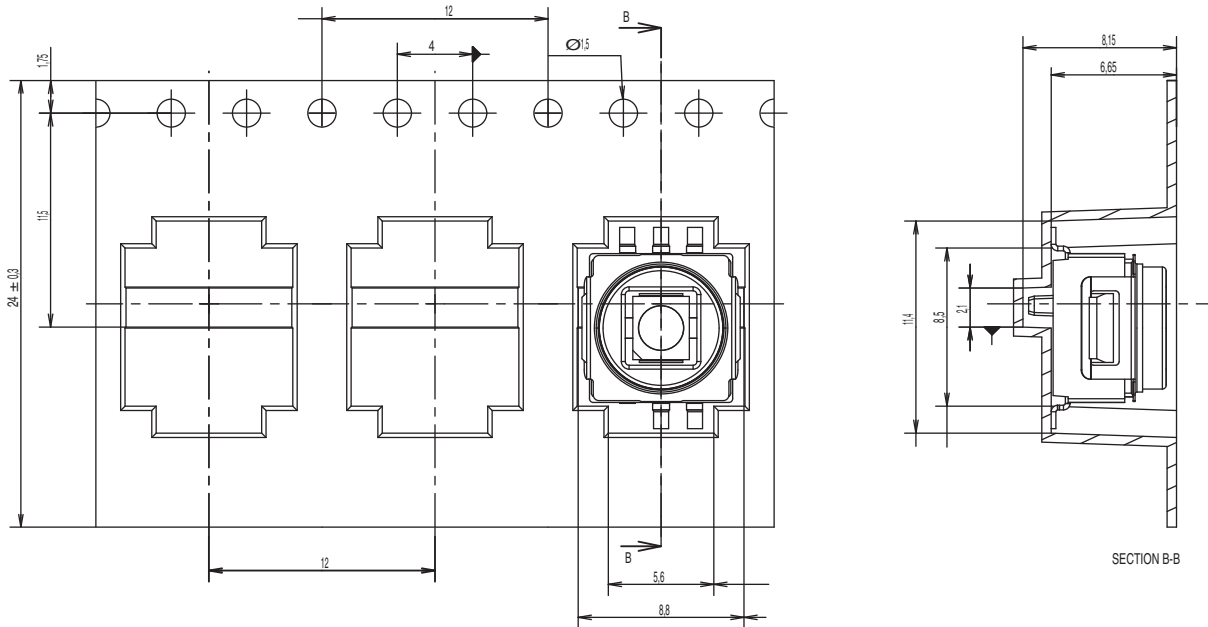
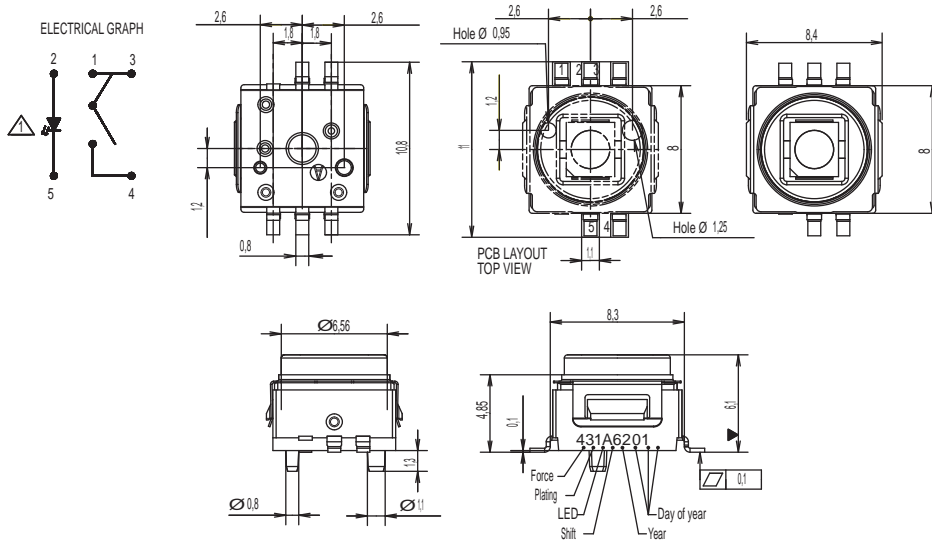
NONE (900 pieces per reel)  
 R (reduced packaging 180 pieces per reel)

# K5AT Illuminated SMT Tact Switch

K5AT

Tactile Switches

B



Dimensions are shown: mm  
Specifications and dimensions subject to change



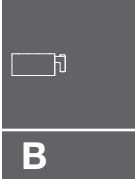
# Lighted SMT Tact Switch with Rugged LED Mounting Process

## Features

- LED assembly without soldering
- Various LED options
- No light perturbation
- Sound haptic
- Various climatic classes

## Typical Applications

- Automotive
- Network equipment
- Telecommunications
- Medical equipment
- Industrial controls



Tactile Switches

## Specification

FUNCTION: momentary action  
 CONTACT ARRANGEMENT: 1 make control = SPST, N.O.  
 TERMINALS: Gullwing type for SMT, peg as option, 2 terminals for LED

## Mechanical

Type	Actuation Force (N)	Operating Life (operations)	Total Travel (mm)
K8xx41G LFS	4.0	300,000	0.45±0.15

Tolerances on actuation force is ± 0.25%.  
 SEALING LEVEL: IP40

## Illumination Colors

White, blue, pure green, orange, super red  
 LED technical information available on product specification.  
 For any extra color, please contact your sales representative.

## Packaging

In reels of 900 pieces under sealed foil.  
 Dimensions of reels according to EIA RS481 or IEC 2863.  
 External diameter 380 mm.

## Electrical

	Silver	Gold
MAXIMUM POWER:	1.0 VA	0.2 VA
MAXIMUM VOLTAGE:	32 VDC	32 VDC
MINIMUM VOLTAGE:	20 mV	20 mV
MAXIMUM CURRENT:	50 mA	10 mA
MINIMUM CURRENT:	1 mA	0.1 mA
DIELECTRIC STRENGTH: (50 Hz, 1 min.)	≥ 250 Vrms	
CONTACT RESISTANCE:	< 100mΩ	
INSULATION RESISTANCE: (100 V, initial stage)	> 10 <sup>9</sup> Ω	
BOUNCE TIME:	< 10 ms	

## Environmental

OPERATING TEMPERATURE: -40°C to +85°C (Silver)  
 -40°C to +125°C (Gold)

STORAGE TEMPERATURE: -55°C to +85°C (Silver)  
 -40°C to +125°C (Gold)

## Process

SOLDERING: Compatible with the lead free soldering profile.  
 No washing  
 MSL level: 5

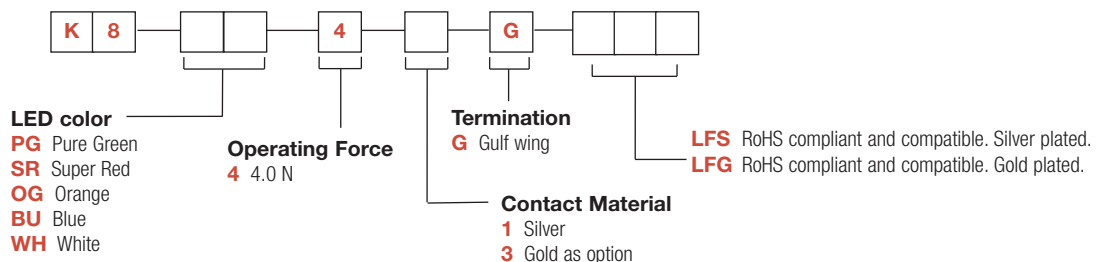
## NOTE:

The specifications show in the datasheet are for reference only and are not valid for design-in work. Please contact your sales representative to request drawings and product specifications.

For systems where reliability and safety are required, please contact your sales representative to secure product integration and function to secure usage.

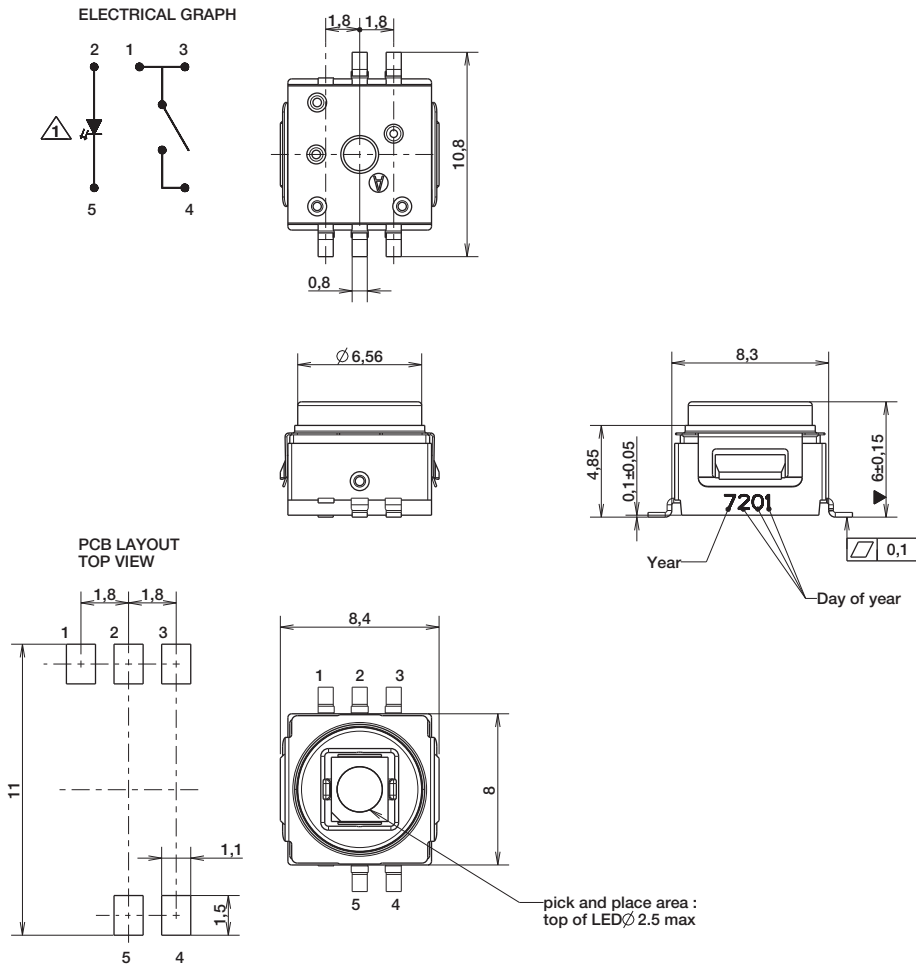
## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and and place it in the appropriate box.



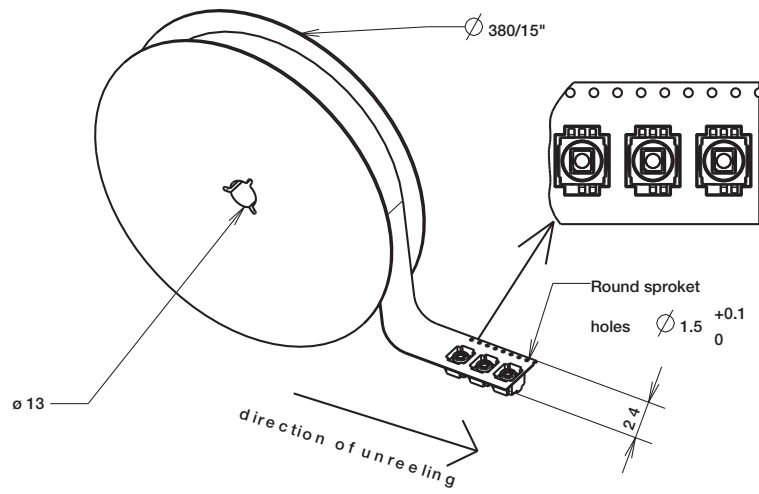
# K8 Lighted SMT Tact Switch with Rugged LED Mounting Process

PART NUMBER	REF LED	EMITTED COLOR	LUMINOUS INTENSITY (mcd) $I_f = 20 \text{ mA}$		CHROMATICITY COORDINATES OR PEAK WAVE LENGTH (typ) $I_f = 20 \text{ mA}$		FORWARD VOLTAGE V $I_f = 20 \text{ MA}$	
			min	typ	X	Y	min	max
K8WH41G	LW T67C-S2U1-5K8L	WHITE	224	560	0,33	0,33	3	4.1
K8BU41G	LB T67C-P2R1-35	BLUE	56	140	465 nm		3	4.1
K8PG41G	LP T676-L1M2-25	PURE GREEN	11.2	28	562 nm		1.8	2.4
K8SR41G	LP T676-Q1R2-1	SUPER RED	71	180	645 nm		1.8	2.3
K8OG41G	LO T676-R1S2-24	ORANGE	112	280	610 nm		1.85	2.35



# K8 Lighted SMT Tact Switch with Rugged LED Mounting Process

TAPE & REEL



B

Tactile Switches

# K5V Illuminated Tact Switch



## Features

- Gold plated dome contact SPST/SPDT
- Excellent ergonomics
- High bright leds
- Reduced space usage on board
- 40 N overload
- Tape and reel
- RoHS compliant and compatible

## Typical Applications

- When backlighting and switch are required to be a "2 in 1" component
- The dome contact secures a superior contact reliability in time
- The ergonomics of K5V provides a long travel, a sharp tactile feel and an audible click
- Server, storage, automotive, network infrastructure, medical

## Specification

FUNCTION: momentary action  
 CONTACT ARRANGEMENT: Normally Open + Normally Closed  
 TERMINALS:  
 THT: Through hole terminals with positioning pegs  
 SMT: Surface mount terminals with positioning pegs  
 PM: Panel mount solder terminals with wire hole

## Electrical

POWER MIN/MAX: 0.02VA / 1.0VA  
 VOLTAGE MIN/MAX: 20mVdc – 32 Vdc  
 CURRENT MIN/MAX: 0.1mA – 100mA  
 CONTACT RESISTANCE: <150m Ω  
 INSULATION RESISTANCE: >1G Ω initial, >10M Ω after damp heat  
 BOUNCE TIME: <5ms

## Mechanical

Version	Operating force FA <sup>1</sup> Newtons (grams)	Operating life (operations)	Travel (total travel) mm(mm)
THT, SMT, PM	4.0 (400)	25,000	1.2 (2.4)

<sup>1</sup> Tolerances of operating force FA is ± 25%.

## Environmental

OPERATING TEMPERATURE: -40°C to 85°C  
 STORAGE TEMPERATURE: -50°C to 85°C  
 RELATIVE HUMIDITY: 90 to 96% according to NF EN 60068-2-30  
 PROTECTION: dust protection and flux tight  
 OVERLOAD: 40N min

## Packaging

THT:  
 60 pieces per tray; 1800 pieces per box  
 SMT:  
 330 pieces per reel (reel ø 360mm); 1320 pieces per box  
 PM:  
 60 pieces per tray; 2100 pieces per box

## Process

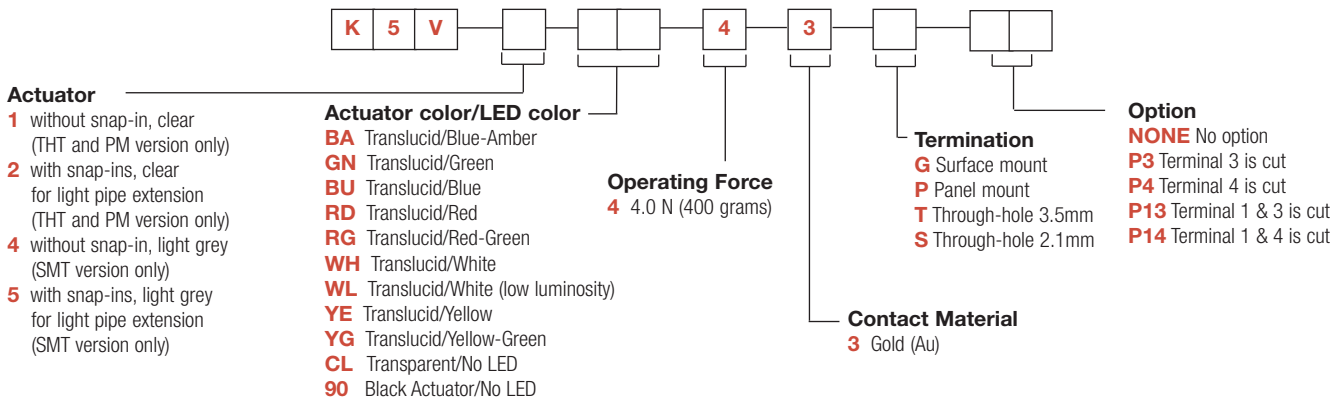
SMT  
 Soldering: Compatible with the lead free soldering profile  
 No washing  
 THT  
 Soldering: Compatible with the lead free soldering profile  
 No washing  
 PM  
 Soldering: Low wattage soldering iron (25-50 watts max).  
 Solder time 3 seconds max. No washing

## Materials

LEAD FREE  
 CONTACTS: Au over Ni  
 SOLDERING: Au over Ni  
 HOUSING: Thermoplastic UL94 V0

## How To Order

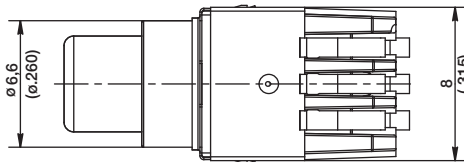
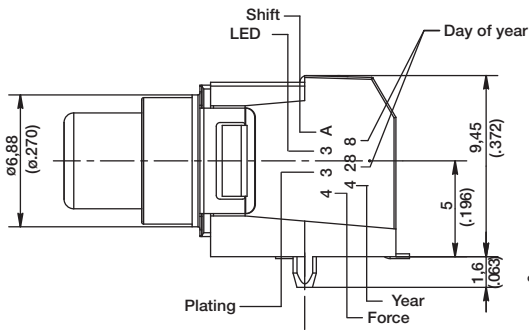
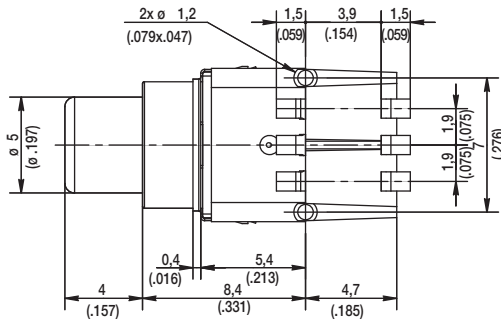
Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.



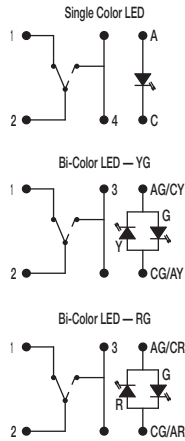


# K5V Illuminated Tact Switch

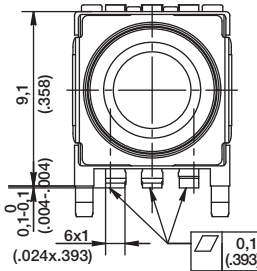
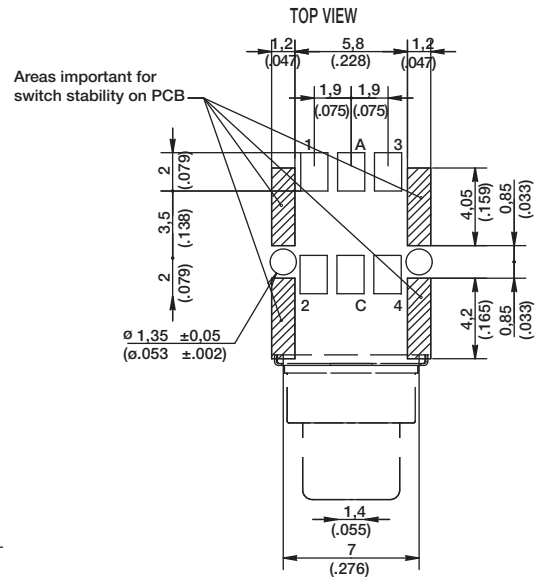
## K5V SMT



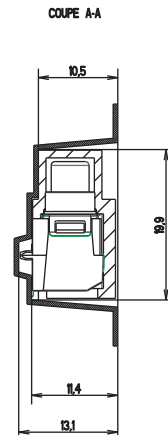
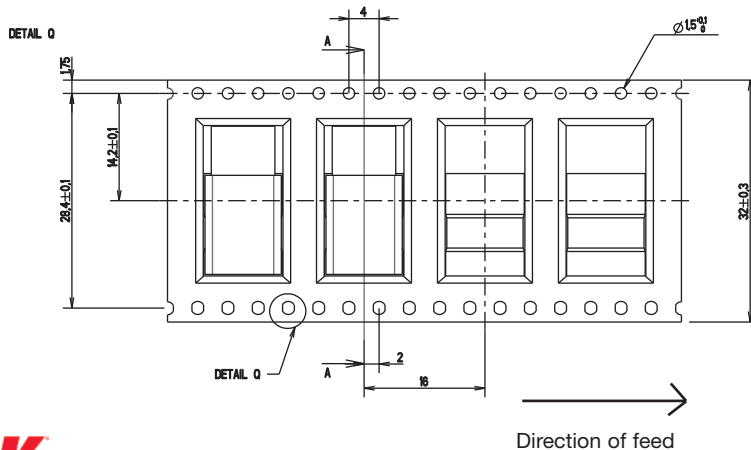
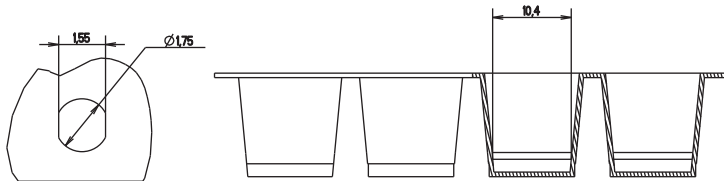
## ELECTRICAL DIAGRAM



## RECOMMENDED PCB LAYOUT ( WITH HOLES )



## TAPE & REEL



Dimensions are shown: mm (inches)  
Specifications and dimensions subject to change

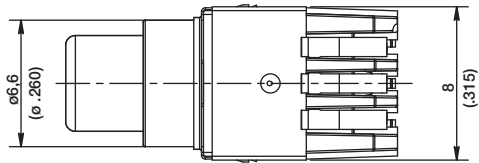
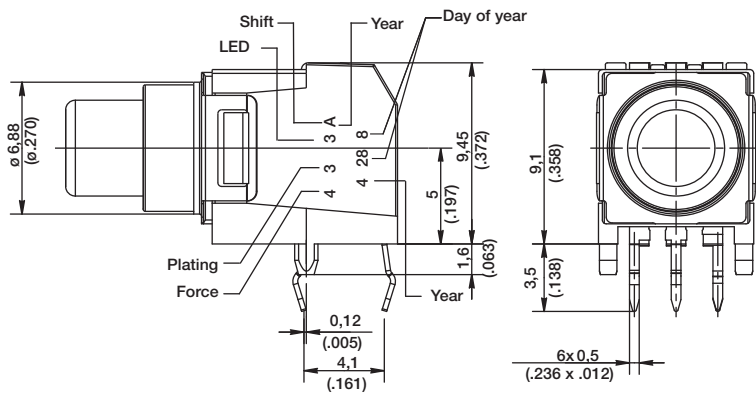
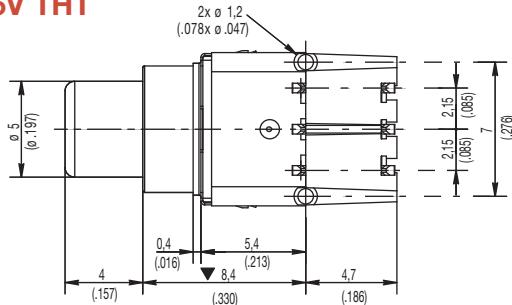


# K5V Illuminated Tact Switch

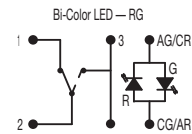
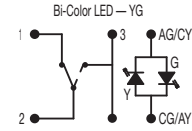
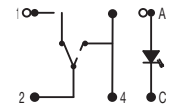
B

Tactile Switches

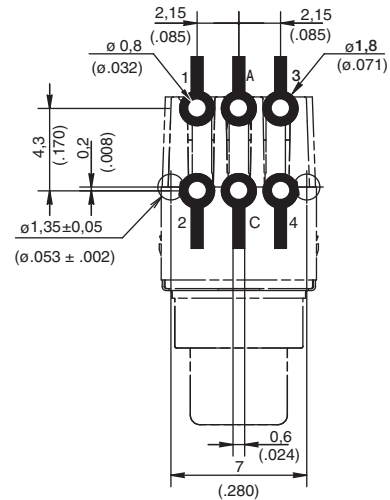
## K5V THT



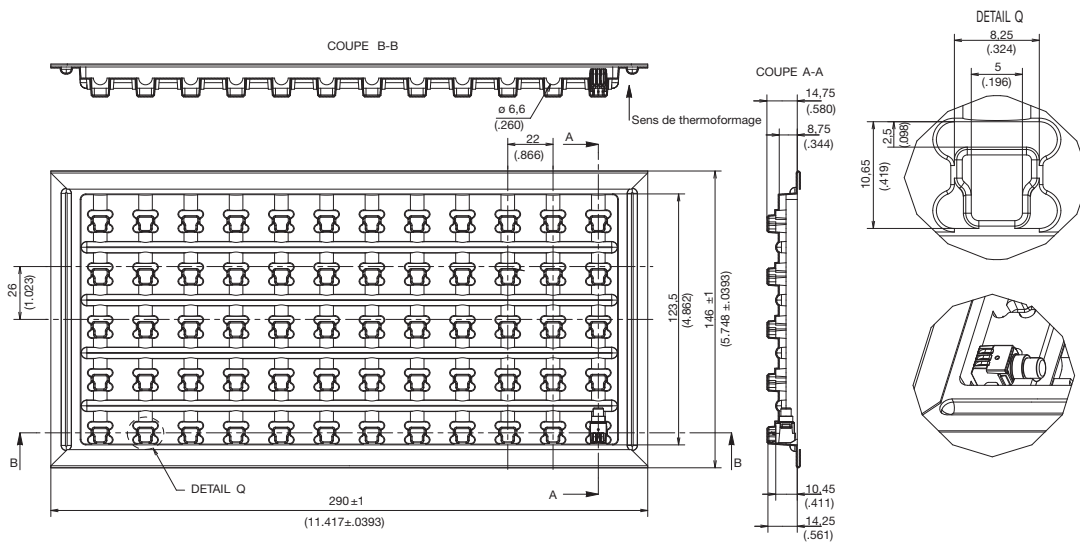
## ELECTRICAL DIAGRAM



## RECOMMENDED PCB LAYOUT (WITH HOLES) TOP VIEW



## TRAY

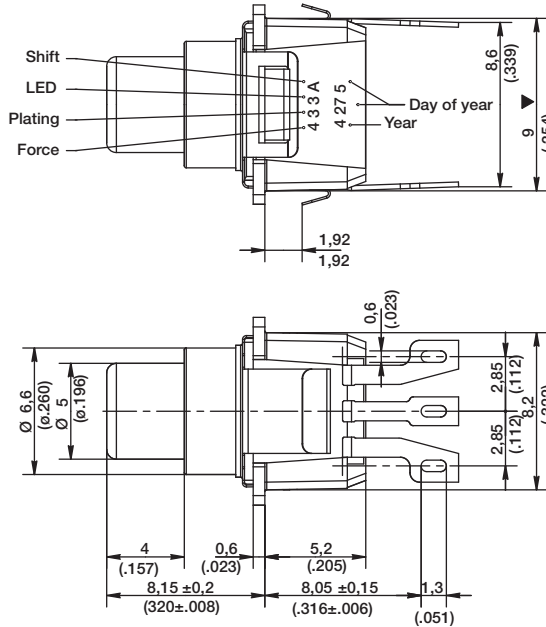


Dimensions are shown: mm (inches)  
Specifications and dimensions subject to change

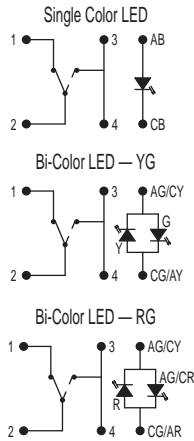
# K5V Illuminated Tact Switch

## K5V PM

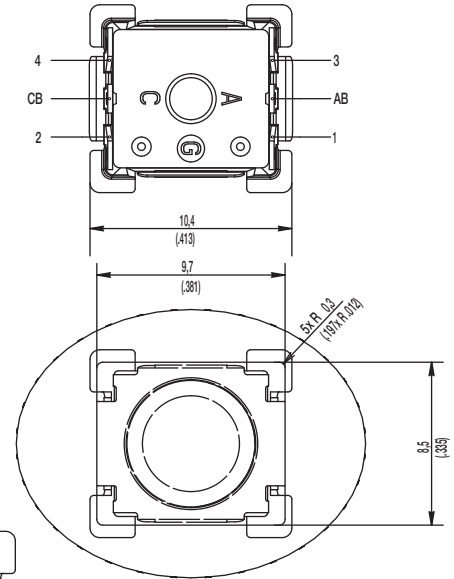
### PRODUCT IDENTIFICATION AND DATE CODES



### ELECTRICAL DIAGRAM



### TERMINAL REFERENCES

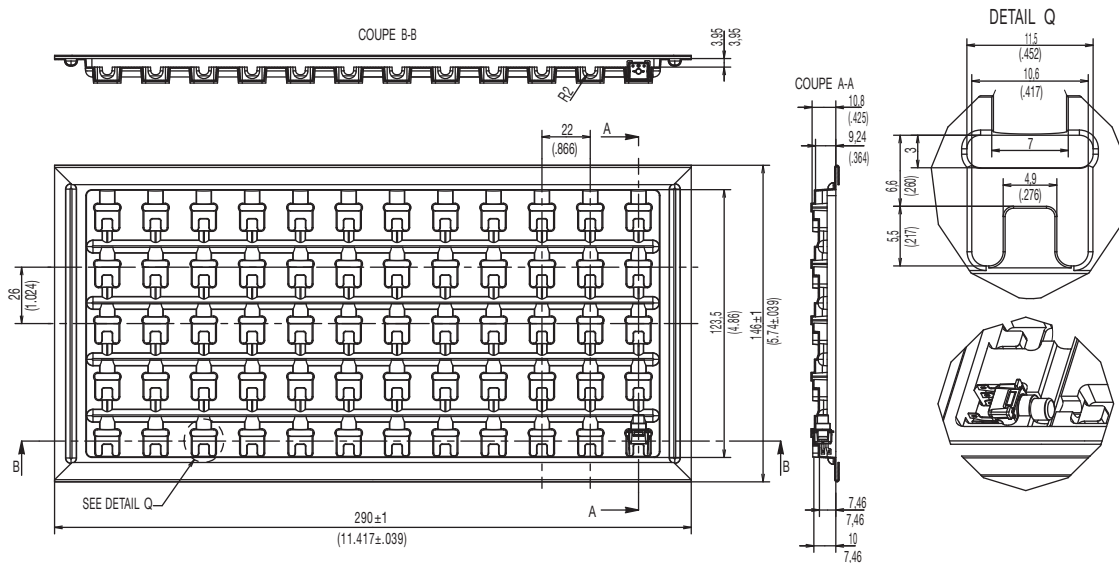


B

Tactile Switches

## TRAY

SUITABLE FOR PANEL THICKNESS OF 1.8MM MAX



Dimensions are shown: mm (inches)  
Specifications and dimensions subject to change

# KSF & KSFI Series Soft Actuated Tact Switch



## Features/Benefits

- Soft actuated switch
- Sealed front end
- Top and side actuated

## Typical Applications

- Low profile keyboards
- Automotive interfaces
- Industrial control

B

Tactile Switches

## Specification

FUNCTION: momentary action  
CONTACT ARRANGEMENT: 1 make contact = SPST, N.O.  
TERMINALS: THT pins

## Mechanical

Type	Force (N)	Operating life (operations)	Travel (mm)
KSF0M211LFT	1.5 ± 0.5	100,000	0.25 ± 0.1
KSF0M311LFT	1.9 ± 0.5	100,000	0.25 ± 0.1
KSF0M411LFT	3.0 ± 0.75	100,000	0.25 ± 0.1
KSF0M511LFT	5.2 ± 1.0	100,000	0.25 ± 0.1
KSFI0V91170SH LFT	3.4 ± 1.5	100,000	0.65 ± 0.25
KSF0M212 LFT	1.6 ± 0.4	300,000	0.25 ± 0.1
KSFI0M412 70SHLFT	3.2 ± 0.8	100,000	0.75 ± 0.25

Overload resistance: 40N, 1 time  
Sealing: IP60 or IP67

**NOTE:** Other configurations of haptics and terminals are available upon demand. Please also refer to KSF and KSFI Mk2 catalogues pages for other options.

This product is designed and manufactured for general electronic devices. For systems where reliability and safety are required, please contact your sales representative to secure product integration and function to secure usage.

## Electrical

	Silver	Gold
MAXIMUM POWER:	1 VA	0.2 VA
MAXIMUM VOLTAGE:	32 VDC	32 VDC
MINIMUM VOLTAGE:	20 mV	20 mV
MAXIMUM CURRENT:	50 mA	10 mA
MINIMUM CURRENT:	1 mA	1 mA
DIELECTRIC STRENGTH (50 Hz, 1 min.): > 250 Vrms		
CONTACT RESISTANCE: < 100 m Ω		
INSULATION RESISTANCE (100 V, initial stage): > 10 <sup>9</sup> Ω		
BOUNCE TIME: < 1 ms		

## Environmental

	Silver	Gold
OPERATING TEMPERATURE:	-40°C to 85°C	-40°C to 125°C
STORAGE TEMPERATURE:	-55°C to 85°C	-40°C to 125°C

## Process

SOLDERING

## Packaging

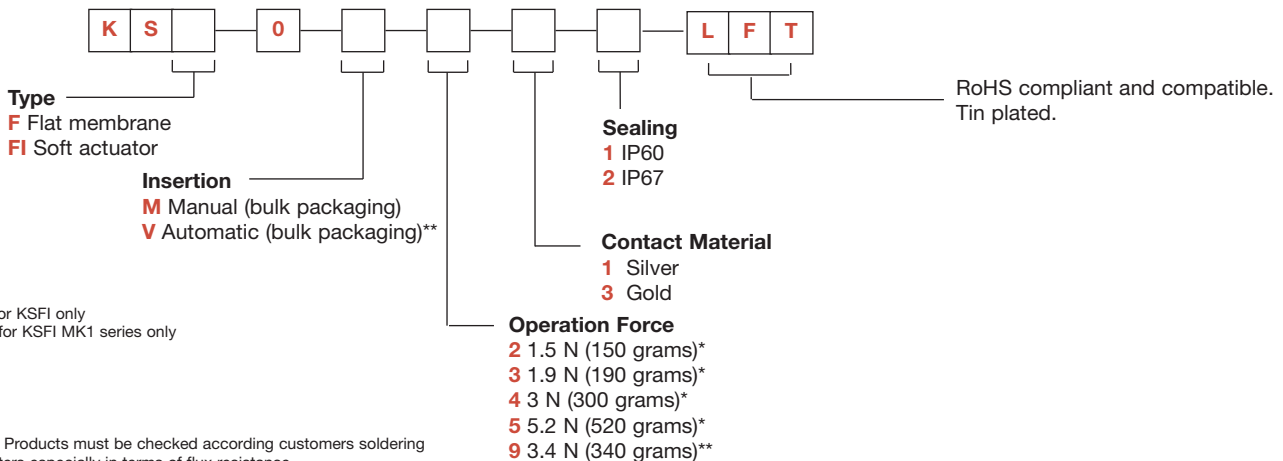
In boxes of 250 pieces (V type) or 500 pieces (M type).

## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

**However, please note that all the combinations of these options are not feasible.**

**For any part number different from those listed above, please consult your local representative.**

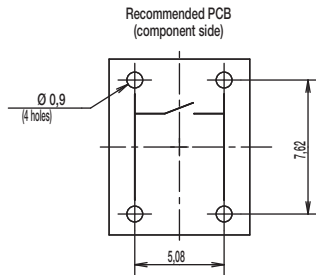
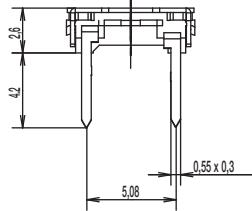
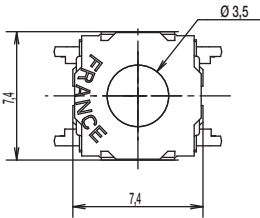
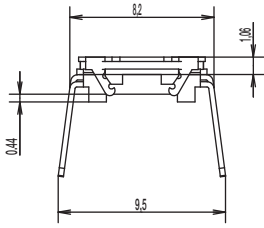


\* valid for KSFI only  
\*\* valid for KSFI MK1 series only

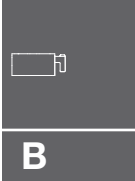
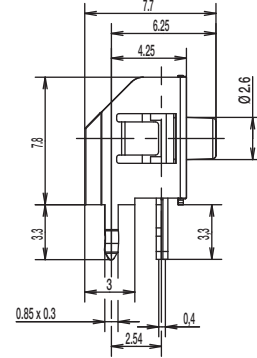
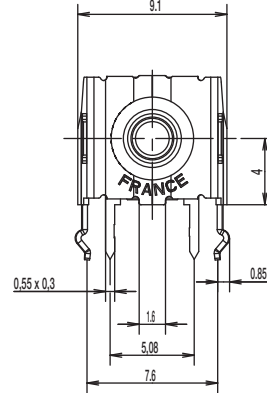
**\*NOTE:** Products must be checked according customers soldering parameters especially in terms of flux resistance.

# KSF & KSFI Series Soft Actuated Tact Switch

## KSF



## KSFI 0V



B

Tactile Switches

# KSA & KSL Series Sealed Tact Switch



## Features/Benefits

- Designed for automatic or manual insertion
- Cambered terminals to ensure self retention
- Top or side actuated
- Large choice of caps
- RoHS compliant and compatible

## Typical Applications

- Automotive
- Industrial
- Telecommunication networks

B

Tactile Switches

## Specification

CONTACT ARRANGEMENT: SPST, N.O.  
 DOUBLE OVERMOLDING ON TERMINAL  
 SEALING: IP60  
 TERMINALS: PC pins, ground pin optional

## Mechanical

Type	Actuation force N	Operating life (operations)	Travel to make
KSA0M211	1,4 ± 0,4	100,000	0,5 ± 0,2
KSA0M311	1,4 ± 0,4	1,000,000	0,5 ± 0,2
KSA0M411	3 ± 0,75	100,000	0,6 ± 0,2
KSA0M511	5 ± 1,5	100,000	0,7 ± 0,2
KSA0M911	3 ± 0,75	500,000	0,6 ± 0,2
KSL0M211	1,4 ± 0,4	100,000	0,5 ± 0,2
KSL0M311	1,4 ± 0,4	1,000,000	0,5 ± 0,2
KSL0M411	3 ± 0,75	100,000	0,6 ± 0,2
KSL0M511	5 ± 1,5	100,000	0,7 ± 0,2
KSL0M911	3 ± 0,75	500,000	0,6 ± 0,2

**NOTE:** Other versions in terms of force, termination length and corrosion protection available. Please contact your sales representative.  
 This data sheet does not provide enough information for applications which require a certain level of quality or safety such as automotive, medical systems, safety equipment. Please contact your sales representative to get contractual specification package.

## Electrical

	Silver	Gold
MAXIMUM POWER:	1 VA	0.2 VA
MAXIMUM VOLTAGE:	32 VDC	32 VDC
MINIMUM VOLTAGE:	20 mV	20 mV
MAXIMUM CURRENT:	50 mA	10 mA
MINIMUM CURRENT:	1 mA	1 mA
DIELECTRIC STRENGTH: 250 Vrms		
CONTACT RESISTANCE: ≤ 100m Ω		
INSULATION RESISTANCE (100 V): ≥ 10 <sup>9</sup> Ω		
BOUNCE TIME: ≤ 1 ms		

## Environmental

	Silver	Gold
OPERATING TEMPERATURE:	-40°C to 85°C	-40°C to 125°C
STORAGE TEMPERATURE:	-40°C to 85°C	-55°C to 125°C

## Process

Wave soldering compatible with lead free soldering profile.

## Packaging

Can be delivered in tubes of 65 pieces for automatic insertion or in boxes of 500 pieces for manual insertion (250 pieces for KSL, KSLV, KSAV).

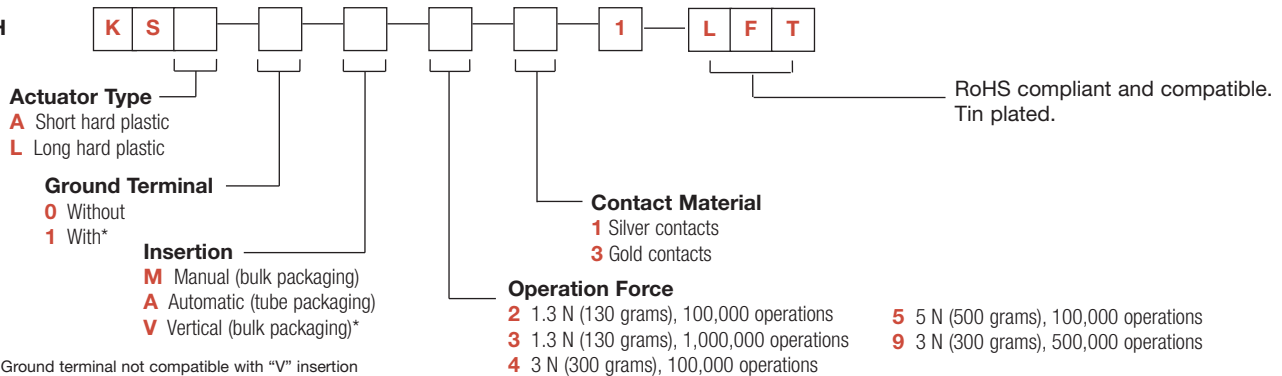
## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

However, please note that all the combinations of these options are not feasible.

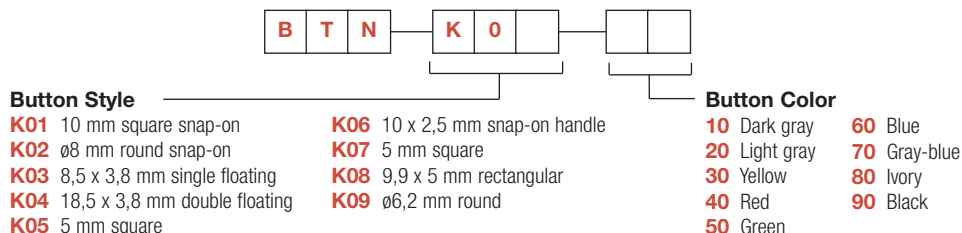
For any part number different from those listed above, please consult your local representative.

## SWITCH



## BUTTONS

Buttons must be ordered separately and will be supplied in bulk.



\*NOTE: Please note that all buttons are not RoHS compliant. Please check the compliance with your C&K sales representative.

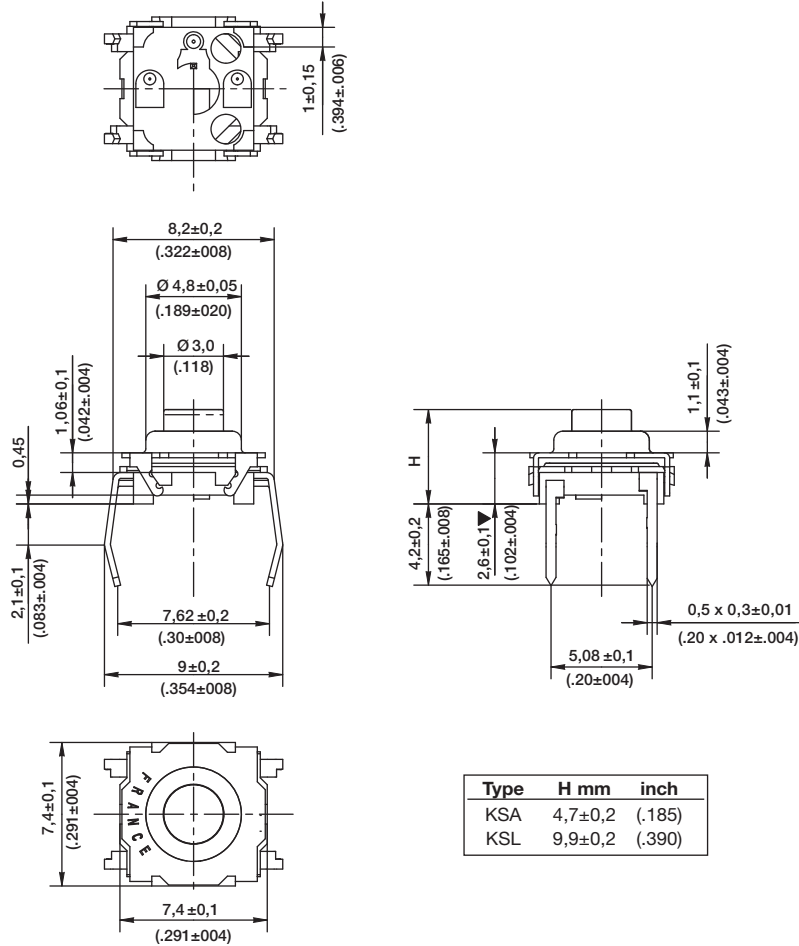


Dimensions are shown: mm (inches)  
 Specifications and dimensions subject to change

# KSA & KSL Series Sealed Tact Switch

## ACTUATOR TYPE

### KSA & KSL

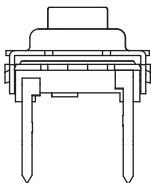


B

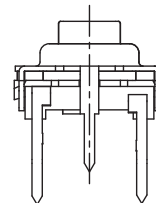
Tactile Switches

## GROUND TERMINAL

0 WITHOUT



1\* WITH



\*Not compatible with "V" insertion



First Angle Projection

Dimensions are shown: mm (inches)  
Specifications and dimensions subject to change

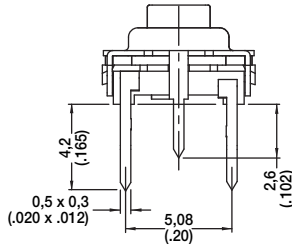
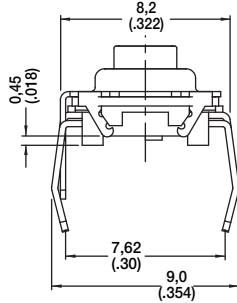


# KSA & KSL Series Sealed Tact Switch

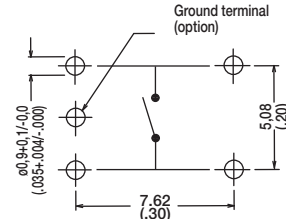
## INSERTION

Tactile Switches

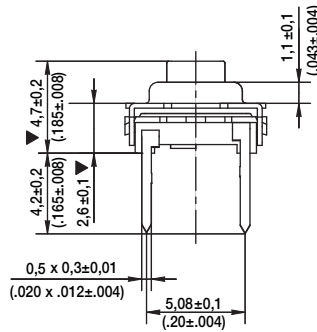
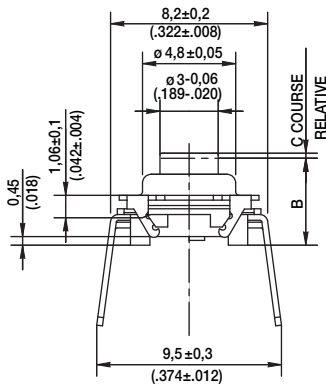
### M MANUAL (BULK PACKAGING)



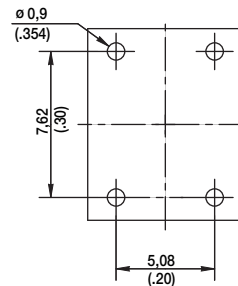
### PCB LAYOUT



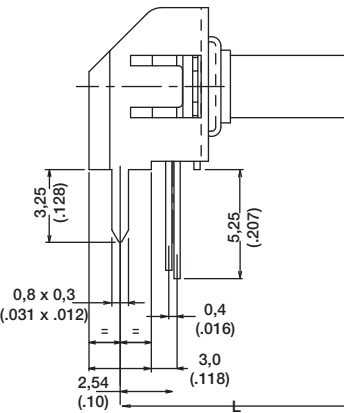
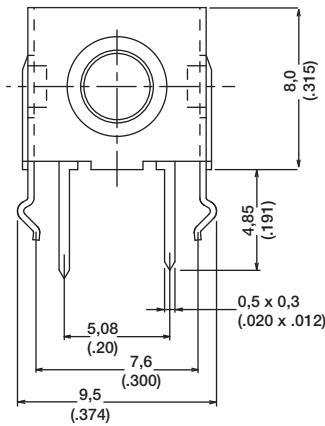
### A AUTOMATIC (TUBE PACKAGING, 65 PIECES PER TUBE)



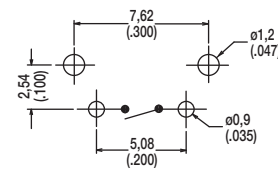
### PCB LAYOUT



### V VERTICAL



### PCB LAYOUT



### DIMENSION L

Type	L mm	inch
KSA0V	5,8	.228
KSL0V	11,1	.437

## OPERATING FORCE

OPTION CODE	OPERATING FORCE
<b>2</b>	1.3 N (130 grams) 100,000 operations
<b>3</b>	1.3 N (130 grams) 1,000,000 operations
<b>4</b>	3.0 N (300 grams) 100,000 operations
<b>5</b>	5.0 N (500 grams) 100,000 operations
<b>9</b>	3.0 N (300 grams) 500,000 operations



First Angle  
Projection

Dimensions are shown: mm (inches)  
Specifications and dimensions subject to change





# KSA & KSL Series Sealed Tact Switch

## CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL
<b>1</b>	Silver contacts
<b>3</b>	Gold contacts

## SEALING

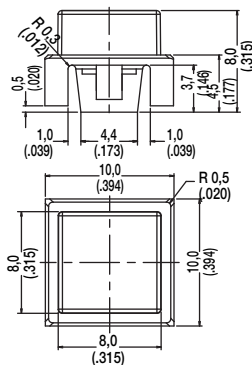
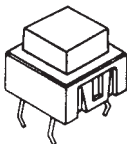
OPTION CODE	SEALING
<b>1</b>	Sealing level IP60

## BUTTONS

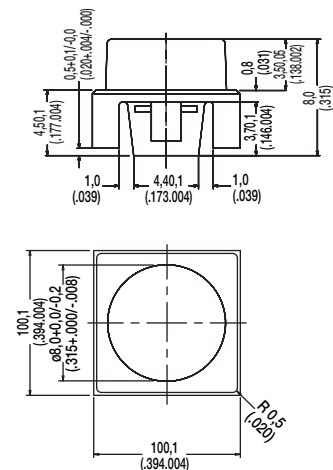
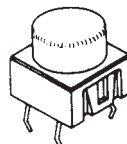
Buttons must be ordered separately and will be supplied in bulk.

