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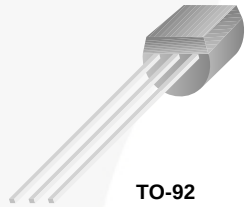
September 2014

# MPSA06 / MMBTA06 / PZTA06
# NPN General-Purpose Amplifier

## Features

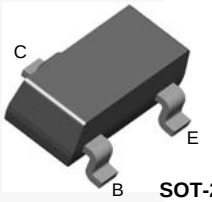
- This device is designed for general-purpose amplifier applications at collector currents to 300 mA.
- Sourced from process 12.

**MPSA06**



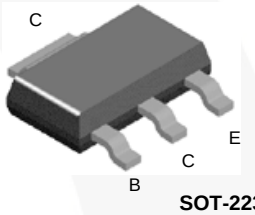

**TO-92**

**MMBTA06**




**SOT-23**
Mark: 1G

**PZTA06**




**SOT-223**

## 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°C unless otherwise noted.

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CEO}$ | 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 | °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.

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## Thermal Characteristics

Values are at $T_A$ = 25°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/°C |
| $R_{\theta JC}$ | Thermal Resistance, Junction-to-Case | 83.3 | | | °C/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | 200 | 357 | 125 | °C/W |

**Notes:**

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

4. Device is mounted on FR-4 PCB 36 mm x 18 mm x 1.5 mm, mounting pad for the collector lead minimum 6 $cm^2$.

## Electrical Characteristics

Values are at $T_A$ = 25°C unless otherwise noted.

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

**Notes:**

5. Pulse test: pulse width ≤ 300 µs, duty cycle ≤ 2%.

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## Typical Performance Characteristics

