

Product Summary

| BV_{DSS} | $R_{DS(ON)}$ max | I_D max $T_A = +25^\circ C$ |
|------------|--------------------------------|----------------------------------|
| 30V | 13m Ω @ $V_{GS} = 10V$ | 9.5A |
| | 14m Ω @ $V_{GS} = 4.5V$ | 9.0A |

Features and Benefits

- DIOFET utilizes a unique patented process to monolithically integrate a MOSFET and a Schottky in a single die to deliver:
 - Low $R_{DS(ON)}$ – minimize conduction losses
 - Low V_{SD} – reducing the losses due to body diode conduction
 - Low Q_{RR} – lower Q_{RR} of the integrated Schottky reduces body diode switching losses
 - Low gate capacitance (Q_g/Q_{gs}) ratio – reduces risk of shoot-through or cross conduction currents at high frequencies
- 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% R_g 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**
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([DMS3014SFGQ](#))**

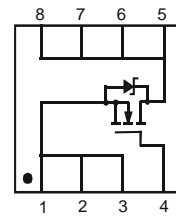
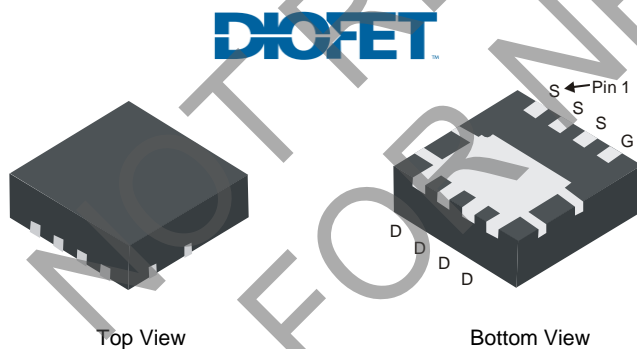
Description and Applications

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.

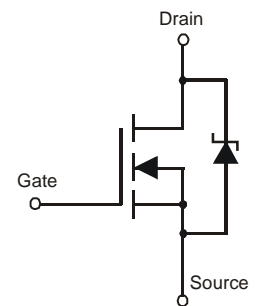
- Backlighting
- Power Management Functions
- DC-DC Converters

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
- Weight: 0.072 grams (Approximate)



Top View
Pin Configuration



Internal Schematic

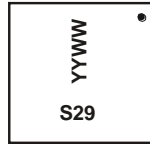
Ordering Information (Note 4)

| Part Number | Case | Packaging |
|---------------|---------------|------------------|
| DMS3014SFG-7 | PowerDI3333-8 | 2000/Tape & Reel |
| DMS3014SFG-13 | PowerDI3333-8 | 3000/Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

PowerDI is a registered trademark of Diodes Incorporated.

Marking Information



S29 = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 18 = 2018)
 WW = Week Code (01 to 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} | ±12 | V |
| Continuous Drain Current (Note 6) V _{GS} = 10V | Steady State | T _A = +25°C T _A = +70°C | I _D | 9.5 7.6 | A |
| | t < 10s | T _A = +25°C T _A = +70°C | I _D | 13.0 9.7 | A |
| Continuous Drain Current (Note 6) V _{GS} = 4.5V | Steady State | T _A = +25°C T _A = +70°C | I _D | 9.0 7.4 | A |
| | t < 10s | T _A = +25°C T _A = +70°C | I _D | 12.2 9.3 | A |
| Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%) | | | I _{DM} | 80 | A |
| Maximum Continuous Body Diode Forward Current (Note 6) | | | I _S | 3.0 | A |
| Avalanche Current (Note 7) L = 0.1mH | | | I _{AR} | 30 | A |
| Repetitive Avalanche Energy (Note 7) L = 0.1mH | | | E _{AR} | 45 | mJ |

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

| Characteristic | | Symbol | Value | Unit |
|--|--------------|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5) | | P _D | 1 | W |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady State | R _{θJA} | 131 | °C/W |
| | t < 10s | | 72 | °C/W |
| Total Power Dissipation (Note 6) | | P _D | 2.1 | W |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady State | R _{θJA} | 63 | °C/W |
| | t < 10s | | 35 | °C/W |
| Thermal Resistance, Junction to Case (Note 6) | | R _{θJC} | 7.1 | °C/W |
| Operating and Storage Temperature Range | | T _J , T _{STG} | -55 to +150 | °C |

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 7. I_{AR} and E_{AR} ratings are based on low frequency and duty cycles to keep T_J = +25°C.

