

## Features

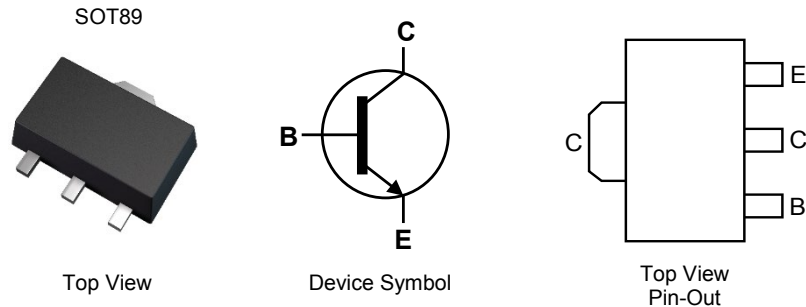
- $BV_{CEO} > 45V, 60V \text{ \& } 80V$
  - $I_C = 1A$  Continuous Collector Current
  - $I_{CM} = 2A$  Peak Pulse Current
  - Low Saturation Voltage  $V_{CE(sat)} < 500mV @ 0.5A$
  - Gain Groups 10 and 16
  - Epitaxial Planar Die Construction
  - Complementary PNP Types: BCX51, 52, and 53
  - **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
  - **Halogen and Antimony Free. "Green" Device (Note 3)**
- For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>

## Mechanical Data

- Case: SOT89
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Leads. Solderable per MIL-STD-202 Method 208 @3
- Weight: 0.055 grams (Approximate)

## Applications

- Medium Power Switching or Amplification Applications
- AF Driver and Output Stages

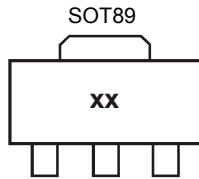


## Ordering Information (Note 4)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
BCX54TA	Standard	BA	7	12	1,000
BCX5410TA	Standard	BC	7	12	1,000
BCX5416TA	Standard	BD	7	12	1,000
BCX5416-13R	Standard	BD	13	12	4,000
BCX55TA	Standard	BE	7	12	1,000
BCX5510TA	Standard	BG	7	12	1,000
BCX5516TA	Standard	BM	7	12	1,000
BCX56TA	Standard	BH	7	12	1,000
BCX5610TA	Standard	BK	7	12	1,000
BCX5616TA	Standard	BL	7	12	1,000
BCX5616TC	Standard	BL	13	12	4,000
BCX5410TC	Standard	BC	13	12	4,000
BCX5416TC	Standard	BD	13	12	4,000
BCX54TC	Standard	BA	13	12	4,000
BCX5510TC	Standard	BG	13	12	4,000
BCX5516TC	Standard	BM	13	12	4,000
BCX55TC	Standard	BE	13	12	4,000
BCX5610TC	Standard	BK	13	12	4,000
BCX56TC	Standard	BH	13	12	4,000

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



xx = Product Type Marking Code, as follows:

BCX54 = BA	BCX55 = BE	BCX56 = BH
BCX5410 = BC	BCX5510 = BG	BCX5610 = BK
BCX5416 = BD	BCX5516 = BM	BCX5616 = BL

## Absolute Maximum Ratings (@ T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	BCX54	BCX55	BCX56	Unit
Collector-Base Voltage	V <sub>CBO</sub>	45	60	100	V
Collector-Emitter Voltage	V <sub>CEO</sub>	45	60	80	V
Emitter-Base Voltage	V <sub>EBO</sub>	6			V
Continuous Collector Current	I <sub>C</sub>	1			A
Peak Pulse Collector Current	I <sub>CM</sub>	2			
Continuous Base Current	I <sub>B</sub>	100			mA
Peak Pulse Base Current	I <sub>BM</sub>	200			

