

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|---|-----------|---------------------------------|------|
| Drain-Source Voltage | V_{DSS} | 30 | V |
| Gate-Source Voltage | V_{GSS} | ± 20 | V |
| Continuous Drain Current, $V_{GS} = 10\text{V}$ (Note 6) | I_D | $T_A = +25^\circ\text{C}$ 16 | A |
| | | $T_A = +70^\circ\text{C}$ 13 | |
| | I_D | $T_C = +25^\circ\text{C}$ 45 | A |
| | | $T_C = +70^\circ\text{C}$ 35 | |
| Pulsed Drain Current (380 μs Pulse, Duty Cycle = 1%) | I_{DM} | 80 | A |
| Maximum Continuous Body Diode Forward Current (Note 6) | I_S | 20 | A |
| Avalanche Current, $L = 0.1\text{mH}$ | I_{AS} | 33 | A |
| Avalanche Energy, $L = 0.1\text{mH}$ | E_{AS} | 55 | mJ |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|-----------------|----------------------------------|--------------------|
| Total Power Dissipation (Note 5) | P_D | $T_A = +25^\circ\text{C}$ 0.9 | W |
| | | $T_A = +70^\circ\text{C}$ 0.6 | |
| Thermal Resistance, Junction to Ambient (Note 5) | $R_{\theta JA}$ | 137 | $^\circ\text{C/W}$ |
| Total Power Dissipation (Note 6) | P_D | $T_A = +25^\circ\text{C}$ 2.1 | W |
| | | $T_A = +70^\circ\text{C}$ 1.4 | |
| Thermal Resistance, Junction to Ambient (Note 6) Steady State | $R_{\theta JA}$ | 59 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Case (Note 6) | $R_{\theta JC}$ | 7.8 | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|--------------|-----|-------|-----------|---------------|---|
| OFF CHARACTERISTICS (Note 7) | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | 30 | — | — | V | $V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$ |
| Zero Gate Voltage Drain Current | I_{DSS} | — | — | 1 | μA | $V_{DS} = 24\text{V}, V_{GS} = 0\text{V}$ |
| Gate-Source Leakage | I_{GSS} | — | — | ± 100 | nA | $V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$ |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | 1 | 1.4 | 2.5 | V | $V_{DS} = V_{GS}, I_D = 250\mu\text{A}$ |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | — | 4.0 | 5.5 | m Ω | $V_{GS} = 10\text{V}, I_D = 20\text{A}$ |
| | | — | 4.9 | 9 | | $V_{GS} = 4.5\text{V}, I_D = 16\text{A}$ |
| Diode Forward Voltage | V_{SD} | — | 0.68 | 1 | V | $V_{GS} = 0\text{V}, I_S = 1\text{A}$ |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C_{iss} | — | 2,000 | — | pF | $V_{DS} = 15\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$ |
| Output Capacitance | C_{oss} | — | 315 | — | pF | |
| Reverse Transfer Capacitance | C_{rss} | — | 248 | — | pF | |
| Gate Resistance | R_g | — | 2.2 | — | Ω | $V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$ |
| Total Gate Charge ($V_{GS} = 4.5\text{V}$) | Q_g | — | 20 | — | nC | $V_{DS} = 15\text{V}, I_D = 15\text{A}$ |
| Total Gate Charge ($V_{GS} = 10\text{V}$) | Q_g | — | 42 | — | nC | |
| Gate-Source Charge | Q_{gs} | — | 4.7 | — | nC | |
| Gate-Drain Charge | Q_{gd} | — | 7.4 | — | nC | |
| Turn-On Delay Time | $t_{D(on)}$ | — | 3.9 | — | ns | $V_{DD} = 15\text{V}, V_{GS} = 10\text{V}, R_G = 3.3\Omega, I_D = 15\text{A}$ |
| Turn-On Rise Time | t_R | — | 4.1 | — | ns | |
| Turn-Off Delay Time | $t_{D(off)}$ | — | 31 | — | ns | |
| Turn-Off Fall Time | t_F | — | 14.6 | — | ns | $I_F = 15\text{A}, di/dt = 100\text{A}/\mu\text{s}$ |
| Reverse Recovery Time | t_{RR} | — | 15 | — | ns | |
| Reverse Recovery Charge | Q_{RR} | — | 6 | — | nC | |

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
 - 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 production testing.

