


ZXTN4004Z

150V NPN LED DRIVING TRANSISTOR IN SOT89

Features

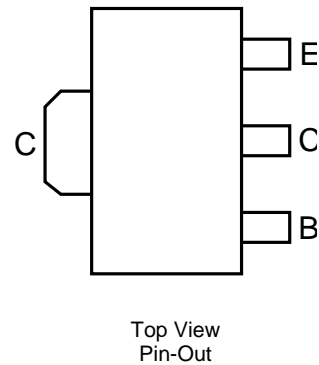
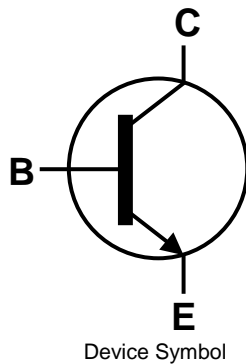
- $BV_{CEO} > 150V$
- $I_C = 1A$ High Continuous Current
- $h_{FE} > 100$ for $I_C = 150mA$, $V_{CE} = 0.25V$
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

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: 0.055 grams (Approximate)

Applications

- LED TV Backlight

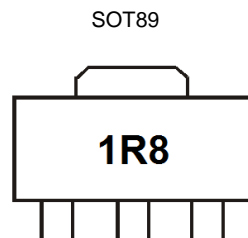


Ordering Information (Notes 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN4004ZTA	AEC-Q101	1R8	7	12	1,000 units
ZXTN4004ZQTA	Automotive	1R8	7	12	1,000 units

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See http://www.diodes.com/quality/lead_free.html 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_compliance_definitions/.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



1R8 = Product type Marking Code

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CB0}	200	V
Collector-Emitter Voltage	V _{CEO}	150	V
Emitter-Base Voltage	V _{EBO}	7	V
Continuous Collector Current	I _C	1	A
Peak Pulse Current	I _{CM}	3	A
Base Current	I _B	500	mA

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

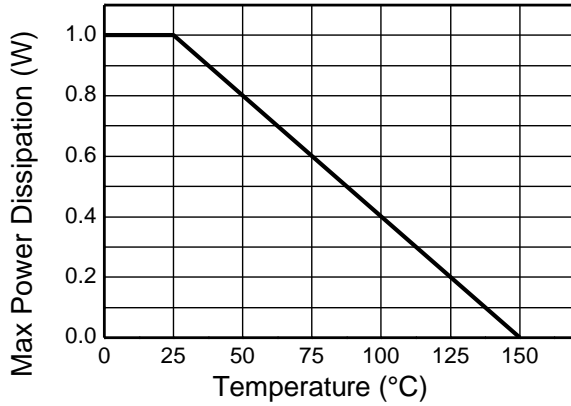
Characteristic	Symbol	Value	Unit
Power Dissipation	P _D	(Note 6)	1
		(Note 7)	1.5
		(Note 8)	2.0
Thermal Resistance, Junction to Ambient Air	R _{θJA}	(Note 6)	125
		(Note 7)	83
		(Note 8)	60
Thermal Resistance, Junction to Lead	R _{θJL}	13	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

ESD Ratings (Note 10)

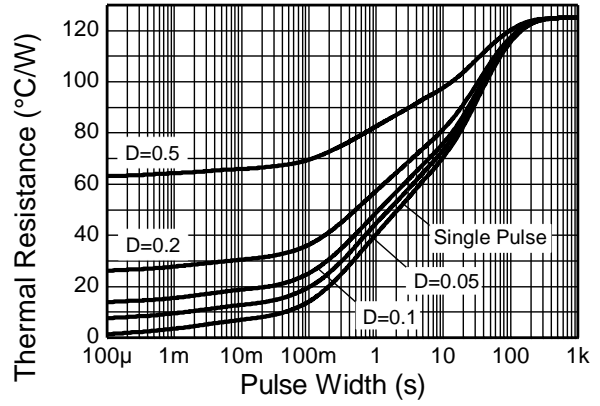
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
- 6. 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.
 - 7. Same as Note 6, except the device is mounted on 25mm x 25mm 1oz copper.
 - 8. Same as Note 6, except the device is mounted on 50mm x 50mm 1oz copper.
 - 9. Thermal resistance from junction to solder-point (on the exposed collector pad).
 - 10. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

