60V NPN MEDIUM POWER TRANSISTOR IN SOT89

Features

- BV_{CEO} > 60V
- I_C = 5A Continuous Collector Current
- Low Saturation Voltage $V_{CE(sat)}$ < 70mV @ 1A
- R_{sat} = 48mΩ for a Low Equivalent On-Resistance
- P_D = 2.4W Power Dissipation
- **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 or your local Diodes representative.**
  https://www.diodes.com/quality/product-definitions/

Mechanical Data

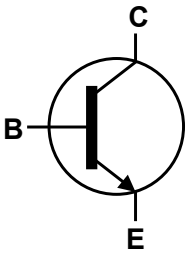
- Case: SOT89
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.055 grams (Approximate)

Applications

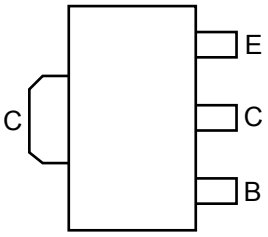
- Emergency Lighting Circuits
- Motor Driving (including DC fans)
- Solenoid, Relay and Actuator Drivers
- DC-DC Modules
- Backlight inverters
- Power Switches
- MOSFET Gate Drivers

SOT89

Top View



Equivalent Circuit



Top View
Pin-Out

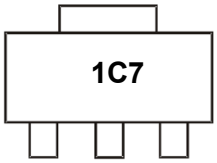
Ordering Information (Notes 4)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN25060BZTA	Standard	1C7	7	12mm	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

SOT89



1C7= Product Type Marking Code

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

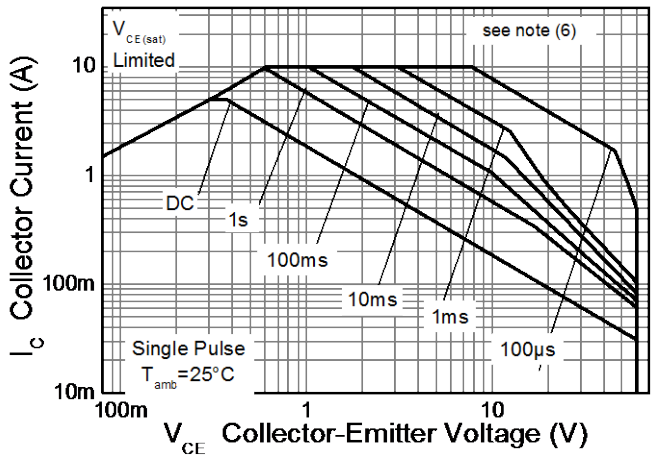
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	150	V
Collector-Emitter Voltage (Forward Blocking)	V_{CEX}	150	V
Collector-Emitter Voltage	V_{CEO}	60	V
Emitter-Collector Voltage (Reverse Blocking)	V_{ECO}	6	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	5	A
Peak Pulse Collector Current (Single Pulse)	I_{CM}	10	A
Base Current	I_B	1	A

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

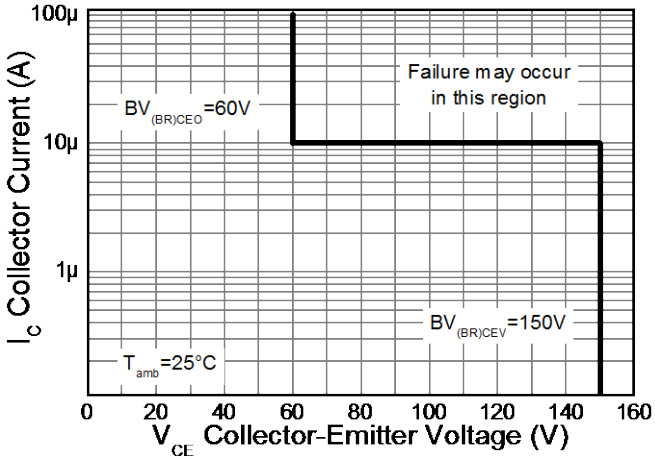
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5) Linear Derating Factor	P_D	1.1 8.8	mW/°C
Power Dissipation (Note 6) Linear Derating Factor		1.8 14.4	
Power Dissipation (Note 7) Linear Derating Factor		2.4 19.2	
Power Dissipation (Note 8) Linear Derating Factor		4.46 35.7	
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	117	°C/W
Thermal Resistance, Junction to Ambient (Note 6)		68	
Thermal Resistance, Junction to Ambient (Note 7)		51	
Thermal Resistance, Junction to Ambient (Note 8)		28	
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°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 2oz copper.
7. Same as Note (5), except the device is mounted on 50mm x 50mm 2oz copper.
8. Same as Note (5), measured at t<5 seconds.

