

Features

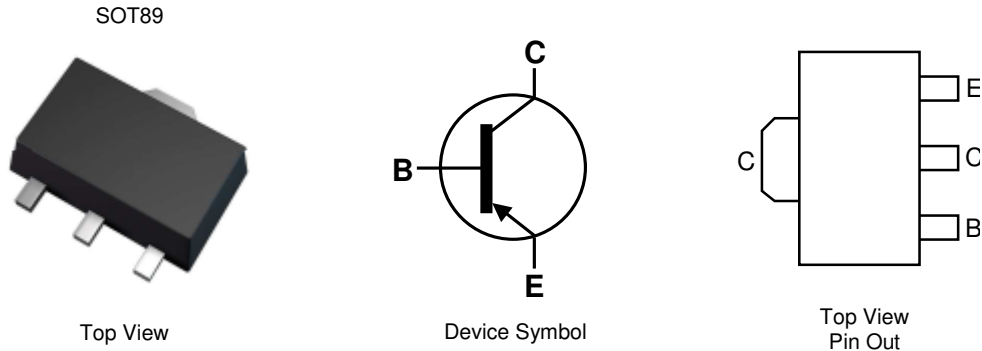
- $BV_{CEO} > -40V$
- $I_C = -5.5A$ High Continuous Current
- $I_{CM} = -15A$ Peak Pulse Current
- $R_{CE(sat)} = 29m\Omega$ for a low equivalent On-Resistance
- Low Saturation Voltage $V_{CE(sat)} < -60mV @ -1A$
- h_{FE} Specified Up to $-10A$ for High Current Gain Hold Up
- **Totally Lead-Free & Fully 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-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

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)

Applications

- Charging circuits
- DC-DC converters
- MOSFET and IGBT gate driving
- Power switches
- Motor controls

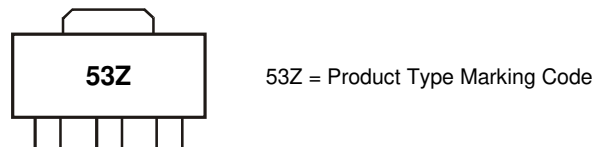


Ordering Information (Note 4)

Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
ZX5T3ZTA	SOT89	53Z	7	12	1,000	Reel
ZX5T3ZTC	SOT89	53Z	13	12	4,000	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



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

Characteristic	Symbol	Limit	Unit
Collector-Base Voltage	V _{CB0}	-50	V
Collector-Base Voltage	V _{CBS}	-50	V
Collector-Emitter Voltage	V _{CEO}	-40	V
Emitter-Base Voltage	V _{EBO}	-7.5	V
Continuous Collector Current	I _C	-5.5	A
Peak Pulse Current	I _{CM}	-15	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation	P _D	(Note 5)	0.9
		(Note 6)	1.5
		(Note 7)	2.1
		(Note 8)	3.0
Thermal Resistance, Junction to Ambient Air	R _{θJA}	(Note 5)	139
		(Note 6)	83
		(Note 7)	60
		(Note 8)	42
Thermal Resistance, Junction to Lead	R _{θJL}	2.81	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

ESD Ratings (Note 10)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
5. For a device mounted with the exposed collector pad on 15mm x 15mm 1oz copper that is on a single-sided 1.6mm 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 x 25mm 1oz copper.
 7. Same as note (5), except the device is mounted on 50mm x 50mm 1oz copper.
 8. Same as note (5), except the device is mounted on 25mm x 25mm 1oz copper and measured at t<5secs.
 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

