

## 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/>

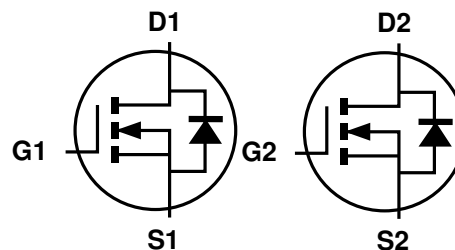
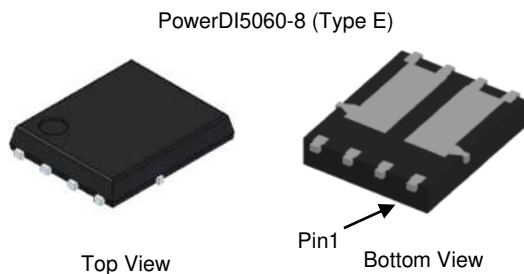
## Description and Applications

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:

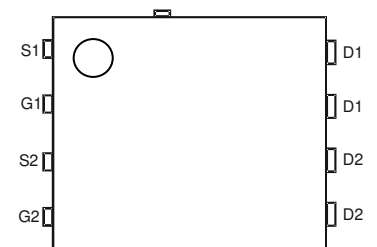
- Synchronous rectifiers
- DC-DC converters
- Primary side switching

## Mechanical Data

- Package: PowerDI®5060-8
- Package 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 
- Weight: 0.097 grams (Approximate)



Equivalent Circuit



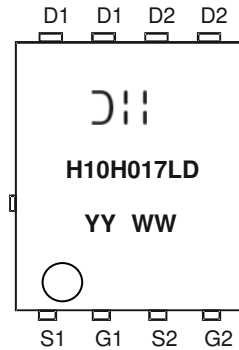
Top View  
Pin Configuration

## Ordering Information (Note 4)

| Orderable Part Number | Package                | Packing |             |
|-----------------------|------------------------|---------|-------------|
|                       |                        | Qty.    | Carrier     |
| DMTH10H017LPDQ-13     | PowerDI5060-8 (Type E) | 2500    | Tape & Reel |

- Notes:
- EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
  - 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.
  - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  - For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



DII = Manufacturer's Marking  
H10H017LD = Product Type Marking Code  
YYWW = Date Code Marking  
YY = Year (ex: 25 = 2025)  
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)                                | T <sub>C</sub> = +25°C  | I <sub>D</sub>   | 59    | A    |
|                                                                                         | T <sub>C</sub> = +100°C |                  | 42    |      |
| Continuous Drain Current, V <sub>GS</sub> = 10V (Note 6)                                | T <sub>A</sub> = +25°C  | I <sub>D</sub>   | 13    | A    |
|                                                                                         | T <sub>A</sub> = +85°C  |                  | 10    |      |
|                                                                                         | T <sub>A</sub> = +100°C |                  | 9     |      |
| Maximum Body Diode Forward Current (Note 7)                                             |                         | I <sub>S</sub>   | 59    | 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 9)                                                     |                         | I <sub>AS</sub>  | 10    | A    |
| Avalanche Energy, L = 3mH (Note 9)                                                      |                         | E <sub>AS</sub>  | 150   | mJ   |
| Avalanche Current, L = 1mH                                                              |                         | I <sub>AS</sub>  | 10    | A    |
| Avalanche Energy, L = 1mH                                                               |                         | E <sub>AS</sub>  | 50    | mJ   |

## Thermal Characteristics

| Characteristic                                   |                        | Symbol                            | Value       | Unit |
|--------------------------------------------------|------------------------|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5)                 | T <sub>A</sub> = +25°C | 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)                 | T <sub>A</sub> = +25°C | P <sub>D</sub>                    | 2.6         | W    |
| Thermal Resistance, Junction to Ambient (Note 6) |                        | R <sub>ΘJA</sub>                  | 56          | °C/W |
| Total Power Dissipation                          | T <sub>C</sub> = +25°C | 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).
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

