

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

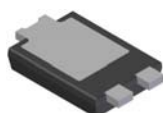
- Motor driver
- Regulator circuit

Mechanical Data

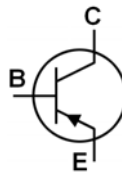
- Case: PowerDI[®]5
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.093 grams (approximate)



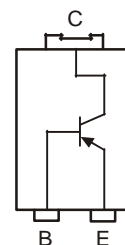
Top View



Bottom View



Device Schematic



Pin-out diagram

Ordering Information (Note 3)

| Part Number | Case | Packaging |
|--------------|------------------------|------------------|
| DXT2012P5-13 | PowerDI [®] 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

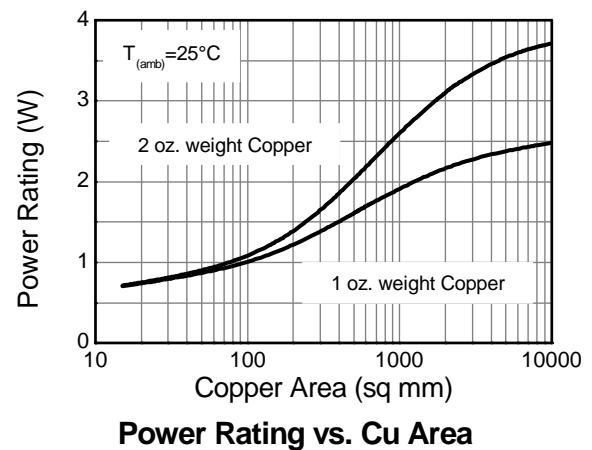
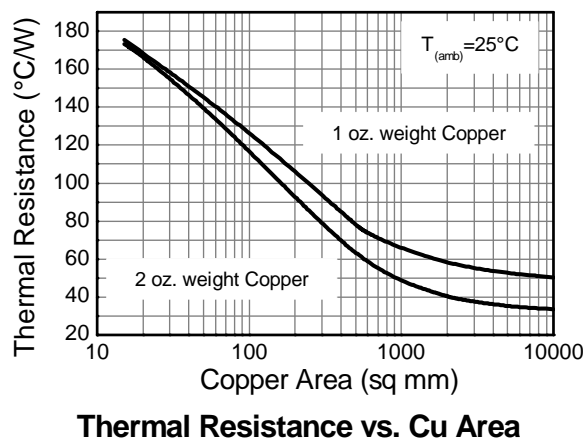
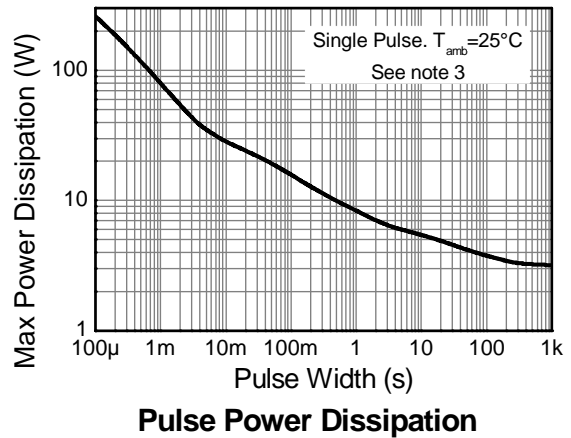
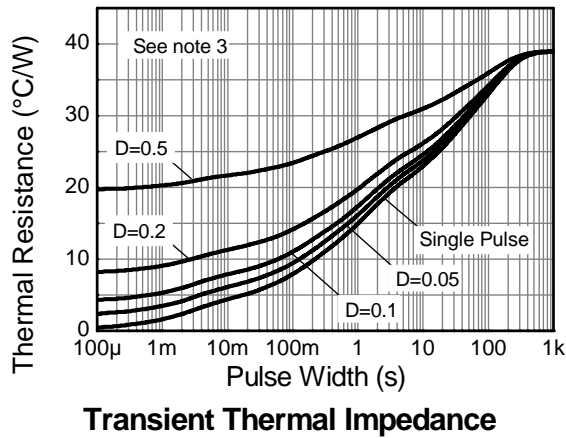
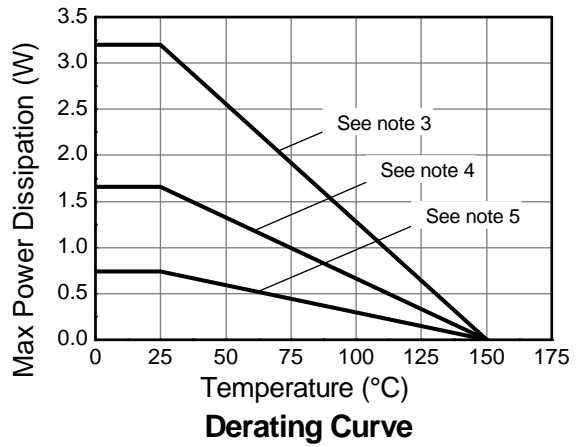
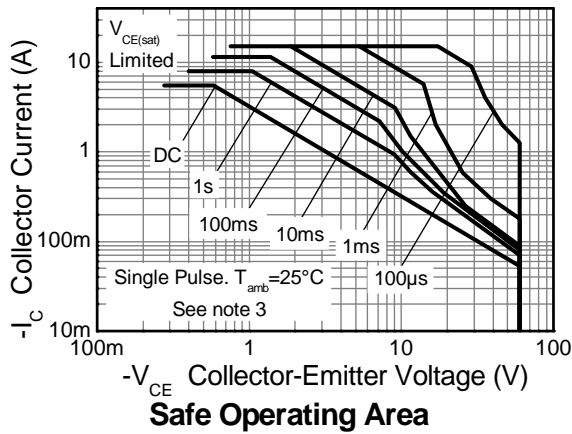
Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|------------------------------|-----------|-------|------|
| Collector-Base Voltage | V_{CBO} | -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.

