

**PNP SILICON PLANAR MEDIUM POWER TRANSISTORS IN SOT89**

**Features**

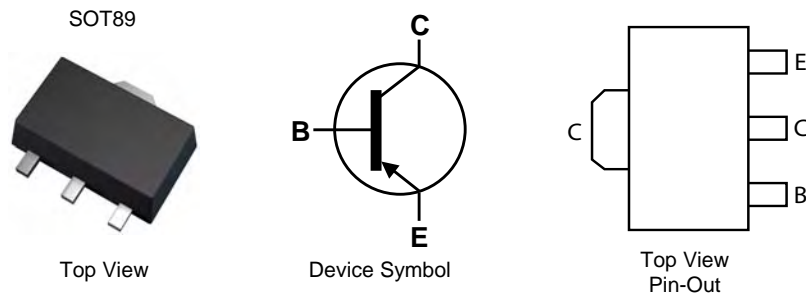
- $I_C = -1A$  Continuous Collector Current
- Low Saturation Voltage  $V_{CE(sat)} < -500mV @ -0.5A$
- Gain groups 10 and 16
- Epitaxial Planar Die Construction
- Complementary NPN types: BCX54, 55, and 56
- **Lead-Free, RoHS Compliant (Note 1)**
- **Halogen and Antimony Free. "Green" Devices (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

**Mechanical Data**

- Case: SOT89
- Case Material: Molded Plastic, "Green" Molding Compound (Note 2)
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish
- Weight: 0.072 grams (Approximate)

**Applications**

- Medium Power Switching or Amplification Applications
- AF driver and output stages

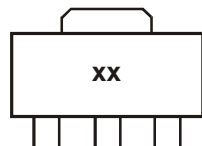


**Ordering Information (Note 3)**

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
BCX51TA	AA	7	12	1,000
BCX5110TA	AC	7	12	1,000
BCX5116TA	AD	7	12	1,000
BCX52TA	AE	7	12	1,000
BCX5210TA	AG	7	12	1,000
BCX5216TA	AM	7	12	1,000
BCX53TA	AH	7	12	1,000
BCX5310TA	AK	7	12	1,000
BCX5316TA	AL	7	12	1,000
BCX5316TC	AL	13	12	4,000
BCX5316-13R	AL	13	12	4,000

- Notes:
1. No purposefully added lead.
  2. Diodes Inc's "Green" Policy can be found on our website at <http://www.diodes.com>
  3. For packaging details, go to our website <http://www.diodes.com>

**Marking Information**



xx = Product Type Marking Code, as follows:

- |              |              |              |
|--------------|--------------|--------------|
| BCX51 = AA   | BCX52 = AE   | BCX53 = AH   |
| BCX5110 = AC | BCX5210 = AG | BCX5310 = AK |
| BCX5116 = AD | BCX5316 = AM | BCX5316 = AL |

**Maximum Ratings** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

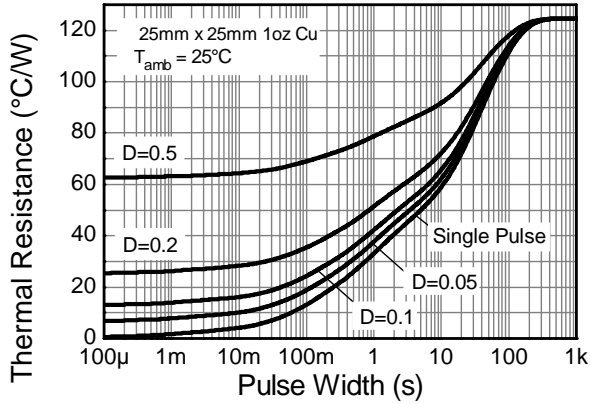
Characteristic	Symbol	BCX51	BCX52	BCX53	Unit
Collector-Base Voltage	$V_{CBO}$	-45	-60	-100	V
Collector-Emitter Voltage	$V_{CEO}$	-45	-60	-80	V
Emitter-Base Voltage	$V_{EBO}$		-5		V
Continuous Collector Current	$I_C$		-1		A
Peak Pulse Collector Current	$I_{CM}$		-1.5		
Continuous Base Current	$I_B$		-100		mA
Peak Pulse Base Current	$I_{BM}$		-200		

