

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON) \text{ max}}$      | $I_D \text{ max}$<br>$T_A = +25^\circ\text{C}$ |
|---------------|-------------------------------|--|
| 75V           | 22mΩ @ $V_{GS} = 10\text{V}$  | 7.8A   |
|               | 28mΩ @ $V_{GS} = 4.5\text{V}$ | 6.9A   |

## 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.

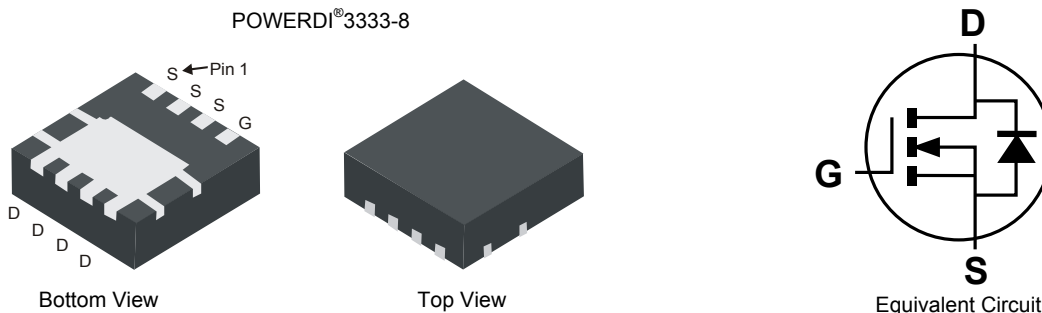
- Backlighting
- Power Management Functions
- DC-DC Converters

## 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: 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)

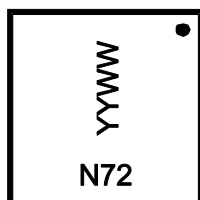


## Ordering Information (Note 4)

| Part Number   | Case           | Packaging         |
|---------------|----------------|-------------------|
| DMN7022LFG-7  | POWERDI®3333-8 | 2,000/Tape & Reel |
| DMN7022LFG-13 | POWERDI®3333-8 | 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



N72= 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> | 75          | 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>   | 7.8<br>6.2  | A     |
|   | t < 10s      | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +70°C | I <sub>D</sub>   | 10.5<br>8.4 | A     |
| Pulsed Drain Current (10μs pulse, duty cycle = 1%)      |              |  | I <sub>DM</sub>  | 56          | A     |
| Maximum Continuous Body Diode Forward Current (Note 6)  |              |  | I <sub>S</sub>   | 2.1         | A     |
| Avalanche Current, L = 0.1mH                            |              |  | I <sub>AS</sub>  | 28.8        | A     |
| Avalanche Energy, L = 0.1mH                             |              |  | E <sub>AS</sub>  | 42.2        | mJ    |

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

| Characteristic                                   |              |  | Symbol                            | Value       | Units |
|--|--------------|--|-----------------------------------|-------------|-------|
| Total Power Dissipation (Note 5)                 |              |  | P <sub>D</sub>                    | 0.9         | W     |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady state |  | R <sub>θJA</sub>                  | 125         | °C/W  |
|  | t < 10s      |  |                                   | 67          |       |
| Total Power Dissipation (Note 6)                 |              |  | P <sub>D</sub>                    | 2           | W     |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady state |  | R <sub>θJA</sub>                  | 62          | °C/W  |
|  | t < 10s      |  |                                   | 34          |       |
| 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>   | 75  | —    | —    | 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> = 75V, 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   | —    | 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> | —   | 14.6 | 22   | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 7.2A  |
|  |                     | —   | 20.5 | 28   |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 6.4A   |
| Diode Forward Voltage                                  | V <sub>SD</sub>     | —   | 0.72 | —    | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 3.2A   |
| <b>DYNAMIC CHARACTERISTICS (Note 8)</b>                |                     |     |      |      |      |   |
| Input Capacitance                                      | C <sub>iss</sub>    | —   | 2737 | —    | pF   | V <sub>DS</sub> = 35V, V <sub>GS</sub> = 0V,<br>f = 1MHz                                    |
| Output Capacitance                                     | C <sub>oss</sub>    | —   | 126  | —    | pF   |   |
| Reverse Transfer Capacitance                           | C <sub>rss</sub>    | —   | 96.1 | —    | pF   |   |
| Gate Resistance  | R <sub>g</sub>      | —   | 0.89 | —    | 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>      | —   | 26.4 | —    | nC   | V <sub>DS</sub> = 38V, I <sub>D</sub> = 7.2A  |
| Total Gate Charge (V <sub>GS</sub> = 10V)              | Q <sub>g</sub>      | —   | 56.5 | —    | nC   |   |
| Gate-Source Charge                                     | Q <sub>gs</sub>     | —   | 12   | —    | nC   |   |
| Gate-Drain Charge                                      | Q <sub>gd</sub>     | —   | 11.8 | —    | nC   |   |
| Turn-On Delay Time                                     | t <sub>D(on)</sub>  | —   | 6.1  | —    | ns   | V <sub>GS</sub> = 10V, V <sub>DS</sub> = 38V,<br>R <sub>G</sub> = 1Ω, I <sub>D</sub> = 5.7A |
| Turn-On Rise Time                                      | t <sub>r</sub>      | —   | 5.7  | —    | ns   |   |
| Turn-Off Delay Time                                    | t <sub>D(off)</sub> | —   | 19.6 | —    | ns   |   |
| Turn-Off Fall Time                                     | t <sub>f</sub>      | —   | 3.9  | —    | ns   |   |
| Body Diode Reverse Recovery Time                       | t <sub>rr</sub>     | —   | 26.2 | —    | ns   | I <sub>F</sub> = 5.7A, di/dt = 100A/μs  |
| Body Diode Reverse Recovery Charge                     | Q <sub>rr</sub>     | —   | 25.2 | —    | nC   |   |

