



**THE DATASHEET OF
DMTH3004LFG-13**



Product Summary

| BV _{DSS} | R _{DS(ON)} Max | I _D Max T _C = +25°C |
|-------------------|--------------------------------|--|
| 30V | 5.5mΩ @ V _{GS} = 10V | 75A |
| | 8.5mΩ @ V _{GS} = 4.5V | 50A |

Features and Benefits

- Low R_{DS(ON)} — Ensures On-State Losses are Minimized
- Excellent Q_{gd} × R_{DS(ON)} Product (FOM)
- 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
- **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 ([DMTH3004LFGQ](#))**

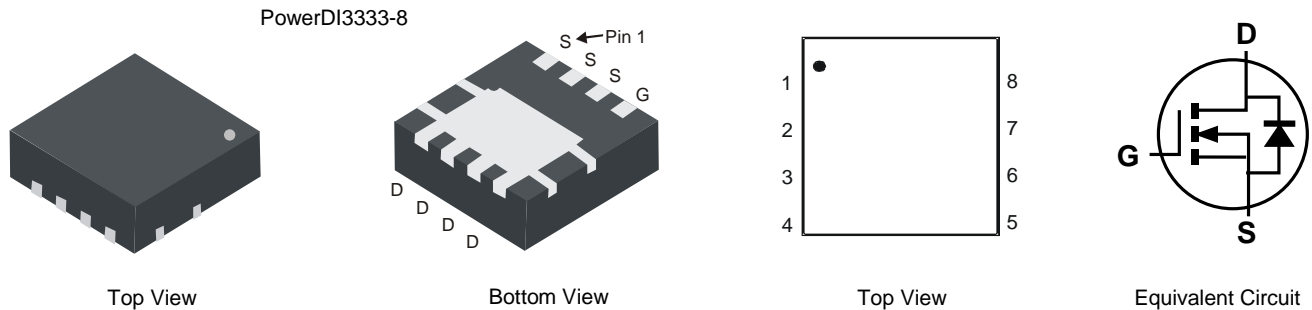
Description and Applications

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.

- Engine Management Systems
- Body Control Electronics
- 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 3 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208e③
- Weight: 0.072 grams (Approximate)

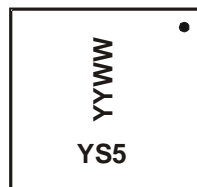


Ordering Information (Note 4)

| Part Number | Case | Packaging |
|----------------|---------------|-------------------|
| DMTH3004LFG-7 | PowerDI3333-8 | 2,000/Tape & Reel |
| DMTH3004LFG-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) & 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



- YS5 = 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} | ±16 | V |
| Continuous Drain Current (Notes 6 & 9) V _{GS} = 10V | I _D | T _C = +25°C | 75 |
| | | T _C = +100°C | 52 |
| Continuous Drain Current (Note 5) V _{GS} = 10V | I _D | T _A = +25°C | 15 |
| | | T _A = +100°C | 10 |
| Maximum Continuous Body Diode Forward Current (Note 5) | I _S | 3 | A |
| Pulsed Drain Current (100µs Pulse, Duty Cycle = 1%) | I _{DM} | 250 | A |
| Pulsed Body Diode Forward Current (100µs Pulse, Duty Cycle = 1%) | I _{SM} | 250 | A |
| Avalanche Current, L = 0.3mH | I _{AS} | 27 | A |
| Avalanche Energy, L = 0.3mH | E _{AS} | 110 | mJ |

