

## Product Summary

| $BV_{DSS}$ | $R_{DS(ON)}$ Max               | $I_D$<br>$T_A = +25^\circ C$ |
|------------|--------------------------------|------------------------------|
| 100V       | 15m $\Omega$ @ $V_{GS} = 10V$  | 8.9A                         |
|            | 18m $\Omega$ @ $V_{GS} = 6.0V$ | 7.9A                         |

## Features and Benefits

- 100% Unclamped Inductive Switch (UIS) Test in Production
- High Conversion Efficiency
- Low  $R_{DS(ON)}$  – Minimizes On-State Losses
- 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**

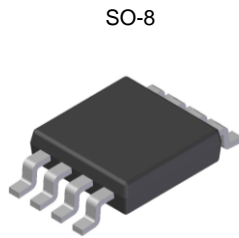
## Description and Applications

This new generation N-Channel Enhancement Mode MOSFET is designed to minimize  $R_{DS(ON)}$ , yet maintain superior switching performance. This device is ideal for use in notebook battery power management and load switch.

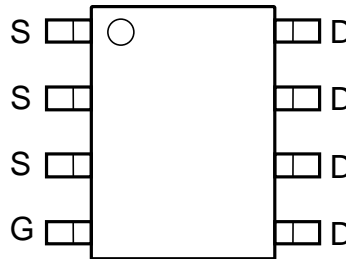
- Backlighting
- Power Management Functions
- DC-DC Converters

## Mechanical Data

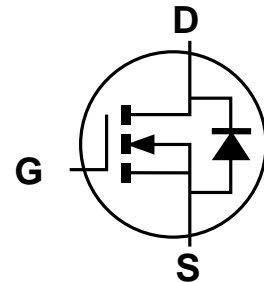
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.074 grams (Approximate)



Top View



Top View



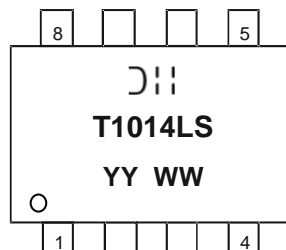
Equivalent Circuit

## Ordering Information (Note 4)

| Part Number     | Case | Packaging         |
|-----------------|------|-------------------|
| DMT10H014LSS-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



☺☺☺ = Manufacturer's Marking  
 T1014LS = 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  | Unit |   |
|---|------------------|--|------|---|
| Drain-Source Voltage                                    | V <sub>DSS</sub> | 100  | V    |   |
| Gate-Source Voltage                                     | V <sub>GSS</sub> | ±20  | V    |   |
| Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V | I <sub>D</sub>   | Steady State                                     | 8.9  | A |
|   |                  | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +70°C | 7.1  | A |
| Maximum Continuous Body Diode Forward Current (Note 6)  | I <sub>S</sub>   | 3  | A    |   |
| Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)      | I <sub>DM</sub>  | 54   | A    |   |
| Avalanche Current, L = 3mH                              | I <sub>AS</sub>  | 7.5  | A    |   |
| Avalanche Energy, L = 3mH                               | E <sub>AS</sub>  | 85   | mJ   |   |