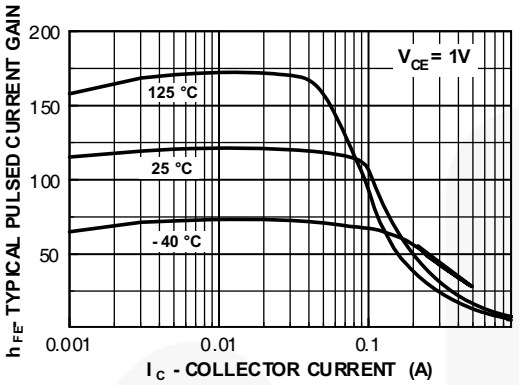



**Figure 1. Typical Pulsed Current Gain vs. Collector Current**

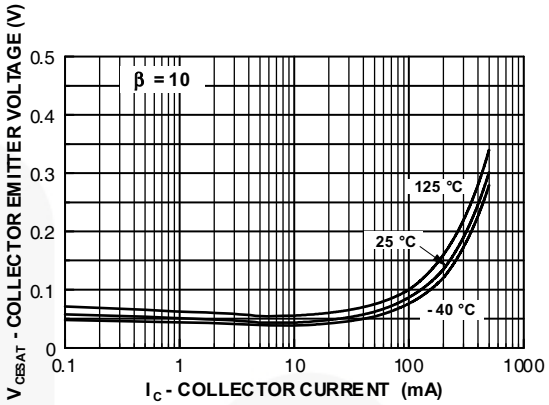



**Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current**

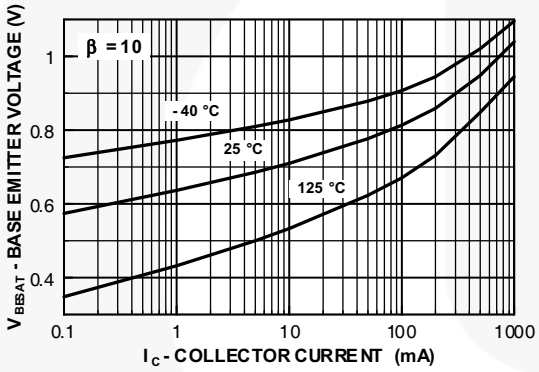



**Figure 3. Base-Emitter Saturation Voltage vs. Collector Current**

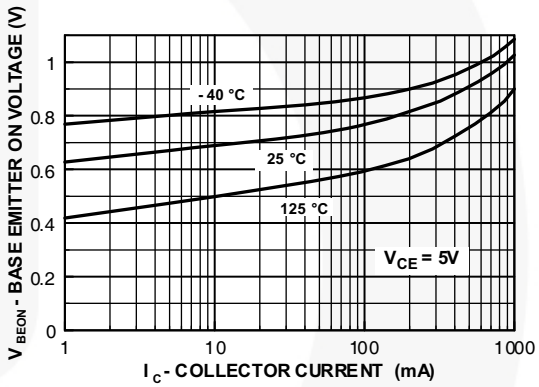



**Figure 4. Base-Emitter On Voltage vs. Collector Current**

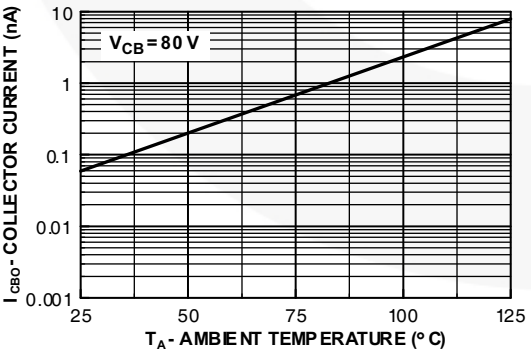



**Figure 5. Collector Cut-Off Current vs. Ambient Temperature**

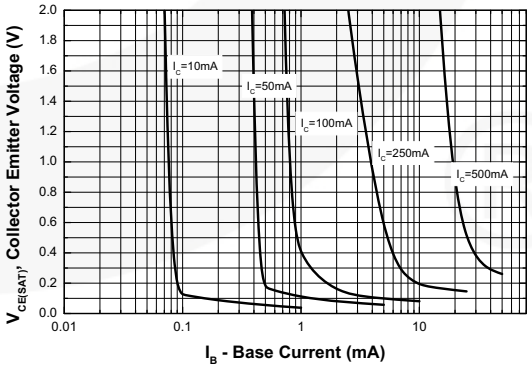



**Figure 6. Collector Saturation Region**

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## Typical Performance Characteristics (Continued)