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

| Characteristic                             | Symbol              | Min | Typ  | Max  | Unit | Test Condition                                                                              |
|--------------------------------------------|---------------------|-----|------|------|------|---------------------------------------------------------------------------------------------|
| <b>OFF CHARACTERISTICS (Note 8)</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 8)</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 9)</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:

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

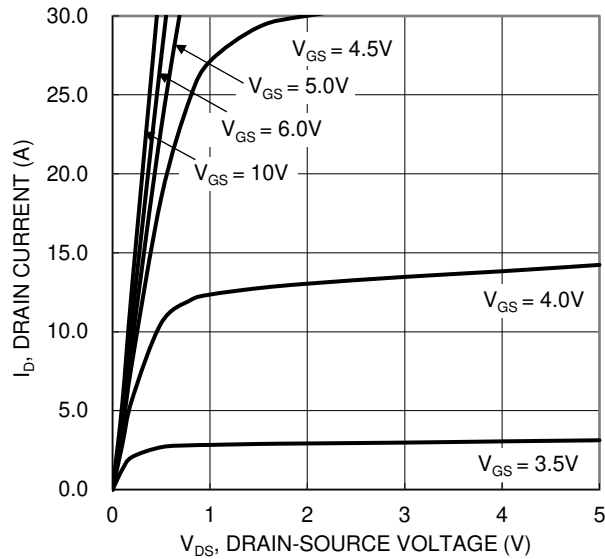


