

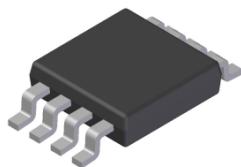
## Product Summary

| <b>BV<sub>DSS</sub></b> | <b>R<sub>DS(ON)</sub> Max</b> | <b>I<sub>D</sub> Max</b><br><b>T<sub>C</sub> = +25°C</b> |
|-------------------------|-------------------------------|--|
| 60V                     | 50mΩ @ V <sub>GS</sub> = 10V  | 16.7A  |
|                         | 65mΩ @ V <sub>GS</sub> = 4.5V | 14.6A  |

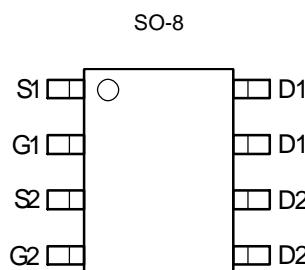
## Description and Applications

This new generation MOSFET is designed to minimize the on-state resistance  $R_{DS(ON)}$ , yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

- Engine Management Systems
- Body Control Electronics
- DC-DC Converters



Top View



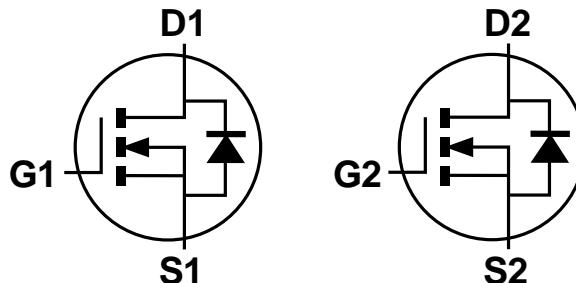
Top View  
Pin Configuration

## 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  $R_{DS(ON)}$  – Minimizes Power Losses
- Low  $Q_g$  – Minimizes Switching Losses
- 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 ([DMNH6042SSDQ](#))

## 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
- Terminal Connections Indicator: See Diagram
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.076 grams (Approximate)



Equivalent Circuit

## Ordering Information (Note 4)

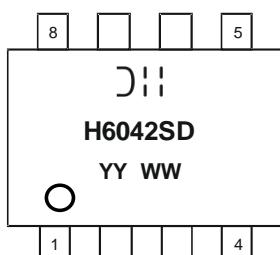
| Part Number    | Case | Packaging         |
|----------------|------|-------------------|
| DMNH6042SSD-13 | SO-8 | 2,500/Tape & Reel |

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

SO-8



D11 = Manufacturer's Marking  
H6042SD = Product Type Marking Code  
YYWW = Date Code Marking  
YY = Year (ex: 16 = 2016)  
WW = Week (01 to 53)

**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic   |              |   | Symbol    | Value      | Units |
|--|--------------|---|-----------|------------|-------|
| Drain-Source Voltage   |              |   | $V_{DSS}$ | 60         | V     |
| Gate-Source Voltage  |              |   | $V_{GSS}$ | $\pm 20$   | V     |
| Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$        | Steady State | $T_A = +25^\circ\text{C}$<br>$T_A = +70^\circ\text{C}$  | $I_D$     | 5.3<br>4.4 | A     |
|  | Steady State | $T_C = +25^\circ\text{C}$<br>$T_C = +100^\circ\text{C}$ | $I_D$     | 16.7<br>14 | A     |
| Pulsed Drain Current (10 $\mu\text{s}$ pulse, duty cycle = 1%) |              |   | $I_{DM}$  | 35         | A     |
| Maximum Continuous Body Diode Forward Current (Note 6)         |              |   | $I_S$     | 2.3        | A     |
| Avalanche Current (Note 7) $L = 10\text{mH}$                   |              |   | $I_{AS}$  | 3.5        | A     |
| Avalanche Energy (Note 7) $L = 10\text{mH}$                    |              |   | $E_{AS}$  | 65         | mJ    |