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

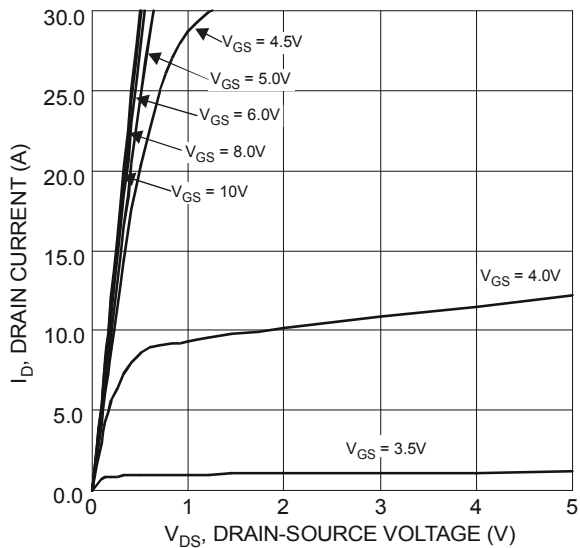


Figure 1 Typical Output Characteristics

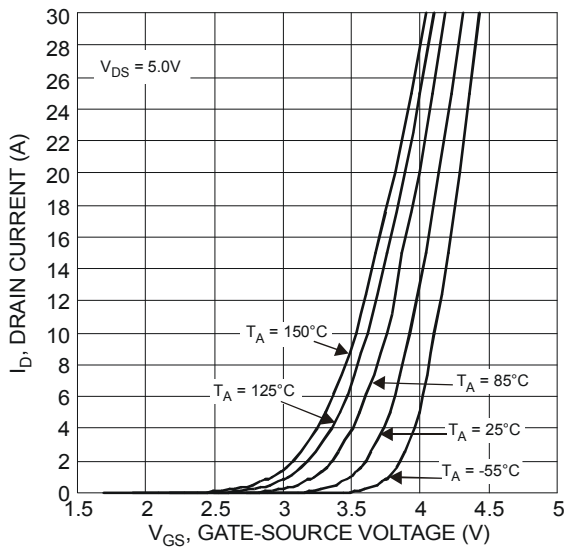


Figure 2 Typical Transfer Characteristics

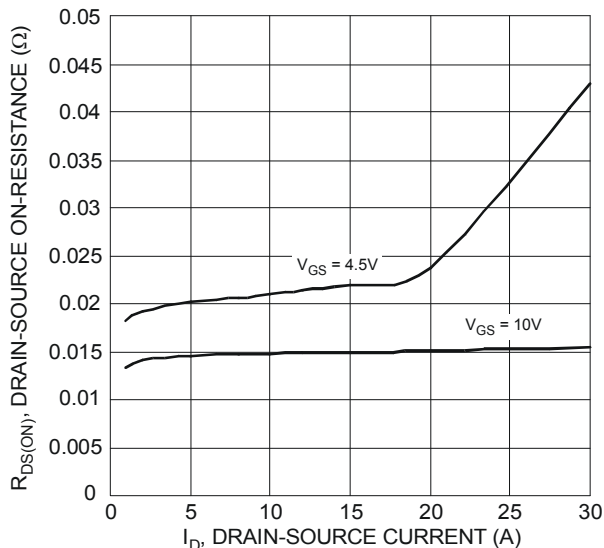


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

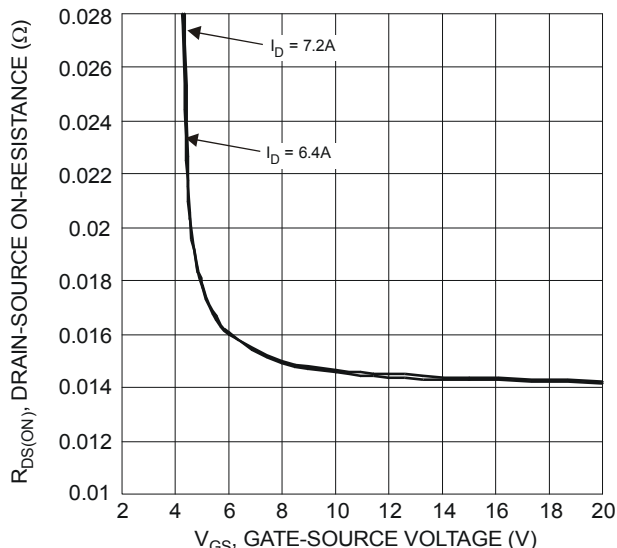


