

**DXT790AP5**

**40V PNP HIGH GAIN TRANSISTOR**  
**PowerDI®5**

**Features**

- 43% smaller than SOT223; 60% smaller than TO252
- Maximum height just 1.1mm
- Rated up to 3.2W
- $V_{CE0} = 40V$
- $I_C = 3A$ ;  $I_{CM} = 6A$
- Low Saturation, high gain transistor,
- **Lead, Halogen, and Antimony Free/RoHS Compliant (Note 1)**
- **“Green” Device (Note 2)**

**Mechanical Data**

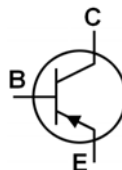
- Case: PowerDI®5
- Case Material: Molded Plastic, “Green” Molding Compound.  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin annealed over Copper leadframe.  
Solderable per MIL-STD-202, Method 208 Ⓔ3
- Weight: 0.093 grams (approximate)



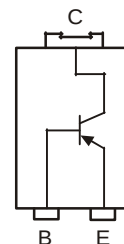
Top View



Bottom View



Device Schematic



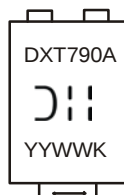
Pin Configuration

**Ordering Information** (Note 3)

| Part Number  | Case      | Packaging        |
|--------------|-----------|------------------|
| DXT790AP5-13 | 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**



