

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON) \text{ max}}$ | $I_D \text{ max}$ $T_A = +25^\circ\text{C}$ |
|---------------|--------------------------|--|
| 100V | 122mΩ @ $V_{GS} = 10V$ | 2.9A |
| | 133mΩ @ $V_{GS} = 4.5V$ | 2.7A |

Description

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.

Applications

- Backlighting
- Power Management Functions
- DC-DC Converters

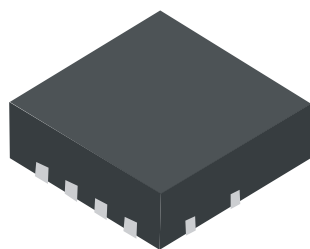
Features

- 100% Unclamped Inductive Switch (UIS) test in production
- 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**

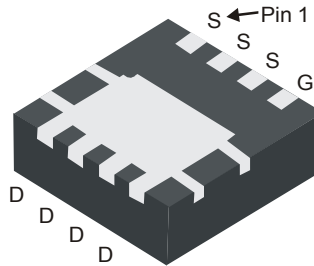
Mechanical Data

- Case: POWERDI3333
- 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: 0.034 grams (approximate)

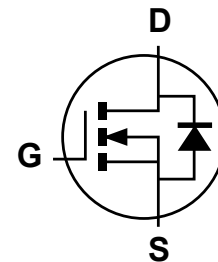
POWERDI3333



Top View



Bottom View



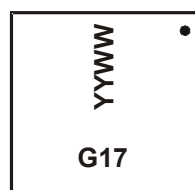
Equivalent Circuit

Ordering Information (Note 4)

| Part Number | Compliance | Case | Packaging |
|-----------------|------------|-------------|------------------|
| DMN10H170SFG-7 | Standard | POWERDI3333 | 2000/Tape & Reel |
| DMN10H170SFG-13 | Standard | POWERDI3333 | 3000/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



- G17 = Product marking code
- YYWW = Date code marking
- YY = Last digit of year (ex: 10 for 2010)
- WW = Week code (01 – 53)

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

| Characteristic | Symbol | Value | Units |
|---|------------------|------------------------|-------|
| Drain-Source Voltage | V _{DSS} | 100 | V |
| Gate-Source Voltage | V _{GSS} | ±20 | V |
| Continuous Drain Current (Note 6) V _{GS} = 10V | Steady State | T _A = +25°C | 2.9 |
| | | T _A = +70°C | 2.4 |
| | t < 10s | T _C = +25°C | 8.5 |
| | | T _A = +25°C | 3.7 |
| | | T _A = +70°C | 3.0 |
| Maximum Continuous Body Diode Forward Current (Note 6) | I _S | 3.0 | A |
| Pulsed Drain Current (10µs pulse, duty cycle = 1%) | I _{DM} | 16 | A |
| Avalanche Current (Note 7) | I _{AR} | 5.3 | A |
| Avalanche Energy (Note 7) | E _{AR} | 20 | mJ |

