

## Product Summary

| BV <sub>DSS</sub> | R <sub>DS(ON)</sub> Max        | I <sub>D</sub> Max<br>T <sub>C</sub> = +25°C |
|-------------------|--------------------------------|----------------------------------------------|
| 30V               | 1.6mΩ @ V <sub>GS</sub> = 10V  | 120A                                         |
|                   | 2.6mΩ @ V <sub>GS</sub> = 4.5V | 97A                                          |

## Description and Applications

This MOSFET is designed to minimize the on-state resistance (R<sub>DS(ON)</sub>) yet maintain superior switching performance, making it ideal for high-efficiency power-management applications.

- Backlighting
- Power-management functions
- DC-DC converters

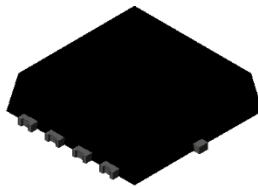
## Features and Benefits

- Low R<sub>DS(ON)</sub> – Ensures On-State Losses Are Minimized
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- Occupies Just 33% of the Board Area Occupied by SO-8 Enabling Smaller End Product
- Wettable Flank for Improved Optical Inspection
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](https://www.diodes.com/quality/product-definitions/) or your local Diodes representative.  
<https://www.diodes.com/quality/product-definitions/>

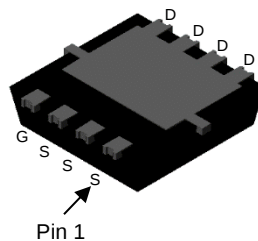
## Mechanical Data

- Package: PowerDI®3333-8
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208③
- Weight: 0.03 grams (Approximate)

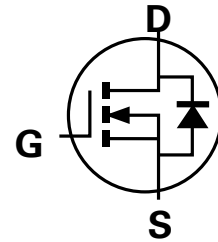
PowerDI3333-8/SWP (Type UX)



Top View



Bottom View



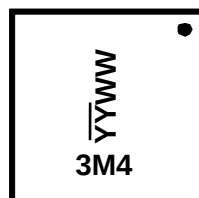
Equivalent Circuit

## Ordering Information (Note 4)

| Orderable Part Number | Package                     | Packing |             |
|-----------------------|-----------------------------|---------|-------------|
|                       |                             | Qty.    | Carrier     |
| DMT31M4LFVW-7         | PowerDI3333-8/SWP (Type UX) | 2000    | Tape & Reel |
| DMT31M4LFVW-13        | PowerDI3333-8/SWP (Type UX) | 3000    | Tape & Reel |

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
  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



3M4 = Product Type Marking Code  
YYWW = Date Code Marking  
YY = Last Two Digits of Year (ex: 25 = 2025)  
WW = Week Code (01 to 53)

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

| Characteristic                                                  | Symbol           | Value     | Unit |
|-----------------------------------------------------------------|------------------|-----------|------|
| Drain-Source Voltage                                            | V <sub>DSS</sub> | 30        | V    |
| Gate-Source Voltage                                             | V <sub>GSS</sub> | ±20       | V    |
| Continuous Drain Current, V <sub>GS</sub> = 10V (Note 5)        | I <sub>D</sub>   | 34<br>27  | A    |
| Continuous Drain Current, V <sub>GS</sub> = 10V (Note 6)        | I <sub>D</sub>   | 120<br>96 | A    |
| Maximum Continuous Body Diode Forward Current (Note 5)          | I <sub>S</sub>   | 3.5       | A    |
| Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)              | I <sub>DM</sub>  | 448       | A    |
| Pulsed Body Diode Forward Current (10μs Pulse, Duty Cycle = 1%) | I <sub>SM</sub>  | 448       | A    |
| Avalanche Current, L = 0.1mH                                    | I <sub>AS</sub>  | 50        | A    |
| Avalanche Energy, L = 0.1mH                                     | E <sub>AS</sub>  | 128       | mJ   |