Figure 1. Typical Output Characteristic

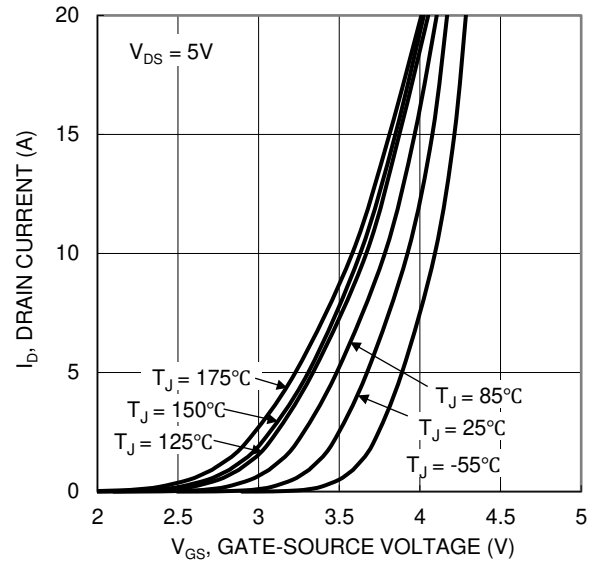


Figure 2. Typical Transfer Characteristic

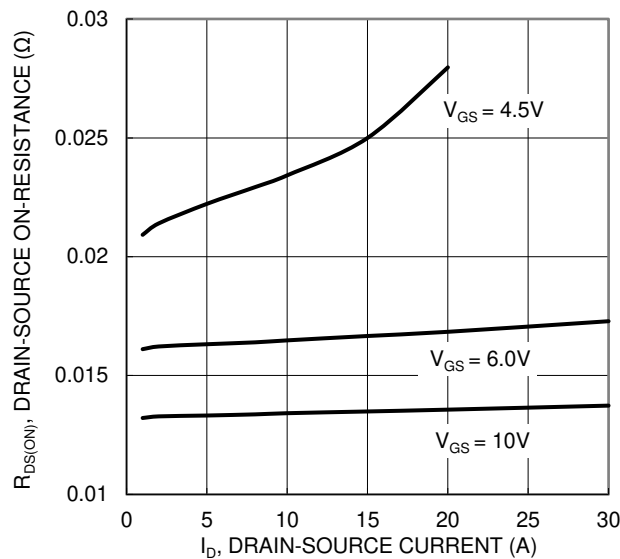


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

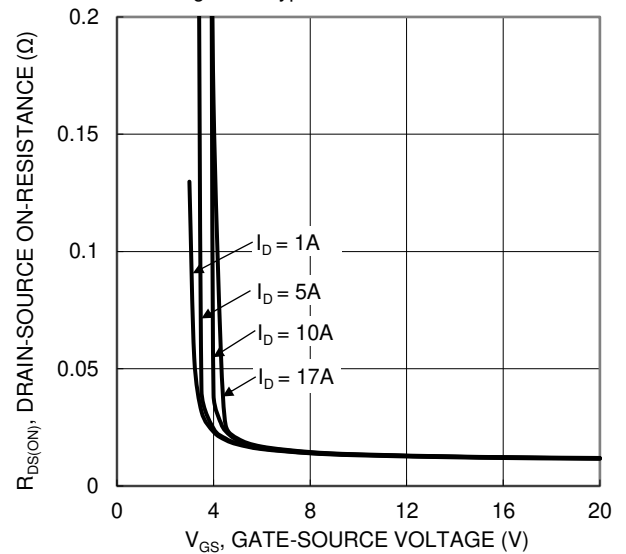


Figure 4. Typical Transfer Characteristic

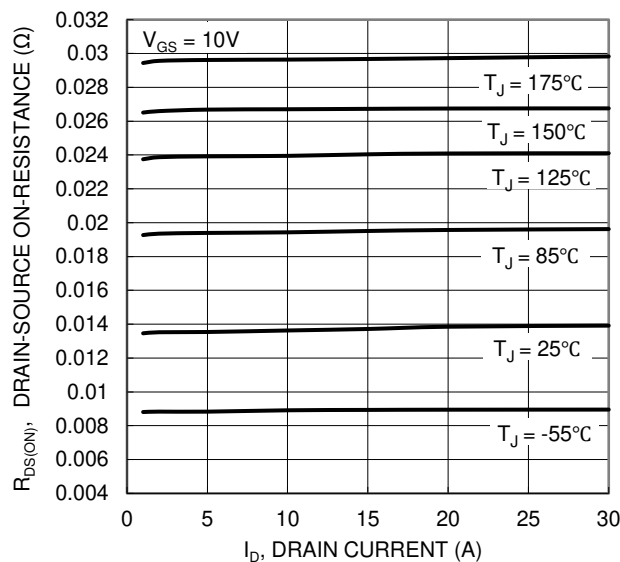