## Thermal Characteristics (@ T<sub>A</sub> = +25°C, unless otherwise specified.)

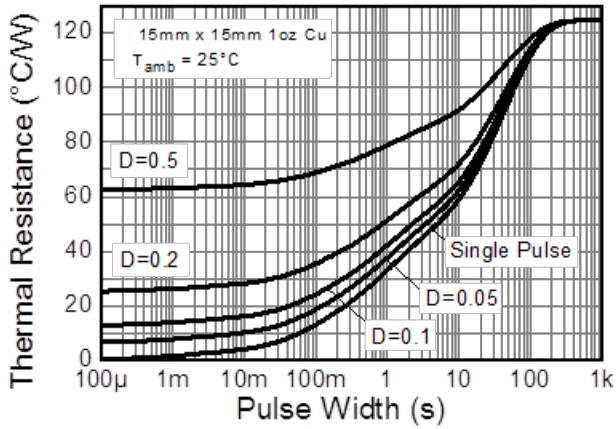
Characteristic	Symbol	Value	Unit
Power Dissipation	(Note 5)	1	W
	(Note 6)	1.5	
	(Note 7)	2.0	
Thermal Resistance, Junction to Ambient Air	(Note 5)	125	°C/W
	(Note 6)	83	
	(Note 7)	60	
Thermal Resistance, Junction to Lead	R <sub>θJL</sub>	13	°C/W
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	27	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

## ESD Ratings (Note 10)

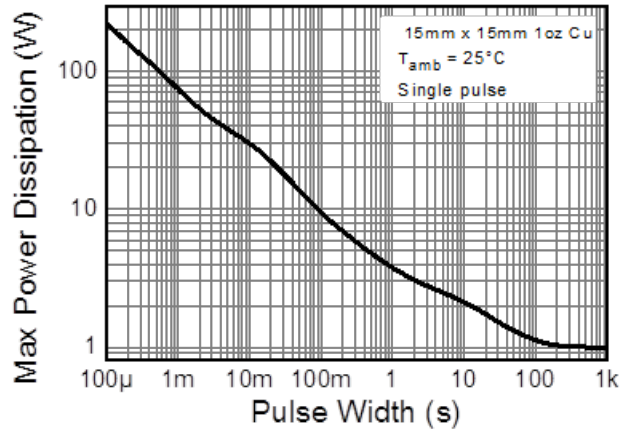
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
5. For a device mounted with the exposed collector pad on 15mm x 15mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still-air conditions whilst operating in a steady-state.
  6. Same as Note 5, except the device is mounted on 25mm x 25mm 1oz copper.
  7. Same as Note 5, except the device is mounted on 50mm x 50mm 1oz copper.
  8. Thermal resistance from junction to solder-point (on the exposed collector pad).
  9. Thermal resistance from junction to the top of the case.
  10. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

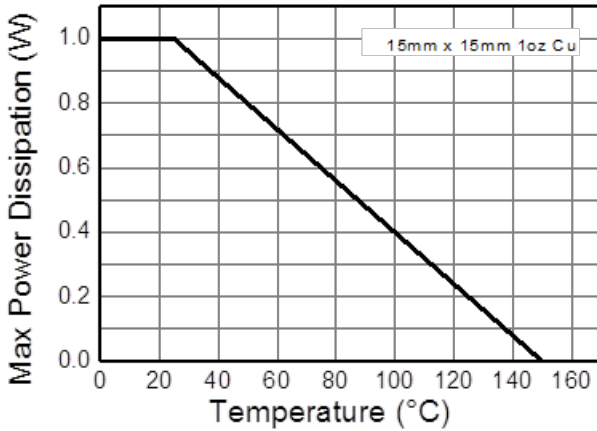
**Thermal Characteristics and Derating Information**



