45V NPN MEDIUM POWER HIGH GAIN TRANSISTOR

Product Summary

BV_{CEO}	45V
R_{SAT}	77mΩ
I_C	3A

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)**

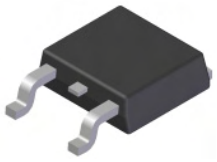
Description and Applications

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.

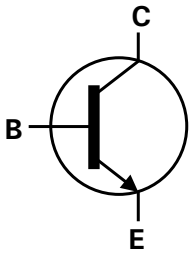
- DC - DC Converters
- MOSFET gate drivers
- Charging circuits
- Power switches
- Siren drivers

Mechanical Data

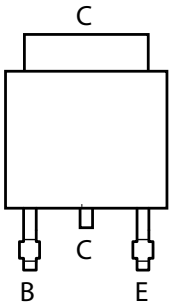
- Case: TO252-3L/DPAK



Top View



Equivalent Circuit



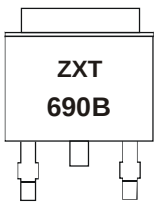
Package Pin Configuration

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

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Maximum Ratings @T_A = 25°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

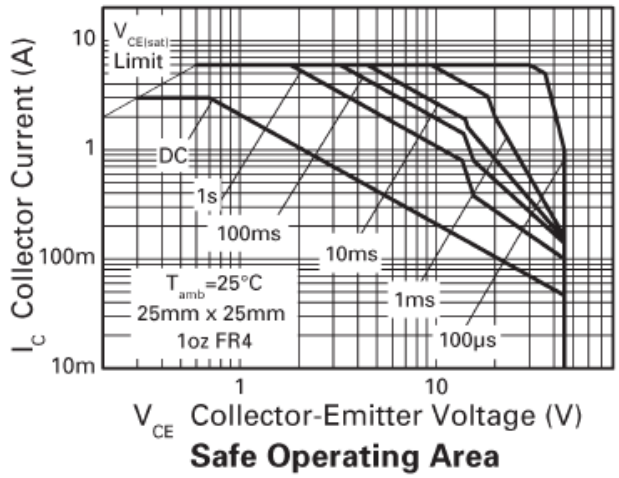
Thermal Characteristics

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

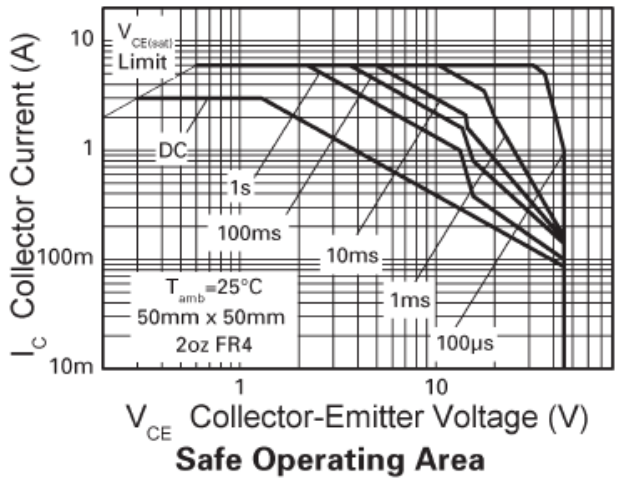
Notes: 3. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
4. For a device surface mounted on 50mm x 50mm FR4 PCB with high coverage of single sided 1oz copper in still air conditions.
5. For a device surface mounted on 50mm x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

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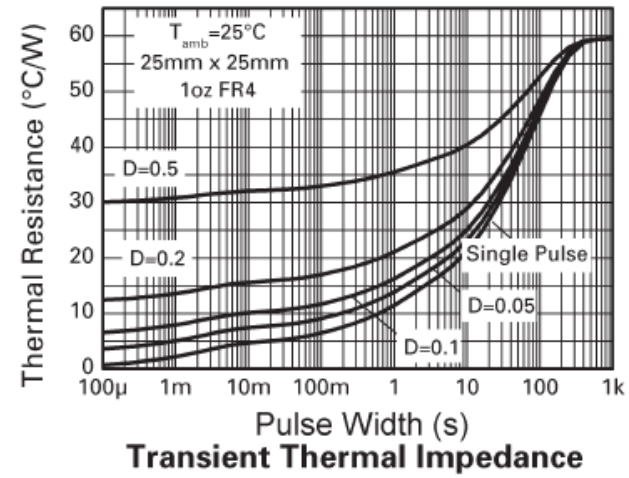
Typical Characteristics



