

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ max | I_D max $T_C = +25^\circ\text{C}$ |
|---------------|---|--|
| 60V | 7.5m Ω @ $V_{GS} = 10\text{V}$ | 60A |
| | 11.5m Ω @ $V_{GS} = 4.5\text{V}$ | 49A |

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

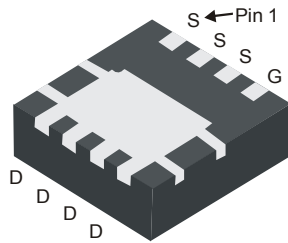
- Synchronous Rectifier
- Backlighting
- Power Management Functions
- DC-DC Converters

Features and Benefits

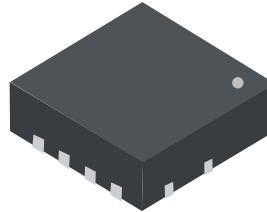
- Low $R_{DS(ON)}$ – Ensures on State Losses Are Minimized
- Excellent $Q_{gd} \times R_{DS(ON)}$ Product (FOM)
- Advanced Technology for DC/DC Converts
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- Occupies Just 33% of the Board Area Occupied by SO-8 Enabling Smaller End Product
- 100% UIS (Avalanche) rated
- ESD Protected Gate
- **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

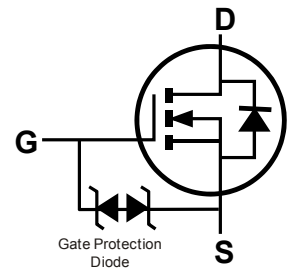
- Case: POWERDI[®]3333-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See diagram
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 ^(e)3
- Weight: 0.008 grams (approximate)



Bottom View



Top View
Internal Schematic

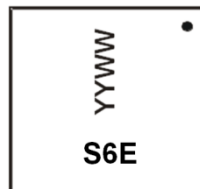


Ordering Information (Note 4)

| Part Number | Case | Packaging |
|---------------|---------------|-------------------|
| DMT6008LFG-7 | POWERDI3333-8 | 2,000/Tape & Reel |
| DMT6008LFG-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



S6E = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last digit of year (ex: 13 = 2013)
 WW = Week code (01 ~ 53)

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

| Characteristic | Symbol | Value | Units |
|---|------------------|------------------------|-------|
| Drain-Source Voltage | V _{DSS} | 60 | V |
| Gate-Source Voltage | V _{GSS} | ±12 | V |
| Continuous Drain Current (Note 5) V _{GS} = 10V | I _D | T _A = +25°C | 13 |
| | | T _A = +70°C | 11 |
| | I _D | T _C = +25°C | 60 |
| | | T _C = +70°C | 48 |
| Maximum Continuous Body Diode Forward Current (Note 5) | I _S | 3 | A |
| Pulsed Drain Current (10µs pulse, duty cycle = 1%) | I _{DM} | 80 | A |
| Avalanche Current (Note 6) | I _{AS} | 13 | A |
| Avalanche Energy (Note 6) | E _{AS} | 25 | 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 | 2.2 |
| | | T _C = +25°C | 41 |
| Thermal Resistance, Junction to Ambient (Note 5) | R _{θJA} | Steady State | 58 |
| | | t < 10s | 35 |
| Thermal Resistance, Junction to Case (Note 5) | R _{θJC} | 3 | °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 7) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 60 | — | — | V | V _{GS} = 0V, I _D = 1mA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | 1 | µA | V _{DS} = 48V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±10 | µA | V _{GS} = ±10V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | 0.7 | — | 2.0 | V | V _{DS} = V _{GS} , I _D = 250µA |
| Static Drain-Source On-Resistance | R _{DS(on)} | — | 5.0 | 7.5 | mΩ | V _{GS} = 10V, I _D = 20A |
| | | — | 6.5 | 11.5 | | V _{GS} = 4.5V, I _D = 20A |
| | | — | 19 | — | | V _{GS} = 3V, I _D = 3A |
| | | — | — | — | | V _{GS} = 0V, I _S = 20A |
| Diode Forward Voltage | V _{SD} | — | 0.9 | 1.2 | V | V _{GS} = 0V, I _S = 20A |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C _{iss} | — | 2713 | — | pF | V _{DS} = 30V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 822 | — | | |
| Reverse Transfer Capacitance | C _{rss} | — | 57 | — | | |
| Gate Resistance | R _g | — | 0.54 | — | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz |
| Total Gate Charge (V _{GS} = 4.5V) | Q _g | — | 22.4 | — | nC | V _{DS} = 30V, I _D = 20A |
| Total Gate Charge (V _{GS} = 10V) | Q _g | — | 50.4 | — | | |
| Gate-Source Charge | Q _{gs} | — | 9.6 | — | | |
| Gate-Drain Charge | Q _{gd} | — | 7.8 | — | | |
| Turn-On Delay Time | t _{D(on)} | — | 7.0 | — | nS | V _{DD} = 30V, V _{GS} = 10V, I _D = 20A, R _G = 3Ω, |
| Turn-On Rise Time | t _r | — | 4.4 | — | | |
| Turn-Off Delay Time | t _{D(off)} | — | 24.4 | — | | |
| Turn-Off Fall Time | t _f | — | 7.0 | — | | |

