

# ANTREX Electronics

## Electronic Components Sourcing Information

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### Product Reference Information

|                      |                           |
|----------------------|---------------------------|
| <b>Part Number:</b>  | DMTH10H009LFGQ-13         |
| <b>Manufacturer:</b> | Diodes Incorporated       |
| <b>Package:</b>      | Please confirm with sales |
| <b>Availability:</b> | Please confirm with sales |

#### Product Page:

<https://antrexco.com/product/details/diodes-incorporated/dmth10h009lfgq-13.html>

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CoC / RoHS / REACH documents available on request

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#### Note:

This PDF includes an ANTREX product reference cover page.

The original manufacturer datasheet follows from the next page.

## Product Summary

| BV <sub>DSS</sub> | R <sub>DS(ON)</sub> Max         | I <sub>D</sub> Max<br>T <sub>c</sub> = +25°C |
|-------------------|---------------------------------|----------------------------------------------|
| 100V              | 8.5mΩ @ V <sub>GS</sub> = 10V   | 46A                                          |
|                   | 13.6mΩ @ V <sub>GS</sub> = 4.5V | 36A                                          |

## Description and Applications

This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- Synchronous rectifiers
- Backlighting
- Power management functions
- DC-DC converters

## Features and Benefits

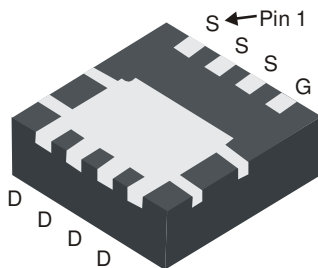
- Low R<sub>DS(ON)</sub> – Ensures On-State Losses are Minimized
- Excellent Q<sub>gd</sub> x R<sub>DS(ON)</sub> Product (FOM)
- Advanced Technology for DC/DC Converters
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- Occupies Just 33% of the Board Area Occupied by SO-8 Enabling Smaller End Product
- 100% Unclamped Inductive Switching (UIS) Test in Production Ensures More Reliable and Robust End Application
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **The DIODES™ DMTH10H009LFGQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

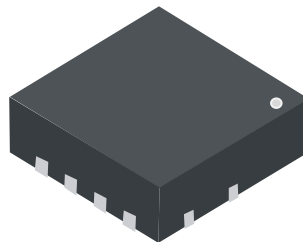
## Mechanical Data

- 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: 0.034 grams (Approximate)

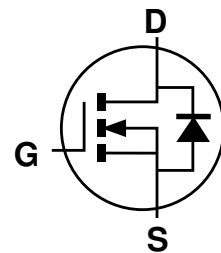
PowerDI3333-8



Bottom View



Top View



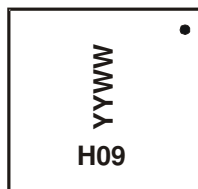
Equivalent Circuit

## Ordering Information (Note 4)

| Part Number       | Package       | Packing |             |
|-------------------|---------------|---------|-------------|
|                   |               | Qty.    | Carrier     |
| DMTH10H009LFGQ-7  | PowerDI3333-8 | 2,000   | Tape & Reel |
| DMTH10H009LFGQ-13 | PowerDI3333-8 | 3,000   | 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



H09 = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 23 = 2023)  
 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> | 100   | V    |
| Gate-Source Voltage                                                |                         | V <sub>GSS</sub> | ±20   | V    |
| Continuous Drain Current (Note 5) V <sub>GS</sub> = 10V            | T <sub>A</sub> = +25°C  | I <sub>D</sub>   | 12    | A    |
|                                                                    | T <sub>A</sub> = +100°C |                  | 8     |      |
|                                                                    | T <sub>C</sub> = +25°C  | I <sub>D</sub>   | 46    | A    |
|                                                                    | T <sub>C</sub> = +100°C |                  | 32    |      |
| Maximum Continuous Body Diode Forward Current (Note 5)             |                         | I <sub>S</sub>   | 30    | A    |
| Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)                 |                         | I <sub>DM</sub>  | 184   | A    |
| Pulsed Body Diode Continuous Current (10μs Pulse, Duty Cycle = 1%) |                         | I <sub>SM</sub>  | 184   | A    |
| Avalanche Current (L = 1mH)                                        |                         | I <sub>AS</sub>  | 17    | A    |
| Avalanche Energy (L = 1mH)                                         |                         | E <sub>AS</sub>  | 144.5 | mJ   |

