NPN MEDIUM POWER TRANSISTORS IN SOT89

Features

- BV_{CEO} > 45V, 60V & 80V
- I_c = 1A Continuous Collector Current
- I_{CM} = 1.5A 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**

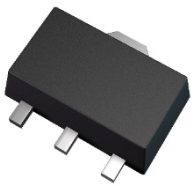
Mechanical Data

- 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 e3
- Weight: 0.055 grams (Approximate)

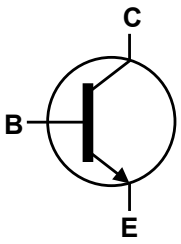
Applications

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

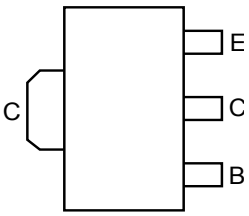
SOT89



Top View



Device Symbol



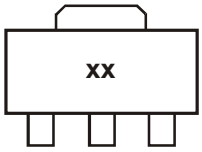
Top View
Pin-Out

Ordering Information (Note 4)

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

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 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 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

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

Characteristic	Symbol	BCX54	BCX55	BCX56	Unit
Collector-Base Voltage	V_{CBO}	45	60	100	V
Collector-Emitter Voltage	V_{CEO}	45	60	80	V
Emitter-Base Voltage	V_{EBO}	6			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°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
Operating and Storage Temperature Range		T_J, T_{STG}	-65 to +150	°C

ESD Ratings (Note 9)

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. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

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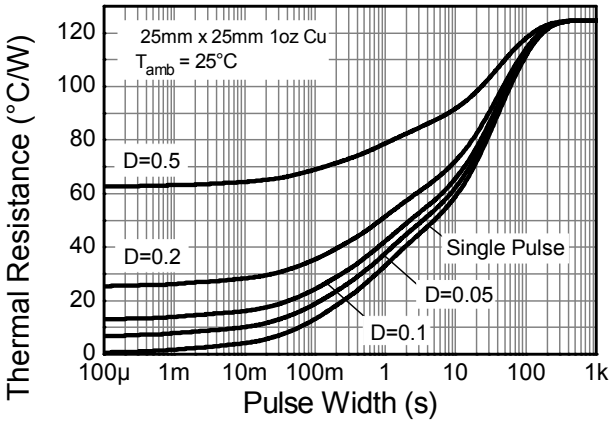
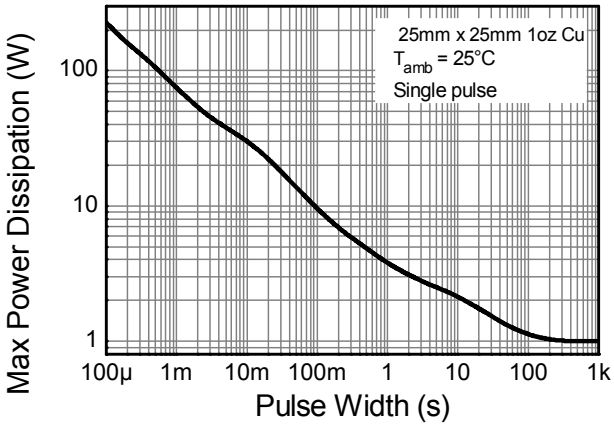
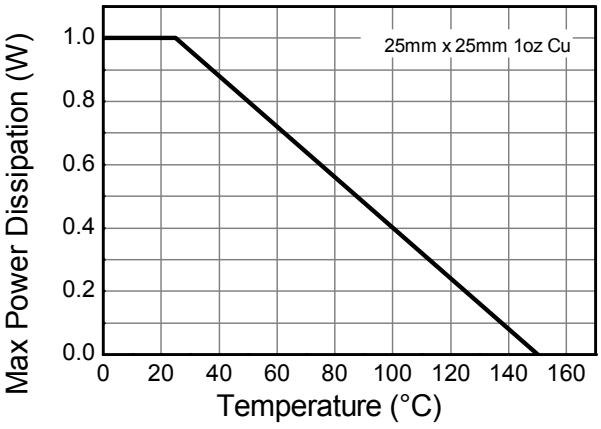
Thermal Characteristics and Derating Information



