

## Features

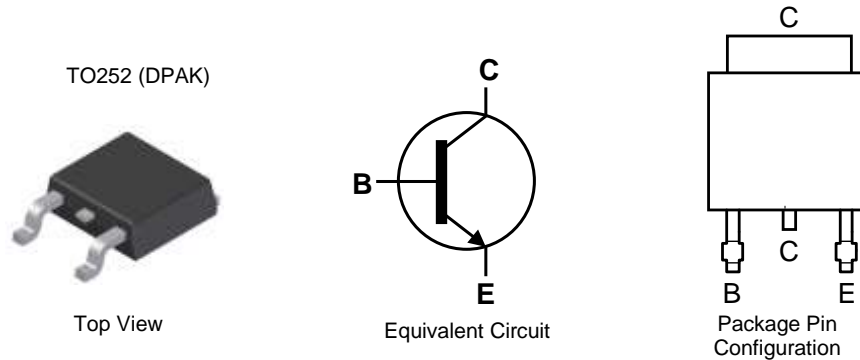
- $BV_{CEO} > 45V$
- $I_C = 3A$  High Continuous Collector Current
- $I_{CM} = 6A$  Peak Pulse Current
- High Gain Device  $>400 @1A$
- $R_{CE(SAT)} = 77m\Omega$  for Low Equivalent On-Resistance
- $h_{FE}$  Specified Up to 6A for a High Gain Hold Up
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP capable (Note 4)**

## Mechanical Data

- Case: TO252 (DPAK)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification 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: 0.34 grams (Approximate)

## Applications

- DC-DC Converters
- Power Switches
- IGBT & MOSFET Gate Drivers
- Motor Control
- Automotive Circuits
- Siren Drivers

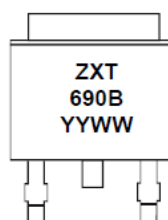


## Ordering Information (Note 5)

Product	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
ZXT690BKTC	AEC-Q101	ZXT690B	13	16	2,500
ZXT690BKQTC	Automotive	ZXT690B	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 <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. 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 <https://www.diodes.com/quality/>.
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>

## Marking Information



ZXT690B = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Digit of Year (ex: 17 = 2017)  
 WW = Week Code (01 – 53)

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	BV <sub>CBO</sub>	60	V
Collector-Emitter Voltage	BV <sub>CEO</sub>	45	V
Emitter-Base Voltage	BV <sub>EBO</sub>	7	V
Continuous Collector Current	I <sub>C</sub>	3	A
Peak Pulse Current	I <sub>CM</sub>	6	A
Base Current	I <sub>B</sub>	0.5	A

