

Features

- $BV_{CEO} > -45V, -60V \text{ \& } -80V$
- $I_C = -1A$ Continuous Collector Current
- $I_{CM} = -2A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)} < -500mV @ -0.5A$
- Complementary NPN Types: [BCX54 / 55 / 56](#)
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **An automotive-compliant part is available under a separate datasheet ([BCX5216Q / BCX5316Q](#)).**

Mechanical Data

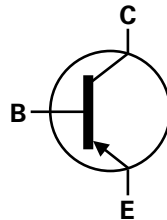
- Package: SOT89
- Package Material: Molded Plastic, "Green" Molding Compound; UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Leads; Solderable per MIL-STD-202 Method 208 [e3](#)
- Weight: 0.052 grams (Approximate)

Applications

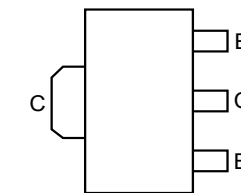
- Medium power switching or amplification applications
- AF drivers and output stages



Top View



Device Symbol



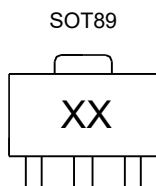
Top View
Pinout

Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
BCX51TA	SOT89	AA	7	12	1000	Reel
BCX5116TA	SOT89	AD	7	12	1000	Reel
BCX52TA	SOT89	AE	7	12	1000	Reel
BCX5216TA	SOT89	AM	7	12	1000	Reel
BCX53TA	SOT89	AH	7	12	1000	Reel
BCX5316TA	SOT89	AL	7	12	1000	Reel
BCX51TC	SOT89	AA	13	12	4000	Reel
BCX51-13R	SOT89	AA	13	12	4000	Reel
BCX5116TC	SOT89	AD	13	12	4000	Reel
BCX52TC	SOT89	AE	13	12	4000	Reel
BCX5216TC	SOT89	AM	13	12	4000	Reel
BCX53TC	SOT89	AH	13	12	4000	Reel
BCX5316TC	SOT89	AL	13	12	4000	Reel
BCX5316-13R	SOT89	AL	13	12	4000	Reel

- 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:

BCX51 = AA
 BCX5116 = AD

BCX52 = AE
 BCX5216 = AM

BCX53 = AH
 BCX5316 = AL

Absolute 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 (Single Pulse)	I _{CM}	-2			
Continuous Base Current	I _B	-100			mA
Peak Pulse Base Current (Single Pulse)	I _{BM}	-200			

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, 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	$^\circ\text{C/W}$
	(Note 6)	83	
	(Note 7)	60	
Thermal Resistance, Junction to Lead	(Note 8)	13	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	(Note 9)	27	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

ESD Ratings (Note 10)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge – Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge – Charged Device Model	ESD CDM	1,000	V	C3

- 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 5, except the device is mounted on 25mm x 25mm 1oz copper.
 - Same as Note 5, except the device is mounted on 50mm x 50mm 1oz copper.
 - Thermal resistance from junction to solder-point (on the exposed collector pad).
 - Thermal resistance from junction to the top of the case.
 - Refer to JEDEC specifications JS-001 and JS-002.

