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March 2014



# MMBTA92 / PZTA92 PNP High-Voltage Amplifier

## Description

This device is designed for high-voltage driver applications. Sourced from process 76.

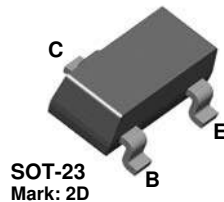


Figure 1. MMBTA92 Device Package

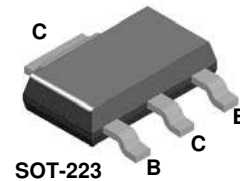


Figure 2. PZTA92 Device Package

## Ordering Information

| Part Number | Top Mark | Package    | Packing Method |
|-------------|----------|------------|----------------|
| MMBTA92     | 2D       | SOT-23 3L  | Tape and Reel  |
| PZTA92      | A92      | SOT-223 4L | 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                        | -300        | V                |
| $V_{CBO}$      | Collector-Base Voltage                           | -300        | V                |
| $V_{EBO}$      | Emitter-Base Voltage                             | -5          | V                |
| $I_C$          | Collector Current - Continuous                   | -500        | 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

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

| Symbol          | Parameter                               | Max.                   |                       | Unit                      |
|-----------------|-----------------------------------------|------------------------|-----------------------|---------------------------|
|                 |                                         | MMBTA92 <sup>(3)</sup> | PZTA92 <sup>(4)</sup> |                           |
| $P_D$           | Total Device Dissipation                | 350                    | 1000                  | mW                        |
|                 | Derate Above $25^\circ\text{C}$         | 2.8                    | 8.0                   | mW/ $^\circ\text{C}$      |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 357                    | 125                   | $^\circ\text{C}/\text{W}$ |

### Notes:

- Device is mounted on FR-4 PCB 1.6 inch x 1.6 inch x 0.06 inch.
- 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

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

| Symbol        | Parameter                                           | Conditions                                                       | Min. | Max.  | Unit          |
|---------------|-----------------------------------------------------|------------------------------------------------------------------|------|-------|---------------|
| $V_{(BR)CEO}$ | Collector-Emitter Breakdown Voltage <sup>(5)</sup>  | $I_C = -1.0\text{ mA}, I_B = 0$                                  | -300 |       | V             |
| $V_{(BR)CBO}$ | Collector-Base Breakdown Voltage                    | $I_C = -100\ \mu\text{A}, I_E = 0$                               | -300 |       | V             |
| $V_{(BR)EBO}$ | Emitter-Base Breakdown Voltage                      | $I_E = -100\ \mu\text{A}, I_C = 0$                               | -5.0 |       | V             |
| $I_{CBO}$     | Collector Cut-Off Current                           | $V_{CB} = -200\text{ V}, I_E = 0$                                |      | -0.25 | $\mu\text{A}$ |
| $I_{EBO}$     | Emitter Cut-Off Current                             | $V_{EB} = -3.0\text{ V}, I_C = 0$                                |      | -0.1  | $\mu\text{A}$ |
| $h_{FE}$      | DC Current Gain <sup>(5)</sup>                      | $I_C = -1.0\text{ mA}, V_{CE} = -10\text{ V}$                    | 25   |       |               |
|               |                                                     | $I_C = -10\text{ mA}, V_{CE} = -10\text{ V}$                     | 40   | 250   |               |
|               |                                                     | $I_C = -30\text{ mA}, V_{CE} = -10\text{ V}$                     | 25   |       |               |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage <sup>(5)</sup> | $I_C = -20\text{ mA}, I_B = -2.0\text{ mA}$                      |      | -0.5  | V             |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage <sup>(5)</sup>      | $I_C = -20\text{ mA}, I_B = -2.0\text{ mA}$                      |      | -0.9  | V             |
| $f_T$         | Current Gain - Bandwidth Product                    | $I_C = -10\text{ mA}, V_{CE} = -20\text{ V}, f = 100\text{ MHz}$ | 50   |       | MHz           |
| $C_{cb}$      | Collector-Base Capacitance                          | $V_{CB} = -20\text{ V}, I_E = 0, f = 1.0\text{ MHz}$             |      | 6.0   | pF            |

