



**THE DATASHEET OF
BCX5616TA**



Features

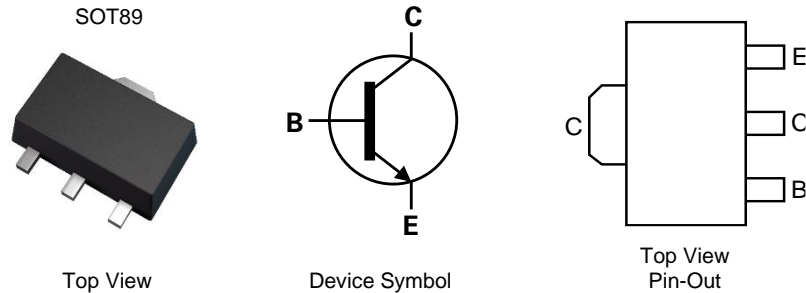
- $BV_{CEO} > 45V, 60V \text{ \& } 80V$
- $I_C = 1A$ Continuous Collector Current
- $I_{CM} = 2A$ Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)} < 500mV @ 0.5A$
- Gain Groups 10 and 16
- Epitaxial Planar Die Construction
- Complementary PNP Types: BCX51, 52, and 53
- **Totally Lead-Free & Fully 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-Q100/101/104/200, 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

- 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
- Weight: 0.055 grams (Approximate)

Applications

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

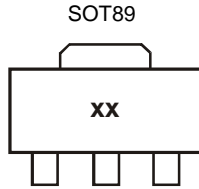


Ordering Information (Note 4)

Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
BCX54TA	SOT89	BA	7	12	1,000	Reel
BCX5410TA	SOT89	BC	7	12	1,000	Reel
BCX5416TA	SOT89	BD	7	12	1,000	Reel
BCX5416-13R	SOT89	BD	13	12	4,000	Reel
BCX55TA	SOT89	BE	7	12	1,000	Reel
BCX5510TA	SOT89	BG	7	12	1,000	Reel
BCX5516TA	SOT89	BM	7	12	1,000	Reel
BCX56TA	SOT89	BH	7	12	1,000	Reel
BCX5610TA	SOT89	BK	7	12	1,000	Reel
BCX5616TA	SOT89	BL	7	12	1,000	Reel
BCX5616TC	SOT89	BL	13	12	4,000	Reel
BCX5410TC	SOT89	BC	13	12	4,000	Reel
BCX5416TC	SOT89	BD	13	12	4,000	Reel
BCX54TC	SOT89	BA	13	12	4,000	Reel
BCX5510TC	SOT89	BG	13	12	4,000	Reel
BCX5516TC	SOT89	BM	13	12	4,000	Reel
BCX55TC	SOT89	BE	13	12	4,000	Reel
BCX5610TC	SOT89	BK	13	12	4,000	Reel
BCX56TC	SOT89	BH	13	12	4,000	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:

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

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}	2			
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	P _D	(Note 5)	0.55
		(Note 6)	1
		(Note 7)	1.5
		(Note 8)	2.0
Thermal Resistance, Junction to Ambient Air	R _{θJA}	(Note 5)	225
		(Note 6)	125
		(Note 7)	83
		(Note 8)	60
Thermal Resistance, Junction to Lead	R _{θJL}	13	°C/W
Thermal Resistance, Junction to Case	R _{θJC}	(Notes 5 & 10)	39
		(Note 10)	27
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

ESD Ratings (Note 11)

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 on minimum recommended pad layout on 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.
 - 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).
 - Thermal resistance from junction to the top of the case.
 - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

