

## Product Summary

| BV <sub>DSS</sub> | R <sub>DS(ON)</sub> Max         | I <sub>D</sub> Max<br>T <sub>C</sub> = +25°C |
|-------------------|---------------------------------|--|
| 100V              | 17.4mΩ @ V <sub>GS</sub> = 10V  | 59A  |
|                   | 30.3mΩ @ V <sub>GS</sub> = 4.5V | 45A  |

## Features and Benefits

- Rated to +175°C—Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching (UIS) Test in Production—Ensures More Reliable and Robust End Application
- High Conversion Efficiency
- Low R<sub>DS(ON)</sub>—Minimizes On State Losses
- Low Input Capacitance
- Fast Switching Speed
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **The DMTH10H017LPDQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**  
<https://www.diodes.com/quality/product-definitions/>

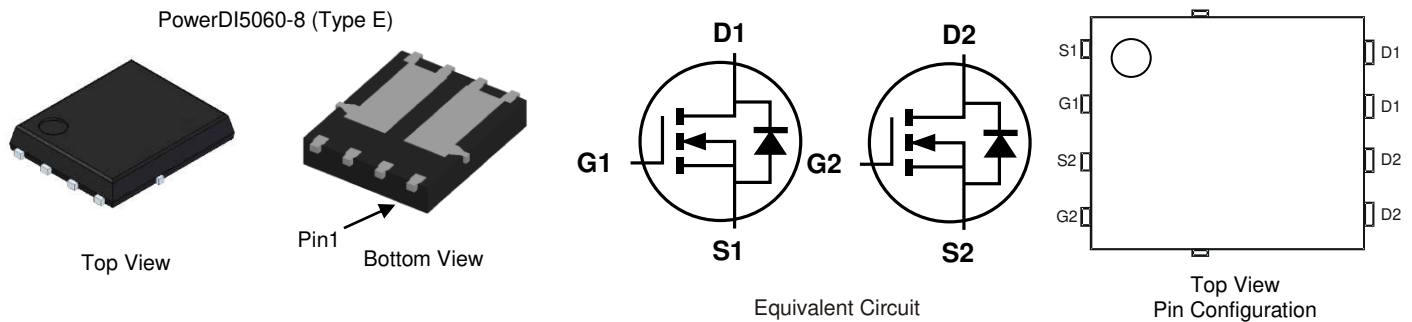
## Description and Applications

This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP, and is ideal for use in:

- Synchronous Rectifier
- DC-DC Converters
- Primary Side Switching

## Mechanical Data

- Case: PowerDI®5060-8
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish—Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 **Ⓔ3**
- Weight: 0.097 grams (Approximate)

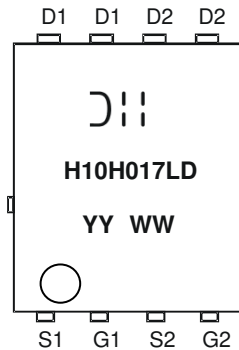


## Ordering Information (Note 4)

| Part Number       | Case                   | Packaging          |
|-------------------|------------------------|--------------------|
| DMTH10H017LPDQ-13 | PowerDI5060-8 (Type E) | 2500 / Tape & Reel |

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
  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



⌋|| = Manufacturer's Marking  
 H10H017LD = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Year (ex: 19 = 2019)  
 WW = Week (01 to 53)

