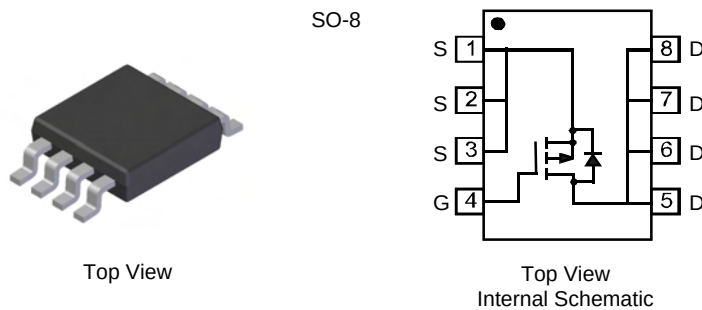


## Features

- Low On-Resistance
  - 14mΩ @  $V_{GS} = -10V$
  - 25mΩ @  $V_{GS} = -4.5V$
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Lead Free By Design/RoHS Compliant (Note 1)
- "Green" Device (Note 2)
- 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: 0.072g (approximate)

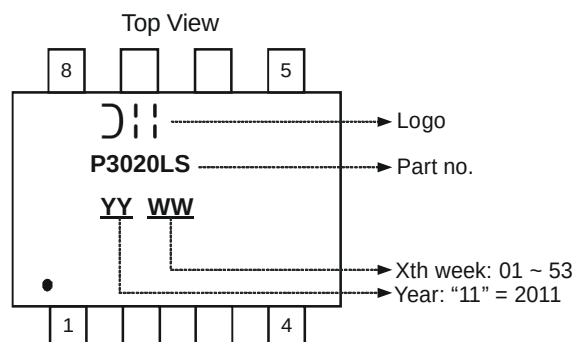


## Ordering Information (Note 3)

| Part Number   | Case | Packaging        |
|---------------|------|------------------|
| DMP3020LSS-13 | SO-8 | 2500/Tape & Reel |

- Notes:
- No purposefully added lead.
  - Diodes Inc.'s "Green" policy can be found on our website at <http://www.diodes.com>.
  - For packaging details, go to our website at <http://www.diodes.com>.

## Marking Information



**Maximum Ratings** @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                |              |                       | Symbol           | Value | Units |
|-------------------------------|--------------|-----------------------|------------------|-------|-------|
| Drain-Source Voltage          |              |                       | V <sub>DSS</sub> | -30   | V     |
| Gate-Source Voltage           |              |                       | V <sub>GSS</sub> | ±25   | V     |
| Drain Current (Note 4)        | Steady State | T <sub>A</sub> = 25°C | I <sub>D</sub>   | -12   | A     |
|                               |              | T <sub>A</sub> = 70°C |                  | -6    |       |
| Pulsed Drain Current (Note 5) |              |                       | I <sub>DM</sub>  | -40   | A     |