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

| Characteristic                                   | Symbol                            | Value       | Unit |
|--------------------------------------------------|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5)                 | P <sub>D</sub>                    | 3.2         | W    |
| Thermal Resistance, Junction to Ambient (Note 5) | R <sub>θJA</sub>                  | 38.4        | °C/W |
| Total Power Dissipation (Note 7)                 | P <sub>D</sub>                    | 1.4         | W    |
| Thermal Resistance, Junction to Ambient (Note 7) | R <sub>θJA</sub>                  | 90.6        | °C/W |
| Thermal Resistance, Junction to Case (Note 6)    | R <sub>θJC</sub>                  | 3.06        | °C/W |
| Operating and Storage Temperature Range          | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

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

| Characteristic                             | Symbol              | Min | Typ  | Max  | Unit | Test Condition                                                                               |
|--------------------------------------------|---------------------|-----|------|------|------|----------------------------------------------------------------------------------------------|
| <b>OFF CHARACTERISTICS (Note 8)</b>        |                     |     |      |      |      |                                                                                              |
| Drain-Source Breakdown Voltage             | BV <sub>DSS</sub>   | 30  | —    | —    | V    | V <sub>GS</sub> = 0, I <sub>D</sub> = 250μA                                                  |
| Zero Gate Voltage Drain Current            | I <sub>DSS</sub>    | —   | —    | 1    | μA   | V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0                                                   |
| Gate-Source Leakage                        | I <sub>GSS</sub>    | —   | —    | ±100 | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0                                                  |
| <b>ON CHARACTERISTICS (Note 8)</b>         |                     |     |      |      |      |                                                                                              |
| Gate Threshold Voltage                     | V <sub>GS(TH)</sub> | 1.2 | —    | 2.5  | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA                                   |
| Static Drain-Source On-Resistance          | R <sub>DS(ON)</sub> | —   | 1.1  | 1.6  | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 30A                                                  |
|                                            |                     | —   | 2.3  | 2.6  |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 30A                                                 |
| Diode Forward Voltage                      | V <sub>SD</sub>     | —   | 0.7  | 1.2  | V    | V <sub>GS</sub> = 0, I <sub>S</sub> = 1A                                                     |
| <b>DYNAMIC CHARACTERISTICS (Note 9)</b>    |                     |     |      |      |      |                                                                                              |
| Input Capacitance                          | C <sub>iss</sub>    | —   | 2955 | —    | pF   | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0,<br>f = 1.0MHz                                    |
| Output Capacitance                         | C <sub>oss</sub>    | —   | 899  | —    | pF   |                                                                                              |
| Reverse Transfer Capacitance               | C <sub>rss</sub>    | —   | 54   | —    | pF   |                                                                                              |
| Gate Resistance                            | R <sub>g</sub>      | —   | 1.51 | —    | Ω    | V <sub>DS</sub> = 0, V <sub>GS</sub> = 0,<br>f = 1.0MHz                                      |
| Total Gate Charge (V <sub>GS</sub> = 4.5V) | Q <sub>g</sub>      | —   | 18.2 | —    | nC   | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 4.5V,<br>I <sub>D</sub> = 10A                       |
| Total Gate Charge (V <sub>GS</sub> = 10V)  | Q <sub>g</sub>      | —   | 37.3 | —    | nC   |                                                                                              |
| Gate-Source Charge                         | Q <sub>gs</sub>     | —   | 7.8  | —    | nC   |                                                                                              |
| Gate-Drain Charge                          | Q <sub>gd</sub>     | —   | 4.1  | —    | nC   |                                                                                              |
| Turn-On Delay Time                         | t <sub>D(ON)</sub>  | —   | 4.5  | —    | ns   | V <sub>GS</sub> = 10V, V <sub>DD</sub> = 15V,<br>R <sub>G</sub> = 3.3Ω, I <sub>D</sub> = 10A |
| Turn-On Rise Time                          | t <sub>R</sub>      | —   | 12   | —    | ns   |                                                                                              |
| Turn-Off Delay Time                        | t <sub>D(OFF)</sub> | —   | 22.9 | —    | ns   |                                                                                              |
| Turn-Off Fall Time                         | t <sub>F</sub>      | —   | 12   | —    | ns   |                                                                                              |

