140V PNP HIGH-VOLTAGE TRANSISTOR IN SOT89

Features

- BV_{CEO} > -140V
- I_C = -3A High Continuous Current
- Low Saturation Voltage $V_{CE(sat)}$ < -75mV @ -0.5A
- R_{sat} = 85mΩ for a Low Equivalent On-Resistance
- **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 (ZXTP2014ZQ)**

Mechanical Data

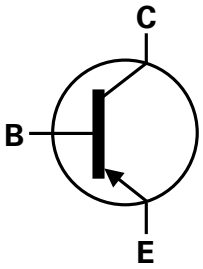
- Package: SOT89
- Package Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.05 grams (Approximate)

Application

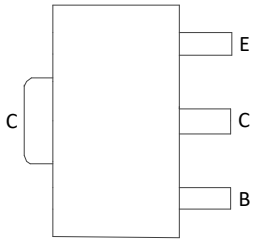
- Motor driving
- Line switching
- High-side switches
- Subscriber line interference cards (SLIC)

SOT89

Top View



Device Symbol



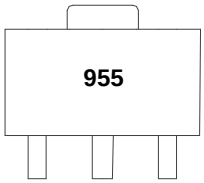
Top View
Pinout

Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
ZXTP2014ZTA	SOT89	955	7	12	1,000	Reel

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



955 = Product Type Marking Code

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-180	V
Collector-Emitter Voltage	V_{CEO}	-140	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current	I_C	-3	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)		60	°C/W
Thermal Resistance, Junction to Case (Note 5)	$R_{\theta JC}$	18.5	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Notes: 5. For a device surface-mounted on 25mm x 25mm x 1.6mm 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 50mm x 50mm x 1.6mm single-sided 1oz weight copper.

