



# THE DATASHEET OF FSB560A



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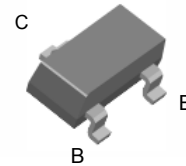
ON Semiconductor®

# FSB560 / FSB560A

## NPN Low-Saturation Transistor

### Features

- These devices are designed with high-current gain and low-saturation voltage with collector currents up to 2 A continuous.



SuperSOT™-3 (SOT-23)

### Ordering Information

Part Number	Marking	Package	Packing Method
FSB560	560	SSOT 3L	Tape and Reel
FSB560A	560A	SSOT 3L	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	2	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. ON 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 Device Dissipation	500	mW
	Derate Above $25^\circ\text{C}$	4	mW/ $^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	250	$^\circ\text{C}/\text{W}$

**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		
		$I_C = 500\text{ mA}, V_{CE} = 2\text{ V}$	FSB560	100	300
			FSB560A	250	550
		$I_C = 1\text{ A}, V_{CE} = 2\text{ V}$	80		
$I_C = 2\text{ A}, V_{CE} = 2\text{ V}$	40				
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage <sup>(4)</sup>	$I_C = 1\text{ A}, I_B = 100\text{ mA}$		300	mV
		$I_C = 2\text{ A}, I_B = 200\text{ mA}$	FSB560	350	
			FSB560A	300	
$V_{BE(sat)}$	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