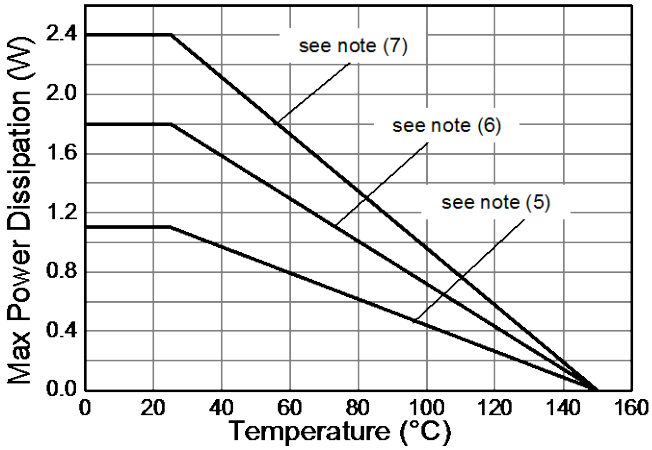
Thermal Characteristics and Derating Information



Safe Operating Area

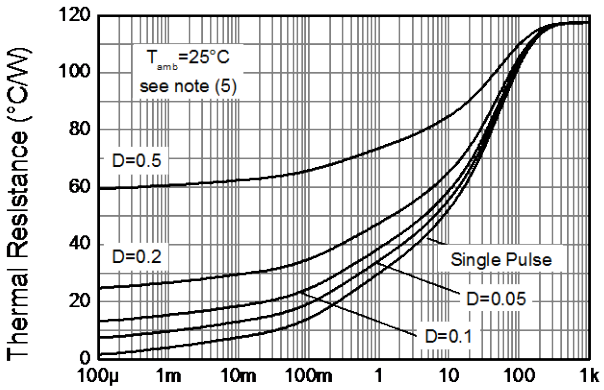


Safe Operating Area

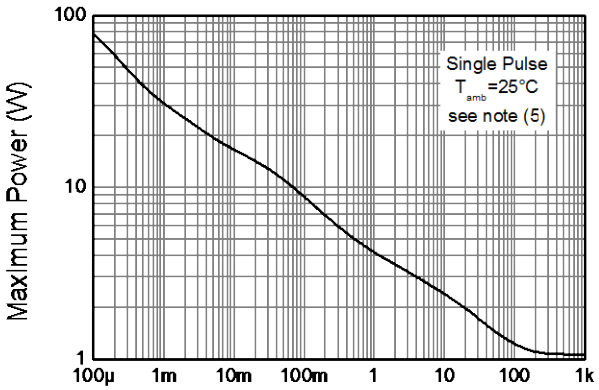


Derating Curve

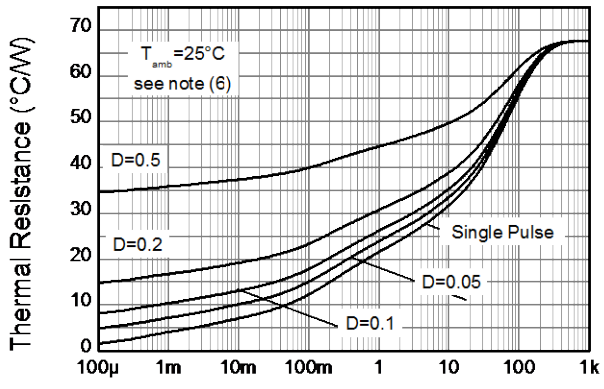
Thermal Characteristics and Derating Information



