

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ | I_D $T_C = +25^\circ\text{C}$ |
|---------------|---------------------------------|------------------------------------|
| 30V | 8.5mΩ @ $V_{GS} = 10\text{V}$ | 30A |
| | 10.5mΩ @ $V_{GS} = 4.5\text{V}$ | 25A |

Description

This new generation MOSFET is 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.

Applications

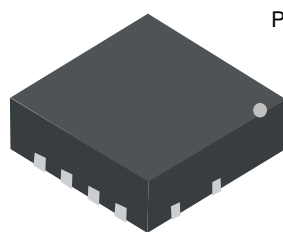
- Backlighting
- DC-DC Converters
- Power Management Functions

Features

- 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
- 100% UIS (Avalanche) rated
- 100% Rg tested
- **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**

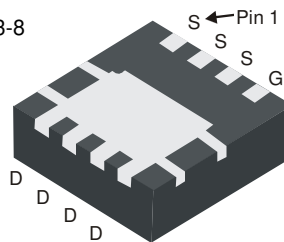
Mechanical Data

- Case: POWERDI3333-8
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.072 grams (Approximate)

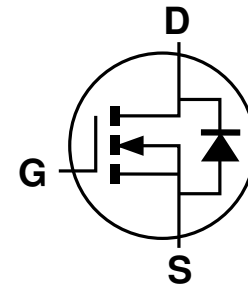


Top View

POWERDI3333-8



Bottom View



Equivalent Circuit

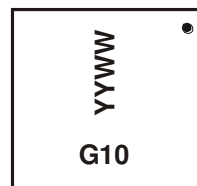
Ordering Information (Note 4)

| Part Number | Compliance | Case | Packaging |
|---------------|------------|---------------|-------------------|
| DMN3010LFG-7 | Standard | POWERDI3333-8 | 2,000/Tape & Reel |
| DMN3010LFG-13 | Standard | 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 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

PowerDI3333-8



G10 = Product Marking Code
 YYWW = Date Code Marking
 YY = Last Digit of Year (ex: 15 for 2015)
 WW = Week Code (01 – 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

| Characteristic | | | Symbol | Value | Unit |
|---|--------------|---|------------------|-----------|------|
| Drain-Source Voltage | | | V _{DSS} | 30 | V |
| Gate-Source Voltage | | | V _{GSS} | ±20 | V |
| Continuous Drain Current (Note 6) V _{GS} = 10V | Steady State | T _A = +25°C T _A = +70°C | I _D | 11 8.5 | A |
| | t < 10s | T _A = +25°C T _A = +70°C | I _D | 14 11 | A |
| Continuous Drain Current (Note 6) V _{GS} = 10V | Steady State | T _C = +25°C T _C = +100°C | I _D | 30 20 | A |
| Pulsed Drain Current (10μs pulse, duty cycle = 1%) | | | I _{DM} | 90 | A |
| Avalanche Current (Note 7) L = 0.1mH | | | I _{AS} | 12.7 | A |
| Avalanche Energy (Note 7) L = 0.1mH | | | E _{AS} | 8.1 | mJ |

Thermal Characteristics

| Characteristic | | Symbol | Value | Units | |
|--|--------------|-----------------------------------|----------------|-------|---|
| Total Power Dissipation (Note 5) | | P _D | 0.9 | W | |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady State | R _{θJA} | 137 | °C/W | |
| | t < 10s | | 90 | °C/W | |
| Total Power Dissipation (Note 6) | | P _D | 2.4 | W | |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady State | R _{θJA} | 52 | °C/W | |
| | t < 10s | | 35 | °C/W | |
| Total Power Dissipation (Note 6) | | T _C = +25°C | P _D | 26 | W |
| Thermal Resistance, Junction to Case (Note 6) | | R _{θJC} | 4.8 | °C/W | |
| Operating and Storage Temperature Range | | T _J , T _{STG} | -55 to +150 | °C | |

