

**100V NPN LOW SAT MEDIUM POWER TRANSISTOR**  
**PowerDI<sup>®</sup>5**


**Features**

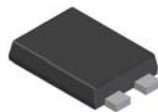
- 43% smaller than SOT223; 60% smaller than TO252
- Maximum height just 1.1mm
- Rated up to 3.2W
- $V_{CE0} = 100V$
- $I_C = 6A$ ;  $I_{CM} = 10A$
- Low Saturation voltage
- **Lead, Halogen, and Antimony Free/RoHS Compliant (Note 1)**
- **“Green” Device (Note 2)**

**Applications**

- Motor Drive
- Regulator circuit

**Mechanical Data**

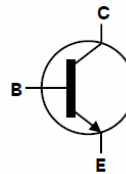
- Case: PowerDI<sup>®</sup>5
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 
- Weight: 0.093 grams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



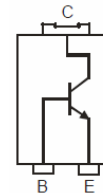
Top View



Bottom View



Device Schematic



Pin-out diagram


**Ordering Information (Note 3)**

Part Number	Case	Packaging
DXT2011P5-13	PowerDI <sup>®</sup> 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**



- DXT2011 = 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)

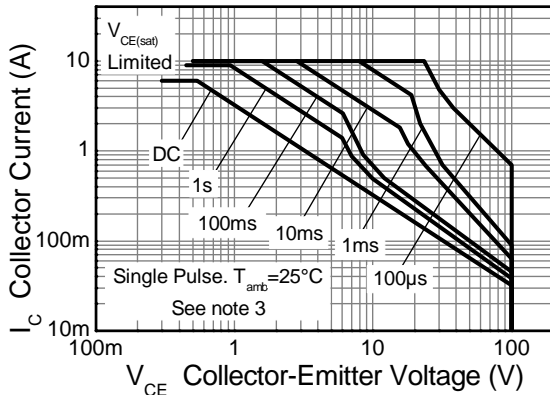
### Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	200	V
Collector-Emitter Voltage	$V_{CEO}$	100	V
Emitter-Base Voltage	$V_{EBO}$	7	V
Continuous Collector Current	$I_C$	6	A
Peak Pulse Current	$I_{CM}$	10	A

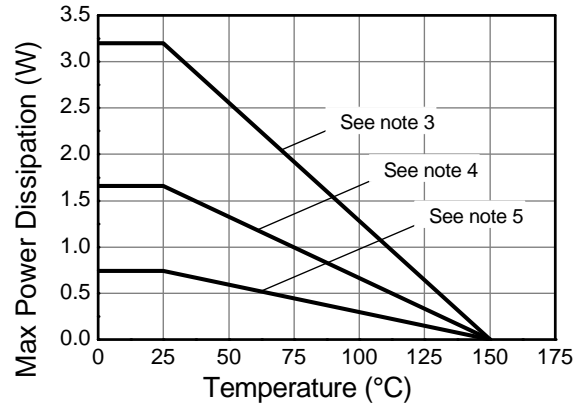
### Thermal Characteristics

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	$R_{\theta JT}$	5.6	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

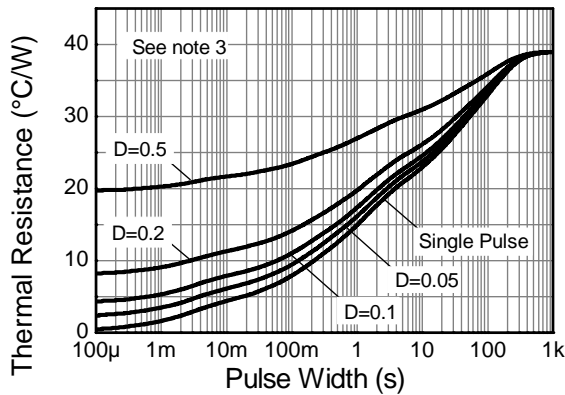
- Notes:
4. Device mounted on FR-4 PCB, single sided 2 oz. copper, collector pad dimensions 50mm x 50mm.
  5. Device mounted on FR-4 PCB, single sided 1 oz. copper, collector pad dimensions 25mm x 25mm.
  6. Device mounted on FR-4 PCB, single sided 1 oz. copper, minimum recommended pad layout.



