

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ Max       | $I_D$ Max<br>$T_C = +25^\circ C$ |
|---------------|------------------------|----------------------------------|
| 30V           | 5.5mΩ @ $V_{GS} = 10V$ | 45A                              |
|               | 9mΩ @ $V_{GS} = 4.5V$  | 30A                              |

## Description and Applications

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

- Power Management Functions
- DC-DC Converters
- Battery

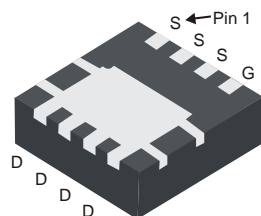
## Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

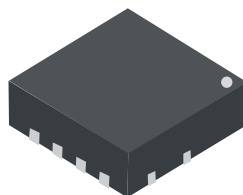
## Mechanical Data

- Case: PowerDI® 3333-8
- 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 Ⓔ3
- Weight: 0.072 grams (Approximate)

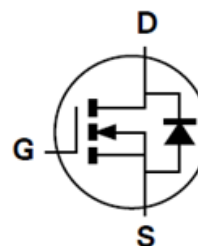
### PowerDI3333-8



Bottom View



Top View



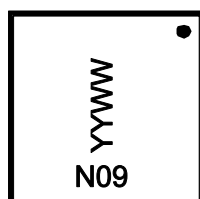
Equivalent Circuit

## Ordering Information (Note 4)

| Part Number   | Case          | Packaging         |
|---------------|---------------|-------------------|
| DMN3009SFG-7  | PowerDI3333-8 | 2,000/Tape & Reel |
| DMN3009SFG-13 | PowerDI3333-8 | 3,000/Tape & Reel |

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  2. 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.
  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 <http://www.diodes.com/products/packages.html>.

## Marking Information



N09= Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Digit of Year (ex: 15 = 2015)  
 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 6) | I <sub>D</sub>   | 16    | A    |
|  |                  | 13    |      |
|  | I <sub>D</sub>   | 45    | A    |
|  |                  | 35    |      |
| Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)      | I <sub>DM</sub>  | 80    | A    |
| Maximum Continuous Body Diode Forward Current (Note 6)   | I <sub>S</sub>   | 20    | A    |
| Avalanche Current, L = 0.1mH                             | I <sub>AS</sub>  | 33    | A    |
| Avalanche Energy, L = 0.1mH                              | E <sub>AS</sub>  | 55    | mJ   |

