100V PNP LOW SATURATION MEDIUM POWER TRANSISTOR IN SOT89

Features

- BV_{CEO} > -100V
- I_C = -3.5A High Continuous Current
- R_{SAT} = 57mΩ for a Low Equivalent On-Resistance
- Low Saturation Voltage $V_{CE(SAT)}$ < -85mV @ I_C = -1A
- h_{FE} Specified Up to -10A for High Current Gain Hold Up
- Complementary NPN Type: ZXTN2011Z
- **Lead-Free Finish; 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

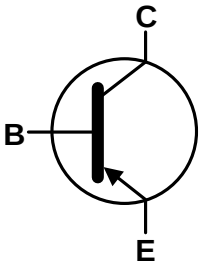
- Case: SOT89
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.05 grams (Approximate)

Application

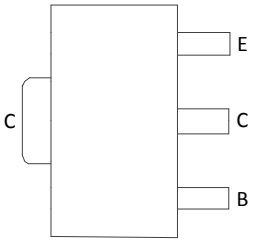
- Emergency Lighting Circuits
- Motor Driving (Including DC Fans)
- Backlight Inverters
- Power Switches
- Gate Driving MOSFETs and IGBTs

SOT89

Top View



Device Symbol



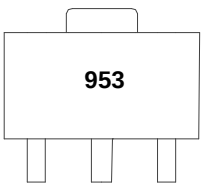
Top View
Pin Out

Ordering Information (Note 4)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
ZXTP2013ZTA	AEC-Q101	953	7	12	1,000

Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
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



953 = Product Type Marking Code

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

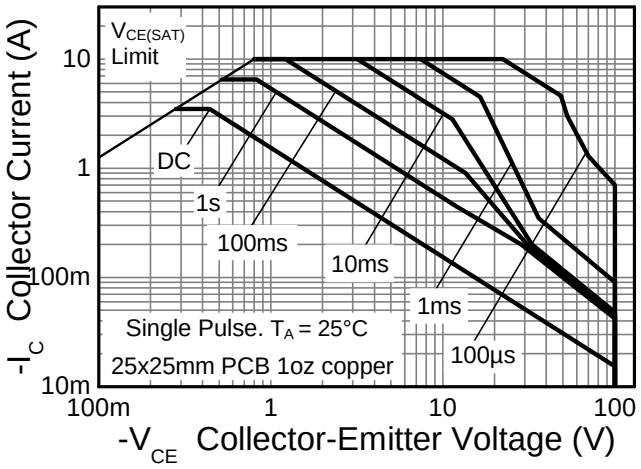
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-140	V
Collector-Emitter Voltage	V_{CEO}	-100	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current	I_C	-3.5	A
Peak Pulse Current	I_{CM}	-10	A

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

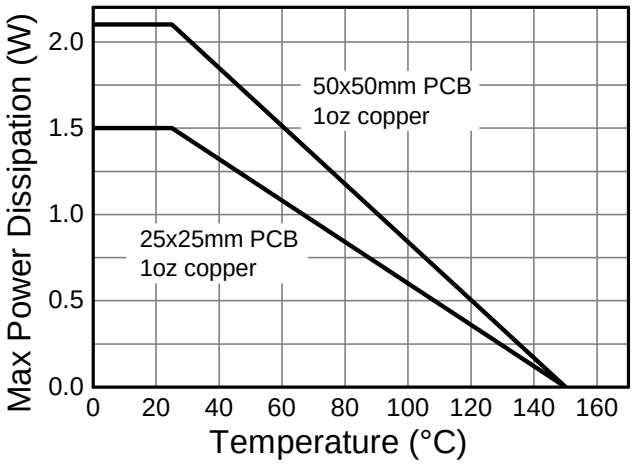
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5) Linear Derating Factor	P_D	1.5 12	W mW/°C
Power Dissipation (Note 6) Linear Derating Factor	P_D	2.1 16.8	W mW/°C
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	83	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta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

Notes: 5. For a device surface mounted on 25mm × 25mm × 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.
6. Same as note (5), except the device is mounted on 50mm × 50mm single sided 1oz weight copper.

