Lead-free Green

60V PNP MEDIUM POWER TRANSISTOR IN SOT89

Description

Packaged in SOT89 outline, this low-saturation PNP transistor offers extremely low on-state losses making it ideal for use in DC-DC circuits and various driving and power management functions.

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: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.05 grams (Approximate)

Features

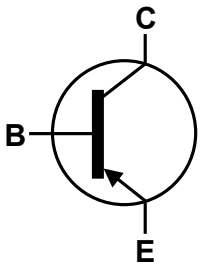
- BV_{CEO} > -60V
- BV_{ECO} > -7V
- I_C = -4.5 High Continuous Collector Current
- I_{CM} = -7A Peak Collector Current
- $V_{CE(sat)}$ < -80mV @ -1A
- $R_{CE(sat)}$ = 50mΩ for a Low Equivalent On-Resistance
- P_D=2.4W
- Complementary Part Number ZXTN19060CZ
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative.**
  https://www.diodes.com/quality/product-definitions/

Applications

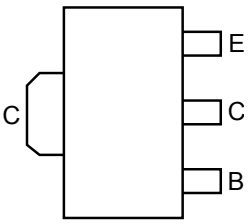
- High Side Driver
- Motor Drive
- Load Disconnect Switch

SOT89

Top View



Device Symbol



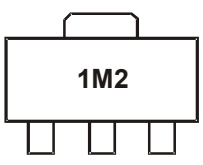
Top View
Pin Out

Ordering Information (Notes 4)

Product	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
ZXTP19060CZTA	1M2	7	12	1000

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 http://www.diodes.com/products/packages.html.

Marking Information



1M2 = Product Type Marking Code

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

Characteristic	Symbol	Limit	Unit
Collector-Base Voltage	V_{CBO}	-60	V
Collector-Emitter Voltage	V_{CEO}	-60	V
Emitter-Collector Voltage (Reverse Blocking)	V_{ECX}	-7	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current	I_C	-4.5	A
Peak Pulse Current	I_{CM}	-7	A
Base Current	I_B	-1	A

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

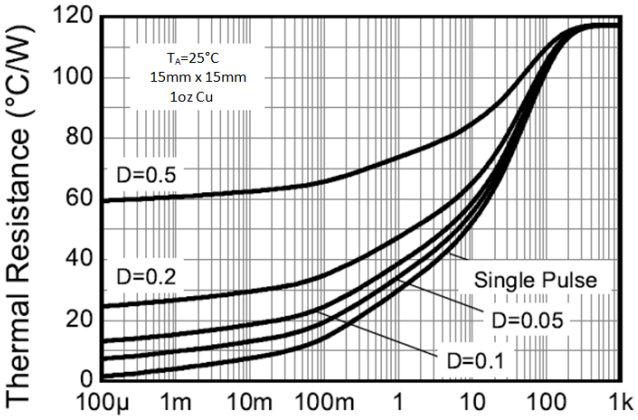
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 5)	P_D	1.1 8.8	W mW/°C
	(Note 6)		1.8 14.4	
	(Note 7)		2.4 19.2	
	(Note 8)		4.46 35.7	
	(Note 9)		26.7 213	
Thermal Resistance, Junction to Ambient Air	(Note 5)	$R_{\theta JA}$	117	°C/W
	(Note 6)		68	
	(Note 7)		51	
	(Note 8)		31	
Thermal Resistance, Junction to Lead	(Note 9)	$R_{\theta JL}$	4.7	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 10)

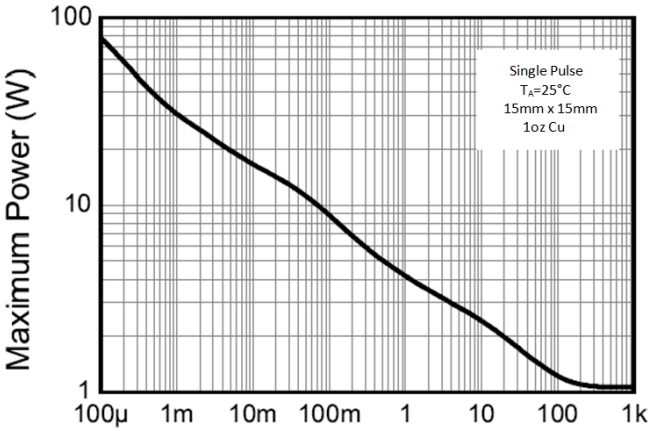
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Notes:
5. For a device mounted with the exposed collector pad on 15mm × 15mm 1oz copper that is on a single-sided 0.6mm 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 × 25mm 2oz copper.
7. Same as Note 5, except the device is mounted on 50mm × 50mm 2oz copper.
8. Same as Note 7, except the device is measured at t<10 seconds.
9. Thermal resistance from junction to solder-point (on the exposed collector pad).
10. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

