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

| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DSS}$ | 60 | V |
| Gate-Source Voltage | | $V_{GSS}$ | ±20 | V |
| Continuous Drain Current (Note 6) | $T_A$ = +25°C<br>$T_A$ = +70°C | $I_D$ | 20.6<br>17.2 | A |
| Continuous Drain Current (Note 7) | $T_C$ = +25°C (Note 10)<br>$T_C$ = +100°C | $I_D$ | 100<br>90 | A |
| Maximum Continuous Body Diode Forward Current (Note 7) | | $I_S$ | 100 | A |
| Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%) | | $I_{DM}$ | 160 | A |
| Avalanche Current, L = 1mH | | $I_{AS}$ | 14.8 | A |
| Avalanche Energy, L = 1mH | | $E_{AS}$ | 98 | mJ |

## Thermal Characteristics

| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Total Power Dissipation (Note 6) | $T_A$ = +25°C | $P_D$ | 3.2 | W |
| Thermal Resistance, Junction to Ambient (Note 6) | | $R_{\theta JA}$ | 47 | °C/W |
| Total Power Dissipation (Note 7) | $T_C$ = +25°C | $P_D$ | 150 | W |
| Thermal Resistance, Junction to Case (Note 7) | | $R_{\theta JC}$ | 1 | °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 8)** | | | | | | |
| 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 | $I_{GSS}$ | — | — | ±100 | nA | $V_{GS}$ = ±20V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS (Note 8)** | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | 1 | — | 3 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = 250µA |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | — | 4.4 | 5.5 | mΩ | $V_{GS}$ = 10V, $I_D$ = 50A |
| | | — | 5.7 | 7.2 | | $V_{GS}$ = 6V, $I_D$ = 20A |
| | | — | 7.7 | 10 | | $V_{GS}$ = 4.5V, $I_D$ = 12.5A |
| Diode Forward Voltage | $V_{SD}$ | — | 0.9 | — | V | $V_{GS}$ = 0V, $I_S$ = 50A |
| **DYNAMIC CHARACTERISTICS (Note 9)** | | | | | | |
| Input Capacitance | $C_{iss}$ | — | 2962 | — | pF | $V_{DS}$ = 30V, $V_{GS}$ = 0V, f = 1MHz |
| Output Capacitance | $C_{oss}$ | — | 965.2 | — | | |
| Reverse Transfer Capacitance | $C_{rss}$ | — | 59.8 | — | | |
| Gate Resistance | $R_g$ | — | 0.66 | — | Ω | $V_{DS}$ = 0V, $V_{GS}$ = 0V, f = 1MHz |
| Total Gate Charge ($V_{GS}$ = 10V) | $Q_g$ | — | 47.1 | — | nC | $V_{DD}$ = 30V, $I_D$ = 50A |
| Total Gate Charge ($V_{GS}$ = 4.5V) | $Q_g$ | — | 23.1 | — | | |
| Gate-Source Charge | $Q_{gs}$ | — | 10.2 | — | | |
| Gate-Drain Charge | $Q_{gd}$ | — | 12.5 | — | | |
| Turn-On Delay Time | $t_{D(ON)}$ | — | 8.3 | — | ns | $V_{DD}$ = 30V, $V_{GS}$ = 10V, $I_D$ = 30A, $R_G$ = 3.3Ω |
| Turn-On Rise Time | $t_R$ | — | 9.4 | — | | |
| Turn-Off Delay Time | $t_{D(OFF)}$ | — | 22 | — | | |
| Turn-Off Fall Time | $t_F$ | — | 8.9 | — | | |
| Body Diode Reverse Recovery Time | $t_{RR}$ | — | 40.4 | — | ns | $I_F$ = 30A, di/dt = 100A/µs |
| Body Diode Reverse Recovery Charge | $Q_{RR}$ | — | 49.7 | — | nC | |

Notes:
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
7. Thermal resistance from junction to soldering point (on the exposed drain pad).
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.
10. Package limited.

