60V PNP LOW SATURATION TRANSISTOR IN SOT89

Features

- BV_{CEO} > -60V
- I_C = -4.3A High Continuous Current
- R_{SAT} = 32mΩ for a Low Equivalent On-Resistance
- Low Saturation Voltage $V_{CE(sat)}$ < -65mV @ I_C = -1A
- h_{FE} Specified Up to -10A for High Current Gain Hold Up
- Complementary NPN Type: DIODES™ ZXTN2010Z
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **An Automotive-Compliant Part is Available Under Separate Datasheet (ZXTP2012ZQ)**

Mechanical Data

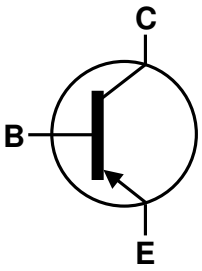
- Package: SOT89
- Package Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish—Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.05 grams (Approximate)

Application

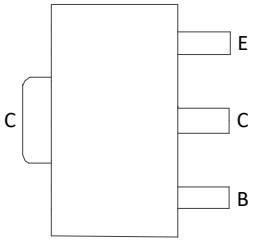
- Emergency Lighting Circuits
- Motor Driving (Including DC Fans)
- Backlight Inverters
- Power Switches
- Gate Driving MOSFETs and IGBTs

SOT89

Top View



Device Symbol



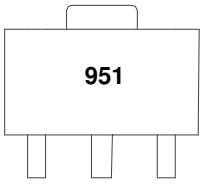
Top View
Pin Out

Ordering Information (Note 4)

Part Number	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
ZXTP2012ZTA	951	7	12	1,000
ZXTP2012Z-13R	951	13	12	4,000

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



951 = Product Type Marking Code

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

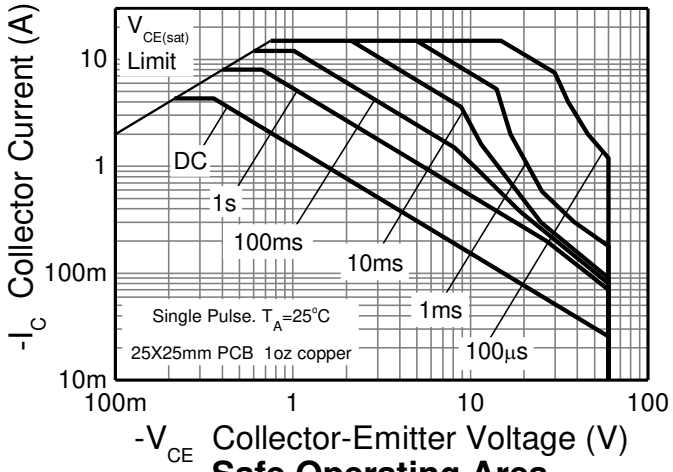
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-100	V
Collector-Emitter Voltage	V_{CEO}	-60	V
Emitter-Base Voltage	V_{EBO}	-7	V
Base Current	I_B	-2	A
Continuous Collector Current	I_C	-4.3	A
Peak Pulse Current	I_{CM}	-15	A

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

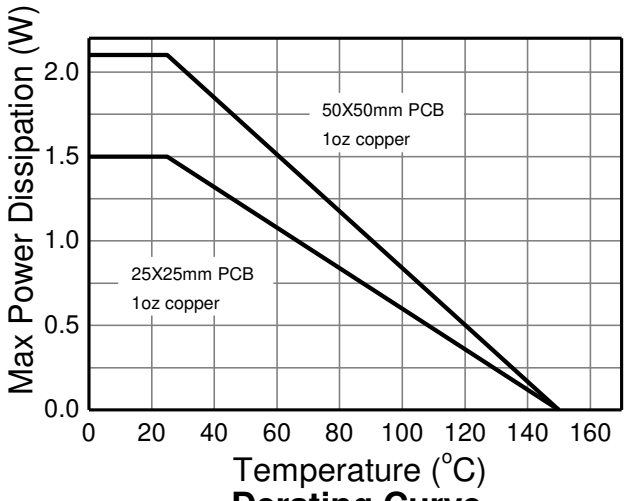
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5) Linear Derating Factor	P_D	1 8	W mW/°C
Power Dissipation (Note 6) Linear Derating Factor	P_D	1.5 12	W mW/°C
Power Dissipation (Note 7) Linear Derating Factor	P_D	2.1 16.8	W mW/°C
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	125	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	83	°C/W
Thermal Resistance, Junction to Ambient (Note 7)	$R_{\theta JA}$	60	°C/W
Thermal Resistance, Junction to Case (Note 5)	$R_{\theta JC}$	21	°C/W
Thermal Resistance, Junction to Leads (Note 8)	$R_{\theta JL}$	3.23	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Notes:
5. Minimum recommended pad layout
6. For a device surface mounted on 25mm x 25mm x 1.6mm FR-4 PCB with high coverage of single sided 1oz copper, in still air conditions; device measured when operating in steady state condition.
7. Same as note (6), except the device is mounted on 50mm x 50mm single sided 1oz weight copper.
8. Thermal resistance from junction to solder-point (on the exposed collector pad).

