

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)} \text{ max}$      | $I_D \text{ max}$<br>$T_A = +25^\circ\text{C}$ |
|---------------|-------------------------------|------------------------------------------------|
| 100V          | 80mΩ @ $V_{GS} = 10\text{V}$  | 4.2A                                           |
|               | 99mΩ @ $V_{GS} = 6.0\text{V}$ | 3.6A                                           |

## Description

This MOSFET has been designed to minimize the on-state resistance ( $R_{DS(on)}$ ) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

## Applications

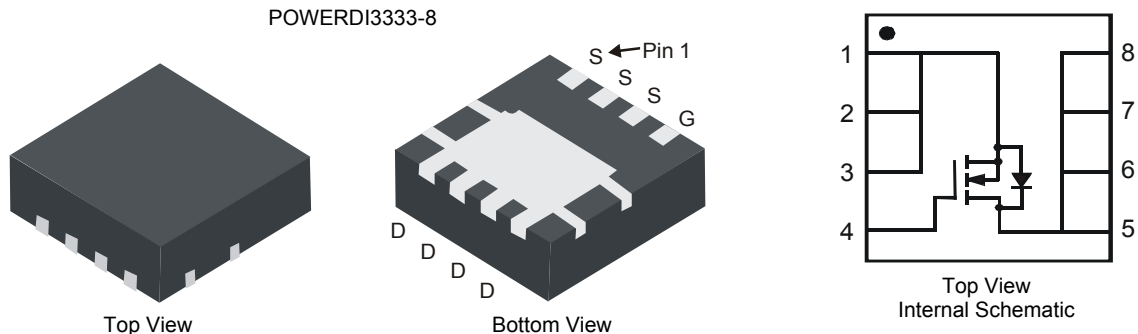
- Power Management Functions
- DC-DC Converters

## Features and Benefits

- Low  $R_{DS(ON)}$  – 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
- 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**

## Mechanical Data

- Case: POWERDI3333-8
- 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: 0.034 grams (approximate)

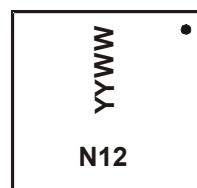


## Ordering Information (Note 4)

| Part Number     | Compliance | Case          | Packaging        |
|-----------------|------------|---------------|------------------|
| DMN10H099SFG-7  | Standard   | POWERDI3333-8 | 2000/Tape & Reel |
| DMN10H099SFG-13 | Standard   | POWERDI3333-8 | 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



N12 = Product Type Marking Code  
YYWW = Date Code Marking  
YY = Last digit of year (ex: 13 = 2013)  
WW = Week code (01 ~ 53)

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

| Characteristic                                          |              |                                                  | Symbol           | Value      | Units |
|---------------------------------------------------------|--------------|--------------------------------------------------|------------------|------------|-------|
| Drain-Source Voltage                                    |              |                                                  | V <sub>DSS</sub> | 100        | V     |
| Gate-Source Voltage                                     |              |                                                  | V <sub>GSS</sub> | ±20        | V     |
| Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V | Steady State | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +70°C | I <sub>D</sub>   | 4.2<br>3.3 | A     |
|                                                         | t < 10s      | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +70°C | I <sub>D</sub>   | 5.8<br>4.5 | A     |
| Continuous Drain Current (Note 6) V <sub>GS</sub> = 6V  | Steady State | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +70°C | I <sub>D</sub>   | 3.6<br>2.9 | A     |
|                                                         | t < 10s      | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +70°C | I <sub>D</sub>   | 5.2<br>4.1 | A     |
| Pulsed Drain Current (10µs pulse, duty cycle = 1%)      |              |                                                  | I <sub>DM</sub>  | 20         | A     |