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

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 6) | P _D | 50 | W |
| Thermal Resistance, Junction to Case (Note 6) | R _{θJC} | 3 | °C/W |
| Total Power Dissipation (Note 5) | P _D | 2.5 | W |
| Thermal Resistance, Junction to Ambient (Note 5) | R _{θJA} | 60 | °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 7) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 30 | — | — | V | V _{GS} = 0V, I _D = 250µA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | 1 | µA | V _{DS} = 24V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±16V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | V _{GS(TH)} | 1 | — | 3 | V | V _{DS} = V _{GS} , I _D = 250µA |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | 4.1 | 5.5 | mΩ | V _{GS} = 10V, I _D = 20A |
| | | — | 6.2 | 8.5 | | V _{GS} = 4.5V, I _D = 7A |
| Diode Forward Voltage | V _{SD} | — | 0.7 | 1 | V | V _{GS} = 0V, I _S = 1A |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C _{iss} | — | 2370 | — | pF | V _{DS} = 15V, V _{GS} = 0V, f = 1MHz |
| Output Capacitance | C _{oss} | — | 1360 | — | | |
| Reverse Transfer Capacitance | C _{rss} | — | 240 | — | | |
| Gate Resistance | R _g | — | 0.6 | — | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1MHz |
| Total Gate Charge (V _{GS} = 4.5V) | Q _g | — | 20 | — | nC | V _{DS} = 15V, I _D = 20A |
| Total Gate Charge (V _{GS} = 10V) | Q _g | — | 44 | — | | |
| Gate-Source Charge | Q _{gs} | — | 7 | — | | |
| Gate-Drain Charge | Q _{gd} | — | 8 | — | | |
| Turn-On Delay Time | t _{D(ON)} | — | 6.2 | — | ns | V _{DD} = 15V, V _{GS} = 10V, R _L = 0.75Ω, R _g = 3Ω, I _D = 20A |
| Turn-On Rise Time | t _R | — | 4.3 | — | | |
| Turn-Off Delay Time | t _{D(OFF)} | — | 21 | — | | |
| Turn-Off Fall Time | t _F | — | 8 | — | | |
| Body Diode Reverse Recovery Time | t _{RR} | — | 25 | — | ns | I _F = 15A, di/dt = 500A/µs |
| Body Diode Reverse Recovery Charge | Q _{RR} | — | 37 | — | nC | |

- 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.
 - Thermal resistance from junction to soldering point (on the exposed drain pad).
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.
 - Package limited.