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

| Characteristic                                   | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5)                 | P <sub>D</sub>                    | 1.2         | W    |
| Thermal Resistance, Junction to Ambient (Note 5) | R <sub>θJA</sub>                  | 100         | °C/W |
| Total Power Dissipation (Note 6)                 | P <sub>D</sub>                    | 1.67        | W    |
| Thermal Resistance, Junction to Ambient (Note 6) | R <sub>θJA</sub>                  | 75          | °C/W |
| Thermal Resistance, Junction to Case (Note 6)    | R <sub>θJC</sub>                  | 12          | °C/W |
| 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 7)</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> = ±20V, V <sub>DS</sub> = 0V   |
| <b>ON CHARACTERISTICS (Note 7)</b>      |                     |     |      |      |      |  |
| Gate Threshold Voltage                  | V <sub>GS(TH)</sub> | 1.4 | 2    | 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> | —   | 11.5 | 15   | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A  |
|   |                     | —   | 15   | 18   |      | V <sub>GS</sub> = 6V, I <sub>D</sub> = 20A   |
|   |                     | —   | 17.5 | 25   |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 5A  |
|   |                     | —   | —    | —    |      | V <sub>GS</sub> = 0V, I <sub>S</sub> = 20A   |
| Diode Forward Voltage                   | V <sub>SD</sub>     | —   | 0.9  | 1.3  | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 20A   |
| <b>DYNAMIC CHARACTERISTICS (Note 8)</b> |                     |     |      |      |      |  |
| Input Capacitance                       | C <sub>ISS</sub>    | —   | 1871 | —    | pF   | V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V<br>f = 1MHz                                    |
| Output Capacitance                      | C <sub>OSS</sub>    | —   | 261  | —    |      |  |
| Reverse Transfer Capacitance            | C <sub>RSS</sub>    | —   | 7    | —    |      |  |
| Gate Resistance                         | R <sub>G</sub>      | —   | 0.75 | —    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz                                       |
| Total Gate Charge                       | Q <sub>g</sub>      | —   | 33.3 | —    | nC   | V <sub>DD</sub> = 50V, I <sub>D</sub> = 10A,<br>V <sub>GS</sub> = 10V                      |
| Gate-Source Charge                      | Q <sub>gs</sub>     | —   | 6.9  | —    |      |  |
| Gate-Drain Charge                       | Q <sub>gd</sub>     | —   | 5.1  | —    |      |  |
| Turn-On Delay Time                      | t <sub>D(ON)</sub>  | —   | 6.5  | —    | ns   | V <sub>DD</sub> = 50V, V <sub>GS</sub> = 10V,<br>I <sub>D</sub> = 10A, R <sub>G</sub> = 6Ω |
| Turn-On Rise Time                       | t <sub>R</sub>      | —   | 7    | —    |      |  |
| Turn-Off Delay Time                     | t <sub>D(OFF)</sub> | —   | 19.7 | —    |      |  |
| Turn-Off Fall Time                      | t <sub>F</sub>      | —   | 8.1  | —    |      |  |
| Reverse Recovery Time                   | t <sub>RR</sub>     | —   | 37.9 | —    | ns   | I <sub>F</sub> = 10A, di/dt = 100A/µs  |
| Reverse Recovery Charge                 | Q <sub>RR</sub>     | —   | 51.9 | —    | nC   |  |

