

Product Summary

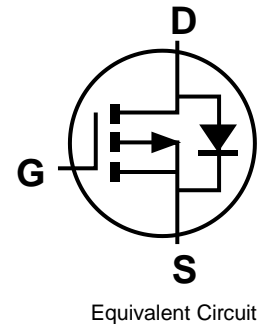
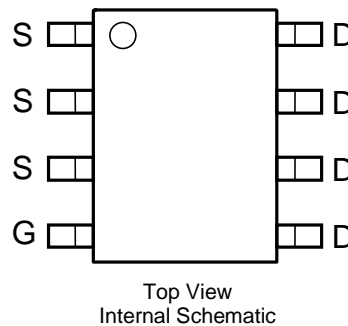
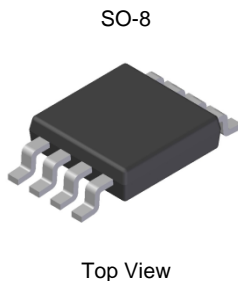
| BV _{DSS} | R _{DS(ON)} max | I _D max T _A = +25°C |
|-------------------|--------------------------------|--|
| -30V | 14mΩ @ V _{GS} = -10V | -12.0A |
| | 25mΩ @ V _{GS} = -4.5V | -8.5A |

Description

This MOSFET is designed to minimize the on-state resistance (R_{DS(ON)}) 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**

Mechanical Data

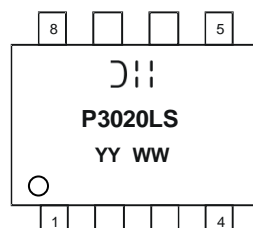
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram
- Terminals: Finish - Matte Tin Annealed over Copper Lead Frame. Solderable per MIL-STD-202, Method 208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

Ordering Information (Note 4)

| Part Number | Case | Packaging |
|---------------|------|------------------|
| DMP3020LSS-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 <http://www.diodes.com/products/packages.html>.

Marking Information



Ⓢ; ; = Manufacturer's Marking
 P3020LS = Product Type Marking Code
 YYWW = Date Code Marking
 YY or YY = Year (ex: 16 = 2016)
 WW = Week (01 to 53)

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

| Characteristic | | | Symbol | Value | Unit |
|-------------------------------|--------------|------------------------|------------------|-------|------|
| Drain-Source Voltage | | | V _{DSS} | -30 | V |
| Gate-Source Voltage | | | V _{GSS} | ±25 | V |
| Drain Current (Note 5) | Steady State | T _A = +25°C | I _D | -12 | A |
| | | T _A = +70°C | | -9 | |
| Pulsed Drain Current (Note 6) | | | I _{DM} | -80 | A |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5) | P _D | 2.5 | W |
| Thermal Resistance, Junction to Ambient | R _{θJA} | 50 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

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} | -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 | |
| | | — | — | ±800 | | V _{GS} = ±25V, V _{DS} = 0V | |
| ON CHARACTERISTICS (Note 7) | | | | | | | |
| Gate Threshold Voltage | V _{GS(TH)} | -1 | — | -2 | V | V _{DS} = V _{GS} , I _D = -250μA | |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | 11.6 | 14 | mΩ | V _{GS} = -10V, I _D = -8A | |
| | | — | 18.6 | 25 | | V _{GS} = -4.5V, I _D = -5A | |
| Forward Transconductance | g _{fs} | — | 12 | — | S | V _{DS} = -10V, I _D = -12A | |
| Diode Forward Voltage (Note 7) | V _{SD} | -0.5 | — | -1.1 | V | V _{GS} = 0V, I _S = -2A | |
| DYNAMIC CHARACTERISTICS | | | | | | | |
| Input Capacitance | C _{iss} | — | 1802 | — | pF | V _{DS} = -15V, V _{GS} = 0V, f = 1.0MHz | |
| Output Capacitance | C _{oss} | — | 415 | — | pF | | |
| Reverse Transfer Capacitance | C _{rss} | — | 295 | — | pF | | |
| Gate Resistance | R _G | — | 2.3 | — | Ω | V _{GS} = 0V, V _{DS} = 0V, f = 1MHz | |
| SWITCHING CHARACTERISTICS | | | | | | | |
| Total Gate Charge | Q _g | — | 15.3 | — | nC | V _{DS} = -15V, V _{GS} = -4.5V, I _D = -8A V _{DS} = -15V, V _{GS} = -10V, I _D = -8A | |
| | | | 30.7 | | | | |
| Gate-Source Charge | Q _{gs} | — | 3.5 | — | | | V _{DS} = -15V, V _{GS} = -10V, I _D = -8A |
| Gate-Drain Charge | Q _{gd} | — | 7.9 | | | | |
| Turn-On Delay Time | t _{D(ON)} | — | 5.1 | — | ns | V _{GS} = -10V, V _{DS} = -15V, R _D = 15Ω, R _G = 6Ω | |
| Rise Time | t _R | — | 8 | — | | | |
| Turn-Off Delay Time | t _{D(OFF)} | — | 46 | — | | | |
| Fall Time | t _F | — | 30 | — | | | |

