

Product Summary

| BV _{DSS} | R _{DS(ON)} MAX | I _D MAX T _C = +25°C |
|-------------------|-------------------------------|--|
| 80V | 25mΩ @ V _{GS} = 10V | 27A |
| | 41mΩ @ V _{GS} = 4.5V | 21A |

Description

This MOSFET is designed to minimize the on-state resistance (R_{DS(ON)}) yet maintain superior switching performance, making it ideal for high-efficiency power-management applications.

Applications

- Backlighting
- Power-management functions
- DC-DC converters

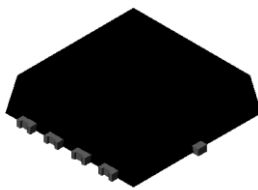
Features and Benefits

- 100% Unclamped Inductive Switching (UIS) Test in Production – Ensures More Reliable and Robust End Application
- Small Form Factor, Thermally Efficient Package Enables Higher Density End Products
- Wettable Flank for Improved Optical Inspection
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **An automotive-compliant part is available under separate datasheet ([DMTH8028LFVWQ](#))**

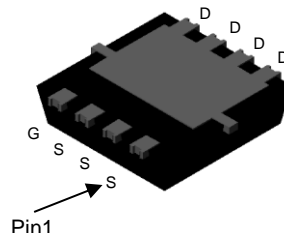
Mechanical Data

- Package: PowerDI[®]3333-8
- Package 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 ^(e3)
- Weight: 0.03 grams (Approximate)

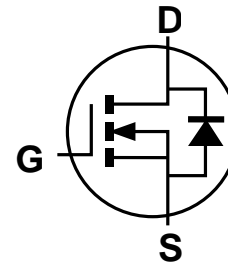
PowerDI3333-8/SWP (Type UX)



Top View



Bottom View



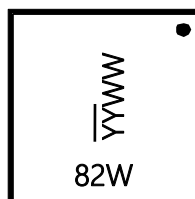
Equivalent Circuit

Ordering Information (Note 4)

| Part Number | Package | Packing | |
|-----------------|-----------------------------|---------|---------------|
| | | Qty. | Carrier |
| DMTH8028LFVW-7 | PowerDI3333-8/SWP (Type UX) | 2,000 | Tape and Reel |
| DMTH8028LFVW-13 | PowerDI3333-8/SWP (Type UX) | 3,000 | Tape and 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/>.

Marking Information



82W = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 23 = 2023)
 WW = Week Code (01 to 53)

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

| Characteristic | Symbol | Value | Unit |
|---|------------------|-------------------------|------|
| Drain-Source Voltage | V _{DSS} | 80 | V |
| Gate-Source Voltage | V _{GSS} | ±20 | V |
| Continuous Drain Current (Note 7) V _{GS} = 10V | I _D | T _C = +25°C | 27 |
| | | T _C = +100°C | 19 |
| Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%) | I _{DM} | 108 | A |
| Maximum Continuous Body Diode Forward Current (Note 7) | I _S | 27 | A |
| Pulsed Body Diode Forward Current | I _{SM} | 108 | A |
| Avalanche Current, L = 0.3mH (Note 8) | I _{AS} | 12.5 | A |
| Avalanche Energy, L = 0.3mH (Note 8) | E _{AS} | 23.4 | mJ |

