

## Product Summary

| BV <sub>DSS</sub> | R <sub>DS(ON)</sub> max        | I <sub>D</sub> max<br>T <sub>A</sub> = +25°C |
|-------------------|--------------------------------|----------------------------------------------|
| 60V               | 19.5mΩ @ V <sub>GS</sub> = 10V | 7.6A                                         |
|                   | 28mΩ @ V <sub>GS</sub> = 4.5V  | 6.2A                                         |

## Description and Applications

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

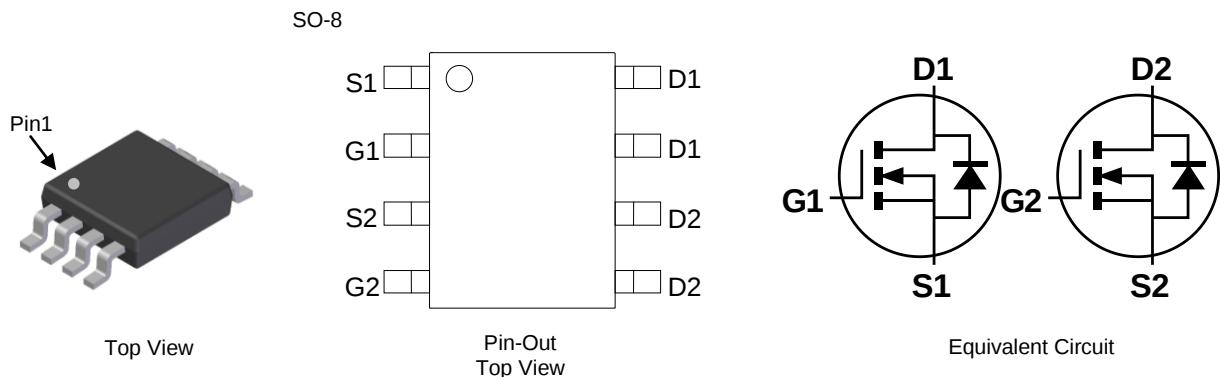
- Load Switch
- Adaptor Switch
- Notebook PC

## Features and Benefits

- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching – ensures more reliable and robust end application
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([DMTH6016LSDQ](#))**

## Mechanical Data

- Case: SO-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 
- Weight: 0.076 grams (Approximate)

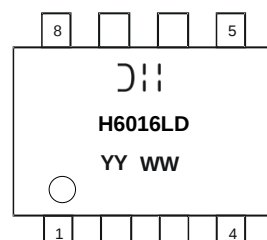


## Ordering Information (Note 4)

| Part Number    | Case | Packaging        |
|----------------|------|------------------|
| DMTH6016LSD-13 | SO-8 | 2500/Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  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



 = Manufacturer's Marking  
 H6016LD = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY or YY = Year (ex: 16 = 2016)  
 WW = Week (01 to 53)

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

| Characteristic                                                  | Symbol           | Value                          | Units |
|-----------------------------------------------------------------|------------------|--------------------------------|-------|
| Drain-Source Voltage                                            | V <sub>DSS</sub> | 60                             | V     |
| Gate-Source Voltage                                             | V <sub>GSS</sub> | ±20                            | V     |
| Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V         | I <sub>D</sub>   | T <sub>A</sub> = +25°C<br>7.6  | A     |
|                                                                 |                  | T <sub>A</sub> = +100°C<br>5.4 |       |
| Continuous Drain Current (Note 6) V <sub>GS</sub> = 4.5V        | I <sub>D</sub>   | T <sub>A</sub> = +25°C<br>6.2  | A     |
|                                                                 |                  | T <sub>A</sub> = +100°C<br>4.4 |       |
| Pulsed Drain Current (10µs pulse, duty cycle = 1%)              | I <sub>DM</sub>  | 40                             | A     |
| Maximum Continuous Body Diode Forward Current                   | I <sub>S</sub>   | 1.7                            | A     |
| Pulsed Body Diode Forward Current (10µs pulse, duty cycle = 1%) | I <sub>SM</sub>  | 40                             | A     |
| Avalanche Current, L = 0.1mH                                    | I <sub>AS</sub>  | 15.3                           | A     |
| Avalanche Energy, L = 0.1mH                                     | E <sub>AS</sub>  | 11.7                           | mJ    |