- DXT790A = 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)

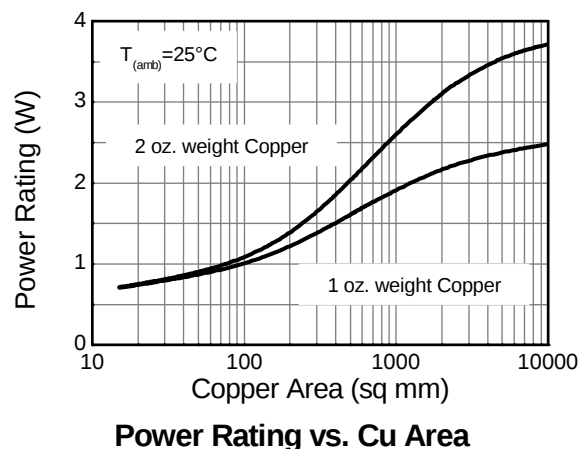
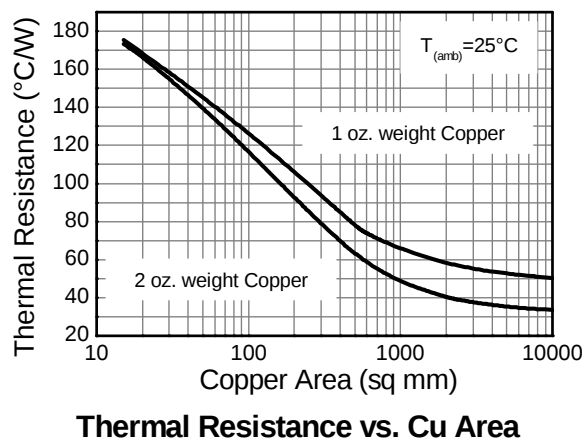
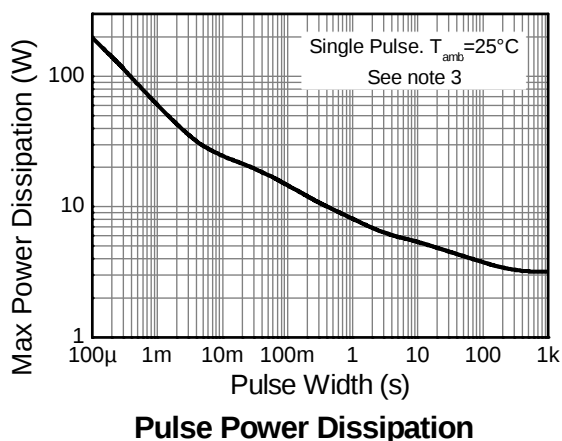
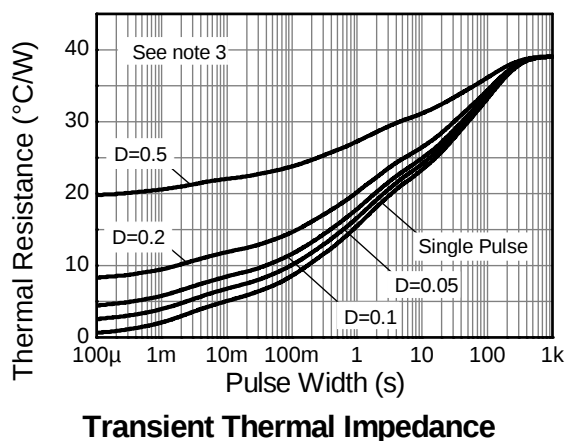
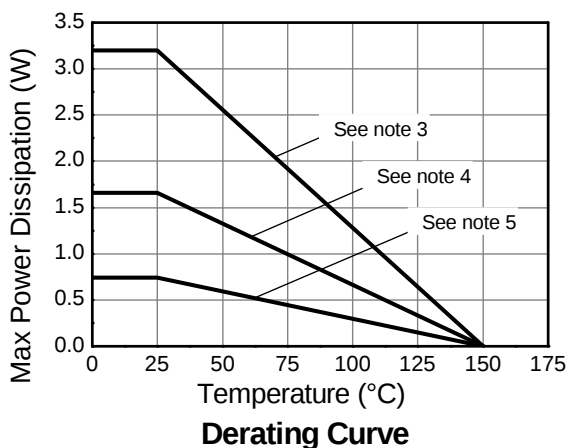
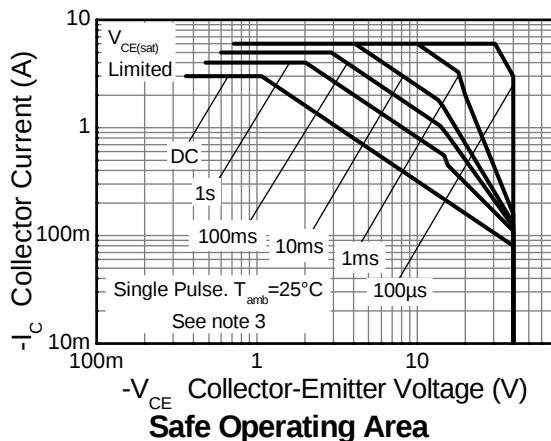
## Maximum Ratings @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic               | Symbol           | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage       | V <sub>CBO</sub> | -50   | V    |
| Collector-Emitter Voltage    | V <sub>CEO</sub> | -40   | V    |
| Emitter-Base Voltage         | V <sub>EBO</sub> | -5    | V    |
| Continuous Collector Current | I <sub>C</sub>   | -3    | A    |
| Peak Pulse Current           | I <sub>CM</sub>  | -6    | A    |
| Base Current                 | I <sub>B</sub>   | -0.5  | 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>                  | 8.9         | °C/W |
| Operating and Storage Temperature Range                                     | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