**Thermal Characteristics**

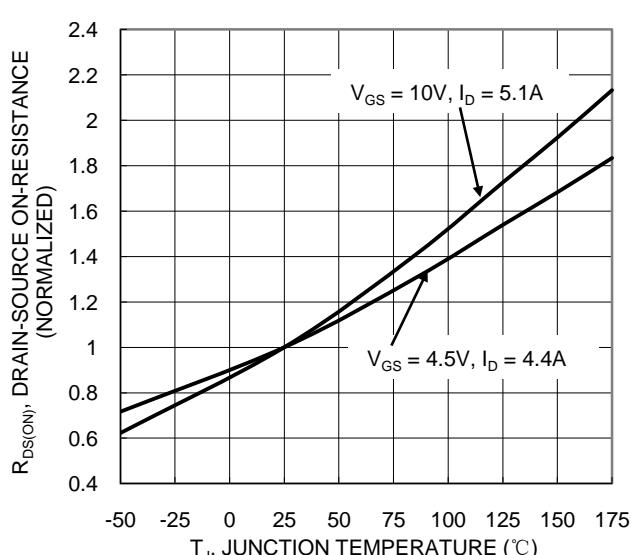
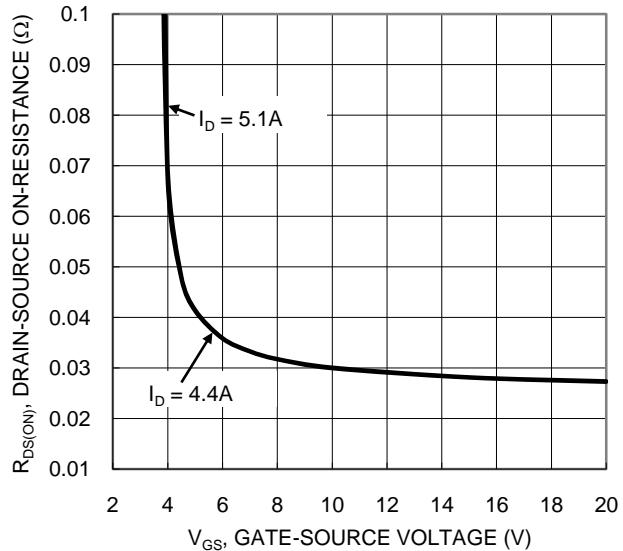
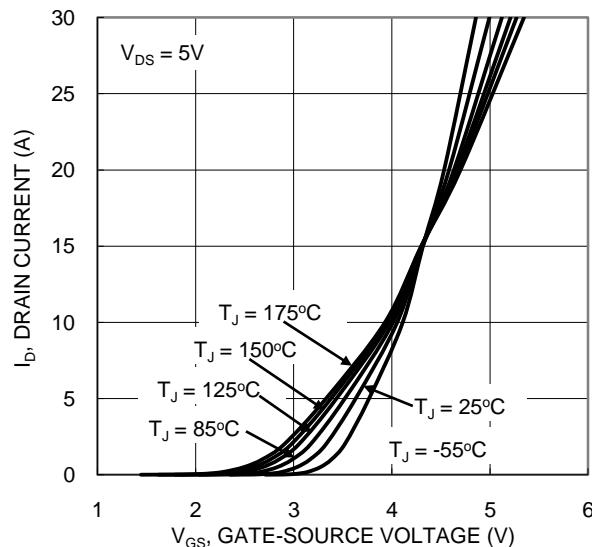
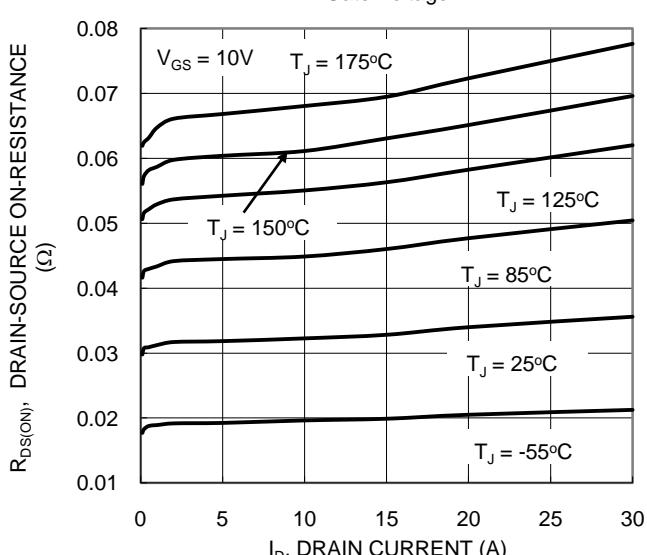
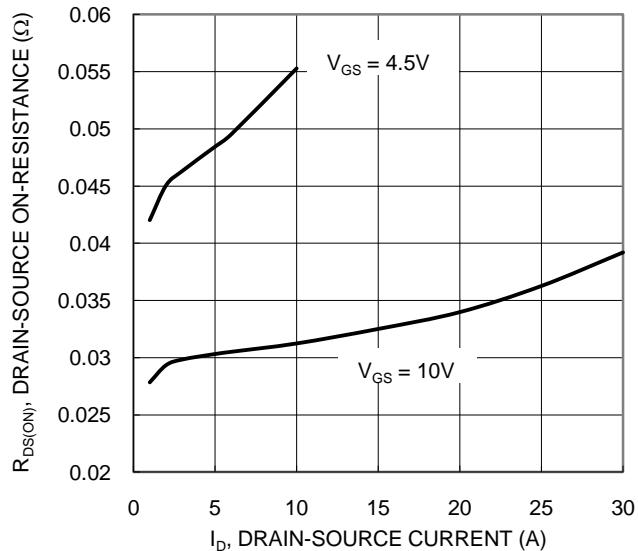
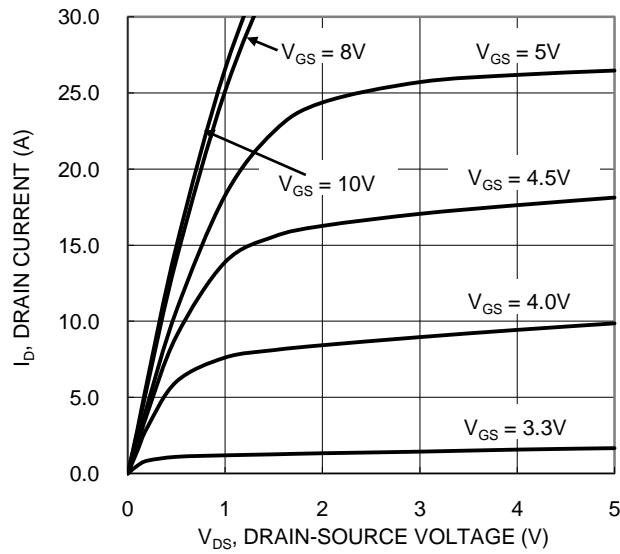
| Characteristic                                   |                  | Symbol          | Value       | Units                     |
|--|------------------|-----------------|-------------|---------------------------|
| Total Power Dissipation (Note 5)                 |                  | $P_D$           | 1.5         | W                         |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady State     | $R_{\theta JA}$ | 100         | $^\circ\text{C}/\text{W}$ |
|  | $t < 10\text{s}$ |                 | 61          |                           |
| Total Power Dissipation (Note 6)                 |                  | $P_D$           | 2.1         | W                         |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady State     | $R_{\theta JA}$ | 72          | $^\circ\text{C}/\text{W}$ |
|  | $t < 10\text{s}$ |                 | 44          |                           |
| Thermal Resistance, Junction to Case (Note 6)    |                  | $R_{\theta JC}$ | 7.25        |                           |
| Operating and Storage Temperature Range          |                  | $T_J, T_{STG}$  | -55 to +175 | $^\circ\text{C}$          |

