

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)} \text{ max}$             | $I_D \text{ max}$<br>$T_C = +25^\circ\text{C}$ |
|---------------|--------------------------------------|------------------------------------------------|
| 80V           | 16m $\Omega$ @ $V_{GS} = 10\text{V}$ | 35A                                            |
|               | 22m $\Omega$ @ $V_{GS} = 6\text{V}$  | 30A                                            |

## Description and Applications

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.

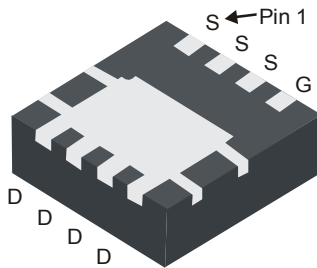
- Synchronous Rectifier
- Backlighting
- Power Management Functions
- DC-DC Converters

## Features and Benefits

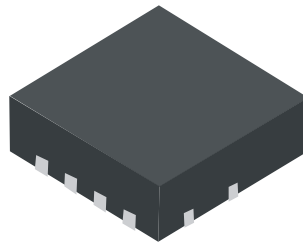
- Low  $R_{DS(ON)}$  – ensures on state losses are minimized
- Excellent  $Q_{gd} \times R_{DS(ON)}$  Product (FOM)
- Advanced Technology for DC/DC converts
- Small form factor thermally efficient package enables higher density end products
- Occupies just 33% of the board area occupied by SO-8 enabling smaller end product
- 100% UIS (Avalanche) rated
- **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

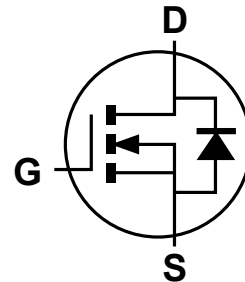
- Case: POWERDI<sup>®</sup>3333-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See diagram
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 
- Weight: 0.008 grams (approximate)



Bottom View



Top View



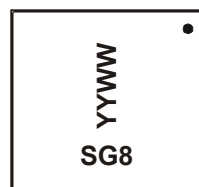
Equivalent Circuit

## Ordering Information (Note 4)

| Part Number   | Case          | Packaging         |
|---------------|---------------|-------------------|
| DMT8012LFG-7  | POWERDI3333-8 | 2,000/Tape & Reel |
| DMT8012LFG-13 | POWERDI3333-8 | 3,000/Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  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



SG8 = 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> | 80    | 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>   | 9.5   | A     |
|                                                         | T <sub>A</sub> = +70°C |                  | 7.6   |       |
|                                                         | T <sub>C</sub> = +25°C | I <sub>D</sub>   | 35    | A     |
|                                                         | T <sub>C</sub> = +70°C |                  | 28    |       |
| Maximum Continuous Body Diode Forward Current (Note 5)  |                        | I <sub>S</sub>   | 2     | A     |
| Pulsed Drain Current (10μs pulse, duty cycle = 1%)      |                        | I <sub>DM</sub>  | 80    | A     |

