# SINGLE P-CHANNEL ENHANCEMENT MODE MOSFET

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ Max | $I_D$ Max<br>$T_A$ = +25°C |
|---|---|---|
| -30V | 11mΩ @ $V_{GS}$ = -10V | -13A |
| | 17mΩ @ $V_{GS}$ = -4.5V | -9.9A |

## Features and Benefits

- 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)**

## Description

This 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.

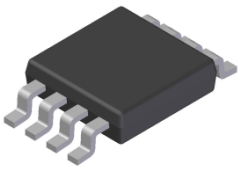
## Applications

- Backlighting
- Power Management Functions
- DC-DC Converters

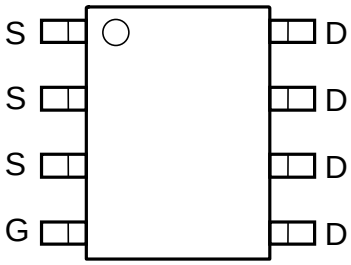
## Mechanical Data

- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.074g (Approximate)

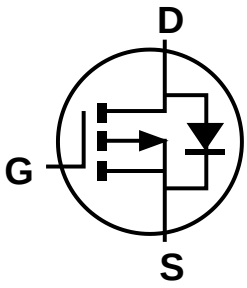
**SO-8**



Top View




Top View
Internal Schematic




Equivalent Circuit

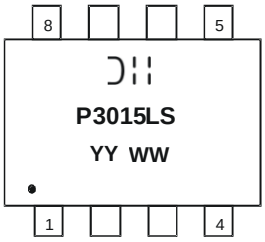
## Ordering Information (Note 5)

| Part Number | Case | Packaging |
|---|---|---|
| DMP3015LSSQ-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 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. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_compliance_definitions/.
5. For packaging details, go to our website at http://www.diodes.com/products/packages.html.


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## Marking Information




= Manufacturer's Marking
P3015LS = Product Type Marking Code
YYWW = Date Code Marking
YY = Year (ex: 13 = 2013)
WW = Week (01 - 53)

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

| Characteristic | | | Symbol | Value | Units |
|---|---|---|---|---|---|
| Drain-Source Voltage | | | $V_{DSS}$ | -30 | V |
| Gate-Source Voltage | | | $V_{GSS}$ | ±20 | V |
| Drain Current (Note 6) | Steady State | $T_A$ = +25°C<br>$T_A$ = +70°C | $I_D$ | -13<br>-9.75 | A |
| Pulsed Drain Current (Note 7) | | | $I_{DM}$ | -45 | A |

## Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Total Power Dissipation (Note 6) | $P_D$ | 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: 6. Device mounted on 2 oz. Copper pads on FR-4 PCB with $R_{\theta JA}$ = +50°C/W.
7. Pulse width ≤10μS, Duty Cycle ≤1%.