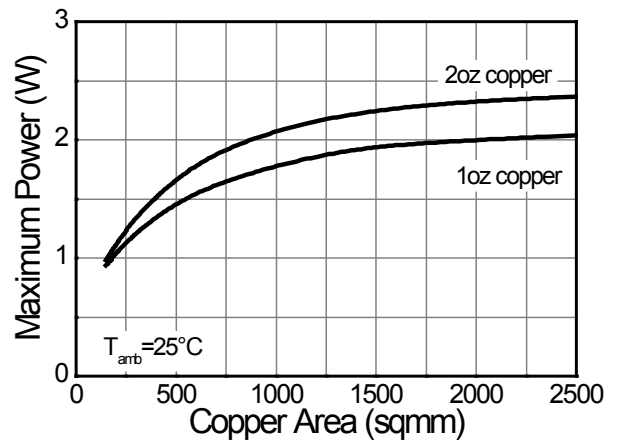
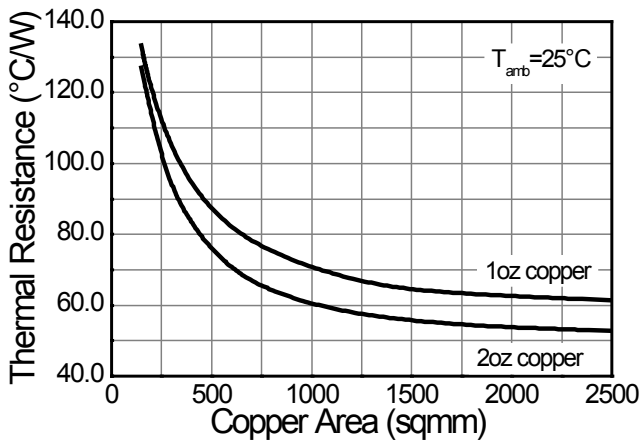
**Transient Thermal Impedance**



**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	$BV_{CBO}$	45	—	—	V	$I_C = 100\mu\text{A}$
		60				
		100				
Collector-Emitter Breakdown Voltage (Note 11)	$BV_{CEO}$	45	—	—	V	$I_C = 10\text{mA}$
		60				
		80				
Emitter-Base Breakdown Voltage	$BV_{EBO}$	6	—	—	V	$I_E = 100\mu\text{A}$
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	$V_{EB} = 5\text{V}$
Static Forward Current Transfer Ratio (Note 11)	$h_{FE}$	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				
		25				
		63	—	160		
10 gain grp	63	—	160	$I_C = 150\text{mA}, V_{CE} = 2\text{V}$		
16 gain grp	100	—	250	$I_C = 150\text{mA}, V_{CE} = 2\text{V}$		
Collector-Emitter Saturation Voltage (Note 11)	$V_{CE(sat)}$	—	—	0.5	V	$I_C = 500\text{mA}, I_B = 50\text{mA}$
Base-Emitter Turn-On Voltage (Note 11)	$V_{BE(on)}$	—	—	1.0	V	$I_C = 500\text{mA}, V_{CE} = 2\text{V}$
Transition Frequency	$f_T$	150	—	—	MHz	$I_C = 50\text{mA}, V_{CE} = 10\text{V}$ $f = 100\text{MHz}$
Output Capacitance	$C_{obo}$	—	—	25	pF	$V_{CB} = 10\text{V}, f = 1\text{MHz}$