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

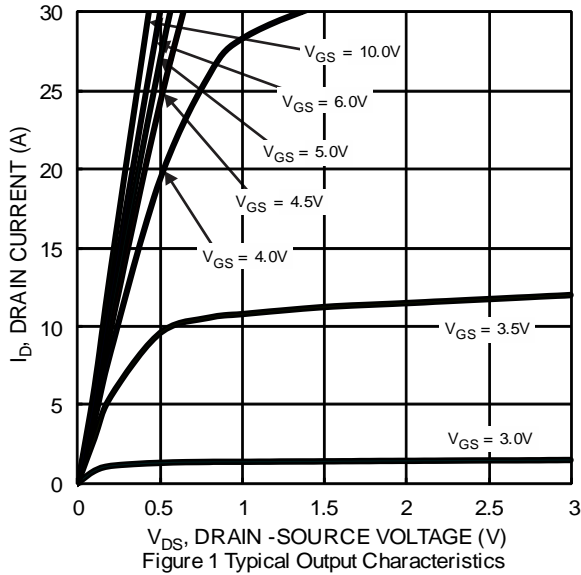


Figure 1 Typical Output Characteristics

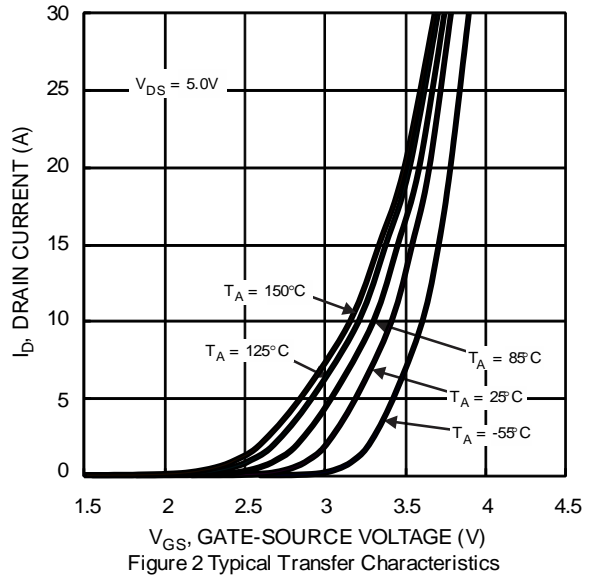


Figure 2 Typical Transfer Characteristics

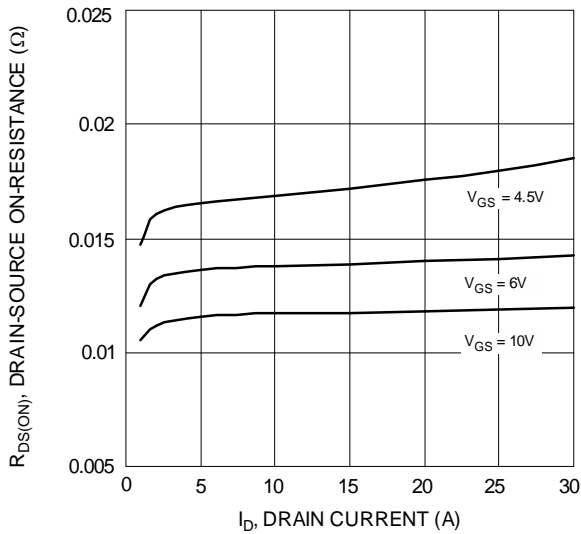


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

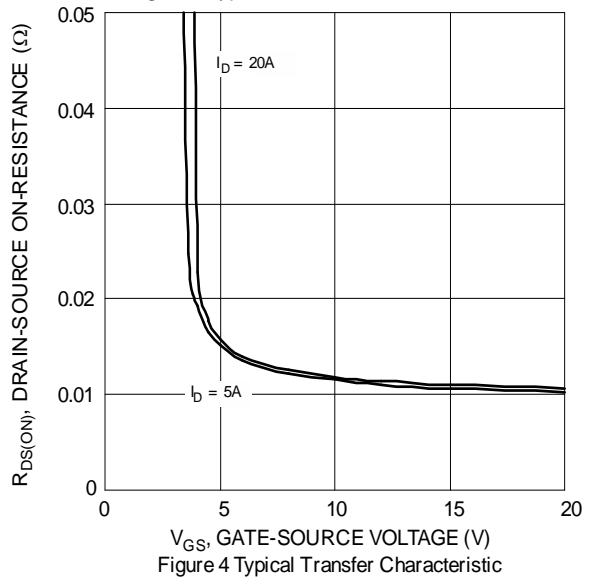