BUTTON TYPE	KSA	KSL	KSAV	KSLV
<b>K01</b>	X			
<b>K02</b>	X			
<b>K03</b>	X	X	X	X
<b>K04</b>	X	X	X	X
<b>K05</b>		X		X
<b>K06</b>	X			
<b>K07</b>		X		X
<b>K08</b>		X		X
<b>K09</b>		X		X

**K01**



**K02**



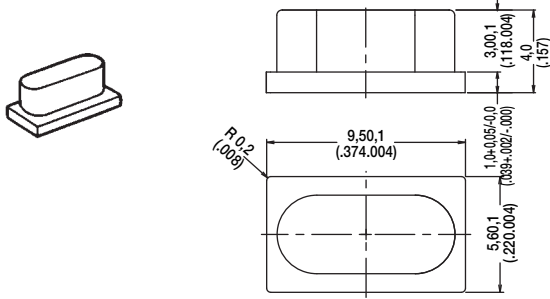
Dimensions are shown: mm (inches)  
Specifications and dimensions subject to change

# KSA & KSL Series Sealed Tact Switch

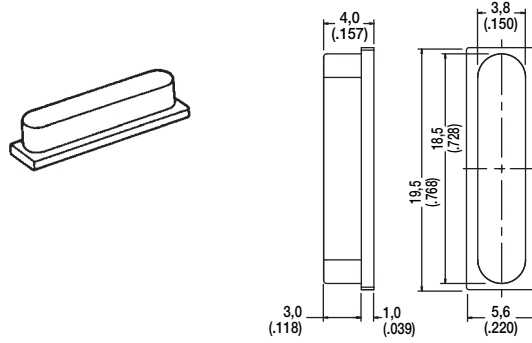
Tactile Switches

B

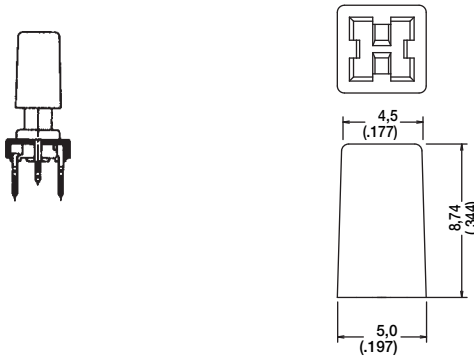
**K03**



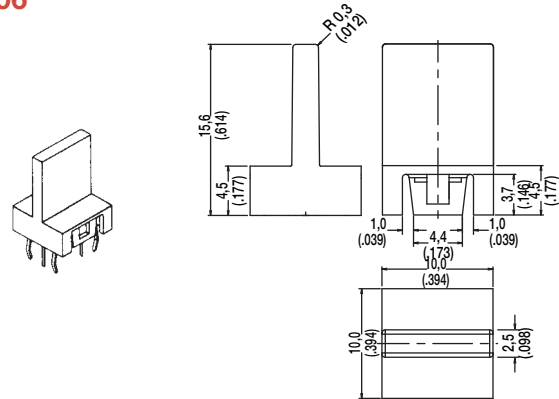
**K04**



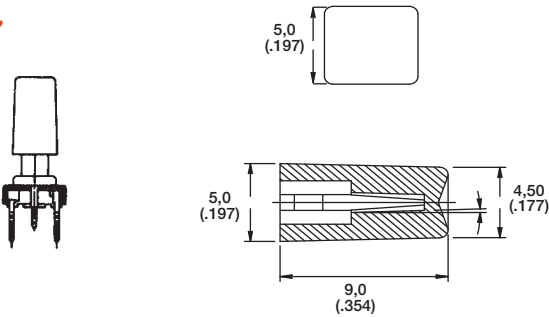
**K05**



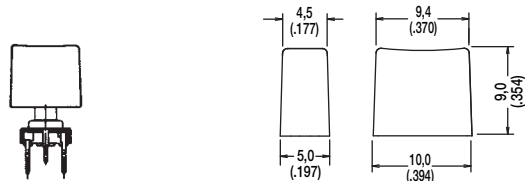
**K06**



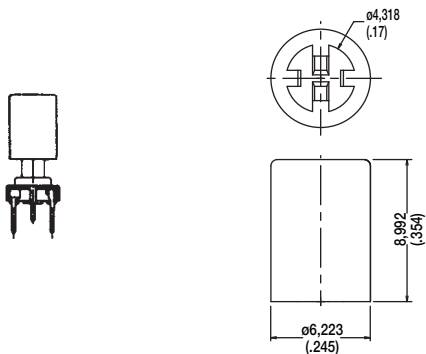
**K07**



**K08**



**K09**



Dimensions are shown: mm (inches)  
 Specifications and dimensions subject to change

# KSA & KSL MKII Series High Performance Sealed Tact Switch

## Features/Benefits

- Highest tact switch sealing performance
- Improved sealing through a modification of the crimping technique and to a double overmolding of the terminal
- Totally sealed
- Up to 1M operations
- RoHS compliant and compatible

## Typical Applications

- Automotive
- Industrial
- Telecommunication networks
- Household appliances
- Heating control systems



B

Tactile Switches

## Specification

CONTACT ARRANGEMENT: SPST, N.O.  
TERMINALS: PC pins  
SEALING: IP65  
Double overmold on terminals

## Mechanical

Type	Actuation force N (grams)	Operating life (operations)	Travel to make
KSA0M212	1,3 ± 0,3	100,000	0,5 ± 0,15
KSA0M312	1,3 ± 0,3	1,000,000	0,5 ± 0,15
KSA0M412	3,25 ± 0,5	100,000	0,6 ± 0,25
KSA0M512	5 ± 1,25	100,000	0,7 ± 0,25

## Packaging

Delivered in boxes of 500 pieces (250 pieces for KSL)

**NOTE:** Specifications listed above are for switches with standard options.  
For information on specific and custom switches, consult Customer Service Center.

Other versions in terms of force, termination length and corrosion protection available.  
Please contact your sales representative.

This data sheet does not provide enough information for applications which require a certain level of quality or safety such as automotive, medical systems, safety equipment.  
Please contact your sales representative to get contractual specification package.

## Electrical

	Silver	Gold
MAXIMUM POWER:	1 VA	0.2 VA
MAXIMUM VOLTAGE:	32 VDC	32 VDC
MINIMUM VOLTAGE:	20 mV	20 mV
MAXIMUM CURRENT:	50 mA	10 mA
MINIMUM CURRENT:	1 mA	1 mA
DIELECTRIC STRENGTH:	≥ 250 Vrms	
CONTACT RESISTANCE:	≤ 100m Ω	
INSULATION RESISTANCE (100 V):	≥ 10 <sup>9</sup> Ω	
BOUNCE TIME:	≤ 1 ms	

## Environmental

	Silver	Gold
OPERATING TEMPERATURE:	-40°C to 85°C	-40°C to 125°C
STORAGE TEMPERATURE:	-40°C to 85°C	-55°C to 125°C

## Process

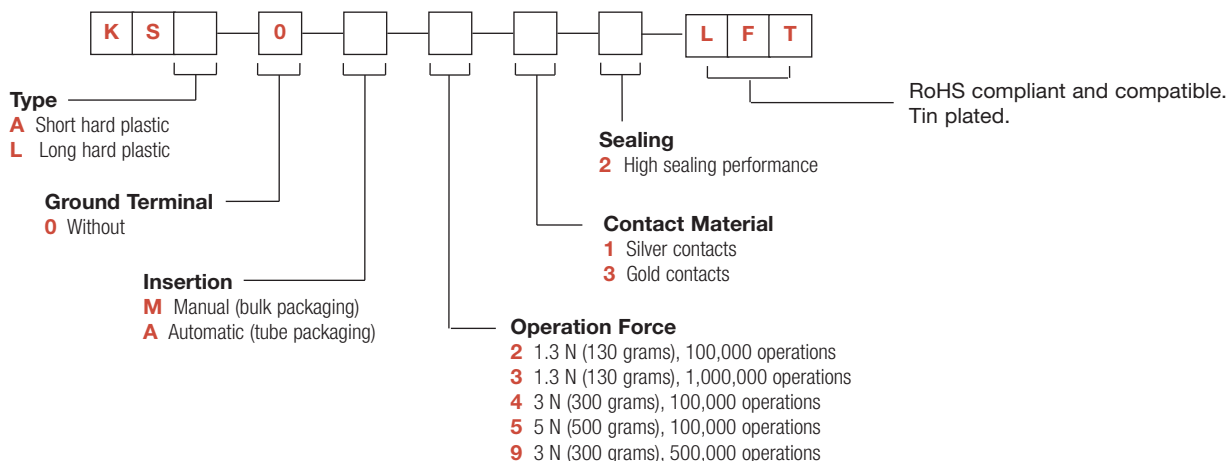
Wave soldering compatible with lead free soldering profile.

## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

**However, please note that all the combinations of these options are not feasible.**

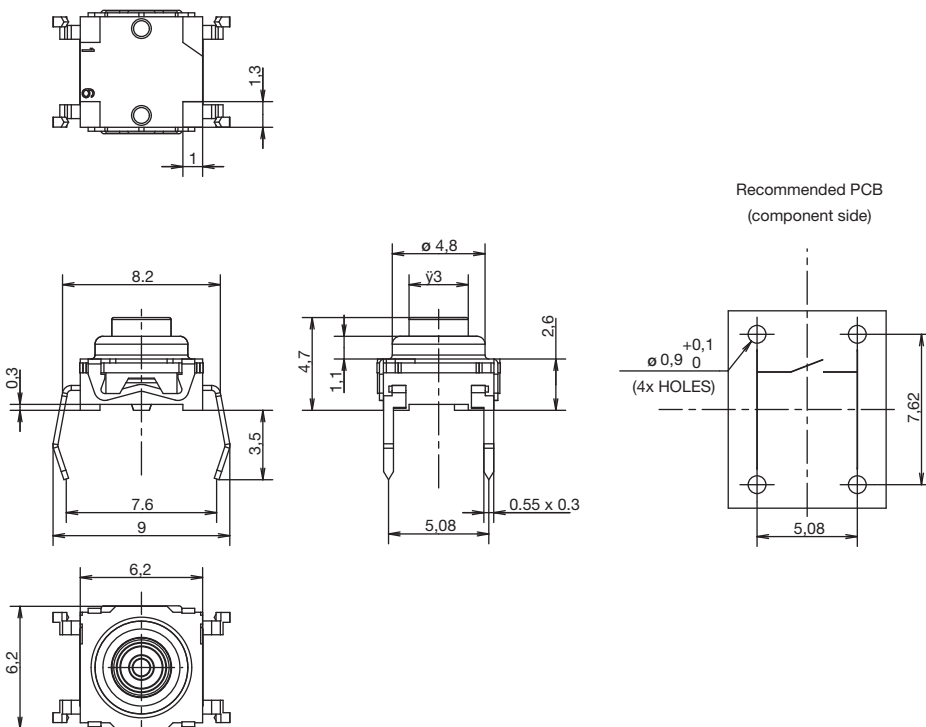
**For any part number different from those listed above, please consult your local representative.**



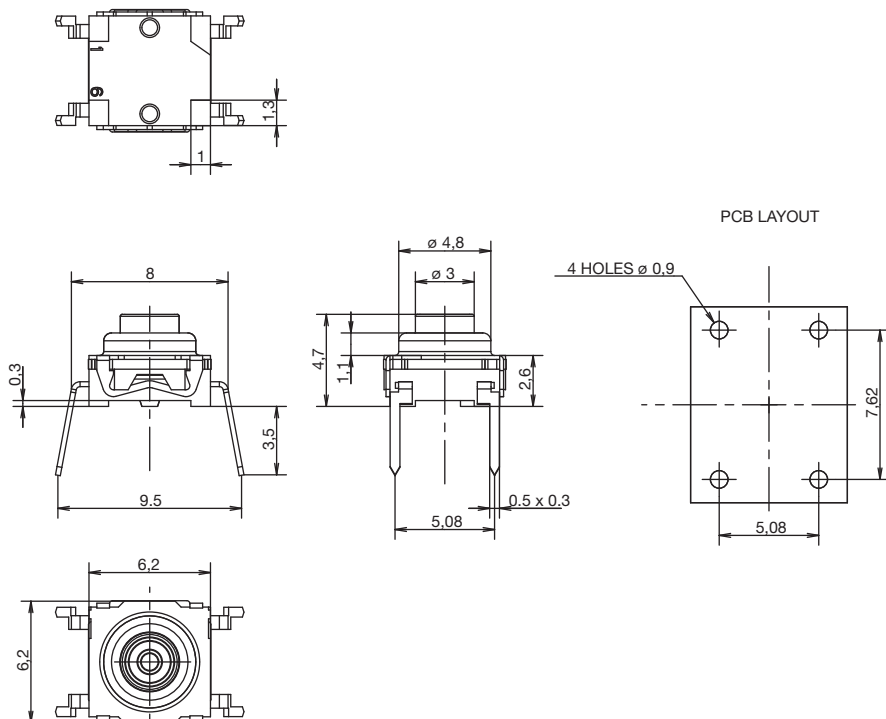
# KSA & KSL MKII Series High Performance Sealed Tact Switch

TYPE 

## KSA & KSL MANUAL INSERTION



## KSA & KSL AUTOMATIC INSERTION



First Angle  
Projection

Dimensions are shown: mm  
Specifications and dimensions subject to change



# KSJ Series Spherical Actuator Tact Switches

## Features/Benefits

- Spherical actuator allows actuation force off center  $\pm 30^\circ$  with regard to vertical
- RoHS compliant and compatible
- Designed for mechanisms
- Compliant side actuation

## Typical Applications

- Automotive
- Cranes, off road, railway
- Factory automation
- Security systems



B

Tactile Switches

## Specification

FUNCTION: Momentary action  
 CONTACT ARRANGEMENT: 1 make contact = SPST, N.O.  
 DISTANCE BETWEEN BUTTON CENTERS (min.): 7.62 (0.300)  
 TERMINALS: PC pins  
 SEALING: IP60

## Environmental

	Silver	Gold
OPERATING TEMPERATURE:	-40°C to 85°C	-40°C to 125°C
STORAGE TEMPERATURE:	-40°C to 85°C	-55°C to 125°C

## Packaging

Delivered in boxes of 250 pieces.

## Mechanical

Type	Actuation force N (grams)	Operating life (operations) axial	Operating life (operations) radial	Travel to make (mm)
KSJ0M21160SH	2 ± 0,5	100,000	30,000	0,6 ± 0,3
KSJ0M41180SH	3,0 ± 0,8	100,000	30,000	0,55 ± 0,25
KSJ0M21180SH	2 ± 0,5	100,000	30,000	0,35 ± 0,2
KSJ0M91180SH	3,9 ± 0,8	100,000	30,000	0,7 ± 0,25

## Electrical

	Silver	Gold
MAXIMUM POWER:	1 VA	0.2 VA
MAXIMUM VOLTAGE:	32 VDC	32 VDC
MINIMUM VOLTAGE:	20 mV	20 mV
MAXIMUM CURRENT:	50 mA	10 mA
MINIMUM CURRENT:	1 mA	1 mA
DIELECTRIC STRENGTH (50 Hz, 1 min.): $\geq 250$ Vrms		
CONTACT RESISTANCE: $\leq 100$ m $\Omega$		
INSULATION RESISTANCE (100V): $\geq 10^9$ ohms		
BOUNCE TIME: $\leq 1$ ms		

## Process

Wave soldering, compatible with lead free soldering profile.

**NOTE:** Specifications listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

This data sheet does not provide enough information for applications which require a certain level of quality or safety such as automotive, medical systems, safety equipment. Please contact your sales representative to get contractual specification package.

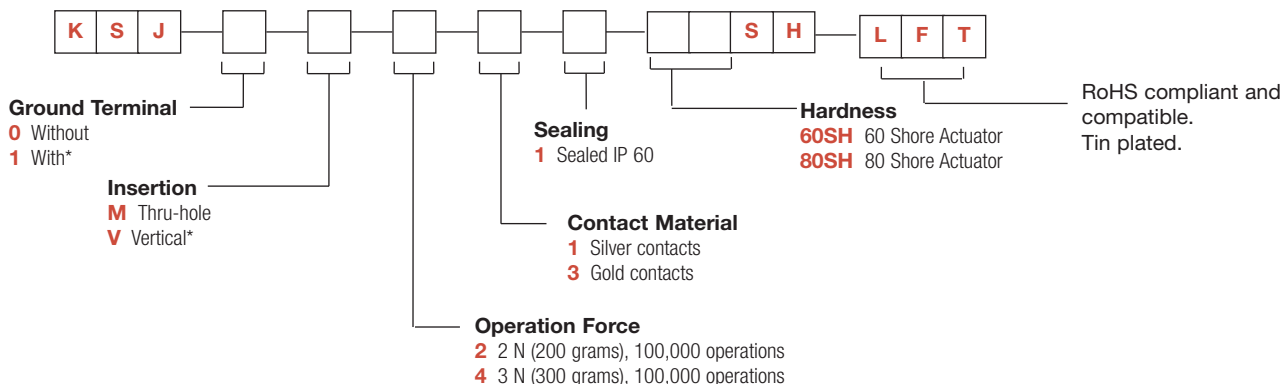
\* Please contact your C&K representative for any question regarding the product integration.

## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

**However, please note that all the combinations of these options are not feasible.**

**For any part number different from those listed in the table above, please consult your local representative.**



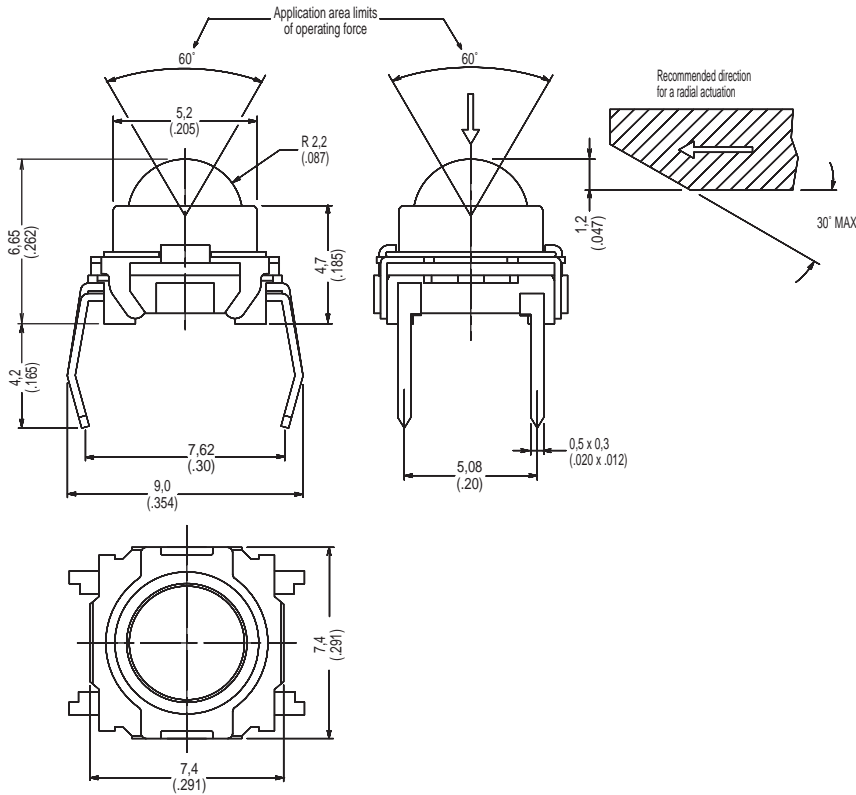
\*Note: "1" ground terminal option not available with "V" version. The bracket for the "V" version plays this role.



Dimensions are shown: mm (inches)  
 Specifications and dimensions subject to change

# KSJ Series Spherical Actuator Tact Switches

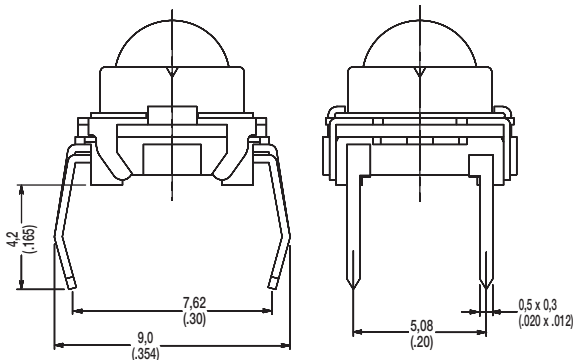
**KSJ**



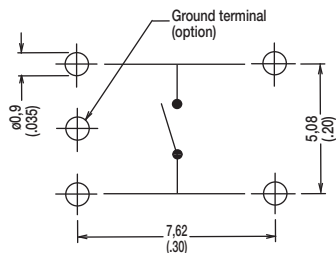
**KSJ0M211**

## INSERTION

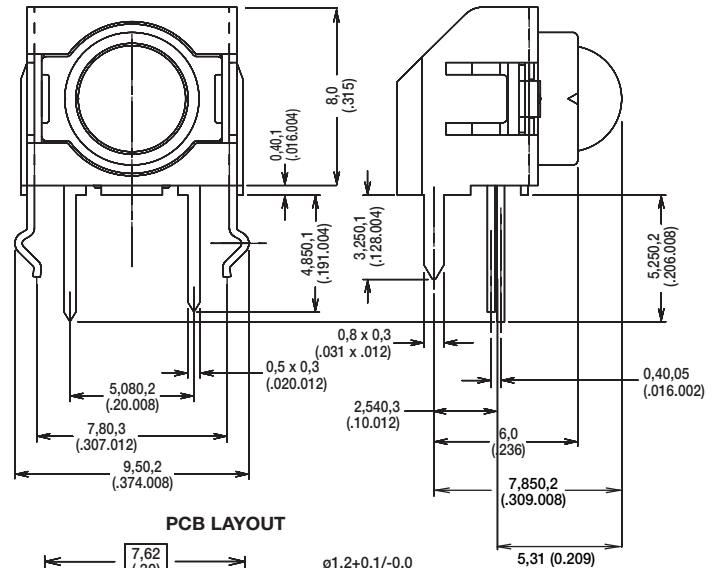
**M THRU-HOLE**



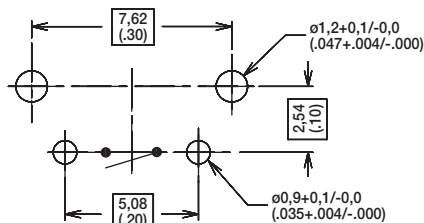
**PCB LAYOUT**



**V VERTICAL**



**PCB LAYOUT**



First Angle  
Projection

Dimensions are shown: mm (inches)  
Specifications and dimensions subject to change



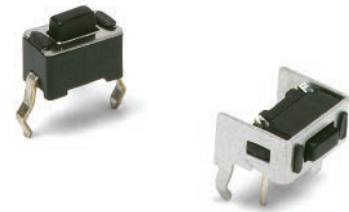
# PTS635 Series 3,5 mm Tact Switches

## Features/Benefits

- Compact size 6 x 3.5 mm
- Variety of switch heights
- Choice of actuation force
- RoHS compliant and compatible

## Typical Applications

- Consumer products
- Instrumentation
- Computer products
- Industrial



B

Tactile Switches

## Specification

FUNCTION: Momentary action  
CONTACT ARRANGEMENT: SPST, N.O.  
TERMINALS: PC pins

## Mechanical

ACTUATION FORCE: PTS635L models: 130 grams.  
PTS635H models: 200 grams.  
LIFE EXPECTANCY: 20,000 operations.

## Electrical

CONTACT RATING: 50 mA @ 12 V DC.  
DIELECTRIC STRENGTH: 250 V AC min.  
CONTACT RESISTANCE: 100 mΩ max. initial.  
INSULATION RESISTANCE: 10<sup>11</sup>Ω min.

## Environmental

OPERATING TEMPERATURE: -40°C to 60°C

**NOTE:** Specifications listed above are for switches with standard options.  
For information on specific and custom switches, consult Customer Service Center.

## Process

SOLDERING: Preheating to 100°C for 45 sec. max. Keep flux flush with top surface of PCB; do not apply to component side of PCB and area where terminals are located. Soldering to 255°C for 5 sec. max. Clean by brushing on solder surface. Do not clean switch with solvents.

## Materials

BASE: 6/6 nylon or glass filled polyester (PBT) (UL 94V-0).  
ACTUATOR: 6/6 nylon or polyacetal (UL 94HB).  
COVER PLATE: PTS635S and PTS635V models: Tin plated stainless steel  
DOME CONTACTS: Phosphor bronze, silver clad.  
STATIONARY CONTACTS: Brass, silver plated.  
TERMINALS: Brass, silver plated. Insert molded.

## Packaging

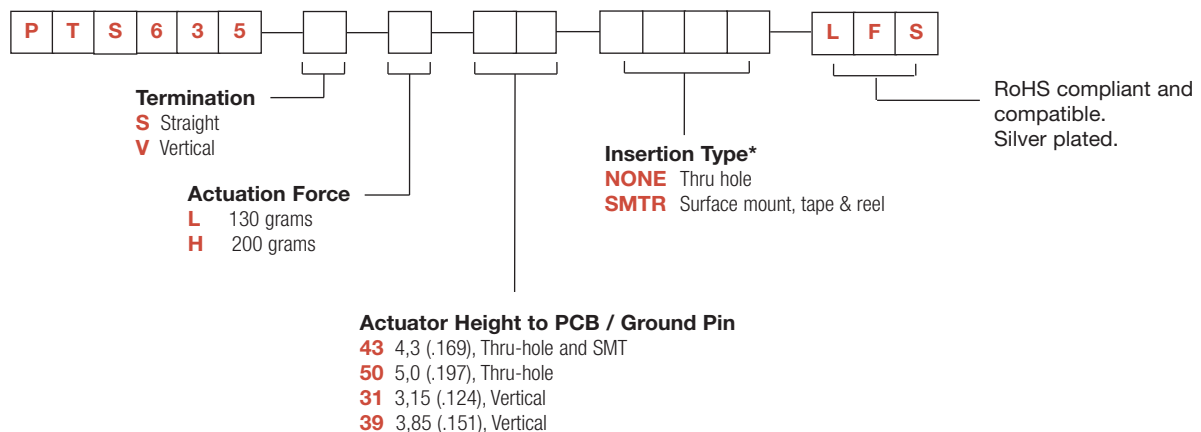
Bulk packaging.

## Tape & reel for:

PTS635Sx43SMTR, 1700 pcs per reel

## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

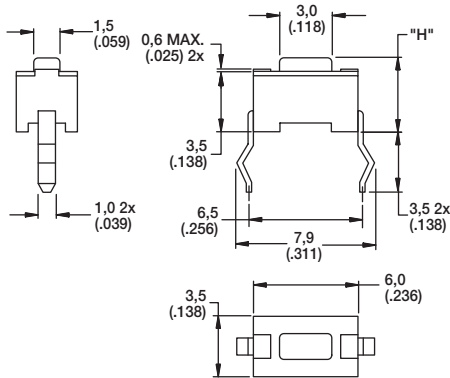


\* SMTR only available with PTS635 43 Actuator Height options.

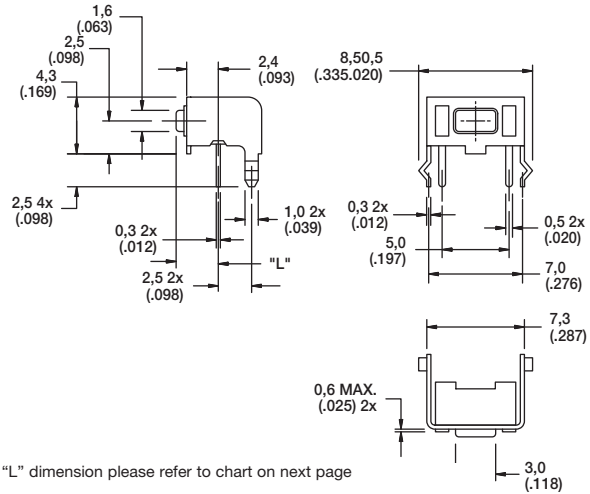
# PTS635 Series 3,5 mm Tact Switches

SERIES

## PTS635



For "H" dimension please refer to chart on next page



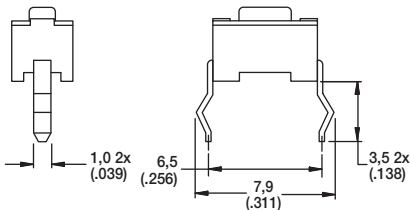
For "L" dimension please refer to chart on next page

Tactile Switches

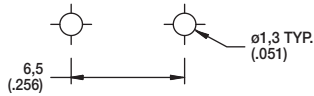
B

TERMINATION

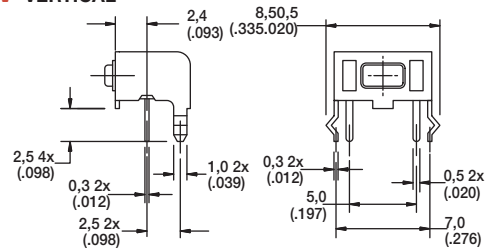
## S STRAIGHT



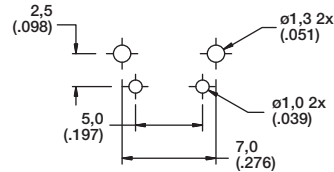
PCB LAYOUT



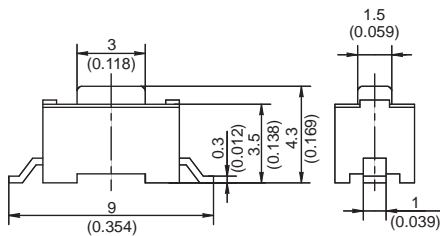
## V VERTICAL



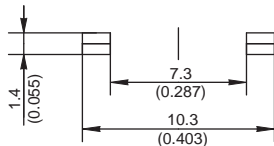
PCB LAYOUT



## SMT 43



PCB LAYOUT



First Angle  
Projection

Dimensions are shown: mm (inches)  
Specifications and dimensions subject to change





# PTS635 Series 3,5 mm Tact Switches

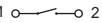

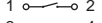
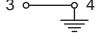
## ACTUATION FORCE



OPTION CODE	FORCE
<b>L</b>	130 grams
<b>H</b>	200 grams

## ACTUATOR HEIGHT

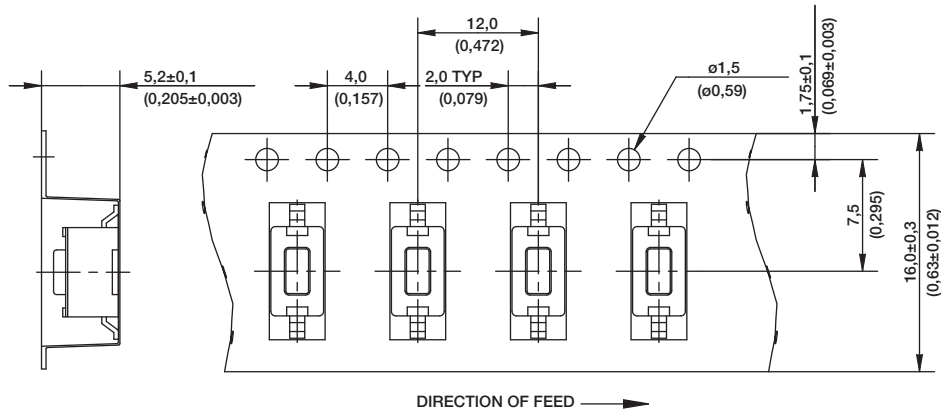


OPTION CODE	HEIGHT "H" or LENGTH "L"	TERMINATION	SCHEMATIC
<b>43</b>	4,3 (.169)	Thru-hole & SMT	1  2
<b>50</b>	5,0 (.197)	Thru-hole	1  2
<b>31</b>	3,15 (.124)	Vertical	1  2
<b>39</b>	3,85 (.151)	Vertical	3  4

## INSERTION TYPE



**SMTR** 43



**B**

Tactile Switches

# PTS641 Series SMT Top Actuated Switches



## Features/Benefits

- 6.3 x 6.3 mm footprint
- Multiple heights
- Ground pin option

## Typical Applications

- Metering
- White goods
- Home and garden equipment

B

Tactile Switches

### Specification

FUNCTION: Momentary action  
CONTACT ARRANGEMENT: 1 make contact = SPST N.O.  
TERMINALS: G type for SMT

### Mechanical

TRAVEL:  
0.20 mm ±0.15 mm for 160 & 250 gf  
0.30 mm ±0.15 mm for 320 gf  
OPERATING LIFE: 100,000 cycles  
OPERATION FORCE:  
160 gf ±50 gf blue actuator  
250 gf ±50 gf red actuator  
320 gf ±80 gf black actuator

### Packaging

Switches in reels of 1,500 pieces.  
Dimensions of reels according to EIA 481B  
External diameter 330 mm

### Electrical

MAXIMUM VOLTAGE: 12 VDC  
MAXIMUM CURRENT DC: 50 mA  
DIELECTRIC STRENGTH: 250 VA C (1mm)  
CONTACT RESISTANCE: 100 m Ω  
INSULATION RESISTANCE: ≥ 100 M Ω  
BOUNCE TIME: < 5 ms

### Environmental

OPERATING TEMPERATURE: -20°C to 85°C

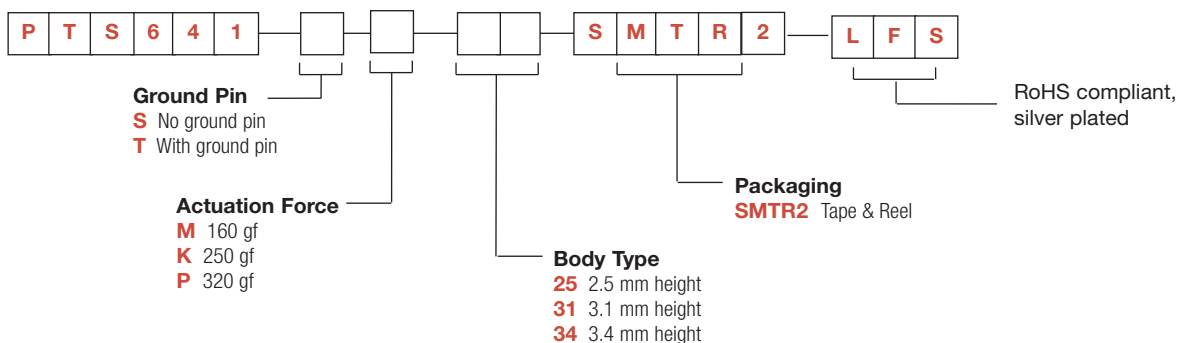
### Process

SOLDERING: This component is suited to the following methods:  
Infrared Reflow Soldering in accordance with IEC61760-1

**NOTE:** Specifications listed above are for switches with standard options.  
For information on specific and custom switches, consult Customer Service Center.

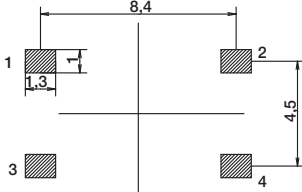
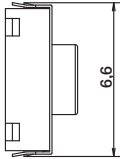
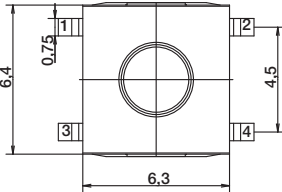
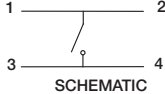
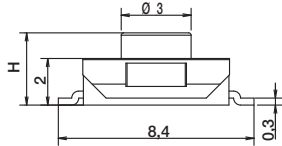
## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.



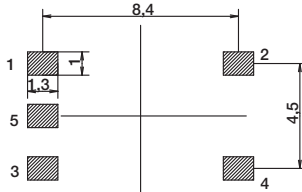
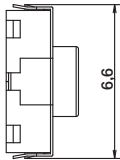
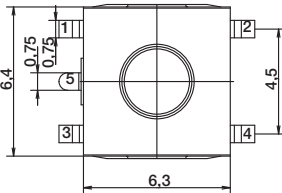
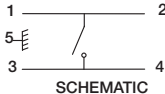
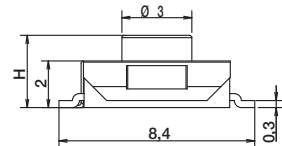
# PTS641 Series SMT Top Actuated Switches

**NO GROUND PIN** H = 2.5, 3.1, or 3.4 mm



RECOMMENDED PCB LAYOUT

**GROUND PIN** H = 2.5, 3.1, or 3.4 mm

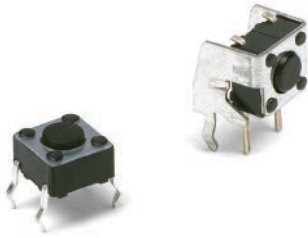


RECOMMENDED PCB LAYOUT



**B**  
Tactile Switches

# PTS645 Series 6 mm Tact Switches



## Features/Benefits

- Compact size 6 x 6 mm
- Variety of actuator lengths
- Choice of actuation force
- RoHS compliant and compatible

## Typical Applications

- Consumer products
- Instrumentation
- Computer products
- Industrial

B

Tactile Switches

### Specification

FUNCTION: Momentary action  
CONTACT ARRANGEMENT: SPST, N.O.  
TERMINALS: PC pins

### Mechanical

ACTUATION FORCE: 130 grams, 160 grams, 200 grams, 260 grams  
LIFE EXPECTANCY: 100,000 operations.

### Electrical

CONTACT RATING: 50 mA @ 12 V DC.  
DIELECTRIC STRENGTH: 250 V AC min.  
CONTACT RESISTANCE: 100 mΩ max. initial.  
INSULATION RESISTANCE: 10<sup>11</sup> Ω min.

### Environmental

OPERATING TEMPERATURE: -20°C to 60°C

### Process

SOLDERING: Preheating to 100°C for 45 sec. max. Keep flux flush with top surface of PCB; do not apply to component side of PCB and area where terminals are located. Soldering to 255°C for 5 sec. max. Clean by brushing on solder surface. Do not clean switch with solvents.

### Packaging

Bulk packaging.

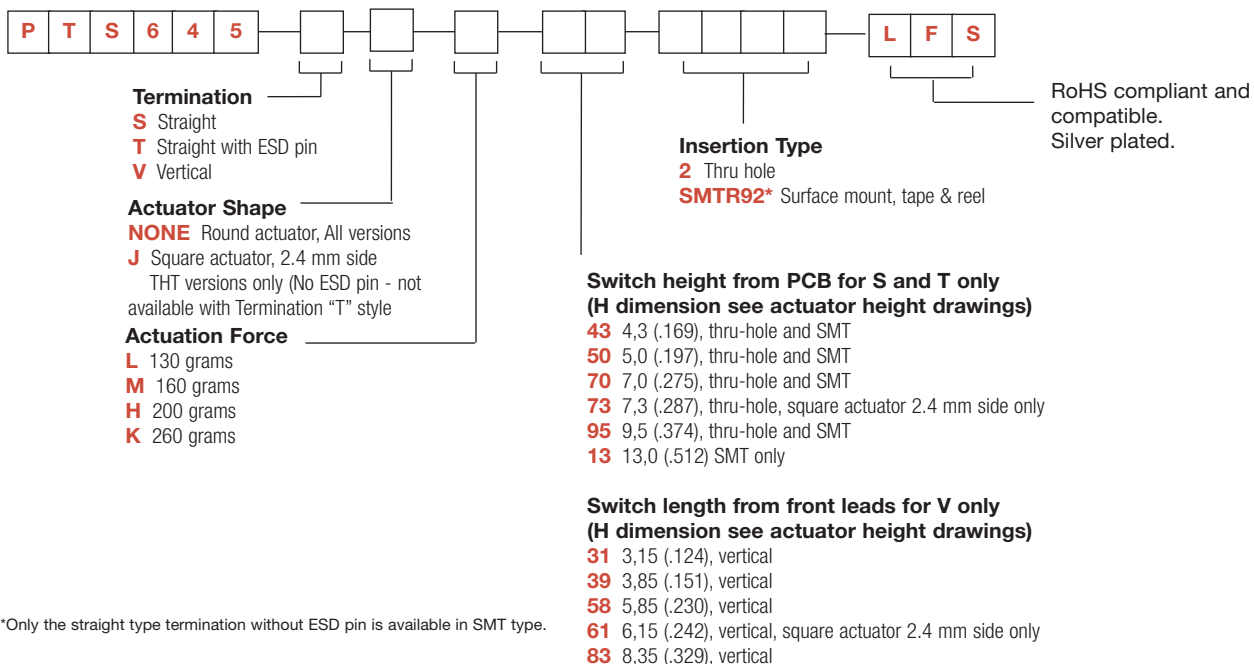
#### Tape & reel for the SMT type:

Reels of 1,000 pieces for 4,3 and 5,0 mm height  
Reels of 700 pieces for 7,0 mm height  
Reels of 500 pieces for 9,5 mm height  
Reels of 400 pieces for 13,0 mm height

**NOTE:** Specifications listed above are for switches with standard options.  
For information on specific and custom switches, consult Customer Service Center.

## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.



\*Only the straight type termination without ESD pin is available in SMT type.

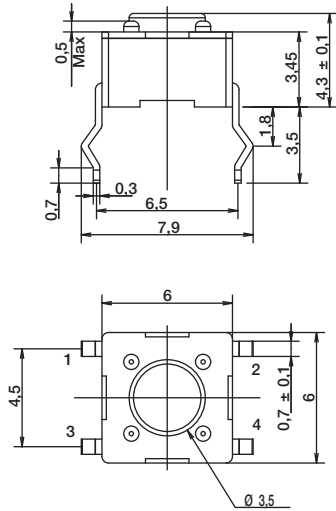


Dimensions are shown: mm  
Specifications and dimensions subject to change

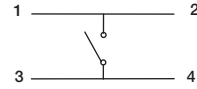
# PTS645 Series 6 mm Tact Switches

## TERMINATION

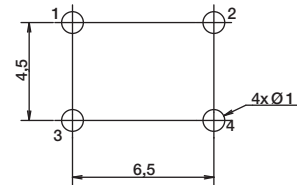
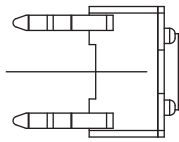
### S STRAIGHT



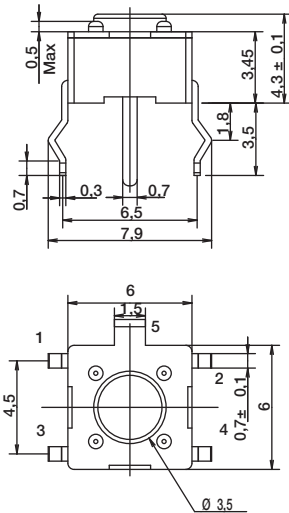
SCHEMATIC



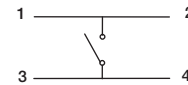
PCB LAYOUT



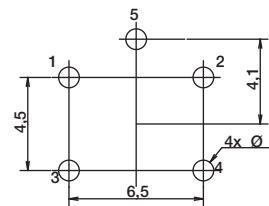
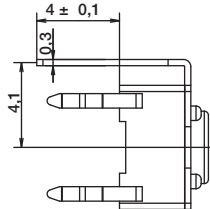
### T STRAIGHT WITH ESD PIN



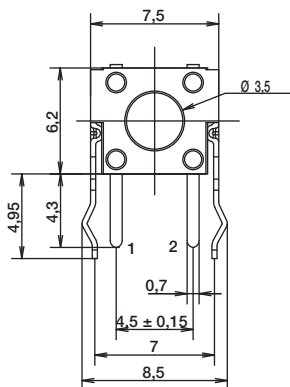
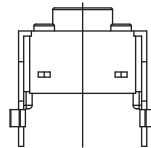
SCHEMATIC



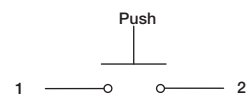
PCB LAYOUT



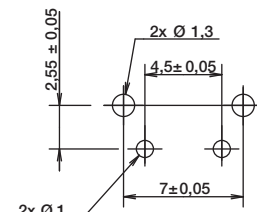
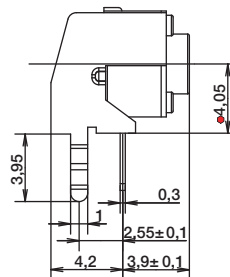
### V VERTICAL



SCHEMATIC



PCB LAYOUT



Dimensions are shown: mm  
Specifications and dimensions subject to change

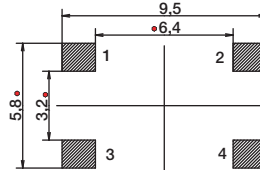
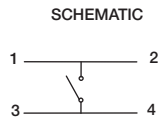
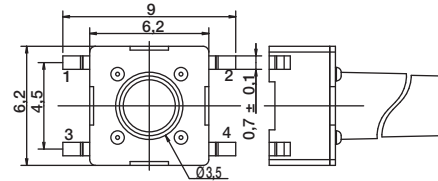
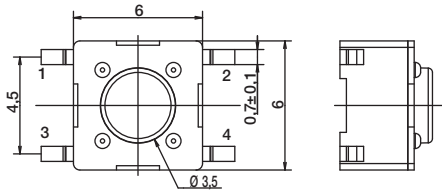
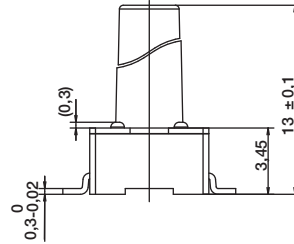
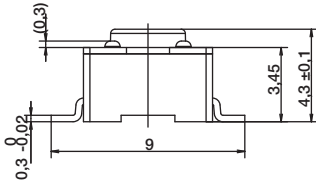
# PTS645 Series 6 mm Tact Switches

## TERMINATION

### SMT

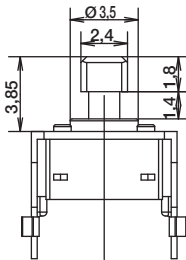
FOR 4.3, 5.0, 7.0, 9.5 MM HEIGHT

13.0 MM HEIGHT ONLY

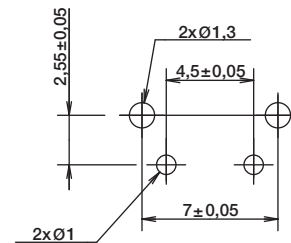
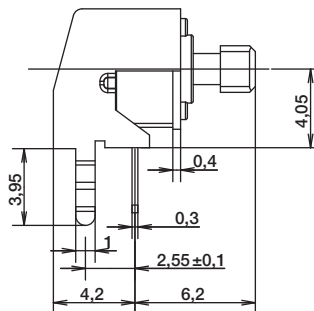
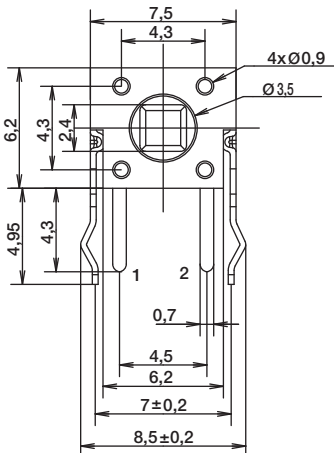
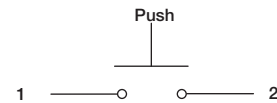


PCB LAYOUT

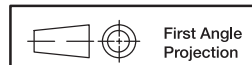
## ACTUATOR SHAPE



SCHEMATIC



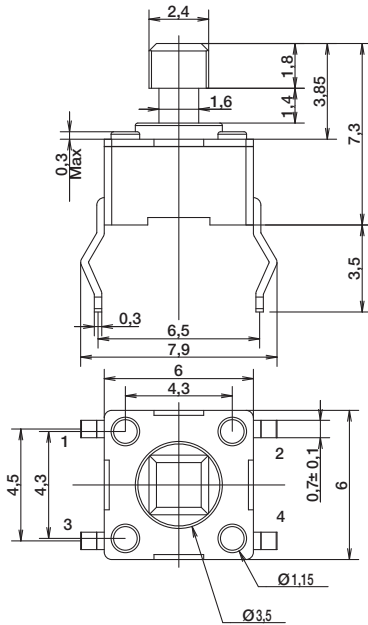
RECOMMENDED PCB LAYOUT



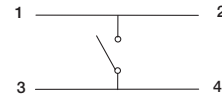
Dimensions are shown: mm  
Specifications and dimensions subject to change

# PTS645 Series 6 mm Tact Switches

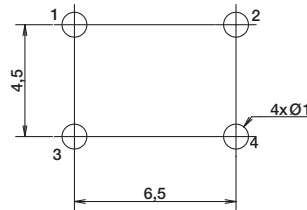
## ACTUATOR SHAPE



SCHEMATIC



RECOMMENDED PCB LAYOUT



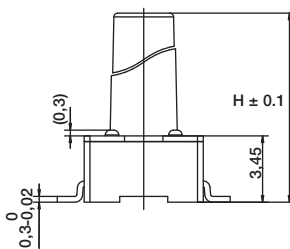
B

Tactile Switches

## ACTUATION FORCE

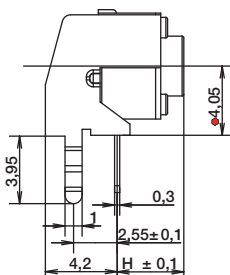
OPTION CODE	FORCE
<b>L</b>	130 grams Black
<b>M</b>	160 grams Blue
<b>H</b>	200 grams Gray
<b>K</b>	260 grams Red

## ACTUATOR HEIGHT



Switch height from PCB for S and T only

OPTION CODE	DIMENSION H	TERMINATION	SCHEMATIC	
			Without EMC pin	With EMC pin
<b>43</b>	4,3 (.169)	Thru-hole and SMT		
<b>50</b>	5,0 (.197)	Thru-hole and SMT		
<b>70</b>	7,0 (.275)	Thru-hole and SMT		
<b>95</b>	9,5 (.374)	Thru-hole and SMT		
<b>13</b>	13,0 (.512)	SMT		



Switch length from front leads for V only

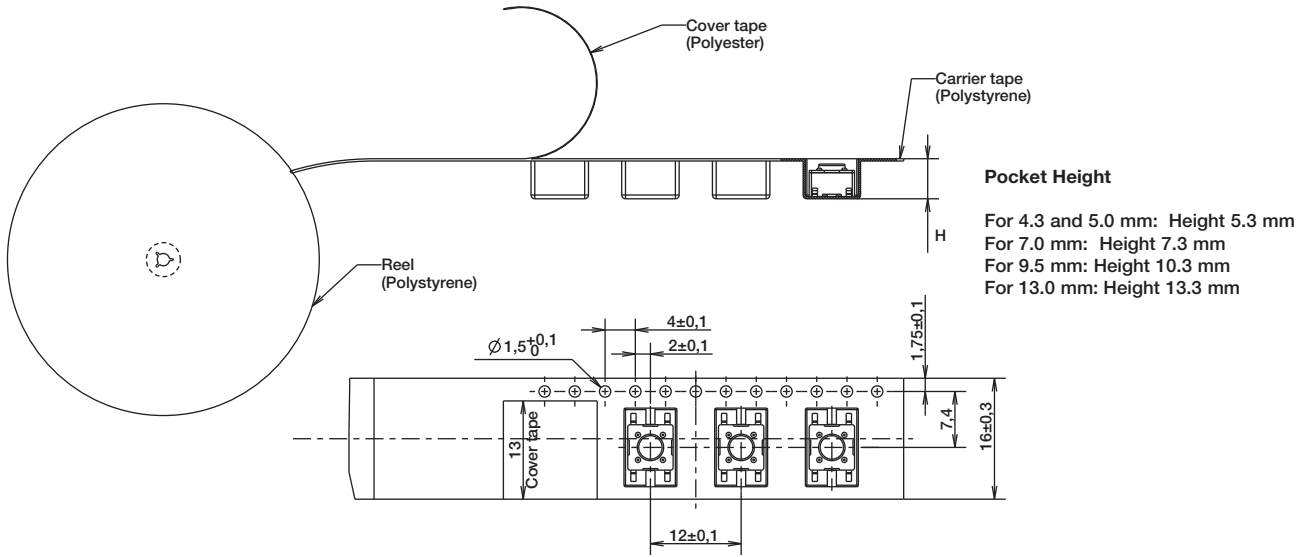
OPTION CODE	DIMENSION H	TERMINATION	SCHEMATIC	
			Without EMC pin	With EMC pin
<b>31</b>	3,15 (.124)	Vertical		
<b>39</b>	3,85 (.151)	Vertical		
<b>58</b>	5,85 (.230)	Vertical		
<b>83</b>	8,35 (.329)	Vertical		

# PTS645 Series 6 mm Tact Switches

## TAPE & REEL

B

Tactile Switches





# PTS645 V SMT Series 6 mm SMT Side Actuated Tact Switch

## Features/Benefits

- Full SMT processing
- Strong PCB soldering pads
- Compact 6 x 6 mm design

## Typical Applications

- Consumer Products
- Set Top and Access Boxes
- Instrumentation
- Home and Garden Equipment



## Specification

FUNCTION: Momentary action  
 CONTACT ARRANGEMENT: 1 make contact = SPST, N.O.  
 TERMINALS: G type for SMT  
 TRAVEL: 0.25 mm +0.2/-0.1 mm  
 OPERATING LIFE: 100,000 cycles

## Mechanical

Part Number	Operating Force (gf)	Actuator Color
PTS645 VN13 SMTR92 LFS	100 ± 30	Dark grey
PTS645 VM13 SMTR92 LFS	160 ± 50	Yellow green

## Electrical

MAXIMUM VOLTAGE: 12 V DC  
 MAXIMUM CURRENT: 50 mA  
 DIELECTRIC STRENGTH: 100 V AC (1mn)  
 CONTACT RESISTANCE: ≤ 100 mΩ  
 INSULATION RESISTANCE: ≥ 100 MΩ  
 BOUNCE TIME: ≤ 10 ms

## Environmental

OPERATING TEMPERATURE: -20°C to 70°C  
 STORAGE TEMPERATURE: -30°C to 80°C

## Process

SOLDERING: This component is suited to the following methods:  
 Infrared Reflow Soldering in accordance with IEC61760-1

Recommended solder paste thickness is ≥ 15µm

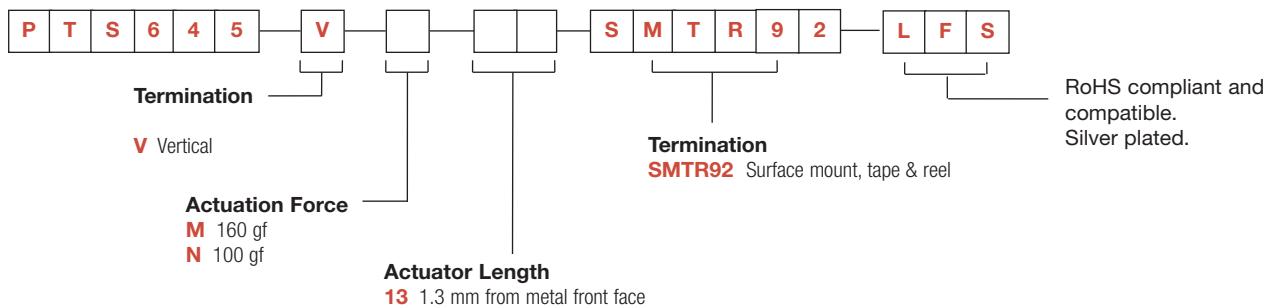
## Packaging

In reels of 650 pieces  
 Dimensions of reels according to EIA 481B  
 External diameter 330 mm

**NOTE:** Specifications listed above are for switches with standard options.  
 For information on specific and custom switches, consult Customer Service Center.