- Notes:
- R_{θJA} is determined with the device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate. R_{θJC} is guaranteed by design while R_{θJA} is determined by the user's board design.
 - UIS in production with L = 0.3mH, T_J = +25°C
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

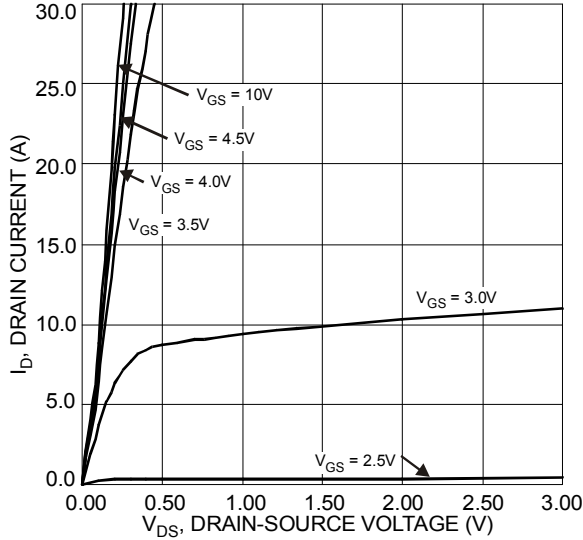


Figure 1 Typical Output Characteristics

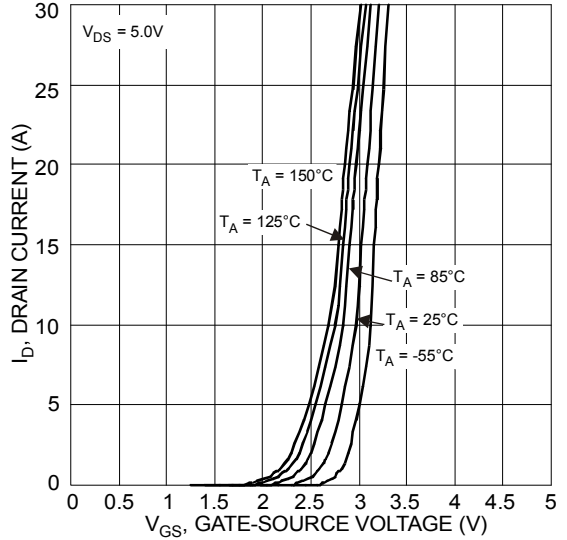


Figure 2 Typical Transfer Characteristics

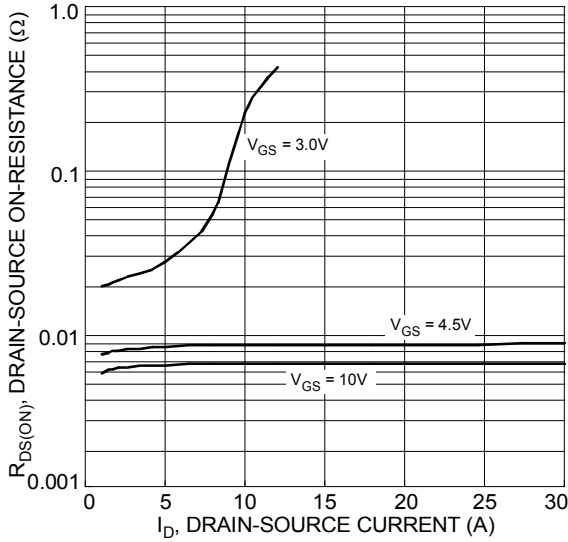


