

**DXTN07100BP5**
**100V NPN MEDIUM POWER LOW SATURATION TRANSISTOR**  
**PowerDI<sup>®</sup>5**
**Features**

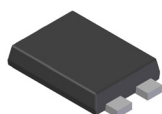
- $BV_{CEO} > 100V$
- $I_C = 2A$  High Continuous Collector Current
- $I_{CM} = 6A$  Peak Collector Current
- $P_D$  up to 3.2W
- 43% smaller than SOT223; 60% smaller than TO252
- Maximum height just 1.1mm
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

**Mechanical Data**

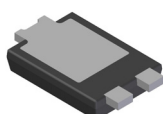
- Case: PowerDI5
- Case Material: Molded Plastic, "Green" Molding Compound.  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per  
MIL-STD-202, Method 208 @3
- Weight: 0.093 grams (approximate)

**Applications**

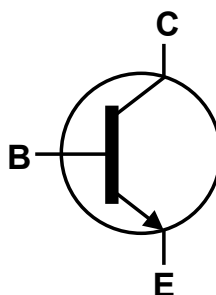
- Voltage Regulator using Emitter-Follower
- DC-DC Converter
- Telecoms
- Power Management



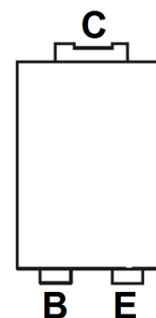
Top View



Bottom View



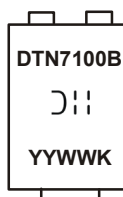
Device Schematic


 Top View  
Pin-Out

**Ordering Information** (Note 4)

| Product         | Compliance | Marking  | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-----------------|------------|----------|--------------------|-----------------|-------------------|
| DXTN07100BP5-13 | AEC-Q101   | DTN7100B | 13                 | 16              | 5,000             |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>

**Marking Information**


DTN7100B = 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)

**Absolute Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic               | Symbol           | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage       | V <sub>CBO</sub> | 120   | V    |
| Collector-Emitter Voltage    | V <sub>CEO</sub> | 100   | V    |
| Emitter-Base Voltage         | V <sub>EBO</sub> | 7     | V    |
| Continuous Collector Current | I <sub>C</sub>   | 2     | A    |
| Peak Pulse Current           | I <sub>CM</sub>  | 6     | A    |

