PNP MEDIUM-POWER TRANSISTORS IN SOT89

Features

- BV_{CEO} > -45V, -60V & -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)

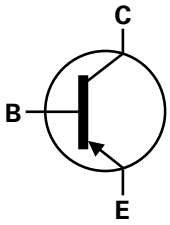
Applications

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

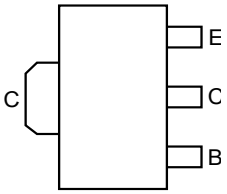
SOT89



Top View



Device Symbol



Top View
Pinout

Ordering Information (Note 4)

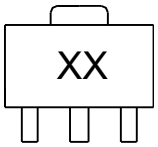
Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
BCX51TA	SOT89	AA	7	12	1000	Reel
BCX5116TA	SOT89	AD	7	12	1000	Reel
BCX52TA	SOT89	AE	7	12	1000	Reel
BCX5216TA	SOT89	AM	7	12	1000	Reel
BCX53TA	SOT89	AH	7	12	1000	Reel
BCX5316TA	SOT89	AL	7	12	1000	Reel
BCX51TC	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/.

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Marking Information

SOT89



xx = Product Type Marking Code, as follows:

BCX51 = AA	BCX52 = AE	BCX53 = AH
BCX5116 = AD	BCX5216 = AM	BCX5316 = AL

Absolute Maximum Ratings (@ T_A = +25°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°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	1	W
	(Note 6)		1.5	
	(Note 7)		2.0	
Thermal Resistance, Junction to Ambient Air	(Note 5)	$R_{\theta JA}$	125	°C/W
	(Note 6)		83	
	(Note 7)		60	
Thermal Resistance, Junction to Lead	(Note 8)	$R_{\theta JL}$	13	°C/W
Thermal Resistance, Junction to Case	(Note 9)	$R_{\theta JC}$	27	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°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.

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Thermal Characteristics and Derating Information

