20V NPN HIGH GAIN TRANSISTOR IN SOT89

Features

- BV_{CEO} > 20V
- I_C = 7.5A Continuous Current
- Low Saturation Voltage $V_{CE(sat)}$ < 35mV @ 1A
- R_{sat} = 27mΩ for a Low Equivalent On-Resistance
- **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/**

Mechanical Data

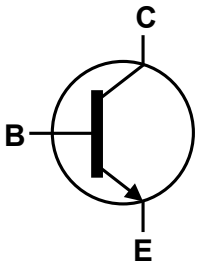
- Case: SOT89
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.05 grams (Approximate)

Application

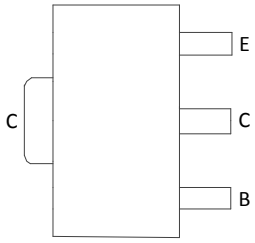
- Emergency lighting circuits
- Motor driving
- Camera strobe
- Boost converter
- CCFL backlight inverters
- MOSFET gate drivers
- LED Driving

SOT89

Top View



Device Symbol



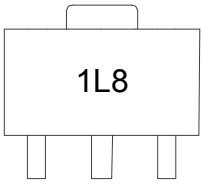
Top View
Pin Out

Ordering Information (Note 4)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
ZXTN19020DZTA	Standard	1L8	7	12	1,000

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



1L8 = Product Type Marking Code

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

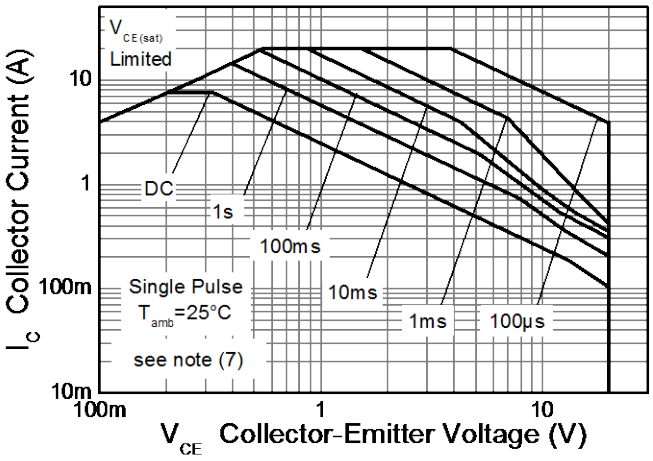
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	70	V
Collector-emitter voltage (forward blocking voltage)	V_{CEX}	70	V
Collector-Base Voltage	V_{CBS}	20	V
Emitter-Collector voltage (reverse blocking)	V_{ECX}	6	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	7.5	A
Peak Pulse Collector Current (single pulse)	I_{CM}	20	A
Base Current	I_B	1	A

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

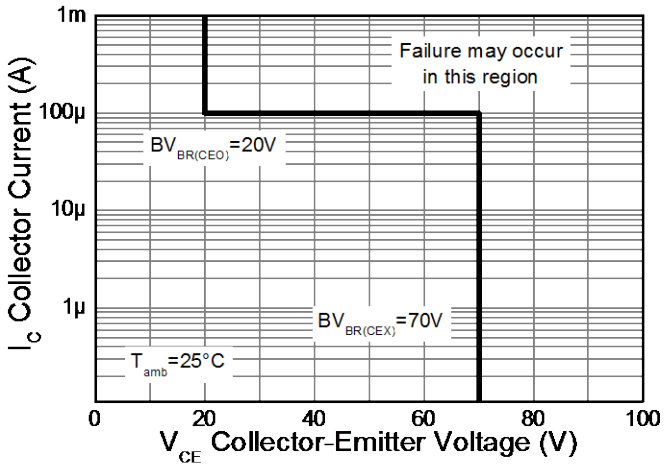
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5) Linear Derating Factor	P_D	1.1 1.8	W mW/°C
Power Dissipation (Note 6) Linear Derating Factor	P_D	1.8 14.4	W mW/°C
Power Dissipation (Note 7) Linear Derating Factor	P_D	2.4 19.2	W mW/°C
Power Dissipation (Note 8) Linear Derating Factor	P_D	4.46 35.7	W mW/°C
Power Dissipation (Note 9) Linear Derating Factor	P_D	27.8 222	W mW/°C
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	117	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	68	°C/W
Thermal Resistance, Junction to Ambient (Note 7)	$R_{\theta JA}$	51	°C/W
Thermal Resistance, Junction to Ambient (Note 8)	$R_{\theta JA}$	28	°C/W
Operating and Storage Temperature Range (Note 9)	T_J, T_{STG}	-55 to +150	°C

