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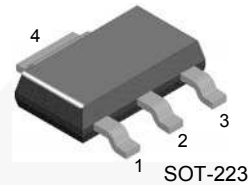


October 2014

# NZT560 / NZT560A NPN Low-Saturation Transistor

## Features

- These devices are designed with high-current gain and low-saturation voltage with collector currents up to 3 A continuous.



1. Base 2,4. Collector 3. Emitter

## Ordering Information

Part Number	Marking	Package	Packing Method
NZT560	560	SOT-223 4L	Tape and Reel
NZT560A	560A	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	60	V
$V_{CBO}$	Collector-Base Voltage	80	V
$V_{EBO}$	Emitter-Base Voltage	5	V
$I_C$	Collector Current - Continuous	3	A
$T_J, T_{STG}$	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<sup>(3)</sup>

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

Symbol	Parameter	Max.	Unit
$P_D$	Total Power Dissipation	1	W
	Derate Above $25^\circ\text{C}$	8	mW/ $^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	125	$^\circ\text{C}/\text{W}$

**Note:**

3. 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

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

Symbol	Parameter	Conditions	Min.	Max.	Unit
$BV_{CEO}$	Collector-Emitter Breakdown Voltage	$I_C = 10\text{ mA}, I_B = 0$	60		V
$BV_{CBO}$	Collector-Base Breakdown Voltage	$I_C = 100\ \mu\text{A}, I_E = 0$	80		V
$BV_{EBO}$	Emitter-Base Breakdown Voltage	$I_E = 100\ \mu\text{A}, I_C = 0$	5		V
$I_{CBO}$	Collector Cut-Off Current	$V_{CB} = 30\text{ V}, I_E = 0$		100	nA
		$V_{CB} = 30\text{ V}, I_E = 0, T_A = 100^\circ\text{C}$		10	$\mu\text{A}$
$I_{EBO}$	Emitter Cut-Off Current	$V_{EB} = 4\text{ V}, I_C = 0$		100	nA
$h_{FE}$	DC Current Gain <sup>(4)</sup>	$I_C = 100\text{ mA}, V_{CE} = 2\text{ V}$	70		
		$I_C = 500\text{ mA}, V_{CE} = 2\text{ V}$	NZT560	100	300
			NZT560A	250	550
		$I_C = 1\text{ A}, V_{CE} = 2\text{ V}$	80		
$I_C = 3\text{ A}, V_{CE} = 2\text{ V}$	25				
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage <sup>(4)</sup>	$I_C = 1\text{ A}, I_B = 100\text{ mA}$		300	mV
		$I_C = 3\text{ A}, I_B = 300\text{ mA}$	NZT560	450	
NZT560A	400				
$V_{BE(sat)}$	Base-Emitter Saturation Voltage <sup>(4)</sup>	$I_C = 1\text{ A}, I_B = 100\text{ mA}$		1.25	V
$V_{BE(on)}$	Base-Emitter On Voltage <sup>(4)</sup>	$I_C = 1\text{ A}, V_{CE} = 2\text{ V}$		1	V
$C_{obo}$	Output Capacitance	$V_{CB} = 10\text{ V}, I_E = 0, f = 1.0\text{ MHz}$		30	pF
$f_T$	Transition Frequency	$I_C = 100\text{ mA}, V_{CE} = 5\text{ V}, f = 100\text{ MHz}$	75		MHz