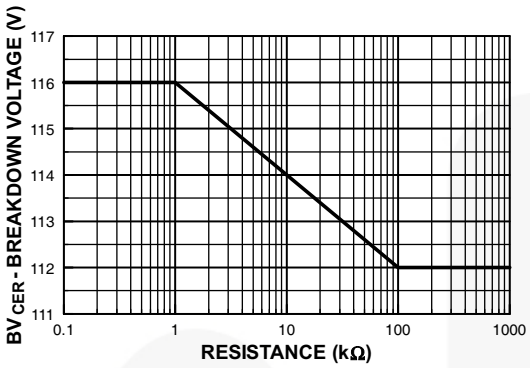



**Figure 7. Collector-Emitter Breakdown Voltage with Resistance Between Emitter-Base**

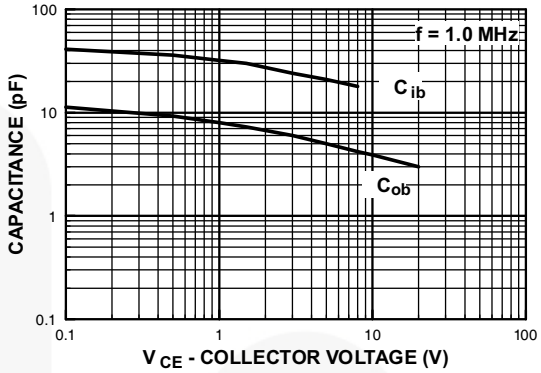



**Figure 8. Input and Output Capacitance vs. Reverse Current**

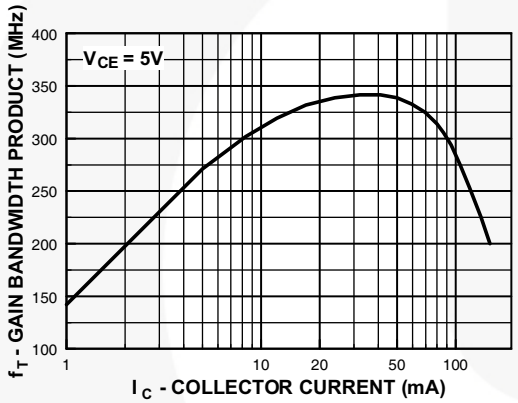



**Figure 9. Gain Bandwidth Product vs. Collector Current**

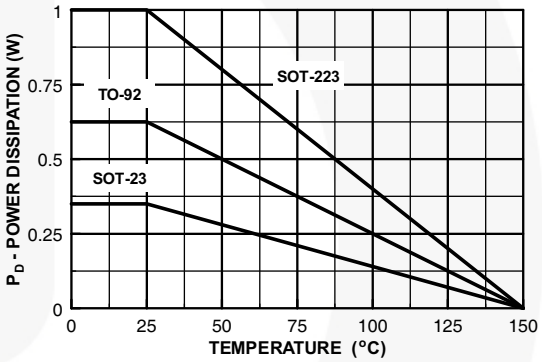
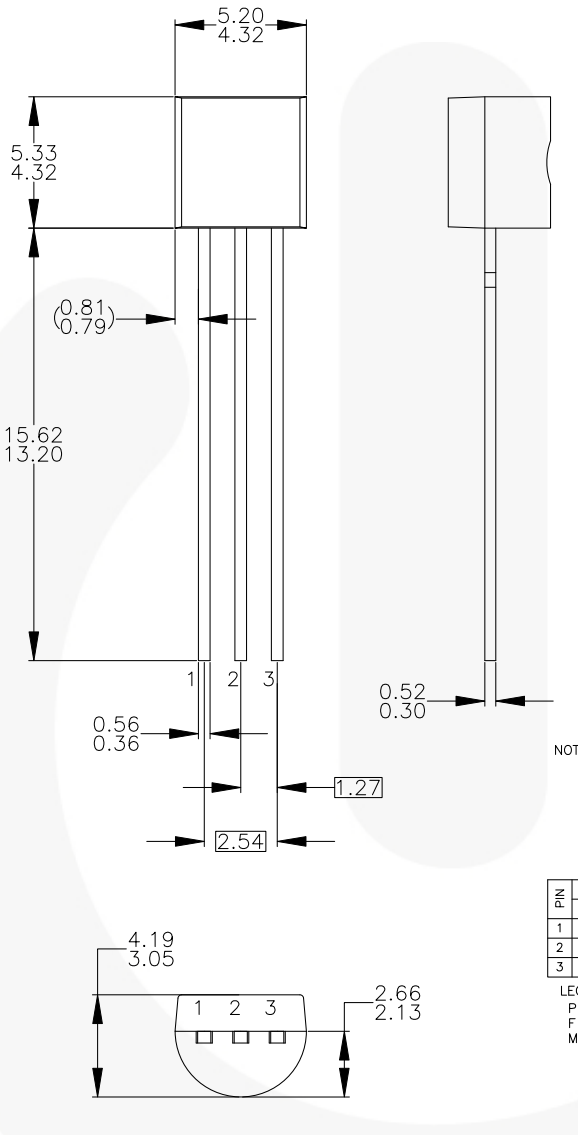



**Figure 10. Power Dissipation vs. Ambient Temperature**

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## 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
F – JFET
M – DMOS
E – EMITTER
B – BASE
C – COLLECTOR
D – DRAIN
S – SOURCE
G – GATE

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

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

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## Physical Dimensions (Continued)