Figure 4 Typical Transfer Characteristic

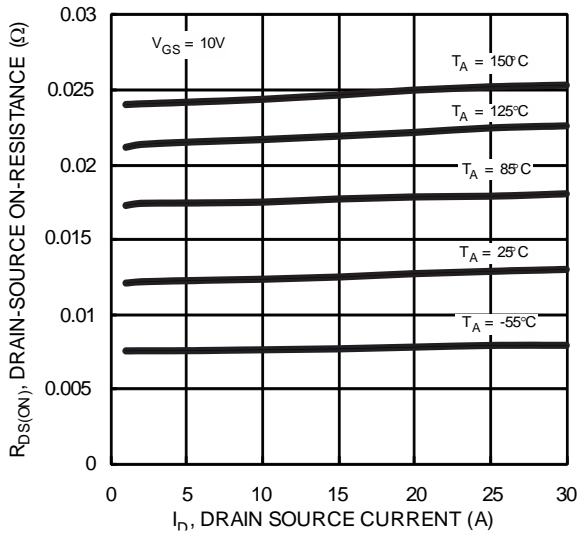


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

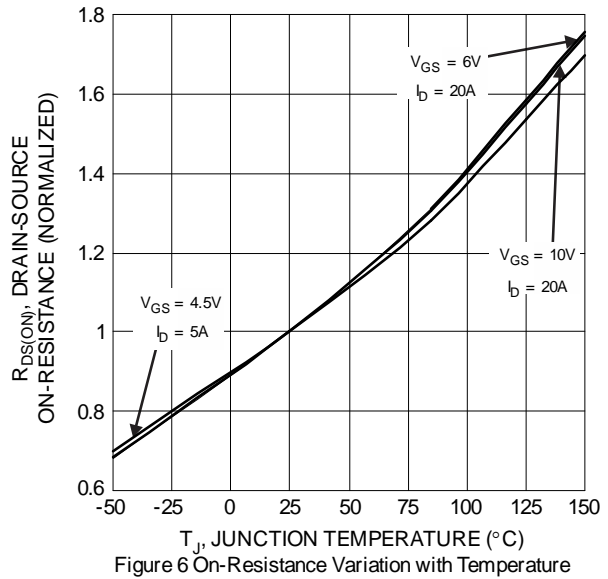


Figure 6 On-Resistance Variation with Temperature

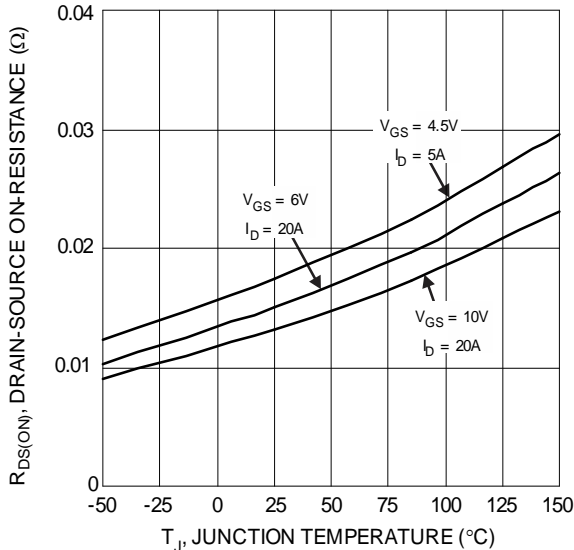


Figure 7 On-Resistance Variation with Junction Temperature

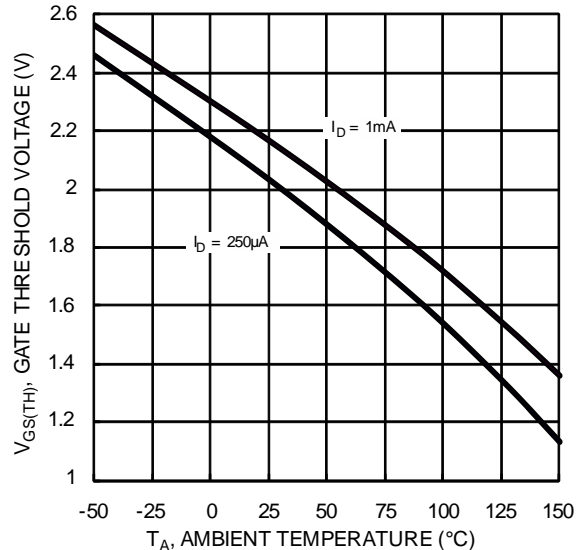