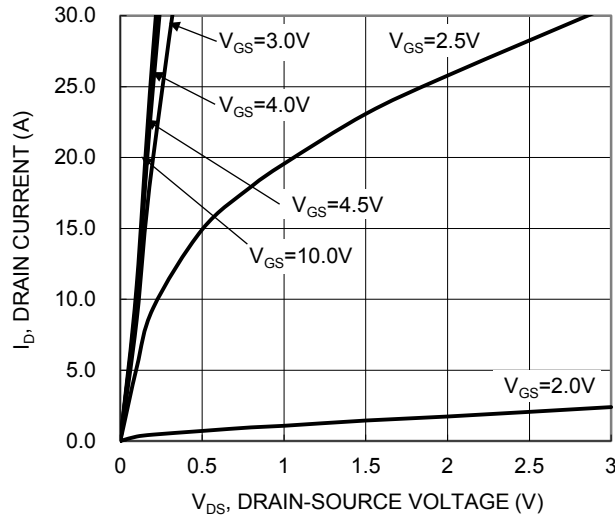


Figure 1. Typical Output Characteristic

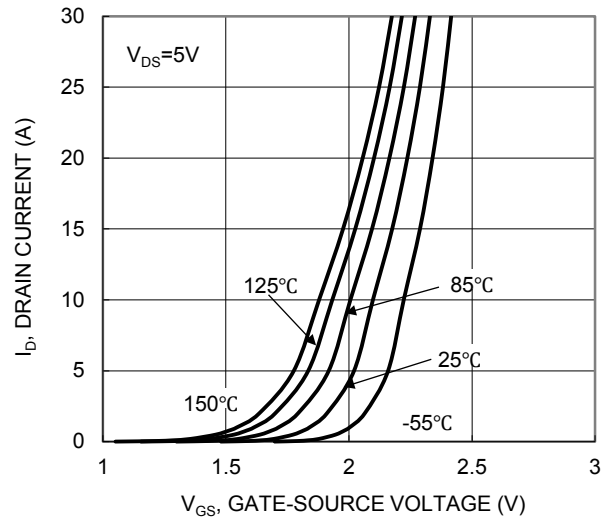


Figure 2. Typical Transfer Characteristic

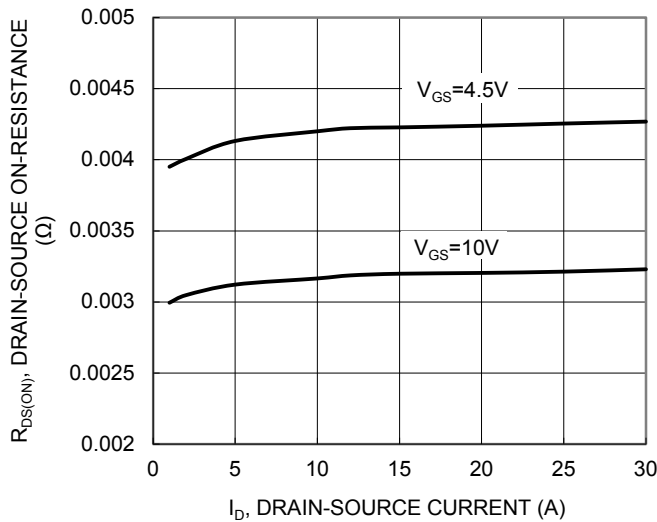


