

DXT690BP5

45V NPN HIGH GAIN TRANSISTOR
PowerDI[®]5

Features

- 43% smaller than SOT223; 60% smaller than TO252
- Maximum height just 1.1mm
- Rated up to 3.2W
- $V_{CE0} = 45V$
- $I_C = 3A$; $I_{CM} = 6A$
- Low Saturation, high gain transistor,
- **Lead, Halogen, and Antimony Free/RoHS Compliant (Note 1)**
- **“Green” Device (Note 2)**

Applications

- LED driver
- Motor driver

Mechanical Data

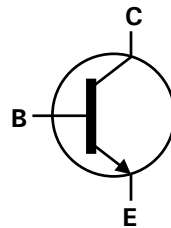
- Case: PowerDI[®]5
- Case Material: Molded Plastic, “Green” Molding Compound.
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin annealed over Copper leadframe.
Solderable per MIL-STD-202, Method 208
- Weight: 0.093 grams (approximate)



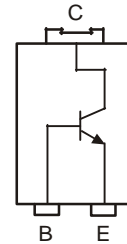
Top View



Bottom View



Device Schematic



Pin Configuration

Ordering Information (Note 3)

Part Number	Case	Packaging
DXT690BP5-13	PowerDI [®] 5	5000/Tape & Reel

- 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>
 3. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

Marking Information



DXT690B = Product Type Marking Code
 = 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)

