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February 2015

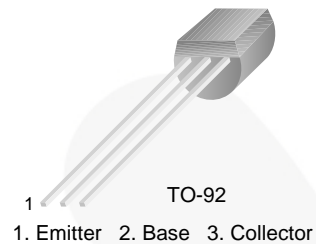
2N5550 — NPN Epitaxial Silicon Transistor

# 2N5550

## NPN Epitaxial Silicon Transistor

### Features

- Amplifier Transistor
- Collector-Emitter Voltage:  $V_{CEO} = 140\text{ V}$



### Ordering Information

Part Number	Top Mark	Package	Packing Method
2N5550BU	2N5550	TO-92 3L	Bulk
2N5550TA	2N5550	TO-92 3L	Ammo
2N5550TAR	2N5550	TO-92 3L	Ammo
2N5550TF	2N5550	TO-92 3L	Tape and Reel
2N5550TFR	2N5550	TO-92 3L	Tape and Reel

### Absolute Maximum Ratings

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
$V_{CBO}$	Collector-Base Voltage	160	V
$V_{CEO}$	Collector-Emitter Voltage	140	V
$V_{EBO}$	Emitter-Base Voltage	6	V
$I_C$	Collector Current	600	mA
$T_J$	Junction Temperature	150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature	-55 to 150	$^\circ\text{C}$

**Thermal Characteristics<sup>(1)</sup>**

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

Symbol	Parameter	Max.	Unit
$P_D$	Total Device Dissipation	625	mW
	Derate Above $25^\circ\text{C}$	5.0	mW/ $^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	200	$^\circ\text{C}/\text{W}$

**Note:**

1. 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.	Typ.	Max.	Unit
$BV_{CBO}$	Collector-Base Breakdown Voltage	$I_C = 100 \mu\text{A}, I_E = 0$	160			V
$BV_{CEO}$	Collector-Emitter Breakdown Voltage <sup>(2)</sup>	$I_C = 1 \text{ mA}, I_B = 0$	140			V
$BV_{EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10 \mu\text{A}, I_C = 0$	6			V
$I_{CBO}$	Collector Cut-Off Current	$V_{CB} = 100 \text{ V}, I_E = 0$			100	nA
$I_{EBO}$	Emitter Cut-Off Current	$V_{EB} = 4 \text{ V}, I_C = 0$			50	nA
$h_{FE}$	DC Current Gain <sup>(2)</sup>	$I_C = 1 \text{ mA}, V_{CE} = 5 \text{ V}$	60			
		$I_C = 10 \text{ mA}, V_{CE} = 5 \text{ V}$	60		250	
		$I_C = 50 \text{ mA}, V_{CE} = 5 \text{ V}$	20			
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage <sup>(2)</sup>	$I_C = 10 \text{ mA}, I_B = 1 \text{ mA}$			0.15	V
		$I_C = 50 \text{ mA}, I_B = 5 \text{ mA}$			0.25	
$V_{BE(sat)}$	Base-Emitter Saturation Voltage <sup>(2)</sup>	$I_C = 10 \text{ mA}, I_B = 1 \text{ mA}$			1.0	V
		$I_C = 50 \text{ mA}, I_B = 5 \text{ mA}$			1.2	
$f_T$	Current Gain Bandwidth Product	$I_C = 10 \text{ mA}, V_{CE} = 10 \text{ V}$ $f = 100 \text{ MHz}$	100		300	MHz
$C_{ob}$	Output Capacitance	$V_{CB} = 10 \text{ V}, I_E = 0,$ $f = 1 \text{ MHz}$			6	pF
NF	Noise Figure	$I_C = 250 \mu\text{A}, V_{CE} = 5 \text{ V},$ $R_S = 1 \text{ k}\Omega, f = 10 \text{ Hz to}$ $15.7 \text{ kHz}$			10	dB