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

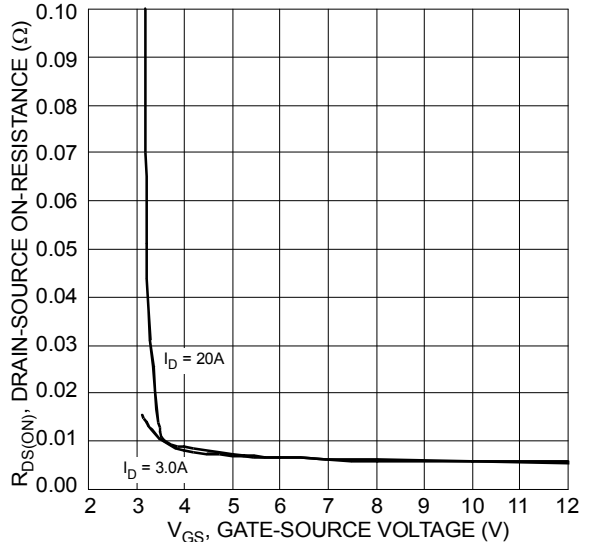


Figure 4 Typical Transfer Characteristics

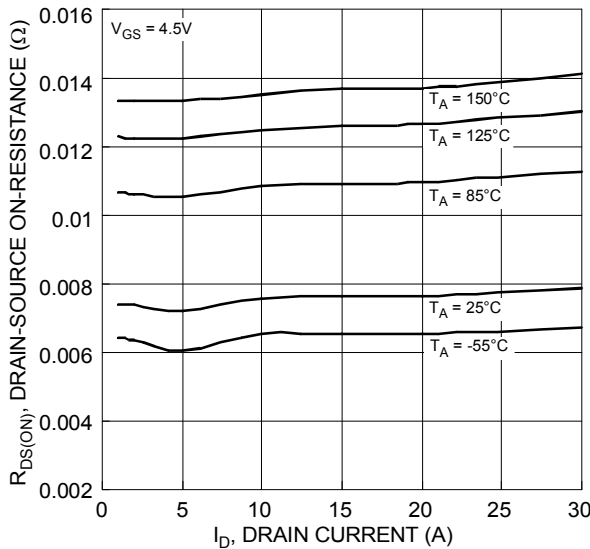


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

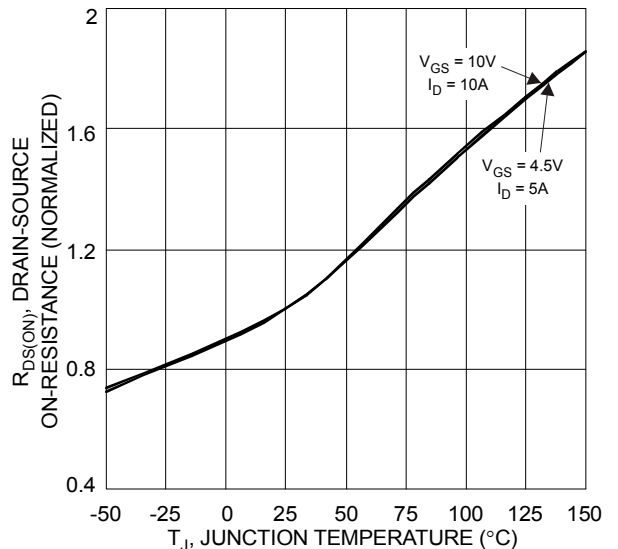


Figure 6 On-Resistance Variation with Temperature

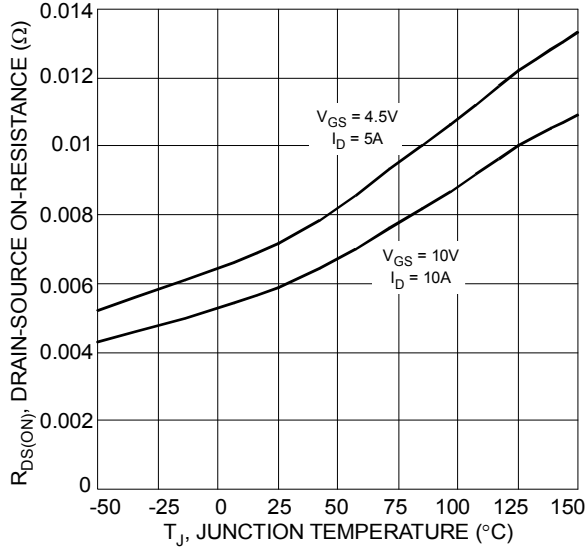


Figure 7 On-Resistance Variation with Temperature

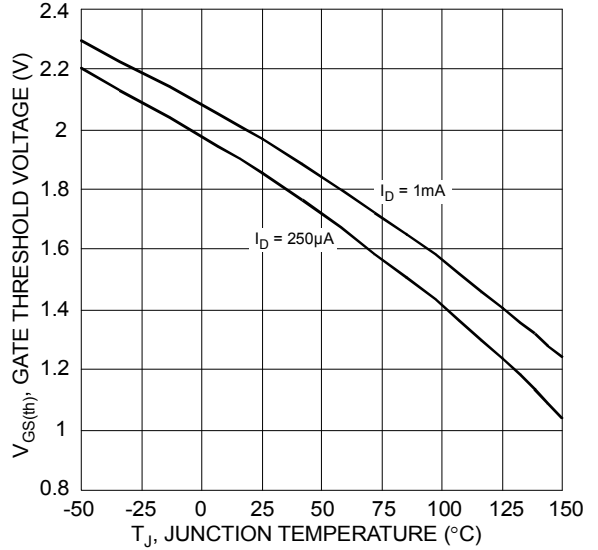


Figure 8 Gate Threshold Variation vs. Ambient Temperature