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

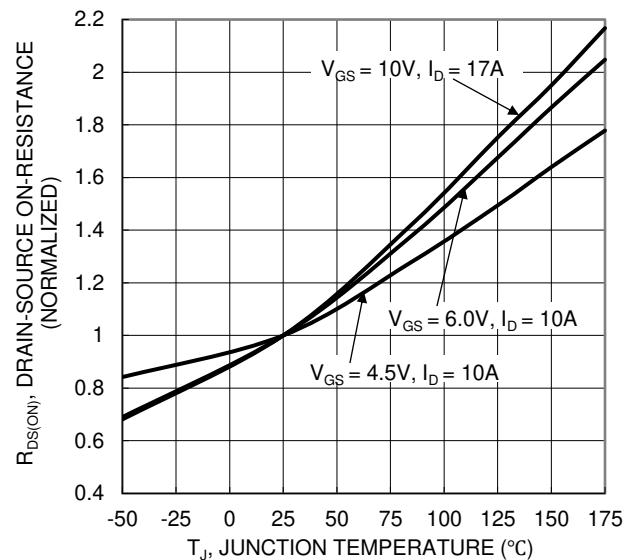
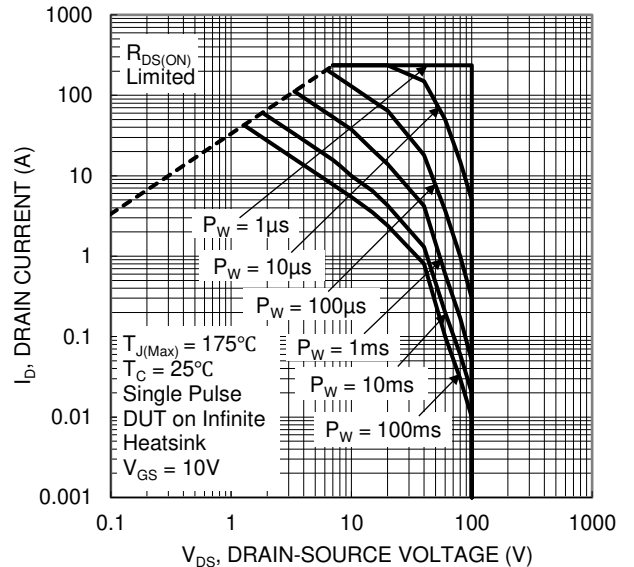
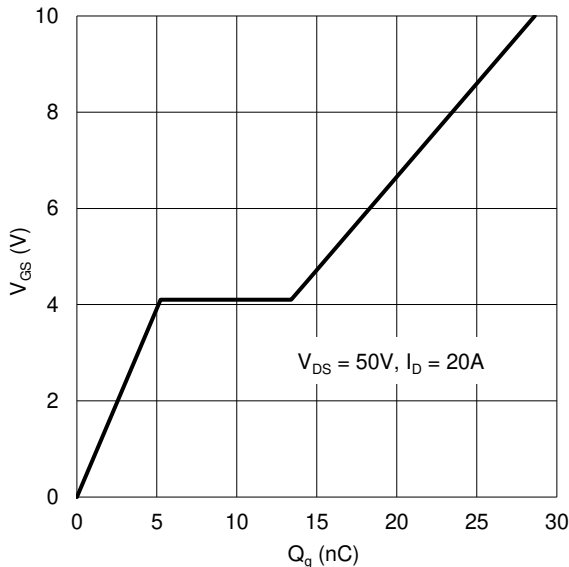
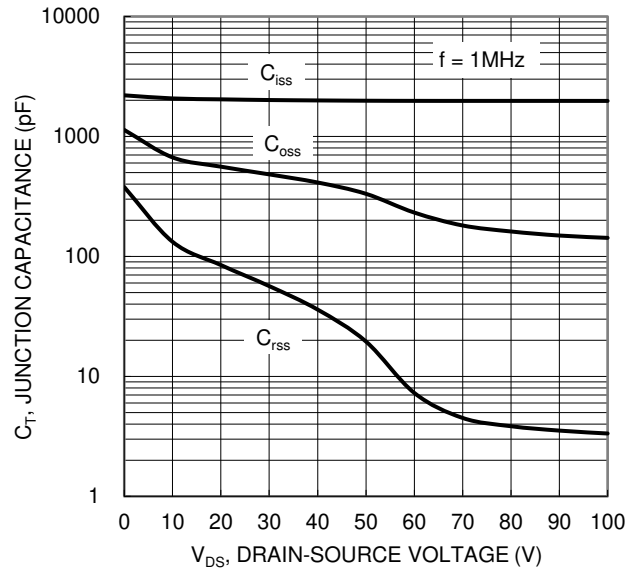
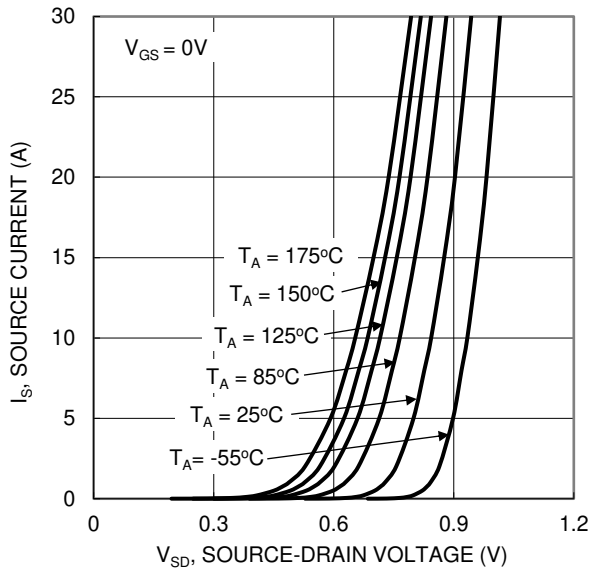
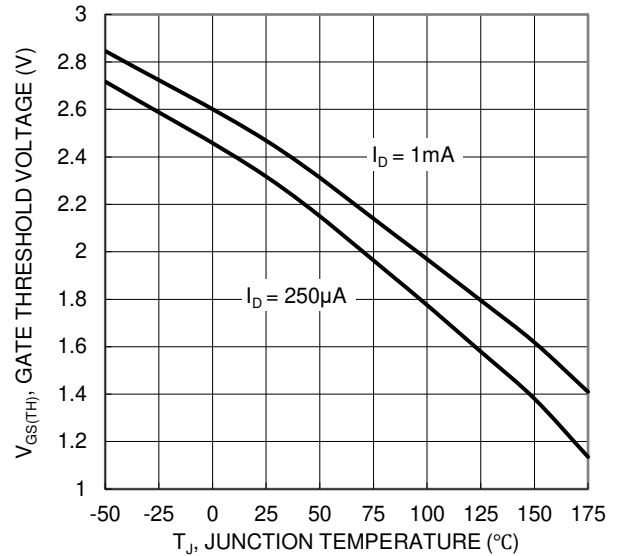
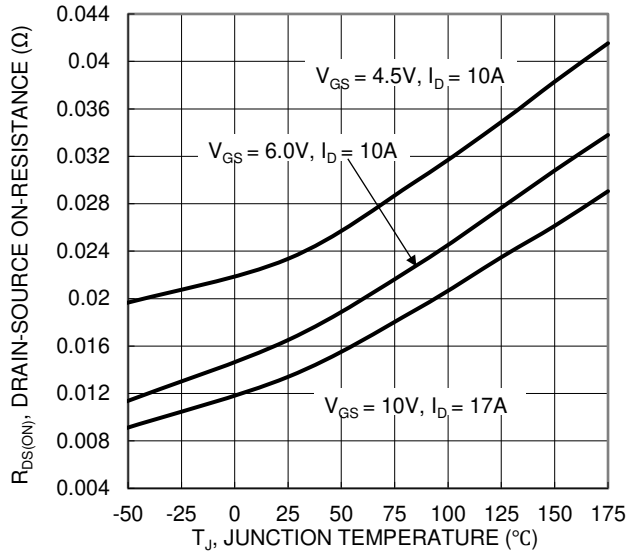