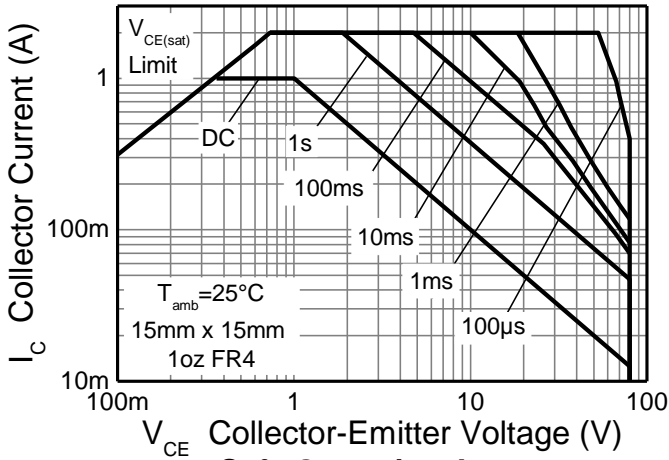


Figure 1. Safe Operation Area

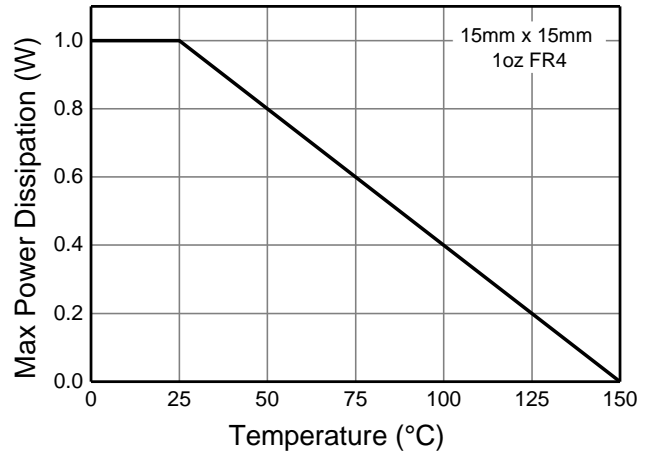


Figure 2. Derating Curve

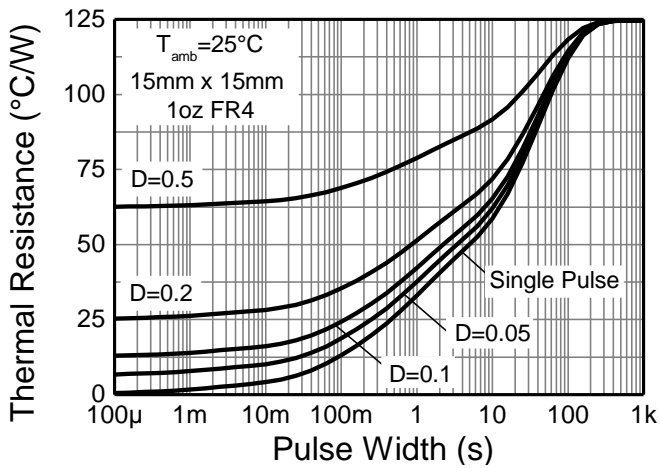


Figure 3. Transient Thermal Impedance

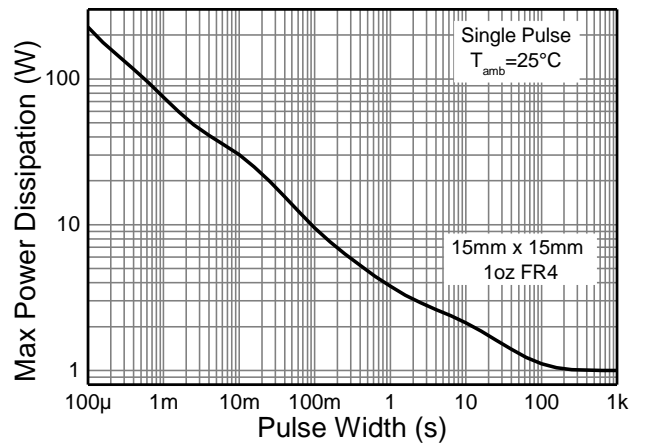


Figure 4. Pulse Power Dissipation

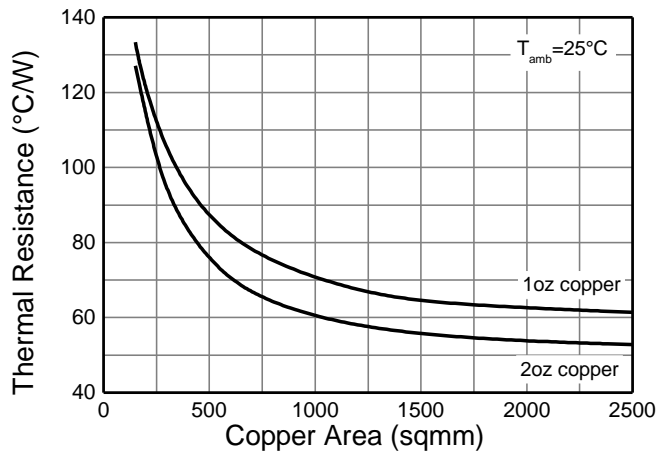


Figure 5. $R_{\theta JA}$ vs. Copper Area

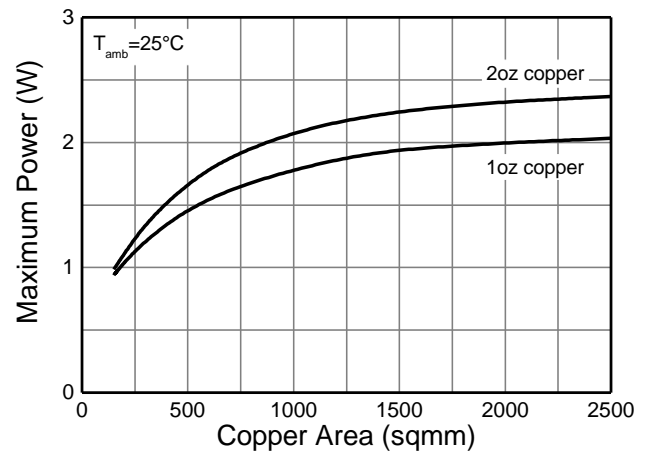


Figure 6. Power Dissipation vs. Copper Area

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
Collector-Base Breakdown Voltage	BCX54	45	—	—	V	$I_C = 100\mu\text{A}$	
	BCX55	60					
	BCX56	100					
Collector-Emitter Breakdown Voltage (Note 12)	BCX54	45	—	—	V	$I_C = 10\text{mA}$	
	BCX55	60					
	BCX56	80					
Emitter-Base Breakdown Voltage	BV_{EBO}	6	—	—	V	$I_E = 100\mu\text{A}$	
Collector Cutoff Current	I_{CBO}	—	—	0.1 20	μA	$V_{CB} = 30\text{V}$ $V_{CB} = 30\text{V}, T_A = +150^\circ\text{C}$	
Emitter Cutoff Current	I_{EBO}	—	—	20	nA	$V_{EB} = 5\text{V}$	
Static Forward Current Transfer Ratio (Note 12)	All versions	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	—	—		$I_C = 500\text{mA}, V_{CE} = 2\text{V}$
			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 12)	$V_{CE(sat)}$	—	—	0.5	V	$I_C = 500\text{mA}, I_B = 50\text{mA}$	
Base-Emitter Turn-On Voltage (Note 12)	$V_{BE(on)}$	—	—	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: 12. 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.)

