

## Product Summary

| Device  | BV <sub>DSS</sub> | R <sub>DS(ON)</sub> Max         | I <sub>D</sub> Max<br>T <sub>C</sub> = +25°C<br>(Note 5) |
|---------|-------------------|---------------------------------|--|
| Q1 & Q2 | 30V               | 11mΩ @ V <sub>GS</sub> = 10V    | 17.5A  |
|         |                   | 17.5mΩ @ V <sub>GS</sub> = 4.5V | 14A  |
|         |                   | 25mΩ @ V <sub>GS</sub> = 3.8V   | 12A  |

## Description

This new generation 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 switches

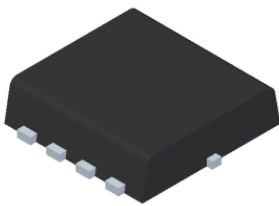
## Features

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Totally Lead-Free & Fully 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](mailto:contact@diodes.com) or your local Diodes representative.**  
<https://www.diodes.com/quality/product-definitions/>

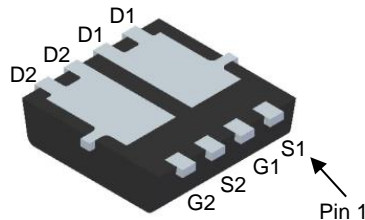
## Mechanical Data

- Package: PowerDI<sup>®</sup>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 208 (E3)
- Weight: 0.072 grams (Approximate)

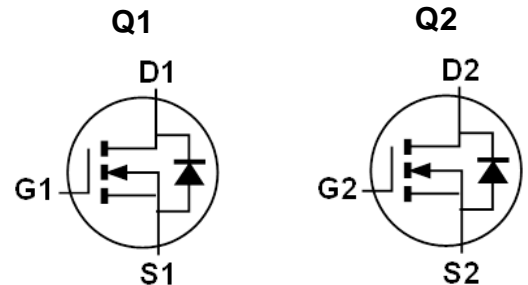
PowerDI3333-8 (Type UXC)



Top View



Bottom View



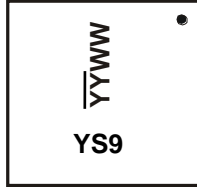
Equivalent Circuit

## Ordering Information (Note 4)

| Part Number   | Package                  | Packing |             |
|---------------|--------------------------|---------|-------------|
|               |                          | Qty.    | Carrier     |
| DMT3009LDV-7  | PowerDI3333-8 (Type UXC) | 2000    | Tape & Reel |
| DMT3009LDV-13 | PowerDI3333-8 (Type UXC) | 3000    | Tape & Reel |

- 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/>.
  5. Package limited.

## Marking Information



YS9 = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 24 for 2024)  
 WW = Week Code (01 to 53)

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

| Characteristic  |  | Symbol           | Q1 & Q2  | Unit |
|---|--|------------------|----------|------|
| Drain-Source Voltage  |  | V <sub>DSS</sub> | 30       | V    |
| Gate-Source Voltage   |  | V <sub>GSS</sub> | +20/ -16 | V    |
| Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V         | Steady State (Note 5)                            | I <sub>D</sub>   | 17.5     | A    |
|   | T <sub>C</sub> = +25°C<br>T <sub>C</sub> = +70°C |                  | 15       |      |
| Maximum Body Diode Forward Current (Note 6)                     |  | I <sub>S</sub>   | 0.8      | A    |
| Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)              |  | I <sub>DM</sub>  | 70       | A    |
| Pulsed Body Diode Forward Current (10µs Pulse, Duty Cycle = 1%) |  | I <sub>SM</sub>  | 70       | A    |
| Avalanche Current (Note 7) L = 0.1mH                            |  | I <sub>AS</sub>  | 20       | A    |
| Avalanche Energy (Note 7) L = 0.1mH                             |  | E <sub>AS</sub>  | 20       | mJ   |