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

| Characteristic | Symbol | Value | Units |
|--|-----------------------------------|------------------------|-------|
| Total Power Dissipation (Note 5) | P _D | T _A = +25°C | 0.94 |
| | | T _A = +70°C | 0.6 |
| Thermal Resistance, Junction to Ambient (Note 5) | R _{θJA} | Steady State | 137 |
| | | t < 10s | 82 |
| Total Power Dissipation (Note 6) | P _D | T _A = +25°C | 2.0 |
| | | T _A = +70°C | 1.3 |
| Thermal Resistance, Junction to Ambient (Note 6) | R _{θJA} | Steady State | 60 |
| | | t < 10s | 36 |
| Thermal Resistance, Junction to Case (Note 6) | R _{θJC} | 7.0 | °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} | 100 | — | — | V | V _{GS} = 0V, I _D = 250µA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | 1.0 | µA | V _{DS} = 100V, V _{GS} = 0V |
| 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 | — | 3.0 | V | V _{DS} = V _{GS} , I _D = 250µA |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | 99 | 122 | mΩ | V _{GS} = 10V, I _D = 3.3A |
| | | — | 104 | 133 | | V _{GS} = 4.5V, I _D = 3.0A |
| Forward Transfer Admittance | Y _{fs} | — | 4.4 | — | S | V _{DS} = 10V, I _D = 3.3A |
| Diode Forward Voltage | V _{SD} | — | 0.7 | 1.0 | V | V _{GS} = 0V, I _S = 3.3A |
| DYNAMIC CHARACTERISTICS (Note 9) | | | | | | |
| Input Capacitance | C _{iSS} | — | 870.7 | — | pF | V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 40.8 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 24.6 | — | pF | |
| Gate resistance | R _g | — | 1.1 | — | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz |
| Total Gate Charge (V _{GS} = 4.5V) | Q _g | — | 7.0 | — | nC | V _{DS} = 50V, I _D = 3.3A |
| Total Gate Charge (V _{GS} = 10V) | Q _g | — | 14.9 | — | nC | |
| Gate-Source Charge | Q _{gs} | — | 3.3 | — | nC | |
| Gate-Drain Charge | Q _{gd} | — | 3.0 | — | nC | |
| Turn-On Delay Time | t _{D(on)} | — | 4.4 | — | ns | V _{DD} = 50V, V _{GEN} = 10V, R _{GEN} = 6.0Ω, I _D = 3.3A |
| Turn-On Rise Time | t _r | — | 2.3 | — | ns | |
| Turn-Off Delay Time | t _{D(off)} | — | 13.9 | — | ns | |
| Turn-Off Fall Time | t _f | — | 3.4 | — | ns | |
| Reverse Recovery Time | t _{rr} | — | 22.4 | — | ns | I _S = 3.3A, dI/dt = 100A/µs |
| Reverse Recovery Charge | Q _{rr} | — | 19.7 | — | 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 1inch square copper plate.
 - UIS in production with L = 1.43mH, T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