Thermal Characteristics and Derating Information

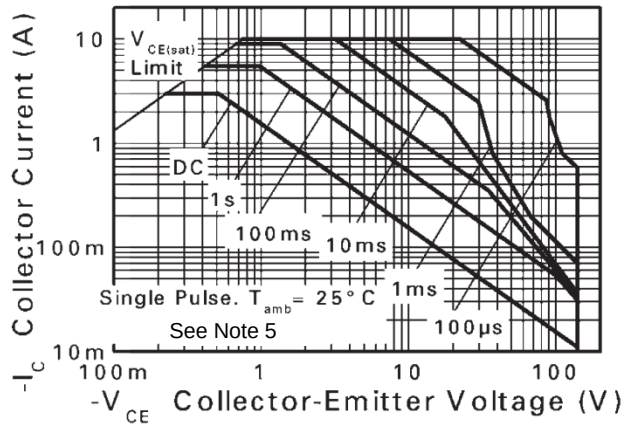


Figure 1. Safe Operating Area

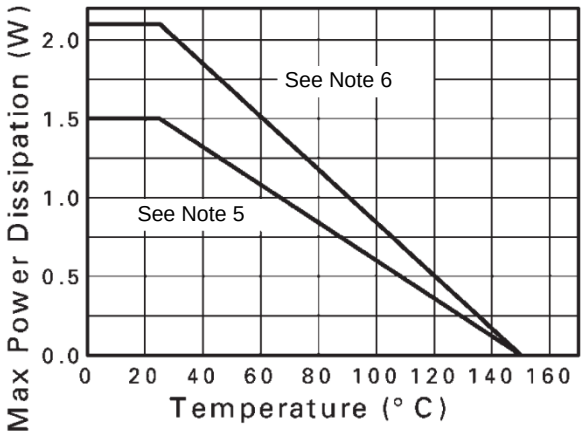


Figure 2. Derating Curve

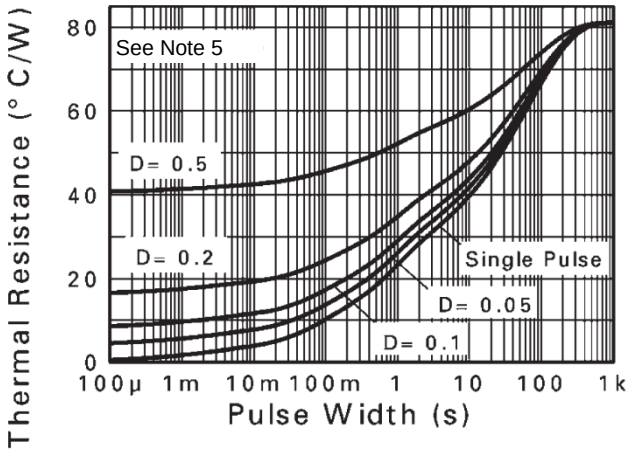


Figure 3. Transient Thermal Impedance

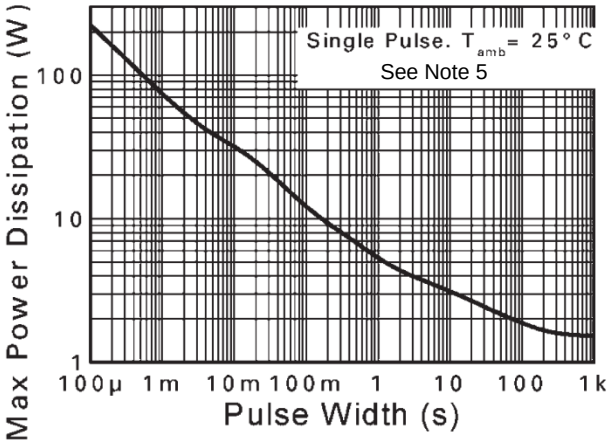


Figure 4. Pulse Power Dissipation

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-180	-200	—	V	I_C = -100µA
Collector-Emitter Breakdown Voltage	BV_{CER}	-180	-200	—	V	I_C = -1µA, R_B ≤ 1kΩ
Collector- Emitter Breakdown Voltage (Note 7)	BV_{CEO}	-140	-160	—	V	I_E = -10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-7.0	-8.0	—	V	I_E = -100µA
Collector-Base Cutoff Current	I_{CBO}	—	-1 —	-20 -0.5	nA µA	V_{CB} = -150V V_{CB} = -150V, T_A = +100°C
Collector-Emitter Cutoff Current	I_{CER}	—	-1 —	-20 -0.5	nA µA	V_{CB} = -150V, R ≤ 1kΩ V_{CB} = -150V, T_A = +100°C, R ≤ 1kΩ
Emitter Cutoff Current	I_{EBO}	—	-1	-10	nA	V_{EB} = -6V
Collector-Emitter Saturation Voltage (Note 7)	$V_{CE(sat)}$	—	-37 -50 -80 -255	-60 -75 -115 -330	mV	I_C = -0.1A, I_B = -5mA I_C = -0.5A, I_B = -50mA I_C = -1A, I_B = -100mA I_C = -3A, I_B = -300mA
Base-Emitter Saturation Voltage (Note 7)	$V_{BE(sat)}$	—	-970	-1010	mV	I_C = -3A, I_B = -300mA
Base-Emitter Turn-On Voltage (Note 7)	$V_{BE(on)}$	—	-800	-900	mV	I_C = -3A, V_{CE} = -5V
Static Forward Current Transfer Ratio (Note 7)	h_{FE}	100 100 45 —	255 200 100 5	— 300 — —	—	I_C = -10mA, V_{CE} = -5V I_C = -1A, V_{CE} = -5V I_C = -3A, V_{CE} = -5V I_C = -10A, V_{CE} = -5V
Transitional Frequency	f_T	—	120	—	MHz	I_C = -100mA, V_{CE} = -10V, f = 50MHz
Output Capacitance	C_{obo}	—	33	—	pF	V_{CB} = -10V, f = 1MHz
Switching Time	t_{on}	—	42	—	ns	I_C = -1A, V_{CC} = -50V, I_{B1} = -I_{B2} = -100mA
	t_{off}		636			