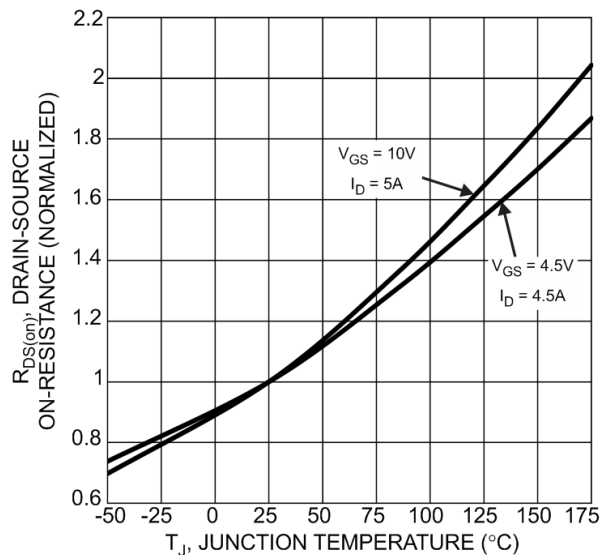
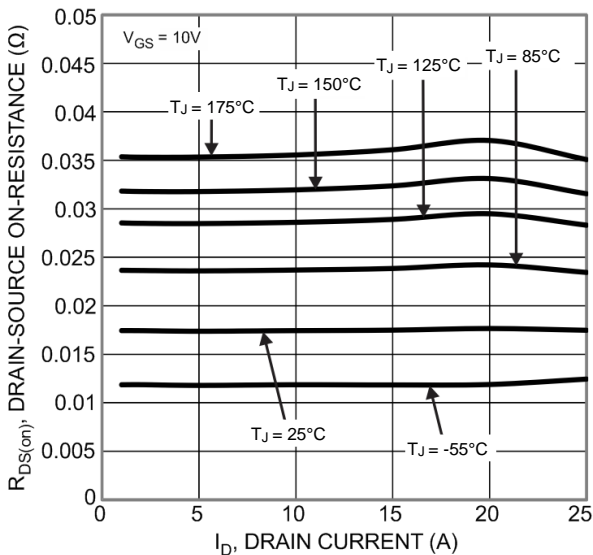
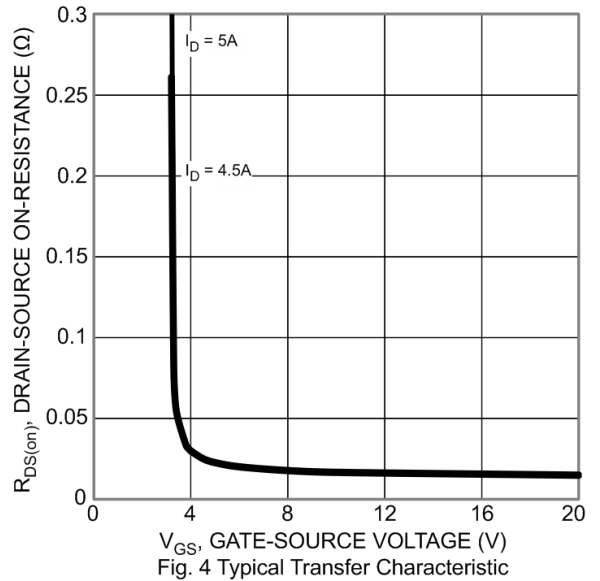
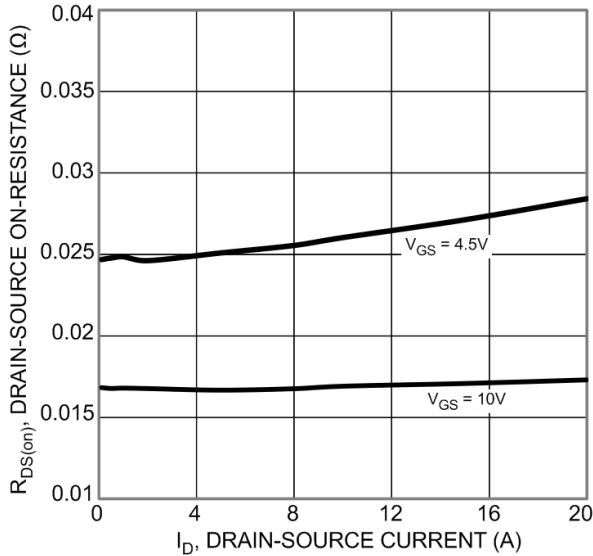
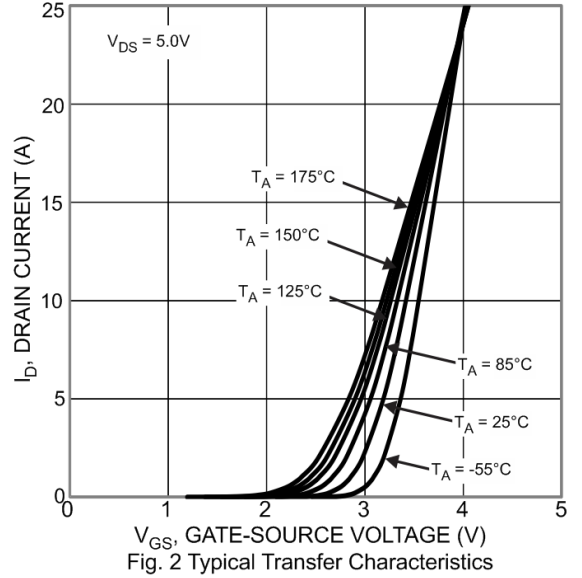
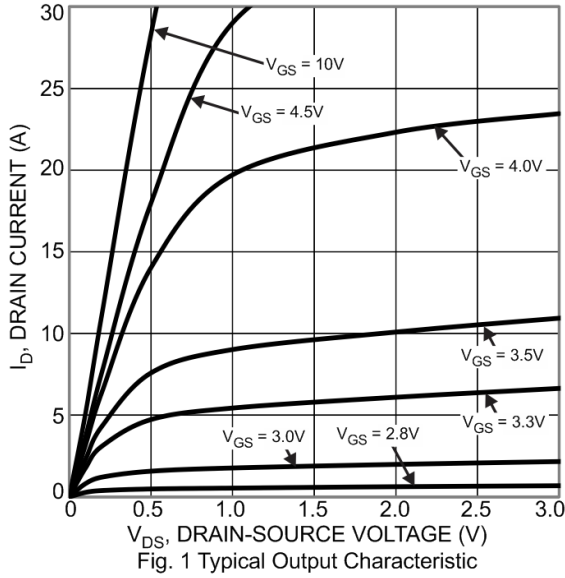
Thermal Characteristics (@ T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5) | P _D | 1.5 | W |
| Thermal Resistance, Junction to Ambient (Note 5) | R _{θJA} | 98 | °C/W |
| Total Power Dissipation (Note 6) | P _D | 3.5 | W |
| Thermal Resistance, Junction to Ambient (Note 6) | R _{θJA} | 42 | °C/W |
| Thermal Resistance, Junction to Case (Note 7) | R _{θJC} | 4.0 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +175 | °C |