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

| Characteristic                                   |                        | Symbol                            | Value       | Units |
|--------------------------------------------------|------------------------|-----------------------------------|-------------|-------|
| Total Power Dissipation (Note 5)                 | T <sub>A</sub> = +25°C | P <sub>D</sub>                    | 0.98        | W     |
|                                                  | T <sub>A</sub> = +70°C |                                   | 0.57        |       |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady state           | R <sub>θJA</sub>                  | 131         | °C/W  |
|                                                  | t < 10s                |                                   | 76          |       |
| Total Power Dissipation (Note 6)                 | T <sub>A</sub> = +25°C | P <sub>D</sub>                    | 2.31        | W     |
|                                                  | T <sub>A</sub> = +70°C |                                   | 1.18        |       |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady state           | R <sub>θJA</sub>                  | 55          | °C/W  |
|                                                  | t < 10s                |                                   | 28          |       |
| Thermal Resistance, Junction to Case (Note 6)    |                        | R <sub>θJC</sub>                  | 6.9         |       |
| 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 (Note 7)</b>      |                     |     |      |      |      |                                                                                               |
| Drain-Source Breakdown Voltage           | BV <sub>DSS</sub>   | 100 | -    | -    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA                                                  |
| Zero Gate Voltage Drain Current          | I <sub>DSS</sub>    | -   | -    | 1.0  | µA   | V <sub>DS</sub> = 80V, 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 7)</b>       |                     |     |      |      |      |                                                                                               |
| Gate Threshold Voltage                   | V <sub>GS(th)</sub> | 1.5 | 2.0  | 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> | -   | 54   | 80   | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 3.3A                                                  |
|                                          |                     | -   | 58   | 99   |      | V <sub>GS</sub> = 6.0V, I <sub>D</sub> = 3.0A                                                 |
| Forward Transfer Admittance              | Y <sub>fs</sub>     | -   | 13   | -    | S    | V <sub>DS</sub> = 10V, I <sub>D</sub> = 3.3A                                                  |
| Diode Forward Voltage                    | V <sub>SD</sub>     | -   | 0.77 | -    | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 3.2A                                                   |
| <b>DYNAMIC CHARACTERISTICS (Note 8)</b>  |                     |     |      |      |      |                                                                                               |
| Input Capacitance                        | C <sub>iss</sub>    | -   | 1172 | -    | pF   | V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V,<br>f = 1.0MHz                                    |
| Output Capacitance                       | C <sub>oss</sub>    | -   | 40.8 | -    | pF   |                                                                                               |
| Reverse Transfer Capacitance             | C <sub>rss</sub>    | -   | 31.3 | -    | pF   |                                                                                               |
| 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> = 10V  | Q <sub>g</sub>      | -   | 25.2 | -    | nC   |                                                                                               |
| Total Gate Charge V <sub>GS</sub> = 4.5V | Q <sub>g</sub>      | -   | 12.2 | -    | nC   |                                                                                               |
| Gate-Source Charge                       | Q <sub>gs</sub>     | -   | 5.3  | -    | nC   |                                                                                               |
| Gate-Drain Charge                        | Q <sub>gd</sub>     | -   | 5.9  | -    | nC   | V <sub>GS</sub> = 10V, V <sub>DS</sub> = 50V,<br>R <sub>G</sub> = 6.0Ω, I <sub>D</sub> = 3.3A |
| Turn-On Delay Time                       | t <sub>D(on)</sub>  | -   | 5.4  | -    | ns   |                                                                                               |
| Turn-On Rise Time                        | t <sub>r</sub>      | -   | 5.9  | -    | ns   |                                                                                               |
| Turn-Off Delay Time                      | t <sub>D(off)</sub> | -   | 20.0 | -    | ns   |                                                                                               |
| Turn-Off Fall Time                       | t <sub>f</sub>      | -   | 7.3  | -    | ns   |                                                                                               |

- Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
  7. Short duration pulse test used to minimize self-heating effect.
  8. Guaranteed by design. Not subject to product testing.

