

## Features

- $BV_{CEO} > 40V$
  - Small Form Factor Thermally Efficient Package. Enables Higher Density End Products
  - $I_C = 2A$  High Continuous Collector Current
  - $I_{CM} = 3A$  Peak Pulse Current
  - Low Saturation Voltage  $V_{CE(sat)} < 320mV @ 1A$
  - Complementary PNP Type: DXTP22040DFGQ
  - Wettable Flank for Improved Optical Inspection
  - **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
  - Halogen and Antimony Free. "Green" Device (Note 3)
  - The DXTN22040DFGQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.
- <https://www.diodes.com/quality/product-definitions/>

## Mechanical Data

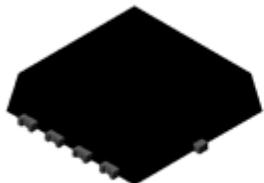
- Case: PowerDI®3333-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.03 grams (Approximate)

## Applications

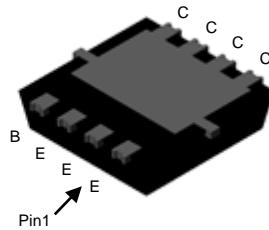
- DC to DC Conversion
- Supply Line Switching
- Low Drop Out Regulation
- LCD Backlighting

PowerDI3333-8 (SWP) (Type UX)

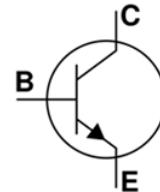
Equivalent Circuit



Top View



Bottom View



Device Symbol

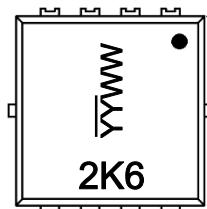
## Ordering Information (Note 4)

| Part Number     | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|-----------------|------------|---------|--------------------|-----------------|-------------------|
| DXTN22040DFGQ-7 | Automotive | 2K6     | 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)



2K6 = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 21 = 2021)  
 WW = Week Code (01 to 53)

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

| Characteristic               | Symbol    | Value | Unit |
|------------------------------|-----------|-------|------|
| Collector-Base Voltage       | $V_{CBO}$ | 50    | V    |
| Collector-Emitter Voltage    | $V_{CEO}$ | 40    | V    |
| Emitter-Base Voltage         | $V_{EBO}$ | 7     | V    |
| Continuous Collector Current | $I_C$     | 2     | A    |
| Peak Pulse Collector Current | $I_{CM}$  | 3     | A    |
| Continuous Base Current      | $I_B$     | 100   | mA   |
| Peak Pulse Base Current      | $I_{BM}$  | 200   | mA   |

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

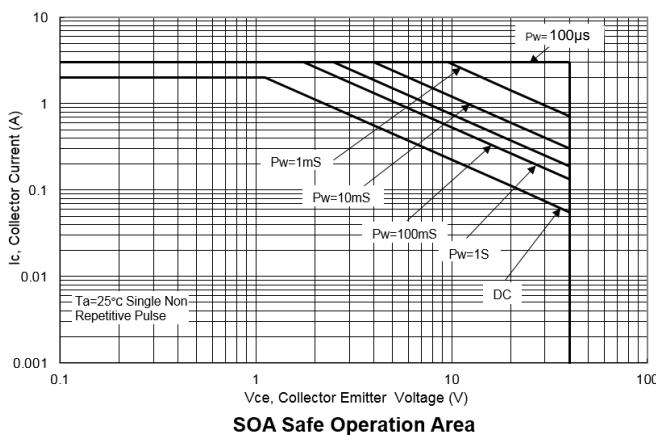
| Characteristic                                 | Symbol          | Value       | Unit |
|--|-----------------|-------------|------|
| Power Dissipation                              | $P_D$           | 1.1         | W    |
|  |                 | 2.3         | W    |
| Thermal Resistance, Junction to Ambient        | $R_{\theta JA}$ | 113         | °C/W |
|  |                 | 55          | °C/W |
| Thermal Resistance, Junction to Leads (Note 7) | $R_{\theta JL}$ | 7.4         | °C/W |
| Operating and Storage Temperature Range        | $T_J, T_{STG}$  | -55 to +150 | °C   |

