

## Features

- 43% smaller than SOT223; 60% smaller than TO252
- Maximum height just 1.1mm
- Rated up to 3.2W
- $V_{CE0} = 60V$
- $I_C = -5.5A$ ;  $I_{CM} = 15A$
- Low Saturation voltage
- **Lead, Halogen, and Antimony Free/RoHS Compliant (Note 1)**
- **“Green” Device (Note 2)**

## Applications

- Motor driver
- Regulator circuit

## Mechanical Data

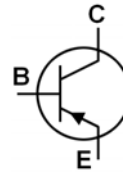
- Case: PowerDI<sup>®</sup>5
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.093 grams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



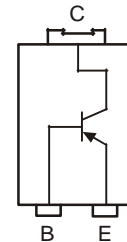
Top View



Bottom View



Device Schematic



Pin-out diagram

## Ordering Information (Note 3)

| Part Number  | Case                   | Packaging        |
|--------------|------------------------|------------------|
| DXT2012P5-13 | 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



- DXT2012 = 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

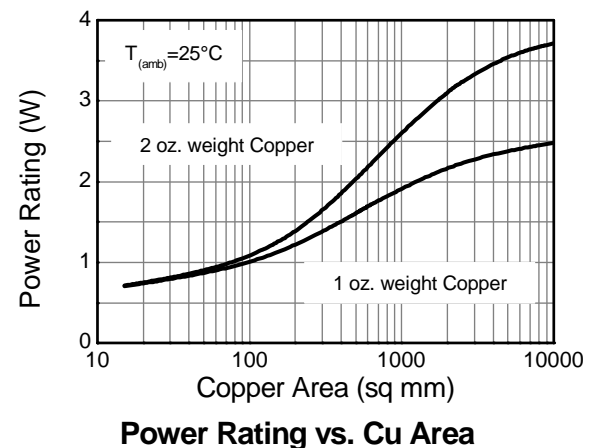
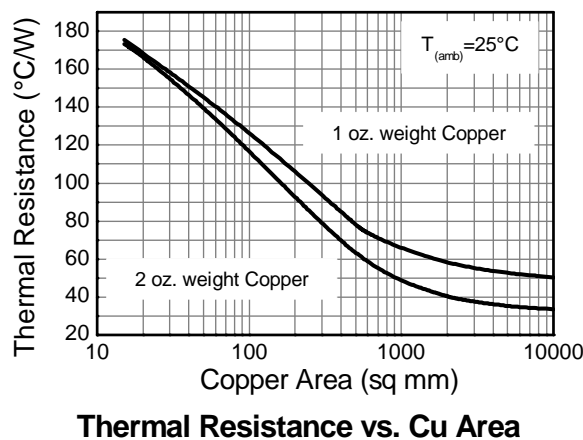
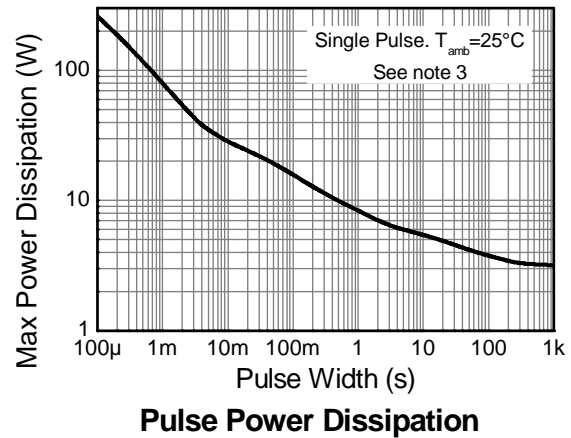
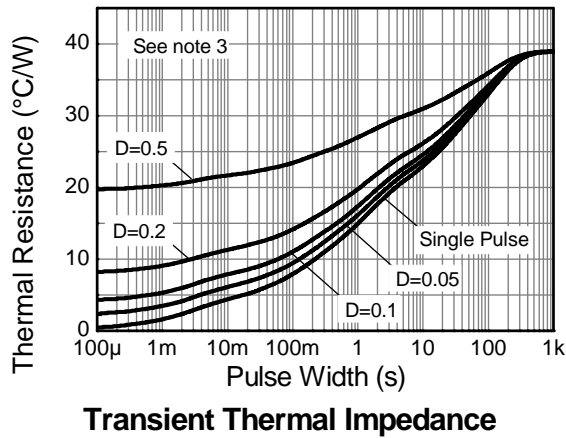
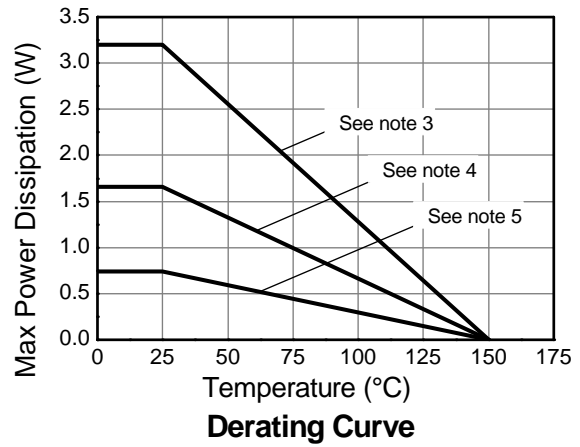
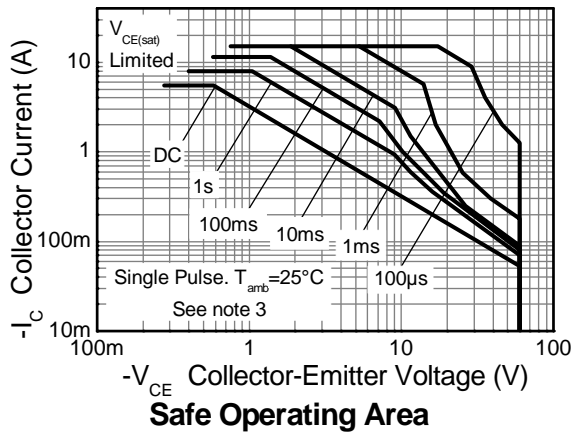
**Maximum Ratings** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