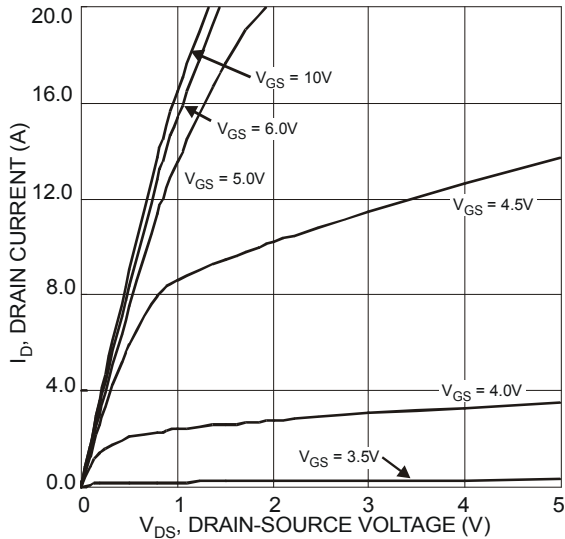


Figure 1 Typical Output Characteristic

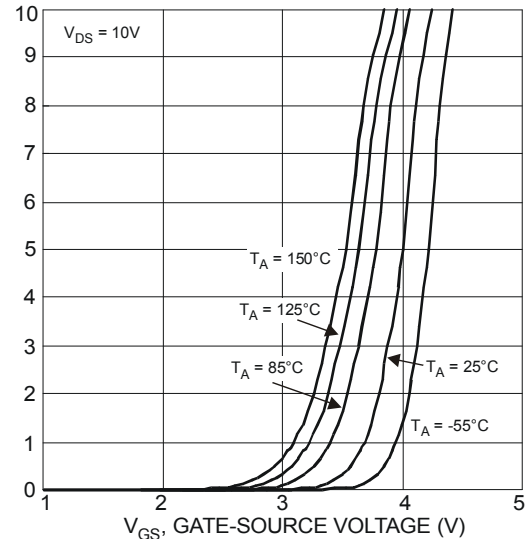


Figure 2 Typical Transfer Characteristics

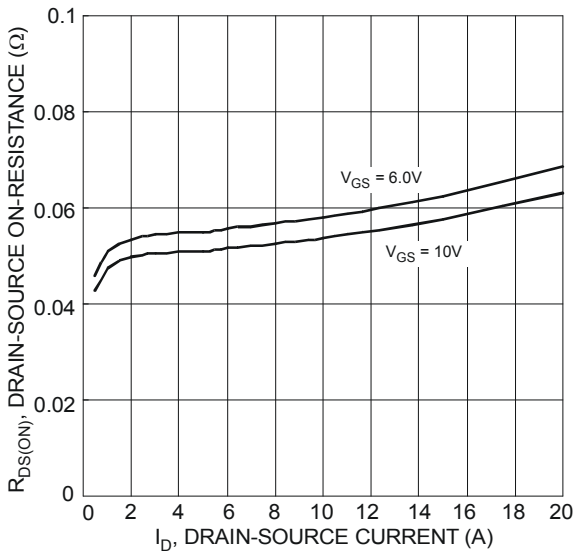


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

