

## Description

This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirement of Automotive Applications

## Features

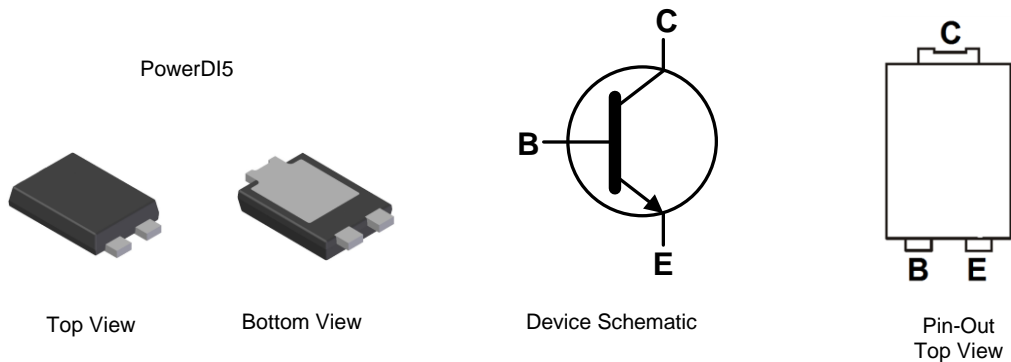
- $BV_{CEO} > 100V$
- $I_C = 6A$  High Continuous Collector Current
- $I_{CM} = 10A$  Peak Collector Current
- $P_D$  up to 3.2W
- 43% Smaller than SOT223; 60% Smaller than TO252
- Maximum Height just 1.1mm
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

## 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 Plated Leads. Solderable per MIL-STD-202, Method 208 <sup>Ⓔ</sup>
- Weight: 0.093 grams (Approximate)

## Applications

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



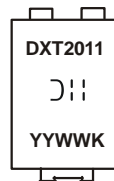
## Ordering Information (Note 5)

Product	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
DXT2011P5Q-13	Automotive	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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to [http://www.diodes.com/product\\_compliance\\_definitions.html](http://www.diodes.com/product_compliance_definitions.html).
  5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information

PowerDI5



DXT2011 = Product Type Marking Code  
 ⌋⌋⌋ = Manufacturer's Code Marking  
 K = Factory Designator  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 17 for 2017)  
 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.)