Figure 8 Gate Threshold Variation vs. Ambient Temperature

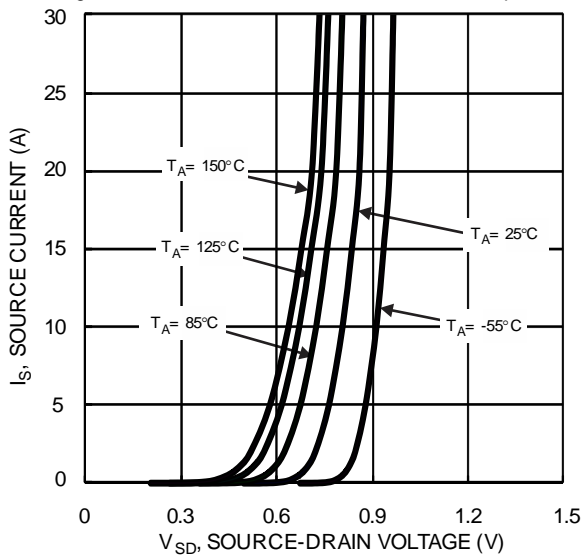


Figure 9 Diode Forward Voltage vs. Current

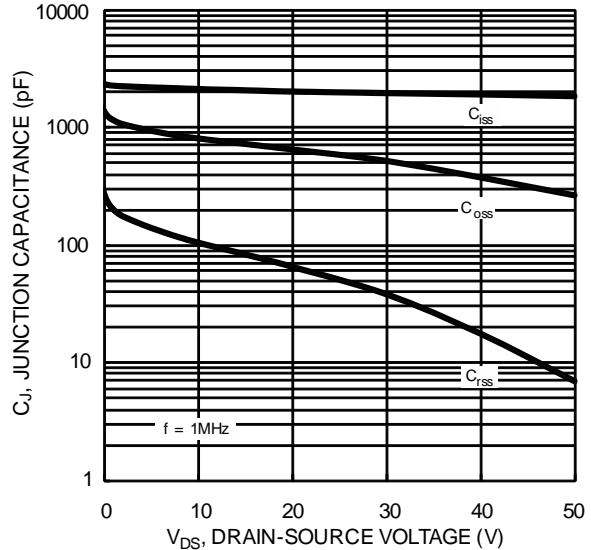


Figure 10 Typical Junction Capacitance

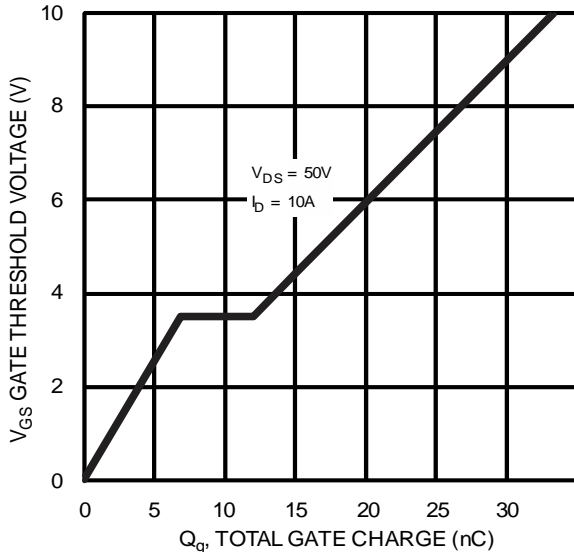


Figure 11 Gate Charge

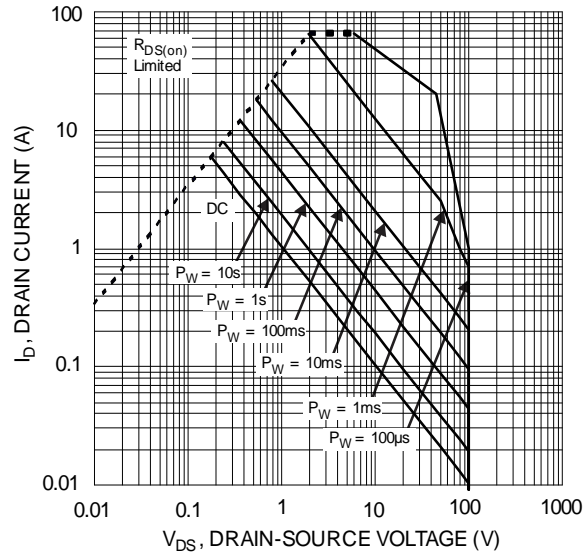
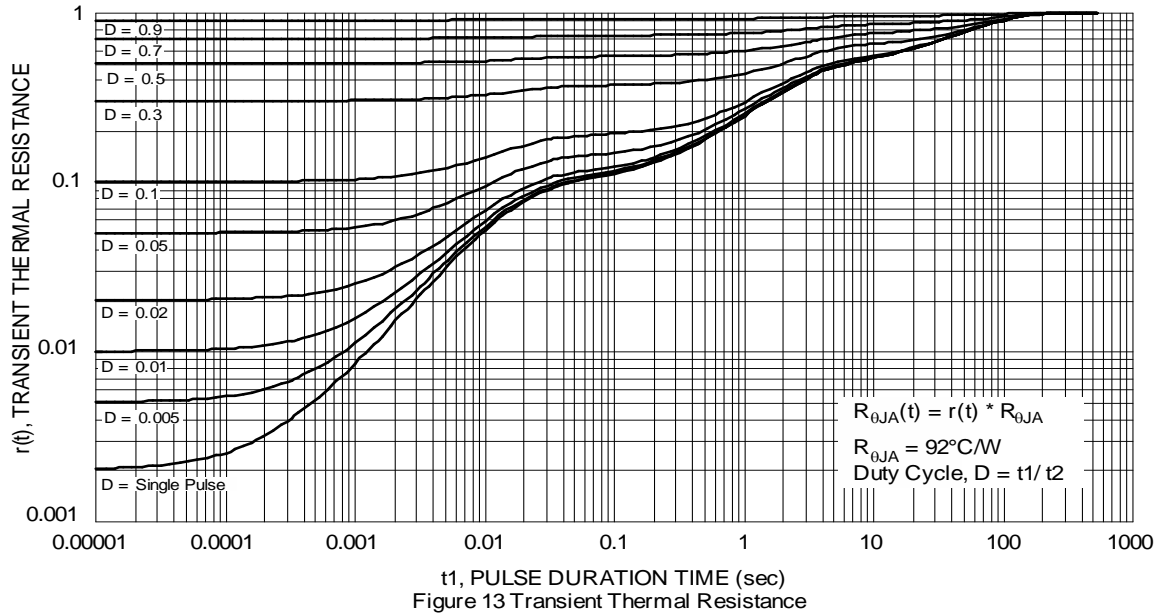