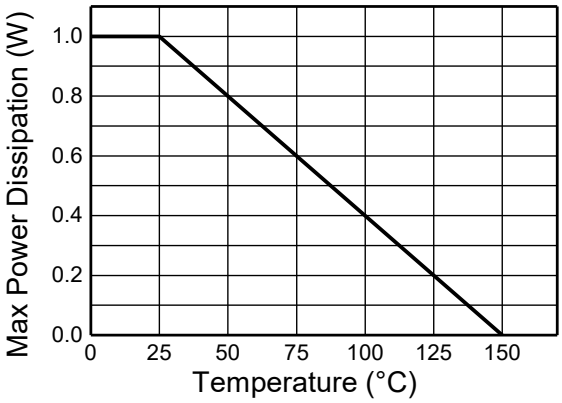


Fig.1 Derating Curve

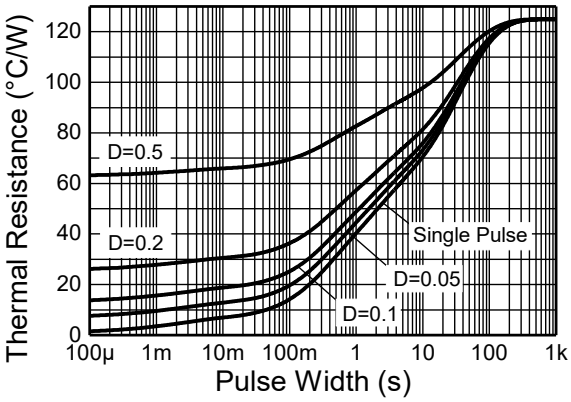


Fig.2 Transient Thermal Impedance

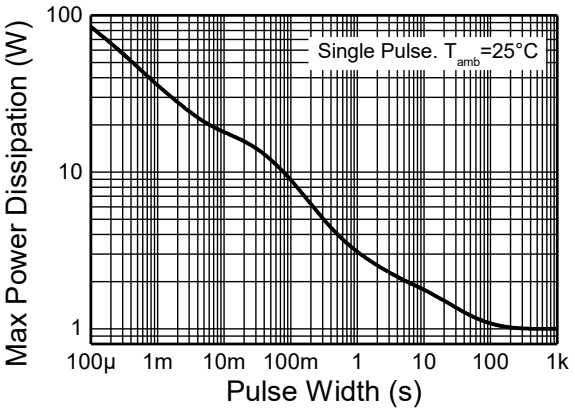


Fig.3 Pulse Power Dissipation

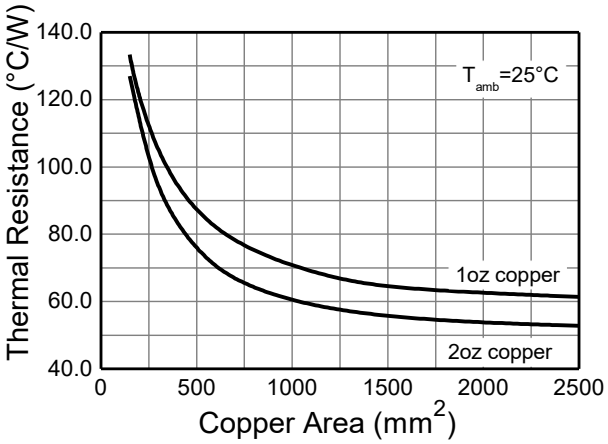


Fig.4 Thermal Resistance v Copper Area

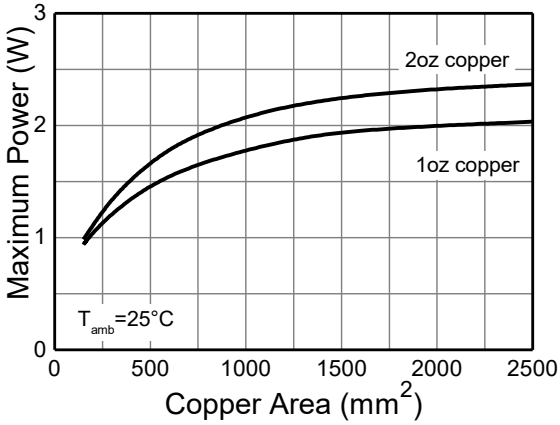


Fig.5 Power Dissipation v Copper Area

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Electrical Characteristics (@ T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BCX51	BV_{CBO}	-45	—	—	V	I_C = -100µA
	BCX52		-60				
	BCX53		-100				
Collector-Emitter Breakdown Voltage (Note 10)	BCX51	BV_{CEO}	-45	—	—	V	I_C = -10mA
	BCX52		-60				
	BCX53		-80				
Emitter-Base Breakdown Voltage		BV_{EBO}	-5	—	—	V	I_E = -10µA
Collector Cutoff Current		I_{CBO}	— —	— —	-0.1 -20	µA	V_{CB} = -30V V_{CB} = -30V, T_J = 150°C
Emitter Cutoff Current		I_{EBO}	—	—	-20	nA	V_{EB} = -5V
DC Current Gain (Note 10)	BCX51/52/53	h_{FE}	25 40 25	— — —	— 250 —	—	I_C = -5mA, V_{CE} = -2V I_C = -150mA, V_{CE} = -2V I_C = -500mA, V_{CE} = -2V
	BCX5116/5216/5316		75 100 25	— — —	— 250 —		I_C = -5mA, V_{CE} = -2V I_C = -150mA, V_{CE} = -2V I_C = -500mA, V_{CE} = -2V
Collector-Emitter Saturation Voltage (Note 10)		$V_{CE(sat)}$	—	—	-0.5	V	I_C = -500mA, I_B = -50mA
Base-Emitter Turn-On Voltage (Note 10)		$V_{BE(on)}$	—	—	-1.0	V	I_C = -500mA, V_{CE} = -2V
Transition Frequency		f_T	150	—	—	MHz	I_C = -50mA, V_{CE} = -10V f = 100MHz
Output Capacitance		C_{obo}	—	—	25	pF	V_{CB} = -10V, f = 1MHz

Note: 10. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

Typical Electrical Characteristics (@ T_A = +25°C, unless otherwise specified.)

