



**DXT2010P5**

**60V NPN MEDIUM POWER TRANSISTOR**  
**PowerDI®5**

## Features

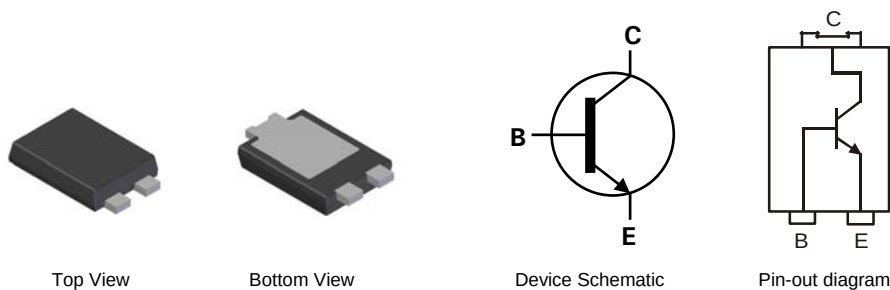
- 43% smaller than SOT223; 60% smaller than TO252
- Maximum height just 1.1mm
- Rated up to 3.2W
- $V_{CE0} = 60V$
- $I_C = 6A$ ;  $I_{CM} = 20A$
- Low Saturation voltage
- **Lead, Halogen and Antimony Free, RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**

## 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 Ⓔ3
- Weight: 0.093 grams (approximate)

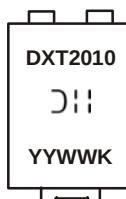


## Ordering Information (Note 3)

| Part Number  | Case      | Packaging        |
|--------------|-----------|------------------|
| DXT2010P5-13 | 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



DXT2010 = Product Type Marking Code  
 J11 = 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)