### Note:

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

### Typical Performance Characteristics

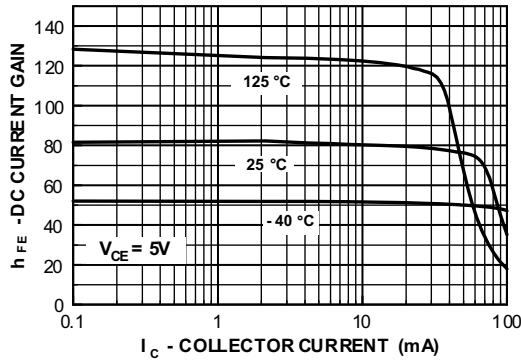


Figure 3. Typical Pulsed Current Gain vs. Collector Current

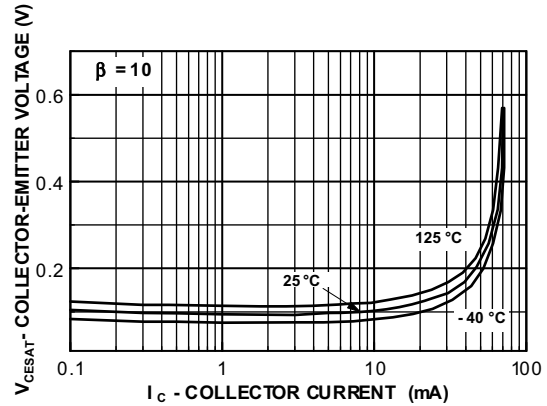


Figure 4. Collector-Emitter Saturation Voltage vs. Collector Current

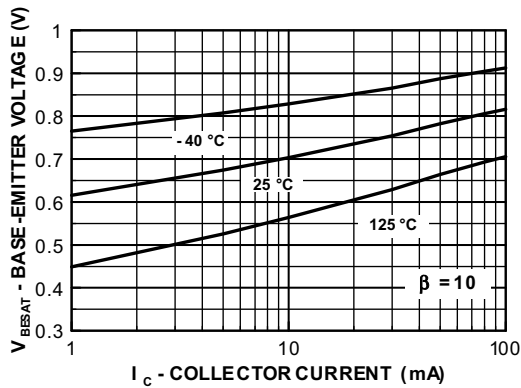


Figure 5. Base-Emitter Saturation Voltage vs. Collector Current

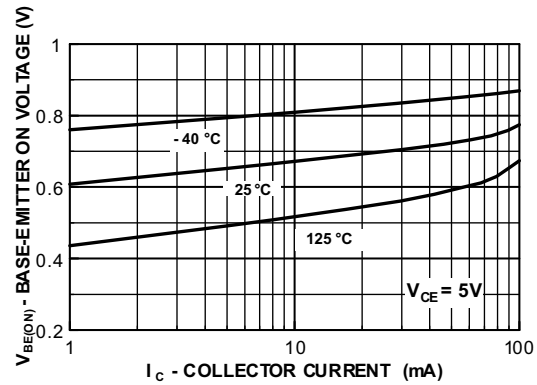


Figure 6. Base-Emitter On Voltage vs. Collector Current

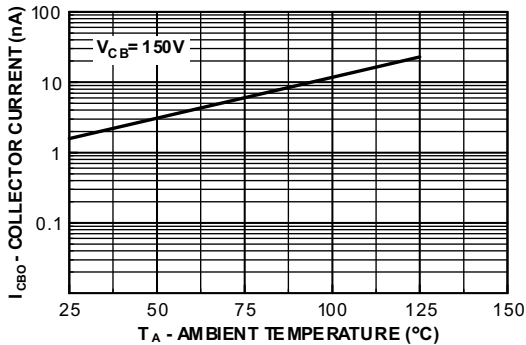


Figure 7. Collector Cut-Off Current vs. Ambient Temperature

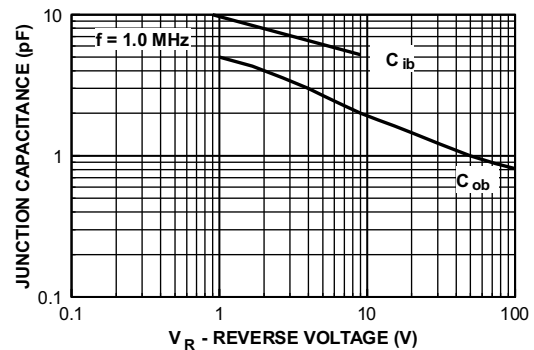


Figure 8. Junction Capacitance vs. Reverse-Bias Voltage

Typical Performance Characteristics (Continued)