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

| Characteristic                                   |                        | Symbol                            | Value       | Unit |
|--------------------------------------------------|------------------------|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5)                 | T <sub>A</sub> = +25°C | P <sub>D</sub>                    | 2.5         | W    |
| Thermal Resistance, Junction to Ambient (Note 5) |                        | R <sub>θJA</sub>                  | 60          | °C/W |
| Total Power Dissipation                          | T <sub>C</sub> = +25°C | P <sub>D</sub>                    | 39          | W    |
| Thermal Resistance, Junction to Case             |                        | R <sub>θJC</sub>                  | 3.8         | °C/W |
| Operating and Storage Temperature Range          |                        | T <sub>J</sub> , T <sub>STG</sub> | -55 to +175 | °C   |

Note: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1 inch square copper plate.

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

| Characteristic                          | Symbol              | Min | Typ  | Max  | Unit | Test Condition                                                                            |
|-----------------------------------------|---------------------|-----|------|------|------|-------------------------------------------------------------------------------------------|
| <b>OFF CHARACTERISTICS (Note 6)</b>     |                     |     |      |      |      |                                                                                           |
| Drain-Source Breakdown Voltage          | BV <sub>DSS</sub>   | 100 | —    | —    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 1mA                                                |
| Zero Gate Voltage Drain Current         | I <sub>DSS</sub>    | —   | —    | 1    | 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 6)</b>      |                     |     |      |      |      |                                                                                           |
| Gate Threshold Voltage                  | V <sub>GS(TH)</sub> | 1.1 | —    | 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> | —   | 6.4  | 8.5  | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A                                               |
|                                         |                     | —   | 8.2  | 13.6 |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 10A                                              |
| Diode Forward Voltage                   | V <sub>SD</sub>     | —   | 0.8  | 1.2  | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 20A                                                |
| <b>DYNAMIC CHARACTERISTICS (Note 7)</b> |                     |     |      |      |      |                                                                                           |
| Input Capacitance                       | C <sub>iss</sub>    | —   | 2361 | —    | pF   | V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V<br>f = 1MHz                                   |
| Output Capacitance                      | C <sub>oss</sub>    | —   | 611  | —    |      |                                                                                           |
| Reverse Transfer Capacitance            | C <sub>rss</sub>    | —   | 16   | —    |      |                                                                                           |
| Gate Resistance                         | R <sub>g</sub>      | —   | 1.7  | —    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz                                      |
| Total Gate Charge                       | Q <sub>g</sub>      | —   | 41   | —    | nC   | V <sub>DD</sub> = 50V, I <sub>D</sub> = 13A<br>V <sub>GS</sub> = 10V                      |
| Gate-Source Charge                      | Q <sub>gs</sub>     | —   | 7.3  | —    |      |                                                                                           |
| Gate-Drain Charge                       | Q <sub>gd</sub>     | —   | 9.3  | —    |      |                                                                                           |
| Turn-On Delay Time                      | t <sub>D(ON)</sub>  | —   | 7    | —    | ns   | V <sub>DD</sub> = 50V, V <sub>GS</sub> = 10V<br>I <sub>D</sub> = 13A, R <sub>g</sub> = 6Ω |
| Turn-On Rise Time                       | t <sub>r</sub>      | —   | 12   | —    |      |                                                                                           |
| Turn-Off Delay Time                     | t <sub>D(OFF)</sub> | —   | 42   | —    |      |                                                                                           |
| Turn-Off Fall Time                      | t <sub>f</sub>      | —   | 24   | —    |      |                                                                                           |
| Reverse Recovery Time                   | t <sub>RR</sub>     | —   | 45   | —    | ns   | I <sub>F</sub> = 13A, dI/dt = 100A/μs                                                     |
| Reverse Recovery Charge                 | Q <sub>RR</sub>     | —   | 68   | —    | nC   |                                                                                           |

Notes: 6. Short duration pulse test used to minimize self-heating effect.  
7. Guaranteed by design. Not subject to product testing.

