

## 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               | 12mΩ @ V <sub>GS</sub> = 10V  | 21A                                          |
|                   | 17mΩ @ V <sub>GS</sub> = 4.5V | 18A                                          |

## Description

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

## Applications

- Power Management Functions
- Analog Switch

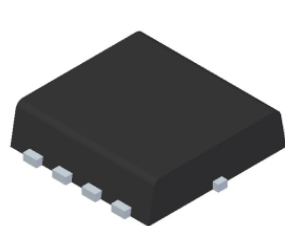
## Features

- 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)**

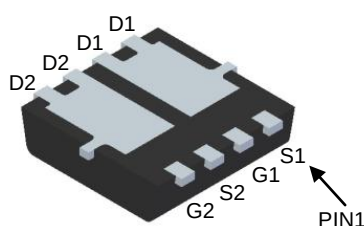
## Mechanical Data

- Case: PowerDI3333-8 (Type UXC)
- 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 
- Weight: 0.072 grams (Approximate)

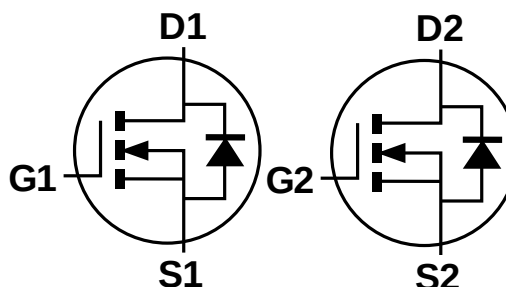
PowerDI3333-8 (Type UXC)



Top View



Bottom View



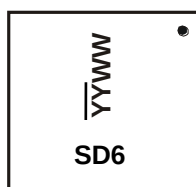
Equivalent Circuit

## Ordering Information (Note 4)

| Part Number   | Case                     | Packaging        |
|---------------|--------------------------|------------------|
| DMN3016LDV-7  | PowerDI3333-8 (Type UXC) | 2000/Tape & Reel |
| DMN3016LDV-13 | PowerDI3333-8 (Type UXC) | 3000/Tape & Reel |

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  - See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) 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.
  - For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



SD6 = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 16 for 2016)  
 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 7) | Steady State | T <sub>C</sub> = +25°C | I <sub>D</sub>   | 21    | A    |
|                                                          |              | T <sub>C</sub> = +70°C |                  | 17    |      |
| Maximum Body Diode Forward Current (Note 6)              |              |                        | I <sub>S</sub>   | 2     | A    |
| Pulsed Drain Current (380μs pulse, Duty cycle = 1%)      |              |                        | I <sub>DM</sub>  | 70    | A    |
| Avalanche Current (L = 0.1mH) (Note 8)                   |              |                        | I <sub>AS</sub>  | 22    | A    |
| Avalanche Energy (L = 0.1mH) (Note 8)                    |              |                        | E <sub>AS</sub>  | 24    | 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>                    | 0.9         | W    |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady State | R <sub>θJA</sub>                  | 134         | °C/W |
|                                                  | t<10s        |                                   | 78          |      |
| Total Power Dissipation (Note 6)                 |              | P <sub>D</sub>                    | 1.8         | W    |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady State | R <sub>θJA</sub>                  | 70          | °C/W |
|                                                  | t<10s        |                                   | 41          |      |
| Thermal Resistance, Junction to Case (Note 7)    |              | R <sub>θJC</sub>                  | 15          |      |
| 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 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 T <sub>J</sub> = +25°C | I <sub>DSS</sub>    | -   | -    | 1    | µA   | V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V                                              |
| Gate-Source Leakage                                    | I <sub>GSS</sub>    | -   | -    | ±100 | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V                                             |
| <b>ON CHARACTERISTICS (Note 9)</b>                     |                     |     |      |      |      |                                                                                          |