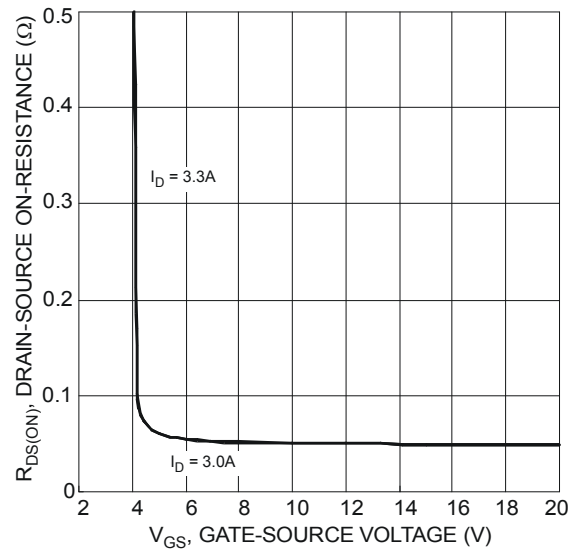


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

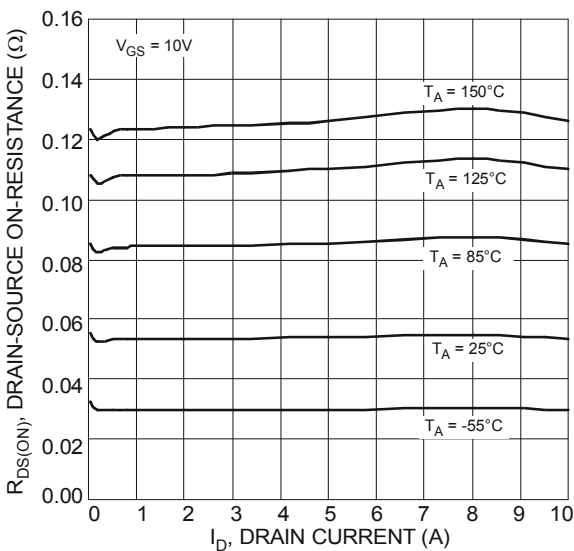


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

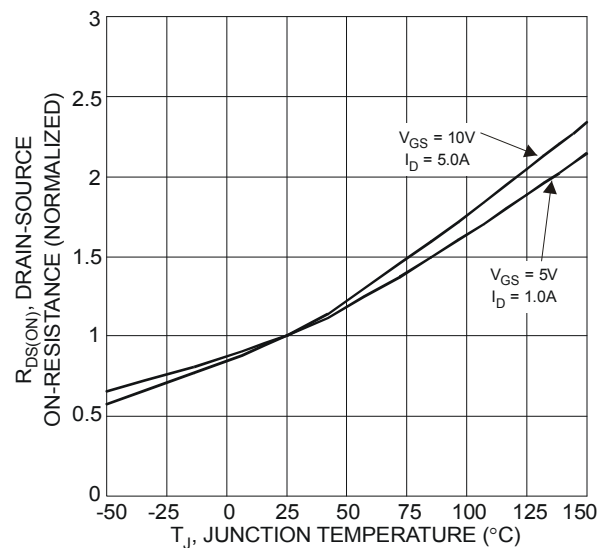
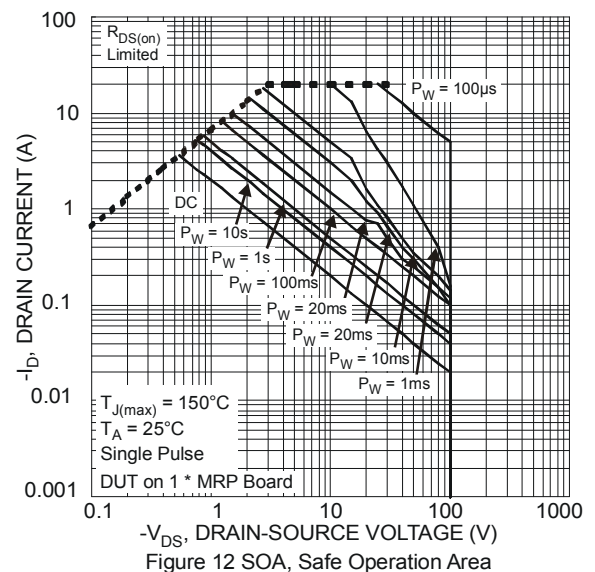
