

## Product Summary

| BV <sub>DSS</sub> | R <sub>DS(ON)</sub> Max       | I <sub>D</sub> Max<br>T <sub>C</sub> = +25°C |
|-------------------|-------------------------------|--|
| 30V               | 3.8mΩ @ V <sub>GS</sub> = 10V | 140A   |
|                   | 6mΩ @ V <sub>GS</sub> = 4.5V  | 110A   |

## Features and Benefits

- Low R<sub>DS(ON)</sub> – Minimizes On-State Losses
- Excellent Q<sub>gd</sub> x R<sub>DS(ON)</sub> Product (FOM)
- Advanced Technology for DC-DC Converters
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- 100% Unclamped Inductive Switching – Ensures More Reliability
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

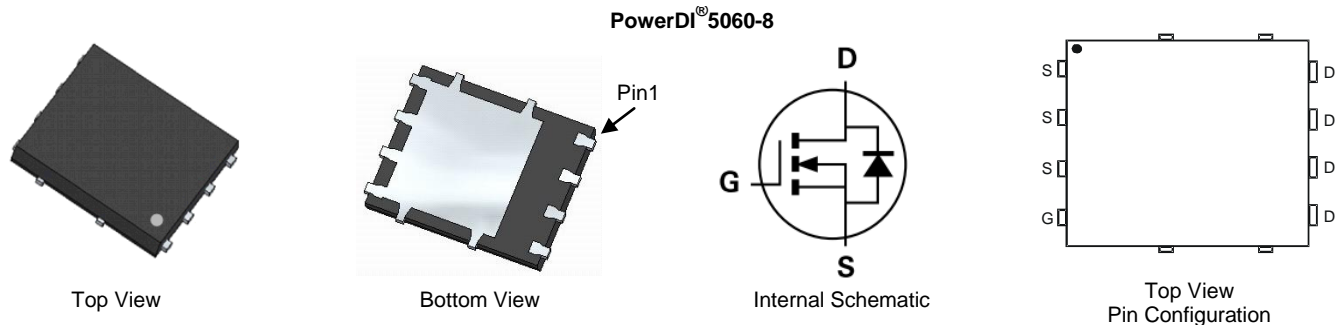
## Description and Applications

This MOSFET is designed to minimize the on-state resistance (R<sub>DS(ON)</sub>), yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

- Backlighting
- Power Management Functions
- DC-DC Converters

## Mechanical Data

- Case: PowerDI<sup>®</sup>5060-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.097 grams (Approximate)



## Ordering Information (Note 4)

| Part Number   | Case                        | Packaging         |
|---------------|-----------------------------|-------------------|
| DMT3004LPS-13 | PowerDI <sup>®</sup> 5060-8 | 2,500/Tape & Reel |

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) 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 <http://www.diodes.com/products/packages.html>.

## Marking Information



D;|| = Manufacturer's Marking  
T3004LS = Product Type Marking Code  
YYWW = Date Code Marking  
YY = Year (ex: 15 = 2015)  
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> | 30   | V    |
| Gate-Source Voltage                                      | V <sub>GSS</sub> | +20<br>-16   | V    |
| Continuous Drain Current, V <sub>GS</sub> = 10V (Note 5) | I <sub>D</sub>   | T <sub>A</sub> = +25°C: 21<br>T <sub>A</sub> = +70°C: 17   | A    |
| Continuous Drain Current, V <sub>GS</sub> = 10V          | I <sub>D</sub>   | T <sub>C</sub> = +25°C: 140<br>T <sub>C</sub> = +70°C: 110 | A    |
| Maximum Continuous Body Diode Forward Current (Note 5)   | I <sub>S</sub>   | T <sub>A</sub> = +25°C: 3                                  | A    |
| Maximum Continuous Body Diode Forward Current            | I <sub>S</sub>   | T <sub>C</sub> = +25°C: 48                                 | A    |
| Maximum Body Diode Forward Pulse Current                 | I <sub>SM</sub>  | T <sub>C</sub> = +25°C: 180                                | A    |
| Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)       | I <sub>DM</sub>  | 180  | A    |
| Avalanche Current, L=0.3mH                               | I <sub>AS</sub>  | 27   | A    |
| Avalanche Energy, L=0.3mH                                | E <sub>AS</sub>  | 110  | mJ   |