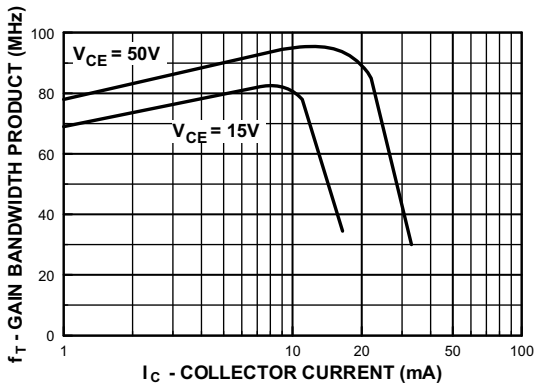


Figure 9. Gain Bandwidth Product vs. Collector Current

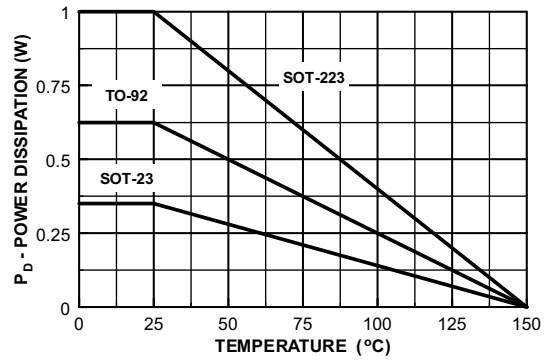


Figure 10. Power Dissipation vs. Ambient Temperature

Physical Dimensions

SOT-23

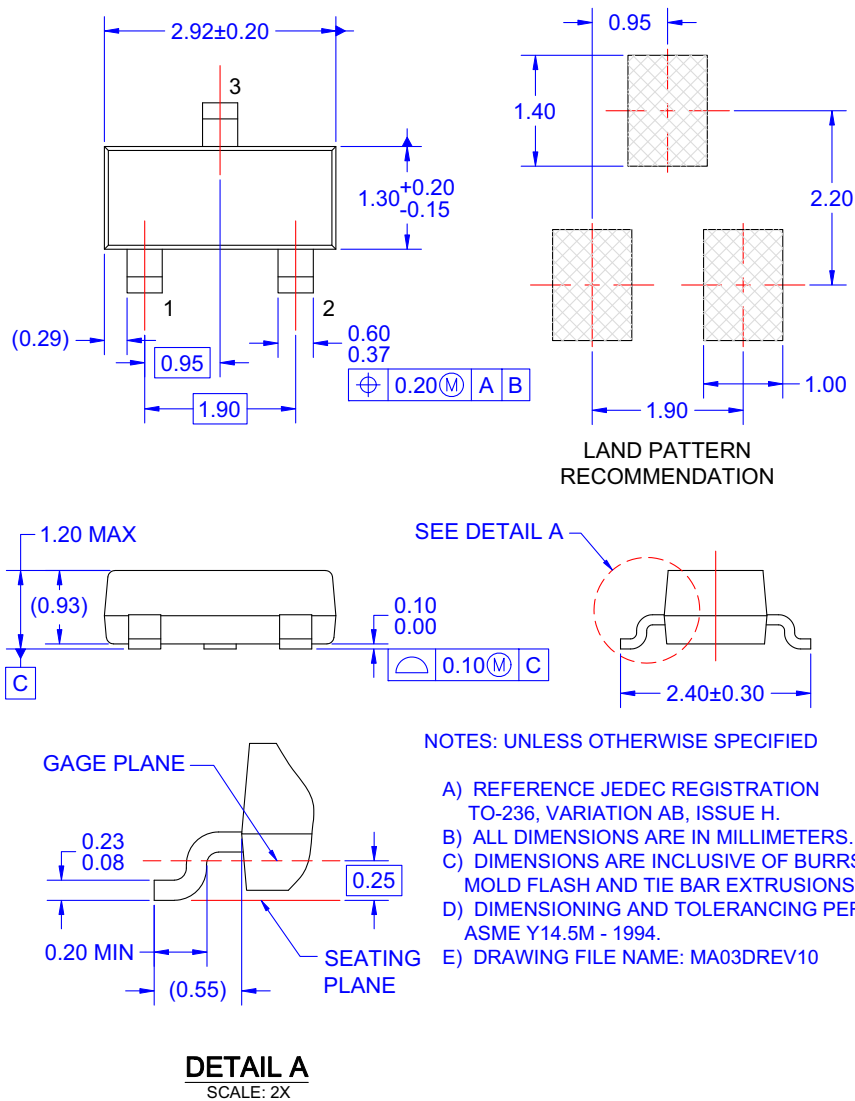