## How To Order

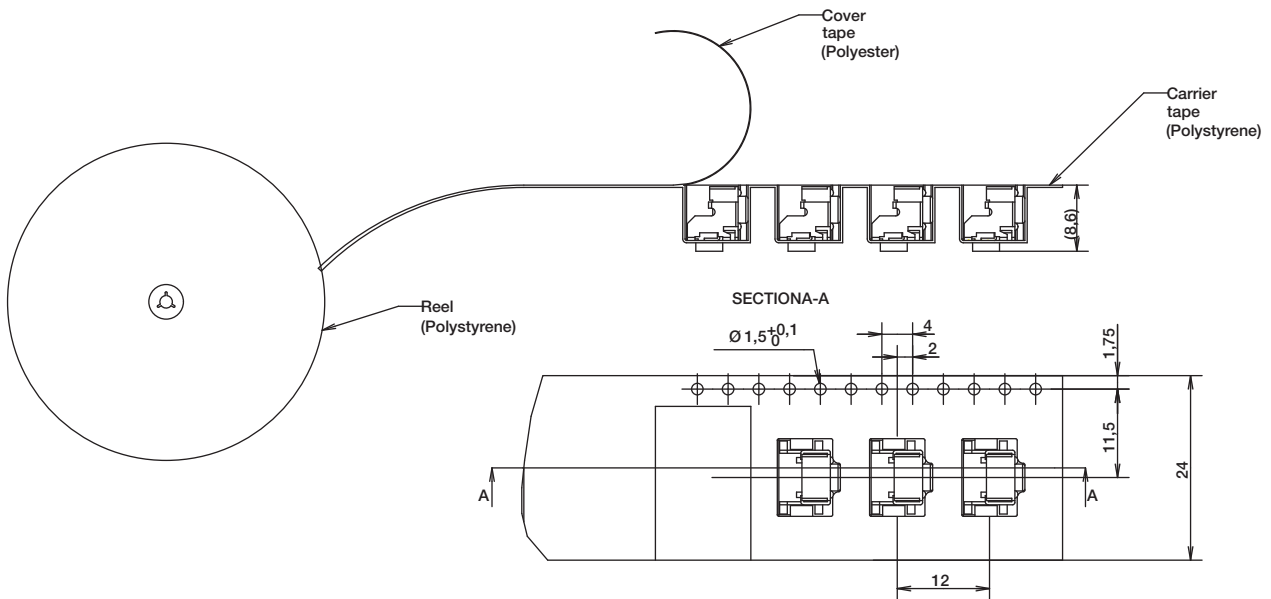
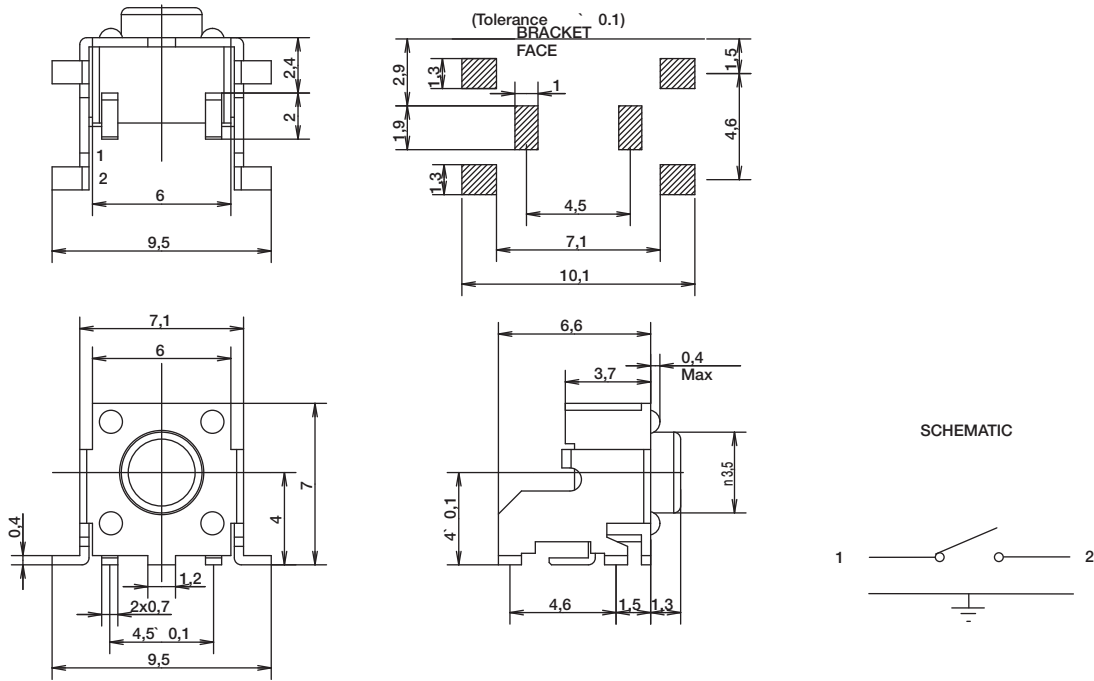
Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.



# PTS645 V SMT Series

## 6 mm SMT Side Actuated Tact Switch

RECOMMENDED PCB LAYOUT



# PTS125 Series 12 mm Tact Switches



## Features/Benefits

- THT and SMT terminations
- Various heights
- Snap fit actuator option

## Typical Applications

- Consumer products
- Instrumentation
- Computer products
- Industrial

## Specification

FUNCTION: Momentary action  
 CONTACT ARRANGEMENT: 1 make contact SPST, N.O.  
 TERMINALS: PC pins for THT and G type for SMT  
 TRAVEL: 0.30 mm ± 0.15 mm

## Mechanical

OPERATING LIFE: 200,000 cycles  
 OPERATING FORCE: 180 gf ± 50  
 250 gf ± 50

## Electrical

MAX VOLTAGE: 12 VDC  
 MAX CURRENT: 50 mA  
 DIELECTRIC STRENGTH: 250 V AC (1mn)  
 CONTACT RESISTANCE: <100 mΩ  
 INSULATION RESISTANCE: >100MΩ  
 BOUNCE TIME: < 5 ms

**NOTE:** Specifications listed above are for switches with standard options.  
 For information on specific and custom switches, consult Customer Service Center.

## Environmental

OPERATING TEMPERATURE: -20°C to 70°C

## Process

SOLDERING: This component is suited to the following methods:  
 Infrared reflow soldering in accordance with IEC 61760-1 for SMT version  
 Wave soldering compatible with lead free soldering profile

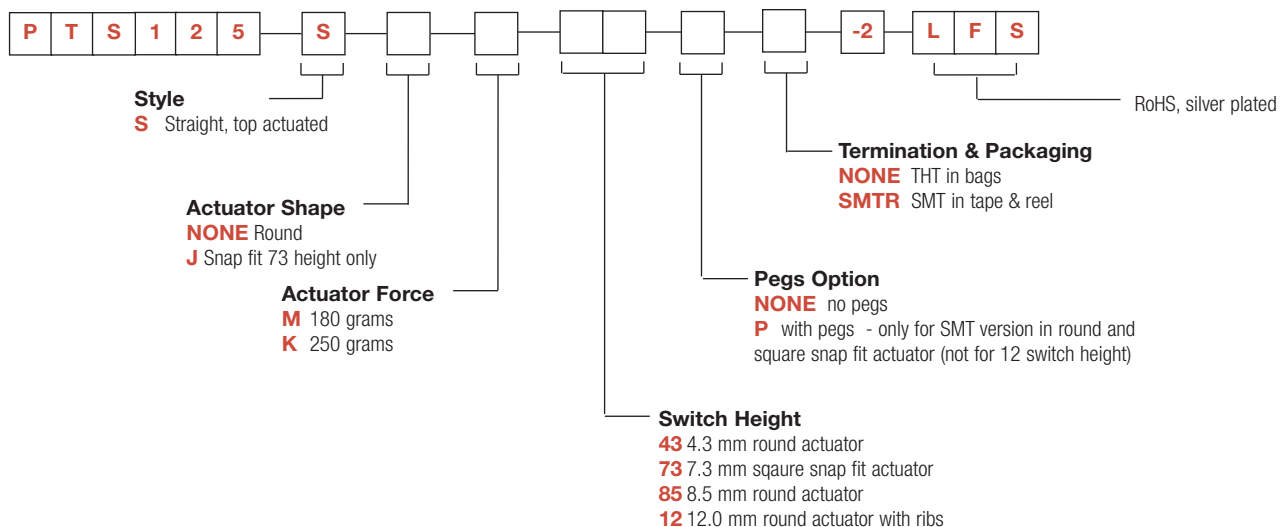
## Packaging

Soldering Style	Height	Packaging	Parts per Packaging
THT	All heights	Plastic bag	500
SMT	4.3 mm	tape & reel	900
SMT	4.3 mm with pegs	tape & reel	600
SMT	7.3 mm	tape & reel	500
SMT	7.3 mm with pegs	tape & reel	500
SMT	8.5 mm	tape & reel	500
SMT	8.5 mm with pegs	tape & reel	400
SMT	12 mm	tape & reel	250

Dimensions of reels according to EIA 481B. External diameter 330 mm.

## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

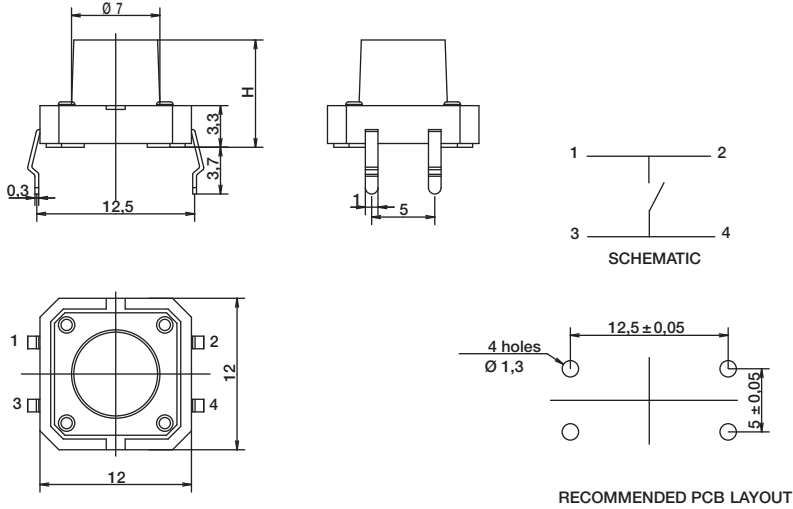


# PTS125 Series 12 mm Tact Switches

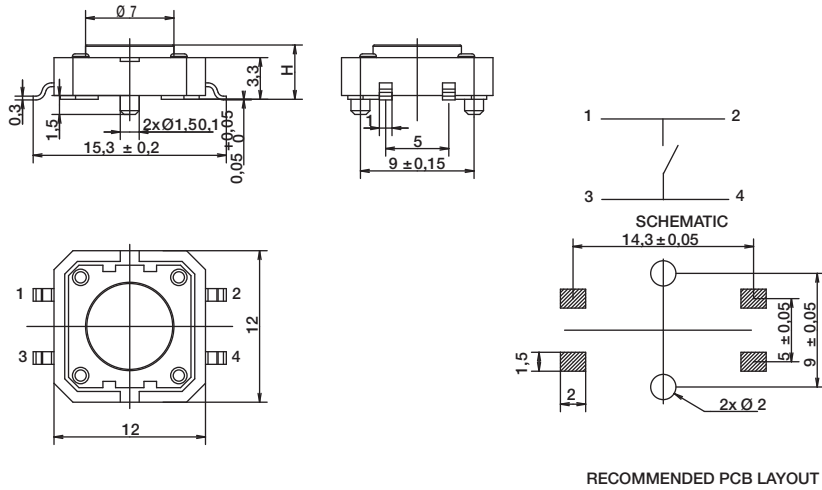
**THT** VERSION WITH ROUND ACTUATOR H= 4.3 & 8.5 MM (other height upon request)

B

Tactile Switches

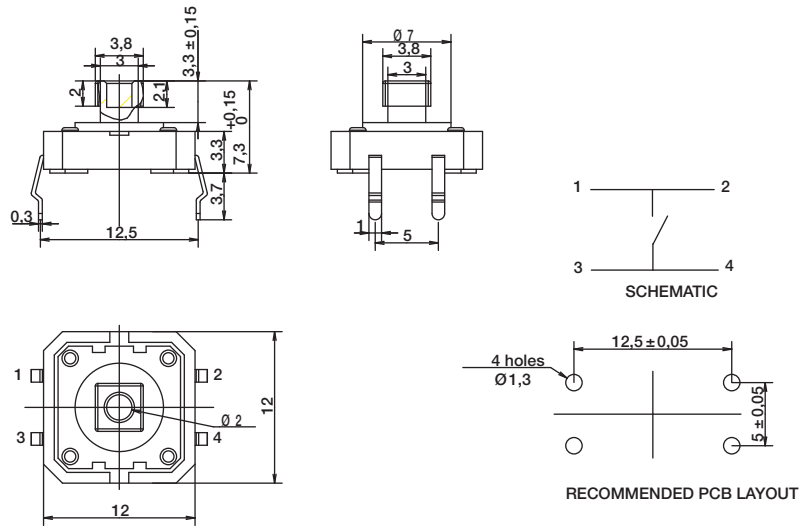


**SMT** VERSION WITH ROUND ACTUATOR AND PEGS H= 4.3 & 8.5 MM (other height upon request)

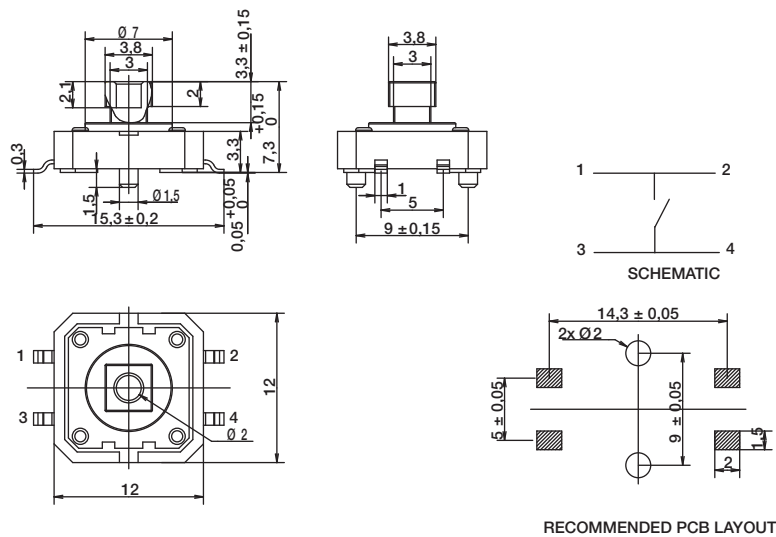


# PTS125 Series 12 mm Tact Switches

## THT VERSION WITH SQUARE SNAP FIT ACTUATOR H= 7.3 MM



## SMT VERSION WITH SQUARE SNAP FIT ACTUATOR AND PEGS H= 7.3 MM



B

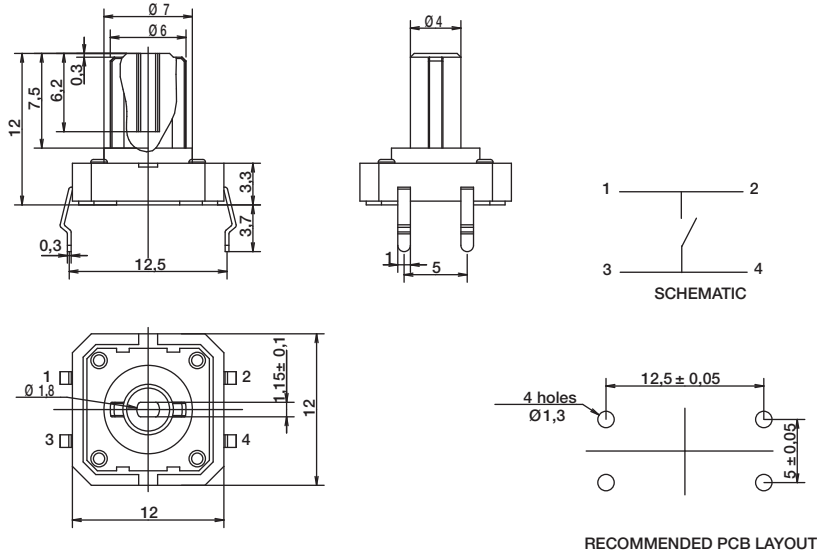
Tactile Switches

# PTS125 Series 12 mm Tact Switches

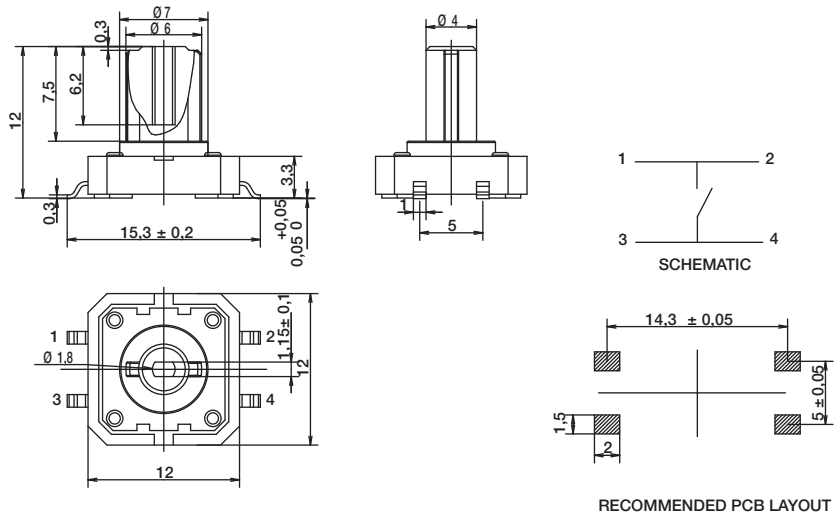
**THT** VERSION WITH ROUND RIBBED ACTUATOR H= 12.0 MM

Tactile Switches

B



**SMT** VERSION WITH ROUND RIBBED ACTUATOR H= 12.0 MM



# ITS Series Illuminated Tact Switch

## Features/Benefits

- Vertical and right angle SMT models
- Vertical and right angle thru-hole models
- Multiple caps and legends
- Several LED colors and bi-color options
- RoHS compliant /compatible

## Typical Applications

- Consumer electronics
- Server/storage
- Medical devices
- Test/Measurement/Instrumentation
- Audio/Video
- Computers/Peripherals
- Security

NEW  
Right  
Angle  
SMT



B

Tactile Switches

## Specification

FUNCTION: N.O. momentary action  
TERMINALS: SMT & Thru-hole

## Mechanical

OPERATING FORCE: 160 ± 50gf for V1; V2; V3; R1; R2 models  
220 ± 50 gf for R3 model  
OPERATING LIFE: 50,000 cycles (250m Ω max)  
RECOMMENDED OPERATING STROKE: 0.25mm ± 0.1mm

## Electrical

RATING: 50mA @ 12VDC  
CONTACT RESISTANCE: <100m Ω (initial)  
DIELECTRIC WITHSTANDING VOLTAGE:  
>250VAC (50-60 Hz) between terminals - 1 min.Ω  
INSULATION RESISTANCE: >100M Ω  
BOUNCE TIME: <10ms

## Packaging

Thru-hole: 200 pieces per tray  
SMT: tape & reel (see V2 or V3 mounting style drawings)

## Environmental

OPERATING TEMPERATURE: -25°C to +70°C  
STORAGE TEMPERATURE: -25°C to +80°C

## Process

SOLDERABILITY: Thru-hole - wave compatible  
SMT - convection or IR reflow compatible

## Materials

CONTACTS/TERMINALS: Base metal; brass  
Plating; Ag  
DOME: Base metal: Phosphor bronze  
Plating; Ag

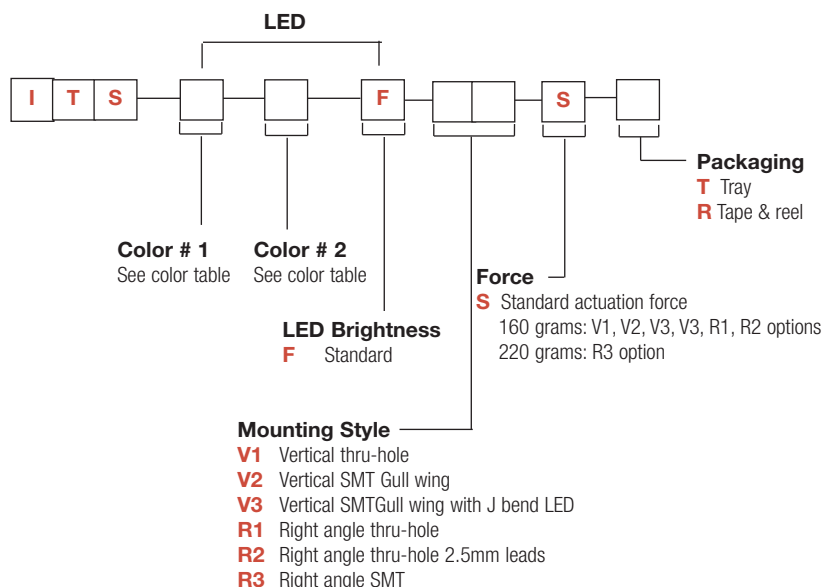
BASE: PA  
ACTUATOR: PA  
COVER: PA

## Caps

Caps are ordered separately and shipped bulk. Thru-hole versions available with caps assembled under custom part number. Contact customer service for details.

## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.



### LED Color

00	No light
10	Red
12	Red/Yellow
13	Red/Green
14	Red/Blue
20	Yellow
21	Yellow/Red
23	Yellow/Green
30	Green
31	Green/Red
32	Green/Yellow
40	Blue
41	Blue/Red
50	White
60	True green

\* Other colors available by request

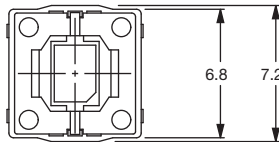
# ITS Series Illuminated Tact Switch

## LED COLOR / BRIGHTNESS

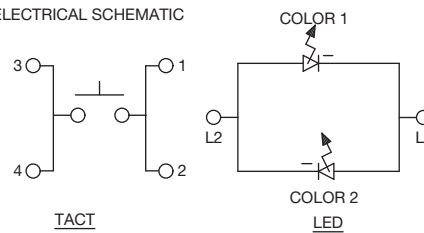
LED Characteristic	units	Standard LED Color Options					
		Red (1)	Yellow (2)	Green (3)	Blue (4)	White (5)	True Green (6)
Recommended Operating	mA @ 5VDC	20mA	20mA	20mA	20mA	20mA	20mA
Forward Current	mA	30 mA	30 mA	30 mA	30 mA	30 mA	30 mA
Peak Pulsing Current (1/8 duty @ 1kHz)	mA	125 mA	125 mA	125 mA	125 mA	125 mA	125 mA
Power Dissipation	mW	75 mW	75 mW	75 mW	108 mW	108 mW	108 mW
Forward Voltage @ 20mA	Volts	2.5 Volts Max.	2.5 Volts Max.	2.5 Volts Max.	3.6 Volts Max.	3.6 Volts Max.	3.6 Volts Max.
Dominant Wavelength @ 20mA	nm	637nm (Typical)	590nm (Typical)	570nm (Typical)	465nm (Typical)	CIE Coordinates X= 0.25 ~ 0.33 Y= 0.24 ~ 0.34	522nm (Typical)
Wavelength at Peak Emission @ 20mA	nm	645nm (Typical)	590nm (Typical)	573nm (Typical)	460nm (Typical)		515nm (Typical)
Spectral Half Bandwidth @ 20mA	nm	20nm (Typical)	20nm (Typical)	17nm (Typical)	25nm (Typical)		33nm (Typical)
Luminous Intensity @ 20mA	mcd	50mcd Minimum	125mcd Minimum	40mcd Minimum	100mcd Minimum	250mcd Minimum	500mcd Minimum
Viewing Angle at 50% LV (@10mA)	degrees	150° Typical	120° Typical	120° Typical	120° Typical	150° Typical	120° Typical

## MOUNTING STYLES

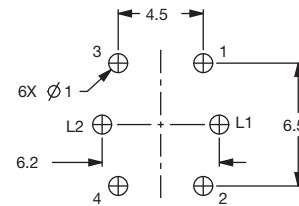
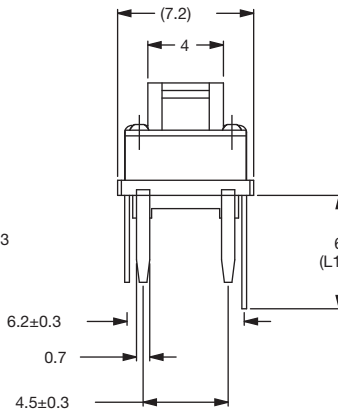
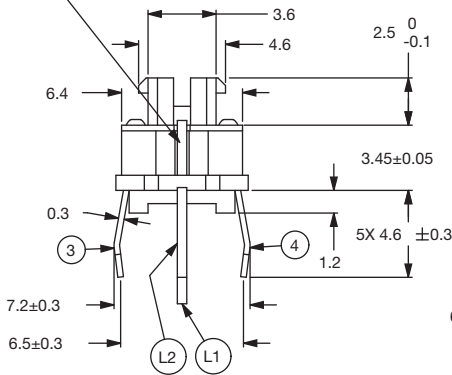
### V1 - Vertical Thru-hole



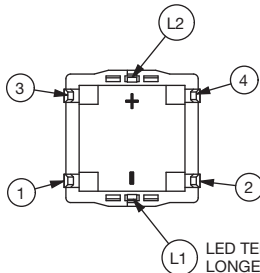
ELECTRICAL SCHEMATIC



DOT SHOWING LED COLOR IS MARKED FOR MINUS POLE SEE SCHEMATIC



P.C.B. LAYOUT



LED TERMINAL L1 IS TRIMMED LONGER THAN TERMINAL L2

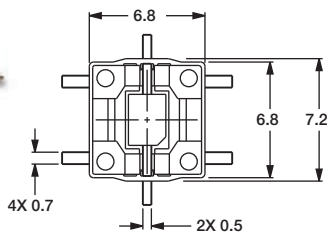
TRAY PACKAGING: 200 PIECES



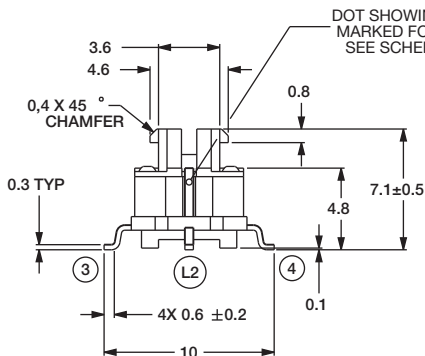
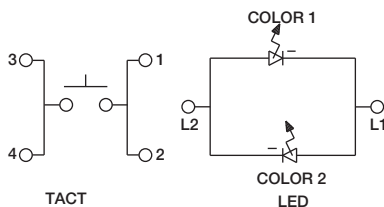
# ITS Series Illuminated Tact Switch

## MOUNTING STYLES

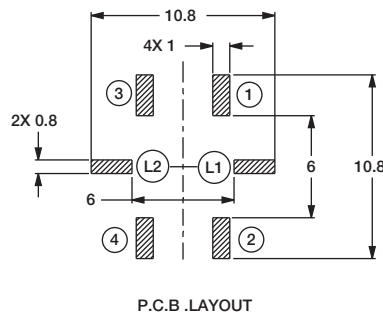
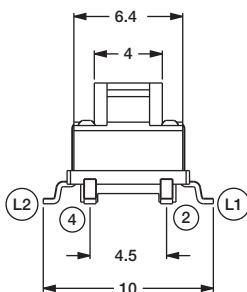
### V2 - Vertical SMT; Gullwing



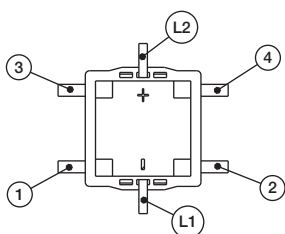
ELECTRICAL SCHEMATIC



DOT SHOWING LED COLOR IS MARKED FOR MINUS POLE (CATHODE) SEE SCHEMATIC

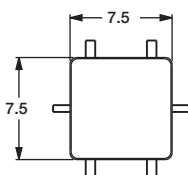


P.C.B. LAYOUT

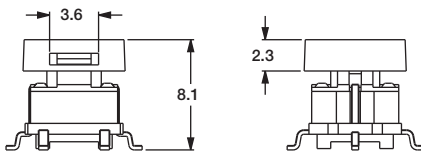


B

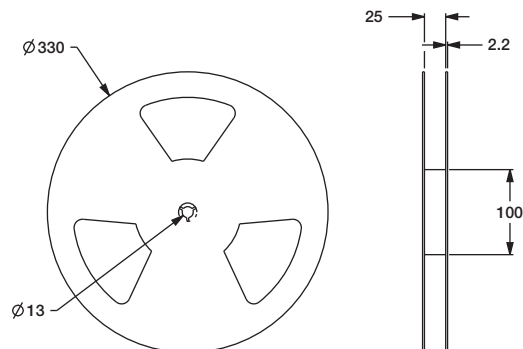
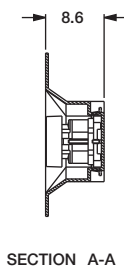
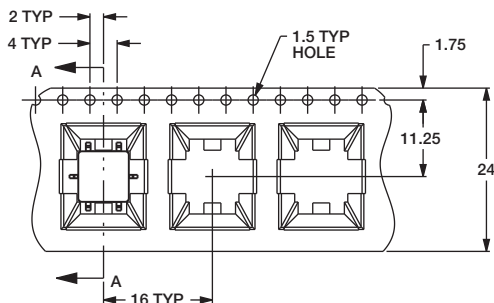
Tactile Switches



TAPE & REEL: 500 PIECES



NOTES:  
1. SWITCH WITH TEMPORARY PICK AND PLACE CAP.



Dimensions are shown: mm  
Specifications and dimensions subject to change

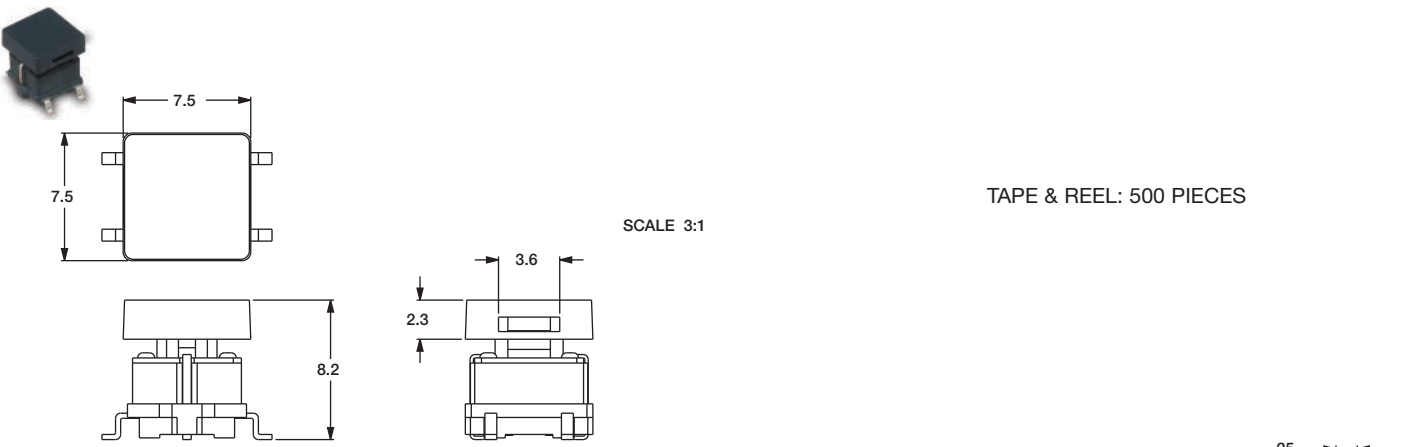
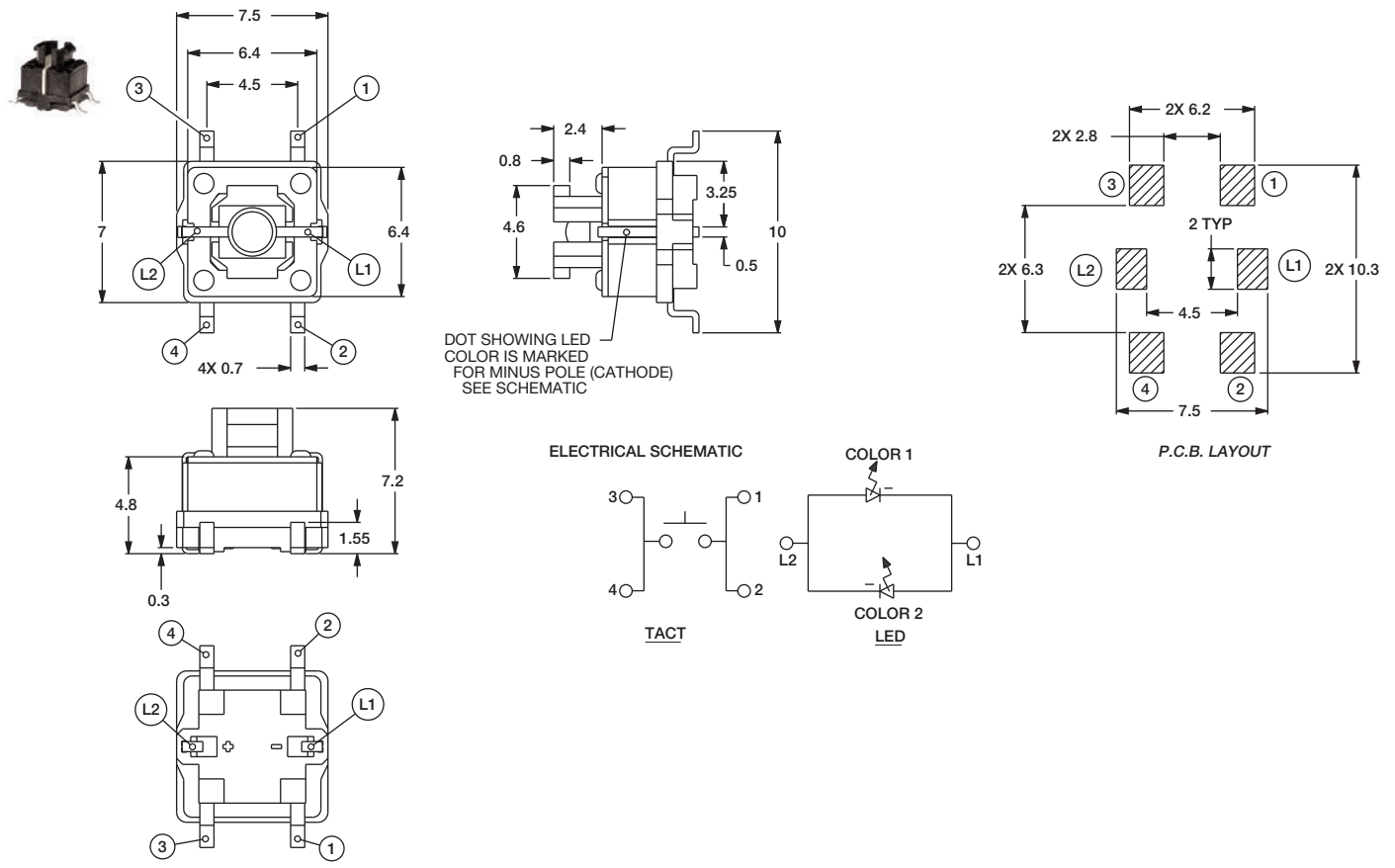
# ITS Series Illuminated Tact Switch

## MOUNTING STYLES

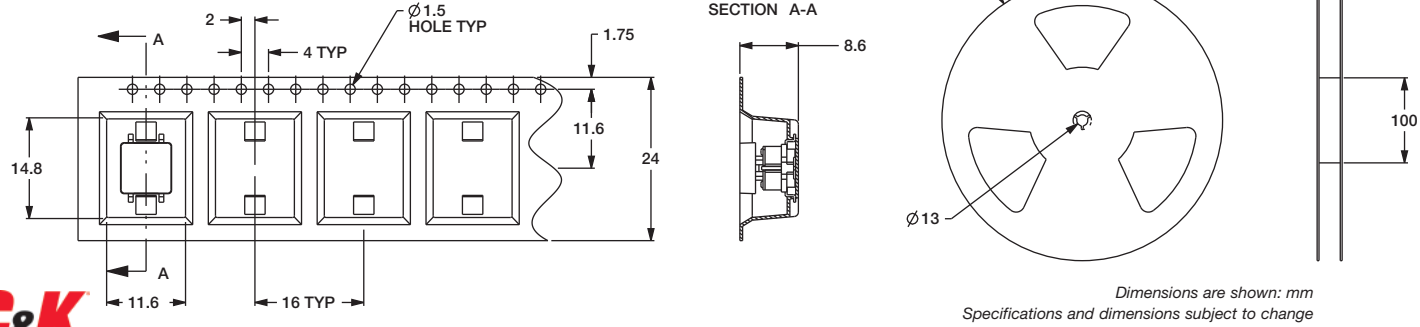
### V3 - Vertical SMT; Gull wing with J bend LED

B

Tactile Switches



NOTES:  
1. SWITCH WITH TEMPORARY PICK AND PLACE CAP.

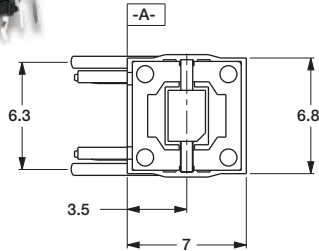


Dimensions are shown: mm  
Specifications and dimensions subject to change

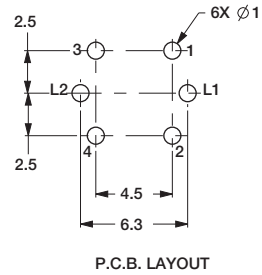
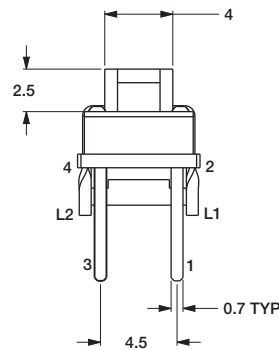
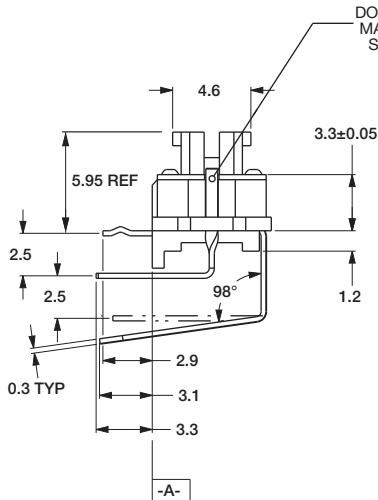
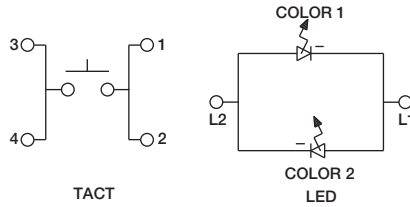
# ITS Series Illuminated Tact Switch

## MOUNTING STYLES

### R1 - Right Angle; Thru-hole

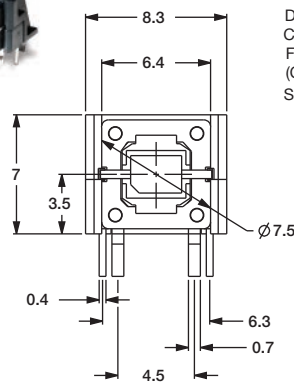


ELECTRICAL SCHEMATIC

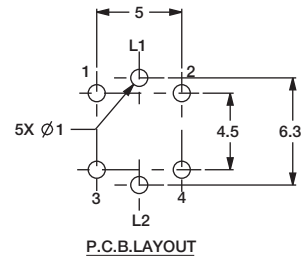
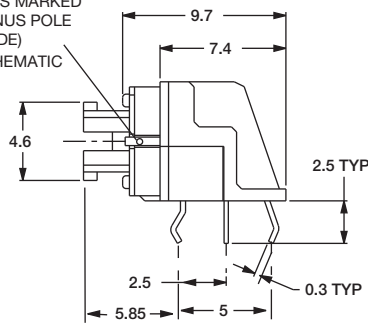


TRAY PACKAGING: 200 PIECES

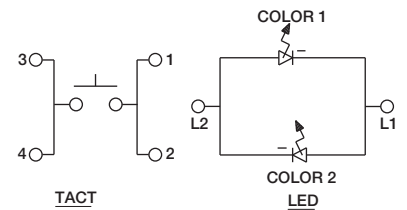
### R2 - Right Angle; Thru-hole 2.5mm leads



DOT SHOWING LED COLOR IS MARKED FOR MINUS POLE (CATHODE) SEE SCHEMATIC



ELECTRICAL SCHEMATIC



TRAY PACKAGING: 200 PIECES

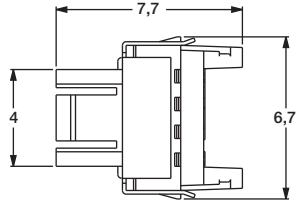
# ITS Series Illuminated Tact Switch

## MOUNTING STYLES

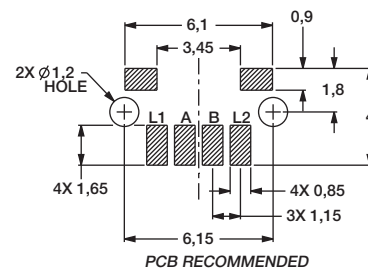
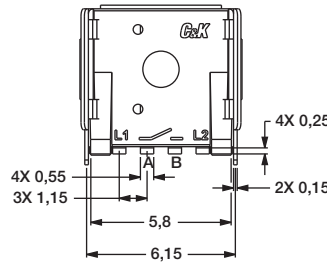
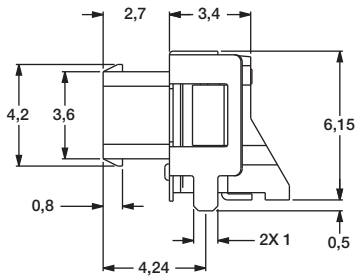
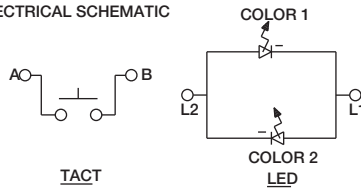
### R3 - Right Angle, SMT

B

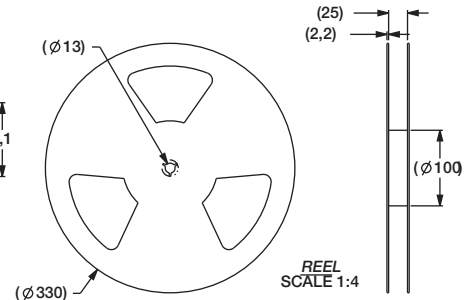
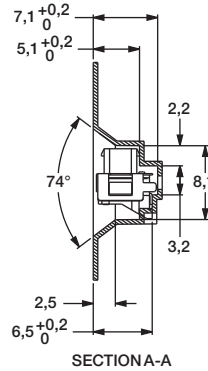
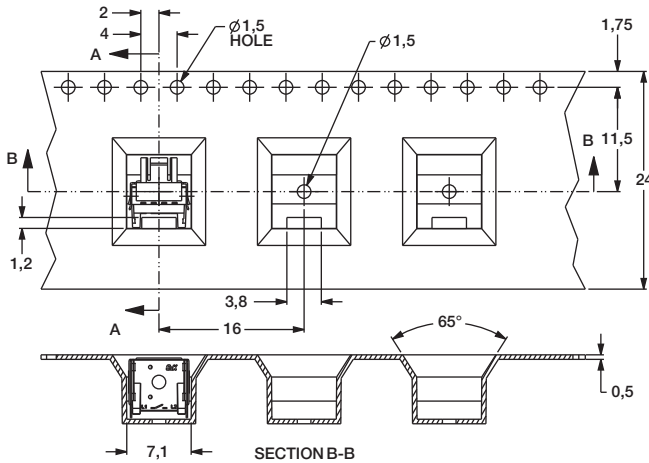
Tactile Switches



ELECTRICAL SCHEMATIC



TAPE & REEL: 500 PIECES



# ITS Series Illuminated Tact Switch

## FORCE

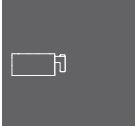
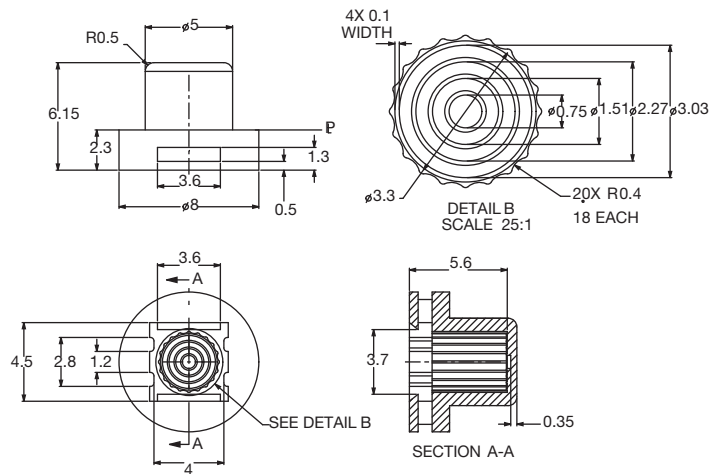
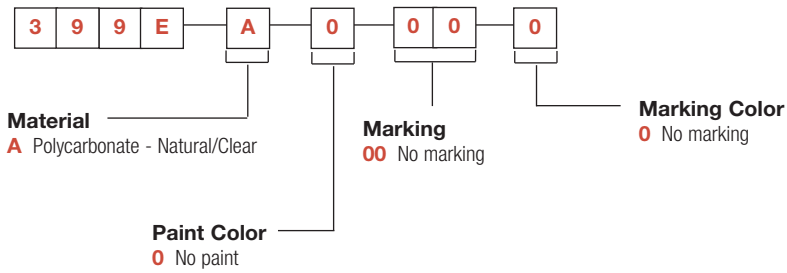
OPTION CODE	FORCE
<b>S</b>	Standard 160 gf - V1, V2, V3, R1, R2 options 220 gf - R3 option

## CAPS

Use the individual ordering code for each cap



**399EA0000**  
Round cap, clear



**B**

Tactile Switches

# ITS Series Illuminated Tact Switch

## CAPS



**400EA0000**

Natural/clear



**400EB0000**

Translucent white, flat edge



**400ECA01E**

Matte silver paint laser etch, flat edge



### Material

- A** Natural/Clear - polycarbonate
- B** Translucent white - polycarbonate
- C** Silver paint laser etch - polycarbonate

### Paint Color

- 0** No paint
- A** Matte silver

### Laser Etch Marking

- 00** No marking
- 01** Power On/Off
- 04** Arrow right
- 05** Arrow left
- 06** Arrow up
- 07** Arrow down
- 09** Power
- 33** Arrow up (fill)
- 34** Arrow down (fill)
- 97** I/O



### Marking Color

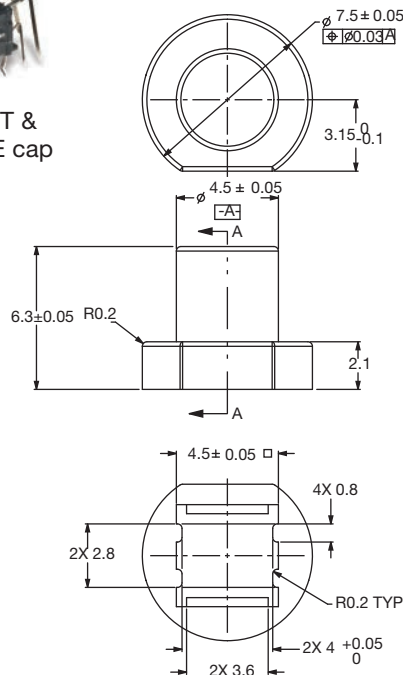
- 0** No marking
- E** Laser etch (painted caps only)

Tactile Switches

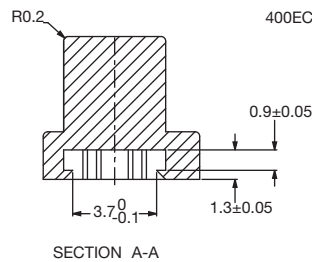
B



ITSXXFR1ST &  
400ECA01E cap



400ECA01E SHOWN



400E cap dimensions shown are "as molded" (no paint).

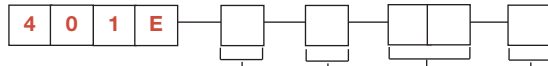
# ITS Series Illuminated Tact Switch

## CAPS



**401ECA06E**

Matte silver paint, laser etch,  
tall oval



**Material**

- A** Natural/clear - polycarbonate
- B** Translucent white - polycarbonate
- C** Paint laser etch - polycarbonate

**Paint Color**

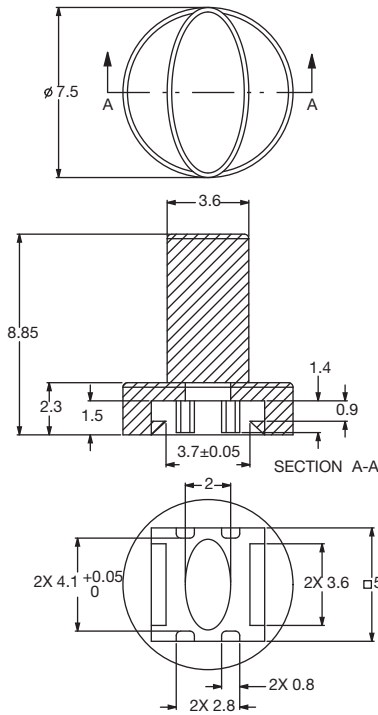
- 0** No paint
- A** Matte silver

**Laser Etch  
Marking**

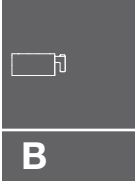
- 00** No marking
- 06** Arrow up
- 07** Arrow down
- 33** Arrow up (fill)
- 34** Arrow down (fill)

**Marking Color**

- 0** No marking
- E** Laser etch (painted caps only)



401E cap dimensions shown are "as molded" (no paint).