## Maximum Ratings (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic  | Symbol           | Value                   | Unit |
|---|------------------|-------------------------|------|
| Drain-Source Voltage  | V <sub>DSS</sub> | 100                     | V    |
| Gate-Source Voltage   | V <sub>GSS</sub> | ±20                     | V    |
| Continuous Drain Current, V <sub>GS</sub> = 10V (Note 7)                                | I <sub>D</sub>   | T <sub>C</sub> = +25°C  | 59   |
|   |                  | T <sub>C</sub> = +100°C | 42   |
| Continuous Drain Current, V <sub>GS</sub> = 10V (Note 6)                                | I <sub>D</sub>   | T <sub>A</sub> = +25°C  | 13   |
|   |                  | T <sub>A</sub> = +85°C  | 10   |
|   |                  | T <sub>A</sub> = +100°C | 9    |
| Maximum Body Diode Forward Current (Note 6)   | I <sub>S</sub>   | 60                      | A    |
| Pulsed Drain Current (10µs Pulse, T <sub>C</sub> = +25°C, Package Limited)              | I <sub>DM</sub>  | 236                     | A    |
| Pulsed Body Diode Forward Current (10µs Pulse, T <sub>C</sub> = +25°C, Package Limited) | I <sub>SM</sub>  | 236                     | A    |
| Avalanche Current, L = 3mH (Note 8)   | I <sub>AS</sub>  | 10                      | A    |
| Avalanche Energy, L = 3mH (Note 8)  | E <sub>AS</sub>  | 150                     | mJ   |
| Avalanche Current, L = 1mH (Note 8)   | I <sub>AS</sub>  | 10                      | A    |
| Avalanche Energy, L = 1mH (Note 8)  | E <sub>AS</sub>  | 50                      | mJ   |

## Thermal Characteristics

| Characteristic                                   | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5)                 | P <sub>D</sub>                    | 1.5         | W    |
| Thermal Resistance, Junction to Ambient (Note 5) | R <sub>θJA</sub>                  | 100         | °C/W |
| Total Power Dissipation (Note 6)                 | P <sub>D</sub>                    | 2.6         | W    |
| Thermal Resistance, Junction to Ambient (Note 6) | R <sub>θJA</sub>                  | 56          | °C/W |
| Total Power Dissipation                          | P <sub>D</sub>                    | 93          | W    |
| Thermal Resistance, Junction to Case (Note 7)    | R <sub>θJC</sub>                  | 1.6         | °C/W |
| Operating and Storage Temperature Range          | T <sub>J</sub> , T <sub>STG</sub> | -55 to +175 | °C   |

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
  - Thermal resistance from junction to solder point (on the exposed drain pin).
  - I<sub>AS</sub> and E<sub>AS</sub> ratings are based on low frequency and duty cycles to keep T<sub>J</sub> = +25°C.

