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)**

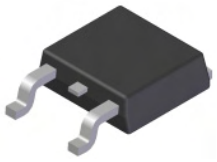
Description and Applications

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.

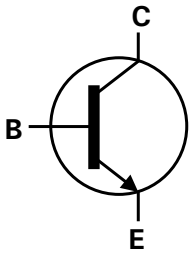
- DC - DC Converters
- MOSFET gate drivers
- Charging circuits
- Power switches
- Siren drivers

Mechanical Data

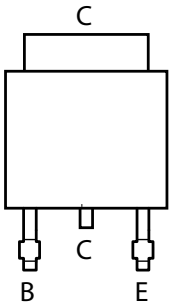
- Case: TO252-3L/DPAK



Top View



Equivalent Circuit



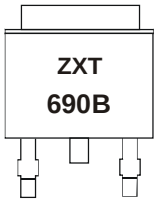
Package Pin Configuration

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

Maximum Ratings @T_A = 25°C unless otherwise specified

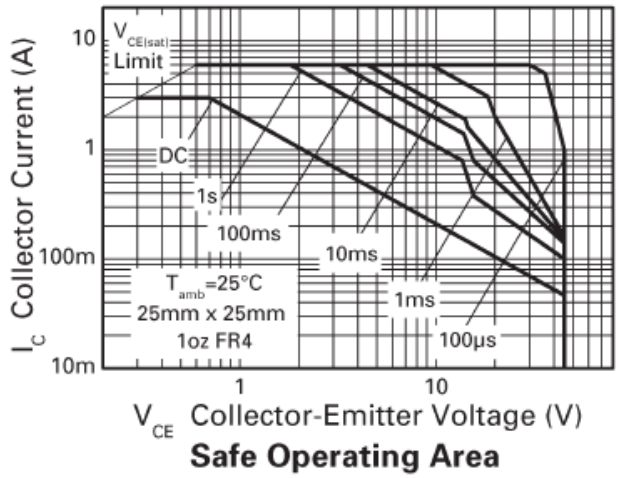
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	BV_{CBO}	60	V
Collector-Emitter Voltage	BV_{CEO}	45	V
Emitter-Base Voltage	BV_{EBO}	5	V
Continuous Collector Current	I_C	3	A
Peak Pulse Current	I_{CM}	6	A
Base Current	I_B	0.5	A

Thermal Characteristics

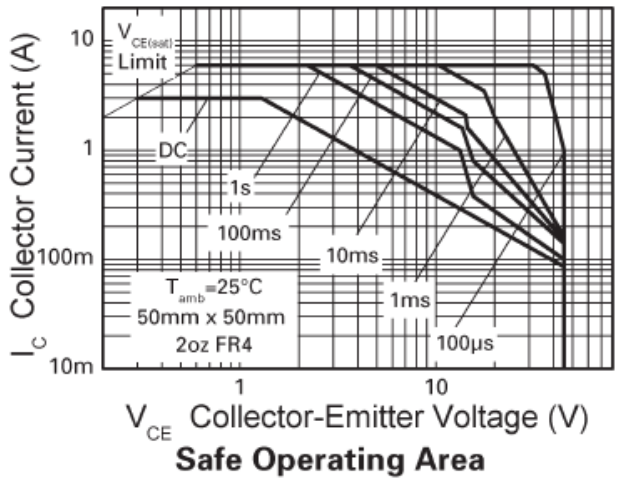
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 3) @ T_A = 25°C Linear Derating Factor	P_D	2.1 16.85	W mW/°C
Thermal Resistance, Junction to Ambient (Note 1)	$R_{\theta JA}$	59	°C/W
Power Dissipation (Note 4) @ T_A = 25°C Linear Derating Factor	P_D	3.0 24.4	W mW/°C
Thermal Resistance, Junction 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.

