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SML13RGB2KH-TR

Super Red/Aqua Green/Super Blue

Surface Mount LED

3.2×2.7×1.1mm Chip LED

120° Viewing Angle

DWG BY:
BL / GP / HF
01-19-07

R&D:
PL
04-11-25

MFG
PP
04-11-25

QA:
RR
04-11-25

REVISION LTR: D
ECR#: 041025-HF02
04-10-25

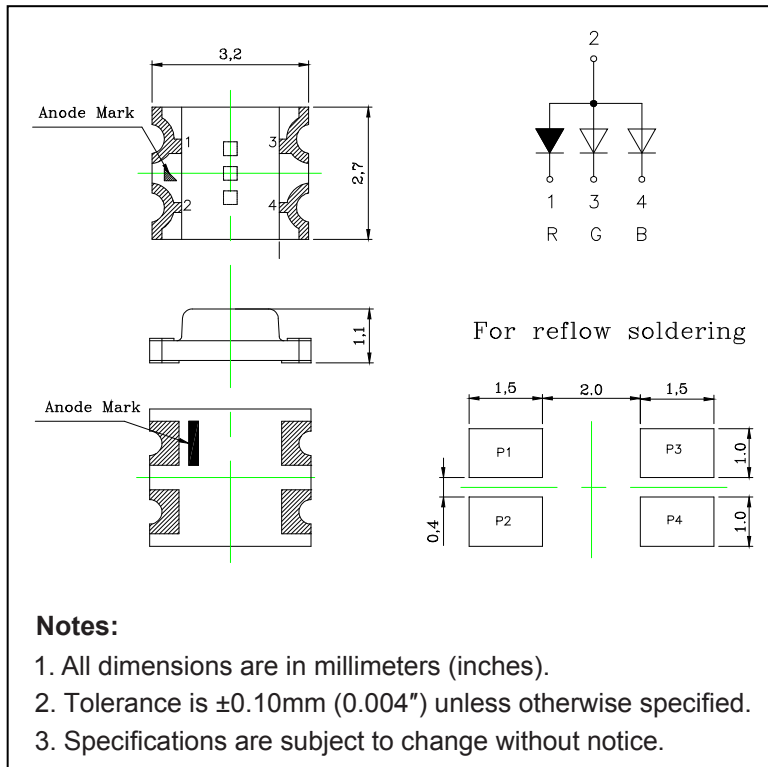
● Features:

1. Emitted Color: Super Red, Aqua Green & Super Blue
2. Lens Appearance: Water Clear
3. Multi-color type.
4. 3.2x2.7x1.1mm(1210) standard package.
5. Suitable for all SMT assembly methods.
6. Compatible with infrared and vapor phase reflow solder process.
7. Compatible with automatic placement equipment.
8. This product doesn't contain restriction Substance, comply ROHS standard.

● Applications:

1. Automotive: Dashboards, stop lamps, turn signals.
2. Backlighting: LCDs, Key pads advertising.
3. Status indicators: Consumer & industrial electronics.
4. General use.

● Package Dimensions



● Absolute Maximum Ratings(Ta=25°C)