Transient Thermal Impedance



Pulse Power Dissipation



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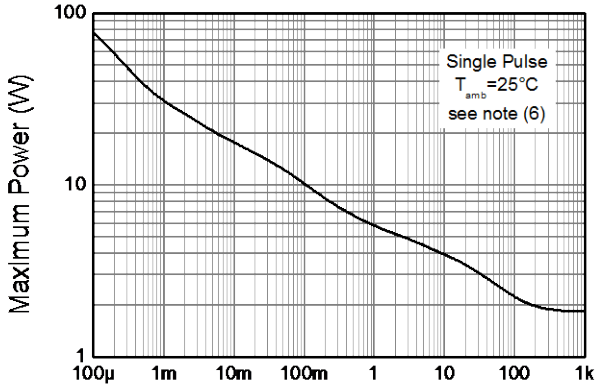
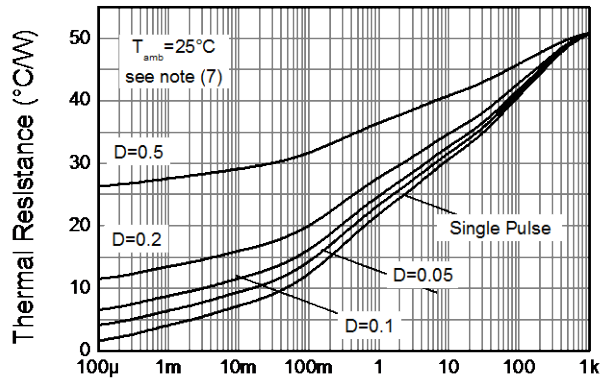
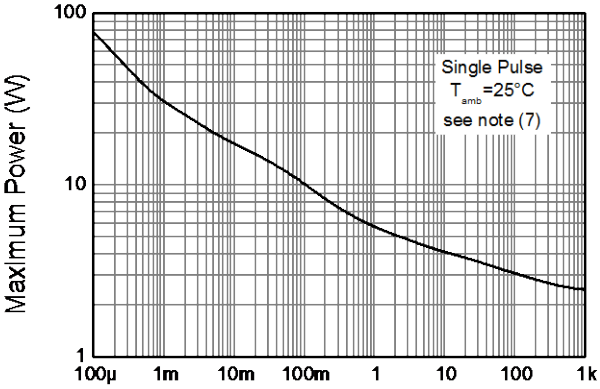