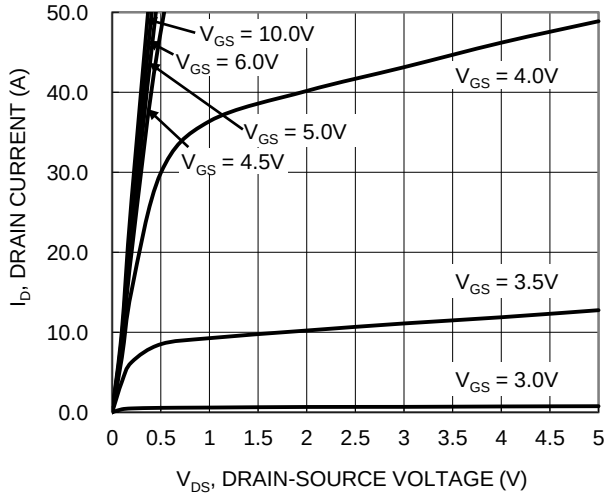



Figure 1. Typical Output Characteristic

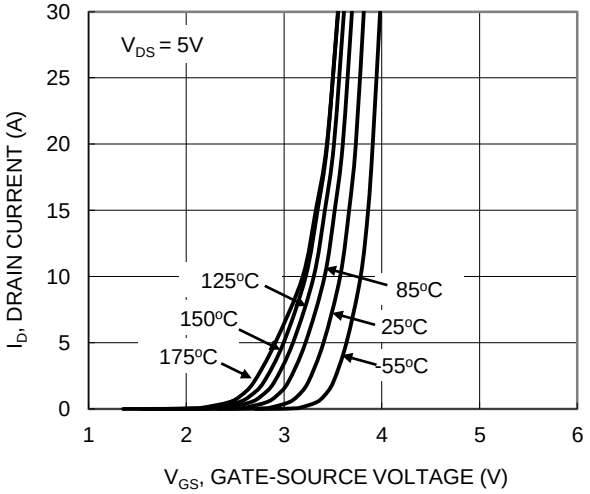



Figure 2. Typical Transfer Characteristic

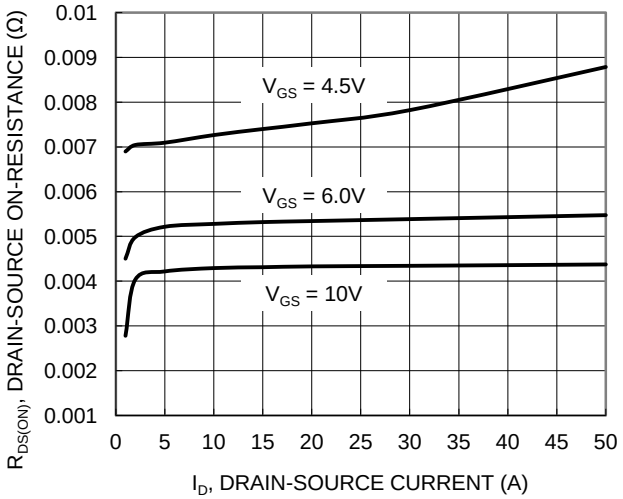



Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

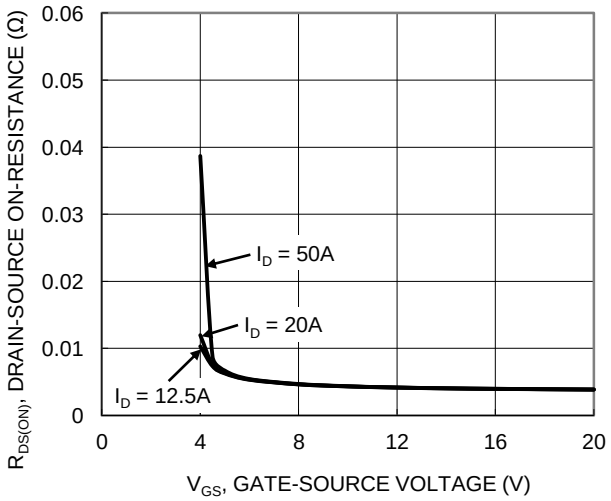