**Note:**

4. Pulse test: pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2.0\%$

## Typical Performance Characteristics

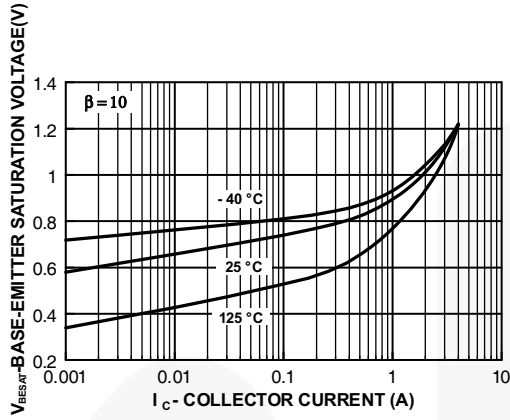


Figure 1. Base-Emitter Saturation Voltage vs. Collector Current

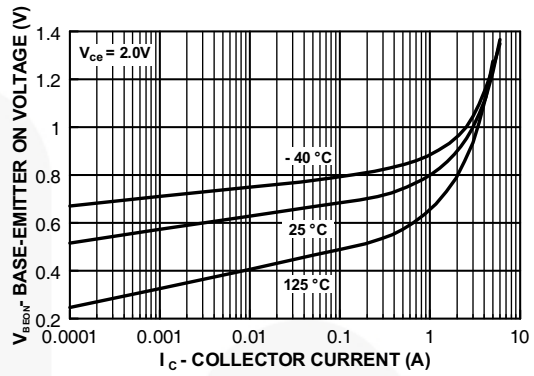


Figure 2. Base-Emitter On Voltage vs. Collector Current

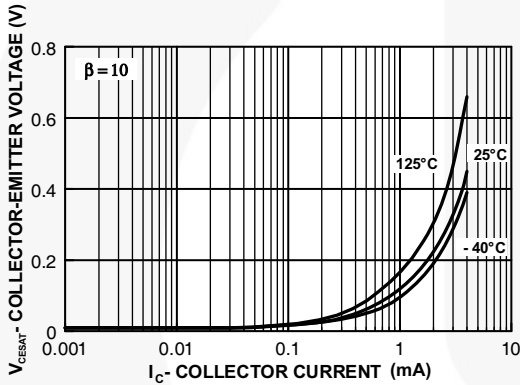


Figure 3. Collector-Emitter Saturation Voltage vs. Collector Current

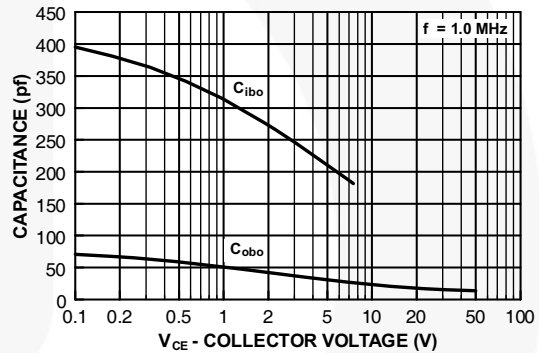


Figure 4. Input / Output Capacitance vs. Reverse Bias Voltage

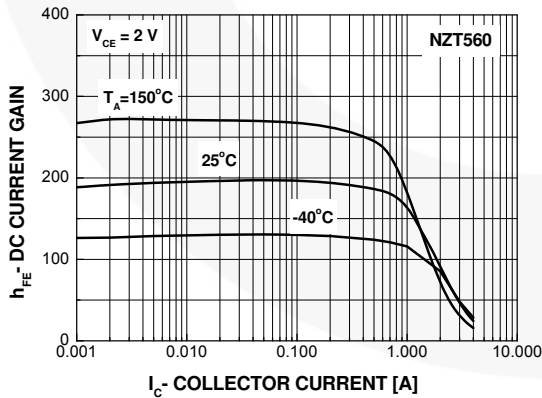


Figure 5. Current Gain vs. Collector Current

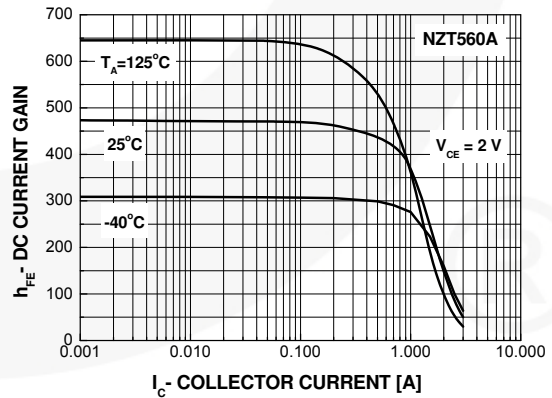
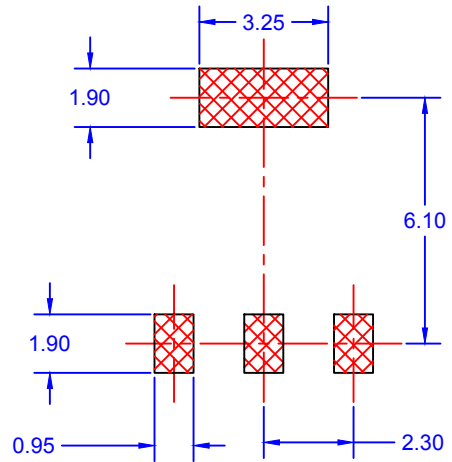