**Electrical Characteristics** (@T<sub>C</sub> = +25°C, unless otherwise specified.)

| Characteristic                             | Symbol              | Min | Typ  | Max  | Unit | Test Condition  |
|--|---------------------|-----|------|------|------|---|
| <b>OFF CHARACTERISTICS (Note 9)</b>        |                     |     |      |      |      |   |
| Drain-Source Breakdown Voltage             | BV <sub>DSS</sub>   | 100 | —    | —    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 1mA  |
| Zero Gate Voltage Drain Current            | I <sub>DSS</sub>    | —   | —    | 1    | μA   | V <sub>DS</sub> = 80V, V <sub>GS</sub> = 0V   |
| Gate-Source Leakage                        | I <sub>GSS</sub>    | —   | —    | ±100 | nA   | V <sub>GS</sub> = ±16V, V <sub>DS</sub> = 0V  |
| <b>ON CHARACTERISTICS (Note 9)</b>         |                     |     |      |      |      |   |
| Gate Threshold Voltage                     | V <sub>GS(TH)</sub> | 1   | —    | 3    | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA                                  |
| Static Drain-Source On-Resistance          | R <sub>DS(ON)</sub> | —   | 13.7 | 17.4 | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 17A   |
|  |                     | —   | 23.8 | 30.3 |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 10A  |
| Diode Forward Voltage                      | V <sub>SD</sub>     | —   | 0.8  | 1.3  | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 17A  |
| <b>DYNAMIC CHARACTERISTICS (Note 10)</b>   |                     |     |      |      |      |   |
| Input Capacitance                          | C <sub>iss</sub>    | —   | 1986 | —    | pF   | V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V,<br>f = 1MHz                                    |
| Output Capacitance                         | C <sub>OSS</sub>    | —   | 333  | —    |      |   |
| Reverse Transfer Capacitance               | C <sub>rSS</sub>    | —   | 20   | —    |      |   |
| Gate Resistance                            | R <sub>G</sub>      | —   | 1.17 | —    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz  |
| Total Gate Charge (V <sub>GS</sub> = 4.5V) | Q <sub>g</sub>      | —   | 14.4 | —    | nC   | V <sub>DS</sub> = 50V, I <sub>D</sub> = 20A   |
| Total Gate Charge (V <sub>GS</sub> = 10V)  | Q <sub>g</sub>      | —   | 28.6 | —    |      |   |
| Gate-Source Charge                         | Q <sub>gs</sub>     | —   | 5.2  | —    |      |   |
| Gate-Drain Charge                          | Q <sub>gd</sub>     | —   | 8.2  | —    |      |   |
| Turn-On Delay Time                         | t <sub>D(ON)</sub>  | —   | 9.8  | —    | ns   | V <sub>DD</sub> = 50V, V <sub>GS</sub> = 10V,<br>R <sub>G</sub> = 11Ω, I <sub>D</sub> = 20A |
| Turn-On Rise Time                          | t <sub>R</sub>      | —   | 16.3 | —    |      |   |
| Turn-Off Delay Time                        | t <sub>D(OFF)</sub> | —   | 32.6 | —    |      |   |
| Turn-Off Fall Time                         | t <sub>F</sub>      | —   | 21.6 | —    |      |   |
| Body Diode Reverse Recovery Time           | t <sub>RR</sub>     | —   | 40.6 | —    | ns   | I <sub>F</sub> = 17A, di/dt = 100A/μs   |
| Body Diode Reverse Recovery Charge         | Q <sub>RR</sub>     | —   | 58.1 | —    | nC   | I <sub>F</sub> = 17A, di/dt = 100A/μs   |

