## SINGLE P-CHANNEL ENHANCEMENT MODE MOSFET

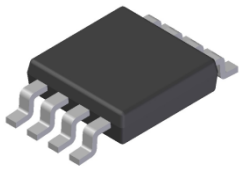
## Features

- Low On-Resistance
  - 13mΩ @ $V_{GS}$ = -10V
  - 16mΩ @ $V_{GS}$ = -4.5V
  - 22mΩ @ $V_{GS}$ = -2.5V
- 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**
- **An Automotive-Compliant Part is Available Under Separate Datasheet (DMP2022LSSQ)**

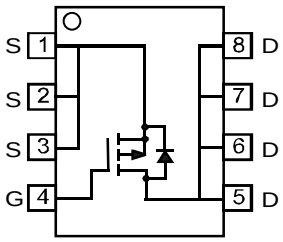
## Mechanical Data

- 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 Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.072g (Approximate)

SO-8



Top View



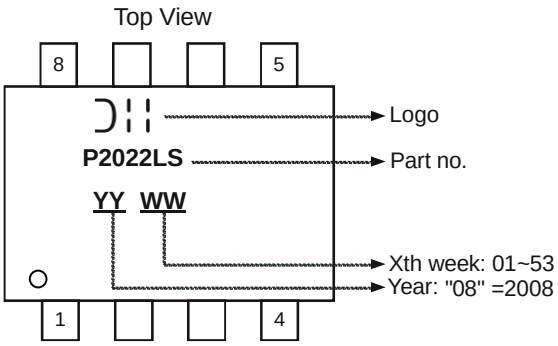

Top View
Internal Schematic

## Ordering Information (Note 4)

| Part Number | Case | Packaging |
|---|---|---|
| DMP2022LSS-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 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 https://www.diodes.com/design/support/packaging/diodes-packaging/.

## Marking Information





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## Maximum Ratings (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | | | Symbol | Value | Unit |
|---|---|---|---|---|---|
| Drain-Source Voltage | | | $V_{DSS}$ | -20 | V |
| Gate-Source Voltage | | | $V_{GSS}$ | ±12 | V |
| Drain Current (Note 5) | Steady State | $T_A$ = +25°C<br>$T_A$ = +70°C | $I_D$ | -10<br>-8 | A |
| Pulsed Drain Current (Note 6) | | | $I_{DM}$ | -90 | A |

## Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Total Power Dissipation (Note 5) | $P_D$ | 2.5 | W |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 50 | °C/W |
| Operating and Storage Temperature Range | $T_{J,}$ $T_{STG}$ | -55 to +150 | °C |

Notes: 5. Device mounted on 2 oz. Copper pads on FR-4 PCB.

6. Pulse width ≤10μS, Duty Cycle ≤1%.

## Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS (Note 7)** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | -20 | — | — | V | $V_{GS}$ = 0V, $I_D$ = -250μA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | — | — | -1 | μA | $V_{DS}$ = -20V, $V_{GS}$ = 0V |
| Gate-Source Leakage | $I_{GSS}$ | — | — | ±100 | nA | $V_{GS}$ = ±12V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS (Note 7)** | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | -0.6 | -0.77 | -1.1 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = -250μA |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | — | 8 | 13 | mΩ | $V_{GS}$ = -10V, $I_D$ = -10A |
| | | — | 11 | 16 | | $V_{GS}$ = -4.5V, $I_D$ = -9A |
| | | — | 17 | 22 | | $V_{GS}$ = -2.5V, $I_D$ = -8A |
| Forward Transconductance | $g_{fs}$ | — | 28 | — | S | $V_{DS}$ = -10V, $I_D$ = -10A |
| Diode Forward Voltage (Note 7) | $V_{SD}$ | -0.5 | -0.68 | -1.2 | V | $V_{GS}$ = 0V, $I_S$ = -3A |
| **DYNAMIC CHARACTERISTICS (Note 8)** | | | | | | |
| Input Capacitance | $C_{iss}$ | — | 2444 | — | pF | $V_{DS}$ = -10V, $V_{GS}$ = 0V<br>f = 1.0MHz |
| Output Capacitance | $C_{oss}$ | — | 594 | — | pF | |
| Reverse Transfer Capacitance | $C_{rss}$ | — | 556 | — | pF | |
| Gate Resistance | $R_G$ | — | 2.0 | — | Ω | $V_{GS}$ = 0V, $V_{DS}$ = 0V, f = 1MHz |
| **SWITCHING CHARACTERISTICS (Note 8)** | | | | | | |
| Total Gate Charge | $Q_g$ | — | 28.1<br>56.9 | — | nC | $V_{DS}$ = -10V, $V_{GS}$ = -4.5V, $I_D$ = -10A<br>$V_{DS}$ = -10V, $V_{GS}$ = -10V, $I_D$ = -10A |
| Gate-Source Charge | $Q_{gs}$ | — | 3.4 | — | | $V_{DS}$ = -10V, $V_{GS}$ = -10V, $I_D$ = -10A |
| Gate-Drain Charge | $Q_{gd}$ | — | 11.9 | — | | $V_{DS}$ = -10V, $V_{GS}$ = -10V, $I_D$ = -10A |
| Turn-On Delay Time | $t_{D(ON)}$ | — | 7.5 | 15 | ns | $V_{DD}$ = -15V, $I_D$ = -1A, $V_{GS}$ = -10V, $R_{GEN}$ = 6Ω |
| Turn-On Rise Time | $t_R$ | — | 9.9 | 20 | | |
| Turn-Off Delay Time | $t_{D(OFF)}$ | — | 108.0 | 216 | | |
| Turn-Off Fall Time | $t_F$ | — | 76.5 | 153 | | |