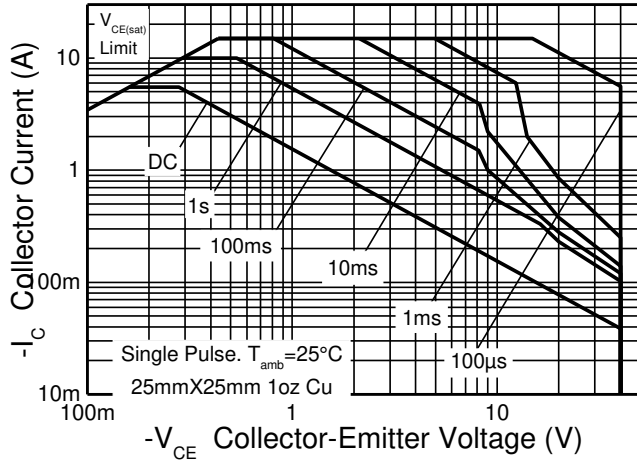


Figure 1. Safe Operating Area

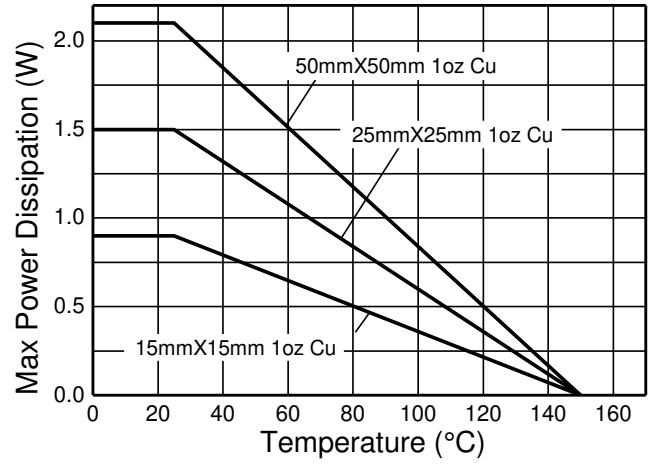


Figure 2. Derating Curve

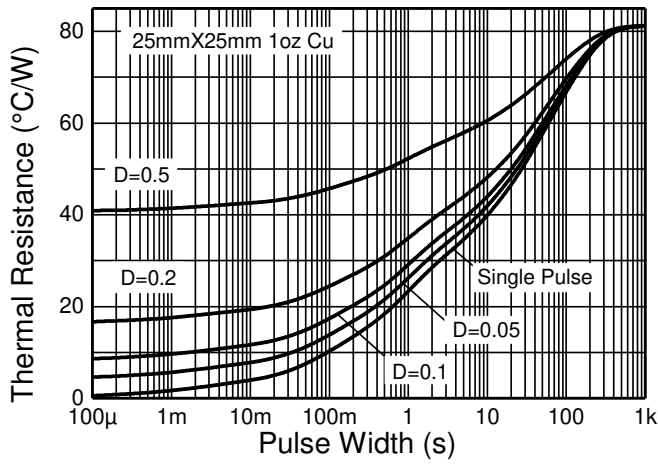


Figure 3. Transient Thermal Impedance

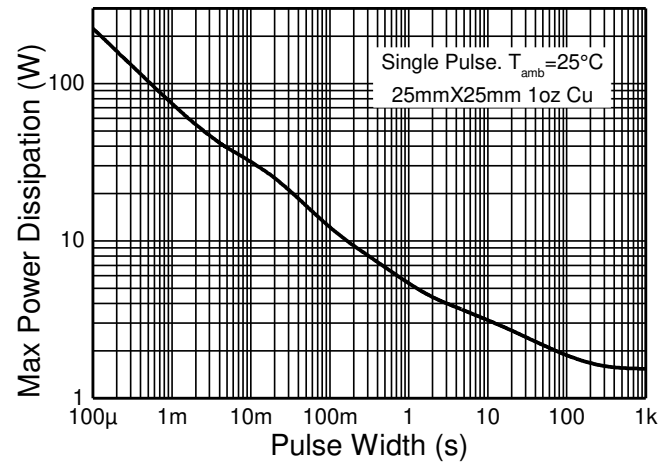


Figure 4. Pulse Power Dissipation

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	-50	-90	—	V	I _C = -100μA
Collector-Emitter Breakdown Voltage	BV _{CES}	-50	-90	—	V	I _C = -100μA
Collector-Emitter Breakdown Voltage (Note 11)	BV _{CEO}	-40	-58	—	V	I _C = -10mA
Emitter-Base Breakdown Voltage	BV _{EBO}	-7.5	-8.3	—	V	I _E = -100μA
Collector Cutoff Current	I _{CBO}	—	1	-20	nA	V _{CB} = -40V
Collector Cutoff Current	I _{CES}	—	1	-20	nA	V _{CE} = -32V
Emitter Cutoff Current	I _{EBO}	—	1	-20	nA	V _{EB} = -6V
DC Current Transfer Static Ratio (Note 11)	h _{FE}	200 200 170 110	390 350 290 175	— 550 — —	—	I _C = -10mA, V _{CE} = -2V I _C = -0.5A, V _{CE} = -2V I _C = -2A, V _{CE} = -2V I _C = -5.5A, V _{CE} = -2V
Collector-Emitter Saturation Voltage (Note 11)	V _{CE(sat)}	— — —	-15 -44 -50 -120 -70 -125 -130 -162	-30 -60 -70 -165 -80 -175 -175 -185	mV	I _C = -0.1A, I _B = -10mA I _C = -1A, I _B = -100mA I _C = -1A, I _B = -50mA I _C = -1A, I _B = -10mA I _C = -2A, I _B = -200mA I _C = -2A, I _B = -40mA I _C = -3.5A, I _B = -175mA I _C = -5.5A, I _B = -550mA
Base-Emitter Saturation Voltage (Note 11)	V _{BE(sat)}	—	-820 -1000	-900 -1075	mV	I _C = -2A, I _B = -40mA I _C = -5.5A, I _B = -550mA
Base-Emitter Turn-On Voltage (Note 11)	V _{BE(om)}	—	-778 -869	-850 -950	mV	I _C = -2A, V _{CE} = -2V I _C = -5.5A, V _{CE} = -2V
Transitional Frequency	f _T	—	152	—	MHz	I _C = -50mA, V _{CE} = -10V f = 100MHz
Output Capacitance	C _{obo}	—	53	—	pF	V _{CB} = -10V, f = 1MHz,
Switching Times	t _d	—	18	—	ns	I _C = -1A, V _{CC} = -10V I _{B1} = -I _{B2} = -100mA
	t _r		17			
	t _s		325			
	t _f		60			
Switching Times	t _d	—	55	—	ns	I _C = -2A, V _{CC} = -30V I _{B1} = -I _{B2} = -20mA
	t _r		107			
	t _s		264			
	t _f		103			

Note: 11. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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