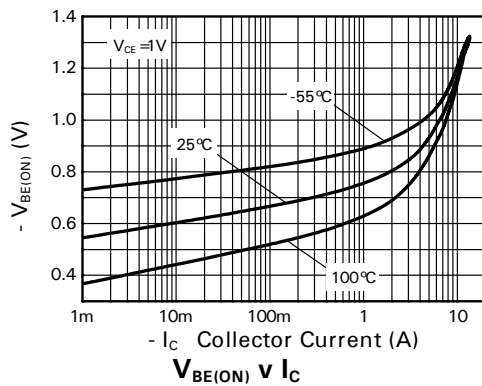
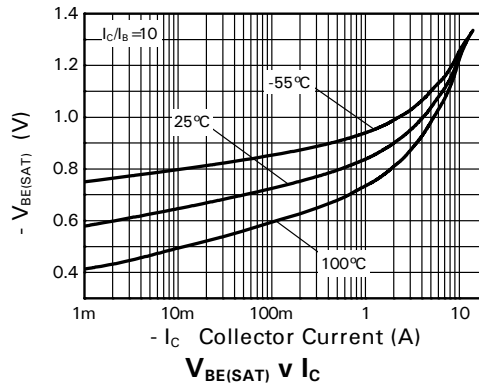
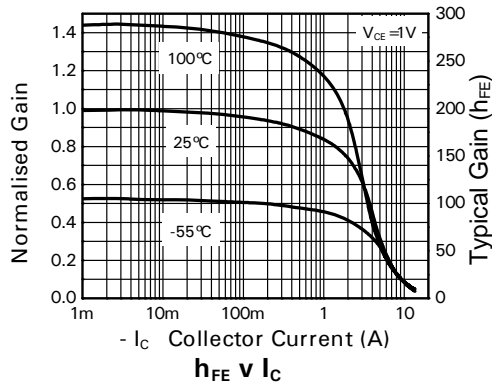
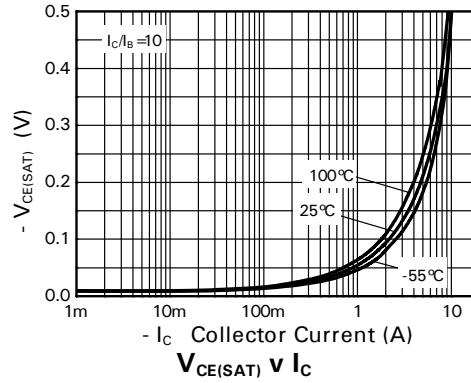
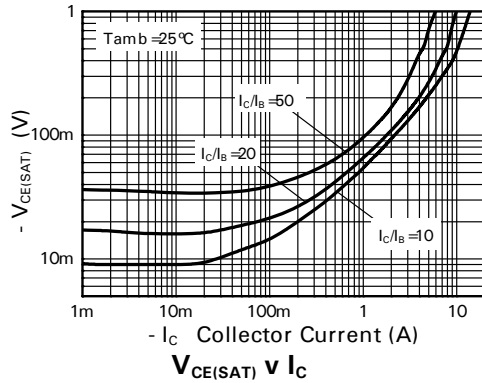


