

## Product Summary

| BV <sub>DSS</sub> | R <sub>DS(ON)</sub> max        | I <sub>D</sub> max<br>T <sub>A</sub> = +25°C |
|-------------------|--------------------------------|--|
| -20V              | 13mΩ @ V <sub>GS</sub> = -10V  | -9.3A  |
|                   | 16mΩ @ V <sub>GS</sub> = -4.5V | -8.3A  |
|                   | 22mΩ @ V <sub>GS</sub> = -2.5V | -7.2A  |

## Description

This MOSFET is designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

## Applications

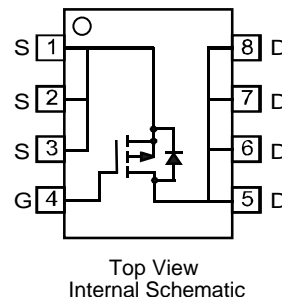
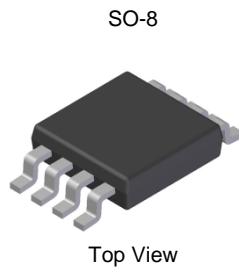
- Backlighting
- Power Management Functions
- DC-DC Converters

## Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **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**
- **PPAP Capable (Note 4)**

## 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 Connections: See Diagram
- Terminals: Finish - Matte Tin Annealed over Copper Lead Frame. Solderable per MIL-STD-202, Method 208③
- Weight: 0.074g (Approximate)

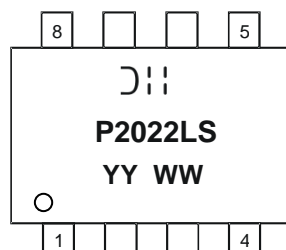


## Ordering Information (Note 5)

| Part Number    | Compliance | Case | Packaging         |
|----------------|------------|------|-------------------|
| DMP2022LSSQ-13 | Automotive | SO-8 | 2,500/Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. 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.
  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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to <https://www.diodes.com/quality/>.
  5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



☺☺☺ = Manufacturer's Marking  
 P2022LS = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Year (ex: 18 = 2018)  
 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> | -20   | V    |
| Gate-Source Voltage           |              |                        | V <sub>GSS</sub> | ±12   | V    |
| Drain Current (Note 6)        | Steady State | T <sub>A</sub> = +25°C | I <sub>D</sub>   | -9.3  | A    |
|                               |              | T <sub>A</sub> = +70°C |                  | -7.4  |      |
| Pulsed Drain Current (Note 7) |              |                        | I <sub>DM</sub>  | -35   | A    |