**Note:**

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

## Typical Performance Characteristics

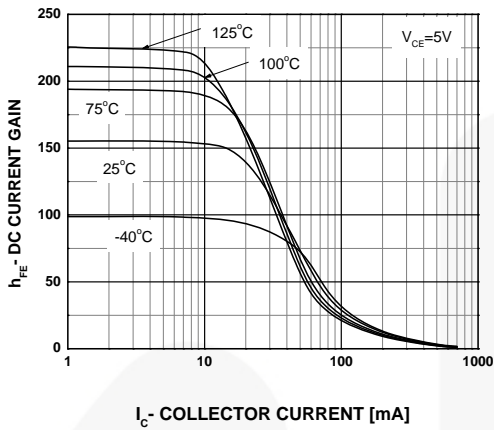


Figure 1. Typical Pulsed Current Gain vs. Collector Current

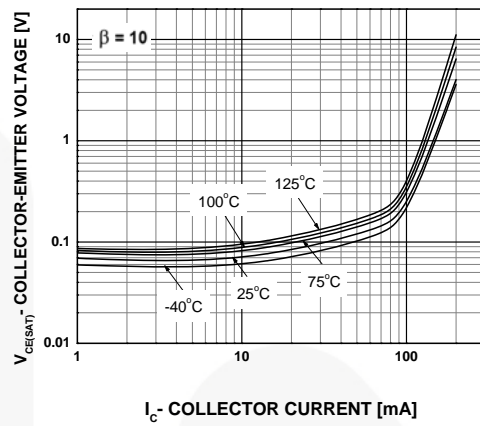


Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current

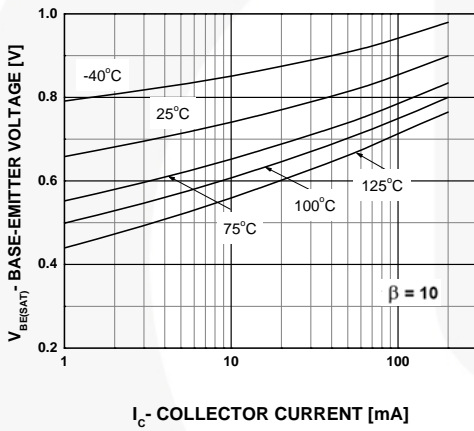


Figure 3. Base-Emitter Saturation Voltage vs. Collector Current

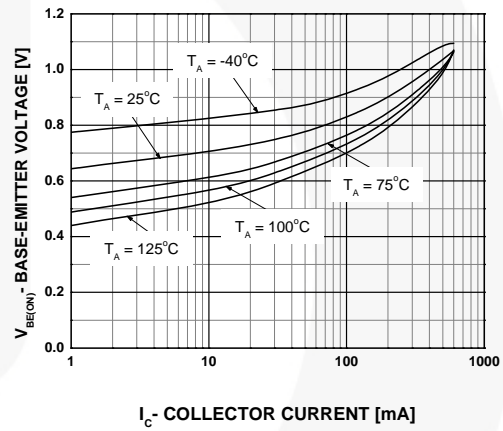


Figure 4. Base-Emitter On Voltage vs. Collector Current

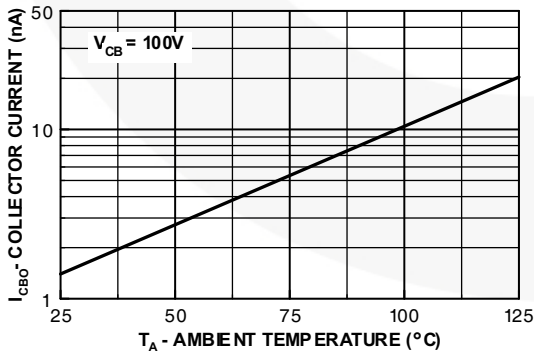


Figure 5. Collector Cut-Off Current vs. Ambient Temperature

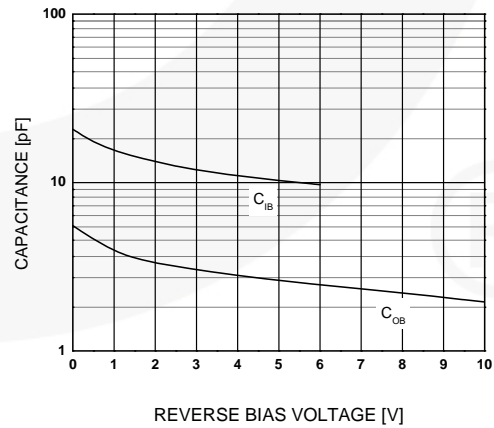
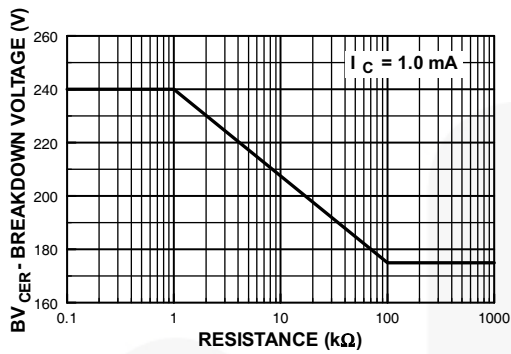
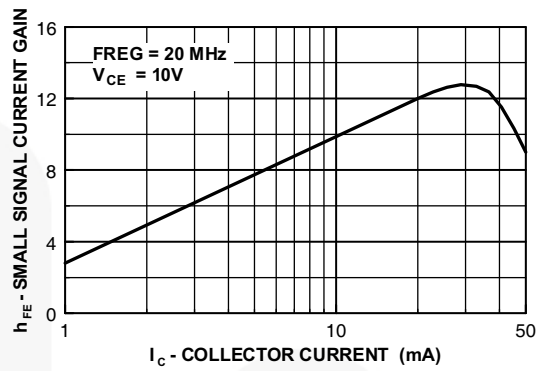