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------------|-----|-------|-------|------|---|
| OFF CHARACTERISTICS (Note 8) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 30 | — | — | V | V _{GS} = 0V, I _D = 250μA |
| Zero Gate Voltage Drain Current T _J = +25°C | I _{DSS} | — | — | 1 | μA | V _{DS} = 30V, V _{GS} = 0V |
| Zero Gate Voltage Drain Current T _J = +150°C (Note 9) | | — | — | 100 | μA | |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±20V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 8) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | 1.0 | — | 2.5 | V | V _{DS} = V _{GS} , I _D = 250μA |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | 6.5 | 8.5 | mΩ | V _{GS} = 10V, I _D = 18A |
| | | — | 8 | 10.5 | | V _{GS} = 4.5V, I _D = 16A |
| Diode Forward Voltage | V _{SD} | — | 0.75 | 1.0 | V | V _{GS} = 0V, I _S = 1A |
| On State Drain Current (Note 9) | I _{D(ON)} | 10 | — | — | A | V _{DS} ≤ 5V, V _{GS} = 4.5V |
| DYNAMIC CHARACTERISTICS (Note 9) | | | | | | |
| Input Capacitance | C _{ISS} | — | 2,075 | 4,150 | pF | V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{OSS} | — | 190 | 380 | | |
| Reverse Transfer Capacitance | C _{RSS} | — | 138 | 276 | | |
| Gate Resistance | R _g | — | 2.4 | 5 | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz |
| Total Gate Charge (V _{GS} = 4.5V) | Q _g | — | 16.1 | 32 | nC | V _{DS} = 15V, I _D = 18A |
| Total Gate Charge (V _{GS} = 10V) | Q _g | — | 37 | 74 | | |
| Gate-Source Charge | Q _{gs} | — | 6.1 | 12 | | |
| Gate-Drain Charge | Q _{gd} | — | 5.9 | 12 | | |
| Turn-On Delay Time | t _{D(on)} | — | 4.5 | 10 | ns | V _{DS} = 15V, V _{GS} = 10V, R _L = 0.83Ω, R _{GEN} = 3Ω, |
| Turn-On Rise Time | t _r | — | 19.6 | 35 | | |
| Turn-Off Delay Time | t _{D(off)} | — | 31 | 50 | | |
| Turn-Off Fall Time | t _f | — | 10.7 | 21 | | |
| Reverse Recovery Time | t _{rr} | — | 13.7 | 27 | ns | I _F = 15A, di/dt = 500A/μs |
| Reverse Recovery Charge | Q _{rr} | — | 18.3 | 37 | nC | |

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1-inch square copper plate.
 - UIS in production with L = 1mH, T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

