

## Product Summary

| BV <sub>DSS</sub> | R <sub>DS(ON)</sub> Max          | I <sub>D</sub> Max<br>T <sub>C</sub> = +25°C |
|-------------------|----------------------------------|--|
| -12V              | 11.7mΩ @ V <sub>GS</sub> = -4.5V | -19A   |
|                   | 18.6mΩ @ V <sub>GS</sub> = -2.5V | -15A   |

## Description

This 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. It is qualified to AEC-Q101, supported by a PPAP.

## Applications

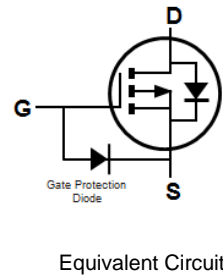
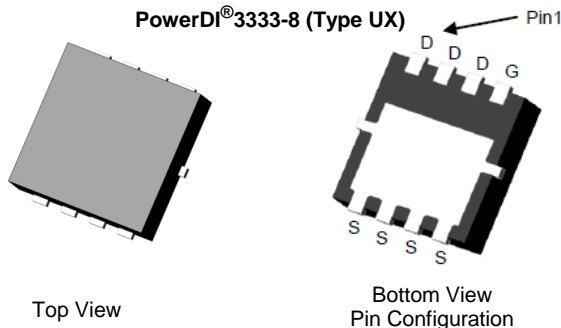
- Backlighting
- Power Management Functions
- DC-DC Converters

## Features and Benefits

- Low R<sub>DS(ON)</sub> – 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
- ESD Protected Up to 3kV
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- The DMP1011LFVQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.**  
<https://www.diodes.com/quality/product-definitions/>

## 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 (B3)
- Weight: 0.072 grams (Approximate)

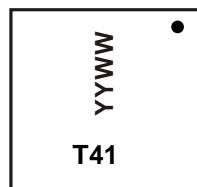


## Ordering Information (Note 4)

| Part Number    | Case                     | Packaging         |
|----------------|--------------------------|-------------------|
| DMP1011LFVQ-7  | PowerDI®3333-8 (Type UX) | 2,000/Tape & Reel |
| DMP1011LFVQ-13 | PowerDI®3333-8 (Type UX) | 3,000/Tape & Reel |

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  - 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.
  - 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



T41 = Product Type Marking Code  
YYWW = Date Code Marking  
YY = Last Two Digits of Year (ex: 21 for 2021)  
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> | -12        | V    |
| Gate-Source Voltage                                      |              |  | V <sub>GSS</sub> | -6         | V    |
| Continuous Drain Current (Note 6) V <sub>GS</sub> = 4.5V | t < 10s      | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +70°C | I <sub>D</sub>   | -13<br>-10 | A    |
|  | Steady State | T <sub>C</sub> = +25°C<br>T <sub>C</sub> = +70°C | I <sub>D</sub>   | -19<br>-15 | A    |
| Maximum Continuous Body Diode Forward Current (Note 6)   |              |  | I <sub>S</sub>   | 3          | A    |
| Pulsed Drain Current (380μs Pulse, Duty Cycle = 1%)      |              |  | I <sub>DM</sub>  | 70         | A    |
| Avalanche Current (Note 7) L = 0.3mH                     |              |  | I <sub>AS</sub>  | 24         | A    |
| Avalanche Energy (Note 7) L = 0.3mH                      |              |  | E <sub>AS</sub>  | 86         | mJ   |