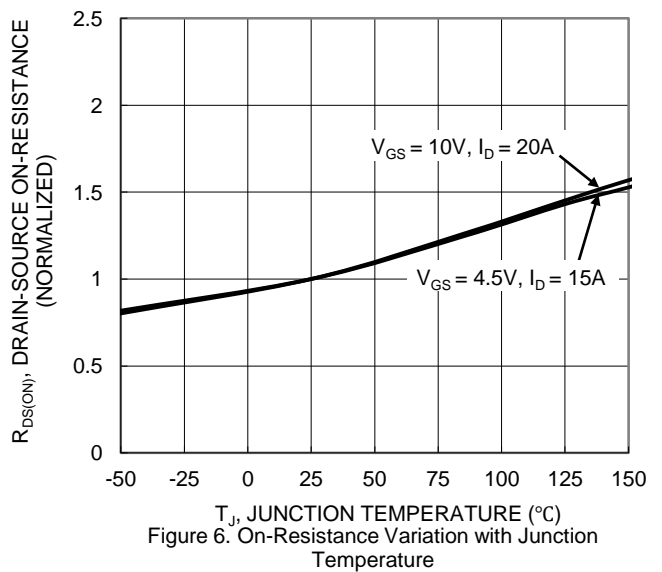
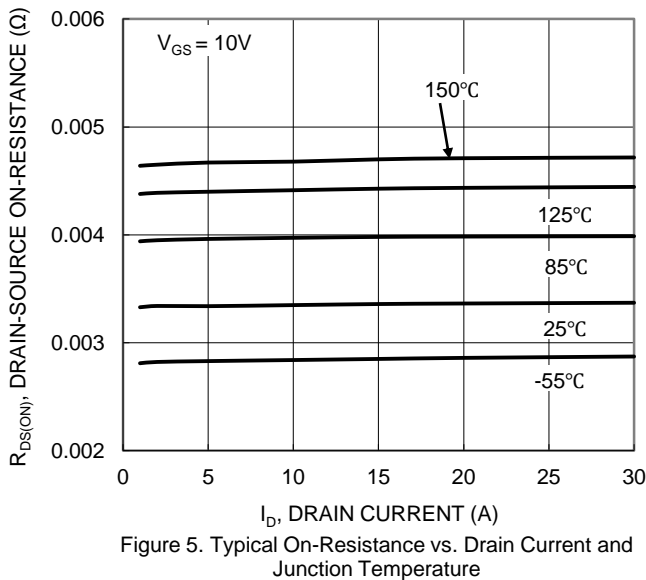
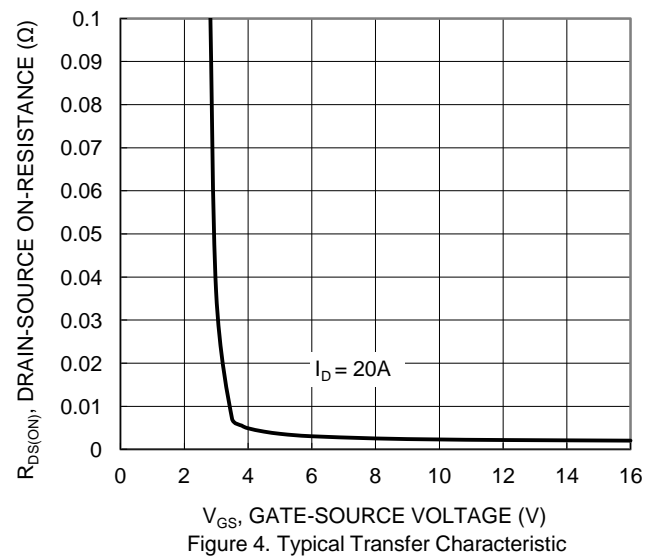