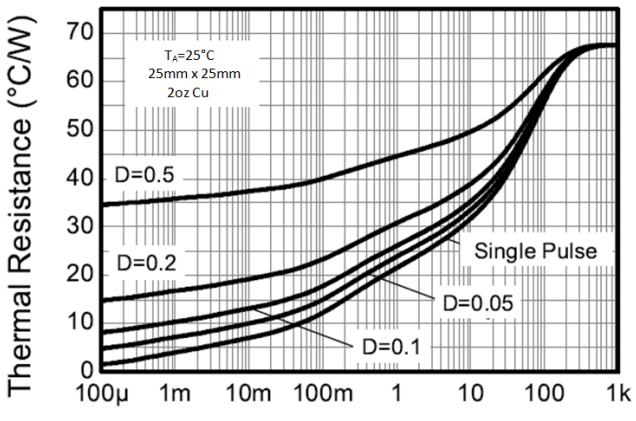
Thermal Characteristics and Derating Information



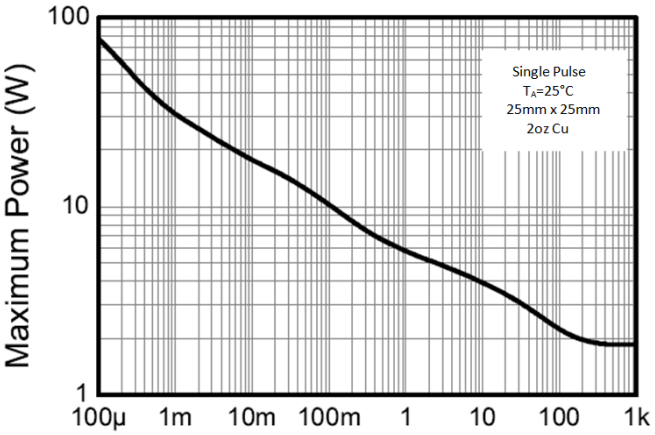
Transient Thermal Impedance



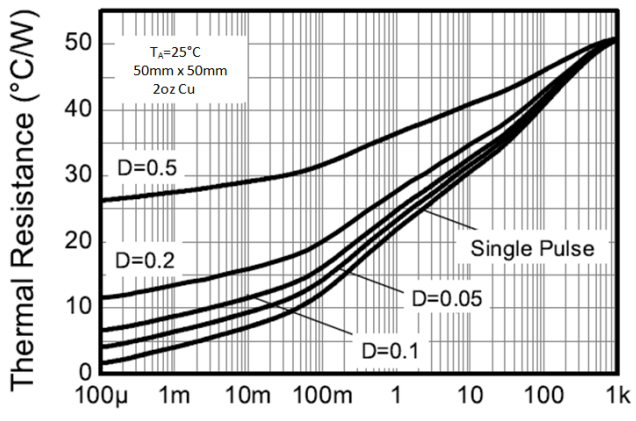
Pulse Power Dissipation



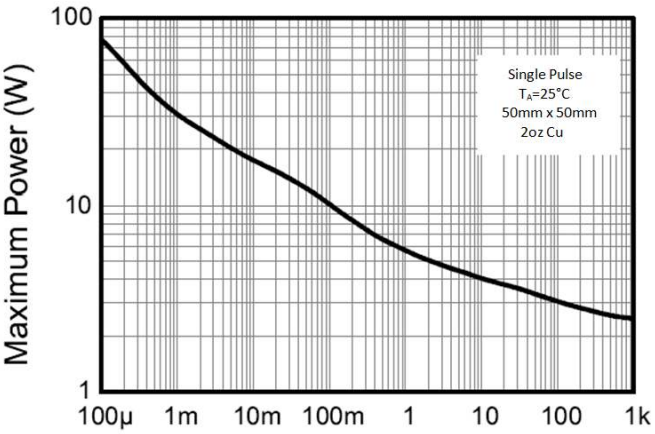
