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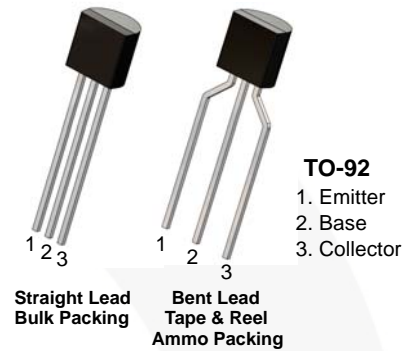


October 2015

# MPSA29 NPN Darlington Transistor

## 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.



## Ordering Information

| Part Number | Top Mark | Package  | Packing Method |
|-------------|----------|----------|----------------|
| MPSA29      | MPSA29   | TO-92 3L | Bulk           |
| MPSA29_D26Z | MPSA29   | TO-92 3L | Tape and Reel  |

## Absolute Maximum Ratings<sup>(1), (2)</sup>

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

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

### Notes:

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

**Thermal Characteristics<sup>(3)</sup>**

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

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

**Note:**

3. 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.

**Electrical Characteristics<sup>(4)</sup>**

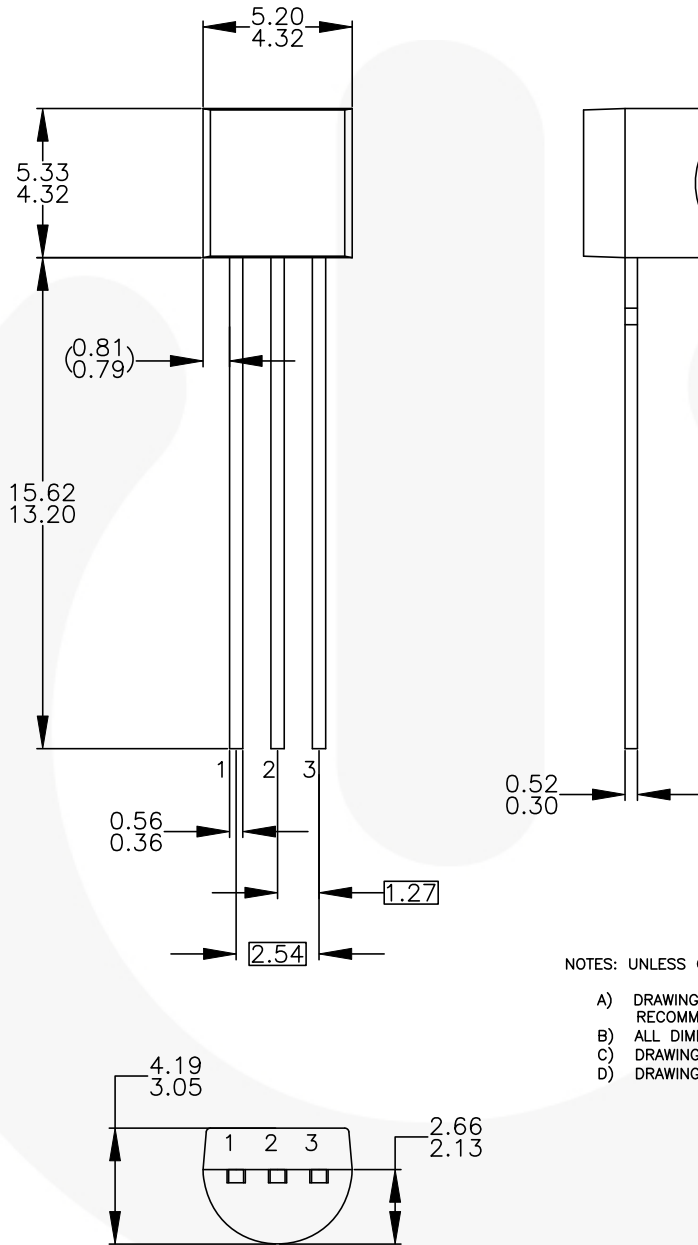
Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| 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  |      |
| $V_{BE(on)}$  | Base-Emitter On Voltage              | $I_C = 100 \text{ mA}, V_{CE} = 5.0 \text{ V}$                     |        | 2.0  | V    |
| $f_T$         | Current Gain - Bandwidth Product     | $I_C = 10 \text{ mA}, V_{CE} = 5.0 \text{ V}, f = 100 \text{ MHz}$ | 125    |      | MHz  |
| $C_{obo}$     | Output Capacitance                   | $V_{CB} = 10 \text{ V}, I_E = 0, f = 1.0 \text{ MHz}$              |        | 8.0  | pF   |

