

# NPN Darlington Transistor

## MPSA29

### Description

This device is designed for applications requiring extremely high current gain at collector currents to 500 mA. Sourced from process 03. See MPSA28 for characteristics.

### Features

- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

### ABSOLUTE MAXIMUM RATINGS (Notes 1, 2)

(Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted)

| Parameter                                        | Symbol         | Value      | Unit             |
|--------------------------------------------------|----------------|------------|------------------|
| Collector-Emitter Voltage                        | $V_{CEO}$      | 100        | V                |
| Collector-Base Voltage                           | $V_{CBO}$      | 100        | V                |
| Emitter-Base Voltage                             | $V_{EBO}$      | 12         | V                |
| Collector Current – Continuous                   | $I_C$          | 800        | mA               |
| Operating and Storage Junction Temperature Range | $T_J, T_{STG}$ | -55 to 150 | $^\circ\text{C}$ |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

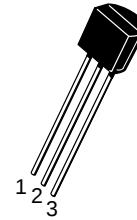
- These ratings are based on a maximum junction temperature of  $150^\circ\text{C}$ .
- These are steady-state limits. onsemi should be consulted on applications involving pulsed or low-duty-cycle operations.

### THERMAL CHARACTERISTICS (Note 3)

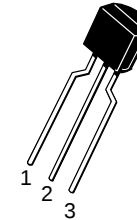
(Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted)

| Parameter                                   | Symbol          | Value | Unit                      |
|---------------------------------------------|-----------------|-------|---------------------------|
| Total Device Dissipation                    | $P_D$           | 625   | mW                        |
| Dissipation Derate Above $25^\circ\text{C}$ | $P_D$           | 5.0   | mW/ $^\circ\text{C}$      |
| Thermal Resistance, Junction-to-Case        | $R_{\theta JC}$ | 83.3  | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction-to-Ambient     | $R_{\theta JA}$ | 200   | $^\circ\text{C}/\text{W}$ |

- PCB size: FR-4, 76 mm x 114 mm x 1.57 mm (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.



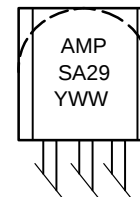
TO-92-3  
CASE 135AN  
Straight Lead  
Bulk Packing



TO-92-3  
CASE 135AR  
Bent Lead  
Tape & Reel  
Ammo Packing

- Emitter
- Base
- Collector

### MARKING DIAGRAM



A = Assembly Code  
MPSA29 = Device Code  
YWW = Date Code

### ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

## MPSA29

### ELECTRICAL CHARACTERISTICS (Note 4)

(Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted)

| Symbol        | Parameter                            | Conditions                                                               | Min.   | Max. | Unit |
|---------------|--------------------------------------|--------------------------------------------------------------------------|--------|------|------|
| $BV_{CEO}$    | Collector–Emitter Breakdown Voltage  | $I_C = 100\ \mu\text{A}$ , $I_B = 0$                                     | 100    |      | V    |
| $BV_{CBO}$    | Collector–Base Breakdown Voltage     | $I_C = 100\ \mu\text{A}$ , $I_E = 0$                                     | 100    |      | V    |
| $BV_{EBO}$    | Emitter–Base Breakdown Voltage       | $I_E = 10\ \mu\text{A}$ , $I_C = 0$                                      | 12     |      | V    |
| $I_{CBO}$     | Collector Cut–Off Current            | $V_{CB} = 80\ \text{V}$ , $I_E = 0$                                      |        | 100  | nA   |
| $I_{CES}$     | Collector Cut–Off Current            | $V_{CE} = 80\ \text{V}$ , $I_E = 0$                                      |        | 500  | nA   |
| $I_{EBO}$     | Emitter Cut–Off Current              | $V_{EB} = 10\ \text{V}$ , $I_C = 0$                                      |        | 100  | nA   |
| $h_{FE}$      | DC Current Gain                      | $V_{CE} = 5.0\ \text{V}$ , $I_C = 10\ \text{mA}$                         | 10,000 |      |      |
|               |                                      | $V_{CE} = 5.0\ \text{V}$ , $I_C = 100\ \text{mA}$                        | 10,000 |      |      |
| $V_{CE(sat)}$ | Collector–Emitter Saturation Voltage | $I_C = 10\ \text{mA}$ , $I_B = 0.01\ \text{mA}$                          |        | 1.2  | V    |
|               |                                      | $I_C = 100\ \text{mA}$ , $I_B = 0.1\ \text{mA}$                          |        | 1.5  | V    |
| $V_{BE(on)}$  | Base–Emitter On Voltage              | $I_C = 100\ \text{mA}$ , $V_{CE} = 5.0\ \text{V}$                        |        | 2.0  | V    |
| $f_T$         | Current Gain – Bandwidth Product     | $I_C = 15\ \text{mA}$ , $V_{CE} = 5.0\ \text{V}$ , $f = 100\ \text{MHz}$ | 125    |      | MHz  |
| $C_{obo}$     | Output Capacitance                   | $V_{CB} = 10\ \text{V}$ , $I_E = 0$ , $f = 1.0\ \text{MHz}$              |        | 8.0  | pF   |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