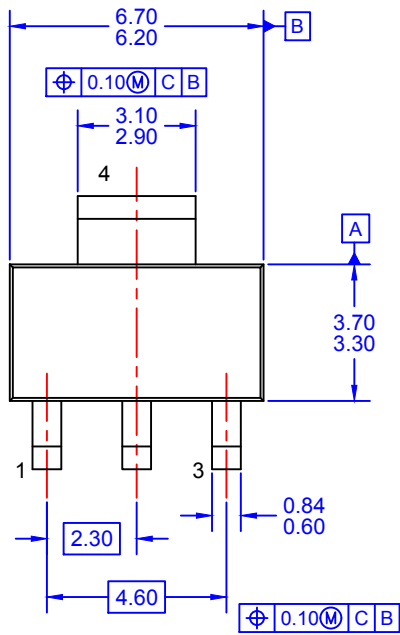
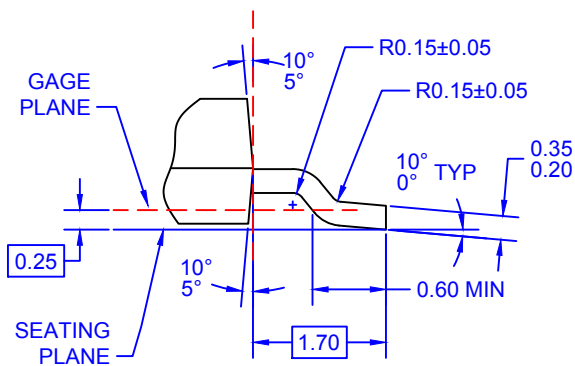
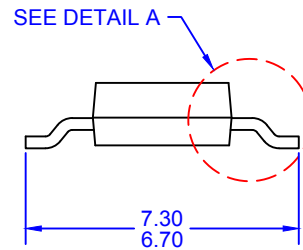
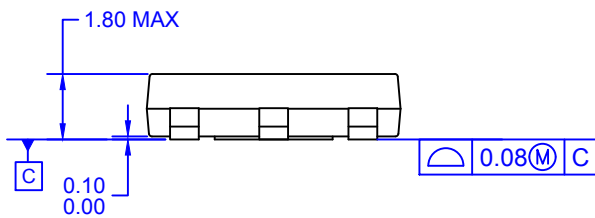


Figure 6. Current Gain vs. Collector Current




LAND PATTERN RECOMMENDATION



DETAIL A  
SCALE: 2:1

- NOTES: UNLESS OTHERWISE SPECIFIED  
 A) DRAWING BASED ON JEDEC REGISTRATION TO-261C, VARIATION AA.  
 B) ALL DIMENSIONS ARE IN MILLIMETERS.  
 C) DIMENSIONS DO NOT INCLUDE BURRS OR MOLD FLASH. MOLD FLASH OR BURRS DOES NOT EXCEED 0.10MM.  
 D) DIMENSIONING AND TOLERANCING PER ASME Y14.5M-2009.  
 E) LANDPATTERN NAME: SOT230P700X180-4BN  
 F) DRAWING FILENAME: MKT-MA04AREV3



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