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
  - Thermal resistance from junction to soldering point (on the exposed drain pad).
  - Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

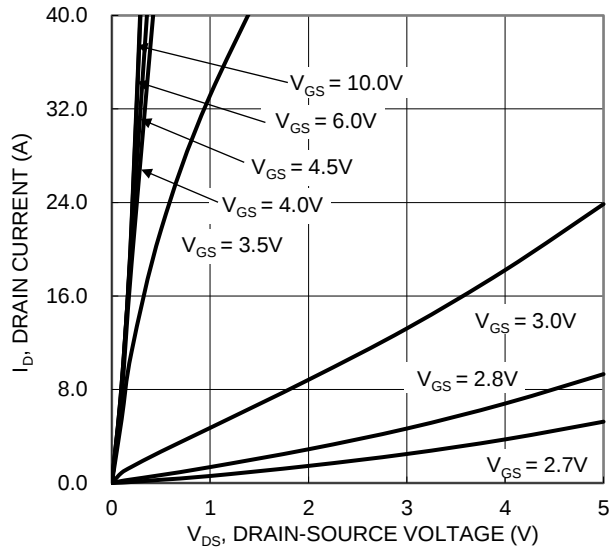


Figure 1. Typical Output Characteristic

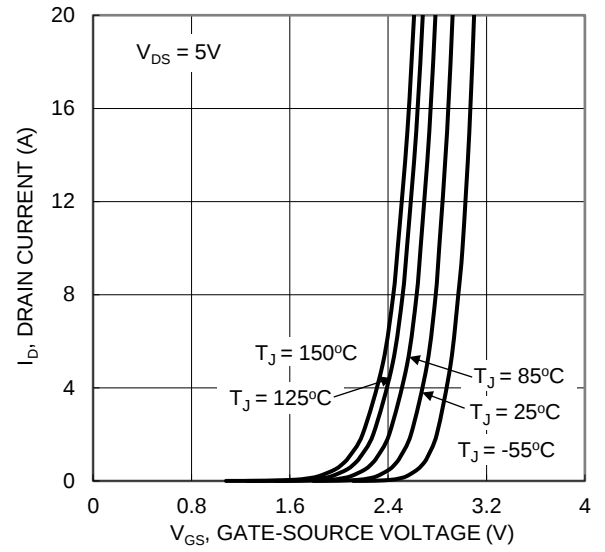


Figure 2. Typical Transfer Characteristic

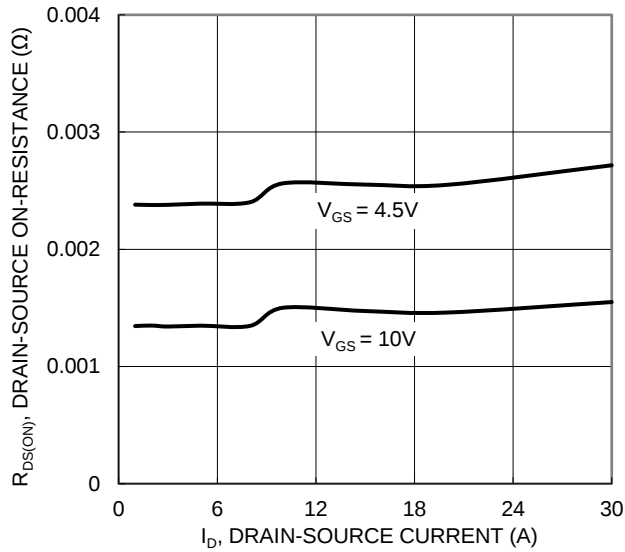


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