Figure 6. Input and Output Capacitance vs. Reverse Voltage

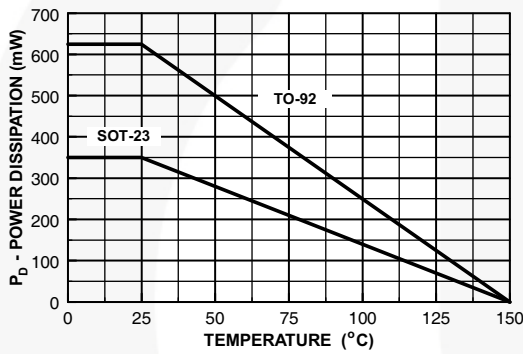
**Typical Performance Characteristics (Continued)**



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



**Figure 8. Small Signal Current Gain vs. Collector Current**



**Figure 9. 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		
	P	F	M	P	F	M	B	F	M	P	F	M	P	F	M
1	E	S	S	E	S	S	B	D	G	C	G	D	C	G	D
2	B	D	G	C	G	D	E	S	S	B	D	G	E	S	S
3	C	G	D	B	D	G	C	G	D	E	S	S	B	D	G

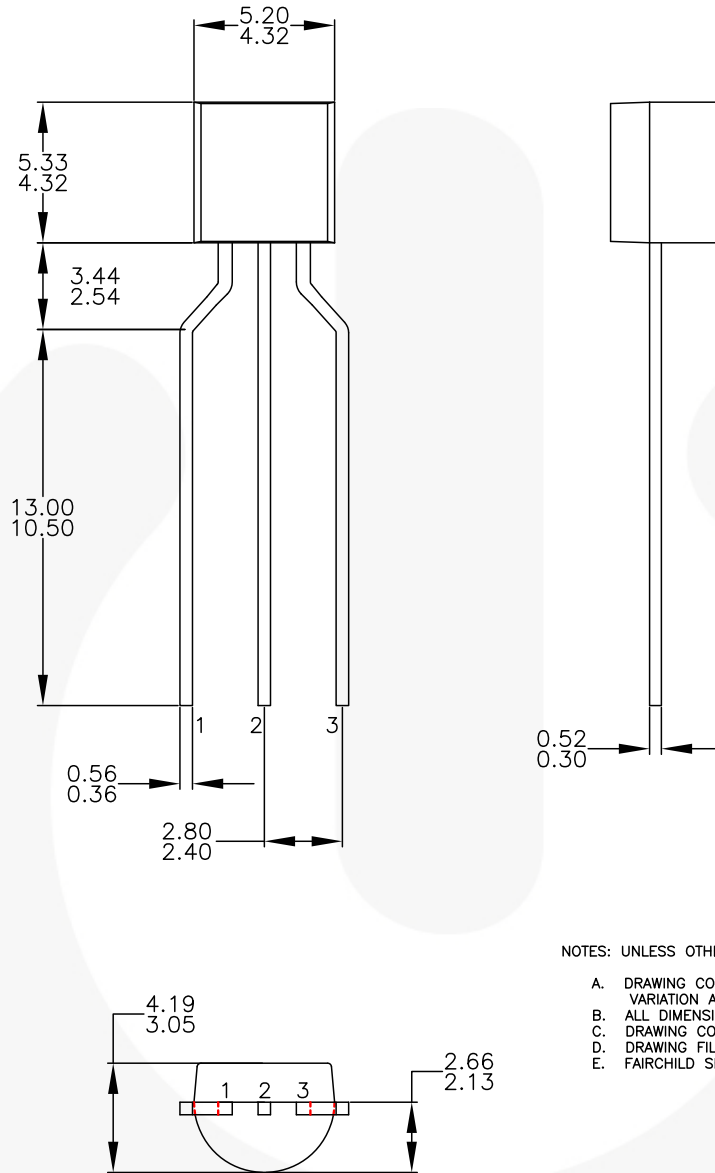
LEGEND:

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 10. 3-Lead, TO-92, JEDEC TO-92 Compliant Straight Lead Configuration, Bulk Type**

Physical Dimensions (Continued)



NOTES: UNLESS OTHERWISE SPECIFIED

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- B. ALL DIMENSIONS ARE IN MILLIMETERS.
- C. DRAWING CONFORMS TO ASME Y14.5M-2009.
- D. DRAWING FILENAME: MKT-ZA03FREV3.
- E. FAIRCHILD SEMICONDUCTOR.

Figure 11. 3-Lead, TO-92, Molded, 0.2 In Line Spacing Lead Form, Ammo, Tape and Reel Type





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