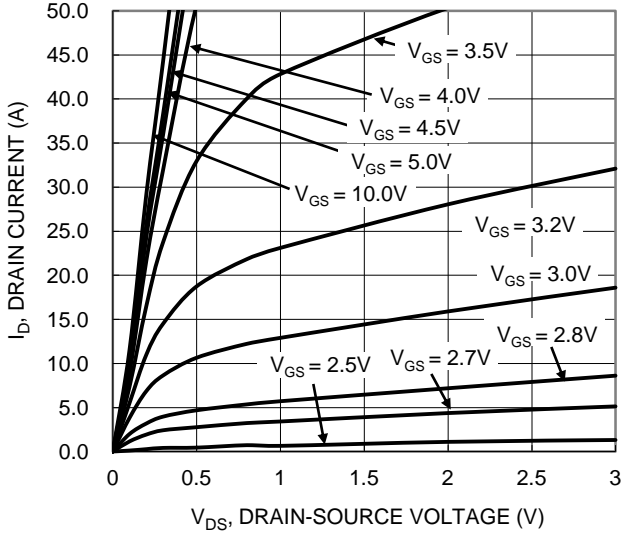


Figure 1. Typical Output Characteristic

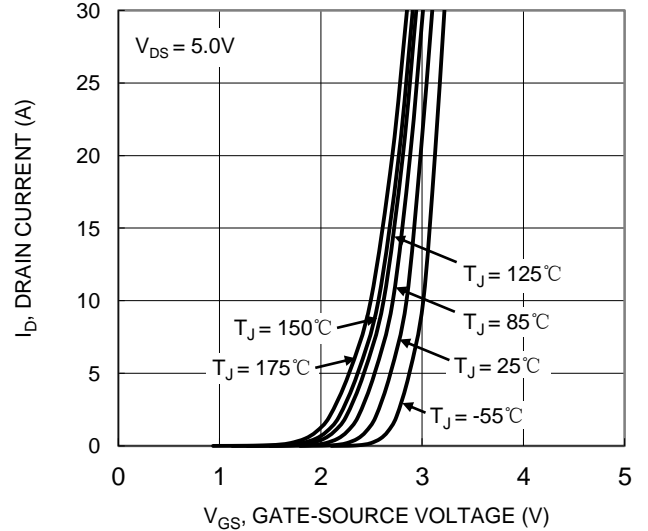


Figure 2. Typical Transfer Characteristic

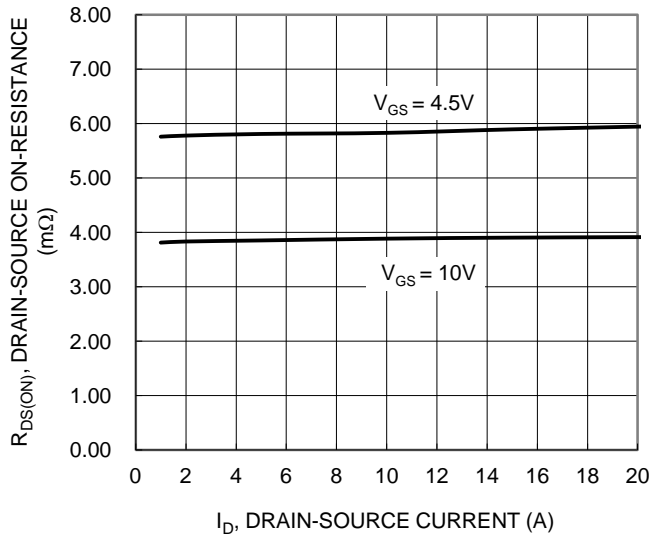


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

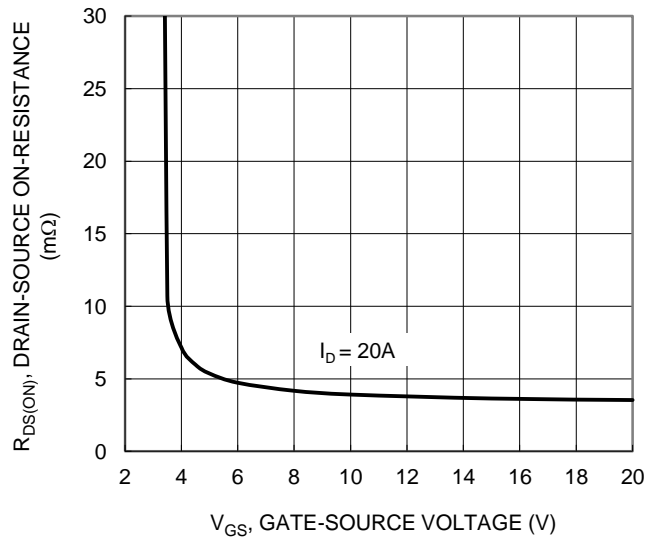


Figure 4. Typical Transfer Characteristic

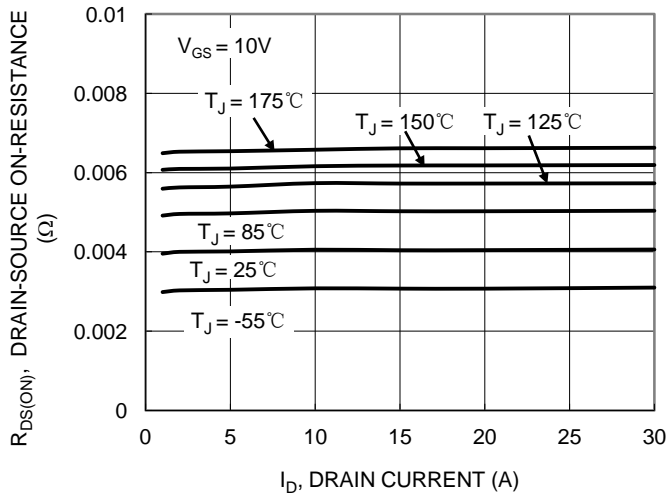