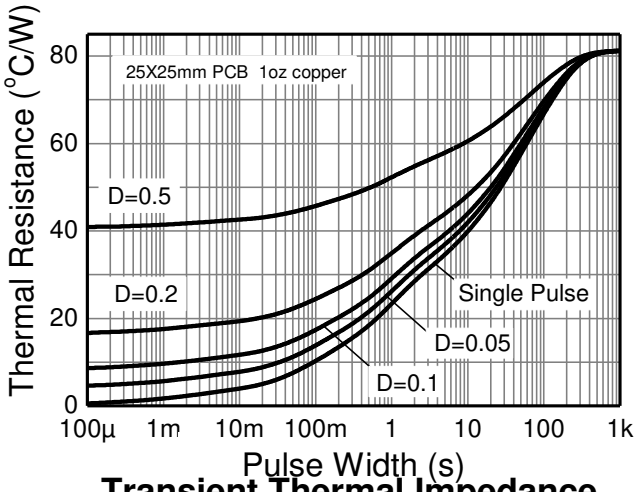
Thermal Characteristics and Derating Information



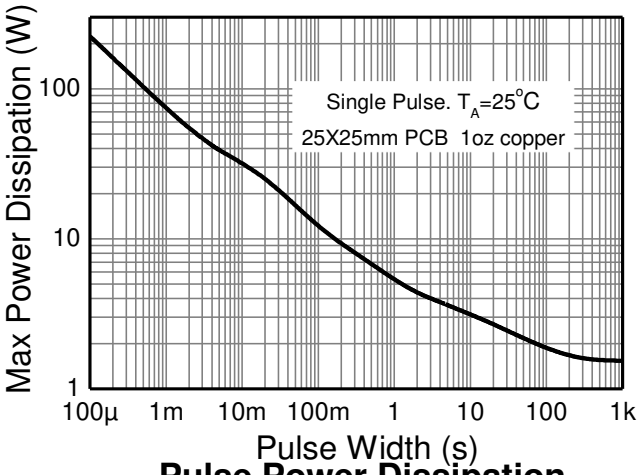
Safe Operating Area



Derating Curve



Transient Thermal Impedance



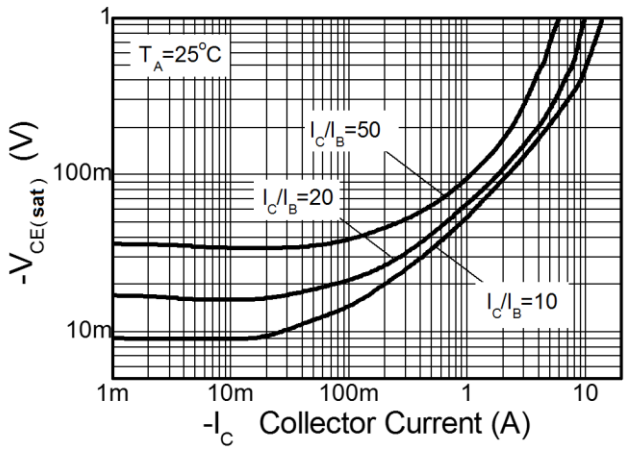
Pulse Power Dissipation

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

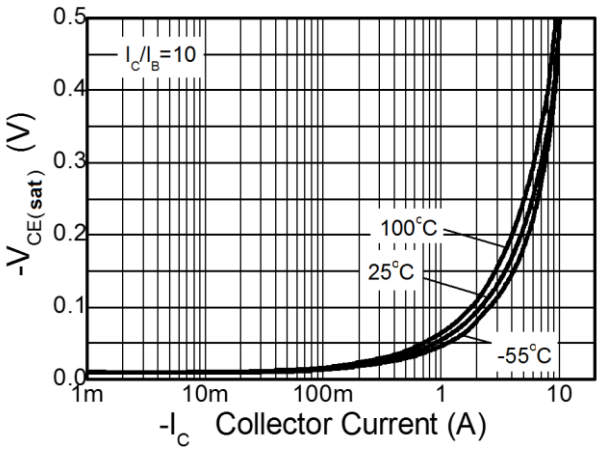
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-100	-120	—	V	I_C = -100µA
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CER}	-100	-120	—	V	I_C = -1µA, $R_B \le 1k\Omega$
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	-60	-80	—	V	I_C = -10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8.1	—	V	I_E = -100µA
Collector Cutoff Current	I_{CBO}	—	-1 —	-20 -500	nA nA	V_{CB} = -80V V_{CB} = -80V, T_A = +100°C
Collector Cutoff Current	I_{CER} $R \le 1k\Omega$	—	-1 —	-20 -500	nA nA	V_{CB} = -80V V_{CB} = -80V, T_A = +100°C
Emitter Cutoff Current	I_{EBO}	—	-1	-10	nA	V_{EB} = -6V