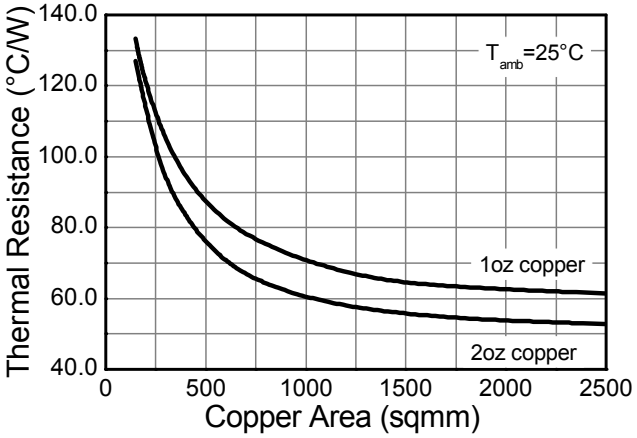
Transient Thermal Impedance

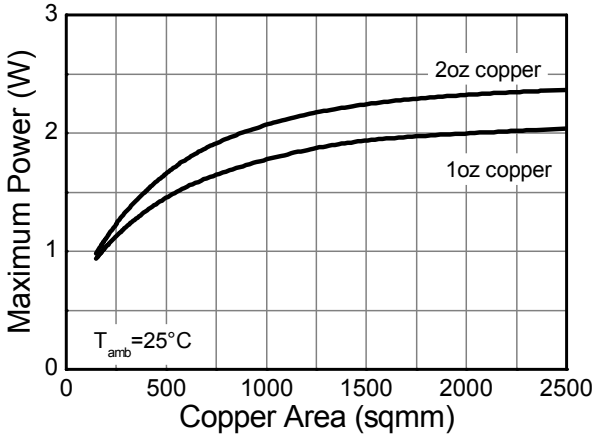


Pulse Power Dissipation



Derating Curve





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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	BCX54	BV_{CBO}	45	—	—	V	I_C = 100µA
	BCX55		60				
	BCX56		100				
Collector-Emitter Breakdown Voltage (Note 10)	BCX54	BV_{CEO}	45	—	—	V	I_C = 10mA
	BCX55		60				
	BCX56		80				
Emitter-Base Breakdown Voltage		BV_{EBO}	6	—	—	V	I_E = 100µA
Collector Cut-off Current		I_{CBO}	—	—	0.1 20	µA	V_{CB} = 30V V_{CB} = 30V, T_A = +150°C
Emitter Cut-off Current		I_{EBO}	—	—	20	nA	V_{EB} = 5V
Static Forward Current Transfer Ratio (Note 10)	All versions	h_{FE}	25 40 25	— — —	— 250 —	—	I_C = 5mA, V_{CE} = 2V I_C = 150mA, V_{CE} = 2V I_C = 500mA, V_{CE} = 2V
	10 gain grp		63	—	160		I_C = 150mA, V_{CE} = 2V
	16 gain grp		100	—	250		I_C = 150mA, 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%.