**B**

Tactile Switches

# KSH Series

## Soft Feeling High Tactile SMT Top Actuated

### Features/Benefits

- 6.3 x 6.3 x 5.0 mm footprint
- Low contact resistance
- High number of cycles
- 2 or 4 pin PCB layout

### Typical Applications

- Automotive Interior
- Car AV equipment
- Electronic musical instrument



### Specifications

FUNCTION: momentary action  
 CONTACT ARRANGEMENT: 1 make contact = SPST N.O.  
 TERMINALS: J type for SMT  
 TRAVEL: 1.3 ± 0.2 mm

### Mechanical

Part Number	Operating Force (N)	Operating Life (operations)
KSH X11J 50 LFS	1.6 ± 0.5	200,000
KSH X21J 50 LFS	2.0 ± 0.6	200,000
KSH X31J 50 LFS	2.5 ± 0.8	200,000
KSH X41J 50 LFS	3.0 ± 1.0	200,000
KSH X51J 50 LFS	3.5 ± 1.2	100,000

### Electrical

MAXIMUM / MINIMUM VOLTAGE: 12 VDC / 2 VDC  
 MAXIMUM / MINIMUM CURRENT DC: 50 mA / 10 µA  
 DIELECTRIC STRENGTH: 250 VA C (1mm)  
 CONTACT RESISTANCE: ≤ 100 mΩ  
 INSULATION RESISTANCE: ≥ 100 MΩ  
 BOUNCE TIME: ≤ 10 ms

### Environmental

OPERATING TEMPERATURE: -40°C to 90°C

### Process

SOLDERING: This component is suited to the following methods:  
 Infrared Reflow Soldering in accordance with IEC61760-1

### Packaging

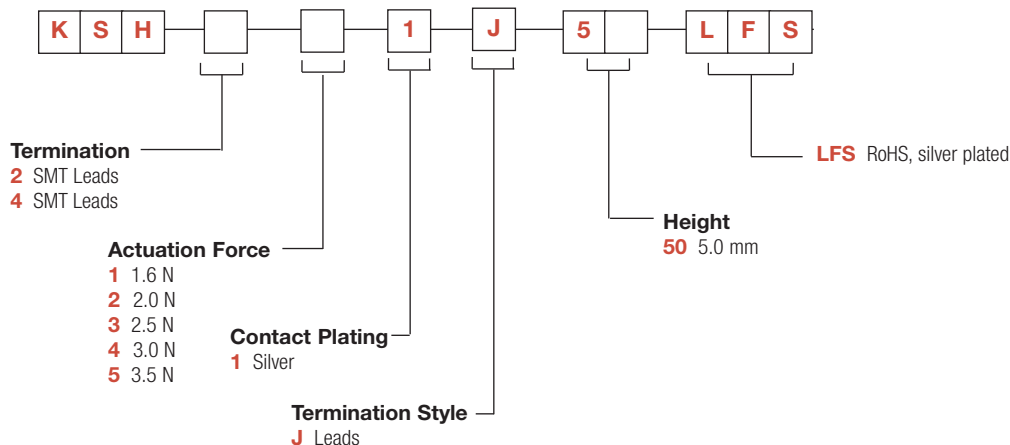
In reels of 1,000 pieces  
 Dimensions of reels according to EIA 481B  
 External diameter 330 mm

**NOTE:** Specifications listed above are for switches with standard options.  
 For information on specific and custom switches, consult Customer Service Center.

### How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box.

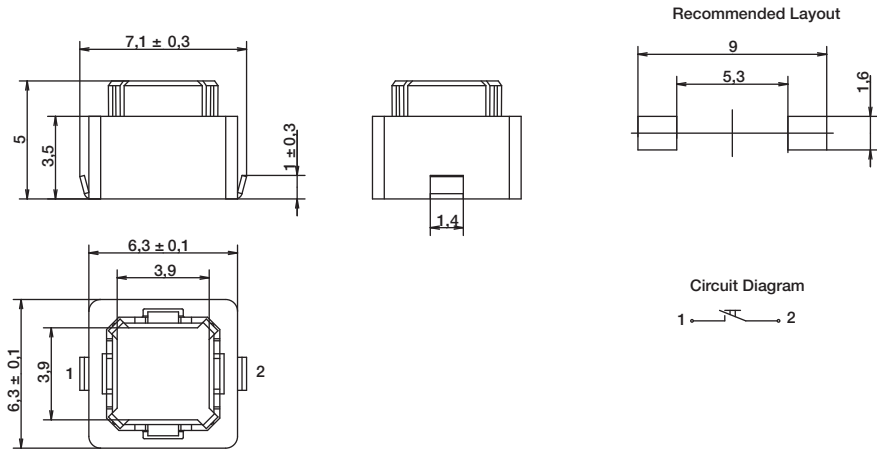
**For any part number different from those listed above, please consult your local representative.**



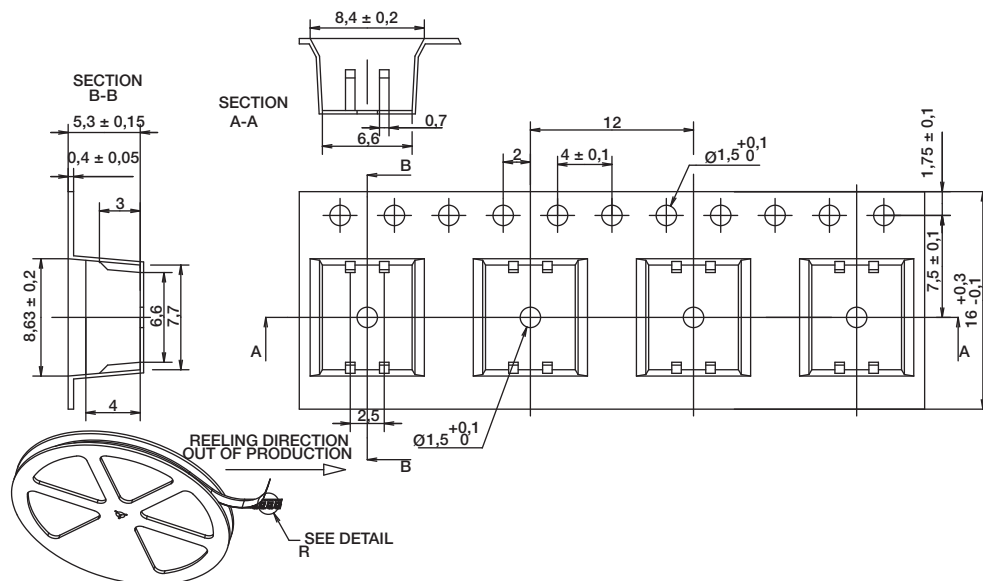
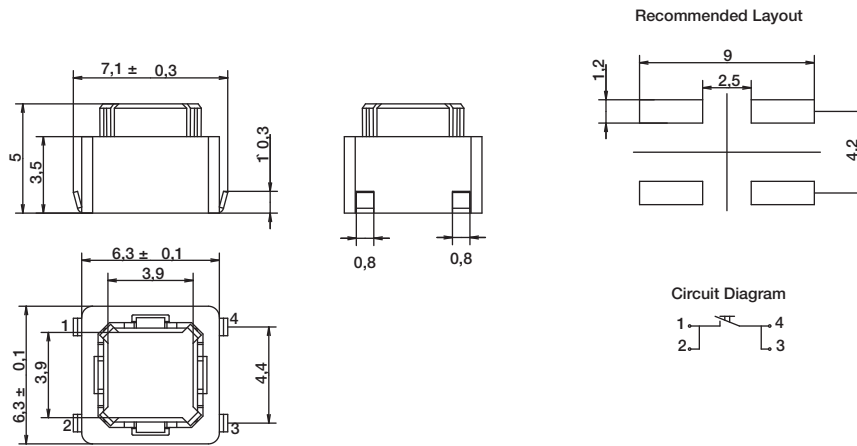


# KSH Series Soft Feeling High Tactile SMT Top Actuated

## KSH2



## KSH4



# KXT2 Series

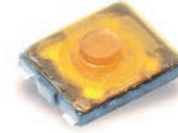
## Double Action Ultra Low Profile Top Actuated

### Features

- 3.9 x 3.0 mm footprint
- 1.05 mm thickness
- Dual action

### Typical Applications

- Wearable electronics
- Mobile Phones
- Portable Electronics



### Specification

FUNCTION: momentary action  
 CONTACT ARRANGEMENT: Dual action = SPDT, N.O.  
 TERMINALS: G type for SMT  
 TRAVEL: 0.1 mm ± 0.05 mm  
 TRAVEL: 0.2 mm + 0.1 / - 0.05 mm

### Mechanical

	Operating force gf		Operating Life
KXT 211 LHS	Push force 1	100 ± 40	100,000
	Push force 2	200 ± 50	

### Electrical

MAXIMUM VOLTAGE: 12 VDC  
 MAXIMUM CURRENT DC: 50 mA  
 DIELECTRIC STRENGTH: 250 V (50 Hz, 1 min.)  
 CONTACT RESISTANCE: ≤ 500 mΩ  
 INSULATION RESISTANCE: 100 MΩ  
 BOUNCE TIME: ≤ 10 ms

### Environmental

OPERATING TEMPERATURE: -40°C to 85°C  
 STORAGE TEMPERATURE: -40°C to 85°C

### Process

SOLDERING: This component is suited to the following methods:  
 Infrared Reflow Soldering in accordance with IEC61760-1

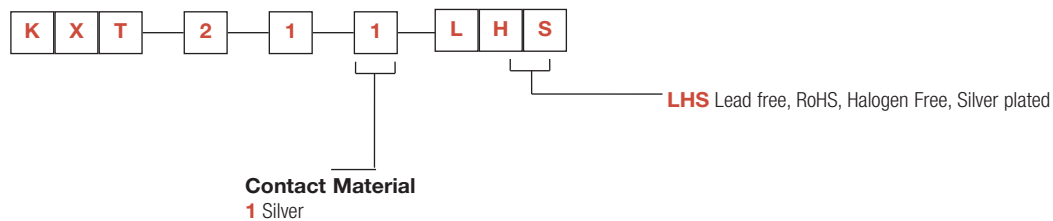
### Packaging

In reels of 6,000 pieces  
 Dimensions of reels according to EIA RS481 or IEC 2863  
 External diameter 178 mm ± 2mm

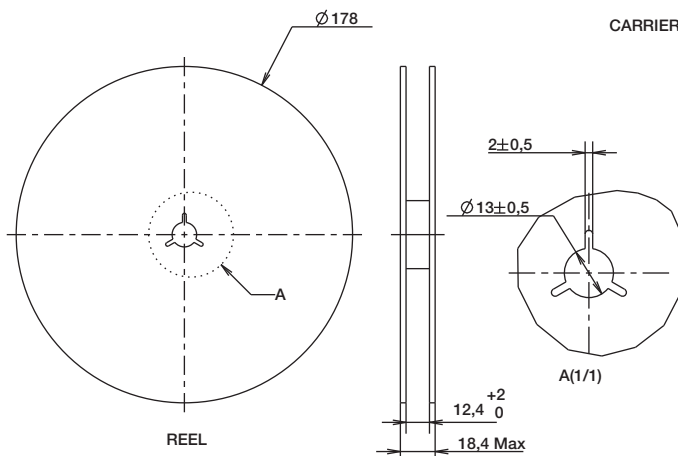
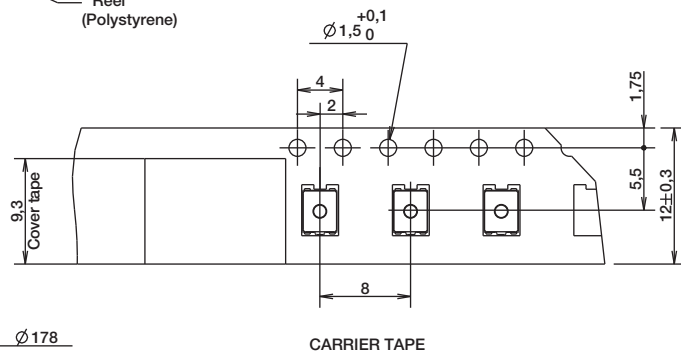
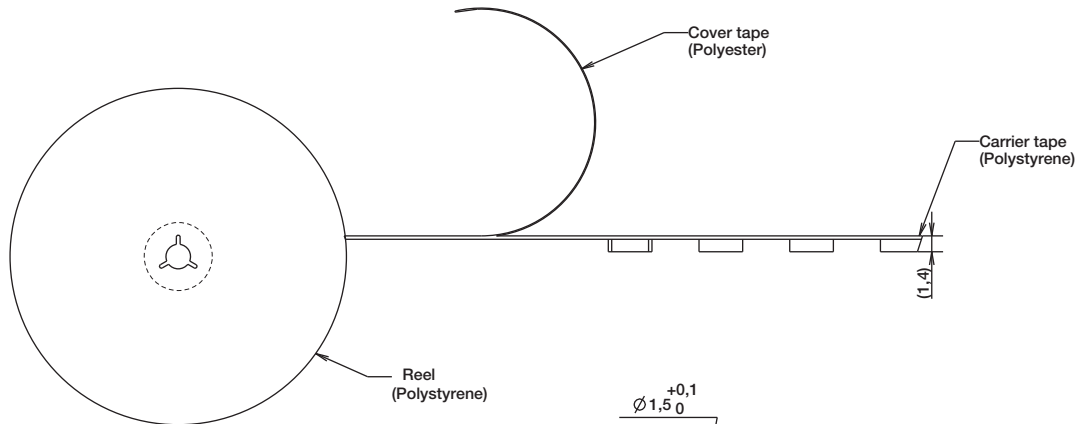
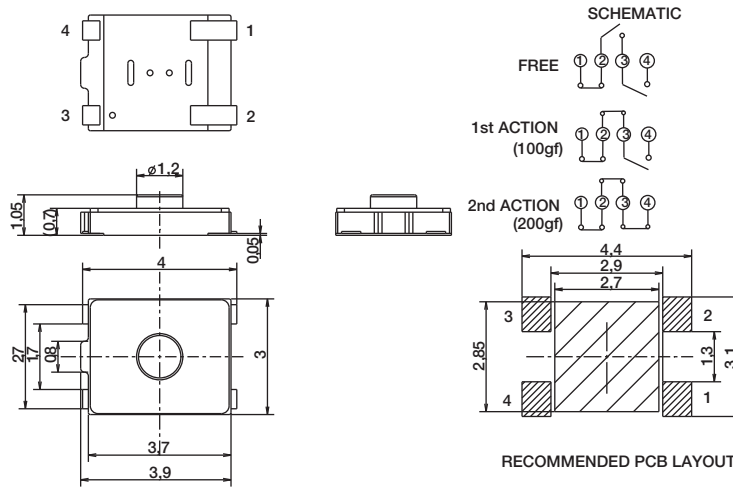
**NOTE:** Specifications listed above are for switches with standard options.  
 For information on specific and custom switches, consult Customer Service Center.

### Part Number Description

For any part number different from those listed above, please consult your local representative.



# KXT2 Series Double Action Ultra Low Profile Top Actuated



Dimensions are shown: mm  
Specifications and dimensions subject to change

# KMR 6 Series

## Microminiature SMT Top Actuated IP67

### Features/Benefits

- Watertight IP67
- Standard and long life versions
- No ground pin
- Ultra low current capabilities
- Excellent tactile feel

### Typical Applications

- Automotive
- Medical
- Consumer
- Industrial



B

Tactile Switches

### Specification

FUNCTION: momentary action  
 CONTACT ARRANGEMENT: 1 make contact = SPST, N.O.  
 TERMINALS: Gullwing type for SMT

### Mechanical

Type NG See description below	Operating force N (grs)	Operating life (cycles)	Travel (mm)
KMR611NG LFS	1.2 (120) ± 0.30	200,000	0.20 mm ± 0.1
KMR611NG ULC LFS	1.2 (120) ± 0.30	200,000	0.20 mm ± 0.1
KMR613NG LFG	1.2 (120) ± 0.30	200,000	0.20 mm ± 0.1
KMR613NG ULC LFG	1.2 (120) ± 0.30	200,000	0.20 mm ± 0.1
KMR621NG LFS	2.0 (200) ± 0.50	200,000	0.25 mm ± 0.1
KMR621NG ULC LFS	2.0 (200) ± 0.50	200,000	0.25 mm ± 0.1
KMR623NG LFG	2.0 (200) ± 0.50	200,000	0.25 mm ± 0.1
KMR623NG ULC LFG	2.0 (200) ± 0.50	200,000	0.25 mm ± 0.1
KMR631NG LFS	3.0 (300) ± 0.75	150,000	0.25 mm ± 0.1
KMR631NG ULC LFS	3.0 (300) ± 0.75	150,000	0.25 mm ± 0.1
KMR632NG LFS	3.0 (300) ± 0.75	300,000	0.25 mm ± 0.1
KMR632NG ULC LFS	3.0 (300) ± 0.75	300,000	0.25 mm ± 0.1
KMR633NG LFG	3.0 (300) ± 0.75	150,000	0.25 mm ± 0.1
KMR633NG ULC LFG	3.0 (300) ± 0.75	150,000	0.25 mm ± 0.1
KMR641NG LFS	4.0 (400) ± 1.00	100,000	0.30 mm ± 0.1
KMR641NG ULC LFS	4.0 (400) ± 1.00	100,000	0.30 mm ± 0.1
KMR642NG LFS	4.0 (400) ± 1.00	200,000	0.30 mm ± 0.1
KMR642NG ULC LFS	4.0 (400) ± 1.00	200,000	0.30 mm ± 0.1
KMR643NG LFG	4.0 (400) ± 1.00	100,000	0.30 mm ± 0.1
KMR643NG ULC LFG	4.0 (400) ± 1.00	100,000	0.30 mm ± 0.1

### Electrical

	Silver	Gold
MAXIMUM POWER:	1 VA	0.2 VA
MAXIMUM VOLTAGE:	32 VDC	32 VDC
MINIMUM VOLTAGE:	20 mVDC	20 mVDC
MAXIMUM CURRENT:	50 mA	10 mA
MINIMUM CURRENT:	1 mA*	1 mA*
DIELECTRIC STRENGTH:	≥ 250 Vrms	
CONTACT RESISTANCE:	≤ 100 mΩ	
INSULATION RESISTANCE:	≥ 1GΩ	
BOUNCE TIME:	≤ 3 ms	

\*For ULC version minimum current is 1µA at 1.8 VDC

### Environmental

	Silver	Gold
OPERATING TEMPERATURE:	-40°C to 85°C	-40°C to 125°C
STORAGE TEMPERATURE:	-55°C to 85°C	-55°C to 125°C

### Process

Infrared Reflow Soldering in accordance with IEC61760-1

### Packaging

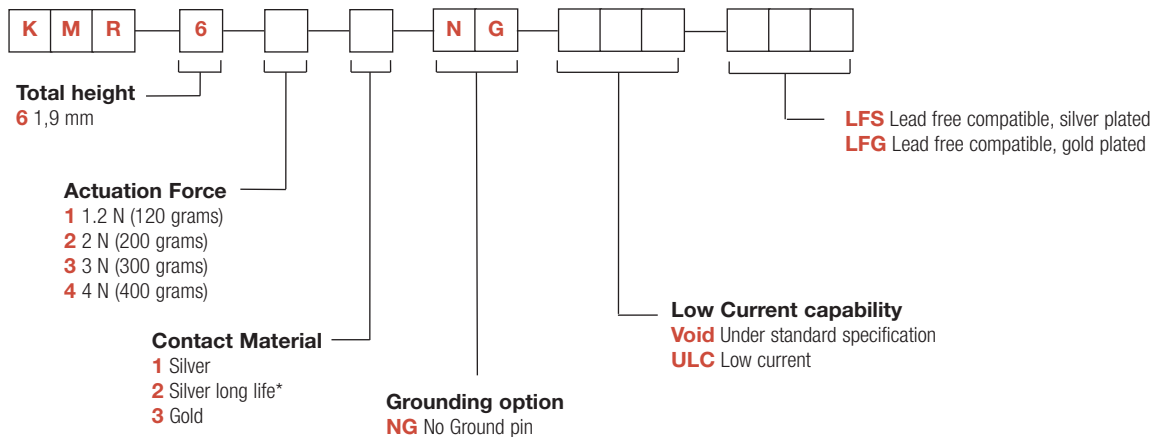
In reels of 7,000 pieces  
 External diameter 330 mm ± 2 mm

**NOTE:** Specifications listed above are for switches with standard options.  
 For information on specific and custom switches, consult Customer Service Center.

TACTILE FEELING: KMR 6 series with actuation force in 2N - 3N - 4N: ≥ 30%  
 KMR 6 series with actuation force in 1.2N: ≥ 20%

### Part Number Description

For any part number different from those listed above, please consult your local representative.



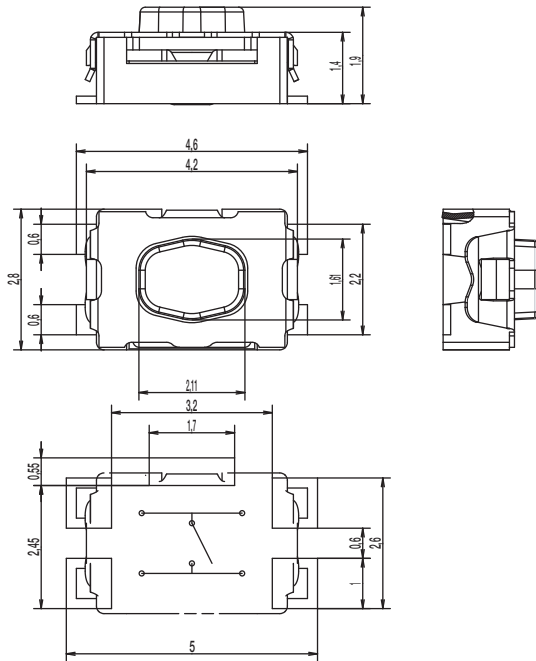
\* Silver long life is available in 3N and 4N actuation force. For other versions, please contact Customer Service.



# KMR 6 Series Microminiature SMT Top Actuated IP67

## KMR 6 Series - 1.9 mm height

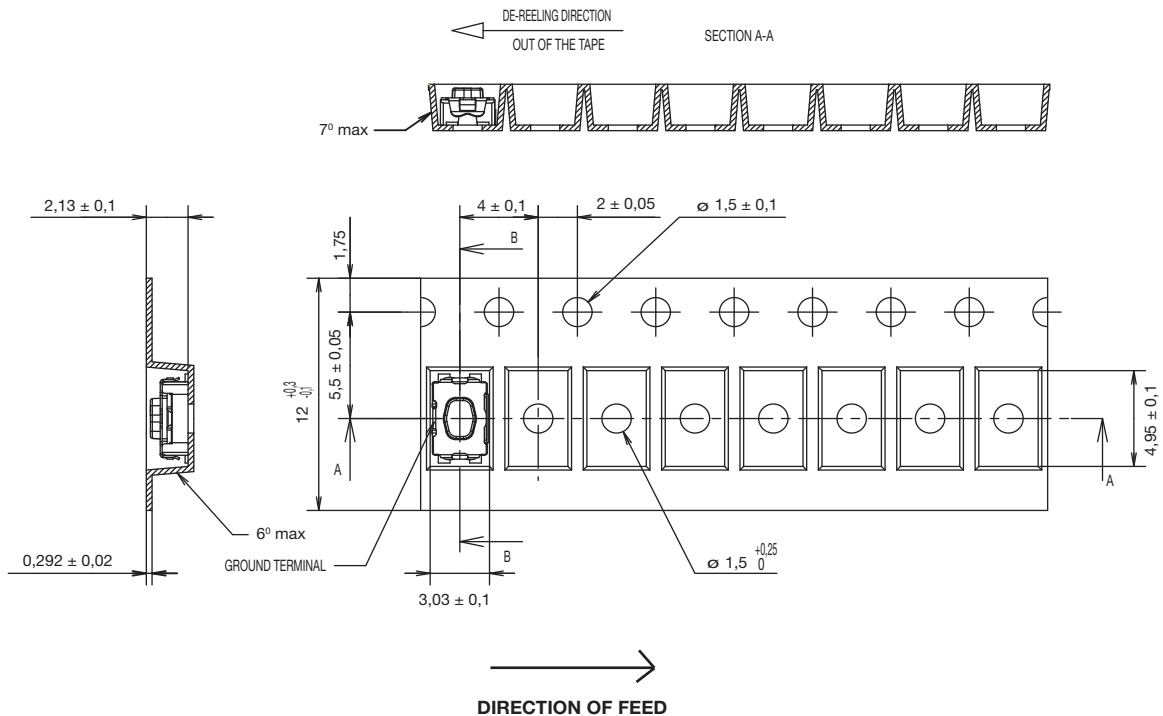
PCB layout shown with ground pin option



B

Tactile Switches

## TAPE & REEL



# KMR 7 Series Microminiature SMT Top Actuated IP67

## Features/Benefits

- Watertight IP67
- Standard and long life versions
- No ground pin
- Ultra low current capabilities
- Excellent tactile feel

## Typical Applications

- Automotive
- Medical
- Consumer
- Industrial



B

Tactile Switches

## Specification

FUNCTION: momentary action  
CONTACT ARRANGEMENT: 1 make contact = SPST, N.O.  
TERMINALS: Gullwing type for SMT

## Mechanical

Type NG See description below	Operating force N (grs)	Operating life (cycles)	Travel (mm)
KMR711NG LFS	1.2 (120) ± 0.30	100,000	0.20 mm ± 0.1
KMR711NG ULC LFS	1.2 (120) ± 0.30	100,000	0.20 mm ± 0.1
KMR713NG LFG	1.2 (120) ± 0.30	100,000	0.20 mm ± 0.1
KMR713NG ULC LFG	1.2 (120) ± 0.30	100,000	0.20 mm ± 0.1
KMR721NG LFS	2.0 (200) ± 0.50	100,000	0.25 mm ± 0.1
KMR721NG ULC LFS	2.0 (200) ± 0.50	100,000	0.25 mm ± 0.1
KMR723NG LFG	2.0 (200) ± 0.50	100,000	0.25 mm ± 0.1
KMR723NG ULC LFG	2.0 (200) ± 0.50	100,000	0.25 mm ± 0.1
KMR731NG LFS	3.0 (300) ± 0.75	100,000	0.25 mm ± 0.1
KMR731NG ULC LFS	3.0 (300) ± 0.75	100,000	0.25 mm ± 0.1
KMR732NG LFS	3.0 (300) ± 0.75	300,000	0.25 mm ± 0.1
KMR732NG ULC LFS	3.0 (300) ± 0.75	300,000	0.25 mm ± 0.1
KMR733NG LFG	3.0 (300) ± 0.75	100,000	0.25 mm ± 0.1
KMR733NG ULC LFG	3.0 (300) ± 0.75	100,000	0.25 mm ± 0.1
KMR741NG LFS	4.0 (400) ± 1.00	100,000	0.30 mm ± 0.1
KMR741NG ULC LFS	4.0 (400) ± 1.00	100,000	0.30 mm ± 0.1
KMR742NG LFS	4.0 (400) ± 1.00	200,000	0.30 mm ± 0.1
KMR742NG ULC LFS	4.0 (400) ± 1.00	200,000	0.30 mm ± 0.1
KMR743NG LFG	4.0 (400) ± 1.00	100,000	0.30 mm ± 0.1
KMR743NG ULC LFG	4.0 (400) ± 1.00	100,000	0.30 mm ± 0.1

## Electrical

	Silver	Gold
MAXIMUM POWER:	1 VA	0.2 VA
MAXIMUM VOLTAGE:	32 VDC	32 VDC
MINIMUM VOLTAGE:	20 mVDC	20 mVDC
MAXIMUM CURRENT:	50 mA	10 mA
MINIMUM CURRENT:	1 mA*	1 mA*
DIELECTRIC STRENGTH:	≥ 250 Vrms	
CONTACT RESISTANCE:	≤ 100 mΩ	
INSULATION RESISTANCE:	≥ 1GΩ	
BOUNCE TIME:	≤ 3 ms	

\*For ULC version minimum current is 1µA at 1.8 VDC

## Environmental

	Silver	Gold
OPERATING TEMPERATURE:	-40°C to 85°C	-40°C to 125°C
STORAGE TEMPERATURE:	-55°C to 85°C	-55°C to 125°C

## Process

Infrared Reflow Soldering in accordance with IEC61760-1

## Packaging

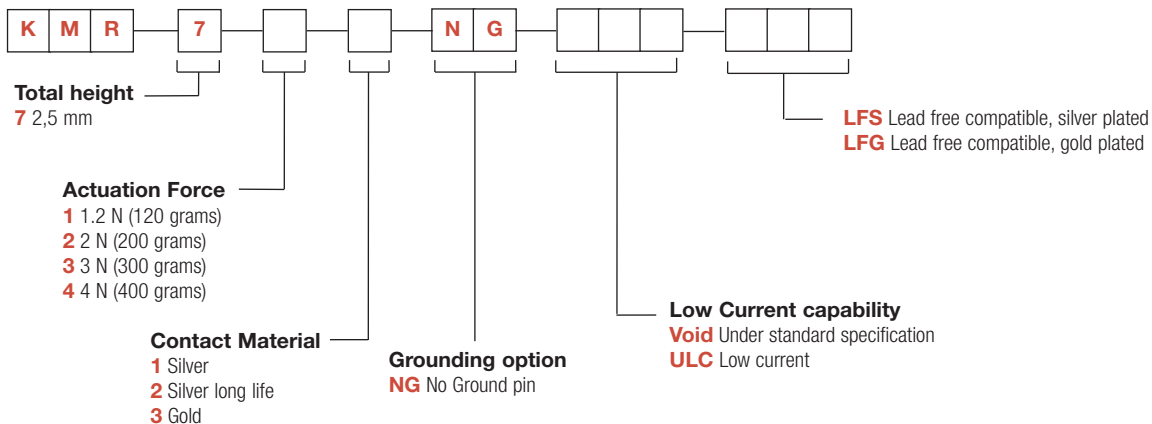
In reels of 6,000 pieces  
External diameter 330 mm ± 2 mm

**NOTE:** Specifications listed above are for switches with standard options.  
For information on specific and custom switches, consult Customer Service Center.

TACTILE FEELING: KMR 7 series with actuation force in 2N - 3N - 4N: ≥ 25%  
KMR 7 series with actuation force in 1.2N: ≥ 20%

## Part Number Description

For any part number different from those listed above, please consult your local representative.

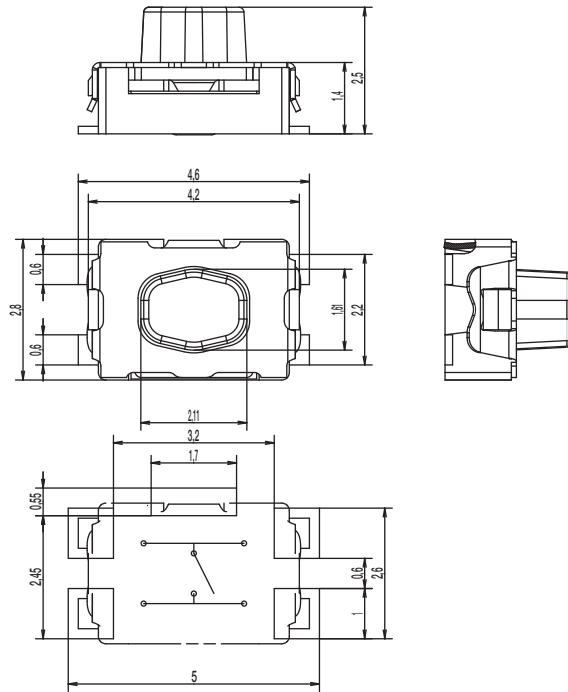


\* Silver long life is available in 3N and 4N actuation force. For other versions, please contact Customer Service.

# KMR 7 Series Microminiature SMT Top Actuated IP67

KMR 7 Series - 2.5 mm height

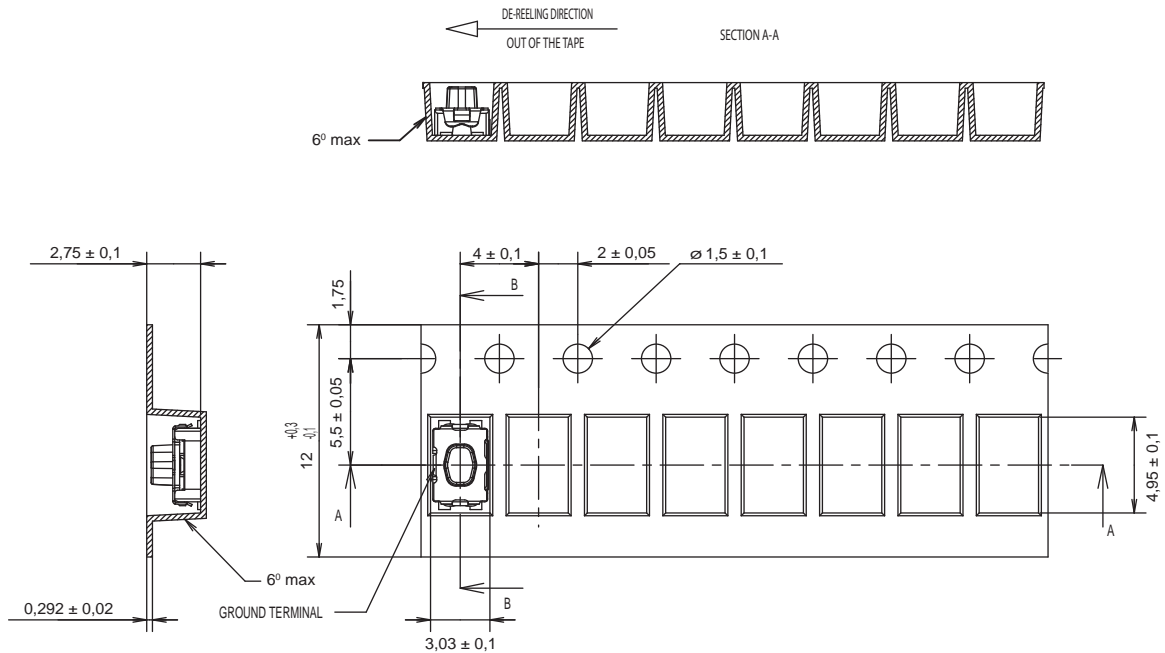
PCB layout shown with ground pin option



B



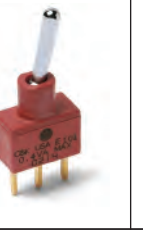




Tactile Switches

## TAPE & REEL



# Toggles

## Product Selection Guide

<b>Toggles</b>							
<b>Series</b>	<b>7000</b>	<b>Military</b>	<b>E</b>	<b>ET</b>	<b>T</b>	<b>GT</b>	<b>9000</b>
<b>Switch Type</b>	Miniature	Miniature	Miniature	Subminiature	Subminiature	Ultraminiature	Power
<b>Poles/Throws</b>	SPDT, DPDT, 3PDT, 4PDT	SPDT, DPDT,	SPDT, DPDT, 3PDT	SPST, SPDT, DPDT	SPST, SPDT, DPDT	SPST, SPDT, DPST, DPDT	DPDT
<b>Maximum Current Silver/Gold</b>	5 Amps	5 Amps	7.5 Amps/ 5 Amps	3 Amps/ 2 Amps	3 Amps/ 2 Amps	0.4 VA	10 Amps
<b>Process Sealed</b>			•	•		•	
<b>PCB Mount Options</b>							
Vertical	•	•	•	•	•	•	•
Right Angle	•	•	•	•	•	•	
Vertical Right Angle	•	•	•	•	•	•	•
<b>Surface Mount Options</b>							
Vertical						•	
Right Angle				•		•	
<b>Panel Mount Options</b>							
Rear Mount	•	•	•		•		•
<b>Termination Options</b>							
PCB Thru-hole	•	•	•	•	•	•	•
Wire Wrap	•		•	•	•		
Solder Lug	•	•	•		•		•
Quick Connect	•		•				•
<b>Other Available Options</b>							
Support Brackets	•	•	•	•	•	•	•
Snap-in Retention	•		•	•			
ESD Protection	•		•	•	•		
Tape & Reel				•		•	
<b>Bushing Options</b>							
10-48					•		
1/4-40	•	•	•		•		•
15/32	•						•
M6P 0.75 (Metric)	•						
<b>Page No.</b>	F-3	F-17	F-22	F-30	F-37	F-43	F-48



**Toggle**



*Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change*



# 7000 Series Miniature Toggle Switches

## Features/Benefits

- Multi-pole and multi-position
- Wide variety of actuator and termination options
- Epoxy terminal-seal compatible with bottom wash cleaning
- RoHS complaint models available

## Typical Applications

- Telecommunications
- Instrumentation
- Medical equipment



## Specifications

CONTACT RATING: B contact material: 0.4 VA max. @ 20 V AC or DC max. Q contact material: 5 AMPS @ 120 V AC or 28 V DC; 2 AMPS @ 250 V AC. See page F-15 for additional ratings.

ELECTRICAL LIFE: 7X01 and UX1 models: 100,000 make-and-break cycles at full load. All other models: 40,000 cycles.

CONTACT RESISTANCE: Below 10 m Ω typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: 10<sup>9</sup> Ω min.

DIELECTRIC STRENGTH: 1000 Vrms min. @ sea level.

OPERATING TEMPERATURE: -30°C to 85°C.

SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

For materials see page F-4.

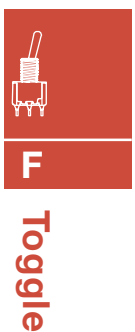
**NOTE:** Any models supplied with P, S R, Q, B or G contact material are RoHS compliant and compatible.

**NOTE:** Specifications listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

## Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages F-4 thru F-16. For additional options not shown in catalog, consult our Customer Service Center.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<b>Switch Function</b>		<b>Actuator</b>		<b>Bushing</b>		<b>Contact Material</b>		<b>Seal</b>		<b>Actuator Color/Finish</b>		<b>KXX Actuator Color/Finish</b>			
<p><b>7101</b> SP On-None-On  <b>7103</b> SP On-Off-On  <b>7105</b> SP Mom.-Off-Mom.  <b>7107</b> SP On-Off-Mom.  <b>7108</b> SP On-None-Mom.  <b>7109</b> SP None-On-Mom.  <b>7201</b> DP On-None-On  <b>7203</b> DP On-Off-On  <b>7205</b> DP Mom.-Off-Mom.  <b>7207</b> DP On-Off-Mom.  <b>7208</b> DP On-None-Mom.  <b>7211</b> DP On-On-On  <b>7213</b> DP On-On-Mom.  <b>7215</b> DP Mom.-On-Mom.  <b>7301</b> 3P On-None-On  <b>7303</b> 3P On-Off-On  <b>7305</b> 3P Mom.-Off-Mom.  <b>7308</b> 3P On-None-Mom.  <b>7401</b> 4P On-None-On  <b>7403</b> 4P On-Off-On  <b>7405</b> 4P Mom.-Off-Mom.  <b>7408</b> 4P On-None-Mom.  <b>7411</b> 4P On-On-On  <b>7413</b> 4P On-On-Mom.  <b>7415</b> 4P Mom.-On-Mom.</p> <p><b>Note:</b> UL models available, see pages F-4 &amp; F-5.</p>		<p><b>M</b> .200" high  <b>P3</b> Flatted, anti-rotation, .450" high  <b>S</b> .420" high  <b>T</b> .687" high, 15/32 bushing  <b>K2</b> Locking lever, .704" high  <b>K9</b> Locking lever, .704" high  <b>K12</b> Locking lever, .732" high  <b>K19</b> Locking lever, .732" high  <b>L</b> .840" high  <b>L1</b> .640" high  <b>L1P</b> Anti-rotation, .640" high  <b>L2</b> .550" high  <b>L2P</b> Anti-rotation, .550" high  <b>L3</b> Plastic .940" inch  <b>L40</b> Lever handle without cap  <b>L41</b> .531" high lever handle with cap  <b>L42</b> .838" high lever handle with cap  <b>MP</b> Anti-rotation, .200" high  <b>P1</b> Flatted, anti-rotation, .840" high  <b>P4</b> Flatted, anti-rotation, .250" high  <b>SP</b> Anti-rotation, .420" high  <b>T1</b> .487" high, 15/32 bushing  <b>T1P</b> Anti-rotation, .487" high, 15/32 bushing  <b>T2P</b> Flatted, anti-rotation, .610" high, 15/32 bushing  <b>TP</b> Anti-rotation, .687" high, 15/32 bushing</p>		<p><b>D</b> .280 high, keyway  <b>H</b> .296 high, flat  <b>Y</b> .350 high, keyway  <b>NONE</b> No bushing choice required  <b>CW</b> Splashproof  <b>D8</b> .280" high, flat  <b>D9</b> .280" high, keyway  <b>H3</b> .315" high, keyway  <b>H4</b> 8mm high, keyway  <b>Y1</b> .378" high, keyway  <b>Y3</b> 8.9mm high, keyway  <b>Y4</b> .378" high, flat  <b>Y9</b> .350" high, keyway</p>		<p><b>A</b> Right angle, PC thru-hole  <b>AV2</b> Vert. right angle, PC thru-hole  <b>C</b> PC Thru-hole  <b>V3</b> .460 high, V-bracket  <b>Z</b> Solder lug  <b>A2</b> Right angle, PC thru-hole  <b>A3</b> Right angle, PC thru-hole  <b>A4</b> Right angle, PC thru-hole  <b>AW1</b> Right angle, extended, PC thru-hole  <b>AW4</b> Right angle, extended, PC thru-hole  <b>V2</b> .555" high, V-bracket  <b>V4</b> .630" high, V-bracket  <b>V6</b> .460" high, V-bracket  <b>V7</b> .630" high, V-bracket  <b>V8</b> .953" high, V-bracket  <b>V9</b> 1.150" high, V-bracket  <b>V21</b> .555" high, snap-in V-bracket  <b>V31</b> .460" high, snap-in V-bracket  <b>V41</b> .630" high, snap-in V-bracket  <b>V71</b> .630" high, snap-in V-bracket  <b>V81</b> .953" high, snap-in V-bracket</p>		<p><b>B</b> Gold  <b>P</b> Gold, matte-tin  <b>Q</b> Silver  <b>S</b> Silver, matte-tin  <b>G</b> Gold over silver  <b>R</b> Gold over silver, matte-tin</p>		<p><b>E</b> Epoxy  <b>I</b> Epoxy potted base</p>		<p><b>NONE</b> Bright chrome  <b>2</b> Black  <b>3</b> Red  <b>S</b> Satin chrome</p>		<p><b>NONE</b> Natural aluminum  <b>2</b> Black anodized aluminum  <b>3</b> Red anodized aluminum  <b>7</b> Blue anodized aluminum</p>	
				<b>Terminations</b>		<b>Actuator Color/Finish</b>		<b>Bushing Finish</b>							
				<p><b>W</b> .750" long, wire wrap  <b>W1</b> .964" long, wire wrap  <b>W3</b> .425" long, wire wrap  <b>W4</b> 1.062" long, wire wrap  <b>W5</b> 1.305" long, wire wrap  <b>Z3</b> Quick connect</p>		<p><b>NONE</b> Nickel on all bushings (except D8, satin chrome)  <b>2</b> Black</p>									



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

# 7000 Series Miniature Toggle Switches

## Materials

CASE: Glass filled nylon 6/6, flame retardant, heat stabilized, or diallyl phthalate (DAP) (UL 94V-0).

ACTUATOR: Brass, chrome plated.

BUSHING: Brass or zinc, nickel plated.

HOUSING: Stainless steel.

SWITCH SUPPORT: Brass or steel, tin plated.

END CONTACTS: B contact material: Copper alloy, with gold plate over nickel plate. Q contact material: Coin silver, silver plated. See page F-15 for additional contact materials.

CENTER CONTACTS & ALL TERMINALS: B contact material: Copper alloy, with gold plate over nickel plate. Q contact material: Copper alloy, silver plated. See above for additional contact materials.

TERMINAL SEAL: Epoxy.

HARDWARE: Nut & Locking Ring: Brass, nickel plated.  
Lockwasher: Steel, nickel plated.

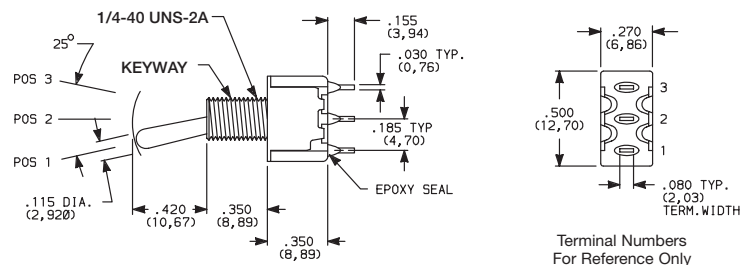
**NOTE:** Materials listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

## SWITCH FUNCTION



NO. POLES	MODEL NO.	UL** MODEL NO.	SWITCH FUNCTION			CONNECTED TERMINALS			SCHEMATIC
			POS. 1 KEYWAY	POS. 2 KEYWAY	POS. 3 KEYWAY	POS. 1 KEYWAY	POS. 2 KEYWAY	POS. 3 KEYWAY	
SP	7101	U11	ON	NONE	ON	2-3	N/A	2-1	
	7103	U13	ON	OFF	ON	2-3	OPEN	2-1	
	7105	U15	MOM.	OFF	MOM.				
	7107	U17	ON	OFF	MOM.				
	7108	U18	ON	NONE	MOM.	2-3	N/A	2-1	
7109	U19	NONE	ON	MOM.	N/A	2-3	2-1		

### SPDT

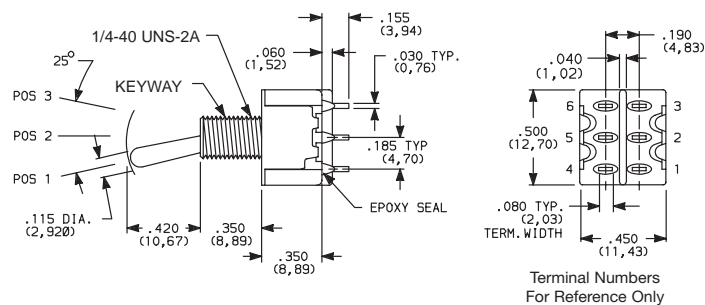


Part number shown: 7101SYZBE

Terminal Numbers  
For Reference Only

DP	7201	U21	ON	NONE	ON	2-3,5-6	N/A	2-1,5-4	
	7203	U23	ON	OFF	ON	2-3,5-6	OPEN	2-1,5-4	
	7205	U25	MOM.	OFF	MOM.				
	7207	U27	ON	OFF	MOM.				
	7208	U28	ON	NONE	MOM.	2-3,5-6	N/A	2-1,5-4	
	7211*	U211*	ON	ON	ON	2-3,5-6	2-3,5-4	2-1,5-4	
	7213*	U213*	ON	ON	MOM.				
7215*	U215*	MOM.	ON	MOM.					

### DPDT



Part number shown: 7201SYZQE

Terminal Numbers  
For Reference Only

MOM. = Momentary

\*\* U11-U415 model nos. with all options when ordered with G, R, Q or S contact material.

\* Wiring for 3-way switch, see Section N.



Third Angle  
Projection

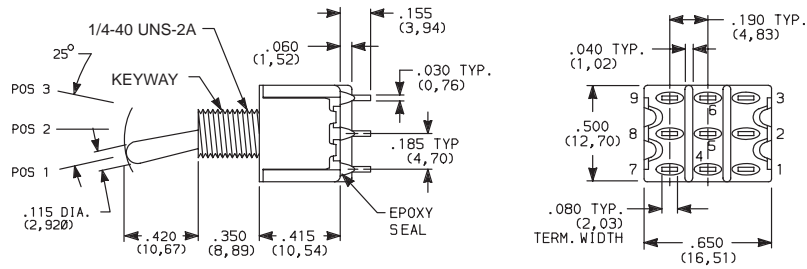
Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

# 7000 Series Miniature Toggle Switches

## SWITCH FUNCTION

NO. POLES	MODEL NO.	UL** MODEL NO.	SWITCH FUNCTION			CONNECTED TERMINALS			SCHEMATIC
			POS. 1	POS. 2	POS. 3	POS. 1	POS. 2	POS. 3	
			KEYWAY	KEYWAY	KEYWAY	KEYWAY	KEYWAY	KEYWAY	
3P	<b>7301</b>	<b>U31</b>	ON	NONE	ON	2-3,5-6,8-9	N/A	2-1,5-4,8-7	
	<b>7303</b>	<b>U33</b>	ON	OFF	ON	2-3,5-6,8-9	OPEN	2-1,5-4,8-7	
	<b>7305</b>	<b>U35</b>	MOM.	OFF	MOM.				
	<b>7307</b>	<b>U37</b>	ON	OFF	MOM.				
	<b>7308</b>	<b>U38</b>	ON	NONE	MOM.				

### 3PDT

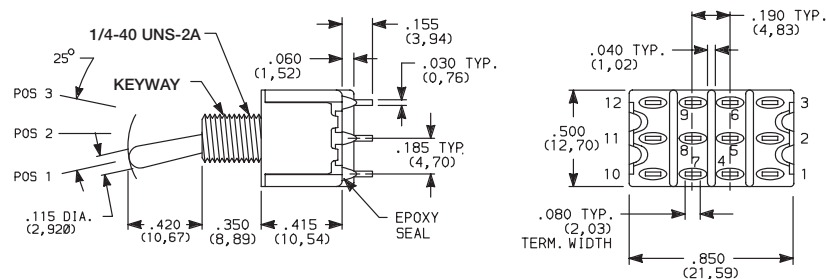


Part number shown: 7301SYZQE

Terminal Numbers  
For Reference Only

4P	<b>7401</b>	<b>U41</b>	ON	NONE	ON	2-3,5-6,8-9,11-12	N/A	2-1,5-4,8-7,11-10	
	<b>7403</b>	<b>U43</b>	ON	OFF	ON	2-3,5-6,8-9,11-12	OPEN	2-1,5-4,8-7,11-10	
	<b>7405</b>	<b>U45</b>	MOM.	OFF	MOM.				
	<b>7408</b>	<b>U48</b>	ON	NONE	MOM.				
	<b>7411*</b>	<b>U411*</b>	ON	ON	ON				
	<b>7413*</b>	<b>U413*</b>	ON	ON	MOM.				
<b>7415*</b>	<b>U415*</b>	MOM.	ON	MOM.					

### 4PDT

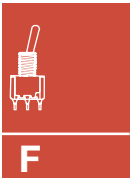


Part number shown: 7401SYZQE

Terminal Numbers  
For Reference Only

MOM. = Momentary  
Wiring for 3-way switch, see Section N.

\*\* U11-U415 model nos. with all options when ordered with G, Q, R or S contact material.



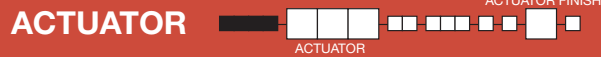
Toggle



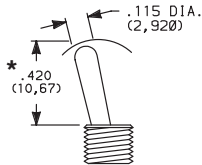
Third Angle  
Projection

Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

# 7000 Series Miniature Toggle Switches

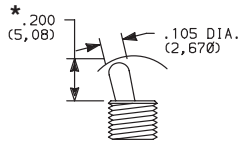


**S** .420" HIGH <sup>1</sup>  
**SP** ANTIROTATION, .420" HIGH <sup>2,3</sup>



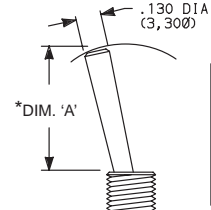
S actuator standard when ordered with C, W-W5, Z & Z3 terminations. Caps are available separately, see page F-16.

**M** .200" HIGH <sup>1</sup>  
**MP** ANTIROTATION, .200" HIGH <sup>2,3</sup>



M actuator standard when ordered with all terminations except C, W-W5, Z & Z3. Caps are available separately, see page F-16.

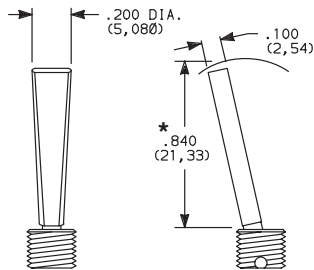
**L, L1, L2** .840", .640", .550" HIGH <sup>1</sup>  
**L1P, L2P** ANTIROTATION, .840", .640", .550" HIGH <sup>2,3</sup>



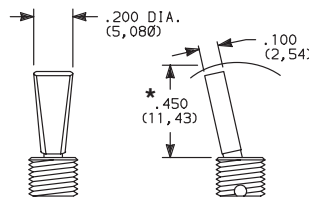
OPTION CODE	DIM 'A'
L	.840 (21,34)
L1, L1P	.640 (16,26)
L2, L2P	.550 (13,97)

Caps are available separately, see page F-16.