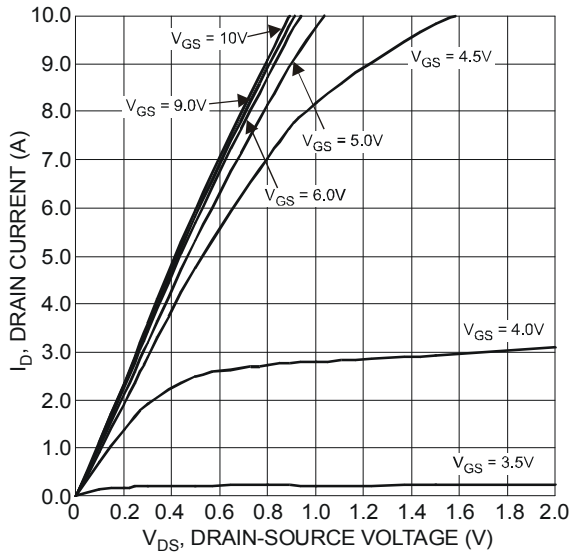


Figure 1 Typical Output Characteristic

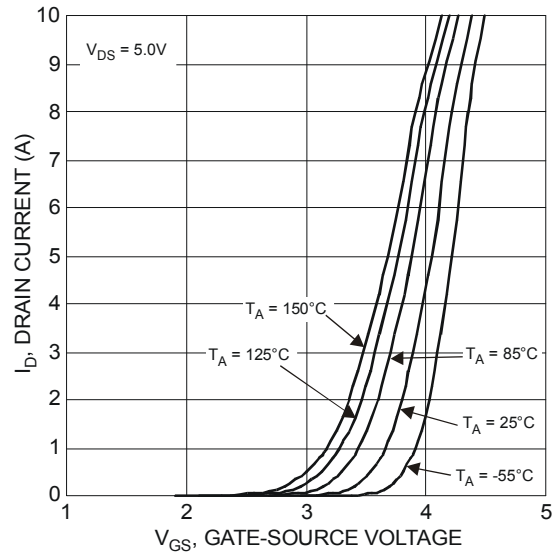


Figure 2 Typical Transfer Characteristics

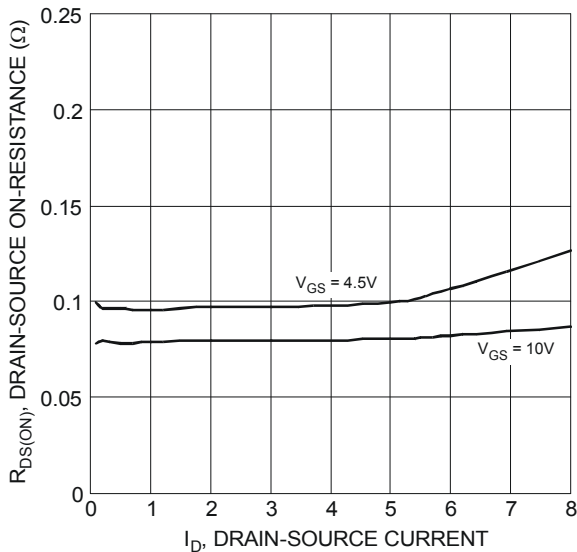


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

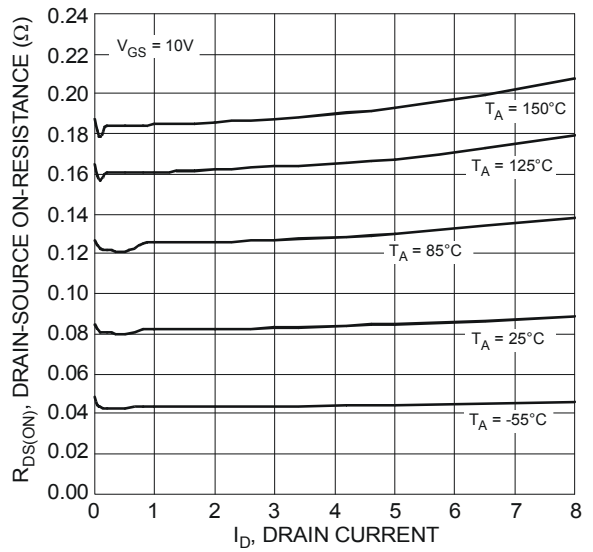


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

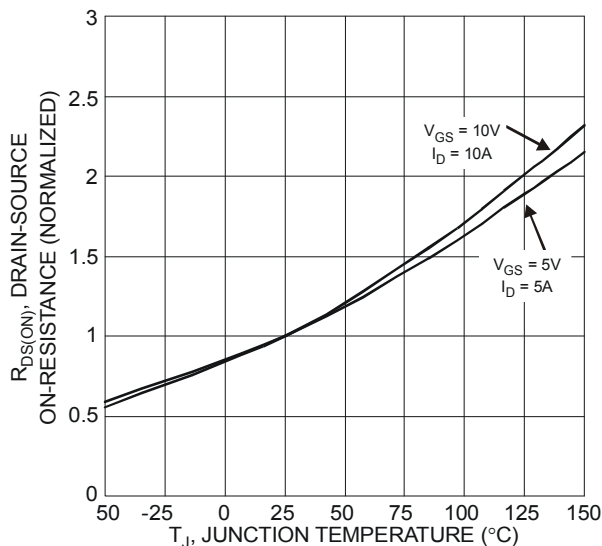


Figure 5 On-Resistance Variation with Temperature

