

**100V NPN MEDIUM POWER LOW SATURATION TRANSISTOR  
POWERDI<sup>®</sup>5**

## Features

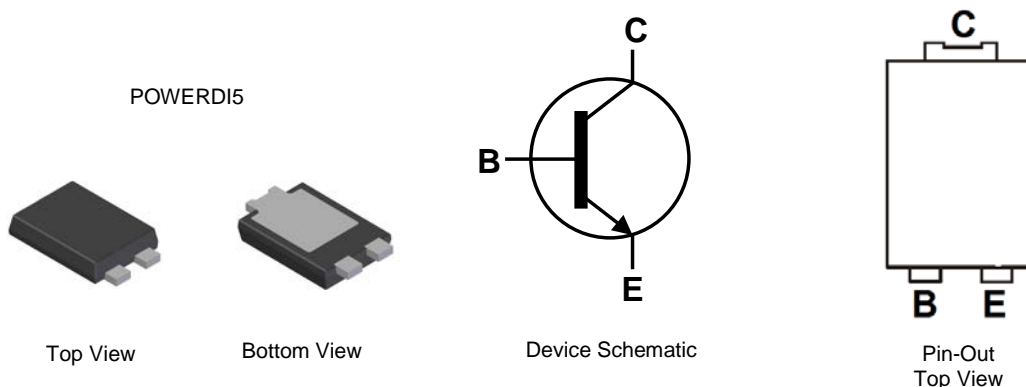
- $BV_{CEO} > 100V$
- $I_C = 6A$  High Continuous Collector Current
- $I_{CM} = 10A$  Peak Collector Current
- $P_D$  up to 3.2W
- 43% smaller than SOT223; 60% smaller than TO252
- Maximum height just 1.1mm
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## 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 Plated Leads. Solderable per  
MIL-STD-202, Method 208 @3
- Weight: 0.093 grams (approximate)

## Applications

- Motor Drive
- Voltage Regulator using Emitter-Follower
- DC-DC Converter
- Telecoms
- Power Management



## Ordering Information (Note 4)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DXT2011P5-13	AEC-Q101	DXT2011	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](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



DXT2011 = Product Type Marking Code  
 311 = 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 (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	200	V
Collector-Emitter Voltage	V <sub>CEO</sub>	100	V
Emitter-Base Voltage	V <sub>EBO</sub>	7	V
Continuous Collector Current	I <sub>C</sub>	6	A
Peak Pulse Current	I <sub>CM</sub>	10	A