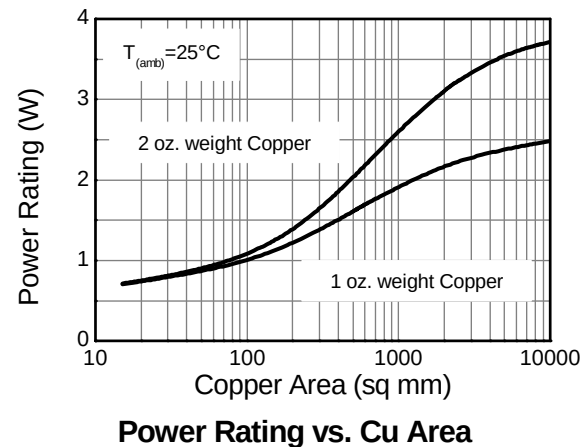
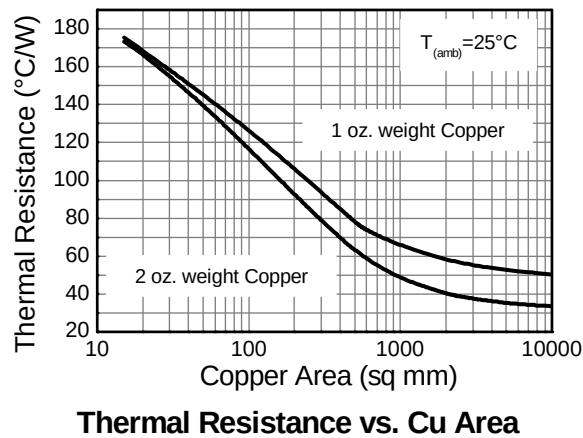
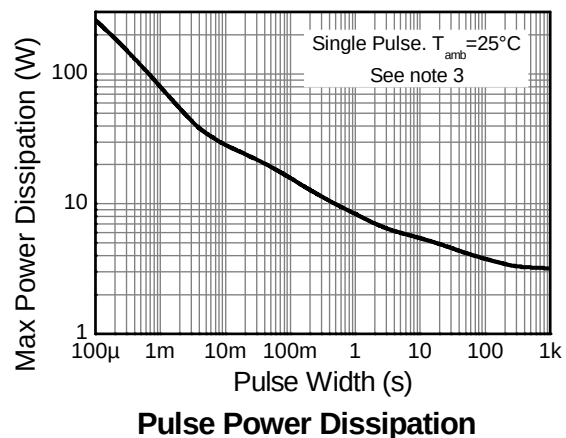
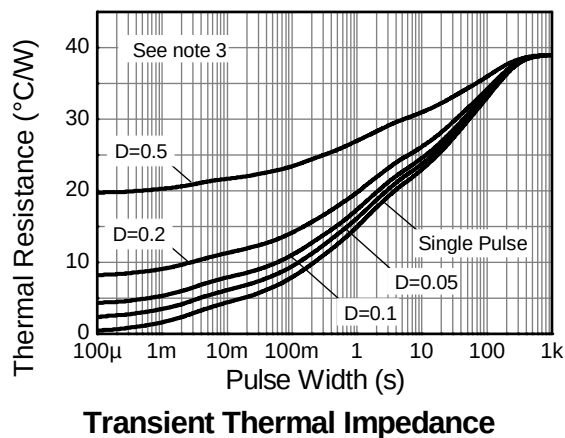
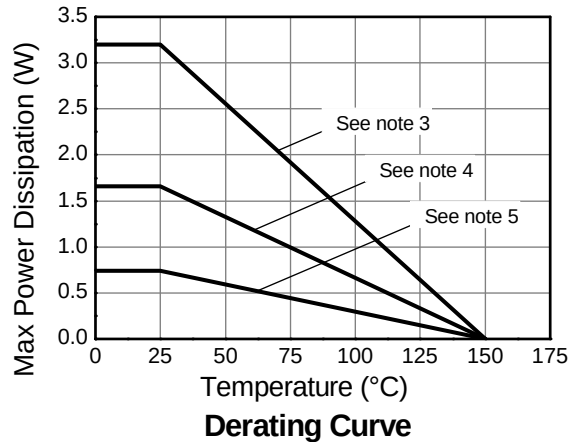
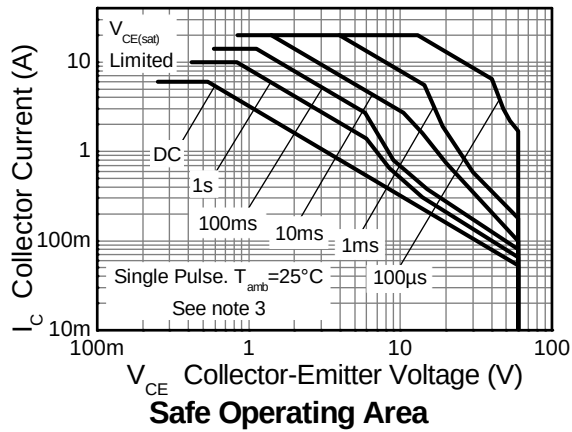
## Maximum Ratings @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic               | Symbol           | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage       | V <sub>CBO</sub> | 150   | V    |
| Collector-Emitter Voltage    | V <sub>CEO</sub> | 60    | 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>  | 20    | A    |

## Thermal Characteristics

| Characteristic                                                              | Symbol                            | Value       | Unit |
|-----------------------------------------------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation @ T <sub>A</sub> = 25°C (Note 4)                          | P <sub>D</sub>                    | 3.2         | W    |
| Thermal Resistance, Junction to Ambient Air (Note 4) @T <sub>A</sub> = 25°C | R <sub>θJA</sub>                  | 39          | °C/W |
| Power Dissipation @ T <sub>A</sub> = 25°C (Note 5)                          | P <sub>D</sub>                    | 1.7         | W    |
| Thermal Resistance, Junction to Ambient Air (Note 5) @T <sub>A</sub> = 25°C | R <sub>θJA</sub>                  | 75          | °C/W |
| Power Dissipation @ T <sub>A</sub> = 25°C (Note 6)                          | P <sub>D</sub>                    | 0.74        | W    |
| Thermal Resistance, Junction to Ambient Air (Note 6) @T <sub>A</sub> = 25°C | R <sub>θJA</sub>                  | 169         | °C/W |
| Thermal Resistance, Junction to Collector Terminal                          | R <sub>θJT</sub>                  | 5.6         | °C/W |
| Operating and Storage Temperature Range                                     | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

- Notes:
- Device mounted on FR-4 PCB, single sided 2 oz. copper, collector pad dimensions 25mm x 25mm.
  - Device mounted on FR-4 PCB, single sided 1 oz. copper, collector pad dimensions 50mm x 50mm.
  - Device mounted on FR-4 PCB, single sided 1 oz. copper, minimum recommended pad layout.