Figure 6. On-Resistance Variation with Temperature



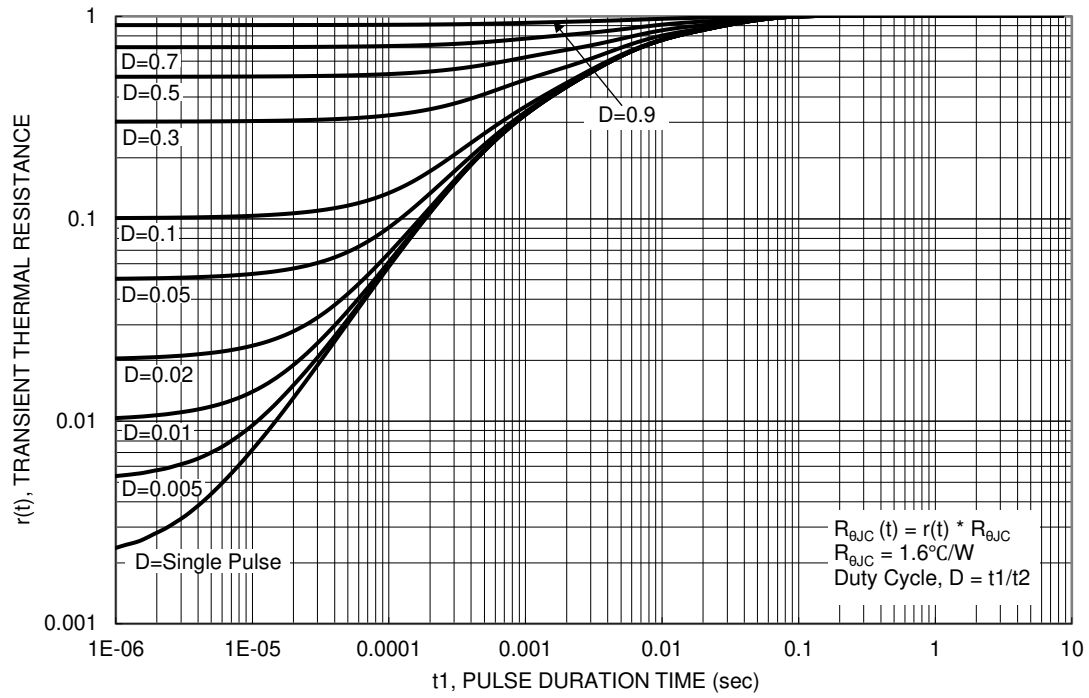
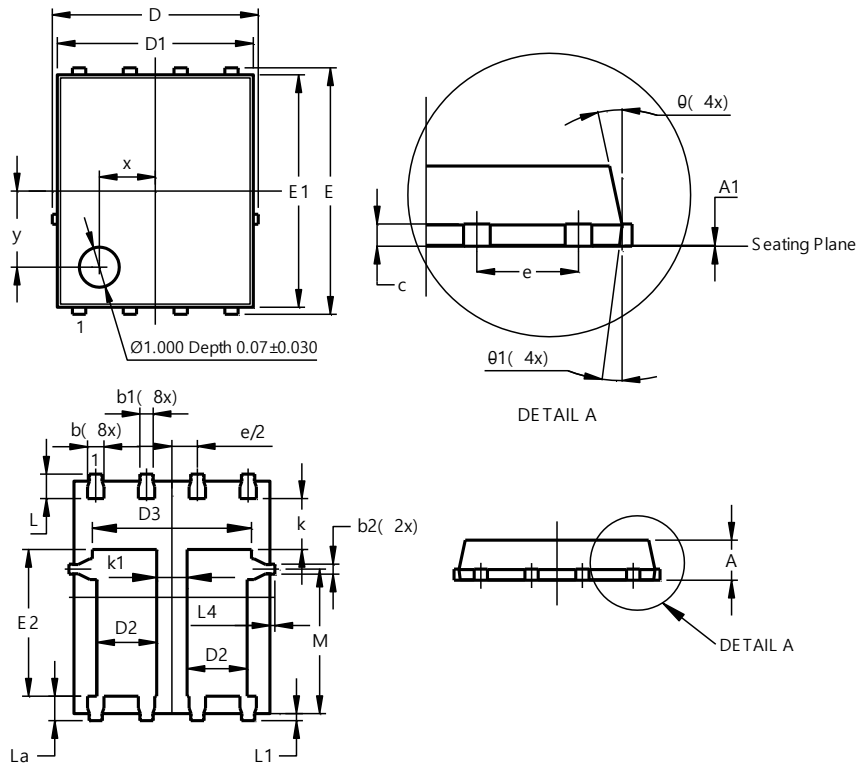


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

PowerDI5060-8 (Type E)

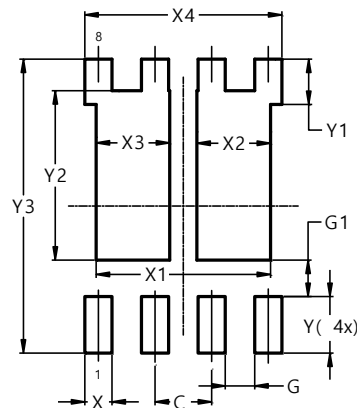


| PowerDI5060-8<br>(Type E) |          |       |       |
|---------------------------|----------|-------|-------|
| Dim                       | Min      | Max   | Typ   |
| A                         | 0.90     | 1.10  | 1.00  |
| A1                        | 0        | 0.05  | 0.02  |
| b                         | 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<br>(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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