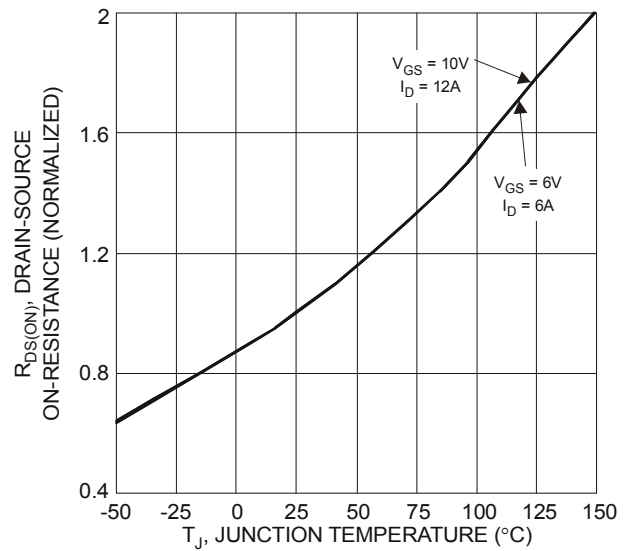
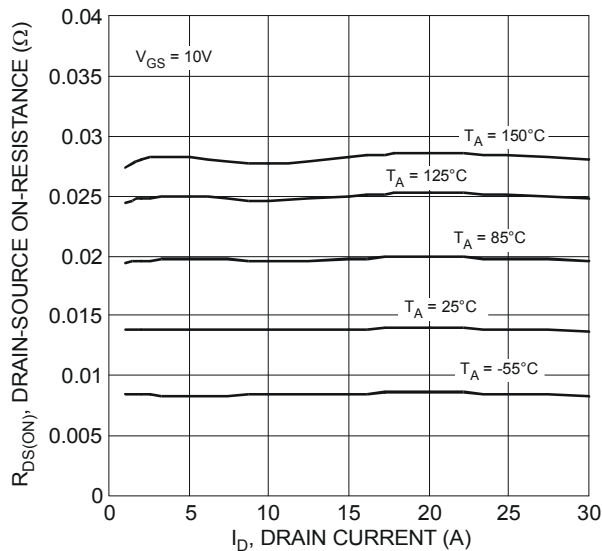
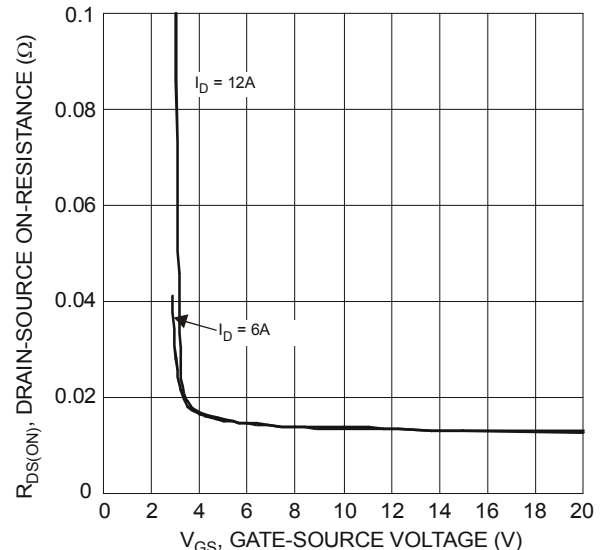
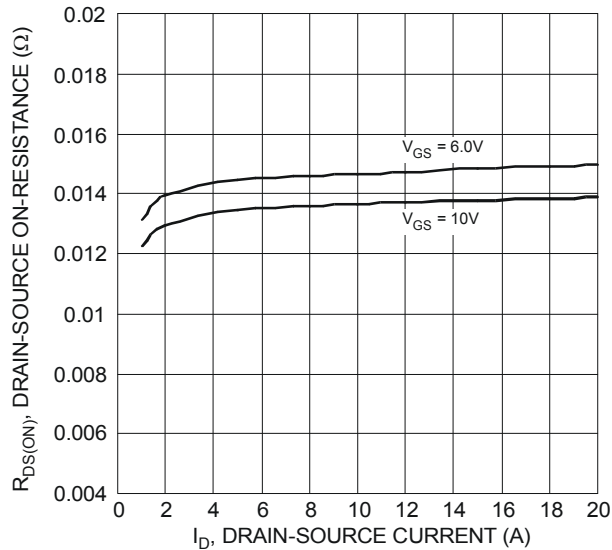