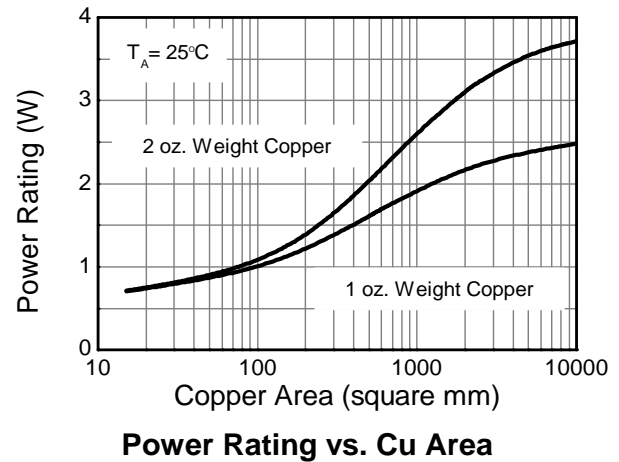
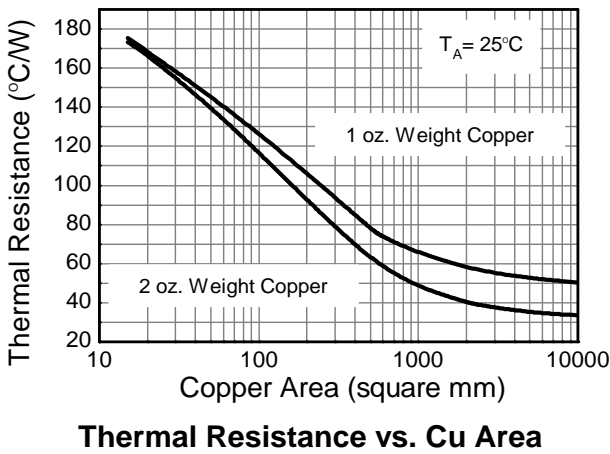
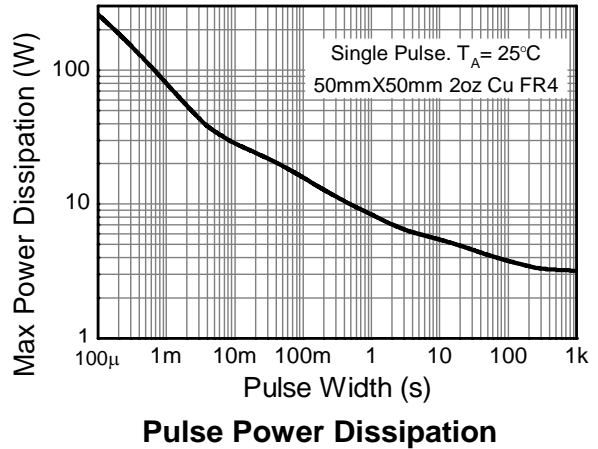
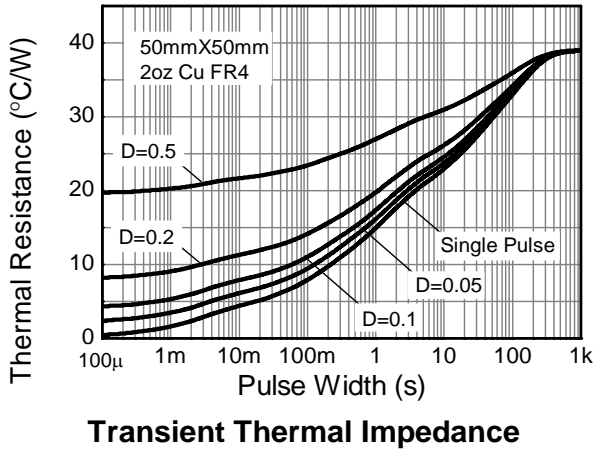
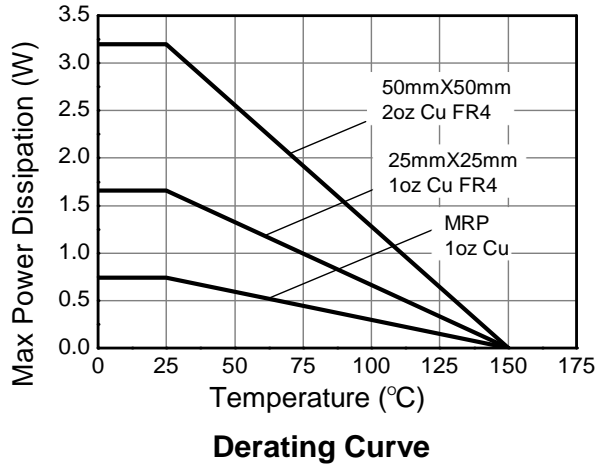
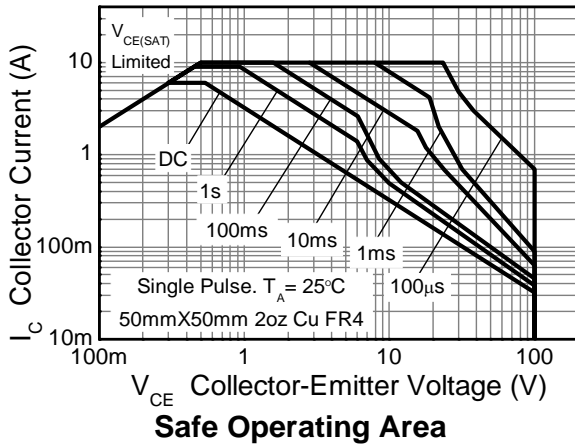
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	3.2	W
		1.7	
		0.74	
Thermal Resistance, Junction to Ambient Air	R <sub>θJA</sub>	39	°C/W
		75	
		169	
Thermal Resistance, Junction to Leads	R <sub>θJL</sub>	5.6	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>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