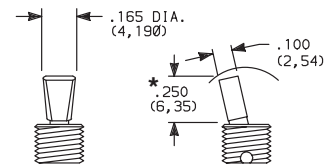
**\*P1** FLATTED WITH ANTIROTATION, .840" HIGH <sup>2,3</sup>



**\*P3** FLATTED WITH ANTIROTATION, .450" HIGH <sup>2,3</sup>

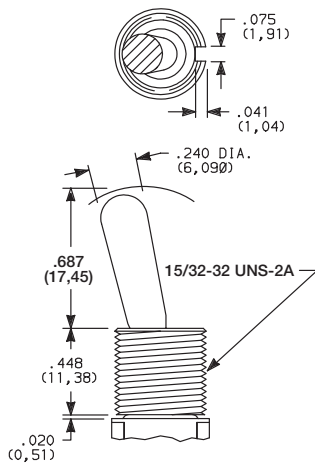


**\*P4** FLATTED WITH ANTIROTATION, .250" HIGH <sup>2,3</sup>

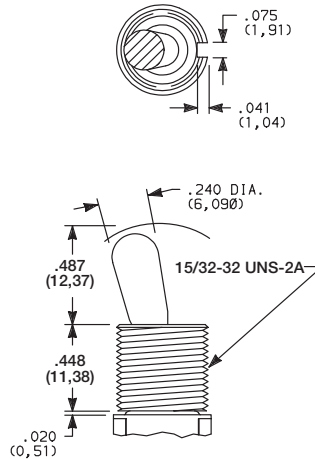


\*Dress nut part number 709901201 supplied standard with threaded bushing. (Part number 709903201 with metric threaded bushings.)

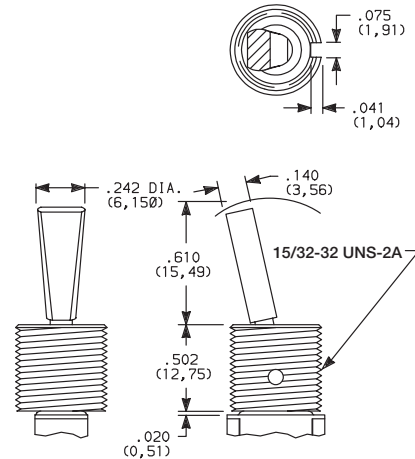
**T** .687 (17,45) HIGH <sup>1,2</sup>  
**TP** ANTIROTATION, .687 (17,45) HIGH, 15/32 BUSHING <sup>1,2,3</sup>



**T1** .487 (12,37) HIGH <sup>1,2</sup>  
**T1P** ANTIROTATION, .487 (12,37) HIGH, 15/32 BUSHING <sup>1,2,3</sup>



**T2P** FLATTED, ANTIROTATION, .610" HIGH, 15/32 BUSHING <sup>1,2,3</sup>



Bushing option code not required unless CW splashproof bushing ordered. TP & T1P actuators not available with CW splashproof bushing. All TXX actuators not available on single pole models with A-A4, AW1-AW4 terminations.

Bushing option code not required. T2P actuator not available with CW splashproof bushing or single pole models with A-A4, AW1-AW4 terminations.

- <sup>1</sup> L, L1, L2, M, S & TXX actuators not available with Y1 bushing.
- <sup>2</sup> L1P, L2P, MP, P1, P3, P4, SP & TXX actuators not available with D8 & H4 bushing.
- <sup>3</sup> Antirotation: Provides anti-'push-in' feature on actuator.
- \* Add .070 (1,78) for D, D8 & D9 bushings, subtract .020 (0,51) for H3 bushing.

OPTION CODE	ACTUATOR FINISH
<b>NONE</b>	BRIGHT CHROME-With Nickel Plated Bushing
<b>2</b>	BLACK
<b>S</b>	SATIN CHROME

**NOTE:** Black hardware is supplied when either black actuators or bushings are specified. For additional hardware, see Section N.



Dimensions are shown: Inches (mm)  
 Specifications and dimensions subject to change

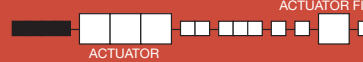


Toggle



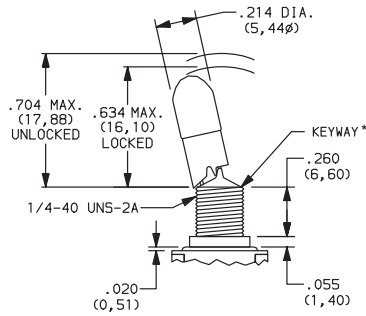
# 7000 Series Miniature Toggle Switches

## ACTUATOR

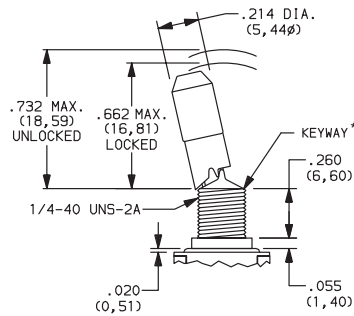


- K2** LOCKING LEVER, .704" HIGH (threaded)
- K9** LOCKING LEVER, .704" HIGH (unthreaded)

- K12** LOCKING LEVER, .732" HIGH (threaded)
- K19** LOCKING LEVER, .732" HIGH (unthreaded)



Replaces K, K8



Replaces K1, K18

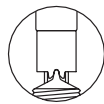
OPTION CODE	ACTUATOR CAP FINISH
<b>NONE</b>	NATURAL ALUMINUM—With Nickle Plated Bushing
<b>2</b>	BLACK ANODIZED ALUMINUM
<b>3</b>	RED ANODIZED ALUMINUM
<b>7</b>	BLUE ANODIZED ALUMINUM

\* All KXX models including KXXCW have a keyway

### Locking Positions



-01 Models  
2 Position lock



-03 & -11 Models  
3 Position lock



-05, -09 & -15 Models  
1 Position lock



-07 & -13 Models  
2 Position lock



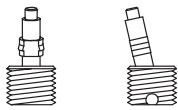
-08 Models  
1 Position lock

**NOTE:** To prevent accidental actuation, toggle must be lifted before being actuated. When released, toggle will lock in place. Overtightening mounting nut may cause actuator to bind.

Locking levers supplied with bushing shown.

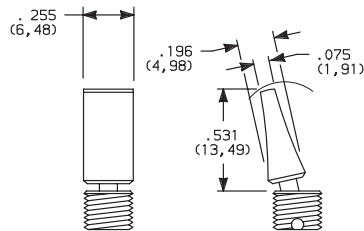
Bushing option code not required unless CW splashproof bushing ordered.

- L40** LEVER HANDLE WITHOUT CAP



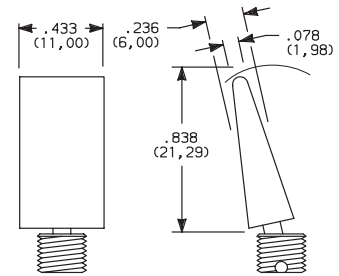
No color choice required

- L41** PLASTIC LEVER HANDLE WITH ANTIROTATION AND CAP, P/N 4810

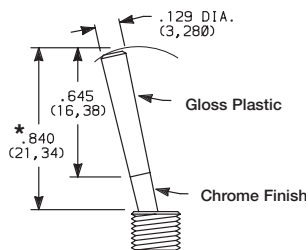


Finish: Matte (L41 & L42).

- L42** PLASTIC LEVER HANDLE WITH ANTIROTATION AND CAP, P/N 4811



- L3** PLASTIC .940" HIGH



OPTION CODE	PLASTIC ACTUATOR COLORS
<b>NONE</b>	No Actuator Color (L40 option)
<b>2</b>	BLACK
<b>3</b>	RED

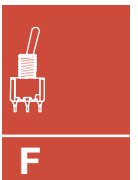
\* Add .070 (1,78) for D, D8 & D9 bushings, subtract .020 (0,51) for H3 bushing.

**NOTE:** Lever handle for L41 & L42 actuators supplied, but not installed. For interchangeability, order L40 actuator option and lever handles separately, see page F-16. L4X actuators not available with H4, Y1, Y4 bushings. Antirotation: Provides anti-'push-in' feature on actuator.



Third Angle Projection

Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



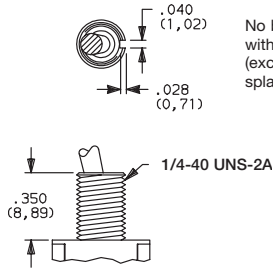
# 7000 Series Miniature Toggle Switches

## BUSHING

BUSHING FINISH

BUSHING

**Y** .350" HIGH, THREADED, KEYWAY  
**Y9** .350" HIGH, UNTHREADED, KEYWAY

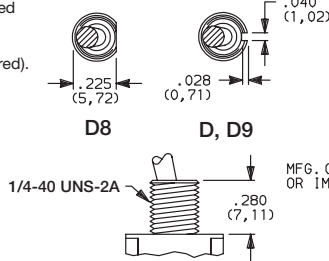


Y bushing standard with C, W-W5, Z or Z3 terminations.

**NONE** NO BUSHING

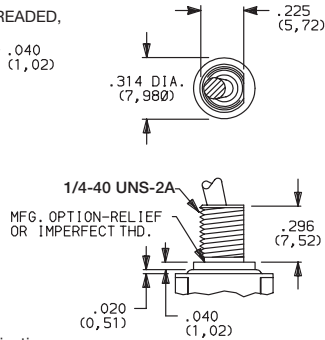
No bushing choice required with KXX, TXX actuators. (exception: Specify CW if splashproof bushing desired).

**D** .280" HIGH, THREADED, KEYWAY  
**D8** .280" HIGH, UNTHREADED, FLAT<sup>3</sup>  
**D9** .280" HIGH, UNTHREADED, KEYWAY

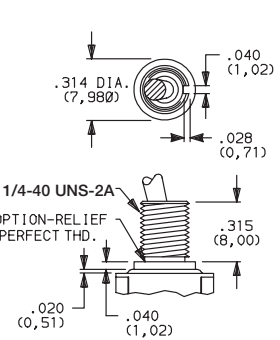


D9 bushing standard with all terminations except C, W-W5, Z or Z3. Add .070 (1,78) to all actuators lengths with D, D8 & D9 bushings.

**H** .296" HIGH, FLAT THREADED, HIGH TORQUE<sup>1,2</sup>

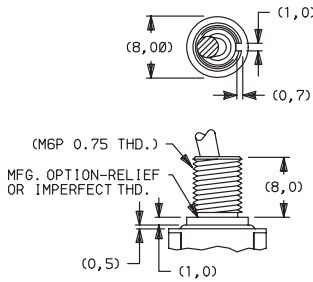


**H3** .315" HIGH, KEYWAY THREADED, HIGH TORQUE<sup>1,2</sup>

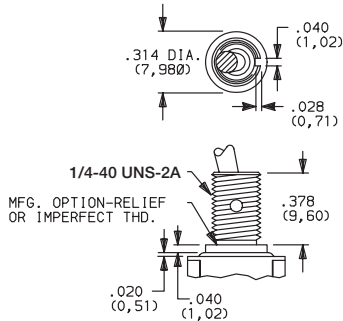


Subtract .020 (0,51) from all actuator lengths for H3 bushing.

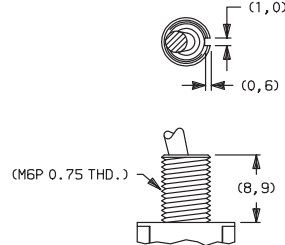
**H4** 8mm HIGH, KEYWAY, THREADED, METRIC HIGH TORQUE<sup>1,2,3</sup>



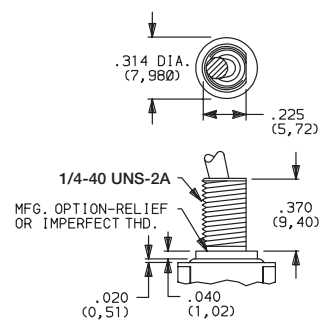
**Y1** .378" HIGH, KEYWAY, THREADED, HIGH TORQUE<sup>1,2,4</sup>



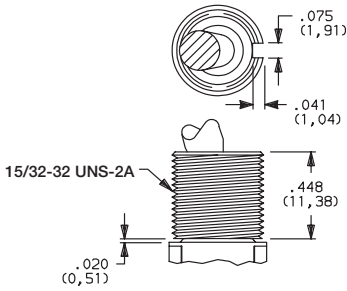
**Y3** 8.9mm HIGH, KEYWAY, THREADED, METRIC



**Y4** .378" HIGH, FLAT, THREADED, HIGH TORQUE<sup>1,2,5</sup>

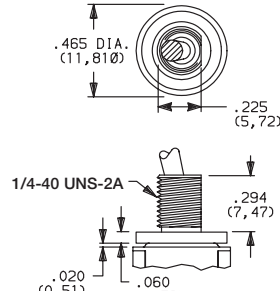


**CW** THREADED, SPLASHPROOF<sup>1,2</sup>  
For T & T1 actuators.



IP67 Degree of protection, totally protected against dust, full-scale voltage protection, temporary immersion. Internal actuator seal standard. External bushing seal available separately from APM Hexseal, part # MFS-60064.

For actuators other than T, T1 and KXX.



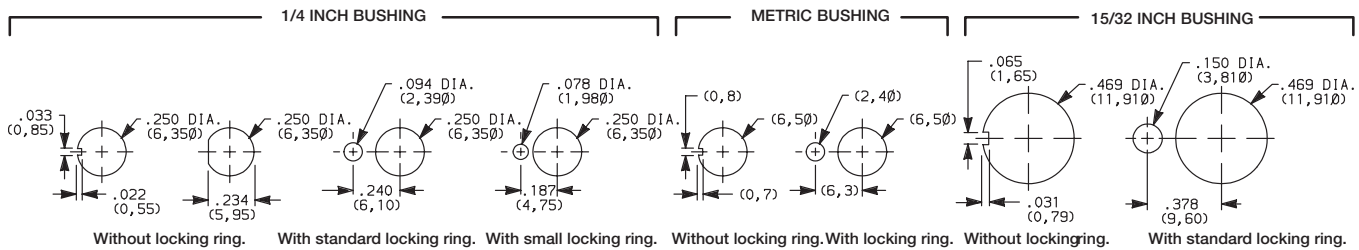
IP67 Degree of protection, totally protected against dust, full-scale voltage protection, temporary immersion. Internal actuator seal and external bushing seal washer standard. IP65 degree of protection for LXP, MP, PX or SP with CW option.

OPTION CODE	BUSHING FINISH
<b>NONE</b>	NICKEL on all bushings except 'D8' satin chrome.
<b>2</b>	BLACK

- Will withstand 12 in.-lbs. of torque with no distortion.
- CW, H, H3, H4, Y1 & Y4 bushings not available on single pole models with A4 terminations.
- D8 & H4 bushings available only with L, L1, L2, M & S actuators.
- Y1 bushing available only with LXP, MP, PX & SP actuators.
- Y4 bushing not available with L4X actuators.

**NOTE:** Two mounting nuts, locking ring and lockwasher supplied standard with threaded bushings. Black hardware is supplied when either black bushings or actuators are specified. Optional mounting nut and locking ring styles and finishes available, see Section N.

## PANEL MOUNTING



Third Angle Projection  
Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

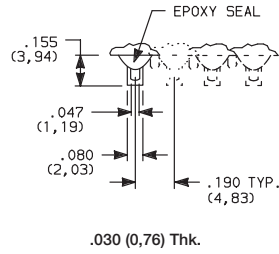
Toggle  
F



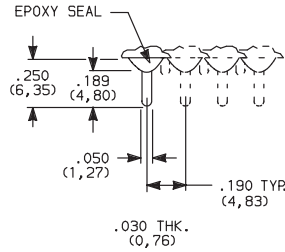
# 7000 Series Miniature Toggle Switches

## TERMINATIONS

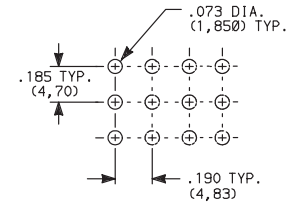
### Z SOLDER LUG



### C PC THRU-HOLE



### PC MOUNTING

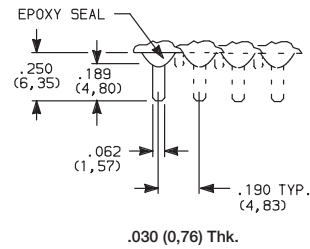


### SPDT thru 4PDT

Not available with P, R or S contact materials.

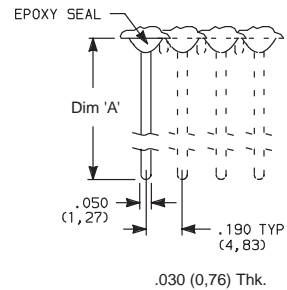
### SPDT thru 4PDT

### Z3 QUICK CONNECT



### W, W1, W3, W4, W5 WIRE WRAP

WIRE WRAP



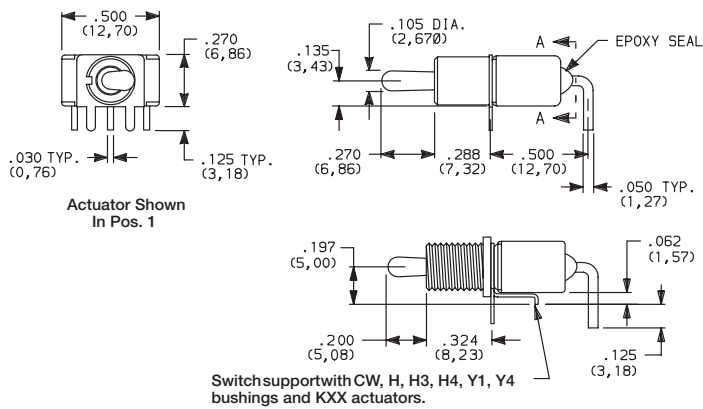
OPTION CODE	DIM 'A'
<b>W</b>	.750 (19,05)
<b>W1</b>	.964 (24,48)
<b>W3</b>	.425 (10,80)
<b>W4</b>	1.062 (26,97)
<b>W5</b>	1.305 (33,15)

### SPDT thru 4PDT

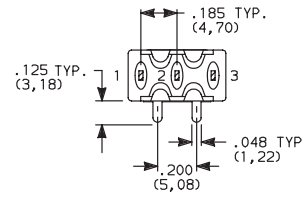
Not available with P, R or S contact materials.  
Mating quick connector available, order part number 530100000, page F-16.

### SPDT thru 4PDT

### A RIGHT ANGLE, PC THRU-HOLE



Part No. Shown: 7101MHABE



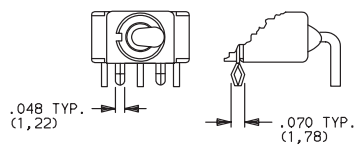
### SECTION A-A

Terminal Nos.  
For Reference Only

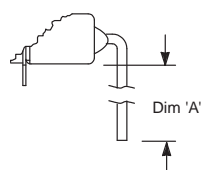


7101MD9ABE  
Horizontal Actuation  
SPDT

### A3 RIGHT ANGLE, SNAP-IN, PC THRU-HOLE

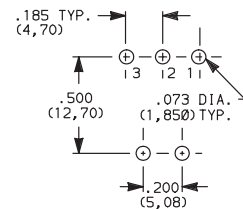


### AW1, AW4 RIGHT ANGLE, EXTENDED, PC THRU-HOLE



OPTION CODE	DIM 'A'
<b>AW1</b>	.72 (18,3)
<b>AW4</b>	.83 (21,1)

### PC MOUNTING



Not available with I seal option.  
Terminal bend radii and lead-in manufacturing option.



Third Angle  
Projection

Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

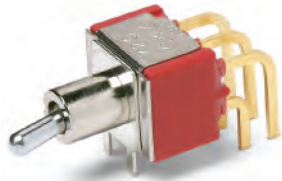


Toggle

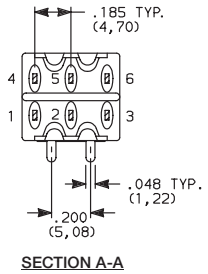
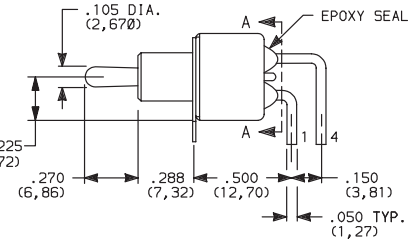
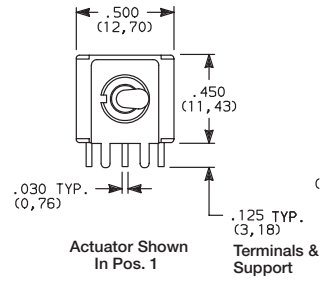
# 7000 Series Miniature Toggle Switches

## TERMINATIONS

**A** RIGHT ANGLE, PC THRU-HOLE

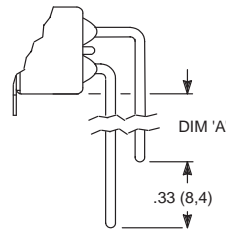
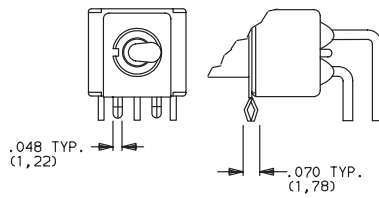


**7201MD9ABE**  
Horizontal Actuation  
**DPDT**



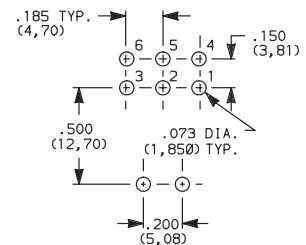
**A3** RIGHT ANGLE, SNAP-IN, PC THRU-HOLE

**AW1, AW4** RIGHT ANGLE, EXTENDED, PC THRU-HOLE



OPTION CODE	DIM 'A'
<b>AW1</b>	.40 (10,2)
<b>AW4</b>	.50 (12,7)

**PC MOUNTING**

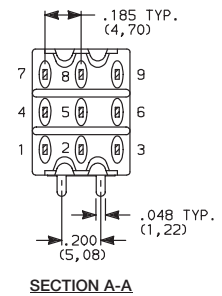
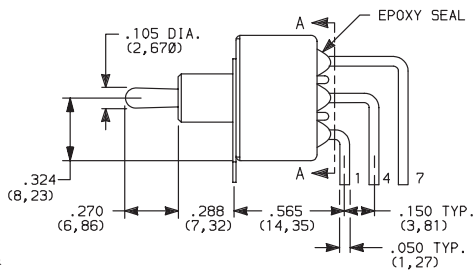
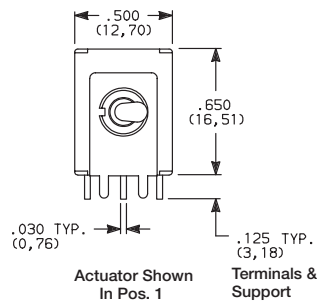


Not available with I seal option.  
Terminal bend radii and lead-in manufacturing option.

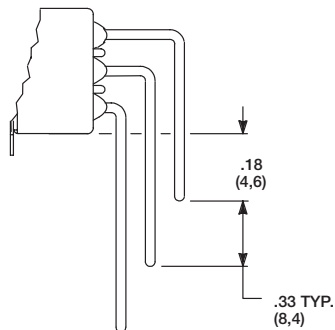
**A** RIGHT ANGLE, PC THRU-HOLE



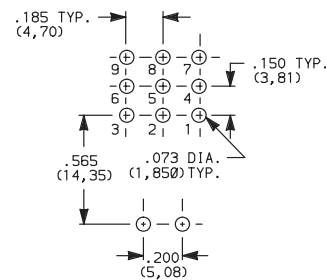
**7301MD9ABE**  
Horizontal Actuation  
**3PDT**



**AW4** RIGHT ANGLE, EXTENDED, PC THRU-HOLE



**PC MOUNTING**



Not available with I seal option.  
Terminal bend radii and lead-in manufacturing option.



**Toggle**



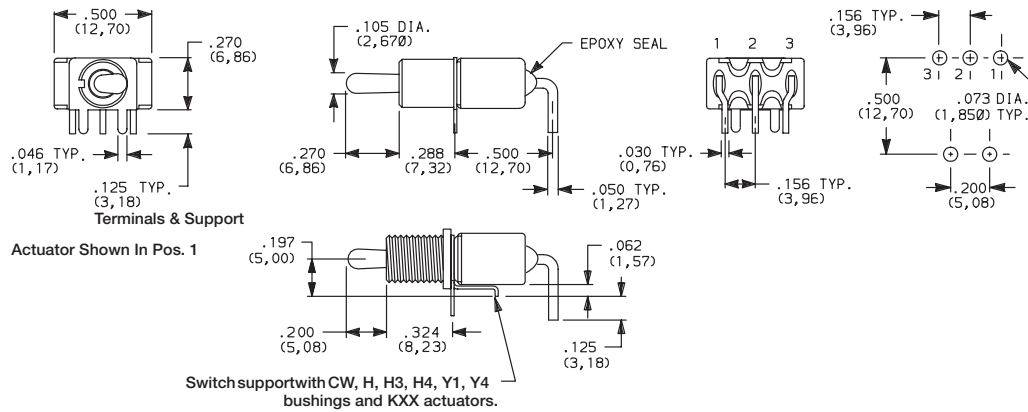
Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



# 7000 Series Miniature Toggle Switches

## TERMINATIONS

**A2** RIGHT ANGLE, PC THRU-HOLE,  
.156" PITCH

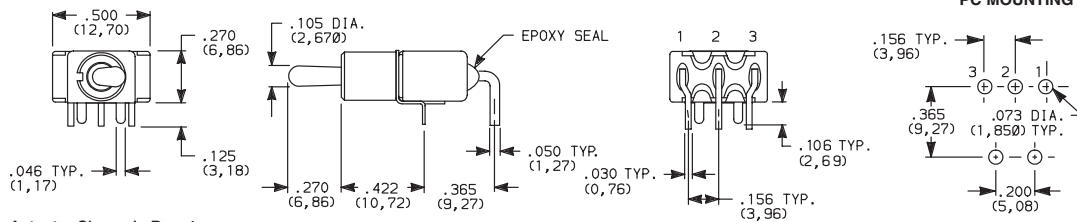


Not available with TXX actuators and I seal.  
Terminal bend radii and lead-in manufacturing option.



7101MHA2BE  
Horizontal Actuation  
SPDT

**A4** RIGHT ANGLE, PC THRU-HOLE  
.156" PITCH



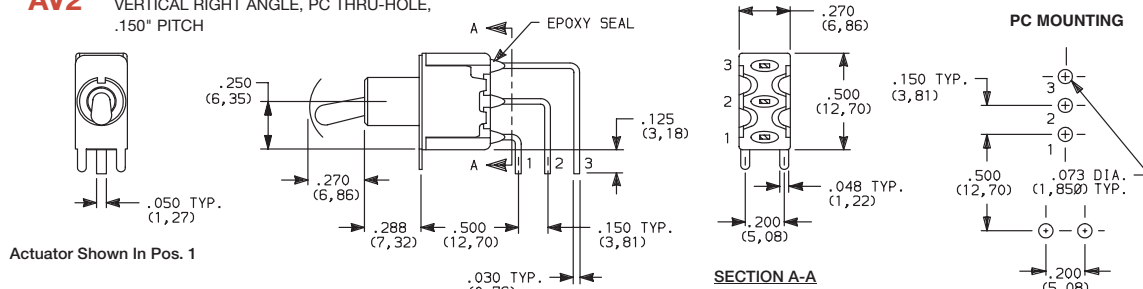
Not available with KXX & TXX actuators, CW, H, H3, H4, Y1 & Y4 bushings, and I seal. Terminal bend radii and lead-in manufacturing option.

**NOTE:** The A4 option is available with any contact material and can be UL recognized and CSA certified. The PC pattern must clear switch support legs.



7101MD9A4BE  
Horizontal Actuation  
SPDT

**AV2** VERTICAL RIGHT ANGLE, PC THRU-HOLE,  
.150" PITCH

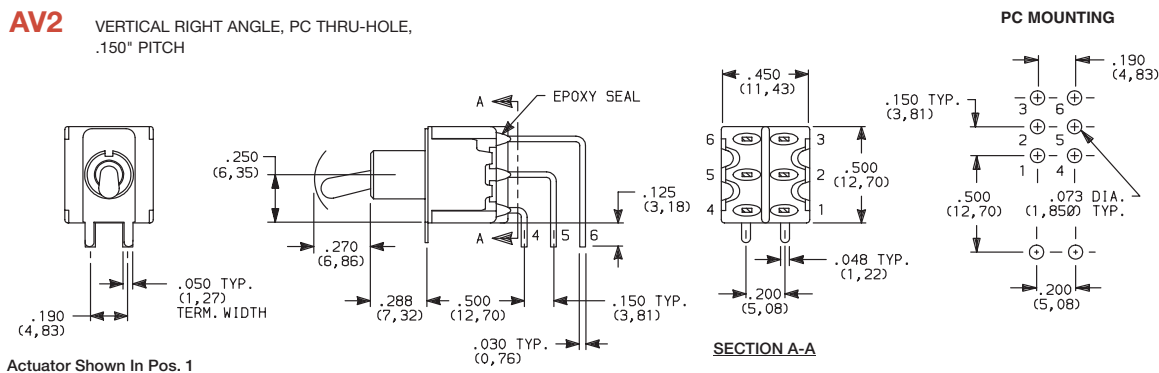


Not available with I seal option.  
Terminal bend radii and lead-in manufacturing option.



7101MD9AV2BE  
Horizontal Actuation  
SPDT

**AV2** VERTICAL RIGHT ANGLE, PC THRU-HOLE,  
.150" PITCH



Not available with I seal option.  
Terminal bend radii and lead-in manufacturing option.



7201MD9AV2BE  
Vertical Actuation  
DPDT



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



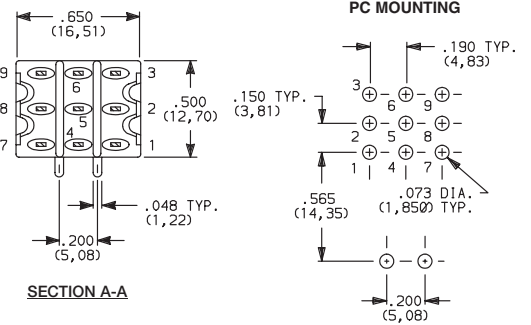
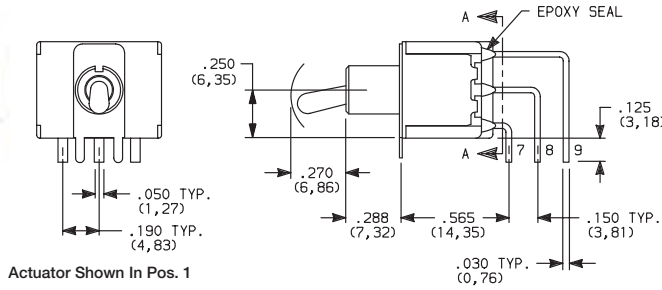
# 7000 Series Miniature Toggle Switches

## TERMINATIONS

**AV2** VERTICAL RIGHT ANGLE, PC THRU-HOLE,  
.150" PITCH



7301MD9AV2BE  
Vertical Actuation  
3PDT

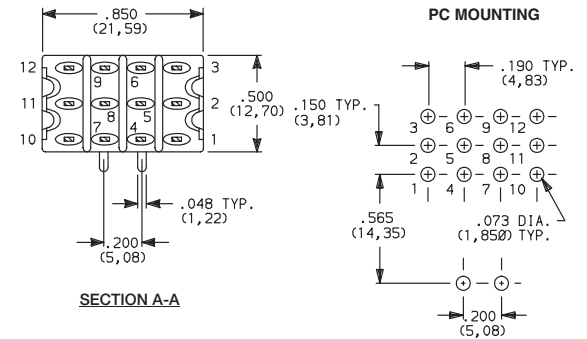
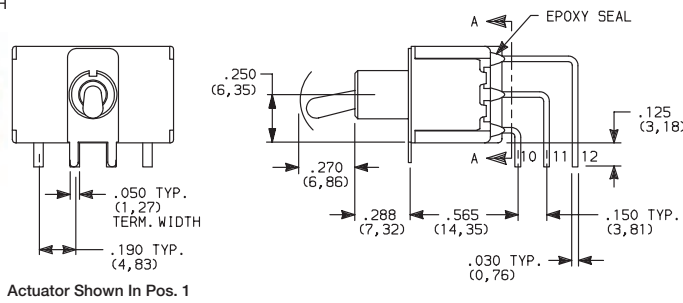


Not available with I seal option.  
Terminal bend radii and lead-in manufacturing option.

**AV2** VERTICAL RIGHT ANGLE, PC THRU-HOLE,  
.150" PITCH



7401MD9AV2BE  
Vertical Actuation  
4PDT



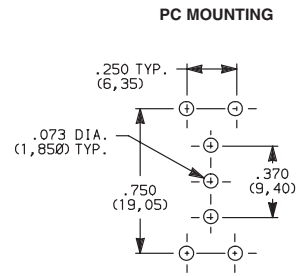
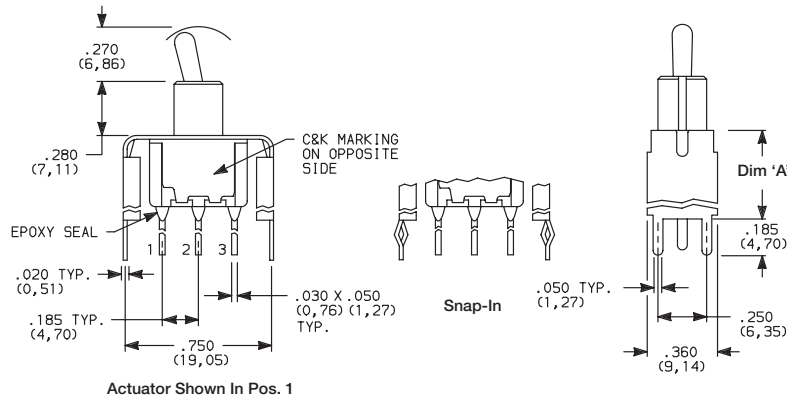
Not available with I seal option.  
Terminal bend radii and lead-in manufacturing option.

**V2, V6, V7, V8** VERTICAL MOUNT, V-BRACKET

**V21, V71, V81** VERTICAL MOUNT, V-BRACKET, SNAP-IN



7101MD9\_BE  
SPDT



OPTION CODE	DIM 'A'
V2, V21	.555 (14,10)
V6	.460 (11,68)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

Not available with I seal option.

Toggle



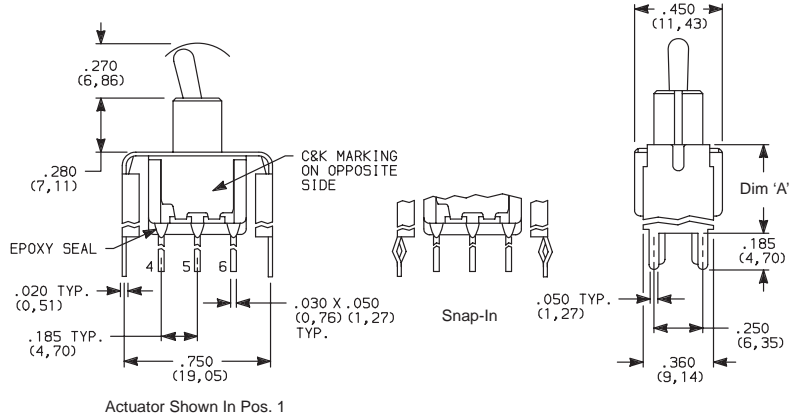
Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

# 7000 Series Miniature Toggle Switches

## TERMINATIONS

**V2, V6, V7, V8** VERTICAL MOUNT, V-BRACKET

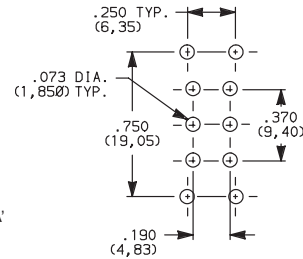
**V21, V61, V71, V81** VERTICAL MOUNT, V-BRACKET, SNAP-IN



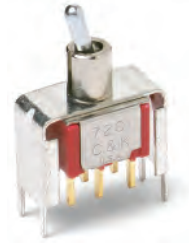
Actuator Shown In Pos. 1

Not available with I seal option.

PC MOUNTING



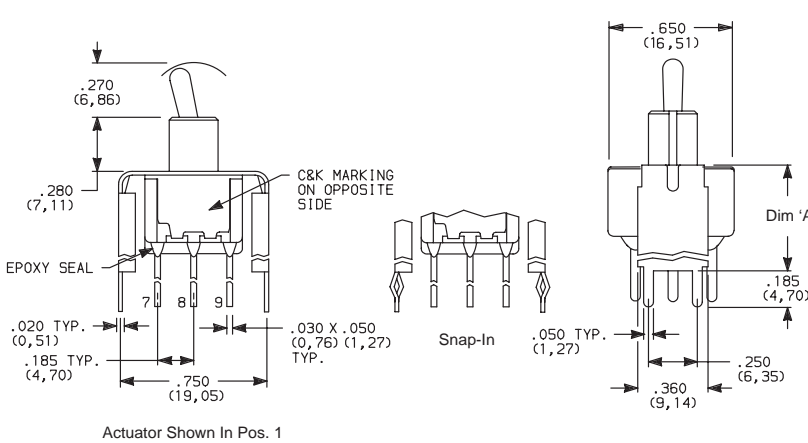
OPTION CODE	DIM 'A'
<b>V2, V21</b>	.555 (14,10)
<b>V6, V61</b>	.460 (11,68)
<b>V7, V71</b>	.630 (16,00)
<b>V8, V81</b>	.953 (24,21)



7201MD9\_BE  
DPDT

**V2, V7, V8** VERTICAL MOUNT, V-BRACKET

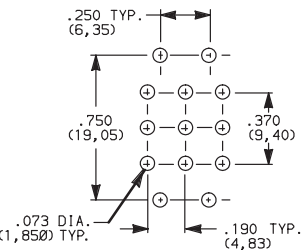
**V21, V71, V81** VERTICAL MOUNT, V-BRACKET, SNAP-IN



Actuator Shown In Pos. 1

Not available with I seal option.

PC MOUNTING



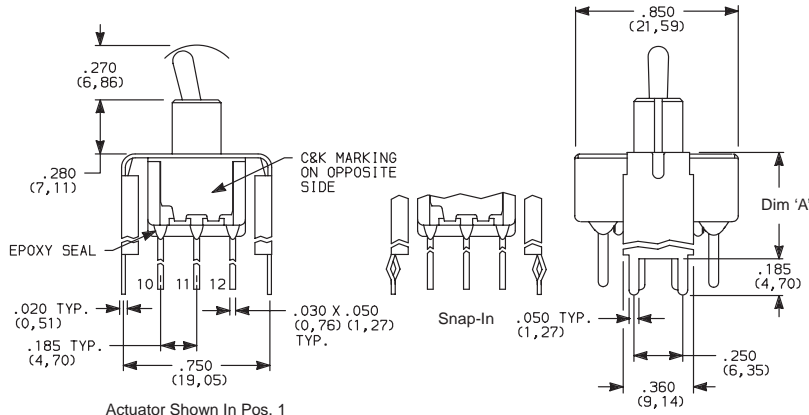
OPTION CODE	DIM 'A'
<b>V2, V21</b>	.555 (14,10)
<b>V7, V71</b>	.630 (16,00)
<b>V8, V81</b>	.953 (24,21)



7301MD9\_BE  
3PDT

**V2, V7, V8** VERTICAL MOUNT, V-BRACKET

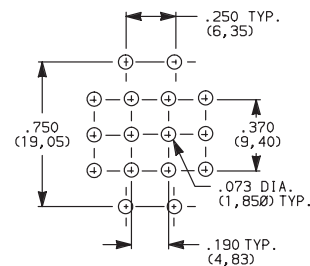
**V21, V71, V81** VERTICAL MOUNT, V-BRACKET, SNAP-IN



Actuator Shown In Pos. 1

Not available with I seal option.

PC MOUNTING



OPTION CODE	DIM 'A'
<b>V2, V21</b>	.555 (14,10)
<b>V7, V71</b>	.630 (16,00)
<b>V8, V81</b>	.953 (24,21)

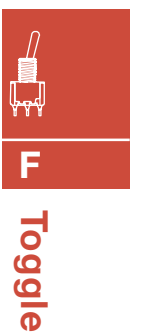


7401MD9\_BE  
4PDT



Third Angle  
Projection

Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



# 7000 Series Miniature Toggle Switches

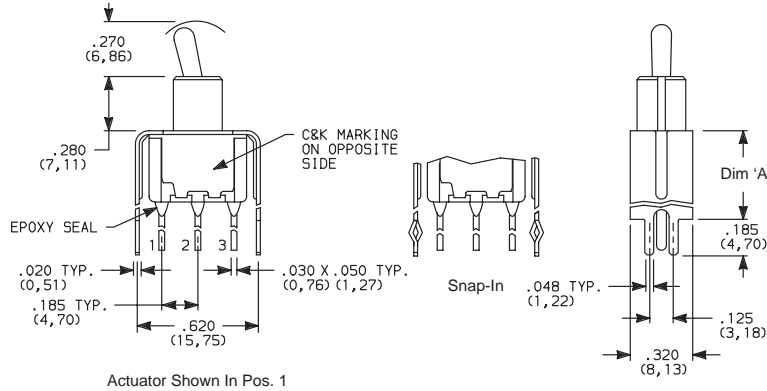
## TERMINATIONS

**V3, V4, V9** VERTICAL MOUNT, V-BRACKET

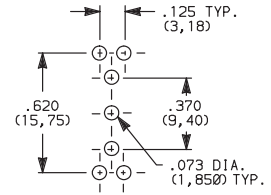
**V31, V41** VERTICAL MOUNT, V-BRACKET, SNAP-IN



7101MD9\_BE  
SPDT



PC MOUNTING

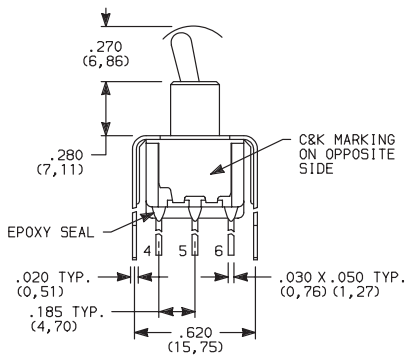


OPTION CODE	DIM 'A'
<b>V3, V31</b>	.460 (11,68)
<b>V4, V41</b>	.630 (16,00)
<b>V9</b>	1.150 (29,21)

Not available with I seal option.

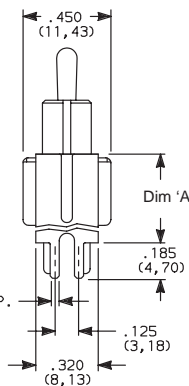
**V3, V4, V9** VERTICAL MOUNT, V-BRACKET

**V31, V41** VERTICAL MOUNT, V-BRACKET, SNAP-IN

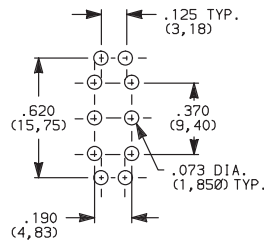


Actuator Shown In Pos. 1

Not available with I seal option.



PC MOUNTING

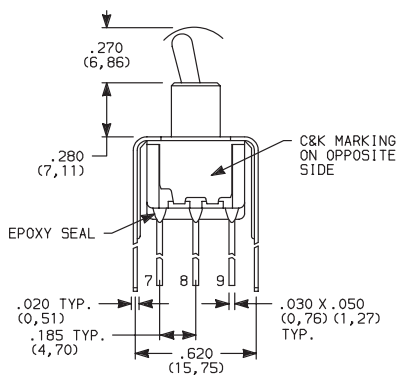


7201MD9\_BE  
DPDT

OPTION CODE	DIM 'A'
<b>V3, V31</b>	.460 (11,68)
<b>V4, V41</b>	.630 (16,00)
<b>V9</b>	1.150 (29,21)

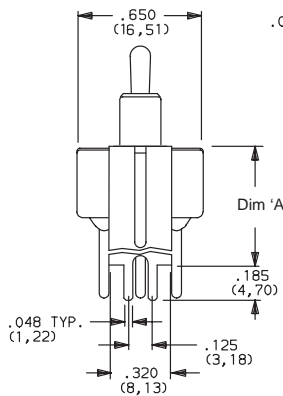
**V4, V9** VERTICAL MOUNT, V-BRACKET

**V41** VERTICAL MOUNT, V-BRACKET, SNAP-IN

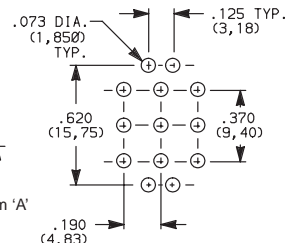


Actuator Shown In Pos. 1

Not available with I seal option.



PC MOUNTING



7301MD9\_BE  
3PDT

OPTION CODE	DIM 'A'
<b>V4, V41</b>	.630 (16,00)
<b>V9</b>	1.150 (29,21)



Third Angle Projection  
Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

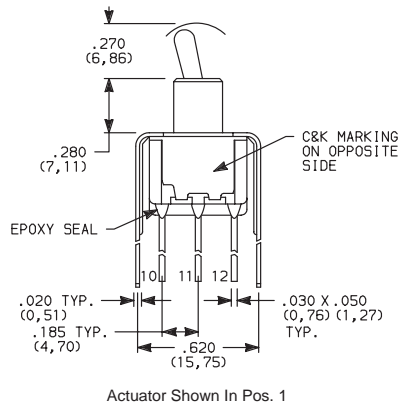
www.ck-components.com

# 7000 Series Miniature Toggle Switches

## TERMINATIONS

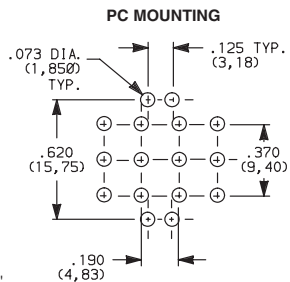
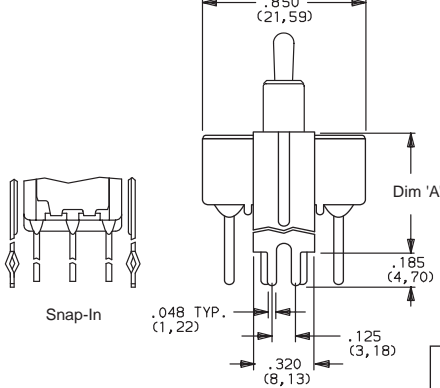
**V4, V9** VERTICAL MOUNT, V-BRACKET

**V41** VERTICAL MOUNT, V-BRACKET, SNAP-IN



Actuator Shown In Pos. 1

Not available with I seal option.



7401MD9\_BE  
4PDT

OPTION CODE	DIM 'A'
<b>V4, V41</b>	.630 (16,00)
<b>V9</b>	1.150 (29,21)

## CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
<b>B</b>	GOLD <sup>1</sup>	GOLD <sup>1</sup>	LOW LEVEL/ DRY CIRCUIT	0.4 VA MAX. @ 20 V AC OR DC MAX.
<b>P</b>		MATTE-TIN <sup>6</sup>		
<b>Q</b>	SILVER <sup>4,5</sup>	SILVER <sup>5</sup>	POWER	5 AMPS @ 120 V AC OR 28 V DC; 2 AMPS @ 250 V AC.
<b>S</b>		MATTE-TIN <sup>6</sup>		
<b>G</b>	GOLD OVER SILVER <sup>2,3</sup>	GOLD <sup>3</sup>	LOW LEVEL/DRY CIRCUIT OR POWER	0.4 VA MAX @ 20 V AC OR DC MAX. OR 5 AMPS @ 120 V AC OR 28 V DC; 2 AMPS @ 250 V AC.
<b>R</b>		MATTE-TIN <sup>6</sup>		

\* Note: See Technical Data section of this catalog for RoHS compliant and compatible definitions and specifications.

<sup>1</sup> CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.

<sup>2</sup> END CONTACTS: Coin silver, with gold plate over nickel plate.

<sup>3</sup> CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.

<sup>4</sup> END CONTACTS: Coin silver, silver plated.

<sup>5</sup> CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.

<sup>6</sup> TERMINALS: Copper alloy, with matte tin alloy nickel plate.

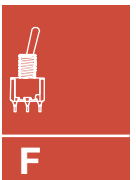
**NOTE:** Any models supplied with P, S, R, Q, B or G contact material are RoHS compliant.

U11-U415 model numbers  with all options when ordered with G, S, R, or Q contact material.

B contact material standard with all terminations except C, Z & Z3.

Q contact material standard with C, Z & Z3 terminations.

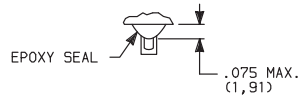
P, S & R contact materials not available with Z & Z3 terminations.



# 7000 Series Miniature Toggle Switches

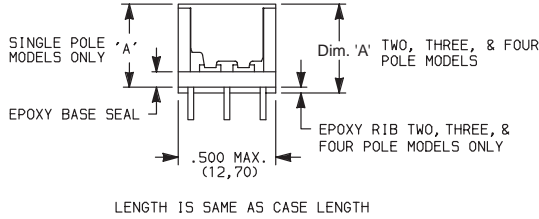
## SEAL

### E EPOXY SEAL



Compatible with "bottom-wash" PC board cleaning methods.

### I EPOXY POTTED BASE

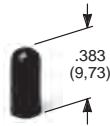


Available with C, W-W5, Z & Z3 terminations only.

NO. POLES	DIM 'A'
SP	.410 (10,41)
DP	.440 (11,18)
3P	.505 (12,83)
4P	.505 (12,83)

## AVAILABLE HARDWARE

### Cap

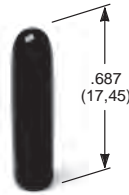


#### PART NO.

896801000 WHITE  
896802000 BLACK  
896803000 RED

Material: Polyethylene  
Finish: Matte

### Cap

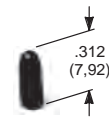


#### PART NO.

763701000 WHITE  
763702000 BLACK  
763703000 RED

Material: Vinyl  
Finish: Matte

### Cap



#### PART NO.

706201000 WHITE  
706202000 BLACK  
706203000 RED

Material: Vinyl  
Finish: Matte

### L41 Lever handle

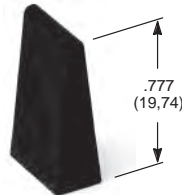


#### PART NO.

481001000 WHITE  
481002263 BLACK  
481003000 RED

Material: Nylon  
Finish: Matte

### L42 Lever handle



#### PART NO.

481101000 WHITE  
481102263 BLACK  
481103000 RED

Material: Nylon  
Finish: Matte

### Fits Z3 Termination female connector



#### PART NO.

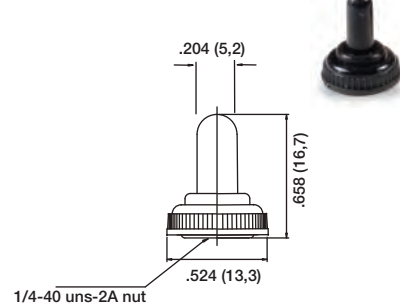
530100000

Available in loose pieces.

**NOTE:** Additional nuts, locking rings and lockwashers available separately, see Section N.

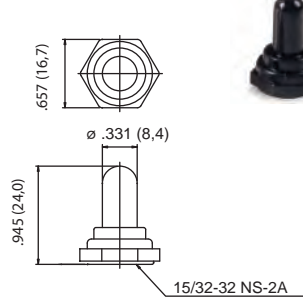
Other colors available, consult Customer Service Center.