DC Current Transfer Static Ratio (Note 9)	h_{FE}	100 100 45 10	250 200 90 25	— 300 — —	—	I_C = -10mA, V_{CE} = -1V I_C = -2A, V_{CE} = -1V I_C = -5A, V_{CE} = -1V I_C = -10A, V_{CE} = -1V
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	—	-14 -50 -75 -160	-20 -65 -110 -215	mV	I_C = -100mA, I_B = -10mA I_C = -1A, I_B = -100mA I_C = -2A, I_B = -200mA I_C = -5A, I_B = -500mA
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	—	-950	-1050	mV	I_C = -5A, I_B = -500mA
Base-Emitter Turn-on Voltage (Note 9)	$V_{BE(on)}$	—	-840	-950	mV	I_C = -5A, V_{CE} = -1V
Transitional Frequency (Note 9)	f_T	—	120	—	MHz	I_C = -100mA, V_{CE} = -10V, f = 50MHz
Output Capacitance	C_{obo}	—	48	—	pF	V_{CB} = -10V, f = 1MHz
Switching Time	t_{on}	—	39	—	ns	V_{CC} = -10V, I_C = -1A, I_{B1} = -I_{B2} = -100mA
	t_{off}	—	370	—		

Note: 9. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

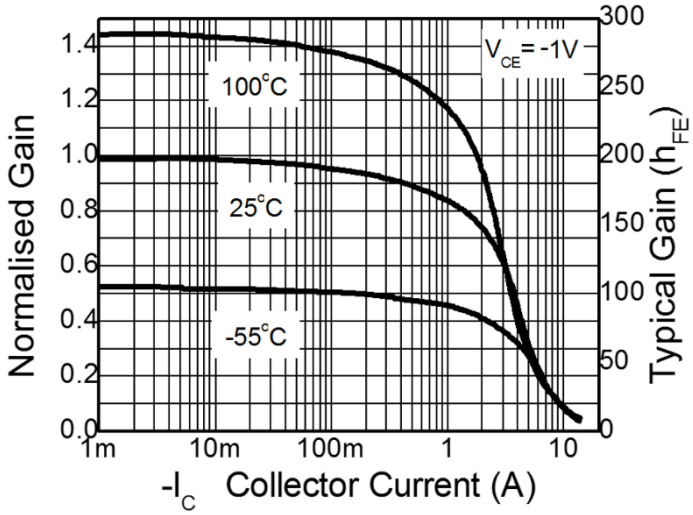
Typical Electrical Characteristics (@ T_A = +25°C, unless otherwise specified.)