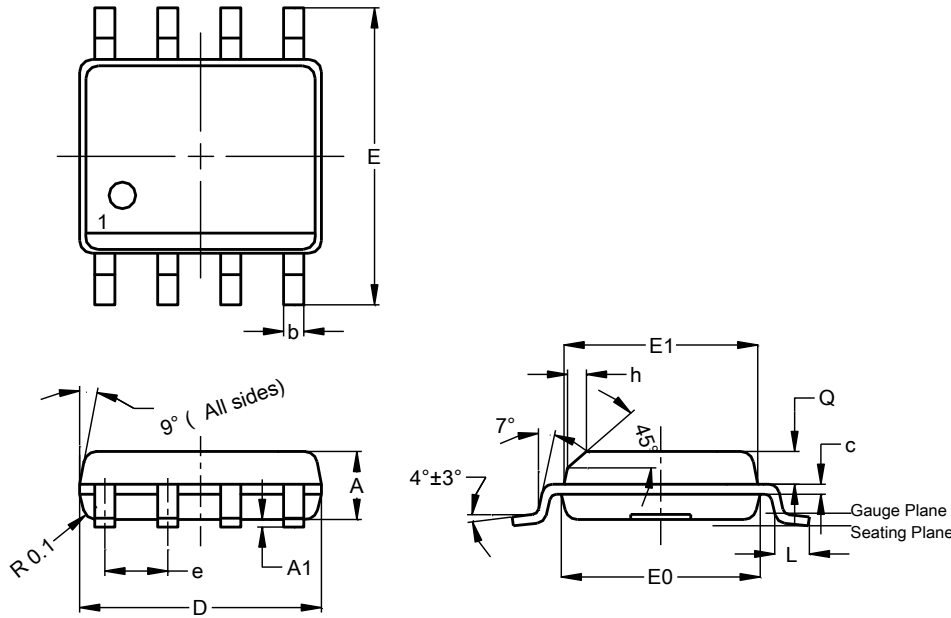
Figure 12 SOA, Safe Operation Area



**Package Outline Dimensions**

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

SO-8

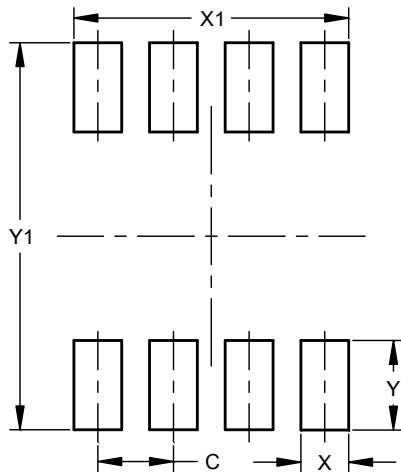


| SO-8                 |      |      |      |
|----------------------|------|------|------|
| Dim                  | Min  | Max  | Typ  |
| A                    | 1.40 | 1.50 | 1.45 |
| A1                   | 0.10 | 0.20 | 0.15 |
| b                    | 0.30 | 0.50 | 0.40 |
| c                    | 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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