

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

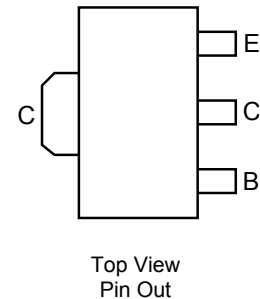
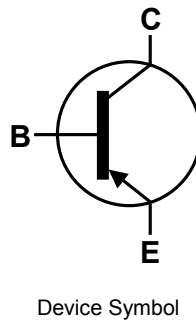
- Case: SOT89
- Case Material: Molded Plastic. "Green" Molding Compound
UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads,
Solderable per MIL-STD-202, Method 208 ③
- Weight: 0.05 grams (Approximate)

Features

- $BV_{CEO} > -60V$
- $BV_{ECO} > -7V$
- $I_C = -4.5$ High Continuous Collector Current
- $I_{CM} = -7A$ Peak Collector Current
- $V_{CE(sat)} < -80mV @ -1A$
- $R_{CE(sat)} = 50m\Omega$ 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

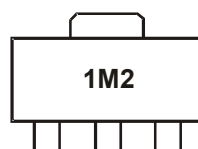


Ordering Information (Notes 4)

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

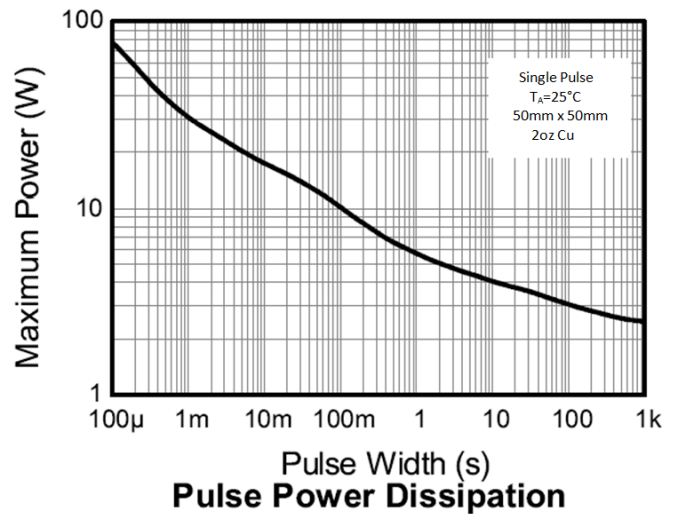
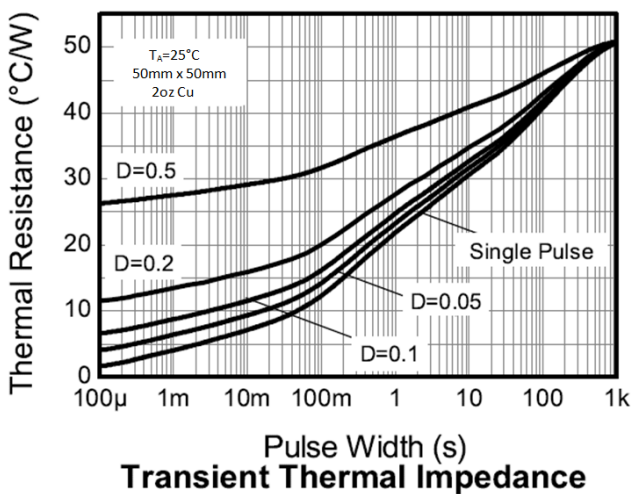
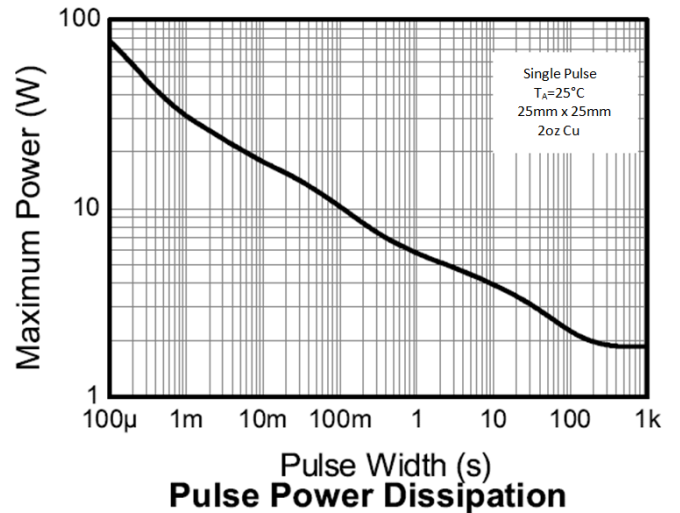
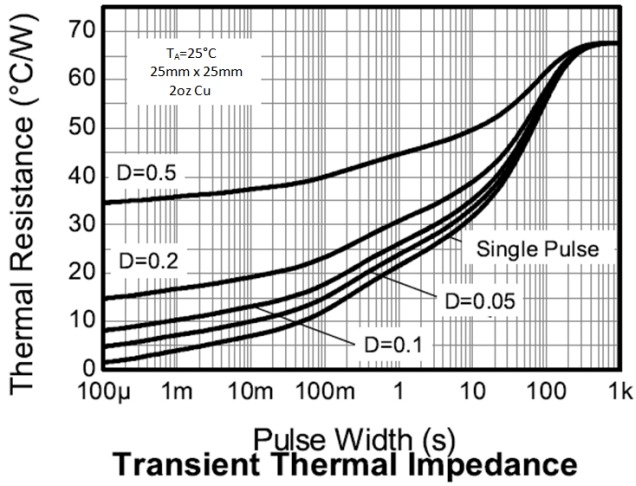
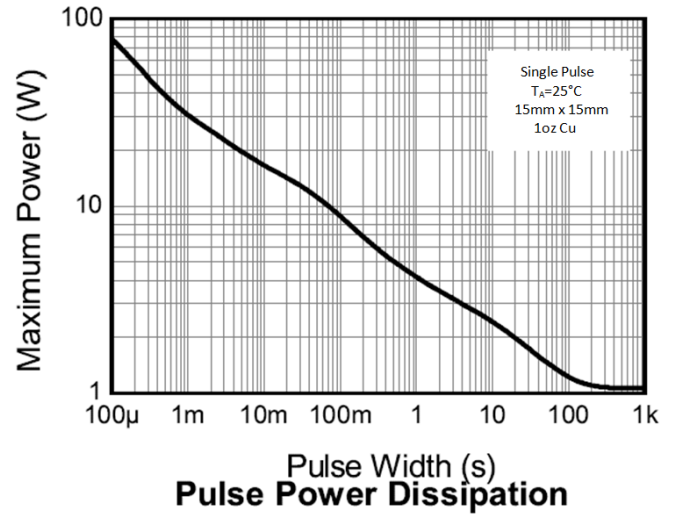
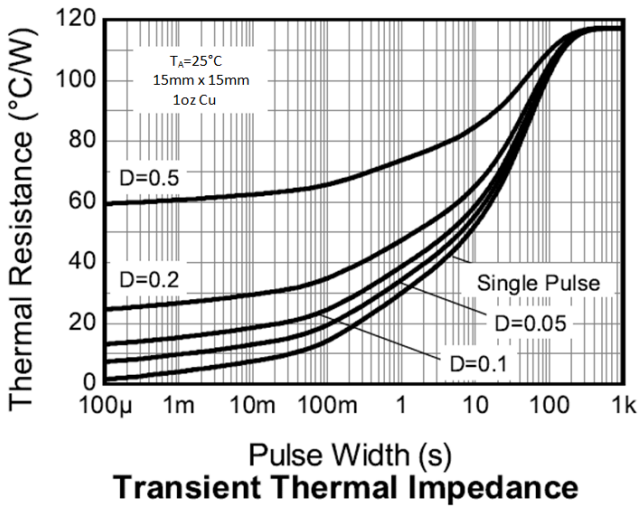
Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 5)	1.1	W mW/ $^\circ\text{C}$
	(Note 6)	8.8	
	(Note 7)	1.8	
	(Note 8)	14.4	
	(Note 9)	2.4	
	(Note 9)	19.2	
Thermal Resistance, Junction to Ambient Air	$R_{\theta JA}$	4.46	$^\circ\text{C/W}$
		35.7	
		26.7	
		213	
Thermal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