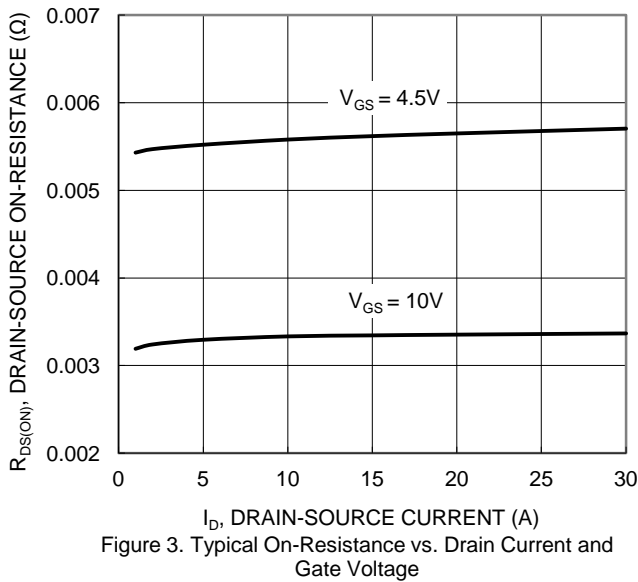
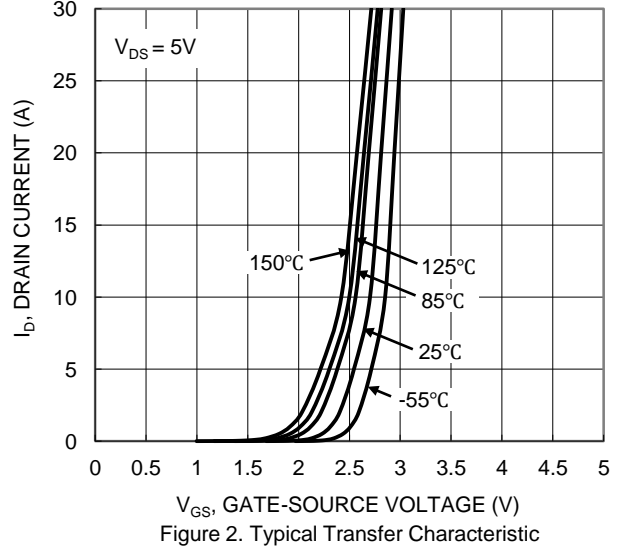
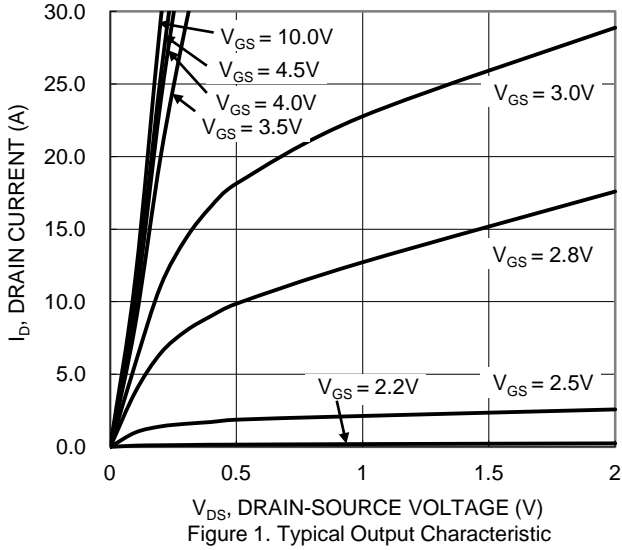
**Thermal Characteristics**