Note: 11. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

**Typical Electrical Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

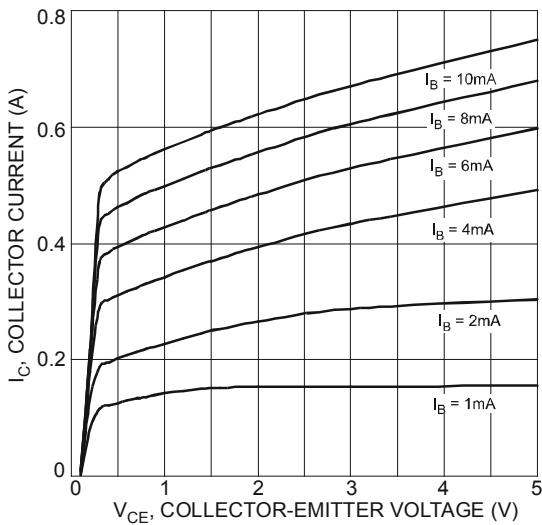


Fig. 1 Typical Collector Current vs. Collector-Emitter Voltage

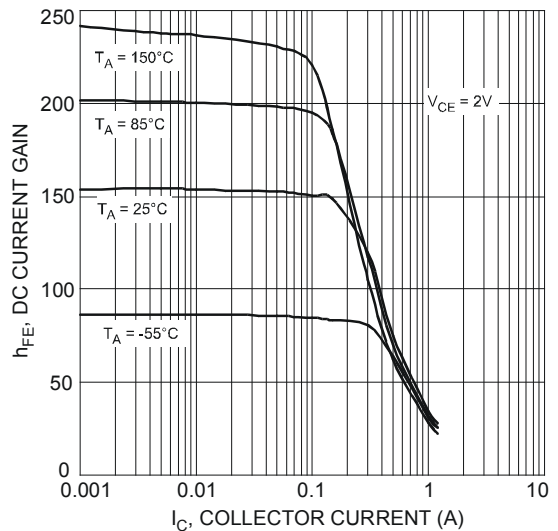


Fig. 2 Typical DC Current Gain vs. Collector Current

**Typical Electrical Characteristics** (continued)

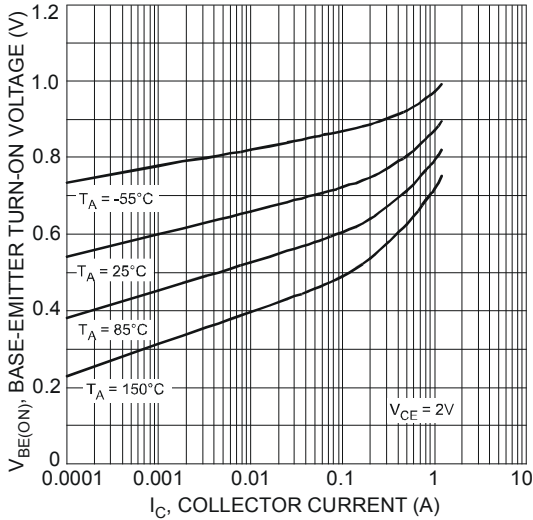


Fig. 3 Typical Base-Emitter Turn-On Voltage vs. Collector Current

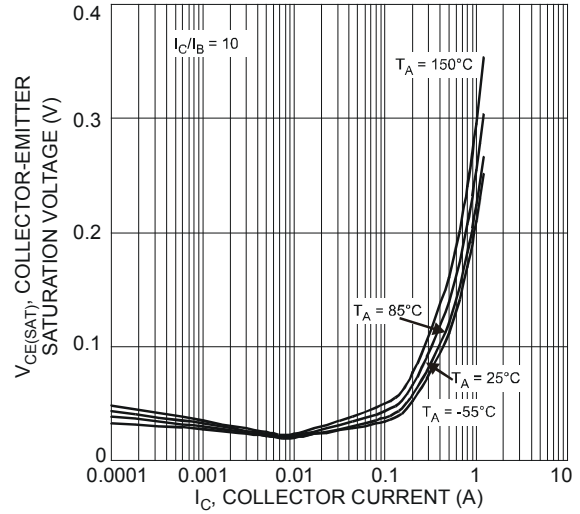


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

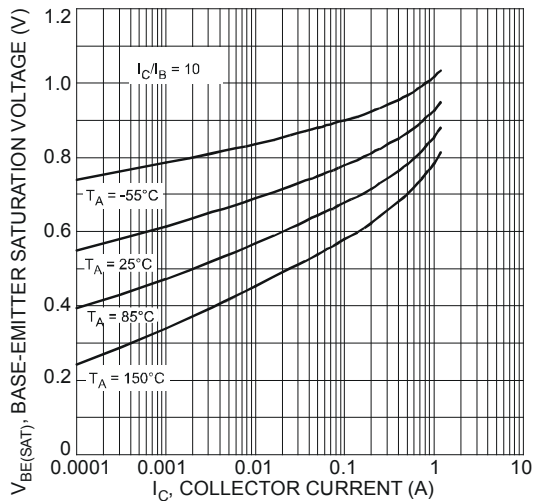