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

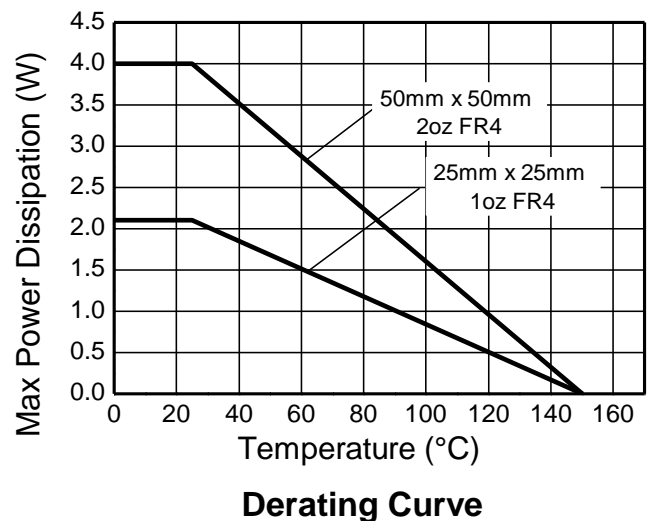
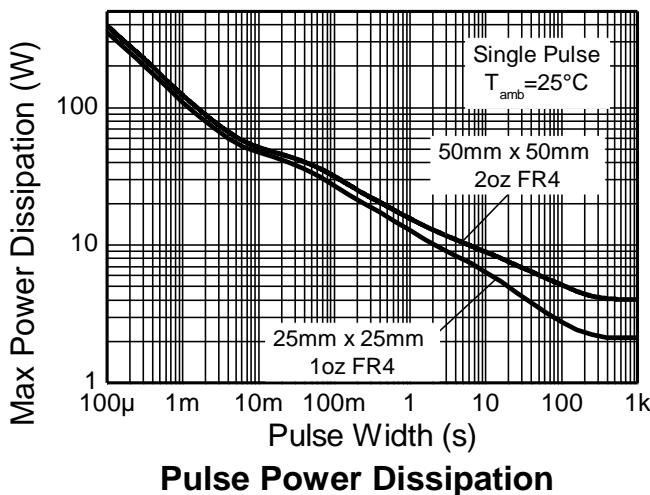
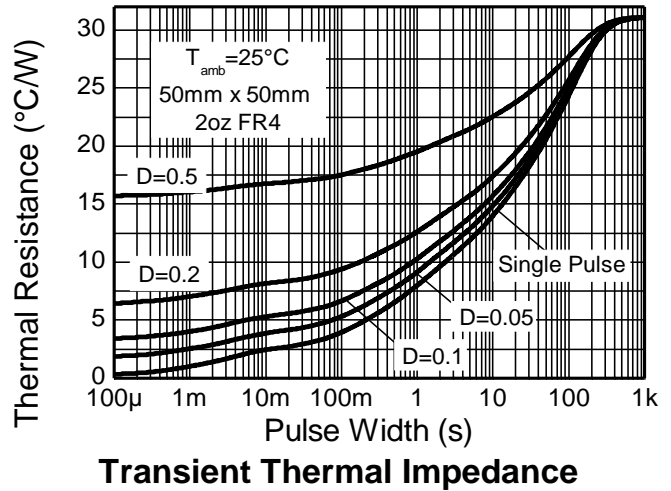
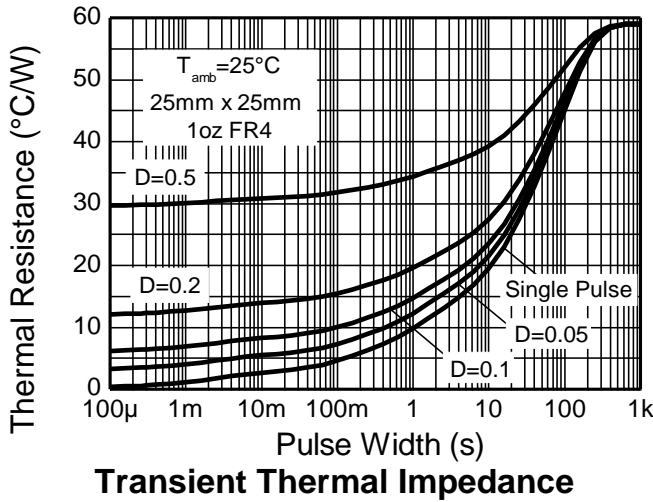
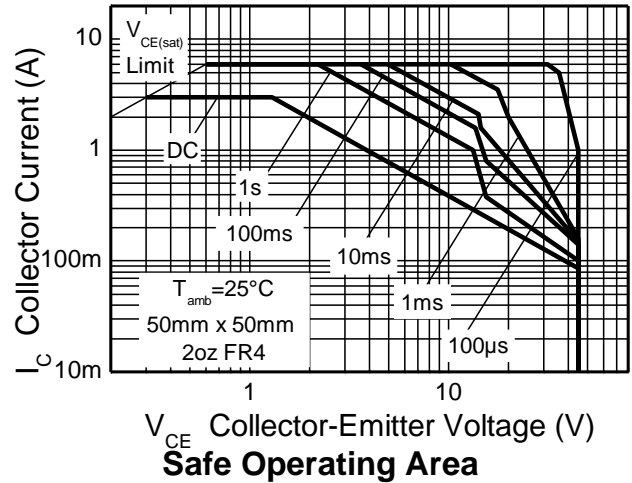
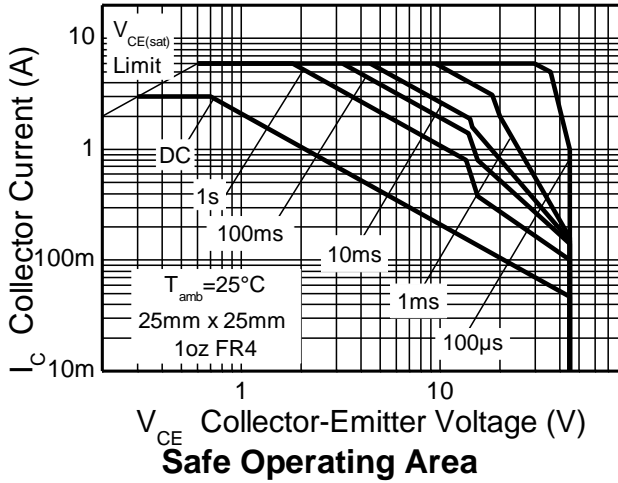
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	(Note 6)	4.0
		(Note 7)	3.4
		(Note 8)	2.1
		(Note 9)	1.6
Thermal Resistance, Junction to Ambient Air	R <sub>θJA</sub>	(Note 6)	32
		(Note 7)	36
		(Note 8)	59
		(Note 9)	80
Thermal Resistance, Junction to Leads	R <sub>θJL</sub>	3	°C/W
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	14.6	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**ESD Ratings** (Note 12)