| Characteristic               | Symbol    | Value | Unit |
|------------------------------|-----------|-------|------|
| Collector-Base Voltage       | $V_{CB0}$ | -100  | V    |
| Collector-Emitter Voltage    | $V_{CEO}$ | -60   | V    |
| Emitter-Base Voltage         | $V_{EBO}$ | -7    | V    |
| Continuous Collector Current | $I_C$     | -5.5  | A    |
| Peak Pulse Current           | $I_{CM}$  | -15   | 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, 2 single sided 1oz. copper, minimum recommended pad layout.

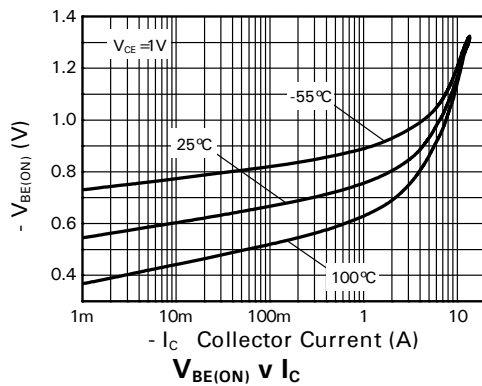
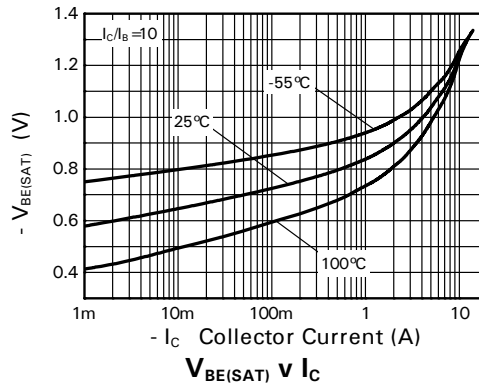
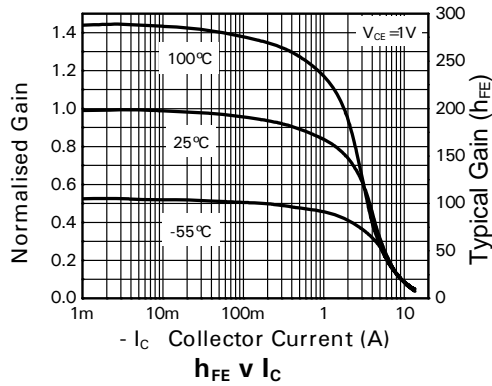
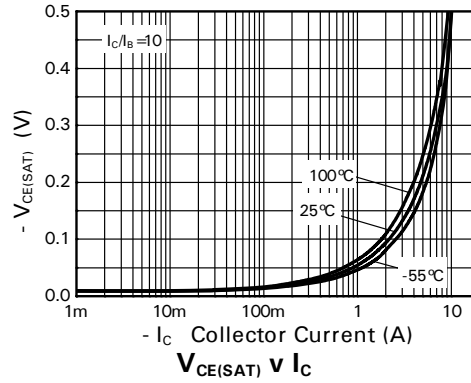
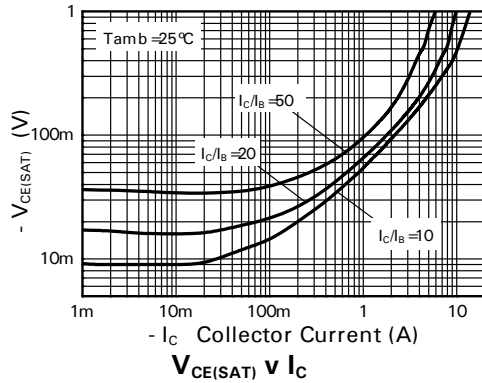