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

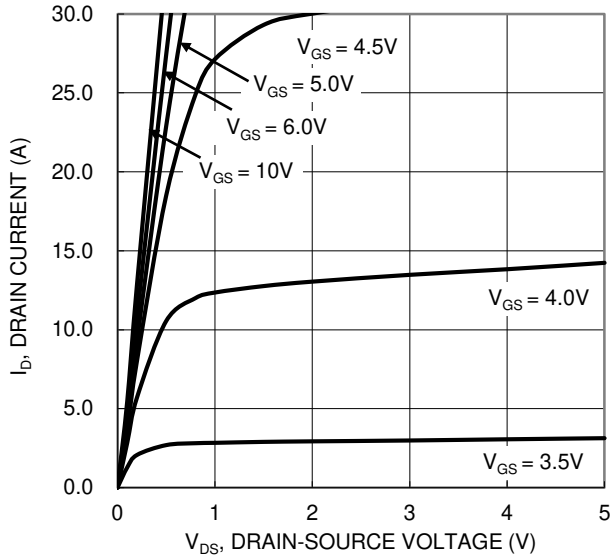


Figure 1. Typical Output Characteristic

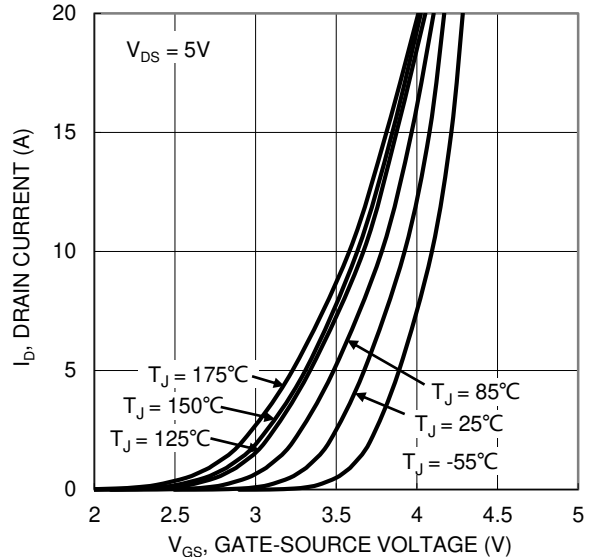


Figure 2. Typical Transfer Characteristic

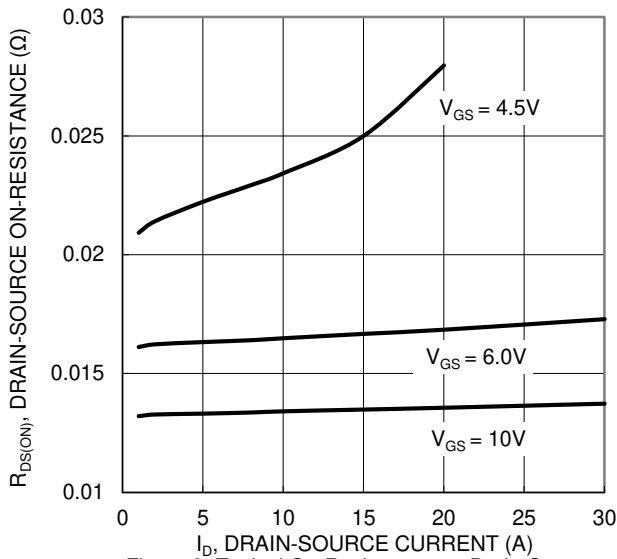


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

