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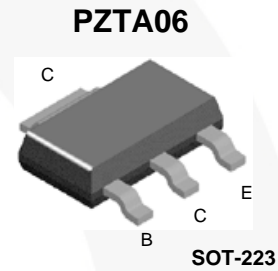
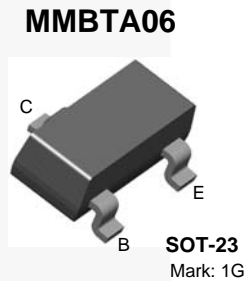
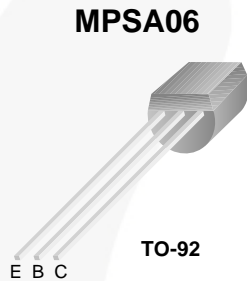


September 2014

MPSA06 / MMBTA06 / PZTA06 NPN General-Purpose Amplifier

Features

- This device is designed for general-purpose amplifier applications at collector currents to 300 mA.
- Sourced from process 12.



Ordering Information

| Part Number | Top Mark | Package | Packing Method |
|-------------|----------|------------|----------------|
| MPSA06 | MPSA06 | TO-92 3L | Bulk |
| MMBTA06 | 1G | SOT-23 3L | Tape and Reel |
| PZTA06 | A06 | SOT-223 4L | Tape and Reel |

Absolute Maximum Ratings^{(1), (2)}

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_{CE0} | Collector-Emitter Voltage | 80 | V |
| V_{CBO} | Collector-Base Voltage | 80 | V |
| V_{EBO} | Emitter-Base Voltage | 4.0 | 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°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 |
|-----------------------|---|--------|------------------------|-----------------------|---------------------------|
| | | MPSA06 | MMBTA06 ⁽³⁾ | PZTA06 ⁽⁴⁾ | |
| P_D | Total Device Dissipation | 625 | 350 | 1000 | mW |
| | Derate Above 25°C | 5.0 | 2.8 | 8.0 | mW/ $^\circ\text{C}$ |
| $R_{\theta\text{JC}}$ | Thermal Resistance, Junction-to-Case | 83.3 | | | $^\circ\text{C}/\text{W}$ |
| $R_{\theta\text{JA}}$ | Thermal Resistance, Junction-to-Ambient | 200 | 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.
- Device is mounted on FR-4 PCB 36 mm x 18 mm x 1.5 mm, mounting pad for the collector lead minimum 6 cm².

Electrical Characteristics

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

| Symbol | Parameter | Conditions | Min. | Max. | Unit |
|-------------------------------------|--|---|------|------|---------------|
| Off Characteristics | | | | | |
| $V_{(\text{BR})\text{CEO}}$ | Collector-Emitter Breakdown Voltage ⁽⁵⁾ | $I_C = 1.0 \text{ mA}, I_B = 0$ | 80 | | V |
| $V_{(\text{BR})\text{EBO}}$ | Emitter-Base Breakdown Voltage | $I_E = 100 \mu\text{A}, I_C = 0$ | 4.0 | | V |
| I_{CEO} | Collector Cut-Off Current | $V_{\text{CE}} = 60 \text{ V}, I_B = 0$ | | 0.1 | μA |
| I_{CBO} | Collector Cut-Off Current | $V_{\text{CB}} = 80 \text{ V}, I_E = 0$ | | 0.1 | μA |
| On Characteristics | | | | | |
| h_{FE} | DC Current Gain | $I_C = 10 \text{ mA}, V_{\text{CE}} = 1.0 \text{ V}$ | 100 | | |
| | | $I_C = 100 \text{ mA}, V_{\text{CE}} = 1.0 \text{ V}$ | 100 | | |
| $V_{\text{CE}(\text{sat})}$ | Collector-Emitter Saturation Voltage | $I_C = 100 \text{ mA}, I_B = 10 \text{ mA}$ | | 0.25 | V |
| $V_{\text{BE}(\text{on})}$ | Base-Emitter On Voltage | $I_C = 100 \text{ mA}, V_{\text{CE}} = 1.0 \text{ V}$ | | 1.2 | V |
| Small Signal Characteristics | | | | | |
| f_T | Current Gain - Bandwidth Product | $I_C = 10 \text{ mA}, V_{\text{CE}} = 2.0 \text{ V}, f = 100 \text{ MHz}$ | 100 | | MHz |

Notes:

- Pulse test: pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.