| Gate Threshold Voltage                                 | V <sub>GS(TH)</sub> | 1.4 | -    | 2.0  | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA                               |
| Static Drain-Source On-Resistance                      | R <sub>DS(ON)</sub> | -   | 9.5  | 12   | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 7A                                               |
|                                                        |                     |     | 14   | 17   |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 7A                                              |
| Diode Forward Voltage                                  | V <sub>SD</sub>     | -   | 0.70 | 1.0  | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A                                                |
| <b>DYNAMIC CHARACTERISTICS (Note 10)</b>               |                     |     |      |      |      |                                                                                          |
| Input Capacitance                                      | C <sub>iss</sub>    | -   | 1184 | -    | pF   | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1.0MHz                                  |
| Output Capacitance                                     | C <sub>oss</sub>    | -   | 137  | -    |      |                                                                                          |
| Reverse Transfer Capacitance                           | C <sub>rss</sub>    | -   | 107  | -    |      |                                                                                          |
| Gate Resistance                                        | R <sub>g</sub>      | -   | 3.0  | -    | 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>      | -   | 9.5  | -    | nC   | V <sub>DS</sub> = 15V, I <sub>D</sub> = 12A                                              |
| Total Gate Charge (V <sub>GS</sub> = 10V)              | Q <sub>g</sub>      | -   | 21   | -    |      |                                                                                          |
| Gate-Source Charge                                     | Q <sub>gs</sub>     | -   | 3.8  | -    |      |                                                                                          |
| Gate-Drain Charge                                      | Q <sub>gd</sub>     | -   | 4.1  | -    |      |                                                                                          |
| Turn-On Delay Time                                     | t <sub>D(ON)</sub>  | -   | 4.5  | -    | ns   | V <sub>DD</sub> = 15V, V <sub>GS</sub> = 10V, R <sub>L</sub> = 1.5Ω, R <sub>G</sub> = 3Ω |
| Turn-On Rise Time                                      | t <sub>R</sub>      | -   | 3.3  | -    |      |                                                                                          |
| Turn-Off Delay Time                                    | t <sub>D(OFF)</sub> | -   | 14   | -    |      |                                                                                          |
| Turn-Off Fall Time                                     | t <sub>F</sub>      | -   | 3.6  | -    |      |                                                                                          |
| Reverse Recovery Time                                  | t <sub>RR</sub>     | -   | 9.3  | -    | ns   | I <sub>F</sub> = 12A, di/dt = 500A/µs                                                    |
| Reverse Recovery Charge                                | Q <sub>RR</sub>     | -   | 2.5  | -    | 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> rating 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.

