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February 2015

# MMBTA28 / PZTA28

## NPN Darlington Transistor

### Description

This device is designed for applications requiring extremely high current gain at collector currents to 500 mA. Sourced from process 03.

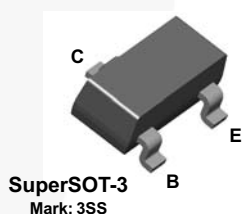


Figure 1. MMBTA28 Device Package

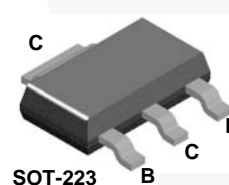


Figure 2. PZTA28 Device Package

### Ordering Information

Part Number	Top Mark	Package	Packing Method
MMBTA28	3SS	SSOT 3L	Tape and Reel
PZTA28	A28	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	12	V
$I_C$	Collector Current - Continuous	800	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
		MMBTA28 <sup>(3)</sup>	PZTA28 <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:

3. Device mounted on FR-4 PCB 36mm x 18mm x 1.5mm; mounting pad for the collector lead minimum 6cm<sup>2</sup>.

4. 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<sup>(5)</sup>

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

Symbol	Parameter	Conditions	Min.	Max.	Unit
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	$I_C = 100\ \mu\text{A}$ , $V_{BE} = 0$	80		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 100\ \mu\text{A}$ , $I_E = 0$	80		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10\ \mu\text{A}$ , $I_C = 0$	12		V
$I_{CBO}$	Collector Cut-Off Current	$V_{CB} = 60\ \text{V}$ , $I_E = 0$		100	nA
$I_{CES}$	Collector Cut-Off Current	$V_{CE} = 60\ \text{V}$ , $V_{BE} = 0$		500	nA
$I_{EBO}$	Emitter Cut-Off Current	$V_{EB} = 10\ \text{V}$ , $I_C = 0$		100	nA
$h_{FE}$	DC Current Gain	$I_C = 10\ \text{mA}$ , $V_{CE} = 5.0\ \text{V}$	10000		
		$I_C = 100\ \text{mA}$ , $V_{CE} = 5.0\ \text{V}$	10000		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 10\ \text{mA}$ , $I_B = 0.01\ \text{mA}$		1.2	V
		$I_C = 100\ \text{mA}$ , $I_B = 0.1\ \text{mA}$		1.5	
$V_{BE(on)}$	Base-Emitter On Voltage	$I_C = 100\ \text{mA}$ , $V_{CE} = 5.0\ \text{V}$		2.0	V
$f_T$	Current Gain - Bandwidth Product	$I_C = 10\ \text{mA}$ , $V_{CE} = 5.0\ \text{V}$ , $f = 100\ \text{MHz}$	125		MHz
$C_{obo}$	Output Capacitance	$V_{CB} = 1.0\ \text{V}$ , $I_E = 0$ , $f = 1.0\ \text{MHz}$		8.0	pF

