

## 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               | 7mΩ @ V <sub>GS</sub> = 10V   | 60A                                          |
|                   | 11mΩ @ V <sub>GS</sub> = 4.5V |                                              |

## Description

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.

## Applications

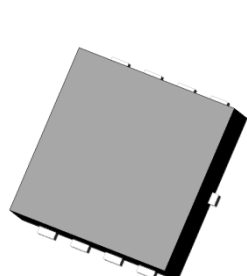
- Power Management Functions
- Analog Switch

## Features

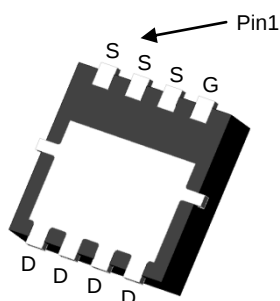
- Low R<sub>DS(ON)</sub> – Ensures On-State Losses are Minimized
- 100% Unclamped Inductive Switching (Test in Production) – Ensures More Reliable and Robust End Application
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- Occupies just 33% of the Board Area Occupied by SO-8 Enabling Smaller End Product
- 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**
- PPAP Capable (Note 4)**

## Mechanical Data

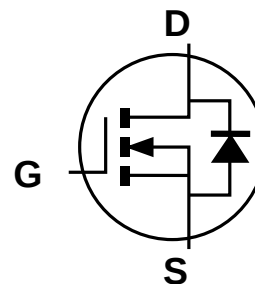
- Case: PowerDI<sup>®</sup> 3333-8 (Type UX)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 <sup>Ⓔ</sup>
- Weight: 0.03 grams (Approximate)



Top View



Bottom View



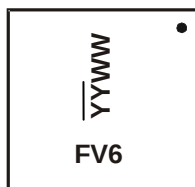
Equivalent Circuit

## Ordering Information (Note 5)

| Part Number    | Case                    | Packaging         |
|----------------|-------------------------|-------------------|
| DMT3006LFVQ-7  | PowerDI3333-8 (Type UX) | 2,000/Tape & Reel |
| DMT3006LFVQ-13 | PowerDI3333-8 (Type UX) | 3,000/Tape & Reel |

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  - 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.
  - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  - Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to <https://www.diodes.com/quality/>.
  - For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



FV6 = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 18 = 2018)  
 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 8)               | Steady State | T <sub>C</sub> = +25°C | I <sub>D</sub>   | 60    | A    |
|                                                                        |              | T <sub>C</sub> = +70°C |                  | 45    |      |
| Maximum Body Diode Forward Current (Note 8)                            |              |                        | I <sub>S</sub>   | 2     | A    |
| Pulsed Drain Current (380μs Pulse, Duty Cycle = 1%)                    |              |                        | I <sub>DM</sub>  | 90    | A    |
| Pulsed Drain Body Diode Forward Current (380μs Pulse, Duty Cycle = 1%) |              |                        | I <sub>SM</sub>  | 90    | A    |
| Avalanche Current (L = 0.1mH) (Note 9)                                 |              |                        | I <sub>AS</sub>  | 24    | A    |
| Avalanche Energy (L = 0.1mH) (Note 9)                                  |              |                        | E <sub>AS</sub>  | 29    | mJ   |