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

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------------|-----|------|------|------|---|
| OFF CHARACTERISTICS (Note 9) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 80 | — | — | V | V _{GS} = 0V, I _D = 1mA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | 1 | µA | V _{DS} = 64V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±20V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 9) | | | | | | |
| Gate Threshold Voltage | V _{GS(TH)} | 1.3 | — | 2.5 | V | V _{DS} = V _{GS} , I _D = 250µA |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | 17 | 25 | mΩ | V _{GS} = 10V, I _D = 5A |
| | | — | 26 | 41 | | V _{GS} = 4.5V, I _D = 4.5A |
| Diode Forward Voltage | V _{SD} | — | 0.8 | 1.2 | V | V _{GS} = 0V, I _S = 5A |
| DYNAMIC CHARACTERISTICS (Note 10) | | | | | | |
| Input Capacitance | C _{iss} | — | 631 | — | pF | V _{DS} = 40V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 200 | — | | |
| Reverse Transfer Capacitance | C _{rss} | — | 19.5 | — | | |
| 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 | — | 5.4 | — | nC | V _{DS} = 40V, I _D = 7.5A |
| Total Gate Charge (V _{GS} = 10V) | Q _g | — | 10.4 | — | | |
| Gate-Source Charge | Q _{gs} | — | 1.8 | — | | |
| Gate-Drain Charge | Q _{gd} | — | 2.4 | — | | |
| Turn-On Delay Time | t _{D(ON)} | — | 7.1 | — | ns | V _{DD} = 40V, V _{GS} = 4.5V, R _G = 2.7Ω, I _D = 10A |
| Turn-On Rise Time | t _r | — | 9.7 | — | | |
| Turn-Off Delay Time | t _{D(OFF)} | — | 18.6 | — | | |
| Turn-Off Fall Time | t _f | — | 8.6 | — | | |
| Body Diode Reverse Recovery Time | t _{RR} | — | 28.5 | — | ns | I _F = 7.5A, di/dt = 100A/µs |
| Body Diode Reverse Recovery Charge | Q _{RR} | — | 21.7 | — | nC | |