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

| Characteristic                                   | Symbol                            | Value       | Units |
|--------------------------------------------------|-----------------------------------|-------------|-------|
| Total Power Dissipation (Note 5)                 | P <sub>D</sub>                    | 1.4         | W     |
| Thermal Resistance, Junction to Ambient (Note 5) | R <sub>θJA</sub>                  | 103         | °C/W  |
| Total Power Dissipation (Note 6)                 | P <sub>D</sub>                    | 1.9         | W     |
| Thermal Resistance, Junction to Ambient (Note 6) | R <sub>θJA</sub>                  | 77          | °C/W  |
| Thermal Resistance, Junction to Case             | R <sub>θJC</sub>                  | 14.5        | °C/W  |
| Operating and Storage Temperature Range          | T <sub>J</sub> , T <sub>STG</sub> | -55 to +175 | °C    |

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

| Characteristic                             | Symbol              | Min | Typ | Max  | Unit | Test Condition                                                                             |
|--------------------------------------------|---------------------|-----|-----|------|------|--------------------------------------------------------------------------------------------|
| <b>OFF CHARACTERISTICS (Note 7)</b>        |                     |     |     |      |      |                                                                                            |
| Drain-Source Breakdown Voltage             | BV <sub>DSS</sub>   | 60  | —   | —    | 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> = 48V, V <sub>GS</sub> = 0V                                                |
| Gate-Source Leakage                        | I <sub>GSS</sub>    | —   | —   | ±100 | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V                                               |
| <b>ON CHARACTERISTICS (Note 7)</b>         |                     |     |     |      |      |                                                                                            |
| Gate Threshold Voltage                     | V <sub>GS(TH)</sub> | 1   | —   | 2.5  | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA                                 |
| Static Drain-Source On-Resistance          | R <sub>DS(ON)</sub> | —   | 15  | 19.5 | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 10A                                                |
|                                            |                     | —   | 21  | 28   |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 6A                                                |
| Diode Forward Voltage                      | V <sub>SD</sub>     | —   | 0.7 | 1.2  | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A                                                  |
| <b>DYNAMIC CHARACTERISTICS (Note 8)</b>    |                     |     |     |      |      |                                                                                            |
| Input Capacitance                          | C <sub>iss</sub>    | —   | 864 | —    | pF   | V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V,<br>f = 1MHz                                   |
| Output Capacitance                         | C <sub>oss</sub>    | —   | 282 | —    |      |                                                                                            |
| Reverse Transfer Capacitance               | C <sub>rss</sub>    | —   | 27  | —    |      |                                                                                            |
| Gate Resistance                            | R <sub>g</sub>      | —   | 1.3 | —    | 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>      | —   | 8.4 | —    | nC   | V <sub>DS</sub> = 30V, I <sub>D</sub> = 10A                                                |
| Total Gate Charge (V <sub>GS</sub> = 10V)  | Q <sub>g</sub>      | —   | 17  | —    |      |                                                                                            |
| Gate-Source Charge                         | Q <sub>gs</sub>     | —   | 3.1 | —    |      |                                                                                            |
| Gate-Drain Charge                          | Q <sub>gd</sub>     | —   | 4.3 | —    |      |                                                                                            |
| Turn-On Delay Time                         | t <sub>D(ON)</sub>  | —   | 3.4 | —    | ns   | V <sub>GS</sub> = 10V, V <sub>DS</sub> = 30V,<br>R <sub>G</sub> = 6Ω, I <sub>D</sub> = 10A |
| Turn-On Rise Time                          | t <sub>R</sub>      | —   | 5.2 | —    |      |                                                                                            |
| Turn-Off Delay Time                        | t <sub>D(OFF)</sub> | —   | 13  | —    |      |                                                                                            |
| Turn-Off Fall Time                         | t <sub>F</sub>      | —   | 7   | —    |      |                                                                                            |
| Reverse Recovery Time                      | t <sub>RR</sub>     | —   | 22  | —    | ns   | I <sub>F</sub> = 10A, di/dt = 100A/µs                                                      |
| Reverse Recovery Charge                    | Q <sub>RR</sub>     | —   | 11  | —    | nC   |                                                                                            |

- Notes: 5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.  
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.  
7. Short duration pulse test used to minimize self-heating effect.  
8. Guaranteed by design. Not subject to product testing.