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

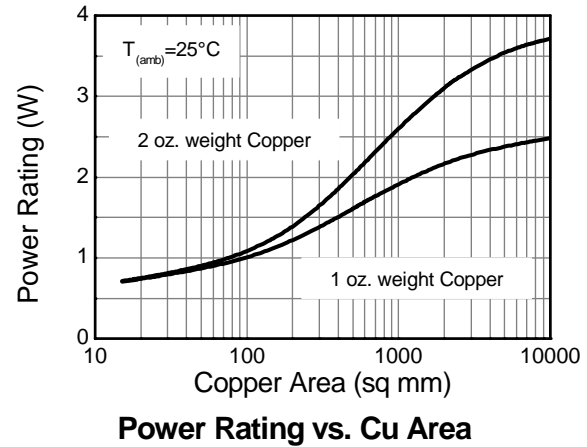
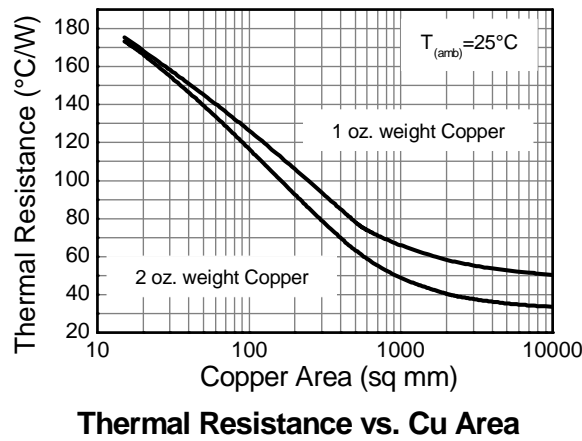
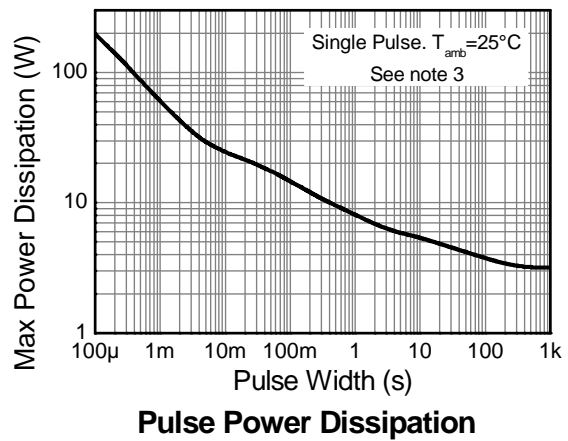
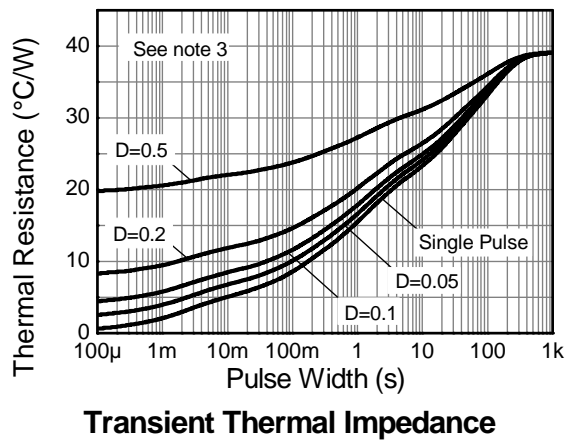
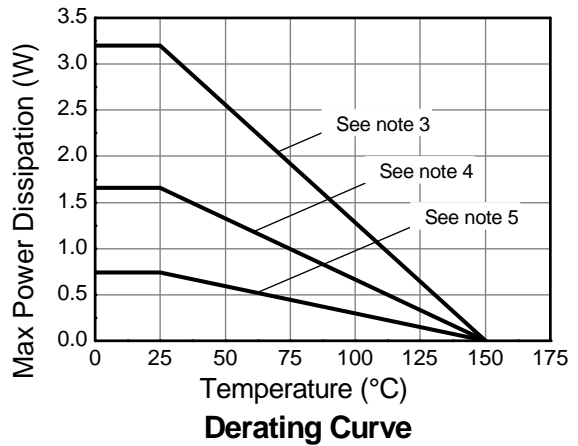
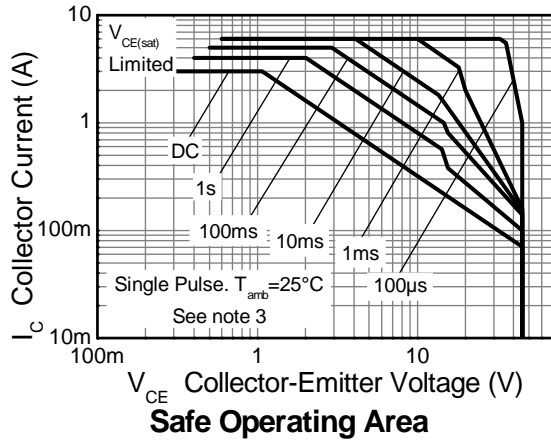
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CB0}	60	V
Collector-Emitter Voltage	V_{CE0}	45	V
Emitter-Base Voltage	V_{EB0}	5	V
Continuous Collector Current	I_C	3	A
Peak Pulse Current	I_{CM}	6	A
Base Current	I_B	0.5	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 4)	P_D	3.2	W
Thermal Resistance, Junction to Ambient Air (Note 4) @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$	39	$^\circ\text{C/W}$
Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 5)	P_D	1.7	W
Thermal Resistance, Junction to Ambient Air (Note 5) @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$	75	$^\circ\text{C/W}$
Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 6)	P_D	0.74	W
Thermal Resistance, Junction to Ambient Air (Note 6) @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$	169	$^\circ\text{C/W}$
Thermal Resistance, Junction to Collector Terminal	$R_{\theta JT}$	8.9	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

- Notes:
4. Device mounted on 1.6mm FR-4 PCB, single sided 2 oz. copper, collector pad dimensions 50mm x 50mm.
 5. Device mounted on 1.6mm FR-4 PCB, single sided 1 oz. copper, collector pad dimensions 25mm x 25mm.
 6. Device mounted on 1.6mm FR-4 PCB, single sided 1 oz. copper, minimum recommended pad layout.