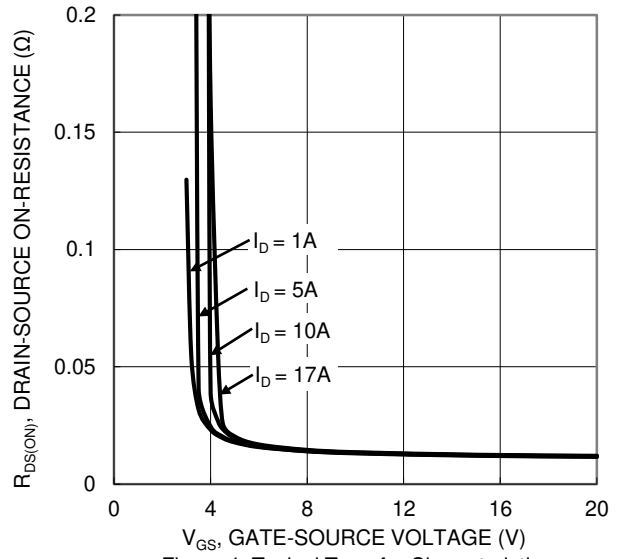


Figure 4. Typical Transfer Characteristic

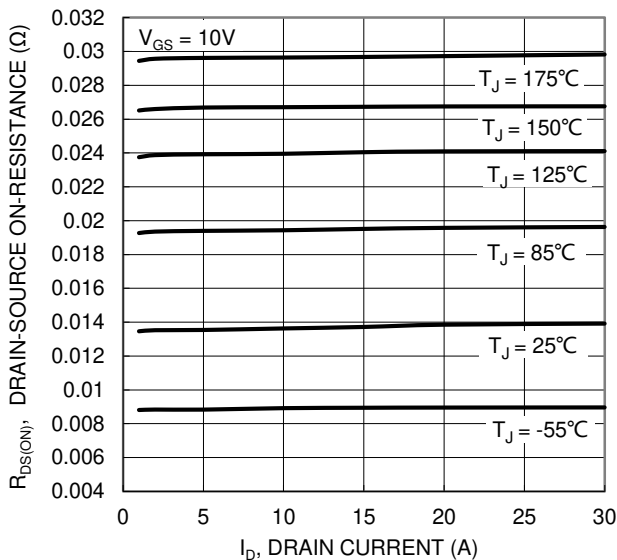


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

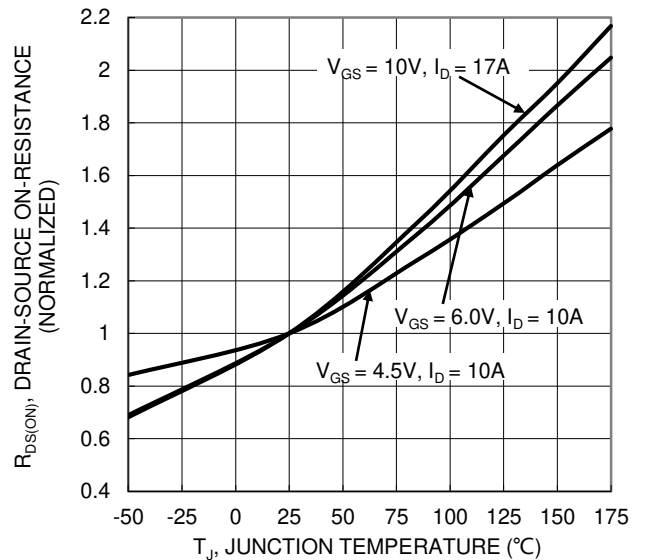


Figure 6. On-Resistance Variation with Temperature