Notes: 4. Device mounted on 1.6mm FR-4 PCB, single sided 2 oz. copper collector pad dimensions 50mm x 50mm.  
5. Device mounted on 1.6mm FR-4 PCB, single sided 1 oz. copper collector pad dimensions 25mm x 25mm.  
6. Device mounted on 1.6mm FR-4 PCB, single sided 1 oz. copper minimum recommended pad layout.

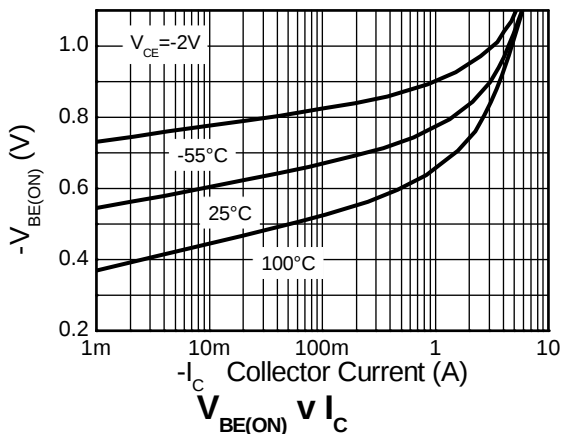
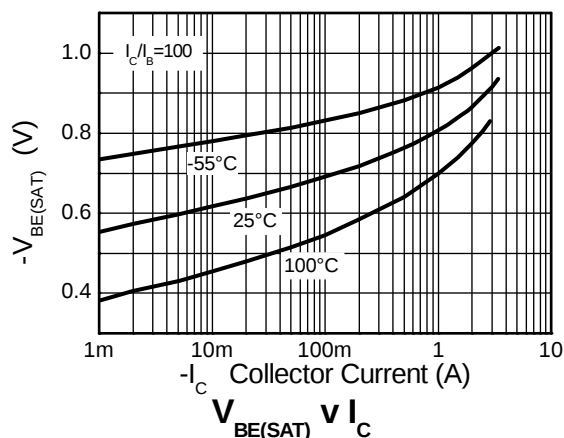
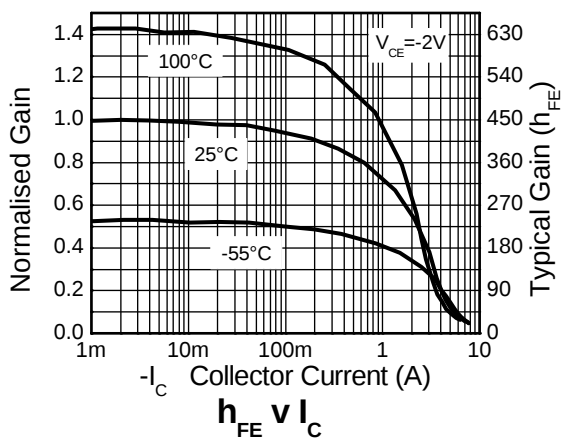
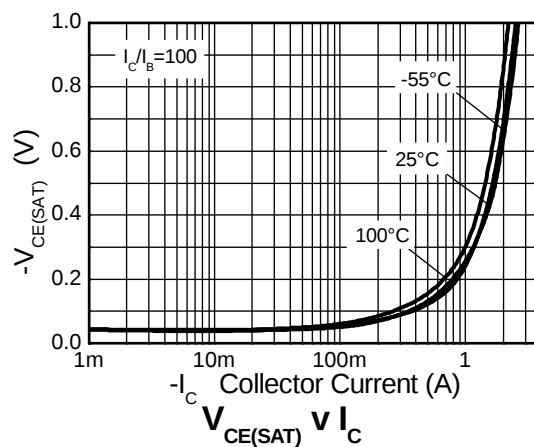
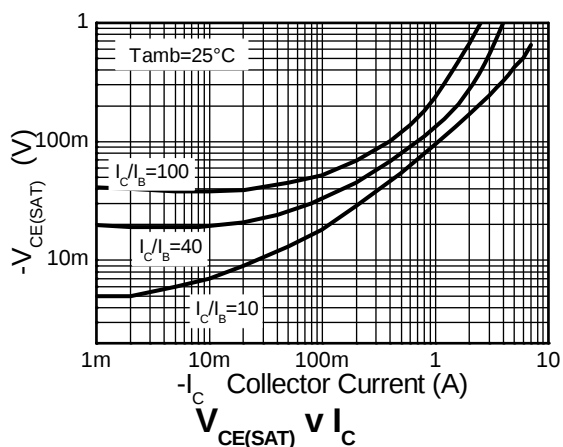


