

**ZXTN4004K**

**150V NPN LED DRIVING TRANSISTOR IN TO252**

**Features**

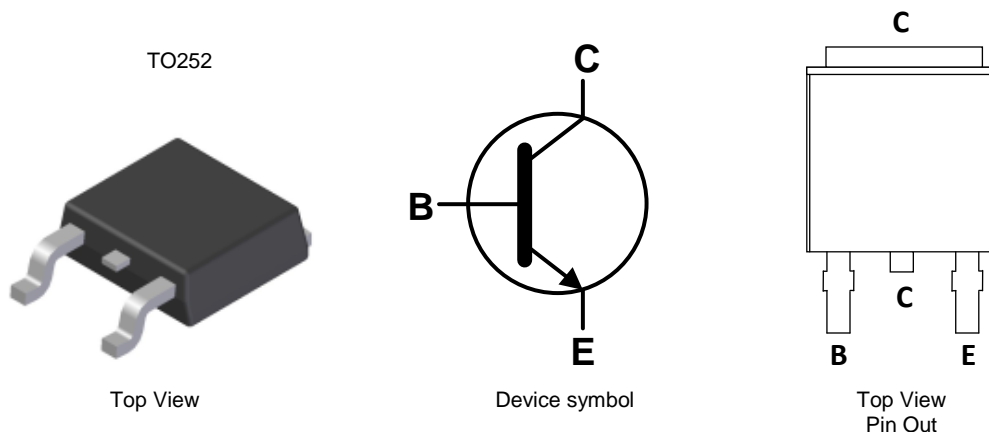
- $BV_{CEO} > 150V$
- $h_{FE} > 100$  for  $I_C = 150mA$ ,  $V_{CE} = 0.25V$
- $I_C (cont) = 1A$
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

**Applications**

- LED TV Backlight

**Mechanical Data**

- Case: TO252 (DPAK)
- 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 (3)
- Weight: 0.34 grams (Approximate)

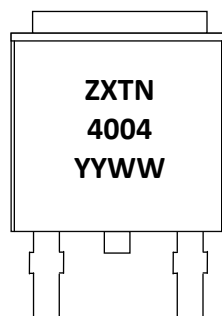


**Ordering Information** (Notes 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN4004KTC	AEC-Q101	ZXTN4004	13	16	2,500
ZXTN4004KQTC	Automotive	ZXTN4004	13	16	2,500

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  2. See [http://www.diodes.com/quality/lead\\_free.html](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/](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**



ZXTN4004 = Product Marking Code  
 YYWW = Date Code Marking  
 YY = Last Digit of Year (ex: 10 = 2010)  
 WW = Week Code (01 – 53)

**Absolute Maximum Ratings** (@T<sub>A</sub> = +25°C unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	150	V
Collector-Emitter Voltage	V <sub>CEO</sub>	150	V
Emitter-Base Voltage	V <sub>EBO</sub>	7	V
Continuous Collector Current	I <sub>C</sub>	1	A
Peak Pulse Current	I <sub>CM</sub>	3	A
Base Current	I <sub>B</sub>	500	mA

**Thermal Characteristics** (@T<sub>A</sub> = +25°C unless otherwise specified.)

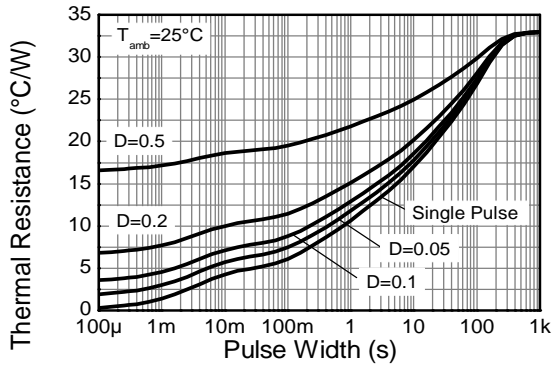
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P <sub>D</sub>	3.8	W
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	33	°C/W
Thermal Resistance, Junction to Leads (Note 7)	R <sub>θJL</sub>	12	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**ESD Ratings** (Note 8)

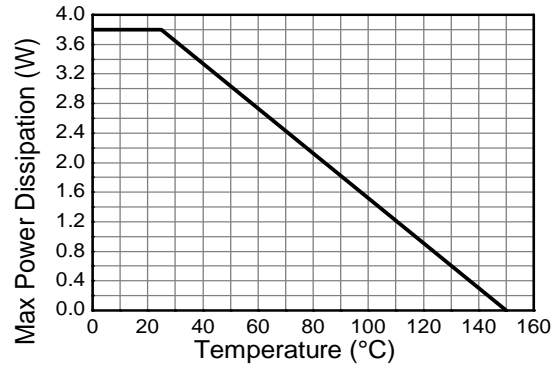
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
6. For a device mounted with the exposed collector pad on 50mm x 50mm, 2oz 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. Thermal resistance from junction to solder-point (on the exposed collector pad).
  8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