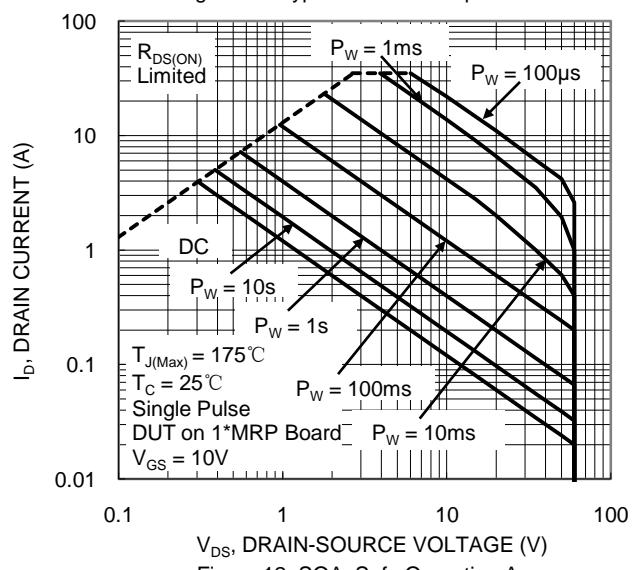
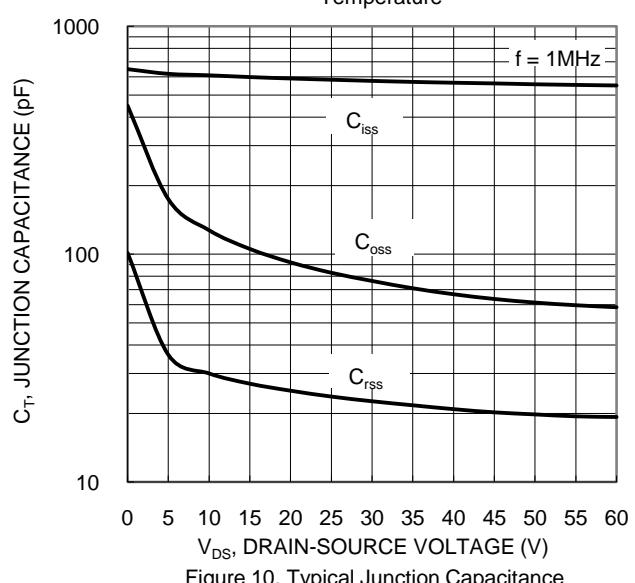
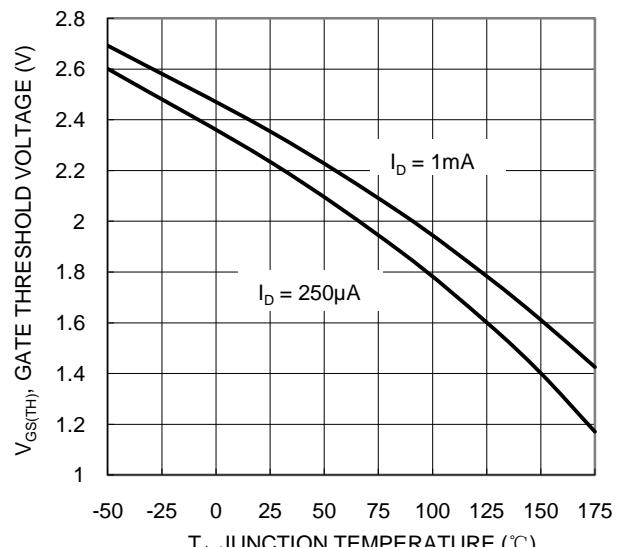
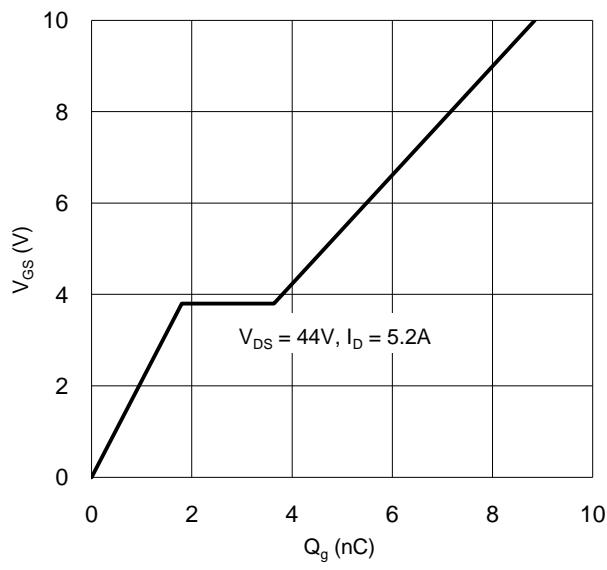
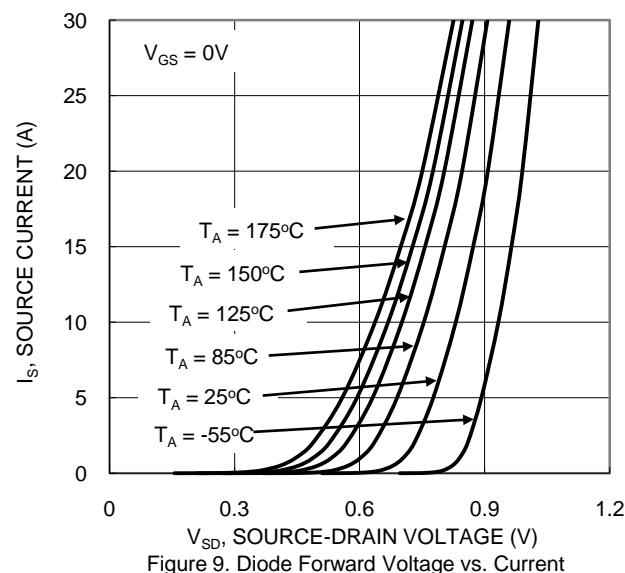
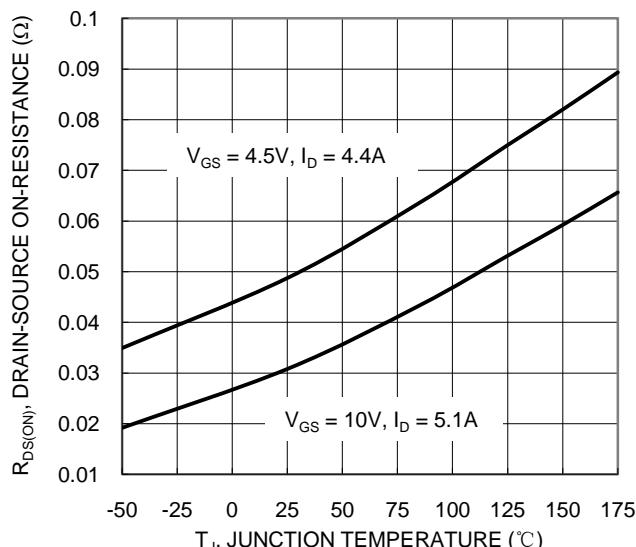
**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic  | Symbol       | Min | Typ  | Max       | Unit             | Test Condition   |
|---|--------------|-----|------|-----------|------------------|--|
| <b>OFF CHARACTERISTICS</b> (Note 8)                       |              |     |      |           |                  |  |
| Drain-Source Breakdown Voltage                            | $BV_{DSS}$   | 60  | —    | —         | V                | $V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$                                 |
| Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$ | $I_{DSS}$    | —   | —    | 1         | $\mu\text{A}$    | $V_{DS} = 60\text{V}, V_{GS} = 0\text{V}$                                  |
| Gate-Source Leakage                                       | $I_{GSS}$    | —   | —    | $\pm 100$ | nA               | $V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$                              |
| <b>ON CHARACTERISTICS</b> (Note 8)                        |              |     |      |           |                  |  |
| Gate Threshold Voltage                                    | $V_{GS(TH)}$ | 1.0 | —    | 3.0       | V                | $V_{DS} = V_{GS}, I_D = 250\mu\text{A}$                                    |
| Static Drain-Source On-Resistance                         | $R_{DS(ON)}$ | —   | 34   | 50        | $\text{m}\Omega$ | $V_{GS} = 10\text{V}, I_D = 5.1\text{A}$                                   |
|   |              | —   | 45   | 65        |                  | $V_{GS} = 4.5\text{V}, I_D = 4.4\text{A}$                                  |
| Diode Forward Voltage                                     | $V_{SD}$     | —   | 0.8  | 1.2       | V                | $V_{GS} = 0\text{V}, I_S = 2.6\text{A}$                                    |