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

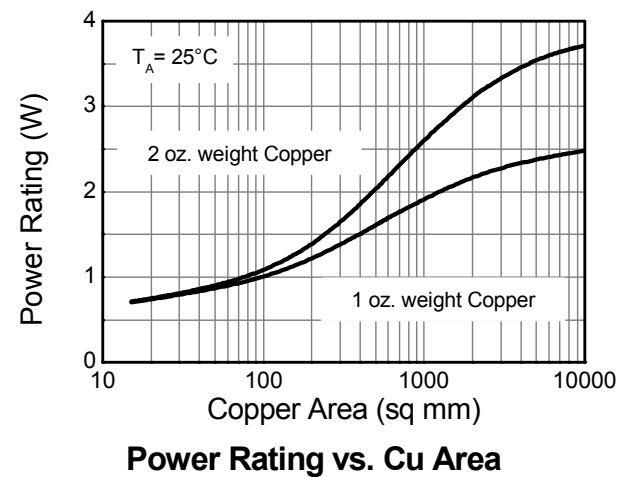
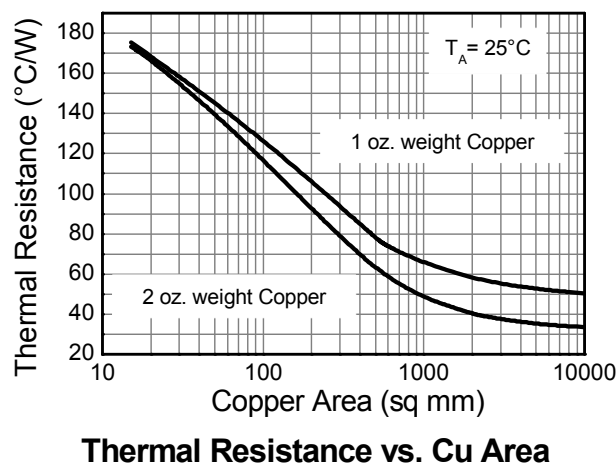
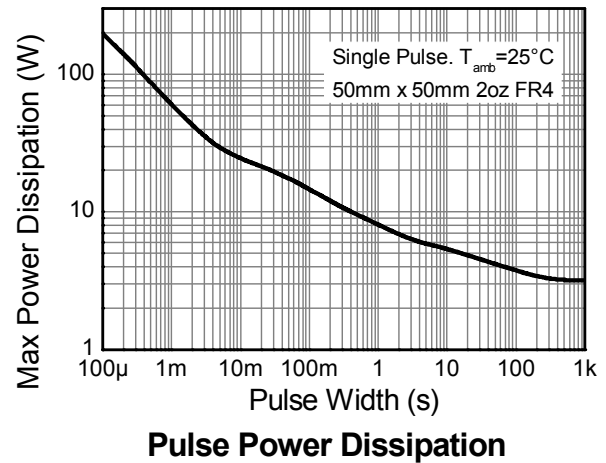
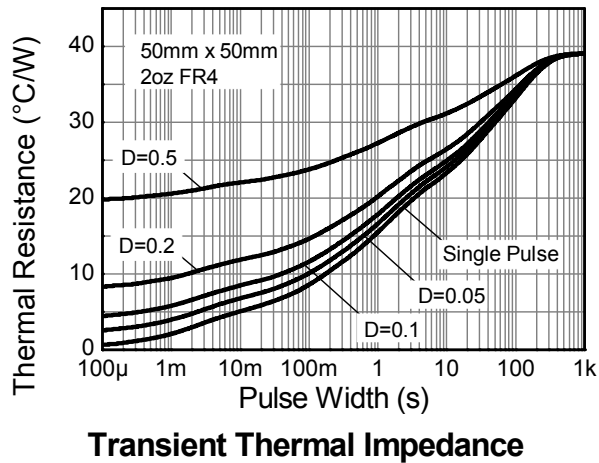
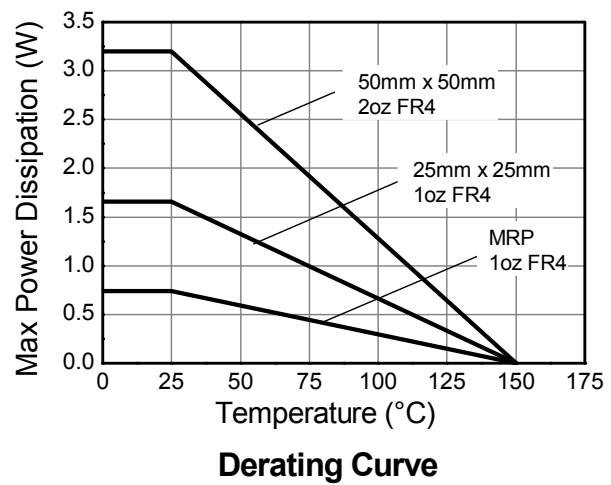
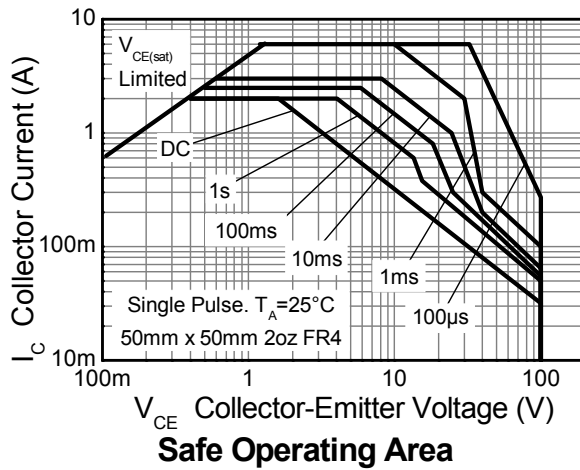
| Characteristic                              | Symbol                            | Value       | Unit |
|---------------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation                           | P <sub>D</sub>                    | 3.2         | W    |
|                                             |                                   | 1.7         |      |
|                                             |                                   | 0.74        |      |
| Thermal Resistance, Junction to Ambient Air | R <sub>θJA</sub>                  | 39          | °C/W |
|                                             |                                   | 75          |      |
|                                             |                                   | 169         |      |
| Thermal Resistance, Junction to Leads       | R <sub>θJL</sub>                  | 9           |      |
| Operating and Storage Temperature Range     | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