**Thermal Characteristics**

| Characteristic                          | Symbol                            | Value       | Unit |
|-----------------------------------------|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 4)        | P <sub>D</sub>                    | 2.5         | W    |
| Thermal Resistance, Junction to Ambient | R <sub>θJA</sub>                  | 50          | °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                                                                                                                                |
|-----------------------------------|----------------------|------|--------------|------|------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| OFF CHARACTERISTICS (Note 6)      |                      |      |              |      |      |                                                                                                                                               |
| Drain-Source Breakdown Voltage    | BV <sub>DSS</sub>    | -30  | —            | —    | 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> = -30V, V <sub>GS</sub> = 0V                                                                                                  |
| Gate-Source Leakage               | I <sub>GSS</sub>     | —    | —            | ±100 | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V                                                                                                  |
|                                   |                      | —    | —            | ±800 |      | V <sub>GS</sub> = ±25V, V <sub>DS</sub> = 0V                                                                                                  |
| ON CHARACTERISTICS (Note 6)       |                      |      |              |      |      |                                                                                                                                               |
| Gate Threshold Voltage            | V <sub>GS(th)</sub>  | -1   | —            | -2   | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA                                                                                   |
| Static Drain-Source On-Resistance | R <sub>DS (ON)</sub> | —    | 11.6         | 14   | mΩ   | V <sub>GS</sub> = -10V, I <sub>D</sub> = -8A                                                                                                  |
|                                   |                      | —    | 18.6         | 25   |      | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -5A                                                                                                 |
| Forward Transconductance          | g <sub>fs</sub>      | —    | 12           | —    | S    | V <sub>DS</sub> = -10V, I <sub>D</sub> = -12A                                                                                                 |
| Diode Forward Voltage (Note 6)    | V <sub>SD</sub>      | -0.5 | —            | -1.1 | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = -2A                                                                                                    |
| DYNAMIC CHARACTERISTICS           |                      |      |              |      |      |                                                                                                                                               |
| Input Capacitance                 | C <sub>iss</sub>     | —    | 1802         | —    | pF   | V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V, f = 1.0MHz                                                                                      |
| Output Capacitance                | C <sub>oss</sub>     | —    | 415          | —    | pF   |                                                                                                                                               |
| Reverse Transfer Capacitance      | C <sub>rss</sub>     | —    | 295          | —    | pF   |                                                                                                                                               |
| Gate Resistance                   | R <sub>G</sub>       | —    | 2.3          | —    | Ω    | V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V, f = MHz                                                                                           |
| SWITCHING CHARACTERISTICS         |                      |      |              |      |      |                                                                                                                                               |
| Total Gate Charge                 | Q <sub>g</sub>       | —    | 15.3<br>30.7 | —    | nC   | V <sub>DS</sub> = -15V, V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -8A<br>V <sub>DS</sub> = -15V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -8A |
| Gate-Source Charge                | Q <sub>gs</sub>      | —    | 3.5          | —    |      | V <sub>DS</sub> = -15V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -8A                                                                          |
| Gate-Drain Charge                 | Q <sub>gd</sub>      | —    | 7.9          | —    |      | V <sub>DS</sub> = -15V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -8A                                                                          |
| Turn-On Delay Time                | t <sub>d(on)</sub>   | —    | 5.1          | —    | ns   | V <sub>GS</sub> = -10V, V <sub>DS</sub> = -15V,<br>R <sub>D</sub> = 15Ω, R <sub>G</sub> = 6Ω                                                  |
| Rise Time                         | t <sub>r</sub>       | —    | 8            | —    |      |                                                                                                                                               |
| Turn-Off Delay Time               | t <sub>d(off)</sub>  | —    | 46           | —    |      |                                                                                                                                               |
| Fall Time                         | t <sub>f</sub>       | —    | 30           | —    |      |                                                                                                                                               |