**ESD Ratings** (Note 8)

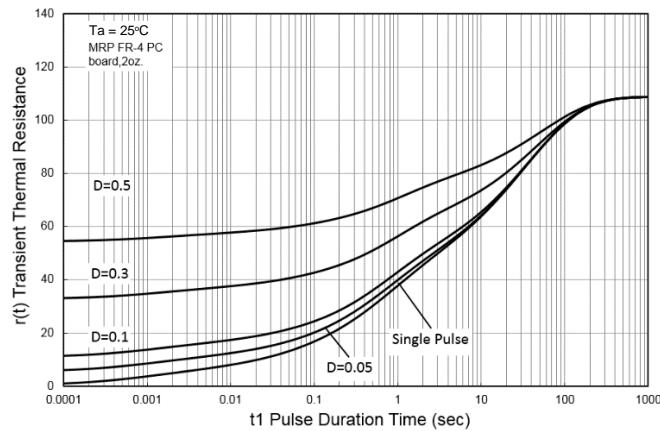
| Characteristic                             | Symbol  | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge – Human Body Model | ESD HBM | 4,000 | V    | 3A          |
| Charge Device Model                        | CDM     | 1,000 | V    | C5          |

- Notes:
- 5. For a device mounted with the collector tab on MRP FR4-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. Thermal resistance from junction to solder-point (at the collector tab).
  - 8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

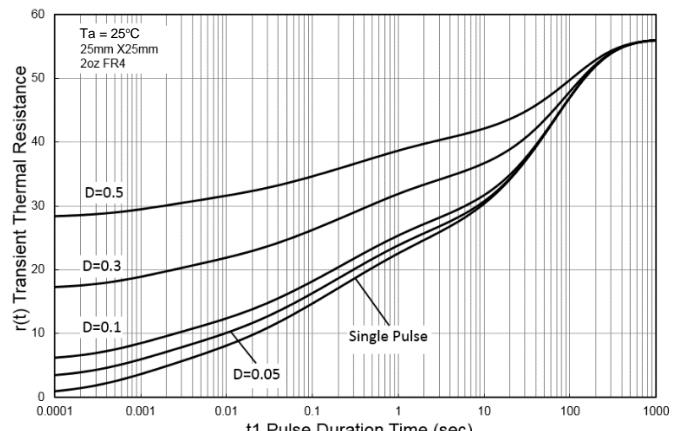
## Thermal Characteristics and Derating Information