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. Same as Note (6), except mounted on 25mm x 25mm 2oz copper.
  8. Same as Note (6), except mounted on 25mm x 25mm 1oz copper.
  9. Same as Note (6), except mounted on minimum recommended pad (MRP) layout.
  10. Thermal resistance from junction to solder-point (on the exposed collector pad).
  11. Thermal resistance from junction to the top of the case.
  12. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

**Thermal Characteristics and Derating Information**

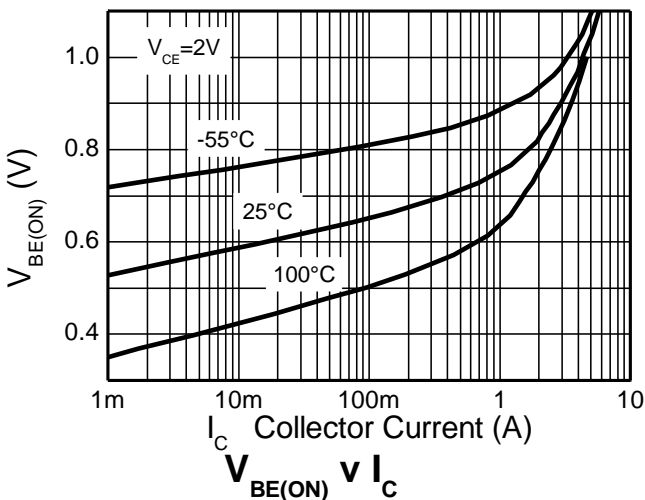
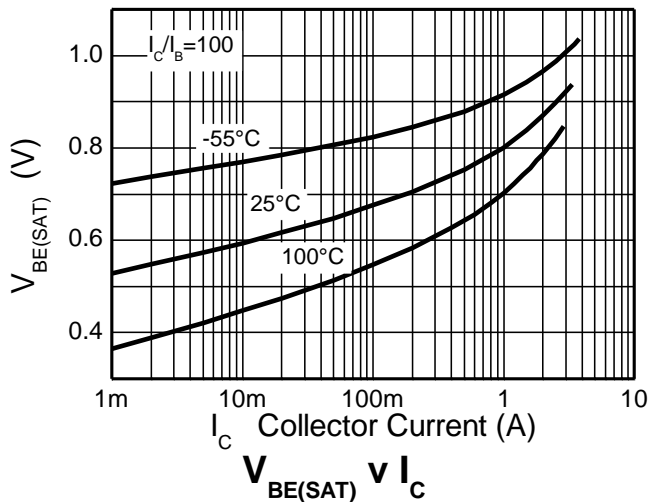
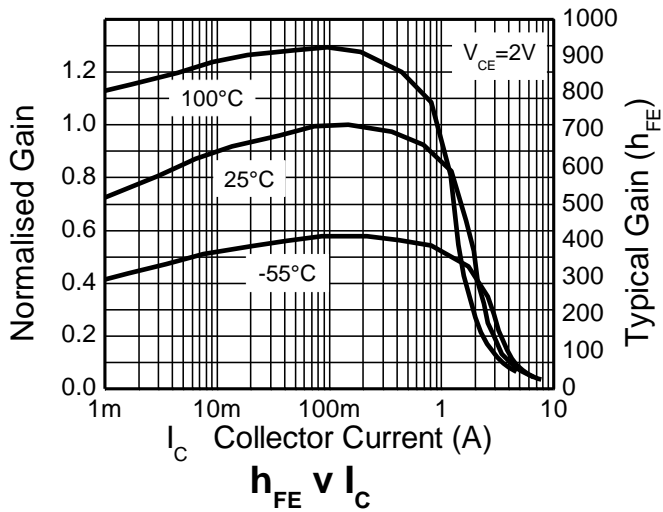
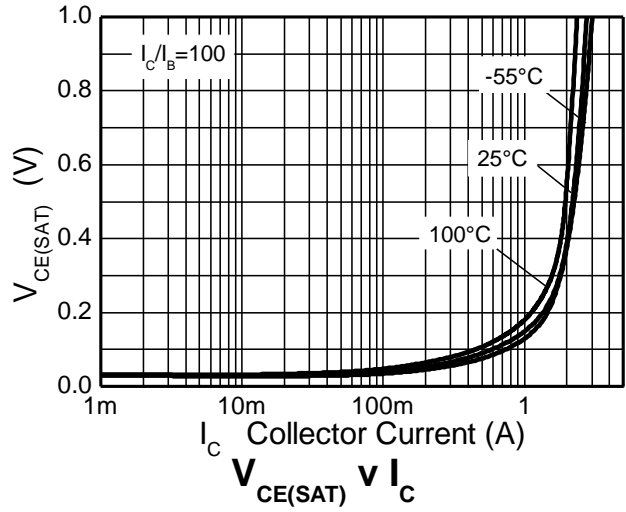
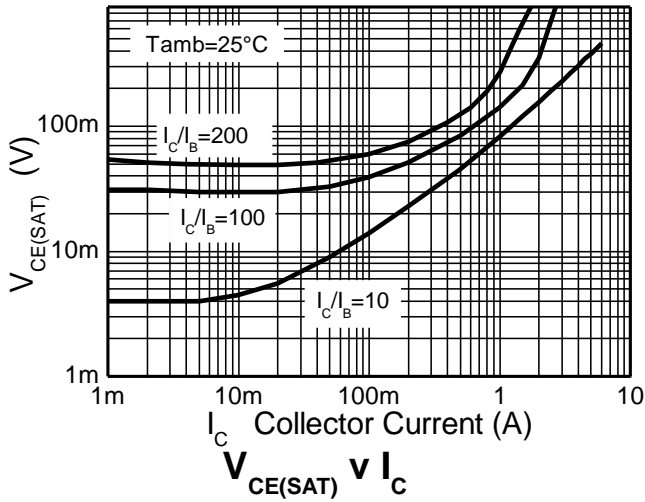