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

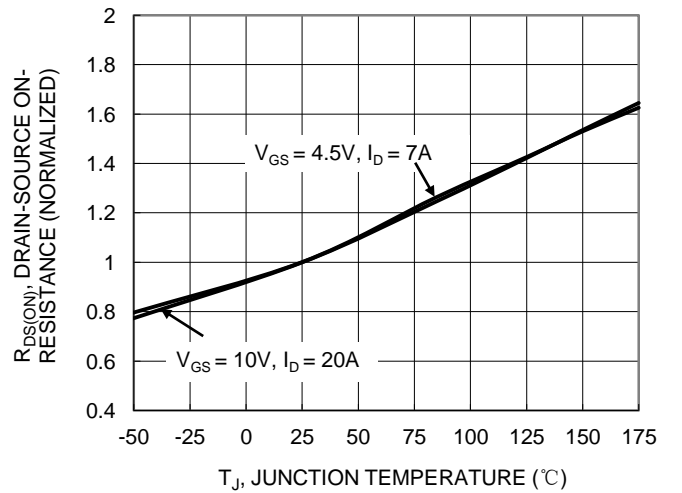


Figure 6. On-Resistance Variation with Temperature

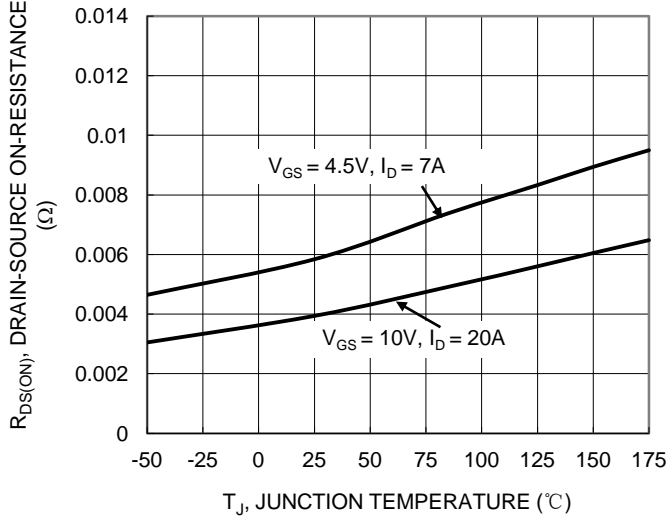


Figure 7. On-Resistance Variation with Temperature

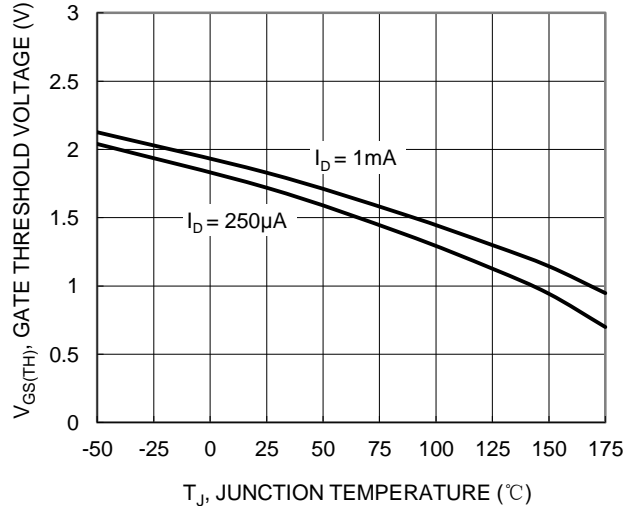


Figure 8. Gate Threshold Variation vs. Junction Temperature

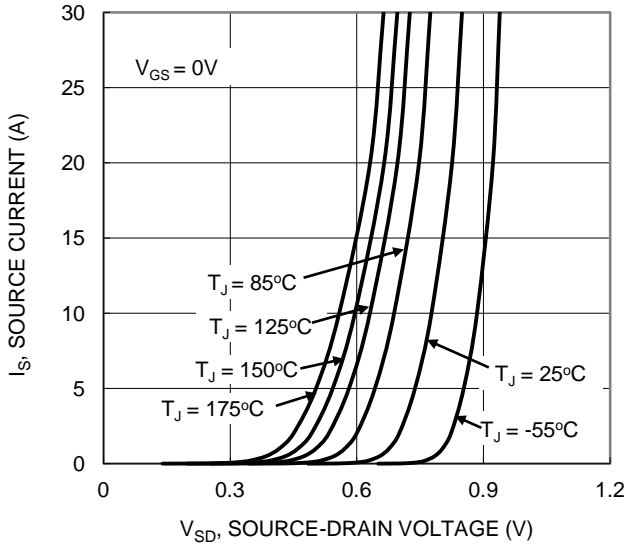


Figure 9. Diode Forward Voltage vs. Current