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

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

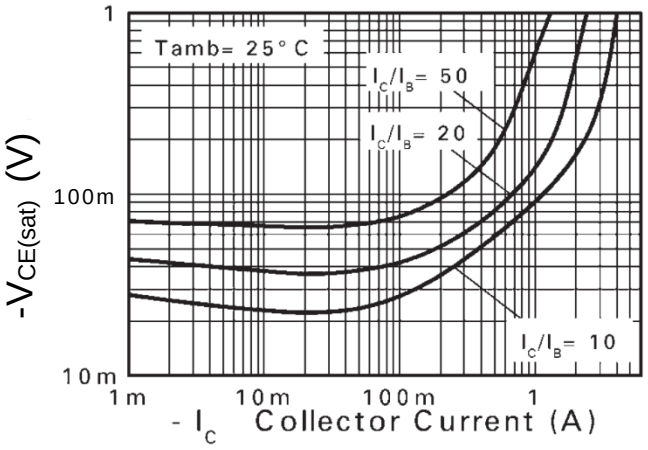


Figure 5. $V_{CE(sat)}$ vs. I_C

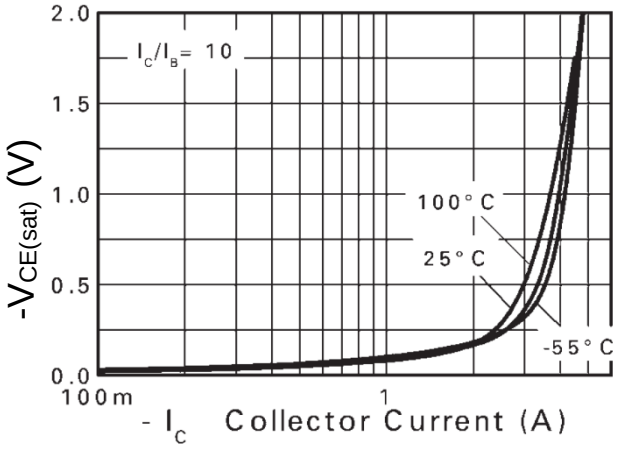


Figure 6. $V_{CE(sat)}$ vs. I_C

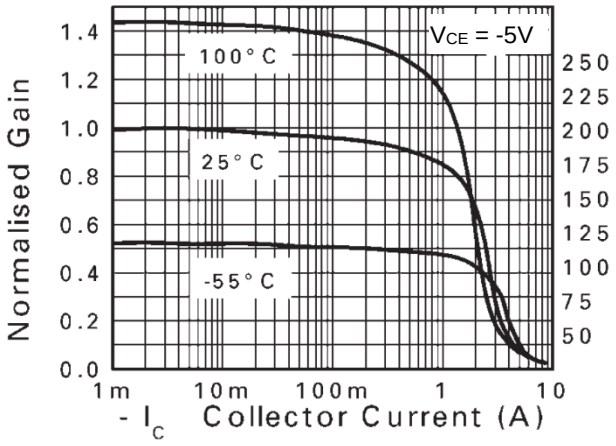


Figure 7. h_{FE} vs. I_C

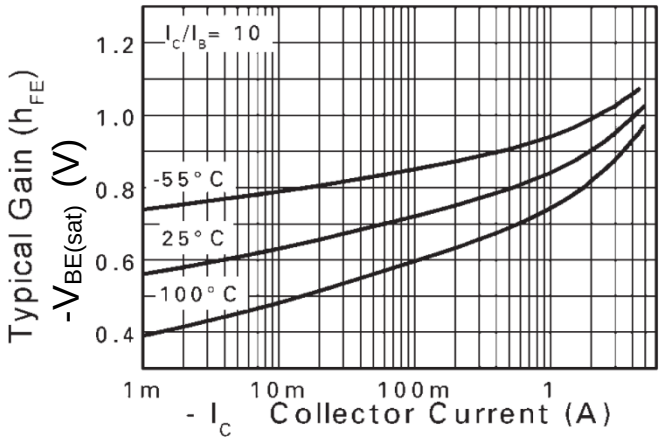


Figure 8. $V_{BE(sat)}$ vs. I_C

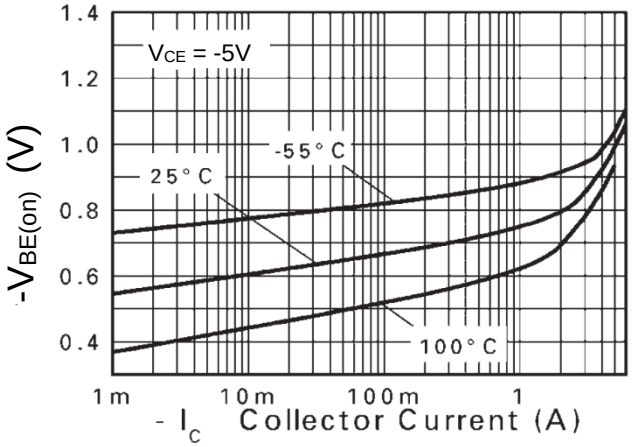


Figure 9. $V_{BE(on)}$ vs. I_C

Package Outline Dimensions

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