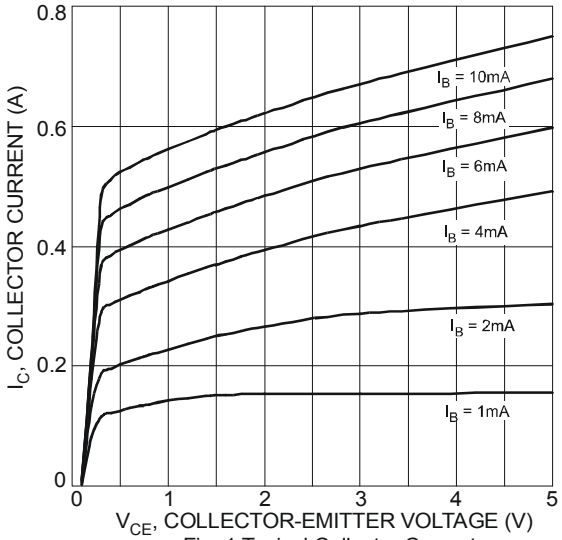

Fig. 1 Typical Collector Current vs. Collector-Emitter Voltage

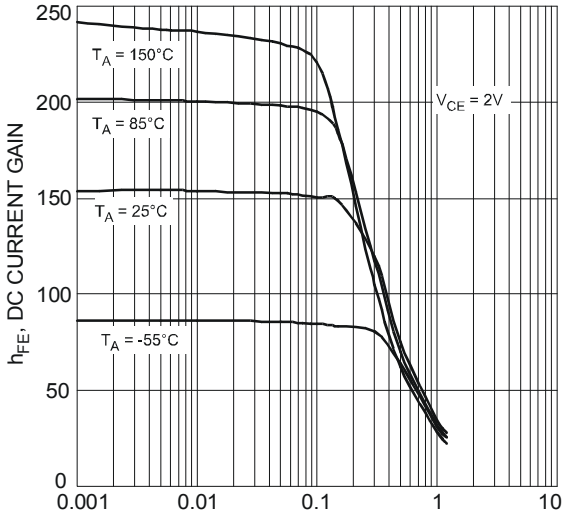

Fig. 2 Typical DC Current Gain vs. Collector Current

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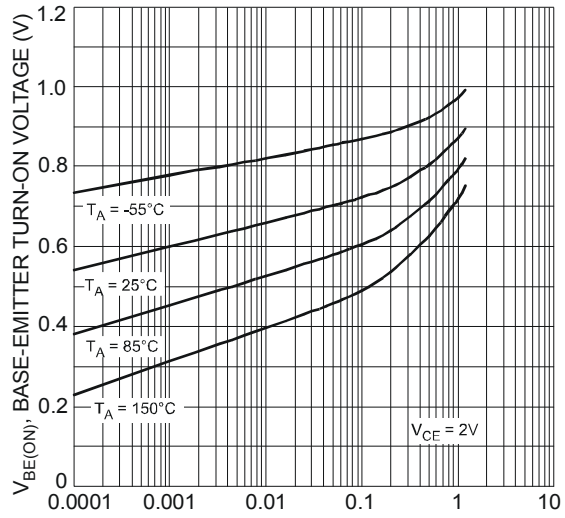