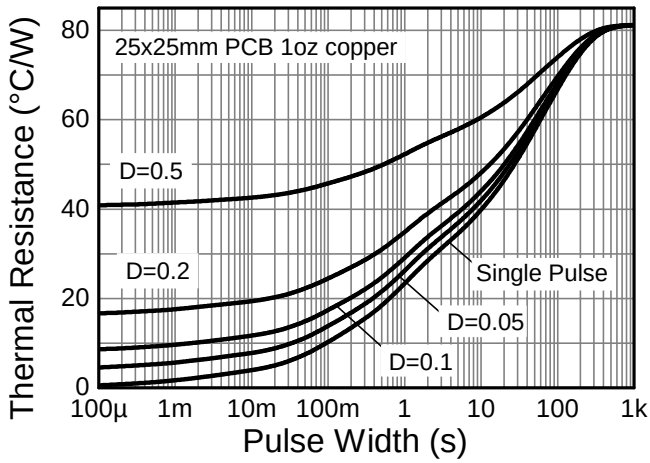
Thermal Characteristics and Derating Information



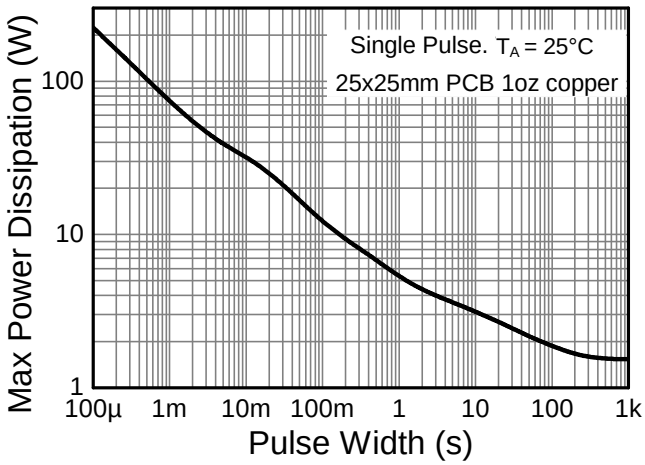
Safe Operating Area



Derating Curve



Transient Thermal Impedance



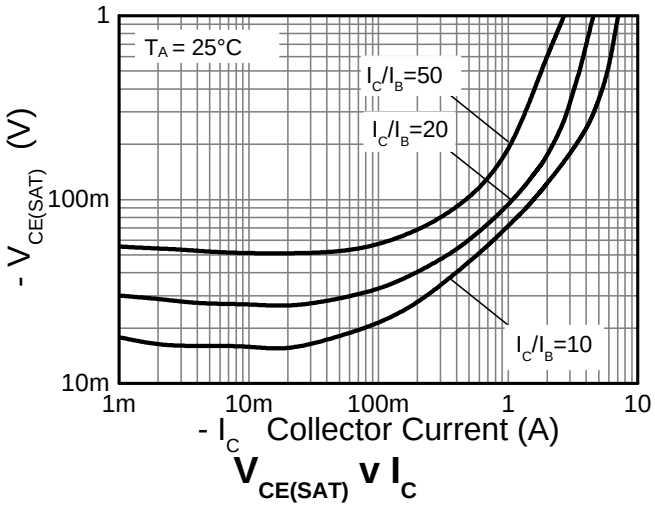
Pulse Power Dissipation

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

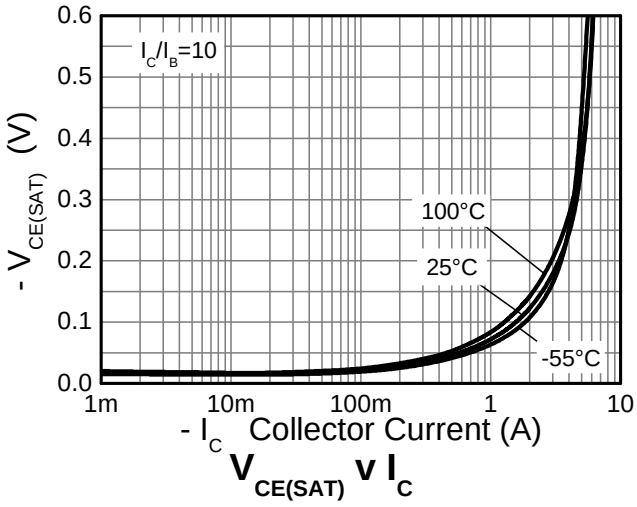
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-140	-160	—	V	I_C = -100µA
Collector-Emitter Breakdown Voltage (Note 7)	BV_{CER}	-140	-160	—	V	I_C = -1µA, R_B ≤ 1kΩ
Collector-Emitter Breakdown Voltage (Note 7)	BV_{CEO}	-100	-115	—	V	I_C = -10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8.1	—	V	I_E = -100µA
Collector Cutoff Current	I_{CBO}	—	< -1 —	-20 -500	nA nA	V_{CB} = -100V V_{CB} = -100V, T_A = +100°C
Collector Cutoff Current	I_{CER} R ≤ 1kΩ	—	< -1 —	-20 -500	nA nA	V_{CB} = -100V V_{CB} = -100V, T_A = +100°C
Emitter Cutoff Current	I_{EBO}	—	< -1	-10	nA	V_{EB} = -6V