**Thermal Characteristics**

| Characteristic                          | Symbol                            | Value       | Unit |
|---|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 6)        | P <sub>D</sub>                    | 1.6         | W    |
| Thermal Resistance, Junction to Ambient | R <sub>θJA</sub>                  | 74          | °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 8)</b>       |                     |      |              |      |      |   |
| Drain-Source Breakdown Voltage            | BV <sub>DSS</sub>   | -20  | —            | —    | 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> = -20V, V <sub>GS</sub> = 0V  |
| Gate-Source Leakage                       | I <sub>GSS</sub>    | —    | —            | ±100 | nA   | V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V  |
| <b>ON CHARACTERISTICS (Note 8)</b>        |                     |      |              |      |      |   |
| Gate Threshold Voltage                    | V <sub>GS(TH)</sub> | -0.6 | -0.77        | -1.1 | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA   |
| Static Drain-Source On-Resistance         | R <sub>DS(ON)</sub> | —    | 8            | 13   | mΩ   | V <sub>GS</sub> = -10V, I <sub>D</sub> = -10A   |
|   |                     | —    | 11           | 16   |      | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -9A   |
|   |                     | —    | 17           | 22   |      | V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -8A   |
| Forward Transconductance                  | g <sub>fs</sub>     | —    | 28           | —    | S    | V <sub>DS</sub> = -10V, I <sub>D</sub> = -10A   |
| Diode Forward Voltage (Note 8)            | V <sub>SD</sub>     | -0.5 | -0.68        | -1.2 | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = -3A  |
| <b>DYNAMIC CHARACTERISTICS (Note 9)</b>   |                     |      |              |      |      |   |
| Input Capacitance                         | C <sub>iss</sub>    | —    | 2575         | —    | pF   | V <sub>DS</sub> = -10V, V <sub>GS</sub> = 0V<br>f = 1MHz  |
| Output Capacitance                        | C <sub>oss</sub>    | —    | 326          | —    | pF   |   |
| Reverse Transfer Capacitance              | C <sub>rss</sub>    | —    | 261          | —    | pF   |   |
| Gate Resistance                           | R <sub>G</sub>      | —    | 10.9         | —    | Ω    | V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V, f = 1MHz  |
| <b>SWITCHING CHARACTERISTICS (Note 9)</b> |                     |      |              |      |      |   |
| Total Gate Charge                         | Q <sub>g</sub>      | —    | 28.1<br>60.2 | —    | nC   | V <sub>DS</sub> = -10V, V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -10A<br>V <sub>DS</sub> = -10V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -10A |
| Gate-Source Charge                        | Q <sub>gs</sub>     | —    | 5.9          | —    |      | V <sub>DS</sub> = -10V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -10A   |
| Gate-Drain Charge                         | Q <sub>gd</sub>     | —    | 7.4          | —    |      | V <sub>DS</sub> = -10V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -10A   |
| Turn-On Delay Time                        | t <sub>D(ON)</sub>  | —    | 4.5          | 15   | ns   | V <sub>DD</sub> = -15V, I <sub>D</sub> = -1A, V <sub>GS</sub> = -10V,<br>R <sub>GEN</sub> = 6Ω  |
| Turn-On Rise Time                         | t <sub>R</sub>      | —    | 3.3          | 20   |      |   |
| Turn-Off Delay Time                       | t <sub>D(OFF)</sub> | —    | 197          | 216  |      |   |
| Turn-Off Fall Time                        | t <sub>F</sub>      | —    | 60.5         | 153  |      |   |

- Notes:
- Device mounted on 2 oz. Copper pads on FR-4 PCB.
  - Pulse width ≤10μs, Duty Cycle ≤1%.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

