

**60V PNP LOW VCESAT TRANSISTOR IN PowerDI3333-8**
**Features**

- $BV_{CEO} > -60V$
- Small Form Factor Thermally Efficient Package- Enables Higher Density End Products
- $I_C = -5.5A$  Continuous Collector Current
- $I_{CM} = -15A$  Peak Pulse Current
- Low Saturation Voltage  $V_{CE(sat)} < -70mV @ -1A$
- $R_{SAT} = 39m\Omega$  for a Low Equivalent On-Resistance
- $h_{FE}$  Specified Up to  $-10A$  for a High Gain Hold Up
- Complementary NPN Type: DXTN03060BFG
- Rated to  $+175^\circ C$  – Ideal For High Temperature Environment
- Wettable Flank For Improved Optical Inspection
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

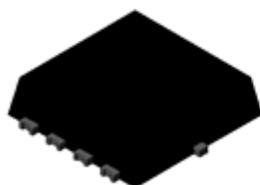
**Mechanical Data**

- Case: PowerDI<sup>®</sup> 3333-8
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability 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: 0.03 grams (Approximate)

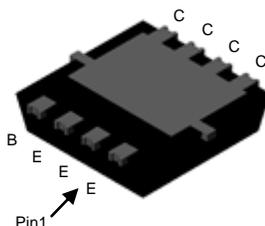
**Applications**

- Motor Driving
- Line Switching
- High Side Switches

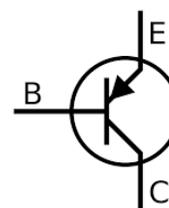
PowerDI3333-8 (SWP) (Type UX)



Top View



Bottom View



Device Symbol

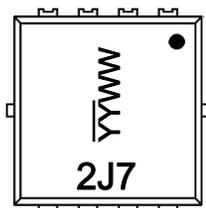
**Ordering Information** (Note 4)

| Part Number    | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|----------------|---------|--------------------|-----------------|-------------------|
| DXTP03060BFG-7 | 2J7     | 7                  | 12              | 2,000             |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

**Marking Information**

PowerDI3333-8 (SWP) (Type UX)



2J7= Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 19 = 2019)  
 WW = Week Code (01 to 53)

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

| Characteristic               | Symbol    | Value | Unit |
|------------------------------|-----------|-------|------|
| Collector-Base Voltage       | $V_{CB0}$ | -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** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

