

**25V NPN LOW SATURATION MEDIUM POWER TRANSISTOR IN SOT89**

## Features

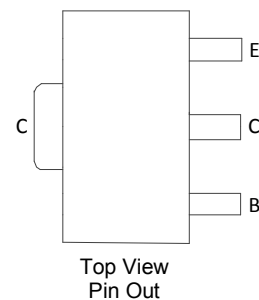
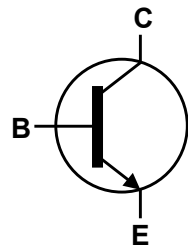
- $BV_{CEO} > 25V$
- $I_C = 5.5A$  Continuous Current
- Low Saturation Voltage  $V_{CE(sat)} < 0.2V @ 6.5A$
- $R_{sat} = 25m\Omega$  for a Low Equivalent On-Resistance
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen- and Antimony-Free. "Green" Device (Note 3)**
- **For automotive 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](mailto:contact@diodes.com) 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
- Weight: 0.05 grams (Approximate)

## Application

- Emergency lighting circuits
- Motor driving (including DC fans)
- Solenoid, relay and actuator drivers
- DC modules
- Backlight Inverters

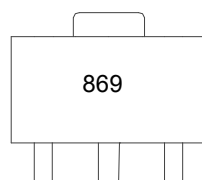


## Ordering Information (Note 4)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
ZXTN2005ZTA	Standard	869	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



869 = Product Type Marking Code

**Absolute Maximum Ratings** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

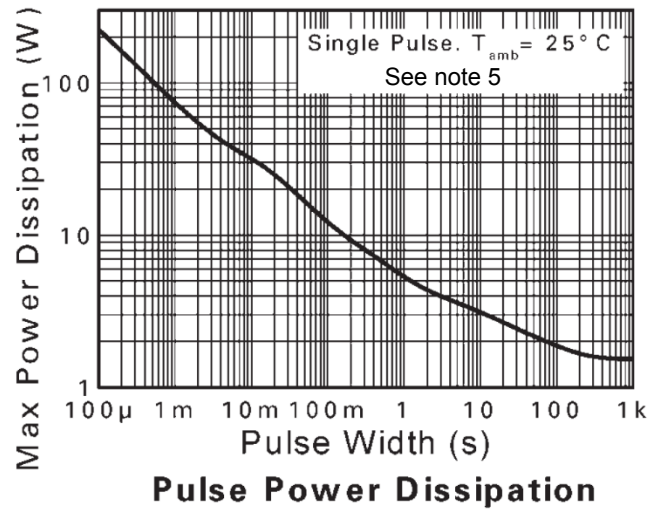
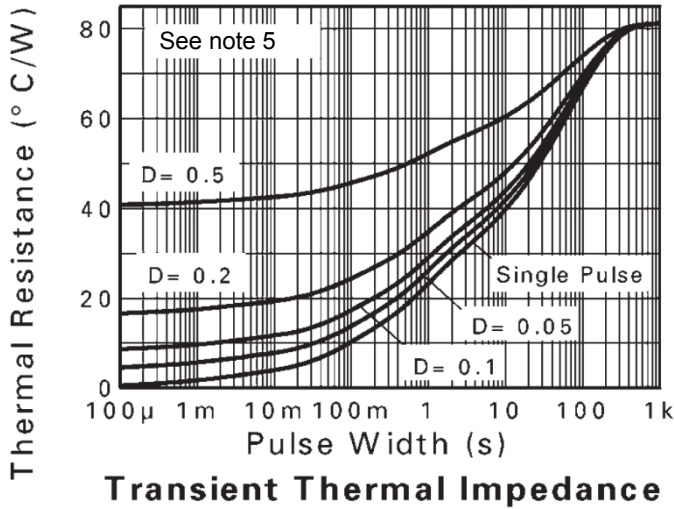
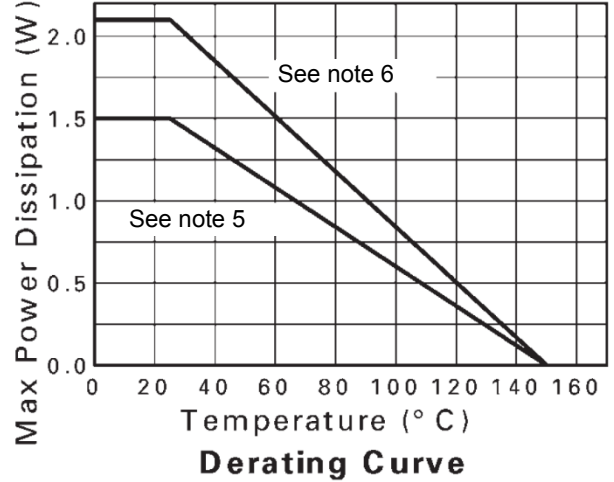
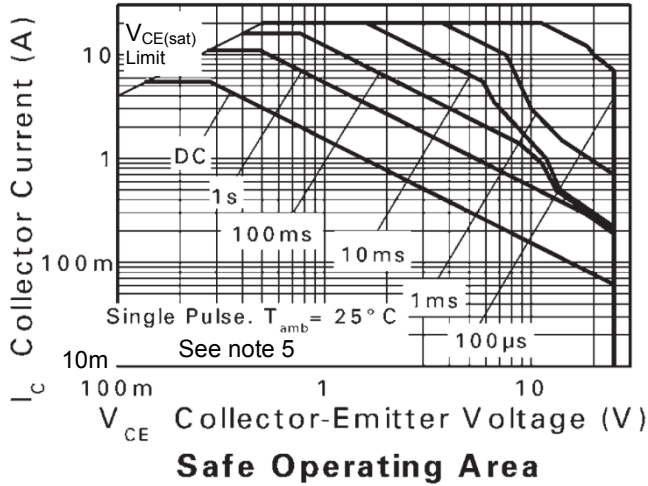
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	60	V
Collector-Emitter Voltage	$V_{CEO}$	25	V
Emitter-Base Voltage	$V_{EBO}$	7	V
Continuous Collector Current	$I_C$	5.5	A
Peak Pulse Collector Current (single pulse)	$I_{CM}$	20	A