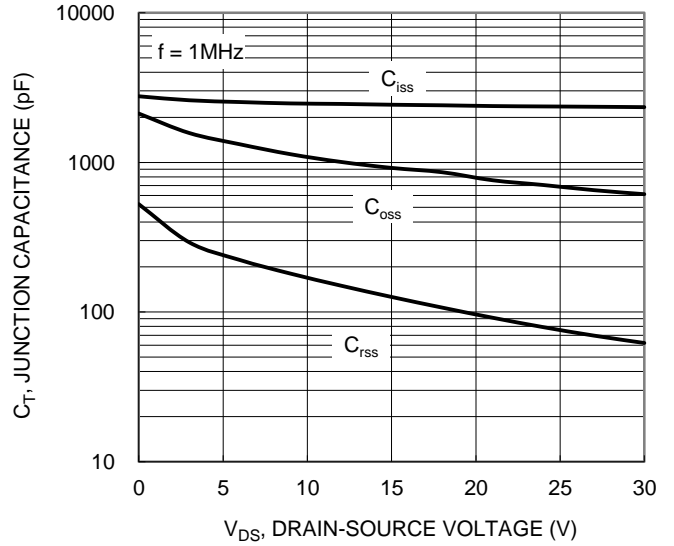


Figure 10. Typical Junction Capacitance

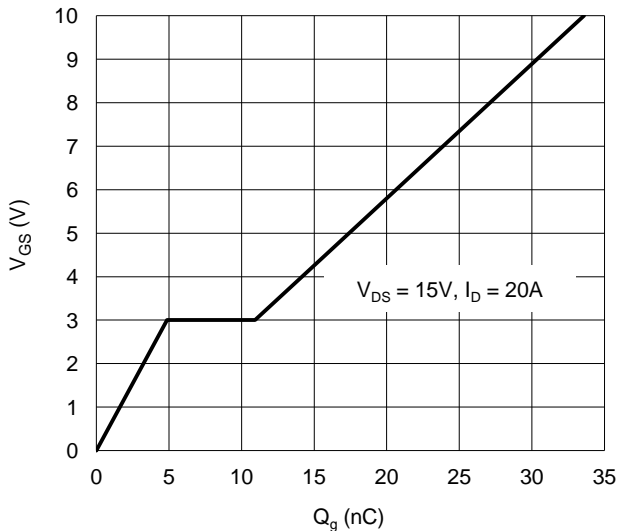


Figure 11. Gate Charge

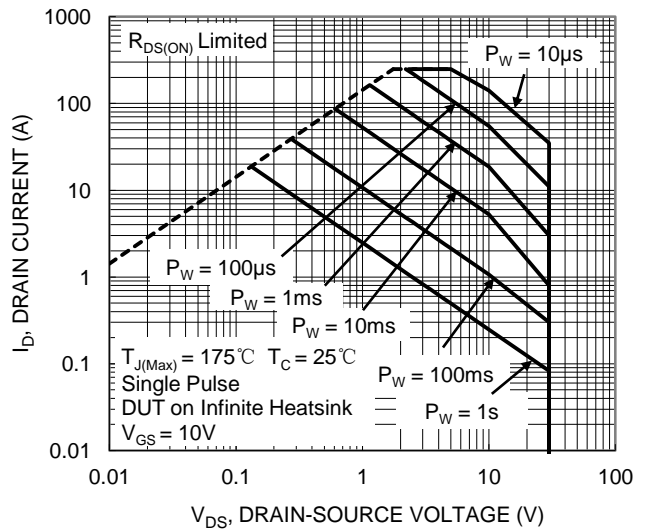


Figure 12. SOA, Safe Operation Area

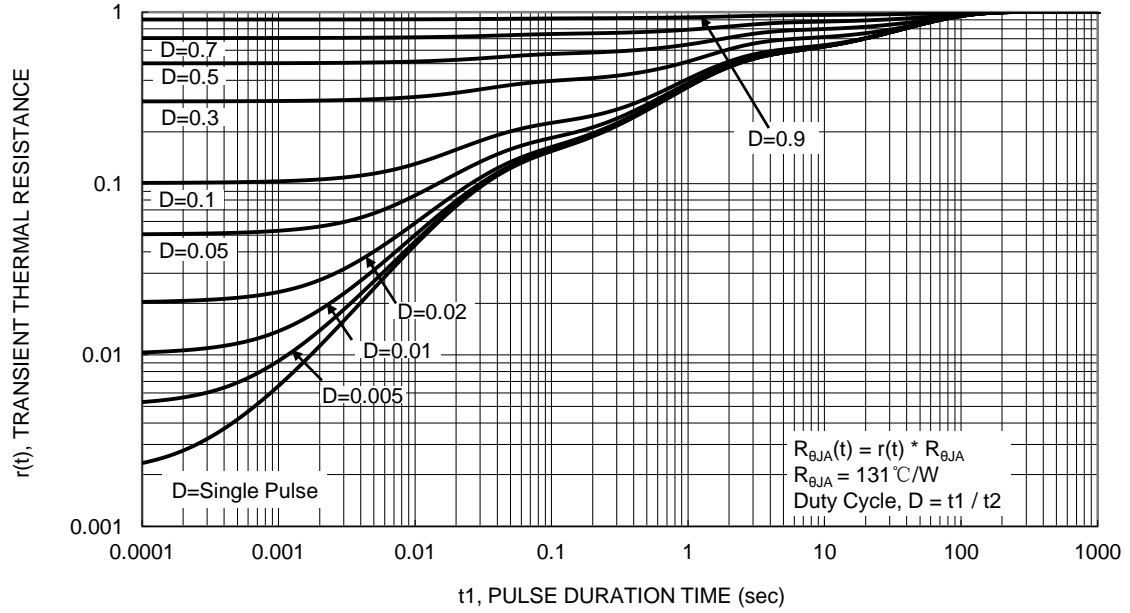
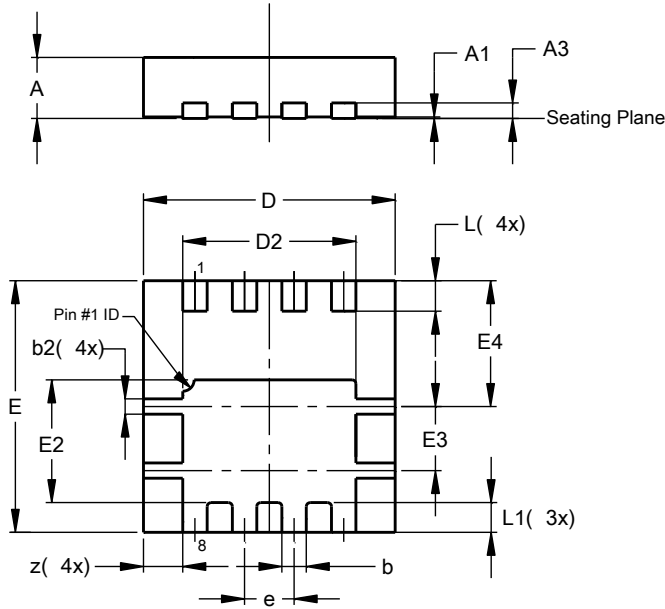


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI3333-8

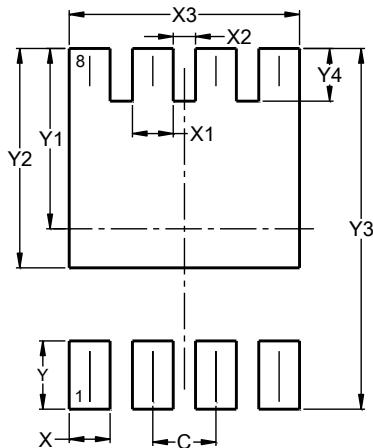


| PowerDI3333-8 | | | |
|----------------------|------|------|-------|
| Dim | Min | Max | Typ |
| A | 0.75 | 0.85 | 0.80 |
| A1 | 0.00 | 0.05 | 0.02 |
| A3 | - | - | 0.203 |
| b | 0.27 | 0.37 | 0.32 |
| b2 | 0.15 | 0.25 | 0.20 |
| D | 3.25 | 3.35 | 3.30 |
| D2 | 2.22 | 2.32 | 2.27 |
| E | 3.25 | 3.35 | 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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