- Notes:
- Device mounted on 2 oz. copper pads on FR-4 PCB with R_{θJA} = 50°C/W.
 - Pulse width ≤10μs, Duty Cycle ≤1%.
 - Short duration pulse test used to minimize self-heating effect.

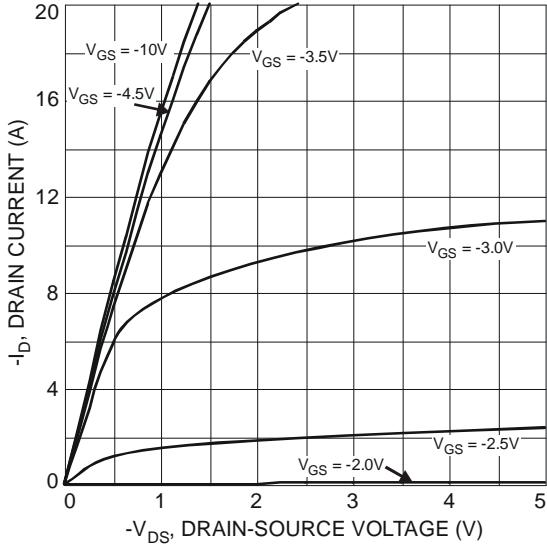


Fig. 1 Typical Output Characteristic

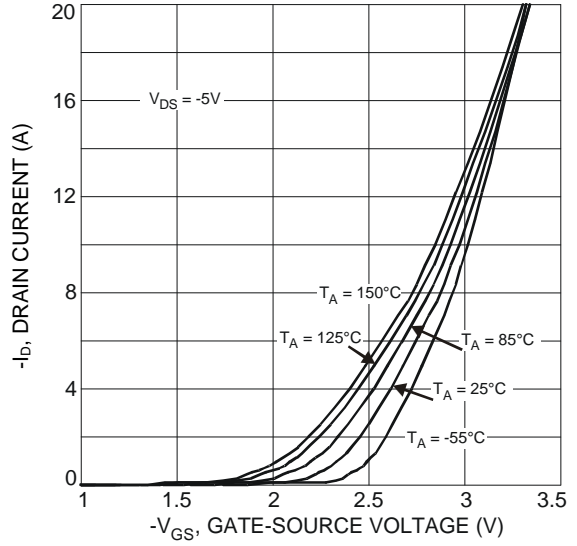


Fig. 2 Typical Transfer Characteristic

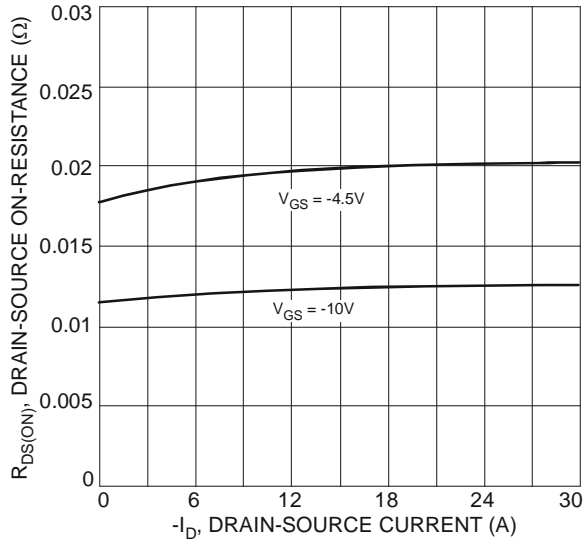


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