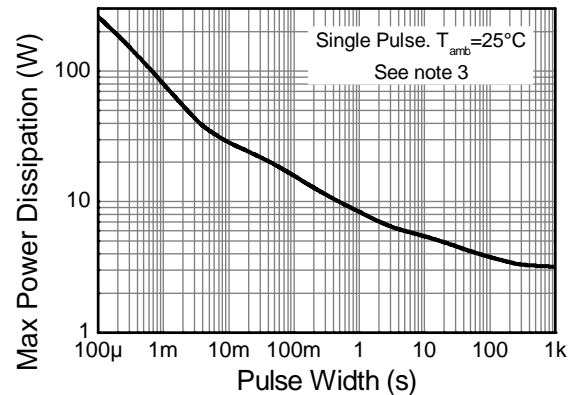
**Safe Operating Area**



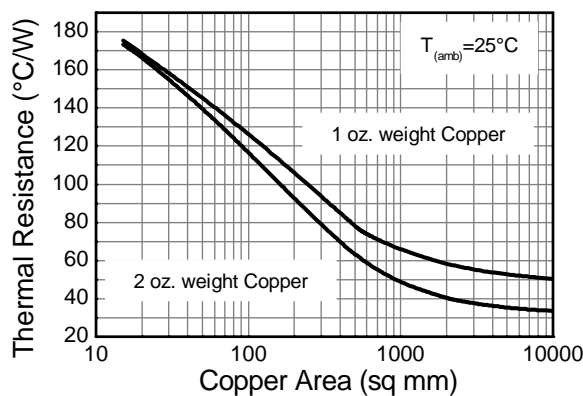
**Derating Curve**



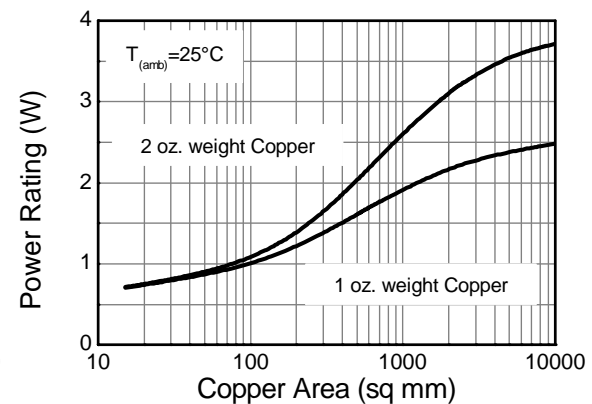
**Transient Thermal Impedance**



**Pulse Power Dissipation**



**Thermal Resistance vs. Cu Area**



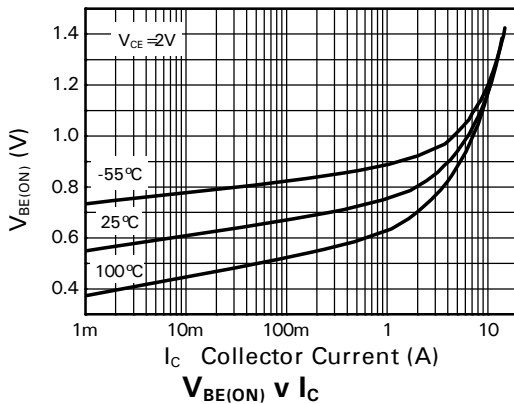
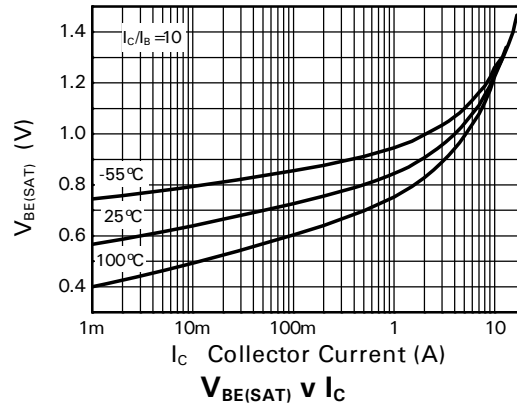
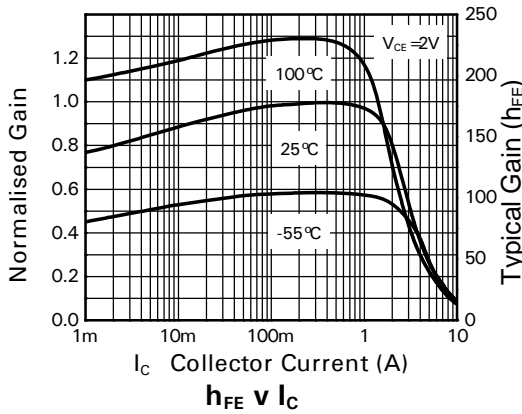
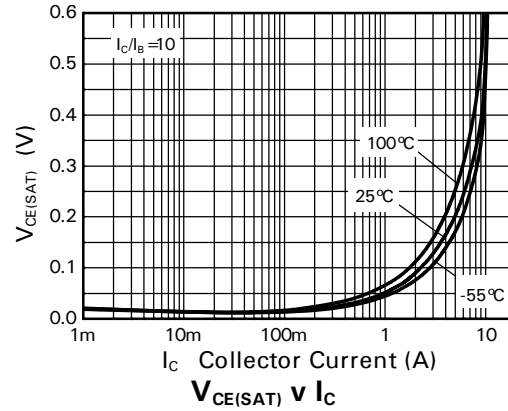
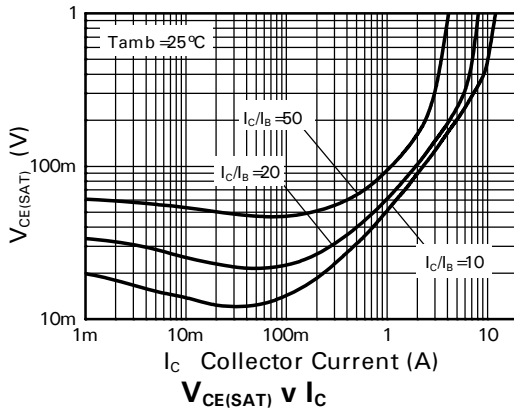
**Power Rating vs. Cu Area**