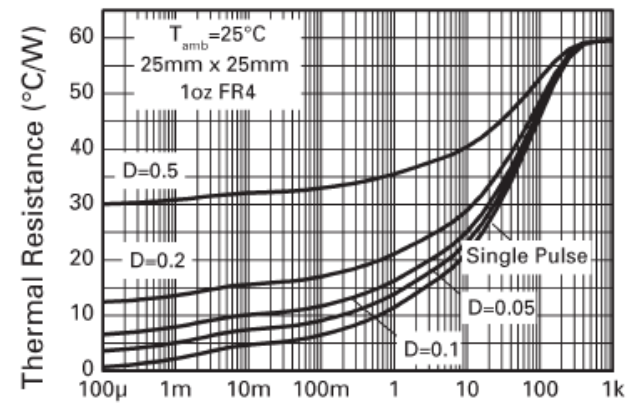
Typical Characteristics



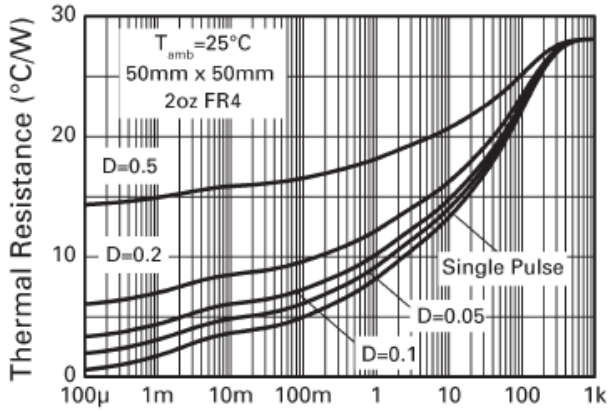
Safe Operating Area



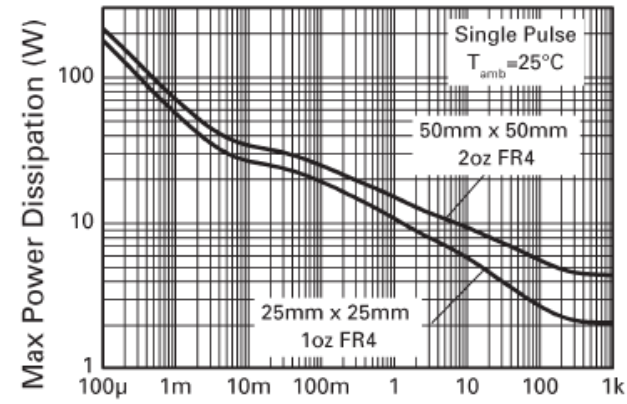
Safe Operating Area



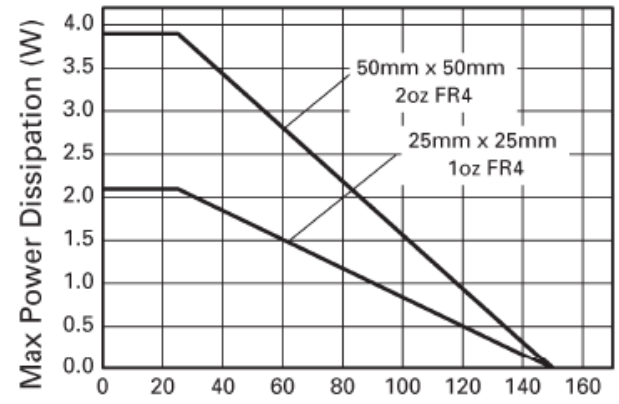
Transient Thermal Impedance



Transient Thermal Impedance



Pulse Power Dissipation



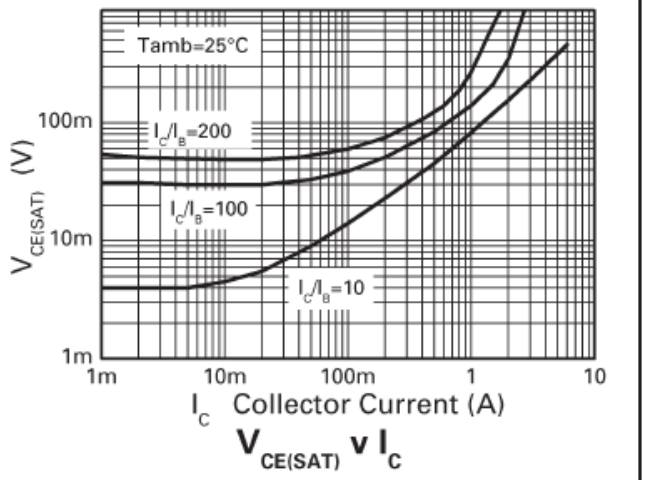
Derating Curve

Electrical Characteristics @T_A = 25°C unless otherwise specified

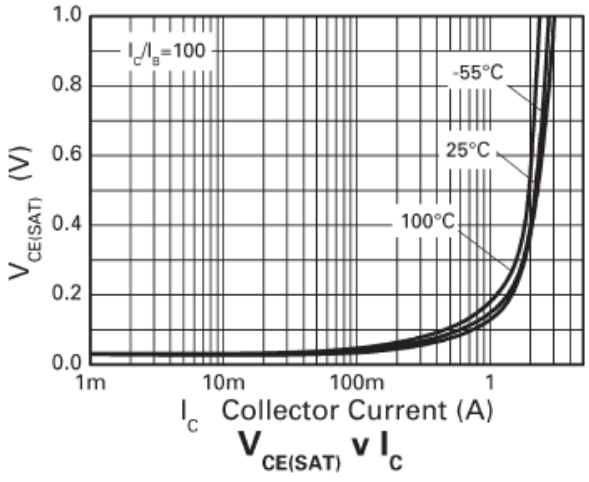
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	60	145	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 6)	BV_{CEO}	45	65	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	5	8.2	—	V	I_E = 100µA
Collector Cutoff Current	I_{CBO}	—	<1	20	nA	V_{CB} = 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%.