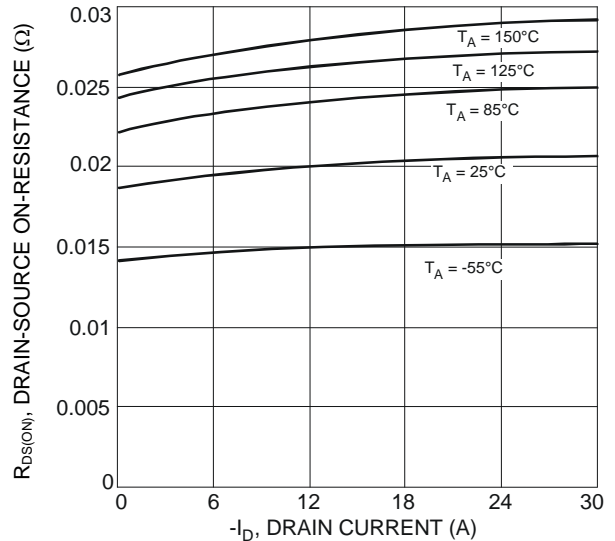


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

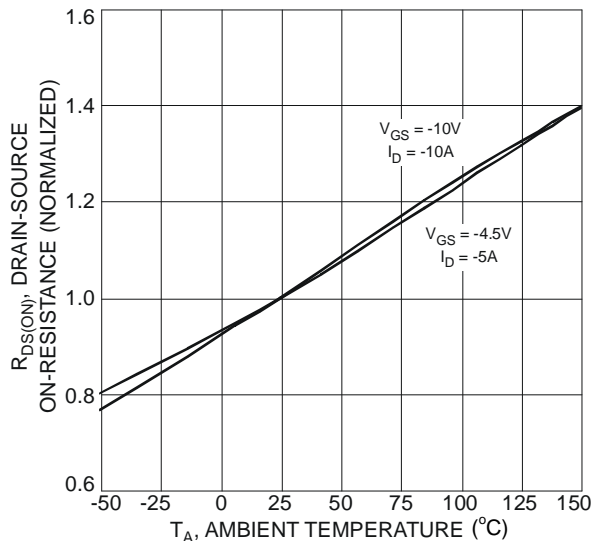


Fig. 5 Normalized On-Resistance vs. Ambient Temperature

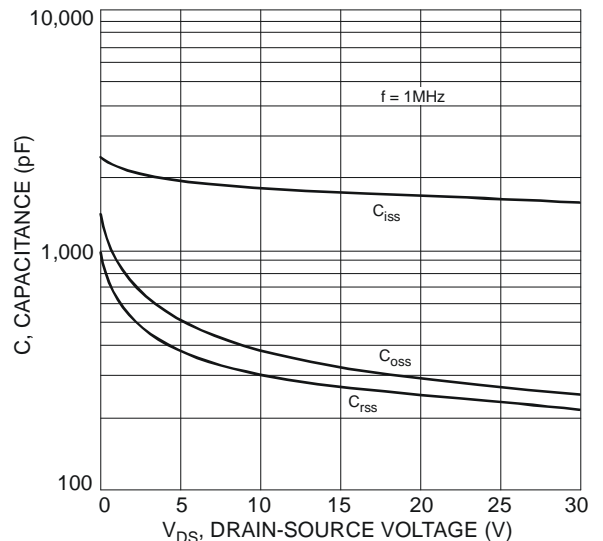


Fig. 6 Typical Total Capacitance

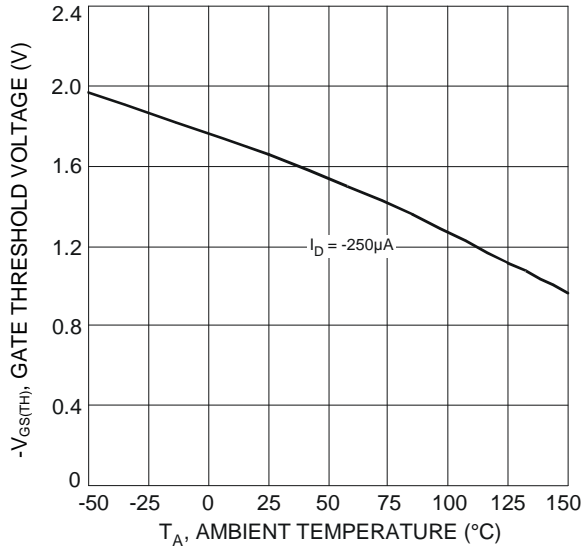


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

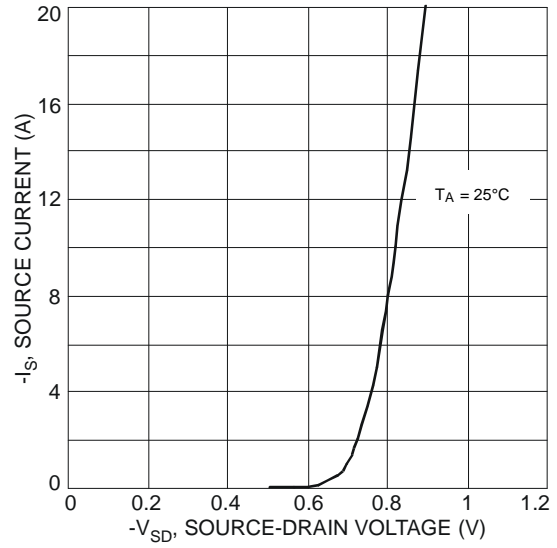


Fig. 8 Diode Forward Voltage vs. Current