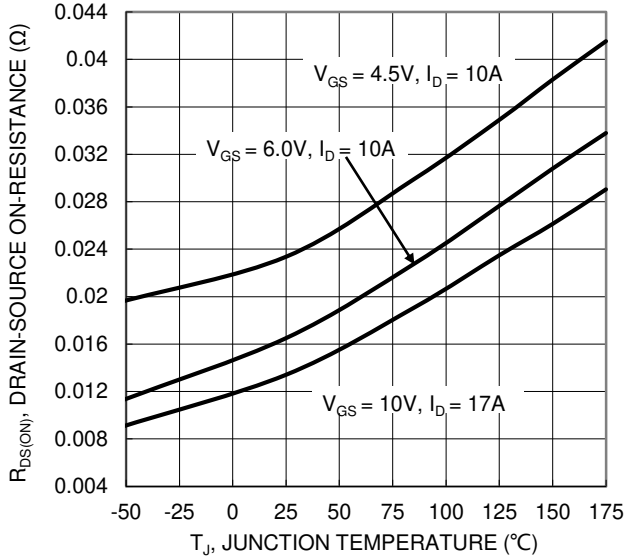


Figure 7. On-Resistance Variation with Temperature

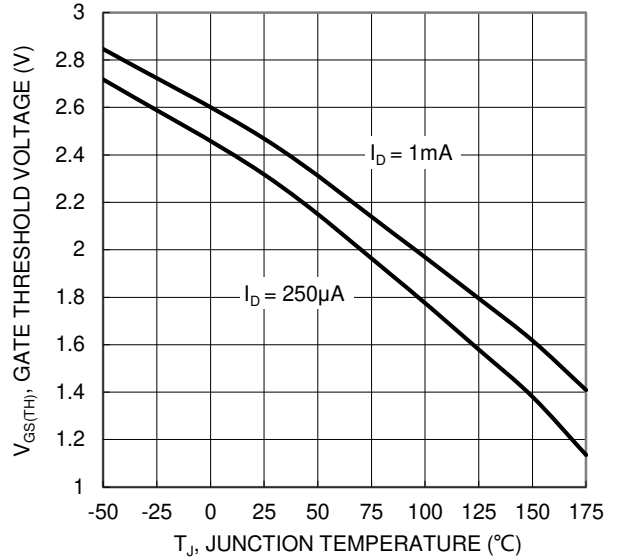


Figure 8. Gate Threshold Variation vs. Junction Temperature

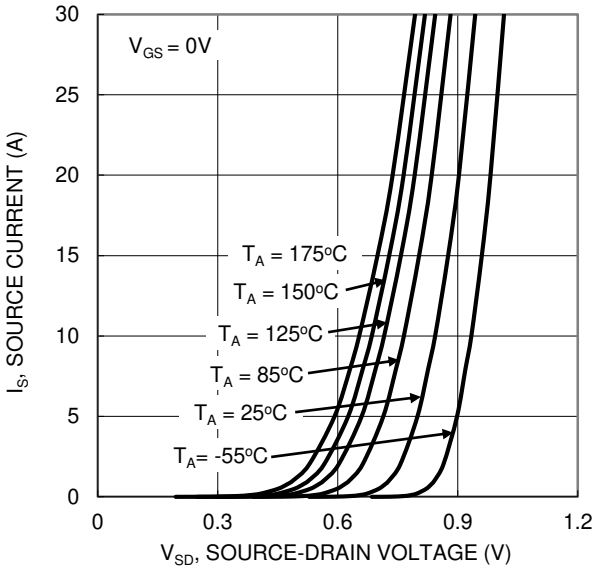


Figure 9. Diode Forward Voltage vs. Current