Figure 4. Typical Transfer Characteristic

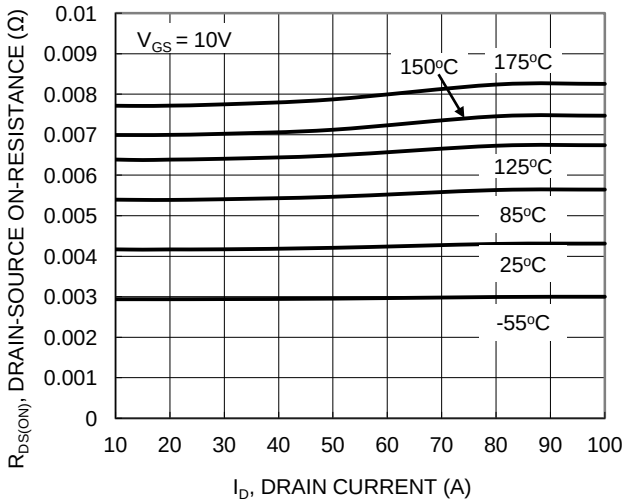



Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

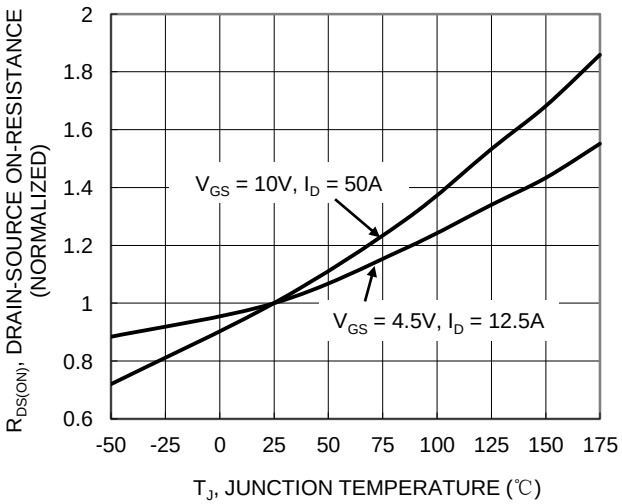



Figure 6. On-Resistance Variation with Junction Temperature

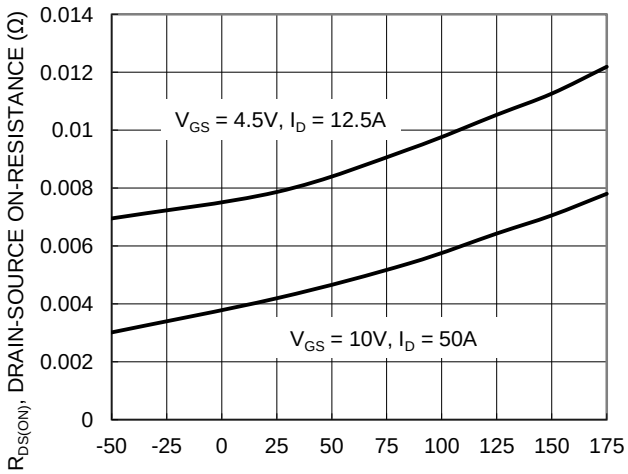