### 759D02000 Sealing Boot



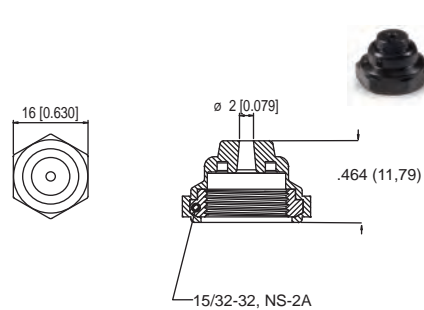
**NOTE:** For use with S actuator style when combined with D, H, H3, Y, and Y4 bushings

### 703D02000 Sealing Boot



**NOTE:** For use with T and TP style actuators. **Cannot be used for Switch Functions: 7103, 7203, 7303, 7403, 7107, 7207, 7307, 7407.**

### 704D02000 Sealing Boot



**NOTE:** For use with T, TP and T2P style actuators. **Cannot be used for Switch Functions: 7103, 7203, 7303, 7403, 7107, 7207, 7307, and 7407.**



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

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Toggle



# Military/Aerospace/Hi-REL MIL-S-83731 Toggle Switches

## Features/Benefits

- Qualified to MIL-S-83731
- 50  $\mu$  inch selective gold contact plating
- Epoxy sealed terminals for process compatibility
- Rated for logic level to 5 amp resistive loads and 2 amp inductive loads
- Flame retardant housing material
- RoHS compliant and compatible

Test Requirement	MIL-S-83731/9, 10, 13, 14, 15, 16
1. Strength of Terminal	1 lb. – solder lug
2. Strength of Actuating Lever Pivot and Stop	10 lbs. & 8 lbs. throughout range
3. Strength of Mounting Means	15 lbs. in. torque on bushing
4. Dielectric (Sea Level) Indication	1000 VAC Group B, 750 VAC after electrical endurance. 500 $\mu$ A max. leakage
5. Contact Voltage Drop	2.5 millivolt initial, 5.0 millivolt after mechanical endurance @ 2-6 VDC 0.1 amp
6. Temperature Rise	50° C rise max. @ rated resistive load after endurance test
7. Short Circuit	10 operations carry 100 amps resistive load @ lowest DC volts
8. Mechanical Life	20K operations at specified high and low temperatures
9. Electrical Endurance	10K operations at specified high and low temperatures
10. Overload	50 operations @ 150% of rated resistive load
11. Electrical Endurance at Sea Level	10K operations resistive load @ room temperature 10K operations inductive load @ room temperature 10K operations lamp load @ room temperature Performed on different test samples
12. Vibration	Method 204 of MIL-STD-202, test condition A .06 D. A. or 10 G's 10-500 Hz, 10 usec. max. chatter
13. Shock	Fuse-method 213 or MIL-STD-202, 10 usec. max. chatter
14. Salt Spray Test Upon Completion	48 hours – method 101 of MIL-STD-202, test condition B 10 operations resistive load (toggle sealed switches only)
15. Moisture Resistance Test Upon Completion	Method 106 of MIL-STD-202 100 VDC potential between current carrying parts and panel
16. Sand & Dust	Method 110 of MIL-STD-202, test condition B 6 hours @ 23°C 2.5K operations mechanical life (toggle sealed switches only)
17. Explosion	MIL-STD-202 method 109, maximum rated DC inductive load (toggle sealed switches only)
18. Sealing	Toggle seal – 5 operations under 0.5 inches of H <sub>2</sub> O above top of bushing
19. A.) Toggle Seal B.) Bushing Seal	(Toggle sealed switches only) (Panel sealed switches only)
20. Temperature Operation	Mechanical life, –25°C to +71°C
21. Life Low Cur. Level	No requirement
22. Fungus	No requirement
23. Intermediate Current	20K operations, 35/40 milliamps @ 5 VDC resistive load @ +71°C
24. Thermal Shock	Method 107 of MIL-STD-202 test condition A; 5 cycles @ –55°C/+85°C

## RATINGS

### CURRENT RATINGS – HIGH LEVEL

Current Capacity in Amperes – Per Pole		
28V dc	115V ac, 400 Hz	125V ac, 60 Hz
Lamp Load		
1	1	1
Resistive Load		
5	5	5
Inductive Load		
2	2	2

### CURRENT RATINGS – LOGIC LEVEL

0.5 Volt – Amp (VA) Max. @ 28 V Max. (AC or DC)
---

## MATERIALS

CASE: Diallyl phthalate (DAP) (UL 94 V-0).  
 BUSHING: Brass, nickel plated.  
 HOUSING: Stainless steel.  
 ACTUATOR: Brass, chrome plated.  
 SWITCH SUPPORT: Brass, tin plated.  
 TERMINALS: Gold over nickel over copper alloy.  
 TERMINAL SEAL: Epoxy.  
 CONTACTS: Gold over nickel over silver over brass.  
 PANEL SEAL: Silicone rubber.  
 MOUNTING HARDWARE: Two hexagon nut, brass with nickel plating; one lockwasher, steel with nickel plating; one locking ring, brass with nickel plating.

**HOW TO ORDER:** Complete part numbers for MIL-S-83731 TOGGLE SWITCHES are shown on pages F-18 through F-21.



Dimensions are shown: Inches (mm)  
 Specifications and dimensions subject to change

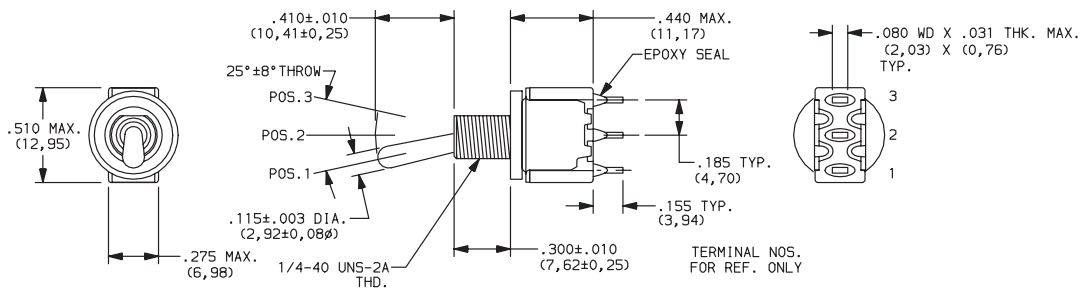


# Military/Aerospace/Hi-REL MIL-S-83731 Toggle Switches



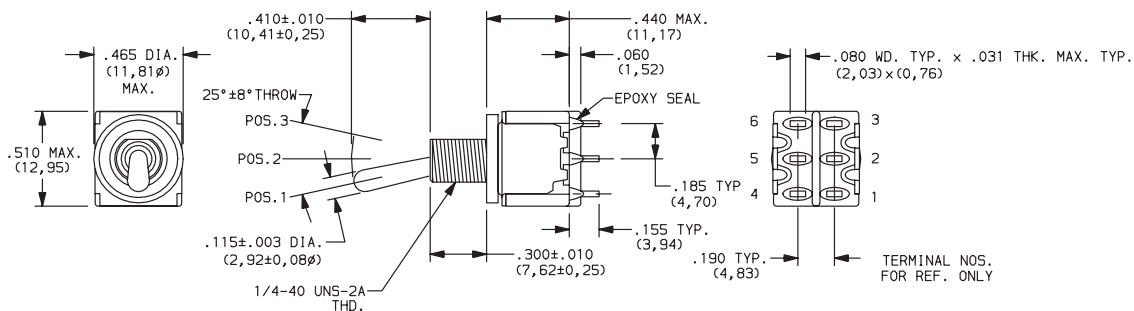
NO. POLES	MODEL NO.	SWITCH FUNCTION			CONNECTED TERMINALS			SCHEMATIC
		POS. 1	POS. 2	POS. 3	POS. 1	POS. 2	POS. 3	
SP	M83731/9-211	ON	OFF	ON	2-3	OPEN	2-1	 SPDT
	M83731/9-231	ON	NONE	ON				
	M83731/9-261	ON	NONE	MOM.				
	M83731/9-271	MOM.	OFF	MOM.				
	M83731/9-311	ON	OFF	MOM.				
	M83731/9-341	NONE	ON	MOM.	N/A	2-3	2-1	

SPDT

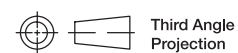
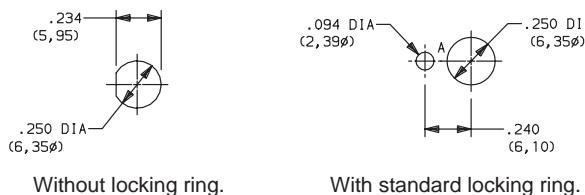


NO. POLES	MODEL NO.	SWITCH FUNCTION			CONNECTED TERMINALS			SCHEMATIC
		POS. 1	POS. 2	POS. 3	POS. 1	POS. 2	POS. 3	
DP	M83731/10-211	ON	OFF	ON	2-3,5-6	OPEN	2-1,5-4	 DPDT
	M83731/10-231	ON	NONE	ON				
	M83731/10-261	ON	NONE	MOM.				
	M83731/10-271	MOM.	OFF	MOM.				
	M83731/10-311	ON	OFF	MOM.				
	M83731/10-321	ON	ON	ON				
	M83731/10-331	ON	ON	MOM.				
	M83731/10-341	NONE	ON	MOM.				
	M83731/10-351	MOM.	ON	MOM.	2-3,5-6	2-3,5-4	2-1,5-4	

DPDT



### PANEL MOUNTING



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



Toggle

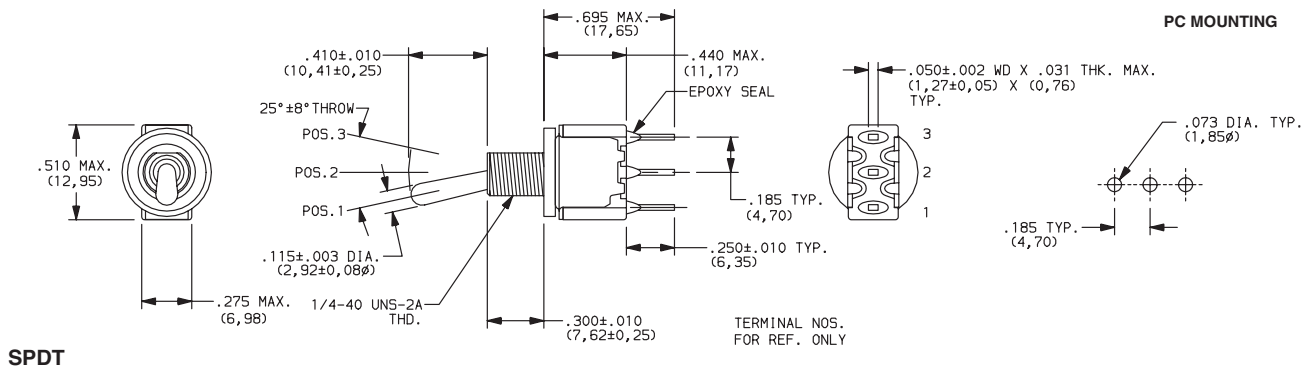




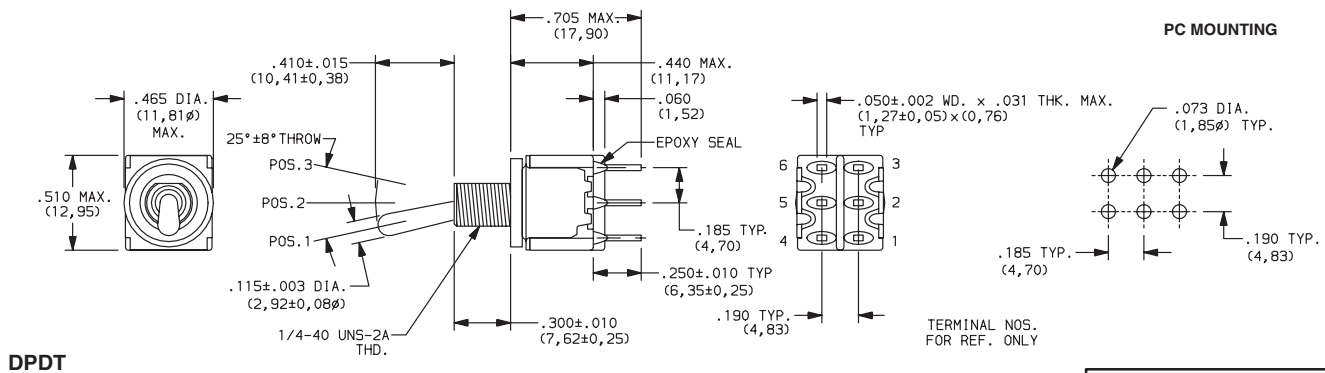
# Military/Aerospace/Hi-REL MIL-S-83731 Toggle Switches



NO. POLES	MODEL NO.	SWITCH FUNCTION			CONNECTED TERMINALS			SCHEMATIC
		POS. 1	POS. 2	POS. 3	POS. 1	POS. 2	POS. 3	
SP	M83731/9-212	ON	OFF	ON	2-3	OPEN	2-1	
	M83731/9-232	ON	NONE	ON				
	M83731/9-262	ON	NONE	MOM.				
	M83731/9-272	MOM.	OFF	MOM.				
	M83731/9-312	ON	OFF	MOM.				
	M83731/9-342	NONE	ON	MOM.				



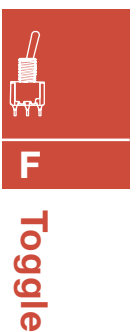
NO. POLES	MODEL NO.	SWITCH FUNCTION			CONNECTED TERMINALS			SCHEMATIC			
		POS. 1	POS. 2	POS. 3	POS. 1	POS. 2	POS. 3				
DP	M83731/10-212	ON	OFF	ON	2-3,5-6	OPEN	2-1,5-4				
	M83731/10-232	ON	NONE	ON							
	M83731/10-262	ON	NONE	MOM.							
	M83731/10-272	MOM.	OFF	MOM.							
	M83731/10-312	ON	OFF	MOM.							
	M83731/10-322	ON	ON	ON							
	M83731/10-332	ON	ON	MOM.							
	M83731/10-342	NONE	ON	MOM.					N/A	2-3,5-6	2-1,5-4
	M83731/10-352	MOM.	ON	MOM.					2-3,5-6	2-3,5-4	2-1,5-4



DPDT



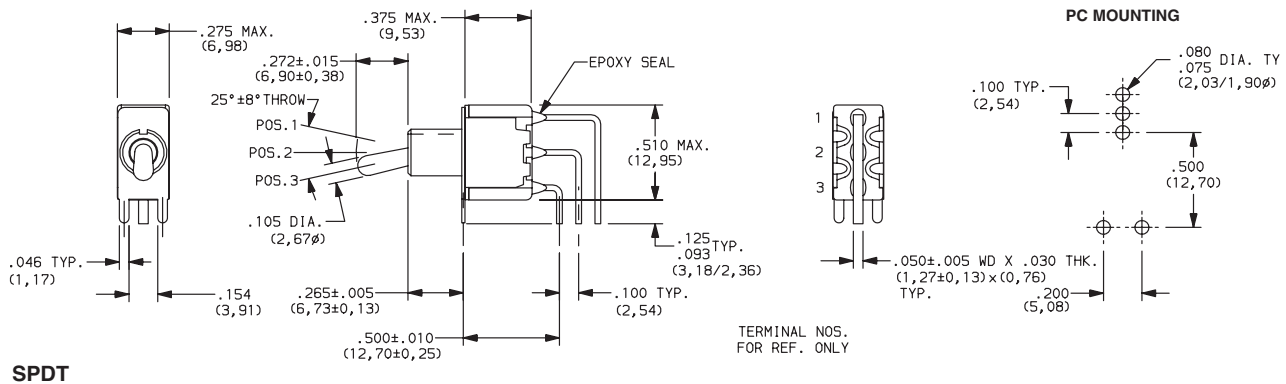
Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



# Military/Aerospace/Hi-REL MIL-S-83731 Toggle Switches



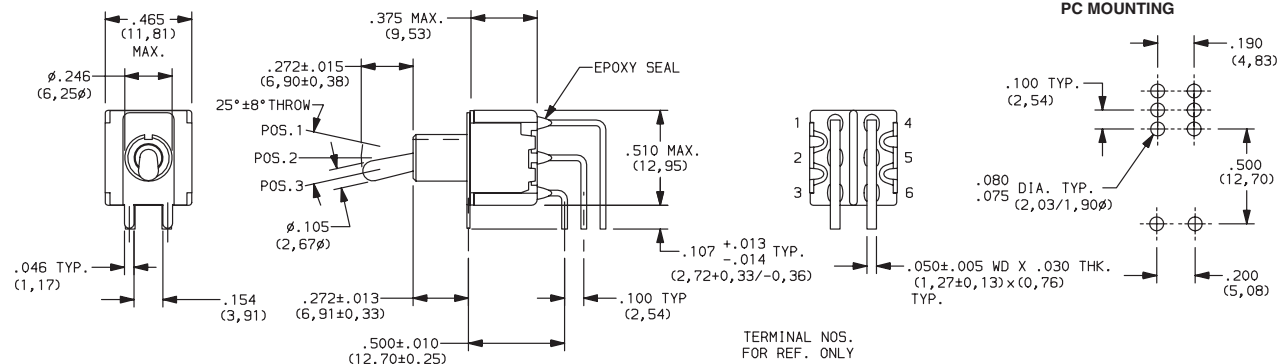
NO. POLES	MODEL NO.	SWITCH FUNCTION			CONNECTED TERMINALS			SCHEMATIC
		POS. 1	POS. 2	POS. 3	POS. 1	POS. 2	POS. 3	
SP	M83731/13-211	ON	OFF	ON	2-3	OPEN	2-1	 SPDT
	M83731/13-231	ON	NONE	ON				
	M83731/13-261	ON	NONE	MOM.				
	M83731/13-271	MOM.	OFF	MOM.				
	M83731/13-311	ON	OFF	MOM.				
	M83731/13-341	NONE	ON	MOM.	N/A	2-3	2-1	



SPDT



NO. POLES	MODEL NO.	SWITCH FUNCTION			CONNECTED TERMINALS			SCHEMATIC
		POS. 1	POS. 2	POS. 3	POS. 1	POS. 2	POS. 3	
DP	M83731/14-211	ON	OFF	ON	2-3,5-6	OPEN	2-1,5-4	 DPDT
	M83731/14-231	ON	NONE	ON				
	M83731/14-261	ON	NONE	MOM.				
	M83731/14-271	MOM.	OFF	MOM.				
	M83731/14-311	ON	OFF	MOM.				
	M83731/14-321	ON	ON	ON				
	M83731/14-331	ON	ON	MOM.				
	M83731/14-341	NONE	ON	MOM.				
	M83731/14-351	MOM.	ON	MOM.	2-3,5-6	2-3,5-4	2-1,5-4	



DPDT



Toggle  
F



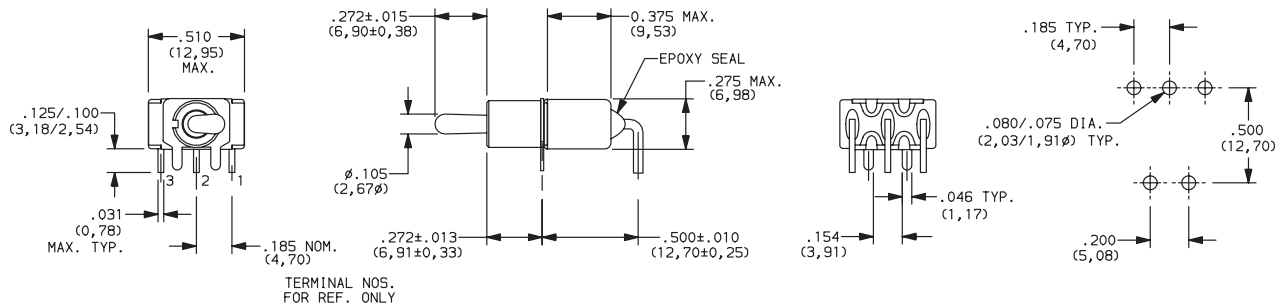
Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

# Military/Aerospace/Hi-REL MIL-S-83731 Toggle Switches



NO. POLES	MODEL NO.	SWITCH FUNCTION			CONNECTED TERMINALS			SCHEMATIC
		POS. 1	POS. 2	POS. 3	POS. 1	POS. 2	POS. 3	
SP	M83731/15-211	ON	OFF	ON	2-3	OPEN	2-1	 SPDT
	M83731/15-231	ON	NONE	ON				
	M83731/15-261	ON	NONE	MOM.				
	M83731/15-271	MOM.	OFF	MOM.				
	M83731/15-311	ON	OFF	MOM.				
	M83731/15-341	NONE	ON	MOM.	N/A	2-3	2-1	

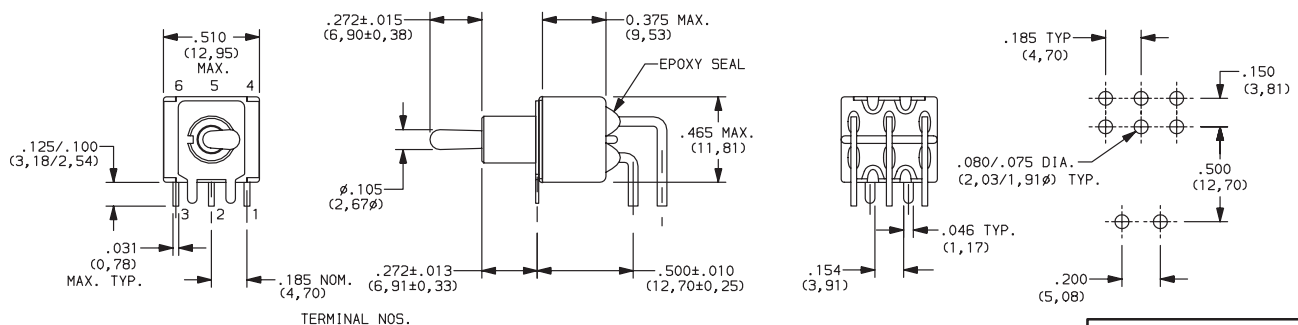
### PC MOUNTING



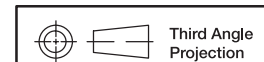
### SPDT

NO. POLES	MODEL NO.	SWITCH FUNCTION			CONNECTED TERMINALS			SCHEMATIC
		POS. 1	POS. 2	POS. 3	POS. 1	POS. 2	POS. 3	
DP	M83731/16-211	ON	OFF	ON	2-3,5-6	OPEN	2-1,5-4	 DPDT
	M83731/16-231	ON	NONE	ON				
	M83731/16-261	ON	NONE	MOM.				
	M83731/16-271	MOM.	OFF	MOM.	2-3,5-6	2-3,5-4	2-1,5-4	
	M83731/16-311	ON	OFF	MOM.				
	M83731/16-321	ON	ON	ON	N/A	2-3,5-6	2-1,5-4	
	M83731/16-331	ON	ON	MOM.				
	M83731/16-341	NONE	ON	MOM.				
	M83731/16-351	MOM.	ON	MOM.	2-3,5-6	2-3,5-4	2-1,5-4	

### PC MOUNTING

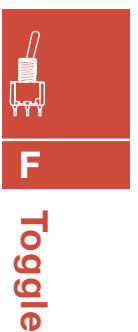


### DPDT

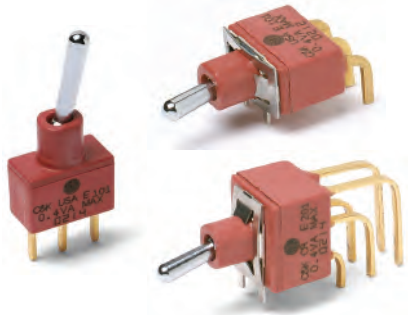


Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

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# E Series Sealed Miniature Toggle Switches



## Features/Benefits

- Sealed against solder and cleaning process contaminants
- UL 94V-0 Nylon case and bushing
- Multi-positions
- ESD protection available
- RoHS compliant models available

## Typical Applications

- Telecommunications
- Instrumentation
- Medical equipment



## Specifications

CONTACT RATING: B contact material: 0.4 VA max. @ 20 V AC or DC max. Q contact material: E1XX & E2XX MODELS: 7.5 AMPS @ 125 V AC or 28 V DC; 3 AMPS @ 250 V AC. E3XX MODELS: 5 AMPS @ 125 V AC or 28 V DC; 2 AMPS @ 250 V AC. See page F-29 for additional ratings.

ELECTRICAL LIFE: E1XX and E2XX models: 40,000 make-and-break cycles at full load. E3XX models: 30,000 cycles.

CONTACT RESISTANCE: Below 10 mΩ typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: 10<sup>9</sup> Ω min.

ELECTROSTATIC DISCHARGE (ESD) OPTION: F1 conductive bushing only. Dissipates up to 20,000 V DC from actuator to ground.

DIELECTRIC STRENGTH: 1000 Vrms min. @ sea level.

OPERATING TEMPERATURE: -30°C to 85°C.

SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

DEGREE OF PROTECTION: IP57; Protection against harmful dust deposit, full-scale voltage protection, temporary immersion.

## Materials

CASE & BUSHING: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0). F1 conductive bushing option is impregnated with carbon fibers.

ACTUATOR: Brass, chrome plated with internal o-ring seal standard.

SWITCH SUPPORT: Brass or steel, matte-tin plated.

SWITCH SUPPORT RETAINER: Stainless steel.

CONTACTS & TERMINALS: B contact material: Copper alloy, with gold plate over nickel plate. Q contact material: Copper alloy, silver plated. See page F-29 for additional contact materials.

TERMINAL SEAL: Epoxy.

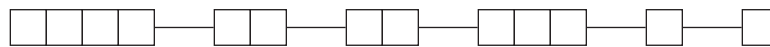
HARDWARE: Nut & Locking ring: Brass, nickel plated. Lockwasher: Steel, nickel plated.

**NOTE:** Any models supplied with P, S, R, Q, B or G contact material are RoHS compliant and compatible.

**NOTE:** Specifications and materials listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

## Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages F-23 thru F-29. For additional options not shown in catalog, consult our Customer Service Center. All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods.



### Switch Function

- E101** SP, On-None-On
- E103** SP, On-Off-On
- E105** SP, Mom.-Off-Mom.
- E107** SP, On-Off-Mom.
- E108** SP, On-None-Mom.
- E201** DP, On-None-On
- E203** DP, On-Off-On
- E205** DP, Mom.-Off-Mom.
- E207** DP, On-Off-Mom.
- E208** DP, On-None-Mom.
- E211** DP, On-On-On
- E213** DP, On-On-Mom.
- E215** DP, Mom.-On-Mom.
- \*\*E301** 3P, On-None-On

### Actuator

- M** .300" high
- S** .500" high
- L3** Plastic, .940" high

### Bushing

- D1** .250" high
- \*F1** Conductive, .250" high
- D9** .280" high
- \*\*Y** Threaded, .350" high

### Terminations

- A** Right angle, PC thru-hole
- AV2** Vertical right angle, PC thru-hole
- C** PC Thru-hole
- V3** .460" high, V-bracket
- Z** Solder lug
- A3** Right angle, PC thru-hole
- AV3** Vertical right angle, PC thru-hole
- V6** .460" high, V-bracket
- V9** 1.150" high, V-bracket
- V31** .460" high, snap-in V-bracket
- V61** .460" high, snap-in V-bracket
- W** .750" long, wire wrap
- Z3** Quick connect

### Contact Material

- B** Gold
- P** Gold, matte-tin
- Q** Silver
- S** Silver, matte-tin
- G** Gold over silver
- R** Gold over silver, matte-tin

### Seal

- E** Epoxy



Toggle

\* F1 available with SP and DP versions only, please see page F-19

\*\* Y threaded bushing available for 1 & 2 pole only



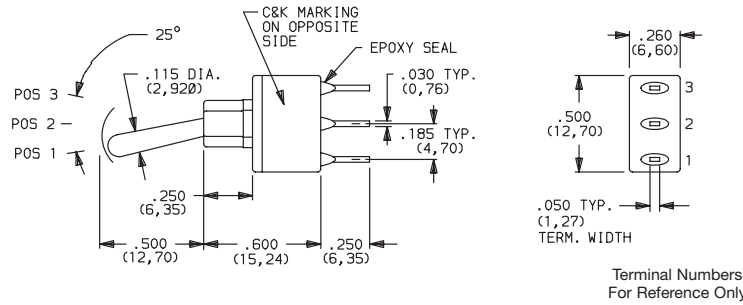
Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

# E Series Sealed Miniature Toggle Switches

## SWITCH FUNCTION

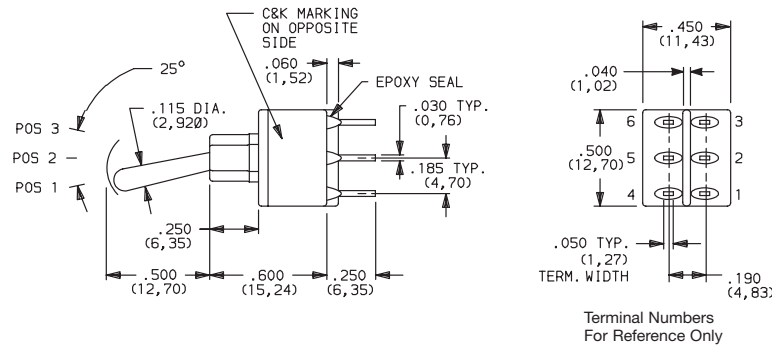
NO. POLES	MODEL NO.	SWITCH FUNCTION			CONNECTED TERMINALS			SCHEMATIC
		POS. 1	POS. 2	POS. 3	POS. 1	POS. 2	POS. 3	
SP	<b>E101</b>	ON	NONE	ON	2-3	N/A	2-1	
	<b>E103</b>	ON	OFF	ON	2-3	OPEN	2-1	
	<b>E105</b>	MOM.	OFF	MOM.				
	<b>E107</b>	ON	OFF	MOM.				
	<b>E108</b>	ON	NONE	MOM.	2-3	N/A	2-1	

### SPDT



DP	<b>E201</b>	ON	NONE	ON	2-3,5-6	N/A	2-1,5-4	
	<b>E203</b>	ON	OFF	ON	2-3,5-6	OPEN	2-1,5-4	
	<b>E205</b>	MOM.	OFF	MOM.				
	<b>E207</b>	ON	OFF	MOM.				
	<b>E208</b>	ON	NONE	MOM.	2-3,5-6	N/A	2-1,5-4	
	<b>E211**</b>	ON	ON	ON	2-3,5-6	2-3,5-4	2-1,5-4	
	<b>E213**</b>	ON	ON	MOM.				
<b>E215**</b>	MOM.	ON	MOM.					

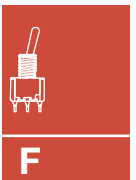
### DPDT



MOM. = Momentary

\*\* Wiring for 3-way switch, see Section N.

All models with all options when ordered with G,R, Q or S contact material except with F1 conductive bushing.



# E Series Sealed Miniature Toggle Switches

## SWITCH FUNCTION

NO. POLES	MODEL NO.	SWITCH FUNCTION			CONNECTED TERMINALS			SCHEMATIC
		POS. 1	POS. 2	POS. 3	POS. 1	POS. 2	POS. 3	
3P	<b>E301</b>	ON	NONE	ON	2-3,5-6,8-9	N/A	2-1,5-4,8-7	

**3PDT**

Part number shown: E301SD1CBE

Terminal Nos. For Reference Only

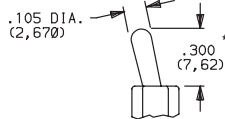
MOM. = Momentary

\*\* Wiring for 3-way switch, see Section N.

All models with all options when ordered with G, R, Q or S contact material except with F1 conductive bushing.

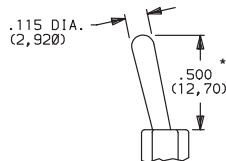
## ACTUATOR

**M** .300" HIGH



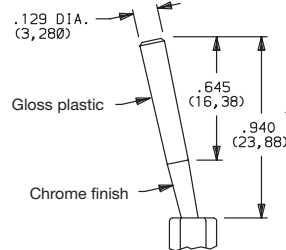
Standard when ordered with A, A3, AV2, AV3, V2-V61 terminations. Finish: Chrome.

**S** .500" HIGH



Standard when ordered with C, Z, Z3, W & W4 terminations. Finish: Chrome

**L3** PLASTIC, .940" HIGH



OPTION CODE	L3 ACTUATOR COLOR
<b>2</b>	BLACK

Other colors available, consult Customer Service Center. No color choice required for S & M actuators.

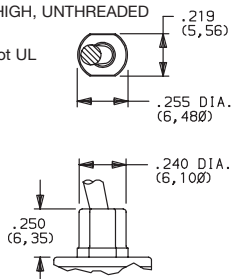
\* Actuators shown with standard D1 bushing. Subtract .030 (0,76) for D9 bushing. Subtract .100 (2,54) for Y bushing.

## BUSHING

**D1** .250" HIGH, UNTHREADED

**F1** ESD CONDUCTIVE BUSHING, .250" HIGH, UNTHREADED

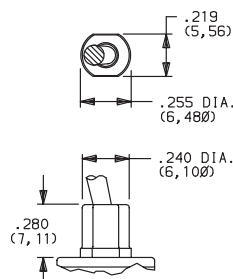
F1 bushing is not UL approved



ESD protection depends on proper grounding of switch support bracket. F1 conductive bushing option is impregnated with carbon fibers; dissipates electrostatic discharge (ESD) up to 20,000 V from actuator to ground.

Available with M & S actuator options and A, A3, AV2, AV3, V3-V61 termination options.

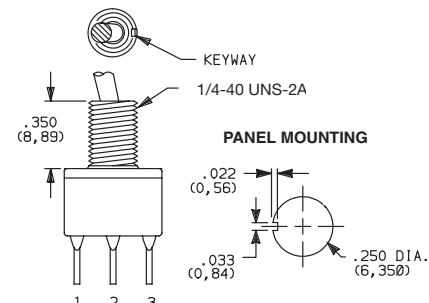
**D9** .280" HIGH, UNTHREADED



E3XX models not available with D9 bushing.

**NOTE:** Internal o-ring actuator seal standard for all bushing options.

**Y** THREADED, INSULATED, .350" HIGH WITH KEYWAY



Available only with C, Z, Z3, & W terminations. Available for 1&2 pole only.

Hardware: One dress nut part number 299D01201, one hex nut part number 540400201 and lockwasher part number 700303202 supplied standard.

**Will withstand 4 in.-lbs. of torque with no distortion.**



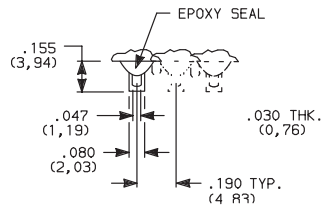
Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

www.ck-components.com

# E Series Sealed Miniature Toggle Switches

## TERMINATIONS

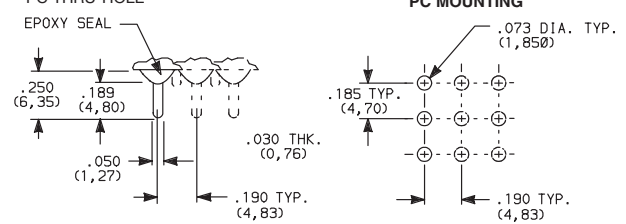
### Z SOLDER LUG



Not available with F1 conductive bushing or P, R or S contact material.

SPDT thru 3PDT

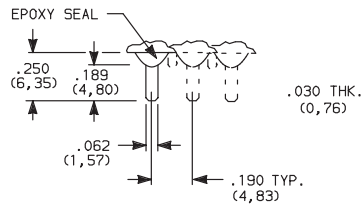
### C PC THRU-HOLE



Not available with F1 conductive bushing.

SPDT thru 3PDT

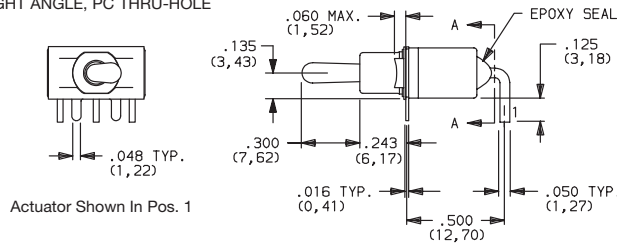
### Z3 QUICK CONNECT



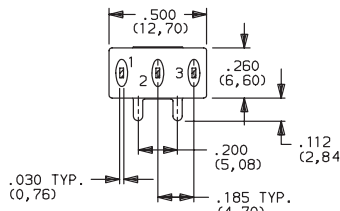
Not available with F1 conductive bushing or P, R or S contact material. Mating quick connector available; order part number 530100000, page F-16.

SPDT thru 3PDT

### A RIGHT ANGLE, PC THRU-HOLE

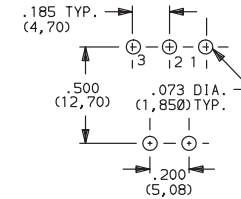


Actuator Shown In Pos. 1



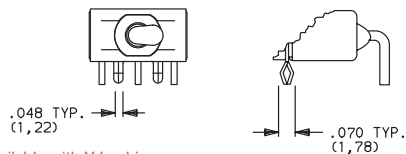
Terminal Nos. For Reference Only

PC MOUNTING



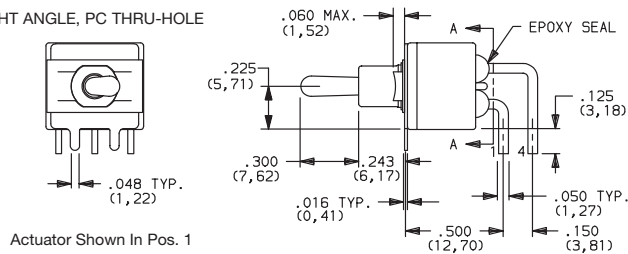
E101MD1ABE  
Horizontal Actuation  
SPDT

### A3 RIGHT ANGLE, SNAP-IN, PC THRU-HOLE

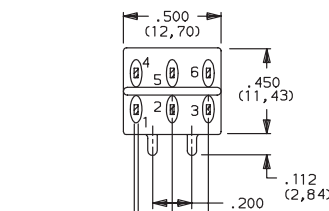


Not available with Y bushing.  
Terminal bend radii and lead-in manufacturing option.

### A RIGHT ANGLE, PC THRU-HOLE

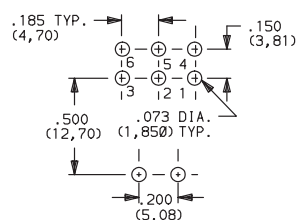


Actuator Shown In Pos. 1



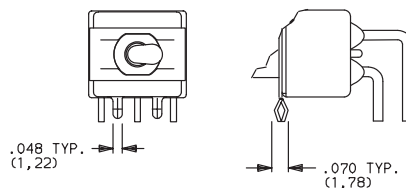
Terminal Nos. For Reference Only

PC MOUNTING



E201MD1ABE  
Horizontal Actuation  
DPDT

### A3 RIGHT ANGLE, SNAP-IN, PC THRU-HOLE



Not available with Y bushing.  
Terminal bend radii and lead-in manufacturing option.



Third Angle  
Projection

Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



F

Toggle

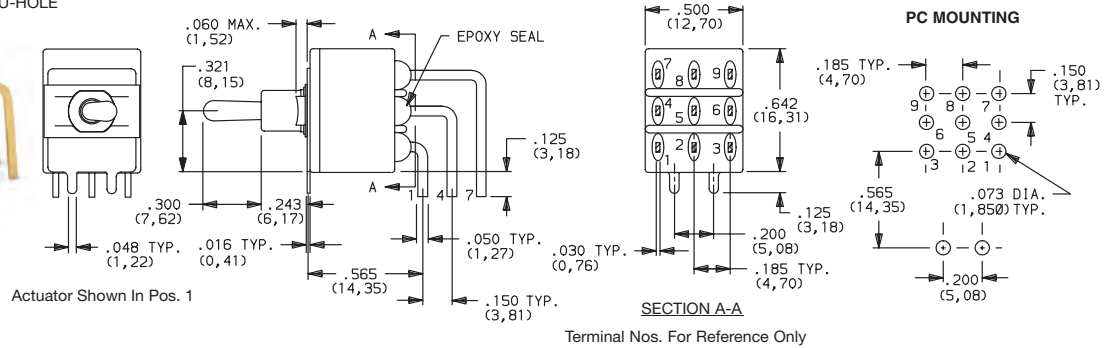
# E Series Sealed Miniature Toggle Switches

## TERMINATIONS

### A RIGHT ANGLE, PC THRU-HOLE



**E301MD1ABE**  
Horizontal Actuation  
**3PDT**

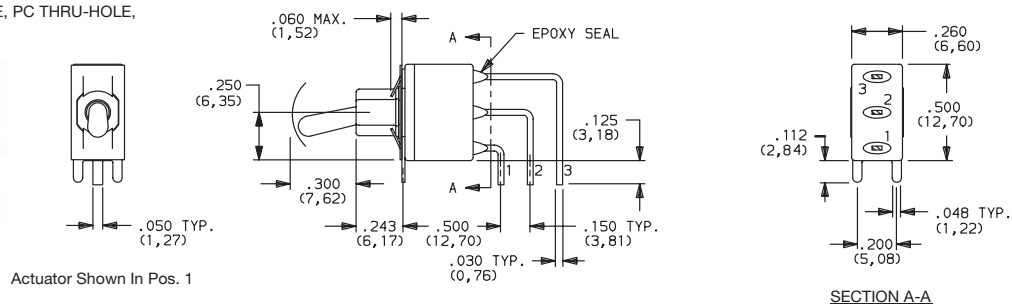


Not available with D9 & Y bushings.  
Terminal bend radii and lead-in manufacturing option.

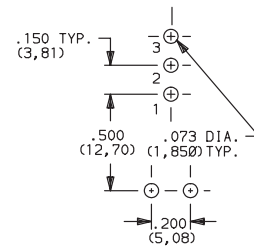
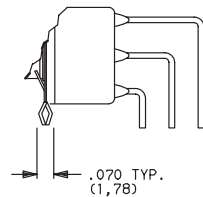
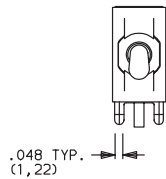
### AV2 VERTICAL RIGHT ANGLE, PC THRU-HOLE, .150" PITCH



**E101MD1AV2BE**  
Vertical Actuation  
**SPDT**



### AV3 VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE, .150" PITCH

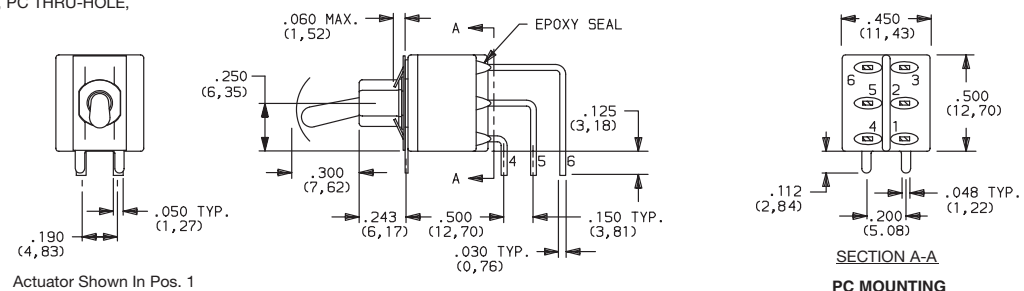


Not available with Y bushing.  
Terminal bend radii and lead-in manufacturing option.

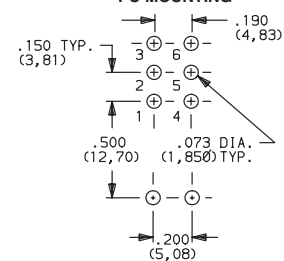
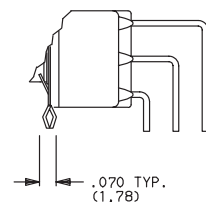
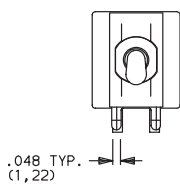
### AV2 VERTICAL RIGHT ANGLE, PC THRU-HOLE, .150" PITCH



**E201MD1AV2BE**  
Vertical Actuation  
**DPDT**



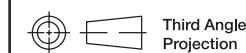
### A3 VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE, .150" PITCH



Not available with Y bushing.  
Terminal bend radii and lead-in manufacturing option.

Toggle

F



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

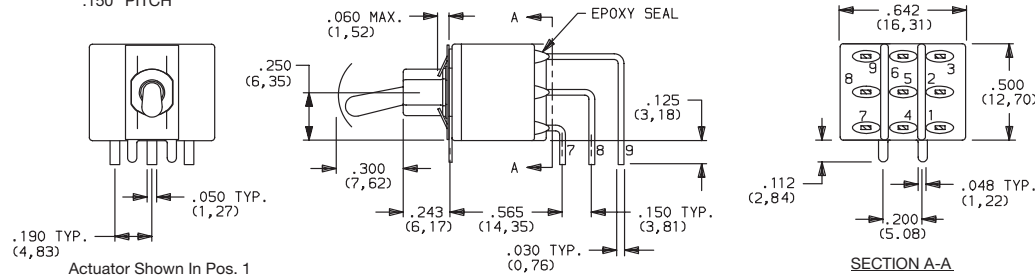




# E Series Sealed Miniature Toggle Switches

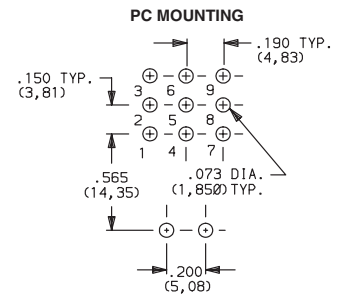
## TERMINATIONS

**AV2** VERTICAL RIGHT ANGLE, PC THRU-HOLE,  
.150" PITCH



**E301MD1AV2BE**  
Vertical Actuation  
**3PDT**

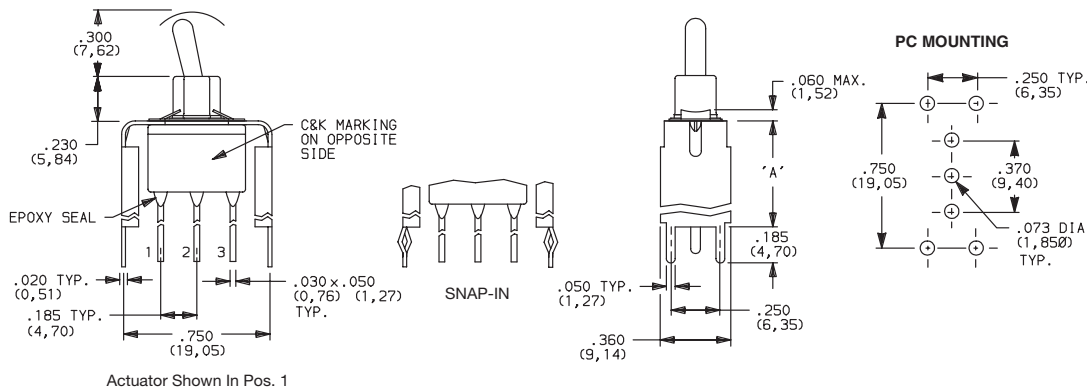
**AV3** VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE  
.150" PITCH



Not available with D9 & Y bushings.  
Terminal bend radii and lead-in manufacturing option.

**V6** VERTICAL MOUNT, V-BRACKET

**V61** VERTICAL MOUNT, V-BRACKET, SNAP-IN



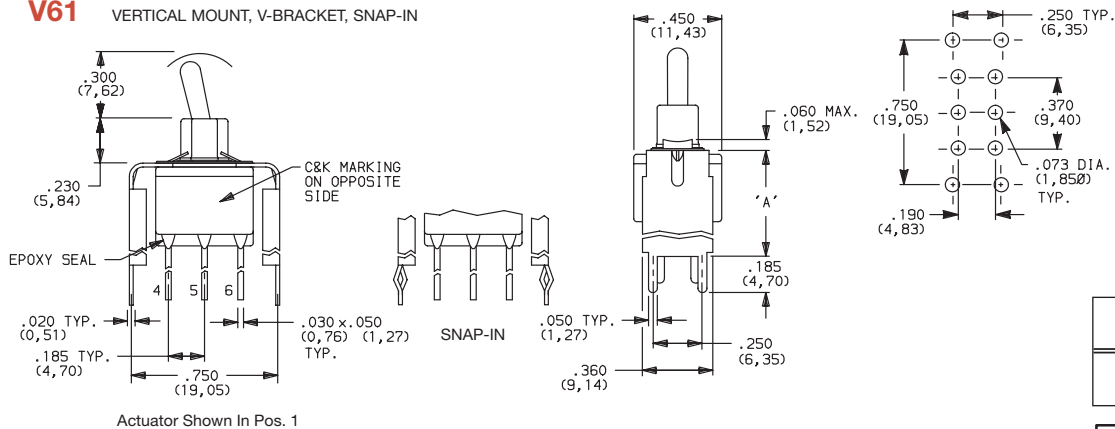
**E101MD1\_BE**  
**SPDT**

OPTION CODE	DIM 'A'
<b>V6, V61</b>	.460 (11,68)

Not available with Y bushing.

**V6** VERTICAL MOUNT, V-BRACKET

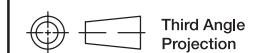
**V61** VERTICAL MOUNT, V-BRACKET, SNAP-IN



**E201MD1\_BE**  
**DPDT**

OPTION CODE	DIM 'A'
<b>V6, V61</b>	.460 (11,68)

Not available with Y bushing.



Third Angle Projection



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

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# E Series Sealed Miniature Toggle Switches

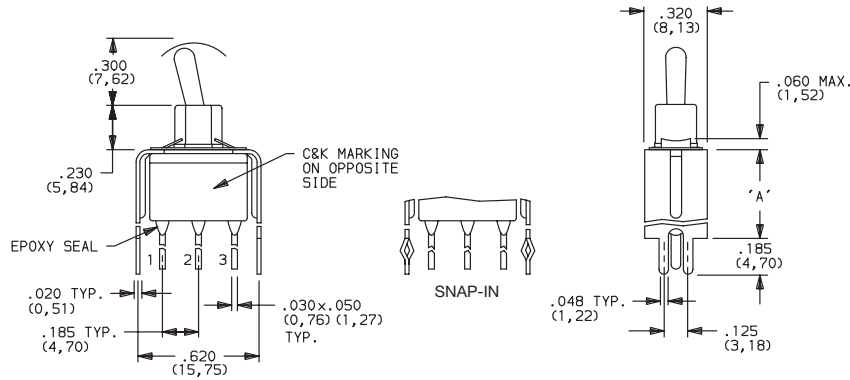
## TERMINATIONS

**V3, V9** VERTICAL MOUNT, V-BRACKET

**V31** VERTICAL MOUNT, V-BRACKET, SNAP-IN



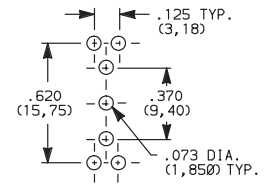
**E101MD1\_BE**  
**SPDT**



Actuator Shown In Pos. 1

Not available with Y bushing.

### PC MOUNTING



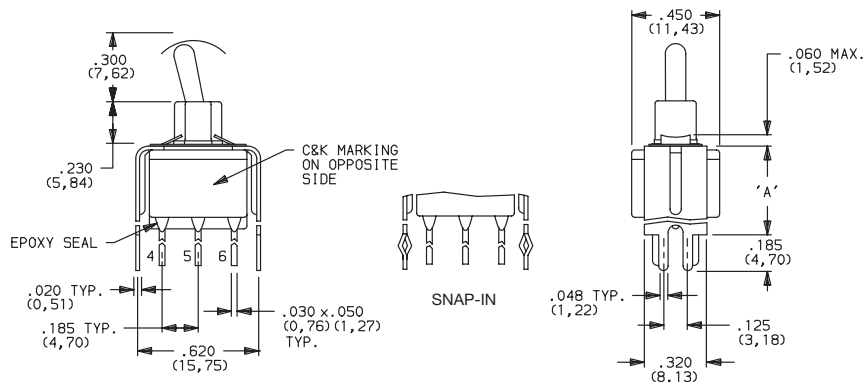
OPTION CODE	DIM 'A'
<b>V3, V31</b>	.460 (11,68)
<b>V9</b>	1.150 (29,21)

**V3, V9** VERTICAL MOUNT, V-BRACKET

**V31** VERTICAL MOUNT, V-BRACKET, SNAP-IN



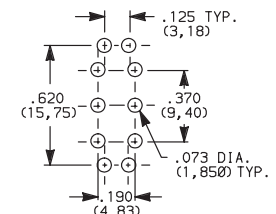
**E201MD1\_BE**  
**DPDT**



Actuator Shown In Pos. 1

Not available with Y bushing.