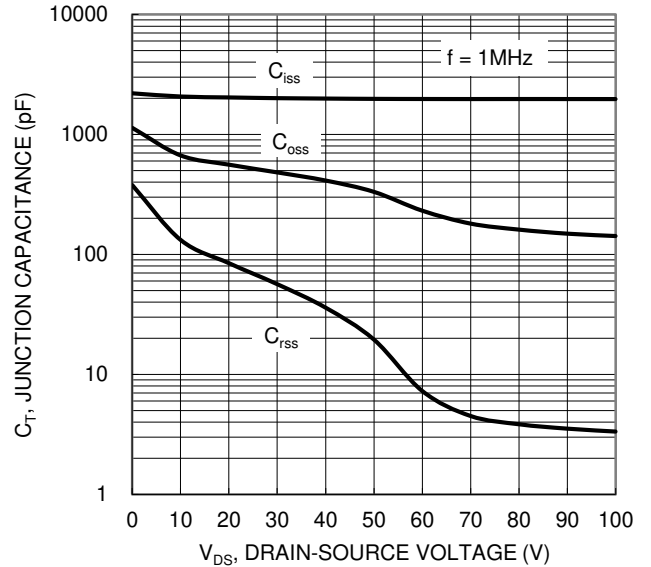


Figure 10. Typical Junction Capacitance

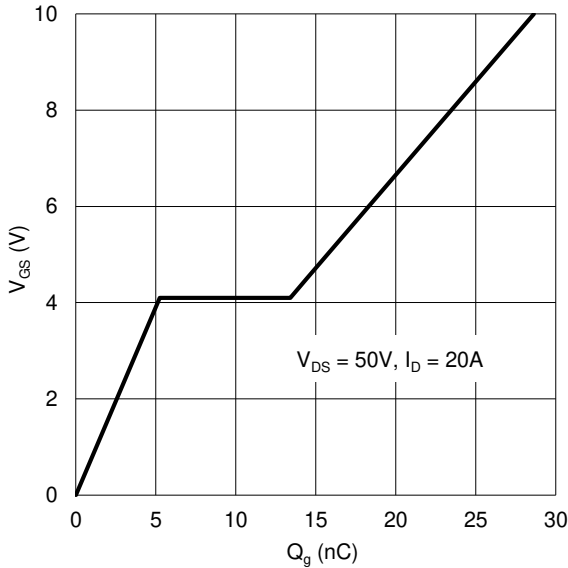


Figure 11. Gate Charge

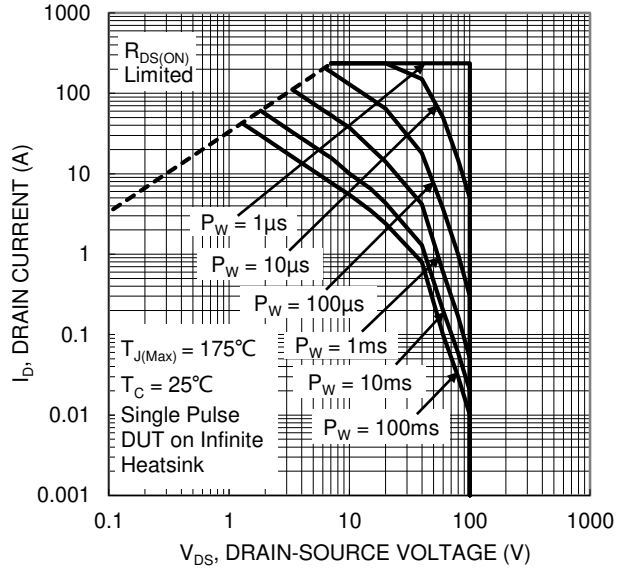


Figure 12. SOA, Safe Operation Area

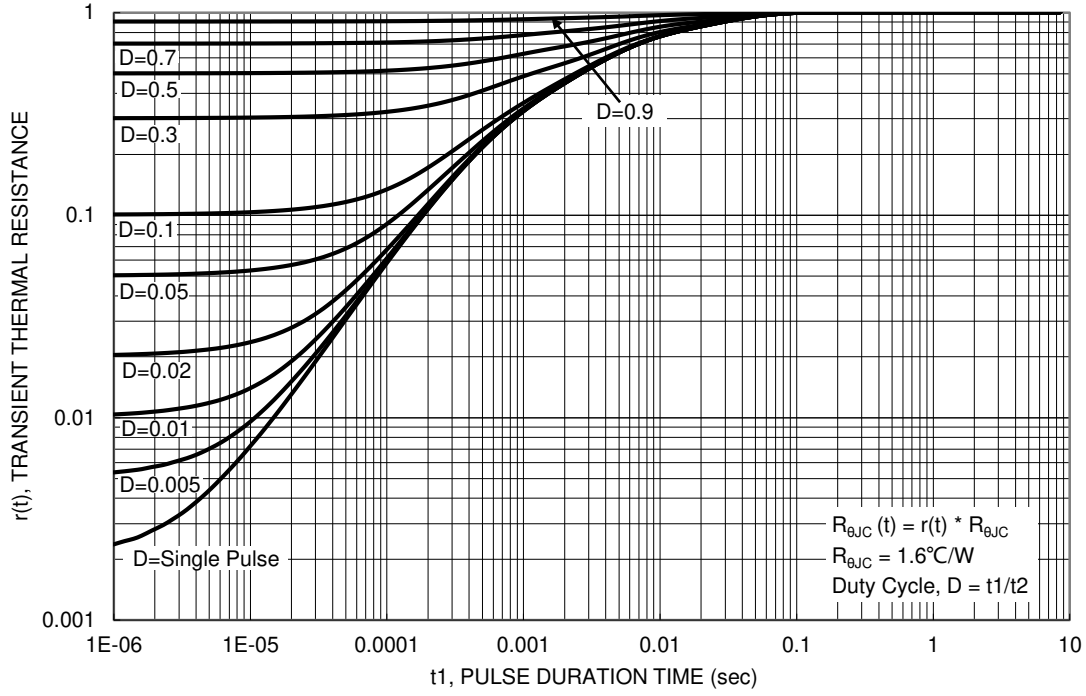
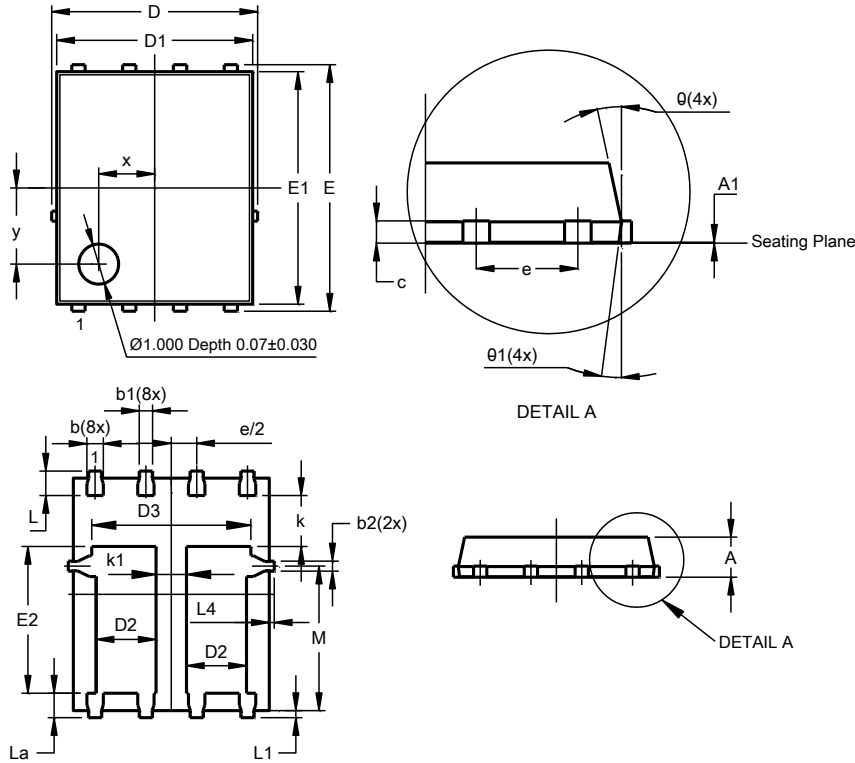