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

| Characteristic                                   |  |              | Symbol                            | Value       | Unit |
|--------------------------------------------------|--|--------------|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 6)                 |  |              | P <sub>D</sub>                    | 1.0         | W    |
| Thermal Resistance, Junction to Ambient (Note 6) |  | Steady State | R <sub>θJA</sub>                  | 130         | °C/W |
| Total Power Dissipation (Note 7)                 |  |              | P <sub>D</sub>                    | 2.0         | W    |
| Thermal Resistance, Junction to Ambient (Note 7) |  | Steady State | R <sub>θJA</sub>                  | 63          | °C/W |
| Thermal Resistance, Junction to Case (Note 8)    |  |              | R <sub>θJC</sub>                  | 2.9         |      |
| 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</b> (Note 10)                   |                     |     |       |      |      |                                                                                              |
| Drain-Source Breakdown Voltage                         | BV <sub>DSS</sub>   | 30  | —     | —    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA                                                 |
| Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C | I <sub>DSS</sub>    | —   | —     | 1    | µA   | V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V                                                  |
| Gate-Source Leakage                                    | I <sub>GSS</sub>    | —   | —     | ±100 | nA   | V <sub>GS</sub> = +20V, V <sub>DS</sub> = 0V<br>V <sub>GS</sub> = -16V, V <sub>DS</sub> = 0V |
| <b>ON CHARACTERISTICS</b> (Note 10)                    |                     |     |       |      |      |                                                                                              |
| Gate Threshold Voltage                                 | V <sub>GS(TH)</sub> | 1.0 | —     | 3.0  | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA                                   |
| Static Drain-Source On-Resistance                      | R <sub>DS(ON)</sub> | —   | 5.6   | 7    | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 9.0A                                                 |
|                                                        |                     |     | 8.0   | 11   |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 8.5A                                                |
| Diode Forward Voltage                                  | V <sub>SD</sub>     | —   | 0.70  | 1.2  | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A                                                    |
| <b>DYNAMIC CHARACTERISTICS</b> (Note 11)               |                     |     |       |      |      |                                                                                              |
| Input Capacitance                                      | C <sub>iss</sub>    | —   | 1,155 | —    | pF   | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V,<br>f = 1.0MHz                                   |
| Output Capacitance                                     | C <sub>oss</sub>    | —   | 456   | —    |      |                                                                                              |
| Reverse Transfer Capacitance                           | C <sub>rss</sub>    | —   | 72    | —    |      |                                                                                              |
| Gate Resistance                                        | R <sub>g</sub>      | —   | 1.6   | —    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz                                       |
| Total Gate Charge (V <sub>GS</sub> = 4.5V)             | Q <sub>g</sub>      | —   | 8.4   | —    | nC   | V <sub>DD</sub> = 15V, I <sub>D</sub> = 9A                                                   |
| Total Gate Charge (V <sub>GS</sub> = 10V)              | Q <sub>g</sub>      | —   | 16.7  | —    |      |                                                                                              |
| Gate-Source Charge                                     | Q <sub>gs</sub>     | —   | 2.2   | —    |      |                                                                                              |
| Gate-Drain Charge                                      | Q <sub>gd</sub>     | —   | 3.5   | —    |      |                                                                                              |
| Turn-On Delay Time                                     | t <sub>D(ON)</sub>  | —   | 3.5   | —    | ns   | V <sub>DD</sub> = 15V, V <sub>GS</sub> = 10V,<br>R <sub>G</sub> = 3Ω, I <sub>D</sub> = 9A    |
| Turn-On Rise Time                                      | t <sub>R</sub>      | —   | 5.5   | —    |      |                                                                                              |
| Turn-Off Delay Time                                    | t <sub>D(OFF)</sub> | —   | 13.5  | —    |      |                                                                                              |
| Turn-Off Fall Time                                     | t <sub>F</sub>      | —   | 4.6   | —    |      |                                                                                              |
| Reverse Recovery Time                                  | t <sub>RR</sub>     | —   | 19.3  | —    | ns   | I <sub>F</sub> = 1.5A, di/dt = 100A/µs                                                       |
| Reverse Recovery Charge                                | Q <sub>RR</sub>     | —   | 8.6   | —    | nC   |                                                                                              |

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
  - 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).
  - I<sub>AS</sub> and E<sub>AS</sub> ratings are based on low frequency and duty cycles to keep T<sub>J</sub> = +25°C.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