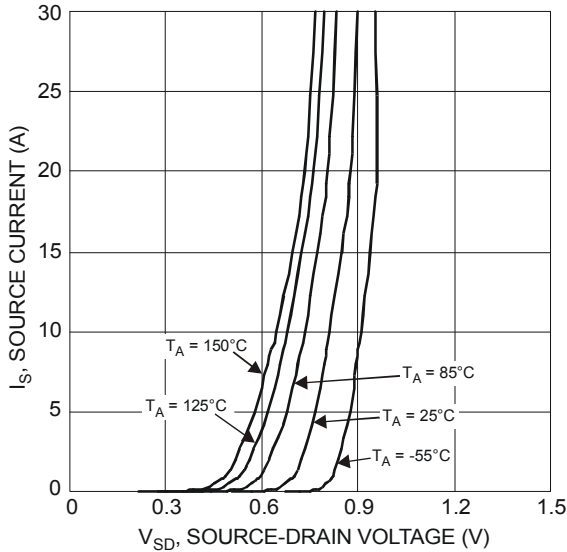


Figure 9 Diode Forward Voltage vs. Current

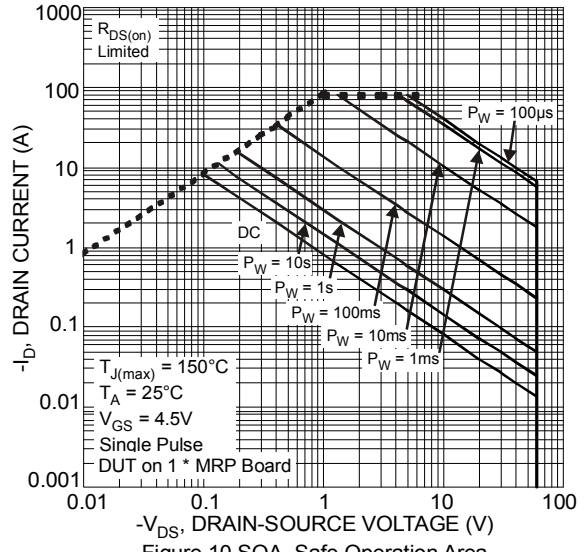


Figure 10 SOA, Safe Operation Area

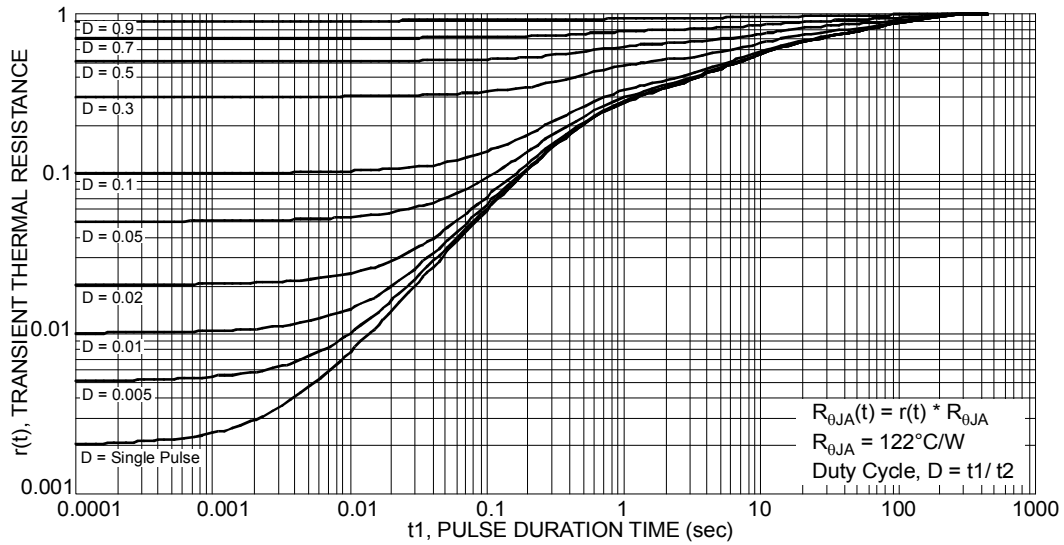
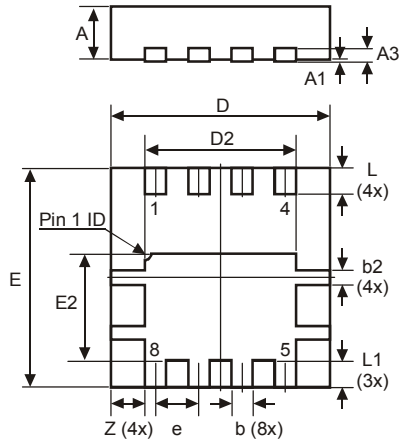


Figure 11 Transient Thermal Resistance

$R_{\theta JA}(t) = r(t) * R_{\theta JA}$
 $R_{\theta JA} = 122^{\circ}\text{C/W}$
 Duty Cycle, $D = t_1 / t_2$

Package Outline Dimensions

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

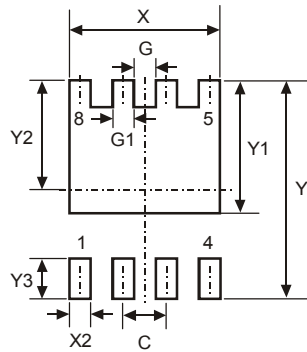


| POWERDI [®] 3333-8 | | | |
|-----------------------------|------|------|-------|
| Dim | Min | Max | Typ |
| D | 3.25 | 3.35 | 3.30 |
| E | 3.25 | 3.35 | 3.30 |
| D2 | 2.22 | 2.32 | 2.27 |
| E2 | 1.56 | 1.66 | 1.61 |
| A | 0.75 | 0.85 | 0.80 |
| A1 | 0 | 0.05 | 0.02 |
| A3 | - | - | 0.203 |
| b | 0.27 | 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 | | | |

NEW PRODUCT

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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