Notes:
5. For a device surface mounted on 15mm x 15mm x 0.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; device measured when operating in steady state condition.
6. Same as note (5), except the device is mounted on 25mm x 25mm x 0.6mm single sided 1oz weight copper.
7. Same as note (5), except the device is mounted on 50mm x 50mm x 0.6mm single sided 1oz weight copper.
8. Same as note (5), except the device is measured at t<5 seconds.
9. Junction to case (collector tab). Typical.

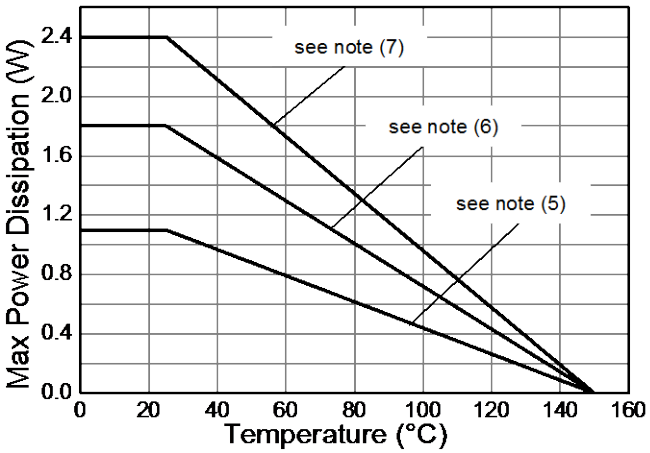
Thermal Characteristics and Derating Information