### PC MOUNTING

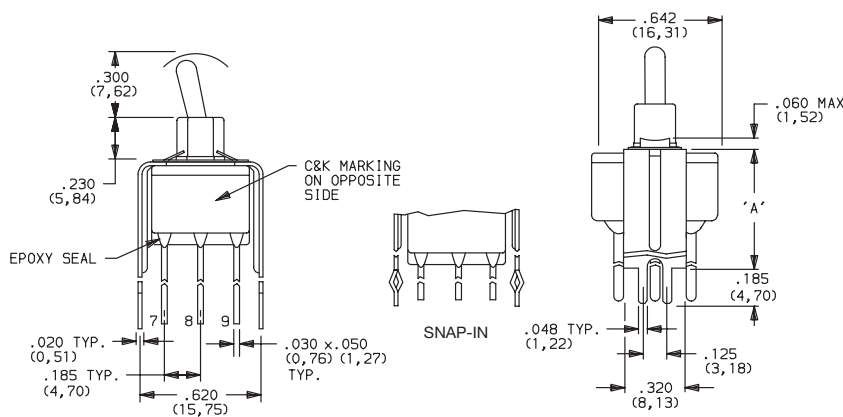


OPTION CODE	DIM 'A'
<b>V3, V31</b>	.460 (11,68)
<b>V9</b>	1.150 (29,21)

**V9** VERTICAL MOUNT, V-BRACKET



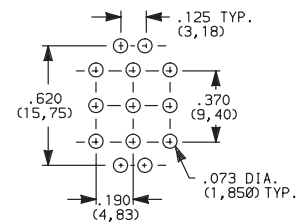
**E301MD1\_BE**  
**3PDT**



Actuator Shown In Pos. 1

Not available with D9 & Y bushings.

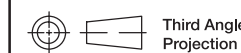
### PC MOUNTING



OPTION CODE	DIM 'A'
<b>V9</b>	1.150 (29,21)

Toggle

F



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

# E Series Sealed Miniature Toggle Switches

## CONTACT MATERIAL



OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
<b>B</b>	GOLD <sup>1</sup>	GOLD <sup>1</sup>	LOW LEVEL/ DRY CIRCUIT	0.4 VA MAX. @ 20 V AC OR DC MAX.
<b>P</b>		MATTE-TIN <sup>6</sup>		
<b>Q</b>	SILVER <sup>4,5</sup>	SILVER <sup>5</sup>	POWER	E1XX & E2XX MODELS: 7.5 AMPS @ 125 V AC OR 28 V DC; 3 AMPS @ 250 V AC. E3XX MODELS: 5 AMPS @ 125 V AC OR 28 V DC; 2 AMPS @ 250 V AC.
<b>S</b>		MATTE-TIN <sup>6</sup>		
<b>G</b>	GOLD OVER SILVER <sup>2,3</sup>	GOLD <sup>3</sup>	LOW LEVEL/DRY CIRCUIT OR POWER	E1XX AND E2XX MODELS: 0.4 VA MAX @20 V AC OR DC MAX. OR 7.5 AMPS @125 V AC OR 28 V DC; 3 AMPS @ 250 V AC. DC E3XX MODELS: 0.4 VA MAX. @ 20 V AC OR DC MAX. OR 5 AMPS @ 125 V AC OR 28 V DC; 2 AMPS @ 250 V AC.
<b>R</b>		MATTE-TIN <sup>6</sup>		

\* Note: See Technical Data section of this catalog for RoHS compliant and compatible definitions and specifications.

<sup>1</sup> CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.

<sup>2</sup> END CONTACTS: Coin silver, with gold plate over nickel plate.

<sup>3</sup> CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.

<sup>4</sup> END CONTACTS: Coin silver, silver plated.

<sup>5</sup> CENTER CONTACT & ALL TERMINALS: Copper alloy, with gold flash over silver plate. Or copper alloy, silver plated.

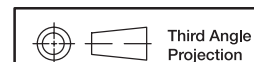
<sup>6</sup> TERMINALS: Copper alloy, with matte-tin over nickel plate.

**NOTE:** Any models supplied with P, S, R, Q, B or G contact material are RoHS compliant.

All models **C&K** **US** with all options when ordered with S, R, G, or Q contact material except with F1 conductive bushing.

B contact material standard with all terminations.

P, S & R contact materials not available with Z & Z3 terminations.



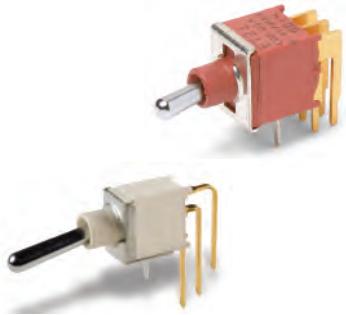
Third Angle  
Projection

Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



Toggle

# ET Series Sealed Subminiature Toggle Switches



## Features/Benefits

- Sealed against solder and cleaning process contaminants
- ESD protection available
- Thru-hole and surface mount models
- Compact size and small footprint save PCB space
- RoHS compliant models available

## Typical Applications

- Hand-held telecommunications
- Instrumentation
- Medical equipment

## Specifications

CONTACT RATING: B contact material: 0.4 VA max. @ 20 V AC or DC max. See page F-35 for additional ratings.

ELECTRICAL LIFE: ETX1 models: 60,000 make-and-break cycles at full load. All other models: 30,000 cycles.

CONTACT RESISTANCE: Below 20 m Ω typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: 10<sup>9</sup> Ω min.

ELECTROSTATIC DISCHARGE (ESD) RESISTANT OPTION:  
M3 & S3 insulating actuator only: 9,000 V DC min. @ sea level, actuator to terminals. F1 conductive bushing only: Dissipates up to 20,000 V DC from actuator to ground. M3 & S3 actuator and F1 bushing options are not recommended for use together.

DIELECTRIC STRENGTH: 1000 Vrms min. @ sea level.

OPERATING TEMPERATURE: -30°C to 85°C.

SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

DEGREE OF PROTECTION: IP57; Protection against harmful dust deposit, full-scale voltage protection, temporary immersion.

PACKAGING: Surface mount switches are shipped in tape and reel packaging, see page F-36 for drawings and reel information.

## Materials

CASE & BUSHING: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0) or glass filled 4/6 nylon, flame retardant, heat stabilized (UL 94V-0). F1 conductive bushing option is impregnated with carbon fibers.

ACTUATOR: M3 & S3 anti-static actuator: Nylon 4/6, black standard (UL 94V-0). All other actuators: Brass, chrome plated. Internal o-ring seal standard with all actuators.

SWITCH SUPPORT: Brass, tin plated.

CONTACTS & TERMINALS: B contact material: Copper alloy, with gold plate over nickel plate. Q contact material: Copper alloy, silver plated. See F-35 for additional contact materials.

TERMINAL SEAL: Epoxy.

**NOTE:** Any models supplied with Q, B, G, P or R contact material are RoHS compliant and compatible.

**NOTE:** Specifications and materials listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

## Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages F-31 thru F-36. For additional options not shown in catalog, consult our Customer Service Center. All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods.

### Switch Function

- ET01 SP, On-None-On
- ET02 SPST, Off-None-On
- ET03 SP, On-Off-On
- ET05 SP, Mom.-Off-Mom.
- ET07 SP, On-Off-Mom.
- ET08 SP, On-None-Mom.
- ET21 DP, On-None-On
- ET23 DP, On-Off-On
- ET24 DP, On-On-On
- ET25 DP, Mom.-Off-Mom.
- ET27 DP, On-Off-Mom.
- ET28 DP, On-None-Mom.

### Actuator

- M .240" high
- M3 Plastic, anti-static, .240" high
- S .400" high
- L .320" high
- S1 .540" high

### Bushing

- D1 .177" High, Unthreaded
- F1 .177" high, unthreaded, ESD conductive

### Terminations

- A Right angle, PC thru-hole
- AV Vertical right angle, PC thru-hole
- C PC Thru-hole
- SA Right angle, surface mount
- SA1 Right angle, surface mount rear-facing
- V3 Vertical mount, V-bracket
- AV3 Vertical right angle, snap-in, PC thru-hole
- V31 Vertical mount, V-bracket, snap-in
- W Wire wrap

### Contact Material

- B Gold
- P Gold, matte tin
- Q Silver
- S Silver/matte-tin
- G Gold over silver
- R Gold over silver, matte-tin

### Seal

- E Epoxy

### Plastic Actuator Color

- NONE No actuator color
- 2 Black
- 1 White



Toggle



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

# ET Series Sealed Subminiature Toggle Switches

## SWITCH FUNCTION

NO. POLES	MODEL NO.	SWITCH FUNCTION			CONNECTED TERMINALS			SCHEMATIC
		POS. 1	POS. 2	POS. 3	POS. 1	POS. 2	POS. 3	
SP	<b>ET01</b>	ON	NONE	ON	2-3	N/A	2-1	
	<b>ET03</b>	ON	OFF	ON	2-3	OPEN	2-1	
	<b>ET05</b>	MOM.	OFF	MOM.				
	<b>ET07</b>	ON	OFF	MOM.				
	<b>ET08</b>	ON	NONE	MOM.	2-3	N/A	2-1	
	<b>ET02</b>	OFF	NONE	ON	OPEN	N/A	3-1	
<b>SPDT</b> <p>Part number shown: ET01MD1CBE      ET02 Models: Omit terminal 2</p>								
DP	<b>ET21</b>	ON	NONE	ON	2-3,5-6	N/A	2-1,5-4	
	<b>ET23</b>	ON	OFF	ON	2-3,5-6	OPEN	2-1,5-4	
	<b>ET25</b>	MOM.	OFF	MOM.				
	<b>ET27</b>	ON	OFF	MOM.				
	<b>ET28</b>	ON	NONE	MOM.	2-3,5-6	N/A	2-1,5-4	
	<b>ET24**</b>	ON	ON	ON	2-3,5-6	2-3,5-4	2-1,5-4	
<b>DPDT</b> <p>Part number shown: ET21MD1CBE</p>								

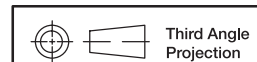
MOM. = Momentary

\*\* Wiring for 3-way switch, see Section N.

All models with all options (except M3 actuator) when ordered with G, L, R or Q contact material except with F1 conductive bushing.



Toggle

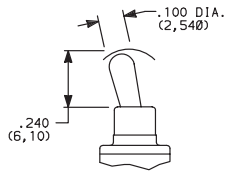


Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

# ET Series Sealed Subminiature Toggle Switches

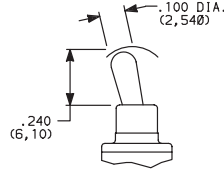
## ACTUATOR

**M** .240" HIGH



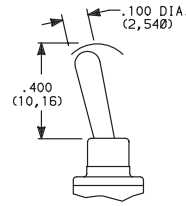
Standard with A, AV, V3 & V31 terminations.

**M3** PLASTIC, ANTISTATIC,  
.240" HIGH



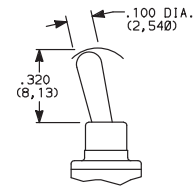
Material: Nylon 4/6 (UL 94V-0), black standard.  
Static resistance: 9,000 V DC min. @ sea level,  
actuator to terminals. Not available with F1  
conductive bushing option. Not UL approved.

**S** .400" HIGH

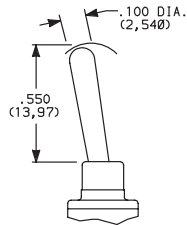


Standard with C or W terminations.

**L** .320" HIGH



**S1** .540" HIGH



OPTION CODE	PLASTIC ACTUATOR COLOR
(NONE)	BLACK (M3 & S3 only)
1	WHITE (M3 & S3 only)

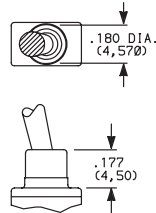
**NOTE:** All actuators have chrome finish (except M3 & S3).

## BUSHING

**D1** .177" HIGH, UNTHREADED

**F1** ESD, CONDUCTIVE BUSHING  
UNTHREADED, .177" HIGH

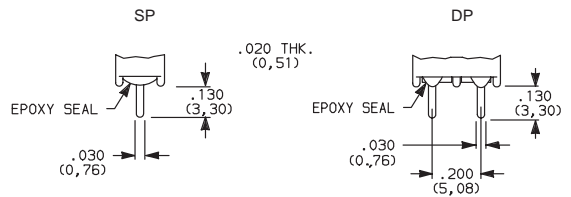
F1 bushing is not UL approved



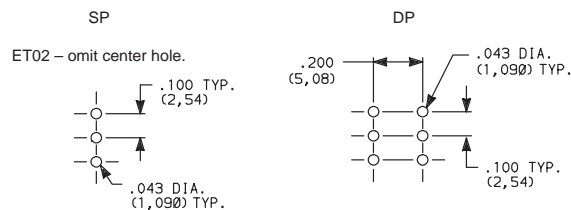
**NOTE:** ESD protection depends on proper grounding of switch support bracket. F1 conductive bushing option is impregnated with carbon fibers; dissipates electrostatic discharge (ESD) up to 20,000 V from actuator to ground. Available with all metal actuator options and A, AV, AV3, V3 and V31 termination options only. Internal actuator o-ring seal standard.

## TERMINATIONS

**C** PC THRU-HOLE



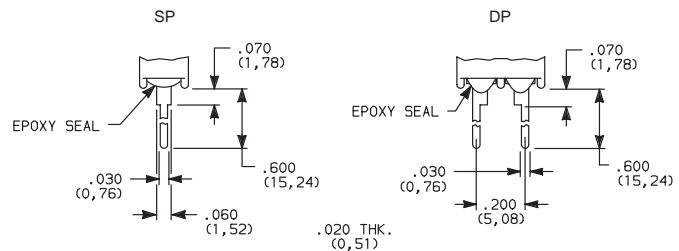
PC MOUNTING



SP and DP

Not available with F1 conductive bushing.

**W** WIRE WRAP



SP and DP

Not available with F1 conductive bushing.



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



Toggle  
F

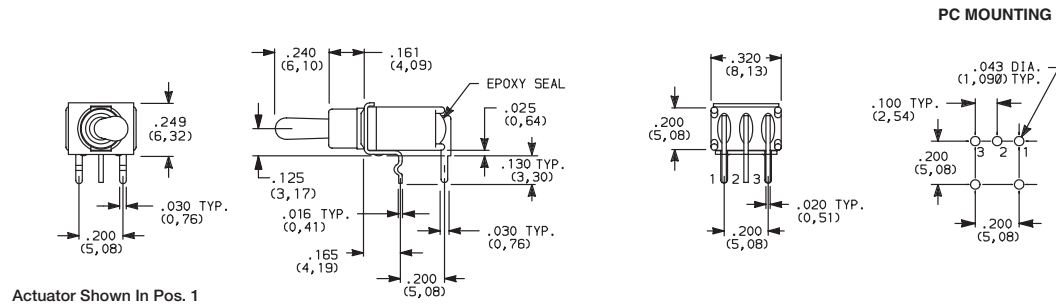


# ET Series Sealed Subminiature Toggle Switches

## TERMINATIONS

**A** RIGHT ANGLE, PC THRU-HOLE

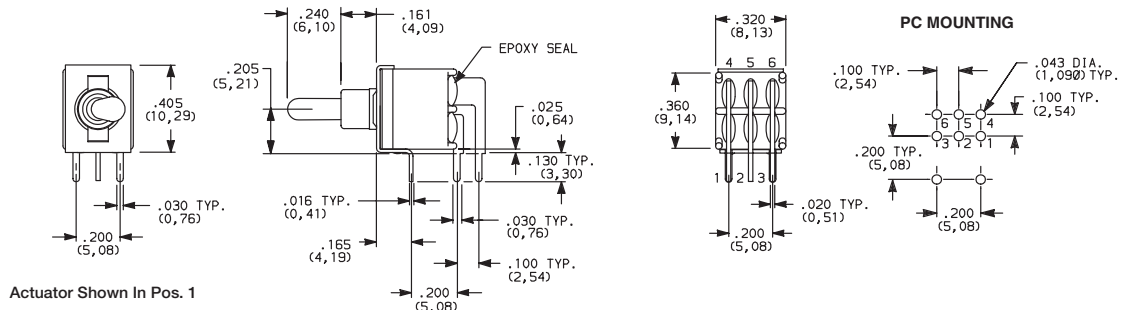
ET01MD1ABE  
Horizontal Actuation  
SPDT



Not available with ET02 model.

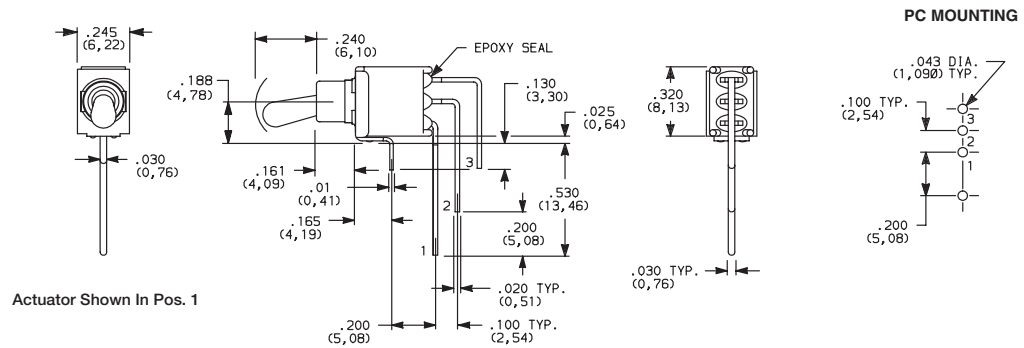
**A** RIGHT ANGLE, PC THRU-HOLE

ET21MD1ABE  
Horizontal Actuation  
DPDT



**AV** VERTICAL RIGHT ANGLE, PC THRU-HOLE

ET01MD1AVBE  
Vertical Actuation  
SPDT

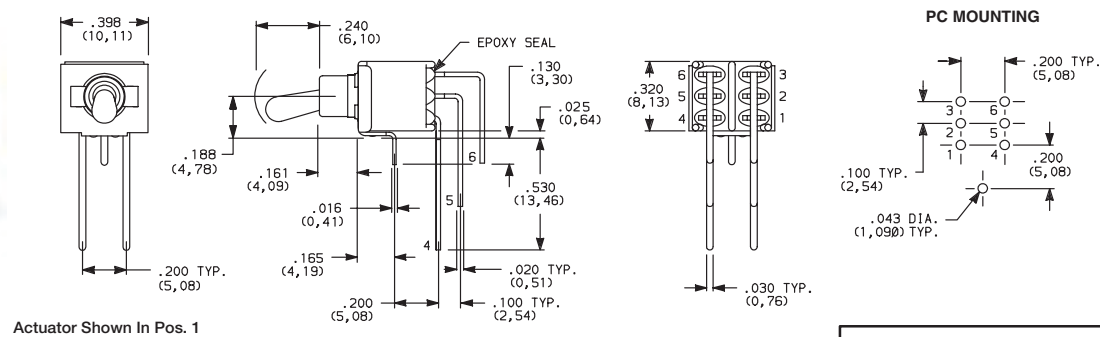


ET02 - omit terminal 2.

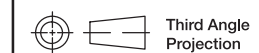
NOTE: Terminal bend radii and lead-in manufacturing option.

**AV** VERTICAL RIGHT ANGLE, PC THRU-HOLE

ET21MD1AVBE  
Vertical Actuation  
DPDT



NOTE: Terminal bend radii and lead-in manufacturing option.



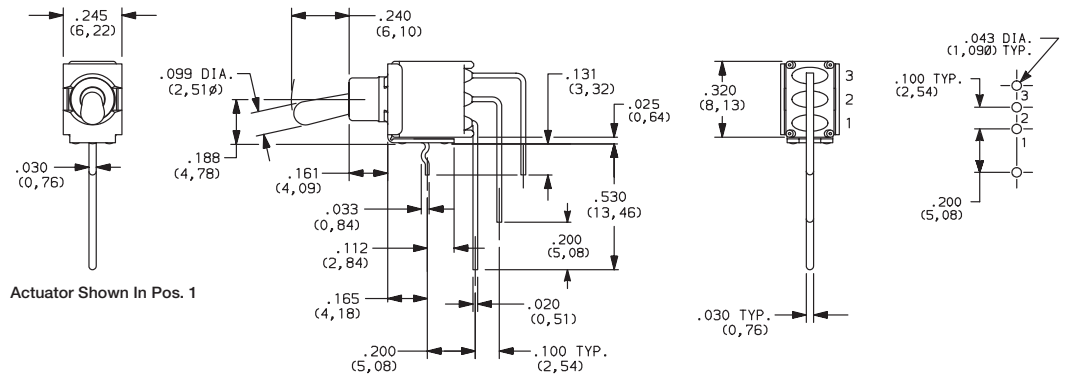
Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

**C&K**

# ET Series Sealed Subminiature Toggle Switches

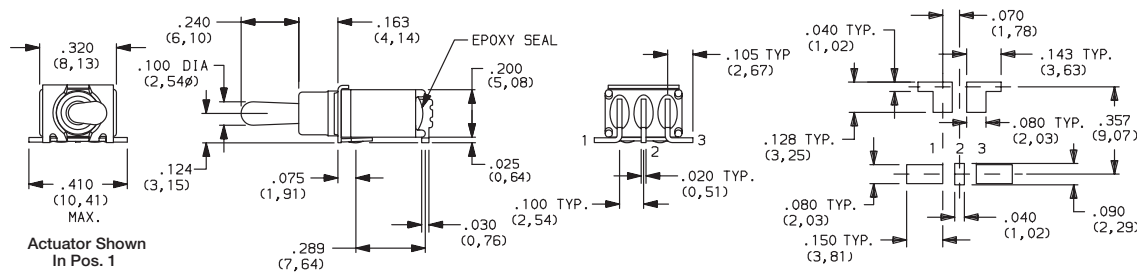
## TERMINATIONS

### AV3 VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE



ET01SD1AV2BE  
Vertical Actuation  
SPDT

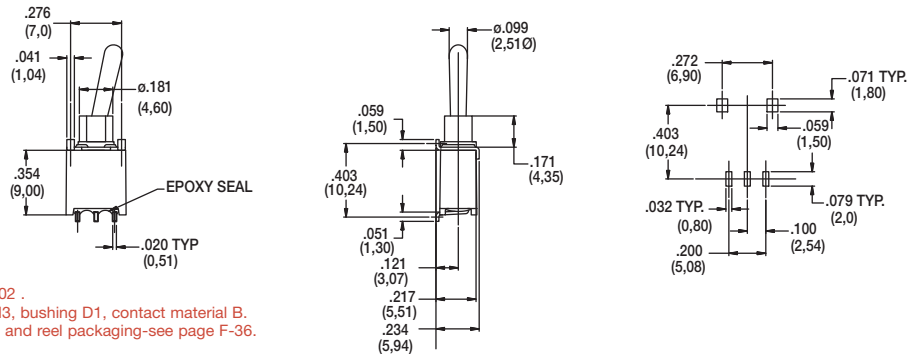
### SA RIGHT ANGLE, SURFACE MOUNT



ET01M3D1SAPE  
Horizontal Actuation  
SPDT Only

Not available with S and S1 actuators. Standard with tape & reel packaging. See page F-36.

### SA1 RIGHT ANGLE, SURFACE MOUNT

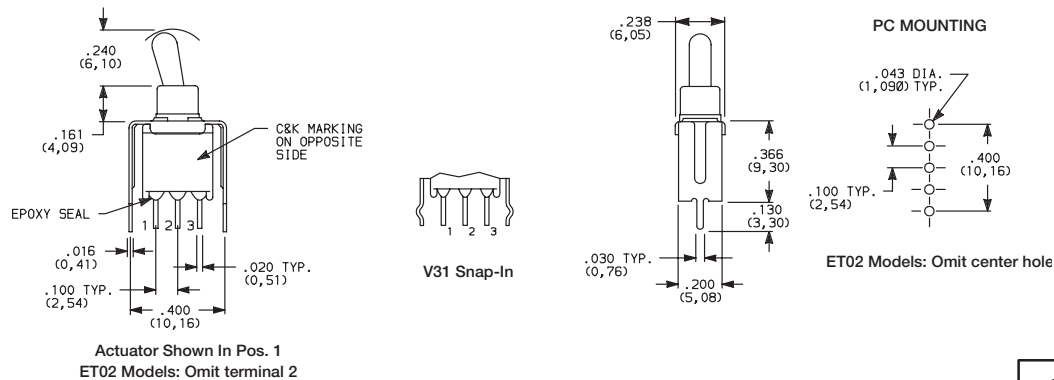


ET01M3D1SA1BE  
Horizontal Actuation  
SPDT Only

Not available in ET02.  
Actuators M and M3, bushing D1, contact material B.  
Standard with tape and reel packaging-see page F-36.

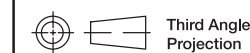
### V3 VERTICAL MOUNT, V-BRACKET

### V31 VERTICAL MOUNT, V-BRACKET, SNAP-IN



ET01MD1V3BE  
SPDT

Toggle  
F



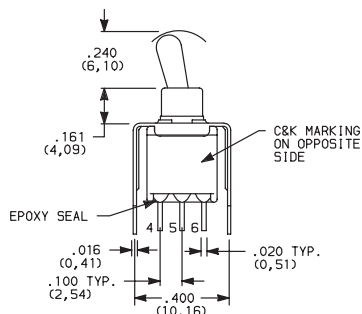
Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



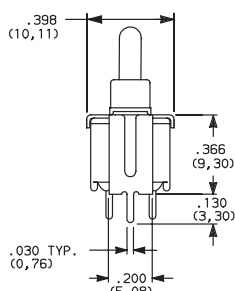
# ET Series Sealed Subminiature Toggle Switches

## TERMINATIONS

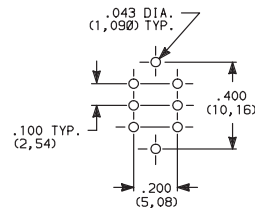
### V3 VERTICAL MOUNT, V-BRACKET



Actuator Shown In Pos. 1



### PC MOUNTING



ET21MD1V3BE  
DPDT

## CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
<b>B</b>	GOLD <sup>1</sup>	GOLD <sup>1</sup>	LOW LEVEL/DRY CIRCUIT	0.4 VA MAX. @ 20 V AC OR DC MAX.
<b>P</b>		MATTE-TIN <sup>6</sup>		
<b>Q</b>	SILVER <sup>4,5</sup>	SILVER <sup>5</sup>	POWER	ETX1 MODELS: 3 AMPS @ 120 V AC OR 28 V DC ALL OTHER MODELS: 2 AMPS @ 120 V AC OR 28 V DC
<b>S</b>		MATTE-TIN <sup>6</sup>		
<b>G</b>	GOLD OVER SILVER <sup>2,3</sup>	GOLD <sup>3</sup>	LOW LEVEL/DRY CIRCUIT OR POWER	ETX1 MODELS: 0.4 VA MAX. @ 20 V AC OR DC MAX. OR 3 AMPS @ 120 V AC OR 28 V DC ALL OTHER MODELS: 0.4 VA MAX. @ 20 V AC OR DC MAX. OR 2 AMPS @ 120 V AC OR 28 V DC
<b>R</b>		MATTE-TIN <sup>6</sup>		

\* Note: See Technical Data section of this catalog for RoHS compliant and compatible definitions and specifications.

<sup>1</sup> CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.

<sup>2</sup> END CONTACTS: Coin silver, with gold plate over nickel plate.


<sup>3</sup> CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.

<sup>4</sup> END CONTACTS: Coin silver, silver plated.

<sup>5</sup> CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.

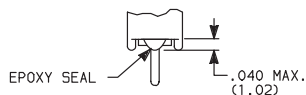
<sup>6</sup> TERMINALS: Copper alloy, with matte tin over nickel plate.

**NOTE:** Any models supplied with Q, B, G, P or R contact material are RoHS compliant.

All models  with all options (except M3 actuator) when ordered with G, L, R or Q contact material except with F1 conductive bushing.

## SEAL

### E EPOXY SEAL



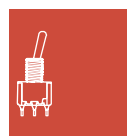
## AVAILABLE HARDWARE

### Cap

#### PART NO.

706201000 WHITE  
706202000 BLACK  
706203000 RED

Material: Vinyl  
Finish: Matte



F

Toggle

**NOTE:** Other colors available, consult Customer Service Center.



Third Angle  
Projection

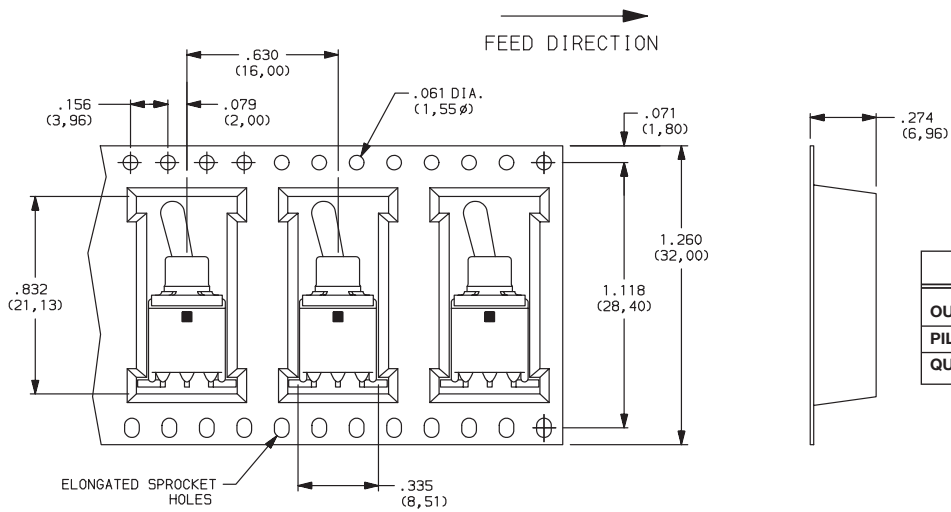
Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



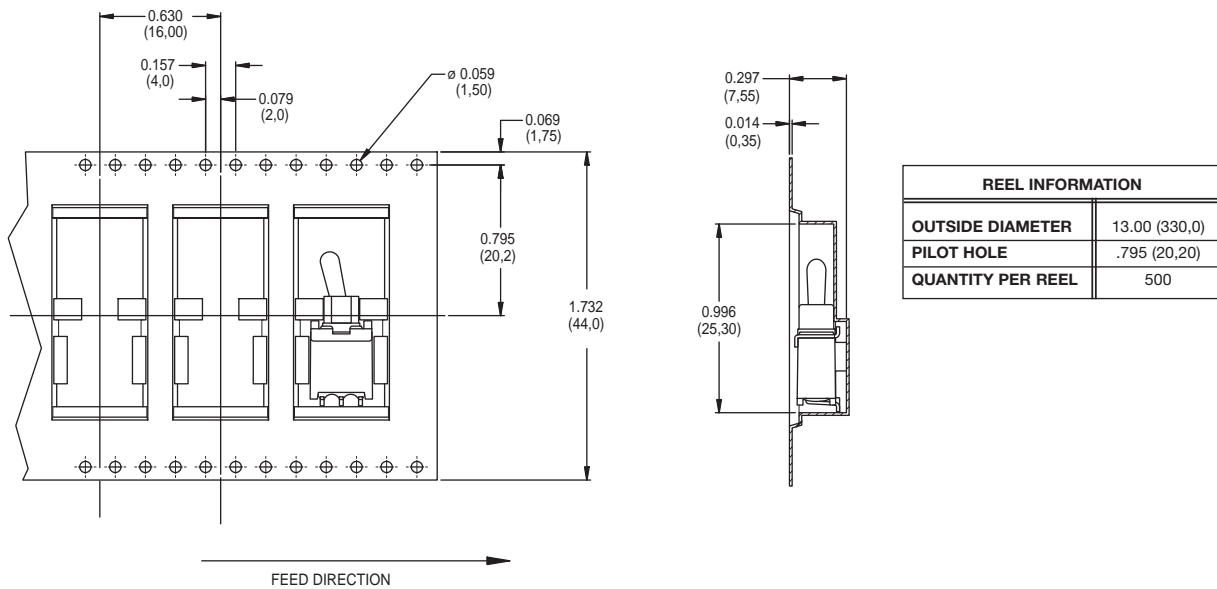
# ET Series Sealed Subminiature Toggle Switches

## TAPE & REEL

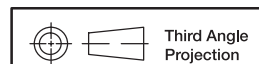
For part number ET01M3D1SAKE



For part number ET01M3D1SA1BE



Toggle



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

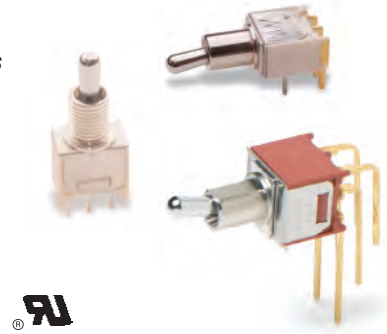
# T Series Subminiature Toggle Switches

## Features/Benefits

- Compact size—small footprint
- Single and double pole models
- PC and panel mount options available
- RoHS compliant models available

## Typical Applications

- Hand-held telecommunications
- Instrumentation
- Medical equipment



## Specifications

**CONTACT RATING:** B contact material: 0.4 VA max. @ 20 V AC or DC max. Q contact material (TX01 models): 3 AMPS @ 120 V AC or 28 V DC. All other models: 2 AMPS @ 120 V AC or 28 V DC. See page F-42 for additional ratings.

**ELECTRICAL LIFE:** TX01 models: 60,000 make-and-break cycles at full load. All other models: 30,000 cycles.

**CONTACT RESISTANCE:** Below 20 m Ω typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

**INSULATION RESISTANCE:** 10<sup>9</sup> Ω min.

**DIELECTRIC STRENGTH:** 1000 Vrms min. @ sea level.

**OPERATING TEMPERATURE:** -30°C to 85°C.

**SOLDERABILITY:** Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

**NOTE:** Any models supplied with P, R, Q, B or G contact material are RoHS compliant and compatible.

**NOTE:** Specifications and materials listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

## Materials

**CASE:** Glass filled nylon 6/6, flame retardant, heat stabilized or diallyl phthalate (DAP), (UL 94V-0) or glass filled nylon 4/6, flame retardant, heat stabilized.

**ACTUATOR:** Brass, chrome plated.

**BUSHING:** Brass, nickel plated.

**HOUSING:** Stainless steel.

**SWITCH SUPPORT:** Brass, matte-tin plated.

**END CONTACTS:** B contact material: Copper alloy, with gold plate over nickel plate. Q contact material: Coin silver, silver plated. See above for additional contact materials.

**CENTER CONTACTS & TERMINALS:** B contact material: Copper alloy, with gold plate over nickel plate. Q contact material: Copper alloy, silver plated. See page F-42 for additional contact materials.

**TERMINAL SEAL:** Epoxy.

**HARDWARE:** Nut & Locking Ring: Brass, nickel plated.

Lockwasher: Steel, nickel plated. Additional hardware available separately, see Section N.

## Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages F-38 thru F-42. For additional options not shown in catalog, consult Customer Service Center. All models have epoxy terminal seal and are compatible with all "bottom-wash" PCB cleaning methods.

### Switch Function

- T101** SPDT On-None-On
- T102** SPDT Off-None-On
- T103** SPDT On-Off-On
- T105** SPDT Mom.-Off-Mom.
- T107** SPDT On-Off-Mom.
- T108** SPDT On-None-Mom.
- T201** DPDT On-None-On
- T203** DPDT On-Off-On
- T205** DPDT Mom.-Off-Mom.
- T207** DPDT On-Off-Mom.
- T208** DPDT On-None-Mom.
- T211** DPDT On-On-On.

### Actuator

- P3** Flatted, anti-rotation, .490" high
- S** .370" high
- K** Locking lever, round tip
- L1** .640" high
- M1** .220" high
- S1** .410" high
- M** .210" high
- L** .290" high

### Bushing

- H** .220" high, threaded, flat
- H9** .220" high, unthreaded, flat
- CF** Splashproof, .310" high, threaded, flat
- D9** .260" high, unthreaded, keyway
- T** .310" high, threaded, flat
- T9** .310" high, unthreaded, flat
- TD** .260" high, threaded, keyway
- TK** .310" high, threaded, keyway
- Y** .220" high, threaded, keyway
- Y9** .220" high, unthreaded, keyway

### Terminations

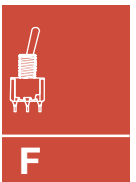
- A** Right angle, PC thru-hole
- AV** Vertical right angle, PC thru-hole
- C** PC Thru-hole
- V3** Vertical mount V-bracket
- Z** Solder lug
- W** Wire wrap

### Contact Material

- B** Gold
- P** Gold, matte tin
- Q** Silver
- G** Gold over silver
- R** Gold over silver, matte-tin

### Seal

- E** Epoxy



Toggle



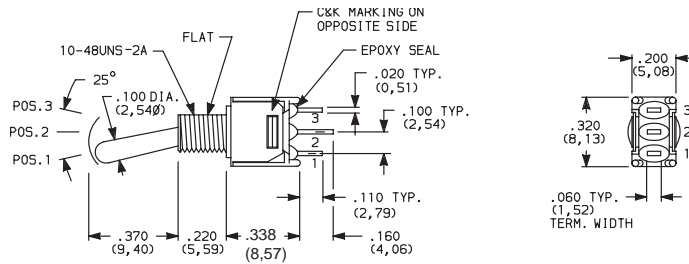
Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

# T Series Subminiature Toggle Switches

## SWITCH FUNCTION

NO. POLES	MODEL NO.	SWITCH FUNCTION			CONNECTED TERMINALS			SCHEMATIC
		POS. 1	POS. 2	POS. 3	POS. 1	POS. 2	POS. 3	
SP	<b>T101</b>	ON	NONE	ON	2-3	N/A	2-1	
	<b>T103</b>	ON	OFF	ON	2-3	OPEN	2-1	
	<b>T105</b>	MOM.	OFF	MOM.				
	<b>T107</b>	ON	OFF	MOM.				
	<b>T108</b>	ON	NONE	MOM.				
	<b>T102</b>	OFF	NONE	ON	OPEN	N/A	3-1	

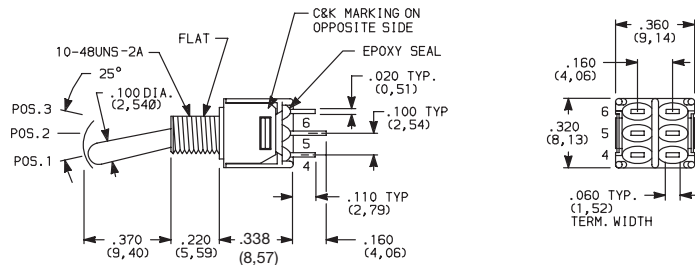
### SPDT



Part number shown: T101SHZQE

NO. POLES	MODEL NO.	SWITCH FUNCTION			CONNECTED TERMINALS			SCHEMATIC
		POS. 1	POS. 2	POS. 3	POS. 1	POS. 2	POS. 3	
DP	<b>T201</b>	ON	NONE	ON	2-3,5-6	N/A	2-1,5-4	
	<b>T203</b>	ON	OFF	ON	2-3,5-6	OPEN	2-1,5-4	
	<b>T205</b>	MOM.	OFF	MOM.				
	<b>T208</b>	ON	NONE	MOM.				
	<b>T211*</b>	ON	ON	ON.				

### DPDT



Terminal Nos.  
For Reference Only

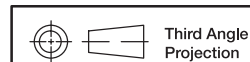
Part number shown: T201SHZQE

MOM. = Momentary

\* Wiring for 3-way switch refer to page N-10

All models with all options when ordered with G, L, R or Q contact material.

Toggle

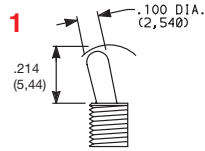


Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

# T Series Subminiature Toggle Switches

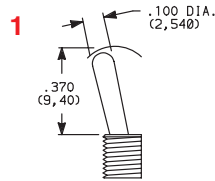
## ACTUATOR

**M** .210" HIGH



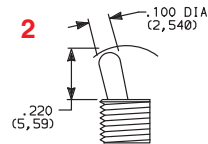
Standard with A, AV or V3 terminations.

**S** .370" HIGH

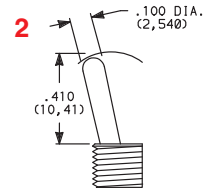


Standard with Z, C or W terminations.

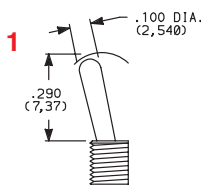
**M1** .220" HIGH (with "T" bushing)



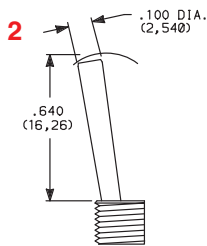
**S1** .410" HIGH (with "T" bushing)



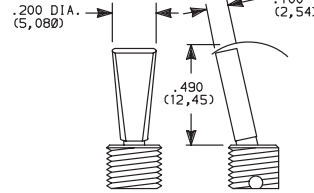
**L** .290" HIGH



**L1** .640" HIGH



**P3** ANTI-ROTATION, FLATTED, .450" HIGH

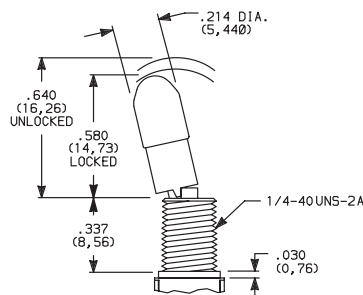


Available with T & T9 bushings only. Dress nut part number 709901201 supplied standard with threaded bushing.

1 Actuator shown with standard H bushing. Subtract .040 (1,02) for TD and D9 bushings, subtract .090 (2,29) for T, T9, TK, K9 & CF bushings.  
2 Actuators shown with T, T9, TK & CF bushings, add .050 (1,27) for TD and D9 bushings, add .090 (2,29) for H, H9, Y & Y9 bushings.  
All actuators have chrome finish (except K).

**K** LOCKING LEVER

### Locking Positions



-01 & -02 Models  
2 Position lock



-03 & -11 Models  
3 Position lock



-08 Models  
1 Position lock

K actuators have natural aluminum finish.

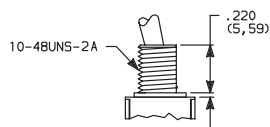
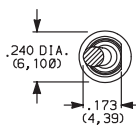
Not available with CF bushing option.

Bushing option code not required. Not available with TX05 & TX07 models.

Keyway on right side. To prevent accidental actuation, toggles must be lifted before being actuated. When released, toggles again lock in place. Overtightening mounting nut may cause actuator to bind.

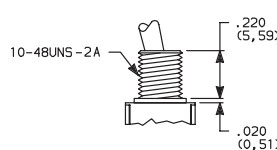
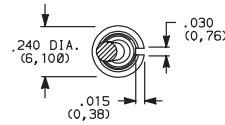
## BUSHING

**H** .220" HIGH THREADED, FLAT

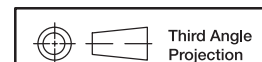
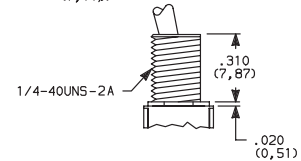
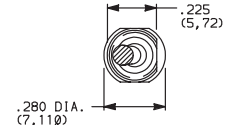


H standard with C, W & Z terminations.  
H9 standard with A, AV & V3 terminations.

**Y** .220" HIGH THREADED, KEYWAY



**T** .310" HIGH THREADED, FLAT



Third Angle Projection

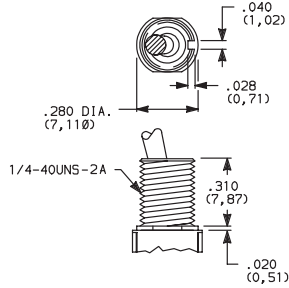
Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



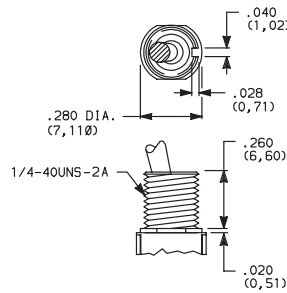
# T Series Subminiature Toggle Switches

## BUSHING

**TK** .310" HIGH THREADED, KEYWAY

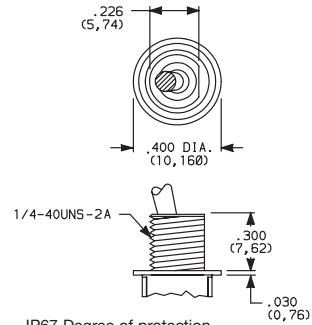


**TD** .260" HIGH THREADED, KEYWAY



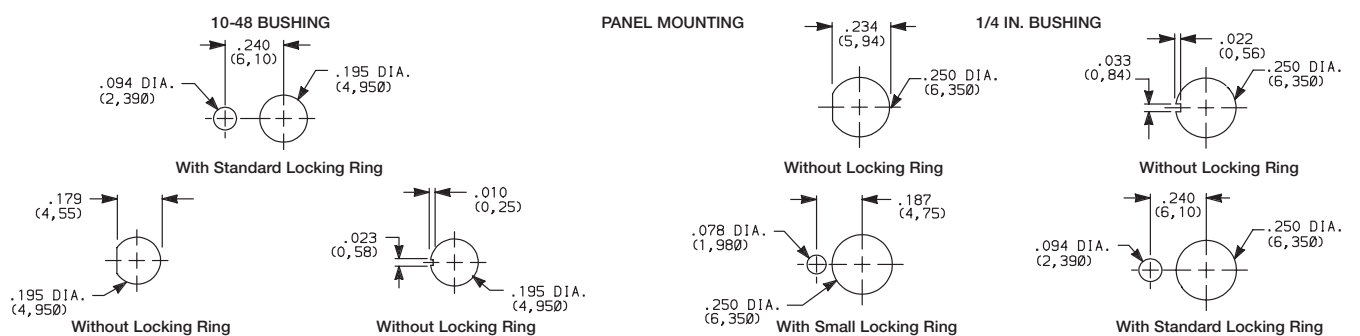
**D9** .260" HIGH UNTHREADED, KEYWAY

**CF** SPLASHPROOF, .310" HIGH THREADED, FLAT



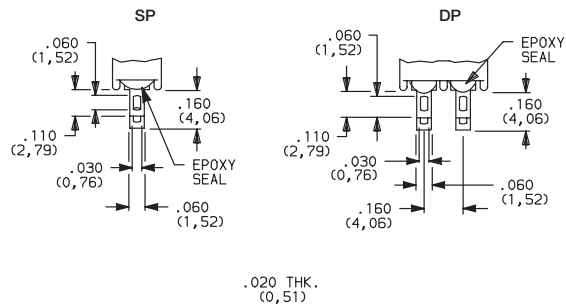
IP67 Degree of protection.  
Internal o-ring actuator seal and external bushing seal washer standard.

Not available with K locking lever option.



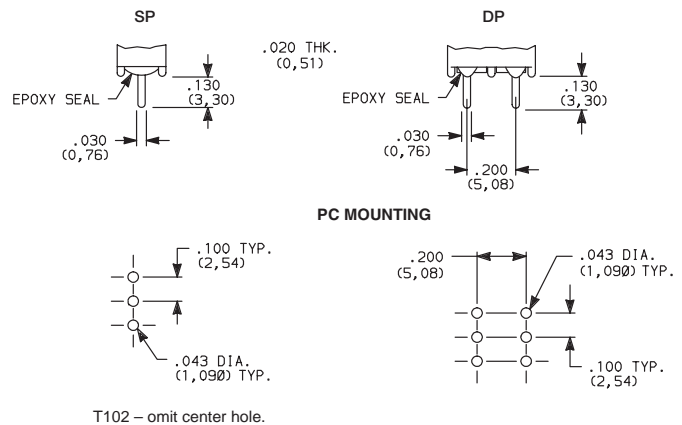
## TERMINATIONS

**Z** SOLDER LUG



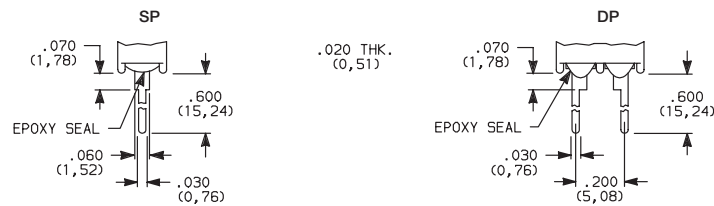
Not available with P or R contact materials.

**C** PC THRU-HOLE



T102 - omit center hole.