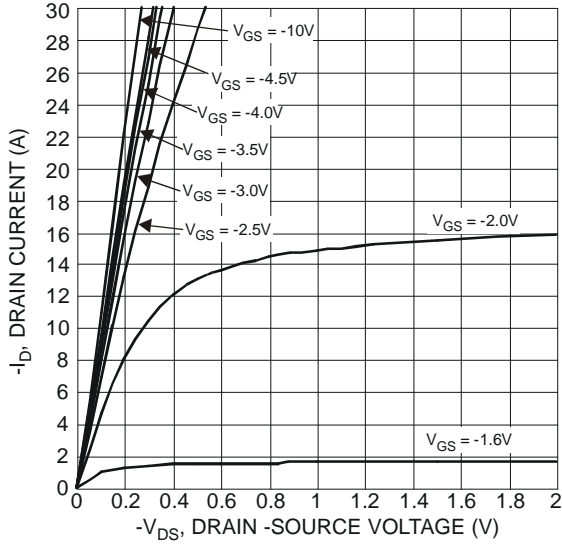


Figure 1 Typical Output Characteristics

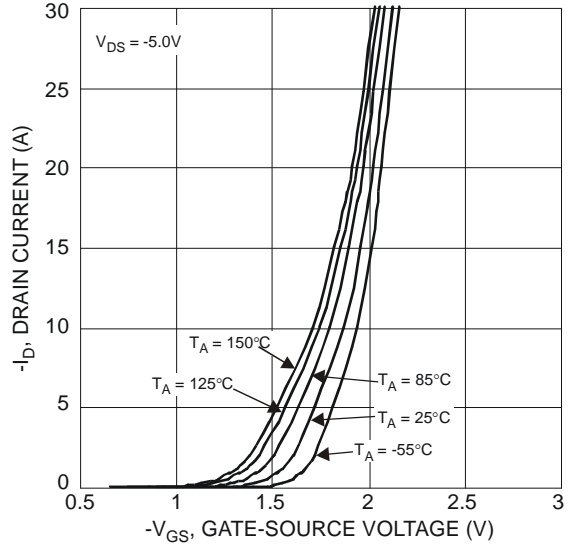


Figure 2 Typical Transfer Characteristics

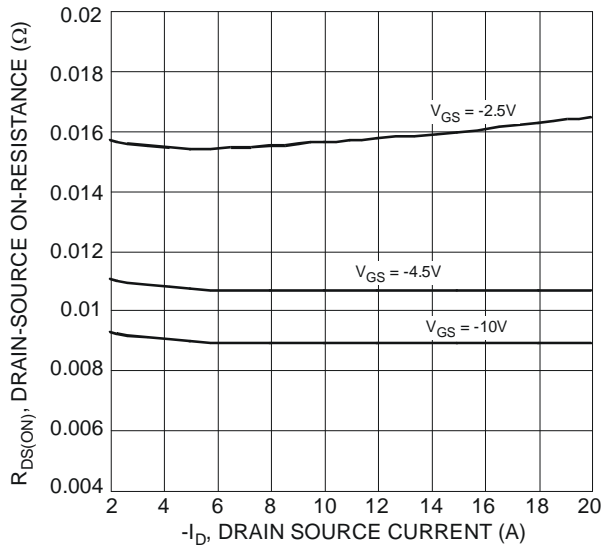


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

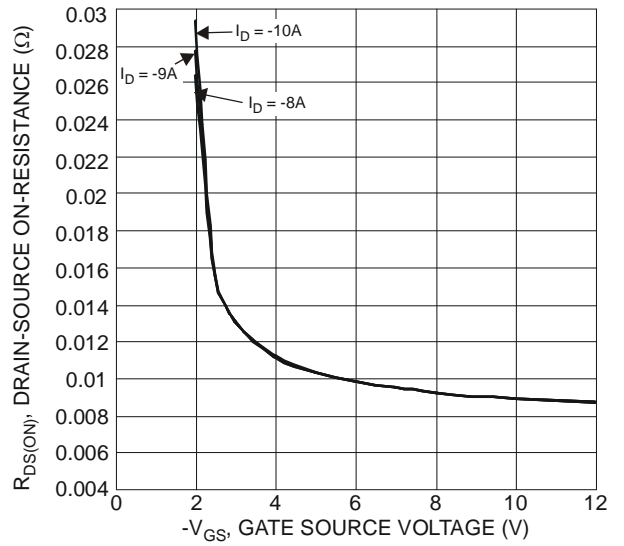


Figure 4 Typical Transfer Characteristics