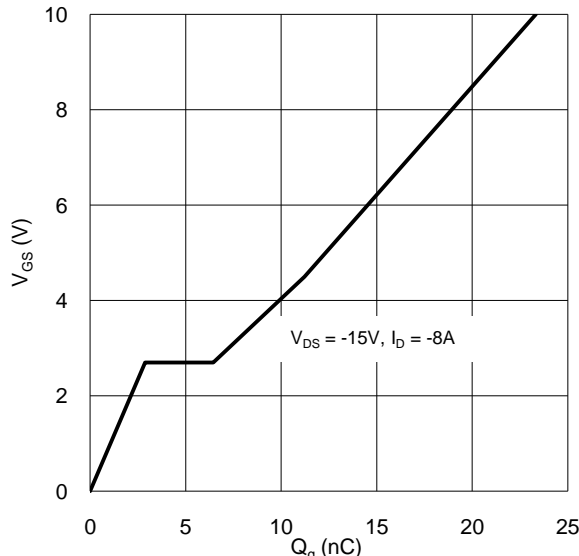


Fig. 9 Gate Charge

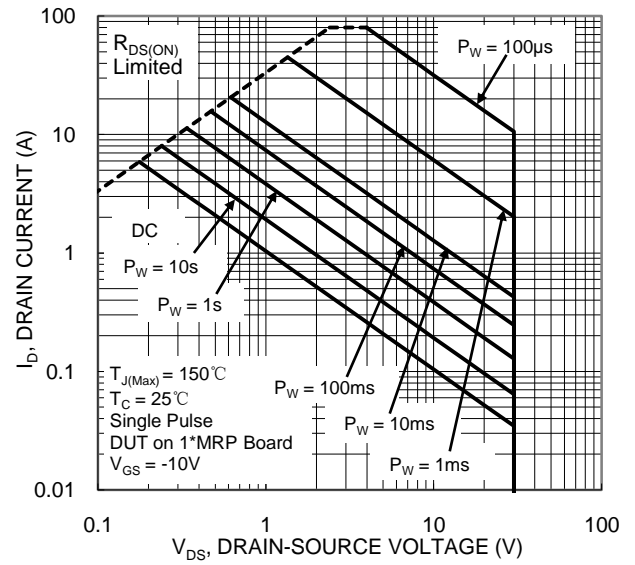


Fig. 10 SOA, Safe Operation Area

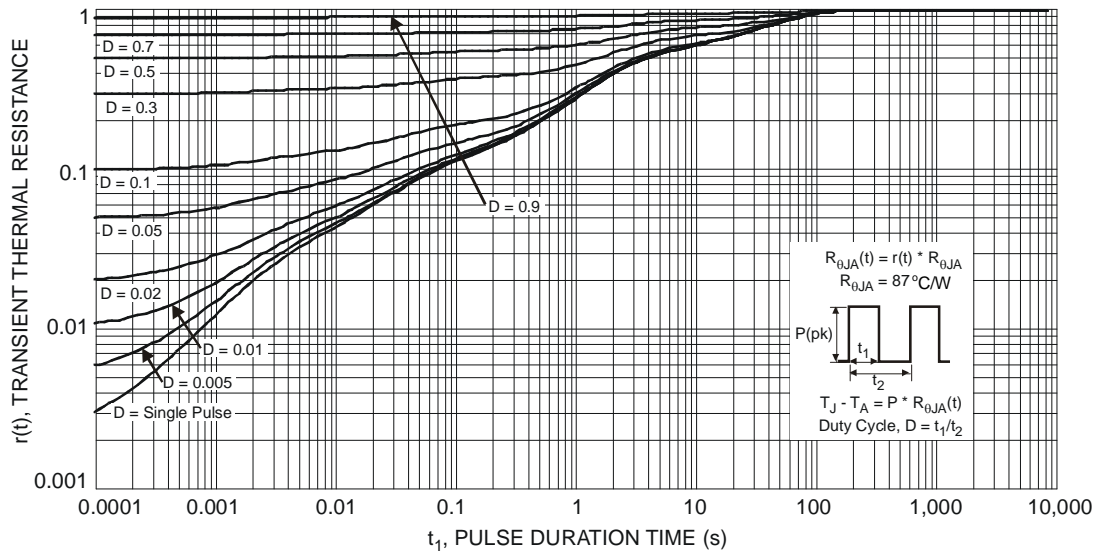
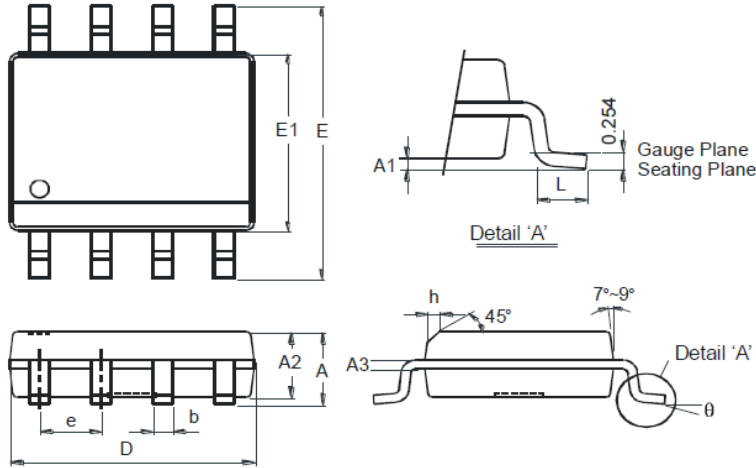


Fig. 11 Transient Thermal Response

Package Outline Dimensions

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

SO-8

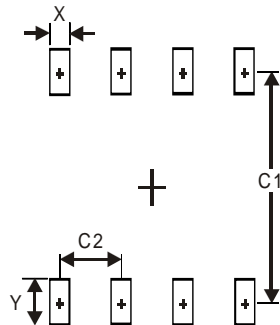


| SO-8 | | |
|----------------------|----------|------|
| Dim | Min | Max |
| A | - | 1.75 |
| A1 | 0.10 | 0.20 |
| A2 | 1.30 | 1.50 |
| A3 | 0.15 | 0.25 |
| b | 0.3 | 0.5 |
| D | 4.85 | 4.95 |
| E | 5.90 | 6.10 |
| E1 | 3.85 | 3.95 |
| e | 1.27 Typ | |
| h | - | 0.35 |
| L | 0.62 | 0.82 |
| θ | 0° | 8° |
| 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) |
|------------|---------------|
| X | 0.60 |
| Y | 1.55 |
| C1 | 5.4 |
| C2 | 1.27 |

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