| Characteristic                                   | Symbol                            | Value                                | Unit |
|--|-----------------------------------|--------------------------------------|------|
| Total Power Dissipation                          | P <sub>D</sub>                    | T <sub>A</sub> = +25°C (Note 5): 2.7 | W    |
|  |                                   | T <sub>C</sub> = +25°C: 113          |      |
| Thermal Resistance, Junction to Ambient (Note 5) | R <sub>θJA</sub>                  | 47                                   | °C/W |
| Thermal Resistance, Junction to Case             | R <sub>θJC</sub>                  | 1.1                                  |      |
| Operating and Storage Temperature Range          | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150                          | °C   |

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

| Characteristic                            | Symbol              | Min | Typ   | Max  | Unit | Test Condition   |
|---|---------------------|-----|-------|------|------|--|
| <b>OFF CHARACTERISTICS (Note 6)</b>       |                     |     |       |      |      |  |
| Drain-Source Breakdown Voltage            | BV <sub>DSS</sub>   | 30  | —     | —    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA   |
| Zero Gate Voltage Drain Current           | I <sub>DSS</sub>    | —   | —     | 1    | μA   | V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V  |
| Gate-Source Leakage                       | I <sub>GSS</sub>    | —   | —     | ±100 | nA   | V <sub>GS</sub> = +20V, V <sub>DS</sub> = 0V<br>V <sub>GS</sub> = -16V, V <sub>DS</sub> = 0V |
| <b>ON CHARACTERISTICS (Note 6)</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> | —   | —     | 3.8  | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A  |
|   |                     | —   | —     | 6    |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 7A  |
| Diode Forward Voltage                     | V <sub>SD</sub>     | —   | 0.70  | 1    | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A  |
| <b>DYNAMIC CHARACTERISTICS (Note 7)</b>   |                     |     |       |      |      |  |
| Input Capacitance                         | C <sub>iss</sub>    | —   | 2,370 | —    | pF   | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V,<br>f = 1MHz                                     |
| Output Capacitance                        | C <sub>oss</sub>    | —   | 1,360 | —    |      |  |
| Reverse Transfer Capacitance              | C <sub>rss</sub>    | —   | 240   | —    |      |  |
| Gate Resistance                           | R <sub>g</sub>      | —   | 0.7   | —    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz   |
| Total Gate Charge (V <sub>GS</sub> = 10V) | Q <sub>g</sub>      | —   | 43.7  | —    | nC   | V <sub>DS</sub> = 15V, I <sub>D</sub> = 20A  |
| Gate-Source Charge                        | Q <sub>gs</sub>     | —   | 6.9   | —    |      |  |
| Gate-Drain Charge                         | Q <sub>gd</sub>     | —   | 8     | —    |      |  |
| Turn-On Delay Time                        | t <sub>D(ON)</sub>  | —   | 6.2   | —    | ns   | V <sub>DD</sub> = 15V, V <sub>GS</sub> = 10V,<br>R <sub>G</sub> = 3Ω, R <sub>L</sub> = 0.75Ω |
| Turn-On Rise Time                         | t <sub>r</sub>      | —   | 4.2   | —    |      |  |
| Turn-Off Delay Time                       | t <sub>D(OFF)</sub> | —   | 21    | —    |      |  |
| Turn-Off Fall Time                        | t <sub>f</sub>      | —   | 8     | —    |      |  |
| Body Diode Reverse Recovery Time          | t <sub>RR</sub>     | —   | 25    | —    | ns   | I <sub>F</sub> = 15A, di/dt = 500A/μs  |
| Body Diode Reverse Recovery Charge        | Q <sub>RR</sub>     | —   | 37    | —    | nC   |  |

- Notes:
- R<sub>θJA</sub> is determined with the device mounted on FR-4 substrate PC board, 2oz copper, with 1in. square copper plate. R<sub>θJC</sub> is guaranteed by design while R<sub>θJA</sub> is determined by the user's board design.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.