DXT690BP5

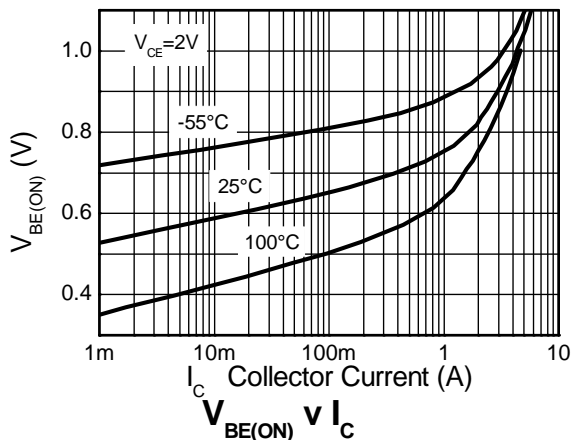
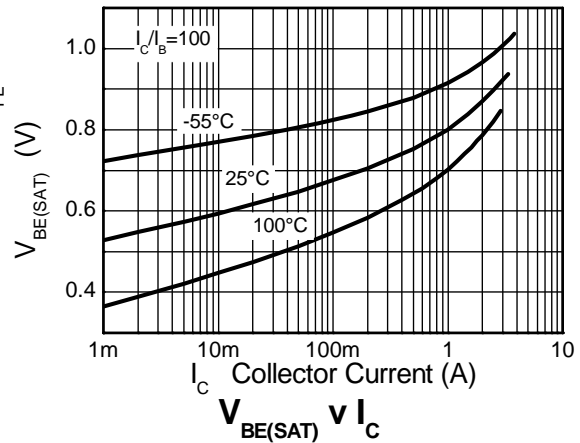
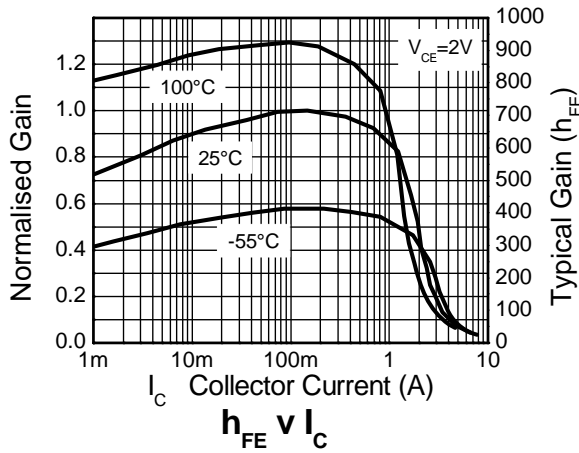
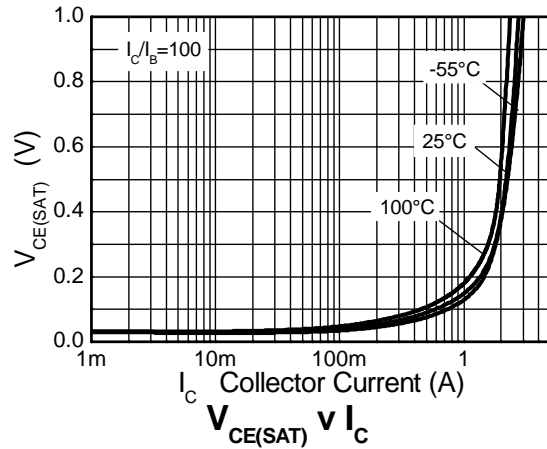
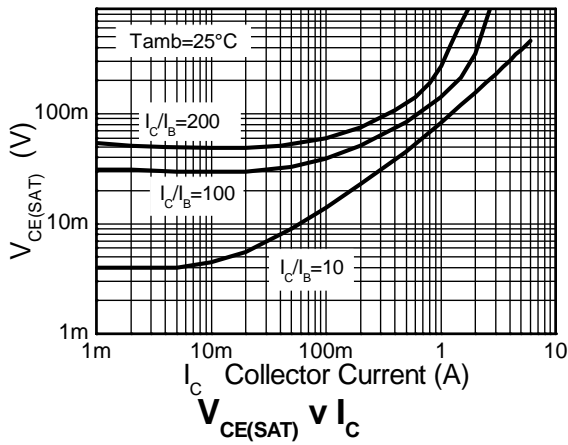


