

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ max | I_D max $T_A = +25^\circ\text{C}$ |
|---------------|-------------------------------|--|
| -30V | 20mΩ @ $V_{GS} = -10\text{V}$ | - 8.7 A |
| | 29mΩ @ $V_{GS} = -5\text{V}$ | -7.2 A |

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**

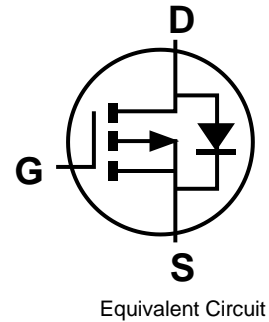
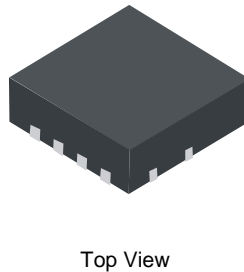
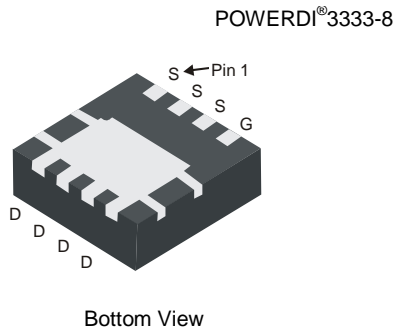
Description and Applications

This 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.

- Backlighting
- Power Management Functions
- DC-DC Converters

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 Indicator: See Diagram
Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208@3
- Weight: 0.03 grams (Approximate)



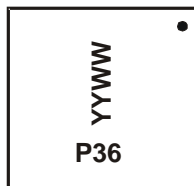
Ordering Information (Note 4)

| Part Number | Case | Packaging |
|---------------|---------------|-------------------|
| DMP3036SFG-7 | POWERDI3333-8 | 2,000/Tape & Reel |
| DMP3036SFG-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 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

POWERDI®3333-8



P36 = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Digit of Year (ex: 14 = 2014)
WW = Week Code (01 ~ 53)

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

| Characteristic | | | Symbol | Value | Units |
|--|--------------|--|------------------|----------------|-------|
| Drain-Source Voltage | | | V _{DSS} | -30 | V |
| Gate-Source Voltage | | | V _{GSS} | ±25 | V |
| Continuous Drain Current (Note 6) V _{GS} = -10V | Steady State | T _A = +25°C T _A = +70°C | I _D | -8.7 -7.0 | A |
| | t < 10s | T _A = +25°C T _A = +70°C | I _D | -12.7 -10.1 | A |
| Continuous Drain Current (Note 6) V _{GS} = -5V | Steady State | T _A = +25°C T _A = +70°C | I _D | -7.2 -5.8 | A |
| | t < 10s | T _A = +25°C T _A = +70°C | I _D | -10.5 -8.4 | A |
| Pulsed Drain Current (10µs pulse, duty cycle = 1%) | | | I _{DM} | -80 | A |
| Maximum Continuous Body Diode Forward Current (Note 6) | | | I _S | -3.6 | A |
| Avalanche Current (Note 7) L=0.3 mH | | | I _{AS} | -17.5 | A |
| Avalanche Energy (Note 7) L=0.3 mH | | | E _{AS} | 64 | mJ |

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

| Characteristic | | Symbol | Value | Units |
|--|--------------|-----------------------------------|-------------|-------|
| Total Power Dissipation (Note 5) | | P _D | 0.95 | W |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady State | R _{θJA} | 137 | °C/W |
| | t < 10s | | 65 | °C/W |
| Total Power Dissipation (Note 6) | | P _D | 2.3 | W |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady State | R _{θJA} | 55 | °C/W |
| | t < 10s | | 26 | °C/W |
| Thermal Resistance, Junction to Case (Note 6) | | R _{θJC} | 6.14 | °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 | I _{DSS} | - | - | -1.0 | µA | V _{DS} = -30V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | - | - | ±100 | nA | V _{GS} = ±25V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 8) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | -1.0 | -2.0 | -2.5 | V | V _{DS} = V _{GS} , I _D = -250µA |
| Static Drain-Source On-Resistance | R _{DS(ON)} | - | 13 | 20 | mΩ | V _{GS} = -10V, I _D = -8A |
| | | - | 18.4 | 29 | | V _{GS} = -5V, I _D = -5A |
| Diode Forward Voltage | V _{SD} | - | -0.74 | -1.0 | V | V _{GS} = 0V, I _S = -1A |
| DYNAMIC CHARACTERISTICS (Note 9) | | | | | | |
| Input Capacitance | C _{ISS} | - | 1931 | - | pF | V _{DS} = -15V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{OSS} | - | 226 | - | pF | |
| Reverse Transfer Capacitance | C _{RSS} | - | 168 | - | pF | |
| Gate Resistance | R _g | - | 10.9 | - | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1MHz |
| Total Gate Charge V _{GS} = -5V | Q _g | - | 8.8 | - | nC | V _{DS} = -15V, V _{GS} = -10V, I _D = -10A |
| Total Gate Charge V _{GS} = -10V | Q _g | - | 16.5 | - | nC | |
| Gate-Source Charge | Q _{gs} | - | 2.6 | - | nC | |
| Gate-Drain Charge | Q _{gd} | - | 3.6 | - | nC | |
| Turn-On Delay Time | t _{D(on)} | - | 8.2 | - | ns | |
| Turn-On Rise Time | t _r | - | 14 | - | ns | V _{GEN} = -10V, V _{DD} = -15V, R _{GEN} = 3Ω, I _D = -10A |
| Turn-Off Delay Time | t _{D(off)} | - | 65 | - | ns | |
| Turn-Off Fall Time | t _f | - | 31.6 | - | ns | |