Transient Thermal Impedance



Pulse Power Dissipation

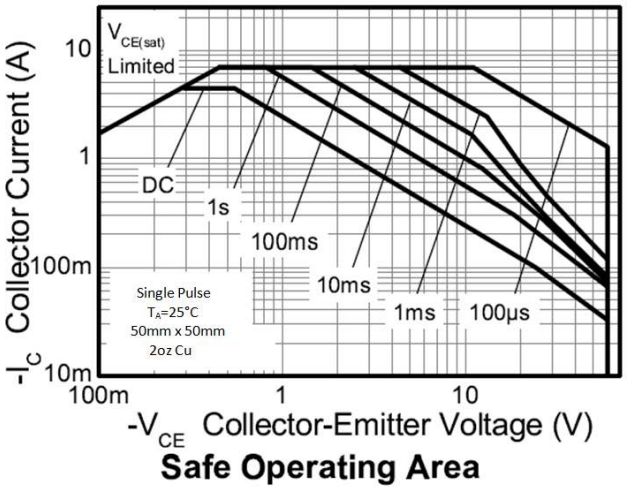


Transient Thermal Impedance

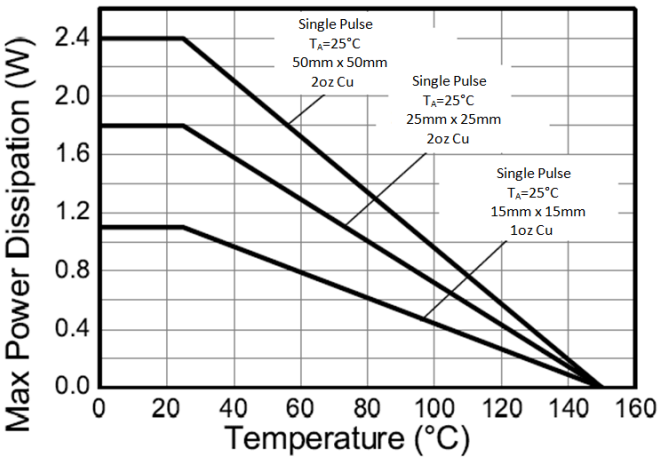


Pulse Power Dissipation

Thermal Characteristics and Derating Information (cont.)