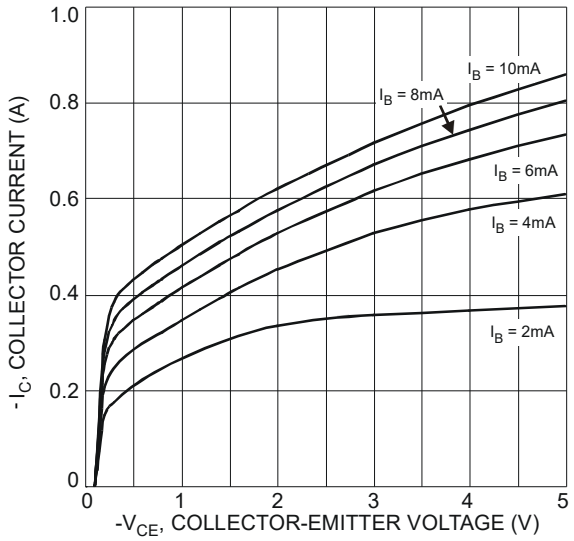


Fig.6 I_C v V_{CE}

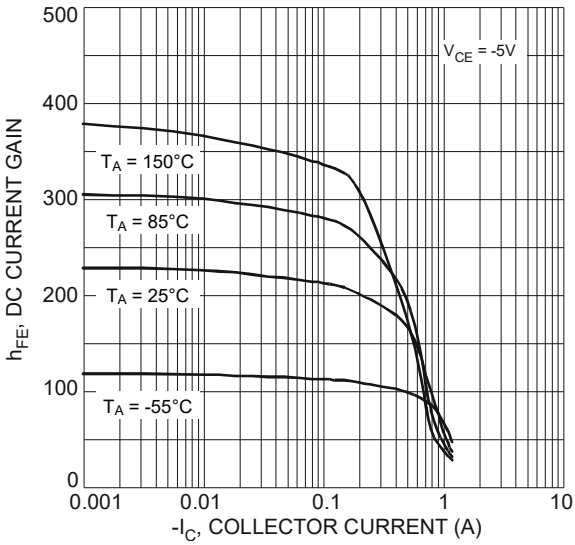


Fig.7 h_{FE} v I_C

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Typical Electrical Characteristics (continued)