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

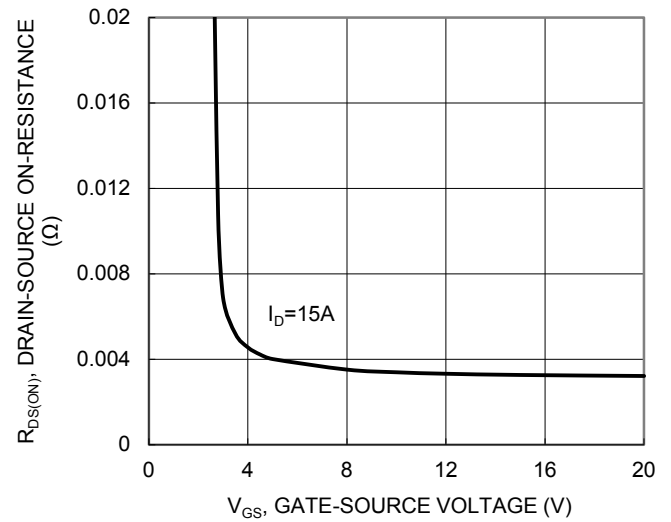


Figure 4. Typical Transfer Characteristic

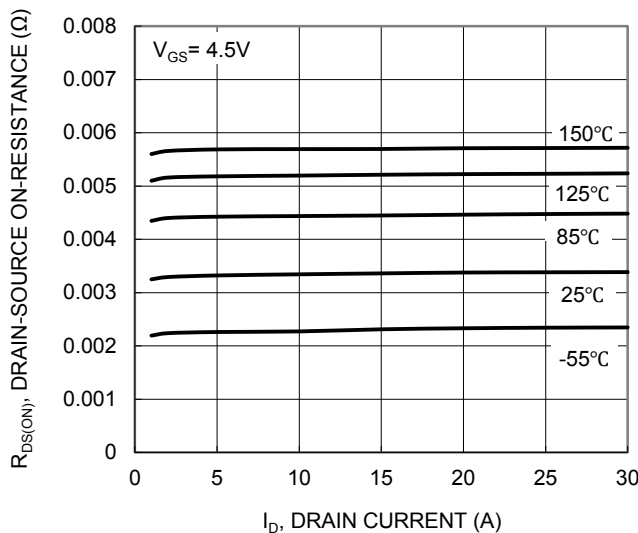