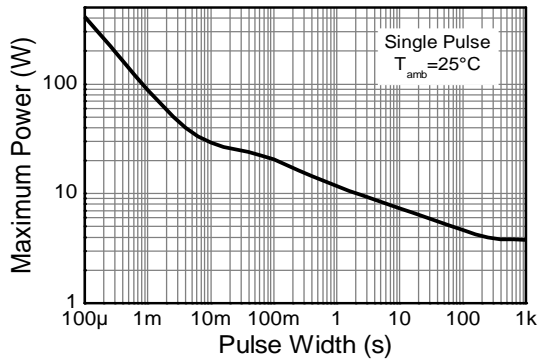
**Thermal Characteristics and Derating Information**



**Transient Thermal Impedance**



**Derating Curve**



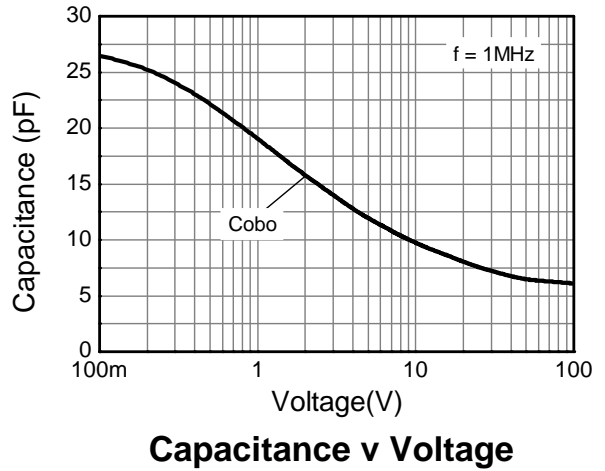
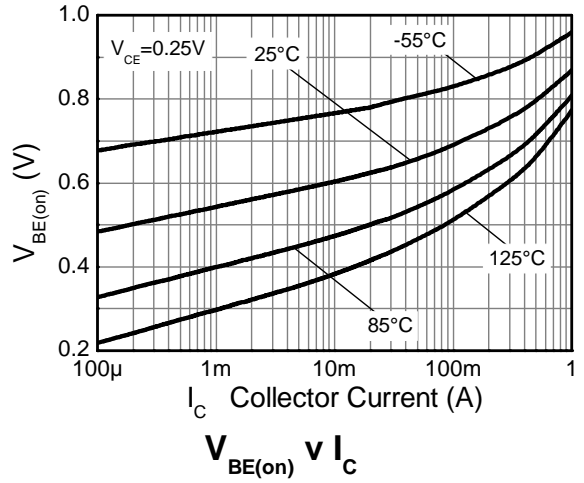
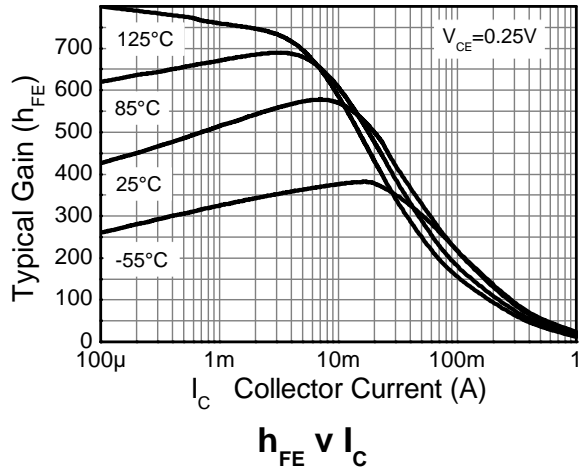
**Pulse Power Dissipation**