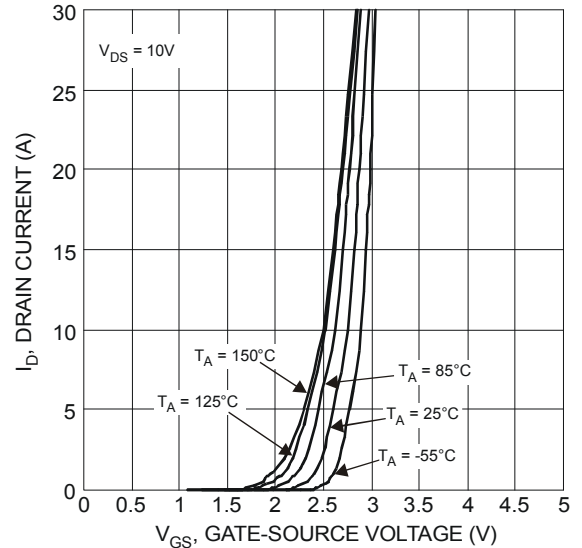
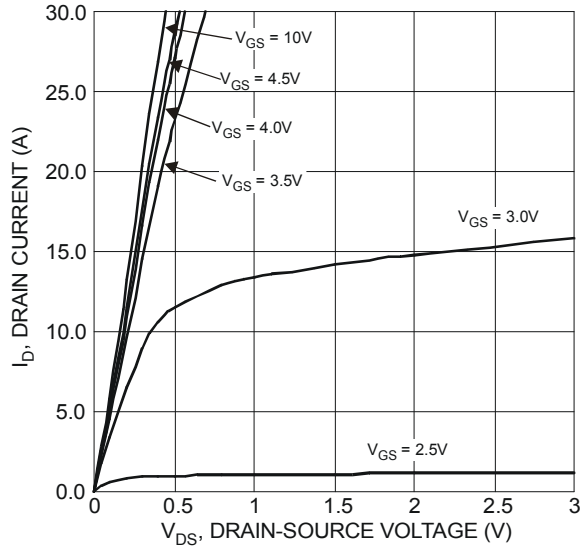
**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