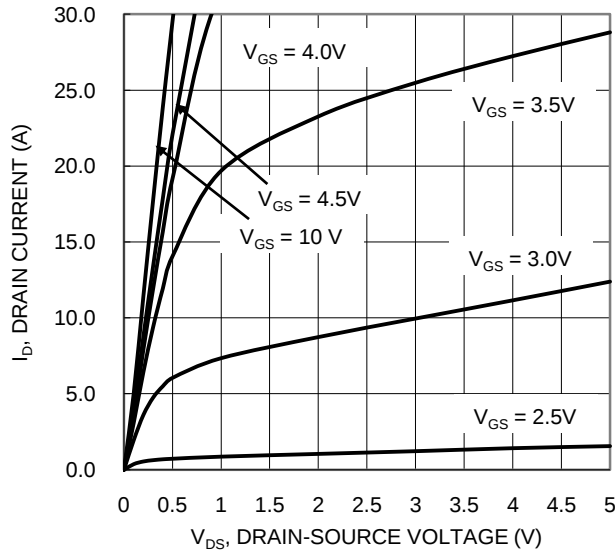


Figure 1. Typical Output Characteristic

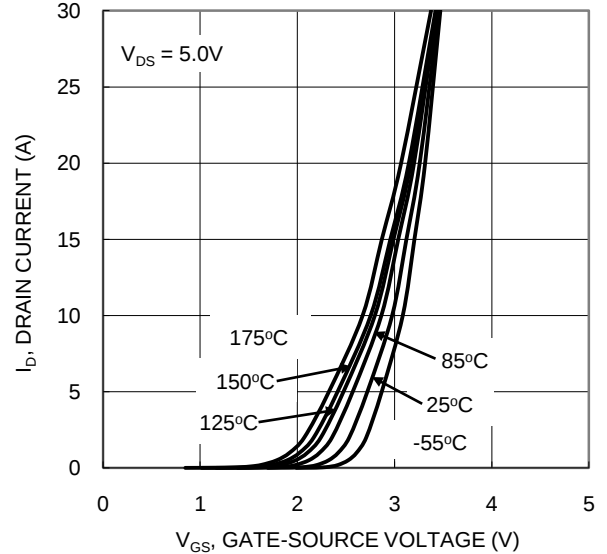


Figure 2. Typical Transfer Characteristic

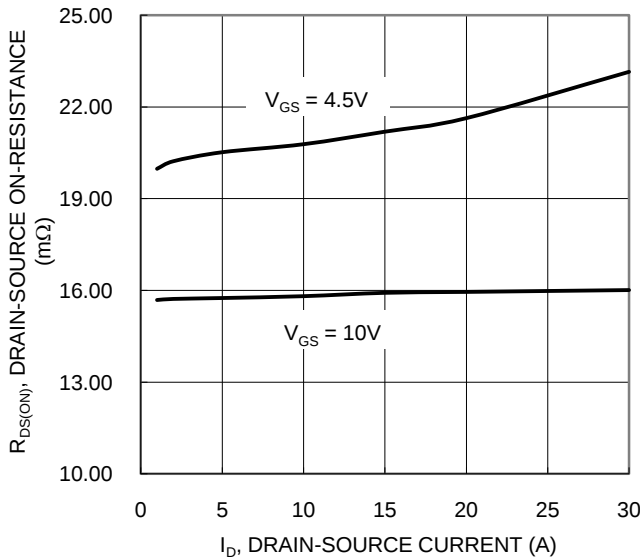


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