- 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 1inch square copper plate.
 - UIS in production with L = 0.1mH, starting T_A = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

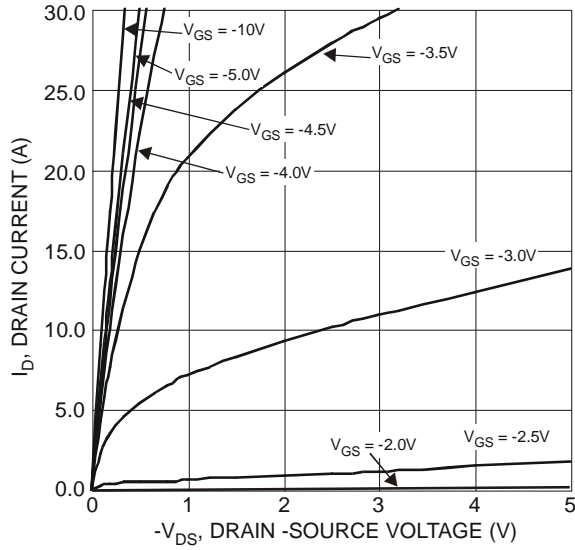


Figure 1 Typical Output Characteristics

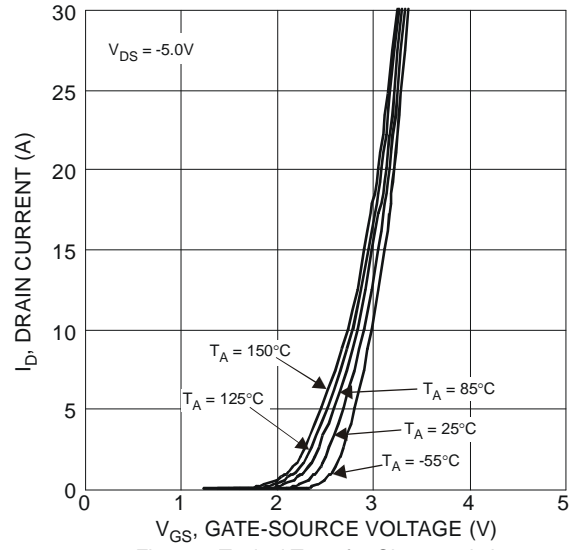


Figure 2 Typical Transfer Characteristics

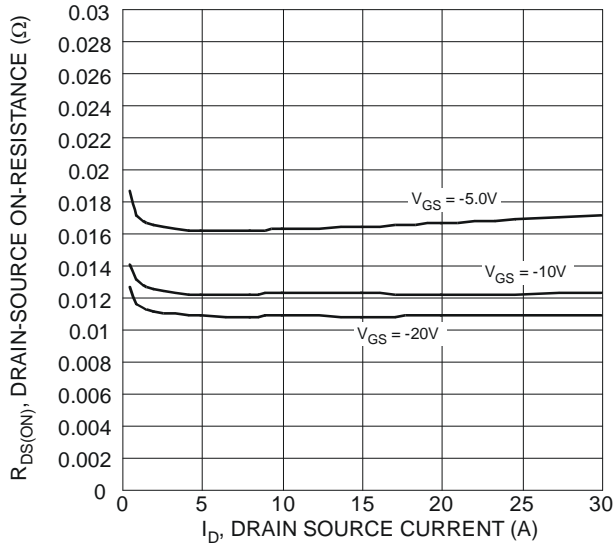


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