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

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** (Note 8) | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | -30 | — | — | V | $V_{GS}$ = 0V, $I_D$ = -250µA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | — | — | -1 | µA | $V_{DS}$ = -30V, $V_{GS}$ = 0V |
| Gate-Source Leakage | $I_{GSS}$ | — | — | ±100 | nA | $V_{GS}$ = ±20V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS** (Note 8) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | -1 | — | -2 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = -250µA |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | —<br>— | 9<br>14 | 11<br>17 | mΩ | $V_{GS}$ = -10V, $I_D$ = -13A<br>$V_{GS}$ = -4.5V, $I_D$ = -10A |
| Forward Transconductance | $g_{fs}$ | — | 15 | — | S | $V_{DS}$ = -15V, $I_D$ = -8A |
| Diode Forward Voltage (Note 8) | $V_{SD}$ | -0.5 | — | -1.1 | V | $V_{GS}$ = 0V, $I_S$ = -2.1A |
| **DYNAMIC CHARACTERISTICS** (Note 9) | | | | | | |
| Input Capacitance | $C_{iss}$ | — | 2,748 | — | pF | $V_{DS}$ = -20V, $V_{GS}$ = 0V<br>f = 1.0MHz |
| Output Capacitance | $C_{oss}$ | — | 357 | — | pF | |
| Reverse Transfer Capacitance | $C_{rss}$ | — | 356 | — | pF | |
| Gate Resistance | $R_G$ | — | 2.0 | — | Ω | $V_{DS}$ = 0V, $V_{GS}$ = 0V<br>f = 1.0MHz |
| **SWITCHING CHARACTERISTICS** (Note 9) | | | | | | |
| Total Gate Charge | $Q_g$ | — | 30.0<br>60.4 | — | nC | $V_{DS}$ = -10V, $V_{GS}$ = -4.5V, $I_D$ = -13A<br>$V_{DS}$ = -10V, $V_{GS}$ = -10V, $I_D$ = -13A |
| Gate-Source Charge | $Q_{gs}$ | — | 7.2 | — | | $V_{DS}$ = -10V, $V_{GS}$ = -10V, $I_D$ = -13A |
| Gate-Drain Charge | $Q_{gd}$ | — | 16.4 | — | | $V_{DS}$ = -10V, $V_{GS}$ = -10V, $I_D$ = -13A |
| Turn-On Delay Time | $t_{d(on)}$ | — | 11.2 | — | nS | $V_{DS}$ = -15V, $V_{GS}$ = -10V,<br>$I_D$ = -1A, $R_G$ = 6.0Ω |
| Rise Time | $t_r$ | — | 12.4 | — | | |
| Turn-Off Delay Time | $t_{d(off)}$ | — | 104.9 | — | | |
| Fall Time | $t_f$ | — | 61.7 | — | | |

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


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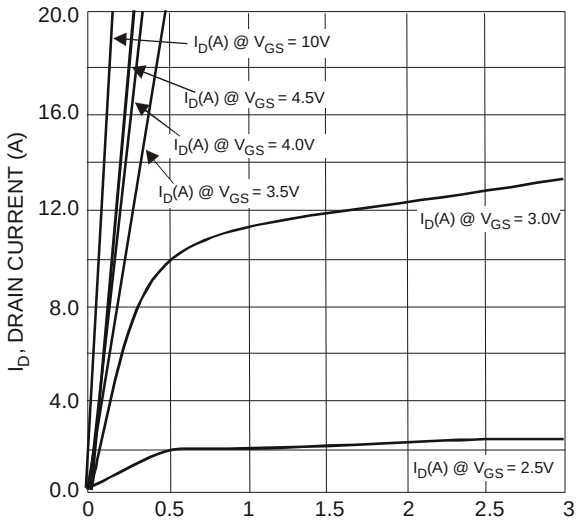