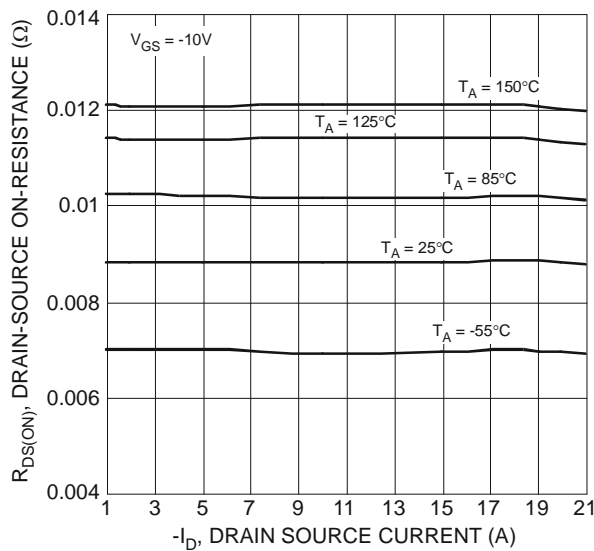


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

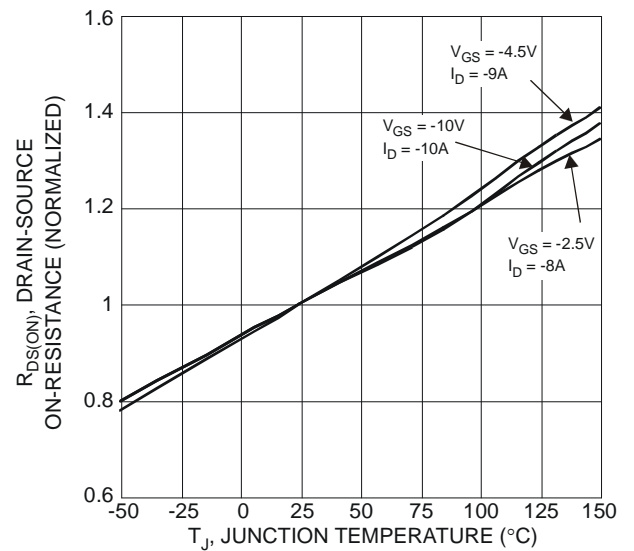


Figure 6 On-Resistance Variation with Temperature

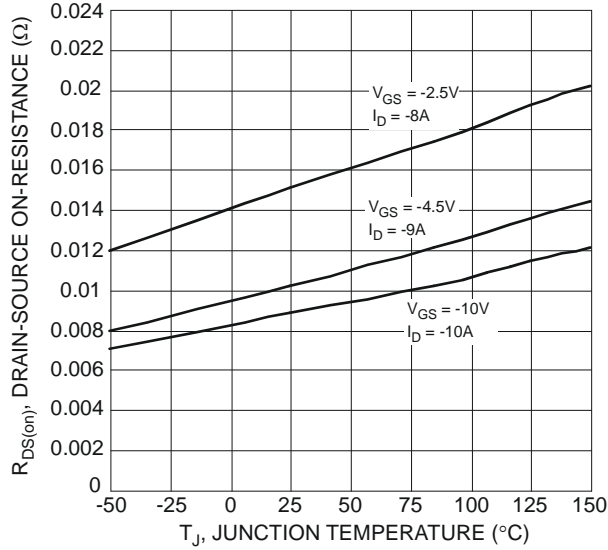


Figure 7 On-Resistance Variation with Temperature

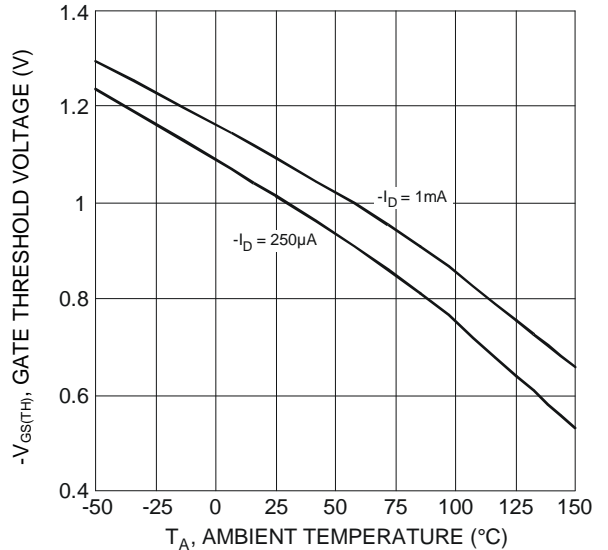


Figure 8 Gate Threshold Variation vs. Ambient Temperature