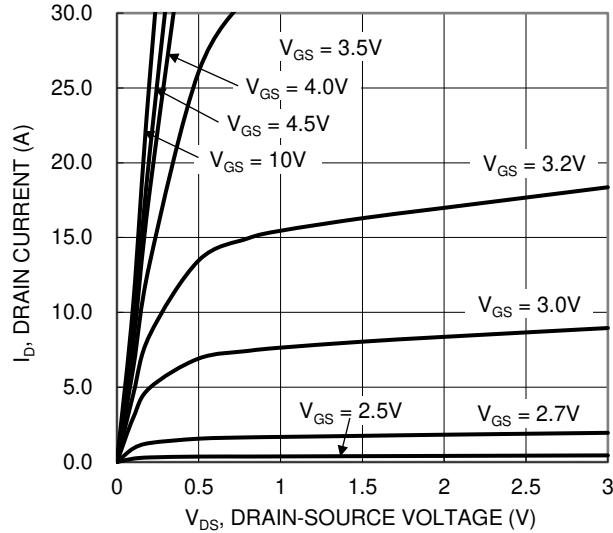


Figure 1. Typical Output Characteristic

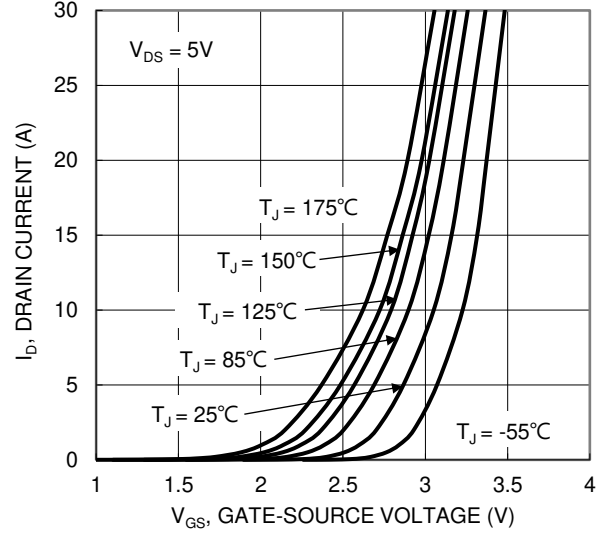


Figure 2. Typical Transfer Characteristic

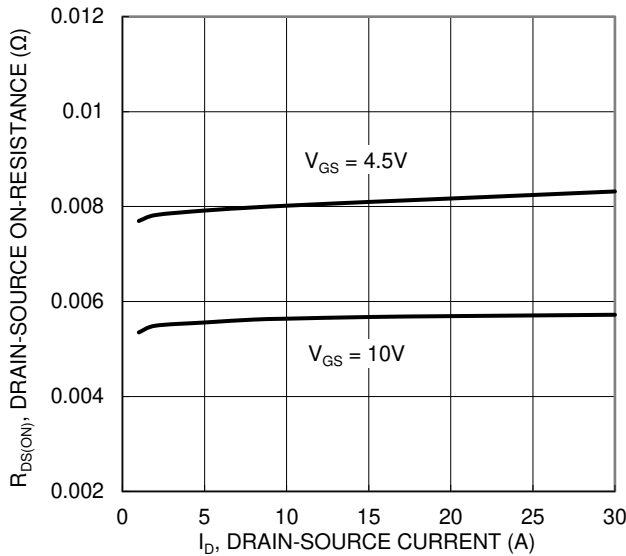


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