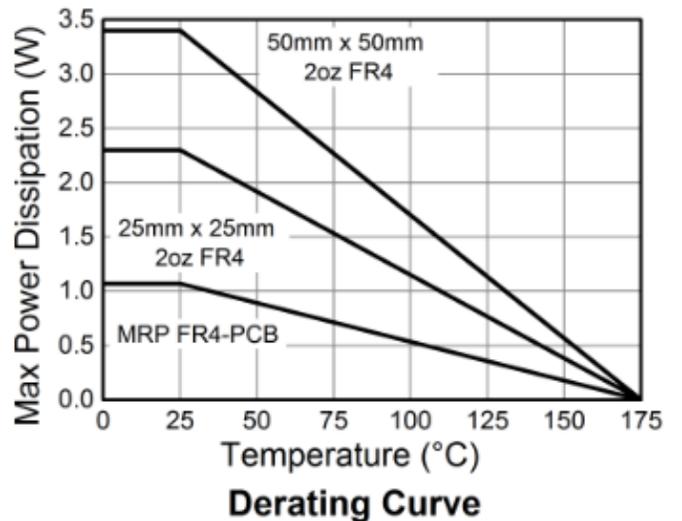
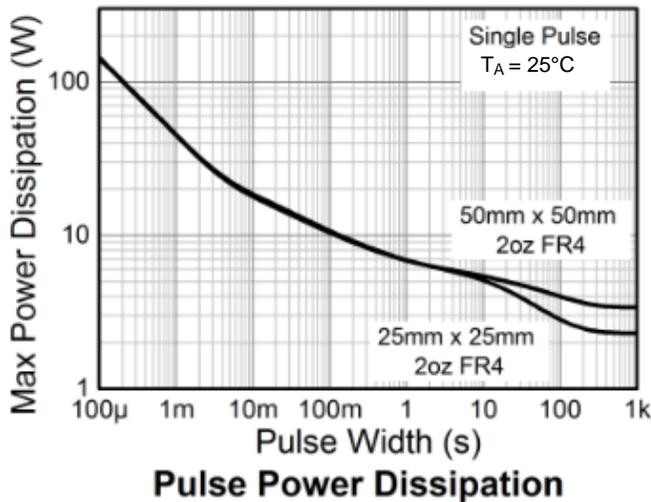
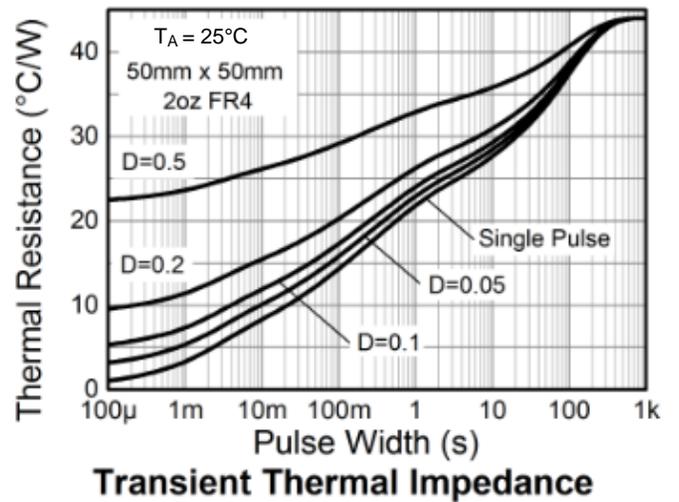
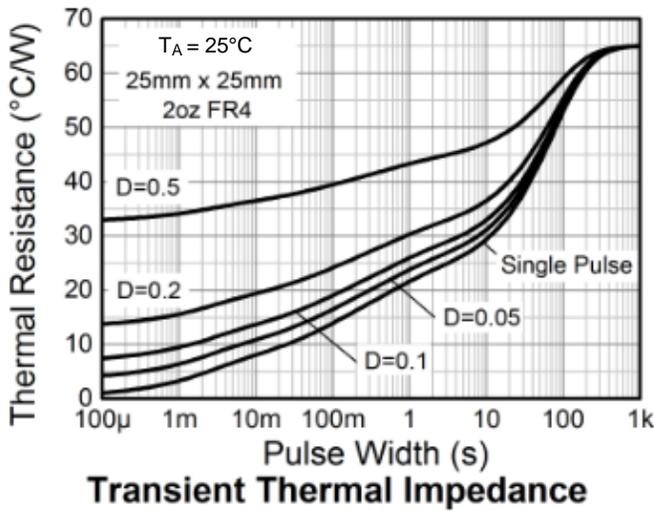
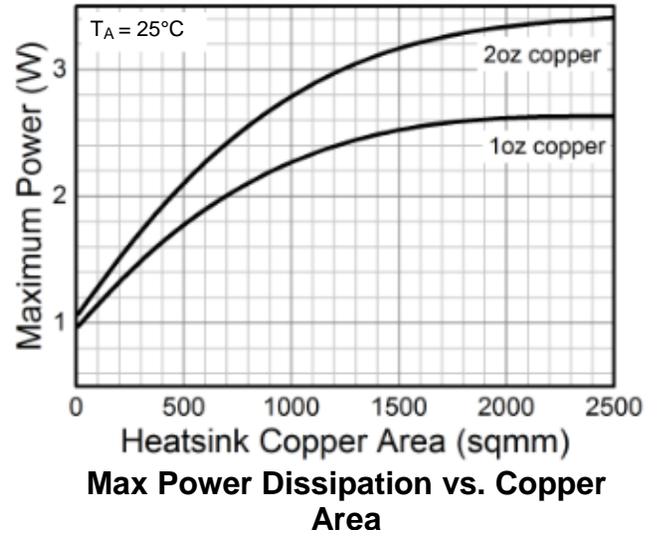
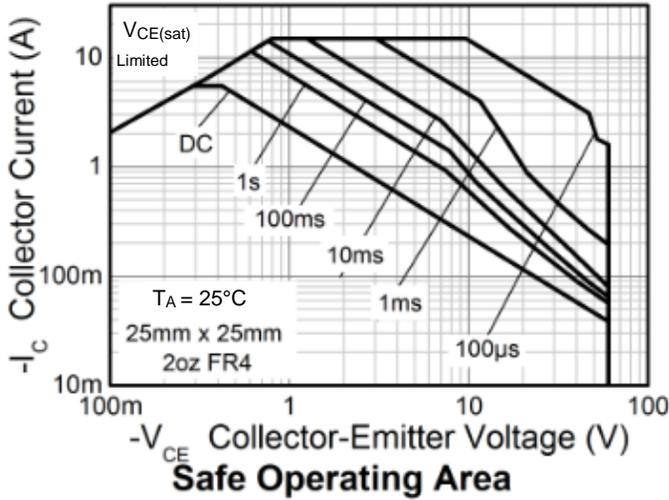
| Characteristic                                 | Symbol          | Value            | Unit               |
|------------------------------------------------|-----------------|------------------|--------------------|
| Power Dissipation                              | $P_D$           | (Note 5)<br>1.07 | W                  |
|                                                |                 | (Note 6)<br>2.3  | W                  |
|                                                |                 | (Note 7)<br>3.4  | W                  |
| Thermal Resistance, Junction to Ambient        | $R_{\theta JA}$ | (Note 5)<br>140  | $^\circ\text{C/W}$ |
|                                                |                 | (Note 6)<br>65   | $^\circ\text{C/W}$ |
|                                                |                 | (Note 7)<br>44   | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Leads (Note 8) | $R_{\theta JL}$ | 6                | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range        | $T_J, T_{STG}$  | -55 to +175      | $^\circ\text{C}$   |