Fig. 3 Typical Base-Emitter Turn-On Voltage vs. Collector Current

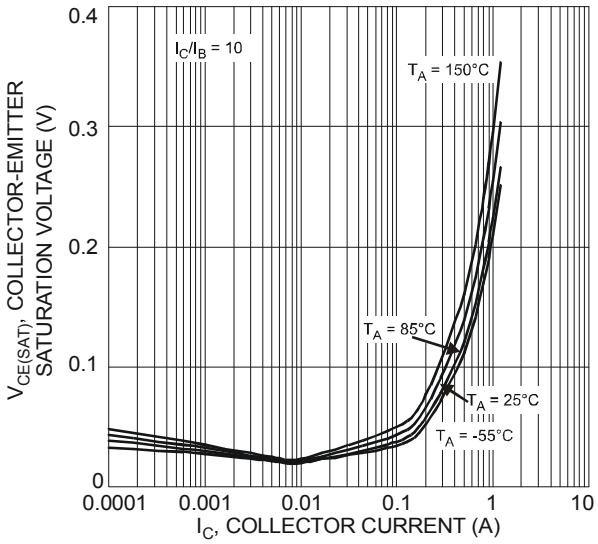

Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

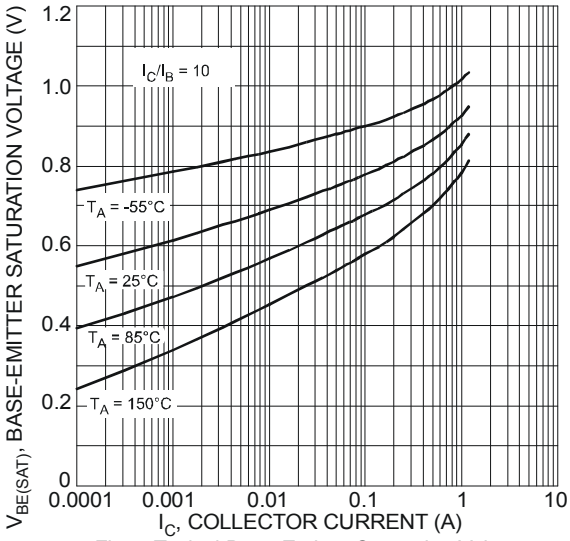

Fig. 5 Typical Base-Emitter Saturation Voltage vs. Collector Current

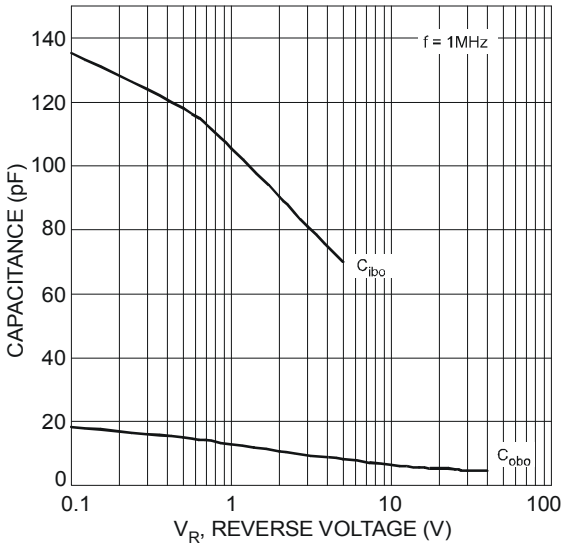

Fig. 6 Typical Capacitance Characteristics

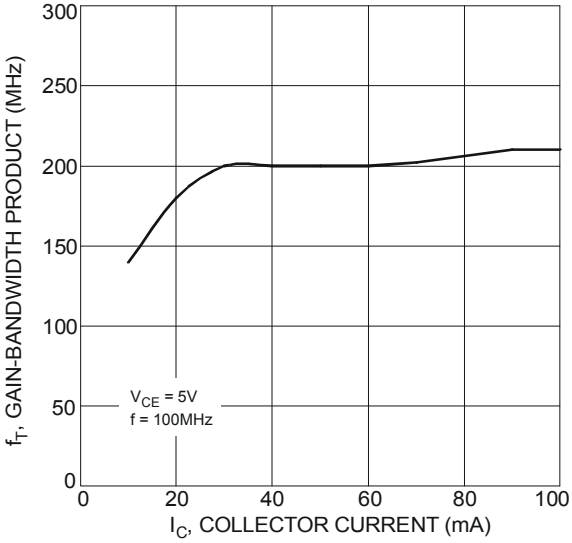

Fig. 7 Typical Gain-Bandwidth Product vs. Collector Current

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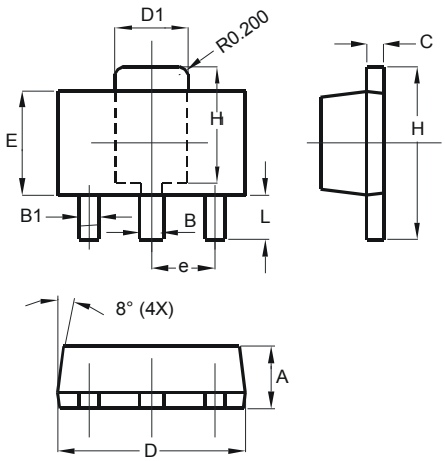
Package Outline Dimensions

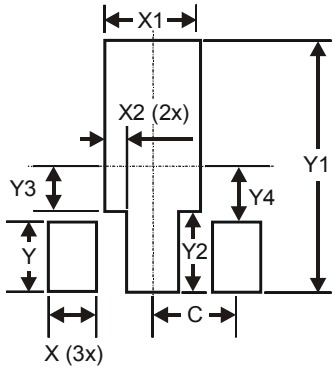
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SOT89		
Dim	**Min**	**Max**
A	1.40	1.60
B	0.44	0.62
B1	0.35	0.54
C	0.35	0.44
D	4.40	4.60
D1	1.62	1.83
E	2.29	2.60
e	1.50 Typ	
H	3.94	4.25
H1	2.63	2.93
L	0.89	1.20
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)
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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