**Electrical Characteristics** (@T<sub>A</sub> = +25°C unless otherwise specified)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage (Note 9)	BV <sub>CBO</sub>	150	-	-	V	I <sub>C</sub> = 0.1mA
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	150	175	-	V	I <sub>C</sub> = 10mA
Emitter-Base Breakdown Voltage (Note 9)	BV <sub>EBO</sub>	7	-	-	V	I <sub>E</sub> = 0.1mA
Collector – Emitter Cut-off Current	I <sub>CES</sub>	-	-	50	nA	V <sub>CE</sub> = 150V
Collector Cut-off Current	I <sub>CBO</sub>	-	-	50	nA	V <sub>CB</sub> = 150V
Emitter Cut-off Current	I <sub>EBO</sub>	-	-	50	nA	V <sub>EB</sub> = 7V
Static Forward Current Transfer Ratio (Note 9)	h <sub>FE</sub>	60 100	-	-	-	I <sub>C</sub> = 85mA, V <sub>CE</sub> = 0.20V I <sub>C</sub> = 150mA, V <sub>CE</sub> = 0.25V
Collector-Emitter Saturation Voltage (Note 9)	V <sub>CE(sat)</sub>	-	-	0.25	V	I <sub>C</sub> = 100mA, I <sub>B</sub> = 5mA
Base-Emitter Saturation Voltage (Note 9)	V <sub>BE(sat)</sub>	-	-	0.95	V	I <sub>C</sub> = 100mA, I <sub>B</sub> = 5mA
Base-Emitter Turn-On Voltage (Note 9)	V <sub>BE(on)</sub>	-	0.71	0.95	V	I <sub>C</sub> = 150mA, V <sub>CE</sub> = 0.25V
Delay Time	t <sub>(d)</sub>	-	512	-	ns	V <sub>CC</sub> = 120V, I <sub>C</sub> = 150mA, -I <sub>B2</sub> = 1.5mA, V <sub>CE(ON)</sub> = 0.25V
Rise Time	t <sub>(r)</sub>	-	426	-	ns	
Storage Time	t <sub>(s)</sub>	-	3413	-	ns	
Fall Time	t <sub>(f)</sub>	-	321	-	ns	
Storage Time	t <sub>(s)</sub>	-	65	-	ns	V <sub>CC</sub> = 120V, I <sub>C</sub> = 150mA, -I <sub>B2</sub> = 1.5mA, V <sub>CE(ON)</sub> = 4V
Fall Time	t <sub>(f)</sub>	-	294	-	ns	

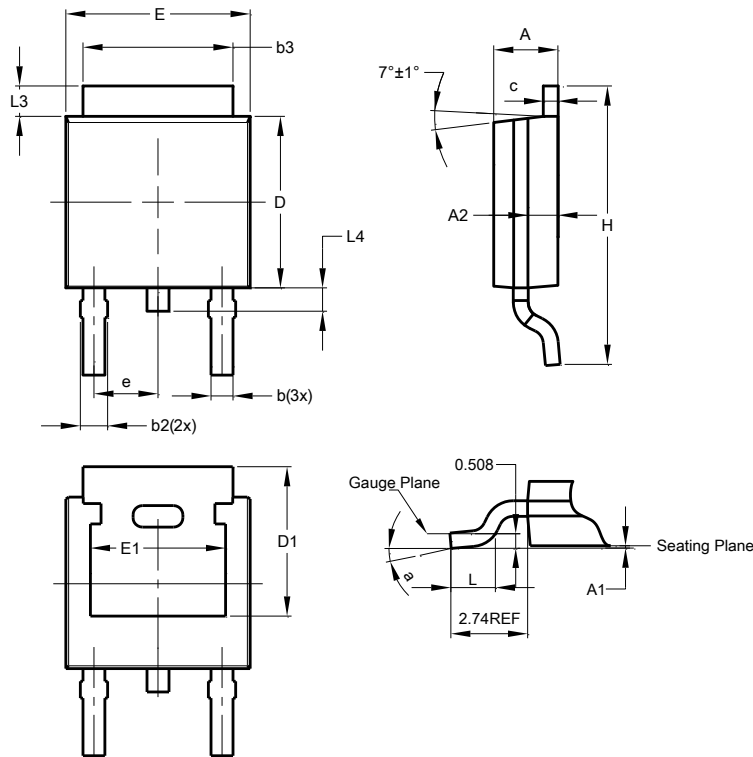
Note: 9. Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤ 2%.

**Typical Electrical Characteristics**



**Package Outline Dimensions**

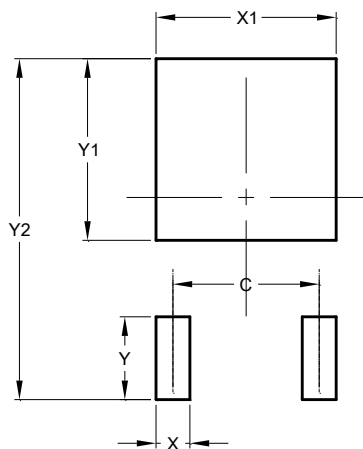
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



TO252 (DPAK)			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	-	-
e	-	-	2.286
E	6.45	6.70	6.58
E1	4.32	-	-
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°	10°	-
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	4.572
X	1.060
X1	5.632
Y	2.600
Y1	5.700
Y2	10.700

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#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.