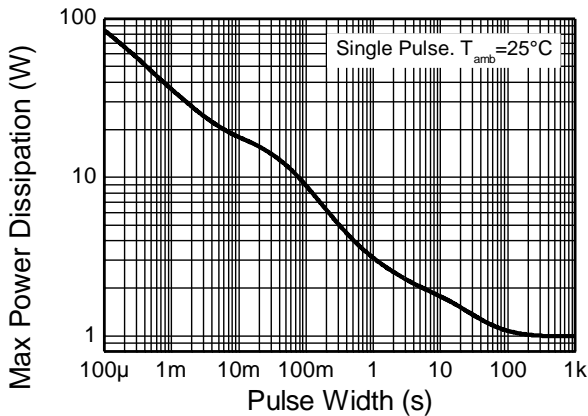
Thermal Characteristics and Derating Information



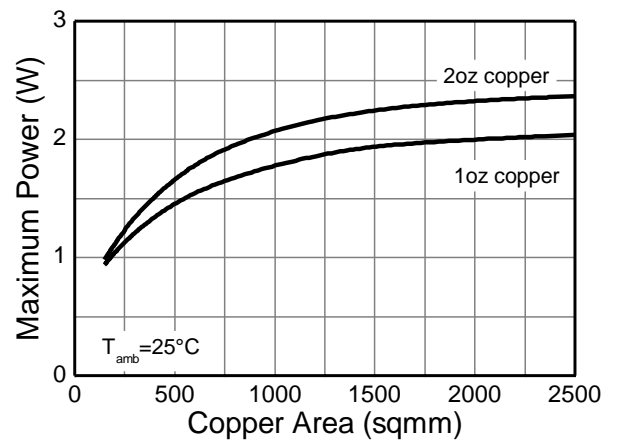
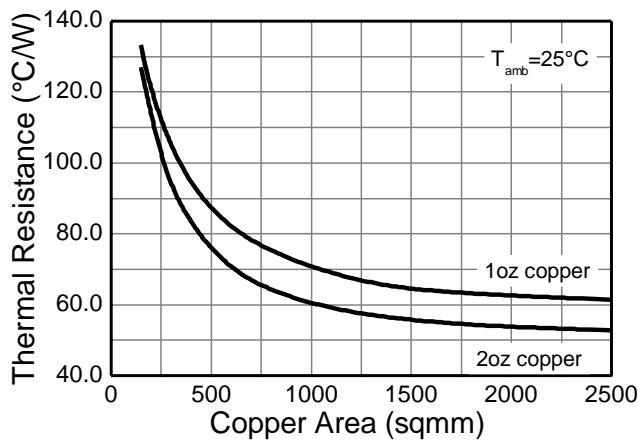
Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation

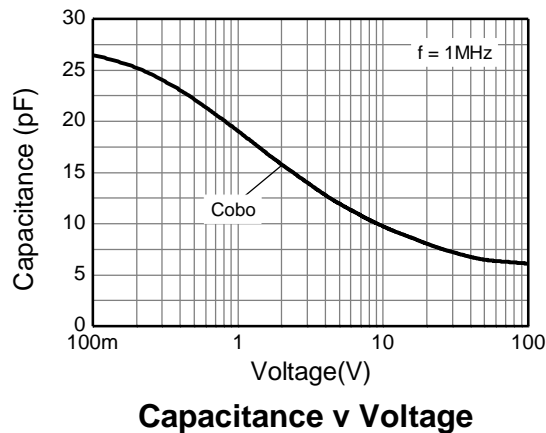
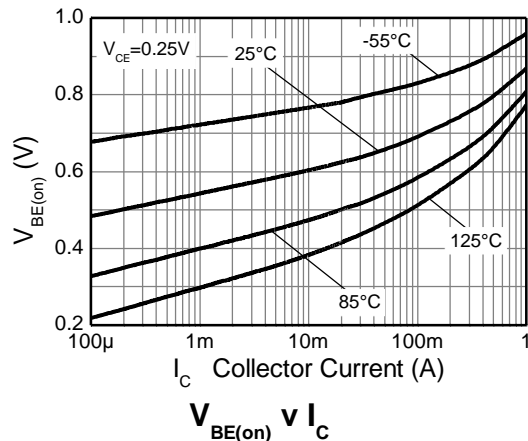
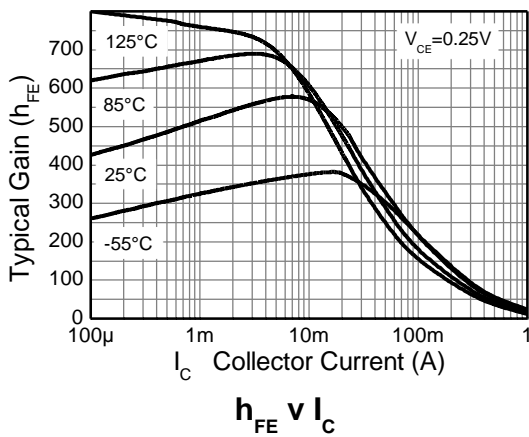