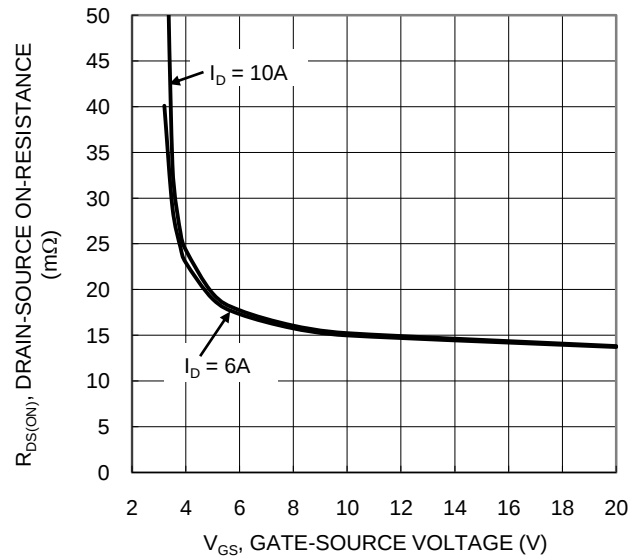


Figure 4. Typical Transfer Characteristic

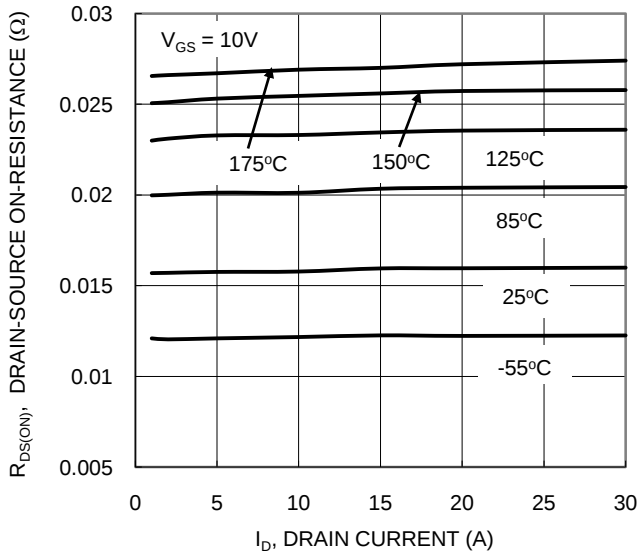


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

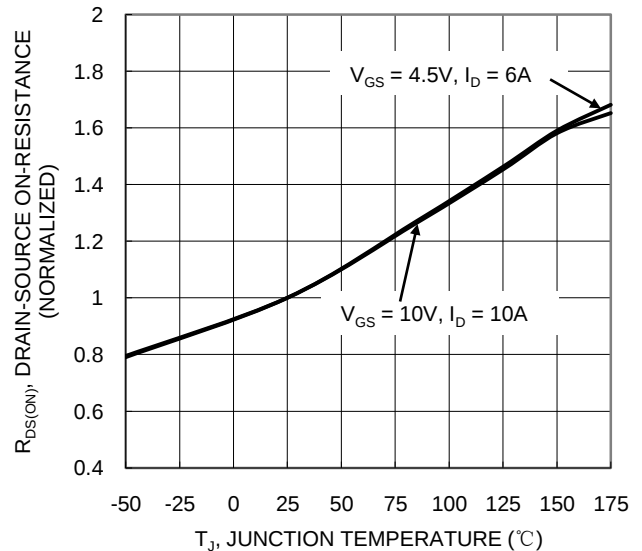