## Thermal Characteristics

| Characteristic                                   |                        | Symbol                            | Value       | Unit |
|--|------------------------|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 8)                 | T <sub>A</sub> = +25°C | P <sub>D</sub>                    | 0.9         | W    |
| Thermal Resistance, Junction to Ambient (Note 8) | Steady State           | R <sub>θJA</sub>                  | 133         | °C/W |
| Total Power Dissipation (Note 6)                 | T <sub>A</sub> = +25°C | P <sub>D</sub>                    | 2.4         | W    |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady State           | R <sub>θJA</sub>                  | 51          | °C/W |
| Thermal Resistance, Junction to Case (Note 6)    |                        | R <sub>θJC</sub>                  | 5           |      |
| Operating and Storage Temperature Range          |                        | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

- Notes:
5. Package limited.
  6. Device mounted on FR-4 substrate PCB, 2oz copper, with 1-inch square copper plate.
  7. UIS in production with L = 0.1mH, starting T<sub>A</sub> = +25°C.
  8. Device mounted on FR-4 substrate PCB, 2oz copper, with minimum recommended pad layout.

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

| Characteristic  | Symbol              | Min | Typ  | Max  | Unit | Test Condition  |
|---|---------------------|-----|------|------|------|---|
| <b>OFF CHARACTERISTICS (Note 9)</b>                               |                     |     |      |      |      |   |
| 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                                   | I <sub>DSS</sub>    | —   | —    | 1    | μA   | V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V   |
| Zero Gate Voltage Drain Current T <sub>J</sub> = +150°C (Note 10) | I <sub>DSS</sub>    | —   | —    | 100  | 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 (Note 9)</b>                                |                     |     |      |      |      |   |
| Gate Threshold Voltage  | V <sub>GS(TH)</sub> | 1   | —    | 3    | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA                                  |
| Static Drain-Source On-Resistance                                 | R <sub>DS(ON)</sub> | —   | 8    | 11   | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 14.4A   |
|   |                     | —   | 12   | 17.5 |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 7A   |
|   |                     | —   | 15   | 25   |      | V <sub>GS</sub> = 3.8V, I <sub>D</sub> = 5A   |
| Diode Forward Voltage   | V <sub>SD</sub>     | —   | 0.8  | 1.2  | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 10A  |
| <b>DYNAMIC CHARACTERISTICS (Note 10)</b>                          |                     |     |      |      |      |   |
| Input Capacitance   | C <sub>iss</sub>    | —   | 823  | —    | pF   | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1.0MHz                                     |
| Output Capacitance  | C <sub>oss</sub>    | —   | 352  | —    |      |   |
| Reverse Transfer Capacitance                                      | C <sub>rss</sub>    | —   | 52   | —    |      |   |
| Gate Resistance   | R <sub>g</sub>      | —   | 1.2  | —    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz                                      |
| Total Gate Charge (V <sub>GS</sub> = 10V)                         | Q <sub>g</sub>      | —   | 12   | —    | nC   | V <sub>DS</sub> = 15V, I <sub>D</sub> = 14.4A   |
| Total Gate Charge (V <sub>GS</sub> = 4.5V)                        | Q <sub>g</sub>      | —   | 5.8  | —    |      |   |
| Gate-Source Charge  | Q <sub>gs</sub>     | —   | 1.7  | —    |      |   |
| Gate-Drain Charge   | Q <sub>gd</sub>     | —   | 2.4  | —    |      |   |
| Turn-On Delay Time  | t <sub>D(ON)</sub>  | —   | 3.2  | —    | ns   | V <sub>GS</sub> = 10V, V <sub>DD</sub> = 15V, R <sub>g</sub> = 1Ω<br>I <sub>D</sub> = 10A   |
| Turn-On Rise Time   | t <sub>r</sub>      | —   | 5.2  | —    |      |   |
| Turn-Off Delay Time   | t <sub>D(OFF)</sub> | —   | 8.9  | —    |      |   |
| Turn-Off Fall Time  | t <sub>f</sub>      | —   | 1.5  | —    |      |   |
| Body Diode Reverse Recovery Time                                  | t <sub>RR</sub>     | —   | 16.4 | —    | ns   | I <sub>F</sub> = 10A, di/dt = 100A/μs   |
| Body Diode Reverse Recovery Charge                                | Q <sub>RR</sub>     | —   | 5.9  | —    | nC   | I <sub>F</sub> = 10A, di/dt = 100A/μs   |

Notes: 9. Short duration pulse test used to minimize self-heating effect.  
10. Guaranteed by design. Not subject to product testing.