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

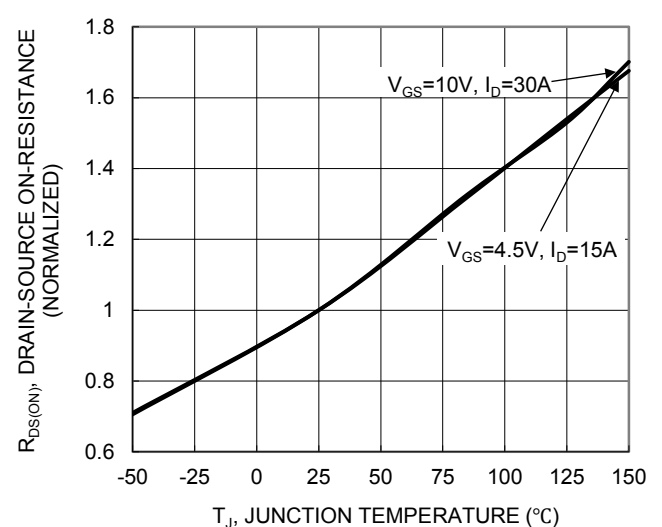
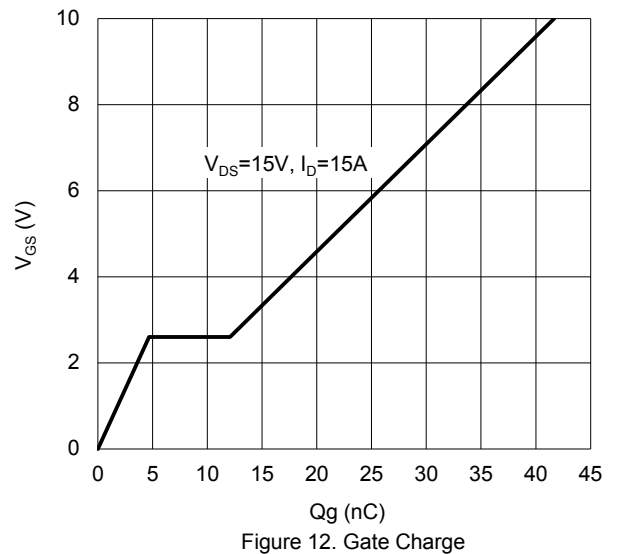
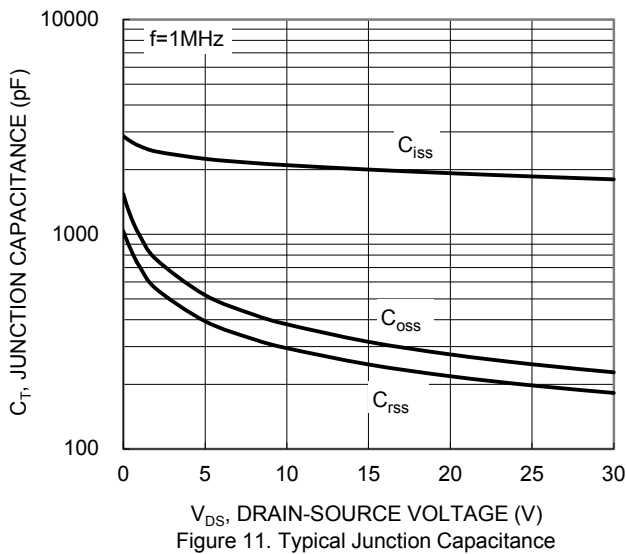
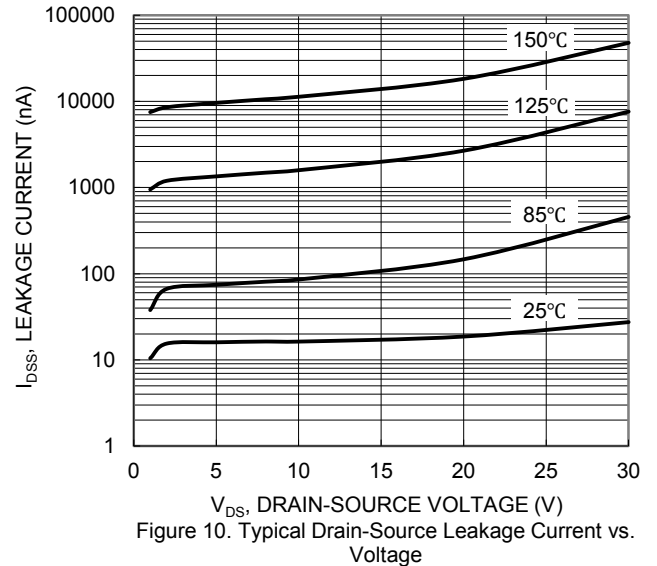