Notes: 7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.


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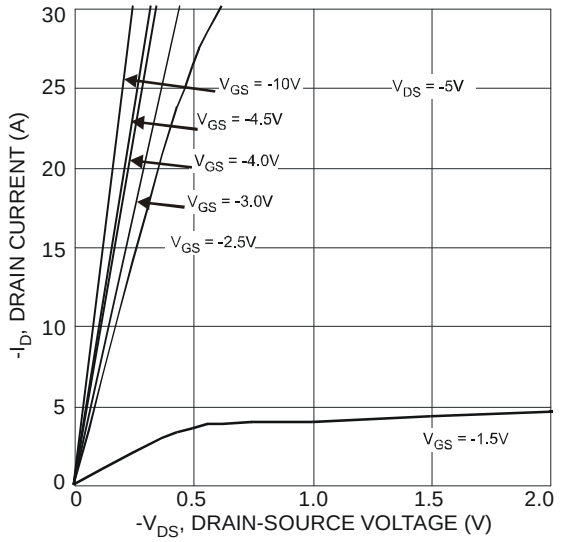



Fig. 1 Typical Output Characteristic

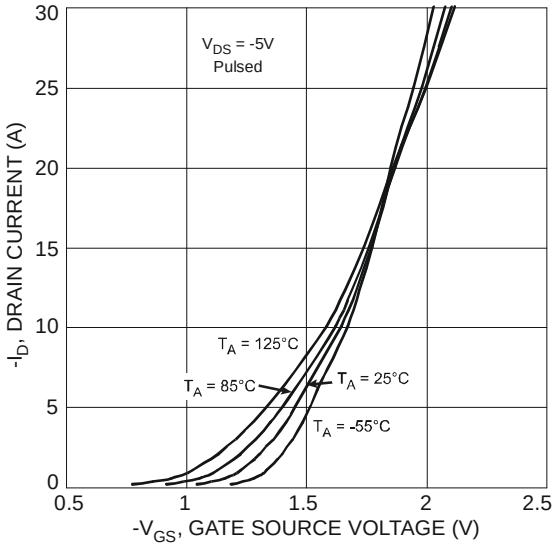



Fig. 2 Typical Transfer Characteristics

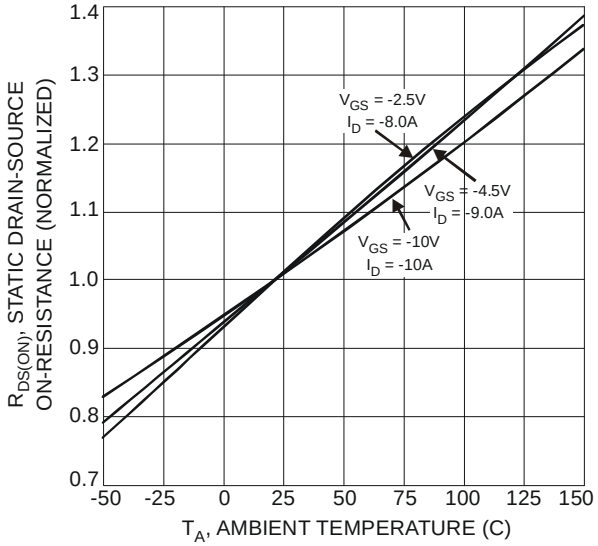



Fig. 3 Normalized Static Drain-Source On-Resistance vs. Ambient Temperature