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$ unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Emitter Breakdown Voltage (Note 11)	BV_{CEO}	150	175	-	V	$I_C = 10\text{mA}$
Collector-Base Breakdown Voltage	BV_{CBO}	200	310	-	V	$I_C = 100\mu\text{A}$
Collector Cut-Off Current	I_{CBO}	-	<1	50	nA	$V_{CB} = 150\text{V}$
Collector Cut-Off Current	I_{CES}	-	<1	50	nA	$V_{CE} = 150\text{V}$
Emitter Cut-Off Current	I_{EBO}	-	<1	50	nA	$V_{EB} = 7\text{V}$
Static Forward Current Transfer Ratio (Note 11)	h_{FE}	200 60 100	- - -	- - -	-	$I_C = 30\text{mA}, V_{CE} = 5\text{V}$ $I_C = 85\text{mA}, V_{CE} = 0.20\text{V}$ $I_C = 150\text{mA}, V_{CE} = 0.25\text{V}$
Base-Emitter Turn-On Voltage (Note 11)	$V_{BE(on)}$	-	0.71	0.95	V	$I_C = 150\text{mA}, V_{CE} = 0.25\text{V}$
Collector-Emitter Saturation Voltage (Note 11)	$V_{CE(sat)}$	-	-	0.25	V	$I_C = 100\text{mA}, I_B = 5\text{mA}$
Delay Time	$t(d)$	-	512	-	ns	$V_{CC} = 120\text{V}, I_C = 150\text{mA},$ $-I_{B2} = 1.5\text{mA}, V_{CE(ON)} = 0.25\text{V}$
Rise Time	$t(r)$	-	426	-	ns	
Storage Time	$t(s)$	-	3413	-	ns	
Fall Time	$t(f)$	-	321	-	ns	
Storage Time	$t(s)$	-	65	-	ns	$V_{CC} = 120\text{V}, I_C = 150\text{mA},$ $-I_{B2} = 1.5\text{mA}, V_{CE(ON)} = 4\text{V}$
Fall Time	$t(f)$	-	294	-	ns	

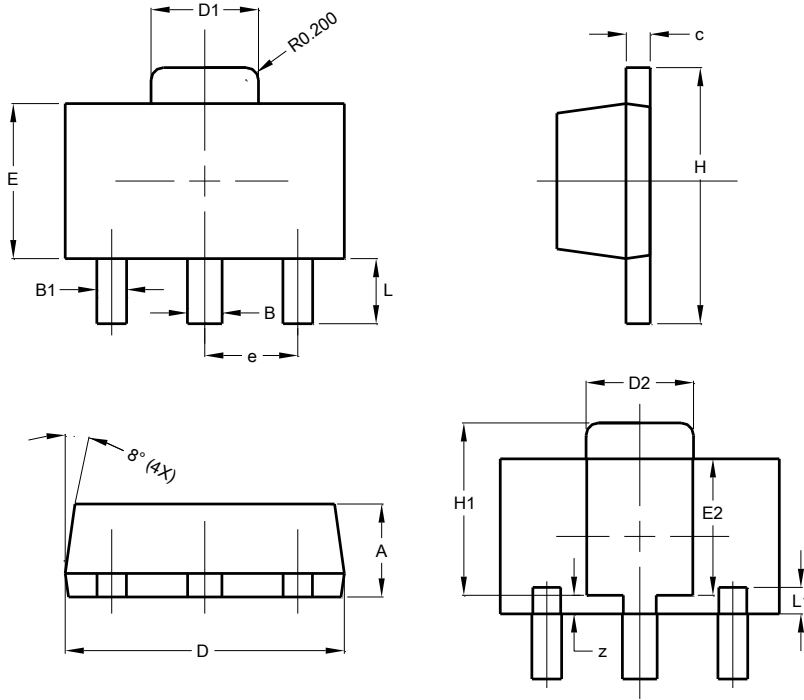
Note: 11. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

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



Package Outline Dimensions

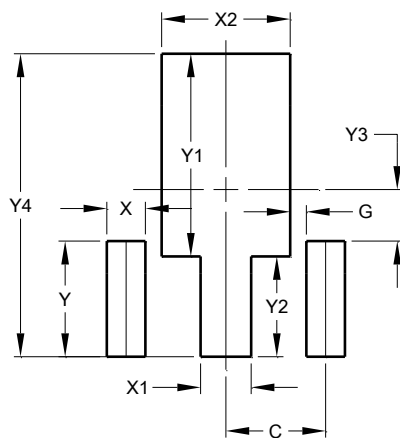
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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 AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> 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

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device terminals and PCB tracking.

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