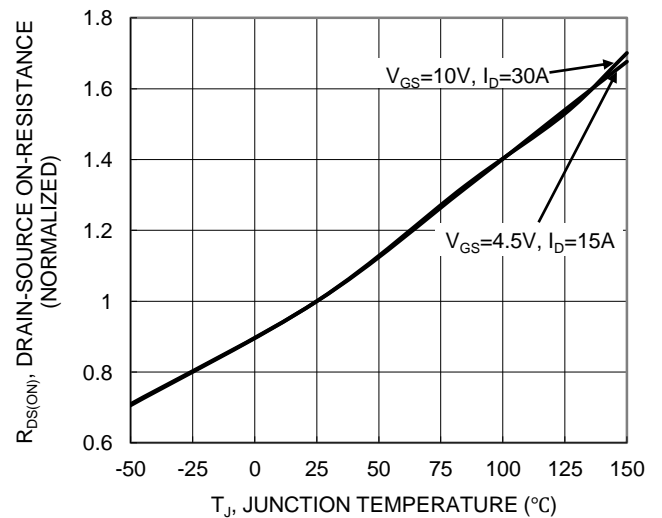
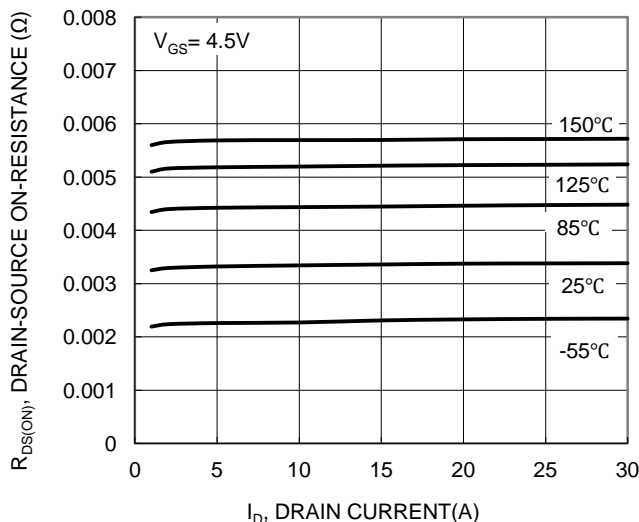
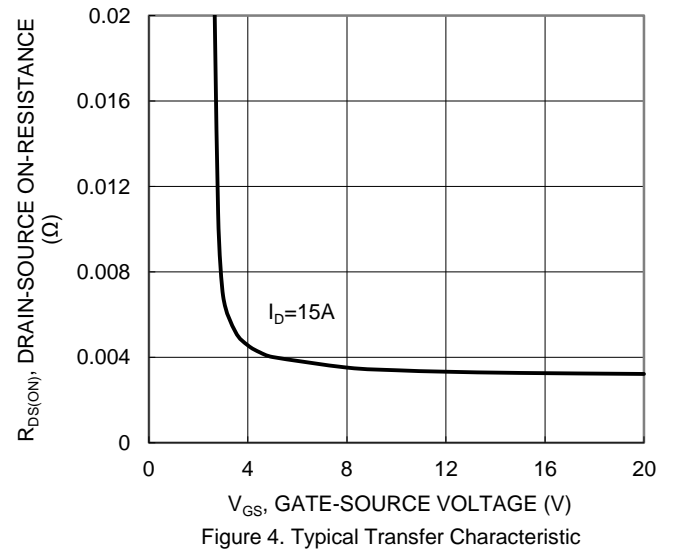
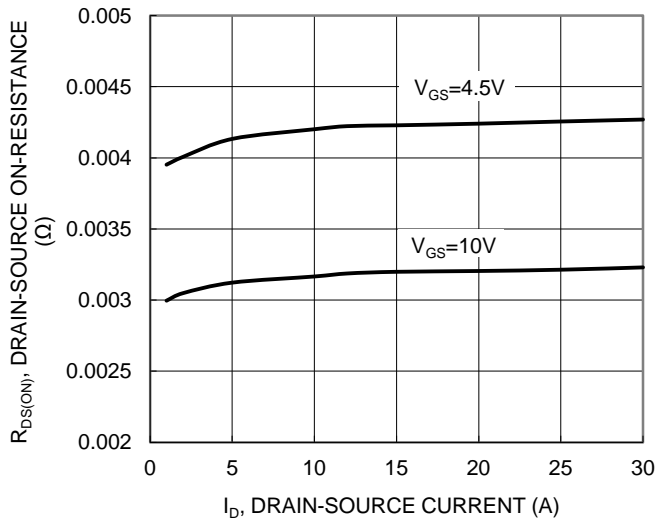
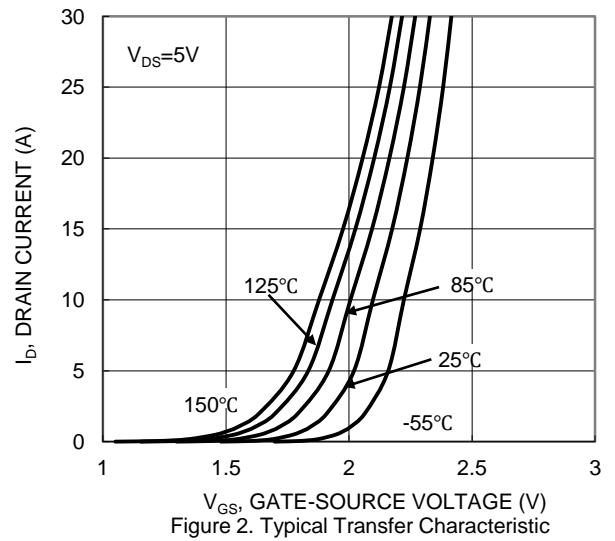
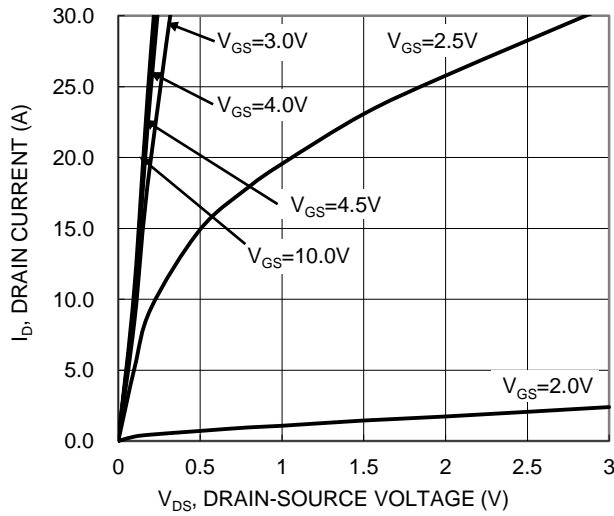
**Thermal Characteristics**