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

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

- Notes:
- 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.
  - Same as note (5), except the device is mounted on 50mm x 50mm x 1.6mm single sided 2oz weight copper.

**Thermal Characteristics and Derating Information**

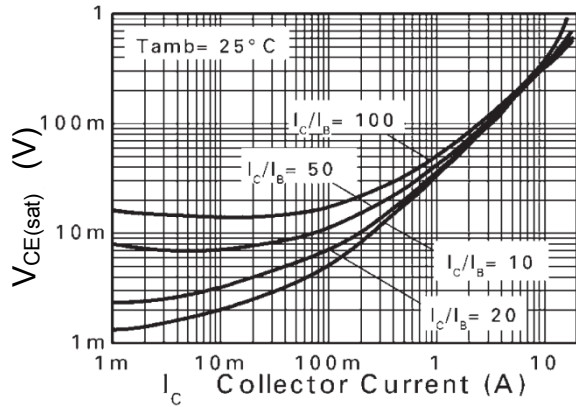


**Electrical Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

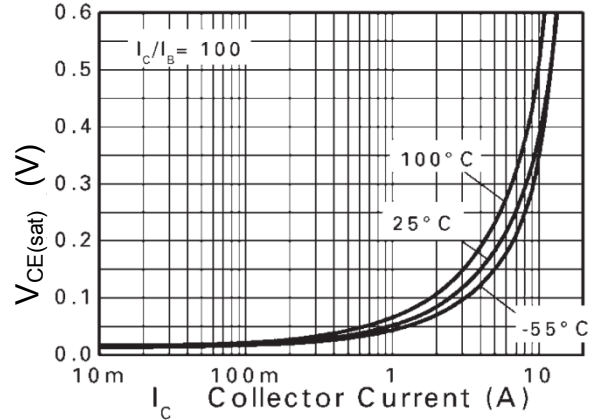
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$BV_{CBO}$	60	120	—	V	$I_C = 100\mu\text{A}$
Collector-emitter breakdown voltage	$BV_{CER}$	60	120	—	V	$I_C = 1\mu\text{A}$ , $R_{BE} \leq 1\text{k}\Omega$
Collector- Emitter Breakdown Voltage (Note 7)	$BV_{CEO}$	25	35	—	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	7.0	8.1	—	V	$I_E = 100\mu\text{A}$
Collector Base Cut-Off Current	$I_{CBO}$	—	—	20 0.5	nA $\mu\text{A}$	$V_{CB} = 50\text{V}$ $V_{CB} = 50\text{V}$ , $T_A = +100^\circ\text{C}$
Collector Emitter Cut-Off Current	$I_{CER}$ $R_{\leq 1\text{k}\Omega}$	—	—	20 0.5	nA $\mu\text{A}$	$V_{CB} = 50\text{V}$ $V_{CB} = 50\text{V}$ , $T_{\text{amb}} = 100^\circ\text{C}$
Emitter Cut-Off Current	$I_{EBO}$	—	—	10	nA	$V_{EB} = 6\text{V}$
Collector-Emitter Saturation Voltage (Note 7)	$V_{CE(\text{sat})}$	—	25 30 45 105 160	35 45 70 130 200	mV	$I_C = 500\text{mA}$ , $I_B = 10\text{mA}$ $I_C = 1\text{A}$ , $I_B = 100\text{mA}$ $I_C = 1\text{A}$ , $I_B = 10\text{mA}$ $I_C = 2\text{A}$ , $I_B = 10\text{mA}$ $I_C = 6.5\text{A}$ , $I_B = 150\text{mA}$
Base-Emitter Saturation Voltage (Note 7)	$V_{BE(\text{sat})}$	—	950	1050	mV	$I_C = 6.5\text{A}$ , $I_B = 150\text{mA}$
Base-Emitter Turn-On Voltage (Note 7)	$V_{BE(\text{on})}$	—	860	960	mV	$I_C = 6.5\text{A}$ , $V_{CE} = 1\text{V}$
DC Current Gain (Note 7)	$h_{FE}$	300 300 200 40	400 450 275 55	—	—	$I_C = 10\text{mA}$ , $V_{CE} = 1\text{V}$ $I_C = 1\text{A}$ , $V_{CE} = 1\text{V}$ $I_C = 7\text{A}$ , $V_{CE} = 1\text{V}$ $I_C = 20\text{A}$ , $V_{CE} = 1\text{V}$
Transitional frequency	$f_T$	—	150	—	MHz	$I_C = 100\text{mA}$ , $V_{CE} = 10\text{V}$ , $f = 50\text{MHz}$
Output Capacitance	$C_{obo}$	—	48	—	pF	$V_{CB} = 10\text{V}$ , $f = 1\text{MHz}$
Switching times	$t_{on}$	—	33	—	ns	$V_{CC} = 10\text{V}$ $I_C = 1\text{A}$ , $I_{B1} = -I_{B2} = 100\text{mA}$
	$t_{off}$	—	464	—		

Note: 7. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

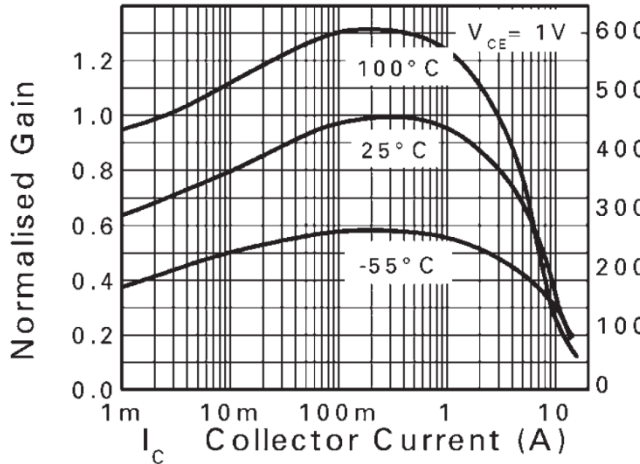
**Typical Electrical Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