Safe Operating Area



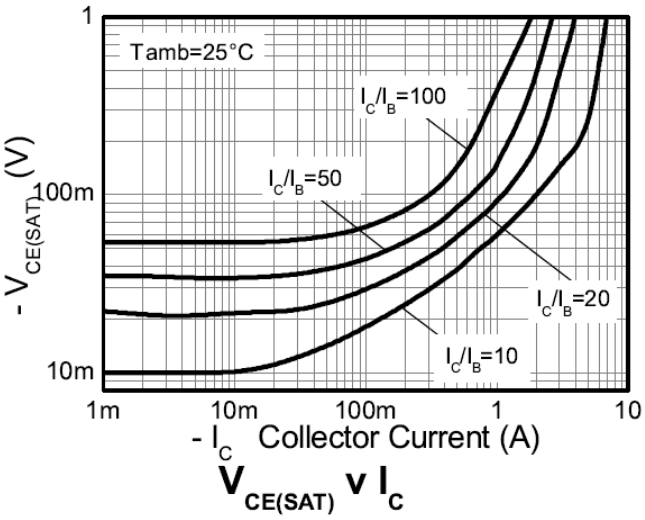
Derating Curve

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

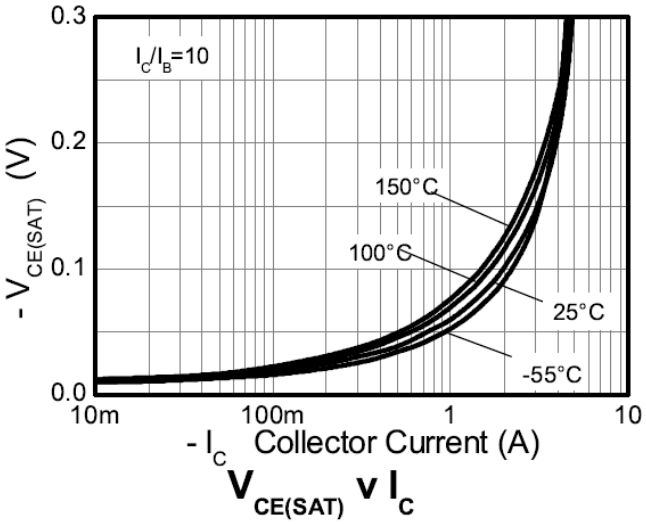
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-60	-110	—	V	I_C = -100µA
Collector-Emitter Breakdown Voltage (Note 11)	BV_{CEO}	-60	-90	—	V	I_C = -10mA
Emitter-Collector Breakdown Voltage (Reverse Blocking)	BV_{ECX}	-7	-8.4	—	V	I_E = -100µA, R_{BC} <1kΩ or 0.25V > V_{BC} > -0.25V
Emitter-Collector Breakdown Voltage (Reverse Blocking)	BV_{ECO}	-7	-8.8	—	V	I_E = -100µA
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8.4	—	V	I_E = -100µA
Collector-Base Cutoff Current	I_{CBO}	— —	-1 —	-50 -0.5	nA µA	V_{CB} = -60V V_{CB} = -60V, T_A = +100°C
Emitter Cutoff Current	I_{EBO}	—	-1	-50	nA	V_{EB} = -6V
DC Current Transfer Static Ratio (Note 11)	h_{FE}	200 160 25	330 260 45	500 — —	—	I_C = -100mA, V_{CE} = -2V I_C = -1A, V_{CE} = -2V I_C = -4.5A, V_{CE} = -2V
Collector-Emitter Saturation Voltage (Note 11)	$V_{CE(sat)}$	—	-62 -150 -500 -105 -145 -240	-80 -205 -750 -165 -200 -410	mV	I_C = -1A, I_B = -100mA I_C = -1A, I_B = -20mA I_C = -2A, I_B = -40mA I_C = -2A, I_B = -200mA I_C = -3A, I_B = -300mA I_C = -4.5A, I_B = -450mA
Base-Emitter Saturation Voltage (Note 11)	$V_{BE(sat)}$	—	-965	-1050	mV	I_C = -4.5A, I_B = -450mA
Base-Emitter Turn-on Voltage (Note 11)	$V_{BE(on)}$	—	-875	-1000	mV	I_C = -4.5A, V_{CE} = -2V
Transitional Frequency	f_T	—	180	—	MHz	I_E = -50mA, V_{CE} = -10V f = 50MHz
Input Capacitance	C_{ibo}	—	280	400	pF	V_{EB} = -0.5V, f = 1MHz,
Output Capacitance	C_{obo}	—	29.5	40	pF	V_{CB} = -10V, f = 1MHz,
Delay Time	t_d	—	24.3	—	ns	I_C = -500mA, V_{CC} = -10V, I_{B1} = -I_{B2} = -50mA
Rise Time	t_r	—	13.2	—	ns	
Storage Time	t_s	—	456	—	ns	
Fall Time	t_f	—	68.2	—	ns	

Note: 11. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

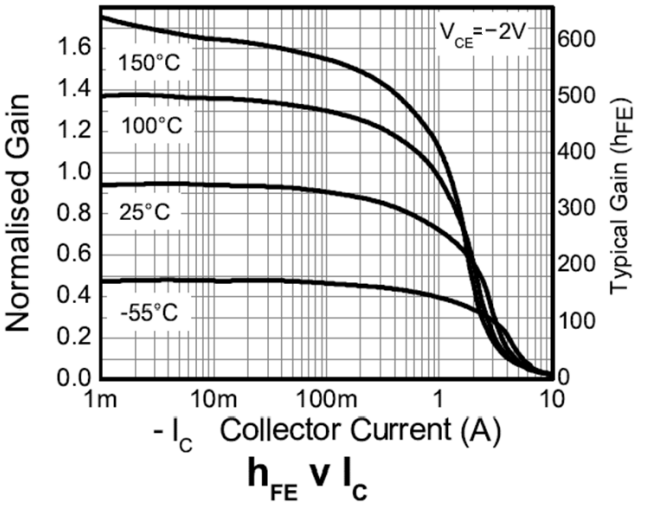
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