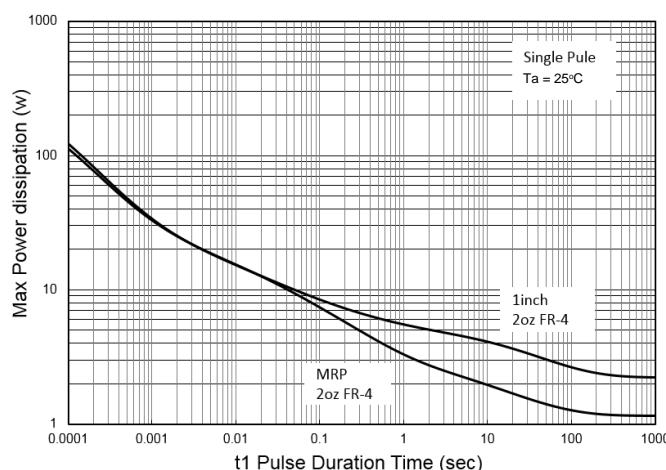
**SOA Safe Operation Area**



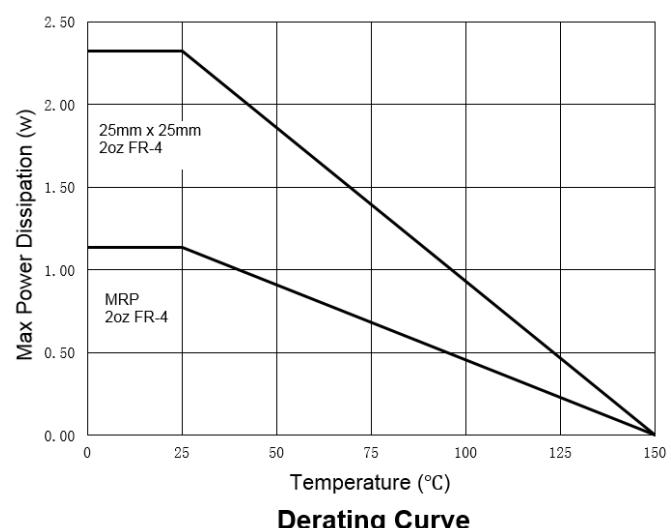
**Transient Thermal Resistance**



**Transient Thermal Resistance**



**Pulse Power dissipation**

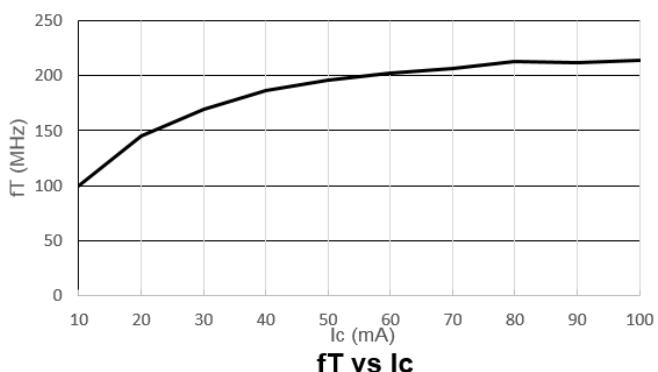
