

**100V NPN LOW SAT MEDIUM POWER TRANSISTOR
POWERDI[®]5**


Features

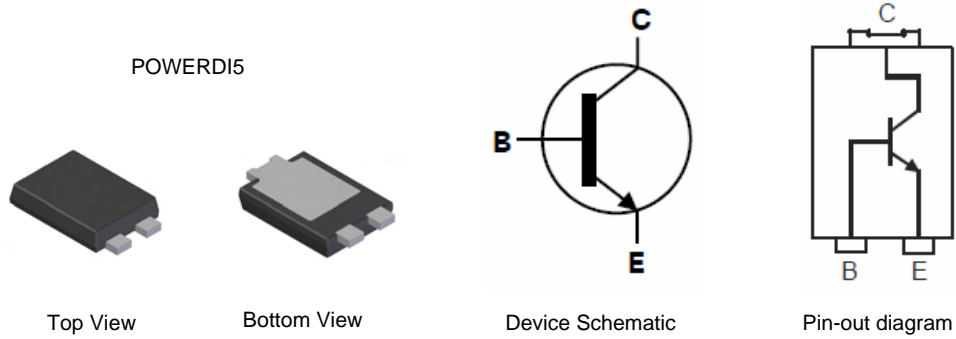
- 43% smaller than SOT223; 60% smaller than TO252
- Maximum height just 1.1mm
- Rated up to 3.2W
- $BV_{CEO} > 100V$
- Maximum continuous current $I_C = 6A$
- Low Saturation voltage
- **Totally Lead-Free & Fully RoHS compliant (Note 1)**
- **Halogen and Antimony Free. "Green" Device (Note 2)**

Applications

- Motor Drive
- Regulator circuit

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 annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 
- Weight: 0.093 grams (approximate)

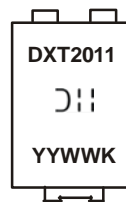


Ordering Information (Note 3)

| Part Number | Case | Packaging |
|--------------|----------|------------------|
| DXT2011P5-13 | POWERDI5 | 5000/Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. Halogen and Antimony free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 3. For packaging details, go to our website at <http://www.diodes.com>.

Marking Information



- DXT2011 = Product Type Marking Code
- D11 = 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

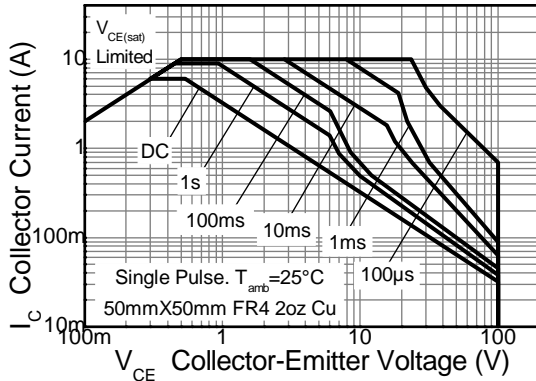
| Characteristic | Symbol | Value | Unit |
|------------------------------|-----------|-------|------|
| Collector-Base Voltage | V_{CBO} | 200 | V |
| Collector-Emitter Voltage | V_{CEO} | 100 | V |
| Emitter-Base Voltage | V_{EBO} | 7 | V |
| Continuous Collector Current | I_C | 6 | A |
| Peak Pulse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

Thermal Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

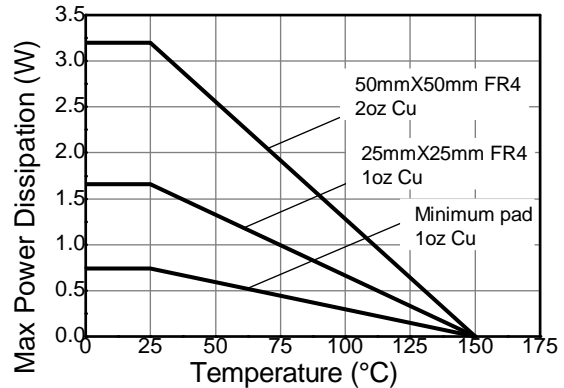
| Characteristic | Symbol | Value | Unit |
|--|-----------------|-------------|--------------------|
| Power Dissipation | P_D | 3.2 | W |
| | | 1.7 | |
| | | 0.74 | |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 39 | $^\circ\text{C/W}$ |
| | | 75 | |
| | | 169 | |
| Thermal Resistance, 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.