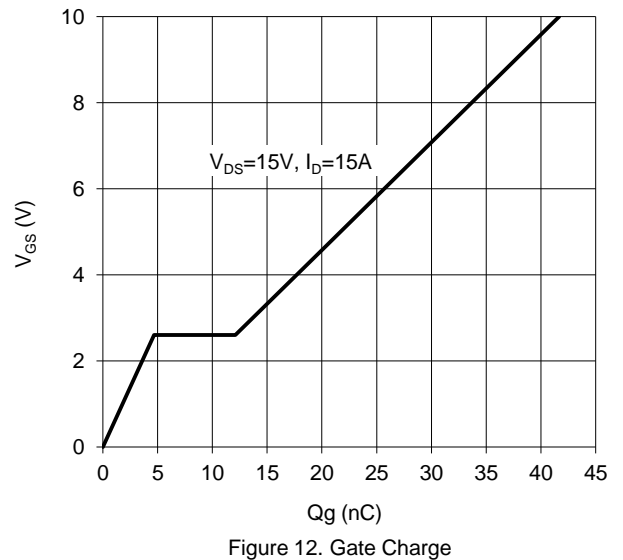
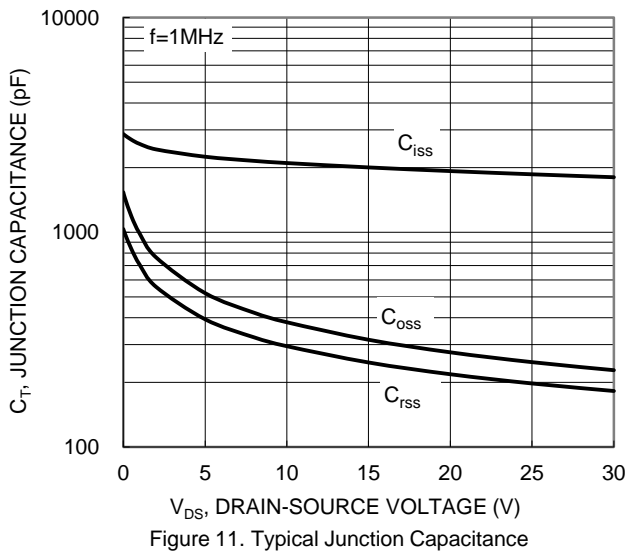
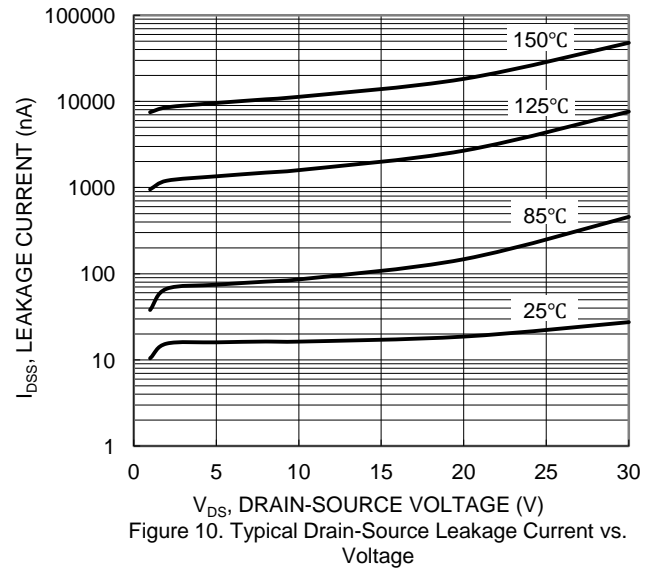
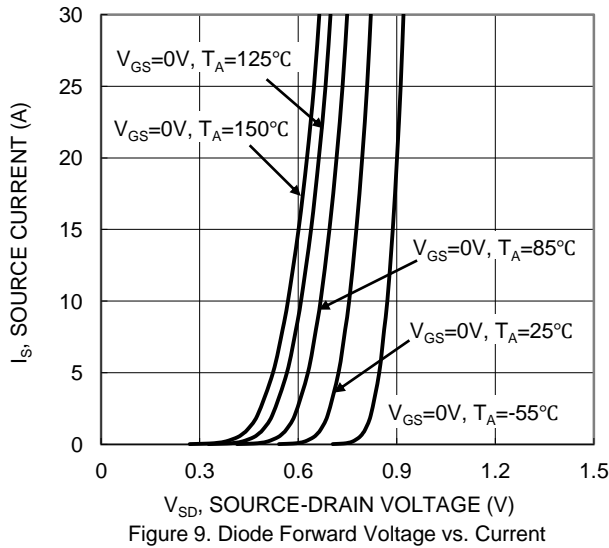
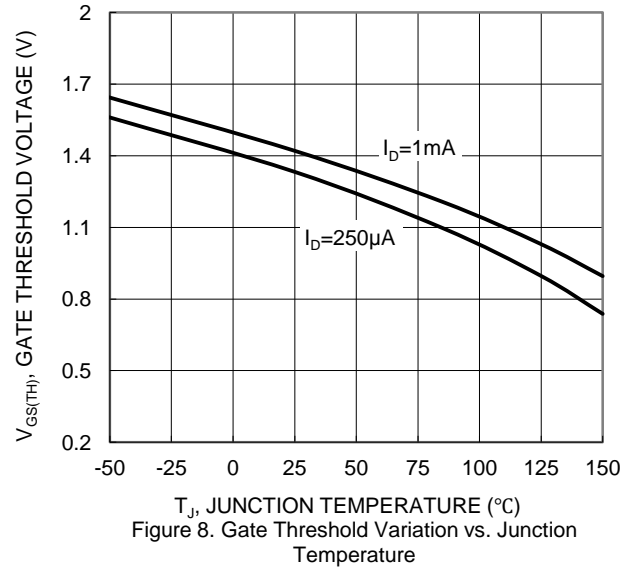
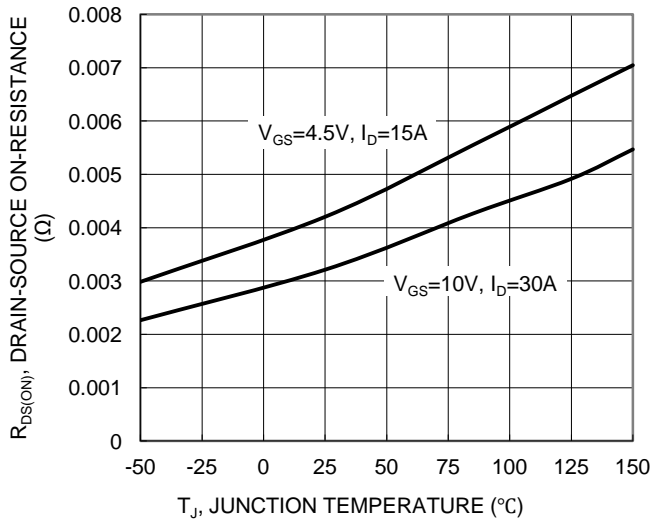
| Characteristic  | Symbol                            | Value       | Unit |
|---|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5)                              | P <sub>D</sub>                    | 0.9         | W    |
|   |                                   | 0.6         |      |
| Thermal Resistance, Junction to Ambient (Note 5)              | R <sub>θJA</sub>                  | 137         | °C/W |
| Total Power Dissipation (Note 6)                              | P <sub>D</sub>                    | 2.1         | W    |
|   |                                   | 1.4         |      |
| Thermal Resistance, Junction to Ambient (Note 6) Steady State | R <sub>θJA</sub>                  | 59          | °C/W |
| Thermal Resistance, Junction to Case (Note 6)                 | R <sub>θJC</sub>                  | 7.8         | °C/W |
| Operating and Storage Temperature Range                       | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

