

## Product Summary

| BV <sub>DSS</sub> | R <sub>DS(ON)</sub> max       | I <sub>D</sub> max<br>T <sub>A</sub> = +25°C |
|-------------------|-------------------------------|----------------------------------------------|
| 30V               | 20mΩ @ V <sub>GS</sub> = 10V  | 6.9A                                         |
|                   | 27mΩ @ V <sub>GS</sub> = 4.5V | 5.8A                                         |

## Description

This MOSFET is designed to minimize the on-state resistance (R<sub>DS(on)</sub>) and yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

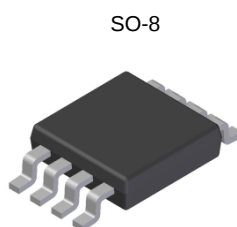
- Backlighting
- Power Management Functions
- DC-DC Converters

## Features

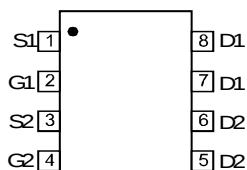
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

## Mechanical Data

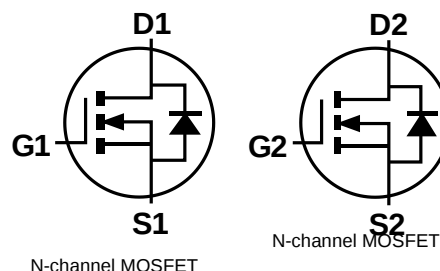
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208③
- Weight: 0.072grams (Approximate)



Top View



Top View  
Internal Schematic



N-channel MOSFET

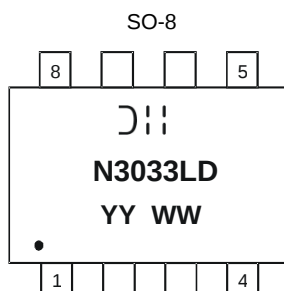
N-channel MOSFET

## Ordering Information (Note 5)

| Part Number    | Case | Packaging         |
|----------------|------|-------------------|
| DMN3033LSDQ-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](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\\_grade\\_definitions/](http://www.diodes.com/quality/product_grade_definitions/).
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



D11 = Manufacturer's Marking  
 N3033LD = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Year (ex: 13 = 2013)  
 WW = Week (01 - 53)

**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> | ±20   | V     |
| Drain Current (Note 6)        | Steady State | T <sub>A</sub> = +25°C | I <sub>D</sub>   | 6.9   | A     |
|                               |              | T <sub>A</sub> = +70°C |                  | 5.8   |       |
| Pulsed Drain Current (Note 7) |              |                        | I <sub>DM</sub>  | 30    | A     |