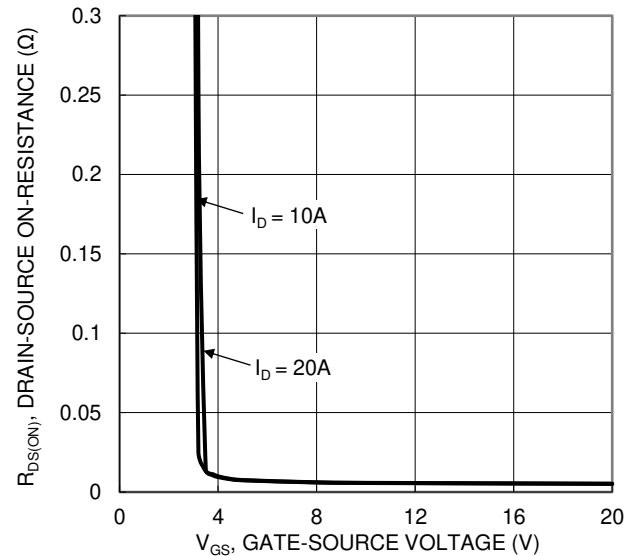


Figure 4. Typical Transfer Characteristic

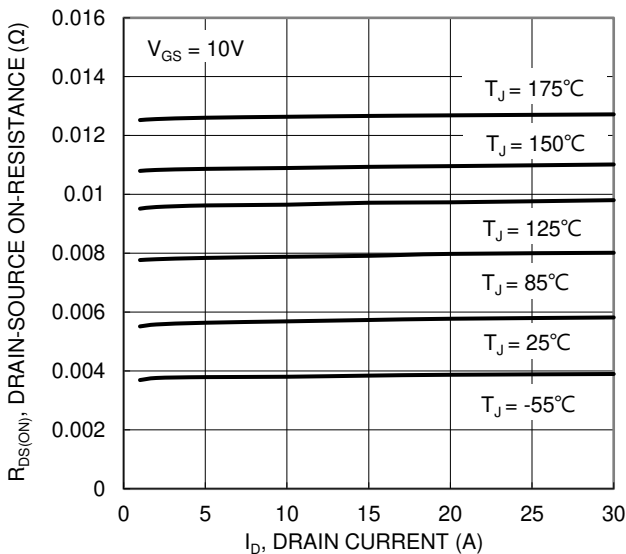


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

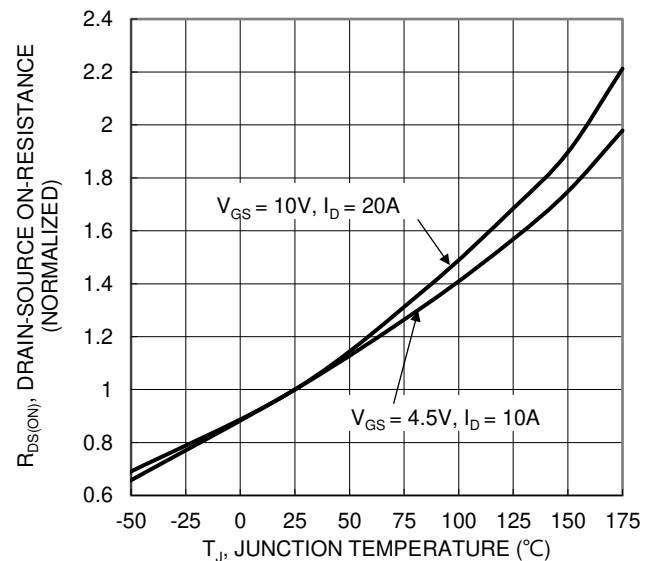