## Electrical Characteristics @T<sub>A</sub> = 25°C unless otherwise specified

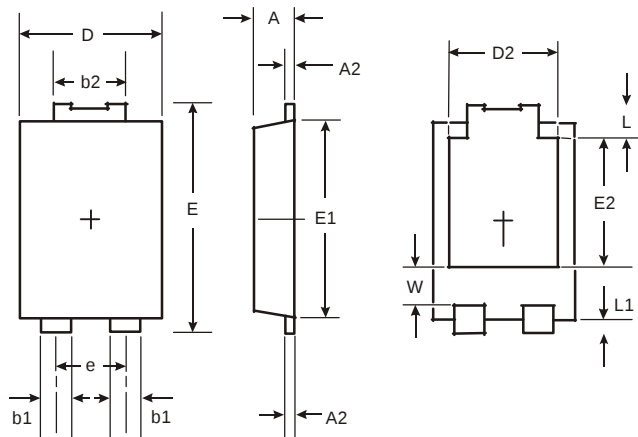
| Characteristic                               | Symbol               | Min | Typ | Max   | Unit | Test Condition                                           |
|----------------------------------------------|----------------------|-----|-----|-------|------|----------------------------------------------------------|
| OFF CHARACTERISTICS                          |                      |     |     |       |      |                                                          |
| Collector-Base Breakdown Voltage             | V <sub>(BR)CBO</sub> | -50 | —   | —     | V    | I <sub>C</sub> = -100μA, I <sub>E</sub> = 0              |
| Collector-Emitter Breakdown Voltage (Note 7) | V <sub>(BR)CEO</sub> | -40 | —   | —     | V    | I <sub>C</sub> = -10mA, I <sub>B</sub> = 0               |
| Emitter-Base Breakdown Voltage               | V <sub>(BR)EBO</sub> | -5  | —   | —     | V    | I <sub>E</sub> = -100μA, I <sub>C</sub> = 0              |
| Collector Cutoff Current                     | I <sub>CBO</sub>     | —   | —   | -20   | nA   | V <sub>CB</sub> = -30V, I <sub>E</sub> = 0               |
| Collector Cutoff Current                     | I <sub>CES</sub>     | —   | —   | -20   | nA   | V <sub>CB</sub> = -30V, V <sub>BE</sub> = 0              |
| Emitter Cutoff Current                       | I <sub>EBO</sub>     | —   | —   | -20   | nA   | V <sub>EB</sub> = -4V, I <sub>C</sub> = 0                |
| ON CHARACTERISTICS (Note 7)                  |                      |     |     |       |      |                                                          |
| Collector-Emitter Saturation Voltage         | V <sub>CE(SAT)</sub> | —   | —   | -170  | mV   | I <sub>C</sub> = -0.5A, I <sub>B</sub> = -5mA            |
|                                              |                      | —   | —   | -350  |      | I <sub>C</sub> = -1A, I <sub>B</sub> = -10mA             |
|                                              |                      | —   | —   | -450  |      | I <sub>C</sub> = -2A, I <sub>B</sub> = -50mA             |
|                                              |                      | —   | —   | -450  |      | I <sub>C</sub> = -3A, I <sub>B</sub> = -300mA            |
| Base-Emitter Saturation Voltage              | V <sub>BE(SAT)</sub> | —   | —   | -1.15 | V    | I <sub>C</sub> = -3A, I <sub>B</sub> = -300mA            |
| Base-Emitter Turn-On Voltage                 | V <sub>BE(ON)</sub>  | —   | —   | -1.0  | V    | V <sub>CE</sub> = -2V, I <sub>C</sub> = -3A              |
| DC Current Gain                              | h <sub>FE</sub>      | 300 | —   | 800   | —    | V <sub>CE</sub> = -2V, I <sub>C</sub> = -10mA            |
|                                              |                      | 250 | —   | —     |      | V <sub>CE</sub> = -2V, I <sub>C</sub> = -500mA           |
|                                              |                      | 200 | —   | —     |      | V <sub>CE</sub> = -2V, I <sub>C</sub> = -1A              |
|                                              |                      | 150 | —   | —     |      | V <sub>CE</sub> = -2V, I <sub>C</sub> = -2A              |
|                                              |                      | 80  | —   | —     |      | V <sub>CE</sub> = -2V, I <sub>C</sub> = -3A              |
| AC CHARACTERISTICS                           |                      |     |     |       |      |                                                          |
| Transition Frequency                         | f <sub>T</sub>       | 100 | —   | —     | MHz  | V <sub>CE</sub> = -5V, I <sub>C</sub> = -50mA, f = 50MHz |
| Output Capacitance                           | C <sub>obo</sub>     | —   | 24  | —     | pF   | V <sub>CB</sub> = -10V, f = 1MHz                         |
| Switching Times                              | t <sub>on</sub>      | —   | 35  | —     | ns   | V <sub>CC</sub> = -10V, I <sub>C</sub> = -500mA,         |
|                                              | t <sub>off</sub>     | —   | 600 | —     | ns   | I <sub>B1</sub> = I <sub>B2</sub> = -50mA                |

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

## Typical Characteristics

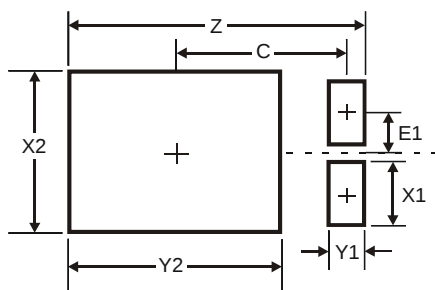


## Package Outline Dimensions



| 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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