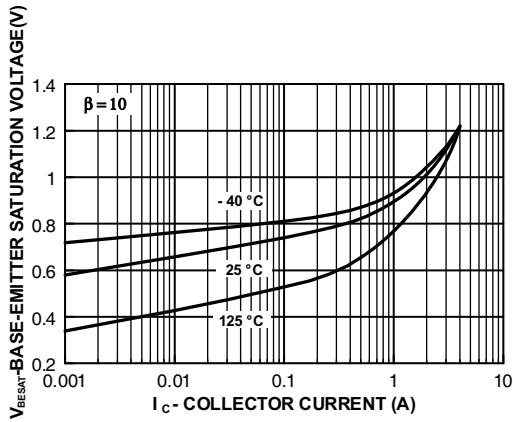


Figure 1. Base-Emitter Saturation Voltage vs. Collector Current

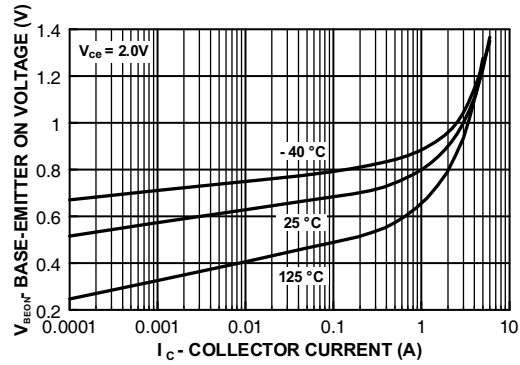


Figure 2. Base-Emitter On Voltage vs. Collector Current

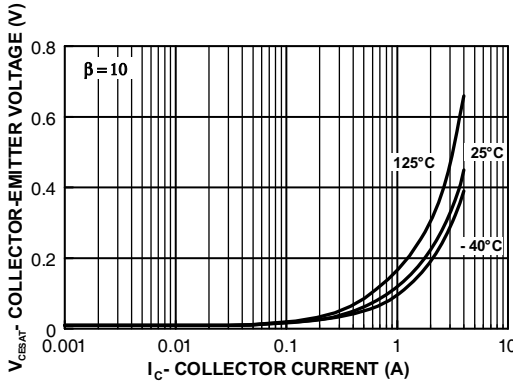


Figure 3. Collector-Emitter Saturation Voltage vs. Collector Current

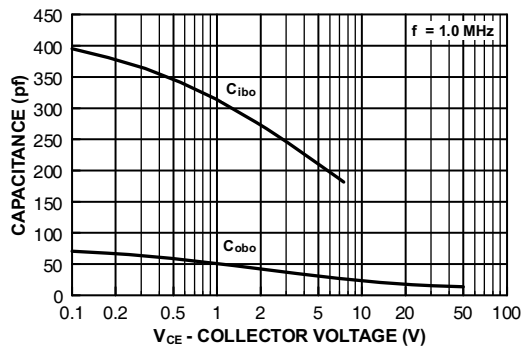


Figure 4. Input / Output Capacitance vs. Reverse Bias Voltage

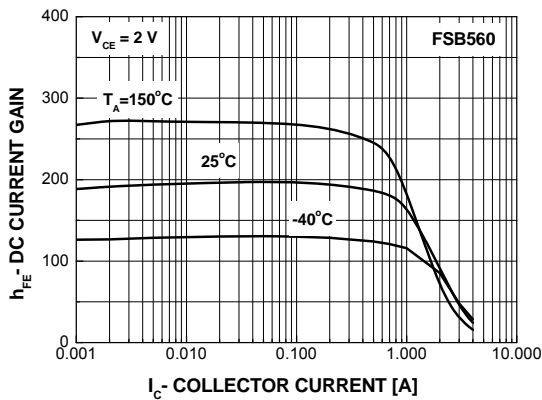


Figure 5. Current Gain vs. Collector Current

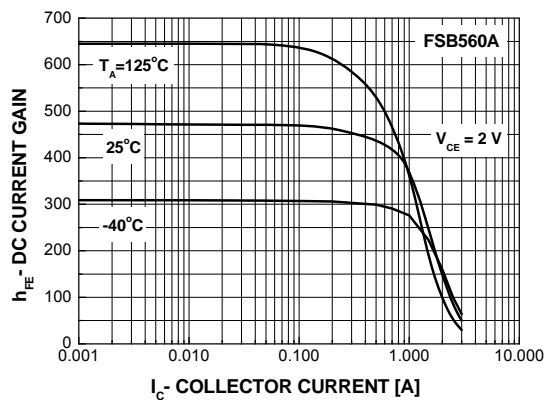
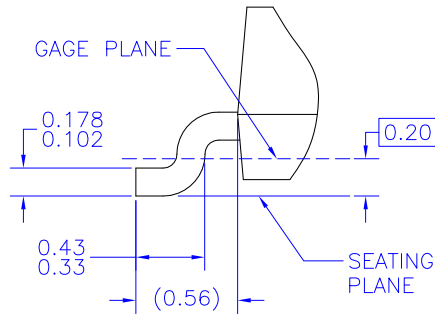
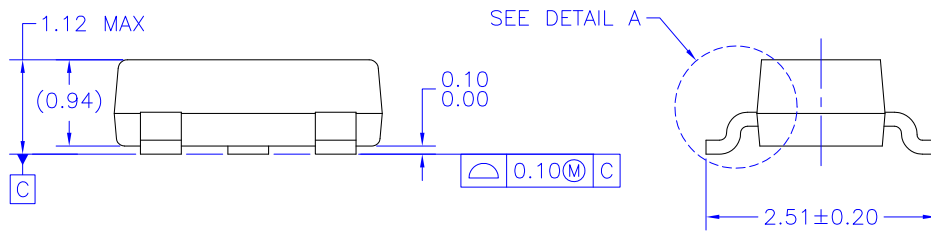
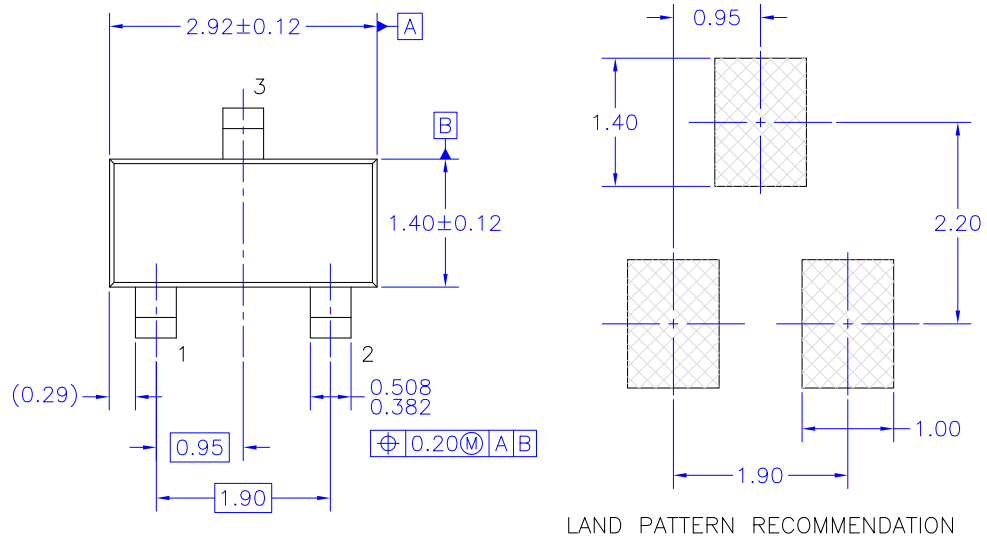


Figure 6. Current Gain vs. Collector Current

**Physical Dimensions**



DETAIL A  
SCALE: 50:1

NOTES: UNLESS OTHERWISE SPECIFIED

- A) NO JEDEC REFERENCE AS OF AUGUST 2003
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
- D) DIMENSIONING AND TOLERANCING PER ASME Y14.5M - 1994.

MA03BREV B

**Figure 7. MOLDED PACKAGE, SUPERSOT, 3-LEAD**

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