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1-inch square copper plate.
 - Thermal resistance from junction to soldering point (on the exposed drain pad).
 - I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.



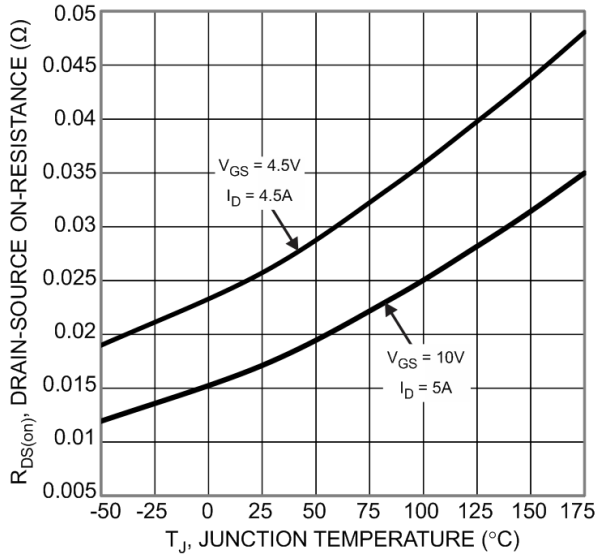


Fig. 7 On-Resistance Variation with Junction Temperature

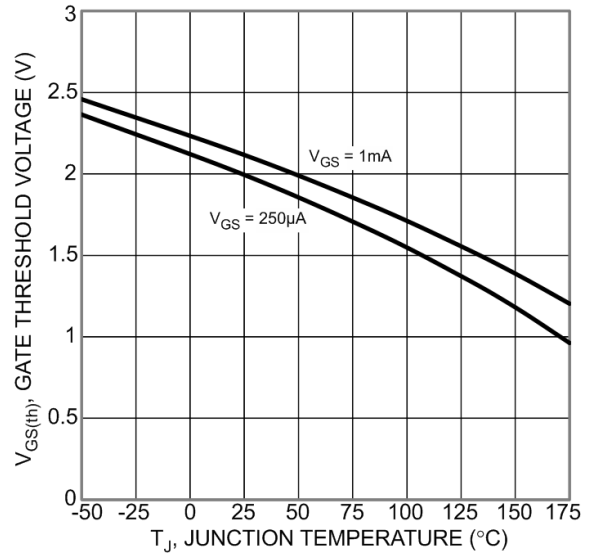


Fig. 8 Gate Threshold Variation vs Junction Temperature