| <b>DYNAMIC CHARACTERISTICS</b> (Note 9)                   |              |     |      |           |                  |  |
| Input Capacitance   | $C_{iss}$    | —   | 584  | —         | pF               | $V_{DS} = 25\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$               |
| Output Capacitance  | $C_{oss}$    | —   | 83   | —         | pF               |  |
| Reverse Transfer Capacitance                              | $C_{rss}$    | —   | 24   | —         | pF               |  |
| Gate Resistance   | $R_g$        | —   | 3.8  | —         | $\Omega$         | $V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$                  |
| Total Gate Charge ( $V_{GS} = 4.5\text{V}$ )              | $Q_g$        | —   | 4.2  | —         | nC               | $V_{DS} = 44\text{V}, I_D = 5.2\text{A}$                                   |
| Total Gate Charge ( $V_{GS} = 10\text{V}$ )               | $Q_g$        | —   | 8.8  | —         | nC               |  |
| Gate-Source Charge  | $Q_{qs}$     | —   | 1.8  | —         | nC               |  |
| Gate-Drain Charge   | $Q_{qd}$     | —   | 1.8  | —         | nC               |  |
| Turn-On Delay Time  | $t_{D(ON)}$  | —   | 3.4  | —         | ns               | $V_{GS} = 10\text{V}, V_{DS} = 30\text{V}, R_G = 6\Omega, I_D = 1\text{A}$ |
| Turn-On Rise Time   | $t_R$        | —   | 1.9  | —         | ns               |  |
| Turn-Off Delay Time                                       | $t_{D(OFF)}$ | —   | 10.1 | —         | ns               |  |
| Turn-Off Fall Time  | $t_F$        | —   | 4.5  | —         | ns               |  |
| Body Diode Reverse Recovery Time                          | $t_{RR}$     | —   | 12.9 | —         | ns               | $I_F = 2.6\text{A}, di/dt = 100\text{A}/\mu\text{s}$                       |
| Body Diode Reverse Recovery Charge                        | $Q_{RR}$     | —   | 5.4  | —         | 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.  $I_{AS}$  and  $E_{AS}$  rating are based on low frequency and duty cycles to keep  $T_J = +25^\circ\text{C}$ .
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.