**Thermal Characteristics**

| Characteristic                          | Symbol                            | Value       | Unit |
|-----------------------------------------|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 6)        | P <sub>D</sub>                    | 2           | W    |
| Thermal Resistance, Junction to Ambient | R <sub>θJA</sub>                  | 62.5        | °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 8)       |                      |     |           |      |      |                                                                                                                                          |
| 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>     | —   | —         | 100  | nA   | 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                                                                                             |
|                                    |                      | —   | —         | 1    | μA   | V <sub>GS</sub> = ±25V, V <sub>DS</sub> = 0V                                                                                             |
| ON CHARACTERISTICS (Note 8)        |                      |     |           |      |      |                                                                                                                                          |
| Gate Threshold Voltage             | V <sub>GS(th)</sub>  | 1   | —         | 2.1  | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA                                                                               |
| Static Drain-Source On-Resistance  | R <sub>DS (ON)</sub> | —   | 13        | 20   | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 6.9A                                                                                             |
|                                    |                      |     | 22        | 27   |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 5A                                                                                              |
| Forward Transconductance           | g <sub>fs</sub>      | —   | 7         | —    | S    | V <sub>DS</sub> =5V, I <sub>D</sub> = 6.9A                                                                                               |
| Diode Forward Voltage (Note 8)     | V <sub>SD</sub>      | 0.5 | —         | 1.2  | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A                                                                                                |
| DYNAMIC CHARACTERISTICS (Note 9)   |                      |     |           |      |      |                                                                                                                                          |
| Input Capacitance                  | C <sub>iSS</sub>     | —   | 725       | —    | pF   | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V<br>f = 1MHz                                                                                  |
| Output Capacitance                 | C <sub>oSS</sub>     | —   | 114       | —    | pF   |                                                                                                                                          |
| Reverse Transfer Capacitance       | C <sub>rSS</sub>     | —   | 92        | —    | pF   |                                                                                                                                          |
| Gate Resistance                    | R <sub>G</sub>       | —   | 0.89      | —    | Ω    | V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V, f = 1MHz                                                                                     |
| SWITCHING CHARACTERISTICS (Note 9) |                      |     |           |      |      |                                                                                                                                          |
| Total Gate Charge                  | Q <sub>g</sub>       | —   | 6.4<br>13 | —    | nC   | V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 15V, I <sub>D</sub> =5A<br>V <sub>GS</sub> = 10V, V <sub>DS</sub> = 15V, I <sub>D</sub> = 6.9A |
| Gate-Source Charge                 | Q <sub>gs</sub>      | —   | 1.9       | —    | nC   | V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 15V, I <sub>D</sub> = 6.9A                                                                     |
| Gate-Drain Charge                  | Q <sub>gd</sub>      | —   | 3.2       | —    | nC   | V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 15V, I <sub>D</sub> = 6.9A                                                                     |
| Turn-On Delay Time                 | t <sub>d(on)</sub>   | —   | 11        | —    | ns   | V <sub>DD</sub> = 15V, V <sub>GS</sub> = 10V,<br>R <sub>D</sub> = 1.8Ω, R <sub>G</sub> = 6Ω                                              |
| Turn-On Rise Time                  | t <sub>r</sub>       | —   | 7         | —    | ns   |                                                                                                                                          |
| Turn-Off Delay Time                | t <sub>d(off)</sub>  | —   | 63        | —    | ns   |                                                                                                                                          |
| Turn-Off Fall Time                 | t <sub>f</sub>       | —   | 30        | —    | ns   |                                                                                                                                          |

- Notes:
6. Device mounted on 2 oz. Copper pads on FR-4 PCB with R<sub>θJA</sub> = 62.5°C/W.
  7. Pulse width ≤10μs, Duty Cycle ≤1%.
  8. Short duration pulse test used to minimize self-heating effect.
  9. Guaranteed by design. Not subject to product testing.