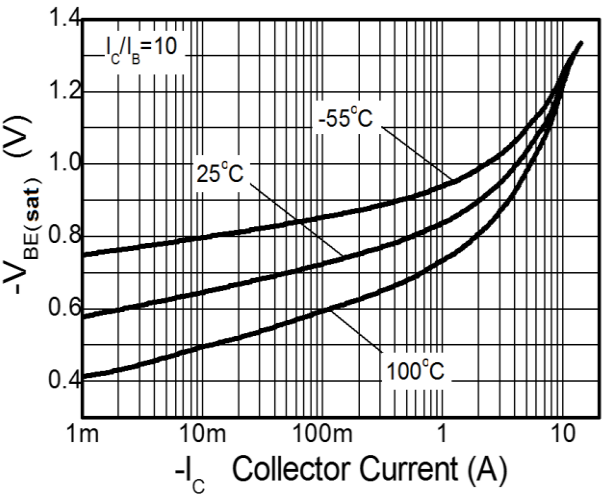
$V_{CE(sat)}$ v I_C



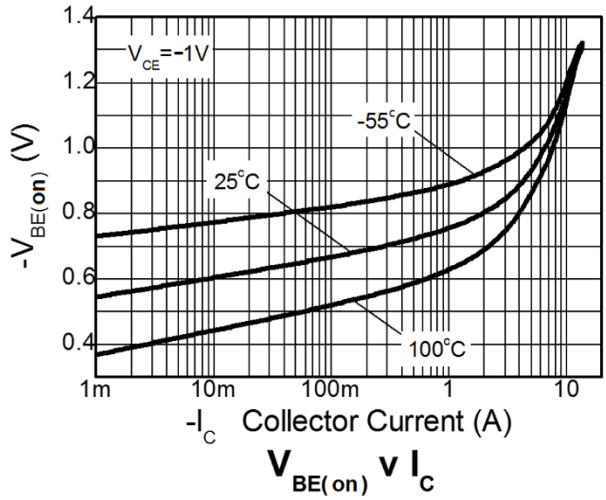
$V_{CE(sat)}$ v I_C



h_{FE} v I_C



$V_{BE(sat)}$ v I_C

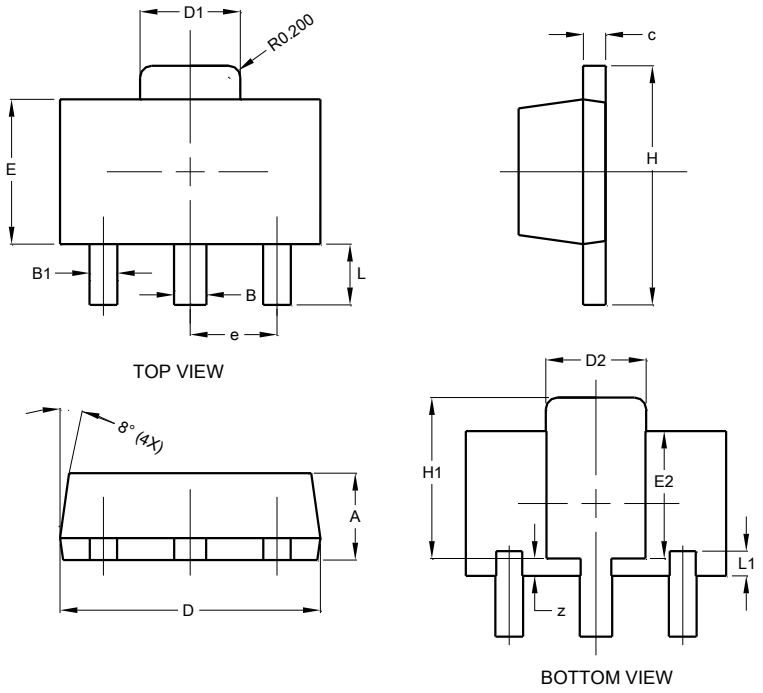


$V_{BE(on)}$ v I_C

Package Outline Dimension

Please see https://www.diodes.com/design/support/packaging/ for the latest version.

SOT89

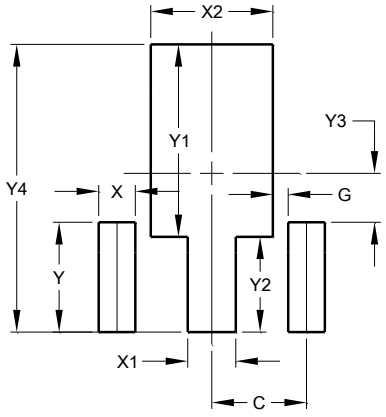


SOT89			
Dim	**Min**	**Max**	**Typ**
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions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

Suggested Pad Layout

Please see https://www.diodes.com/design/support/packaging/ 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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