## Thermal Characteristics

| Characteristic                                   |              | Symbol                            | Value       | Unit |
|--|--------------|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5)                 |              | P <sub>D</sub>                    | 1.05        | W    |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady State | R <sub>θJA</sub>                  | 118         | °C/W |
|  | t < 10s      |                                   | 83.5        |      |
| Total Power Dissipation (Note 6)                 |              | P <sub>D</sub>                    | 2.16        | W    |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady State | R <sub>θJA</sub>                  | 57          | °C/W |
|  | t < 10s      |                                   | 40.3        |      |
| Thermal Resistance, Junction to Case (Note 6)    |              | R <sub>θJC</sub>                  | 11.7        |      |
| 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 8)                    |                     |      |      |      |      |   |
| Drain-Source Breakdown Voltage                         | BV <sub>DSS</sub>   | -12  | —    | —    | 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> = -9.6V, V <sub>GS</sub> = 0V   |
| Gate-Source Leakage                                    | I <sub>GSS</sub>    | —    | —    | -100 | nA   | V <sub>GS</sub> = -6V, V <sub>DS</sub> = 0V   |
| <b>ON CHARACTERISTICS</b> (Note 8)                     |                     |      |      |      |      |   |
| Gate Threshold Voltage                                 | V <sub>GS(TH)</sub> | -0.6 | —    | -1.2 | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA   |
| Static Drain-Source On-Resistance                      | R <sub>DS(ON)</sub> | —    | 9.8  | 11.7 | mΩ   | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -12A  |
|  |                     | —    | 14.6 | 18.6 |      | V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -9A   |
| Diode Forward Voltage                                  | V <sub>SD</sub>     | —    | -0.8 | -1.0 | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = -16A   |
| <b>DYNAMIC CHARACTERISTICS</b> (Note 9)                |                     |      |      |      |      |   |
| Input Capacitance                                      | C <sub>iss</sub>    | —    | 913  | —    | pF   | V <sub>DS</sub> = -6V, V <sub>GS</sub> = 0V, f = 1.0MHz   |
| Output Capacitance                                     | C <sub>oss</sub>    | —    | 458  | —    |      |   |
| Reverse Transfer Capacitance                           | C <sub>rss</sub>    | —    | 53   | —    |      |   |
| Gate Resistance  | R <sub>g</sub>      | —    | 1.85 | —    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz  |
| Total Gate Charge (V <sub>GS</sub> = -6V)              | Q <sub>g</sub>      | —    | 9.5  | —    | nC   | V <sub>DS</sub> = -6V, I <sub>D</sub> = -12A  |
| Total Gate Charge (V <sub>GS</sub> = -4.5V)            | Q <sub>g</sub>      | —    | 7.1  | —    |      |   |
| Gate-Source Charge                                     | Q <sub>gs</sub>     | —    | 1.4  | —    |      |   |
| Gate-Drain Charge                                      | Q <sub>gd</sub>     | —    | 1.1  | —    |      |   |
| Turn-On Delay Time                                     | t <sub>D(ON)</sub>  | —    | 6.3  | —    | ns   | V <sub>DS</sub> = -6V, V <sub>GS</sub> = -4.5V, R <sub>L</sub> = 1Ω, R <sub>g</sub> = 4.7Ω, I <sub>D</sub> = -12A |
| Turn-On Rise Time                                      | t <sub>r</sub>      | —    | 2.6  | —    |      |   |
| Turn-Off Delay Time                                    | t <sub>D(OFF)</sub> | —    | 14.4 | —    |      |   |
| Turn-Off Fall Time                                     | t <sub>f</sub>      | —    | 3.9  | —    |      |   |
| Body Diode Reverse Recovery Time                       | t <sub>RR</sub>     | —    | 13.5 | —    | ns   | I <sub>F</sub> = -12A, dI/dt = 100A/μs  |
| Body Diode Reverse Recovery Charge                     | Q <sub>RR</sub>     | —    | 2.5  | —    | nC   | I <sub>F</sub> = -12A, dI/dt = 100A/μs  |

- 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 1-inch square copper plate.
  - I<sub>AS</sub> and E<sub>AS</sub> ratings 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 production testing.