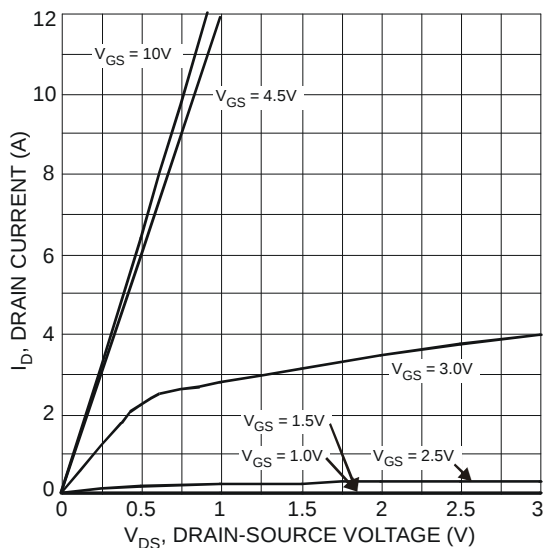


Fig. 1 Typical Output Characteristics

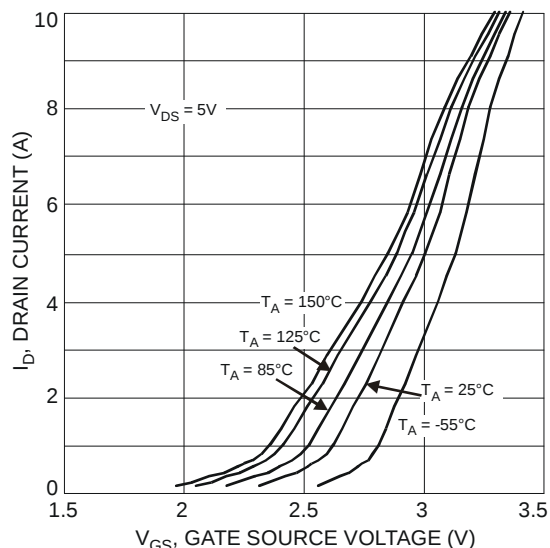


Fig. 2 Typical Transfer Characteristics

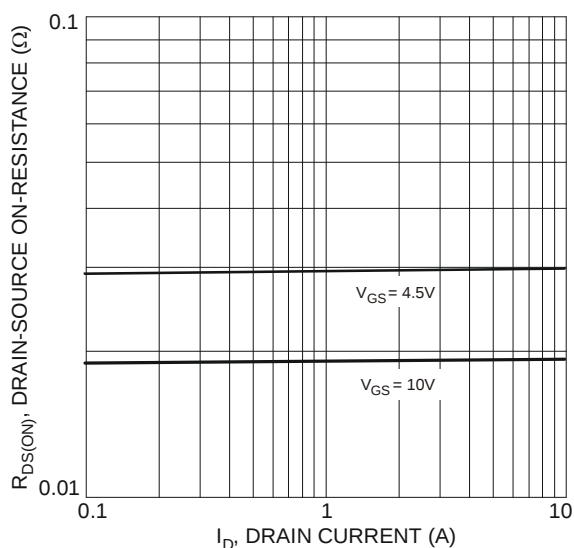


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

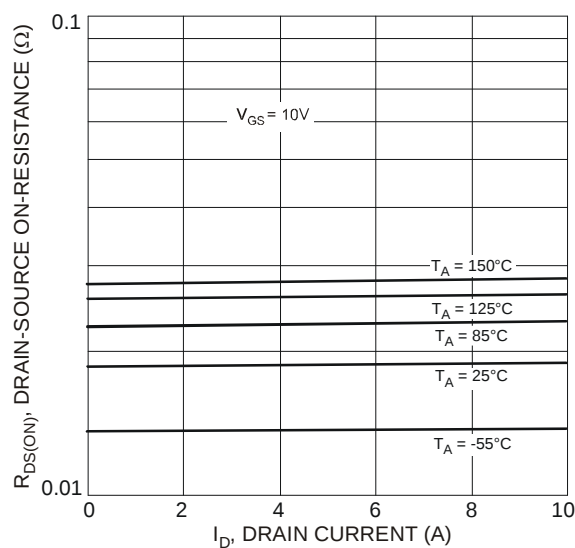