Figure 11. 3-LEAD, SOT23, JEDEC TO-236, LOW PROFILE (ACTIVE)

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Physical Dimensions (Continued)

SOT-223

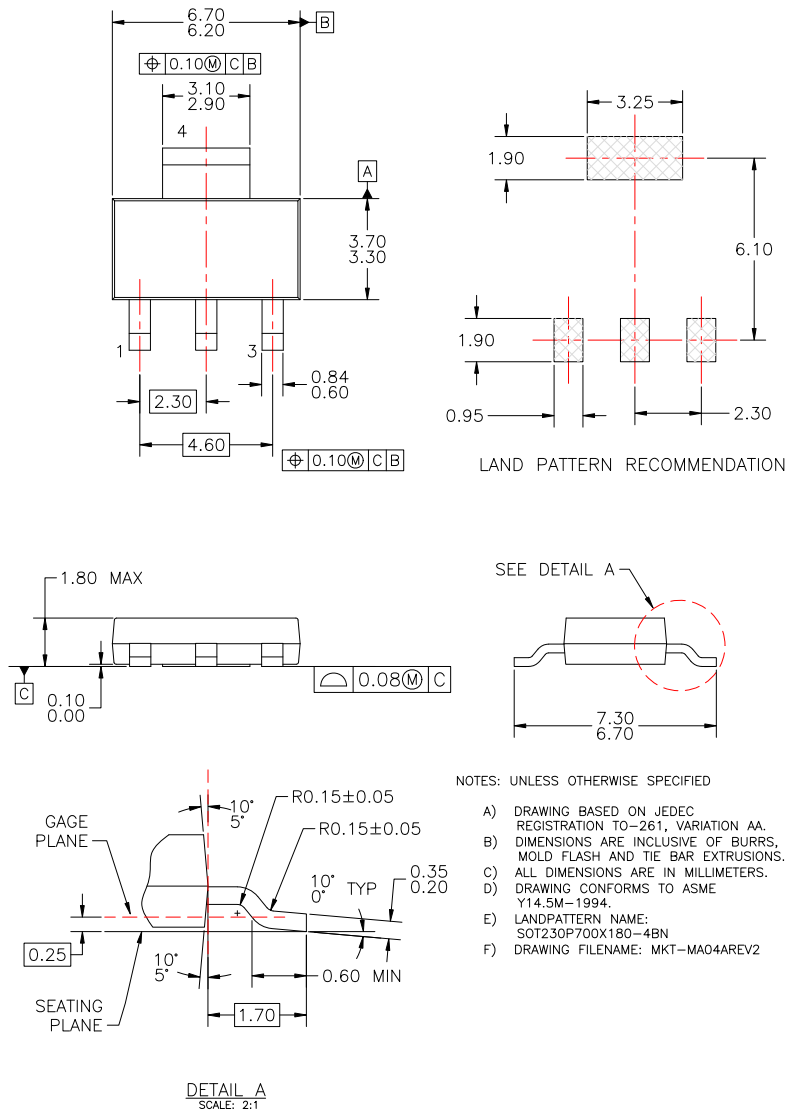


Figure 12. MOLDED PACKAGING, SOT-223, 4-LEAD (ACTIVE)

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