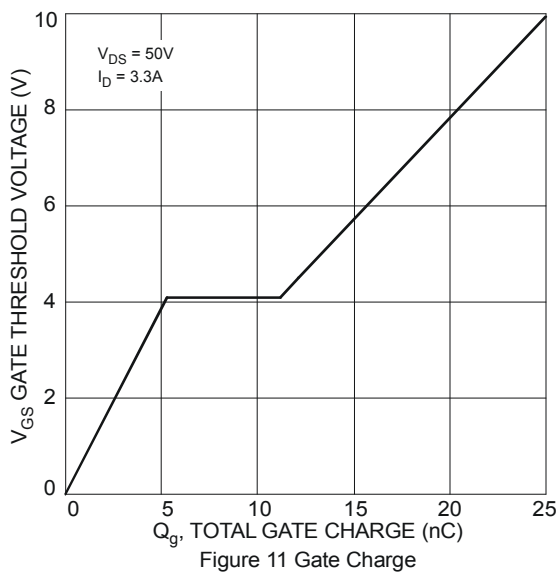
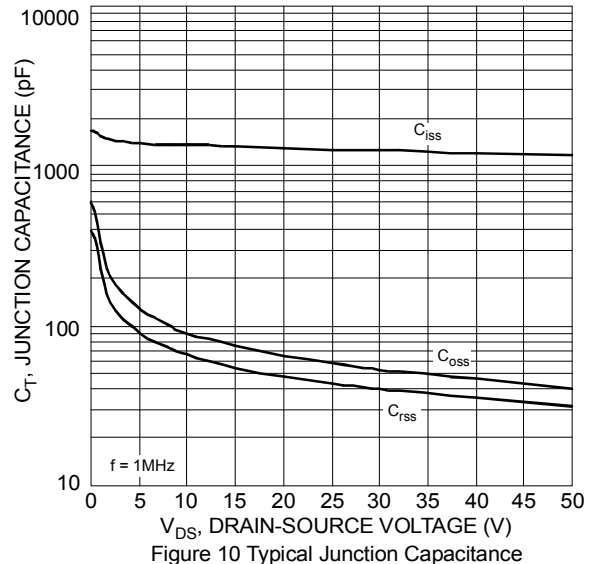
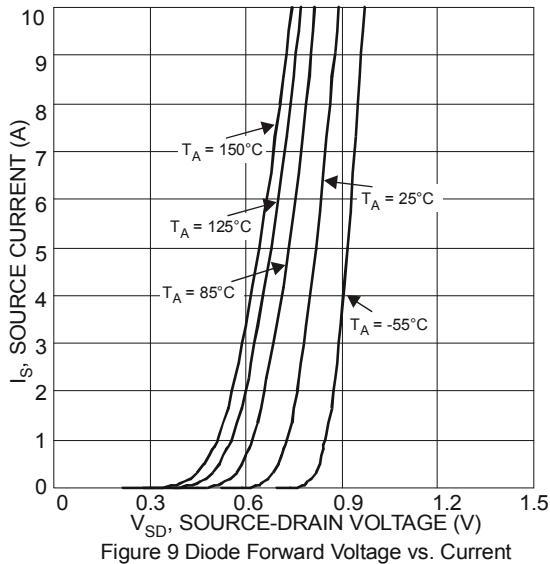
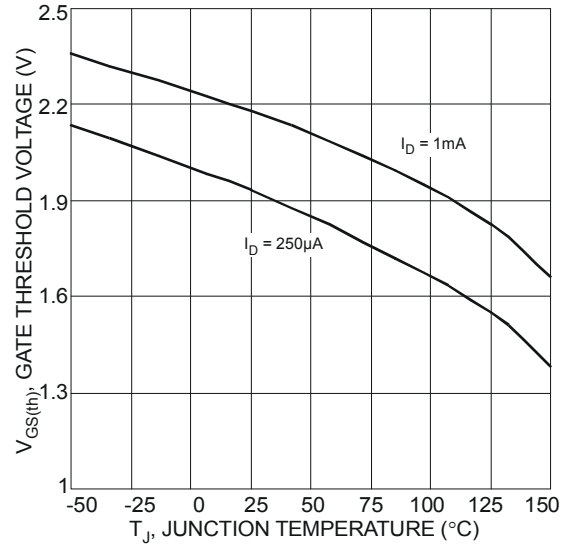
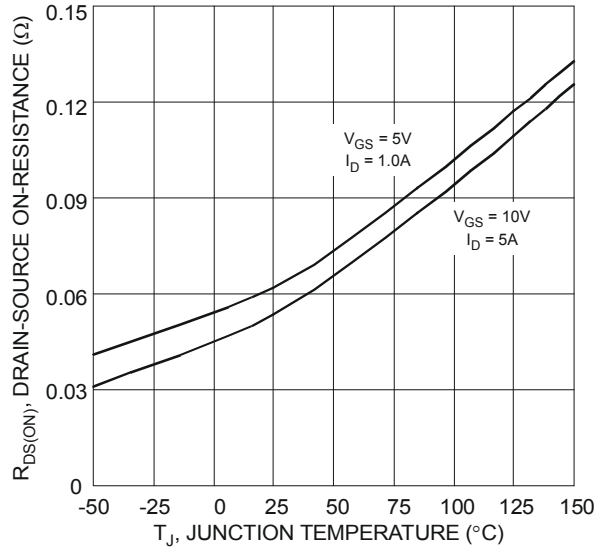
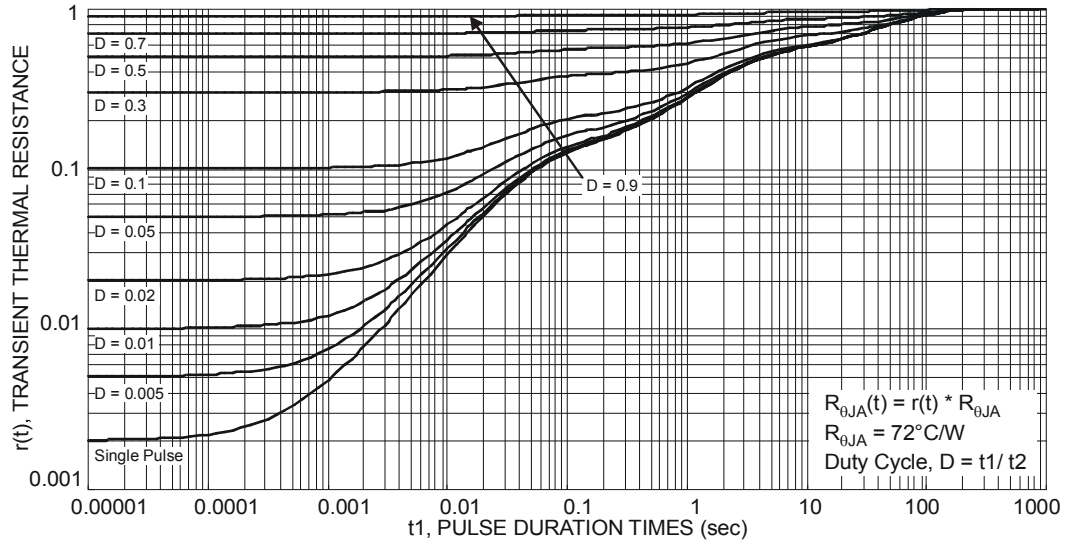


