

## Features

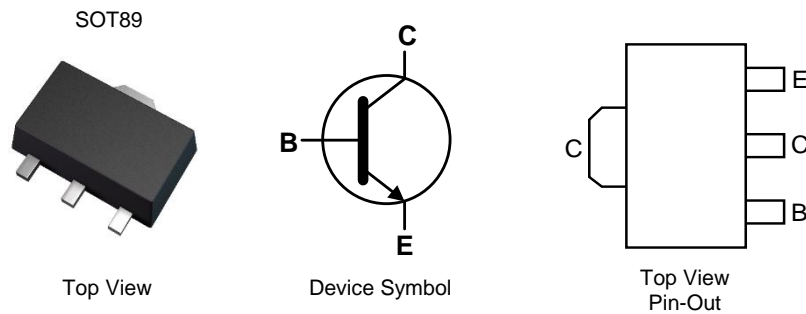
- $BV_{CE0} > 45V, 60V \& 80V$
- $I_c = 1A$  Continuous Collector Current
- $I_{CM} = 2A$  Peak Pulse Current
- Low Saturation Voltage  $V_{CE(sat)} < 500mV @ 0.5A$
- Gain Groups 10 and 16
- Epitaxial Planar Die Construction
- Complementary PNP Types: BCX51, 52, and 53
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

## 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

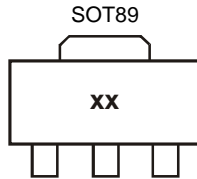


## Ordering Information (Notes 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
BCX54TA	AEC-Q101	BA	7	12	1,000
BCX5410TA	AEC-Q101	BC	7	12	1,000
BCX5416TA	AEC-Q101	BD	7	12	1,000
BCX5416-13R	AEC-Q101	BD	13	12	4,000
BCX55TA	AEC-Q101	BE	7	12	1,000
BCX5510TA	AEC-Q101	BG	7	12	1,000
BCX5516TA	AEC-Q101	BM	7	12	1,000
BCX56TA	AEC-Q101	BH	7	12	1,000
BCX5610TA	AEC-Q101	BK	7	12	1,000
BCX5616TA	AEC-Q101	BL	7	12	1,000
BCX5616TC	AEC-Q101	BL	13	12	4,000
BCX5410TC	AEC-Q101	BC	13	12	4,000
BCX5416TC	AEC-Q101	BD	13	12	4,000
BCX54TC	AEC-Q101	BA	13	12	4,000
BCX5510TC	AEC-Q101	BG	13	12	4,000
BCX5516TC	AEC-Q101	BM	13	12	4,000
BCX55TC	AEC-Q101	BE	13	12	4,000
BCX5610TC	AEC-Q101	BK	13	12	4,000
BCX56TC	AEC-Q101	BH	13	12	4,000
BCX5616QTA	Automotive	Refer to <a href="http://diodes.com/datasheets/BCX5616Q.pdf">http://diodes.com/datasheets/BCX5616Q.pdf</a>			

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to [http://www.diodes.com/quality/product\\_compliance\\_definitions/](http://www.diodes.com/quality/product_compliance_definitions/).
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## 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.)

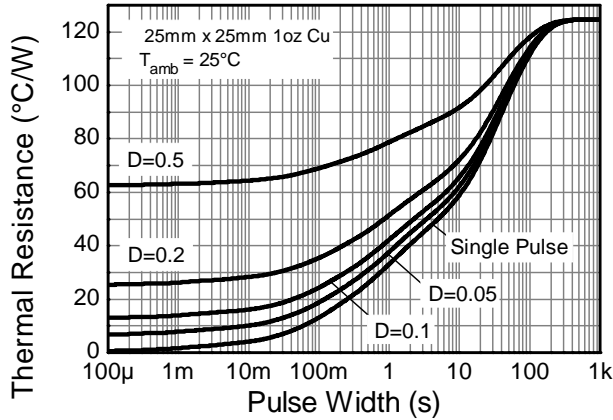
Characteristic	Symbol	Value	Unit
Power Dissipation	(Note 6)	1	W
	(Note 7)	1.5	
	(Note 8)	2.0	
Thermal Resistance, Junction to Ambient Air	(Note 6)	125	°C/W
	(Note 7)	83	
	(Note 8)	60	
Thermal Resistance, Junction to Lead	(Note 9)	13	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-65 to +150	°C