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DMN3010LFG

Document number: DS36195 Rev. 7 - 2

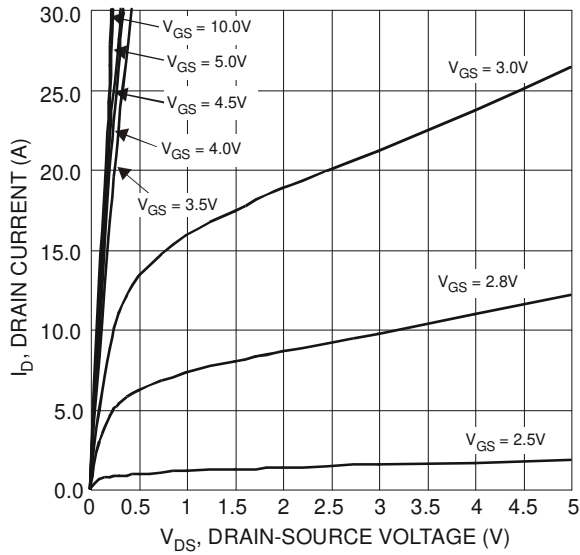


Figure 1 Typical Output Characteristics

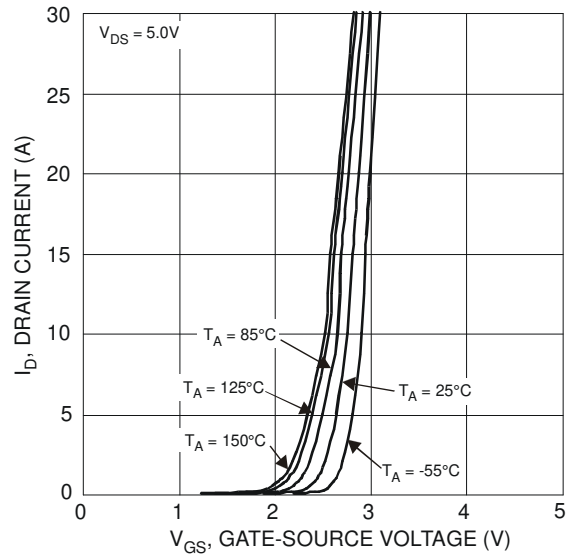


Figure 2 Typical Transfer Characteristics

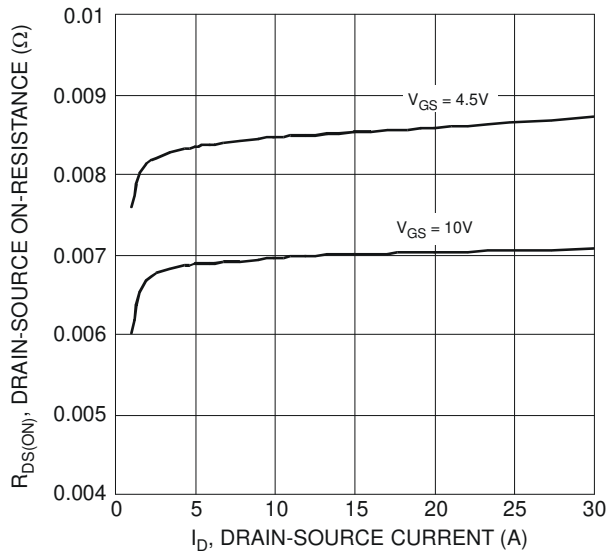


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

