

45V NPN HIGH GAIN TRANSISTOR IN POWERDI®5

Features

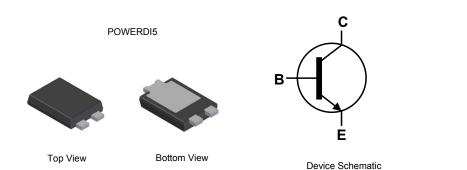
- BV_{CEO} > 45V
- I_C = 3A High Continuous Collector Current
- I_{CM} = 6A Peak Collector Current
- High gain device >400 @1A
- $R_{CE(sat)} = 77m\Omega$ for low equivalent On-Resistance
- h_{FE} specified up to 6A for a high gain hold up
- 43% smaller than SOT223; 60% smaller than TO252
- Maximum height just 1.1mm
- Totally Lead-Free & Fully 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)

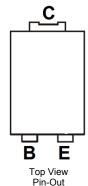
Mechanical Data

- Case: PowerDI5
- 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 annealed over Copper leadframe Solderable per MIL-STD-202, Method 208 ®3
- Weight: 0.093 grams (approximate)

Applications

- LED driver
- Motor driver
- Power Switches
- DC-DC Converters
- IGBT & MOSFET Gate Drivers
- Automotive Circuits





Ordering Information (Notes 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DXT690BP5-13	AEC-Q101	DXT690B	13	16	5,000
DXT690BP5Q-13	Automotive	DXT690B	13	16	5,000

Notes:

- 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- 2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green"
- 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/.
- 5. For packaging details, go to our website at http://www.diodes.com/products/packages.html

Marking Information



DXT690B = Product Type Marking Code

Oli = Manufacturers' Code Marking

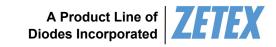
K = Factory Designator

YYWW = Date Code Marking

YY = Last Two Digits of Year (ex: 09 for 2009)

WW = Week code (01 to 53)





Absolute Maximum Ratings (@TA = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	60	V
Collector-Emitter Voltage	V _{CEO}	45	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	Ic	3	Α
Peak Pulse Current	I _{CM}	6	Α
Base Current	I _B	0.5	A

Thermal Characteristics (@TA = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit		
	(Note 6)		3.2		
Power Dissipation	(Note 7)	P_{D}	1.7	W	
	(Note 8)		0.74		
	(Note 6)		39		
Thermal Resistance, Junction to Ambient Air	(Note 7)	$R_{\theta JA}$	75		
	(Note 8)		169	°C/W	
Thermal Resistance, Junction to Leads	(Note 9)	$R_{\theta JL}$	9		
Thermal Resistance, Junction to Case	(Note 10)	$R_{ heta JC}$	10		
Operating and Storage Temperature Range	T_{J}, T_{STG}	-55 to +150	°C		

ESD Ratings (Note 11)

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	С

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 1oz copper.

 8. Same as note (6), except mounted on minimum recommended pad (MRP) layout.

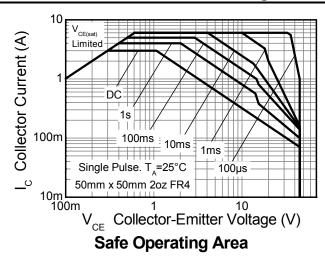
 9. Thermal resistance from junction to solder-point (on the exposed collector pad).

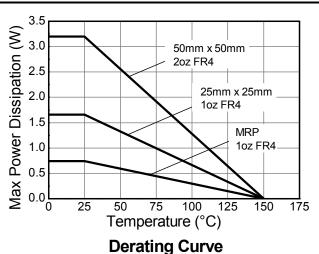
 10. Thermal resistance from junction to the top of the case.

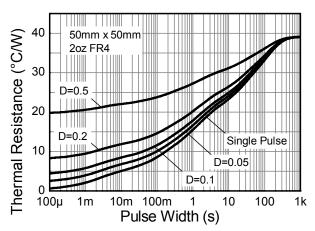
 11. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