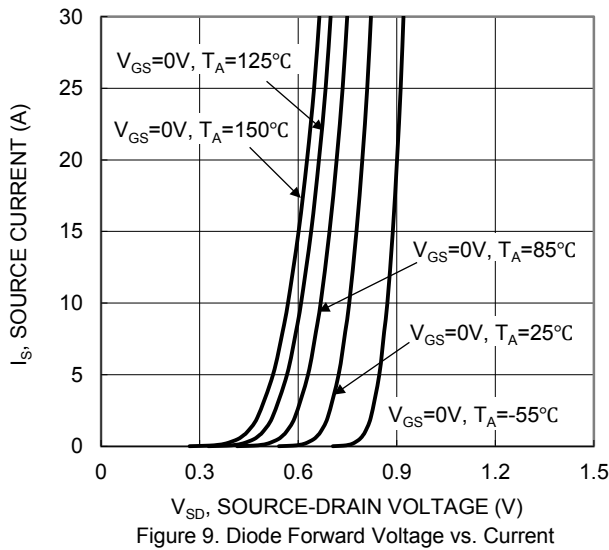
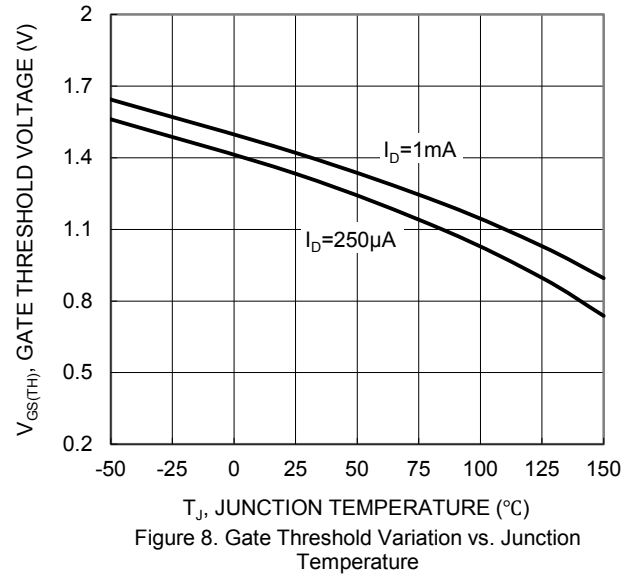
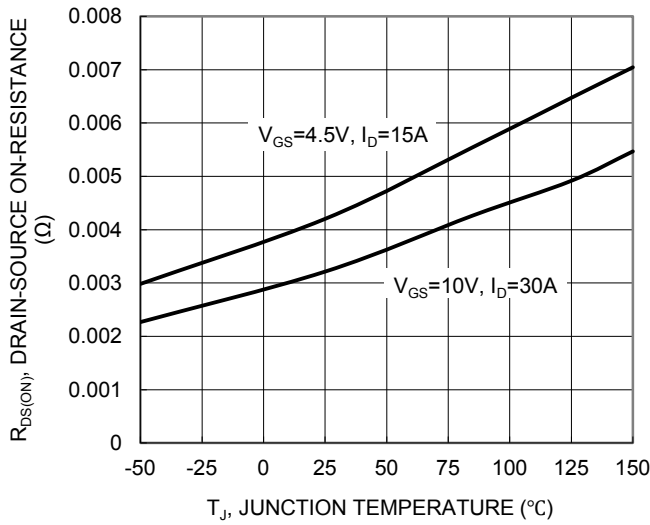
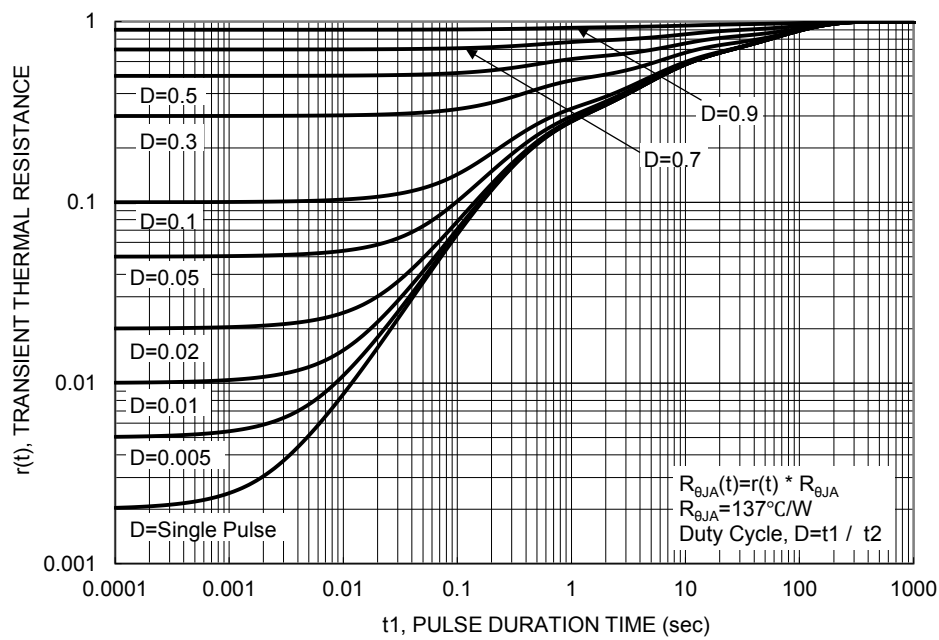
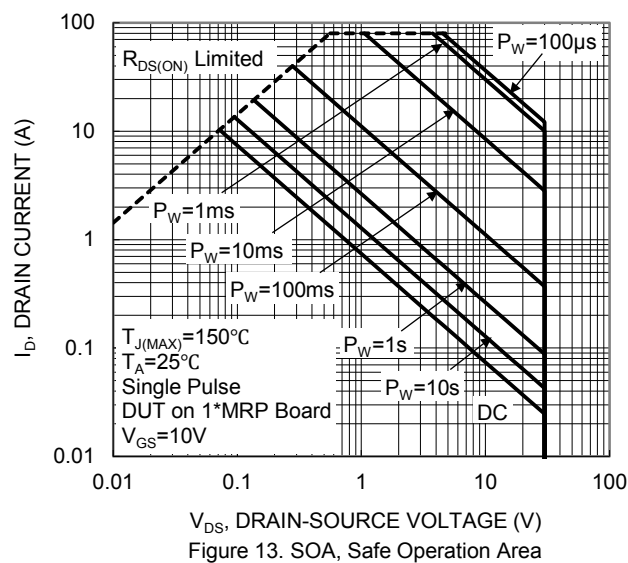