**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  | $\geq 400$ | V    | C           |

- Notes:
5. For a device mounted with the collector tab on MRP FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  6. Same as Note 5, except the device is mounted on 25mm x 25mm 2oz copper.
  7. Same as Note 5, except the device is mounted on 50mm x 50mm 2oz copper.
  8. Thermal resistance from junction to solder-point (at the collector tab).
  9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

**Thermal Characteristics and Derating Information**

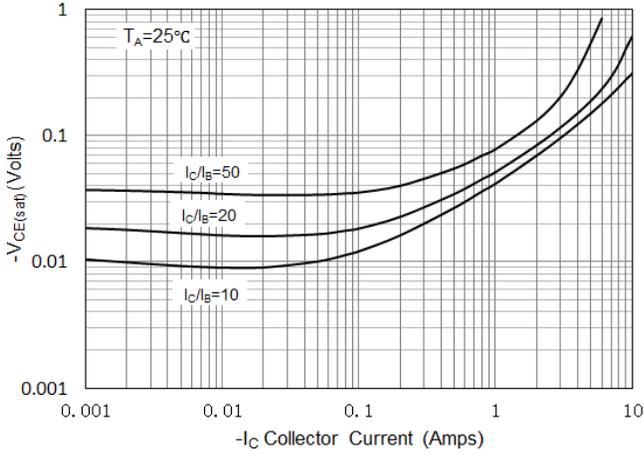


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

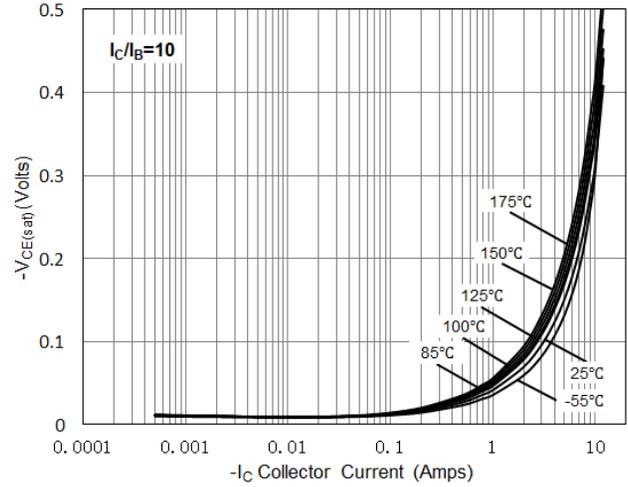
| Characteristic                                  | Symbol               | Min  | Typ   | Max   | Unit | Test Condition                                                                              |
|-------------------------------------------------|----------------------|------|-------|-------|------|---------------------------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage                | BV <sub>CBO</sub>    | -100 | -120  | —     | V    | I <sub>C</sub> = -100μA                                                                     |
| Collector-Emitter Breakdown Voltage             | BV <sub>CER</sub>    | -100 | -113  | —     | V    | I <sub>C</sub> = -1μA, R <sub>B</sub> ≤ 1kΩ                                                 |
| Collector-Emitter Breakdown Voltage (Note 10)   | BV <sub>CEO</sub>    | -60  | -77   | —     | V    | I <sub>C</sub> = -10mA                                                                      |
| Emitter-Base Breakdown Voltage                  | BV <sub>EBO</sub>    | -7   | -8.5  | —     | V    | I <sub>E</sub> = -100μA                                                                     |
| Collector-Base Cutoff Current                   | I <sub>CBO</sub>     | —    | -2    | -20   | nA   | V <sub>CB</sub> = -80V                                                                      |
|                                                 |                      | —    | —     | -100  | μA   | V <sub>CB</sub> = -80V, T <sub>A</sub> = +125°C                                             |
| Collector-Emitter Cutoff Current (R ≤ 1kΩ)      | I <sub>CER</sub>     | —    | -2    | -50   | nA   | V <sub>CB</sub> = -80V                                                                      |
|                                                 |                      | —    | —     | -100  | μA   | V <sub>CB</sub> = -80V, T <sub>A</sub> = +125°C                                             |
| Emitter Cutoff Current                          | I <sub>EBO</sub>     | —    | -1    | -20   | nA   | V <sub>EB</sub> = -6V                                                                       |
| Static Forward Current Transfer Ratio (Note 10) | h <sub>FE</sub>      | 100  | 207   | —     | —    | I <sub>C</sub> = -10mA, V <sub>CE</sub> = -2V                                               |
|                                                 |                      | 100  | 161   | 300   | —    | I <sub>C</sub> = -2A, V <sub>CE</sub> = -2V                                                 |
|                                                 |                      | 45   | 77    | —     | —    | I <sub>C</sub> = -5A, V <sub>CE</sub> = -2V                                                 |
|                                                 |                      | 10   | 25    | —     | —    | I <sub>C</sub> = -10A, V <sub>CE</sub> = -2V                                                |
| Collector-Emitter Saturation Voltage (Note 10)  | V <sub>CE(sat)</sub> | —    | -12   | -25   | mV   | I <sub>C</sub> = -100mA, I <sub>B</sub> = -10mA                                             |
|                                                 |                      | —    | -41   | -70   | mV   | I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA                                               |
|                                                 |                      | —    | -70   | -120  | mV   | I <sub>C</sub> = -2A, I <sub>B</sub> = -200mA                                               |
|                                                 |                      | —    | -150  | -250  | mV   | I <sub>C</sub> = -5A, I <sub>B</sub> = -500mA                                               |
| Base-Emitter Saturation Voltage (Note 10)       | V <sub>BE(sat)</sub> | —    | -1000 | -1150 | mV   | I <sub>C</sub> = -5A, I <sub>B</sub> = -500mA                                               |
| Base-Emitter Turn-On Voltage (Note 10)          | V <sub>BE(on)</sub>  | —    | -880  | -1020 | mV   | I <sub>C</sub> = -5A, V <sub>CE</sub> = -1V                                                 |
| Output Capacitance                              | C <sub>obo</sub>     | —    | 48    | —     | pF   | V <sub>CB</sub> = -10V, f = 1MHz                                                            |
| Transition Frequency                            | f <sub>T</sub>       | —    | 120   | —     | MHz  | V <sub>CE</sub> = -10V, I <sub>C</sub> = -100mA<br>f = 50MHz                                |
| Switching Time                                  | t <sub>delay</sub>   | —    | 9     | —     | ns   | V <sub>CC</sub> = -10V, I <sub>C</sub> = -1A<br>I <sub>B1</sub> = -I <sub>B2</sub> = -100mA |
|                                                 | t <sub>rise</sub>    | —    | 260   | —     | ns   |                                                                                             |
|                                                 | t <sub>storage</sub> | —    | 1205  | —     | ns   |                                                                                             |
|                                                 | t <sub>fall</sub>    | —    | 181   | —     | ns   |                                                                                             |