Fig.1 Typical Output Characteristics

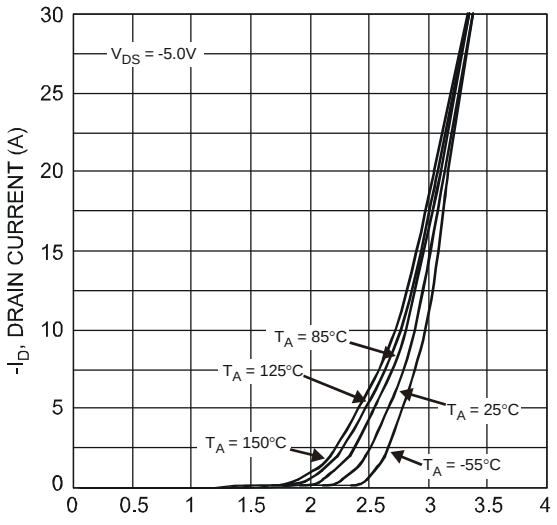



Fig. 2 Typical Transfer Characteristics

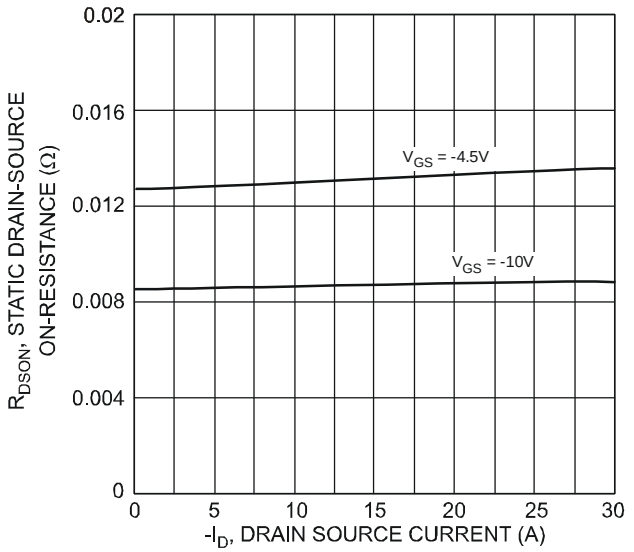



Fig. 3 On-Resistance vs. Drain Current & Gate Voltage

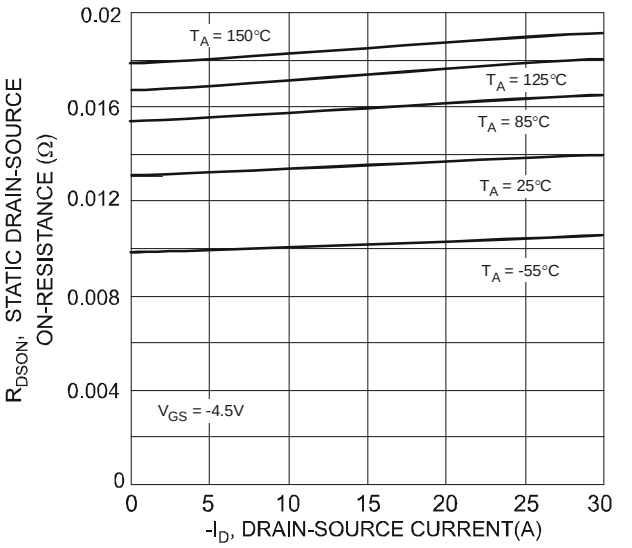



Fig. 4 On-Resistance vs.Drain Current & Gate Voltage