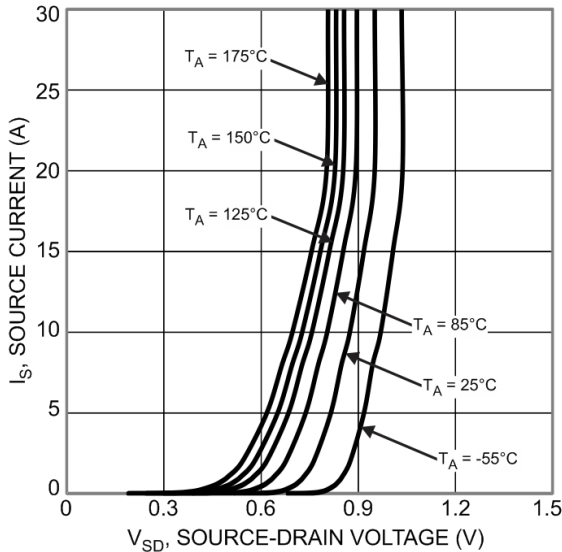


Fig. 9 Diode Forward Voltage vs Current

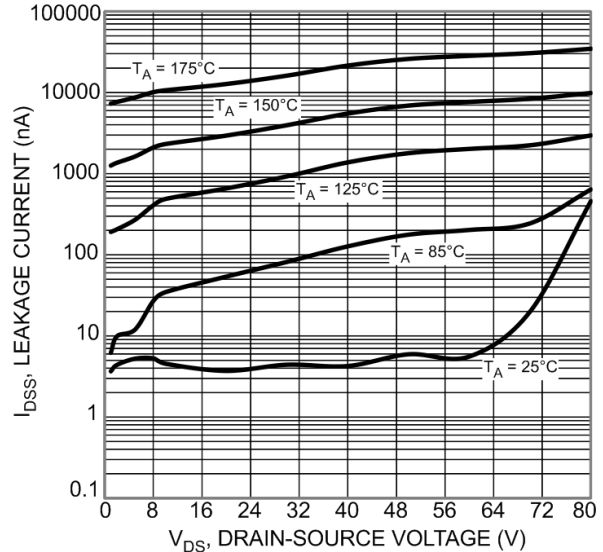


Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

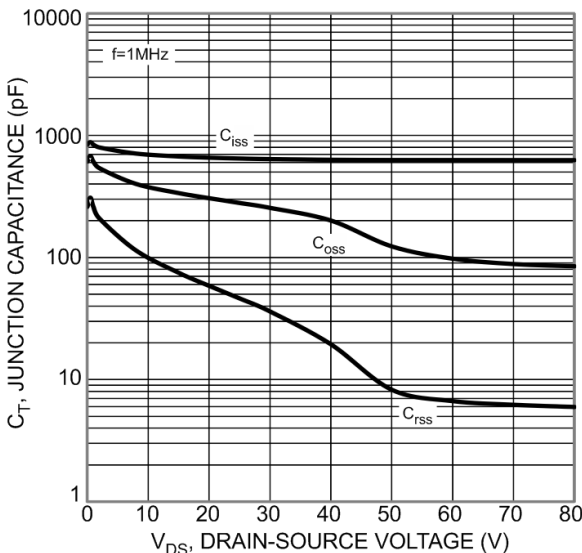


Fig. 11 Typical Junction Capacitance

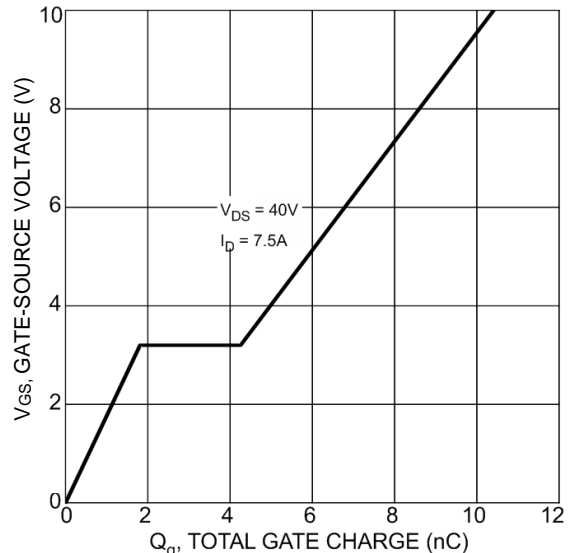
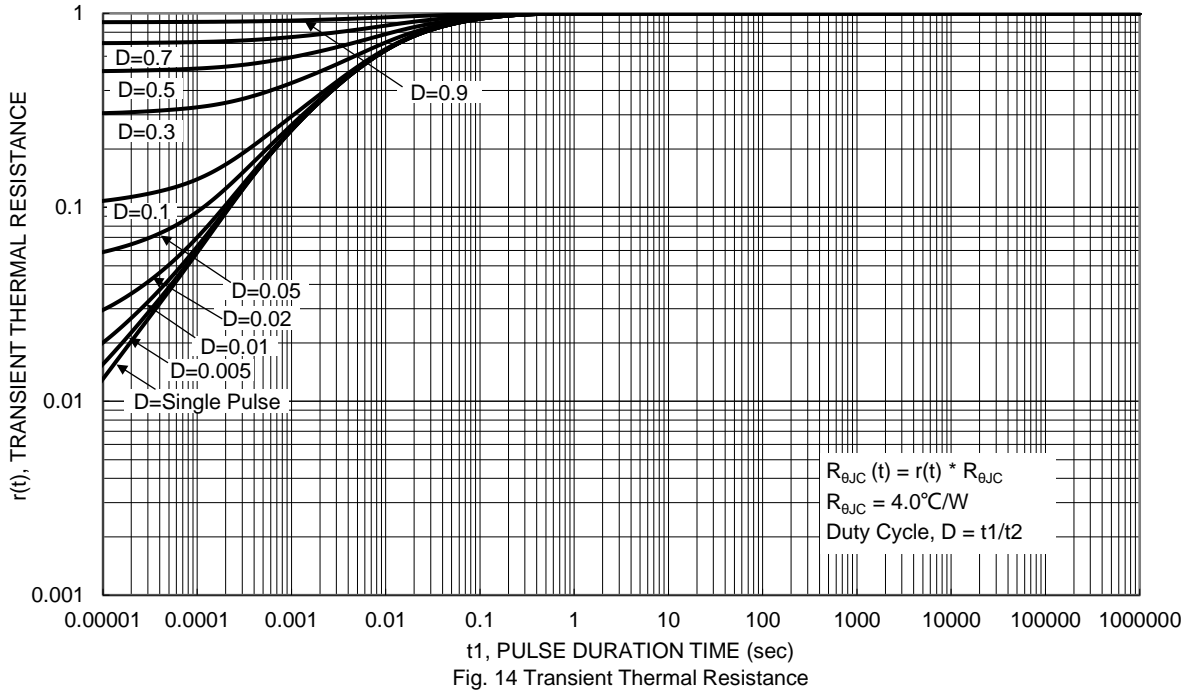
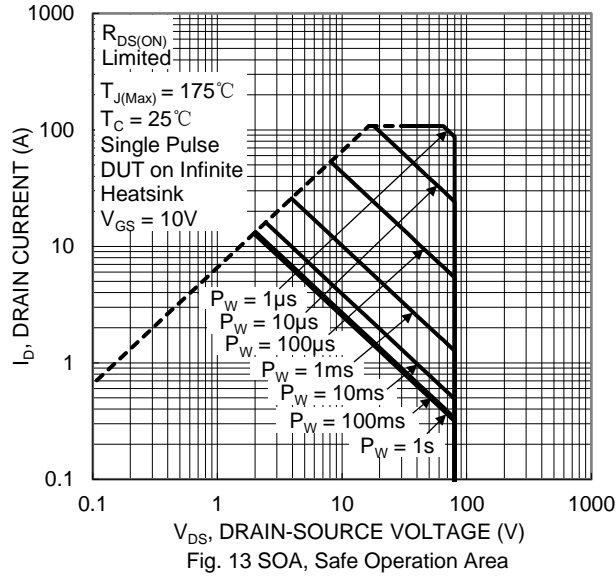