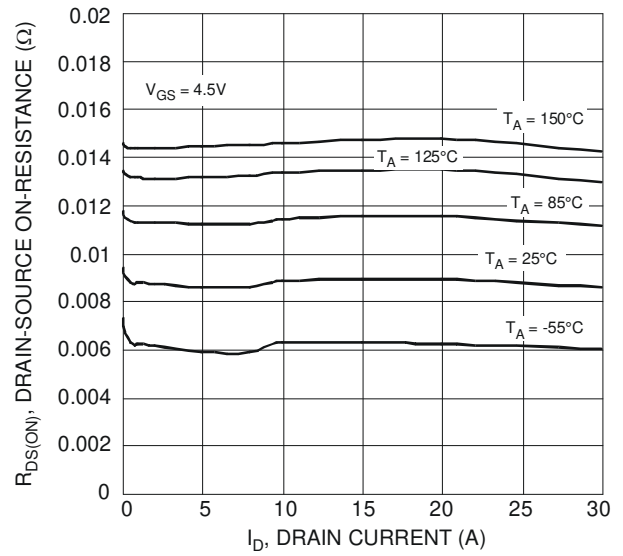


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

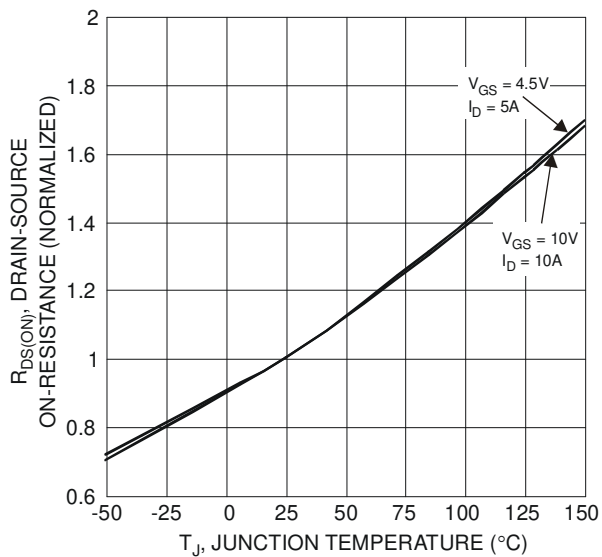


Figure 5 On-Resistance Variation with Temperature

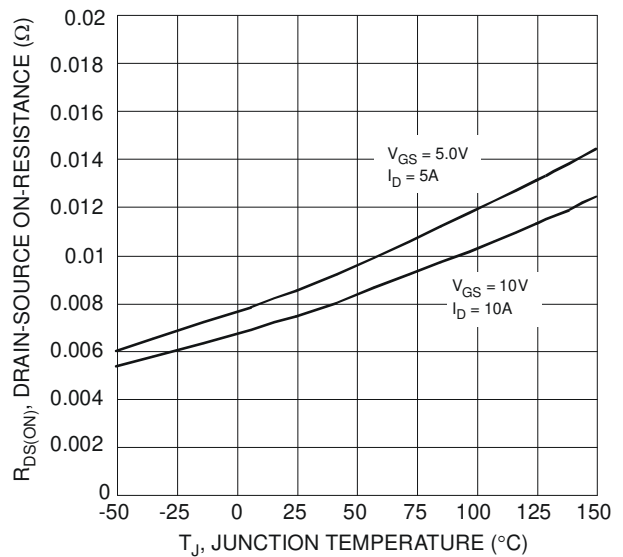


Figure 6 On-Resistance Variation with Temperature

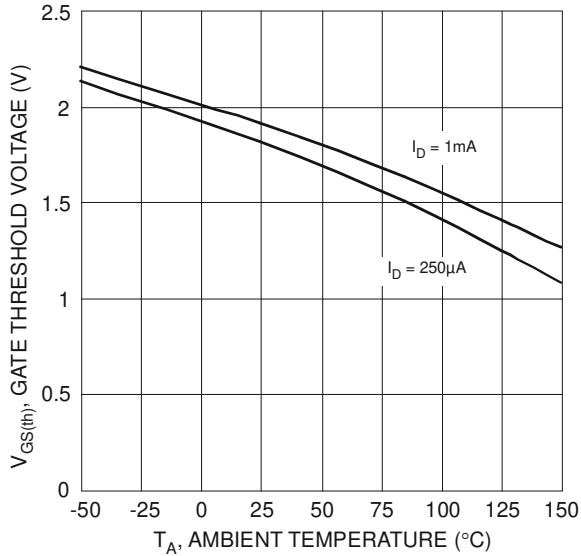