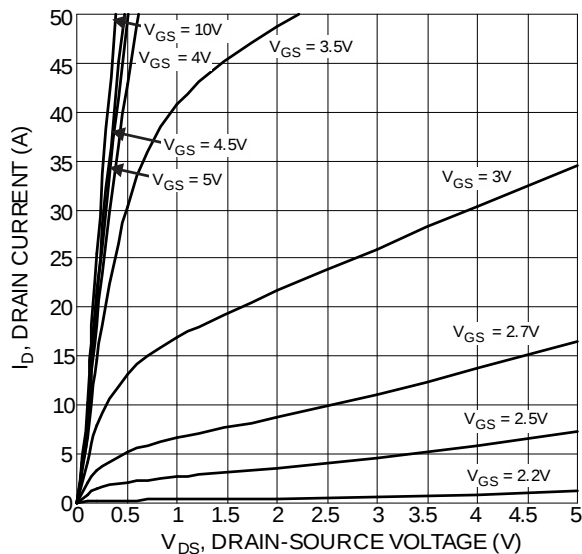


Figure 1 Typical Output Characteristic

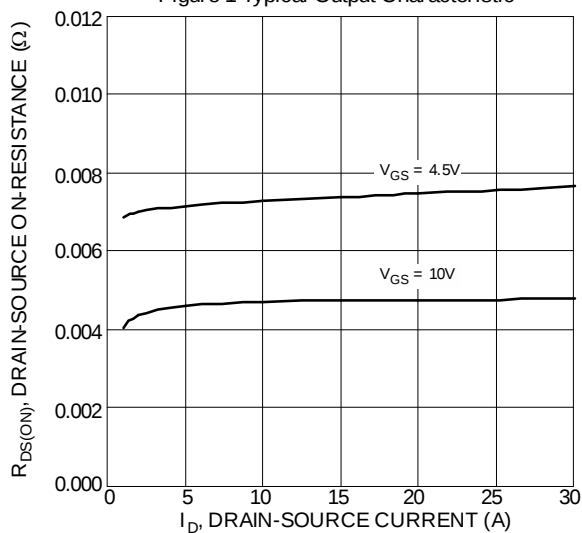


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

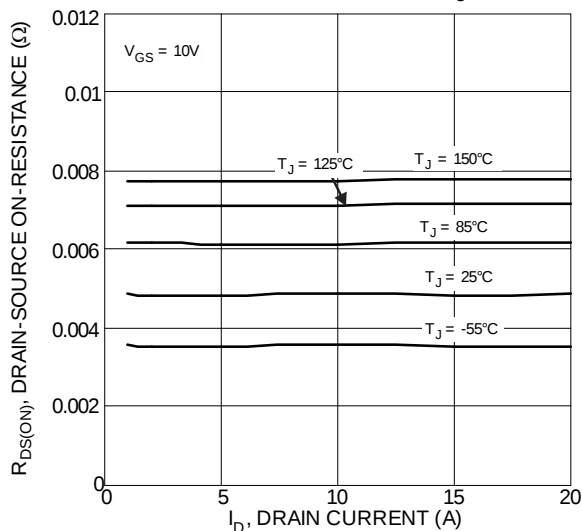


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