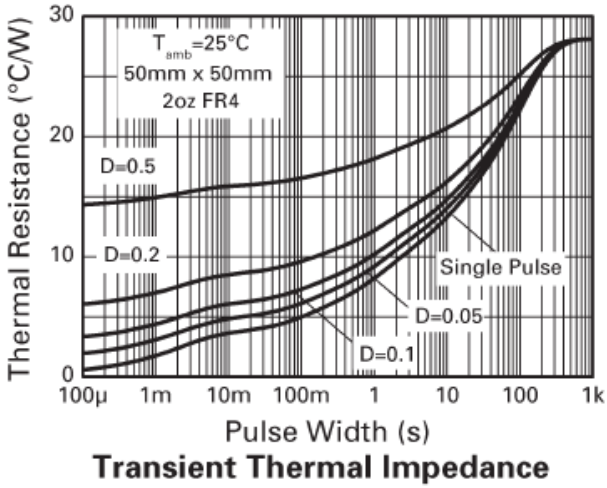
Safe Operating Area



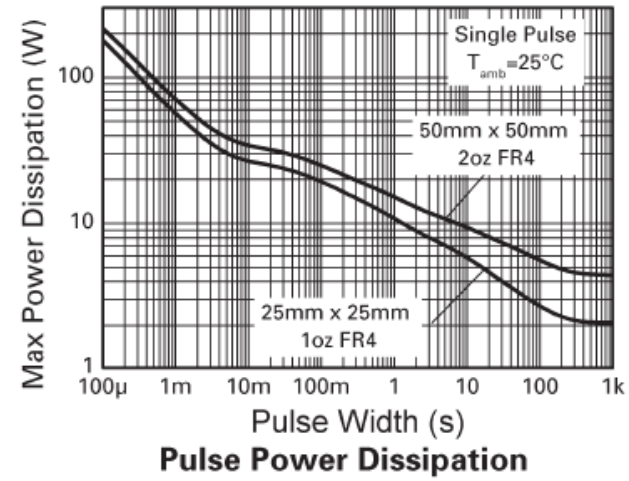
Safe Operating Area



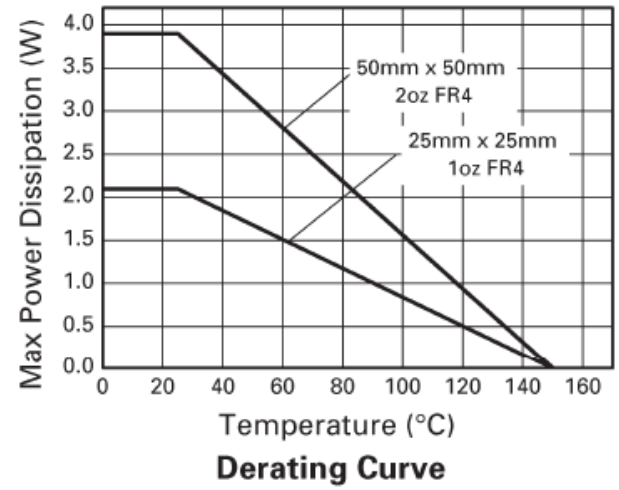
Transient Thermal Impedance



Transient Thermal Impedance



Pulse Power Dissipation



Derating Curve

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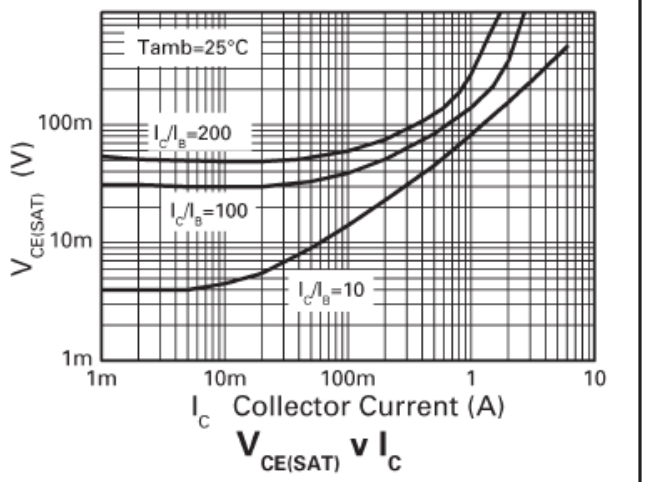
Electrical Characteristics @T_A = 25°C unless otherwise specified

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

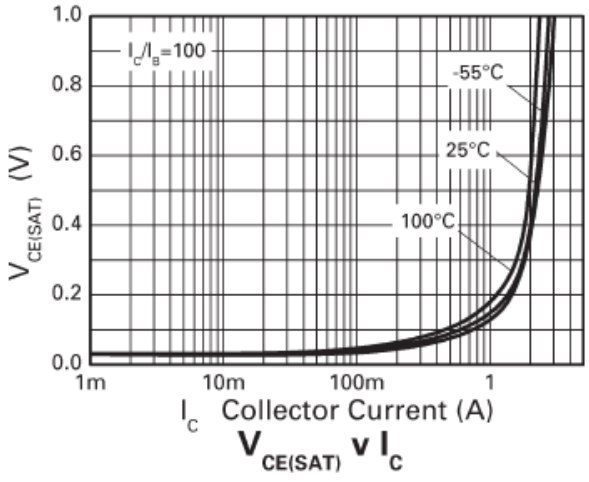
Notes: 6. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.