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

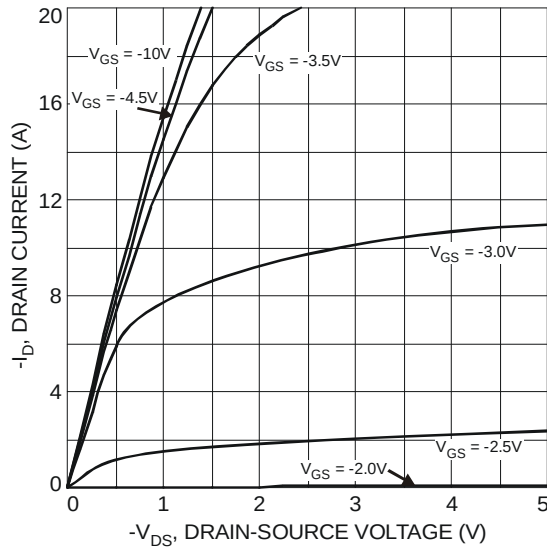


Fig. 1 Typical Output Characteristic

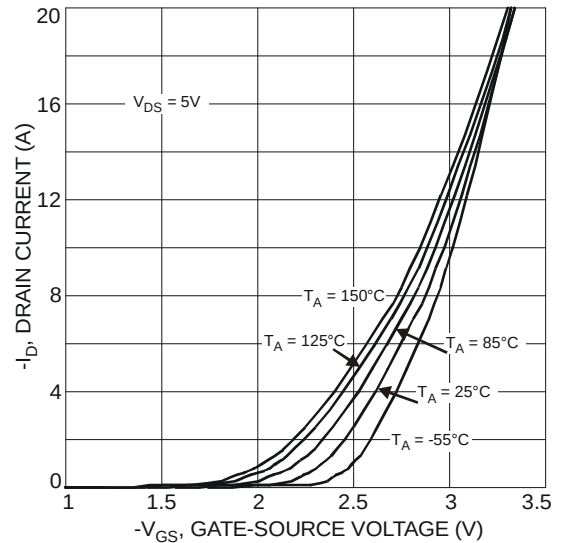


Fig. 2 Typical Transfer Characteristic

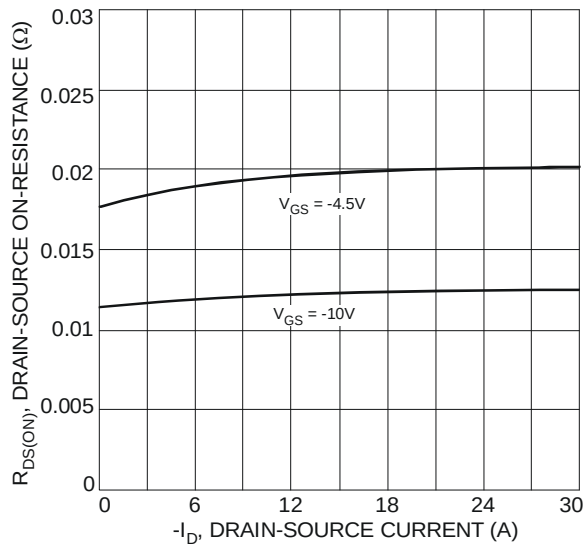


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

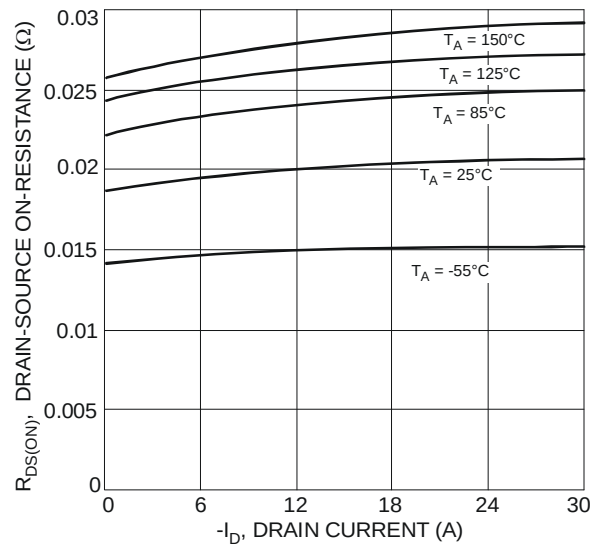


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

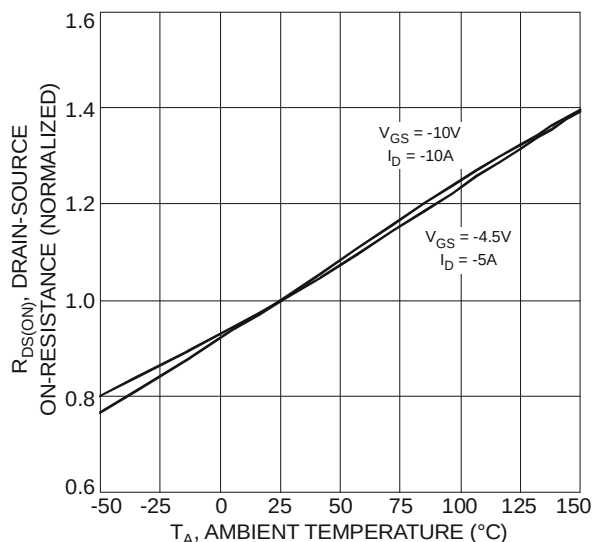


Fig. 5 Normalized On-Resistance vs. Ambient Temperature

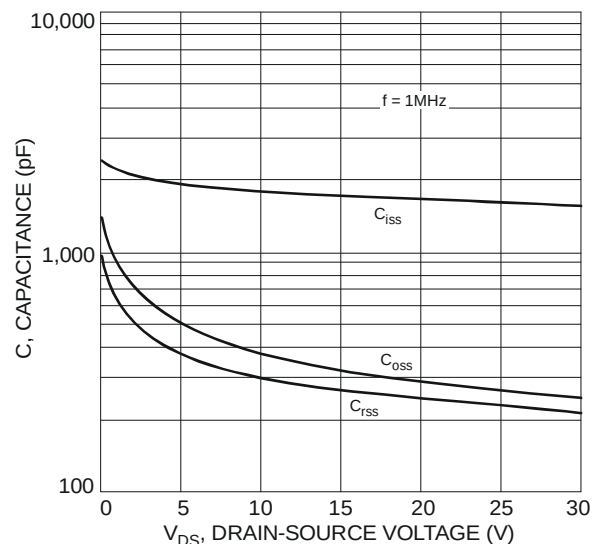


Fig. 6 Typical Total Capacitance

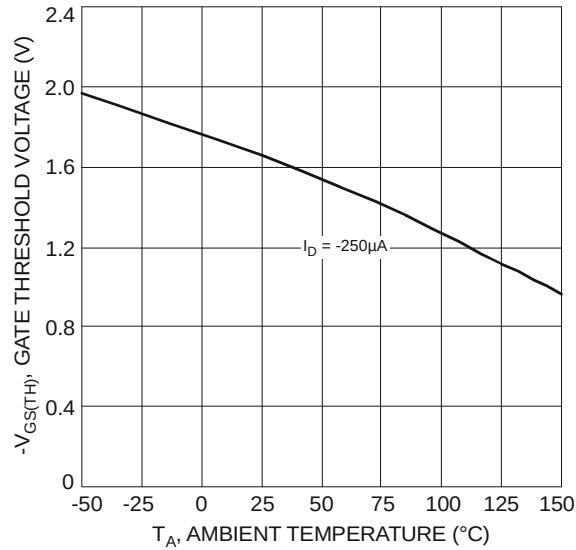