Electrical Characteristics @T_A = 25°C unless otherwise specified

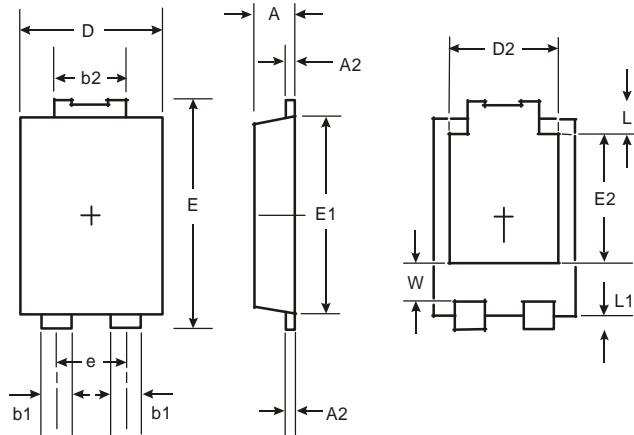
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	V _{(BR)CBO}	60	—	—	V	I _C = 100μA, I _E = 0
Collector-Emitter Breakdown Voltage (Note 7)	V _{(BR)CEO}	45	—	—	V	I _C = 10mA, I _B = 0
Emitter-Base Breakdown Voltage	V _{(BR)EBO}	5	—	—	V	I _E = 100μA, I _C = 0
Collector Cutoff Current	I _{CBO}	—	—	20	nA	V _{CB} = 35V, I _E = 0
Collector Cutoff Current	I _{CES}	—	—	20	nA	V _{CB} = 35V, V _{BE} = 0
Emitter Cutoff Current	I _{EBO}	—	—	20	nA	V _{EB} = 4V, I _C = 0
ON CHARACTERISTICS (Note 7)						
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	—	—	85 360 320 350	mV	I _C = 1A, 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)}	—	—	1.2	V	I _C = 3A, I _B = 150mA
Base-Emitter Turn-On Voltage	V _{BE(ON)}	—	—	1.1	V	V _{CE} = 2V, I _C = 3A
DC Current Gain	h _{FE}	500 400 150 60	— — — —	— — — —	—	V _{CE} = 2V, I _C = 100mA V _{CE} = 2V, I _C = 1A V _{CE} = 2V, I _C = 2A V _{CE} = 2V, I _C = 3A
AC CHARACTERISTICS						
Transition Frequency	f _T	150	—	—	MHz	V _{CE} = 5V, I _C = 50mA, f = 50MHz
Output Capacitance	C _{obo}	—	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

Notes: 7. Pulse Test: Pulse width ≤300μs. Duty cycle ≤2.0%.

Typical Characteristic

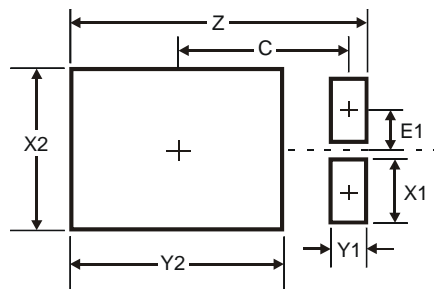


Package Outline Dimensions



PowerDI [®] 5		
Dim	Min	Max
A	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	
E	6.40	6.60
e	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



Dimensions	Value (in mm)
Z	6.6
X1	1.4
X2	3.6
Y1	0.8
Y2	4.7
C	3.87
E1	0.9

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