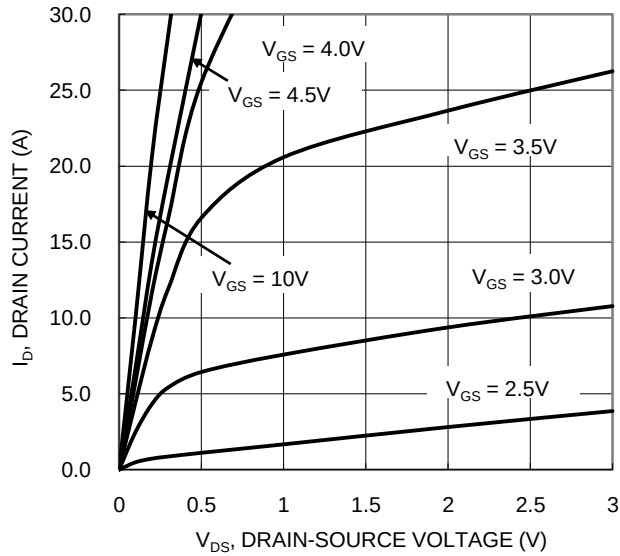


Figure 1. Typical Output Characteristic

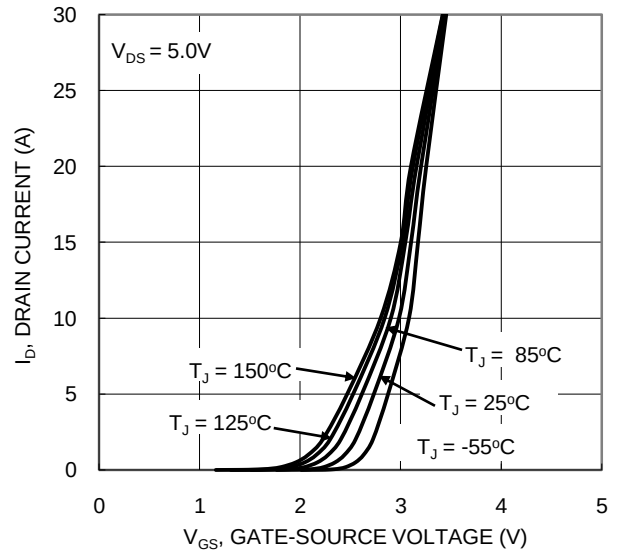


Figure 2. Typical Transfer Characteristic

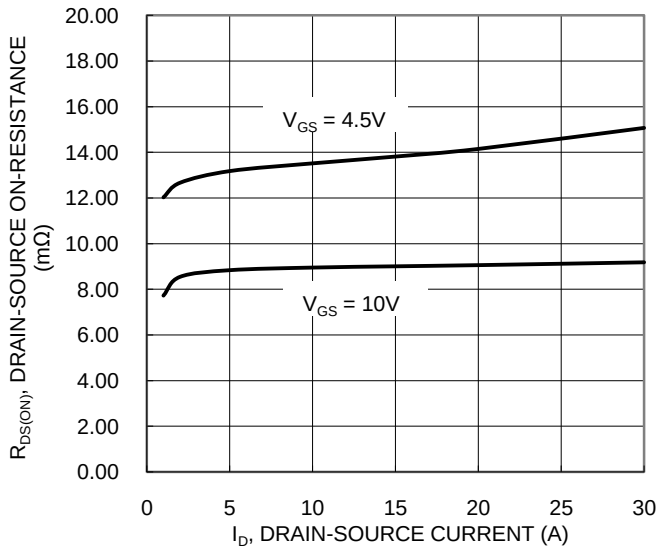


Figure 3. Typical On-Resistance vs Drain Current and Gate Voltage