Pulse Power Dissipation



Transient Thermal Impedance



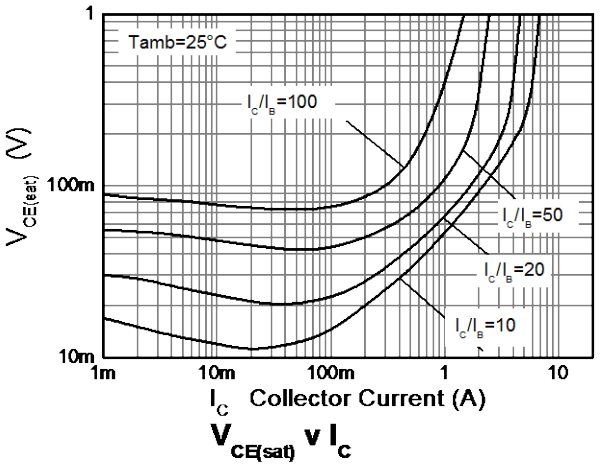
Pulse Power Dissipation

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

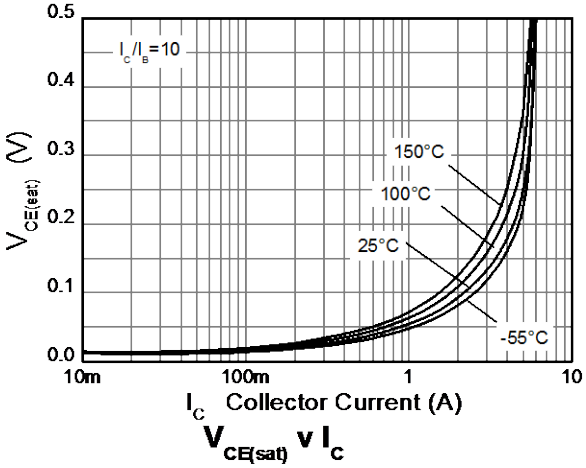
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	150	190	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Forward Blocking)	BV_{CEX}	150	190	—	V	I_C = 100µA, R_{BE} ≤1kΩ or -1V < V_{BE} <0.25V
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	60	80	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8	—	V	I_E = 100µA
Emitter-Collector Breakdown Voltage (Reverse Blocking)	BV_{ECX}	6	8	—	V	I_E = 100µA, R_{BC} ≤1kΩ or <0.25V > V_{BC} >0.25V
Emitter-Collector Breakdown Voltage (Base Open)	BV_{ECO}	6	7	—	V	I_E = 100µA
Collector-Base Cutoff Current	I_{CBO}	—	1	50 20	nA µA	V_{CB} = 120V V_{CB} = 120V, T_{amb} = 100°C
Collector-Emitter Cut-Off Current	I_{CEX}	—	—	100	nA	V_{CE} = 120V, R_{BE} ≤1kΩ or -1V < V_{BE} <0.25V
Emitter-Base Cut-Off Current	I_{EBO}	—	1	50	nA	V_{EB} = 5.6V
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	—	55 70 185 240	70 90 230 305	mV	I_C = 1A, I_B = 100mA I_C = 1A, I_B = 50mA I_C = 4A, I_B = 400mA I_C = 5A, I_B = 500mA
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	—	1020	1100	mV	I_C = 5A, I_B = 500mA
Base-Emitter Turn-On Voltage (Note 9)	$V_{BE(on)}$	—	960	1050	mV	I_C = 5A, V_{CE} = 2V
DC Current Gain (Note 9)	h_{FE}	100 90 45 —	200 180 90 20	300 — — —	—	I_C = 10mA, V_{CE} = 2V I_C = 1A, V_{CE} = 2V I_C = 2A, V_{CE} = 50V I_C = 5A, V_{CE} = 5V
Transitional frequency	f_T	—	185	—	MHz	I_C = 100mA, V_{CE} = 5V f=100MHz
Output capacitance	C_{obo}	—	11.5	20	pF	V_{CB}= 10V, f=1MHz
Delay Time	t_d	—	16	—	ns	V_{CC} = 10V, I_{CC} = 500mA I_{B1} = - I_{B2} = 50mA
Rise Time	t_r	—	15	—	ns	
Storage Time	t_s	—	509	—	ns	
Fall Time	t_f	—	57	—	ns	

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

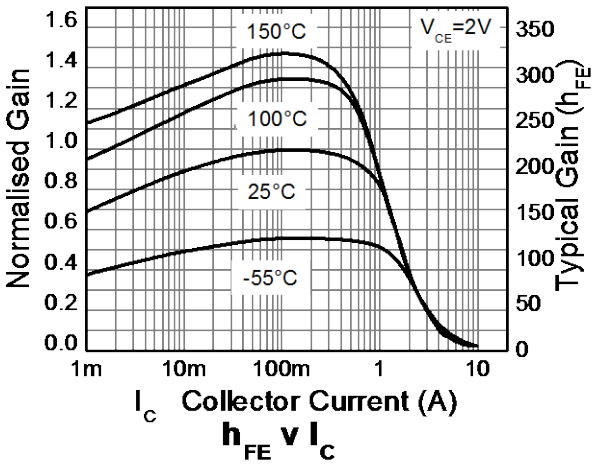
Typical Electrical Characteristics (@ T_A = +25°C, unless otherwise specified.)