**W** WIRE WRAP



Third Angle  
Projection

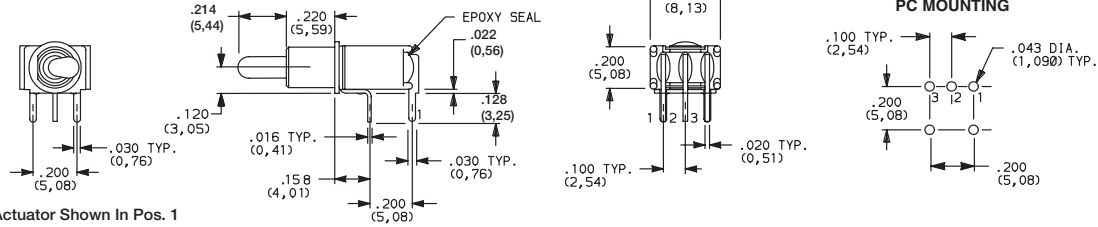
Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

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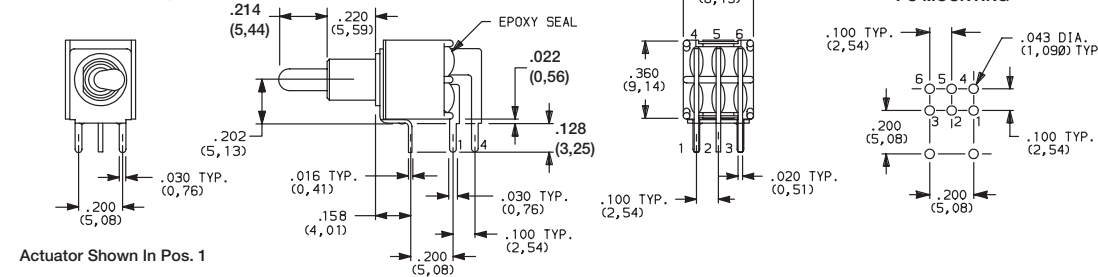
# T Series Subminiature Toggle Switches

## TERMINATIONS

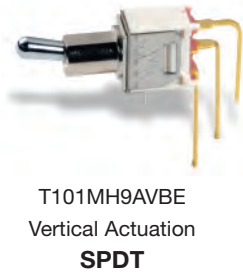
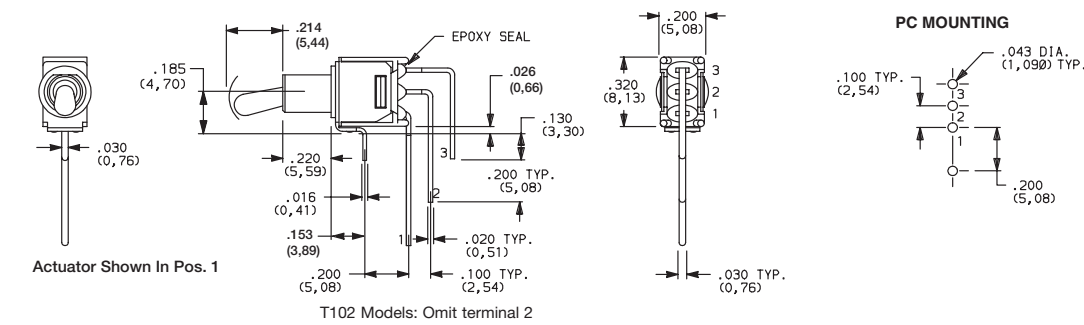
### A RIGHT ANGLE, PC THRU-HOLE



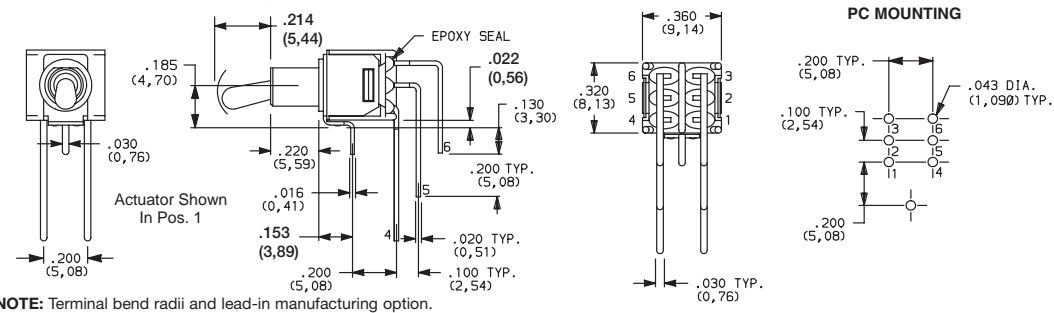
### A RIGHT ANGLE, PC THRU-HOLE



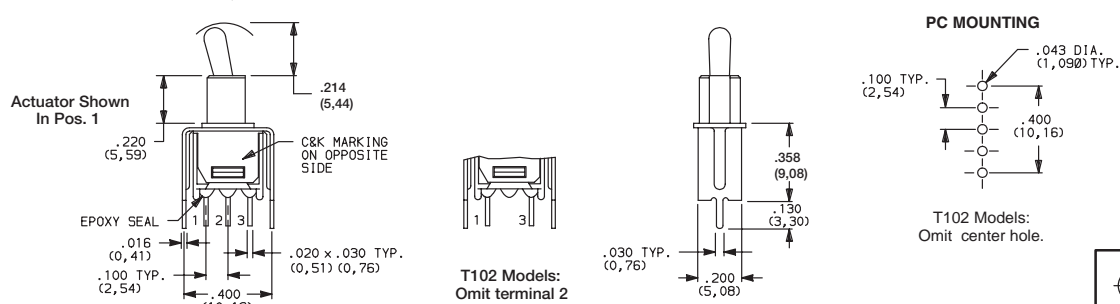
### AV VERTICAL RIGHT ANGLE, PC THRU-HOLE



### AV VERTICAL RIGHT ANGLE, PC THRU-HOLE



### V3 VERTICAL MOUNT, V-BRACKET



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



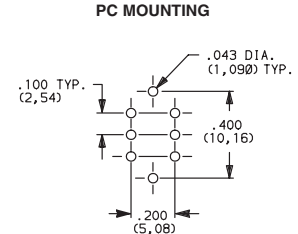
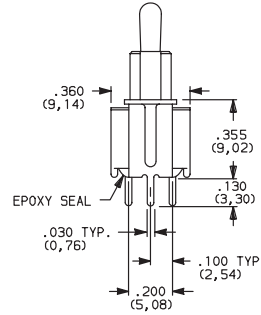
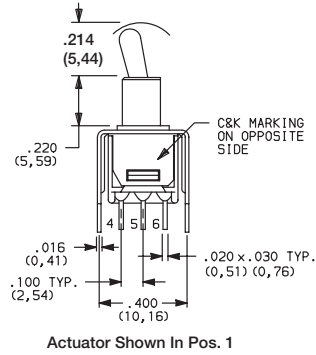
# T Series Subminiature Toggle Switches

## TERMINATIONS

**V3** VERTICAL MOUNT, V-BRACKET



T201MH9V3BE  
DPDT



## CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
<b>B</b>	GOLD <sup>1</sup>	GOLD <sup>1</sup>	LOW LEVEL/ DRY CIRCUIT	0.4 VA MAX. @ 20 V AC OR DC MAX.
<b>P</b>		MATTE-TIN <sup>6</sup>		
<b>Q</b>	SILVER <sup>4,5</sup>	SILVER <sup>5</sup>	POWER	TX01 MODELS: 3 AMPS @ 120 V AC OR 28 V DC. ALL OTHER MODELS: 2 AMPS @ 120 V AC OR 28 V DC.
<b>G</b>	GOLD OVER SILVER <sup>2,3</sup>	GOLD <sup>3</sup>	LOW LEVEL/DRY CIRCUIT OR POWER	TX01 MODELS: 0.4 VA MAX @ 20 V AC OR DC MAX. OR 3 AMPS @ 120 V AC OR 28 V DC. ALL OTHER MODELS: 0.4 VA MAX @ 20 V AC OR DC MAX. OR 2 AMPS @ 120 V AC OR 28 V DC.
<b>R</b>		MATTE-TIN <sup>6</sup>		

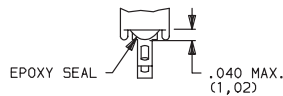
\* Note: See Technical Data section of this catalog for RoHS compliant and compatible definitions and specifications.

- <sup>1</sup> CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>2</sup> END CONTACTS: Coin silver, with gold plate over nickel plate.
- <sup>3</sup> CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>4</sup> END CONTACTS: Coin silver, silver plated.
- <sup>5</sup> CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
- <sup>6</sup> TERMINALS: Copper alloy, with matte-tin over nickel plate.

All models with all options when ordered with R, G, or Q contact material.  
B contact material standard with A, AV, V3 & W terminations.  
Q contact material standard with C & Z terminations.

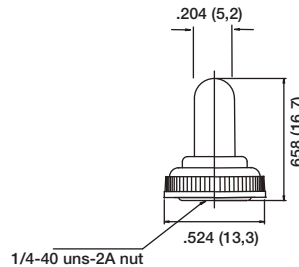
## SEAL

**E** EPOXY SEAL



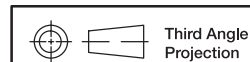
## AVAILABLE HARDWARE

**759D02000** SEALING BOOT



\* Note: For use with S1 actuator style when combined with T, TK, and CF bushings.

Toggle



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



# GT Series Sealed Ultraminiature Toggle Switches

## Features/Benefits

- Sealed against solder and cleaning process contaminants
- Ultraminiature size, smallest footprint available
- Thru-hole and surface mount models
- High temperature materials (UL 94V-0)
- RoHS compliant and compatible

## Typical Applications

- Hand-held telecommunications
- Small instrumentation



## Specifications

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max.  
 MECHANICAL & ELECTRICAL LIFE: 40,000 make-and-break cycles at full load.  
 CONTACT RESISTANCE: Below 50 m Ω typ. initial @ 2-4 V DC, 100 mA.  
 INSULATION RESISTANCE: 10<sup>9</sup> Ω min.  
 DIELECTRIC STRENGTH: 500 Vrms min. @ sea level.  
 OPERATING TEMPERATURE: -30°C to 85°C.  
 SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).  
 PACKAGING: Surface mount switches shipped in anti-static tape and reel packaging per EIA 481-3, see page F-47 for drawings and reel information. Tape and cover strip are conductive for use near statically sensitive components, consult Customer Service Center.

## Materials

HOUSING AND BASE: Glass filled nylon 4/6, flame retardant, heat stabilized (UL 94V-0).  
 ACTUATOR: Glass filled nylon 4/6, flame retardant, heat stabilized (UL 94V-0), with standard internal o-ring seal.  
 SWITCH SUPPORT: Brass, tin plated.  
 MOVABLE CONTACTS: Copper alloy, with gold plate over nickel plate.  
 STATIONARY CONTACTS: Copper alloy, with gold plate over nickel plate.  
 TERMINALS: Gold.  
 TERMINAL SEAL: Epoxy. All terminals insert molded.

**NOTE:** Specifications and materials listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

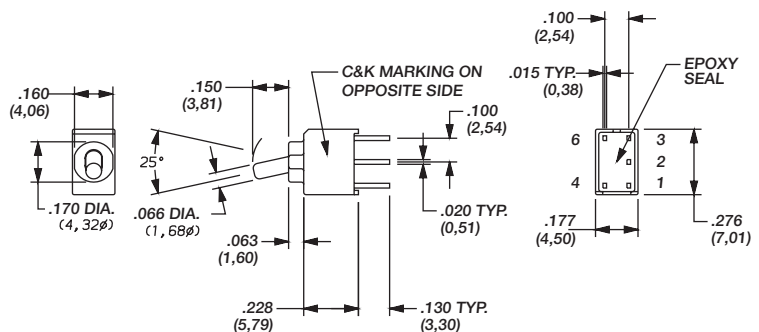
## How To Order

Complete part numbers for GT Series Sealed Ultraminiature Toggle Switches are shown on pages F-43 thru F-47.

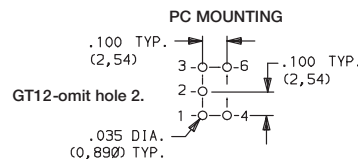


GT11MCBE  
SPDT

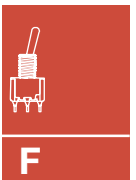
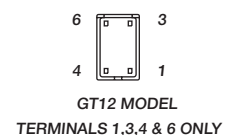
PART NUMBER	SWITCH FUNCTION		
	POS. 1	POS. 2	POS. 3
<b>GT11MCBE</b>	ON	NONE	ON
<b>GT13MCBE</b>	ON	OFF	ON
Conn. Terms.	2-3	OPEN	2-1
Schematic			
SPDT	Note: Pins 4 and 6 not connected		
<b>GT12MCBE</b>	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1
Schematic			
SPST	Note: Pins 4 and 6 not connected		



ACTUATOR SHOWN IN POS. 1



TERMINAL NOS. FOR  
REFERENCE ONLY

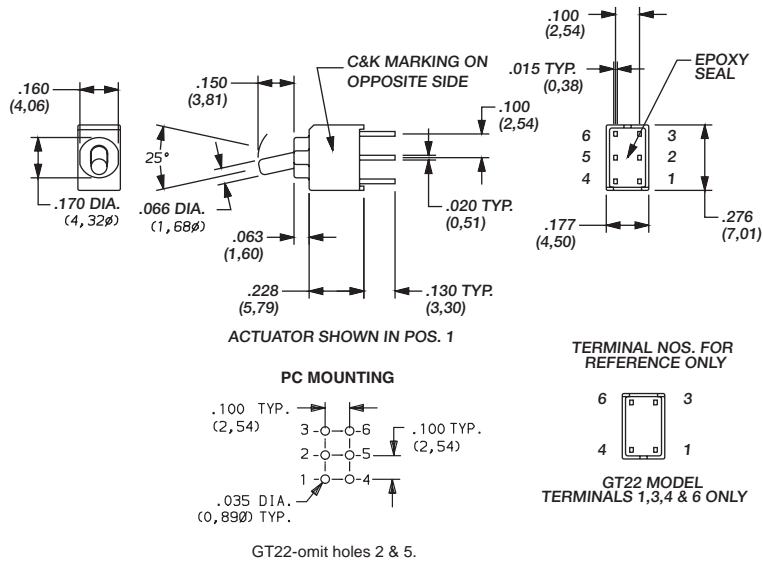


Toggle

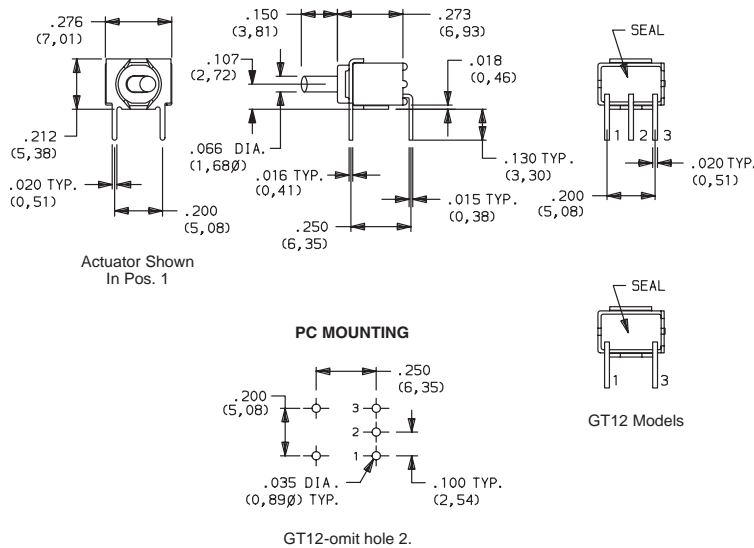


Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

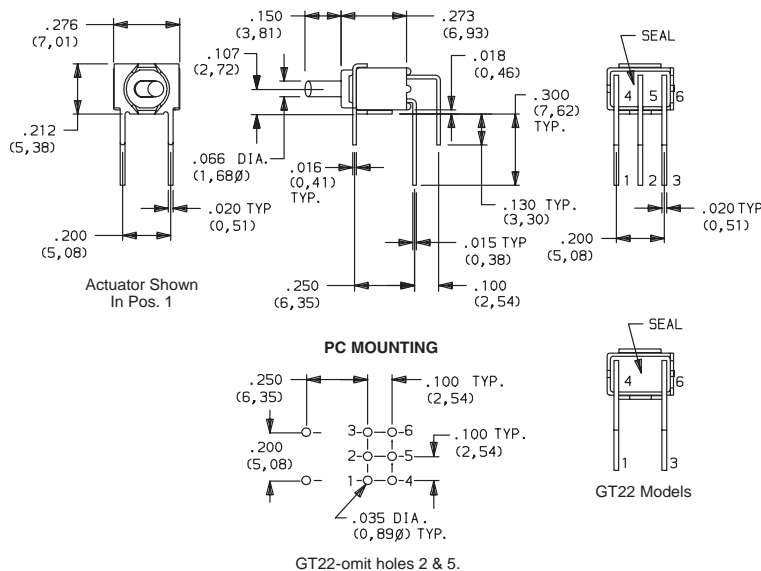
# GT Series Sealed Ultraminiature Toggle Switches



PART NUMBER	SWITCH FUNCTION		
	POS. 1	POS. 2	POS. 3
<b>GT21MCBE</b> <b>GT23MCBE</b>	ON	NONE	ON
Conn. Terms.	2-3, 5-6	OPEN	2-1, 5-4
Schematic			
DPDT			
<b>GT22MCBE</b>	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1
Schematic			
DPST			



PART NUMBER	SWITCH FUNCTION		
	POS. 1	POS. 2	POS. 3
<b>GT11MABE</b> <b>GT13MABE</b>	ON	NONE	ON
Conn. Terms.	2-3	OPEN	2-1
Schematic			
SPDT			
<b>GT12MABE</b>	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1
Schematic			
SPST			



PART NUMBER	SWITCH FUNCTION		
	POS. 1	POS. 2	POS. 3
<b>GT21MABE</b> <b>GT23MABE</b>	ON	NONE	ON
Conn. Terms.	2-3, 5-6	OPEN	2-1, 5-4
Schematic			
DPDT			
<b>GT22MABE</b>	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1, 6-4
Schematic			
DPST			



**Toggle**

**F**



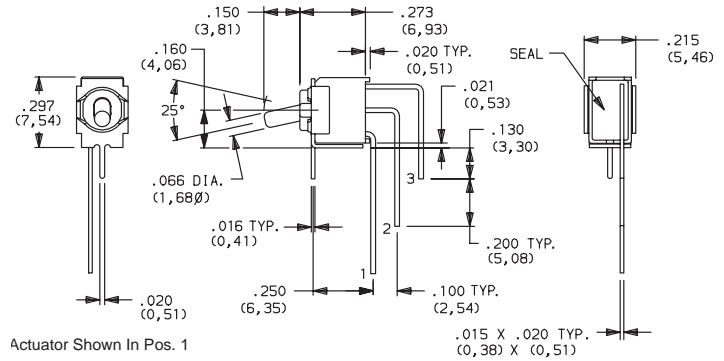
Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

# GT Series Sealed Ultraminiature Toggle Switches



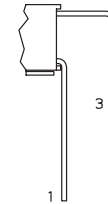
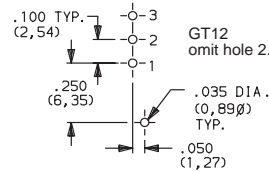
GT11MAVBE  
Vertical  
Actuation  
SPDT

PART NUMBER	SWITCH FUNCTION		
	POS.1	POS. 2	POS. 3
<b>GT11MAVBE</b>	ON	NONE	ON
<b>GT13MAVBE</b>	ON	OFF	ON
Conn. Terms.	2-3	OPEN	2-1
Schematic			
SPDT			
<b>GT12MAVBE</b>	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1
Schematic			
SPST			



Actuator Shown In Pos. 1

### PC MOUNTING

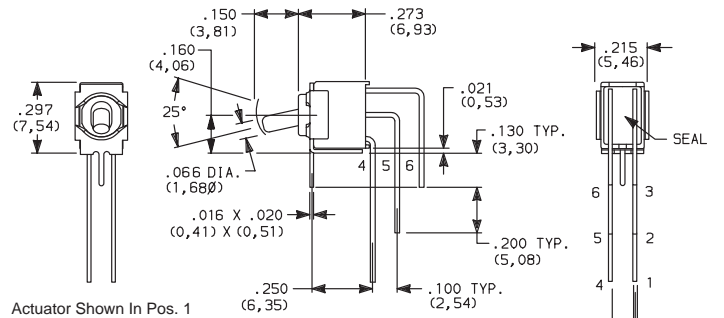


GT12 Models



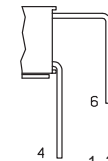
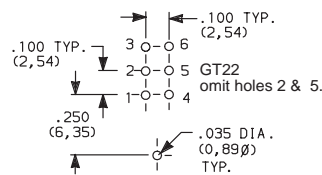
GT21MAVBE  
Vertical  
Actuation  
DPDT

PART NUMBER	SWITCH FUNCTION		
	POS.1	POS. 2	POS. 3
<b>GT21MAVBE</b>	ON	NONE	ON
<b>GT23MAVBE</b>	ON	OFF	ON
Conn. Terms.	2-3, 5-6	OPEN	2-1, 5-4
Schematic			
DPDT			
<b>GT22MAVBE</b>	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1, 6-4
Schematic			
DPST			



Actuator Shown In Pos. 1

### PC MOUNTING

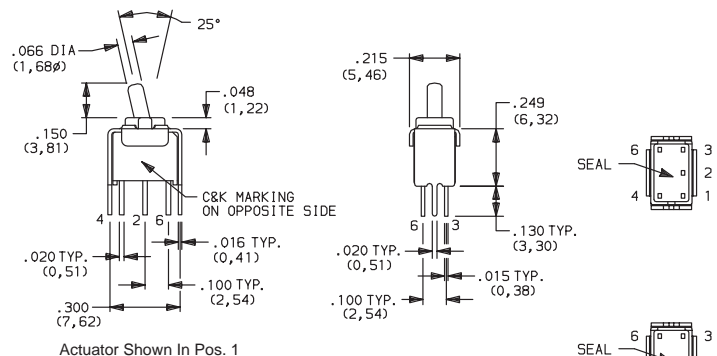


GT22 Models:  
1, 3, 4 & 6 terminals only.



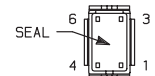
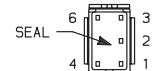
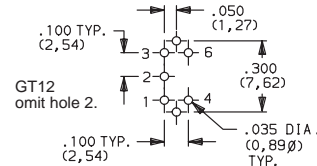
GT11MV3BE  
SPDT

PART NUMBER	SWITCH FUNCTION		
	POS.1	POS. 2	POS. 3
<b>GT11MV3BE</b>	ON	NONE	ON
<b>GT13MV3BE</b>	ON	OFF	ON
Conn. Terms.	2-3	OPEN	2-1
Schematic			
SPDT			
Note: Pins 4 and 6 not connected			
<b>GT12MV3BE</b>	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1
Schematic			
SPST			
Note: Pins 4 and 6 not connected			

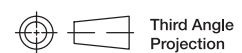


Actuator Shown In Pos. 1

### PC MOUNTING

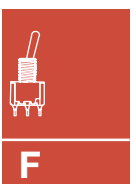


GT12 Models

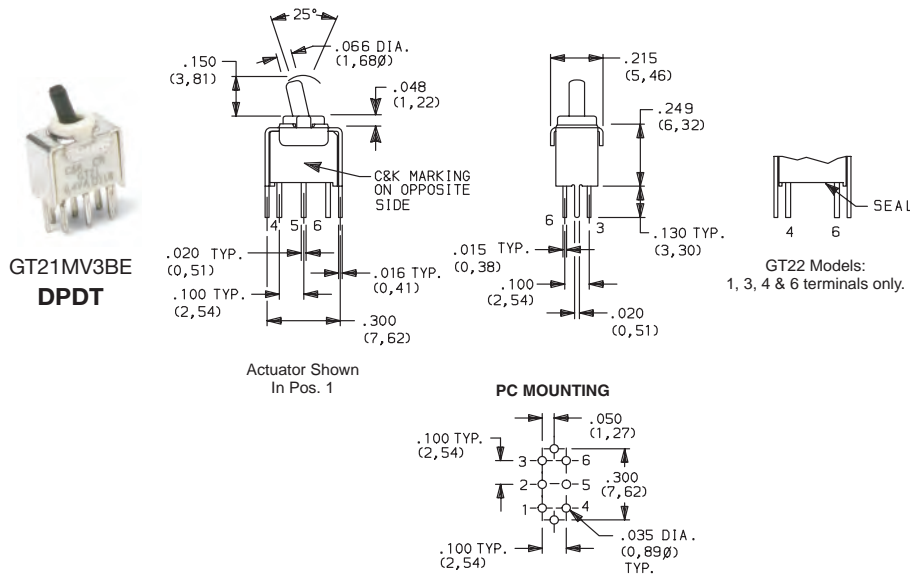


Third Angle  
Projection

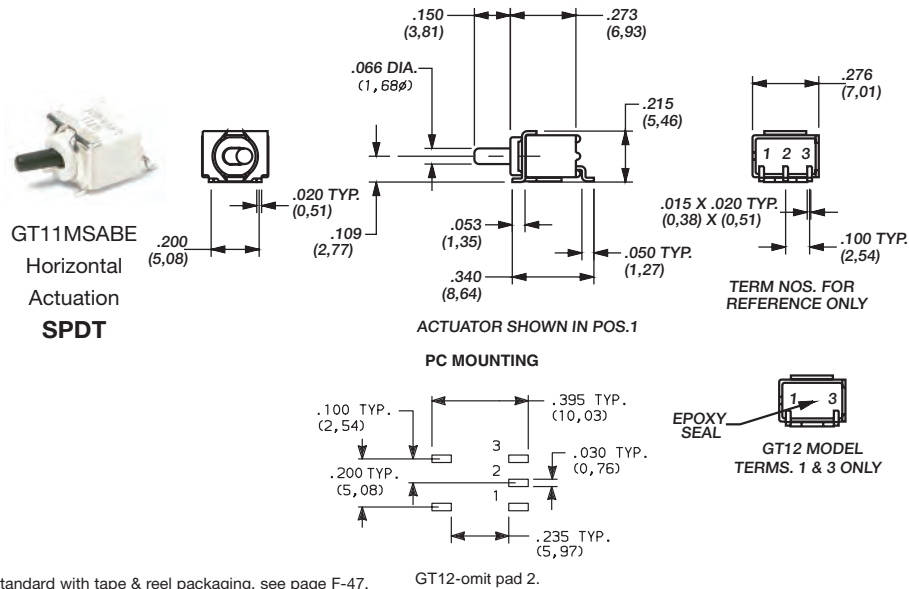
Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



# GT Series Sealed Ultraminiature Toggle Switches



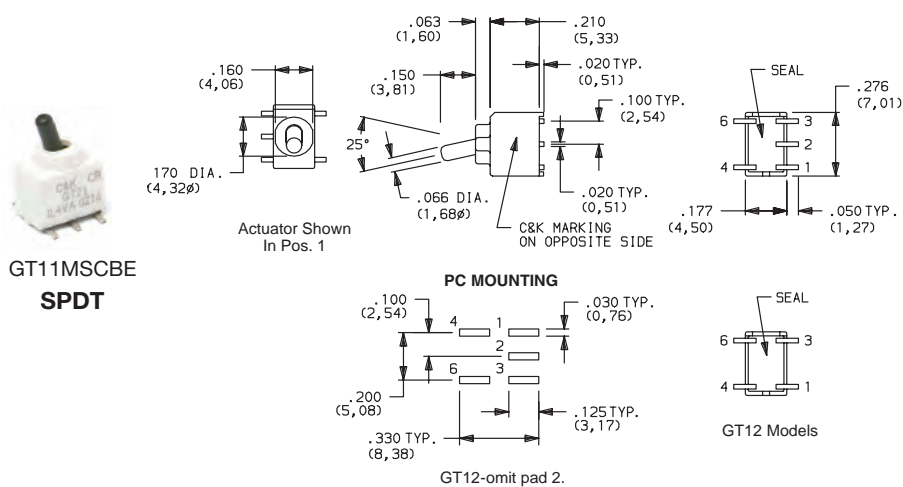
PART NUMBER	SWITCH FUNCTION		
	POS.1	POS. 2	POS. 3
GT21MV3BE GT23MV3BE	ON ON	NONE OFF	ON ON
Conn. Terms.	2-3, 5-6	OPEN	2-1, 5-4
Schematic			
DPDT			
GT22MV3BE	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1, 6-4
Schematic			
DPST			



PART NUMBER	SWITCH FUNCTION		
	POS.1	POS. 2	POS. 3
GT11MSABETR GT13MSABETR	ON ON	NONE OFF	ON ON
Conn. Terms.	2-3	OPEN	2-1
Schematic			
SPDT			
GT12MSABETR	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1
Schematic			
SPST			

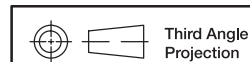
Standard with tape & reel packaging, see page F-47.

GT12-omit pad 2.



PART NUMBER	SWITCH FUNCTION		
	POS.1	POS. 2	POS. 3
GT11MSCBETR GT13MSCBETR	ON ON	NONE OFF	ON ON
Conn. Terms.	2-3	OPEN	2-1
Schematic			
SPDT	Note: Pins 4 and 6 not connected		
GT12MSCBETR	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1
Schematic			
SPST	Note: Pins 4 and 6 not connected		

Standard with tape & reel packaging, see page F-47.



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

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Toggle

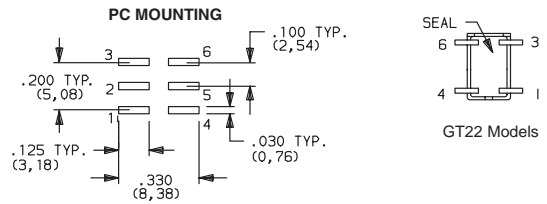
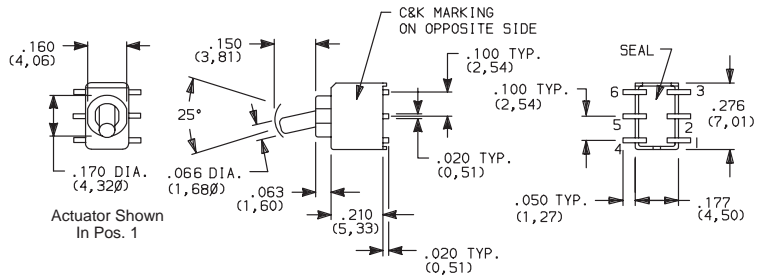


# GT Series Sealed Ultraminiature Toggle Switches



GT21MSCBE  
DPDT

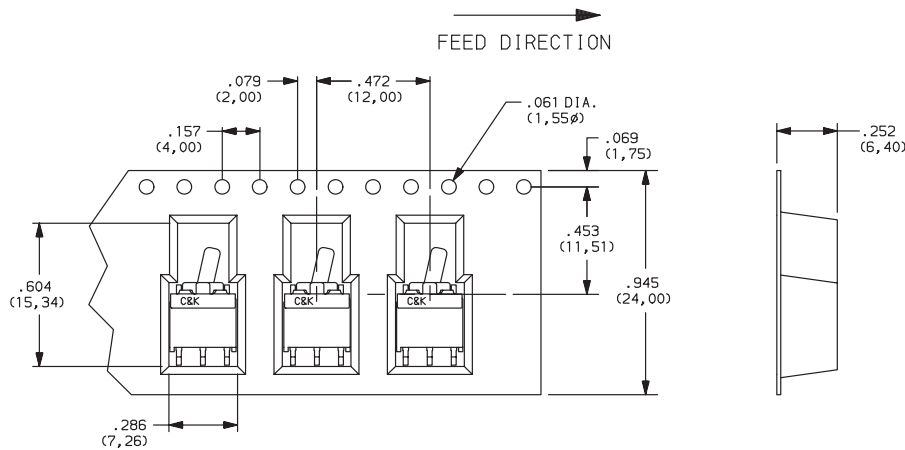
PART NUMBER	SWITCH FUNCTION		
	POS. 1	POS. 2	POS. 3
<b>GT21MSCBETR</b>	ON	NONE	ON
<b>GT23MSCBETR</b>	ON	OFF	ON
Conn. Terms.	2-3, 5-6	OPEN	2-1, 5-4
Schematic			
DPDT			
<b>GT22MSCBETR</b>	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1, 6-4
Schematic			
DPST			



GT22-omit pads 2 & 5.  
Standard with tape & reel packaging

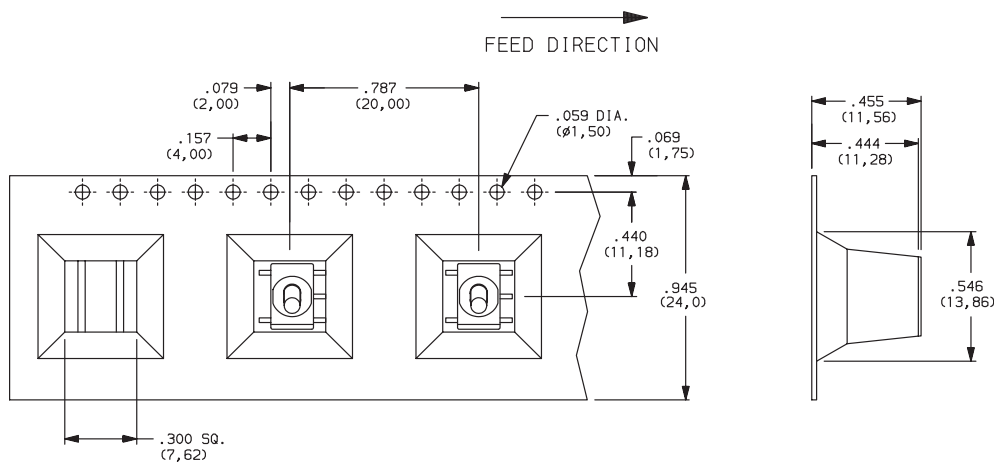
## TAPE & REEL

For part numbers GT11MSABE, GT12MSABE, GT13MSABE



REEL INFORMATION	
OUTSIDE DIAMETER	13.00 (330,0)
PILOT HOLE	.512 (13,0)
QUANTITY PER REEL	600

For part numbers GT11MSCBE, GT12MSCBE, GT13MSCBE, GT21MSCBE, GT22MSCBE, GT23MSCBE,



REEL INFORMATION	
OUTSIDE DIAMETER	13.00 (330,0)
PILOT HOLE	.512 (13,0)
QUANTITY PER REEL	200

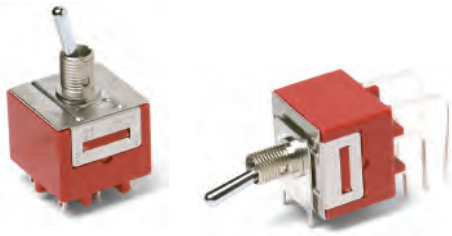


Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

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# 9000 Series Power Toggle Switches



## Features/Benefits

- Power ratings up to 10 AMPS
- Double pole models
- Locking lever options available
- Wide variety of actuator styles
- RoHS compliant and compatible

## Typical Applications

- Shut-off switch
- Small equipment



## Specifications

### CONTACT RATING:

#### 9201 Model

- GP (general purpose)  
6 AMPS 125 VAC 50/60 Hz T85 10,000 cycles (10E3)
- 3 AMPS 250 VAC 50/60 Hz T85 10,000 cycles
- R (resistive)  
6 AMPS 30 VDC T85 10,000 cycles

#### 9221 Model:

- GP (general purpose)  
10 AMPS 125 VAC 50/60 Hz T85 10,000 cycles
- 5 AMPS 250 VAC 50/60 Hz T85 10,000 cycles
- R (resistive)  
10 AMPS 30 VDC T85 10,000 cycles

ELECTRICAL LIFE: 25,000 make-and-break cycles at full load.

CONTACT RESISTANCE: Below 10 m Ω typ. initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: 10<sup>9</sup> Ω min.

DIELECTRIC STRENGTH: 2,500 Vrms min. @ sea level.

OPERATING TEMPERATURE: -30°C to 85°C.

SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

## Materials

CASE: Diallyl phthalate (DAP) (UL 94V-0).

ACTUATOR: Brass, chrome plated.

BUSHING: Brass or zinc, nickel plated.

HOUSING: Stainless steel.

SWITCH SUPPORT: Brass or steel, matte-tin plated.

END CONTACTS: 9201 Model: Coin silver, silver plated.  
9221 Model: Silver cadmium oxide.

CENTER CONTACTS: Copper alloy, silver plated

ALL TERMINALS: 9201 Model: Copper alloy, silver plated.  
9221 Model: Copper alloy, matte-tin plated.

TERMINAL SEAL: Epoxy.

HARDWARE: Nut & Locking ring: Brass, nickel plated.  
Lockwasher: Steel, nickel plated.

**NOTE:** Any models supplied with Q contact material are RoHS compliant and compatible.

**NOTE:** Specifications and materials listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

## Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages F-49 thru F-52. For additional options not shown in catalog, consult Customer Service Center.

<p><b>Switch Function</b></p> <p><b>9201</b> DPDT, On-On, 6 Amps <b>9221</b> DPDT, On-On, 10 Amps</p> <p><b>Actuator</b></p> <p><b>S</b> Antirotation, .410" high <b>K</b> Locking lever, .650" high <b>K1</b> Locking lever, .680" high <b>L43</b> Lever handle with cap <b>P3</b> Flatted, anti-rotation, .450" high <b>T</b> .687" high, 15/32 bushing <b>T1</b> .460" high, 15/32 bushing</p>	<p><b>Bushing</b></p> <p><b>H3</b> .296" high, keyway <b>CW</b> Splashproof <b>H</b> .296" high, flat</p> <p><b>Terminations</b></p> <p><b>Z</b> Solder lug <b>Z4</b> Quick connect (9221 only) <b>AV2</b> Vert. right angle, PC thru-hole (9201 only) <b>C</b> PC Thru-hole</p>	<p><b>Contact Material</b></p> <p><b>Q</b> Silver</p> <p><b>Seal</b></p> <p><b>E</b> Epoxy <b>D</b> No epoxy</p> <p><b>Actuator Color/Finish</b></p> <p><b>NONE</b> Bright chrome <b>2</b> Black</p> <p><b>Bushing Finish</b></p> <p><b>NONE</b> Nickel <b>2</b> Black</p> <p><b>KXX Actuator Color/Finish</b></p> <p><b>NONE</b> Natural aluminum <b>2</b> Black anodized aluminum</p>
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Toggle



*Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change*

# 9000 Series Power Toggle Switches

## SWITCH FUNCTION

NO. POLES	MODEL NO.	RATING*	SWITCH FUNCTION		CONNECTED TERMINALS		SCHEMATIC
			POS. 1 	POS. 2 	POS. 1 	POS. 2 	
DP	9201	6 AMPS	ON	ON	2-3,5-6	2-1,5-4	
	9221	10 AMPS	ON	ON			

**DPDT**

Part number shown: 9201SH3ZQE

\* See CONTACT MATERIAL, page F-52, for complete ratings.

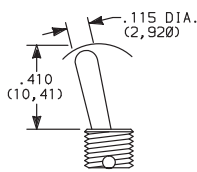
All 9000 Series models meet international dimensional and electrical requirements.



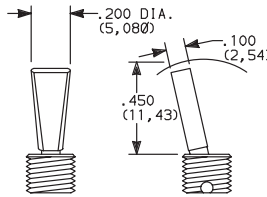
9221 model must be ordered with Z4 terminations and D seal option.

## ACTUATOR

**S** ANTIROTATION, .410" HIGH



**P3** FLATTED, ANTIROTATION, .450" HIGH



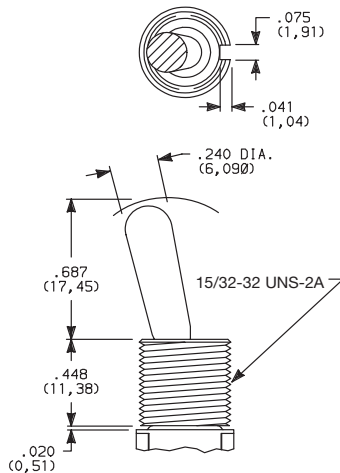
OPTION CODE	ACTUATOR FINISH
NONE	NATURAL ALUMINUM—With Nickel Plated Bushing
2	BLACK

**NOTE:** Black hardware is supplied when either black actuators or bushings are specified. All hardware is available separately, see Section N.

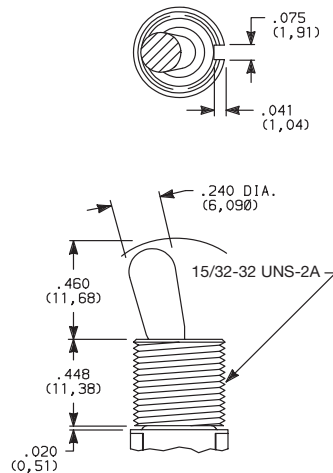
Antirotation is standard on all actuators, provides 'anti-push-in' feature on actuator.

Dress nut part number: 709901201 supplied standard with P3 actuator.

**T** .687" HIGH, 15/32 BUSHING



**T1** .460" HIGH, 15/32 BUSHING

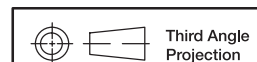


OPTION CODE	ACTUATOR FINISH
NONE	BRIGHT CHROME—With Nickel Plated Bushing
2	BLACK

**NOTE:** Bushing option code not required for T & T1 actuators unless CW splashproof bushing ordered.

Black hardware is supplied when either black actuators or bushings are specified. All hardware is available separately, see Section N.

Antirotation is standard on all actuators except T & T1, provides 'anti-push-in' feature on actuator.



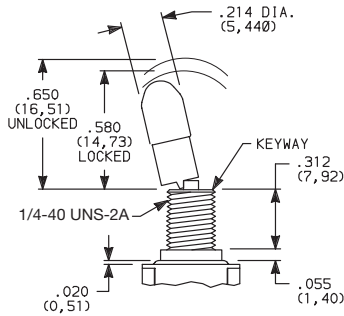
Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



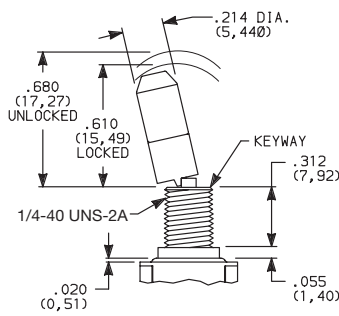
# 9000 Series Power Toggle Switches

## ACTUATOR ACTUATOR FINISH

**K** LOCKING LEVER, .650" HIGH, THREADED



**K1** LOCKING LEVER, .680" HIGH, THREADED



### Locking Positions

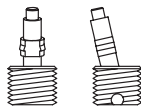


2 Position Lock

**NOTE:** To prevent accidental actuation, toggles must be lifted before being actuated. When released, toggles again lock in place. Bushing option code not required. Overtightening mounting nut may cause actuator to bind.

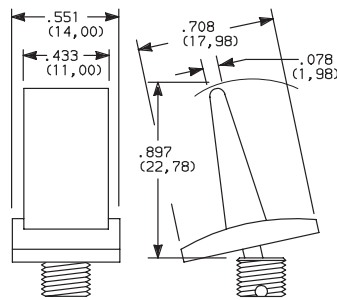
OPTION CODE	ACTUATOR CAP FINISH
<b>NONE</b>	NATURAL ALUMINUM—With Nickel Plated Bushing
<b>2</b>	BLACK ANODIZED ALUMINUM

**L40** LEVER HANDLE WITHOUT CAP



No color choice required.

**L43** PLASTIC LEVER HANDLE WITH ANTIROTATION AND CAP, P/N 4812



Finish: Matte

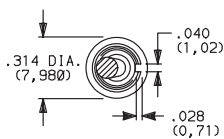
OPTION CODE	ACTUATOR CAP COLOR
<b>2</b>	BLACK
<b>NONE</b>	No Actuator Color (L40 option)

Other colors available, consult Customer Service Center.

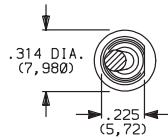
**NOTE:** Lever handle actuator L43 supplied, but not installed. For interchangeability, order L40 actuator option and order lever handles separately, see page F-52. Antirotation is standard on all actuators, provides 'anti-push-in' feature.

## BUSHING BUSHING FINISH

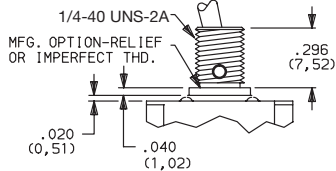
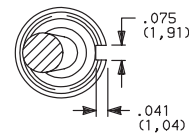
**H3** .296" HIGH, THREADED, KEYWAY



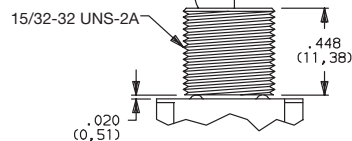
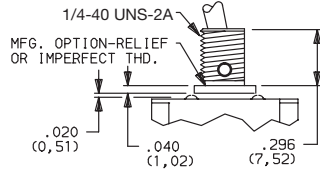
**H** .296" HIGH, THREADED, FLAT



**CW** SPLASHPROOF, 15/32 BUSHING



Will withstand 12 in./lbs. of torque with no distortion.

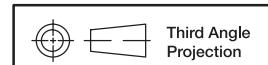


For T & T1 actuators only.

OPTION CODE	BUSHING FINISH
<b>NONE</b>	NICKEL
<b>2</b>	BLACK

**NOTE:** Two mounting nuts, locking ring and lockwasher supplied standard with threaded bushings. Black hardware is supplied when either black bushings or actuators are specified. Optional mounting nut and locking ring styles and finishes available, see Section N.

Internal actuator seal standard. External bushing seal available separately from APM Hexseal, part # MFS-60064.



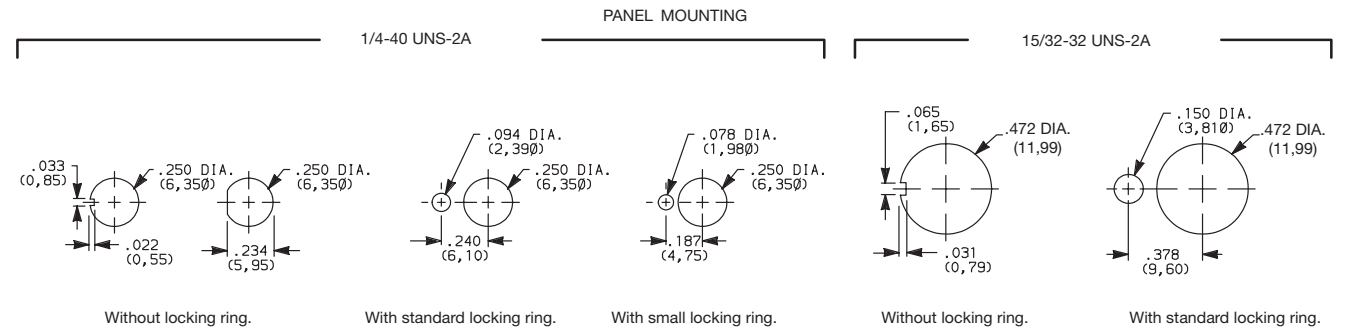
Third Angle Projection  
Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



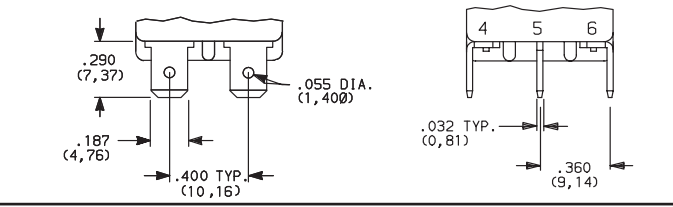
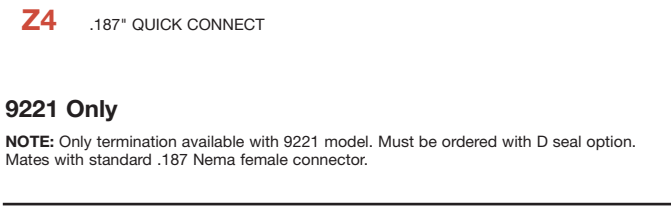
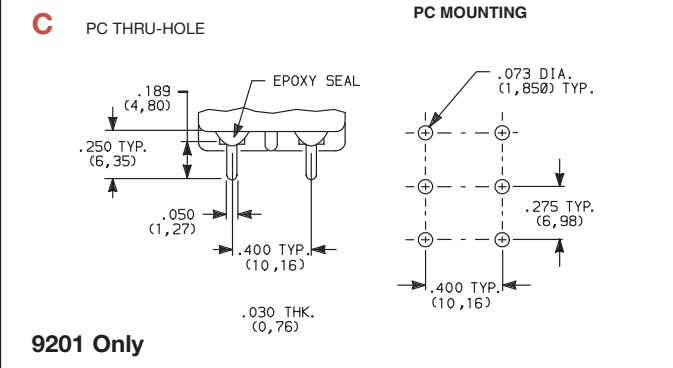
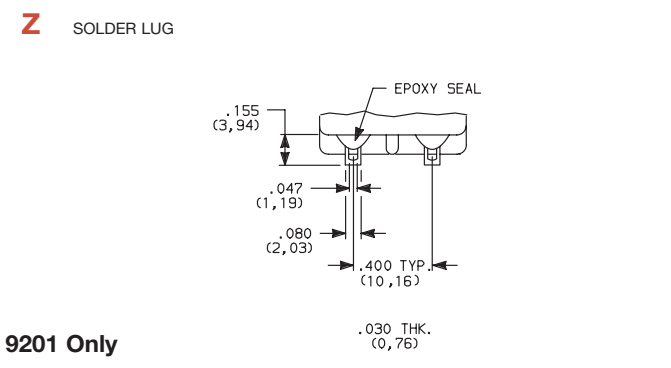


# 9000 Series Power Toggle Switches

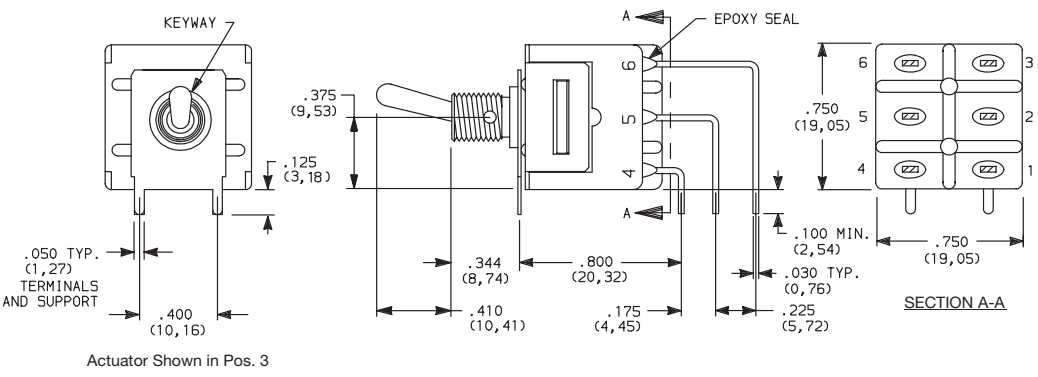
## BUSHING



## TERMINATIONS



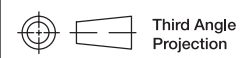
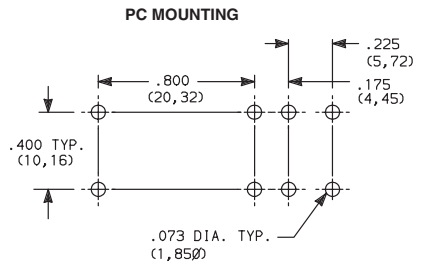
**AV2** VERTICAL RIGHT ANGLE, PC THRU-HOLE



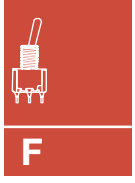
9201SH3AV2QE  
Vertical Actuation  
DPDT

9201 Only

**NOTE:** Terminal bend radii and lead-in manufacturing option. Terminal spacing greater than 3mm at all points.



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



Toggle

# 9000 Series Power Toggle Switches

## CONTACT MATERIAL

OPTION CODE	MODEL	CONTACT MATERIAL	TERMINAL PLATING	RATINGS
Q	9201	SILVER 1,2	SILVER OR TIN 2,5	GP (general purpose) 6 AMPS 125 VAC 50/60 Hz T85 10,000 cycles (10E3) 3 AMPS 250 VAC 50/60 Hz T85 10,000 cycles R (resistive) 6 AMPS 30 VDC T85 10,000 cycles
	9221	SILVER CADMIUM OXIDE 3,4,6	TIN 5	GP (general purpose) 10 AMPS 125 VAC 50/60 Hz T85 10,000 cycles 5 AMPS 250 VAC 50/60 Hz T85 10,000 cycles R (resistive) 10 AMPS 30 VDC T85 10,000 cycles

\* Note: See Technical Data section of this catalog for RoHS compliant and compatible definitions and specifications.

<sup>1</sup> END CONTACTS: Coin silver, silver plated.

<sup>2</sup> CENTER CONTACTS & ALL TERMINALS: Copper alloy, silver plated.

<sup>3</sup> END CONTACTS: Silver cadmium oxide.

<sup>4</sup> CENTER CONTACTS: Copper alloy, silver plated.

<sup>5</sup> Z4 TERMINALS ONLY: Copper alloy, matte-tin plated.

<sup>6</sup> Cadmium in electrical switch contacts is exempt from RoHS.

**NOTE:** Any models supplied with Q contact material are RoHS compliant.

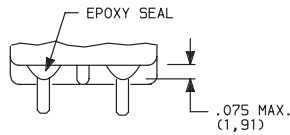
All 9000 Series models meet international dimensional and electrical requirements.

9221 model must be ordered with Z4 terminations and D seal option.



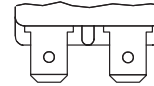
## SEAL

**E** EPOXY SEAL



Not available with 9221 model or Z4 terminations.

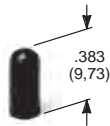
**D** NO EPOXY SEAL



Must be ordered with 9221 model and Z4 termination.

## AVAILABLE HARDWARE

Cap  
Compatible with S actuator



**PART NO.**  
896801000 WHITE  
896802000 BLACK  
896803000 RED

Material: Polyethylene  
Finish: Matte

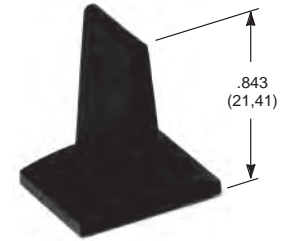
Cap  
Compatible with S actuator



**PART NO.**  
706201000 WHITE  
706202000 BLACK  
706203000 RED

Material: Vinyl  
Finish: Matte

L43 Actuator



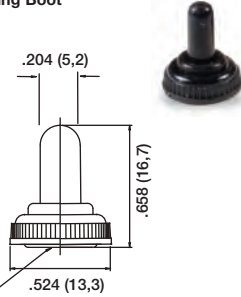
**PART NO.**  
481202000 BLACK  
481203000 RED

Material: Nylon  
Finish: Matte

**NOTE:** Additional nuts, locking rings and lockwashers available separately, see Section N.

Other colors available, consult Customer Service Center.

759D02000 Sealing Boot



1/4-40 uns-2A nut

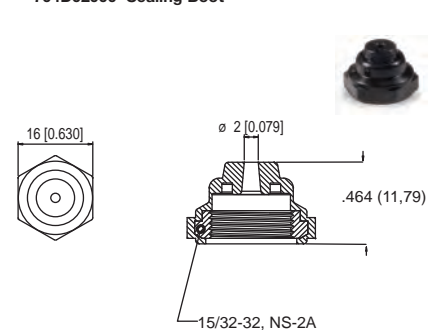
**NOTE:** For use with S actuator style when combined with H3 and H bushings

703D02000 Sealing Boot

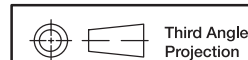


**NOTE:** For use with T style actuator

704D02000 Sealing Boot



**NOTE:** For use with T style actuator



Third Angle Projection

Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

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