Safe Operating Area

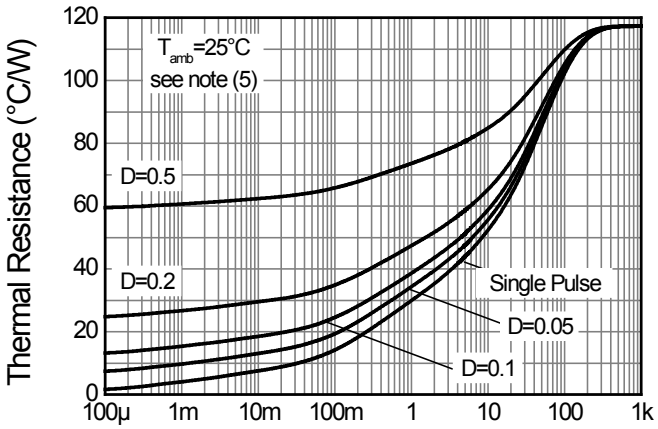


Safe Operating Area

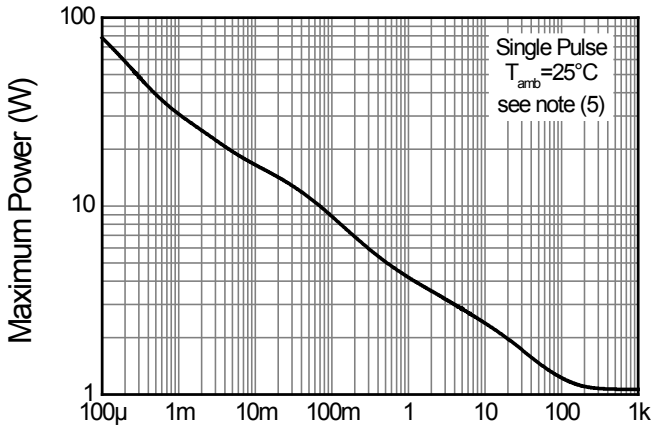


Derating Curve

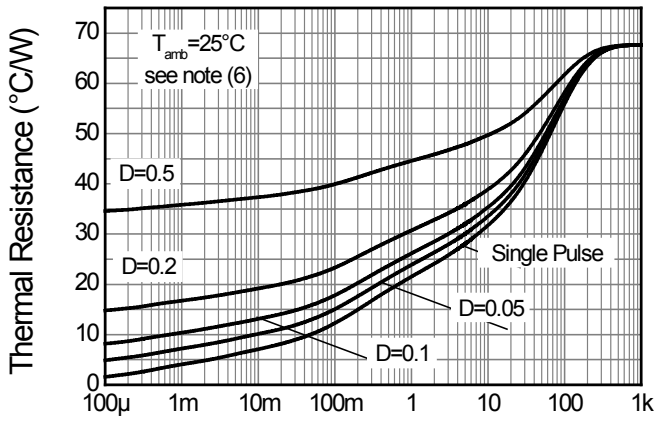
Thermal Characteristics and Derating Information