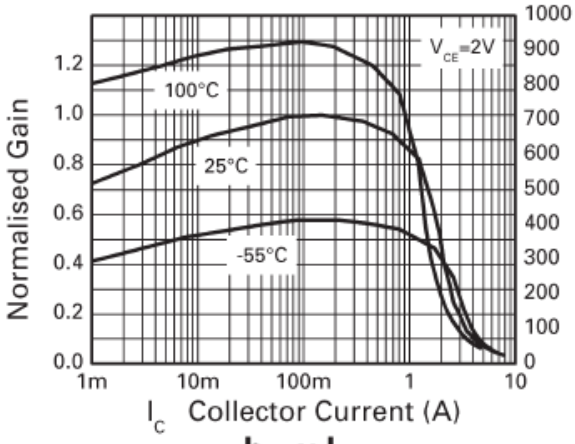
Typical Characteristics



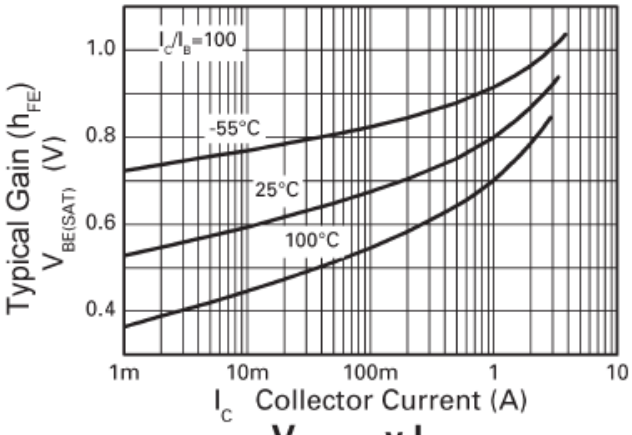
$V_{CE(SAT)}$ v I_C



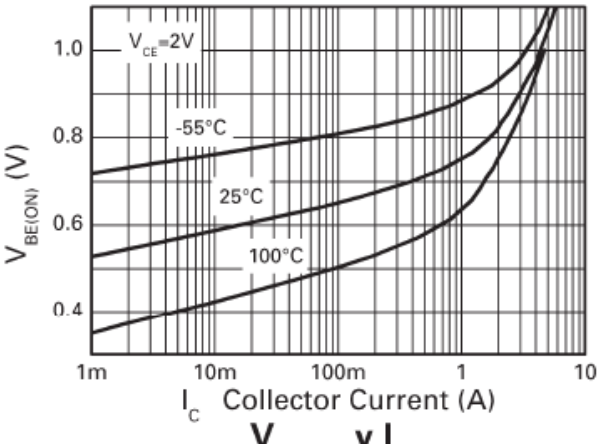
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C

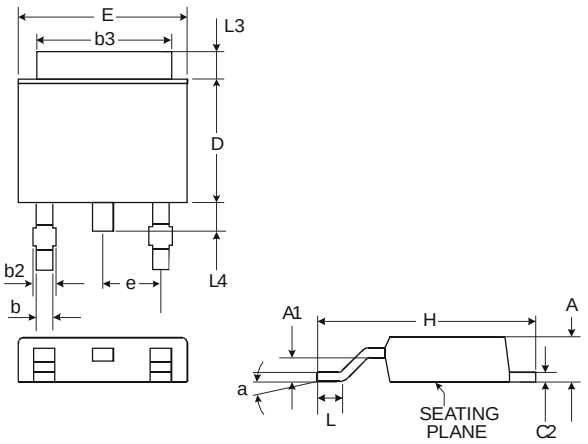


$V_{BE(SAT)}$ v I_C



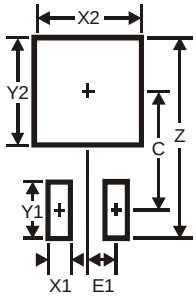
$V_{BE(ON)}$ v I_C

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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