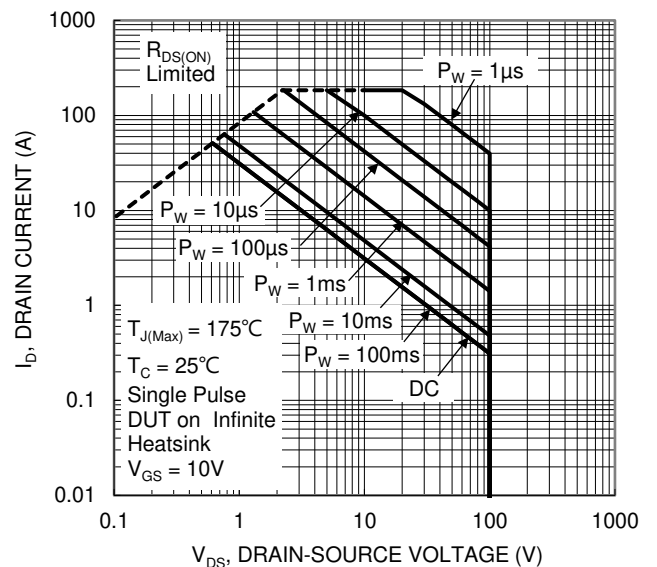
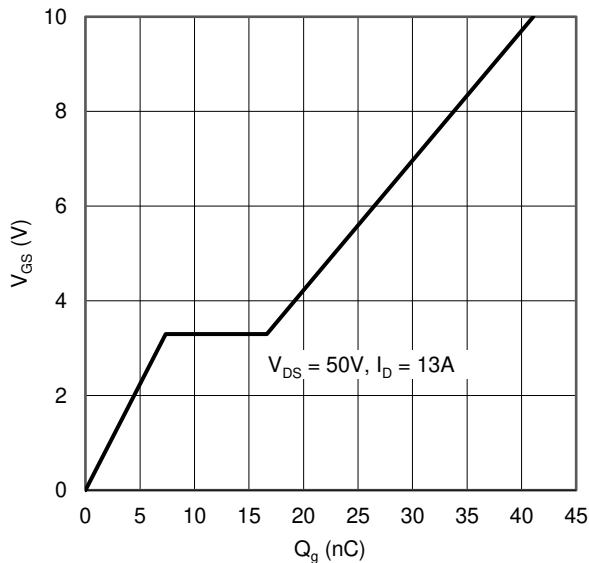
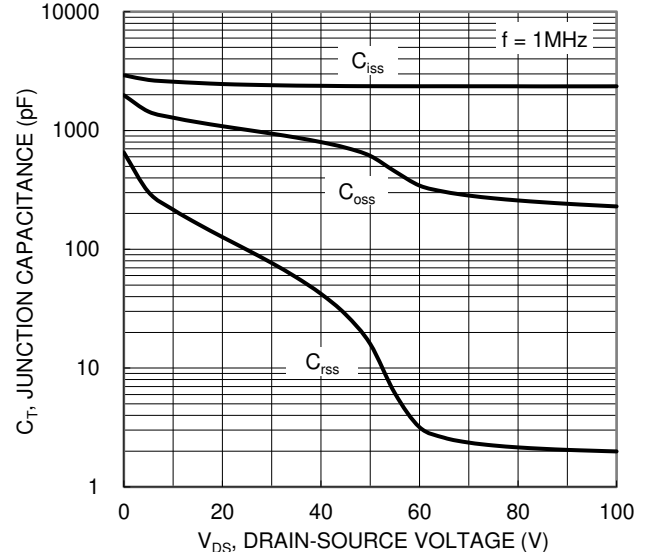
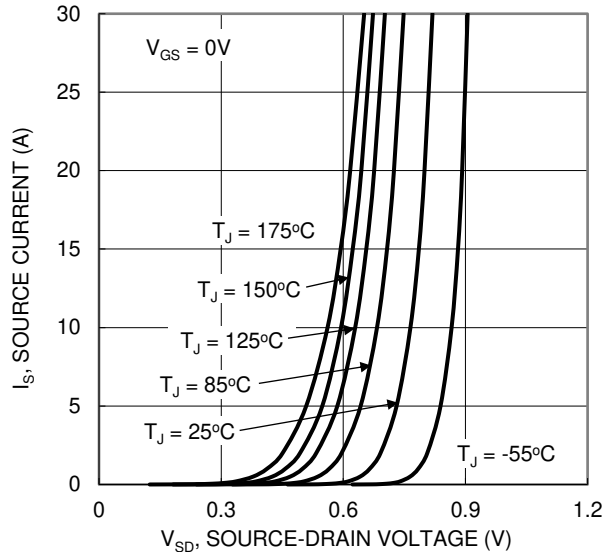
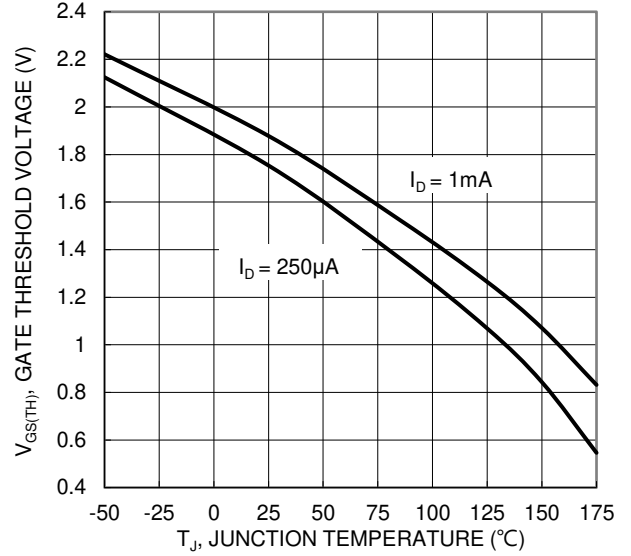
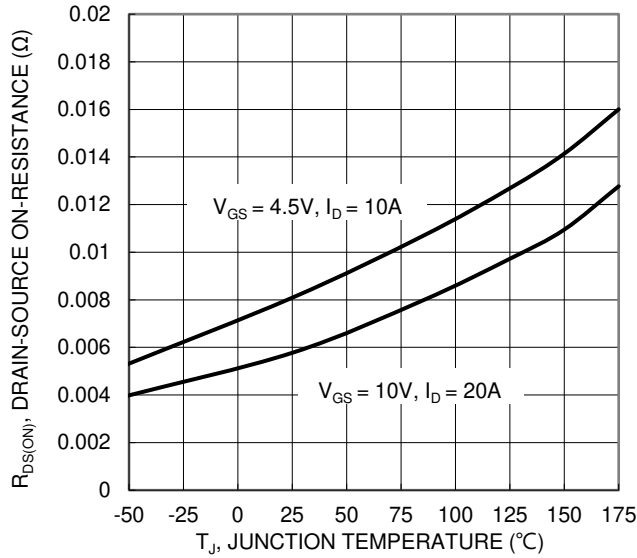