**Thermal Characteristics** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

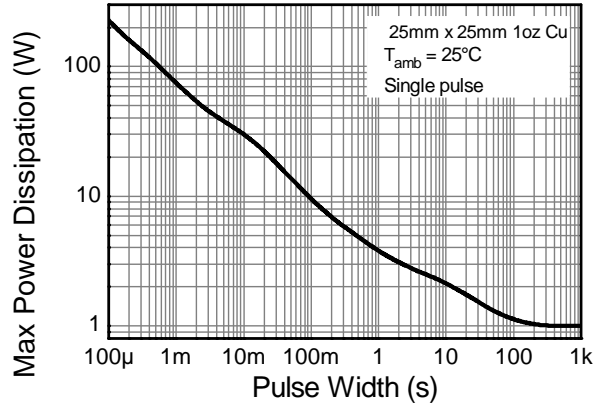
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4)	$P_D$	1	W
Thermal Resistance, Junction to Ambient (Note 4)	$R_{\theta JA}$	124	$^\circ\text{C/W}$
Thermal Resistance, Junction to Leads (Note 5)	$R_{\theta JL}$	10.0	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-65 to +150	$^\circ\text{C}$

- Notes:
4. For a device surface mounted on 25mm X 25mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
  5. Thermal resistance from junction to solder-point (on the exposed collector pad).

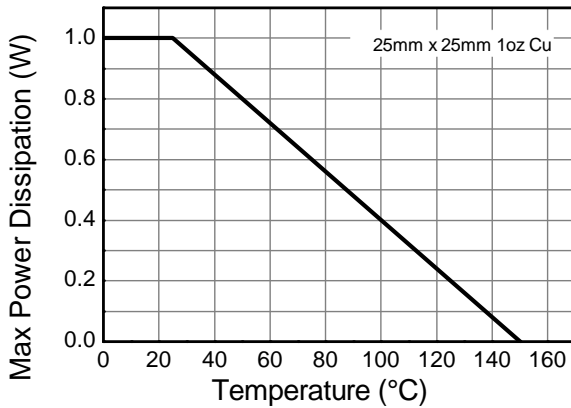
**Thermal Characteristics**



**Transient Thermal Impedance**



**Pulse Power Dissipation**



**Derating Curve**

**Electrical Characteristics** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BCX51	$BV_{CBO}$	-45	-	-	V	$I_C = -100\mu\text{A}$
	BCX52		-60				
	BCX53		-100				
Collector-Emitter Breakdown Voltage (Note 6)	BCX51	$BV_{CEO}$	-45	-	-	V	$I_C = -10\text{mA}$
	BCX52		-60				
	BCX53		-80				
Emitter-Base Breakdown Voltage		$BV_{EBO}$	-5	-	-	V	$I_E = -10\mu\text{A}$
Collector Cut-off Current		$I_{CBO}$	-	-	-0.1 -20	$\mu\text{A}$	$V_{CB} = -30\text{V}$ $V_{CB} = -30\text{V}, T_A = 150^\circ\text{C}$
Emitter Cut-off Current		$I_{EBO}$	-	-	-20	nA	$V_{EB} = -4\text{V}$
Static Forward Current Transfer Ratio (Note 6)	All versions	$h_{FE}$	25	-	-		$I_C = -5\text{mA}, V_{CE} = -2\text{V}$ $I_C = -150\text{mA}, V_{CE} = -2\text{V}$ $I_C = -500\text{mA}, V_{CE} = -2\text{V}$
			40	-	250		
			25	-	-		
	10 gain grp		63	-	160		
	16 gain grp	100	-	250		$I_C = -150\text{mA}, V_{CE} = -2\text{V}$	
Collector-Emitter Saturation Voltage (Note 6)		$V_{CE(sat)}$	-	-	-0.5	V	$I_C = -500\text{mA}, I_B = -50\text{mA}$
Base-Emitter Turn-On Voltage (Note 6)		$V_{BE(on)}$	-	-	-1.0	V	$I_C = -500\text{mA}, V_{CE} = -2\text{V}$
Transition Frequency		$f_r$	150	-	-	MHz	$I_C = -50\text{mA}, V_{CE} = -10\text{V}$ $f = 100\text{MHz}$
Output Capacitance		$C_{obo}$	-	-	25	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$