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

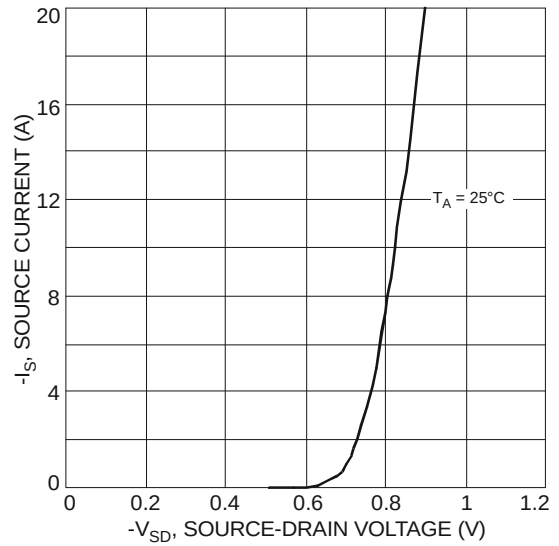


Fig. 8 Diode Forward Voltage vs. Current

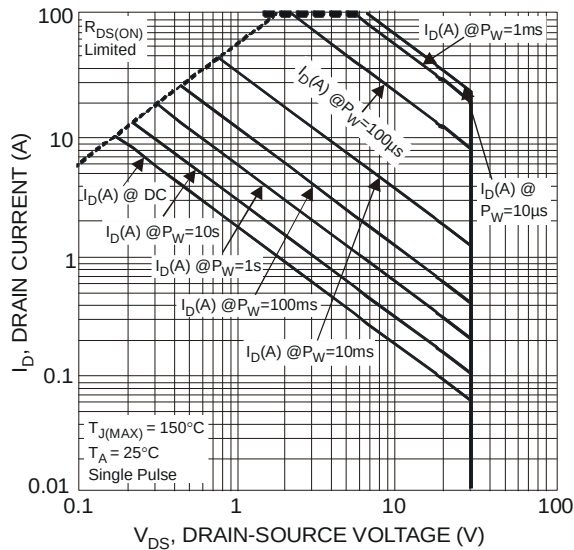


Fig. 9 SOA, Safe Operation Area

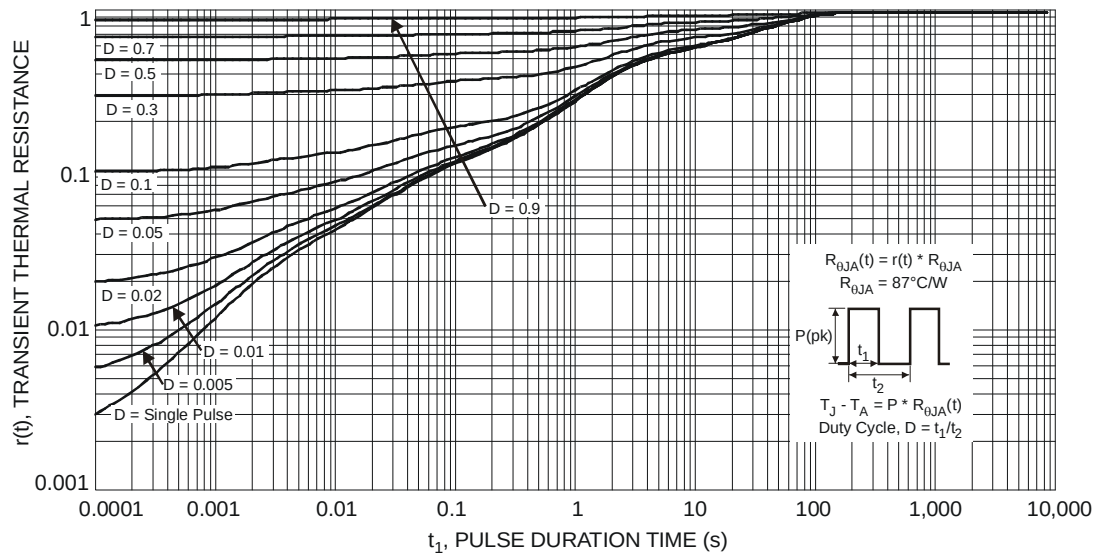
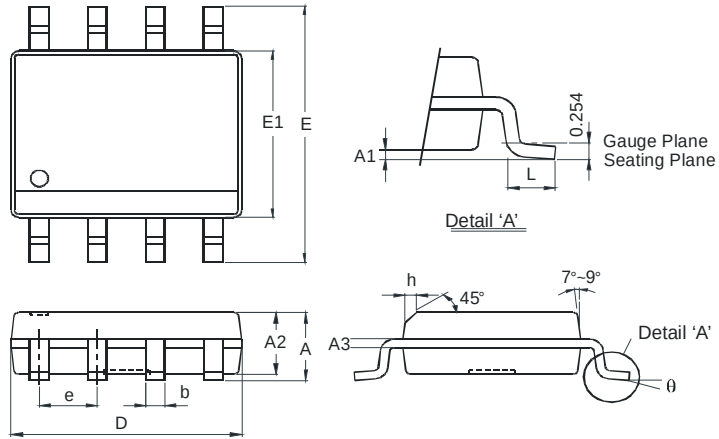


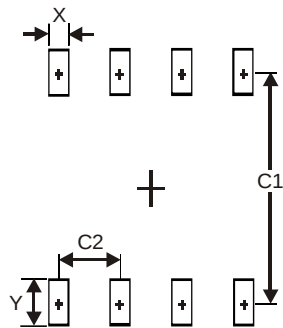
Fig. 10 Transient Thermal Response

## Package Outline Dimensions



| SO-8                 |          |      |
|----------------------|----------|------|
| Dim                  | Min      | Max  |
| <b>A</b>             | -        | 1.75 |
| <b>A1</b>            | 0.10     | 0.20 |
| <b>A2</b>            | 1.30     | 1.50 |
| <b>A3</b>            | 0.15     | 0.25 |
| <b>b</b>             | 0.3      | 0.5  |
| <b>D</b>             | 4.85     | 4.95 |
| <b>E</b>             | 5.90     | 6.10 |
| <b>E1</b>            | 3.85     | 3.95 |
| <b>e</b>             | 1.27 Typ |      |
| <b>h</b>             | -        | 0.35 |
| <b>L</b>             | 0.62     | 0.82 |
| <b>θ</b>             | 0°       | 8°   |
| All Dimensions in mm |          |      |

## Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| <b>X</b>   | 0.60          |
| <b>Y</b>   | 1.55          |
| <b>C1</b>  | 5.4           |
| <b>C2</b>  | 1.27          |

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