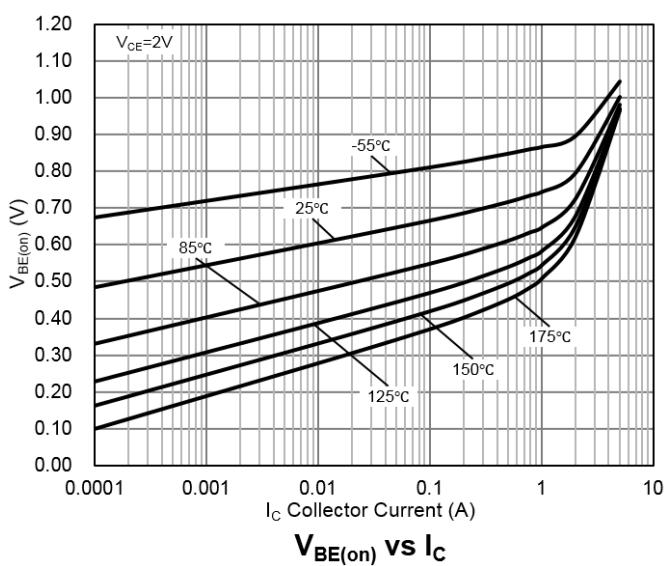
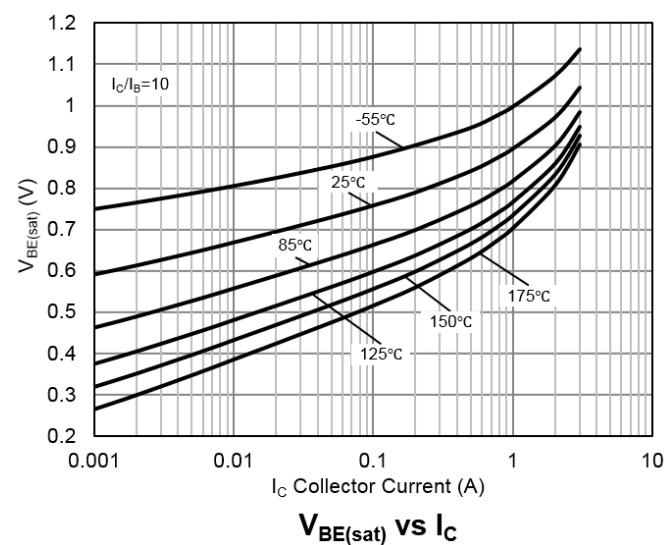
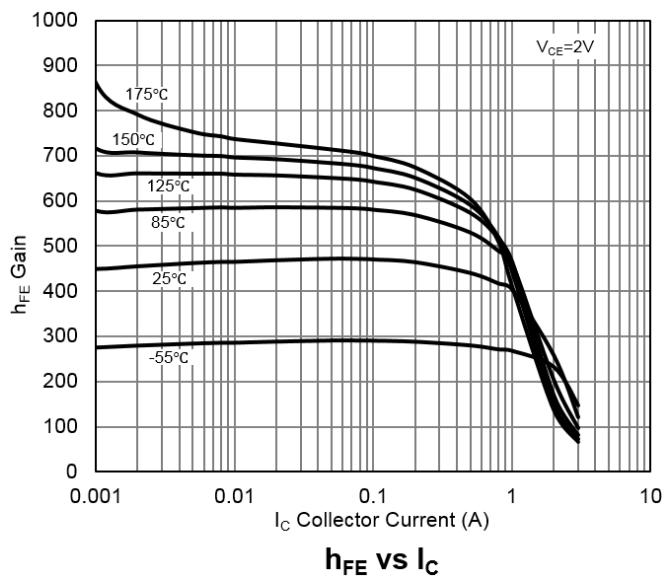
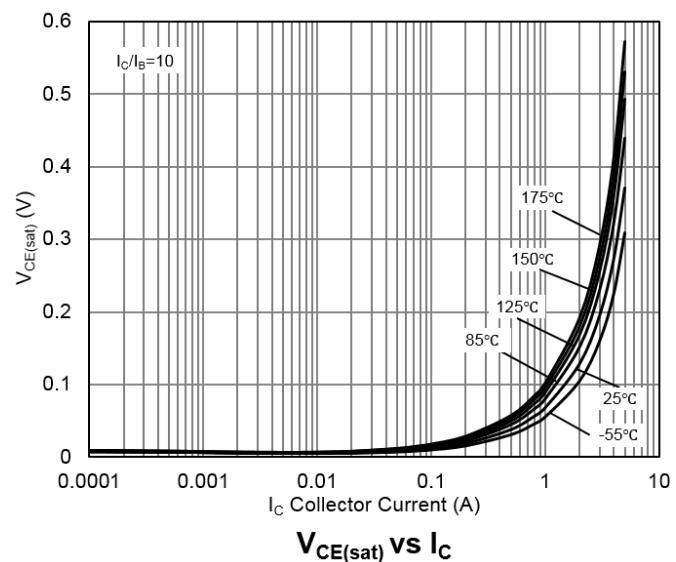
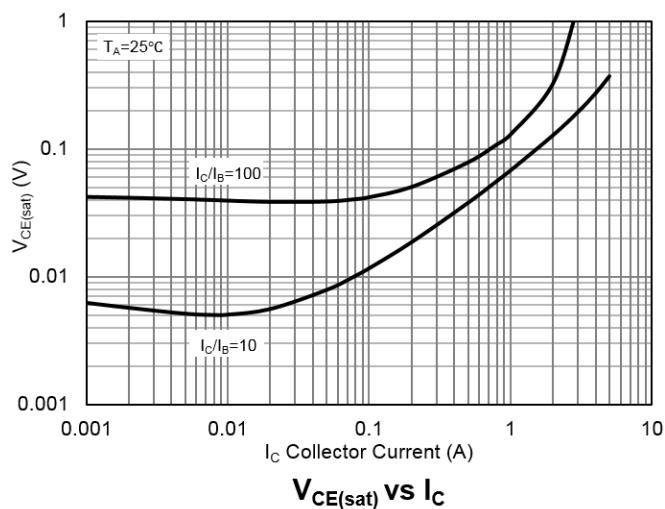