## Thermal Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

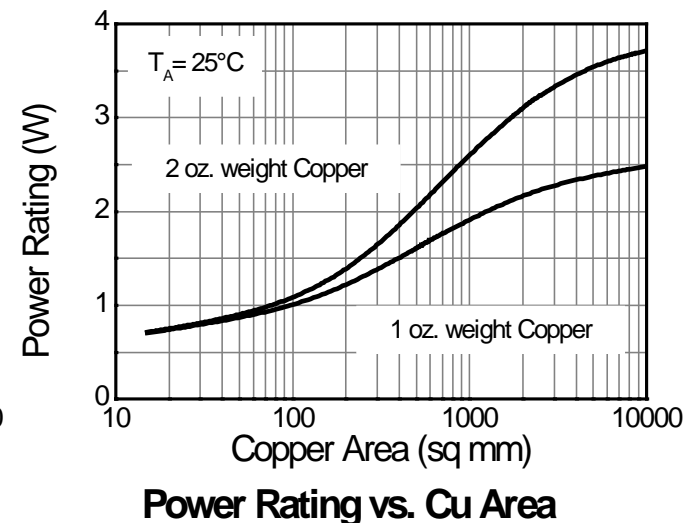
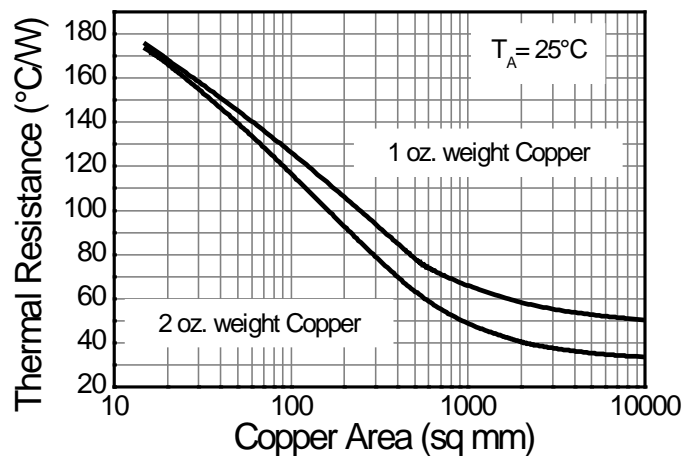
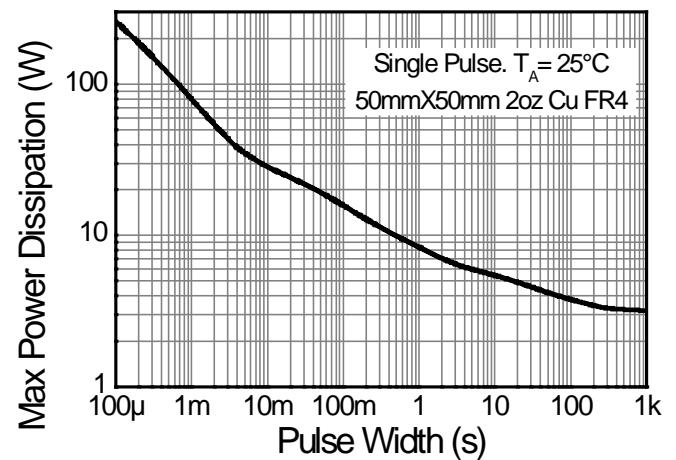
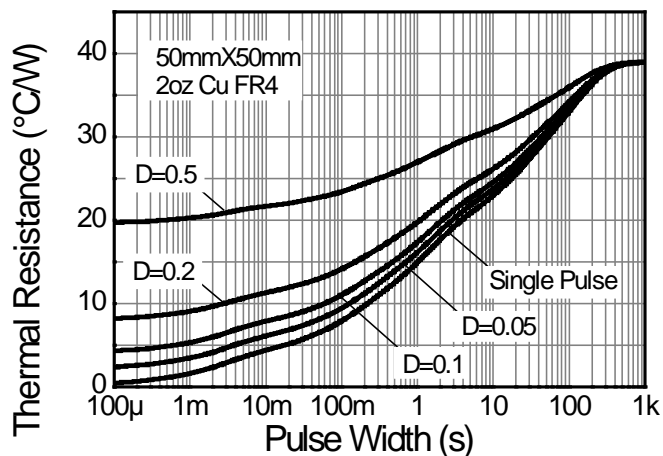
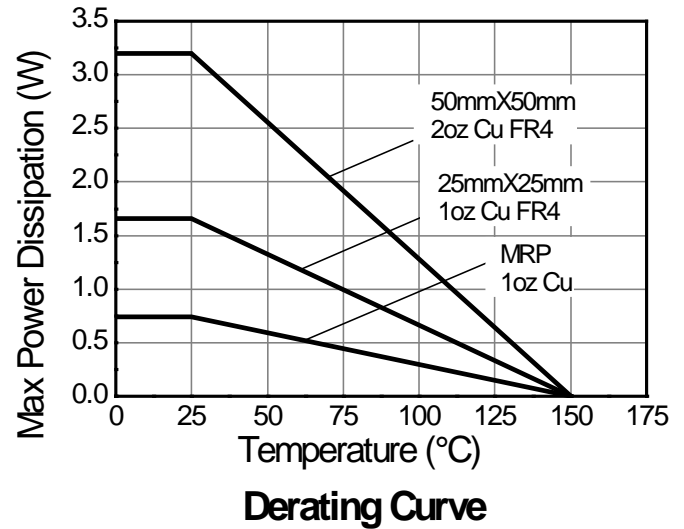
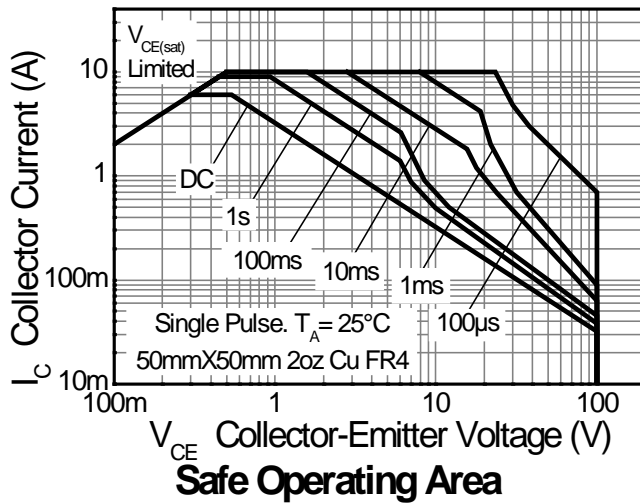
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	3.2	W
		1.7	
		0.74	
Thermal Resistance, Junction to Ambient Air	R <sub>θJA</sub>	39	°C/W
		75	
		169	
Thermal Resistance, Junction to Leads	R <sub>θJL</sub>	5.6	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