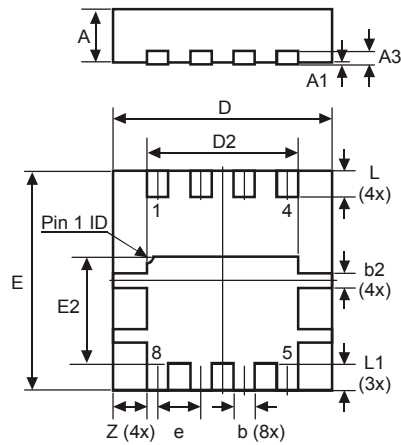
Figure 6 On-Resistance Variation with Temperature





## Package Outline Dimensions

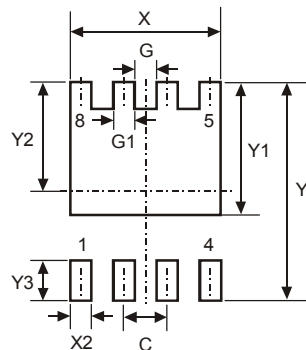
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| POWERDI3333-8        |      |      |       |
|----------------------|------|------|-------|
| Dim                  | Min  | Max  | Typ   |
| D                    | 3.25 | 3.35 | 3.30  |
| E                    | 3.25 | 3.35 | 3.30  |
| D2                   | 2.22 | 2.32 | 2.27  |
| E2                   | 1.56 | 1.66 | 1.61  |
| A                    | 0.75 | 0.85 | 0.80  |
| A1                   | 0    | 0.05 | 0.02  |
| A3                   | —    | —    | 0.203 |
| b                    | 0.27 | 0.37 | 0.32  |
| b2                   | —    | —    | 0.20  |
| L                    | 0.35 | 0.45 | 0.40  |
| L1                   | —    | —    | 0.39  |
| e                    | —    | —    | 0.65  |
| Z                    | —    | —    | 0.515 |
| All Dimensions in mm |      |      |       |

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 0.650         |
| G          | 0.230         |
| G1         | 0.420         |
| Y          | 3.700         |
| Y1         | 2.250         |
| Y2         | 1.850         |
| Y3         | 0.700         |
| X          | 2.370         |
| X2         | 0.420         |

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