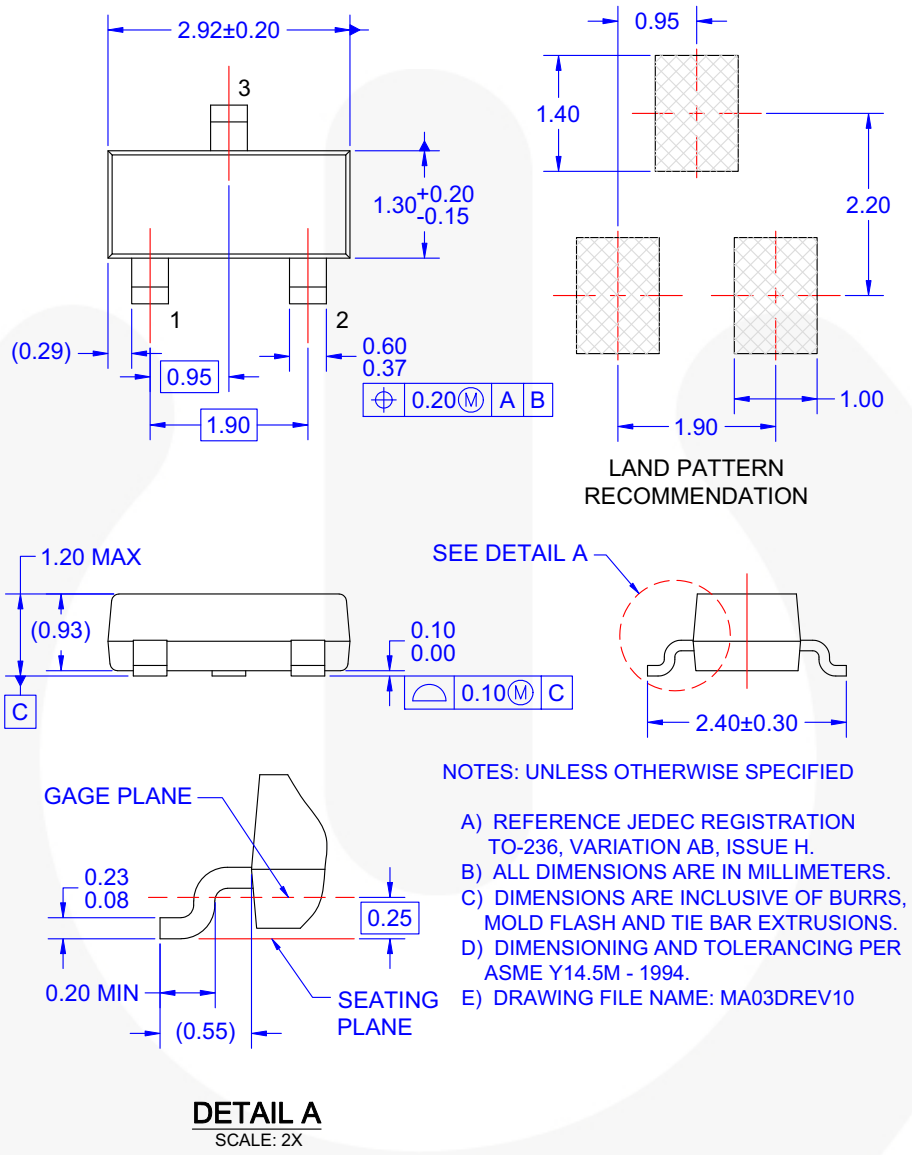



**Figure 12. 3-LEAD, SOT23, JEDEC TO-236, LOW PROFILE**

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## Physical Dimensions (Continued)

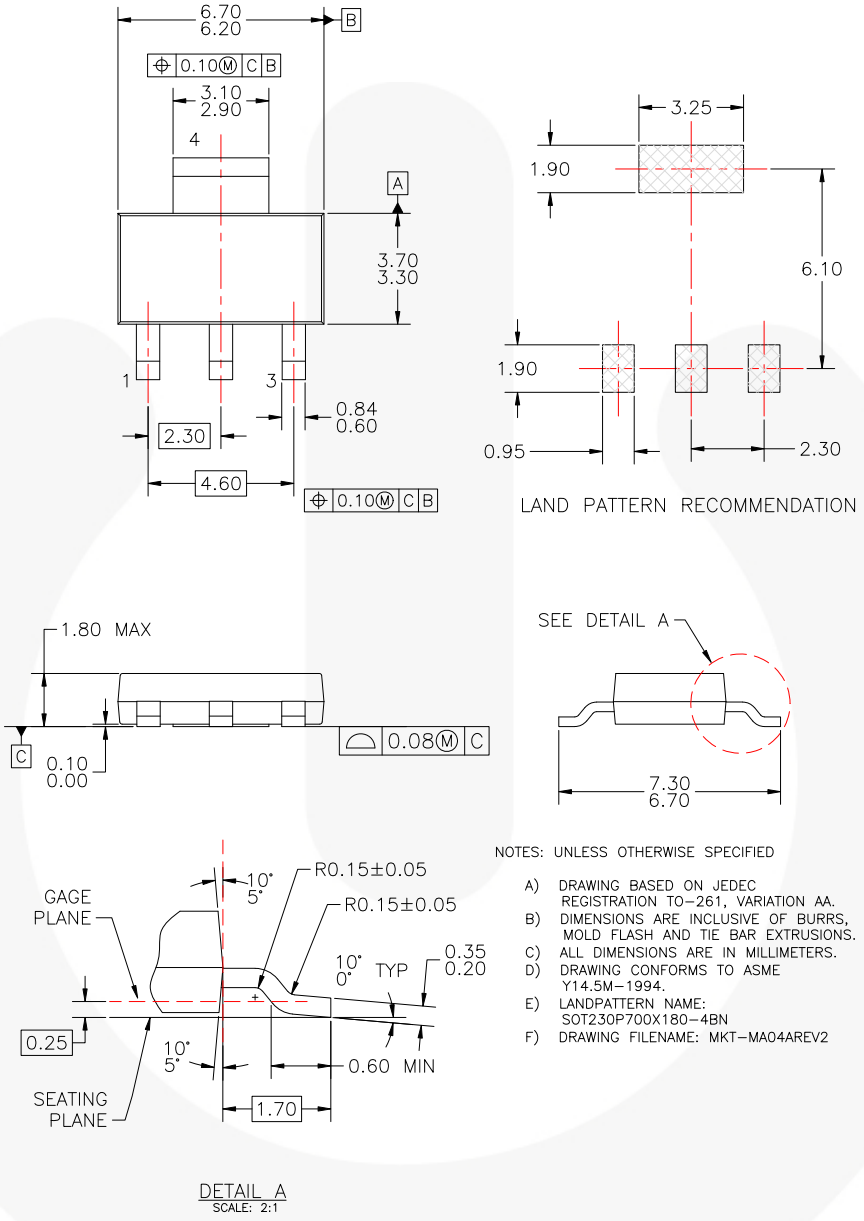



**Figure 13. MOLDED PACKAGING, SOT-223, 4-LEAD**

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