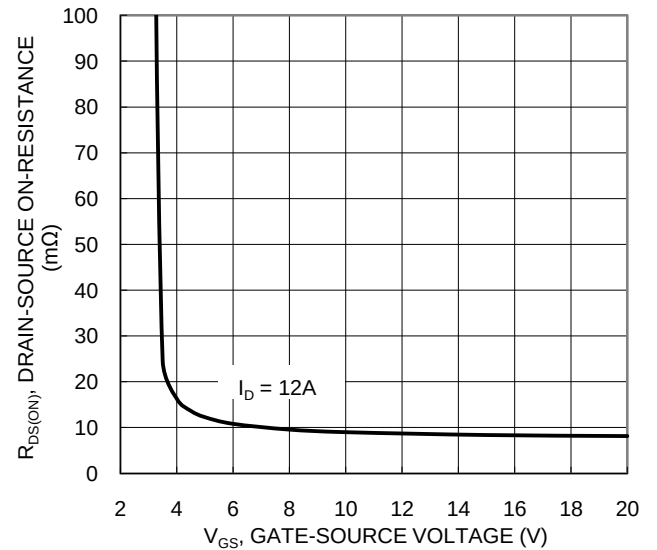


Figure 4. Typical Transfer Characteristic

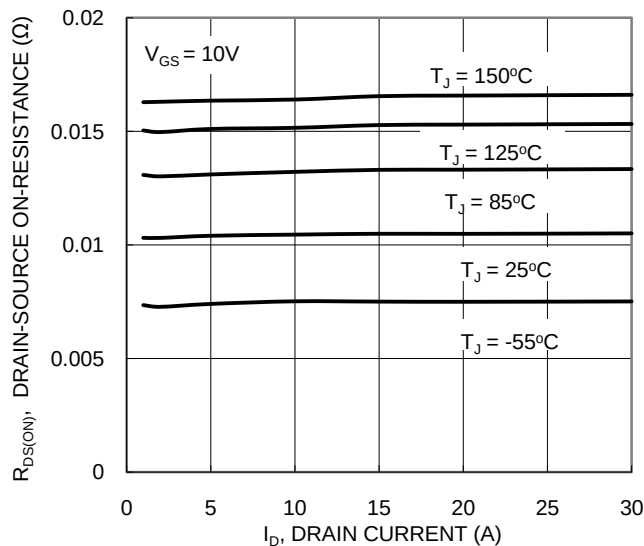


Figure 5. Typical On-Resistance vs Drain Current and Temperature

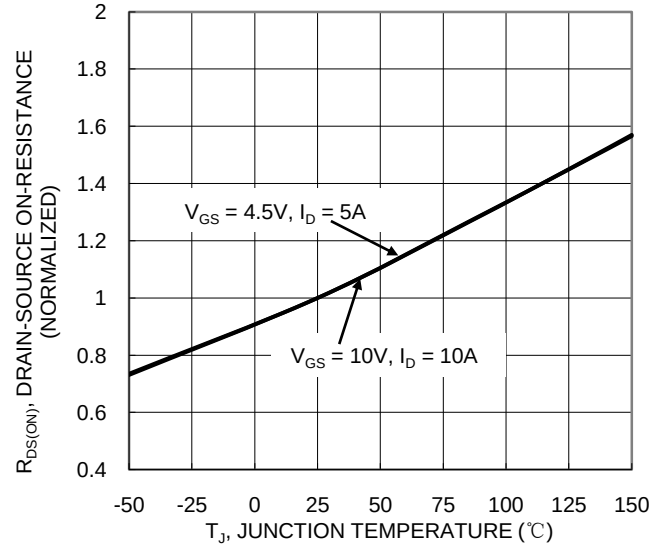