ESD Ratings (Note 10)

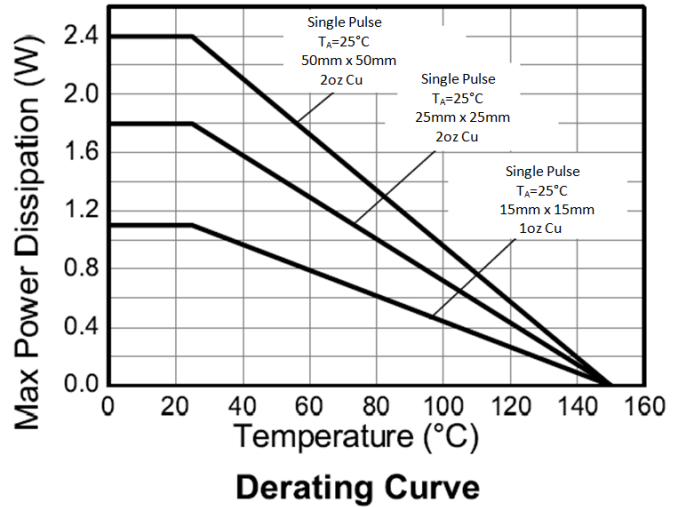
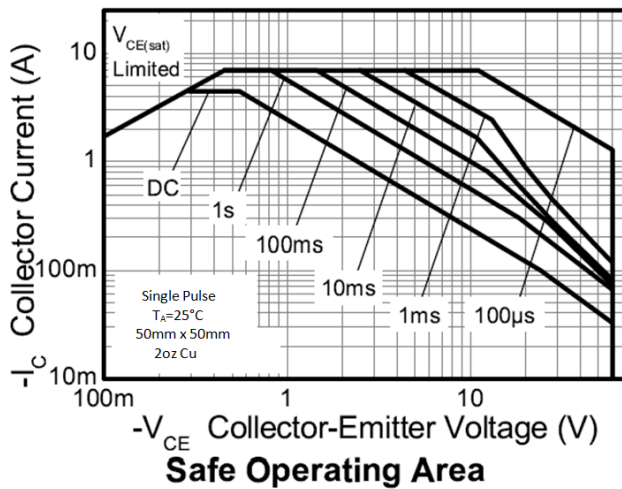
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- 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



Thermal Characteristics and Derating Information (cont.)