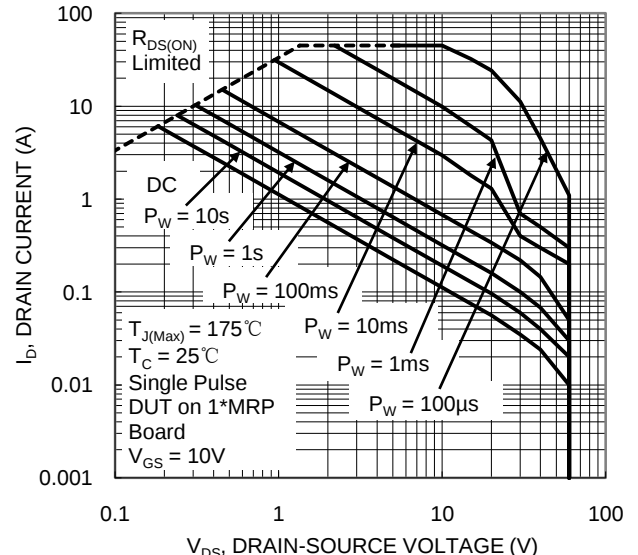
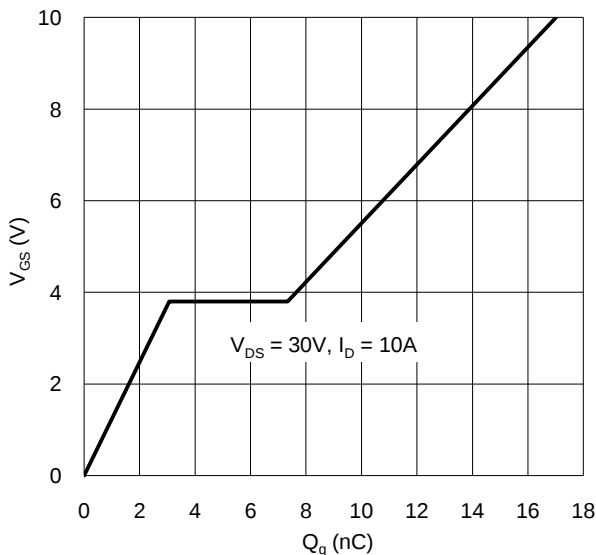
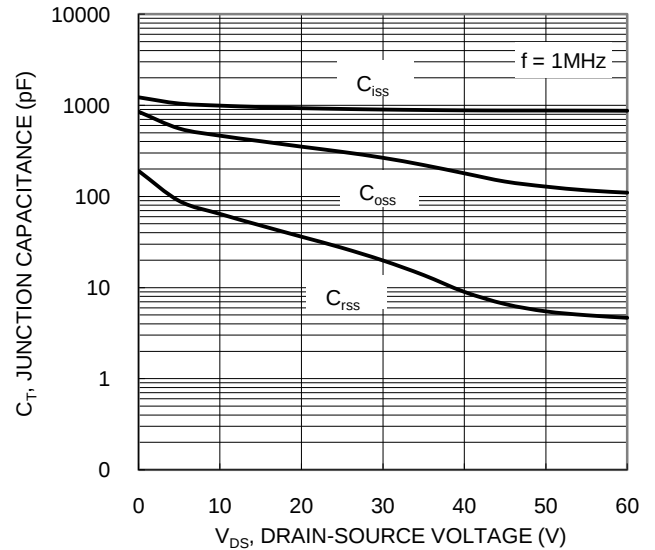
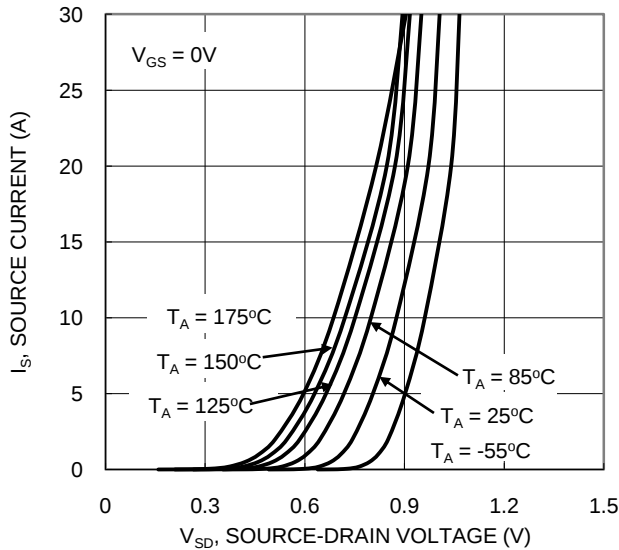
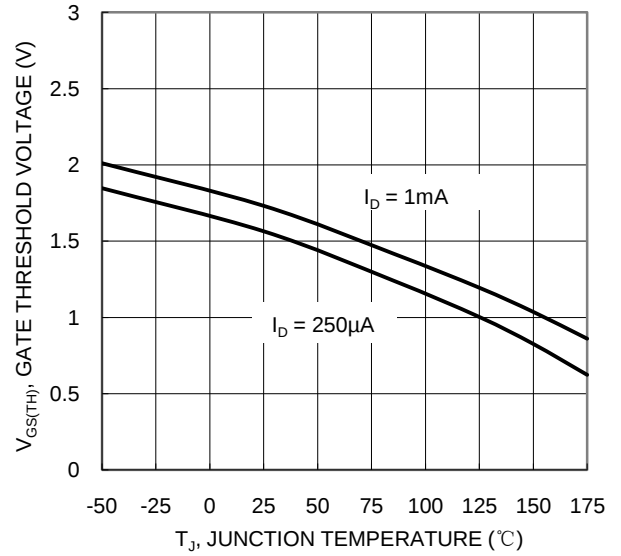
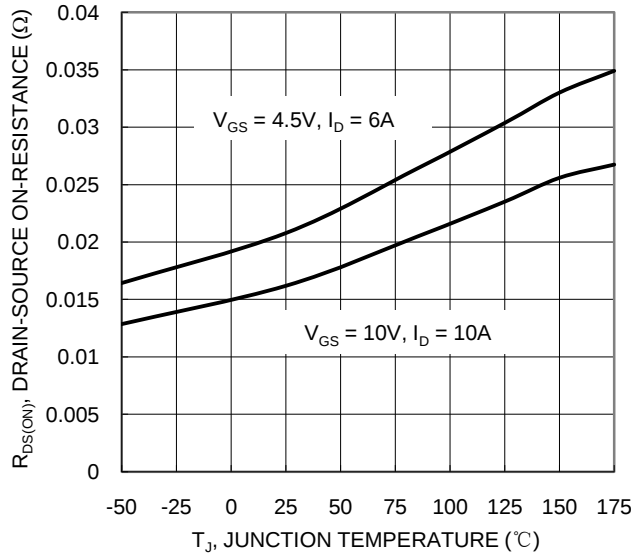