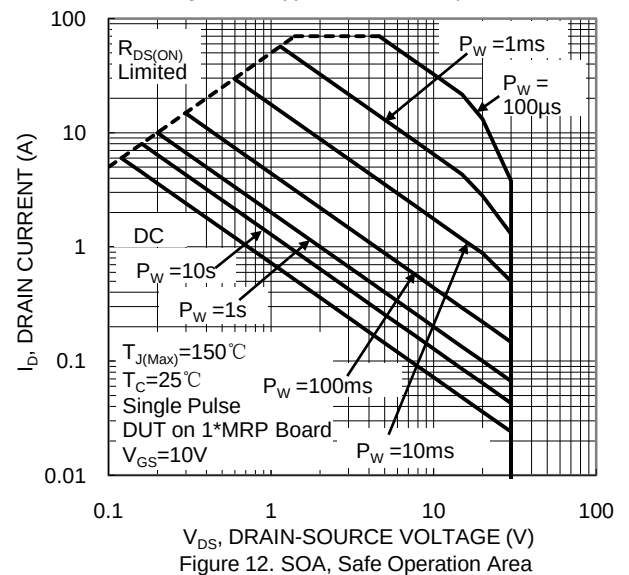
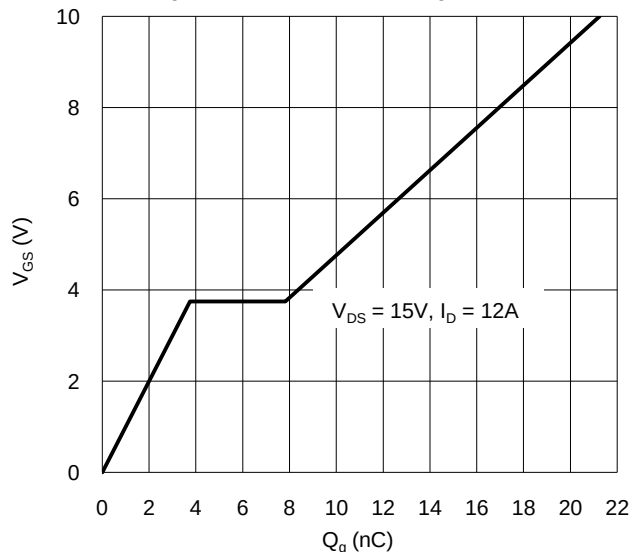
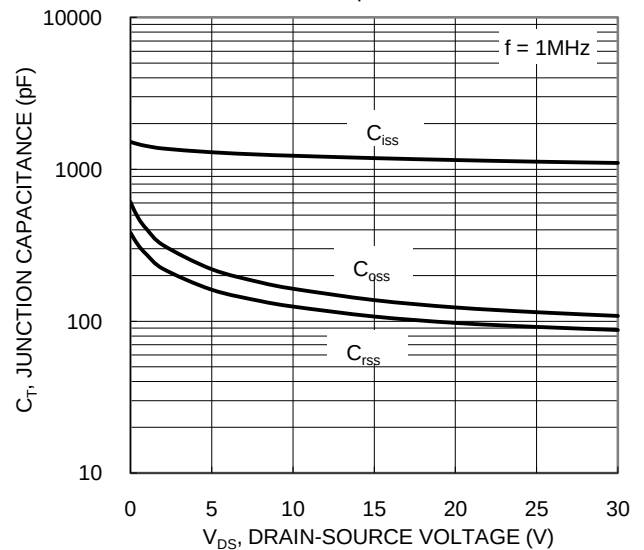
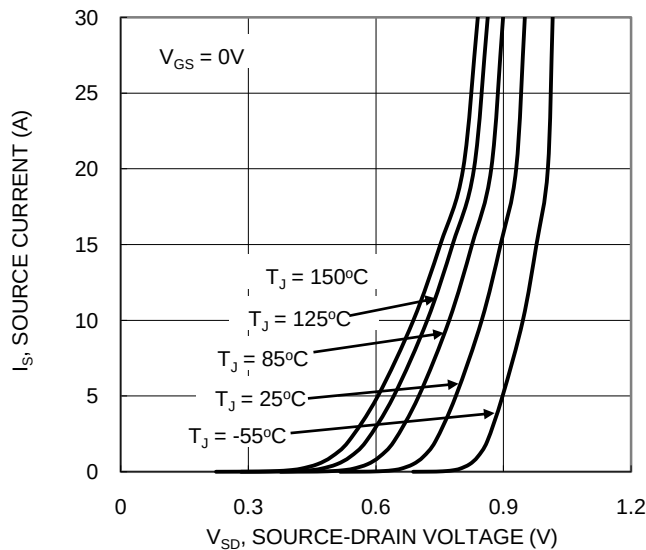
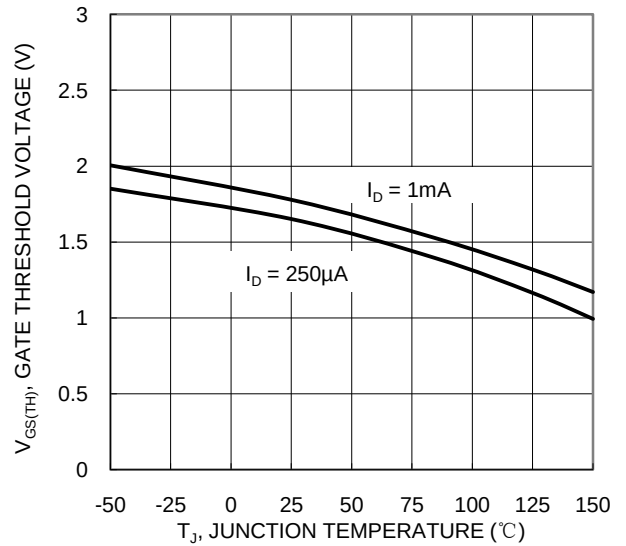
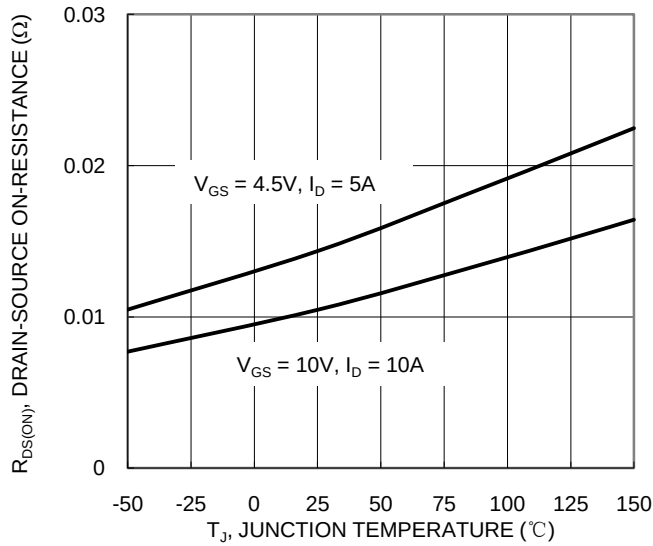