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

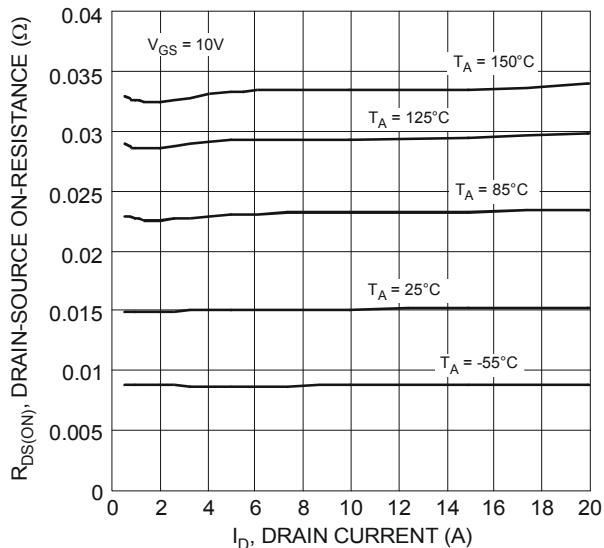


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

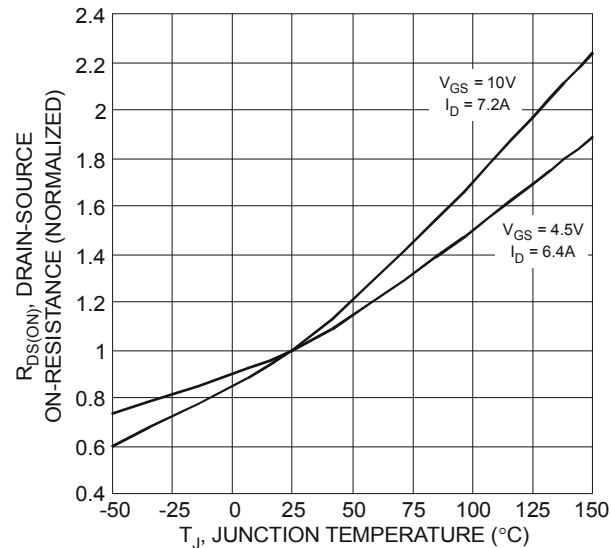


Figure 6 On-Resistance Variation with Temperature

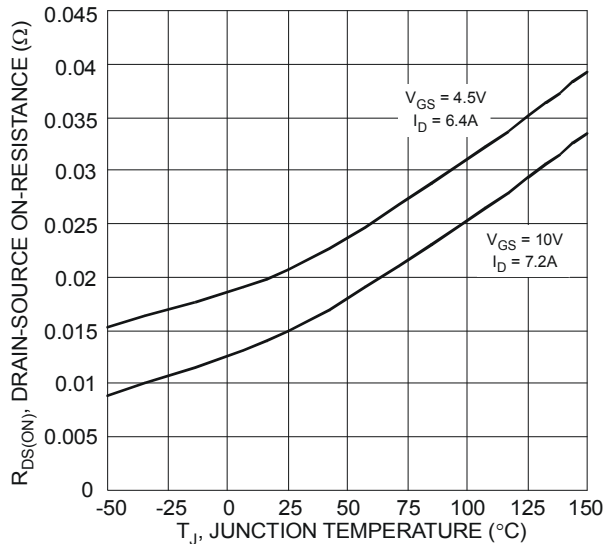


Figure 7 On-Resistance Variation with Temperature

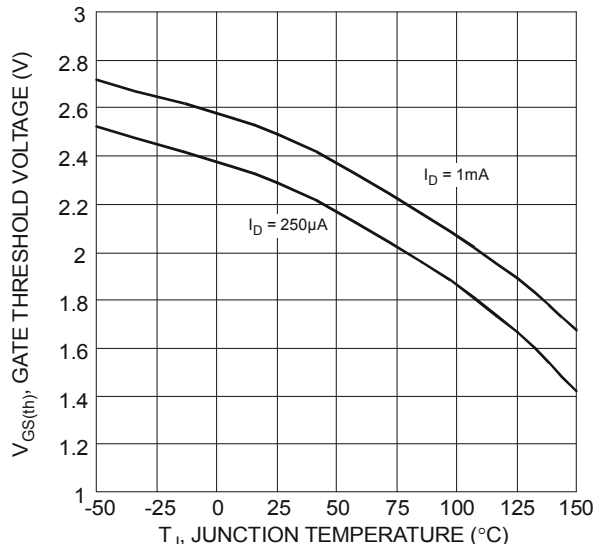


Figure 8 Gate Threshold Variation vs. Ambient Temperature