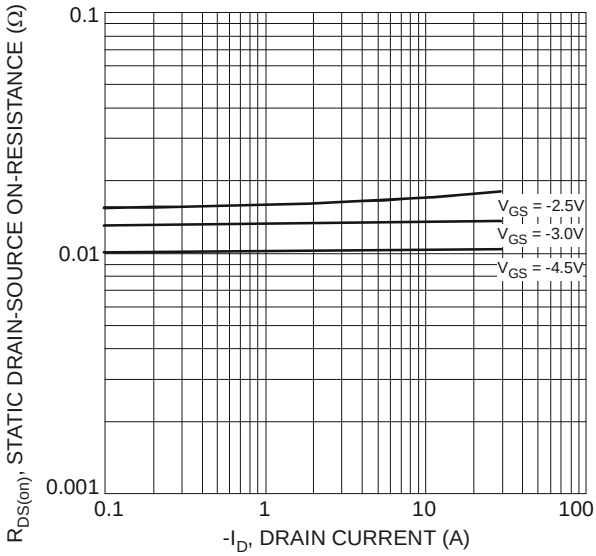



Fig. 4 On-Resistance vs. Drain Current and Gate Voltage

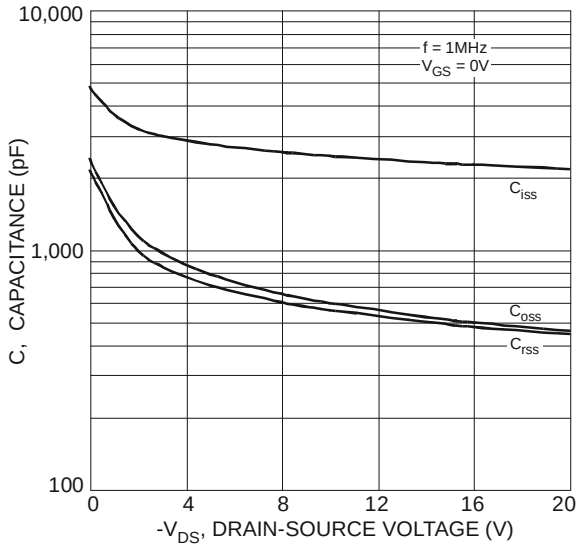



Fig. 5 Typical Total Capacitance

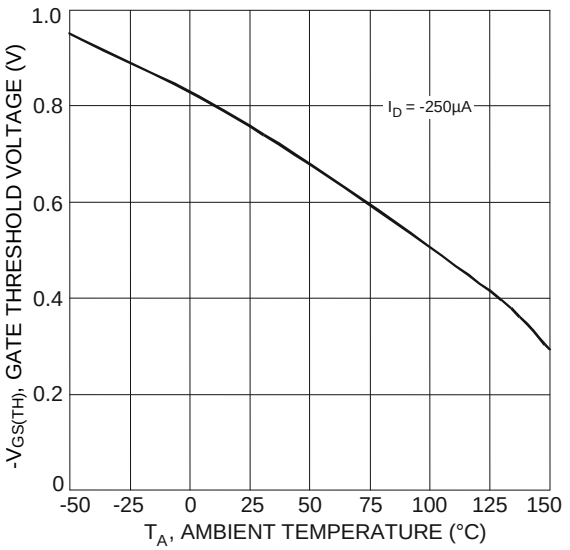



Fig. 6 Gate Threshold Variation vs. Ambient Temperature


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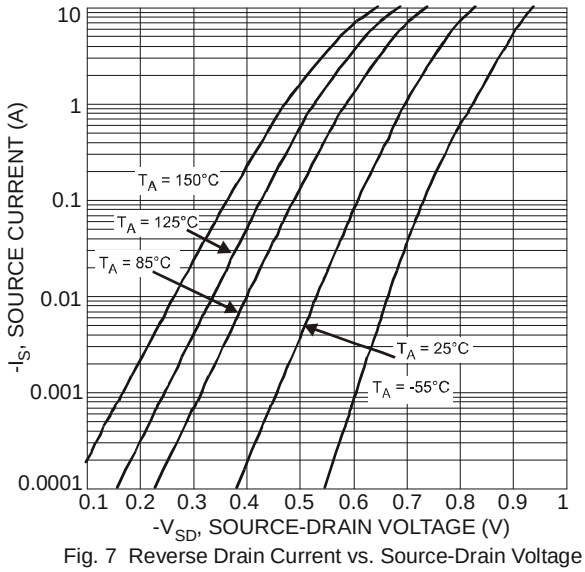