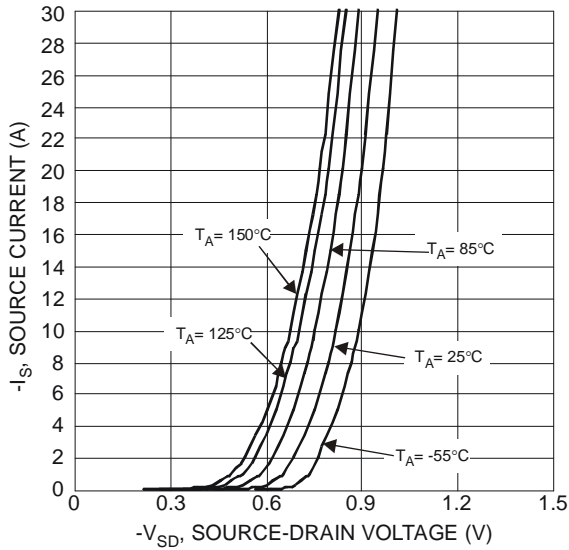


Figure 9 Diode Forward Voltage vs. Current

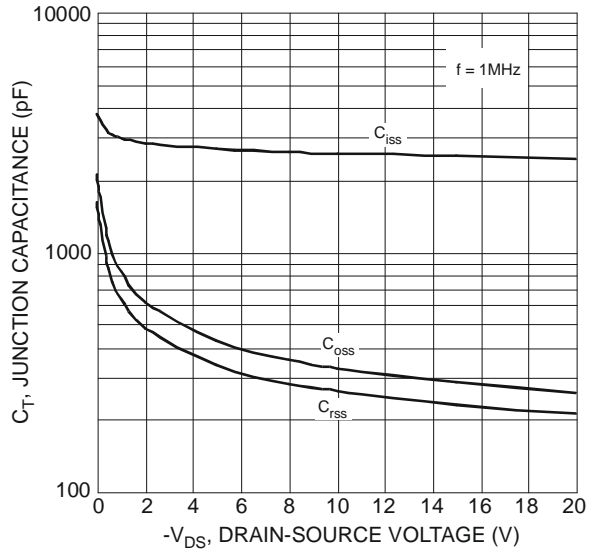


Figure 10 Typical Junction Capacitance

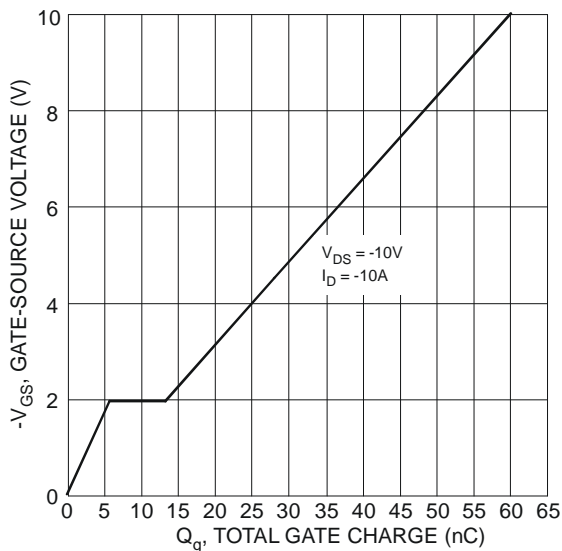


Figure 11 Gate-Charge Characteristics

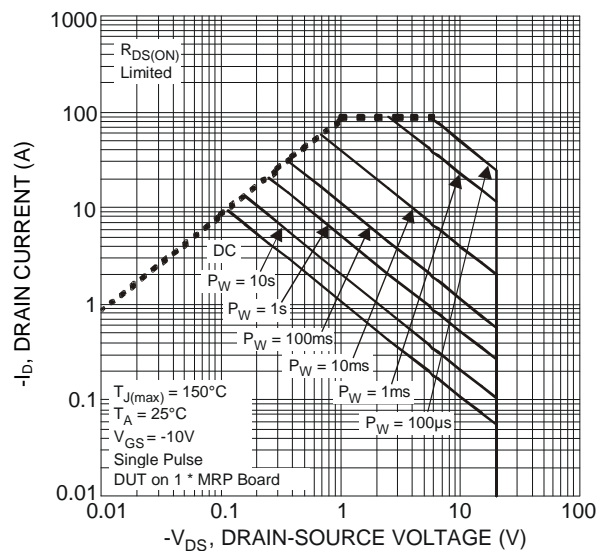
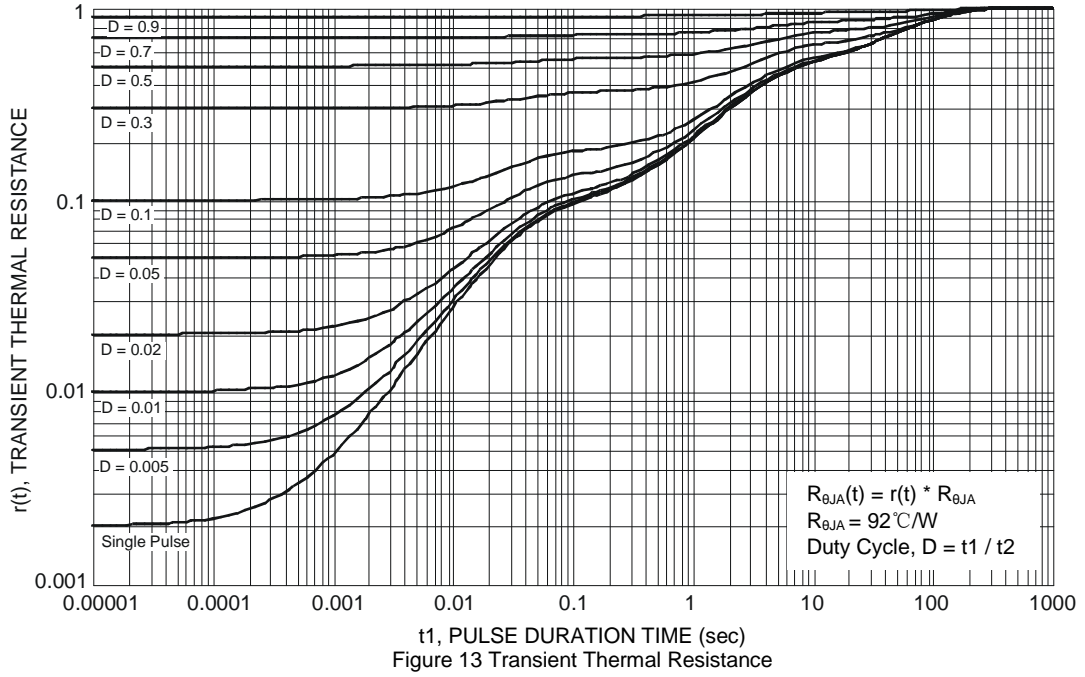