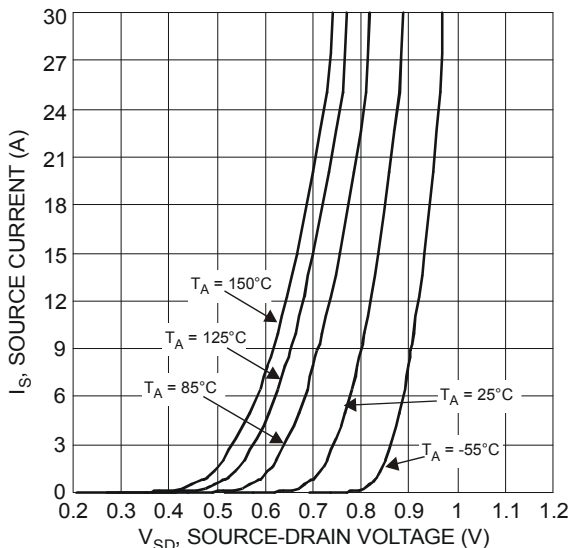


Figure 9 Diode Forward Voltage vs. Current

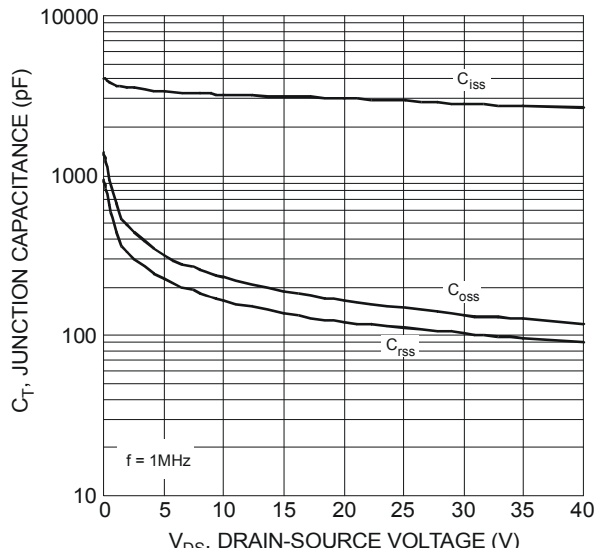


Figure 10 Typical Junction Capacitance

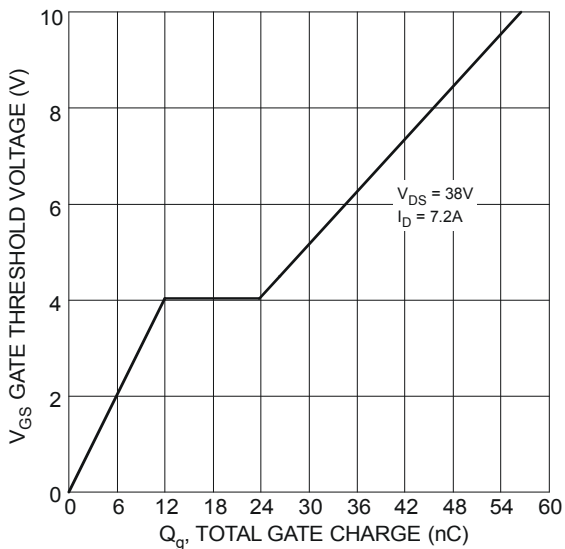


Figure 11 Gate Charge

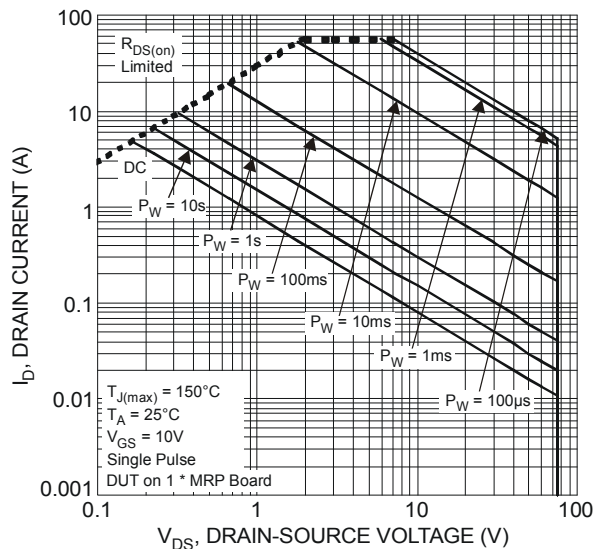


Figure 12 SOA, Safe Operation Area

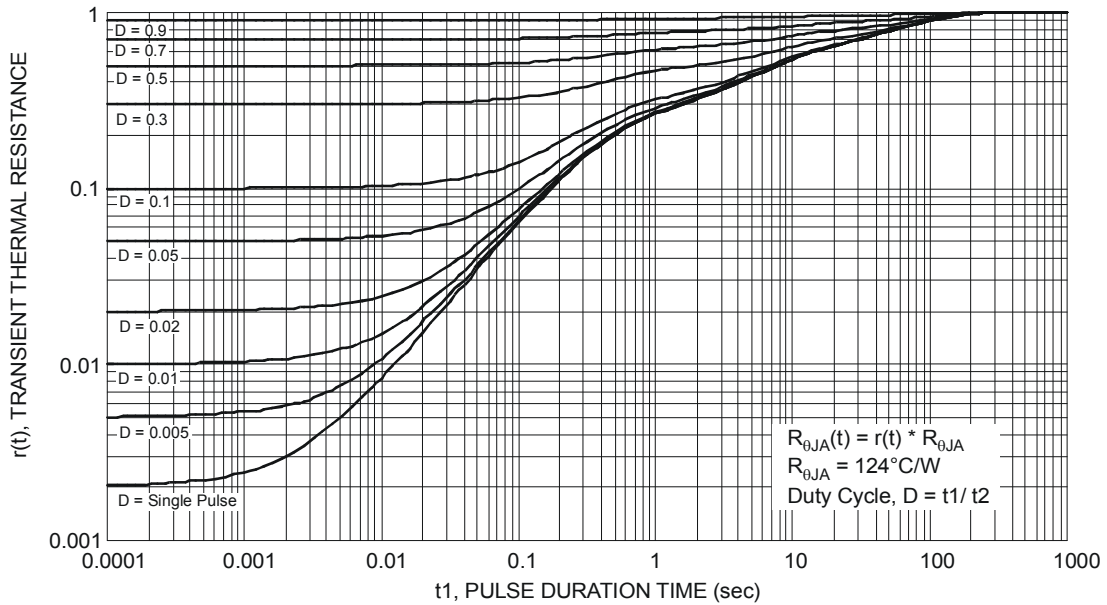
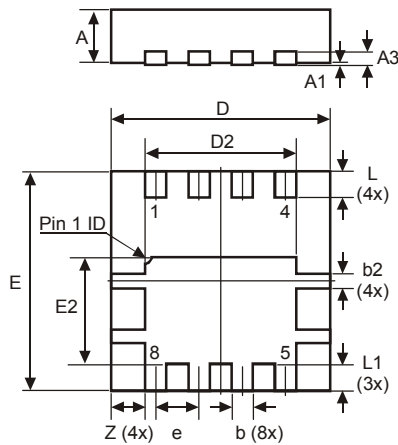


Figure 13 Transient Thermal Resistance

## Package Outline Dimensions

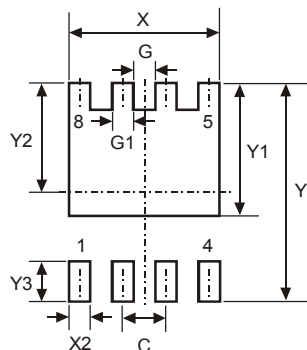
Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



| POWERDI <sup>®</sup> 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 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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