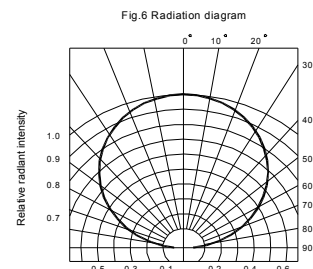
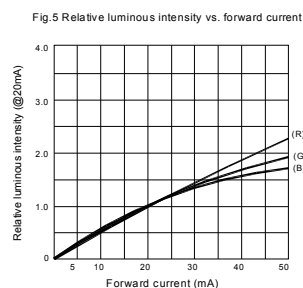
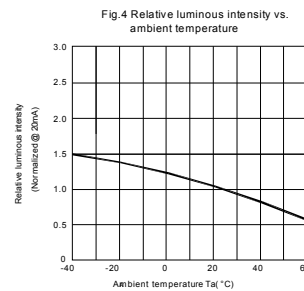
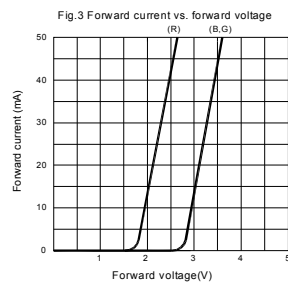
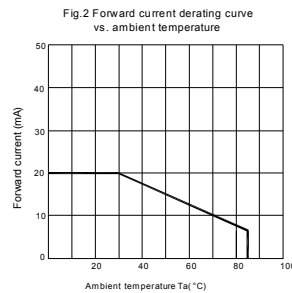
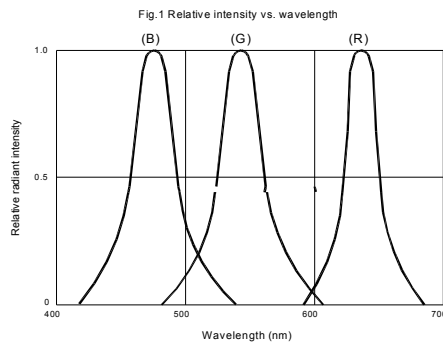
Parameter	Symbol	Super Red	Aqua Green	Super Blue	Unit
Power Dissipation	Pd	50	70	70	mW
Forward Current	I _F	20	20	20	mA
Peak Forward Current *1	I _{FP}	100	100	100	mA
Reverse Voltage	V _R	5			V
Operating Temperature	Topr	-40°C~85°C			-
Storage Temperature	Tstg	-40°C~85°C			-
Soldering Temperature	Tsol	See Page 7			-

* 1 Condition for I_{FP} is pulse of 1/10 duty and 0.1msec width.

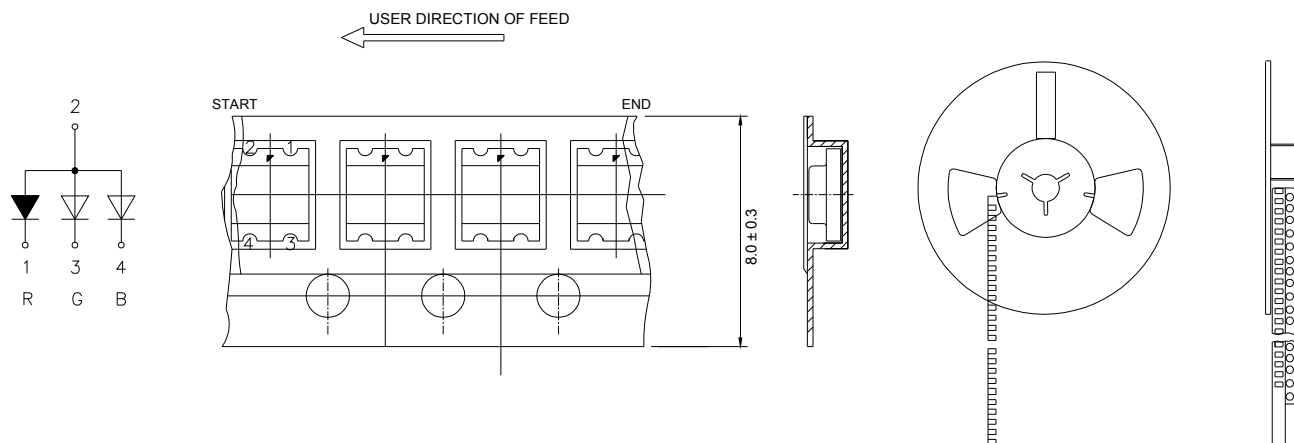
● Electrical and Optical Characteristics (Ta=25°C)

Parameter	Symbol	Condition	Color	Min.	Typ.	Max.	Unit
Forward Voltage	V _f	I _F =20mA	Super Red Aqua Green Super Blue	1.8 2.8 2.8	2.2 3.0 3.0	2.6 3.6 3.6	V
Luminous Intensity	I _v	I _F =20mA	Super Red Aqua Green Super Blue	63 475 42	140 1200 120	-	mcd
Reverse Current	I _R	V _R =5V	Super Red Aqua Green Super Blue	-	-	100 1 1	μA
Peak Wavelength	λ _p	I _F =20mA	Super Red Aqua Green Super Blue	-	625 525 470	-	nm
Dominant Wavelength	λ _d	I _F =20mA	Super Red Aqua Green Super Blue	615 520 460	-	625 535 475	nm
Viewing Angle	2θ _{1/2}	I _F =20mA	Super Red Aqua Green Super Blue	-	120	-	deg

● Typical Electro-Optical Characteristics Curves



● **Taping and packaging specifications(Units: mm)**
Quantity: 1,000-3,000 pcs.