**Derating Curve**

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

| Characteristic                                 | Symbol                      | Min                      | Typ                          | Max                            | Unit                | Test Condition   |
|--|-----------------------------|--------------------------|------------------------------|--------------------------------|---------------------|--|
| Collector-Base Breakdown Voltage               | $\text{BV}_{\text{CBO}}$    | 50                       | 171                          | —                              | V                   | $I_C = 100\mu\text{A}$   |
| Collector-Emitter Breakdown Voltage (Note 9)   | $\text{BV}_{\text{CEO}}$    | 40                       | 54                           | —                              | V                   | $I_C = 10\text{mA}$  |
| Emitter-Base Breakdown Voltage                 | $\text{BV}_{\text{EBO}}$    | 7                        | 8.1                          | —                              | V                   | $I_E = 100\mu\text{A}$   |
| Collector-Base Cut-Off Current                 | $I_{\text{CBO}}$            | —                        | 1<br>0.01                    | 50<br>10                       | nA<br>$\mu\text{A}$ | $V_{\text{CB}} = 40\text{V}$<br>$V_{\text{CB}} = 40\text{V}, T_A = +150^\circ\text{C}$   |
| Emitter-Base Cut-Off Current                   | $I_{\text{EBO}}$            | —                        | 1                            | 20                             | nA                  | $V_{\text{EB}} = 6\text{V}$  |
| Collector-Emitter Cut-Off Current              | $I_{\text{CES}}$            | —                        | 1                            | 50                             | nA                  | $V_{\text{CE}} = 40\text{V}, V_{\text{BE}} = 0\text{V}$  |
| Static Forward Current Transfer Ratio (Note 9) | $\text{h}_{\text{FE}}$      | 300<br>300<br>200<br>140 | 464<br>468<br>445<br>377     | —<br>900<br>—<br>—             | —                   | $I_C = 1\text{mA}, V_{\text{CE}} = 2\text{V}$<br>$I_C = 500\text{mA}, V_{\text{CE}} = 2\text{V}$<br>$I_C = 1\text{A}, V_{\text{CE}} = 2\text{V}$<br>$I_C = 2\text{A}, V_{\text{CE}} = 2\text{V}$             |
| Collector-Emitter Saturation Voltage (Note 9)  | $V_{\text{CE}(\text{sat})}$ | —                        | 43<br>38<br>68<br>126<br>187 | 80<br>120<br>220<br>350<br>600 | mV                  | $I_C = 100\text{mA}, I_B = 1\text{mA}$<br>$I_C = 500\text{mA}, I_B = 50\text{mA}$<br>$I_C = 1\text{A}, I_B = 100\text{mA}$<br>$I_C = 2\text{A}, I_B = 200\text{mA}$<br>$I_C = 3\text{A}, I_B = 300\text{mA}$ |
| Base-Emitter Saturation Voltage (Note 9)       | $V_{\text{BE}(\text{sat})}$ | —                        | 0.9                          | 1.1                            | V                   | $I_C = 1\text{A}, I_B = 100\text{mA}$  |
| Base-Emitter Turn-On Voltage (Note 9)          | $V_{\text{BE}(\text{on})}$  | —                        | 0.74                         | 1                              | V                   | $I_C = 1\text{A}, V_{\text{CE}} = 5\text{V}$   |
| Input Capacitance                              | $C_{\text{i}bo}$            | —                        | 161                          | —                              | pF                  | $V_{\text{EB}} = 0.5\text{V}, f = 1\text{MHz}$   |
| Output Capacitance                             | $C_{\text{o}bo}$            | —                        | 11                           | —                              | pF                  | $V_{\text{CB}} = 10\text{V}, f = 1\text{MHz}$  |
| Transition Frequency                           | $f_T$                       | —                        | 198                          | —                              | MHz                 | $I_C = 50\text{mA}, V_{\text{CE}} = 10\text{V}$<br>$f = 100\text{MHz}$   |
| Switching Time                                 | $t_{\text{delay}}$          | —                        | 7.9                          | —                              | ns                  | $I_C = 1\text{A}, V_{\text{CC}} = 10\text{V},$<br>$I_{B1} = -I_{B2} = 100\text{mA}$  |
|  | $t_{\text{rise}}$           | —                        | 2.9                          | —                              | ns                  |  |
|  | $t_{\text{storage}}$        | —                        | 673                          | —                              | ns                  |  |
|  | $t_{\text{fall}}$           | —                        | 26.8                         | —                              | ns                  |  |