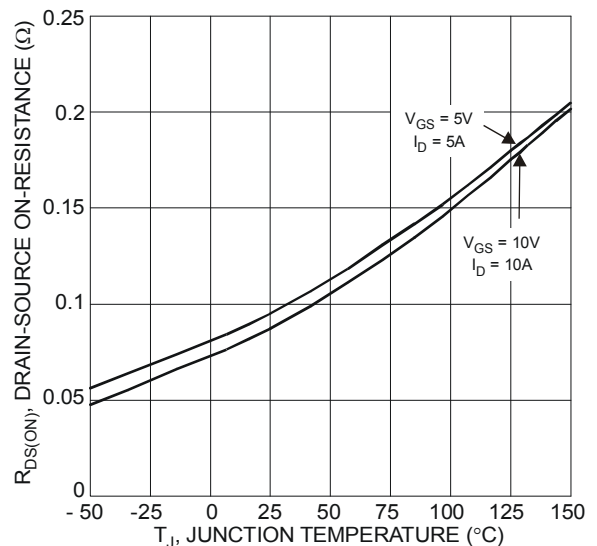


Figure 6 On-Resistance Variation with Temperature

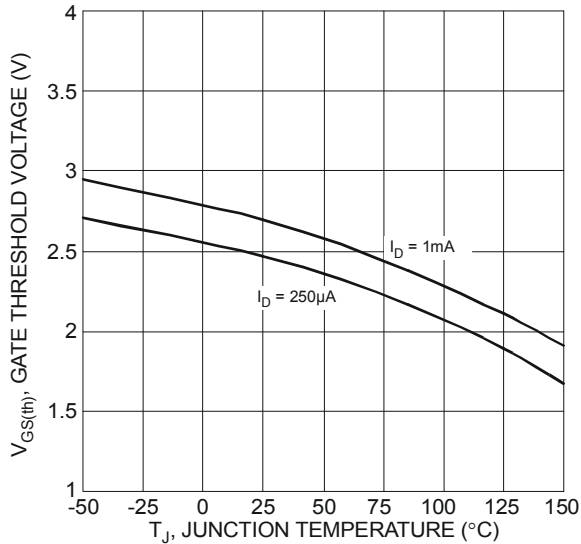


Figure 7 Gate Threshold Variation vs. Ambient Temperature

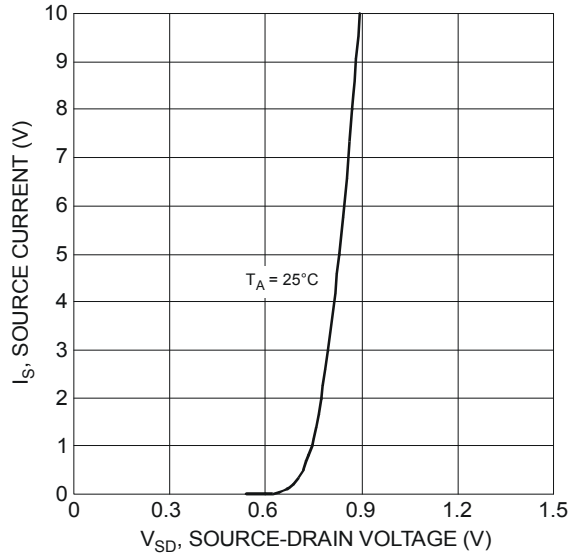


Figure 8 Diode Forward Voltage vs. Current

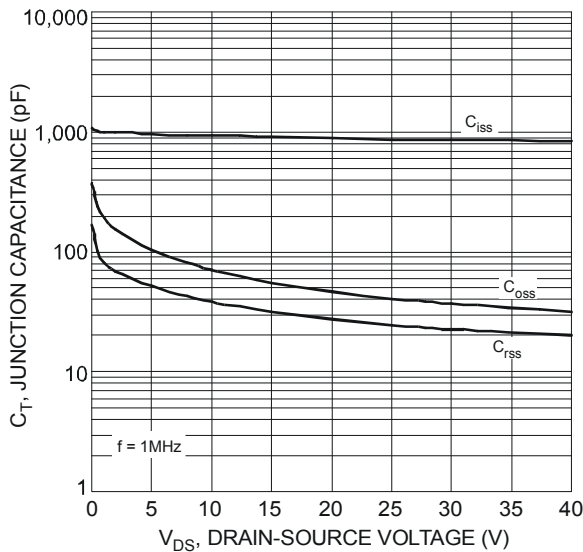


Figure 9 Typical Junction Capacitance

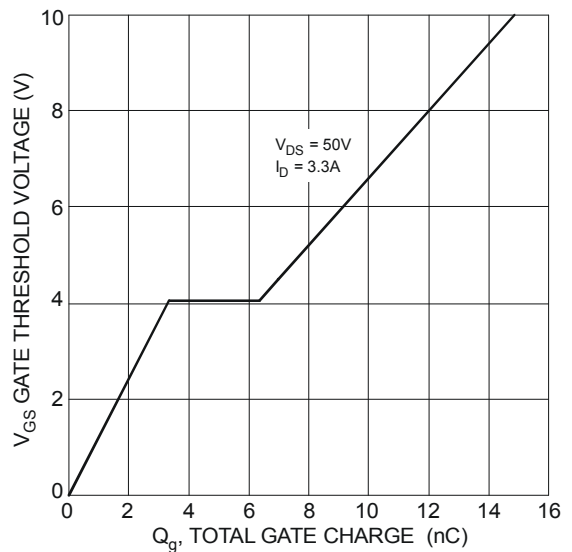


Figure 10 Gate Charge

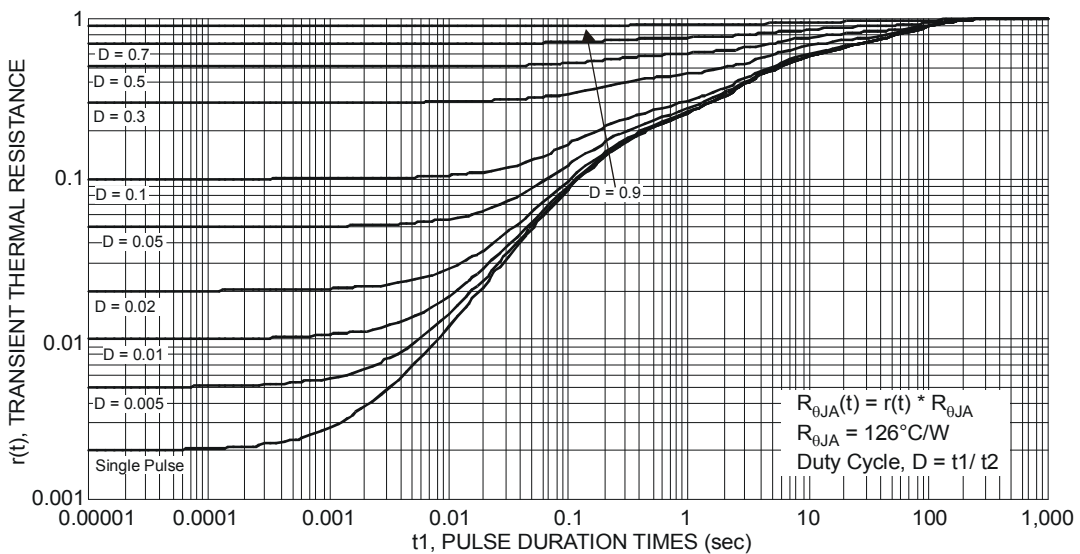