**ESD Ratings** (Note 10)

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:
6. For a device mounted with the exposed collector pad on 50mm x 50mm 2oz copper that is on a single-sided 1.6mm FR-4 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. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

**Thermal Characteristics and Derating Information**

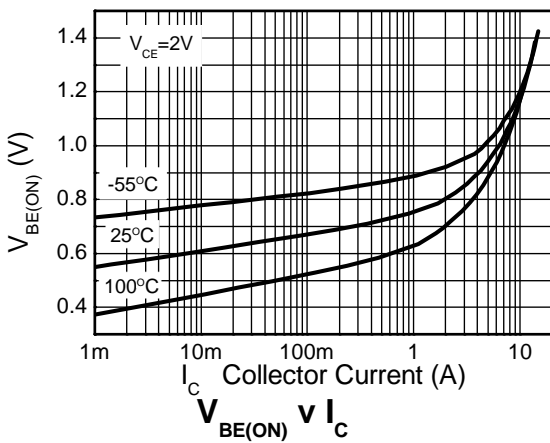
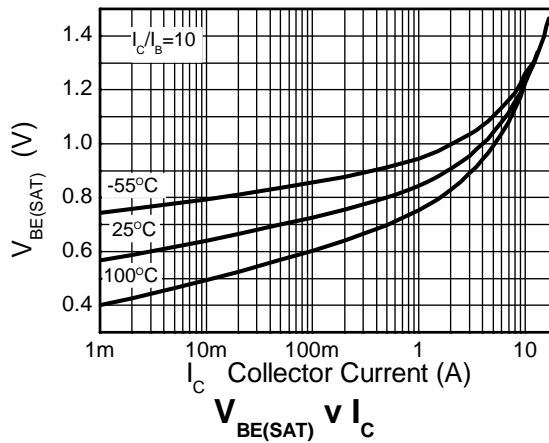
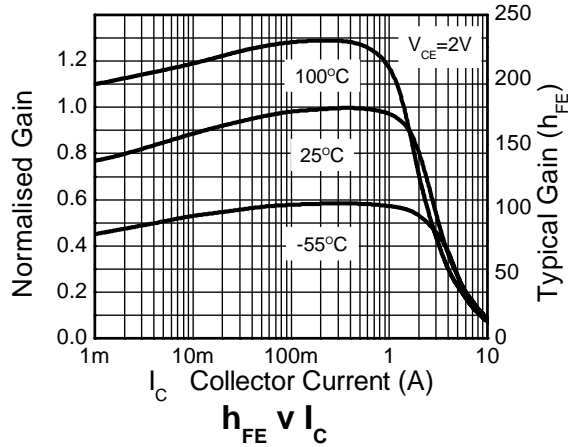
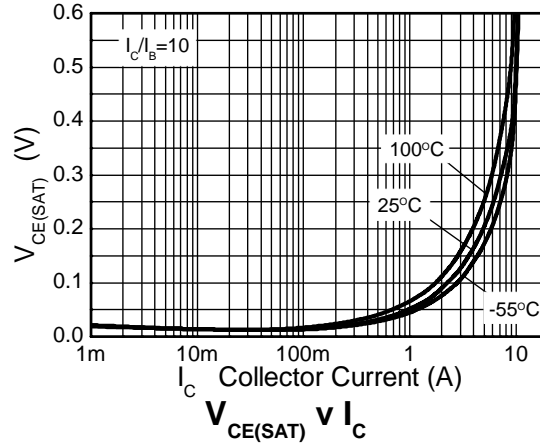
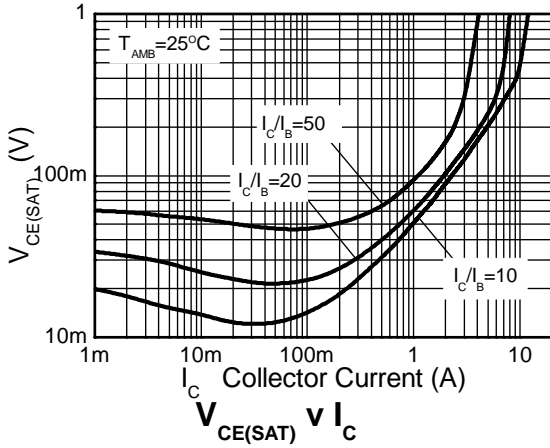