Note: 10. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

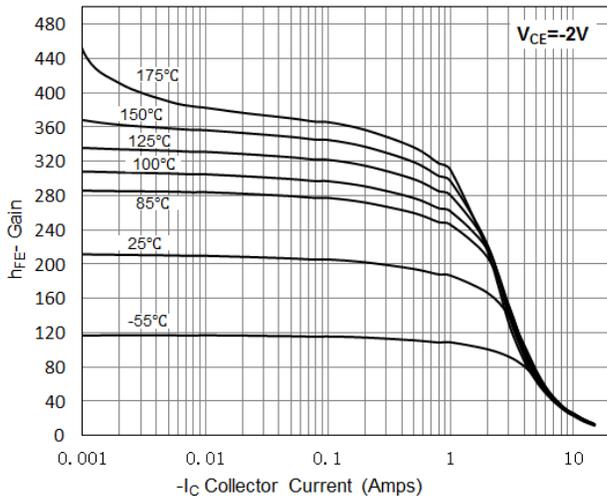
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



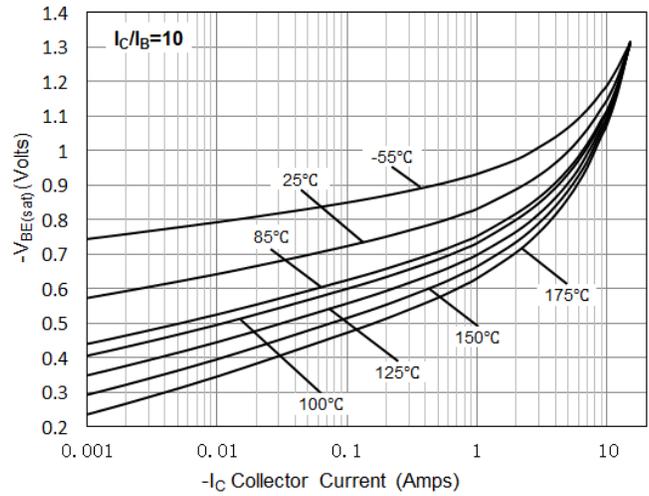
**$V_{CE(sat)}$  vs  $I_C$**



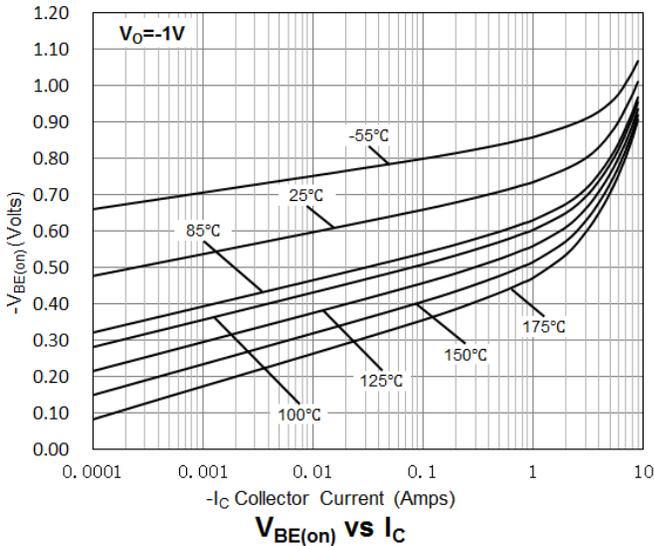
**$V_{CE(sat)}$  vs  $I_C$**



**$h_{FE}$  vs  $I_C$**



**$V_{BE(sat)}$  vs  $I_C$**

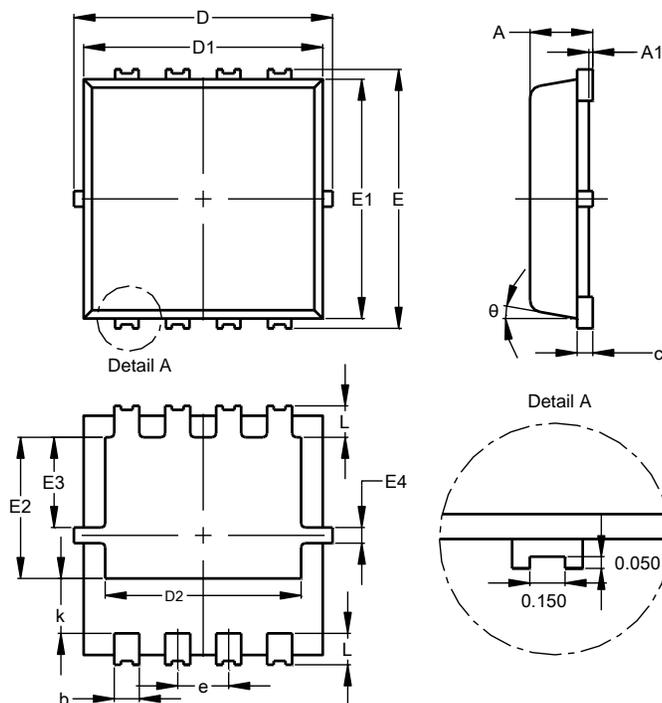


**$V_{BE(on)}$  vs  $I_C$**

**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**PowerDI3333-8 (SWP) (Type UX)**

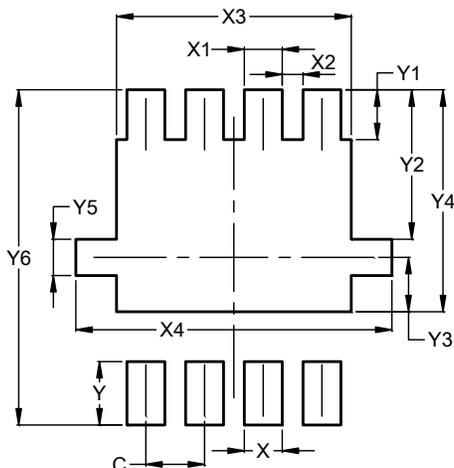


| PowerDI3333-8 (SWP)<br>(Type UX) |      |      |      |
|----------------------------------|------|------|------|
| Dim                              | Min  | Max  | Typ  |
| A                                | 0.75 | 0.85 | 0.80 |
| A1                               | 0.00 | 0.05 | --   |
| b                                | 0.25 | 0.40 | 0.32 |
| c                                | 0.10 | 0.25 | 0.15 |
| D                                | 3.20 | 3.40 | 3.30 |
| D1                               | 2.95 | 3.15 | 3.05 |
| D2                               | 2.30 | 2.70 | 2.50 |
| E                                | 3.20 | 3.40 | 3.30 |
| E1                               | 2.95 | 3.15 | 3.05 |
| E2                               | 1.60 | 2.00 | 1.80 |
| E3                               | 0.95 | 1.35 | 1.15 |
| E4                               | 0.10 | 0.30 | 0.20 |
| e                                | --   | --   | 0.65 |
| k                                | 0.50 | 0.90 | 0.70 |
| L                                | 0.30 | 0.50 | 0.40 |
| θ                                | 0°   | 12°  | 10°  |
| <b>All Dimensions in mm</b>      |      |      |      |

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**PowerDI3333-8 (SWP) (Type UX)**



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 0.650         |
| X          | 0.420         |
| X1         | 0.420         |
| X2         | 0.230         |
| X3         | 2.600         |
| X4         | 3.500         |
| Y          | 0.700         |
| Y1         | 0.550         |
| Y2         | 1.650         |
| Y3         | 0.600         |
| Y4         | 2.450         |
| Y5         | 0.400         |
| Y6         | 3.700         |

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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