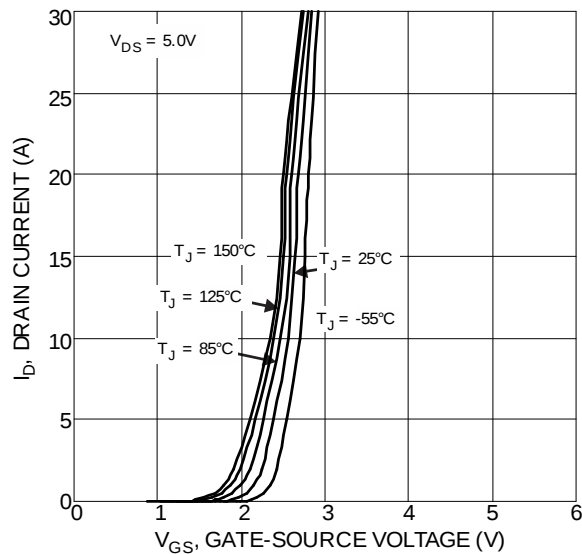


Figure 2 Typical Transfer Characteristics

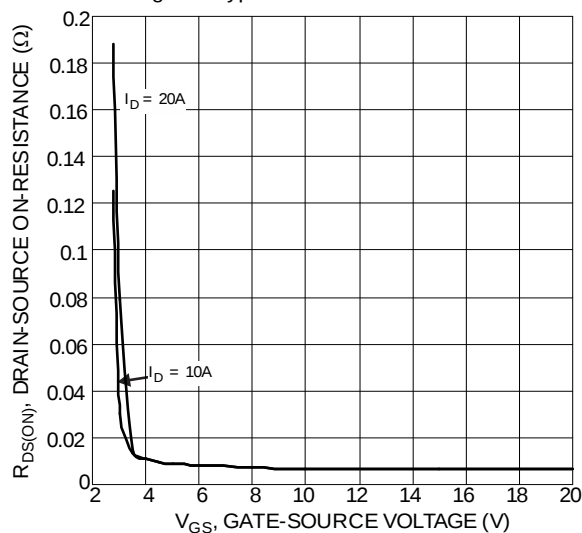


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

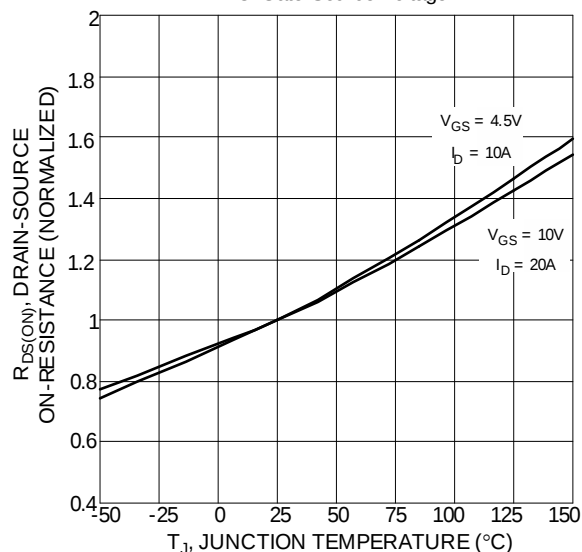
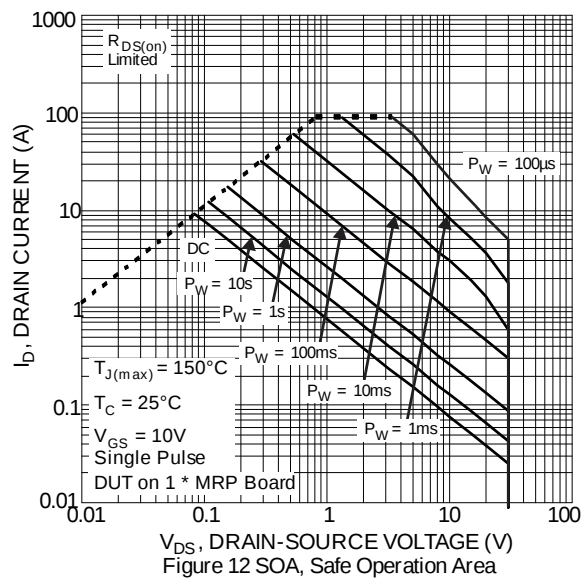