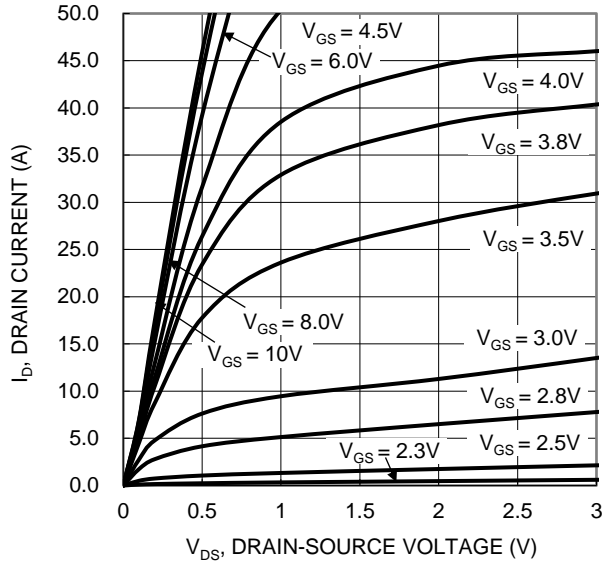


Figure 1. Typical Output Characteristic

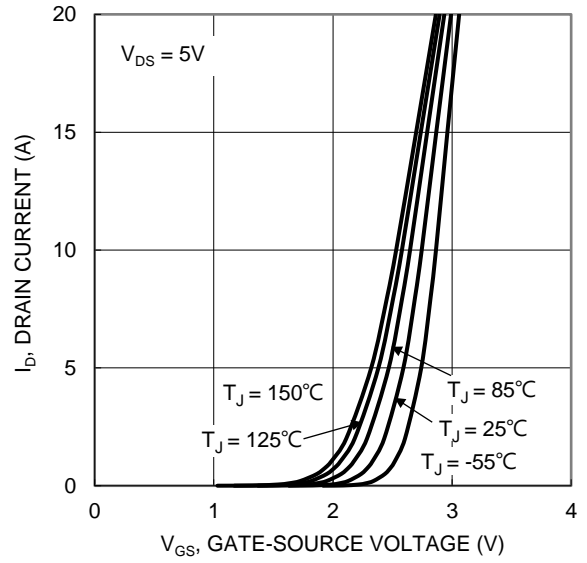


Figure 2. Typical Transfer Characteristic

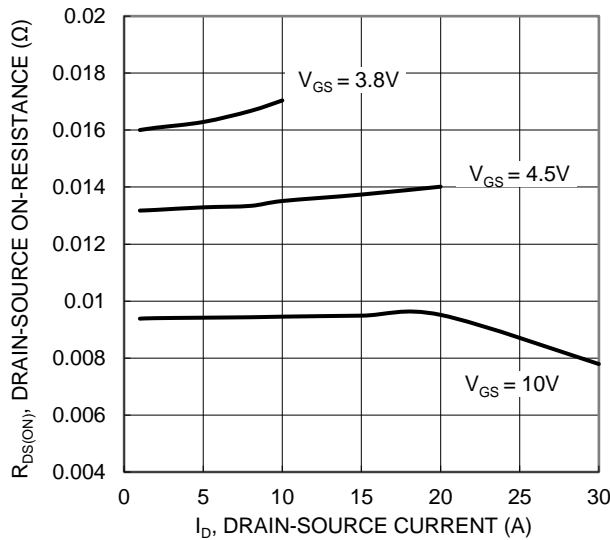


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

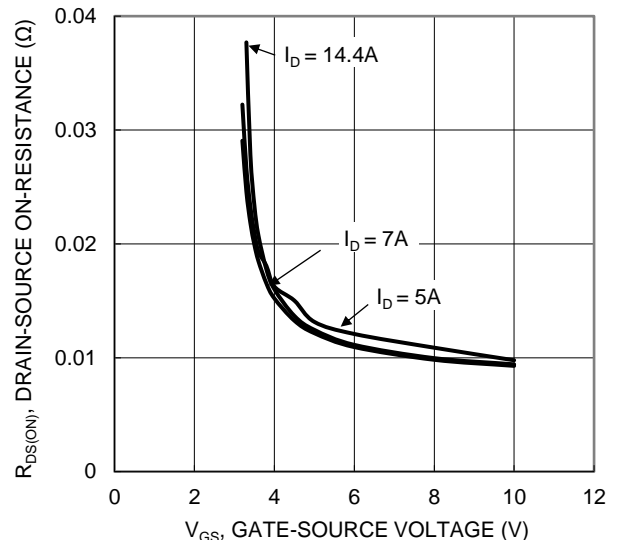


Figure 4. Typical Transfer Characteristic

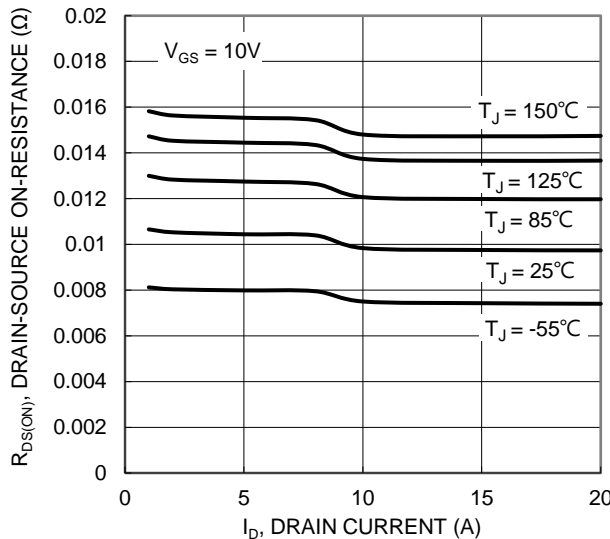


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

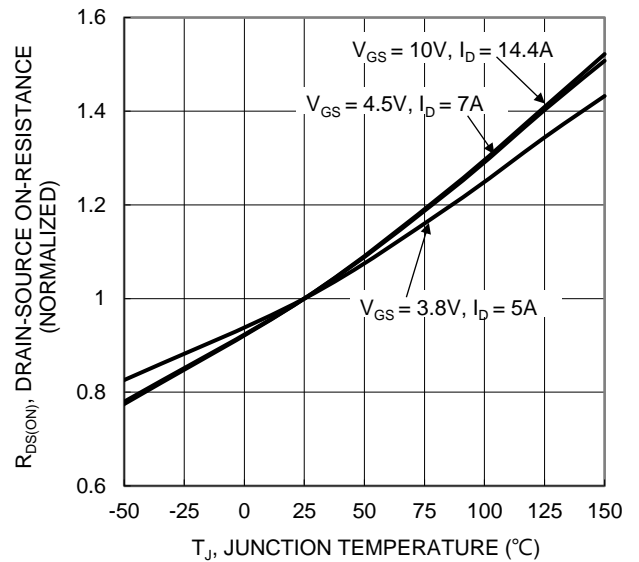