## ESD Ratings (Note 10)

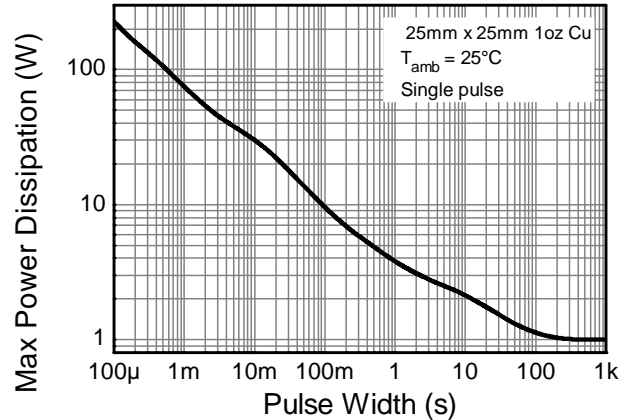
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
- 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.
  - Same as Note 6, except the device is mounted on 25mm x 25mm 1oz copper.
  - Same as Note 6, except the device is mounted on 50mm x 50mm 1oz copper.
  - Thermal resistance from junction to solder-point (on the exposed collector pad).
  - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

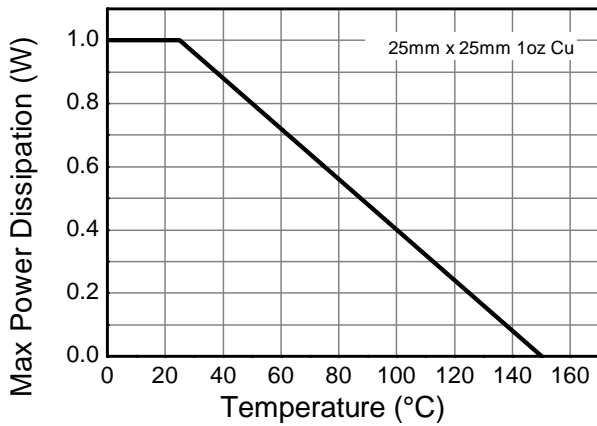
**Thermal Characteristics and Derating Information**



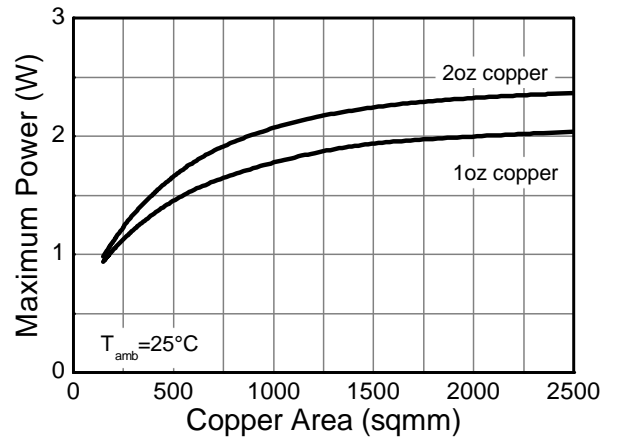
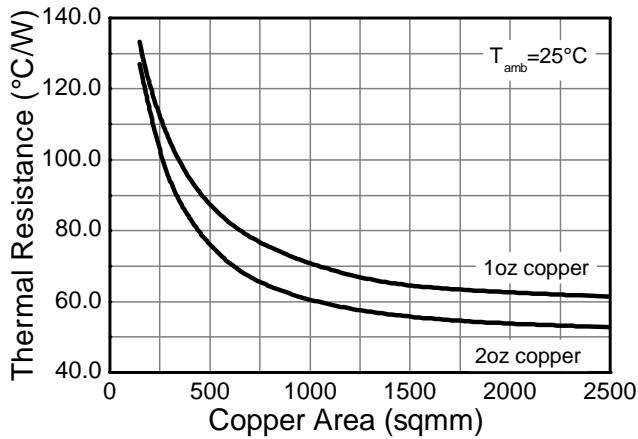
**Transient Thermal Impedance**



**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)	All versions	$h_{FE}$	25	—	—	—	$I_C = 5\text{mA}, V_{CE} = 2\text{V}$ $I_C = 150\text{mA}, V_{CE} = 2\text{V}$ $I_C = 500\text{mA}, V_{CE} = 2\text{V}$ $I_C = 150\text{mA}, V_{CE} = 2\text{V}$ $I_C = 150\text{mA}, V_{CE} = 2\text{V}$
			40				
			25				
			25				
	10 gain grp	63	—	160			
	16 gain grp	100	—	250			
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  $\leq 2\%$ .

