

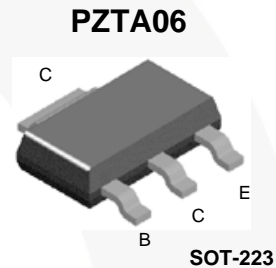
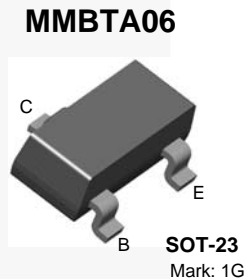
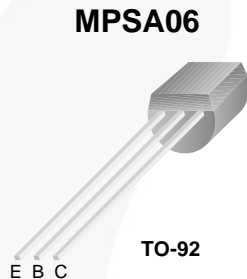


September 2014

# 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<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	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  $150^\circ\text{C}$ .
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
		MPSA06	MMBTA06 <sup>(3)</sup>	PZTA06 <sup>(4)</sup>	
$P_D$	Total Device Dissipation	625	350	1000	mW
	Derate Above $25^\circ\text{C}$	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 cm<sup>2</sup>.

## Electrical Characteristics

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

Symbol	Parameter	Conditions	Min.	Max.	Unit
<b>Off Characteristics</b>					
$V_{(\text{BR})\text{CEO}}$	Collector-Emitter Breakdown Voltage <sup>(5)</sup>	$I_C = 1.0 \text{ mA}, I_B = 0$	80		V
$V_{(\text{BR})\text{EBO}}$	Emitter-Base Breakdown Voltage	$I_E = 100 \mu\text{A}, I_C = 0$	4.0		V
$I_{\text{CEO}}$	Collector Cut-Off Current	$V_{\text{CE}} = 60 \text{ V}, I_B = 0$		0.1	$\mu\text{A}$
$I_{\text{CBO}}$	Collector Cut-Off Current	$V_{\text{CB}} = 80 \text{ V}, I_E = 0$		0.1	$\mu\text{A}$
<b>On Characteristics</b>					
$h_{\text{FE}}$	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
<b>Small Signal Characteristics</b>					
$f_T$	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