Figure 6. On-Resistance Variation with Junction Temperature

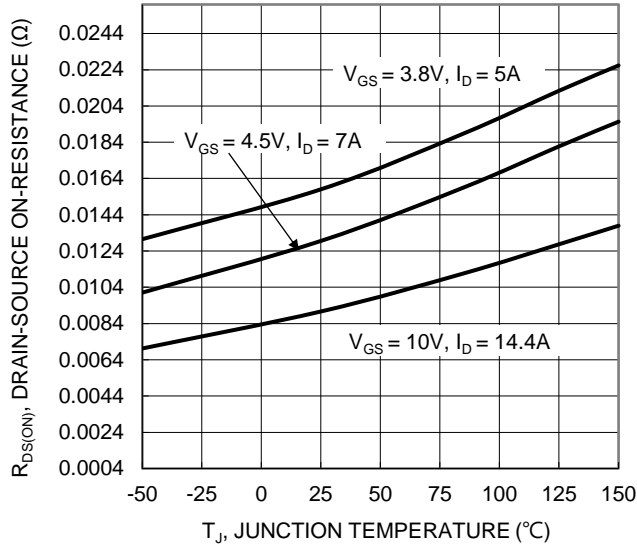


Figure 7. On-Resistance Variation with Junction Temperature

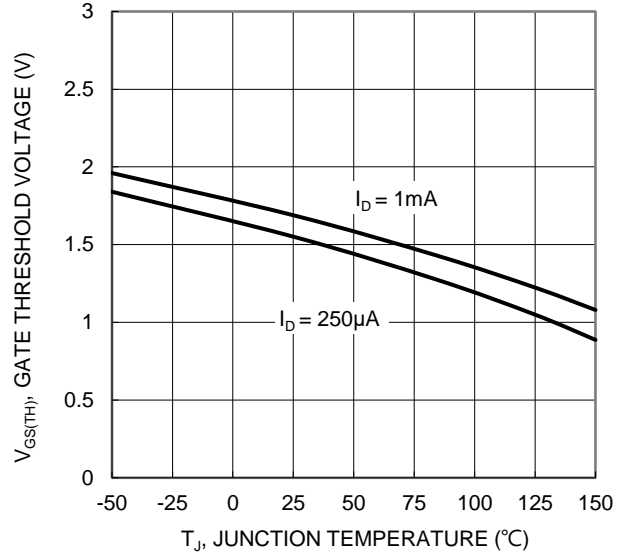


Figure 8. Gate Threshold Variation vs. Junction Temperature

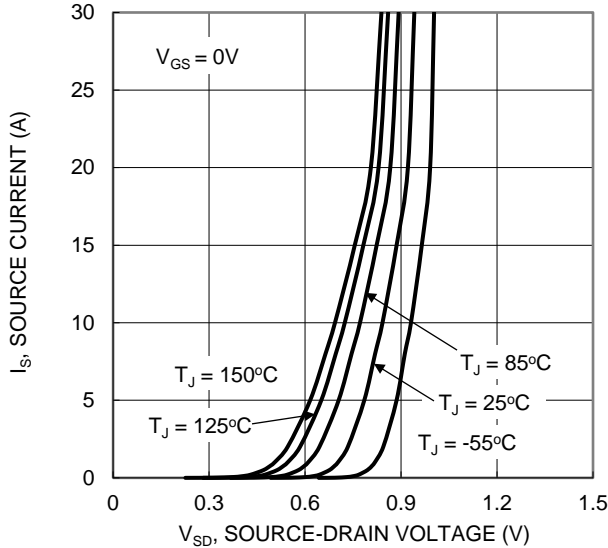


Figure 9. Diode Forward Voltage vs. Current

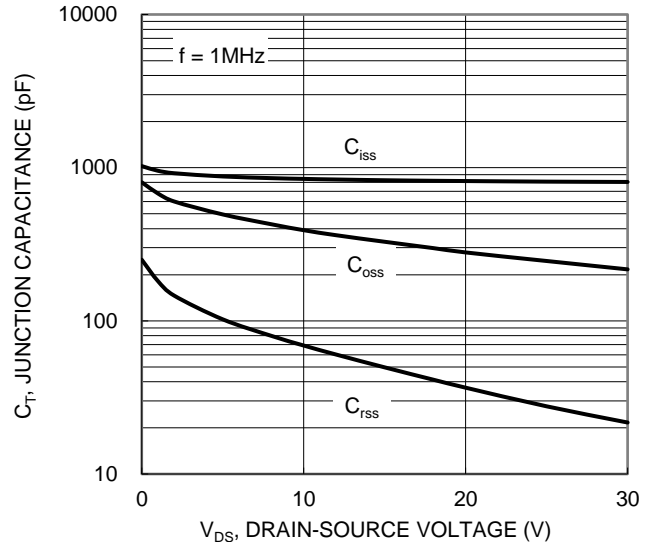


Figure 10. Typical Junction Capacitance

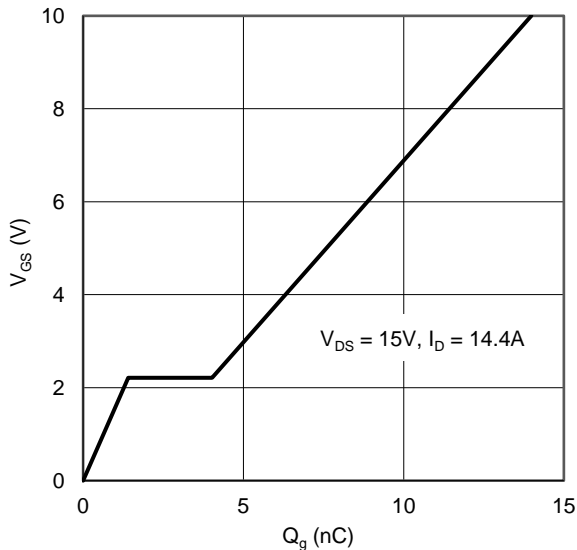


Figure 11. Gate Charge