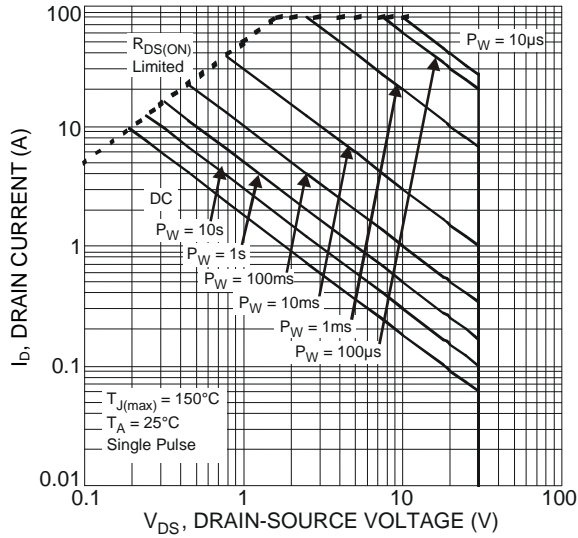


Fig. 1 SOA, Safe Operation Area

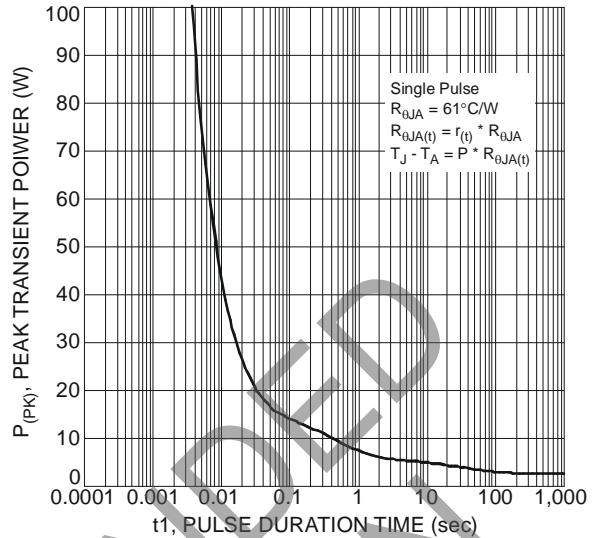


Fig. 2 Single Pulse Maximum Power Dissipation

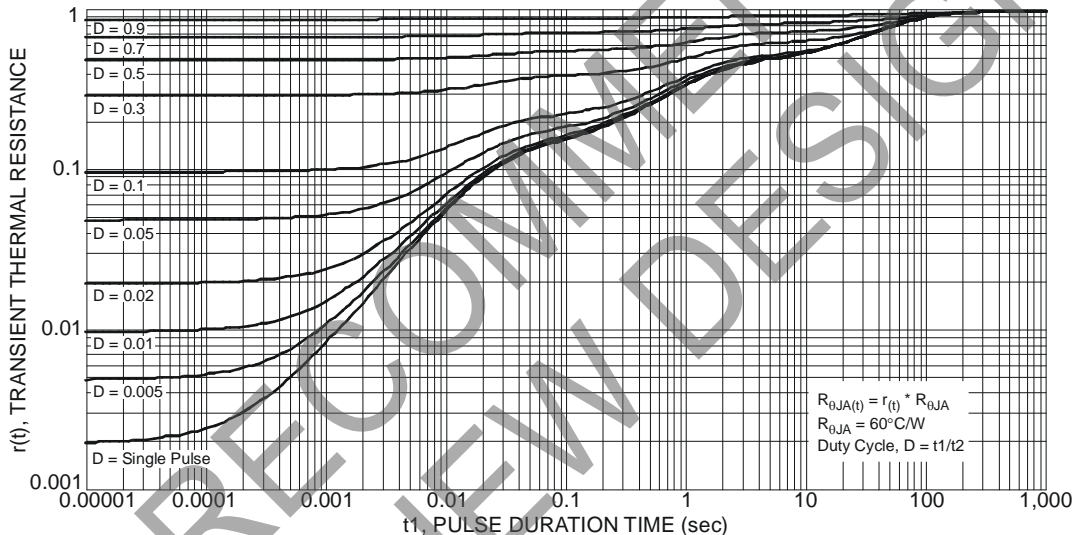


Fig. 3 Transient Thermal Resistance

NOT RECOMMENDED FOR NEW DESIGN

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} | — | — | 100 | μA | V _{DS} = 30V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±12V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 8) | | | | | | |
| Gate Threshold Voltage | V _{GS(TH)} | 1.0 | — | 2.2 | V | V _{DS} = V _{GS} , I _D = 250μA |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | 9 | 13 | mΩ | V _{GS} = 10V, I _D = 10.4A |
| | | — | 10 | 14 | | V _{GS} = 4.5V, I _D = 10.4A |
| Forward Transfer Admittance | Y _{fs} | — | 23 | — | S | V _{DS} = 5V, I _D = 10.4A |
| Diode Forward Voltage | V _{SD} | — | 0.4 | 0.55 | V | V _{GS} = 0V, I _S = 1A |
| DYNAMIC CHARACTERISTICS (Note 9) | | | | | | |