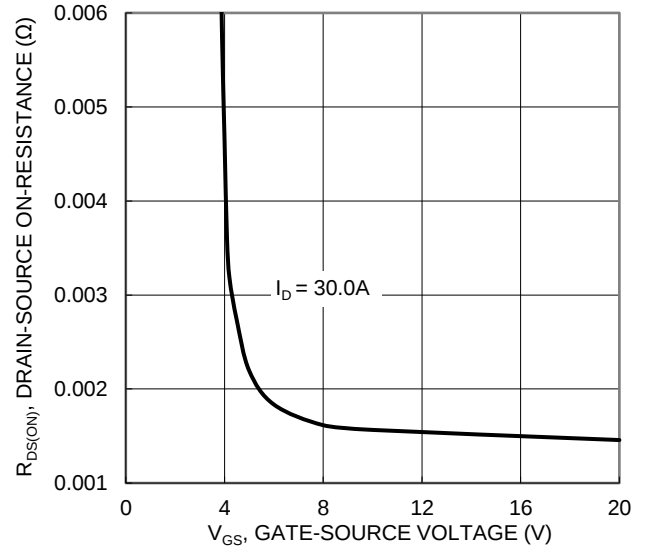


Figure 4. Typical Transfer Characteristic

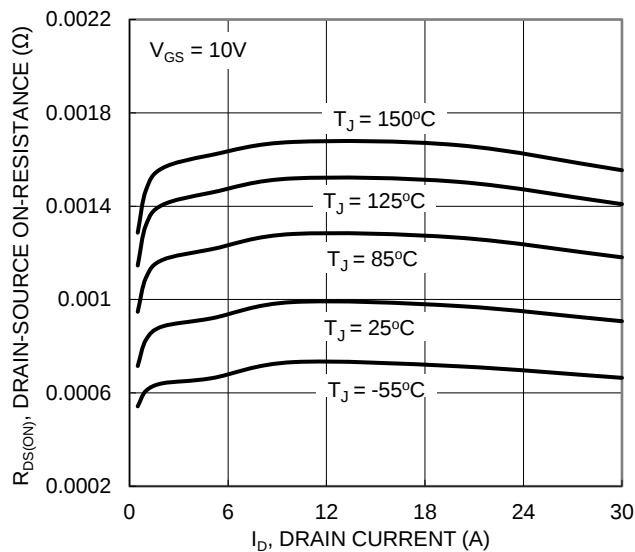


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

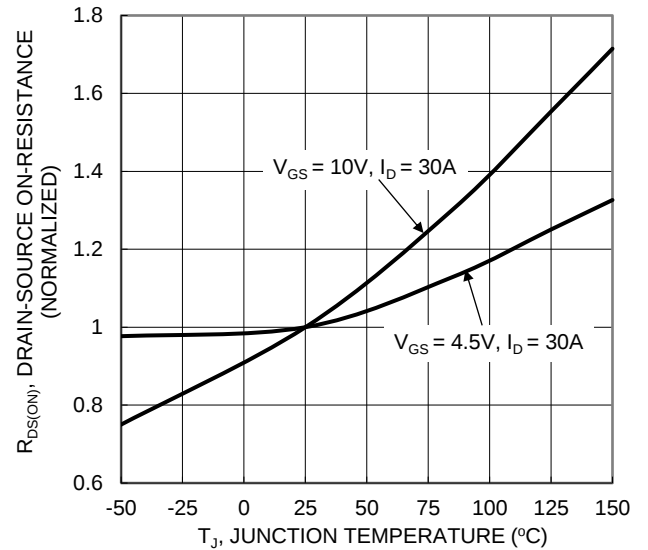