Thermal Characteristics and Derating Information

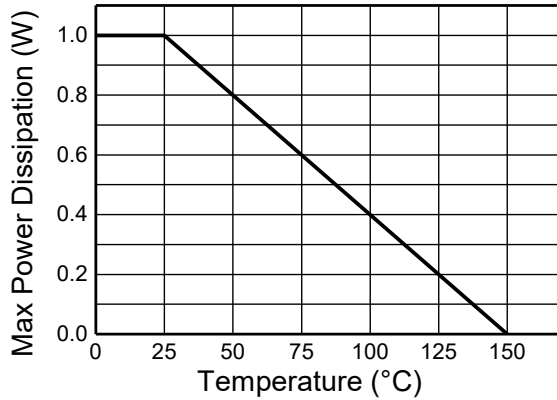


Fig.1 Derating Curve

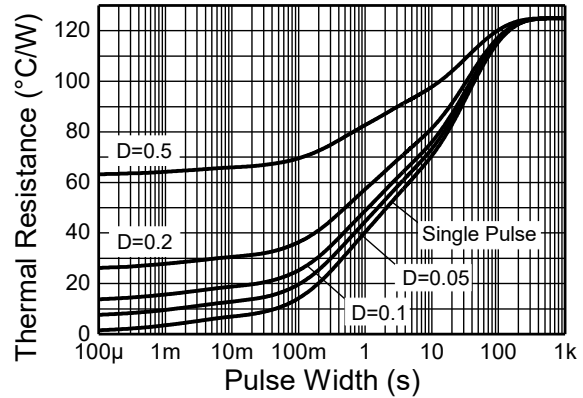


Fig.2 Transient Thermal Impedance

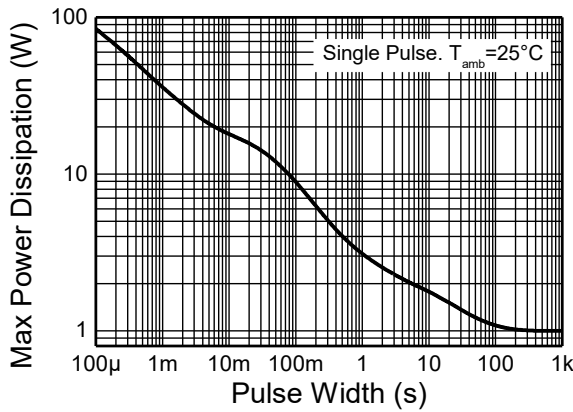


Fig.3 Pulse Power Dissipation

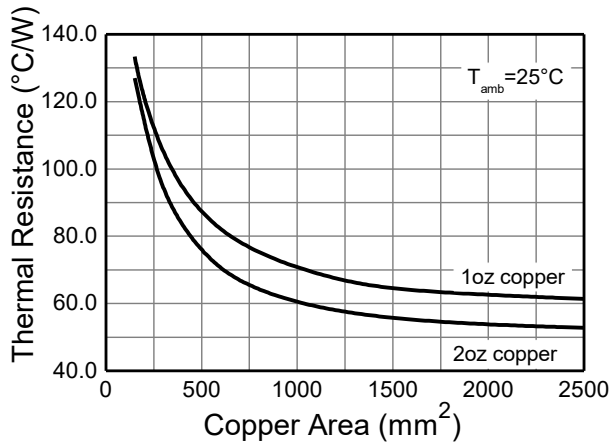


Fig.4 Thermal Resistance v Copper Area

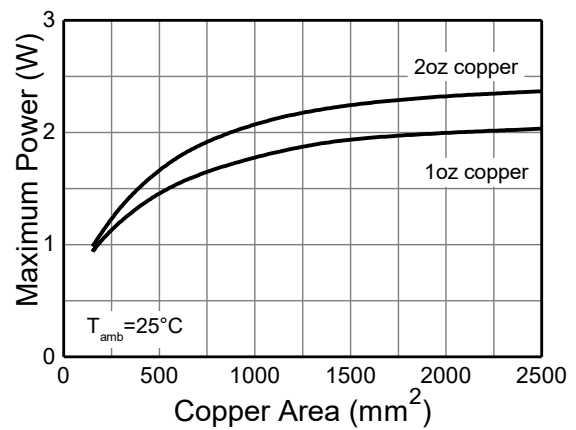


Fig.5 Power Dissipation v Copper Area

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 11)	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 Cutoff Current		I_{CBO}	—	—	-0.1 -20	μA	$V_{CB} = -30\text{V}$ $V_{CB} = -30\text{V}$, $T_J = +150^\circ\text{C}$
Emitter Cutoff Current		I_{EBO}	—	—	-20	nA	$V_{EB} = -5\text{V}$
DC Current Gain (Note 11)	BCX51/52/53	h_{FE}	25	—	—	—	$I_C = -5\text{mA}$, $V_{CE} = -2\text{V}$
			40	—	250		$I_C = -150\text{mA}$, $V_{CE} = -2\text{V}$
			25	—	—		$I_C = -500\text{mA}$, $V_{CE} = -2\text{V}$
	BCX5116/5216/5316		75	—	—		$I_C = -5\text{mA}$, $V_{CE} = -2\text{V}$
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.)