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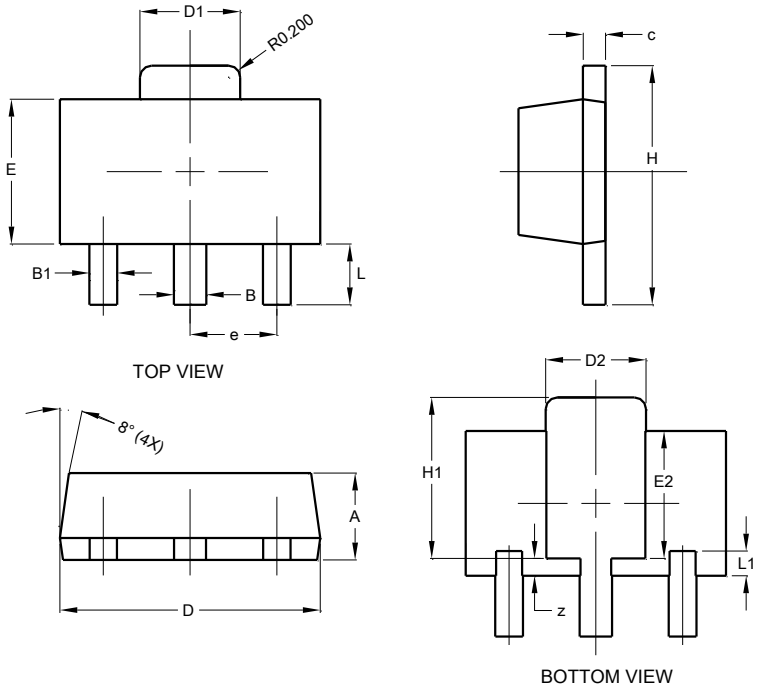

SOT89			
Dim	**Min**	**Max**	**Typ**
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions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

Suggested Pad Layout

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

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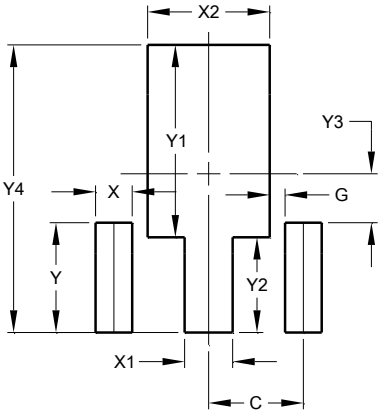

Dimensions	Value (in mm)
C	1.500
G	0.244
X	0.580
X1	0.760
X2	1.933
Y	1.730
Y1	3.030
Y2	1.500
Y3	0.770
Y4	4.530

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