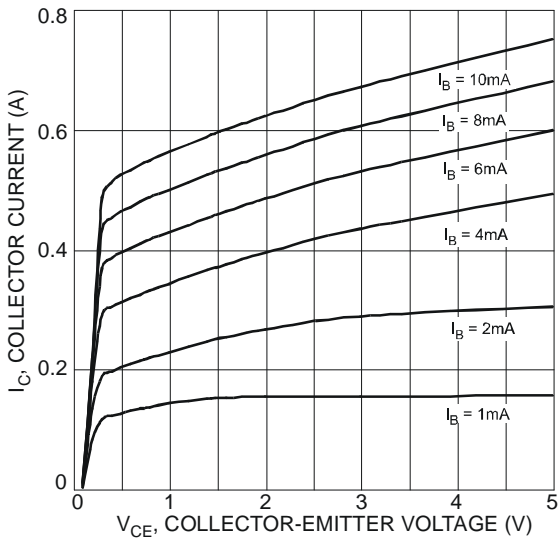


Fig. 1 Typical Collector Current vs. Collector-Emitter Voltage

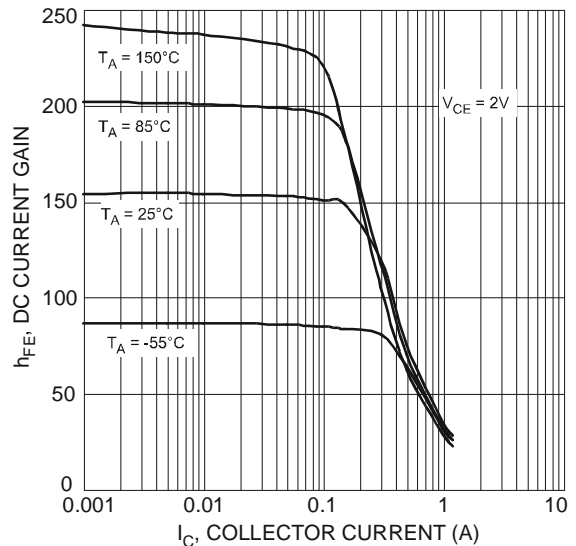


Fig. 2 Typical DC Current Gain vs. Collector Current

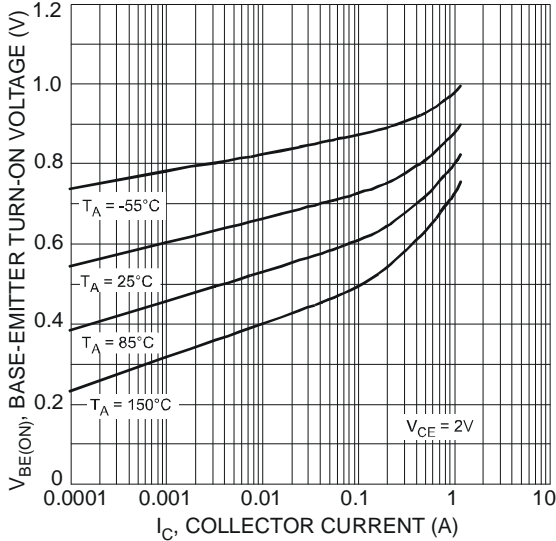


Fig. 3 Typical Base-Emitter Turn-On Voltage vs. Collector Current

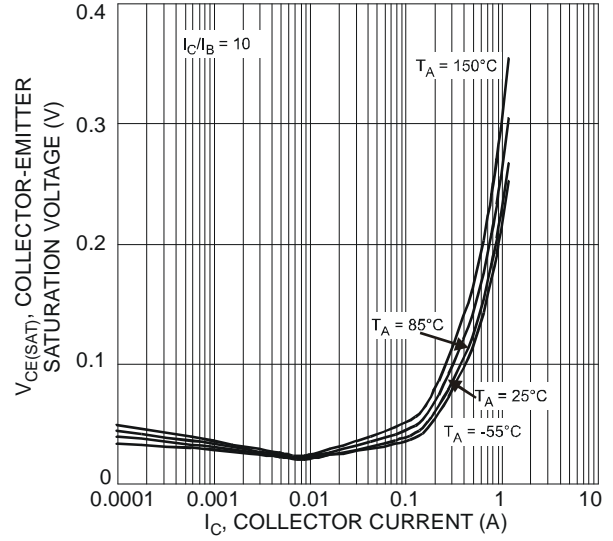


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

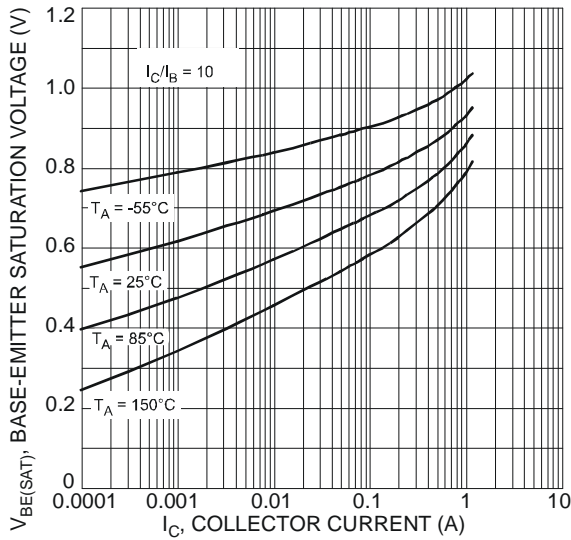


Fig. 5 Typical Base-Emitter Saturation Voltage vs. Collector Current

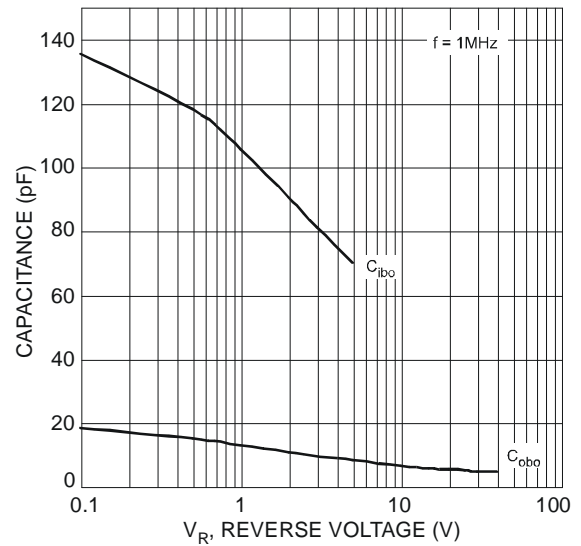