Notes: 6. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

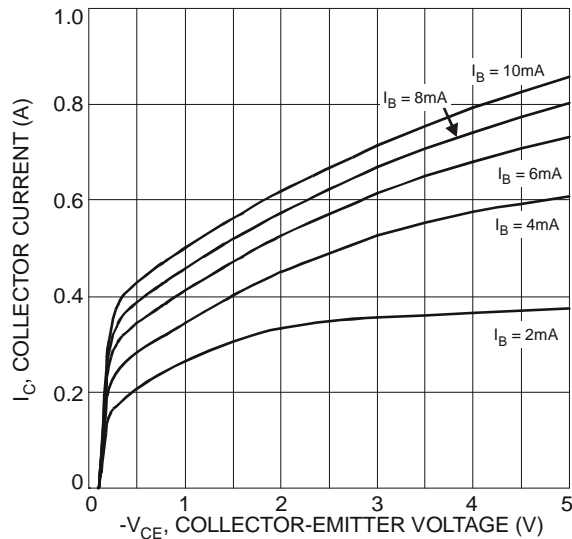


Fig. 1 Typical Collector Current vs. Collector-Emitter Voltage

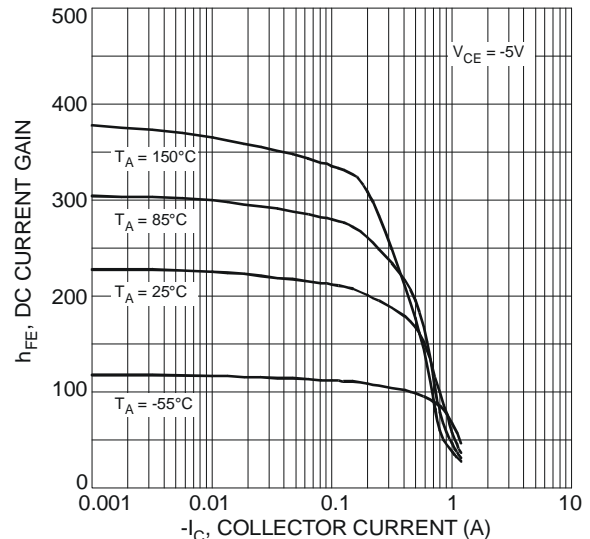


Fig. 2 Typical DC Current Gain vs. Collector Current

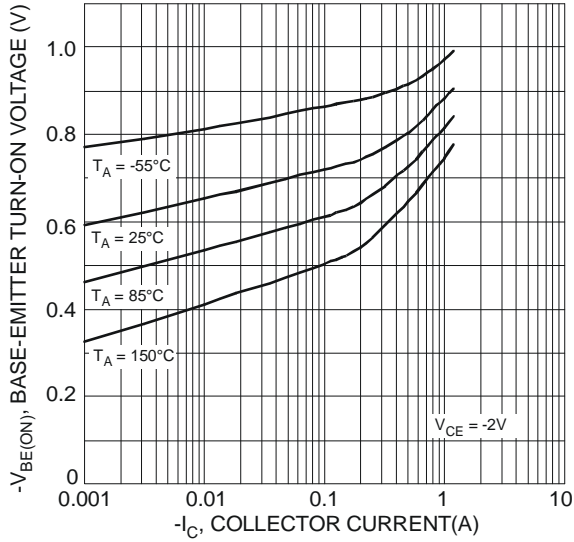


Fig 3 Typical Base-Emitter Turn-On Voltage vs. Collector Current

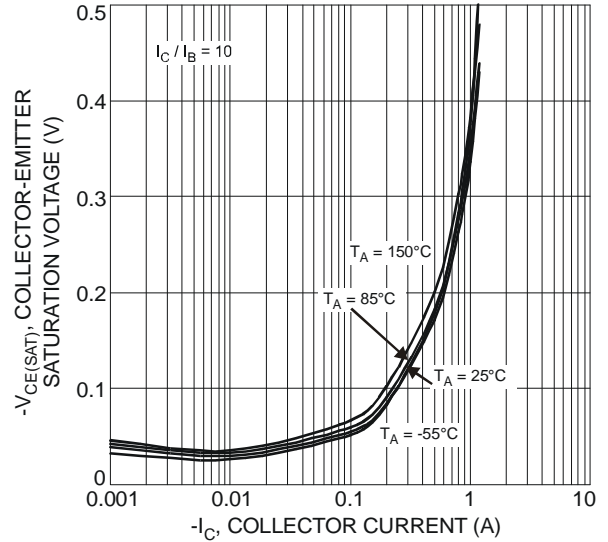


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

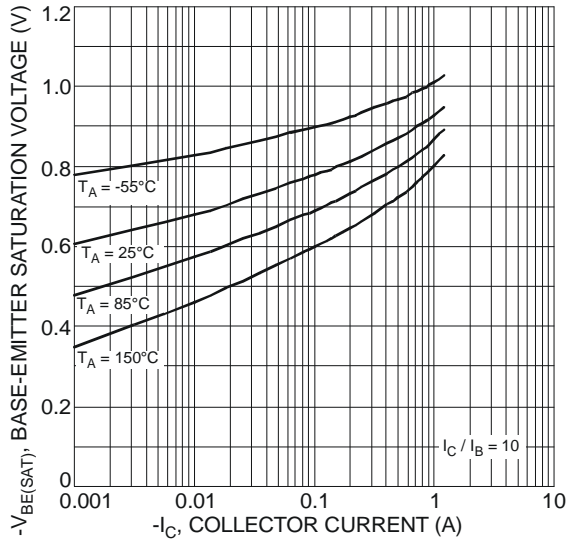


Fig. 5 Typical Base-Emitter Saturation Voltage vs. Collector Current

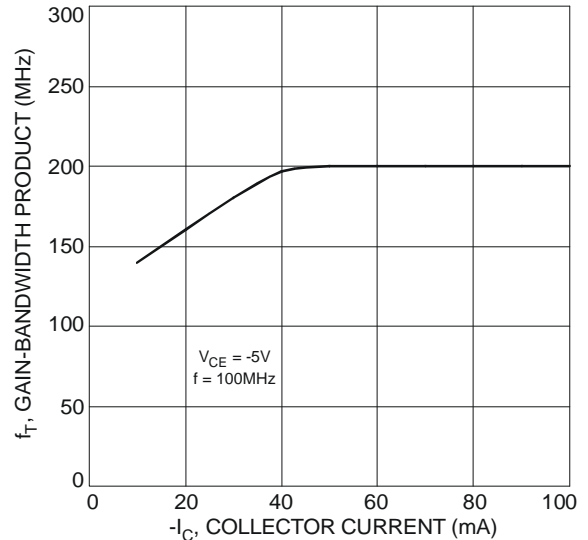