**Note:**

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

Physical Dimensions



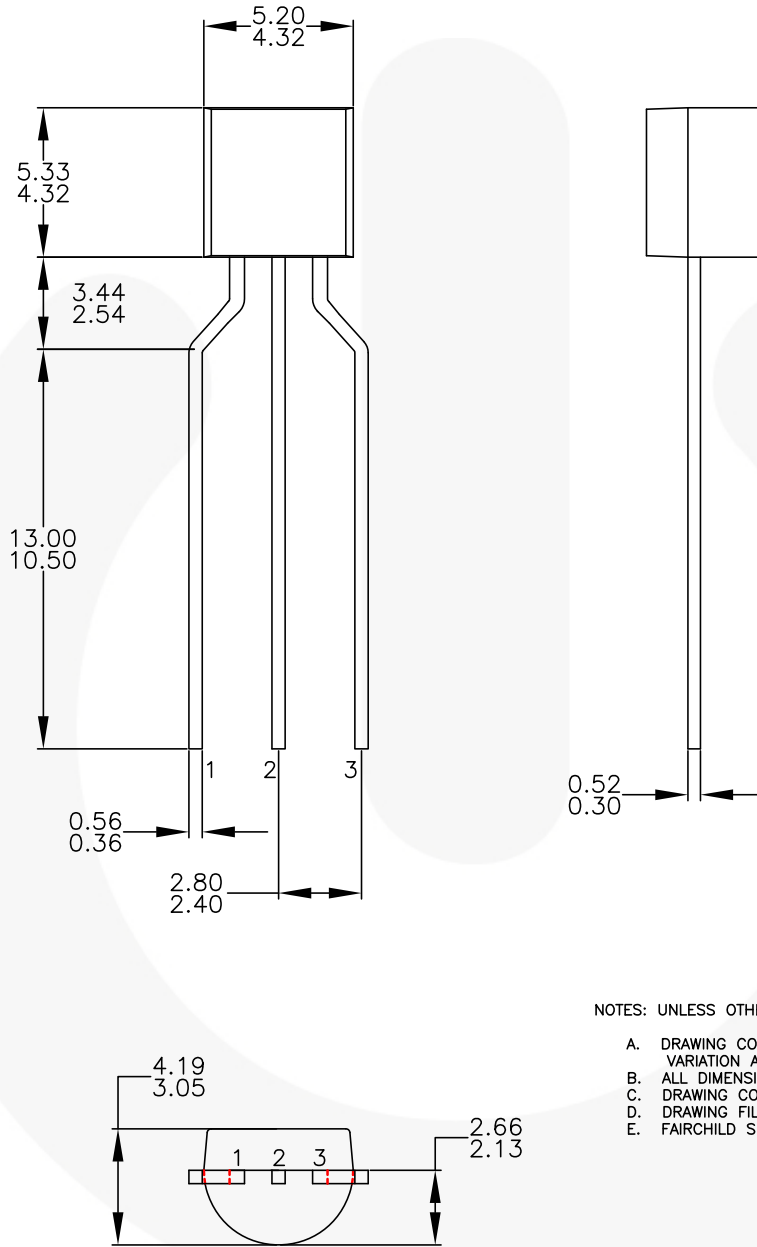
NOTES: UNLESS OTHERWISE SPECIFIED

- A) DRAWING WITH REFERENCE TO JEDEC TO-92 RECOMMENDATIONS.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DRAWING CONFORMS TO ASME Y14.5M-2009.
- D) DRAWING FILENAME: MKT-ZA03DREV4.



Figure 1. 3-Lead, TO-92, Molded, STD Straight Lead, Bulk Type

Physical Dimensions (Continued)



NOTES: UNLESS OTHERWISE SPECIFIED


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Figure 2. 3-Lead, TO-92, Molded, 0.2 In Line Spacing Lead Form, Ammo, Tape and Reel Type





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