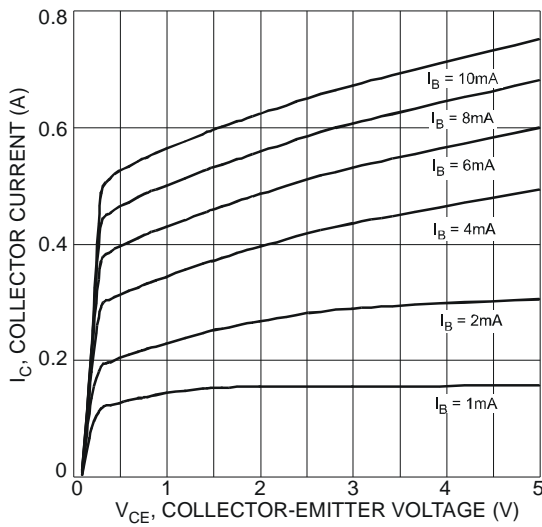


Figure 7. Typical Collector Current vs. Collector-Emitter Voltage

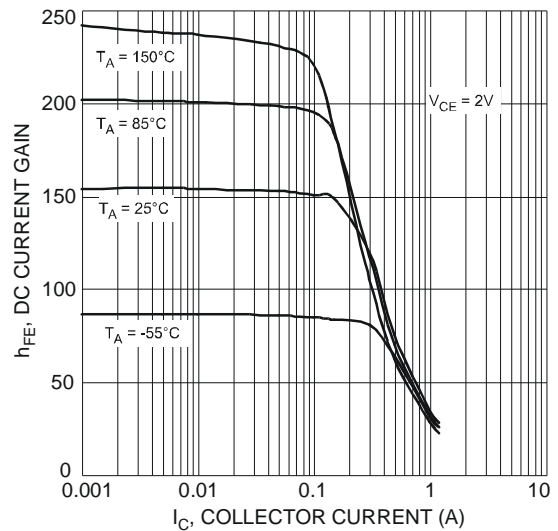


Figure 8. Typical DC Current Gain vs. Collector Current

Typical Electrical Characteristics (continued)