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

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 11)	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> = 100μA
Collector Cutoff Current	I <sub>CBO</sub>	—	—	20 0.5	nA μA	V <sub>CB</sub> = 150V V <sub>CB</sub> = 150V, T <sub>A</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>A</sub> = +100°C
Emitter Cutoff Current	I <sub>EBO</sub>	—	—	10	nA	V <sub>EB</sub> = 6V
Collector-Emitter Saturation Voltage (Note 11)	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 11)	V <sub>BE(SAT)</sub>	—	1020	1120	mV	I <sub>C</sub> = 5A, I <sub>B</sub> = 500mA
Base-Emitter Turn-On Voltage (Note 11)	V <sub>BE(ON)</sub>	—	920	1000	mV	V <sub>CE</sub> = 2V, I <sub>C</sub> = 5A
DC Current Gain (Note 11)	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: 11. Pulse Test: Pulse width ≤ 300μs. Duty cycle ≤ 2.0%.

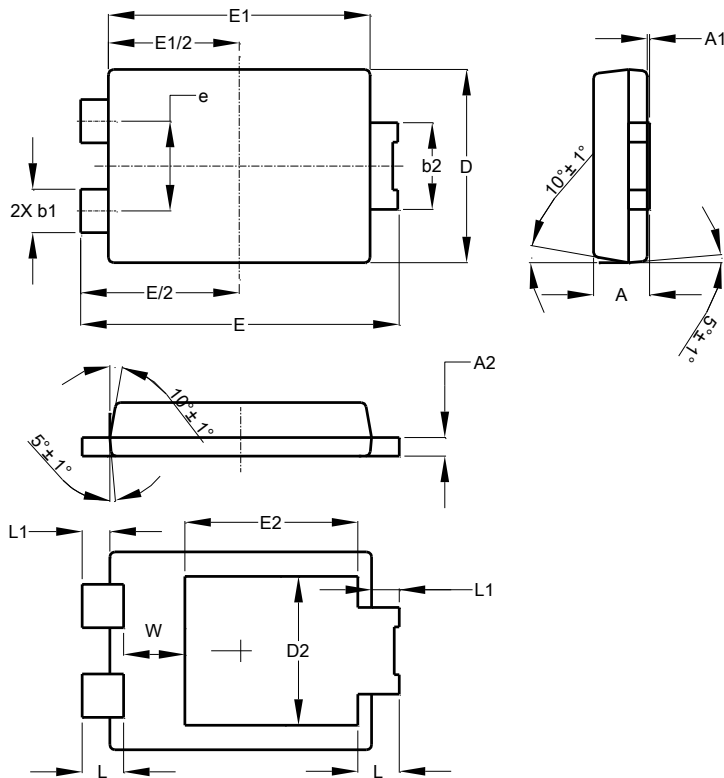
**Typical Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)



**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**PowerDI5**

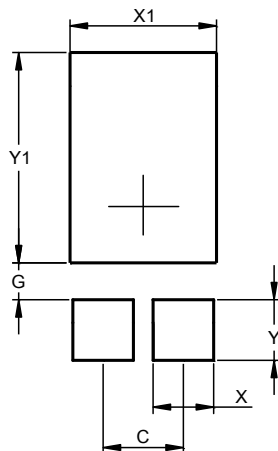


PowerDI5			
Dim	Min	Max	Typ
A	1.05	1.15	1.10
A1	0.00	0.05	--
A2	0.33	0.43	0.381
b1	0.80	0.99	0.89
b2	1.70	1.88	1.78
D	3.90	4.05	3.966
D2	--	--	3.054
E	6.40	6.60	6.504
e	--	--	1.84
E1	5.30	5.45	5.37
E2	--	--	3.549
L	0.75	0.95	0.85
L1	0.50	0.65	0.57
W	1.10	1.41	1.255
All Dimensions in mm			

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**PowerDI5**



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

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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