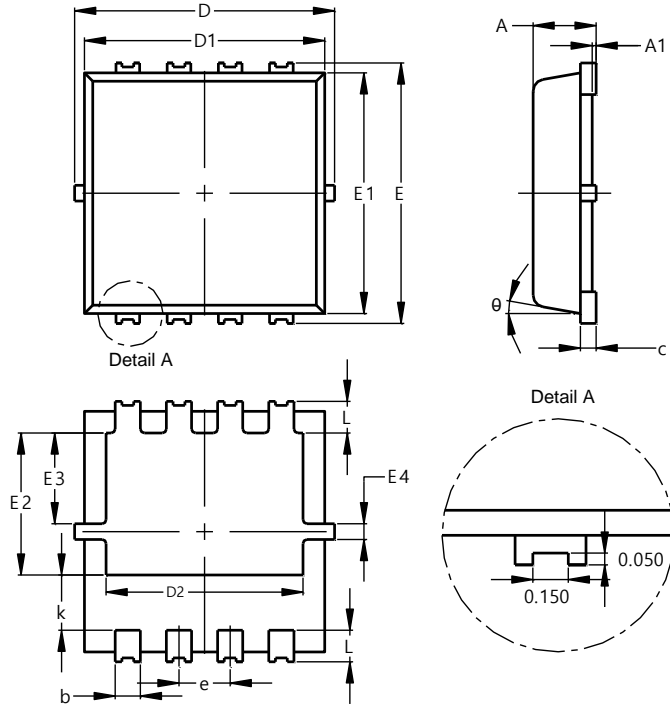
Fig. 12 Gate Charge



Package Outline Dimensions

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

PowerDI3333-8/SWP (Type UX)

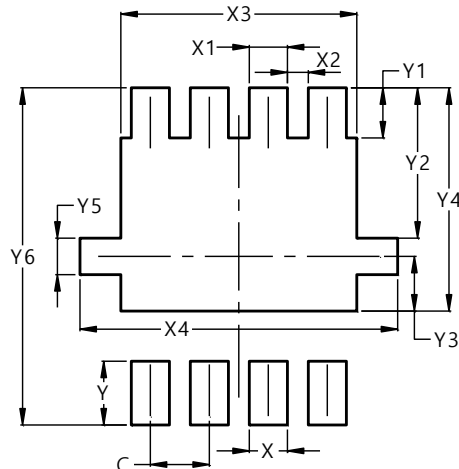


| PowerDI3333-8/SWP (Type UX) | | | |
|--------------------------------|------|------|------|
| Dim | Min | Max | Typ |
| A | 0.75 | 0.85 | 0.80 |
| A1 | 0.00 | 0.05 | -- |
| b | 0.25 | 0.40 | 0.32 |
| c | 0.10 | 0.25 | 0.15 |
| D | 3.20 | 3.40 | 3.30 |
| D1 | 2.95 | 3.15 | 3.05 |
| D2 | 2.30 | 2.70 | 2.50 |
| E | 3.20 | 3.40 | 3.30 |
| E1 | 2.95 | 3.15 | 3.05 |
| E2 | 1.60 | 2.00 | 1.80 |
| E3 | 0.95 | 1.35 | 1.15 |
| E4 | 0.10 | 0.30 | 0.20 |
| e | -- | -- | 0.65 |
| k | 0.50 | 0.90 | 0.70 |
| L | 0.30 | 0.50 | 0.40 |
| θ | 0° | 12° | 10° |
| All Dimensions in mm | | | |

Suggested Pad Layout

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

PowerDI3333-8/SWP (Type UX)



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 0.650 |
| X | 0.420 |
| X1 | 0.420 |
| X2 | 0.230 |
| X3 | 2.600 |
| X4 | 3.500 |
| Y | 0.700 |
| Y1 | 0.550 |
| Y2 | 1.650 |
| Y3 | 0.600 |
| Y4 | 2.450 |
| Y5 | 0.400 |
| Y6 | 3.700 |

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