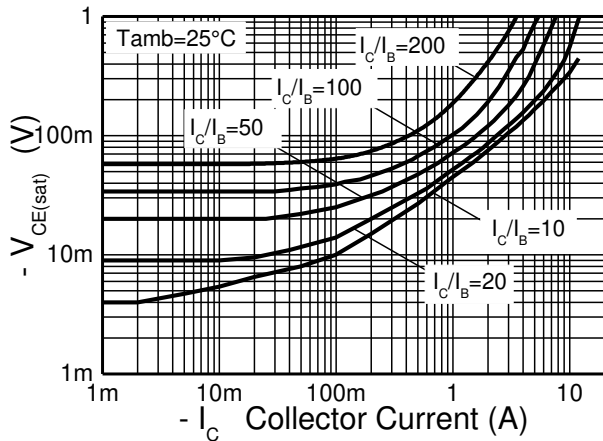


Figure 5. $V_{CE(sat)}$ v I_C

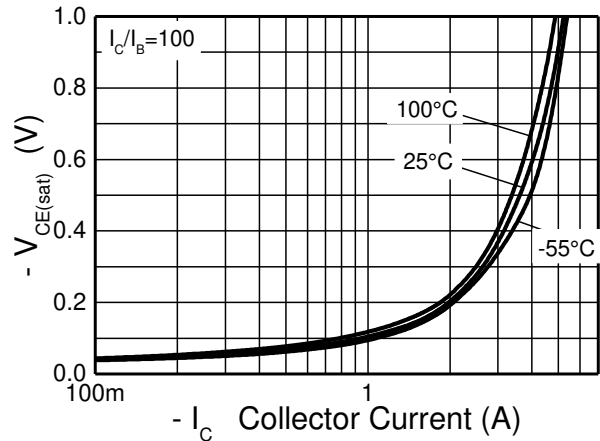


Figure 6. $V_{CE(sat)}$ v I_C

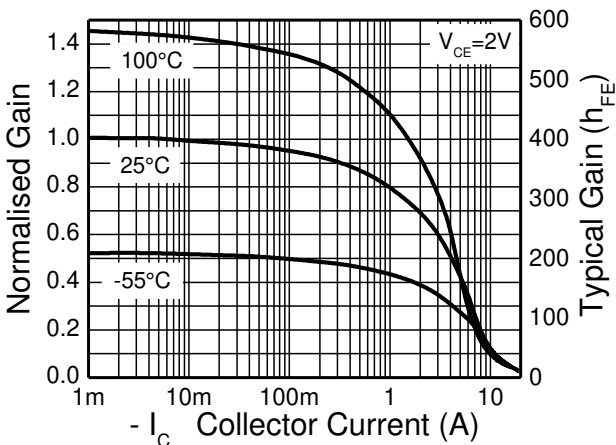


Figure 7. h_{FE} v I_C

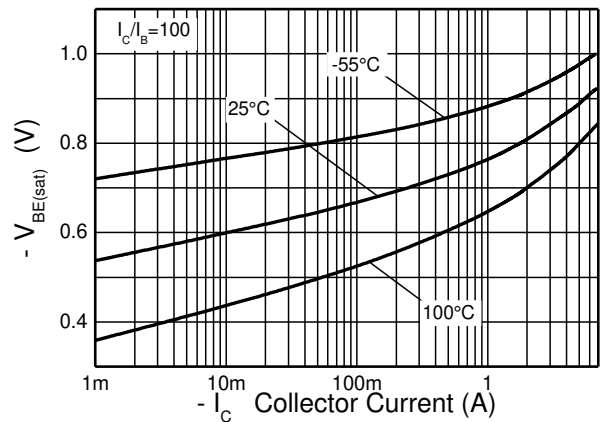


Figure 8. $V_{BE(sat)}$ v I_C

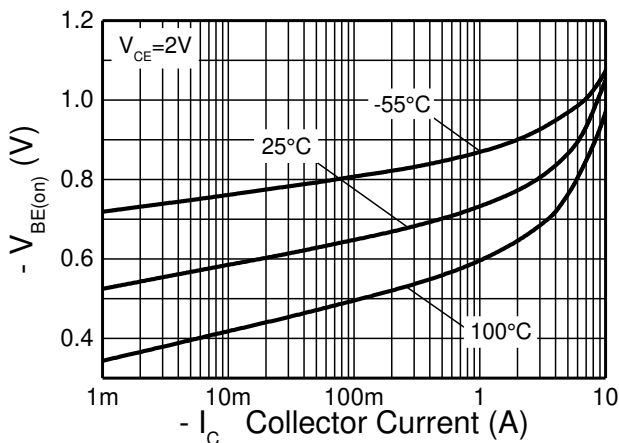