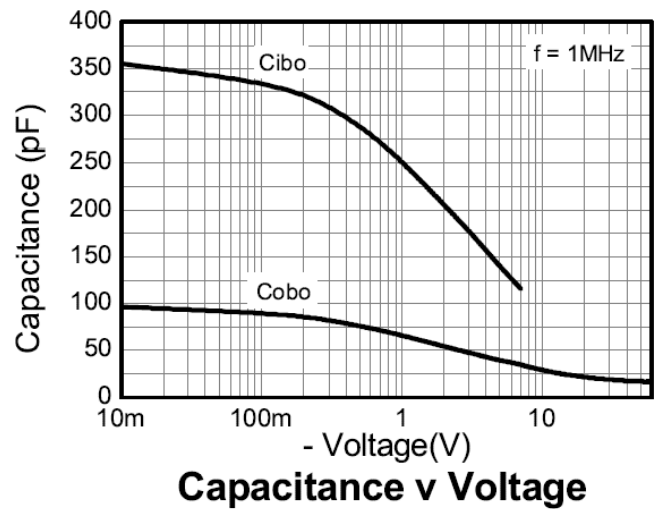
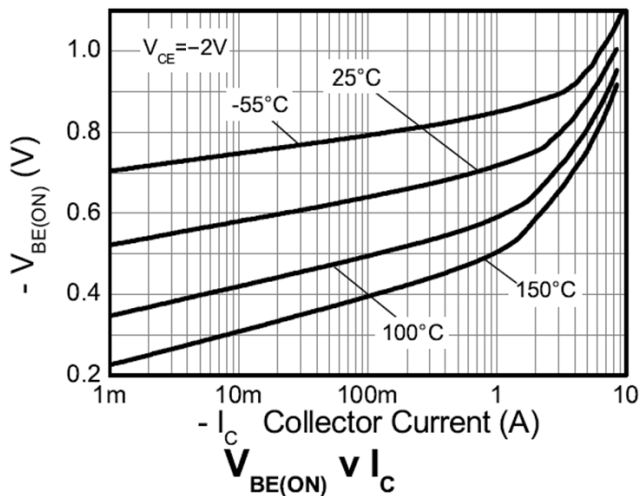
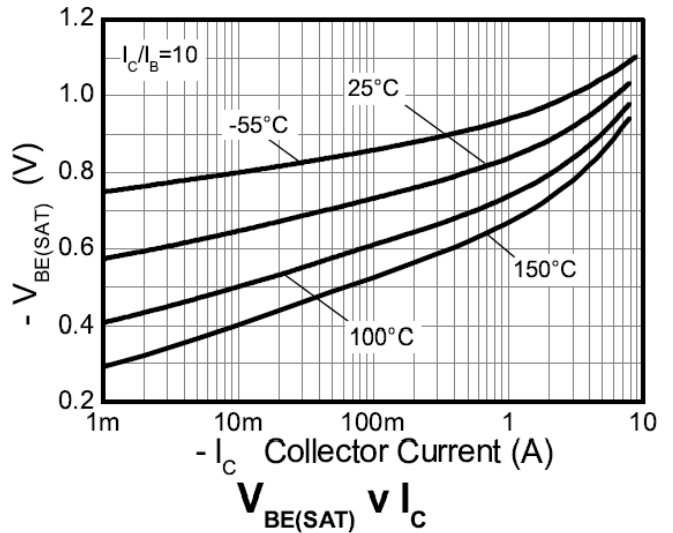
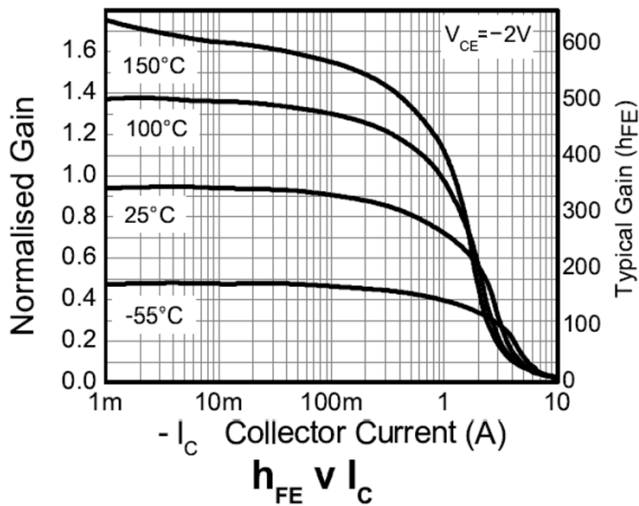
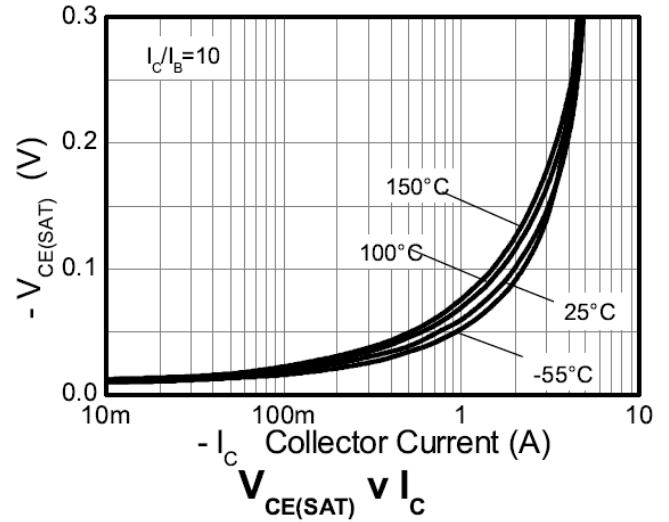
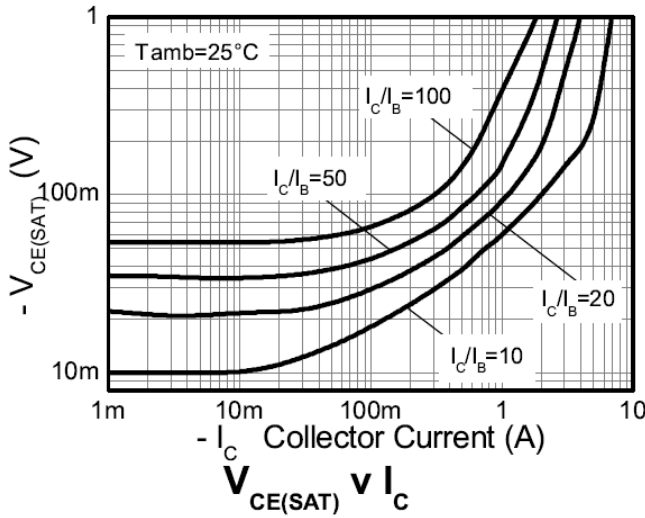