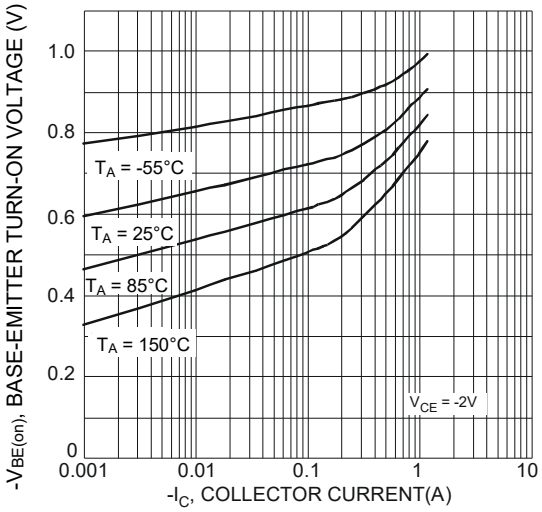


Fig.8 $V_{BE(on)}$ v I_C

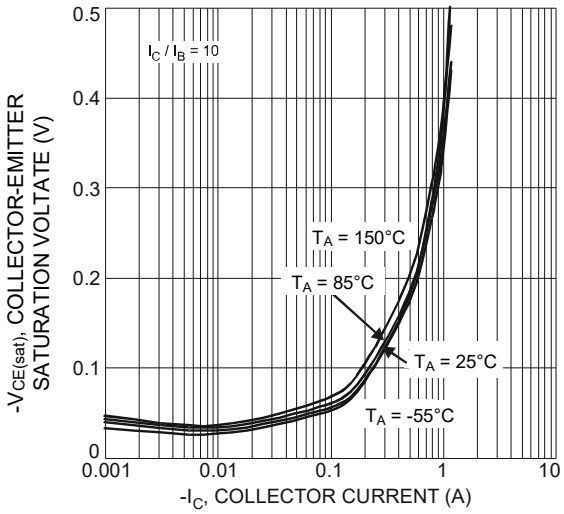


Fig.9 $V_{CE(sat)}$ v I_C

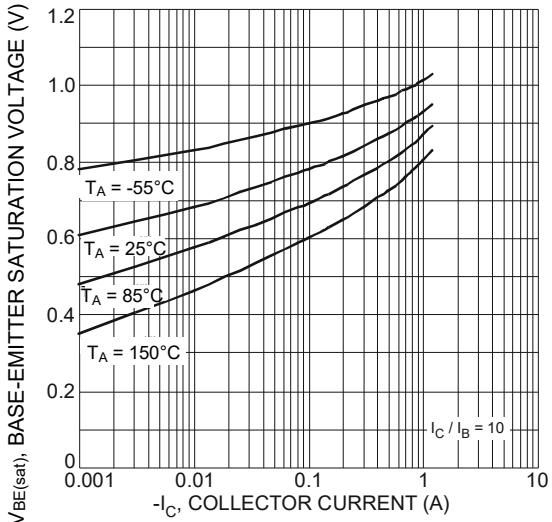


Fig.10 $V_{BE(sat)}$ v I_C

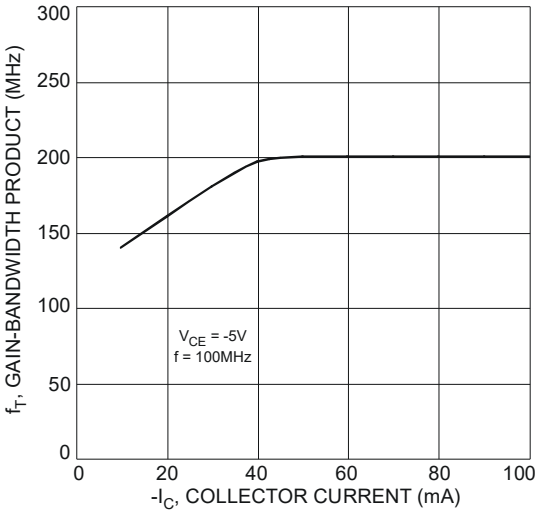


Fig.11 f_T v I_C

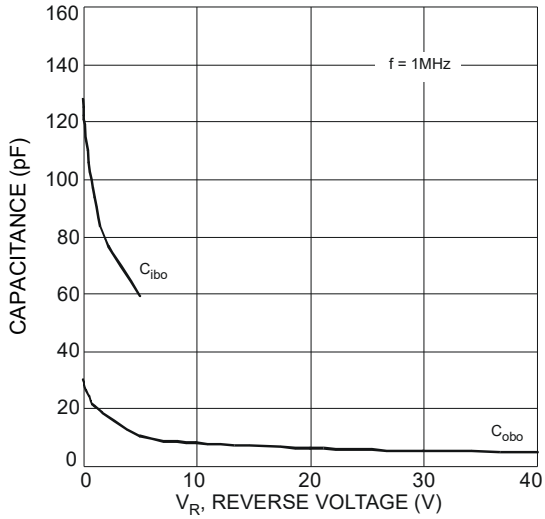


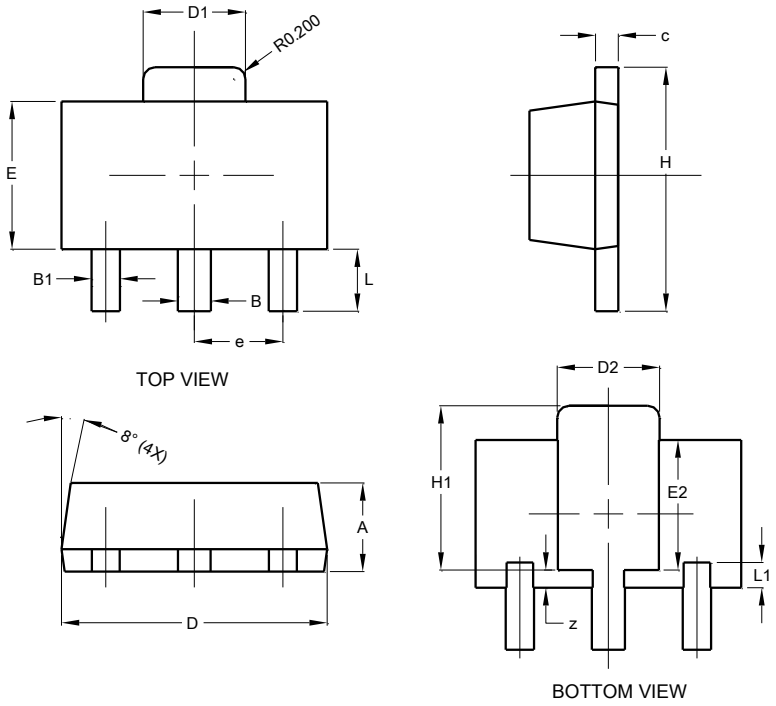
Fig.12 C v V_R

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Package Outline Dimensions

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

SOT89

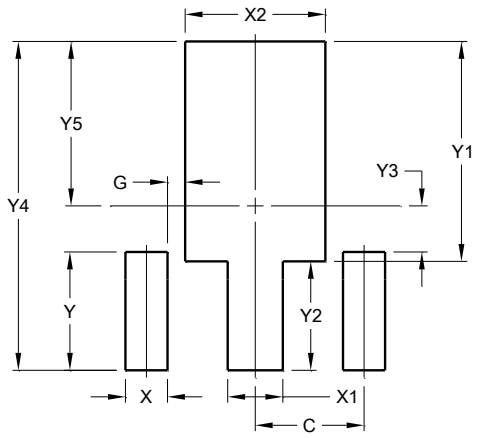


SOT89			
Dim	**Min**	**Max**	**Typ**
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.00	0.527	0.327
z	0.20	0.40	0.30
All Dimensions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