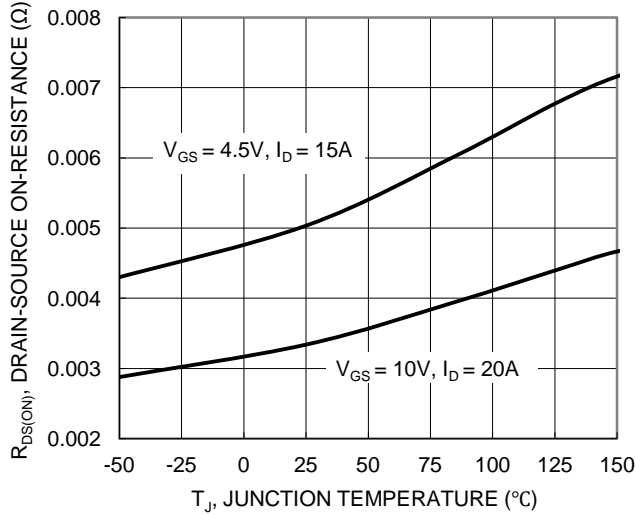


Figure 9. On-Resistance Variation with Junction Temperature

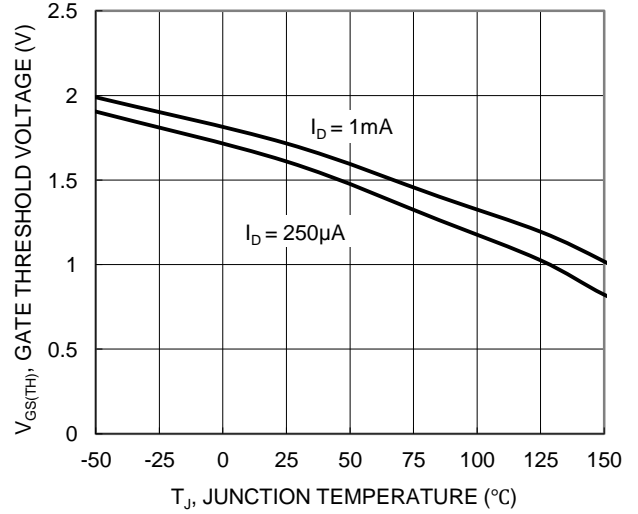


Figure 8. Gate Threshold Variation vs. Junction Temperature

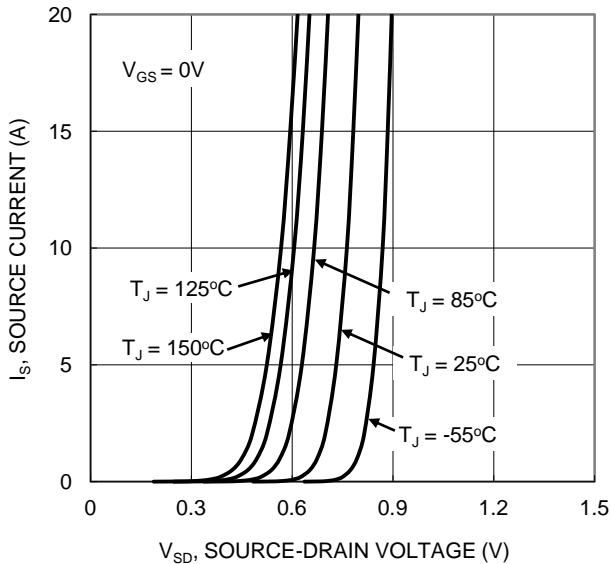


Figure 9. Diode Forward Voltage vs. Current

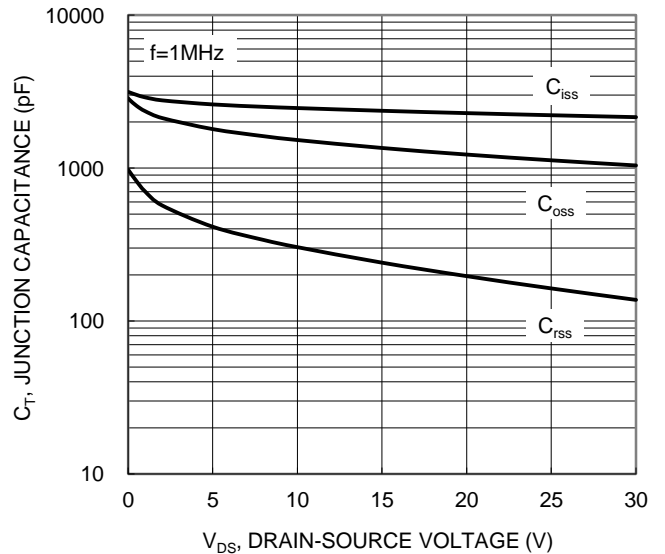


Figure 10. Typical Junction Capacitance

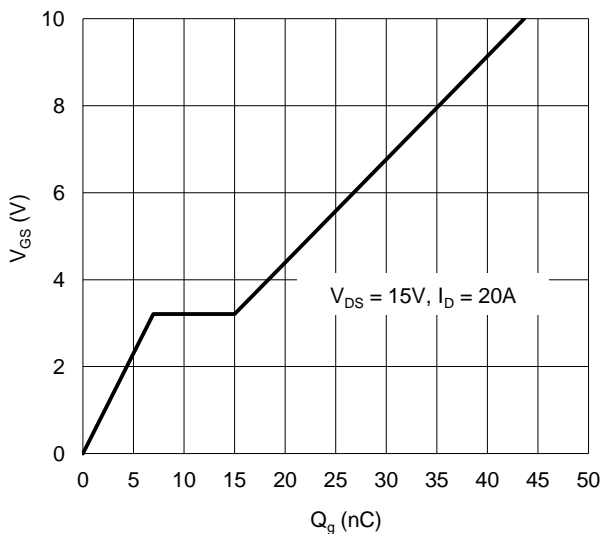


Figure 11. Gate Charge

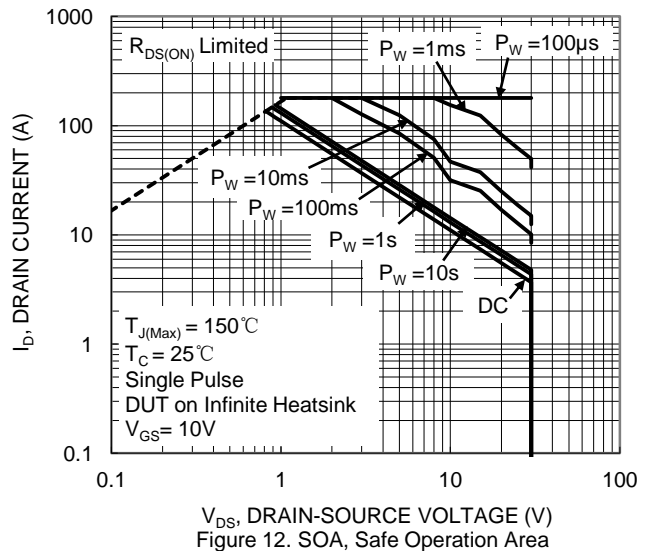


Figure 12. SOA, Safe Operation Area