**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

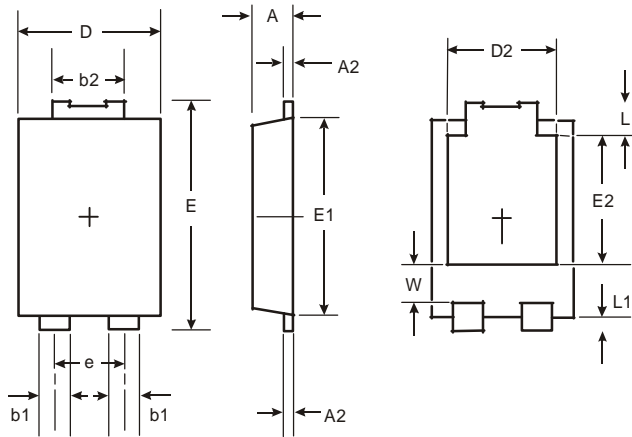
| Characteristic                                | Symbol                                   | Min  | Typ       | Max   | Unit | Test Condition  |
|---|--|------|-----------|-------|------|---|
| Collector-Base Breakdown Voltage              | V <sub>(BR)CBO</sub>                     | -100 | -120      | -     | V    | I <sub>C</sub> = -100μA   |
| Collector-Emitter Breakdown Voltage (Note 7)  | V <sub>(BR)CEO</sub>                     | -60  | -80       | -     | 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>                         | -    | <1        | -20   | nA   | V <sub>CB</sub> = -80V  |
| Collector Cutoff Current                      | I <sub>CER</sub><br>R <sub>S</sub> ≤ 1kΩ | -    | <1        | -20   | nA   | V <sub>CB</sub> = -80V  |
| Emitter Cutoff Current                        | I <sub>EBO</sub>                         | -    | <1        | -10   | nA   | V <sub>CB</sub> = -80V, T <sub>amb</sub> = 100 °C   |
| Collector-Emitter Saturation Voltage (Note 7) | V <sub>CE(sat)</sub>                     | -    | -15       | -25   | mV   | I <sub>C</sub> = -0.1A, I <sub>B</sub> = -10mA  |
|   |  | -    | -55       | -70   |      | I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA   |
|   |  | -    | -90       | -120  |      | I <sub>C</sub> = -2A, I <sub>B</sub> = -200mA   |
|   |  | -    | -195      | -250  |      | I <sub>C</sub> = -5A, I <sub>B</sub> = -500mA   |
| Base-Emitter Saturation Voltage (Note 7)      | V <sub>BE(sat)</sub>                     | -    | -1030     | -1150 | mV   | I <sub>C</sub> = -5A, I <sub>B</sub> = -500mA   |
| Base-Emitter Turn-On Voltage (Note 7)         | V <sub>BE(on)</sub>                      | -    | -920      | -1020 | mV   | V <sub>CE</sub> = -1V, I <sub>C</sub> = -5A   |
| DC Current Gain (Note 7)                      | h <sub>FE</sub>                          | 100  | 250       | -     | -    | V <sub>CE</sub> = -1V, I <sub>C</sub> = -10mA   |
|   |  | 100  | 200       | 300   |      | V <sub>CE</sub> = -1V, I <sub>C</sub> = -2A   |
|   |  | 45   | 90        | -     |      | V <sub>CE</sub> = -1V, I <sub>C</sub> = -5A   |
|   |  | 10   | 25        | -     |      | V <sub>CE</sub> = -1V, I <sub>C</sub> = -10A  |
| Transition Frequency                          | f <sub>T</sub>                           | -    | 120       | -     | MHz  | V <sub>CE</sub> = -10V, I <sub>C</sub> = -100mA,<br>f = 50MHz                             |
| Output Capacitance                            | C <sub>obo</sub>                         | -    | 48        | -     | pF   | V <sub>CB</sub> = -10V, f = 1MHz  |
| Switching Times                               | t <sub>on</sub><br>t <sub>off</sub>      | -    | 39<br>370 | -     | ns   | V <sub>CC</sub> = 10V, I <sub>C</sub> = 1A,<br>I <sub>B1</sub> = I <sub>B2</sub> = -100mA |

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

**Typical Characteristic**

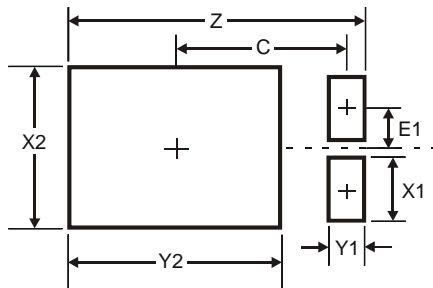


**Package Outline Dimensions**



| PowerDI®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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