Fig. 7 Reverse Drain Current vs. Source-Drain Voltage

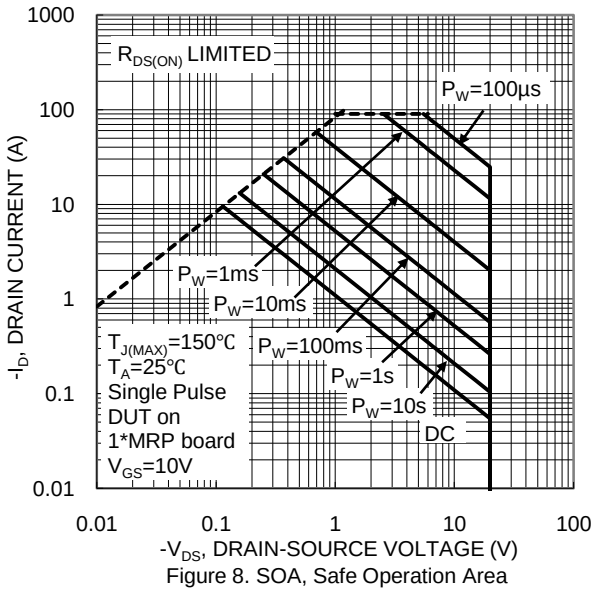


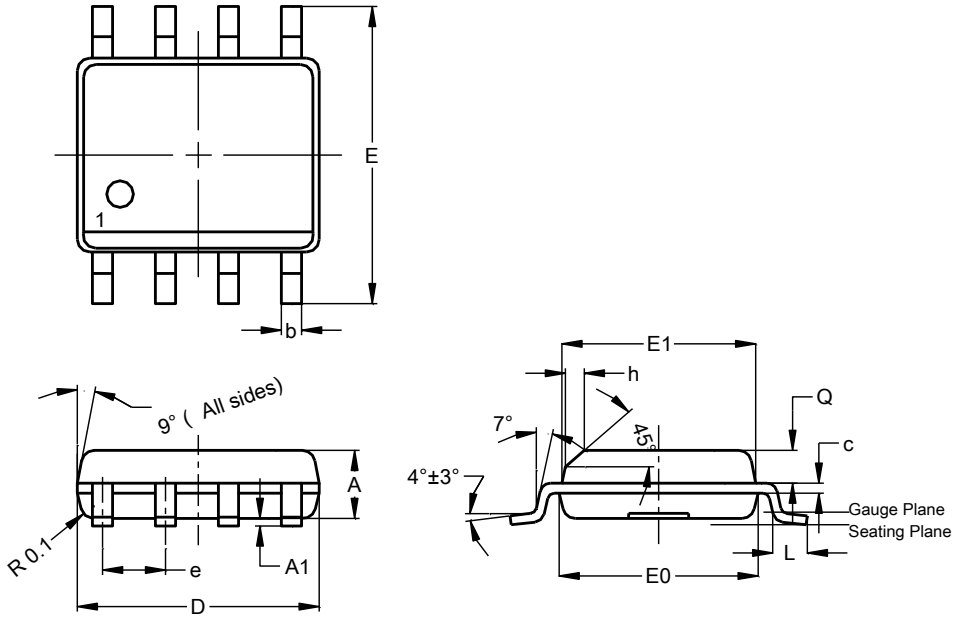

Figure 8. SOA, Safe Operation Area


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## Package Outline Dimensions

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

**SO-8**

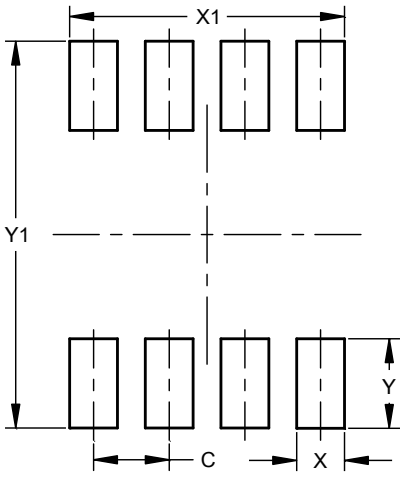



| SO-8 | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 1.40 | 1.50 | 1.45 |
| **A1** | 0.10 | 0.20 | 0.15 |
| **b** | 0.30 | 0.50 | 0.40 |
| **c** | 0.15 | 0.25 | 0.20 |
| **D** | 4.85 | 4.95 | 4.90 |
| **E** | 5.90 | 6.10 | 6.00 |
| **E1** | 3.80 | 3.90 | 3.85 |
| **E0** | 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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