### Note:

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

## Typical Performance Characteristics

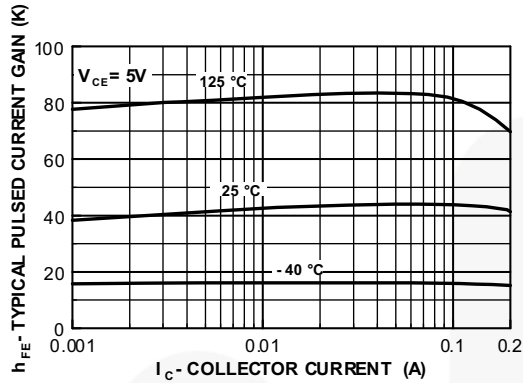


Figure 3. Typical Pulsed Current Gain vs. Collector Current

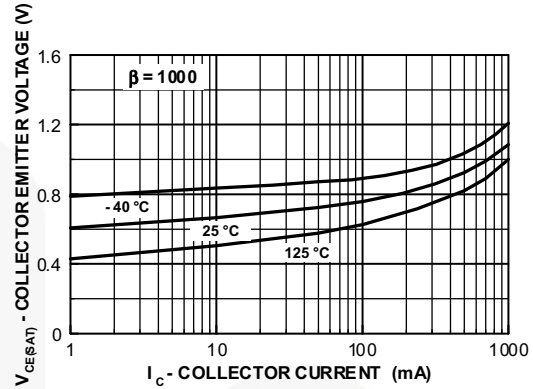


Figure 4. Collector-Emitter Saturation Voltage vs. Collector Current

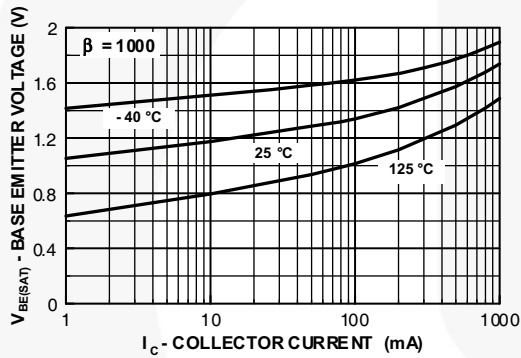


Figure 5. Base-Emitter Saturation Voltage vs. Collector Current

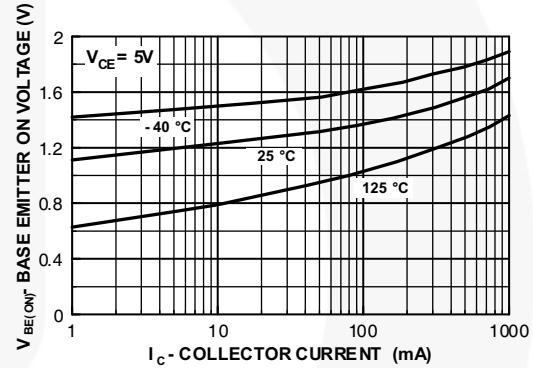


Figure 6. Base-Emitter On Voltage vs. Collector Current

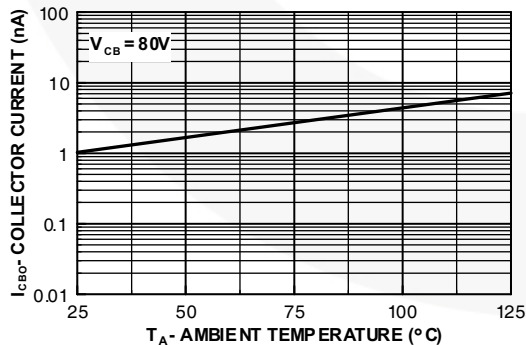


Figure 7. Collector Cut-Off Current vs. Ambient Temperature

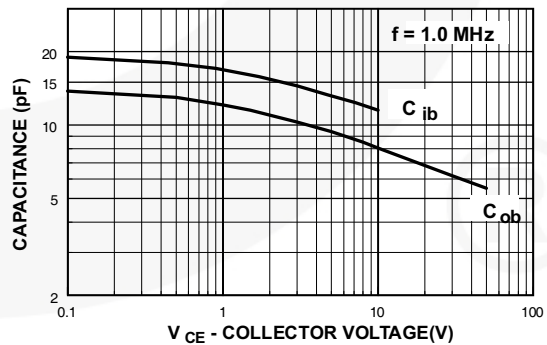


Figure 8. Input and Output Capacitance vs. Reverse Voltage

# Typical Performance Characteristics (Continued)

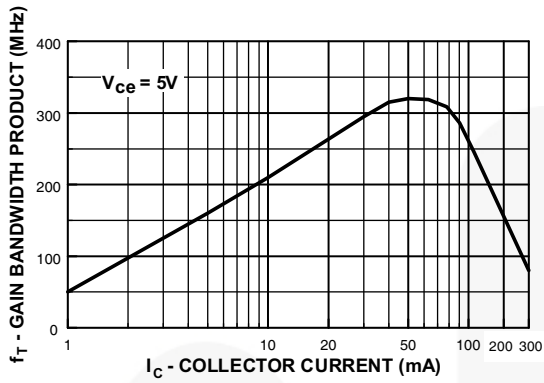


Figure 9. Gain Bandwidth Product vs. Collector Current

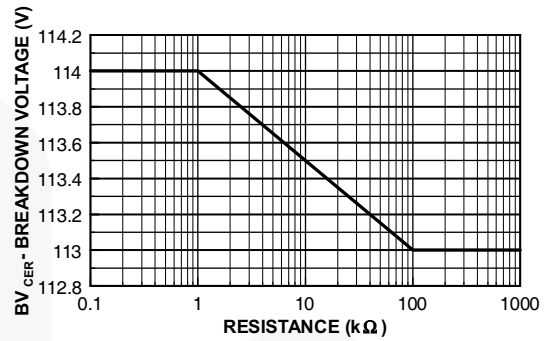


Figure 10. Collector-Emitter Breakdown Voltage with Resistance Between Emitter-Base