DC Current Transfer Static Ratio (Note 7)	h_{FE}	100 100 25 15 —	250 200 50 30 5	— 300 — — —	—	I_C = -10mA, V_{CE} = -1V I_C = -1A, V_{CE} = -1V I_C = -3A, V_{CE} = -1V I_C = -4A, V_{CE} = -1V I_C = -10A, V_{CE} = -1V
Collector-Emitter Saturation Voltage (Note 7)	$V_{CE(SAT)}$	—	-20 -65 -110 -230	-30 -85 -135 -300	mV	I_C = -100mA, I_B = -10mA I_C = -1A, I_B = -100mA I_C = -2A, I_B = -200mA I_C = -4A, I_B = -400mA
Base-Emitter Saturation Voltage (Note 7)	$V_{BE(SAT)}$	—	-970	-1060	mV	I_C = -4A, I_B = -400mA
Base-Emitter Turn-On Voltage (Note 7)	$V_{BE(ON)}$	—	-910	-1030	mV	I_C = -4A, V_{CE} = -1V
Transitional Frequency	f_T	—	125	—	MHz	I_C = -100mA, V_{CE} = -10V, f = 50MHz
Output Capacitance (Note 7)	C_{OBO}	—	42	—	pF	V_{CB} = -10V, f = 1MHz
Switching Time	t_{ON}	—	42	—	ns	V_{CC} = -10V, I_C = -1A, I_{B1} = -I_{B2} = -100mA
	t_{OFF}		540			

Note: 7. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

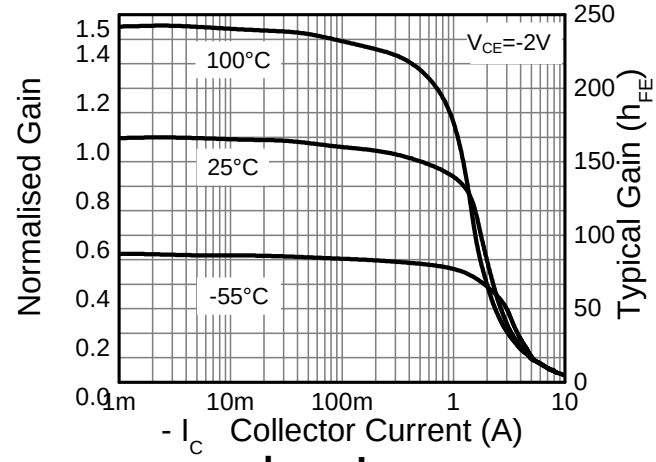
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