Figure 7. On-Resistance Variation with Junction Temperature

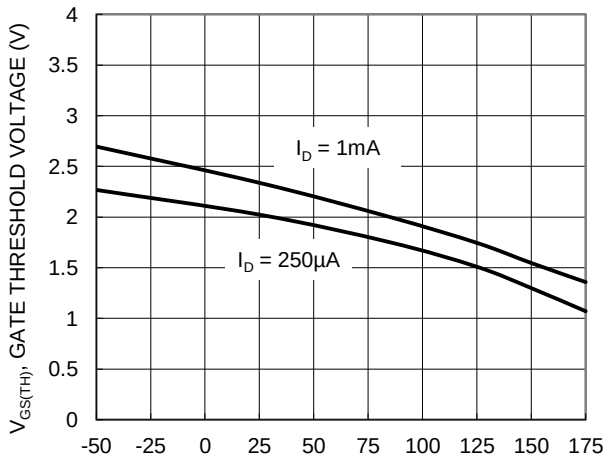



Figure 8. Gate Threshold Variation vs. Junction Temperature

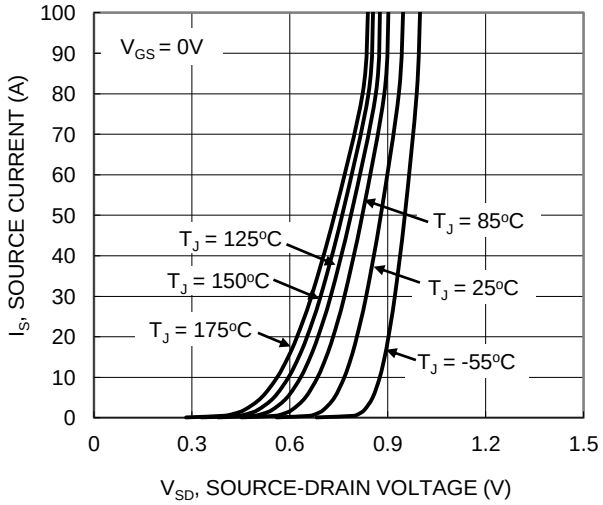



Figure 9. Diode Forward Voltage vs. Current

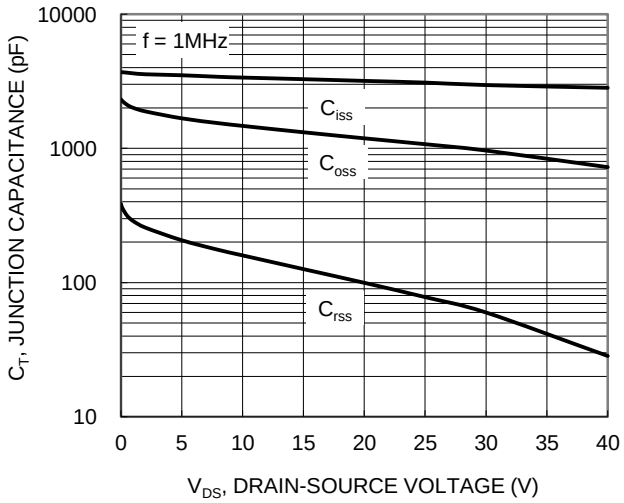