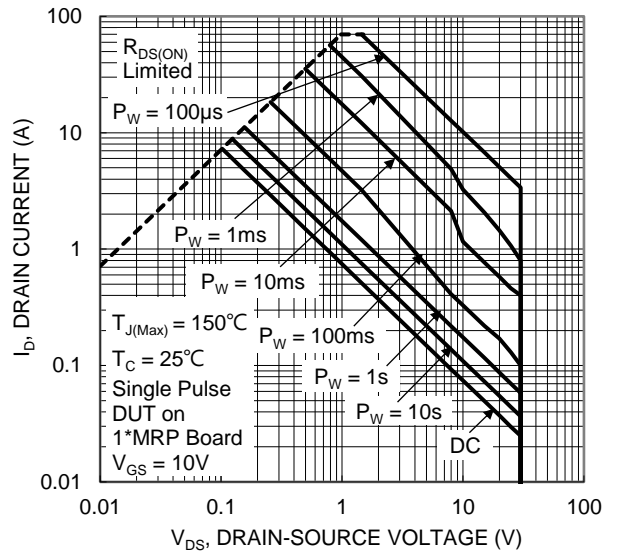


Figure 12. SOA, Safe Operation Area

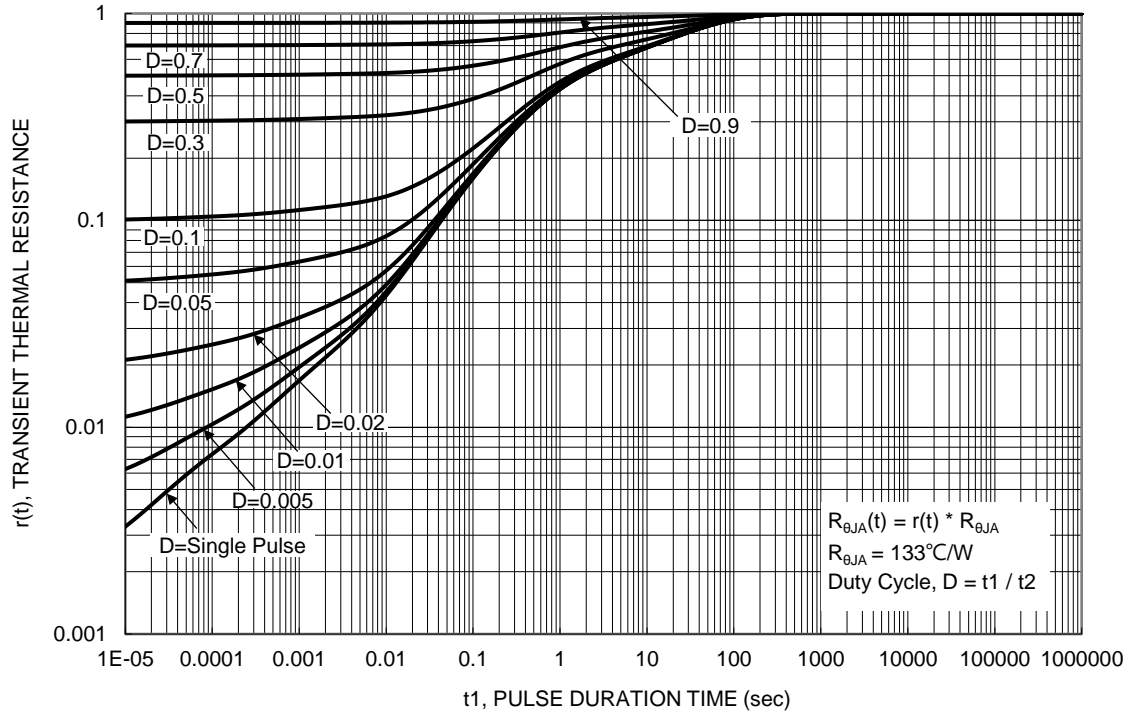
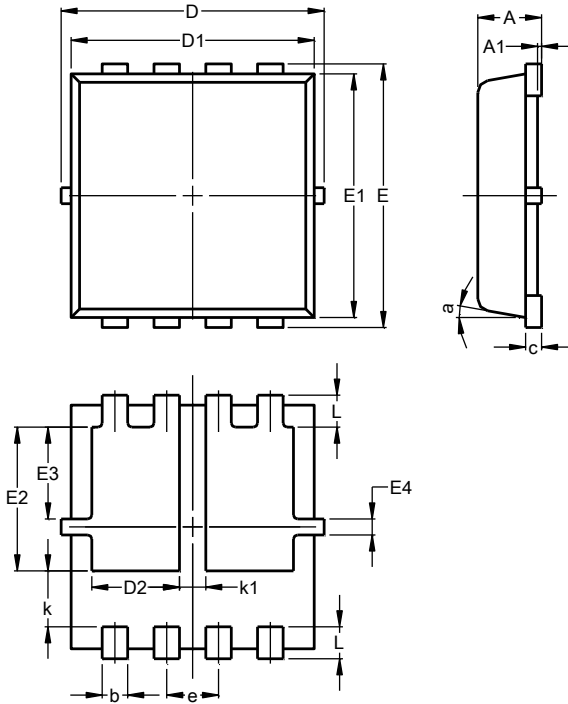


Figure 13. Transient Thermal Resistance

**Package Outline Dimensions**

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

**PowerDI3333-8 (Type UXC)**

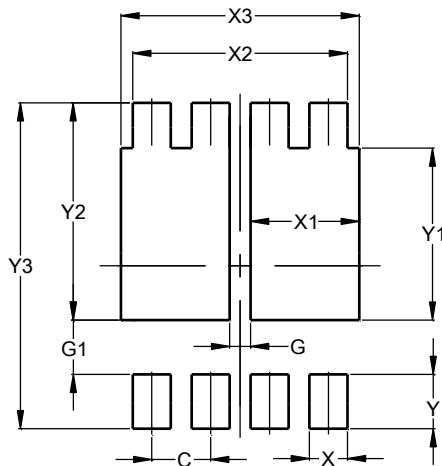


| PowerDI3333-8<br>(Type UXC) |      |      |      |
|-----------------------------|------|------|------|
| Dim                         | Min  | Max  | Typ  |
| A                           | 0.75 | 0.85 | 0.80 |
| A1                          | 0.00 | 0.05 | --   |
| b                           | 0.25 | 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                          | 0.90 | 1.30 | 1.10 |
| 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 |
| L                           | 0.30 | 0.50 | 0.40 |
| k                           | 0.50 | 0.90 | 0.70 |
| k1                          | 0.13 | 0.53 | 0.33 |
| a                           | 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 (Type UXC)**



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 0.650         |
| G          | 0.230         |
| G1         | 0.600         |
| X          | 0.420         |
| X1         | 1.200         |
| X2         | 2.370         |
| X3         | 2.630         |
| Y          | 0.600         |
| Y1         | 1.900         |
| Y2         | 2.400         |
| Y3         | 3.600         |

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