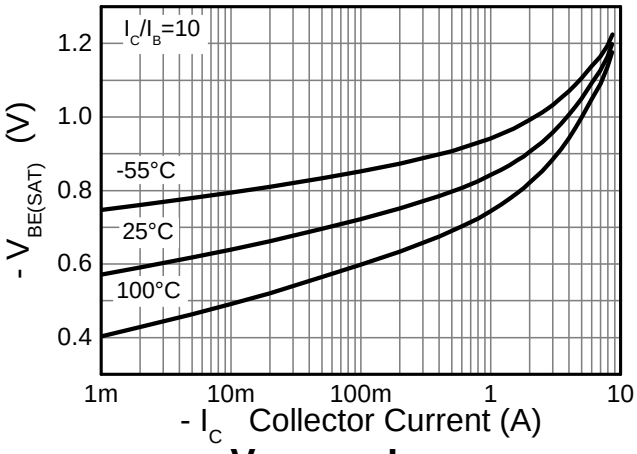
$V_{CE(SAT)}$ v I_C



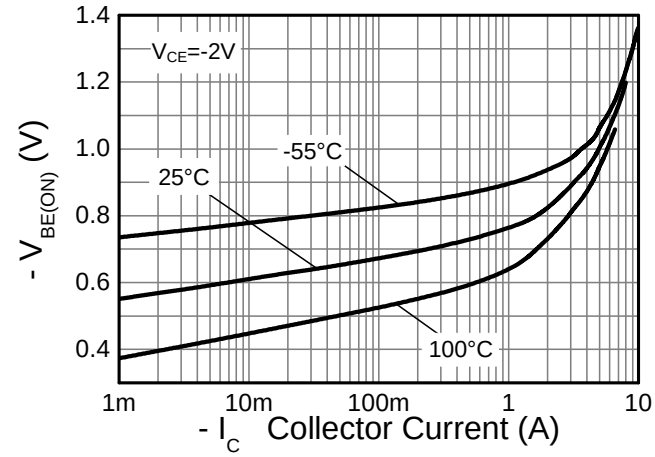
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



$V_{BE(SAT)}$ v I_C

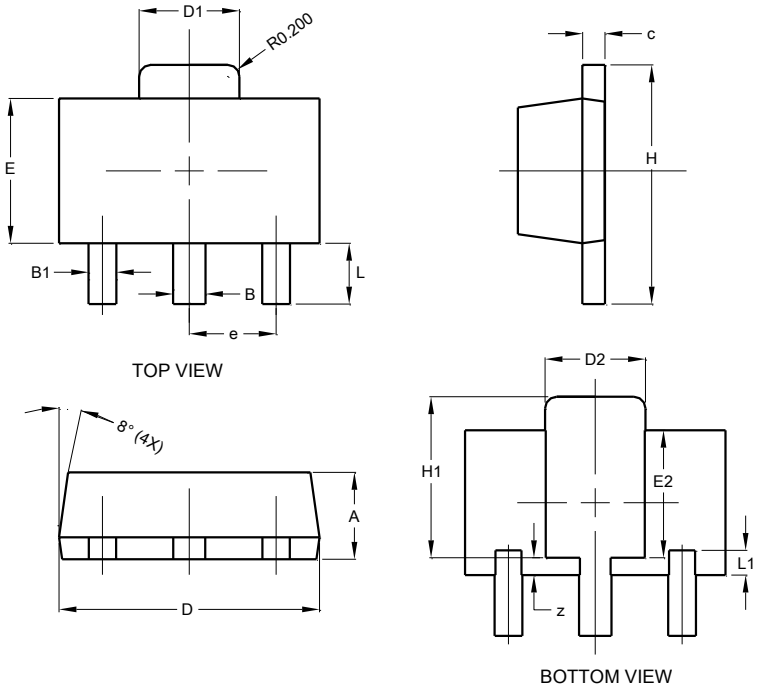


$V_{BE(ON)}$ v I_C

Package Outline Dimensions

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

SOT89

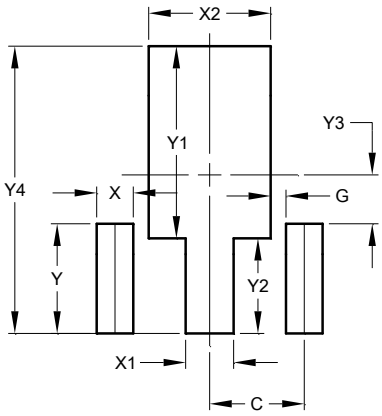


SOT89			
Dim	**Min**	**Max**	**Typ**
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions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