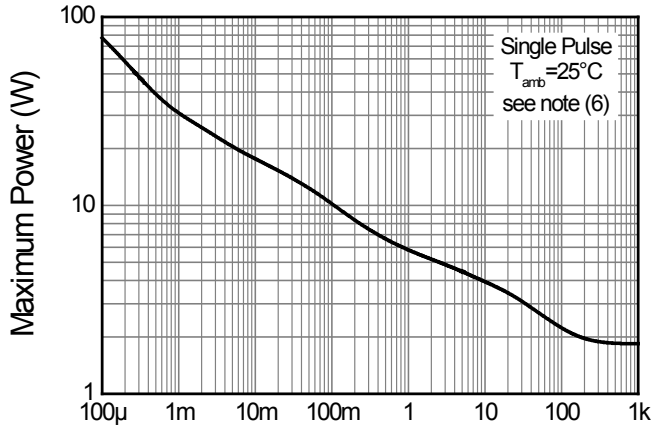
Transient Thermal Impedance



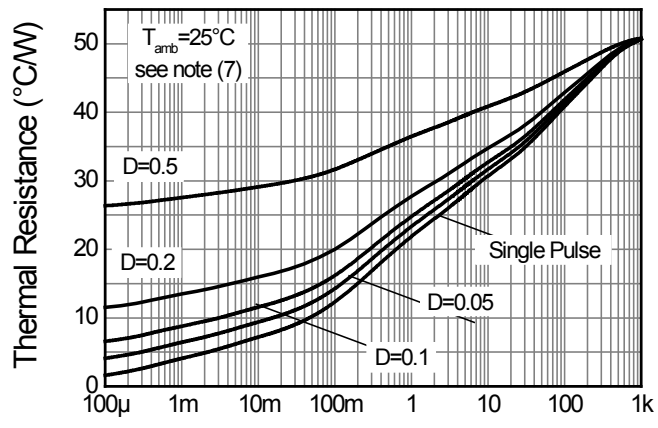
Pulse Power Dissipation



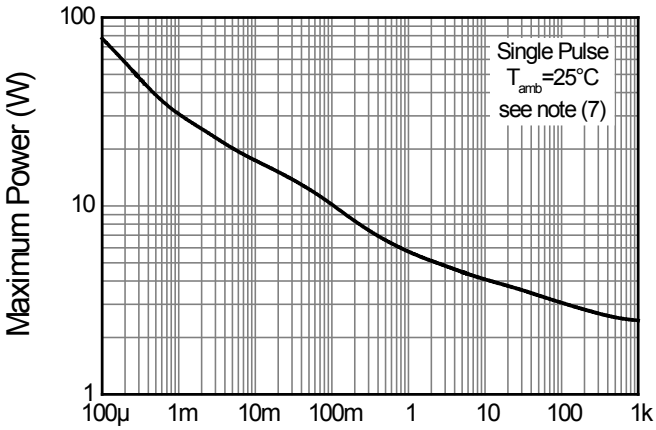
Transient Thermal Impedance



Pulse Power Dissipation



Transient Thermal Impedance



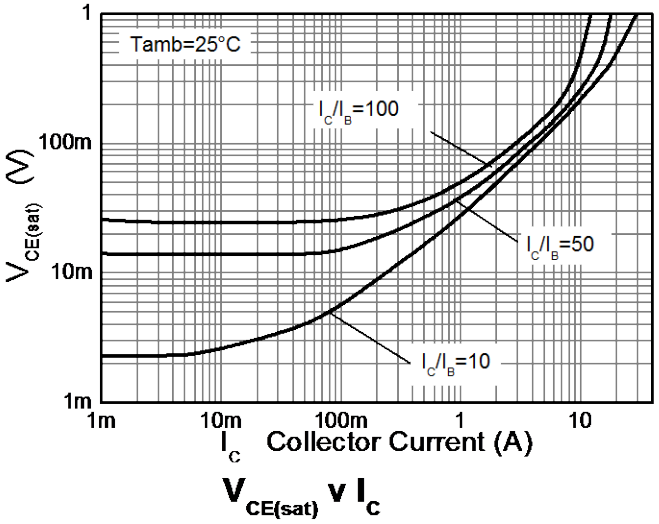
Pulse Power Dissipation

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

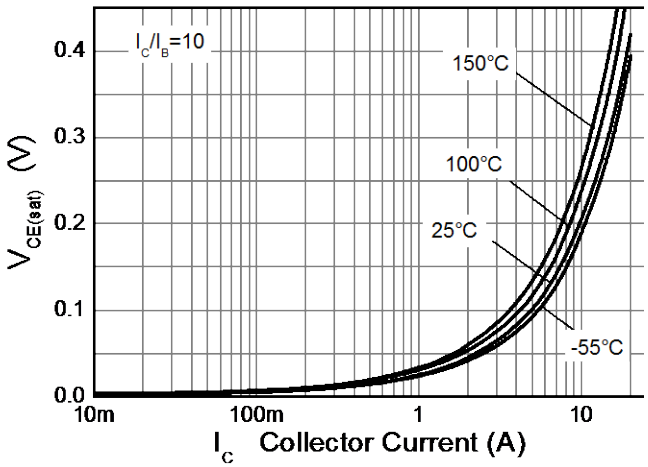
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	70	100	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (forward blocking)	BV_{CEX}	70	100	—	V	I_C = 100µA, R_{BE} ≤ 1kΩ or -1V < V_{BE} < 0.25V
Collector- Emitter Breakdown Voltage (Note 10)	BV_{CEO}	20	30	—	V	I_C = 10mA
Emitter-Collector Breakdown Voltage (reverse blocking)	BV_{ECX}	6	8.4	—	V	I_E = 100µA, R_{BC} ≤ 1kΩ or 0.25V > V_{BE} > -0.25V
Emitter-Collector Breakdown Voltage (reverse blocking)	BV_{ECO}	4.5	5.7	—	V	I_E = 100µA
Emitter-Base Breakdown Voltage	BV_{EBO}	7.0	8.4	—	V	I_E = 100µA
Collector-Base Cut-Off Current	I_{CBO}	—	1	50 0.5	nA µA	V_{CB} = 70V V_{CB} = 70V, Tamb=100°C