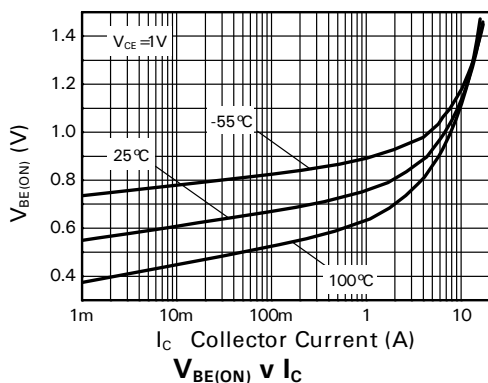
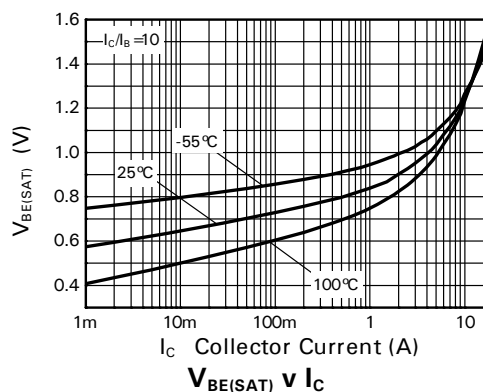
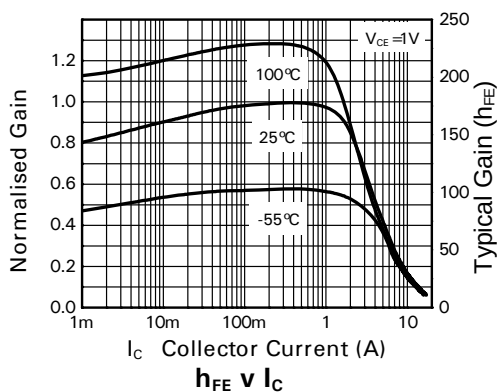
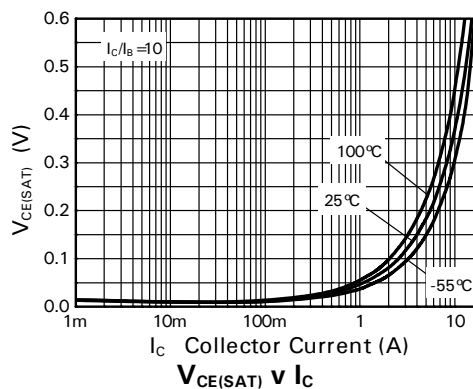
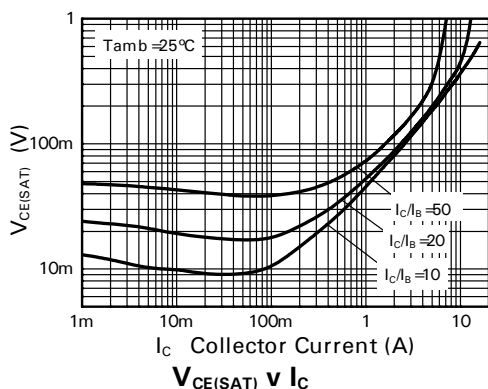