## ESD Ratings (Note 9)

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	C

- Notes:
- 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.
  - Same as note (5), except mounted on 25mm x 25mm 1oz copper.
  - Same as note (5), except mounted on minimum recommended pad (MRP) layout.
  - Thermal resistance from junction to solder-point (on the exposed collector pad).
  - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

## Thermal Characteristics and Derating Information

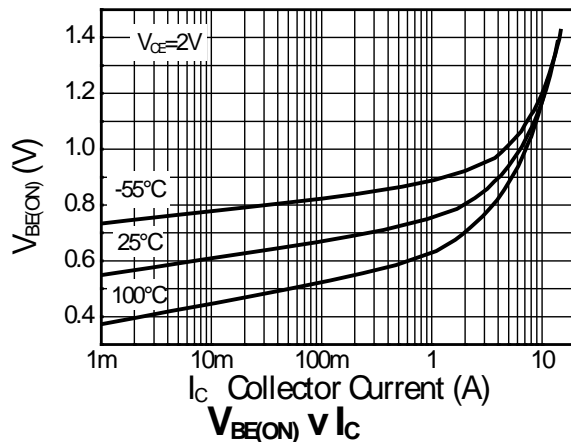
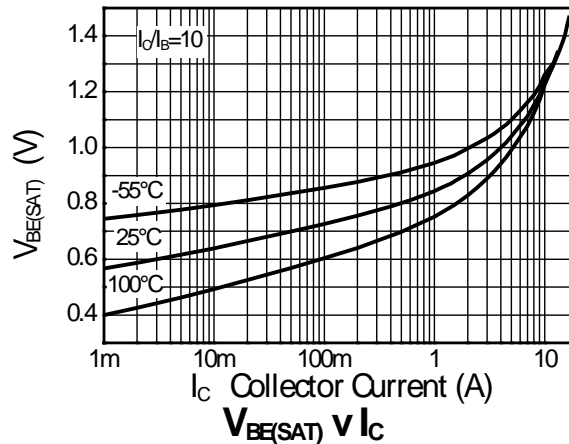
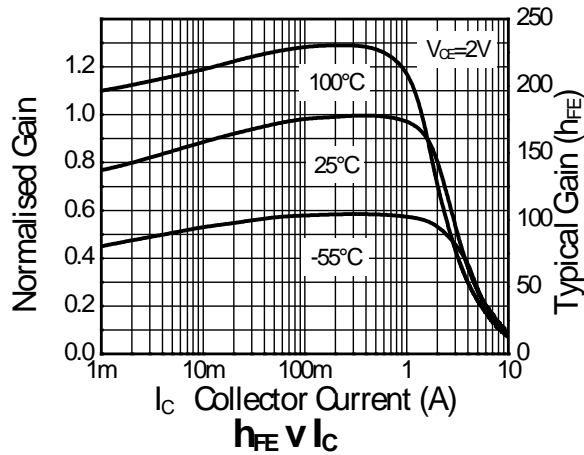
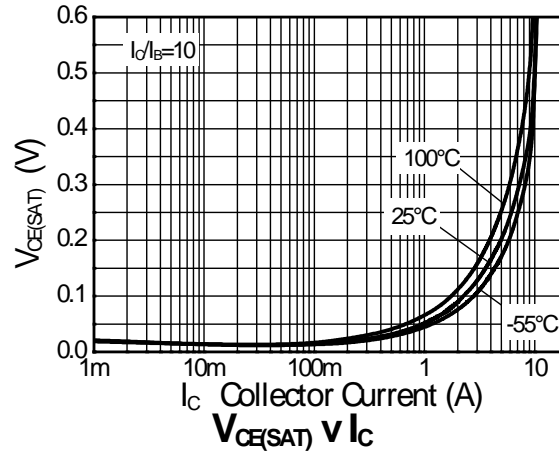
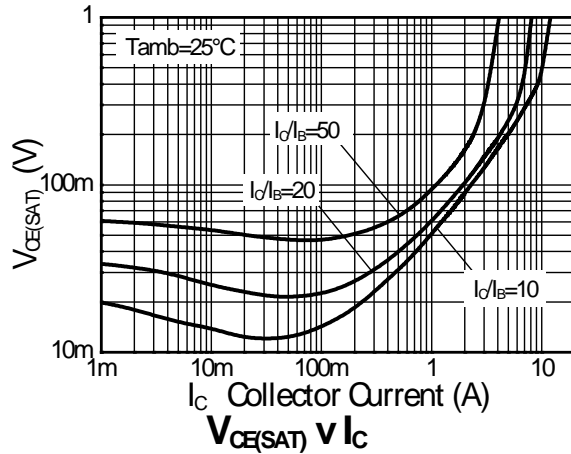


## Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	200	235	—	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 10)	BV <sub>CEO</sub>	100	115	—	V	I <sub>C</sub> = 10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	7	8.1	—	V	I <sub>E</sub> = 100 μA
Collector Cutoff Current	I <sub>CBO</sub>	—	—	20 0.5	nA μA	V <sub>CB</sub> = 150V V <sub>CB</sub> = 150V, T <sub>AMB</sub> = 100°C
Collector Cutoff Current	I <sub>CER</sub> R≤1kΩ	—	—	20 0.5	nA μA	V <sub>CB</sub> = 150V V <sub>CB</sub> = 150V, T <sub>AMB</sub> = 100°C
Emitter Cutoff Current	I <sub>EBO</sub>	—	—	10	nA	V <sub>EB</sub> = 6V
Collector-Emitter Saturation Voltage (Note 10)	V <sub>CE(sat)</sub>	—	21 50 95 180	35 65 125 220	mV	I <sub>C</sub> = 0.1A, I <sub>B</sub> = -5mA I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA I <sub>C</sub> = 2A, I <sub>B</sub> = 100mA I <sub>C</sub> = 5A, I <sub>B</sub> = 500mA
Base-Emitter Saturation Voltage (Note 10)	V <sub>BE(sat)</sub>	—	1020	1120	mV	I <sub>C</sub> = 5A, I <sub>B</sub> = 500mA
Base-Emitter Turn-On Voltage (Note 10)	V <sub>BE(on)</sub>	—	920	1000	mV	V <sub>CE</sub> = 2V, I <sub>C</sub> = 5A
DC Current Gain (Note 10)	h <sub>FE</sub>	100 100 30 10	— — — —	— 300 — —	— — — —	V <sub>CE</sub> = 2V, I <sub>C</sub> = 10mA V <sub>CE</sub> = 2V, I <sub>C</sub> = 2A V <sub>CE</sub> = 2V, I <sub>C</sub> = 5A 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

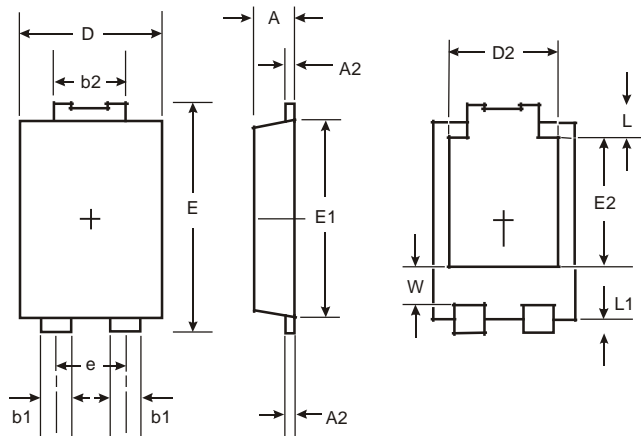
Note: 10. Pulse Test: Pulse width ≤ 300μs. Duty cycle ≤ 2.0%.

**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



## Package Outline Dimensions

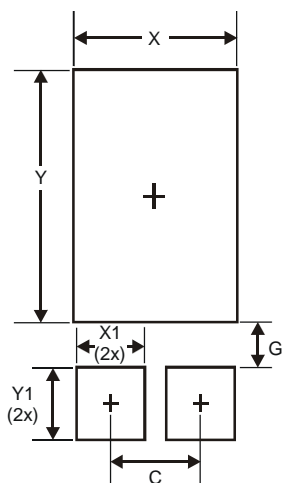
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



POWERDI5		
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

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
C	1.840
G	0.852
X	3.360
X1	1.390
Y	4.860
Y1	1.400

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device Terminals and PCB tracking.

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