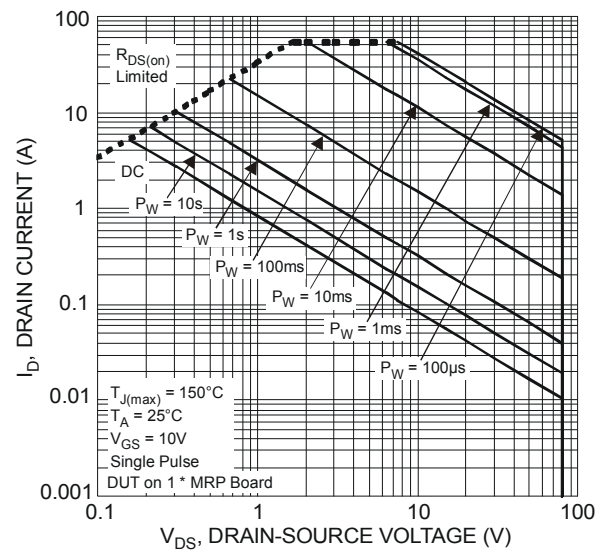
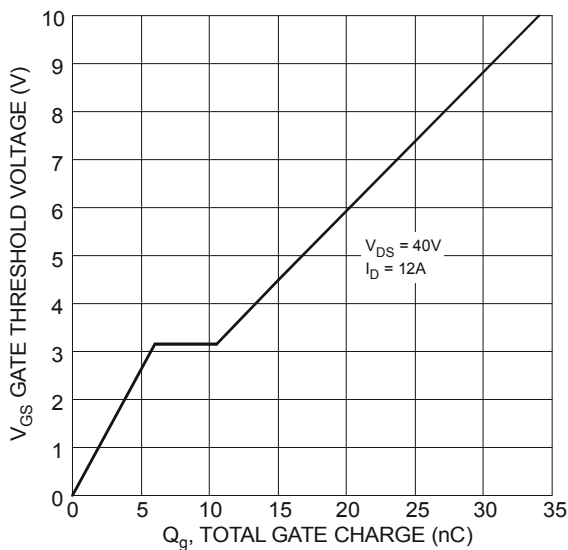
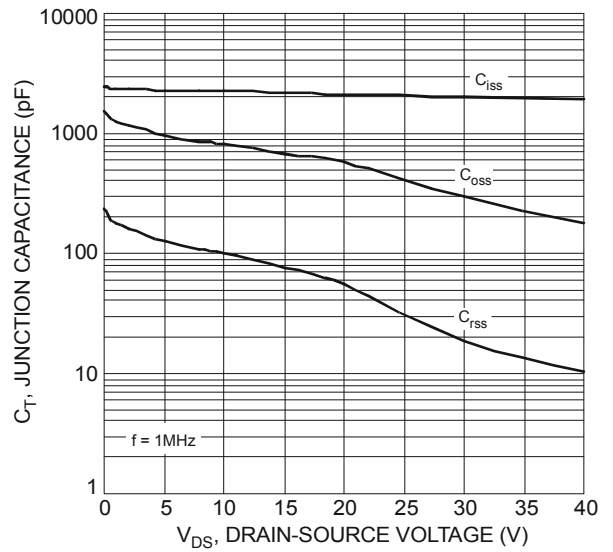
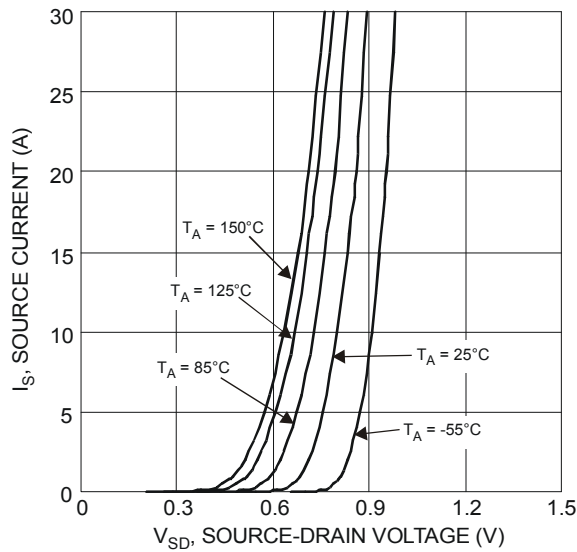
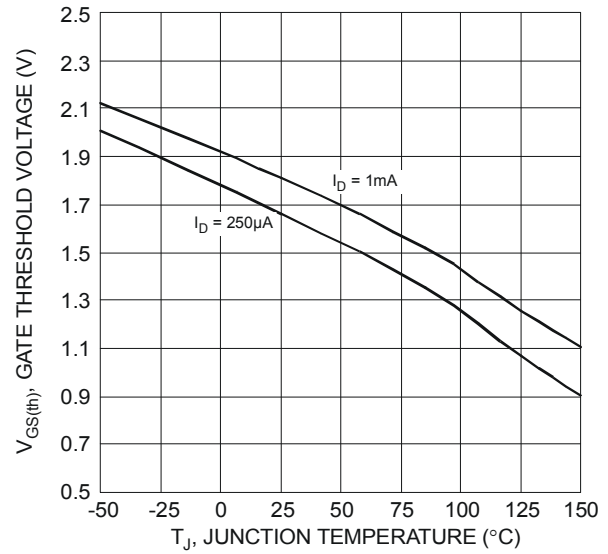
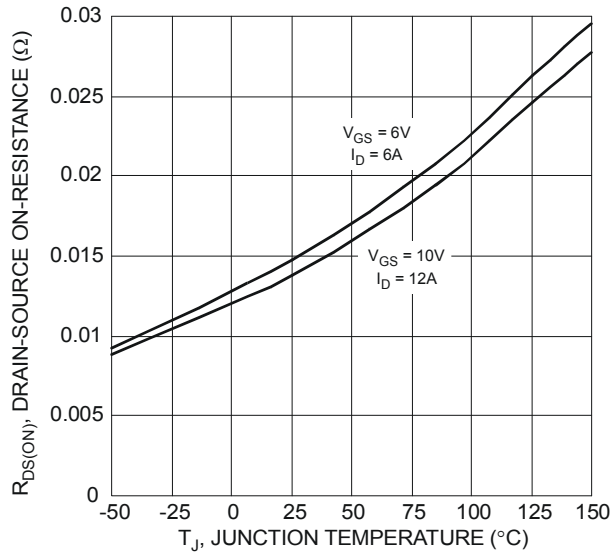
| Characteristic                                   |                        | Symbol                            | Value      | Units |
|--------------------------------------------------|------------------------|-----------------------------------|------------|-------|
| Total Power Dissipation (Note 5)                 | T <sub>A</sub> = +25°C | P <sub>D</sub>                    | 2.2        | W     |
|                                                  | T <sub>C</sub> = +25°C |                                   | 30         |       |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady State           | R <sub>θJA</sub>                  | 57         | °C/W  |
|                                                  | t<10s                  |                                   | 35         |       |
| Thermal Resistance, Junction to Case (Note 5)    |                        | R <sub>θJC</sub>                  | 4.2        |       |
| 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 6)</b>        |                     |     |      |      |      |                                                                                            |
| Drain-Source Breakdown Voltage             | BV <sub>DSS</sub>   | 80  | —    | —    | 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> = 64V, 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   | 1.5  | 3    | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA                                 |
| Static Drain-Source On-Resistance          | R <sub>DS(on)</sub> | —   | 13   | 16   | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 12A                                                |
|                                            |                     | —   | 14   | 22   |      | V <sub>GS</sub> = 6V, I <sub>D</sub> = 6A                                                  |
| Diode Forward Voltage                      | V <sub>SD</sub>     | —   | 0.9  | 1.2  | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 12A                                                 |
| <b>DYNAMIC CHARACTERISTICS (Note 7)</b>    |                     |     |      |      |      |                                                                                            |