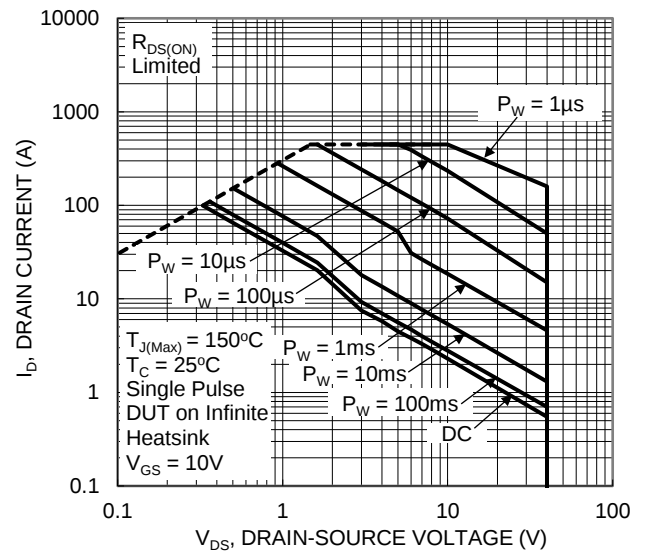
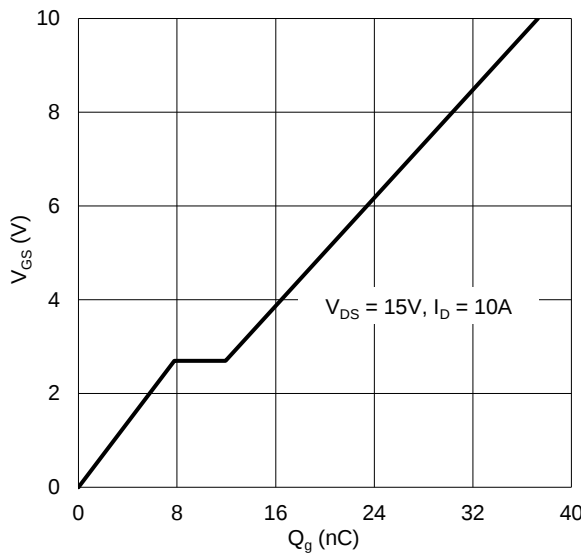
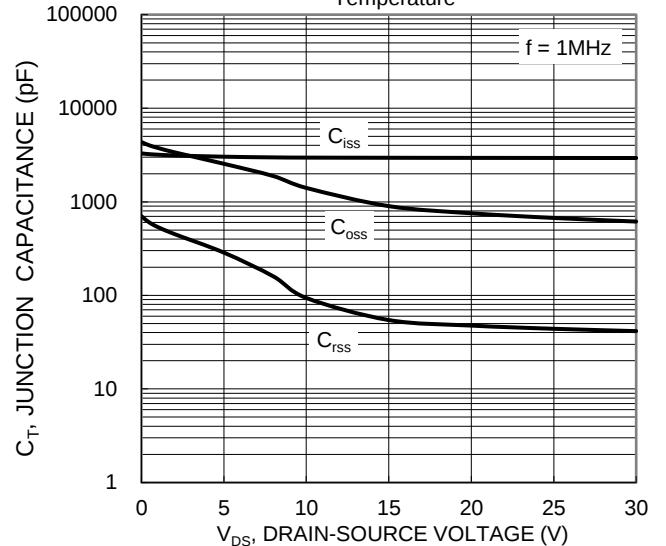
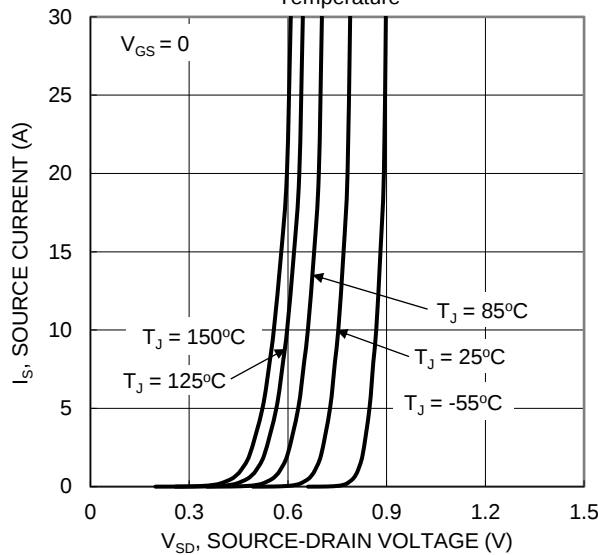
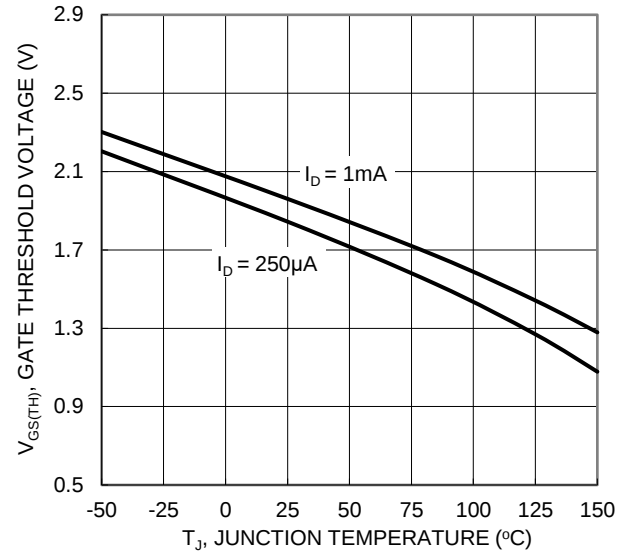
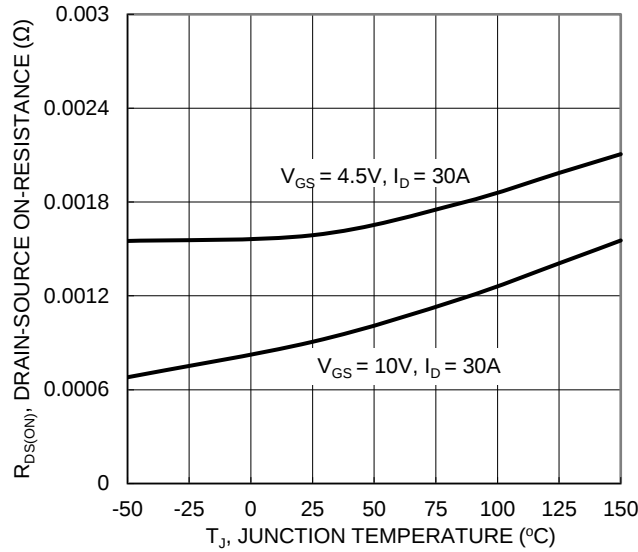