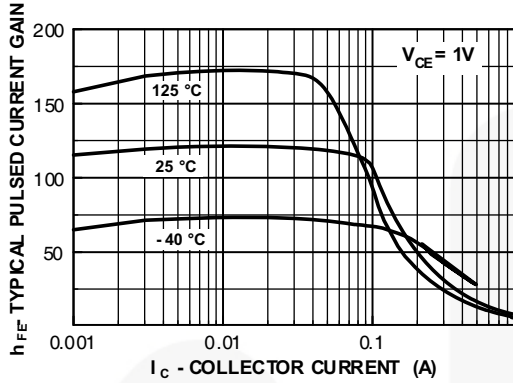


Figure 1. Typical Pulsed Current Gain vs. Collector Current

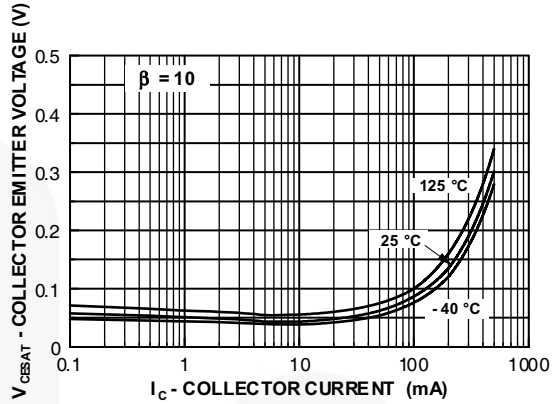


Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current

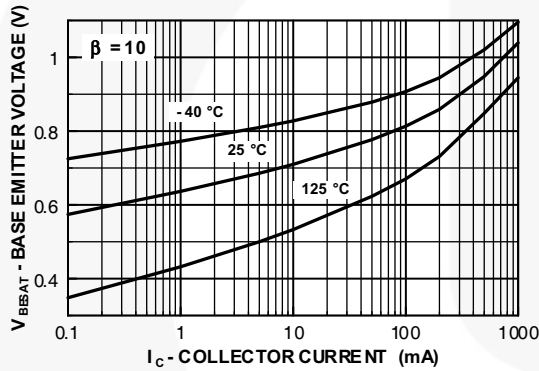


Figure 3. Base-Emitter Saturation Voltage vs. Collector Current

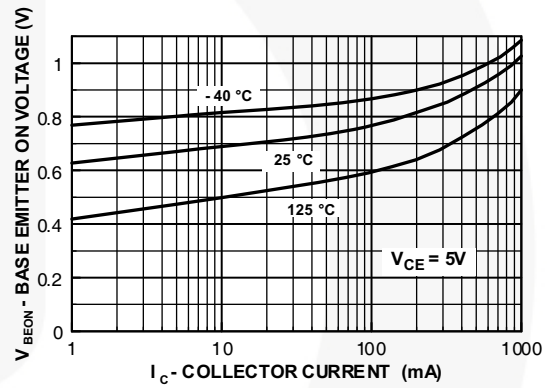


Figure 4. Base-Emitter On Voltage vs. Collector Current

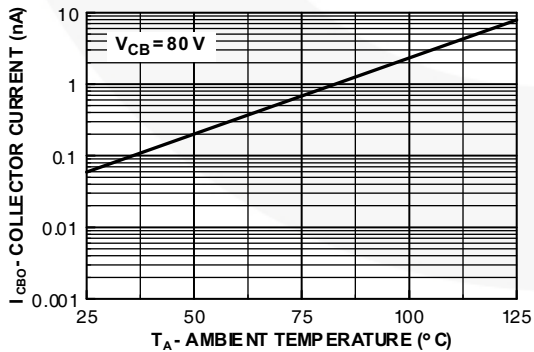


Figure 5. Collector Cut-Off Current vs. Ambient Temperature

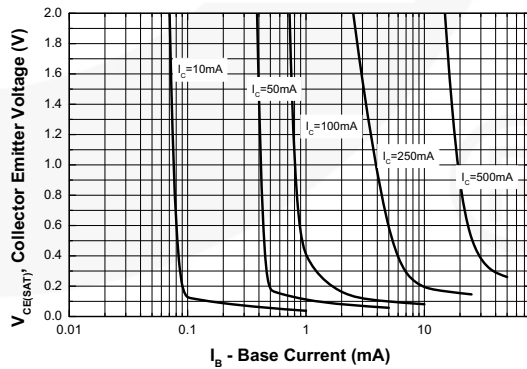
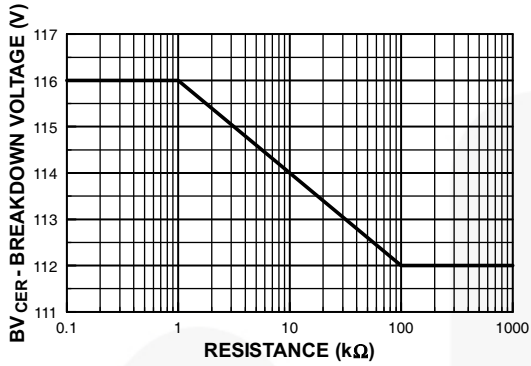
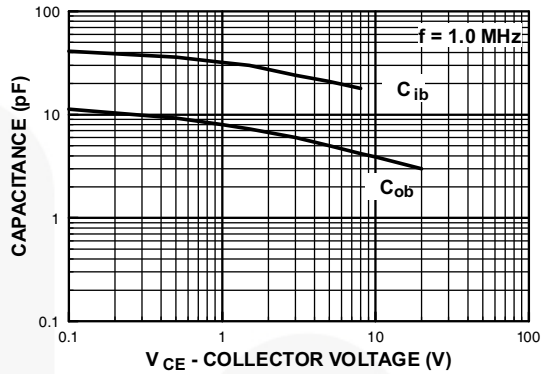


Figure 6. Collector Saturation Region

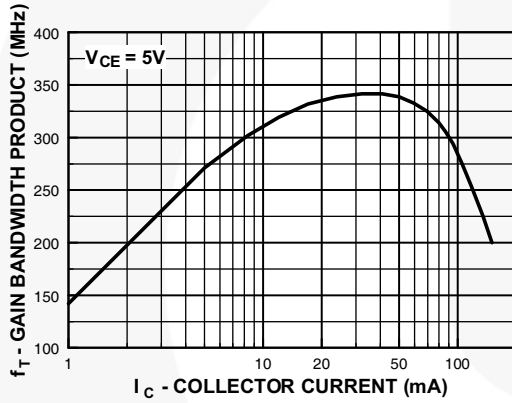
**Typical Performance Characteristics** (Continued)



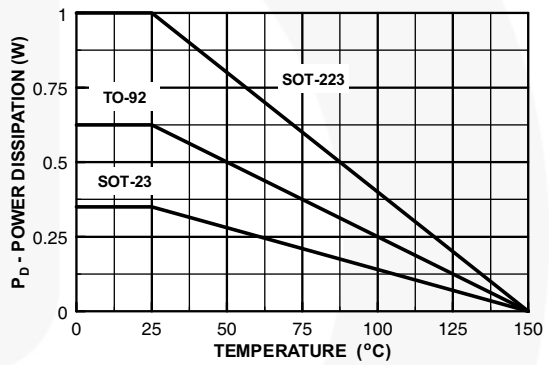
**Figure 7. Collector-Emitter Breakdown Voltage with Resistance Between Emitter-Base**