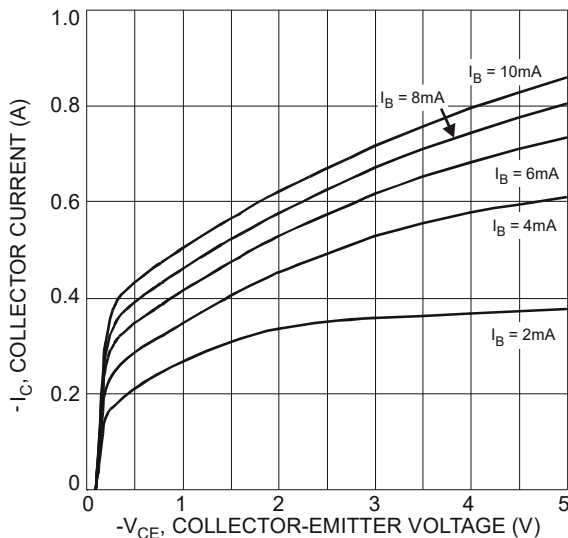


Fig.6 I_C v V_{CE}

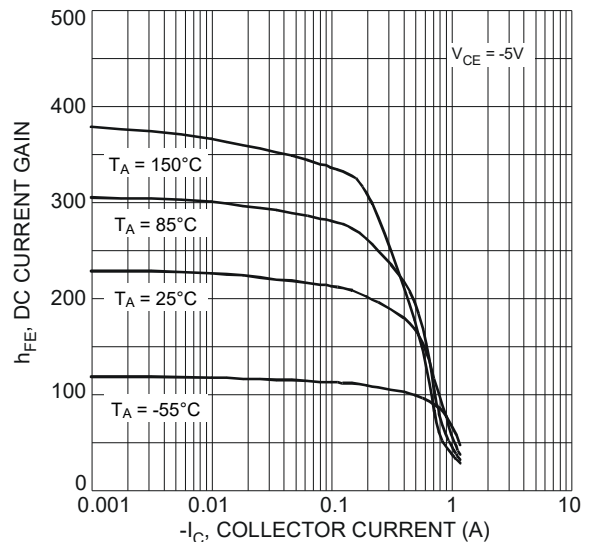


Fig.7 h_{FE} v I_C

Typical Electrical Characteristics (continued)