Figure 7 Gate Threshold Variation vs. Ambient Temperature

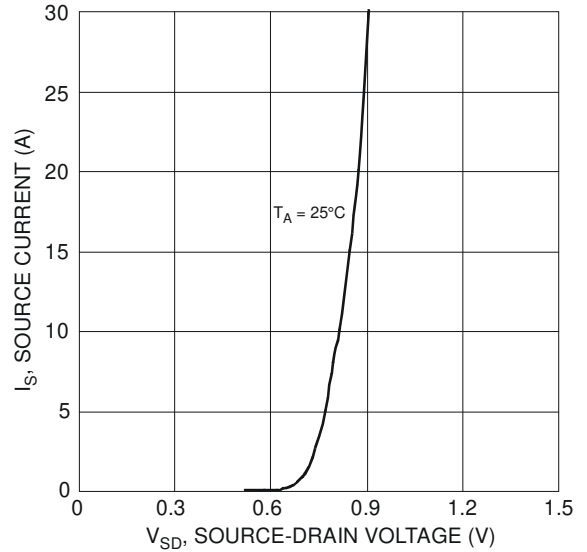


Figure 8 Diode Forward Voltage vs. Current

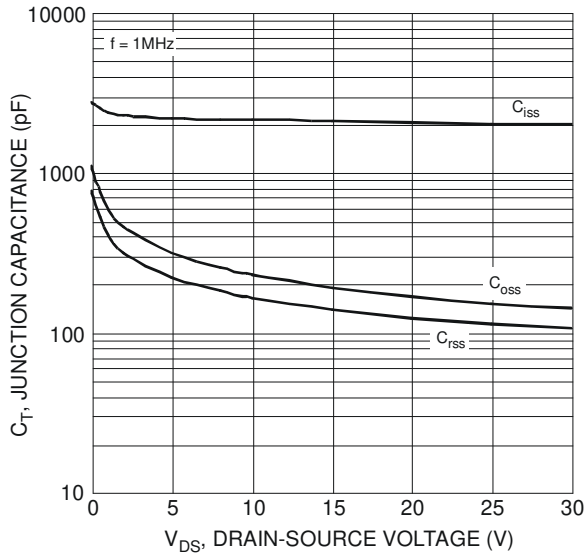


Figure 9 Typical Junction Capacitance

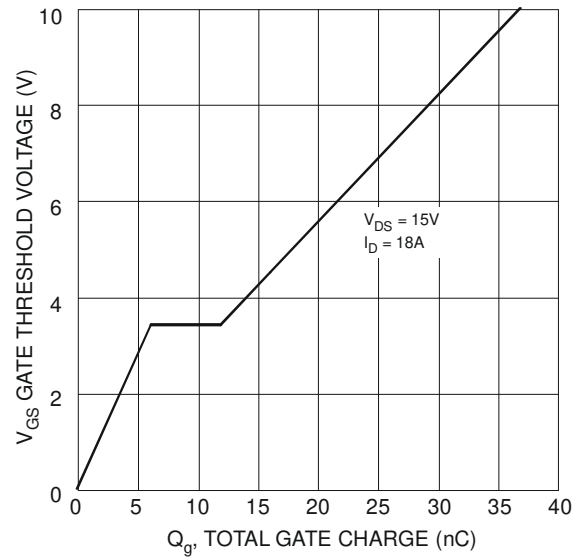


Figure 10 Gate Charge

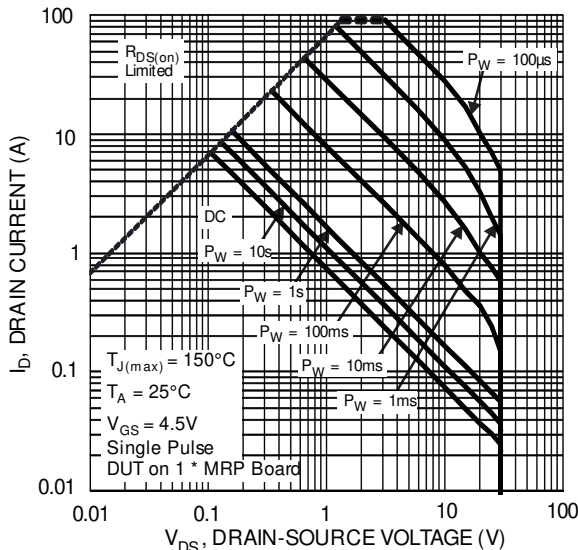
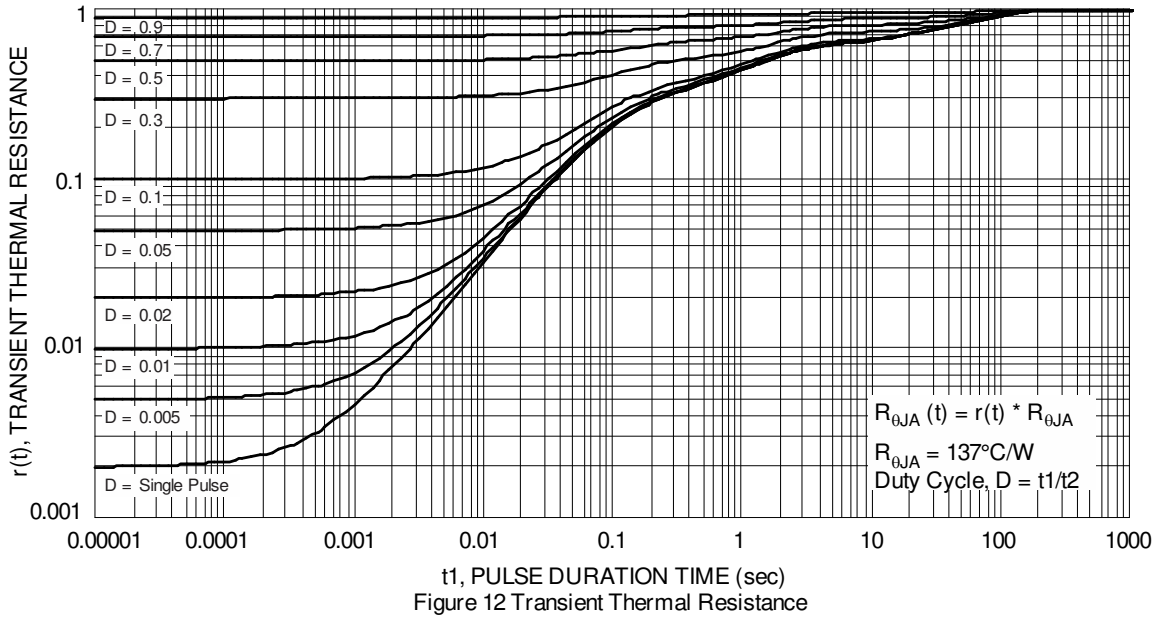