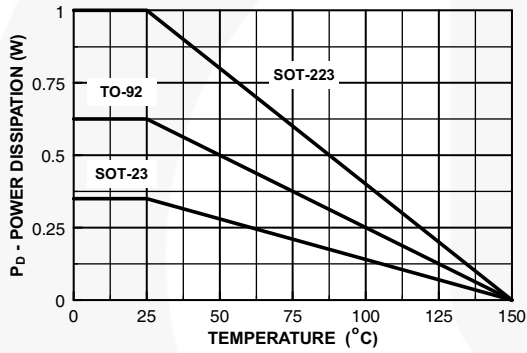
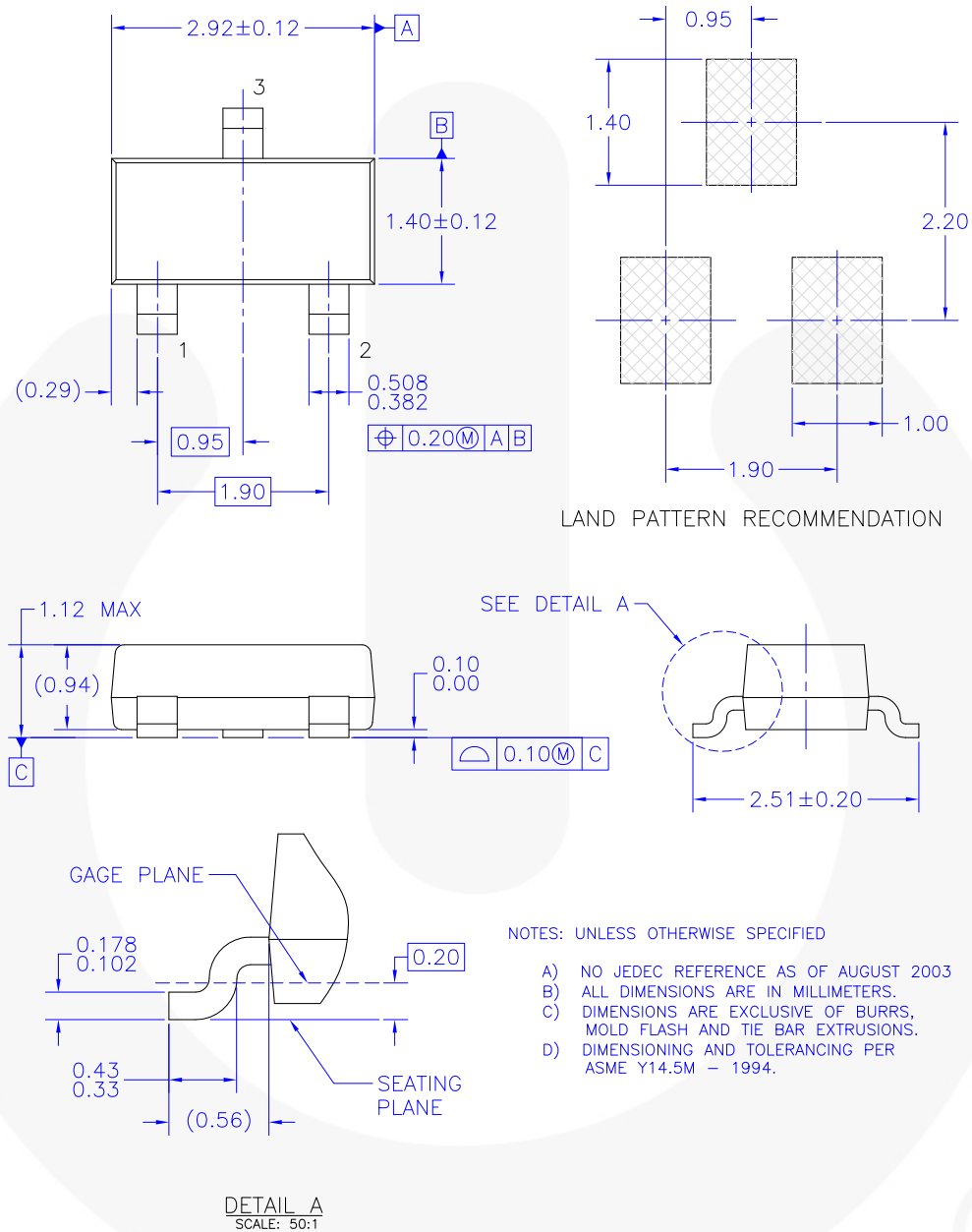