| Input Capacitance | C _{iss} | — | 2296 | 4310 | pF | V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 164 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 120 | — | pF | |
| Gate Resistance | R _g | 0.26 | 1.3 | 2.34 | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1MHz |
| Total Gate Charge V _{GS} = 4.5V | Q _g | — | 19.3 | — | nC | V _{DS} = 15V, V _{GS} = 10V, I _D = 10.4A |
| Total Gate Charge V _{GS} = 10V | Q _g | — | 45.7 | — | nC | |
| Gate-Source Charge | Q _{gs} | — | 5.0 | — | nC | |
| Gate-Drain Charge | Q _{gd} | — | 2.9 | — | nC | |
| Turn-On Delay Time | t _{D(ON)} | — | 5.5 | — | ns | |
| Turn-On Rise Time | t _r | — | 24.4 | — | ns | V _{GS} = 10V, V _{DS} = 15V, R _G = 3Ω, R _L = 1.2Ω |
| Turn-Off Delay Time | t _{D(OFF)} | — | 33.1 | — | ns | |
| Turn-Off Fall Time | t _f | — | 6.6 | — | ns | |
| Reverse Recovery Time | t _{RR} | — | 12.9 | — | ns | I _F = 13A, di/dt = 500A/μs |
| Reverse Recovery Charge | Q _{RR} | — | 8.0 | — | nC | I _F = 13A, di/dt = 500A/μs |