Fig. 6 Typical Capacitance Characteristics

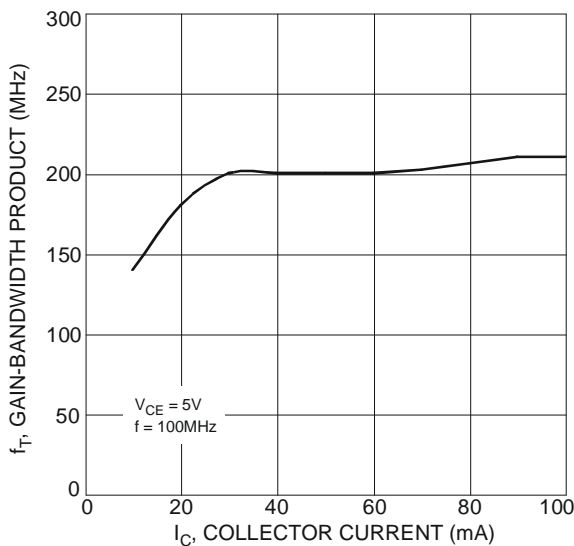
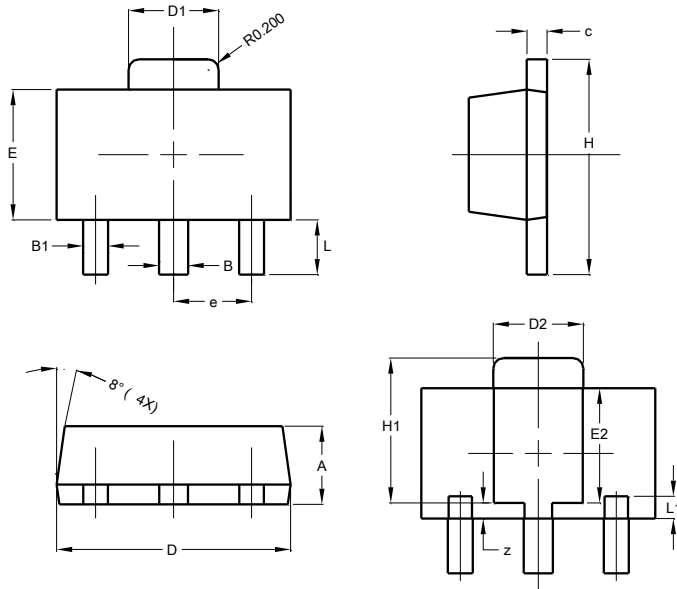


Fig. 7 Typical Gain-Bandwidth Product vs. Collector Current

**Package Outline Dimensions**

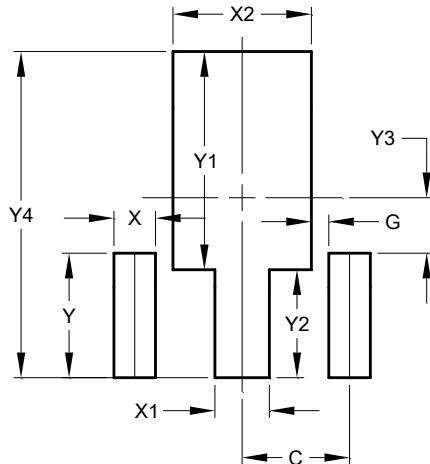
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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 AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



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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