

**45V NPN MEDIUM POWER HIGH GAIN TRANSISTOR**

**Product Summary**

$BV_{CEO}$	45V
$R_{SAT}$	77mΩ
$I_C$	3A

**Description and Applications**

Packaged in the TO252-3L/DPAK outline this high gain 45V NPN transistor offers low on state losses making it ideal for use in DC-DC circuits and various driving and power management functions.

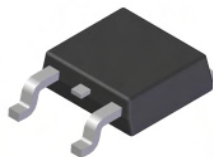
- DC - DC Converters
- MOSFET gate drivers
- Charging circuits
- Power switches
- Siren drivers

**Features and Benefits**

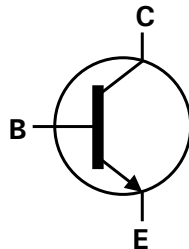
- 3 Amps continuous current
- Up to 6 Amps peak current
- Low saturation voltages
- High gain
- Lead, Halogen, and Antimony Free, RoHS Compliant (Note 1)
- "Green" Device (Note 2)

**Mechanical Data**

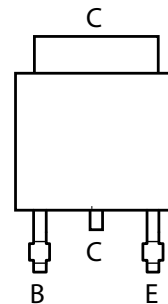
- Case: TO252-3L/DPAK



Top View



Equivalent Circuit



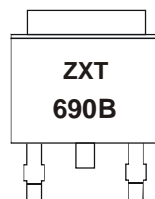
Package Pin Configuration

**Ordering Information**

Product	Marking	Reel size	Tape width	Quantity per reel
ZXT690BKTC	ZXT690B	13 in.	16mm embossed	2500 units

- Notes:
1. No purposefully added lead. Halogen and Antimony Free.
  2. Diodes Inc.'s "Green" Policy can be found on our website at <http://www.diodes.com>

**Marking Information**



ZXT690B = Product Type Marking Code

## Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

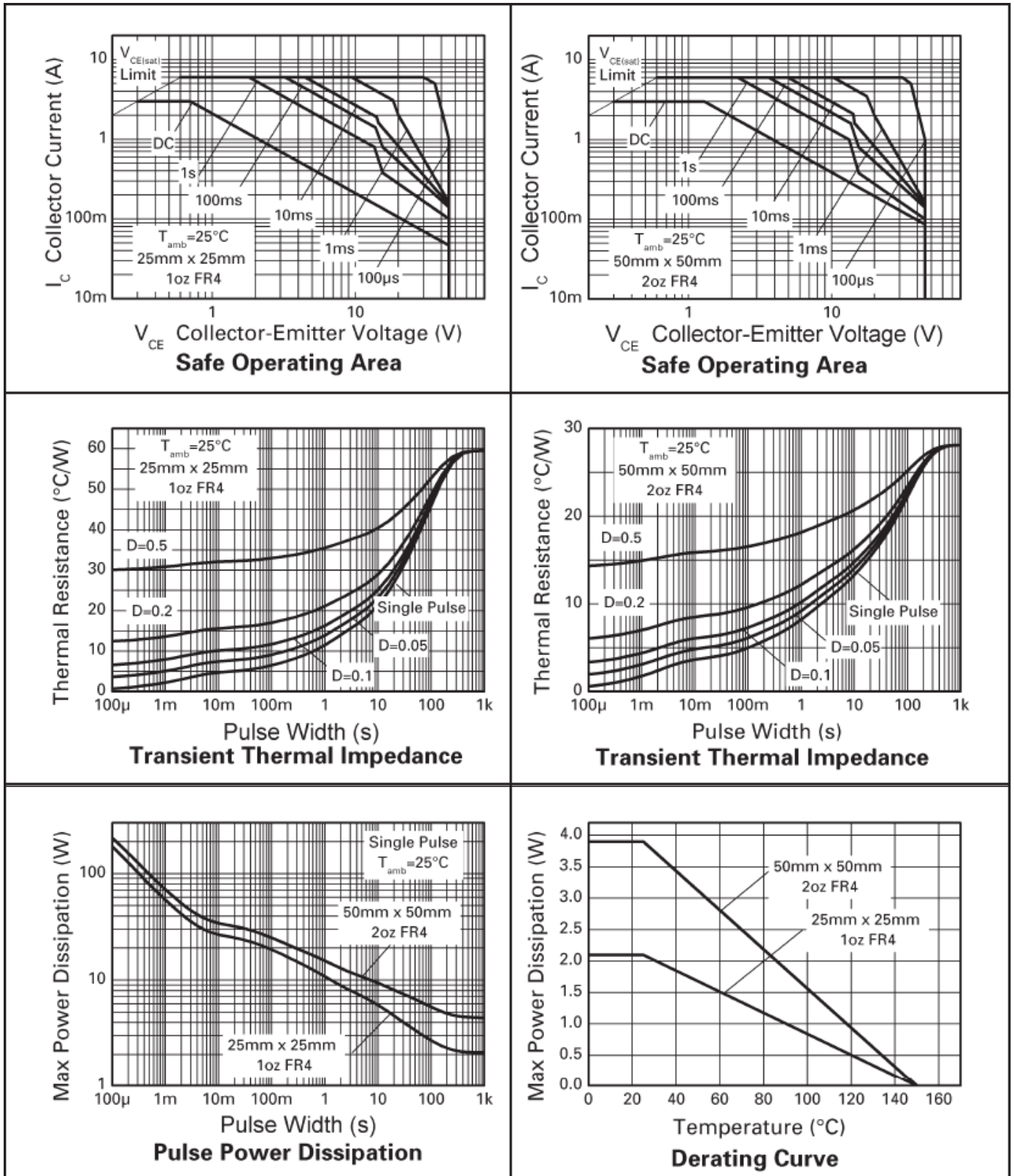
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$BV_{CBO}$	60	V
Collector-Emitter Voltage	$BV_{CEO}$	45	V
Emitter-Base Voltage	$BV_{EBO}$	5	V
Continuous Collector Current	$I_C$	3	A
Peak Pulse Current	$I_{CM}$	6	A
Base Current	$I_B$	0.5	A

## Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 3) @ $T_A = 25^\circ\text{C}$ Linear Derating Factor	$P_D$	2.1 16.85	W mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 1)	$R_{\theta JA}$	59	$^\circ\text{C}/\text{W}$
Power Dissipation (Note 4) @ $T_A = 25^\circ\text{C}$ Linear Derating Factor	$P_D$	3.0 24.4	W mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 2)	$R_{\theta JA}$	41	$^\circ\text{C}/\text{W}$
Power Dissipation (Note 5) @ $T_A = 25^\circ\text{C}$ Linear Derating Factor	$P_D$	3.9 30.9	W mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 3)	$R_{\theta JA}$	32	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

- Notes:
3. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
  4. For a device surface mounted on 50mm x 50mm FR4 PCB with high coverage of single sided 1oz copper in still air conditions.
  5. For a device surface mounted on 50mm x 50mm FR4 PCB with high coverage of single sided 2oz copper in still air conditions.

**Typical Characteristics**

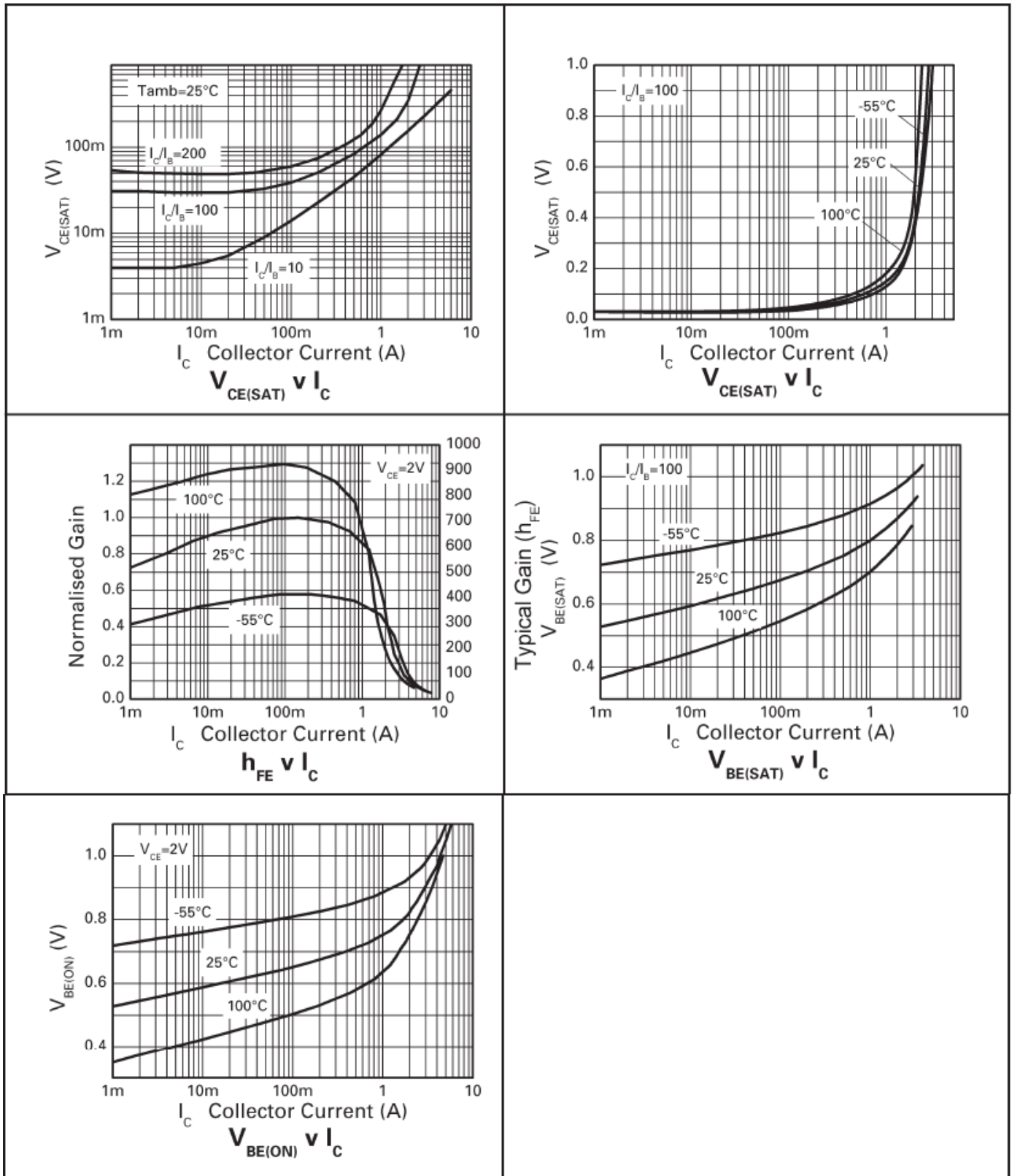


**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

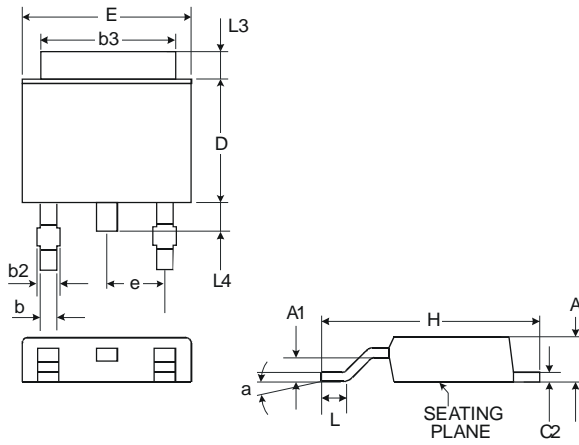
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	60	145	—	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 6)	BV <sub>CEO</sub>	45	65	—	V	I <sub>C</sub> = 10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	5	8.2	—	V	I <sub>E</sub> = 100μA
Collector Cutoff Current	I <sub>CBO</sub>	—	<1	20	nA	V <sub>CB</sub> = 35V
Collector Cutoff Current	I <sub>CES</sub>	—	<1	20	nA	V <sub>CB</sub> = 35V
Emitter Cutoff Current	I <sub>EBO</sub>	—	<1	20	nA	V <sub>EB</sub> = 4V
Collector-Emitter Saturation Voltage (Note 6)	V <sub>CE(sat)</sub>	—	50	85	mV	I <sub>C</sub> = 0.1A, I <sub>B</sub> = 0.5mA