Figure 11. Power Dissipation vs. Ambient Temperature

## Physical Dimensions



MA03BREV B

Figure 12. MOLDED PACKAGE, SUPERSOT, 3-LEAD

## Physical Dimensions (Continued)

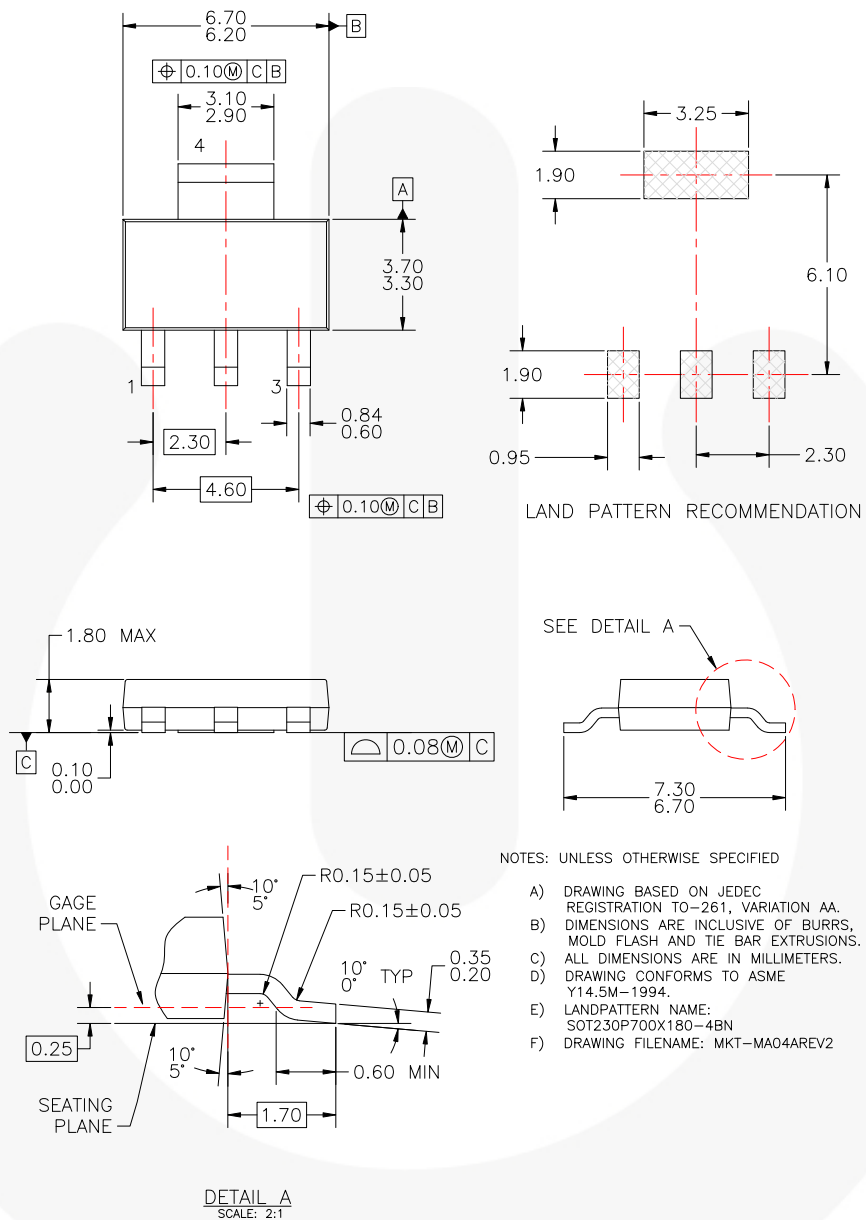


Figure 13. MOLDED PACKAGING, SOT-223, 4-LEAD





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