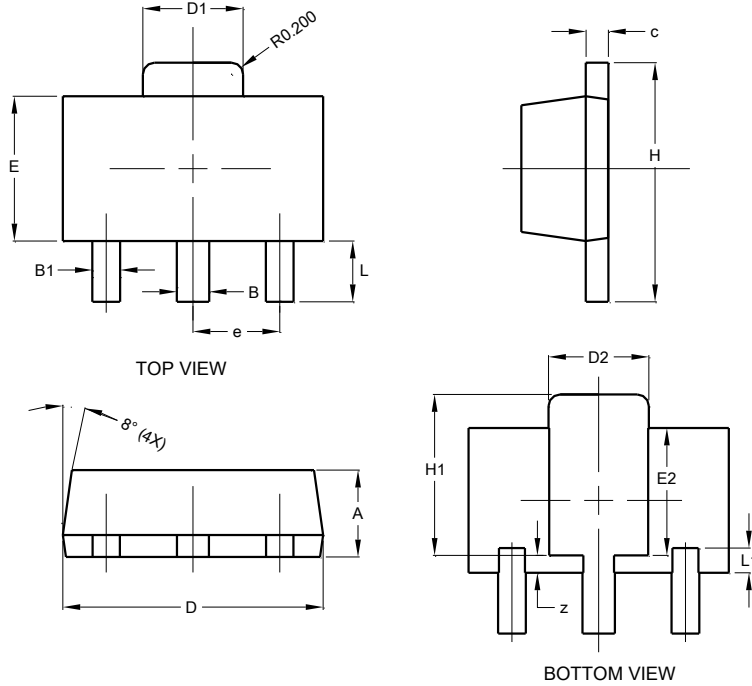


Figure 9. $V_{BE(on)}$ v I_C

Package Outline Dimensions

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

SOT89

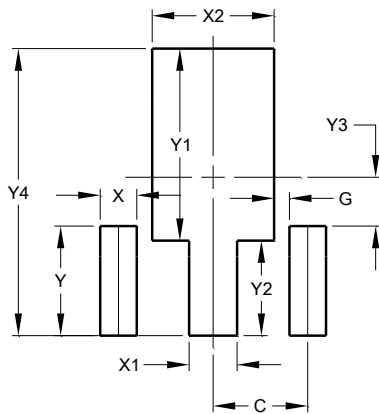


SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions in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