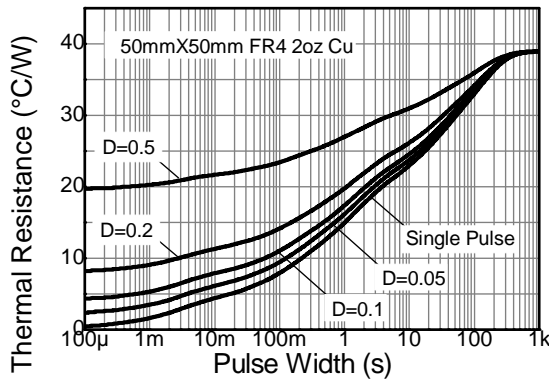
Thermal Characteristics



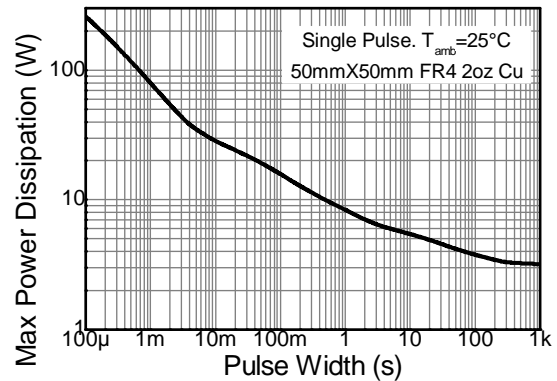
Safe Operating Area



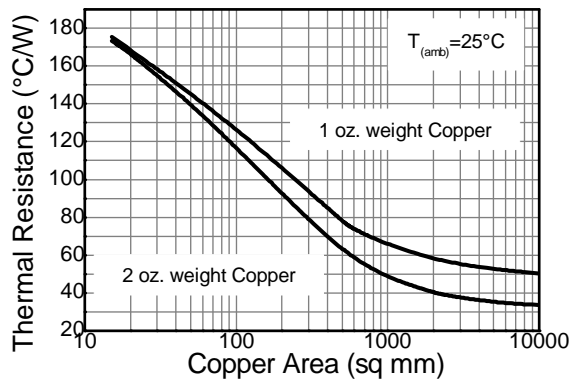
Derating Curve



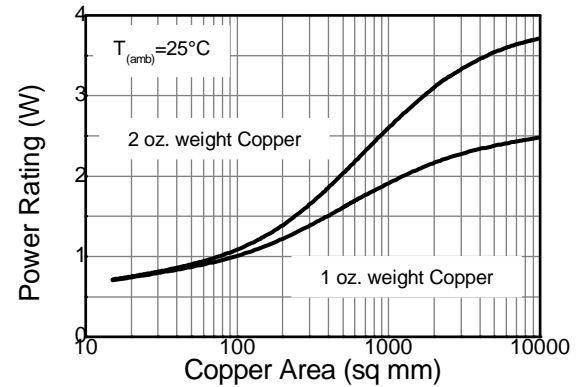
Transient Thermal Impedance



Pulse Power Dissipation



Thermal Resistance vs. Cu Area



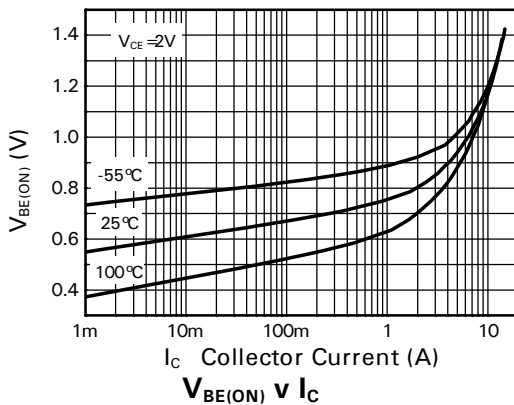
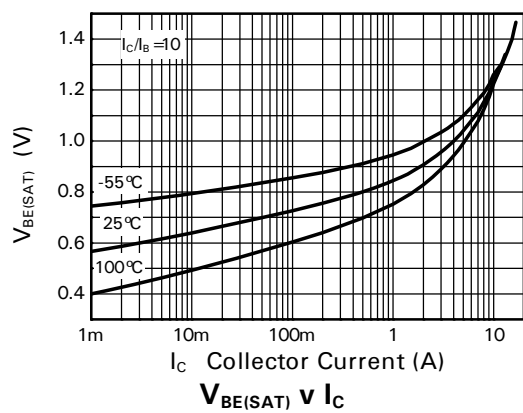
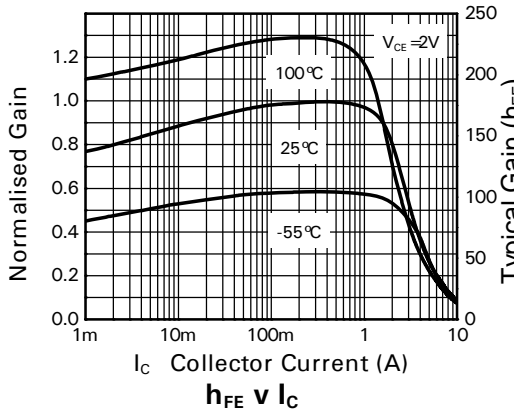
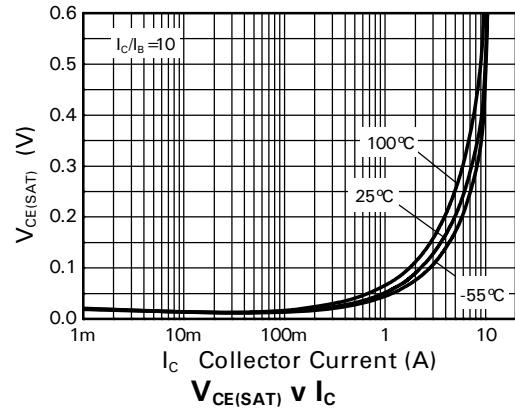
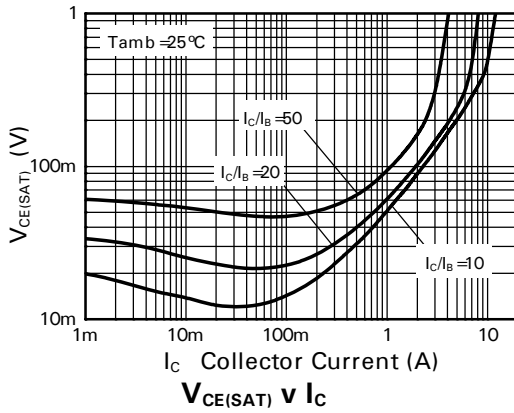
Power Rating vs. Cu Area