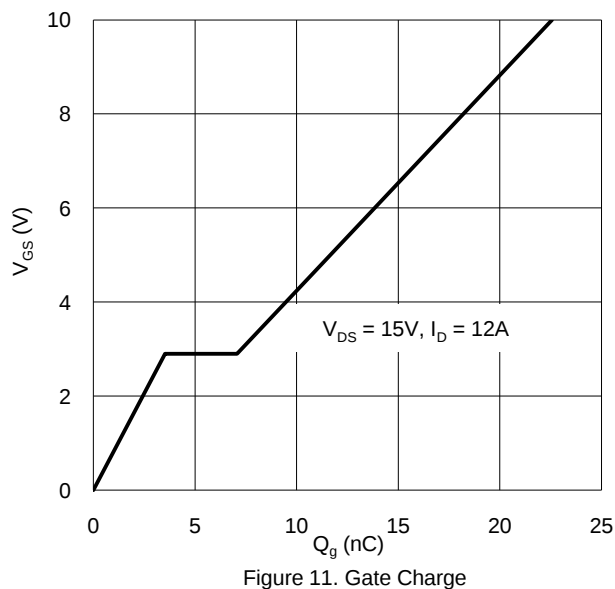
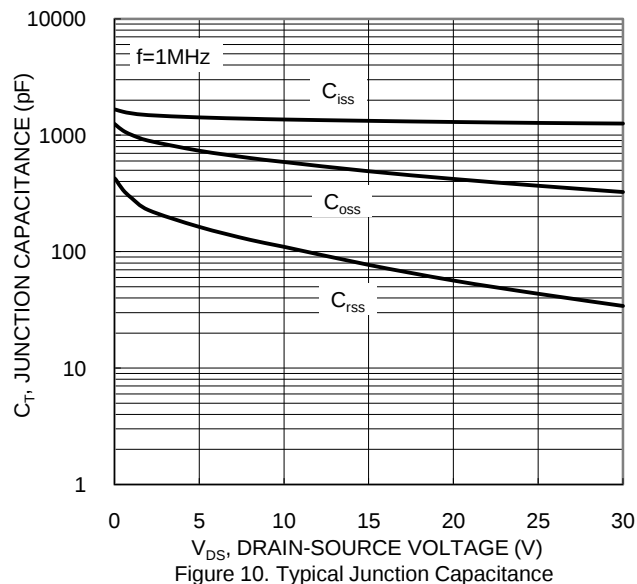
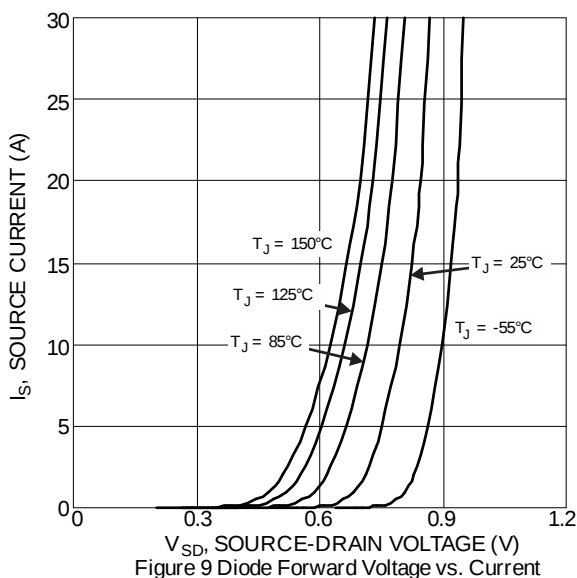
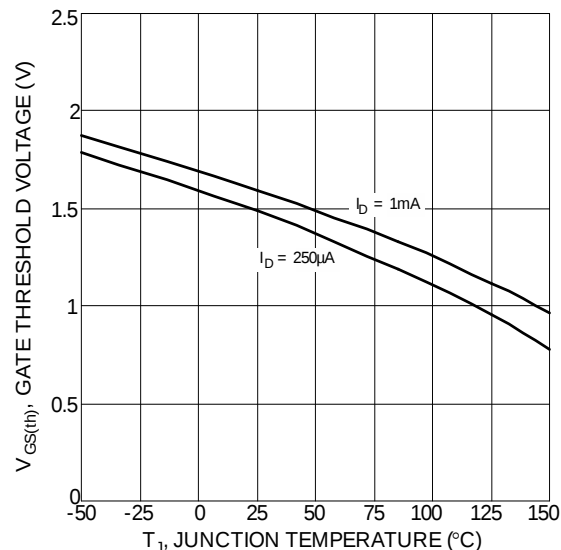
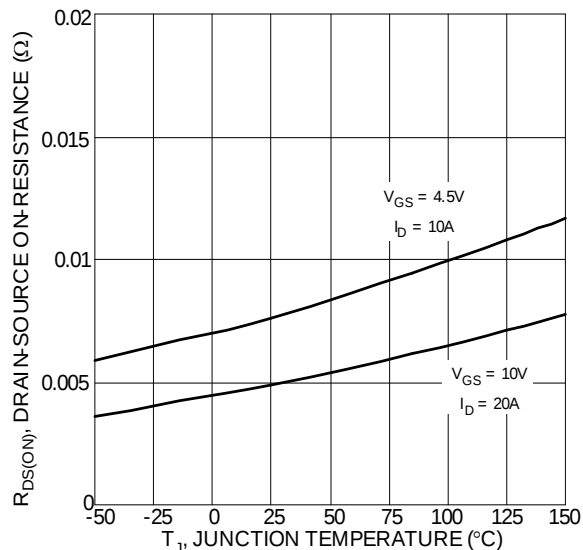
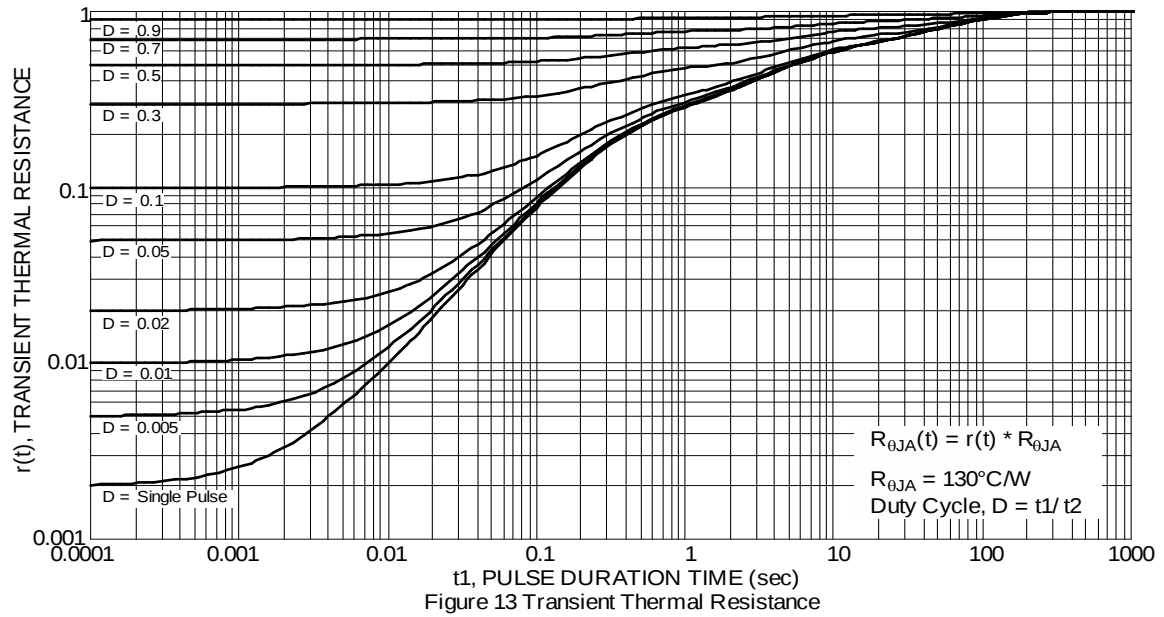