Figure 11 Transient Thermal Resistance

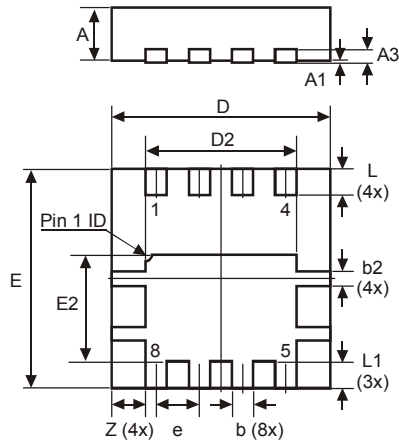
$$R_{\theta JA}(t) = r(t) * R_{\theta JA}$$

$$R_{\theta JA} = 126^{\circ}\text{C/W}$$

$$\text{Duty Cycle, } D = t_1 / t_2$$

Package Outline Dimensions

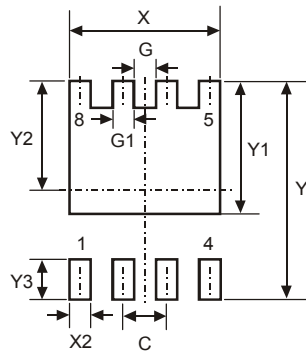
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| 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 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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