Figure 10. Typical Junction Capacitance

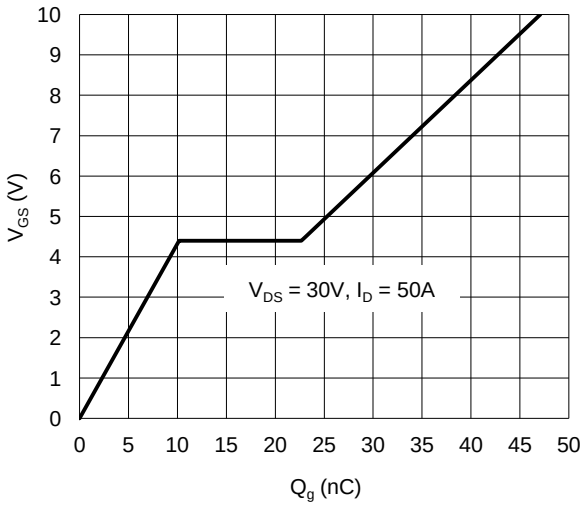



Figure 11. Gate Charge

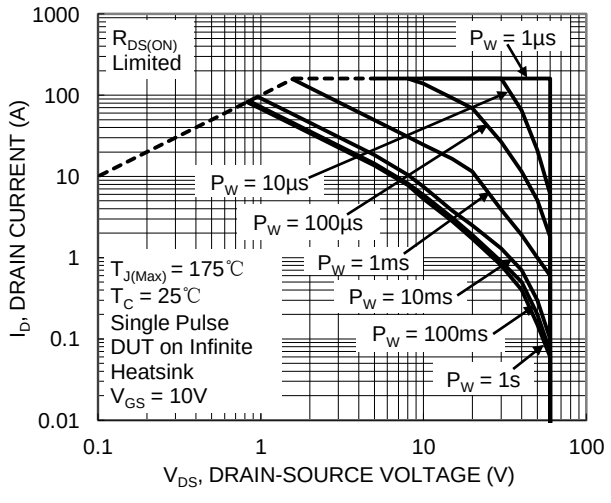



Figure 12. SOA, Safe Operation Area

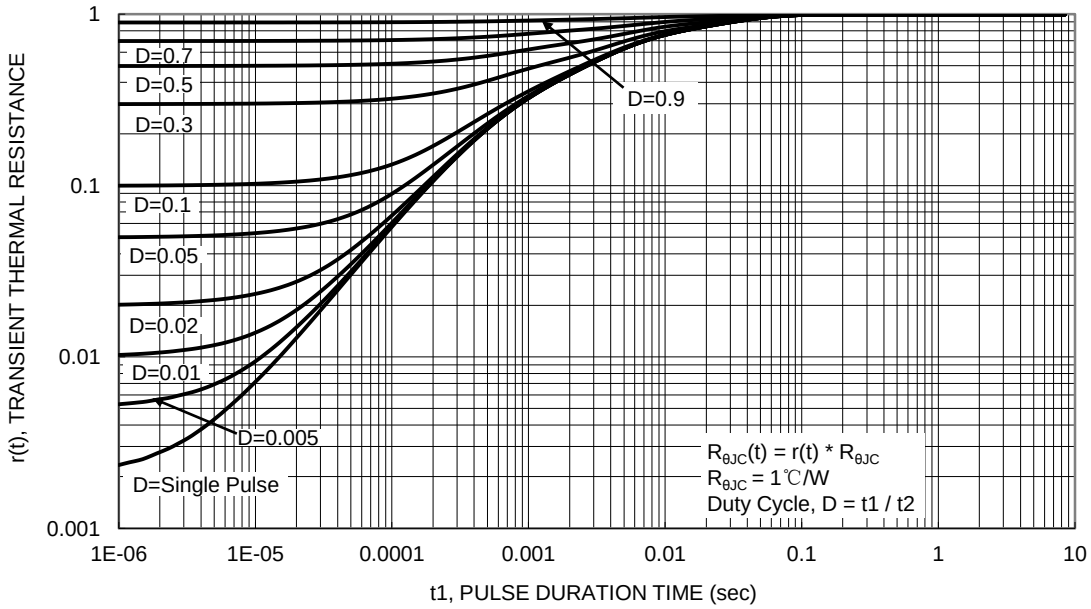
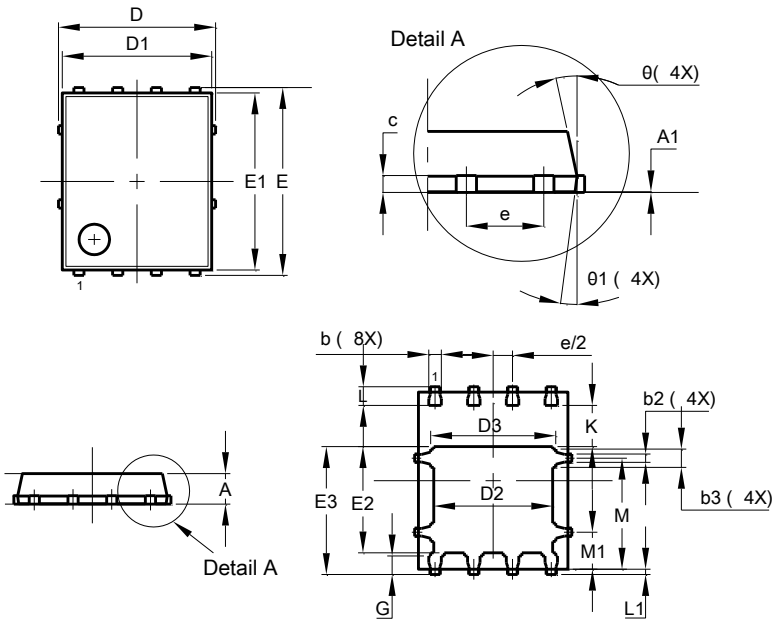



Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

**PowerDI5060-8**

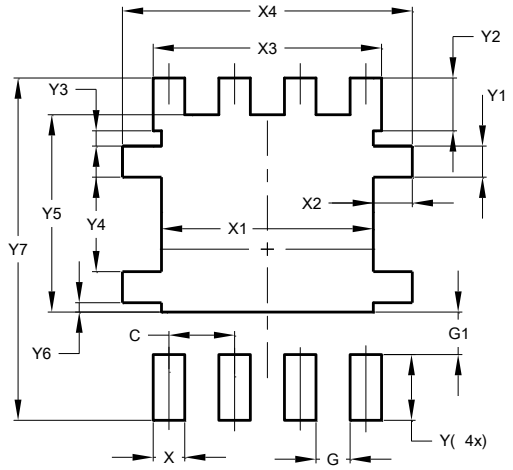



| PowerDI5060-8 | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 0.90 | 1.10 | 1.00 |
| **A1** | 0.00 | 0.05 | – |
| **b** | 0.33 | 0.51 | 0.41 |
| **b2** | 0.200 | 0.350 | 0.273 |
| **b3** | 0.40 | 0.80 | 0.60 |
| **c** | 0.230 | 0.330 | 0.277 |
| **D** | 5.15 BSC | | |
| **D1** | 4.70 | 5.10 | 4.90 |
| **D2** | 3.70 | 4.10 | 3.90 |
| **D3** | 3.90 | 4.30 | 4.10 |
| **E** | 6.15 BSC | | |
| **E1** | 5.60 | 6.00 | 5.80 |
| **E2** | 3.28 | 3.68 | 3.48 |
| **E3** | 3.99 | 4.39 | 4.19 |
| **e** | 1.27 BSC | | |
| **G** | 0.51 | 0.71 | 0.61 |
| **K** | 0.51 | – | – |
| **L** | 0.51 | 0.71 | 0.61 |
| **L1** | 0.100 | 0.200 | 0.175 |
| **M** | 3.235 | 4.035 | 3.635 |
| **M1** | 1.00 | 1.40 | 1.21 |
| **Θ** | 10° | 12° | 11° |
| **Θ1** | 6° | 8° | 7° |
| **All Dimensions in mm** | | | |

## Suggested Pad Layout

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

**PowerDI5060-8**




| Dimensions | Value (in mm) |
|---|---|
| **C** | 1.270 |
| **G** | 0.660 |
| **G1** | 0.820 |
| **X** | 0.610 |
| **X1** | 4.100 |
| **X2** | 0.755 |
| **X3** | 4.420 |
| **X4** | 5.610 |
| **Y** | 1.270 |
| **Y1** | 0.600 |
| **Y2** | 1.020 |
| **Y3** | 0.295 |
| **Y4** | 1.825 |
| **Y5** | 3.810 |
| **Y6** | 0.180 |
| **Y7** | 6.610 |

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