FAIRCHILD SEMICONDUCTOR®

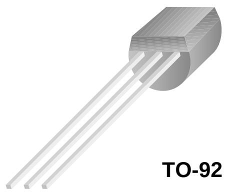
March 2011

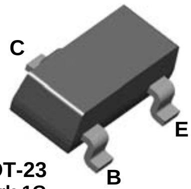
# MPSA06 / MMBTA06 / PZTA06
# NPN General Purpose Amplifier

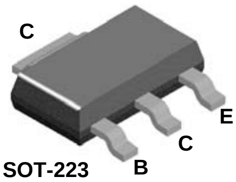
## Features

- This device is designed for general purpose amplifier applications at collector currents to 300mA.
- Sourced from Process 33.

**MPSA06** **MMBTA06** **PZTA06**




## Absolute Maximum Ratings * $T_a$ = 25°C unless otherwise noted

| Symbol | Parameter | Value | Units |
|---|---|---|---|
| $V_{CEO}$ | 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 |

* These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

**NOTES:**

1) These ratings are based on a maximum junction temperature of 150 degrees C.
2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

## Thermal Characteristics $T_a$ = 25°C unless otherwise noted

| Symbol | Parameter | Max. | | | Units |
|---|---|---|---|---|---|
| | | MPSA06 | *MMBTA06 | **PZTA06 | |
| $P_D$ | Total Device Dissipation<br>Derate above 25°C | 625<br>5.0 | 350<br>2.8 | 1,000<br>8.0 | mW<br>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 |

* Device mounted on FR-4 PCB 1.6” × 1.6” × 0.06”.