Collector-Emitter Cut-Off current	I_{CEX}	—	—	100	nA	V_{CE} = 70V, R_{BE} ≤ 1kΩ or -1V < V_{BE} < 0.25V
Emitter-Base Cut-Off Current	I_{EBO}	—	1	50	nA	V_{EB} = 5.6V
Collector-Emitter Saturation Voltage (Note 10)	$V_{CE(sat)}$	—	26 50 75 60 83 155	32 70 100 80 105 200	mV	I_C = 1A, I_B = 100mA I_C = 1A, I_B = 10mA I_C = 2A, I_B = 20mA I_C = 2A, I_B = 40mA I_C = 4A, I_B = 400mA I_C = 7.5A, I_B = 375mA
Base-Emitter Saturation Voltage (Note 10)	$V_{BE(sat)}$	—	1000	1100	mV	I_C = 7.5A, I_B = 375mA
Base-Emitter Turn-On Voltage (Note 10)	$V_{BE(on)}$	—	870	1000	mV	I_C = 7.5A, V_{CE} = 2V
DC Forward Gain (Note 10)	h_{FE}	300 260 150 50 —	450 390 210 75 35	900 — — — —	—	I_C = 100mA, V_{CE} = 2V I_C = 2A, V_{CE} = 2V I_C = 7.5A, V_{CE} = 2V I_C = 15A, V_{CE} = 2V I_C = 20A, V_{CE} = 2V
Transitional frequency	f_T	—	160	—	MHz	I_C = 50mA, V_{CE} = 10V f = 100MHz
Input Capacitance	C_{ibo}	—	297	400	pF	V_{EB} = 0.5V, f = 1MHz
Output Capacitance	C_{obo}	—	32.6	40	pF	V_{CB} = 10V, f = 1MHz
Delay time	t_d	—	129	—	ns	I_C = 1A, V_{CC} = 10V, I_{B1} =-I_{B2} = 10mA
Rise time	t_r		96			
Storage time	t_s		398			
Fall time	t_f		90			