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

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

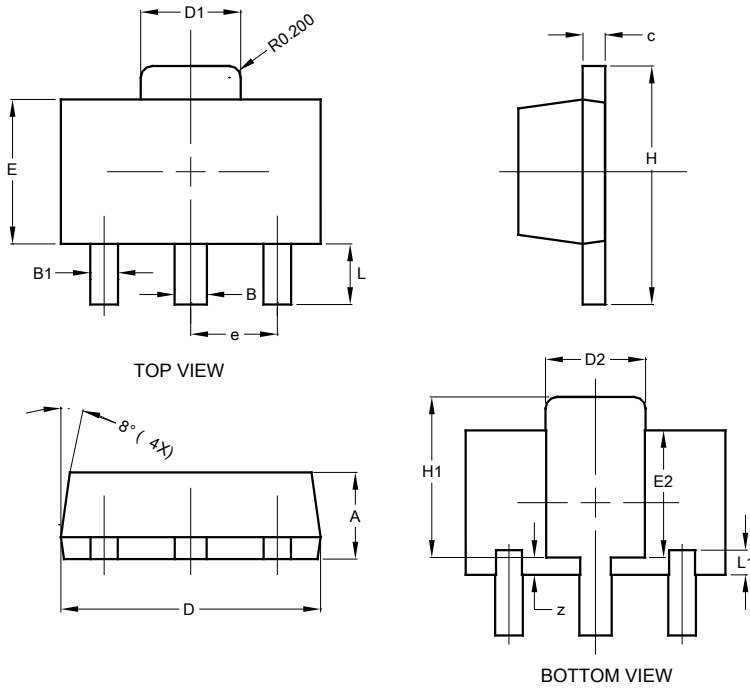
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



Package Outline Dimensions

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

SOT89

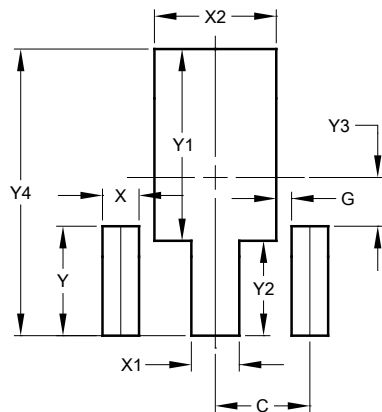


SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions in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