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

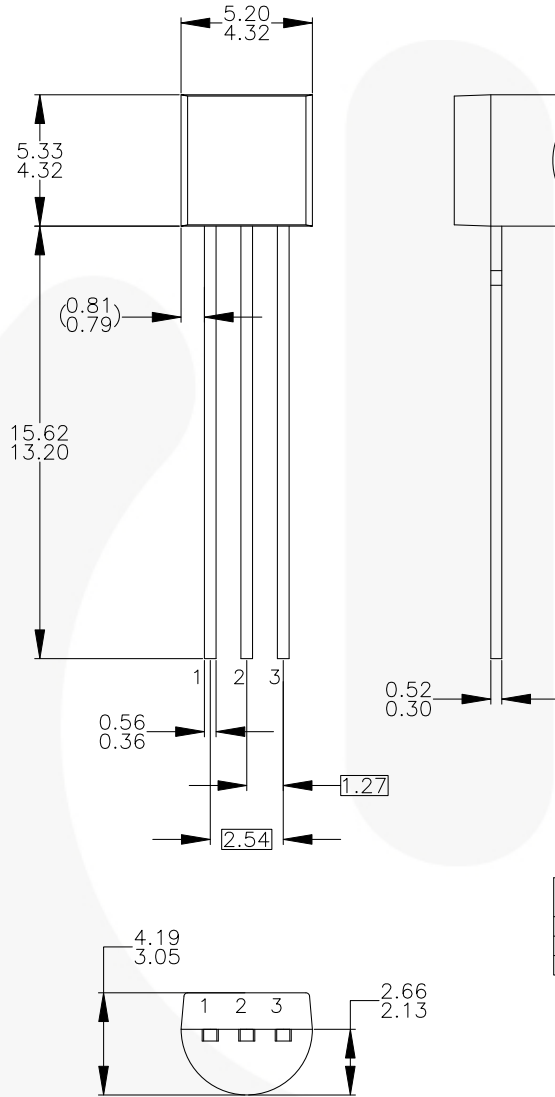


**Figure 9. Gain Bandwidth Product vs. Collector Current**



**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
1	E	S	B	C	D
2	D	G	E	B	E
3	C	D	D	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)