Figure 6. On-Resistance Variation with Junction Temperature



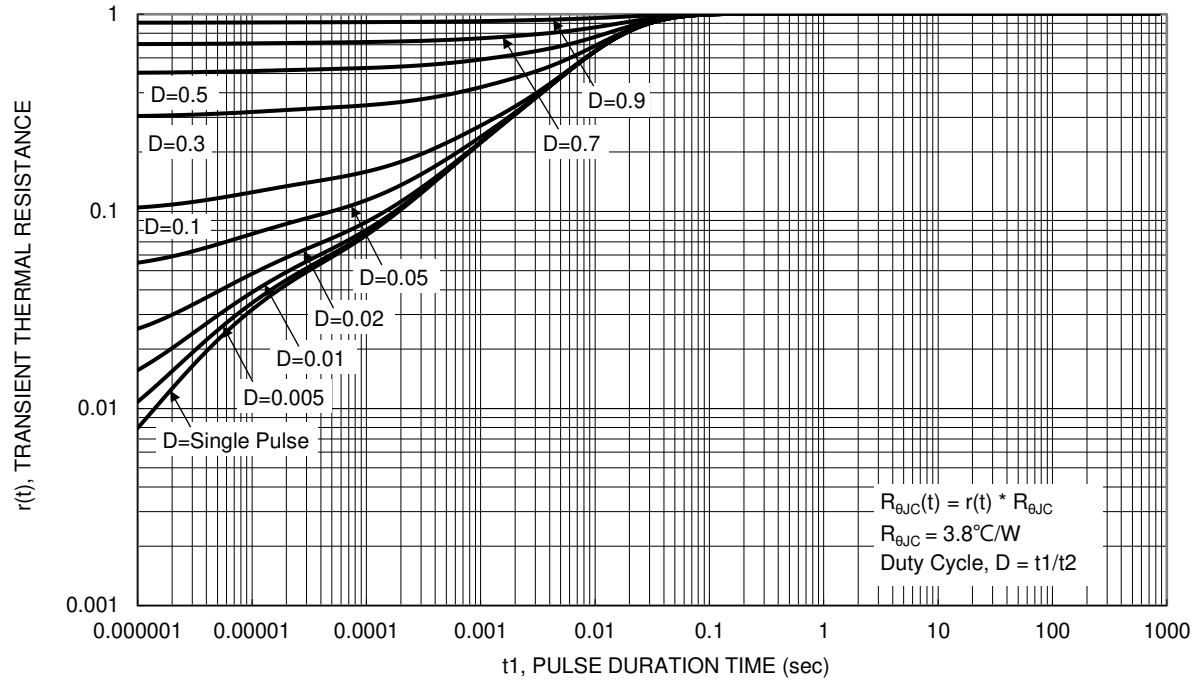
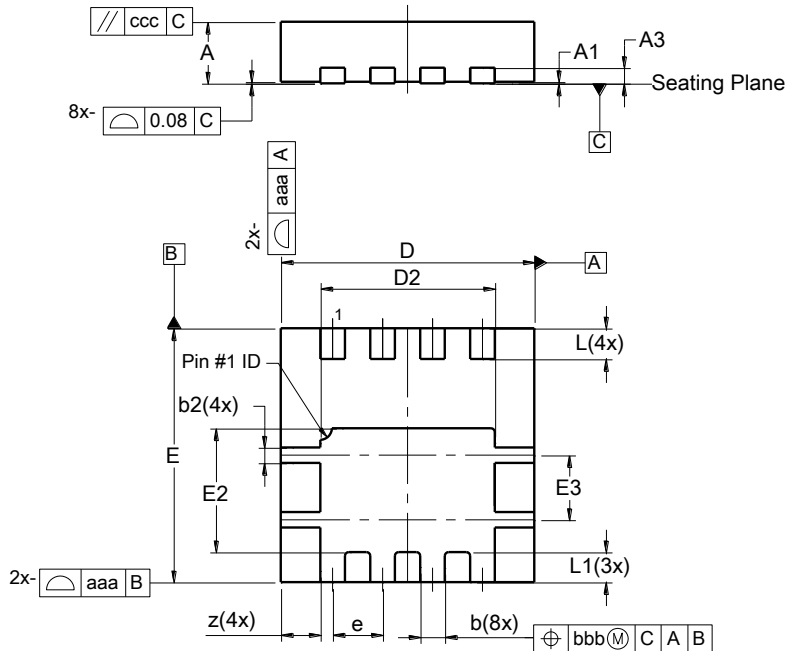


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

PowerDI3333-8

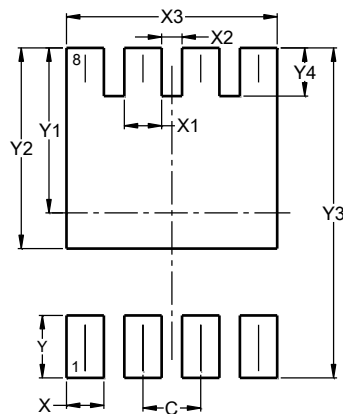


| PowerDI3333-8        |      |      |       |
|----------------------|------|------|-------|
| Dim                  | Min  | Max  | Typ   |
| A                    | 0.75 | 0.85 | 0.80  |
| A1                   | 0.00 | 0.05 | 0.02  |
| A3                   | —    | —    | 0.203 |
| b                    | 0.27 | 0.37 | 0.32  |
| b2                   | —    | —    | 0.20  |
| D                    | 3.25 | 3.35 | 3.30  |
| D2                   | 2.22 | 2.32 | 2.27  |
| E                    | 3.25 | 3.35 | 3.30  |
| E2                   | 1.56 | 1.66 | 1.61  |
| E3                   | 0.79 | 0.89 | 0.84  |
| e                    | —    | —    | 0.65  |
| L                    | 0.35 | 0.45 | 0.40  |
| L1                   | —    | —    | 0.39  |
| z                    | —    | —    | 0.515 |
| aaa                  | 0.25 |      |       |
| bbb                  | 0.10 |      |       |
| ccc                  | 0.10 |      |       |
| All Dimensions in mm |      |      |       |

## Suggested Pad Layout

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

PowerDI3333-8



| 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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