● **Bin Limits**

Intensity Bin Limits (JE) (20mA)

BIN CODE	Min. (mcd)	Max. (mcd)
P	63	94
Q	94	140
R	140	210
S	210	317

Tolerance for each Bin limit is $\pm 15\%$.

Intensity Bin Limits (G6) (20mA)

BIN CODE	Min. (mcd)	Max. (mcd)
U	475	715
V	715	1070
W	1070	1600
X	1600	2400

Tolerance for each Bin limit is $\pm 15\%$.

Color Bin Limits (G6) (20mA)

BIN CODE	Min. (nm)	Max. (nm)
6	520	525
7	525	530
8	530	535

Tolerance for each Bin limit is $\pm 1\text{nm}$.

● **Continuation for Bin Limits. . .**

V_F Bin Limits (G6) (20mA)

BIN CODE	Min.(v)	Max.(v)
G	2.8	3.0
H	3.0	3.2
J	3.2	3.4
K	3.4	3.6

Tolerance for each Bin limit is $\pm 0.05V$.

Intensity Bin Limits (BH) (20mA)

BIN CODE	Min. (mcd)	Max. (mcd)
N	42	63
P	63	94
Q	94	140
R	140	210

Tolerance for each Bin limit is $\pm 15\%$.

Color Bin Limits (BH) (20mA)

BIN CODE	Min. (nm)	Max. (nm)
3	460	465
4	465	470
5	470	475

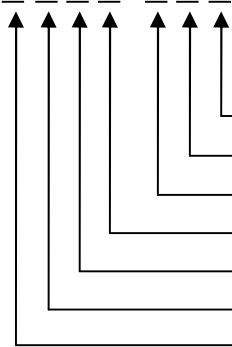
Tolerance for each Bin limit is $\pm 1nm$.

V_F Bin Limits (BH) (20mA)

BIN CODE	Min.(v)	Max.(v)
G	2.8	3.0
H	3.0	3.2
J	3.2	3.4
K	3.4	3.6

Tolerance for each Bin limit is $\pm 0.05V$.

● **BIN : X-X X X - X X X**



V_F BIN CODE (BH)
Color BIN CODE (BH)
Intensity BIN CODE (BH)
V_F BIN CODE (G6)
Color BIN CODE (G6)
Intensity BIN CODE (G6)
Intensity BIN CODE (JE)

● Reliability Test

Classification	Test Item	Reference Standard	Test Conditions	Result
Endurance Test	Operation Life	MIL-STD-750D:1026 MIL-STD-883D:1005 JIS-C-7021 :B-1	Ta: Under room temperature Test time:1,000hrs IF=Product Recommended IF	0/32
	High Temperature High Humidity Storage	MIL-STD-202F:103B JIS-C-7021 :B-11	Ta:85±5℃ RH:90%-95% Test time:240hrs	0/32
	High Temperature Storage	MIL-STD-883:1008 JIS-C-7021 :B-10	Ta:100±5℃ Test time:1,000hrs	0/32
	Low Temperature Storage	JIS-C-7021 :B-11	Ta: -40±5℃ Test time=1,000hrs	0/32
Environmental Test	Temperature Cycling	MIL-STD-202F:107D MIL-STD-750D:1051 MIL-STD-883D:1010 JIS-C-7021 :A-2	Ta:-35±5℃~25±5℃~85±5℃~25±5℃ 30min 5min 30min 5min Time: 5cycles	0/32
	Thermal Shock	MIL-STD-202F:107D(1980) MIL-STD-750D:1051(1995) MIL-STD-883D:1011(1991)	Ta:-40±5℃ ~+85±5℃ 10min 10 min Time: 20min/cycle 10cycle	0/32
	Wetting balance	MIL-STD-883:2003 MIL-STD-202F:208D MIL-STD-883D:2003	Ta:230±5℃ Time:5±0.5s	0/32
	Solder Resistance	MIL-STD-202F:210A MIL-STD-883D:1011 JIS-C-7021 :A-1	Ta:260±10℃ Time:10±1s	0/32