Figure 6. On-Resistance Variation with Temperature



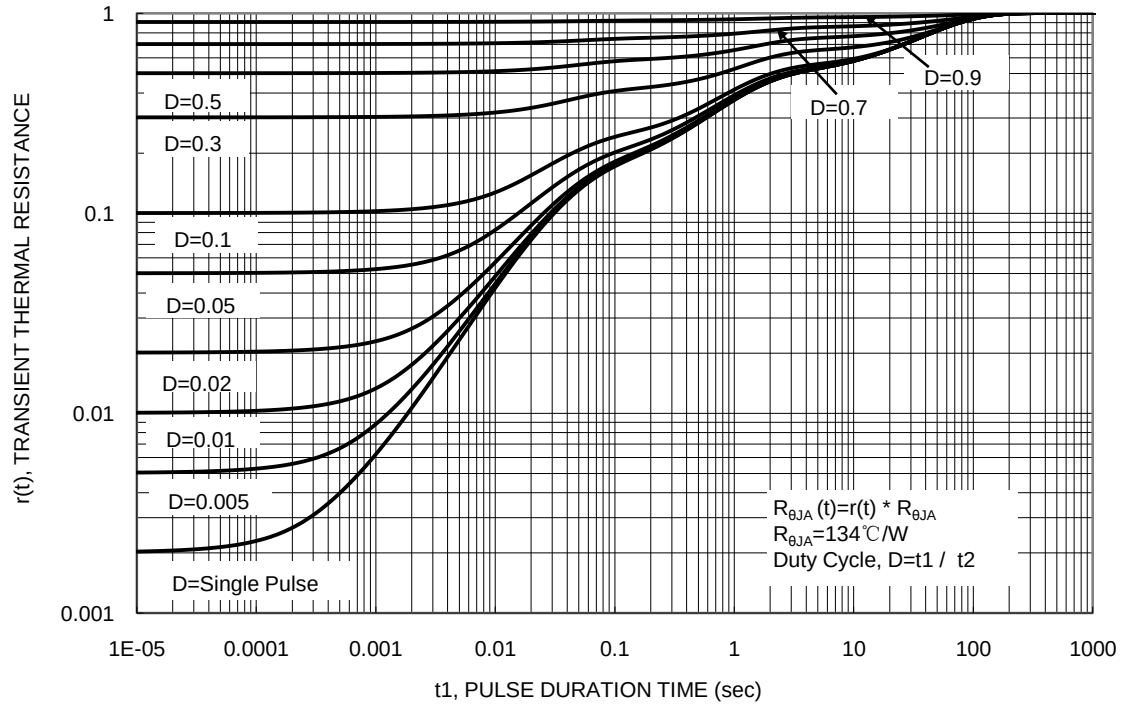
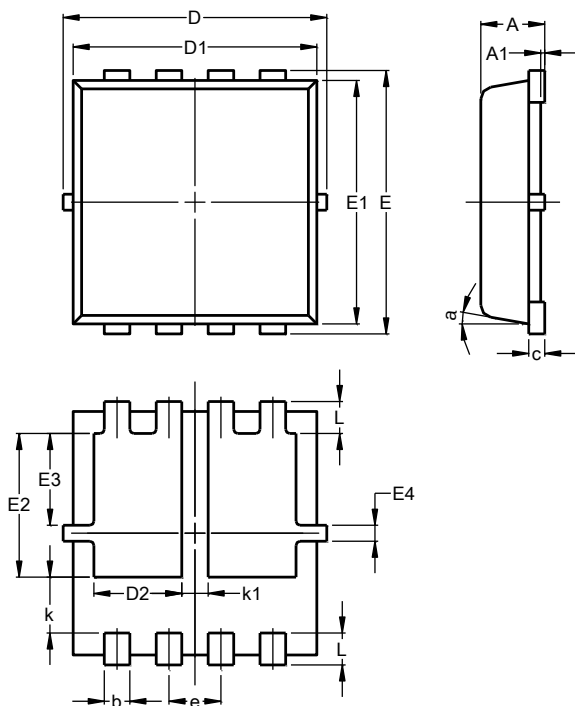


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

**PowerDI3333-8 (Type UXC)**

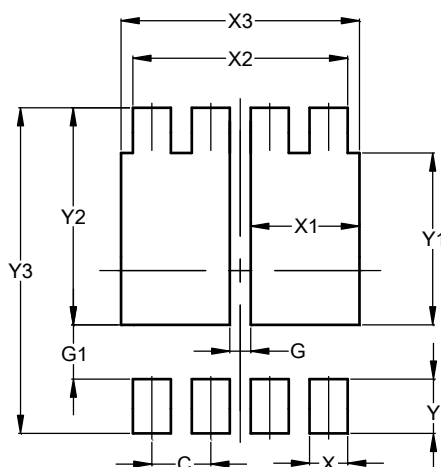


| PowerDI3333-8<br>(Type UXC) |      |      |      |
|-----------------------------|------|------|------|
| Dim                         | Min  | Max  | Typ  |
| A                           | 0.75 | 0.85 | 0.80 |
| A1                          | 0.00 | 0.05 | --   |
| b                           | 0.25 | 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°  |
| All Dimensions in mm        |      |      |      |

## 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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