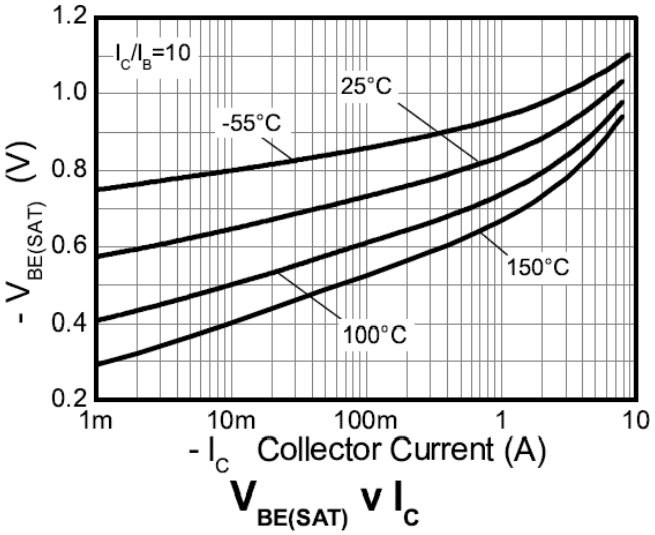
$V_{CE(SAT)}$ v I_C



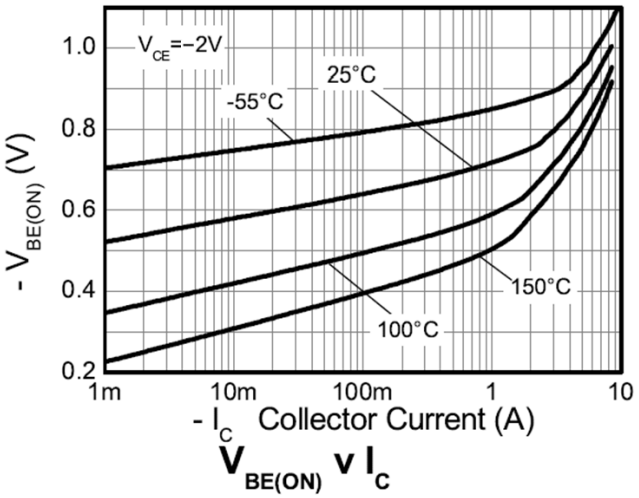
$V_{CE(SAT)}$ v I_C



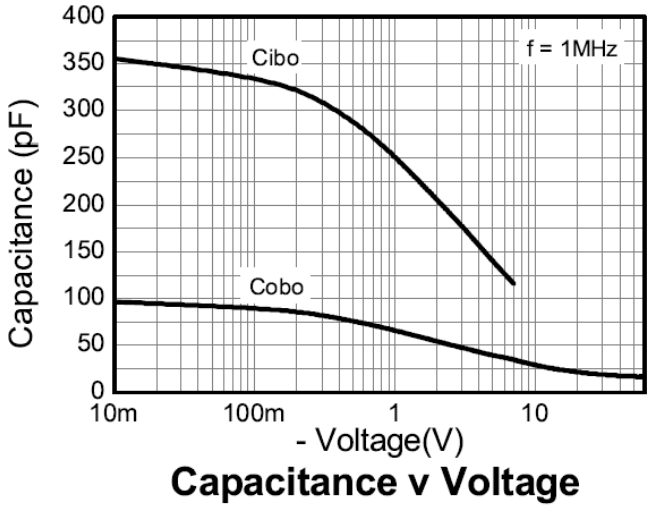
h_{FE} v I_C



$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

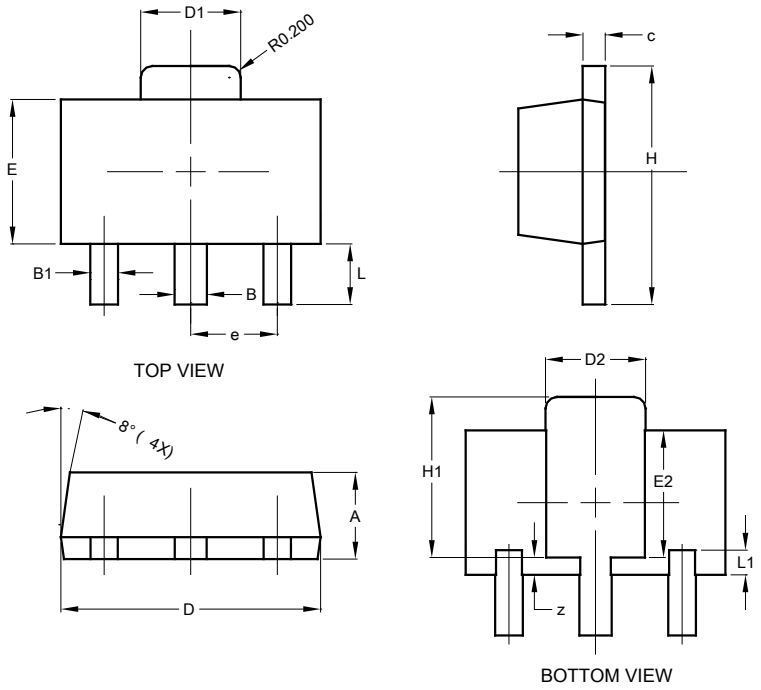


Capacitance v Voltage

Package Outline Dimensions

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

SOT89

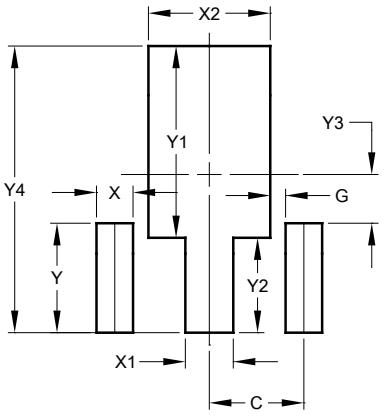


SOT89			
Dim	**Min**	**Max**	**Typ**
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions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