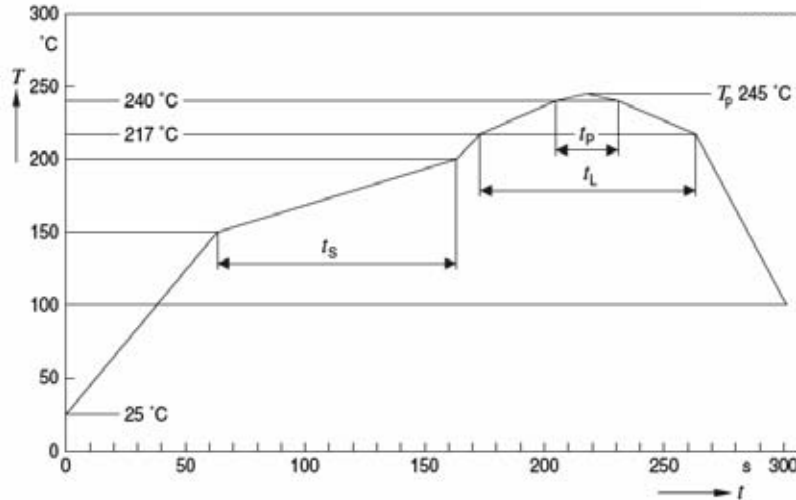
● Judgment criteria of failure for the reliability

Measuring items	Symbol	Measuring conditions	Judgement criteria for failure
Forward voltage	V _F (V)	I _F =20mA	Initial Level*1.1
Reverse current	I _R (uA)	V _R =5V	Over U*2
Luminous intensity	I _v (mcd)	I _F =20mA	Initial Level*0.7

Note: 1.U means the upper limit of specified characteristics.

2. Measurement shall be taken between 2 hours and after the test pieces have been returned to normal ambient conditions after completion of each test.

● IR-Reflow Soldering



Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat ¹⁾ 25 °C to 150 °C			2	3	K/s
Time t _s T _{Smin} to T _{Smax}	t _s	60	100	120	s
Ramp-up rate to peak ¹⁾ T _{Smax} to T _p			2	3	K/s
Liquidus temperature	T _L		217		°C
Time above liquidus temperature	t _L		80	100	s
Peak temperature	T _p		245	260	°C
Time within 5 °C of the specified peak temperature T _p - 5 K	t _p	10	20	30	s
Ramp-down rate* T _p to 100 °C			3	6	K/s
Time 25 °C to T _p				480	s

All temperatures refer to the center of the package, measured on the top of the component
* slope calculation DT/Dt; Dt max. 5 s; fulfillment for the whole T-range

1. Avoid any external stress applied to the resin while the LEDs are at high temperature, especially during soldering.
2. Avoid rapid cooling or any excess vibration during temperature ramp-down process.
3. Although the soldering condition is recommended above, soldering at the lowest possible temperature is feasible for the LEDs.

● IRON Soldering

350°C Within 3 sec.,One time only.

● Notes for designing:

Care must be taken to provide the current limiting resistor in the circuit so as to drive the LEDs within the rated figures. Also, caution should be taken not to overload LEDs with instantaneous voltage at the turning ON and OFF of the circuit.

When using the pulse drive care must be taken to keep the average current within the rated figures. Also, the circuit should be designed so as to be subjected to reverse voltage when turning off the LEDs.

● Storage:

In order to avoid the absorption of moisture, it is recommended to solder LEDs as soon as possible after unpacking the sealed envelope.

If the envelope is still packed, to store it in the environment as following:

- (1) Temperature : 5°C-30°C(41°F) Humidity : RH 60% Max.
- (2) After this bag is opened, devices that will be applied to infrared reflow, vapor-phase reflow, or equivalent soldering process must be:
 - a. Completed within 168 hours.
 - b. Stored at less than 30% RH.
- (3) Devices require baking before mounting, if:
 - (2) a or (2) b is not met.
- (4) If baking is required, devices must be baked under below conditions:
48 hours at 60°C ± 3°C.

● Package and Label of Products:

- (1) Package: Products are packed in one bag of 3000 pcs. (one taping reel) and a label is attached on each bag.