Figure 6. On-Resistance Variation with Junction Temperature



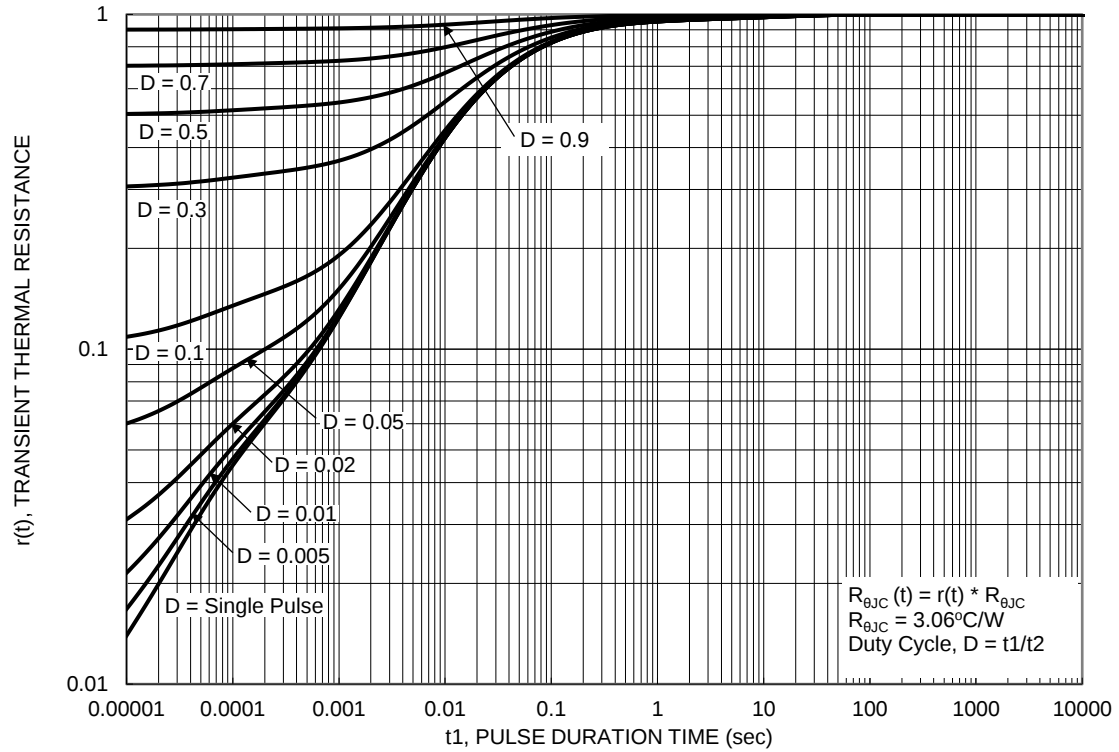
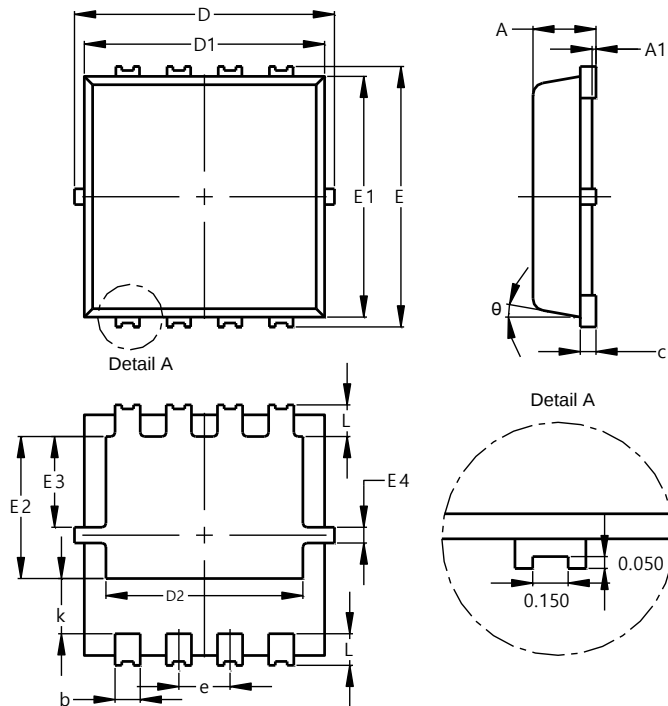


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

PowerDI3333-8/SWP (Type UX)

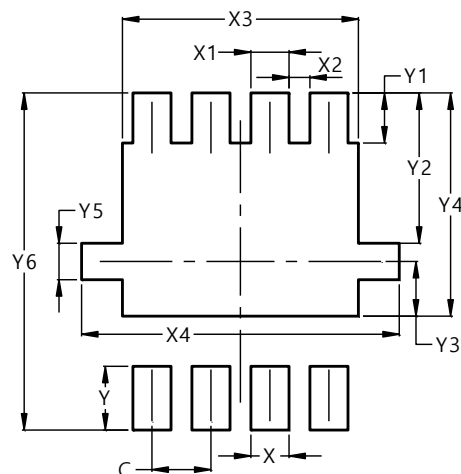


| PowerDI3333-8/SWP<br>(Type UX) |      |      |      |
|--------------------------------|------|------|------|
| Dim                            | Min  | Max  | Typ  |
| A                              | 0.75 | 0.85 | 0.80 |
| A1                             | 0.00 | 0.05 | --   |
| b                              | 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°  |
| All Dimensions in mm           |      |      |      |

## 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         |

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