| Input Capacitance                          | C <sub>iss</sub>    | —   | 1949 | —    | pF   | V <sub>DS</sub> = 40V, V <sub>GS</sub> = 0V, f = 1MHz                                      |
| Output Capacitance                         | C <sub>oss</sub>    | —   | 177  | —    |      |                                                                                            |
| Reverse Transfer Capacitance               | C <sub>rss</sub>    | —   | 10   | —    |      |                                                                                            |
| Gate resistance                            | R <sub>g</sub>      | —   | 0.7  | —    | 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>      | —   | 15   | —    | nC   | V <sub>DS</sub> = 40V, I <sub>D</sub> = 12A                                                |
| Total Gate Charge (V <sub>GS</sub> = 10V)  | Q <sub>g</sub>      | —   | 34   | —    |      |                                                                                            |
| Gate-Source Charge                         | Q <sub>gs</sub>     | —   | 6    | —    |      |                                                                                            |
| Gate-Drain Charge                          | Q <sub>gd</sub>     | —   | 4.5  | —    |      |                                                                                            |
| Turn-On Delay Time                         | t <sub>D(on)</sub>  | —   | 4.9  | —    | nS   | V <sub>DD</sub> = 40V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 12A, R <sub>G</sub> = 1.6Ω, |
| Turn-On Rise Time                          | t <sub>r</sub>      | —   | 3.8  | —    |      |                                                                                            |
| Turn-Off Delay Time                        | t <sub>D(off)</sub> | —   | 16.5 | —    |      |                                                                                            |
| Turn-Off Fall Time                         | t <sub>f</sub>      | —   | 3.5  | —    |      |                                                                                            |
| Body Diode Reverse Recovery Time           | t <sub>rr</sub>     | —   | 30.2 | —    | nS   | I <sub>F</sub> = 12A, di/dt = 100A/μs                                                      |
| Body Diode Reverse Recovery Charge         | Q <sub>rr</sub>     | —   | 34.6 | —    | nC   |                                                                                            |