Notes: 8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

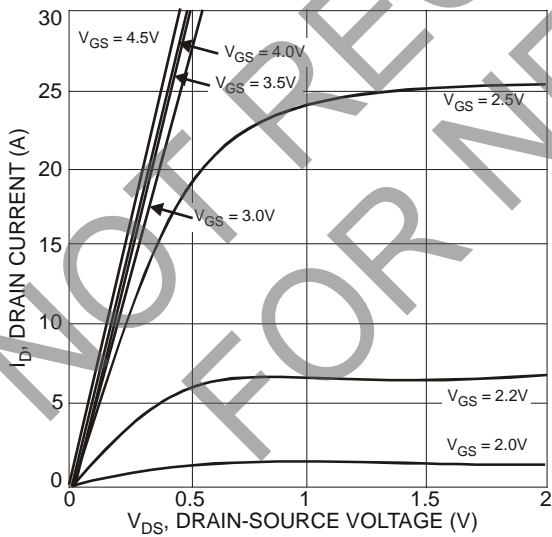


Fig. 4 Typical Output Characteristic

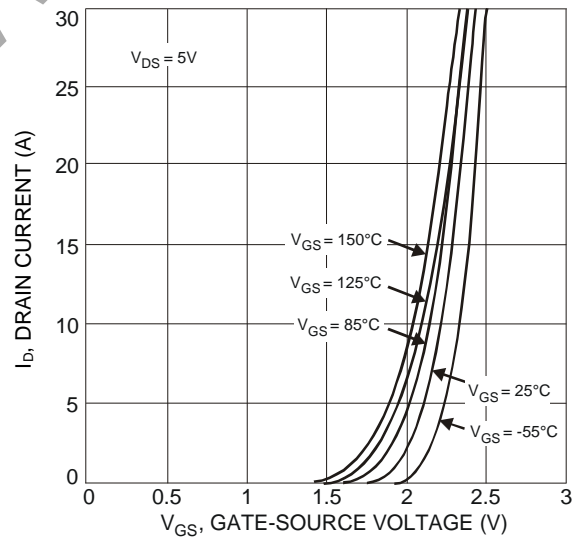
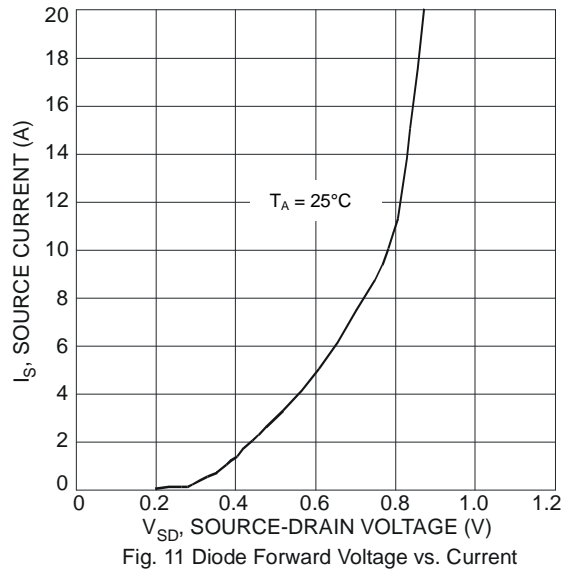