Typical Performance Characteristics



Figure 1. Typical Pulsed Current Gain vs. Collector Current

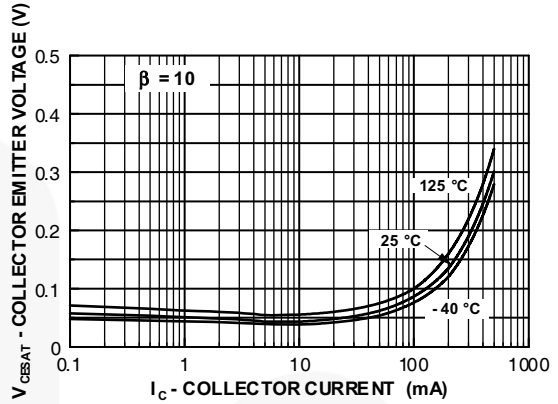


Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current



Figure 3. Base-Emitter Saturation Voltage vs. Collector Current

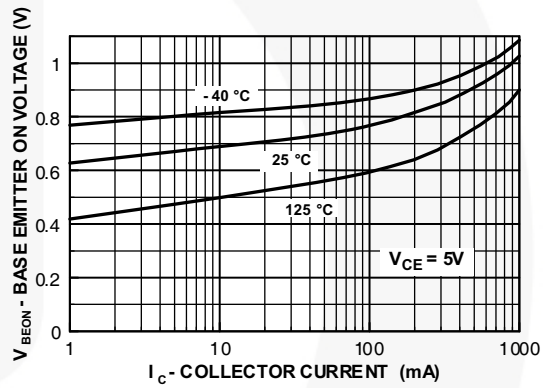


Figure 4. Base-Emitter On Voltage vs. Collector Current

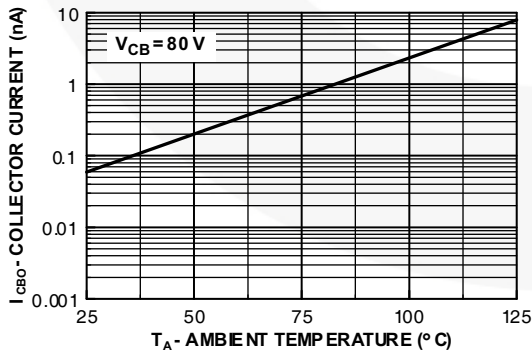


Figure 5. Collector Cut-Off Current vs. Ambient Temperature

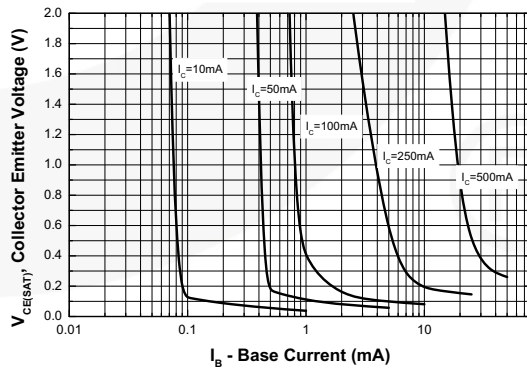


Figure 6. Collector Saturation Region

Typical Performance Characteristics (Continued)



Figure 7. Collector-Emitter Breakdown Voltage with Resistance Between Emitter-Base



Figure 8. Input and Output Capacitance vs. Reverse Current

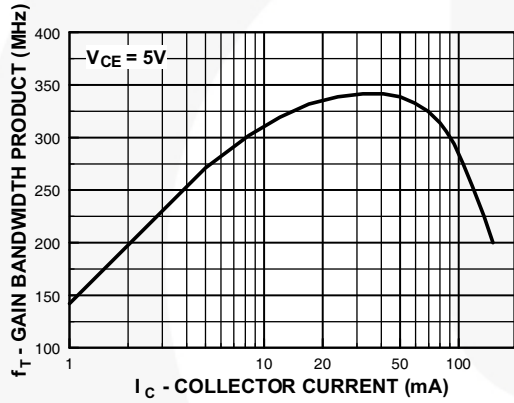


Figure 9. Gain Bandwidth Product vs. Collector Current

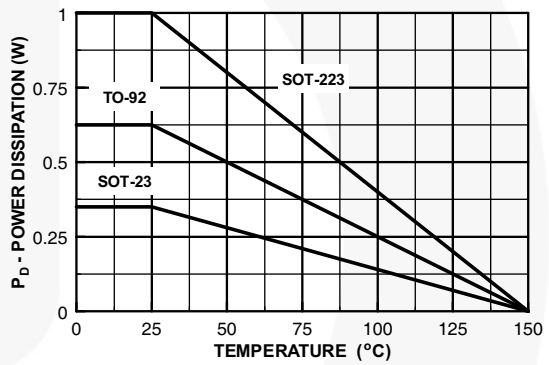


Figure 10. Power Dissipation vs. Ambient Temperature

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-1994.
- D) TO-92 (92,94,96,97,98) PIN CONFIGURATION:

| PIN | 92 | 94 | 96 | 97 | 98 |
|-----|-------|-------|-------|-------|-------|
| | P F M | P F M | B F M | P F M | P F M |
| 1 | E S S | E S S | B D G | C G D | C G D |
| 2 | B D G | C G D | E S S | B D G | E S S |
| 3 | C G D | B D G | C G D | E S S | B D G |