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

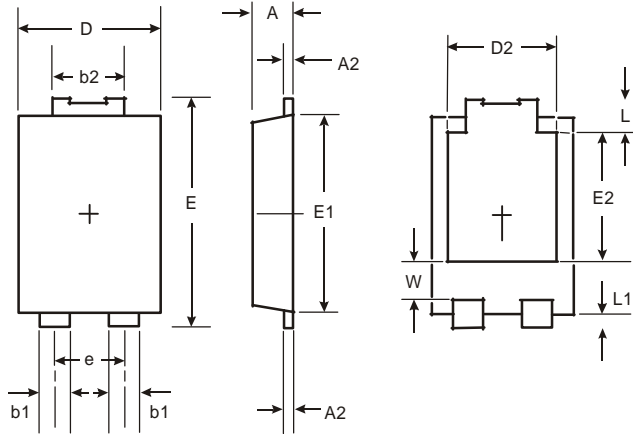
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	200	235	—	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 7)	V <sub>(BR)CEO</sub>	100	115	—	V	I <sub>C</sub> = 10mA
Emitter-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	7	8.1	—	V	I <sub>E</sub> = 100μA
Collector Cutoff Current	I <sub>CBO</sub>	—	—	20	nA	V <sub>CB</sub> = 150V
Collector Cutoff Current	I <sub>CER</sub> R ≤ 1kΩ	—	—	20	nA	V <sub>CB</sub> = 150V
Emitter Cutoff Current	I <sub>EBO</sub>	—	—	10	nA	V <sub>EB</sub> = 6V
Collector-Emitter Saturation Voltage (Note 7)	V <sub>CE(sat)</sub>	—	21	35	mV	I <sub>C</sub> = 0.1A, I <sub>B</sub> = -5mA
		—	50	65		I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA
		—	95	125		I <sub>C</sub> = 2A, I <sub>B</sub> = 100mA
		—	180	220		I <sub>C</sub> = 5A, I <sub>B</sub> = 500mA
Base-Emitter Saturation Voltage (Note 7)	V <sub>BE(sat)</sub>	—	1020	1120	mV	I <sub>C</sub> = 5A, I <sub>B</sub> = 500mA
Base-Emitter Turn-On Voltage (Note 7)	V <sub>BE(on)</sub>	—	920	1000	mV	V <sub>CE</sub> = 2V, I <sub>C</sub> = 5A
DC Current Gain (Note 7)	h <sub>FE</sub>	100	230	—	—	V <sub>CE</sub> = 2V, I <sub>C</sub> = 10mA
		100	200	300		V <sub>CE</sub> = 2V, I <sub>C</sub> = 2A
		30	60	—		V <sub>CE</sub> = 2V, I <sub>C</sub> = 5A
		10	20	—		V <sub>CE</sub> = 2V, I <sub>C</sub> = 10A
Transition Frequency	f <sub>T</sub>	—	130	—	MHz	V <sub>CE</sub> = 10V, I <sub>C</sub> = 100mA, f = 50MHz
Output Capacitance	C <sub>obo</sub>	—	26	—	pF	V <sub>CB</sub> = 10V, f = 1MHz
Switching Times	t <sub>on</sub> t <sub>off</sub>	— —	41 1010	— —	ns	V <sub>CC</sub> = 10V, I <sub>C</sub> = 1A, I <sub>B1</sub> = I <sub>B2</sub> = 100mA

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

**Typical Characteristic**

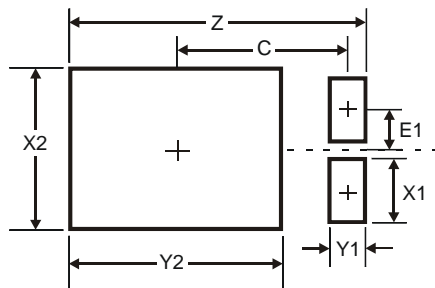


**Package Outline Dimensions**



PowerDI <sup>®</sup> 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
<b>All Dimensions in mm</b>		

**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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