Figure 6 On-Resistance Variation with Temperature

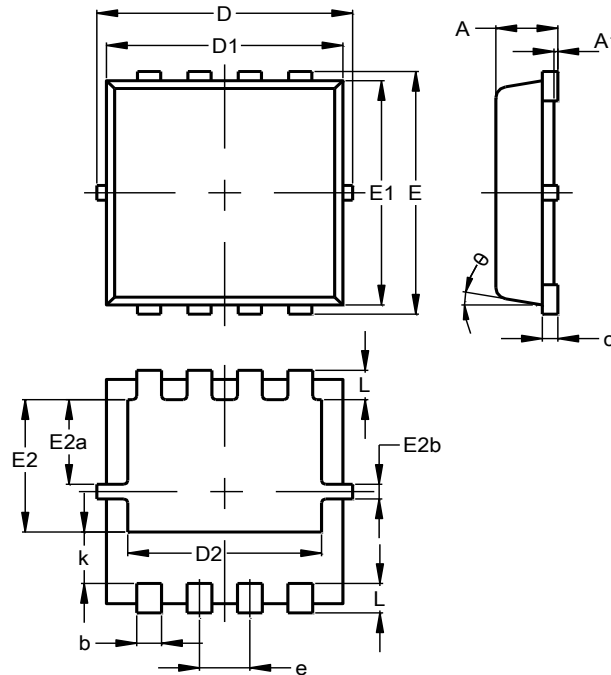




## Package Outline Dimensions

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

### PowerDI3333-8 (Type UX)

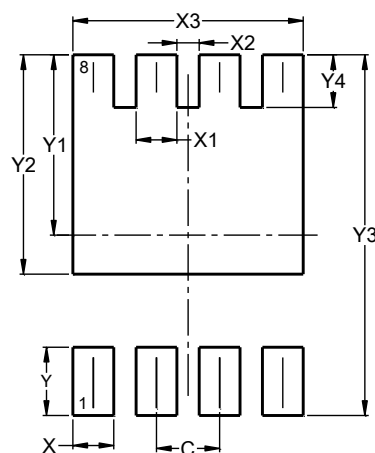


| PowerDI3333-8<br>(Type UX) |          |      |      |
|----------------------------|----------|------|------|
| Dim                        | Min      | Max  | Typ  |
| A                          | 0.75     | 0.85 | 0.80 |
| A1                         | 0.00     | 0.05 | --   |
| b                          | 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 |
| E2a                        | 0.95     | 1.35 | 1.15 |
| E2b                        | 0.10     | 0.30 | 0.20 |
| e                          | 0.65 BSC |      |      |
| 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 (Type UX)



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 0.650         |
| X          | 0.420         |
| X1         | 0.420         |
| X2         | 0.230         |
| X3         | 2.370         |
| Y          | 0.700         |
| Y1         | 1.850         |
| Y2         | 2.250         |
| Y3         | 3.700         |
| Y4         | 0.540         |

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