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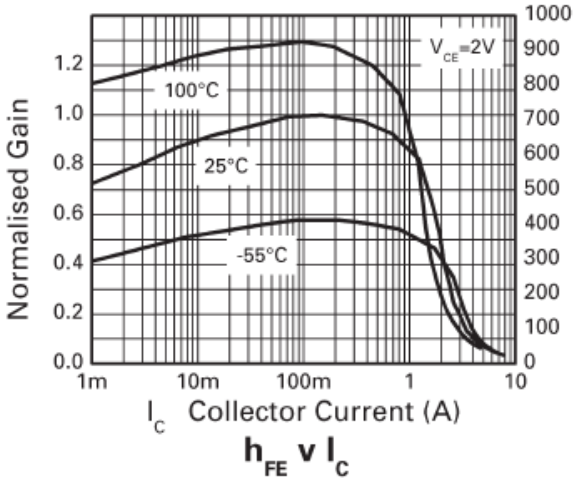
Typical Characteristics



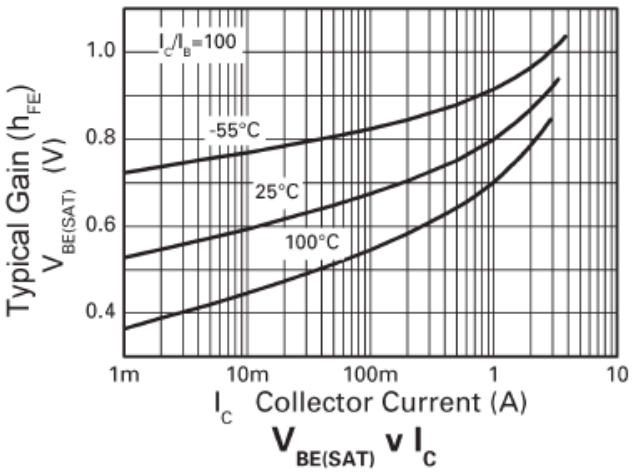
$V_{CE(SAT)}$ v I_C



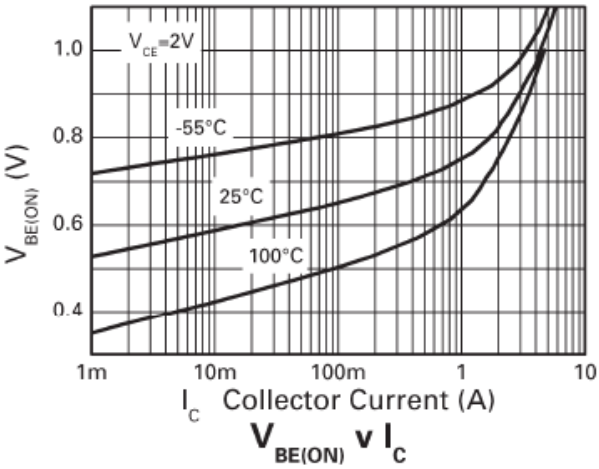
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



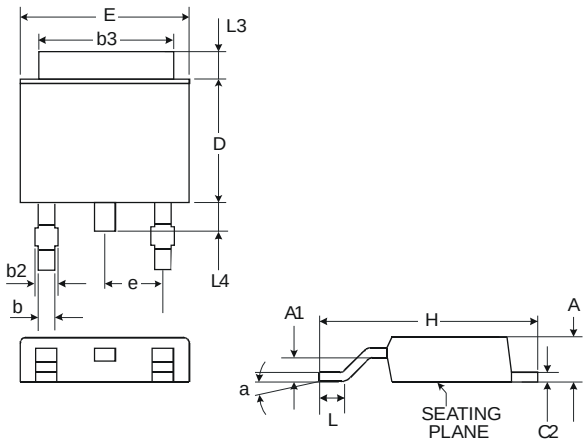
$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

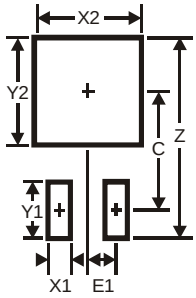
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Package Outline Dimensions



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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