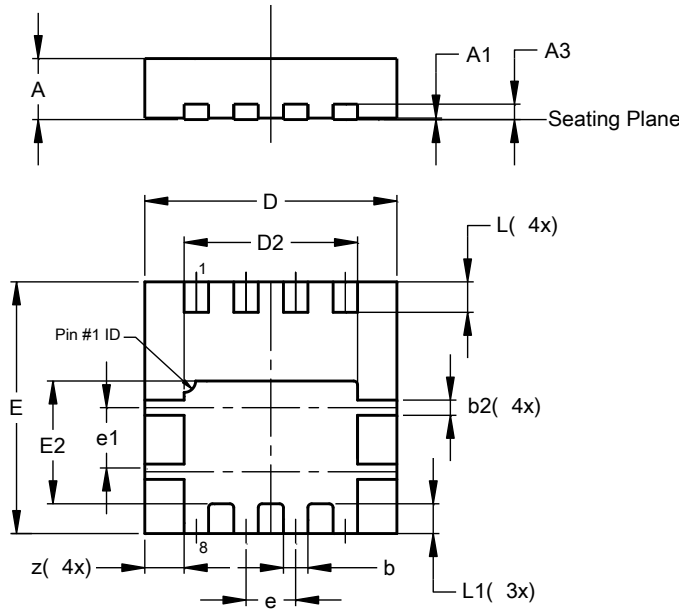
Figure 11 SOA, Safe Operation Area



Package Outline Dimensions

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

POWERDI®3333-8

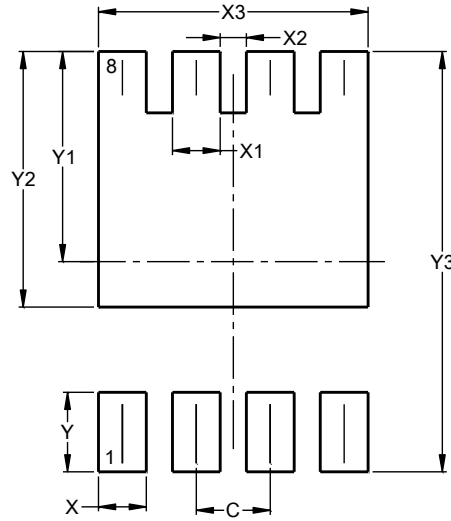


| POWERDI®3333-8 | | | |
|-----------------------------|------|------|-------|
| Dim | Min | Max | Typ |
| A | 0.75 | 0.85 | 0.80 |
| A1 | 0.00 | 0.05 | 0.02 |
| A3 | - | - | 0.203 |
| b | 0.27 | 0.37 | 0.32 |
| b2 | - | - | 0.20 |
| D | 3.25 | 3.35 | 3.30 |
| D2 | 2.22 | 2.32 | 2.27 |
| E | 3.25 | 3.35 | 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.

POWERDI@3333-8



| 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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