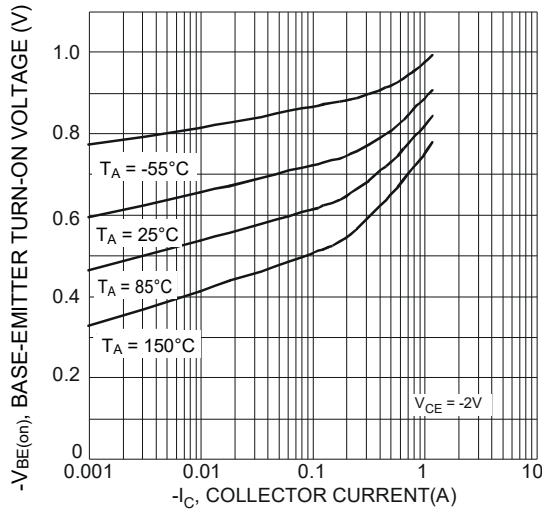


Fig.8 $V_{BE(on)}$ v I_C

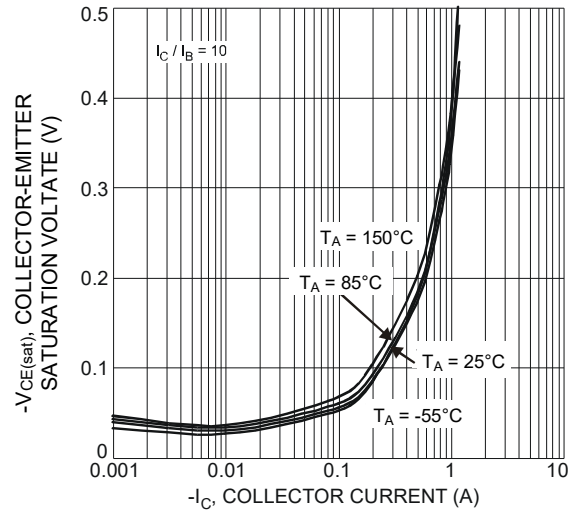


Fig.9 $V_{CE(sat)}$ v I_C

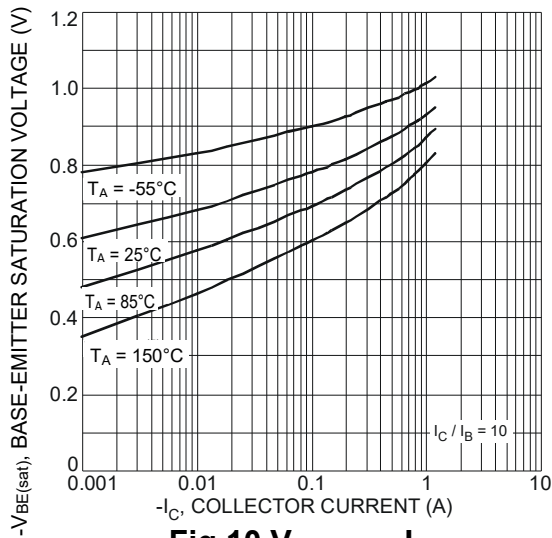


Fig.10 $V_{BE(sat)}$ v I_C

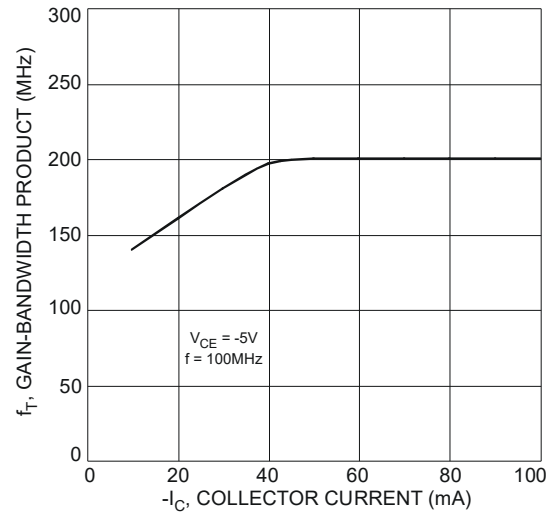


Fig.11 f_T v I_C

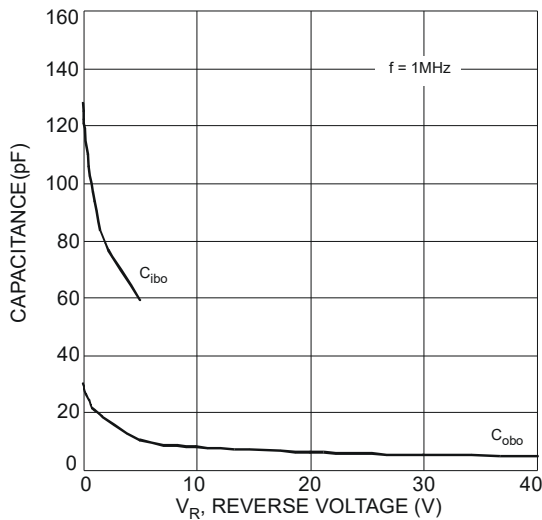
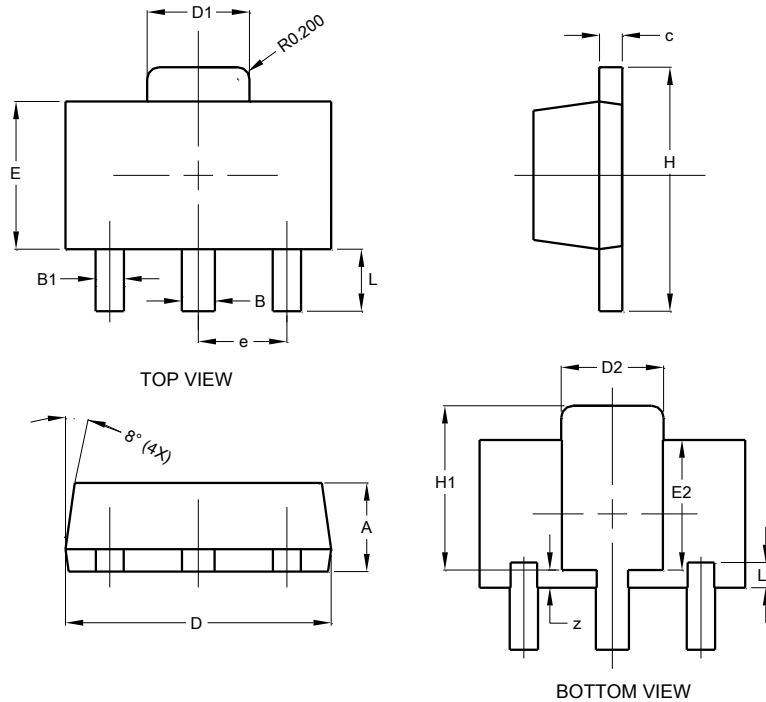


Fig.12 C v V_R

Package Outline Dimensions

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

SOT89

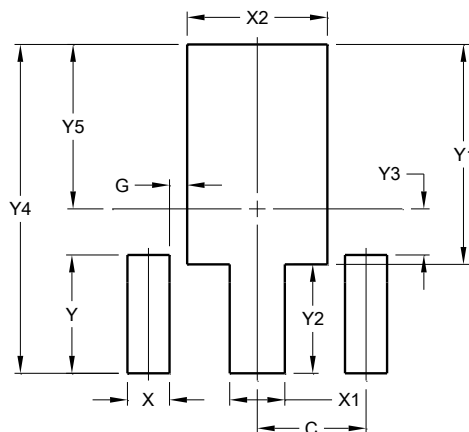


SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.00	0.527	0.327
z	0.20	0.40	0.30
All Dimensions in 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	1.630
Y1	3.030
Y2	1.500
Y3	0.635
Y4	4.530
Y5	2.265

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