**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

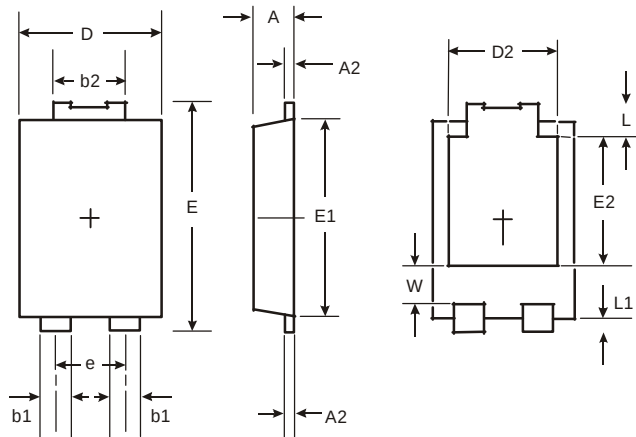
| Characteristic                                | Symbol                              | Min                    | Typ                          | Max                          | Unit     | Test Condition                                                                                                                                                                                                                         |
|-----------------------------------------------|-------------------------------------|------------------------|------------------------------|------------------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage              | V <sub>(BR)CBO</sub>                | 150                    | 190                          | —                            | 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>                | 7.0                    | 8.1                          | —                            | V        | I <sub>E</sub> = 100μA                                                                                                                                                                                                                 |
| Collector Cutoff Current                      | I <sub>CBO</sub>                    | —                      | —                            | 20<br>0.5                    | nA<br>μA | V <sub>CB</sub> = 120V<br>V <sub>CB</sub> = 120V, T <sub>amb</sub> = 100 °C                                                                                                                                                            |
| Collector Cutoff Current                      | I <sub>CER</sub><br>R ≤ 1kΩ         | —                      | —                            | 20<br>0.5                    | nA<br>μA | V <sub>CB</sub> = 120V<br>V <sub>CB</sub> = 120V, 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 7) | V <sub>CE(sat)</sub>                | —                      | 20<br>45<br>50<br>100<br>210 | 30<br>60<br>70<br>135<br>260 | mV       | I <sub>C</sub> = 100mA, I <sub>B</sub> = 5mA<br>I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA<br>I <sub>C</sub> = 1A, I <sub>B</sub> = 50mA<br>I <sub>C</sub> = 2A, I <sub>B</sub> = 50mA<br>I <sub>C</sub> = 6A, I <sub>B</sub> = 300mA |
| Base-Emitter Saturation Voltage (Note 7)      | V <sub>BE(sat)</sub>                | —                      | 1000                         | 1100                         | mV       | I <sub>C</sub> = 6A, I <sub>B</sub> = 300mA                                                                                                                                                                                            |
| Base-Emitter Turn-On Voltage (Note 7)         | V <sub>BE(on)</sub>                 | —                      | 940                          | 1050                         | mV       | V <sub>CE</sub> = 1V, I <sub>C</sub> = 6A                                                                                                                                                                                              |
| DC Current Gain (Note 6)                      | h <sub>FE</sub>                     | 100<br>100<br>55<br>20 | 200<br>200<br>105<br>40      | —<br>300<br>—<br>—           | —        | I <sub>C</sub> = 10mA, V <sub>CE</sub> = 1V<br>I <sub>C</sub> = 2A, V <sub>CE</sub> = 1V<br>I <sub>C</sub> = 5A, V <sub>CE</sub> = 1V<br>I <sub>C</sub> = 10A, V <sub>CE</sub> = 1V                                                    |
| Transition Frequency                          | f <sub>T</sub>                      | —                      | 130                          | —                            | MHz      | I <sub>C</sub> = 100mA, V <sub>CE</sub> = 10V<br>f = 50MHz                                                                                                                                                                             |
| Output Capacitance (Note 7)                   | C <sub>obo</sub>                    | —                      | 31                           | —                            | pF       | V <sub>CB</sub> = -10A, f = 1MHz                                                                                                                                                                                                       |
| Switching Times                               | t <sub>on</sub><br>t <sub>off</sub> | —<br>—                 | 42<br>760                    | —<br>—                       | ns<br>ns | I <sub>C</sub> = 1A, V <sub>CC</sub> = 10V,<br>I <sub>B1</sub> = I <sub>B2</sub> = 100mA                                                                                                                                               |

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

## Typical Characteristic

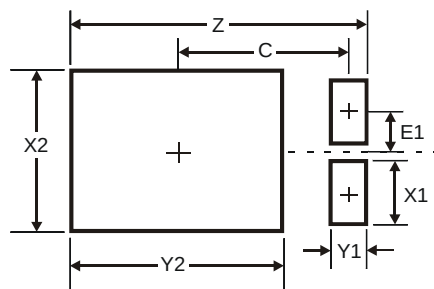


## Package Outline Dimensions



| PowerDI <sup>®</sup> 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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