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

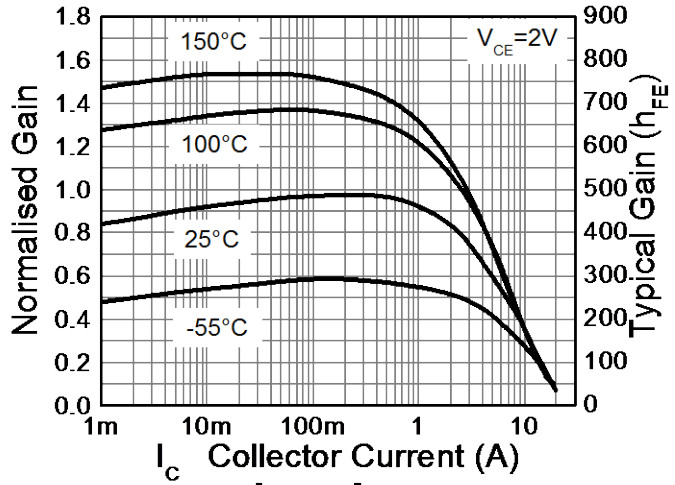
Typical Electrical Characteristics (@ T_A = +25°C, unless otherwise specified.)



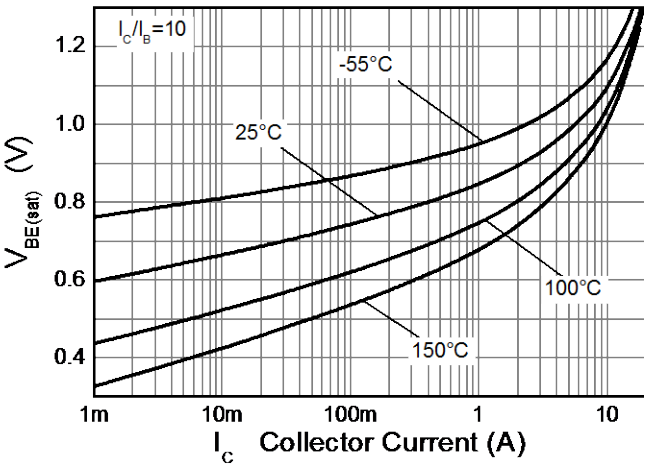
$V_{CE(sat)}$ v I_C



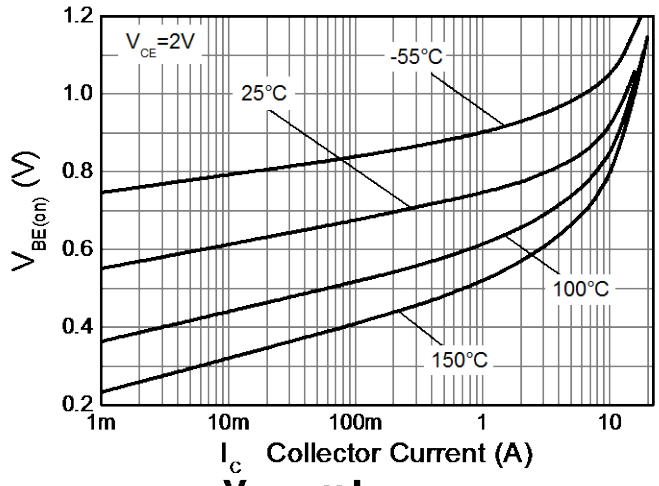
$V_{CE(sat)}$ v I_C



h_{FE} v I_C



$V_{BE(sat)}$ v I_C

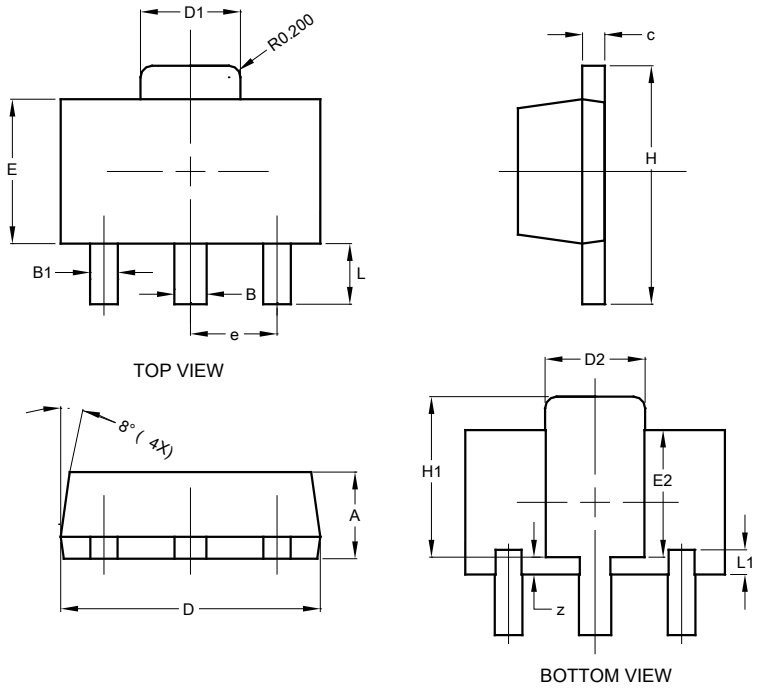


$V_{BE(on)}$ v I_C

Package Outline Dimensions

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

SOT89

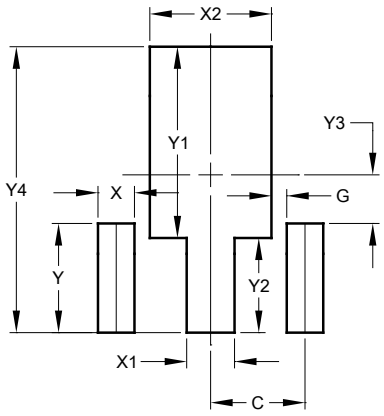


SOT89			
Dim	**Min**	**Max**	**Typ**
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions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