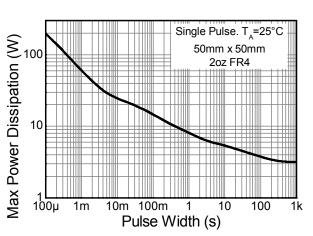


Thermal Characteristics and Derating Information

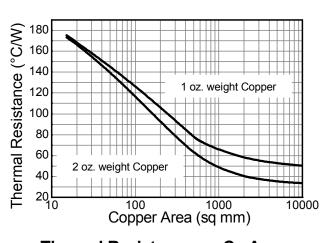




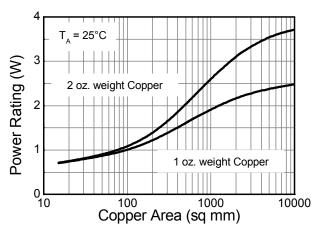




Transient Thermal Impedance



Pulse Power Dissipation



Thermal Resistance vs. Cu Area

Power Rating vs. Cu Area





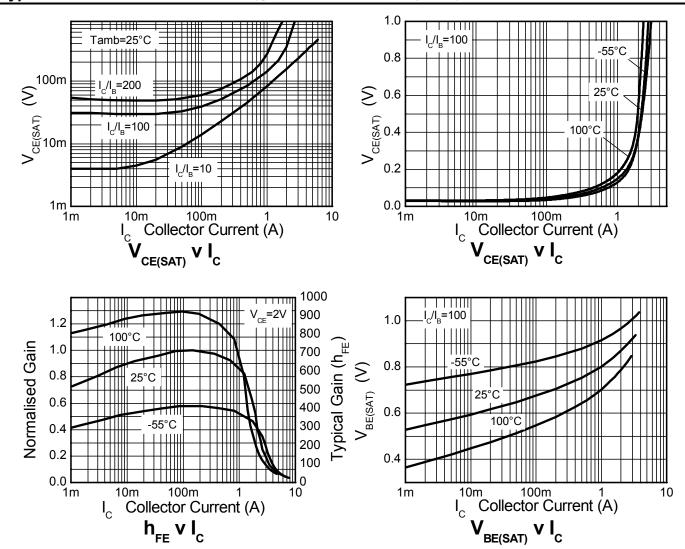
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

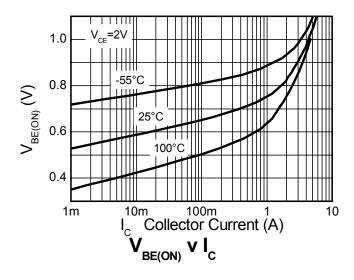
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage		60	145	_	V	$I_C = 100 \mu A, I_E = 0$
Collector-Emitter Breakdown Voltage (Note 12)	BV _{CEO}	45	65	_	V	I _C = 10mA, I _B = 0
Emitter-Base Breakdown Voltage	BV _{EBO}	7	8.2	_	V	I _E = 100μA, I _C = 0
Collector-Base Cutoff Current	I _{CBO}	_	<1	20	nA	V _{CB} = 35V, I _E = 0
Collector-Emitter Cutoff Current	I _{CES}	_	<1	20	nA	V _{CB} = 35V, V _{BE} = 0
Emitter-Base Cutoff Current	I _{EBO}	_	<1	20	nA	V _{EB} = 5.6V, I _C = 0
ON CHARACTERISTICS (Note 12)			•			
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	_ _ _	50 240 210 230	85 360 320 350	mV	I_C = 100mA, I_B = 0.5mA I_C = 1A, I_B = 5mA I_C = 2A, I_B = 40mA I_C = 3A, I_B = 150mA
Base-Emitter Saturation Voltage	V _{BE(SAT)}	-	1.0	1.2	V	I _C = 3A, I _B = 150mA
Base-Emitter Turn-On Voltage	V _{BE(ON)}	_	0.9	1.1	V	I _C = 3A, V _{CE} = 2V
DC Current Gain	h _{FE}	500 400 150 60	700 600 350 120		ı	I _C = 100mA, V _{CE} = 2V I _C = 1A, V _{CE} = 2V I _C = 2A, V _{CE} = 2V I _C = 3A, V _{CE} = 2V
AC CHARACTERISTICS						
Transition Frequency	f _T	150	_	-	MHz	I_C = 50mA, V_{CE} = 5V, f = 50MHz
Output Capacitance	C _{obo}	1	16	-	pF	V _{CB} = 10V, f = 1MHz
Switching Times	t _{on} t _{off}	_	33 1300	_	ns ns	V _{CC} = 10V, I _C = 500mA, I _{B1} = -I _{B2} = 50mA

Note: 12. Pulse Test: Pulse width \leq 300 μ s. Duty cycle \leq 2.0%.



Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

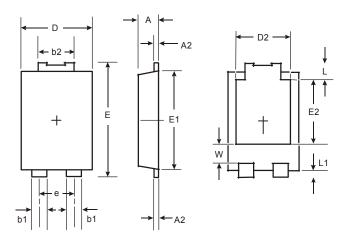






Package Outline Dimensions

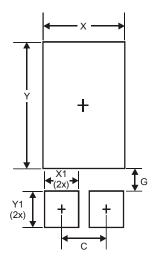
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



POWERDI5					
Dim	Min	Max			
Α	1.05	1.15			
A2	0.33	0.43			
b1	0.80	0.99			
b2	1.70	1.88			
D	3.90	4.05			
D2	3.054 Typ				
Е	6.40	6.60			
е	1.84 Typ				
E1	5.30 5.45				
E2	3.549 Typ				
L	0.75	0.95			
L1	0.50	0.65			
W	1.10	1.41			
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)			
С	1.840			
G	0.852			
X	3.360			
X1	1.390			
Y	4.860			
V1	1 400			





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