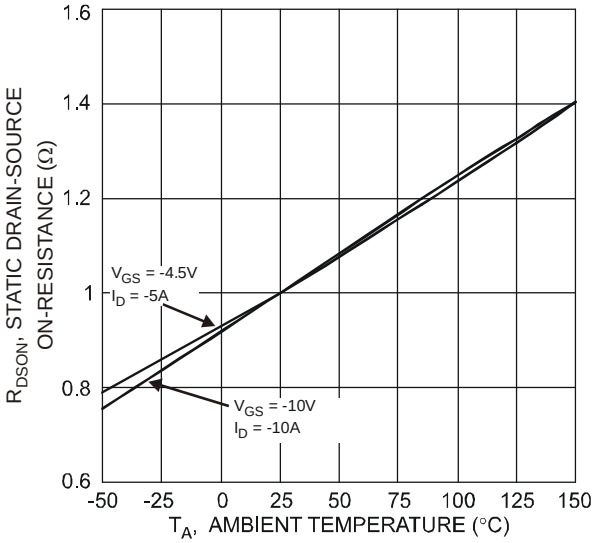



Fig. 5 Static Drain-Source On-Resistance vs. Ambient Temperature

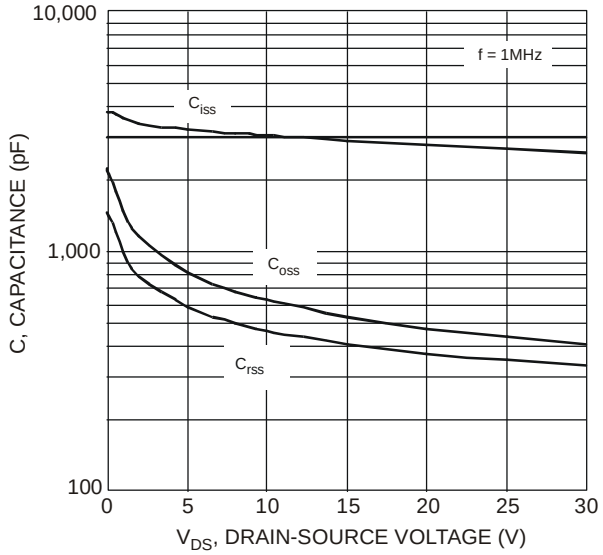



Fig. 6 Typical Total Capacitance


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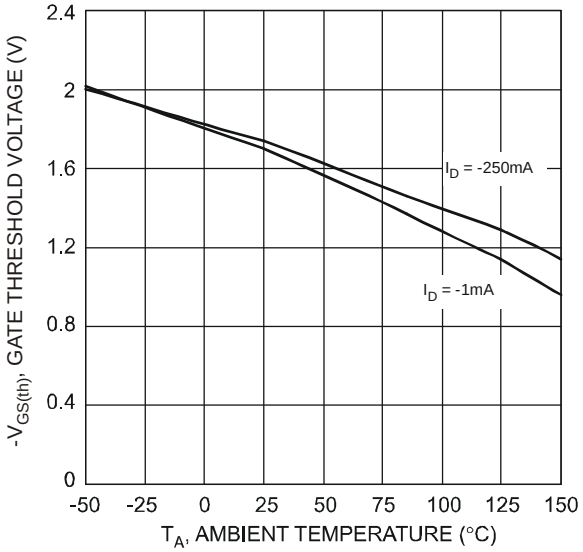