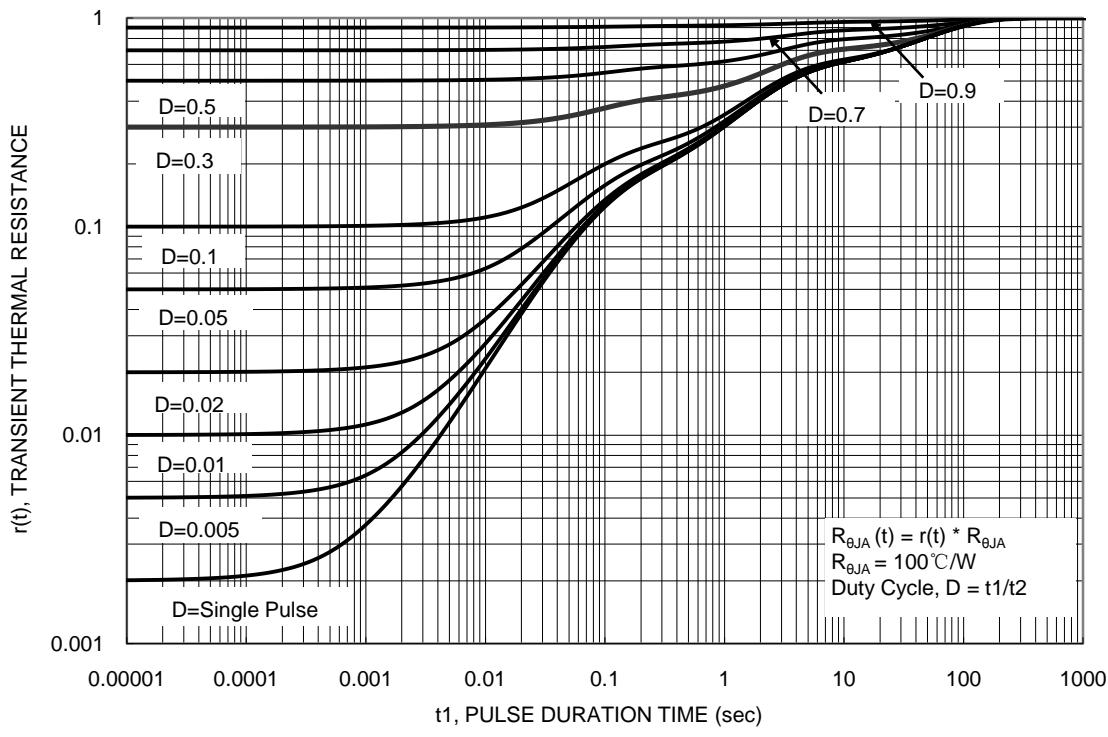
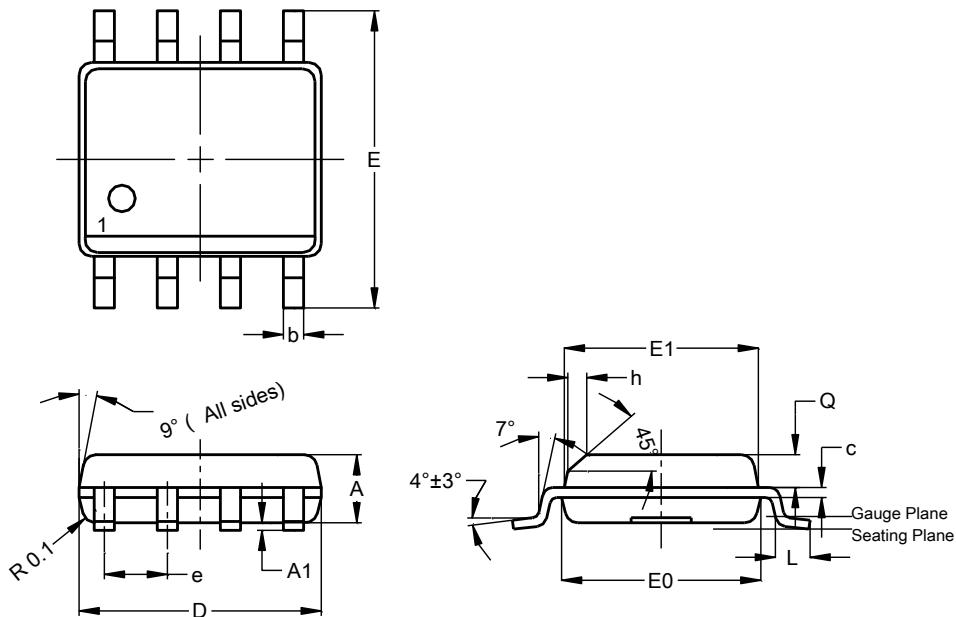