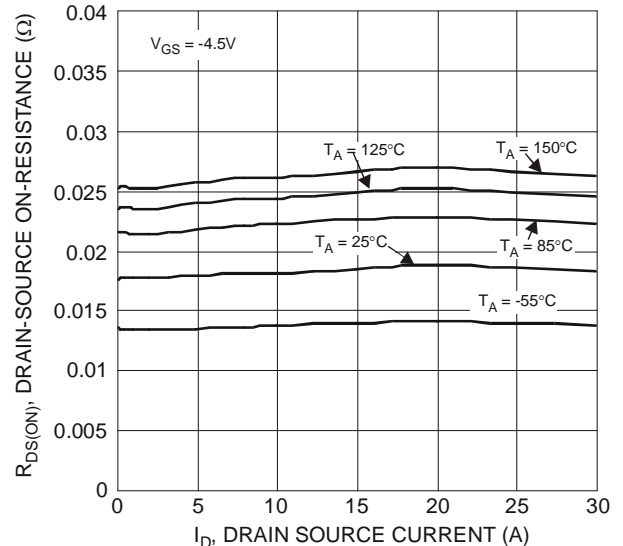


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

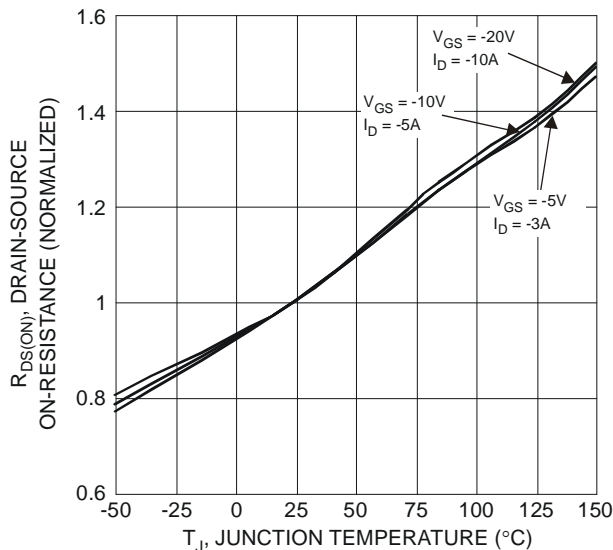


Figure 5 On-Resistance Variation with Temperature

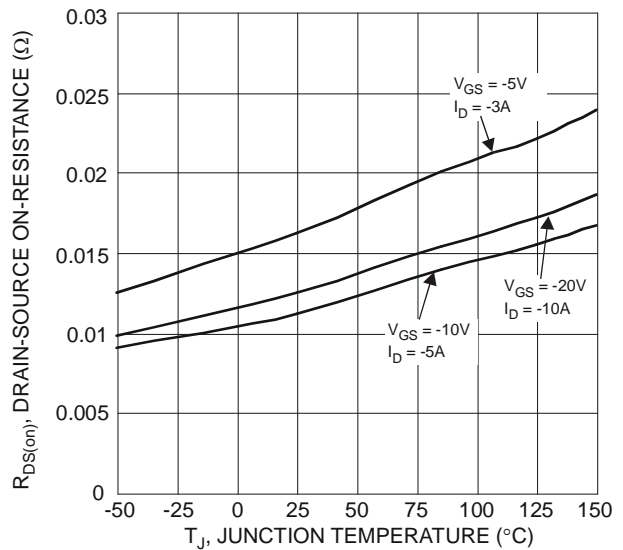


Figure 6 On-Resistance Variation with Temperature

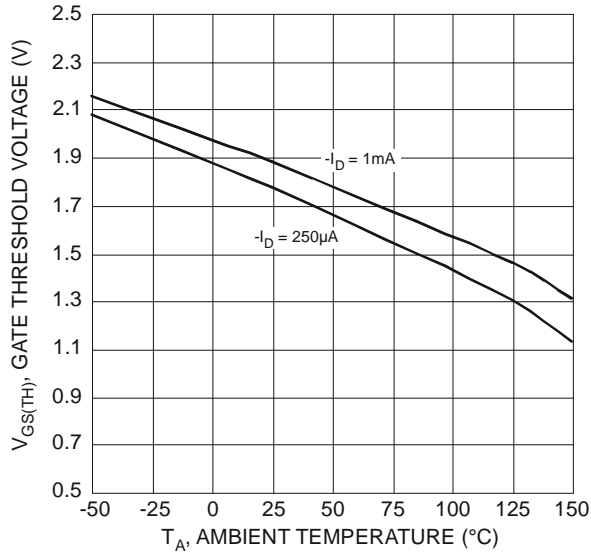


Figure 7 Gate Threshold Variation vs. Ambient Temperature

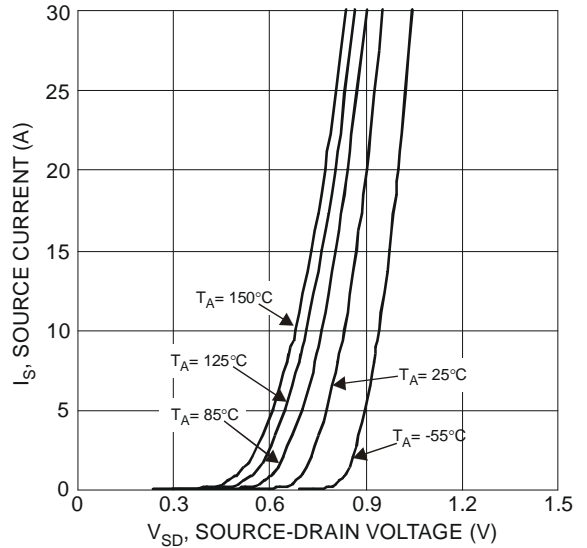