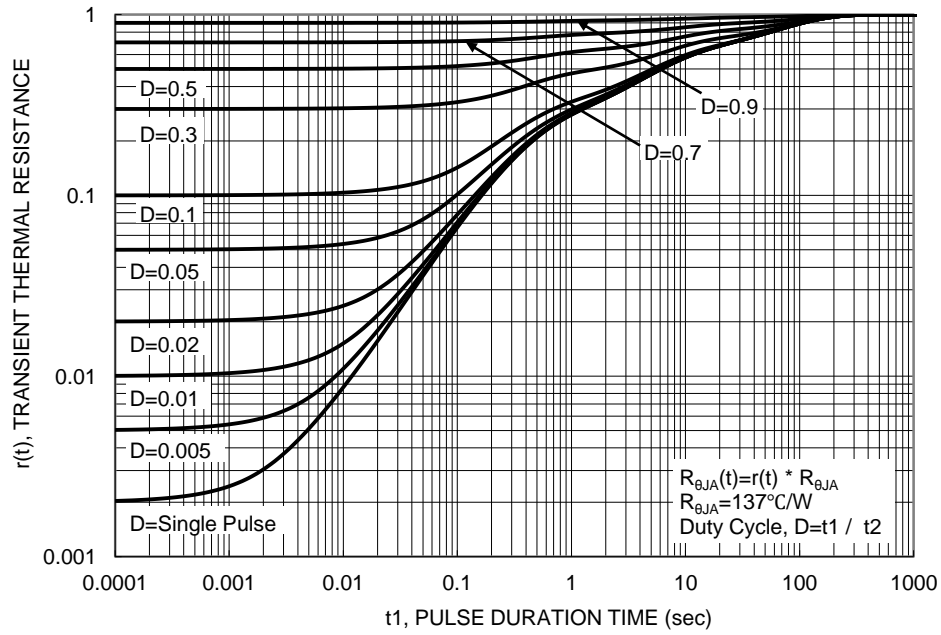
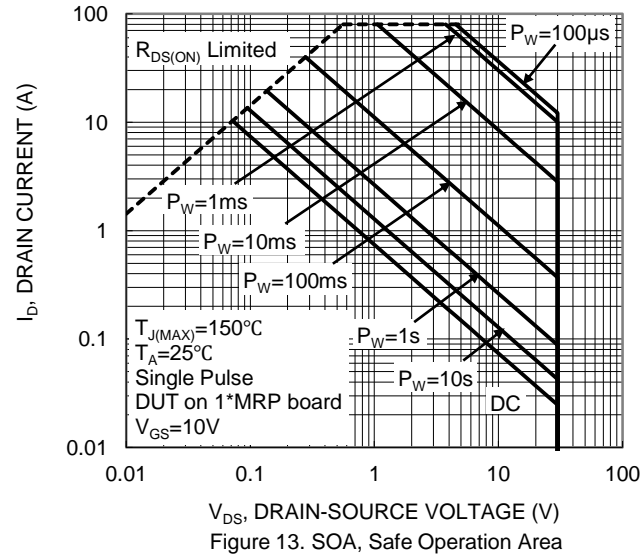
**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                             | Symbol              | Min | Typ   | Max  | Unit | Test Condition  |
|--|---------------------|-----|-------|------|------|---|
| <b>OFF CHARACTERISTICS</b> (Note 6)        |                     |     |       |      |      |   |
| 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   |
| Gate-Source Leakage                        | I <sub>GSS</sub>    | —   | —     | ±100 | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V  |
| <b>ON CHARACTERISTICS</b> (Note 6)         |                     |     |       |      |      |   |
| Gate Threshold Voltage                     | V <sub>GS(TH)</sub> | 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> | —   | —     | 5.5  | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A   |
|  |                     | —   | —     | 9    |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 16A  |
| Diode Forward Voltage                      | V <sub>SD</sub>     | —   | —     | 1    | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A   |
| <b>DYNAMIC CHARACTERISTICS</b> (Note 7)    |                     |     |       |      |      |   |
| Input Capacitance                          | C <sub>iss</sub>    | —   | 2,000 | —    | pF   | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1MHz                                     |
| Output Capacitance                         | C <sub>oss</sub>    | —   | 315   | —    | pF   |   |
| Reverse Transfer Capacitance               | C <sub>rss</sub>    | —   | 248   | —    | pF   |   |
| Gate Resistance                            | R <sub>g</sub>      | —   | 2.2   | —    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz                                      |
| Total Gate Charge (V <sub>GS</sub> = 4.5V) | Q <sub>g</sub>      | —   | 20    | —    | nC   | V <sub>DS</sub> = 15V, I <sub>D</sub> = 15A   |
| Total Gate Charge (V <sub>GS</sub> = 10V)  | Q <sub>g</sub>      | —   | 42    | —    | nC   |   |
| Gate-Source Charge                         | Q <sub>gs</sub>     | —   | 4.7   | —    | nC   |   |
| Gate-Drain Charge                          | Q <sub>gd</sub>     | —   | 7.4   | —    | nC   |   |
| Turn-On Delay Time                         | t <sub>D(ON)</sub>  | —   | 3.9   | —    | nS   | V <sub>DD</sub> = 15V, V <sub>GS</sub> = 10V, R <sub>G</sub> = 3.3Ω, I <sub>D</sub> = 15A |
| Turn-On Rise Time                          | t <sub>R</sub>      | —   | 4.1   | —    | nS   |   |
| Turn-Off Delay Time                        | t <sub>D(OFF)</sub> | —   | 31    | —    | nS   |   |
| Turn-Off Fall Time                         | t <sub>F</sub>      | —   | 14.6  | —    | nS   | I <sub>F</sub> = 15A, di/dt = 100A/µs   |
| Reverse Recovery Time                      | t <sub>RR</sub>     | —   | 15    | —    | nS   |   |
| Reverse Recovery Charge                    | Q <sub>RR</sub>     | —   | 6     | —    | nC   |   |