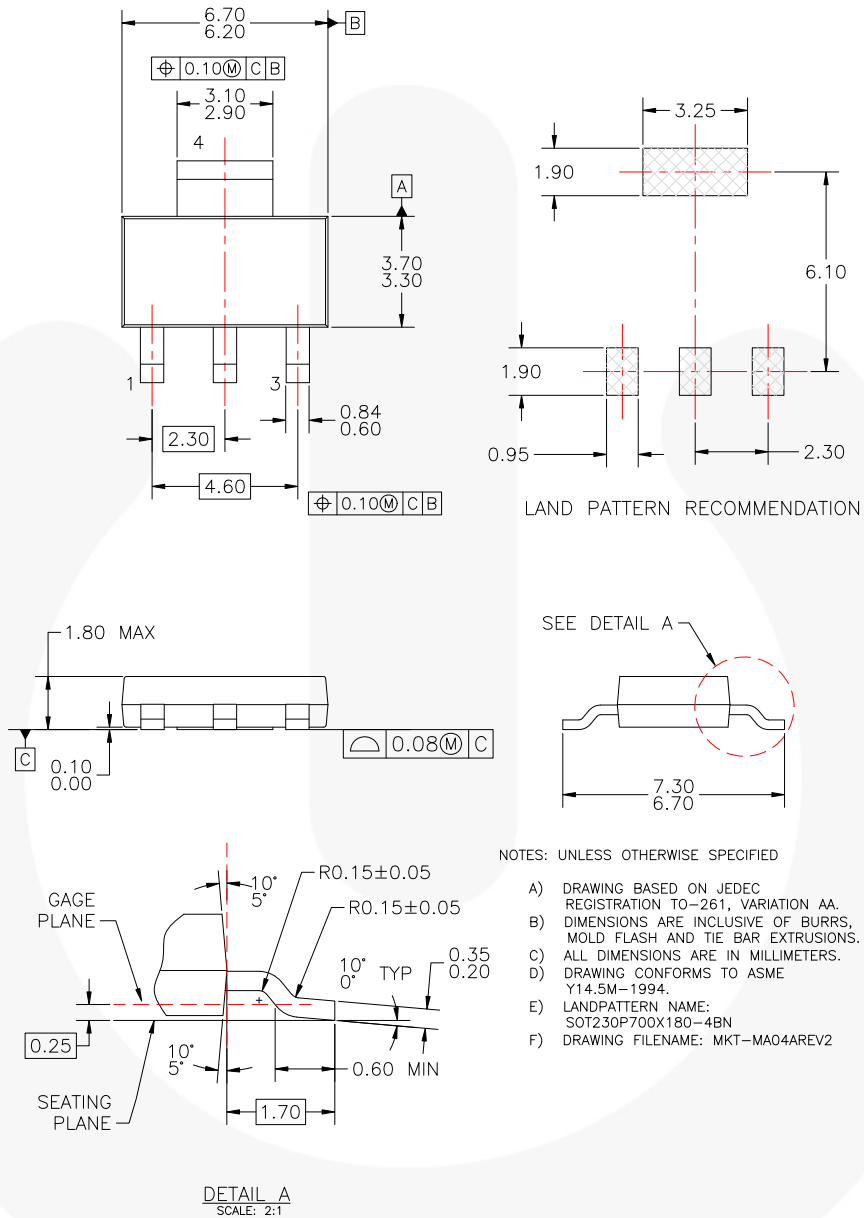
LEGEND:

P - BIPOLAR E - EMITTER D - DRAIN
 F - JFET B - BASE S - SOURCE
 M - DMOS C - COLLECTOR G - GATE

- E) FOR PACKAGE 92, 94, 96, 97 AND 98: PIN CONFIGURATION DRAIN "D" AND SOURCE "S" ARE INTERCHANGEABLE AT JFET "F" OPTION.
- F) DRAWING FILENAME: MKT-ZA03DREV3.

Figure 11. 3-LEAD, TO-92, MOLDED, STD STRAIGHT LEAD (NO EOL CODE)

Physical Dimensions (Continued)



NOTES: UNLESS OTHERWISE SPECIFIED

- A) DRAWING BASED ON JEDEC REGISTRATION TO-261, VARIATION AA.
- B) DIMENSIONS ARE INCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
- C) ALL DIMENSIONS ARE IN MILLIMETERS.
- D) DRAWING CONFORMS TO ASME Y14.5M-1994.
- E) LANDPATTERN NAME: SOT230P700X180-4BN
- F) DRAWING FILENAME: MKT-MA04AREV2

Figure 13. MOLDED PACKAGING, SOT-223, 4-LEAD



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