Figure 6. On-Resistance Variation with Temperature

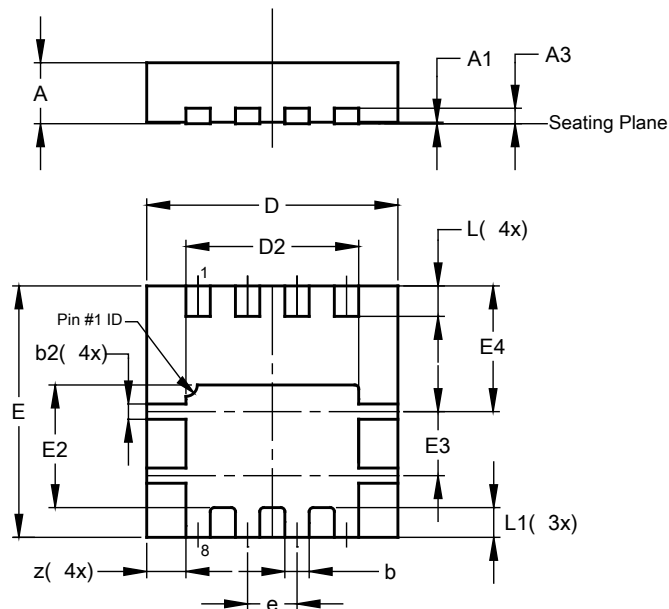




Package Outline Dimensions

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

PowerDI3333-8

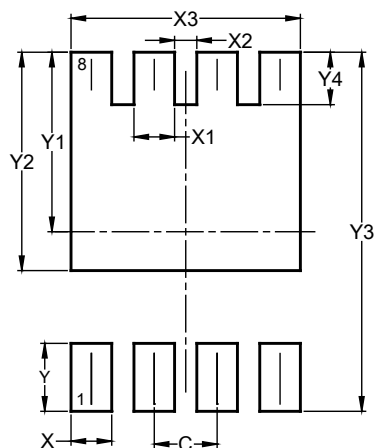


| PowerDI3333-8 | | | |
|----------------------|------|------|-------|
| Dim | Min | Max | Typ |
| A | 0.75 | 0.85 | 0.80 |
| A1 | 0.00 | 0.05 | 0.02 |
| A3 | — | — | 0.203 |
| b | 0.27 | 0.37 | 0.32 |
| b2 | 0.15 | 0.25 | 0.20 |
| D | 3.25 | 3.35 | 3.30 |
| D2 | 2.22 | 2.32 | 2.27 |
| E | 3.25 | 3.35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