**ESD Ratings** (Note 9)

| Characteristic                             | Symbol  | Value | Unit | JEDEC Class |
|--------------------------------------------|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V    | 3A          |
| Electrostatic Discharge - Machine Model    | ESD MM  | 400   | V    | C           |

- Notes:
- For a device mounted with the exposed collector pad on 50mm x 50mm 2oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  - Same as note (5), except mounted on 25mm x 25mm 1oz copper.
  - Same as note (5), except mounted on minimum recommended pad (MRP) layout.
  - Thermal resistance from junction to solder-point (on the exposed collector pad).
  - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

## Thermal Characteristics and Derating Information

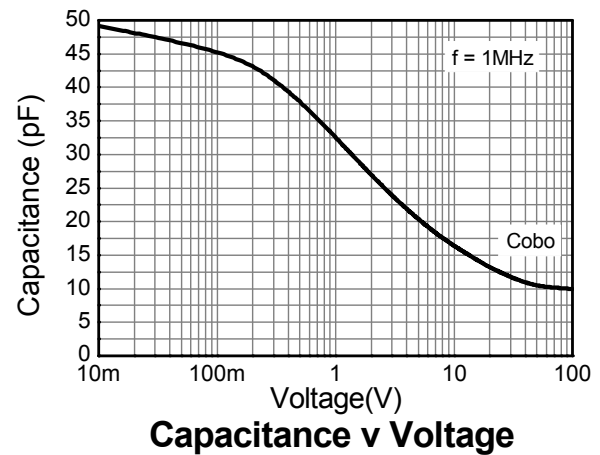
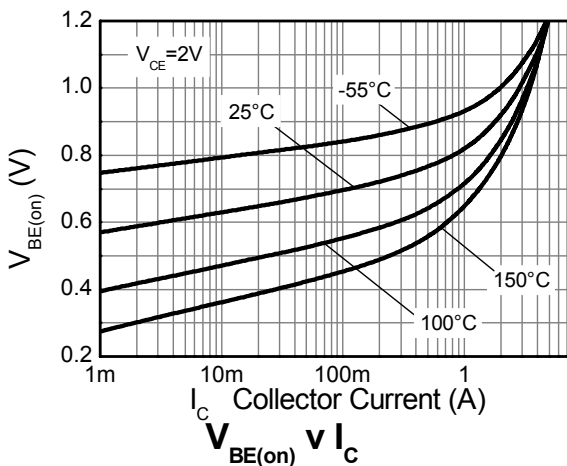
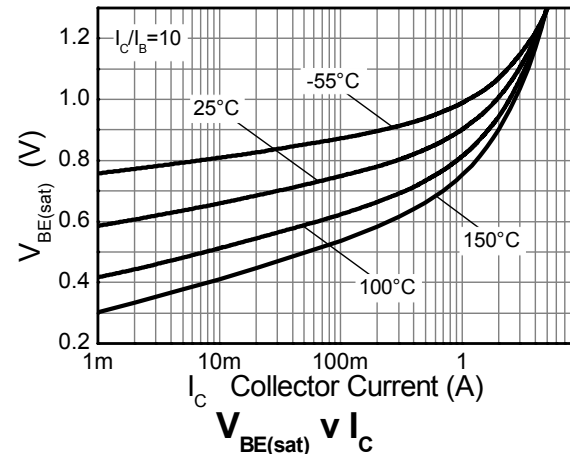
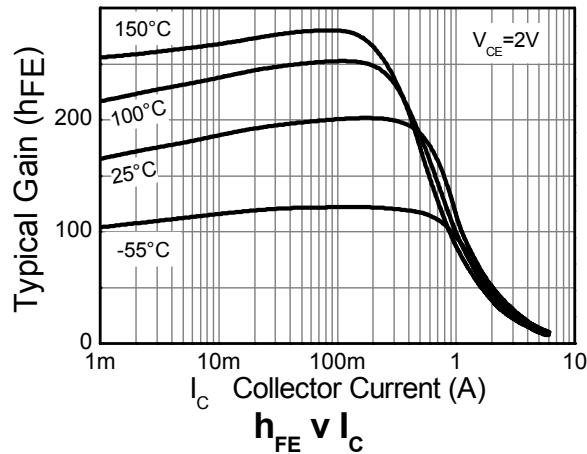
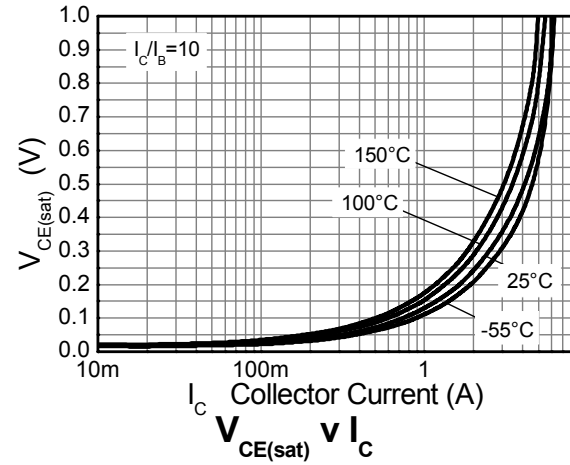
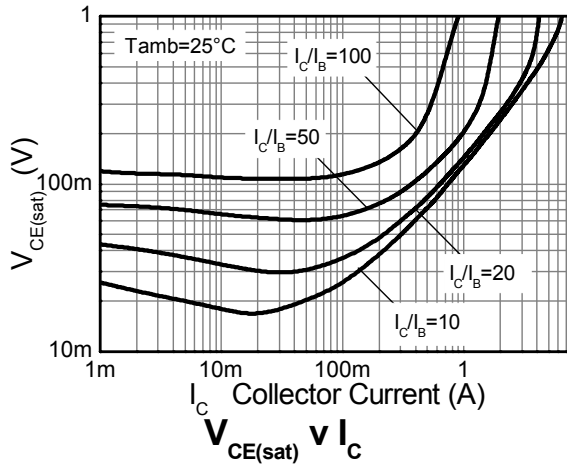