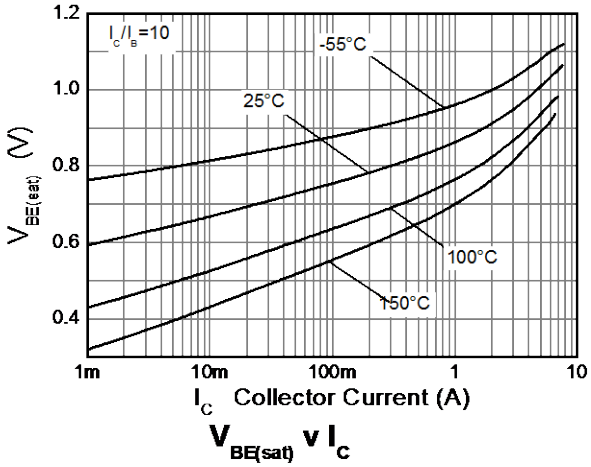
$V_{CE(sat)}$ v I_C



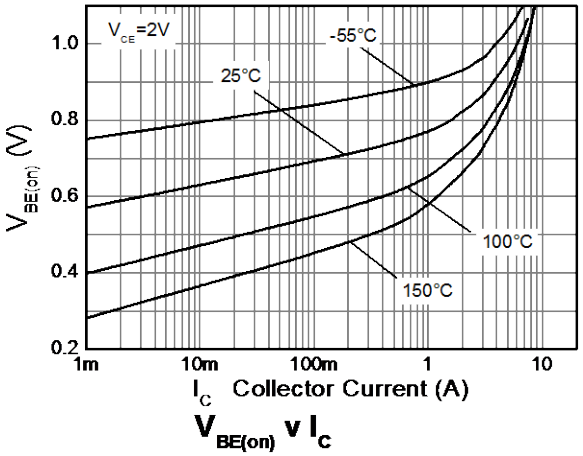
$V_{CE(sat)}$ v I_C



h_{FE} v I_C



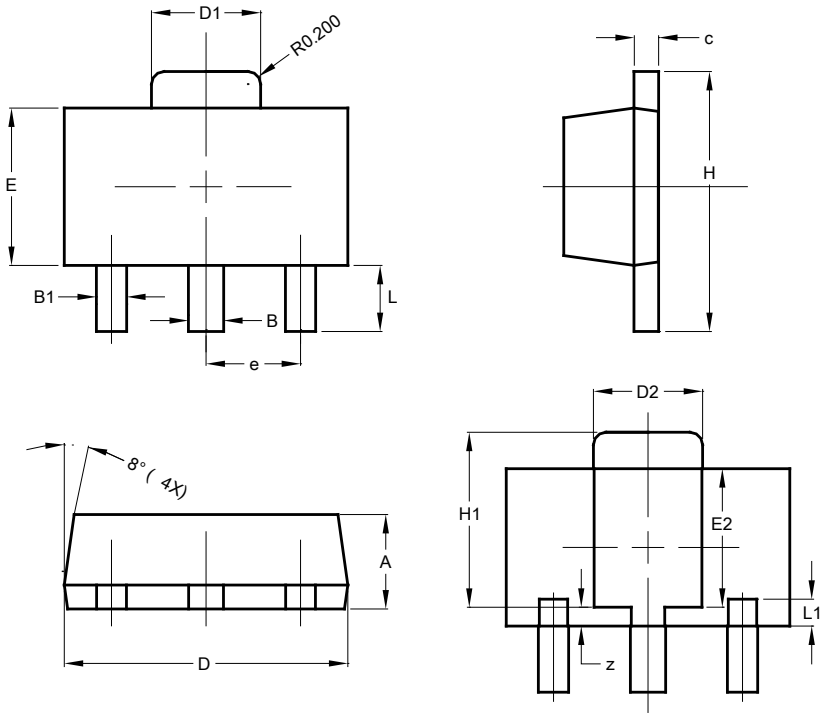
$V_{BE(sat)}$ v I_C



$V_{BE(on)}$ v I_C

Package Outline Dimensions

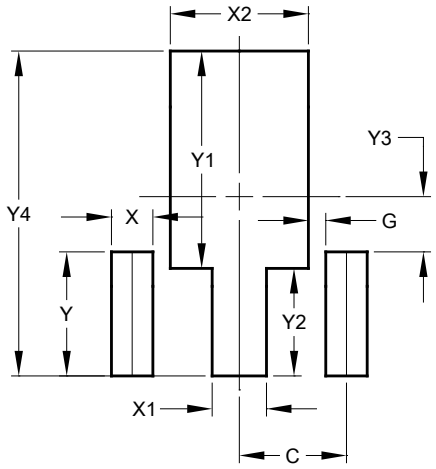
Please see http://www.diodes.com/package-outlines.html for the latest version.



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.



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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