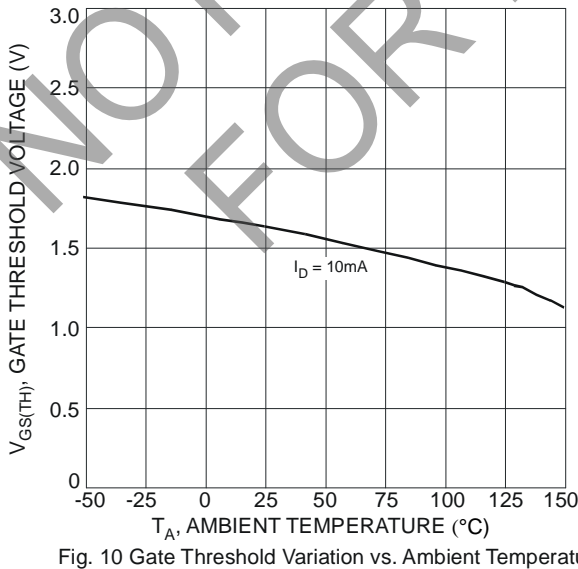
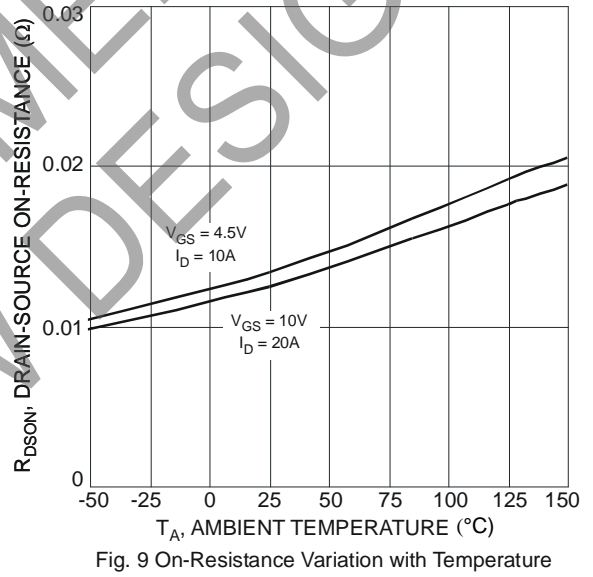
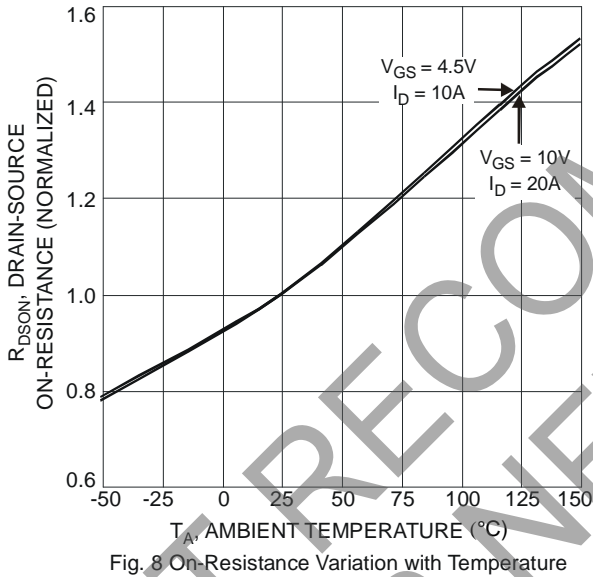
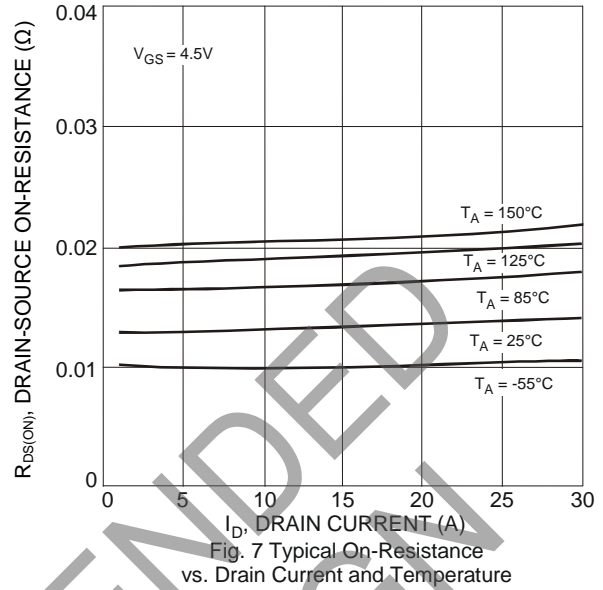
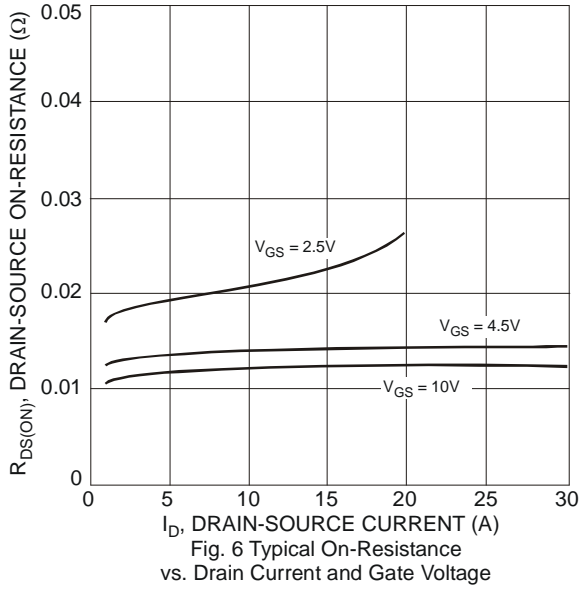