Electrical Characteristics @T_A = 25°C unless otherwise specified

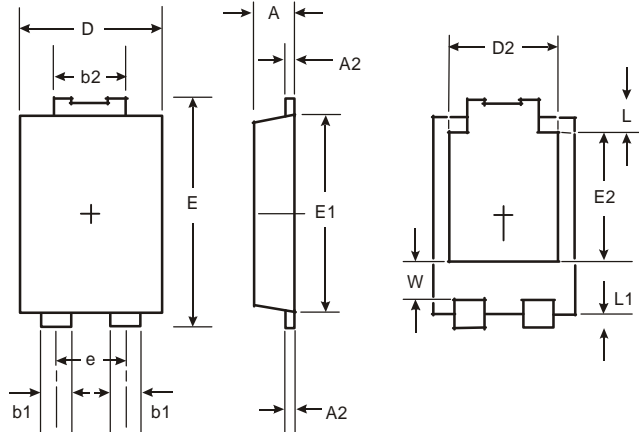
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|----------------------|-----|------|------|------|---|
| Collector-Base Breakdown Voltage | BV _{CBO} | 200 | 235 | — | V | I _C = 100μA |
| Collector-Emitter Breakdown Voltage (Note 7) | BV _{CEO} | 100 | 115 | — | V | I _C = 10mA |
| Emitter-Base Breakdown Voltage | BV _{EBO} | 7 | 8.1 | — | V | I _E = 100μA |
| Collector Cutoff Current | I _{CBO} | — | — | 20 | nA | V _{CB} = 150V |
| | | — | — | 0.5 | μA | V _{CB} = 150V, T _{amb} = 100 °C |
| Collector Cutoff Current | I _{CER} | — | — | 20 | nA | V _{CB} = 150V |
| | R ≤ 1kΩ | — | — | 0.5 | μA | V _{CB} = 150V, T _{amb} = 100 °C |
| Emitter Cutoff Current | I _{EBO} | — | — | 10 | nA | V _{EB} = 6V |
| Collector-Emitter Saturation Voltage (Note 7) | V _{CE(sat)} | — | 21 | 35 | mV | I _C = 0.1A, I _B = -5mA |
| | | — | 50 | 65 | | I _C = 1A, I _B = 100mA |
| | | — | 95 | 125 | | I _C = 2A, I _B = 100mA |
| | | — | 180 | 220 | | I _C = 5A, I _B = 500mA |
| Base-Emitter Saturation Voltage (Note 7) | V _{BE(sat)} | — | 1020 | 1120 | mV | I _C = 5A, I _B = 500mA |
| Base-Emitter Turn-On Voltage (Note 7) | V _{BE(on)} | — | 920 | 1000 | mV | V _{CE} = 2V, I _C = 5A |
| DC Current Gain (Note 7) | h _{FE} | 100 | — | — | — | V _{CE} = 2V, I _C = 10mA |
| | | 100 | — | 300 | — | V _{CE} = 2V, I _C = 2A |
| | | 30 | — | — | — | V _{CE} = 2V, I _C = 5A |
| | | 10 | — | — | — | V _{CE} = 2V, I _C = 10A |
| Transition Frequency | f _T | — | 130 | — | MHz | V _{CE} = 10V, I _C = 100mA, f = 50MHz |
| Output Capacitance | C _{obo} | — | 26 | — | pF | V _{CB} = 10V, f = 1MHz |
| Switching Times | t _{on} | — | 41 | — | ns | V _{CC} = 10V, I _C = 1A, |
| | t _{off} | — | 1010 | — | | I _{B1} = I _{B2} = 100mA |

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

Typical Characteristic

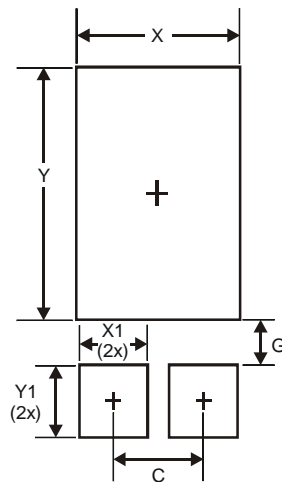


Package Outline Dimensions



| 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



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

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