Figure 13. Transient Thermal Resistance

**Package Outline Dimensions**

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

**PowerDI5060-8 (Type E)**

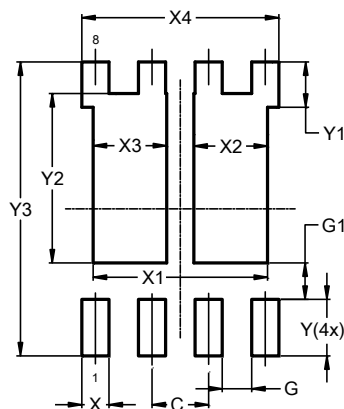


| PowerDI5060-8 (Type E) |          |       |       |
|------------------------|----------|-------|-------|
| Dim                    | Min      | Max   | Typ   |
| A                      | 0.90     | 1.10  | 1.00  |
| A1                     | 0        | 0.05  | 0.02  |
| b                      | 0.33     | 0.51  | 0.41  |
| b1                     | 0.300    | 0.366 | 0.333 |
| b2                     | 0.20     | 0.35  | 0.25  |
| c                      | 0.23     | 0.33  | 0.277 |
| D                      | 5.15 BSC |       |       |
| D1                     | 4.85     | 4.95  | 4.90  |
| D2                     | 1.40     | 1.60  | 1.50  |
| D3                     | —        | —     | 3.98  |
| E                      | 6.15 BSC |       |       |
| E1                     | 5.75     | 5.85  | 5.80  |
| E2                     | 3.56     | 3.76  | 3.66  |
| e                      | 1.27BSC  |       |       |
| k                      | —        | —     | 1.27  |
| k1                     | 0.56     | —     | —     |
| L                      | 0.51     | 0.71  | 0.61  |
| La                     | 0.51     | 0.71  | 0.61  |
| L1                     | 0.05     | 0.20  | 0.175 |
| L4                     | —        | —     | 0.125 |
| M                      | 3.50     | 3.71  | 3.605 |
| x                      | —        | —     | 1.400 |
| y                      | —        | —     | 1.900 |
| 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 (Type E)**



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 1.270         |
| G          | 0.660         |
| G1         | 0.820         |
| X          | 0.610         |
| X1         | 3.910         |
| X2         | 1.650         |
| X3         | 1.650         |
| X4         | 4.420         |
| Y          | 1.270         |
| Y1         | 1.020         |
| Y2         | 3.810         |
| Y3         | 6.610         |

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