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

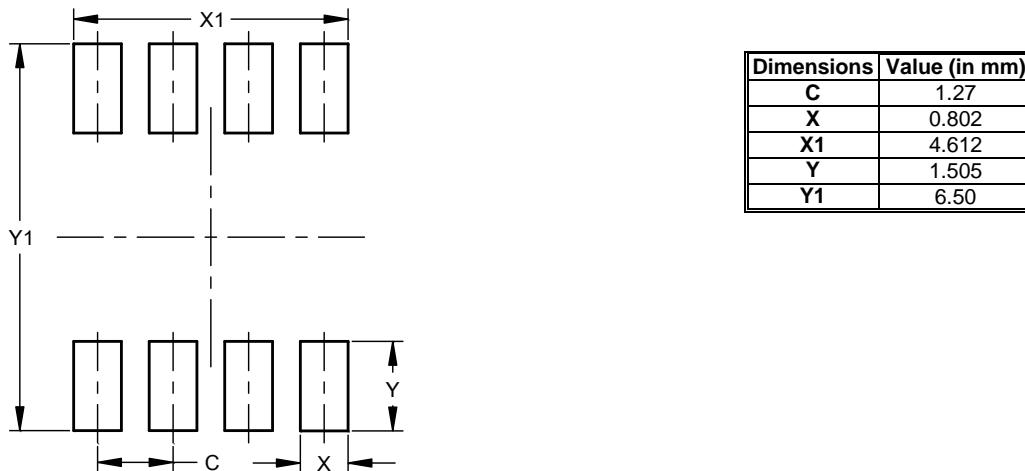
SO-8



## Suggested Pad Layout

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

SO-8



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