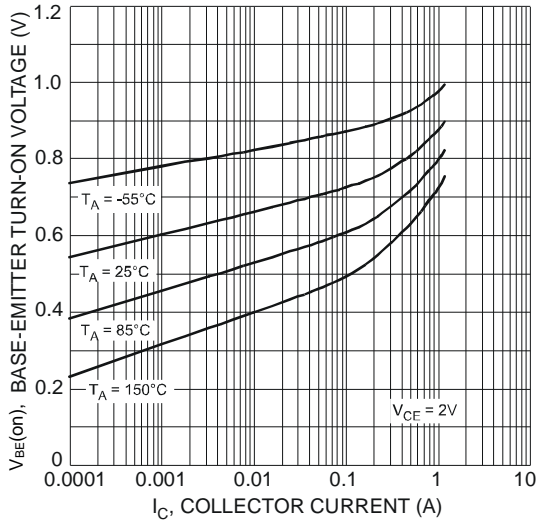


Figure 9. Typical Base-Emitter Turn-On Voltage vs. Collector Current

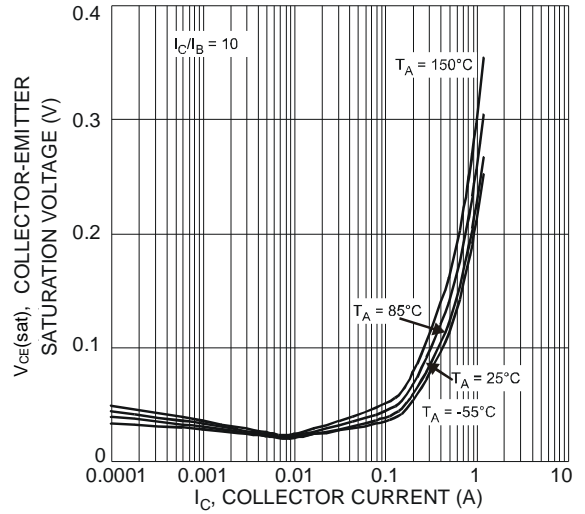


Figure 10. Typical Collector-Emitter Saturation Voltage vs. Collector Current

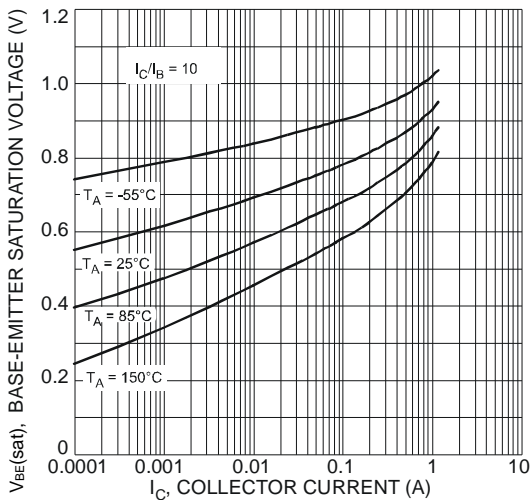


Figure 11. Typical Base-Emitter Saturation Voltage vs. Collector Current

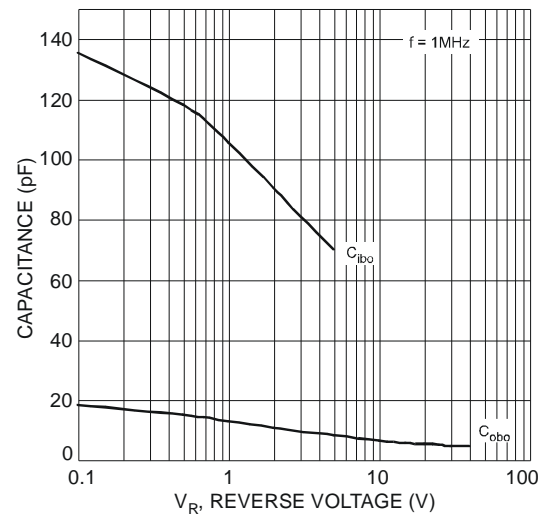


Figure 12. Typical Capacitance Characteristics

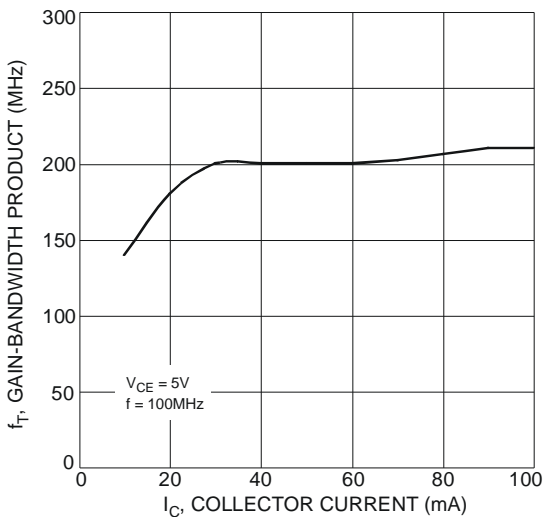
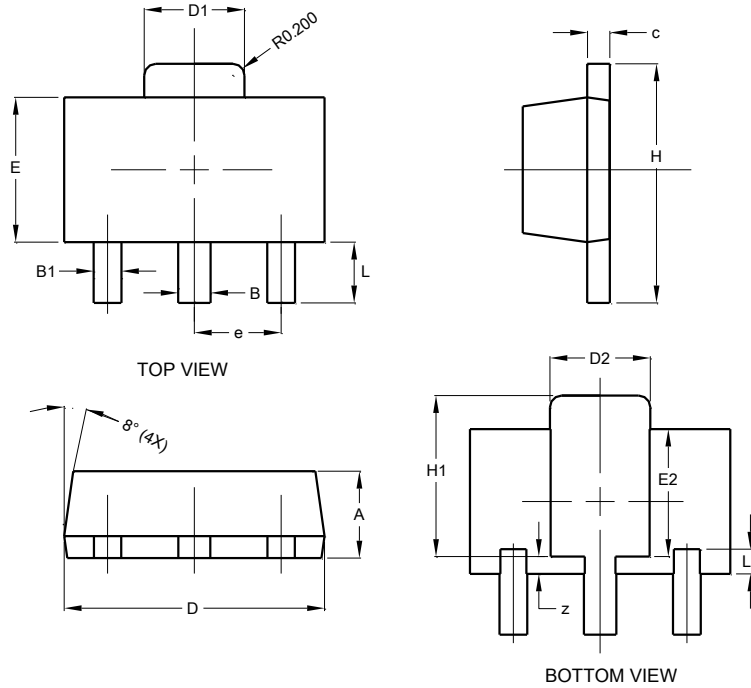


Figure 13. Typical Gain-Bandwidth Product vs. Collector Current

Package Outline Dimensions

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

SOT89

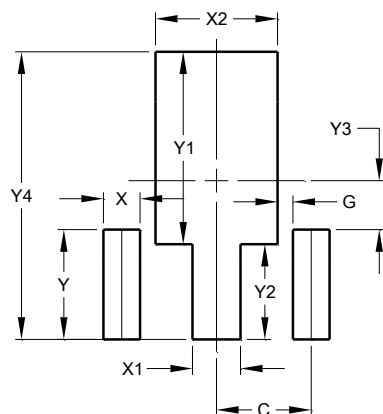


SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions in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