- 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.



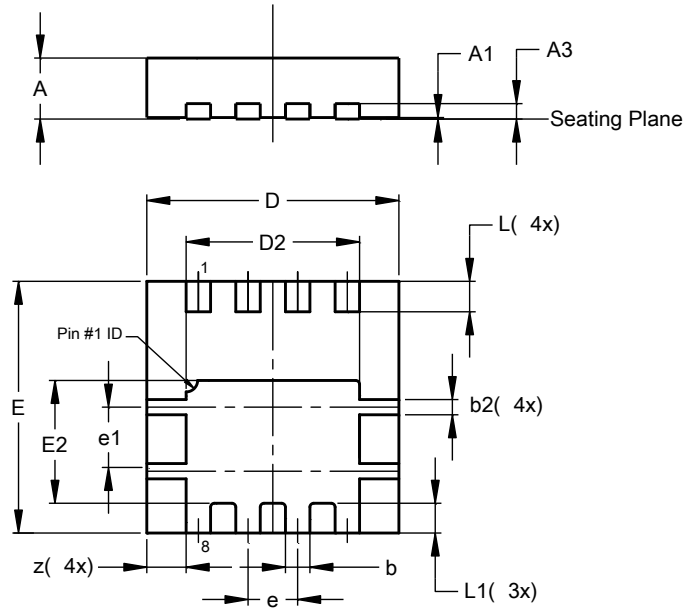




## Package Outline Dimensions

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

PowerDI3333-8

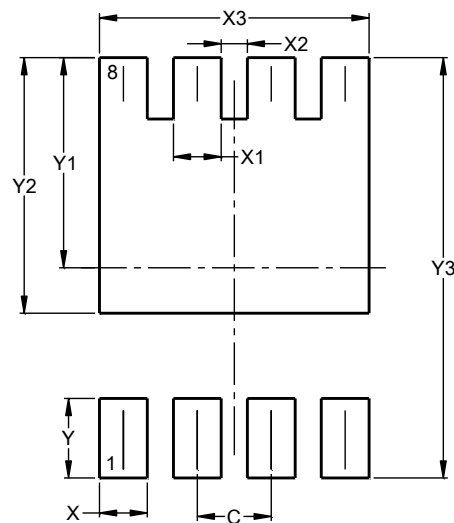


| PowerDI3333-8        |      |      |       |
|----------------------|------|------|-------|
| Dim                  | Min  | Max  | Typ   |
| A                    | 0.75 | 0.85 | 0.80  |
| A1                   | 0.00 | 0.05 | 0.02  |
| A3                   | —    | —    | 0.203 |
| b                    | 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  |
| e                    | —    | —    | 0.65  |
| e1                   | 0.79 | 0.89 | 0.84  |
| L                    | 0.35 | 0.45 | 0.40  |
| L1                   | —    | —    | 0.39  |
| 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.

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         |

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