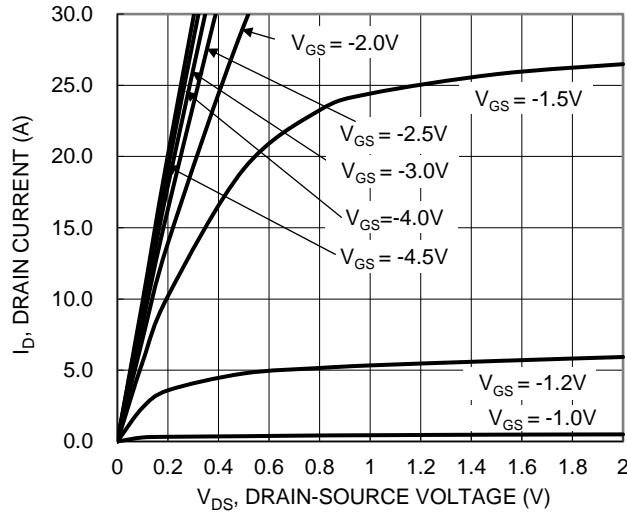


Figure 1. Typical Output Characteristic

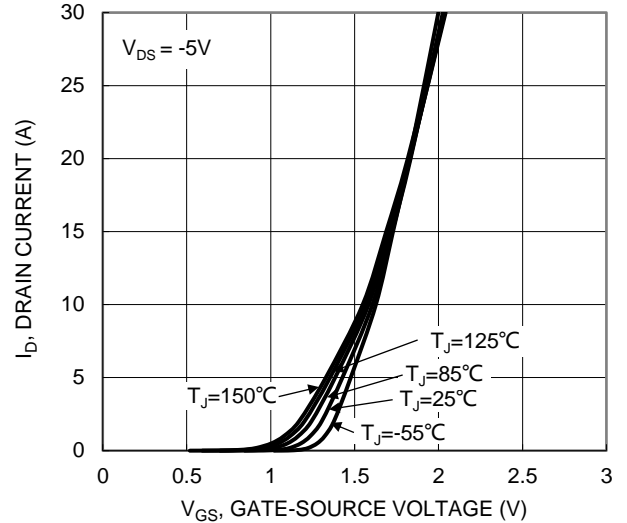


Figure 2. Typical Transfer Characteristic

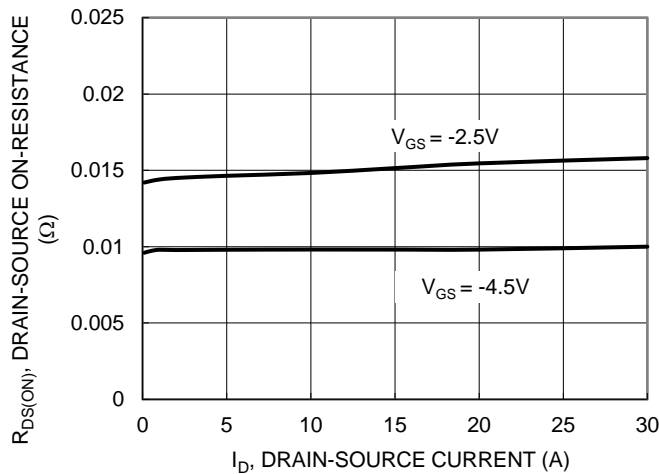


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