Fig. 6 Typical Gain-Bandwidth Product vs. Collector Current

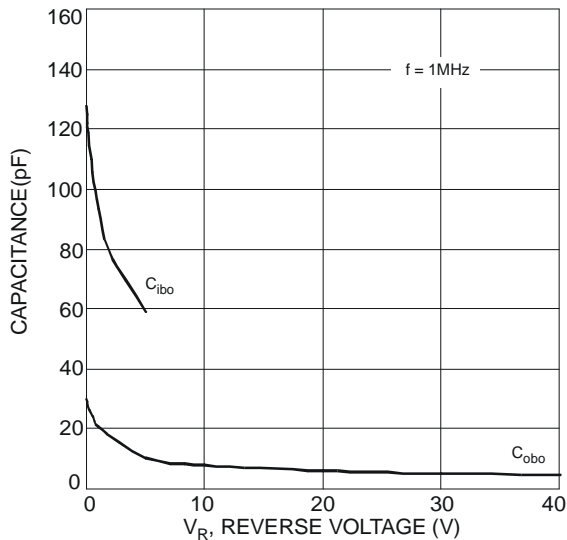
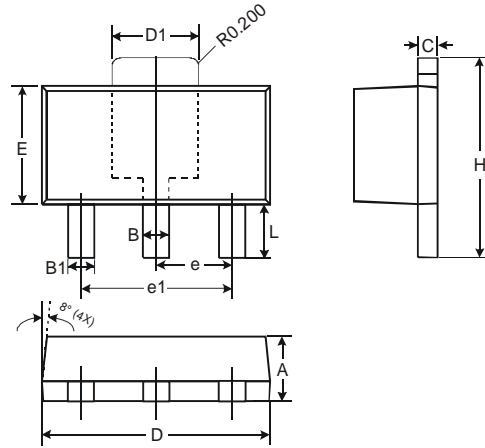


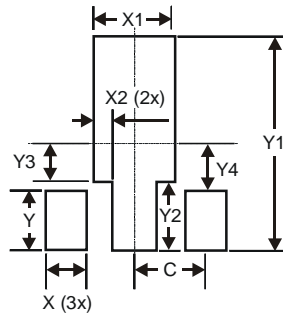
Fig. 7 Typical Capacitance Characteristics

**Package Outline Dimensions**



SOT89		
Dim	Min	Max
A	1.40	1.60
B	0.44	0.62
B1	0.35	0.54
C	0.35	0.43
D	4.40	4.60
D1	1.52	1.83
E	2.29	2.60
e	1.50 Typ	
e1	3.00 Typ	
H	3.94	4.25
L	0.89	1.20
All Dimensions in mm		

**Suggested Pad Layout**



Dimensions	Value (in mm)
X	0.900
X1	1.733
X2	0.416
Y	1.300
Y1	4.600
Y2	1.475
Y3	0.950
Y4	1.125
C	1.500

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