4. Pulse test: pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2.0\%$

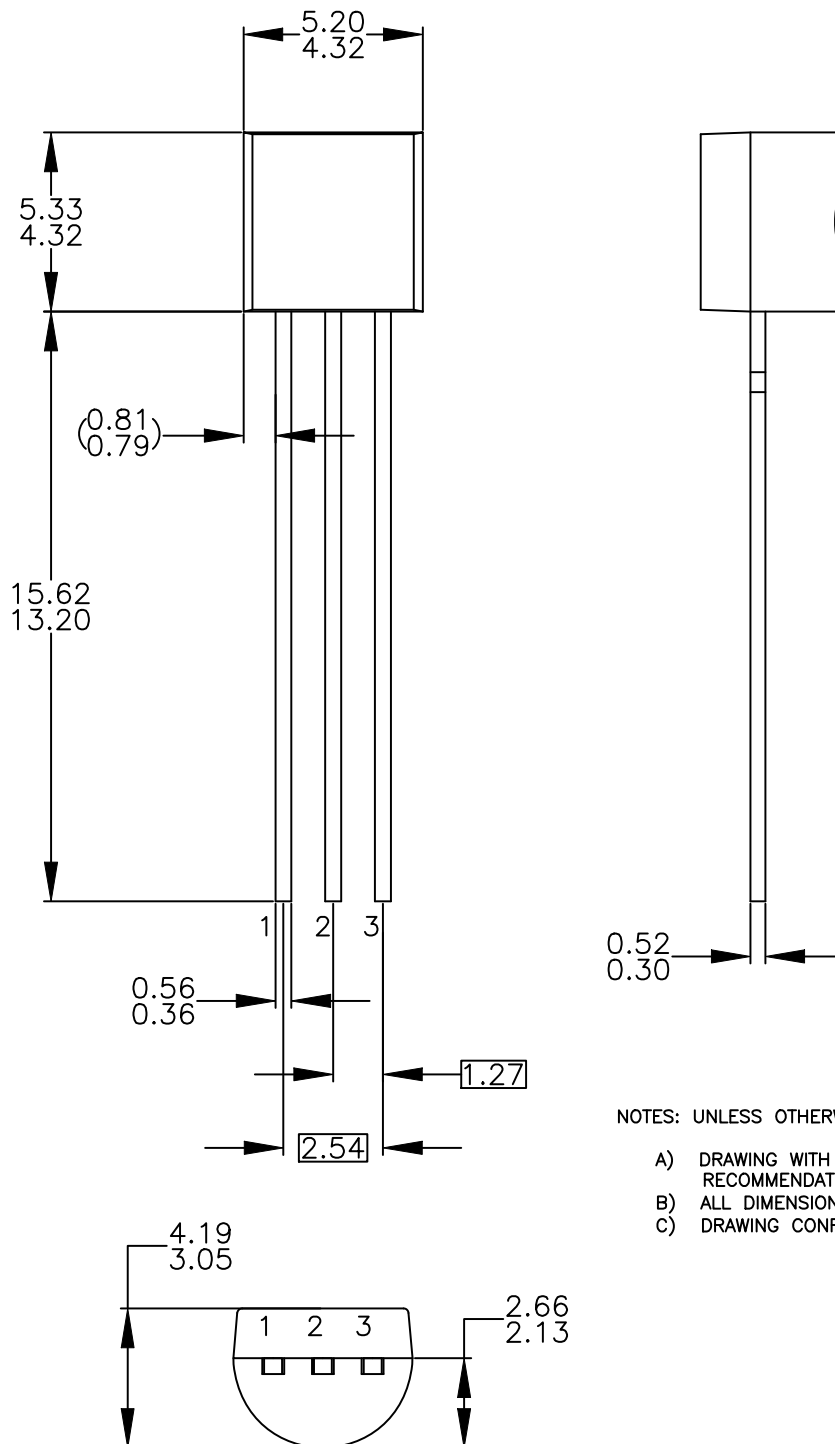
### ORDERING INFORMATION

| Part Number | Top Mark | Package                       | Shipping <sup>†</sup>    |
|-------------|----------|-------------------------------|--------------------------|
| MPSA29      | MPSA29   | TO–92–3, case 135AN (Pb–Free) | 10,000 Units/ Bulk Box   |
| MPSA29–D26Z | MPSA29   | TO–92–3, case 135AR (Pb–Free) | 2,000 Units/ Tape & Reel |

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

**TO-92 3 4.825x4.76**  
**CASE 135AN**  
**ISSUE O**

DATE 31 JUL 2016



NOTES: UNLESS OTHERWISE SPECIFIED

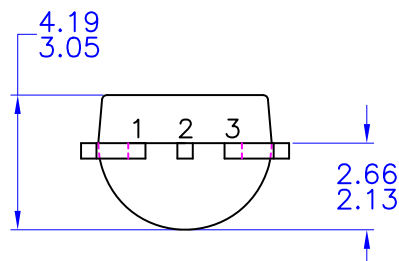
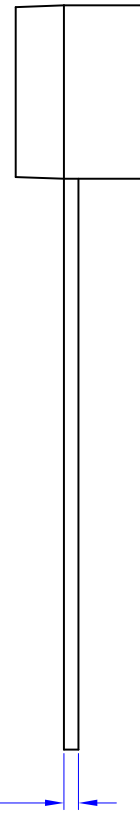
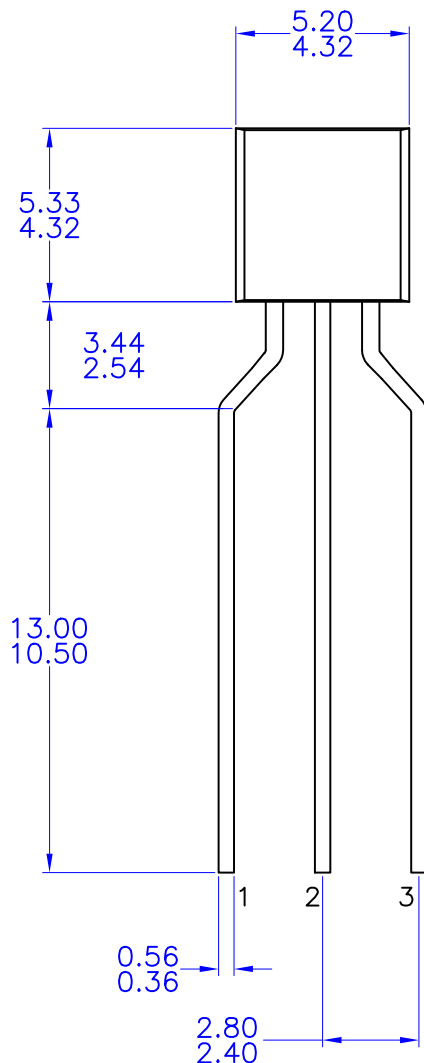
- A) DRAWING WITH REFERENCE TO JEDEC TO-92 RECOMMENDATIONS.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
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|                         |                           |                                                                                                                                                                                     |
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**TO-92 3 4.83x4.76 LEADFORMED**  
CASE 135AR  
ISSUE O

DATE 30 SEP 2016



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|                         |                                     |                                                                                                                                                                                     |
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