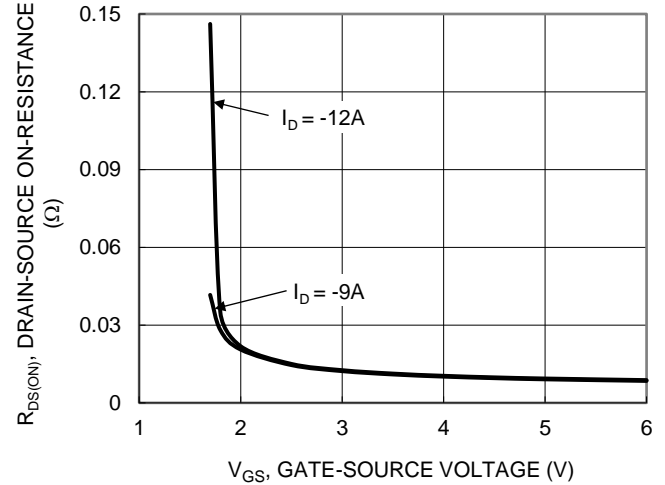


Figure 4. Typical Transfer Characteristic

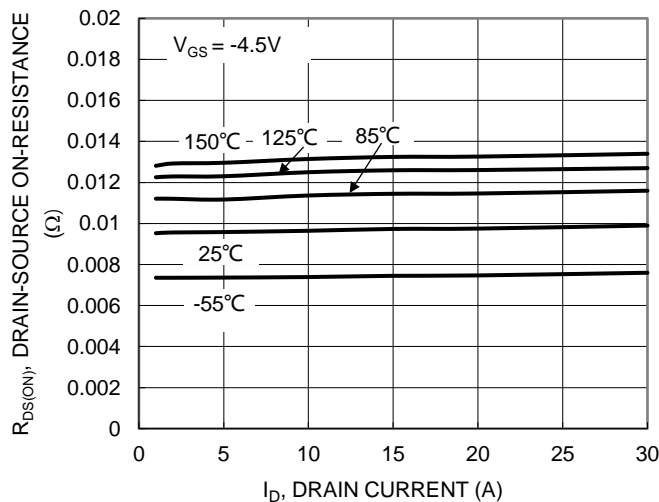


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

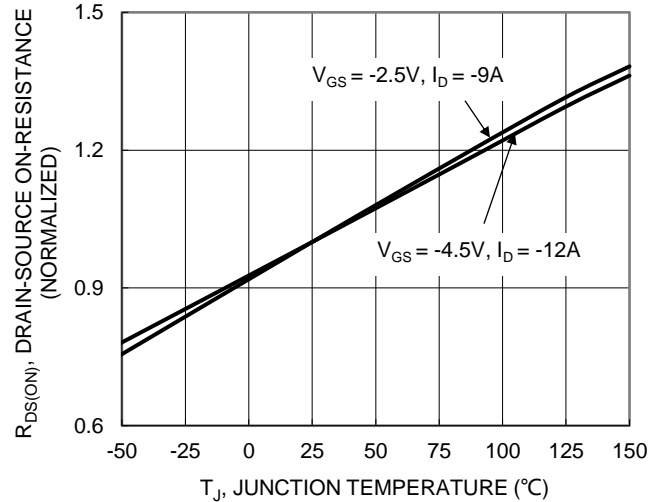


Figure 6. On-Resistance Variation with Temperature

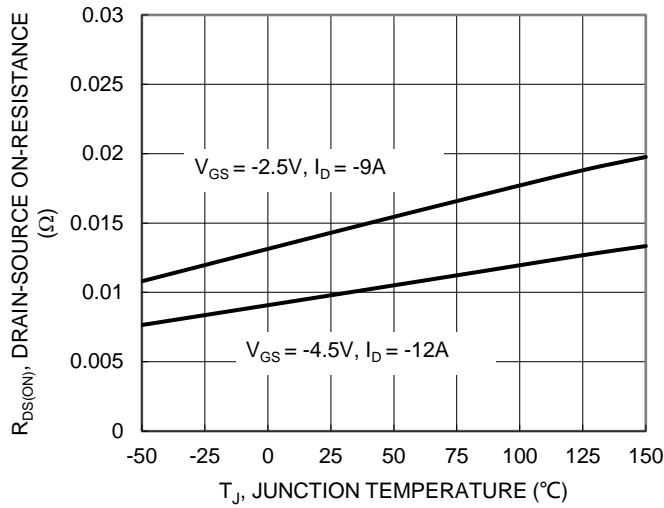