Figure 6. On-Resistance Variation with Temperature



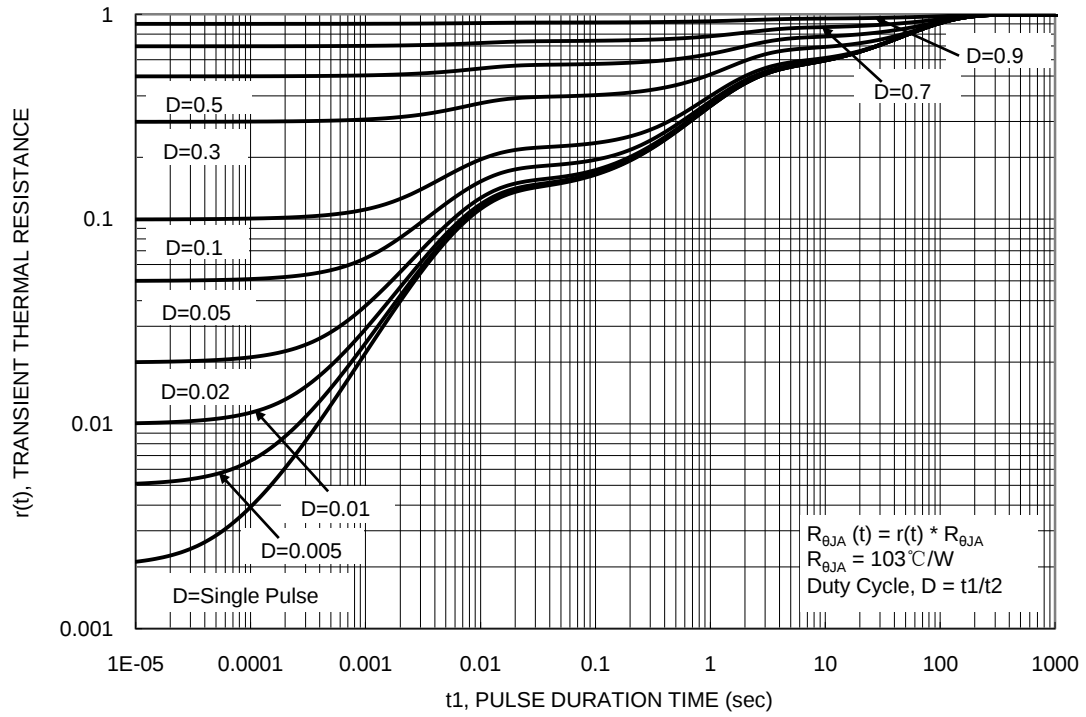
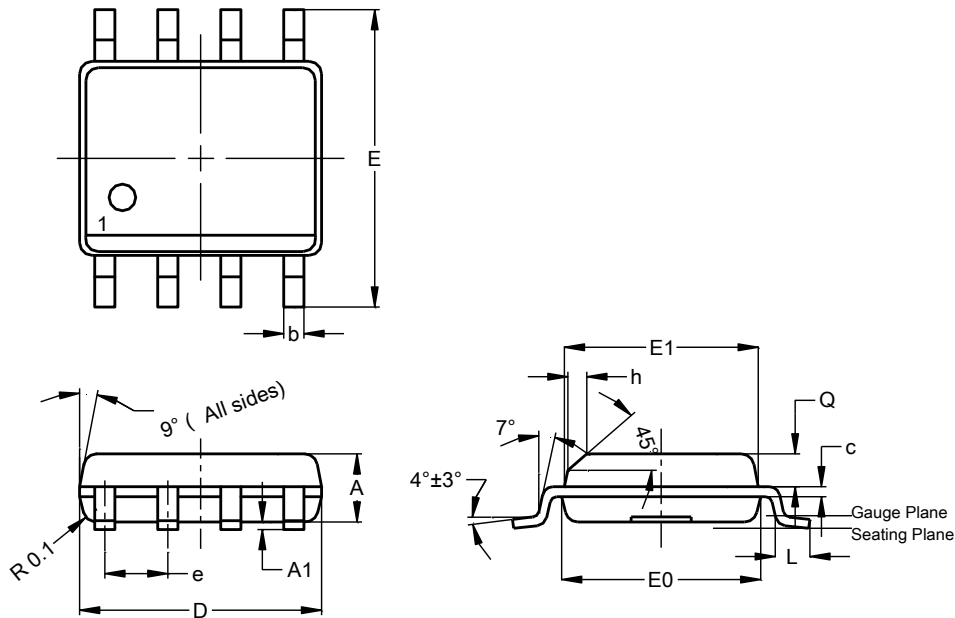


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

### SO-8

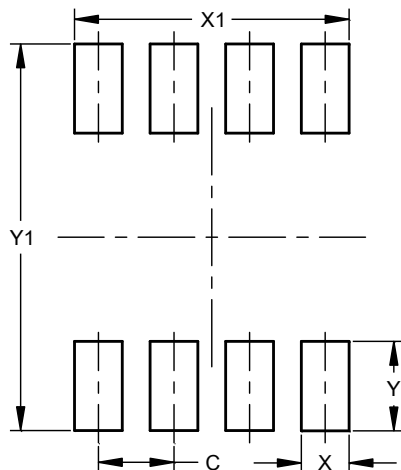


| SO-8                 |      |      |      |
|----------------------|------|------|------|
| Dim                  | Min  | Max  | Typ  |
| A                    | 1.40 | 1.50 | 1.45 |
| A1                   | 0.10 | 0.20 | 0.15 |
| b                    | 0.30 | 0.50 | 0.40 |
| c                    | 0.15 | 0.25 | 0.20 |
| D                    | 4.85 | 4.95 | 4.90 |
| E                    | 5.90 | 6.10 | 6.00 |
| E1                   | 3.80 | 3.90 | 3.85 |
| E0                   | 3.85 | 3.95 | 3.90 |
| e                    | --   | --   | 1.27 |
| h                    | -    | --   | 0.35 |
| L                    | 0.62 | 0.82 | 0.72 |
| Q                    | 0.60 | 0.70 | 0.65 |
| All Dimensions in mm |      |      |      |

## Suggested Pad Layout

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

### SO-8



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 1.27          |
| X          | 0.802         |
| X1         | 4.612         |
| Y          | 1.505         |
| Y1         | 6.50          |

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