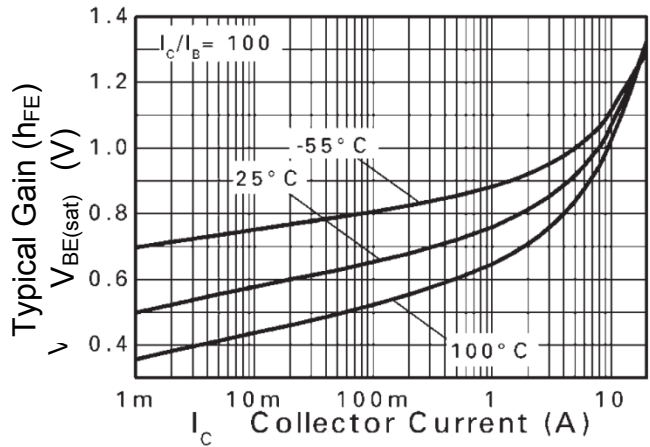
$V_{CE(sat)}$  v  $I_C$



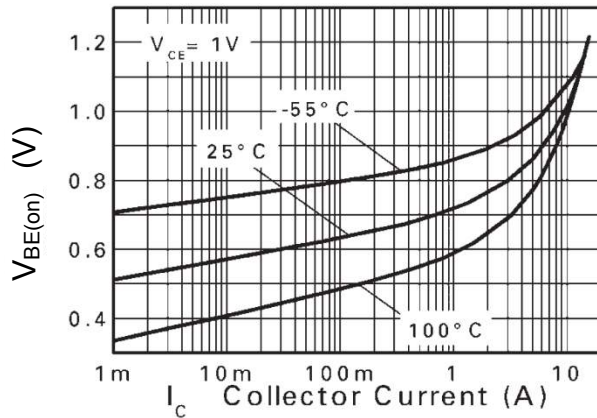
$V_{CE(sat)}$  v  $I_C$



$h_{FE}$  v  $I_C$



$V_{BE(sat)}$  v  $I_C$

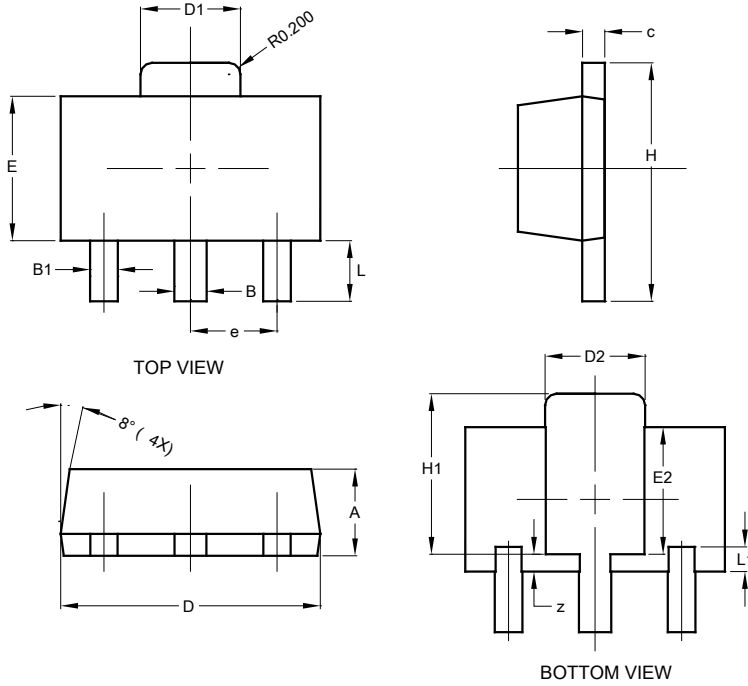


$V_{BE(on)}$  v  $I_C$

**Package Outline Dimensions**

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

**SOT89**

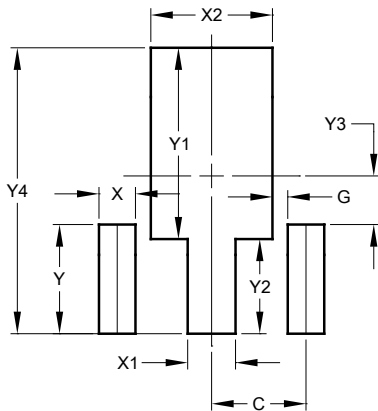


SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
<b>All Dimensions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

**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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