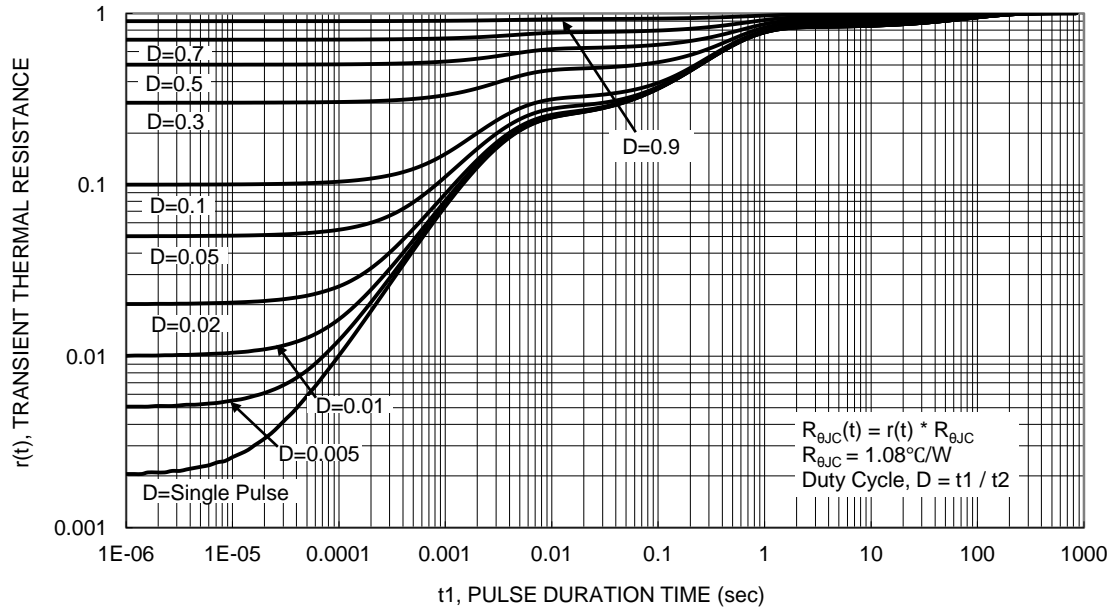
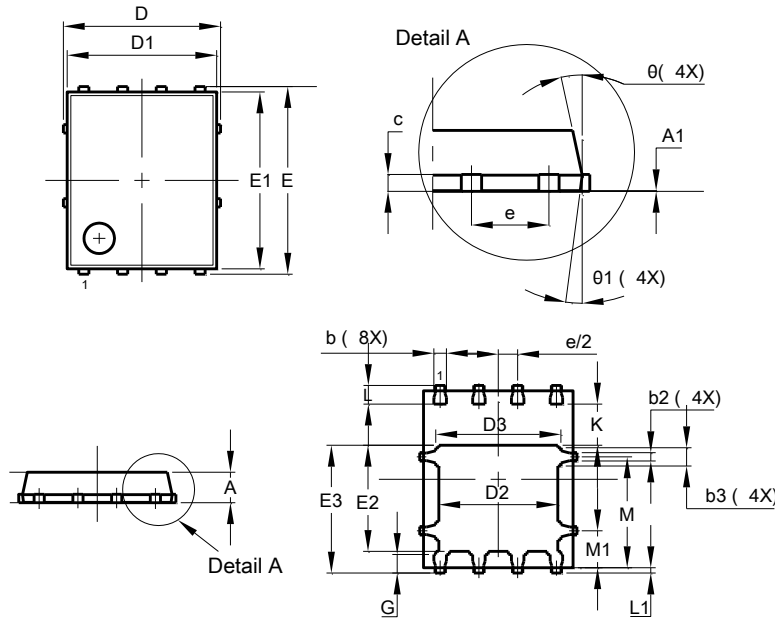


Figure 13. Transient Thermal Resistance

**Package Outline Dimensions**

Please see AP02001 at [http://www.diodes.com/\\_files/datasheets/ap02001.pdf](http://www.diodes.com/_files/datasheets/ap02001.pdf) for the latest version.

**POWERDI®5060-8**

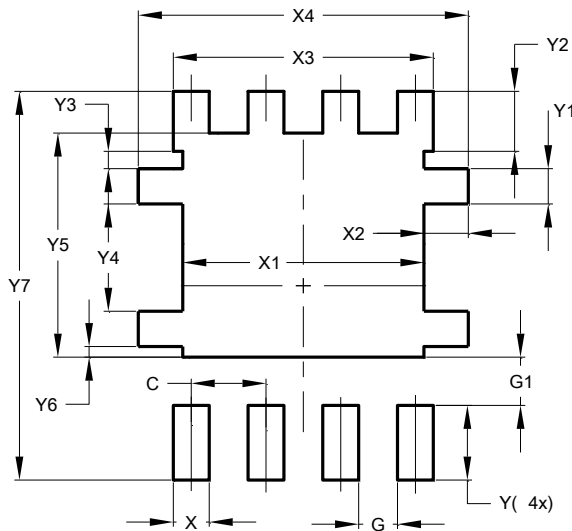


| POWERDI®5060-8       |          |       |       |
|----------------------|----------|-------|-------|
| Dim                  | Min      | Max   | Typ   |
| A                    | 0.90     | 1.10  | 1.00  |
| A1                   | 0.00     | 0.05  | —     |
| b                    | 0.33     | 0.51  | 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 AP02001 at [http://www.diodes.com/\\_files/datasheets/ap02001.pdf](http://www.diodes.com/_files/datasheets/ap02001.pdf) for the latest version.

**POWERDI®5060-8**



| 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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