Figure 7. On-Resistance Variation with Temperature

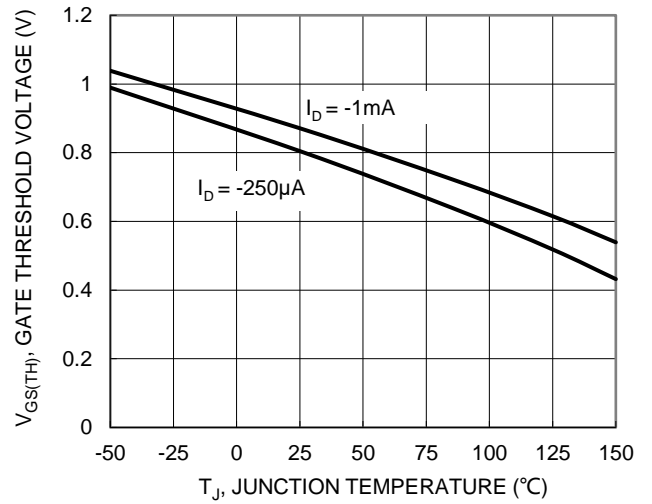


Figure 8. Gate Threshold Variation vs. Junction Temperature

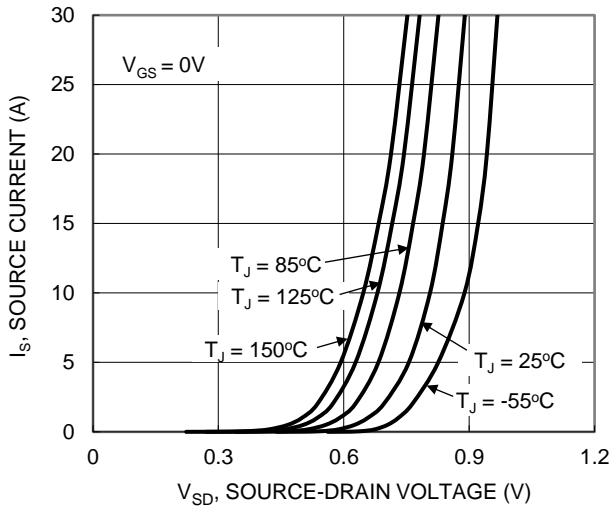


Figure 9. Diode Forward Voltage vs. Current

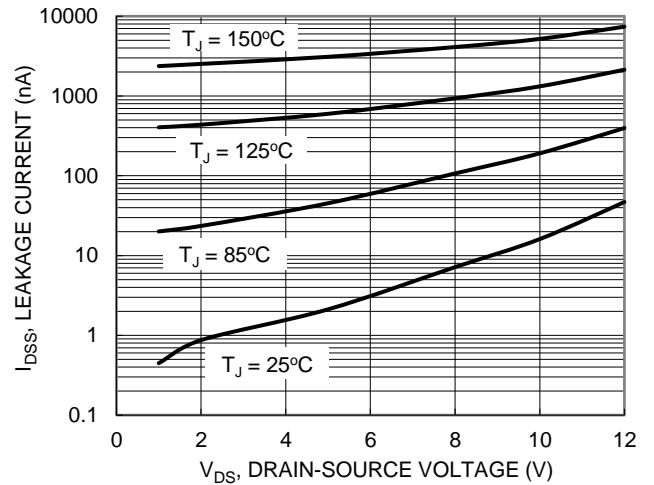