			240	360		I <sub>C</sub> = 1A, I <sub>B</sub> = 5mA
			210	320		I <sub>C</sub> = 2A, I <sub>B</sub> = 40mA
			230	350		I <sub>C</sub> = 3A, I <sub>B</sub> = 150mA
Base-Emitter Saturation Voltage (Note 6)	V <sub>BE(sat)</sub>	—	1.0	1.2	mV	I <sub>C</sub> = 3A, I <sub>B</sub> = 150mA
Base-Emitter Turn-On Voltage (Note 6)	V <sub>BE(on)</sub>	—	0.9	1.1	mV	I <sub>C</sub> = 3A, V <sub>CE</sub> = 2V
DC Current Gain (Note 6)	h <sub>FE</sub>	—	500	—	—	I <sub>C</sub> = 100mA, V <sub>CE</sub> = 2V
			400			I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V
			150			I <sub>C</sub> = 2A, V <sub>CE</sub> = 2V
			60			I <sub>C</sub> = 3A, V <sub>CE</sub> = 2V
Current Gain-Bandwidth Product	f <sub>T</sub>	—	—	—	MHz	I <sub>C</sub> = 50mA, V <sub>CE</sub> = 5V, f = 50MHz
Output Capacitance (Note 6)	C <sub>obo</sub>	—	16	—	pF	V <sub>CB</sub> = 10V, f = 1MHz
Turn-On Time	t <sub>on</sub>	—	33	—	ns	I <sub>C</sub> = 500mA, V <sub>CC</sub> = 10V,
Turn-Off Time	t <sub>off</sub>	—	1300	—	ns	I <sub>B1</sub> = I <sub>B2</sub> = 50mA

Notes: 6. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.

**Typical Characteristics**

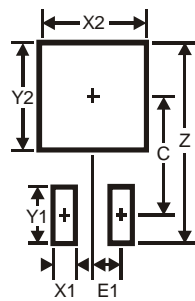


**Package Outline Dimensions**



TO252-3L			
Dim	Min	Typ	Max
A	2.19	2.29	2.39
A1	0.97	1.07	1.17
b	0.64	0.76	0.88
b2	0.76	0.95	1.14
b3	5.21	5.33	5.50
C2	0.45	0.51	0.58
D	6.00	6.10	6.20
E	6.45	6.58	6.70
e	2.286 Typ.		
H	9.40	9.91	10.41
L	1.40	1.59	1.78
L3	0.88	1.08	1.27
L4	0.64	0.83	1.02
a	0°	-	10°
All Dimensions in mm			

**Package Outline Dimensions**



Dimensions	Value (in mm)
Z	11.6
X1	1.5
X2	7.0
Y1	2.5
Y2	7.0
C	6.9
E1	2.3

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