- Notes:
5. R<sub>θJA</sub> is determined with the device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate. R<sub>θJC</sub> is guaranteed by design while R<sub>θJA</sub> is determined by the user's board design.
  6. Short duration pulse test used to minimize self-heating effect.
  7. Guaranteed by design. Not subject to product testing.





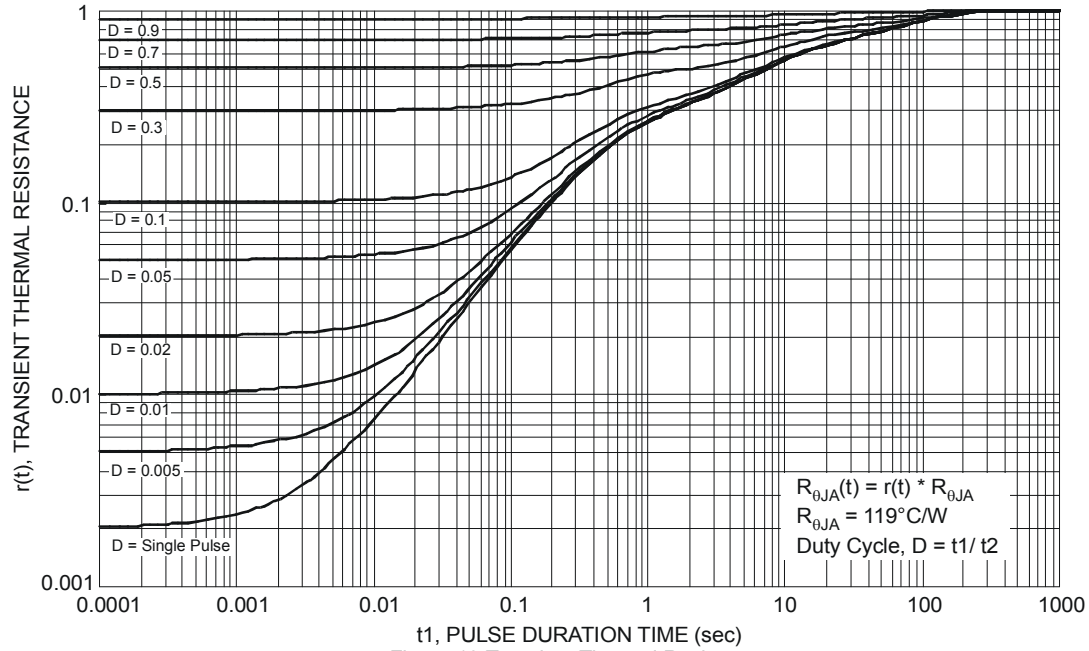
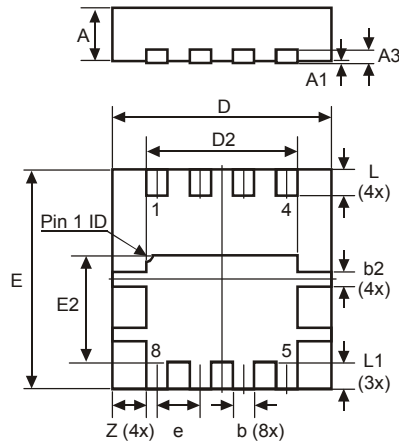


Figure 13 Transient Thermal Resistance

## Package Outline Dimensions

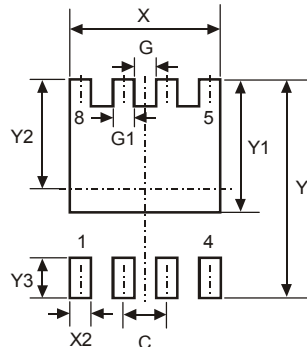
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| POWERDI®3333-8       |      |      |       |
|----------------------|------|------|-------|
| 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 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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