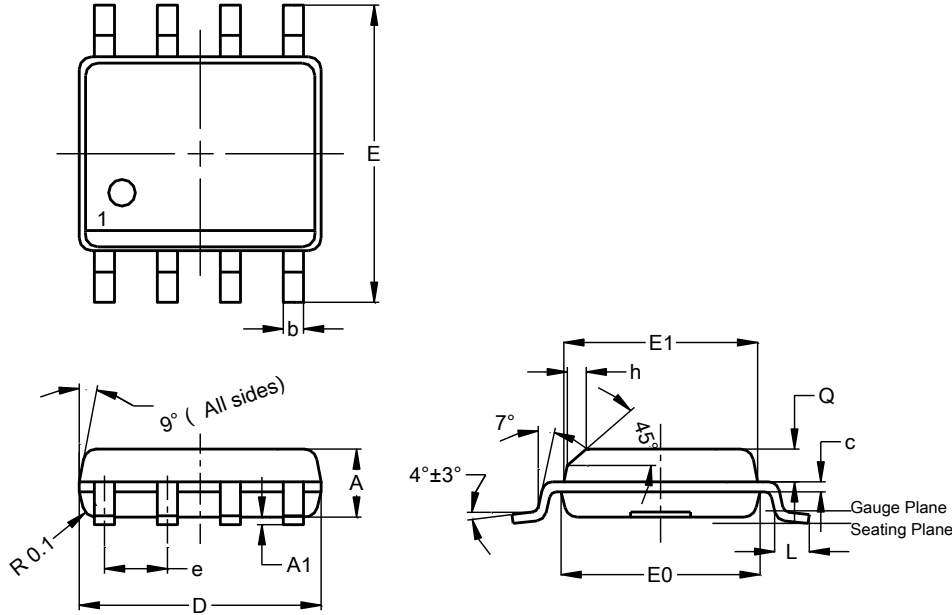
Figure 12 SOA, Safe Operation Area



**Package Outline Dimensions**

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

**SO-8**



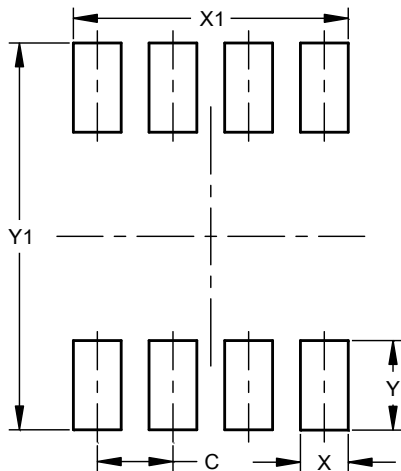
| SO-8 |      |      |      |
|------|------|------|------|
| Dim  | Min  | Max  | Typ  |
| A    | 1.40 | 1.50 | 1.45 |
| A1   | 0.10 | 0.20 | 0.15 |
| b    | 0.30 | 0.50 | 0.40 |
| c    | 0.15 | 0.25 | 0.20 |
| D    | 4.85 | 4.95 | 4.90 |
| E    | 5.90 | 6.10 | 6.00 |
| E1   | 3.80 | 3.90 | 3.85 |
| 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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