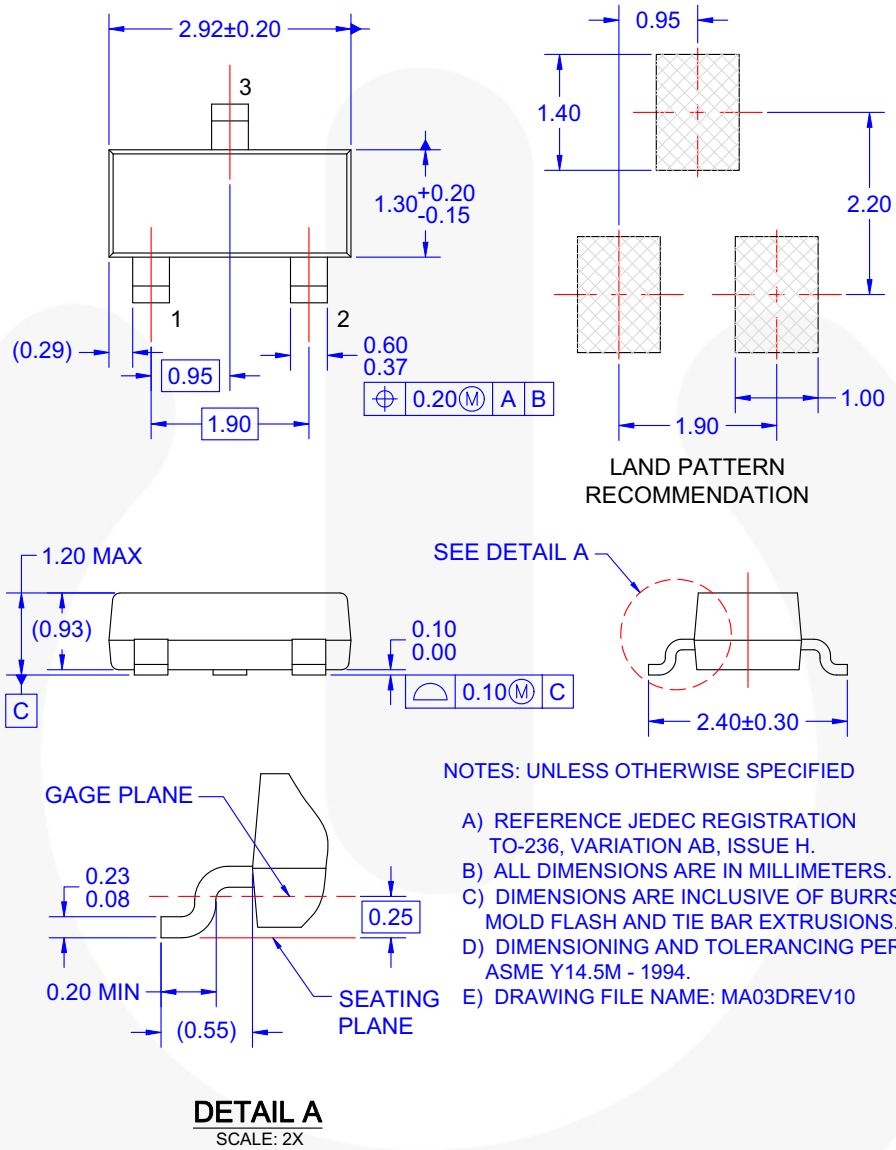


Figure 12. 3-LEAD, SOT23, JEDEC TO-236, LOW PROFILE

Physical Dimensions (Continued)

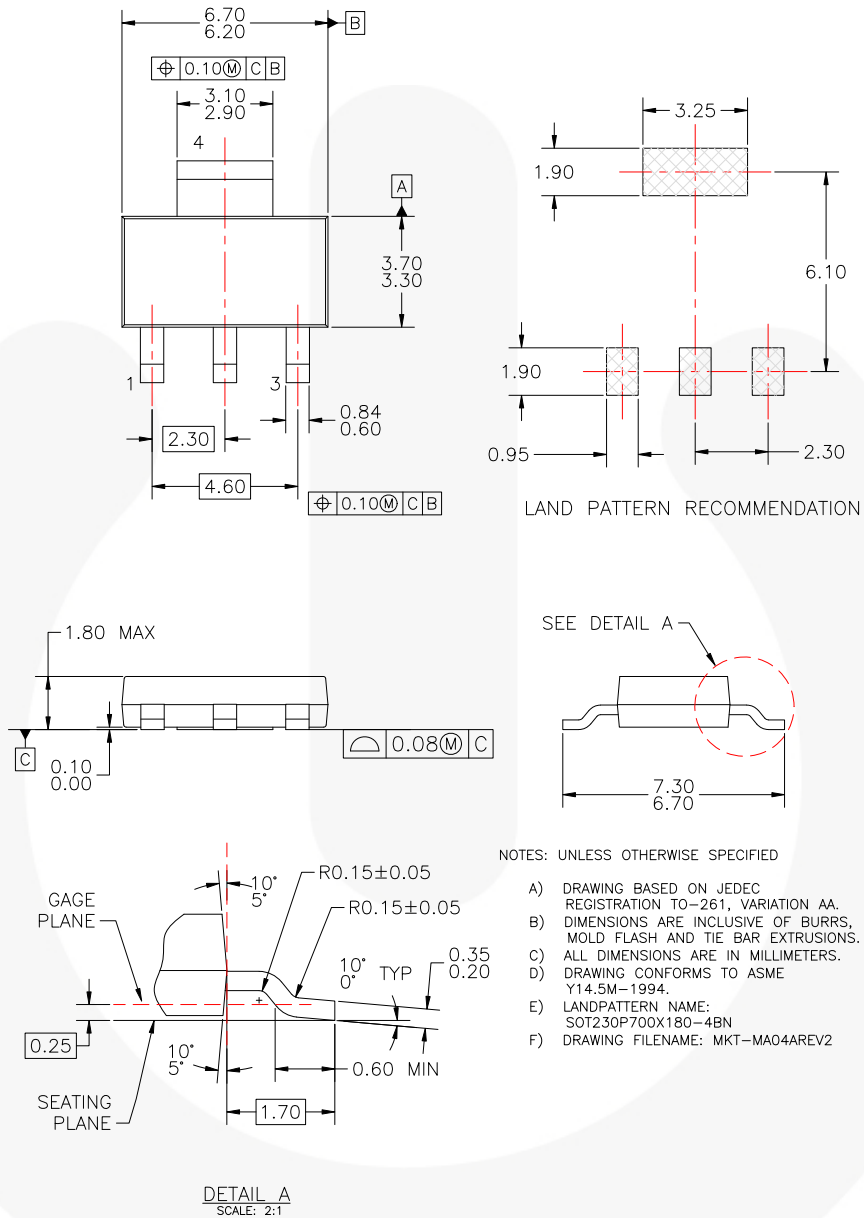



Figure 13. MOLDED PACKAGING, SOT-223, 4-LEAD





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