Fig. 7 Gate Threshold Variation vs. Ambient Temperature

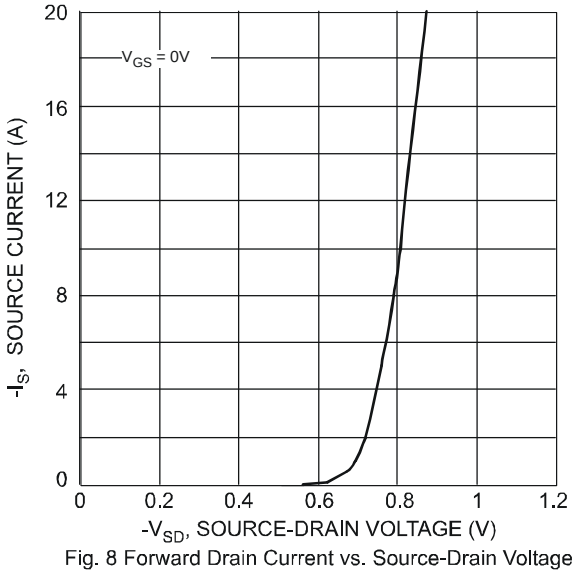



Fig. 8 Forward Drain Current vs. Source-Drain Voltage

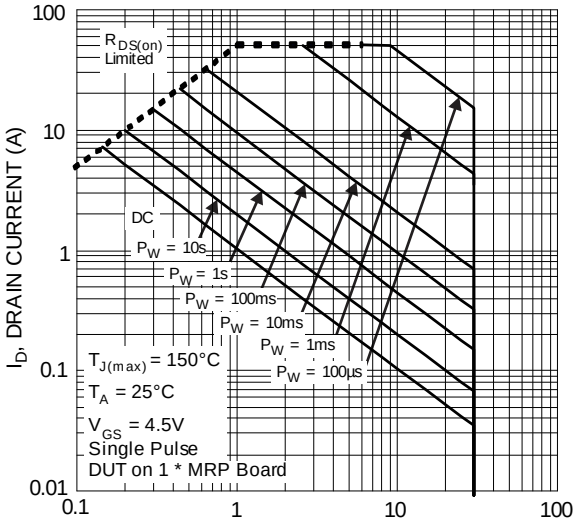



Figure 9 SOA, Safe Operation Area

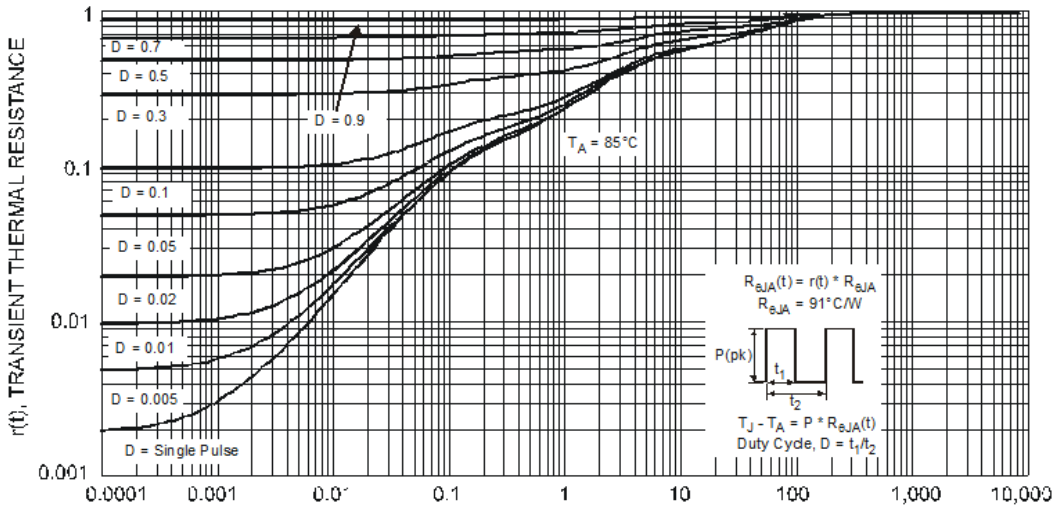


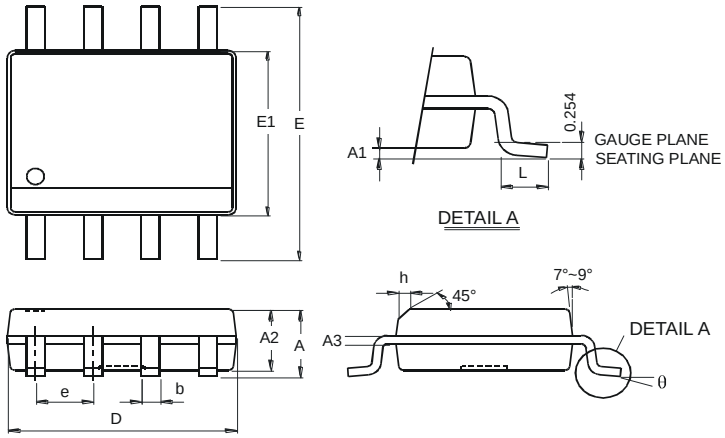

Fig. 10 Transient Thermal Resistance


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## Package Outline Dimensions

Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.

**SO-8**

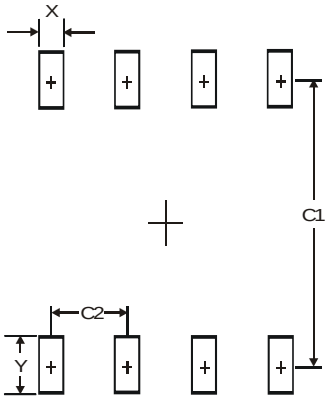



| SO-8 | | |
|---|---|---|
| **Dim** | **Min** | **Max** |
| **A** | — | 1.75 |
| **A1** | 0.08 | 0.25 |
| **A2** | 1.30 | 1.50 |
| **A3** | 0.20 Typ. | |
| **b** | 0.3 | 0.5 |
| **D** | 4.80 | 5.30 |
| **E** | 5.79 | 6.20 |
| **E1** | 3.70 | 4.10 |
| **e** | 1.27 Typ. | |
| **h** | — | 0.35 |
| **L** | 0.38 | 1.27 |
| **θ** | 0° | 8° |
| **All Dimensions in mm** | | |

## Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.

**SO-8**




| Dimensions | Value (in mm) |
|---|---|
| **X** | 0.60 |
| **Y** | 1.55 |
| **C1** | 5.4 |
| **C2** | 1.27 |


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