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                 | Symbol                              | Min                   | Typ                     | Max                | Unit     | Test Condition                                                                                                                                                                        |
|------------------------------------------------|-------------------------------------|-----------------------|-------------------------|--------------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage               | BV <sub>CBO</sub>                   | 120                   | —                       | —                  | V        | I <sub>C</sub> = 100μA                                                                                                                                                                |
| Collector-Emitter Breakdown Voltage (Note 10)  | BV <sub>CEO</sub>                   | 100                   | —                       | —                  | V        | I <sub>C</sub> = 10mA                                                                                                                                                                 |
| Emitter-Base Breakdown Voltage                 | BV <sub>EBO</sub>                   | 5                     | —                       | —                  | V        | I <sub>E</sub> = 100μA                                                                                                                                                                |
| Collector Cutoff Current                       | I <sub>CBO</sub>                    | —                     | —                       | 0.1<br>10          | μA       | V <sub>CB</sub> = 100V<br>V <sub>CB</sub> = 100V, T <sub>AMB</sub> = +100°C                                                                                                           |
| Emitter Cutoff Current                         | I <sub>EBO</sub>                    | —                     | —                       | 0.1                | μA       | V <sub>EB</sub> = 4V                                                                                                                                                                  |
| Collector-Emitter Saturation Voltage (Note 10) | V <sub>CE(sat)</sub>                | —                     | 0.13<br>0.23            | 0.3<br>0.5         | V        | I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA<br>I <sub>C</sub> = 2A, I <sub>B</sub> = 200mA                                                                                            |
| Base-Emitter Saturation Voltage (Note 10)      | V <sub>BE(sat)</sub>                | —                     | 0.9                     | 1.25               | V        | I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA                                                                                                                                           |
| Base-Emitter Turn-On Voltage (Note 10)         | V <sub>BE(on)</sub>                 | —                     | 0.8                     | 1.00               | V        | I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V                                                                                                                                             |
| DC Current Gain (Note 10)                      | h <sub>FE</sub>                     | 70<br>100<br>55<br>25 | 200<br>200<br>110<br>55 | —<br>300<br>—<br>— | —        | I <sub>C</sub> = 50mA, V <sub>CE</sub> = 2V<br>I <sub>C</sub> = 500mA, V <sub>CE</sub> = 2V<br>I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V<br>I <sub>C</sub> = 2A, V <sub>CE</sub> = 2V |
| Transition Frequency                           | f <sub>T</sub>                      | 140                   | 175                     | —                  | MHz      | I <sub>C</sub> = 100mA, V <sub>CE</sub> = 5V<br>f = 100MHz                                                                                                                            |
| Output Capacitance                             | C <sub>obo</sub>                    | —                     | —                       | 30                 | pF       | V <sub>CB</sub> = 10A, f = 1MHz                                                                                                                                                       |
| Switching Times                                | t <sub>on</sub><br>t <sub>off</sub> | —                     | 80<br>1200              | —                  | ns<br>ns | I <sub>C</sub> = 500mA, V <sub>CC</sub> = 10V,<br>I <sub>B1</sub> = I <sub>B2</sub> = 50mA                                                                                            |

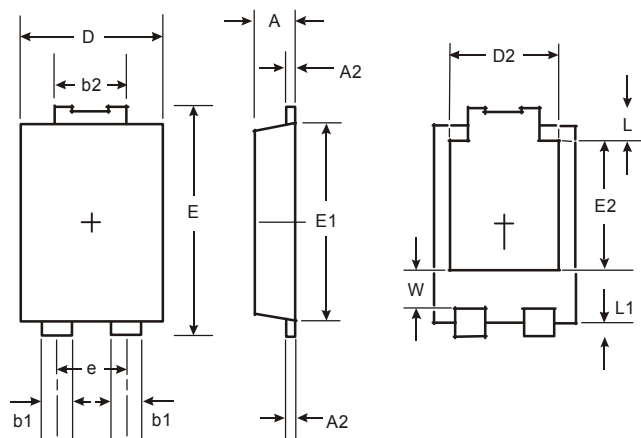
Note: 10. Pulse Test: Pulse width ≤ 300μs. Duty cycle ≤ 2.0%.

**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



## Package Outline Dimensions

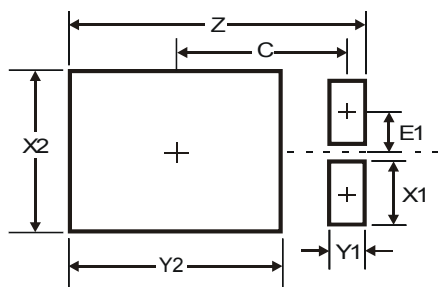
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| 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

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for latest version.



| 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           |

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device Terminals and PCB tracking.

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