Fig. 5 Typical Transfer Characteristic



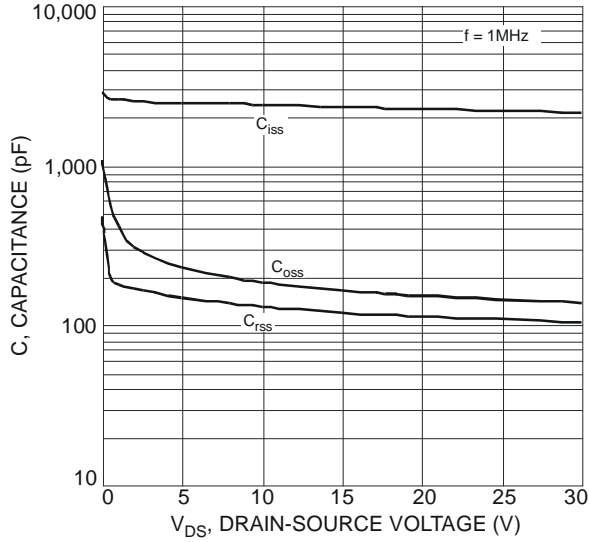


Fig. 12 Typical Total Capacitance

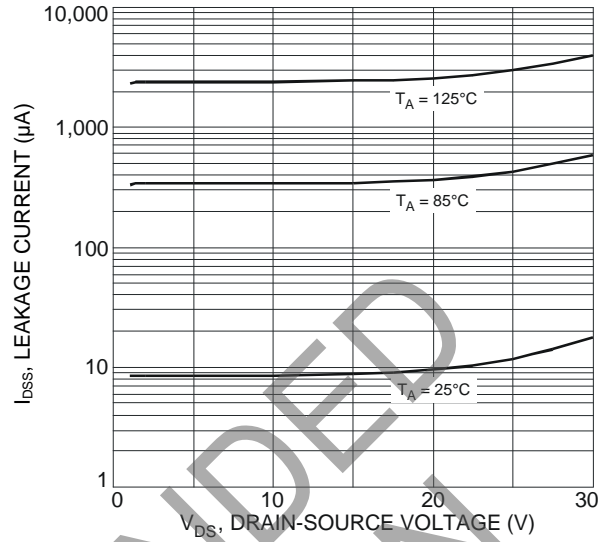


Fig. 13 Typical Leakage Current vs. Drain-Source Voltage

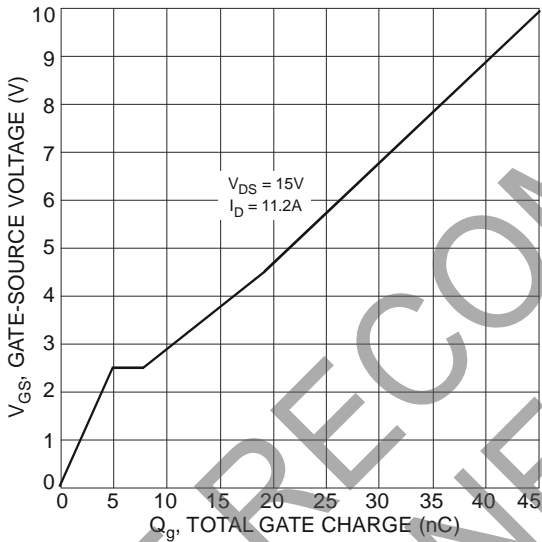


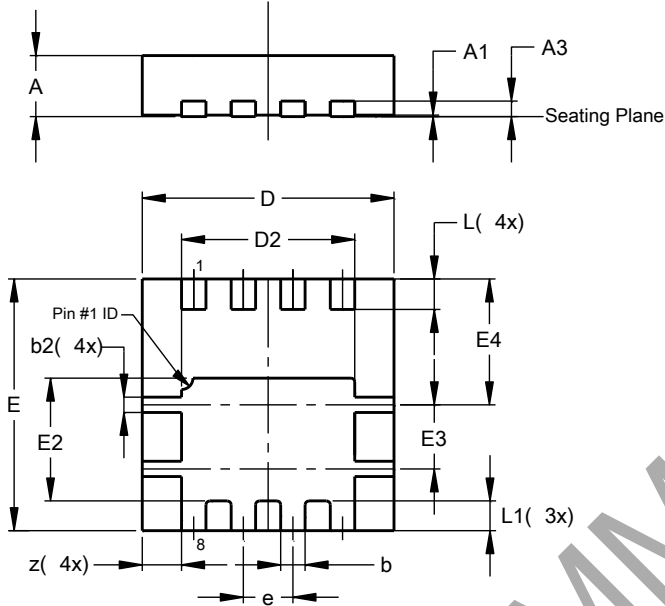
Fig. 14 Gate-Source Voltage vs. Total Gate Charge

NOT RECOMMENDED FOR NEW DESIGN

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

PowerDI3333-8

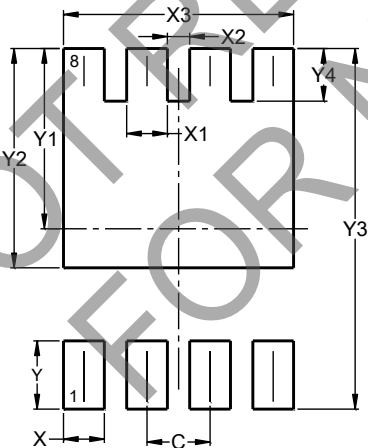


| PowerDI3333-8 | | | |
|----------------------|------|------|-------|
| Dim | Min | Max | Typ |
| A | 0.75 | 0.85 | 0.80 |
| A1 | 0.00 | 0.05 | 0.02 |
| A3 | - | - | 0.203 |
| b | 0.27 | 0.37 | 0.32 |
| b2 | 0.15 | 0.25 | 0.20 |
| D | 3.25 | 3.35 | 3.30 |
| D2 | 2.22 | 2.32 | 2.27 |
| E | 3.25 | 3.35 | 3.30 |
| E2 | 1.56 | 1.66 | 1.61 |
| E3 | 0.79 | 0.89 | 0.84 |
| E4 | 1.60 | 1.70 | 1.65 |
| e | - | - | 0.65 |
| L | 0.35 | 0.45 | 0.40 |
| L1 | - | - | 0.39 |
| z | - | - | 0.515 |
| All Dimensions in mm | | | |

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

PowerDI3333-8



| 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 |
| Y4 | 0.540 |

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