Figure 10. Typical Drain-Source Leakage Current vs. Voltage

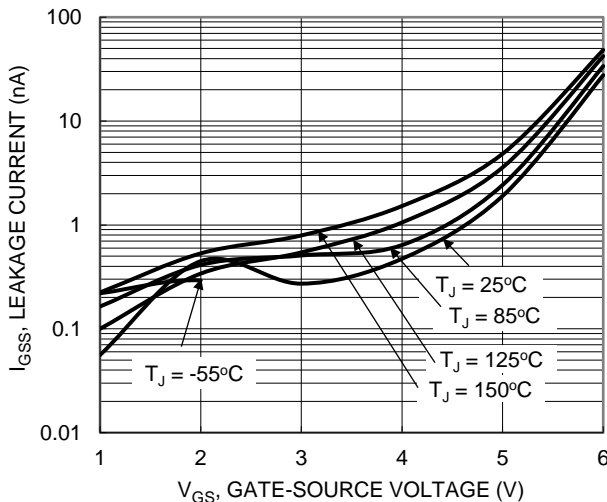


Figure 11. Gate-Source Leakage Current vs. Voltage

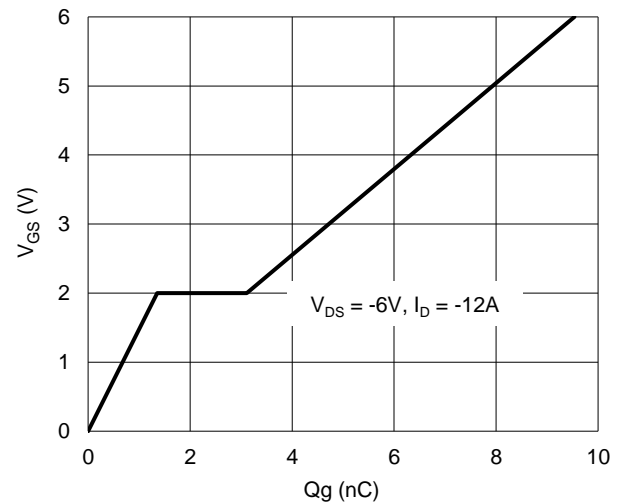
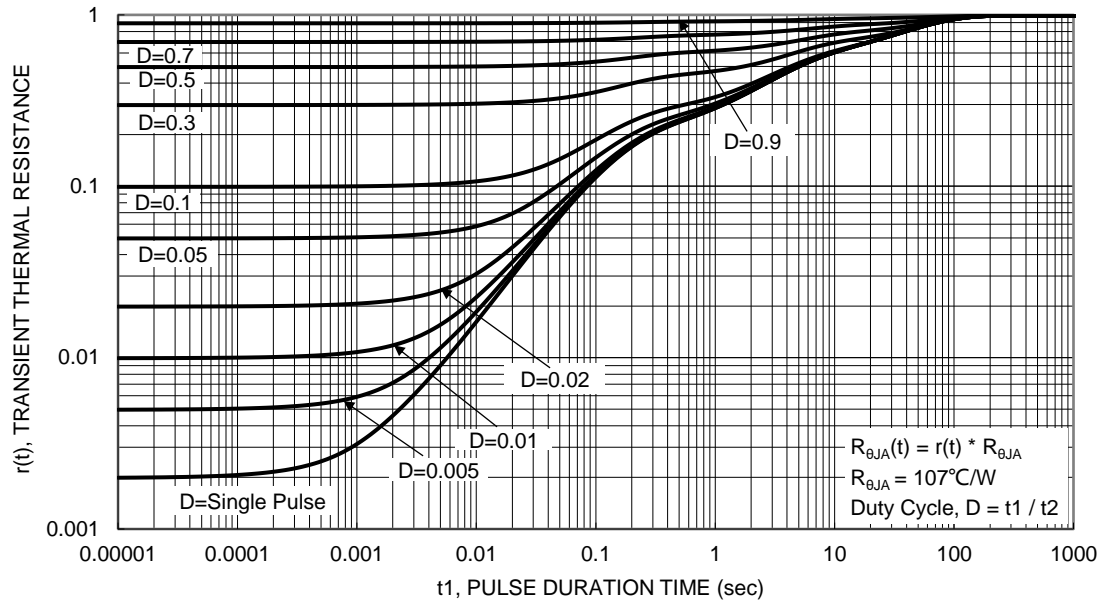
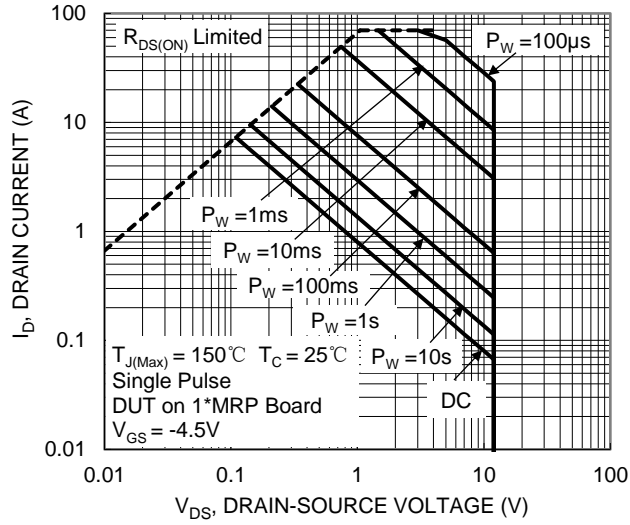