** Device mounted on FR-4 PCB 36mm × 18mm × 1.5mm; mounting pad for the collector lead min. $6cm^2$.

## Electrical Characteristics $T_a$ = 25°C unless otherwise noted

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

* Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2.0%

## Typical Performance Characteristics

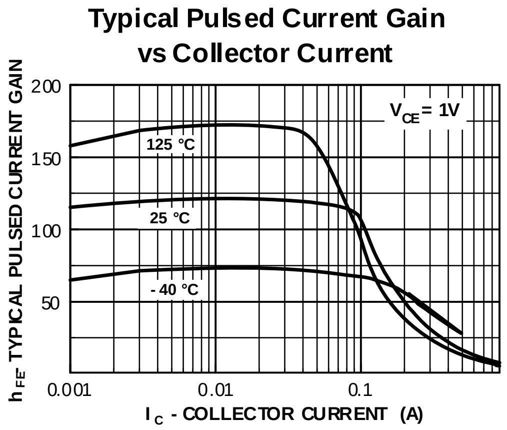



Figure 1. Typical Pulsed Current Gain vs Collector Current

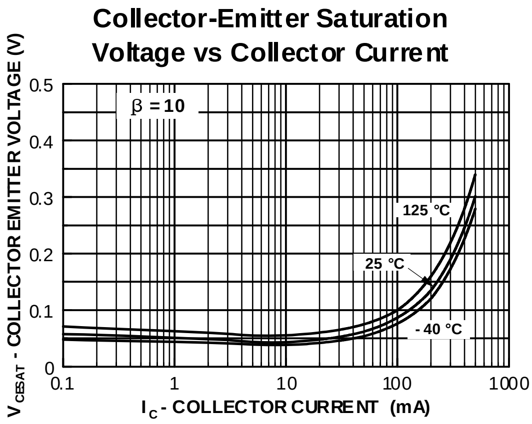



Figure 2. Collector-Emitter Saturation Voltage vs Collector Current

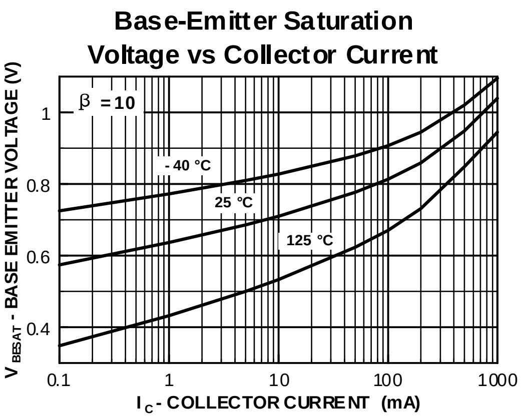



Figure 3. Base-Emitter Saturation Voltage vs Collector Current

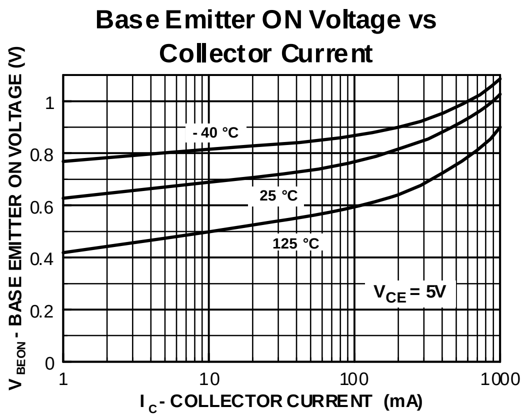



Figure 4. Base-Emitter On Voltage vs Collector Current

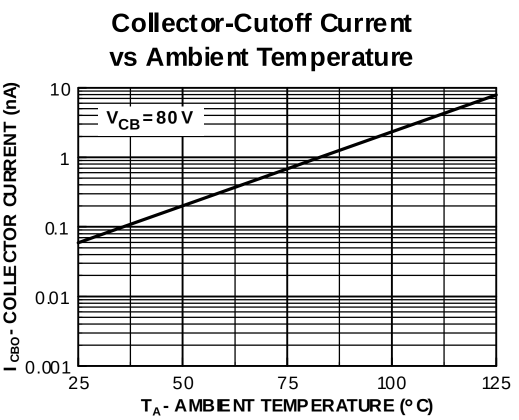



Figure 5. Collector Cutoff Current vs Ambient Temperature

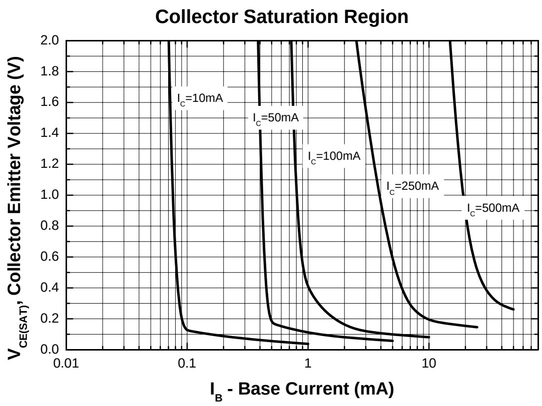



Figure 6. Collector Saturation Region

## Typical Performance Characteristics (continued)

**Collector-Emitter Breakdown Voltage with Resistance Between Emitter-Base**

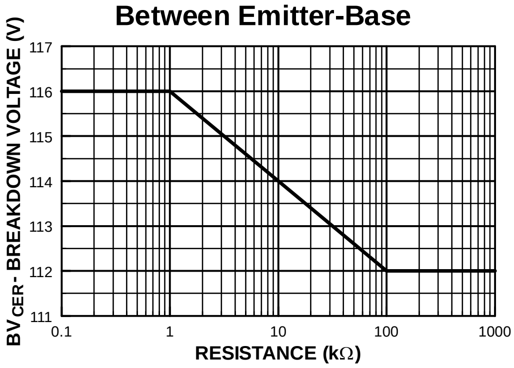



**Figure 7. Collector-Emitter Breakdown Voltage with Resistance Between Emitter-Base**

**Input and Output Capacitance vs Reverse Voltage**

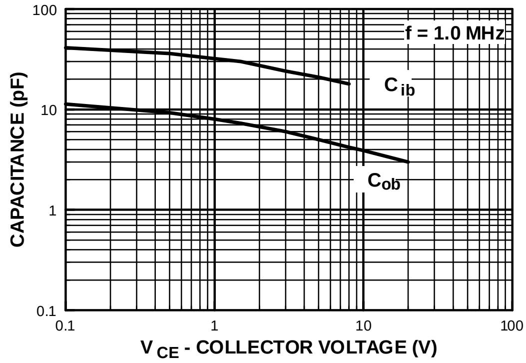



**Figure 8. Input and Output Capacitance vs Reverse Voltage**

**Gain Bandwidth Product vs Collector Current**

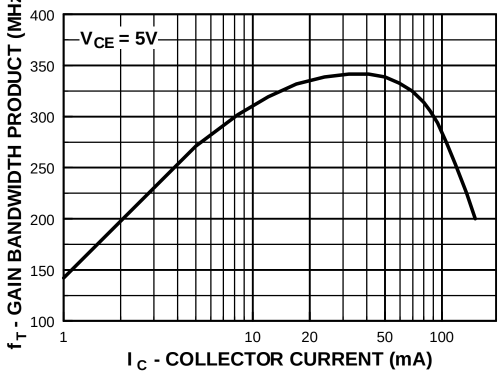



**Figure 9. Gain Bandwidth Product vs Collector Current**

**Power Dissipation vs Ambient Temperature**

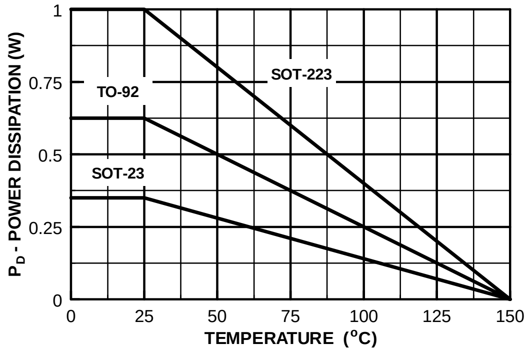



**Figure 10. Power Dissipation vs Ambient Temperature**

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