Fig. 5 Typical Base-Emitter Saturation Voltage vs. Collector Current

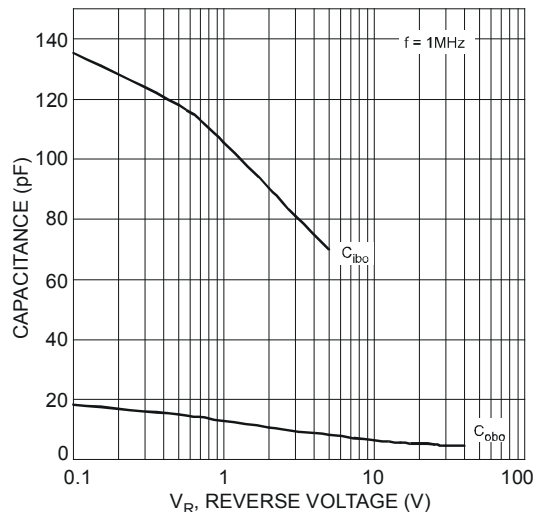


Fig. 6 Typical Capacitance Characteristics

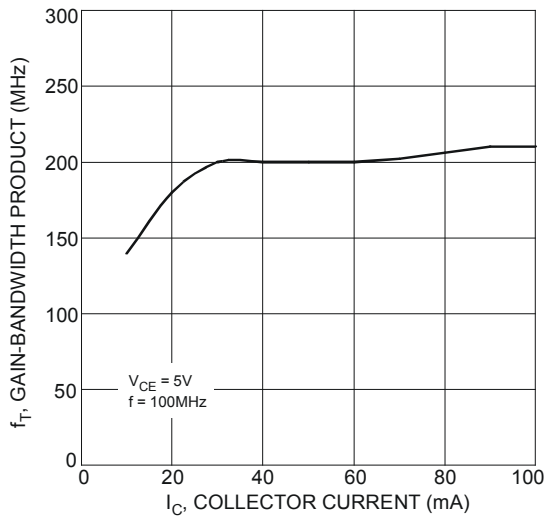
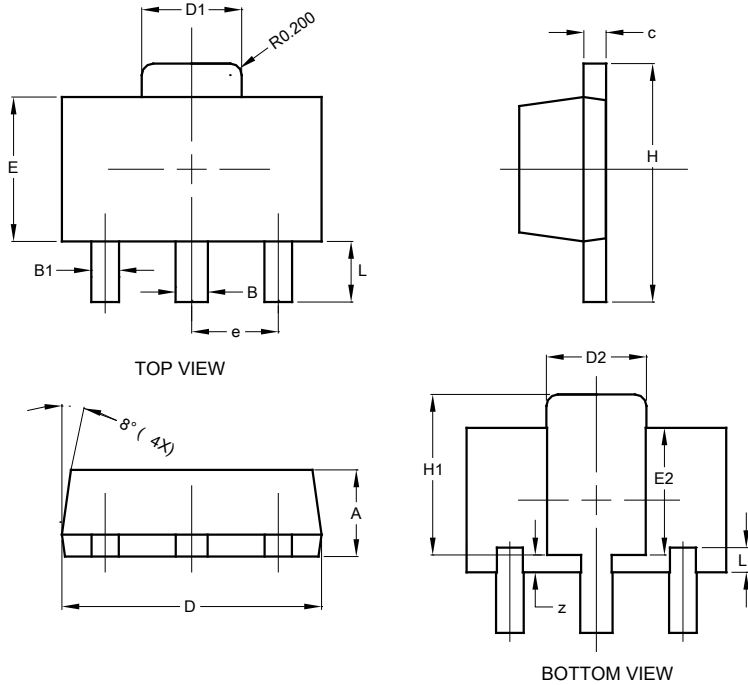


Fig. 7 Typical Gain-Bandwidth Product vs. Collector Current

**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SOT89**

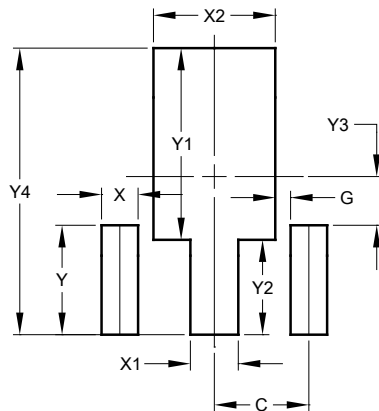


SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions in mm			

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SOT89**



Dimensions	Value (in mm)
C	1.500
G	0.244
X	0.580
X1	0.760
X2	1.933
Y	1.730
Y1	3.030
Y2	1.500
Y3	0.770
Y4	4.530

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