**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$BV_{CBO}$	60	145	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 13)	$BV_{CEO}$	45	65	—	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	7	8.2	—	V	$I_E = 100\mu\text{A}$
Collector Cutoff Current	$I_{CBO}$	—	<1	20	nA	$V_{CB} = 35\text{V}$
Collector Cutoff Current	$I_{CES}$	—	<1	20	nA	$V_{CE} = 35\text{V}$
Emitter Cutoff Current	$I_{EBO}$	—	<1	20	nA	$V_{EB} = 5.6\text{V}$
Collector-Emitter Saturation Voltage (Note 13)	$V_{CE(SAT)}$	—	50	85	mV	$I_C = 0.1\text{A}, I_B = 0.5\text{mA}$
			240	360		$I_C = 1\text{A}, I_B = 5\text{mA}$
			210	320		$I_C = 2\text{A}, I_B = 40\text{mA}$
			230	350		$I_C = 3\text{A}, I_B = 150\text{mA}$
Base-Emitter Saturation Voltage (Note 13)	$V_{BE(SAT)}$	—	1.0	1.2	V	$I_C = 3\text{A}, I_B = 150\text{mA}$
Base-Emitter Turn-On Voltage (Note 13)	$V_{BE(ON)}$	—	0.9	1.1	V	$I_C = 3\text{A}, V_{CE} = 2\text{V}$
DC Current Gain (Note 13)	$h_{FE}$	—	500	700	—	$I_C = 100\text{mA}, V_{CE} = 2\text{V}$
			400	600		$I_C = 1\text{A}, V_{CE} = 2\text{V}$
			150	350		$I_C = 2\text{A}, V_{CE} = 2\text{V}$
			60	120		$I_C = 3\text{A}, V_{CE} = 2\text{V}$
Current Gain-Bandwidth Product	$f_T$	150	—	—	MHz	$I_C = 50\text{mA}, V_{CE} = 5\text{V}, f = 50\text{MHz}$
Output Capacitance	$C_{OBO}$	—	16	—	pF	$V_{CB} = 10\text{V}, f = 1\text{MHz}$
Turn-On Time	$t_{ON}$	—	33	—	ns	$I_C = 500\text{mA}, V_{CC} = 10\text{V}$ ,
Turn-Off Time	$t_{OFF}$	—	1,300	—	ns	$I_{B1} = -I_{B2} = 50\text{mA}$

Note: 13. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

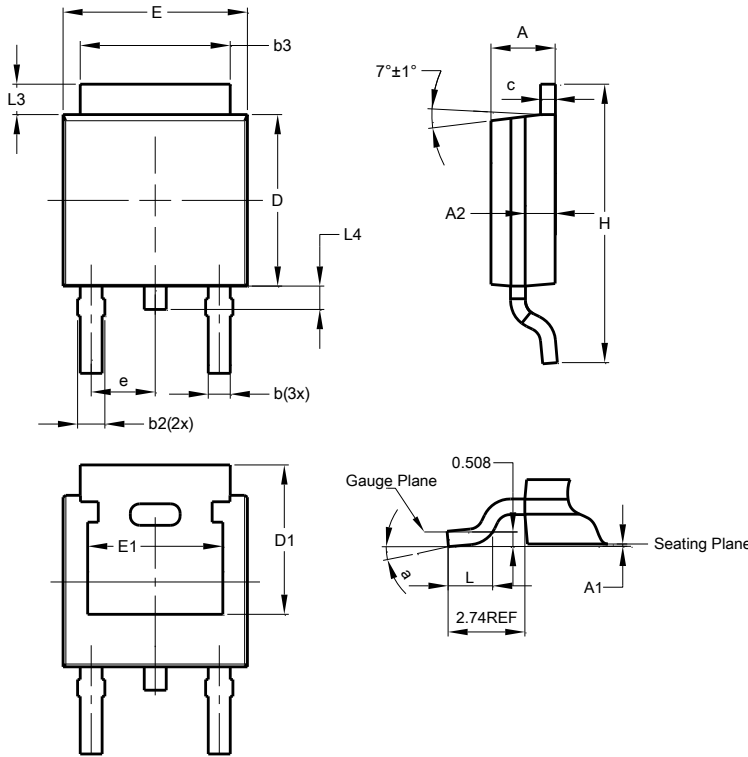
**Typical Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)



**Package Outline Dimensions**

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

**TO252 (DPAK)**

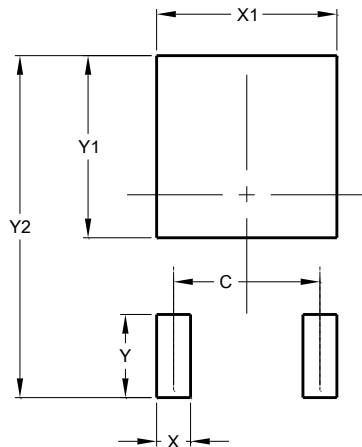


TO252 (DPAK)			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	-	-
e	-	-	2.286
E	6.45	6.70	6.58
E1	4.32	-	-
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°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

**Suggested Pad Layout**

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

**TO252 (DPAK)**



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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