Electrical Characteristics @T_A = 25°C unless otherwise specified

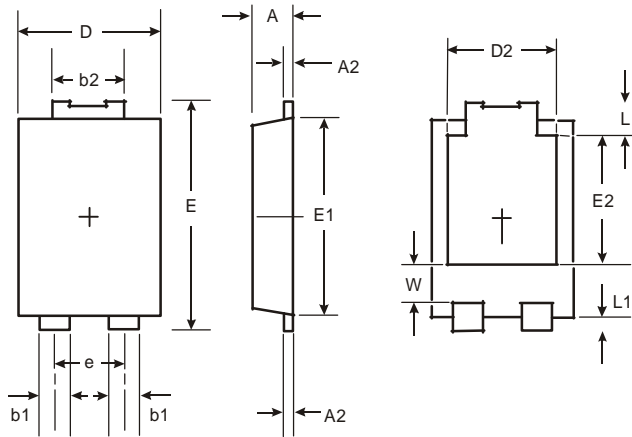
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|--|------|-----------|-------|------|---|
| Collector-Base Breakdown Voltage | V _{(BR)CBO} | -100 | -120 | - | V | I _C = -100μA |
| Collector-Emitter Breakdown Voltage (Note 7) | V _{(BR)CEO} | -60 | -80 | - | V | I _C = -10mA |
| Emitter-Base Breakdown Voltage | V _{(BR)EBO} | -7 | -8.1 | - | V | I _E = -100μA |
| Collector Cutoff Current | I _{CBO} | - | <1 | -20 | nA | V _{CB} = -80V |
| Collector Cutoff Current | I _{CER} R _S ≤ 1kΩ | - | <1 | -20 | nA | V _{CB} = -80V |
| Emitter Cutoff Current | I _{EBO} | - | <1 | -10 | nA | V _{CB} = -80V, T _{amb} = 100 °C |
| Collector-Emitter Saturation Voltage (Note 7) | V _{CE(sat)} | - | -15 | -25 | mV | I _C = -0.1A, I _B = -10mA |
| | | - | -55 | -70 | | I _C = -1A, I _B = -100mA |
| | | - | -90 | -120 | | I _C = -2A, I _B = -200mA |
| | | - | -195 | -250 | | I _C = -5A, I _B = -500mA |
| Base-Emitter Saturation Voltage (Note 7) | V _{BE(sat)} | - | -1030 | -1150 | mV | I _C = -5A, I _B = -500mA |
| Base-Emitter Turn-On Voltage (Note 7) | V _{BE(on)} | - | -920 | -1020 | mV | V _{CE} = -1V, I _C = -5A |
| DC Current Gain (Note 7) | h _{FE} | 100 | 250 | - | - | V _{CE} = -1V, I _C = -10mA |
| | | 100 | 200 | 300 | | V _{CE} = -1V, I _C = -2A |
| | | 45 | 90 | - | | V _{CE} = -1V, I _C = -5A |
| | | 10 | 25 | - | | V _{CE} = -1V, I _C = -10A |
| Transition Frequency | f _T | - | 120 | - | MHz | V _{CE} = -10V, I _C = -100mA, f = 50MHz |
| Output Capacitance | C _{obo} | - | 48 | - | pF | V _{CB} = -10V, f = 1MHz |
| Switching Times | t _{on} t _{off} | - | 39 370 | - | ns | V _{CC} = 10V, I _C = 1A, I _{B1} = I _{B2} = -100mA |

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

Typical Characteristic

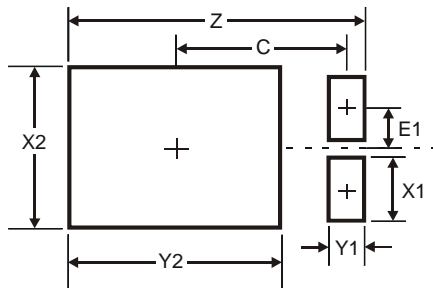


Package Outline Dimensions



| 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 |
| 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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