Figure 8 Diode Forward Voltage vs. Current

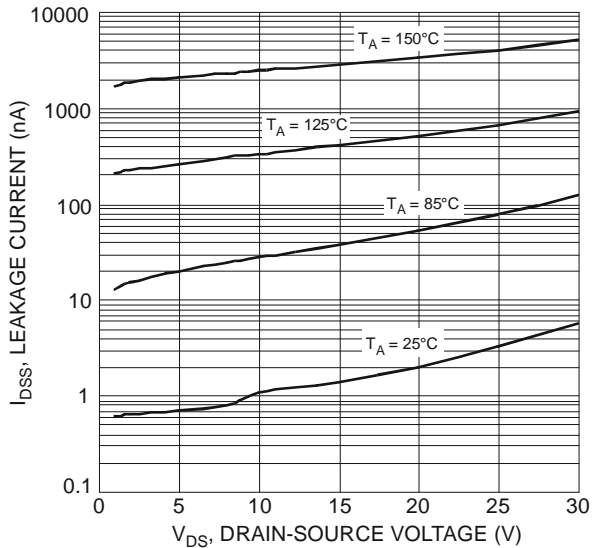


Figure 9 Typical Drain-Source Leakage Current vs. Voltage

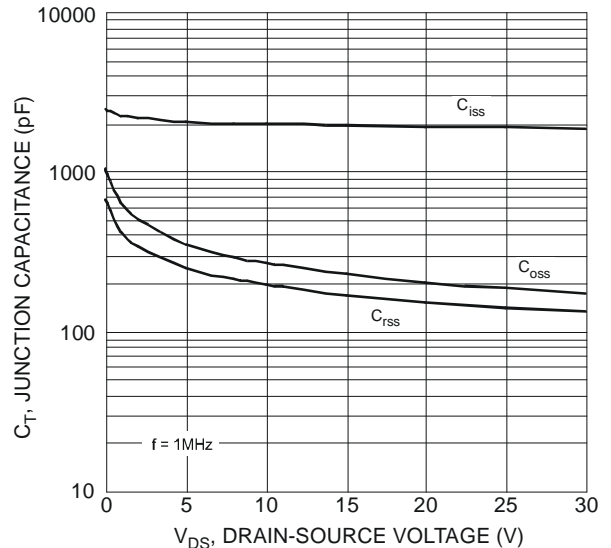


Figure 10 Typical Junction Capacitance

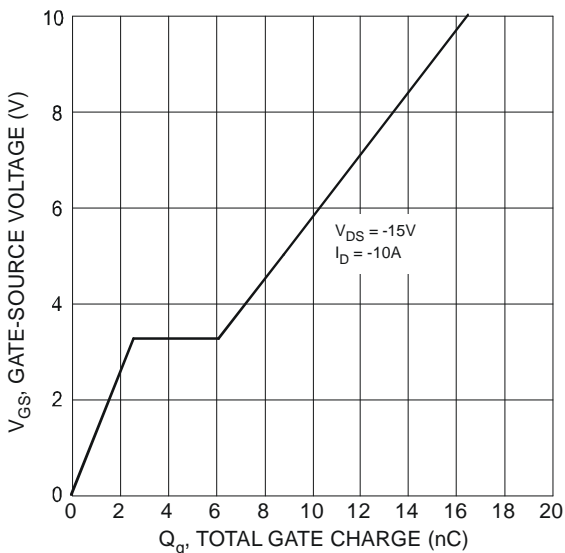


Figure 11 Gate-Charge Characteristics

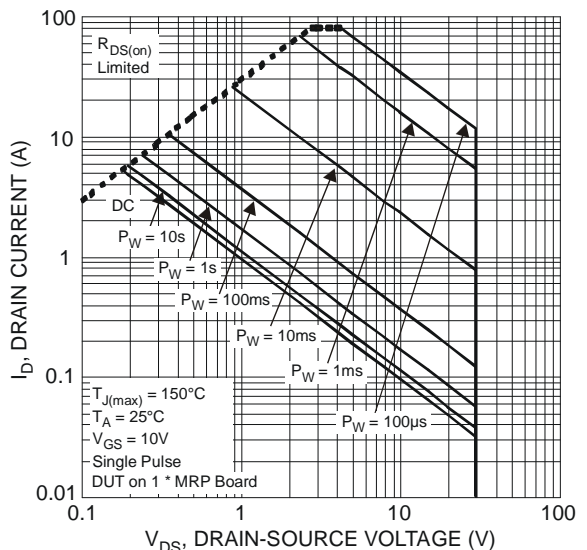
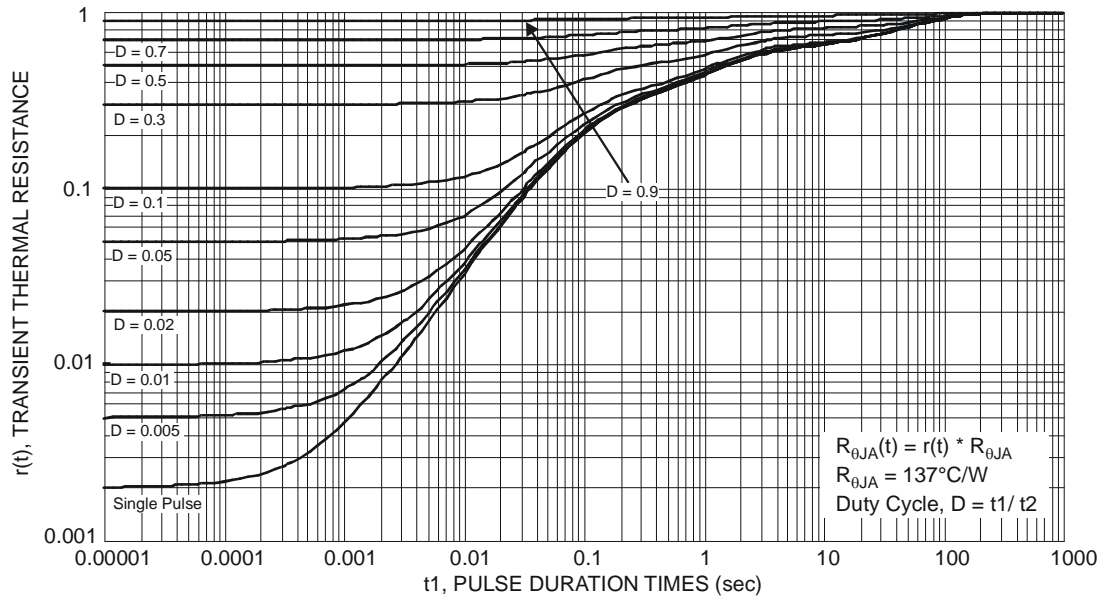
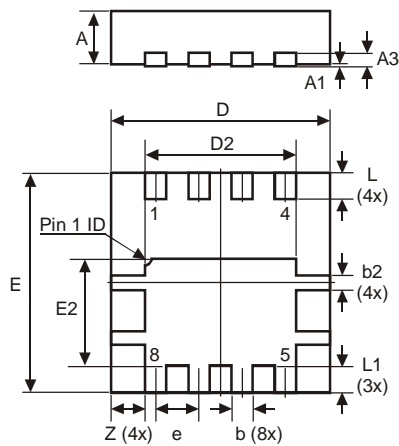


Figure 12 SOA, Safe Operation Area



Package Outline Dimensions

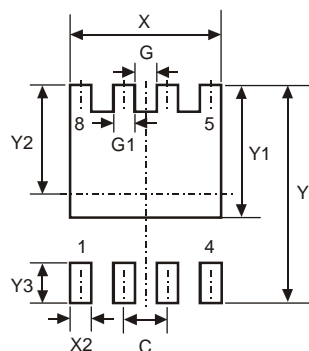
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| POWERDI3333-8 | | | |
|----------------------|------|------|-------|
| 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 AP02002 at <http://www.diodes.com/datasheets/ap02002.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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