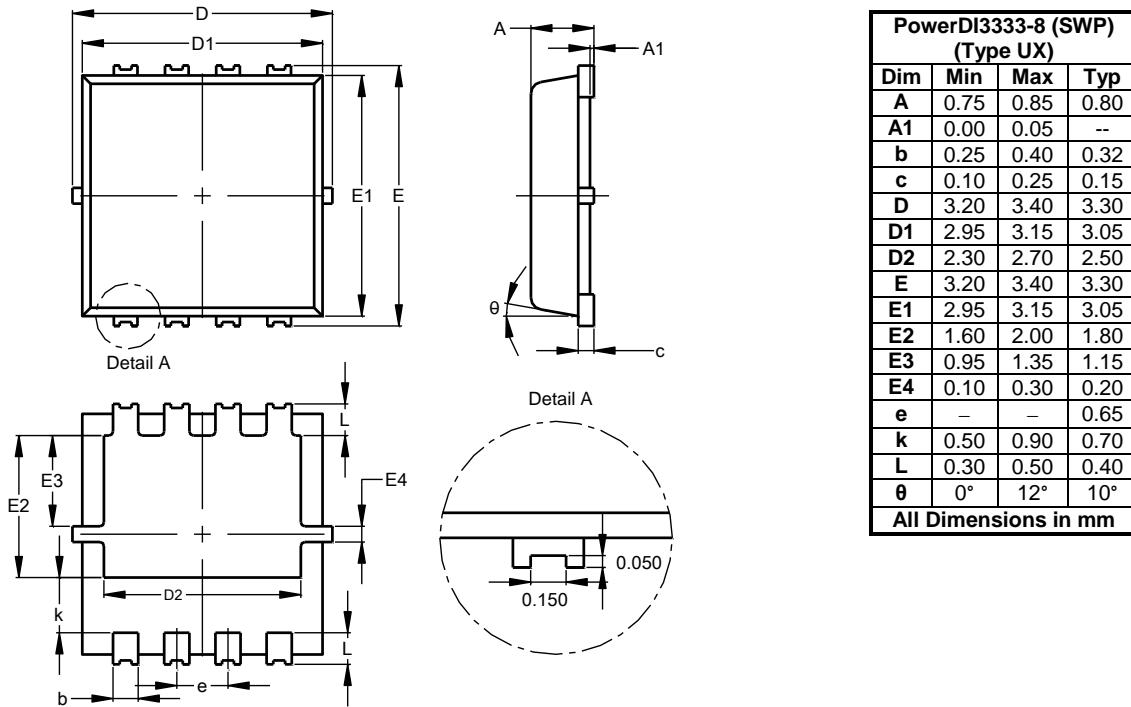
Note: 9. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .



## Package Outline Dimensions

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

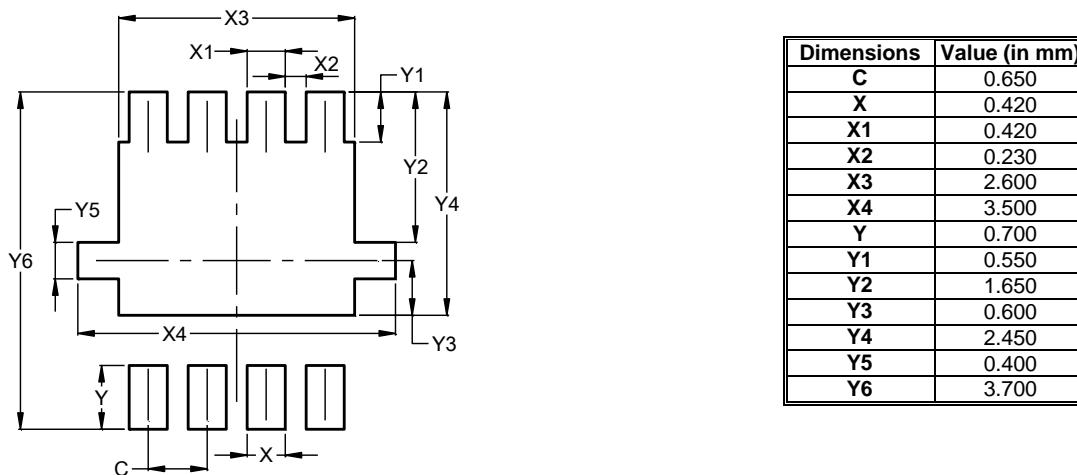
PowerDI3333-8 (SWP) (Type UX)



## Suggested Pad Layout

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

PowerDI3333-8 (SWP) (Type UX)



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