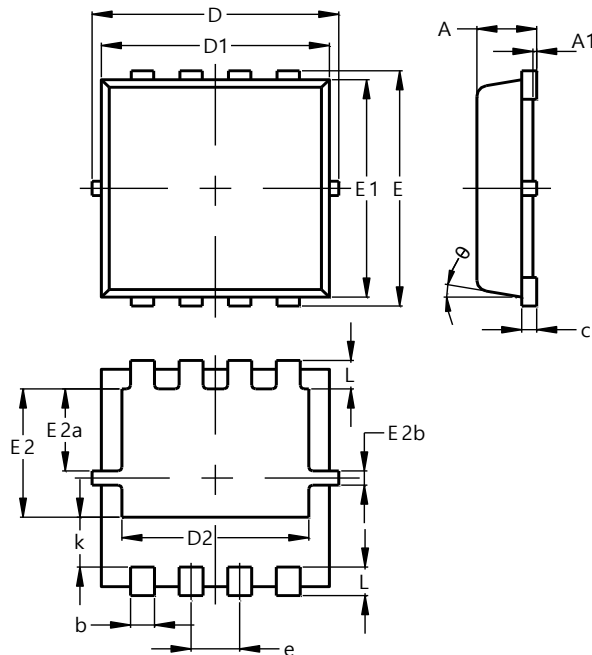
Figure 12. Gate Charge



## Package Outline Dimensions

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

**PowerDI®3333-8 (Type UX)**

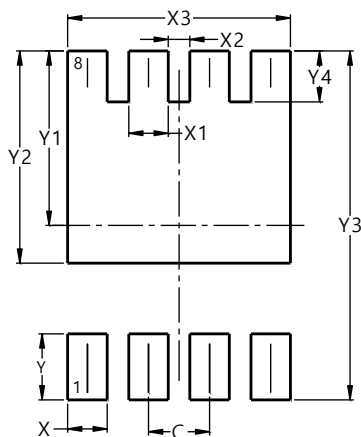


| PowerDI3333-8<br>(Type UX) |          |      |      |
|----------------------------|----------|------|------|
| Dim                        | Min      | Max  | Typ  |
| A                          | 0.75     | 0.85 | 0.80 |
| A1                         | 0.00     | 0.05 | --   |
| b                          | 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                         | 2.30     | 2.70 | 2.50 |
| E                          | 3.20     | 3.40 | 3.30 |
| E1                         | 2.95     | 3.15 | 3.05 |
| E2                         | 1.60     | 2.00 | 1.80 |
| E2a                        | 0.95     | 1.35 | 1.15 |
| E2b                        | 0.10     | 0.30 | 0.20 |
| e                          | 0.65 BSC |      |      |
| k                          | 0.50     | 0.90 | 0.70 |
| L                          | 0.30     | 0.50 | 0.40 |
| θ                          | 0°       | 12°  | 10°  |
| All Dimensions in mm       |          |      |      |

## Suggested Pad Layout

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

**PowerDI®3333-8 (Type UX)**



| 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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