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

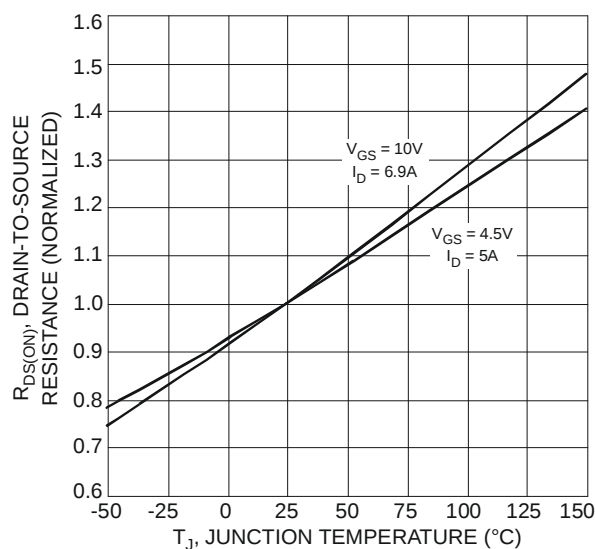


Fig. 5 On-Resistance Variation with Temperature

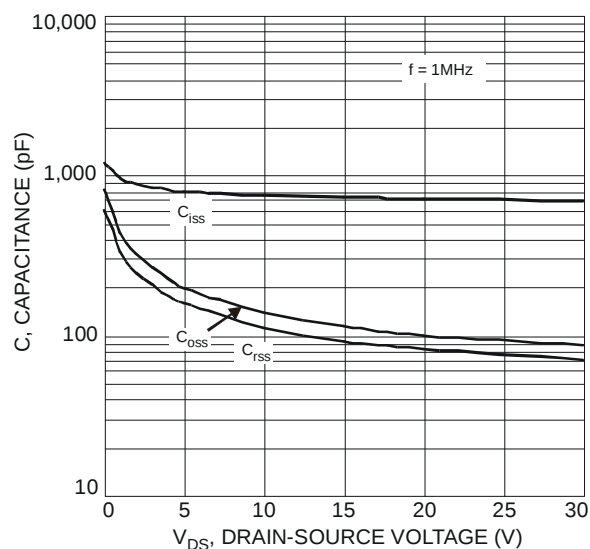
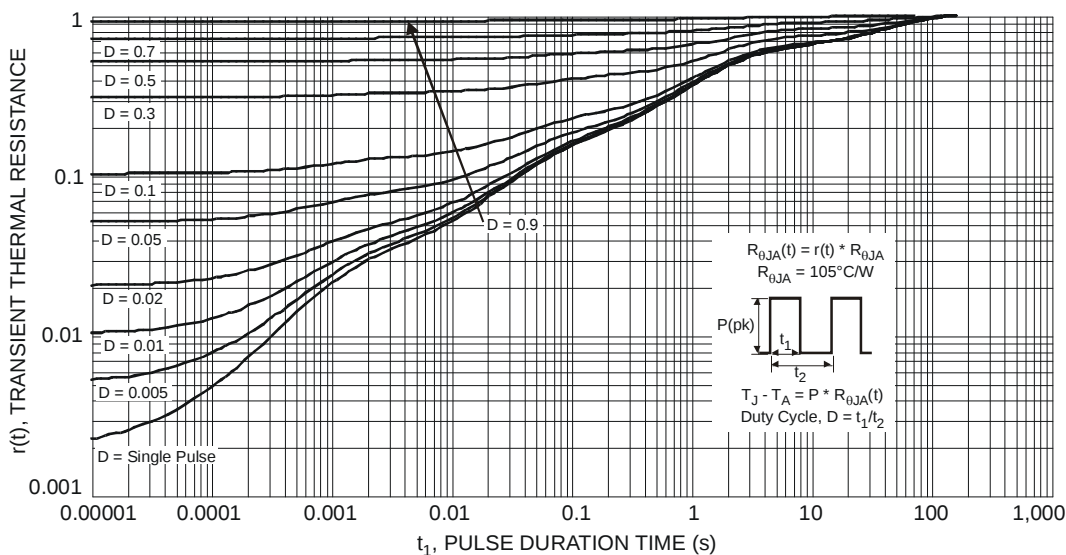
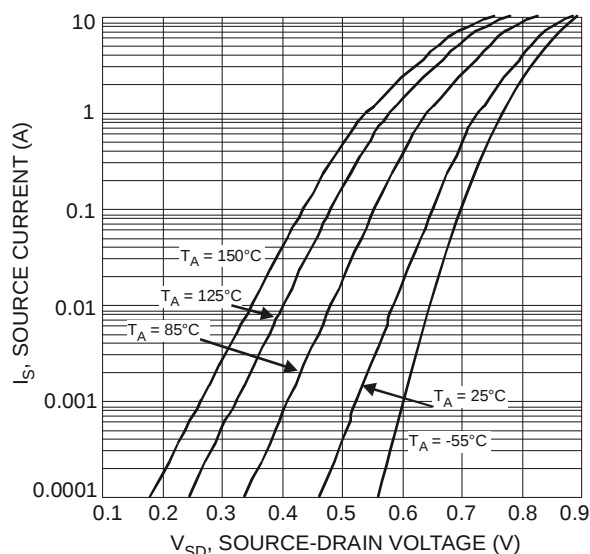
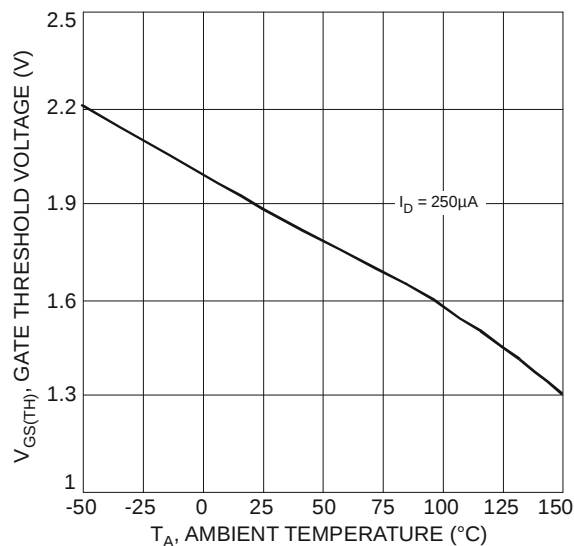
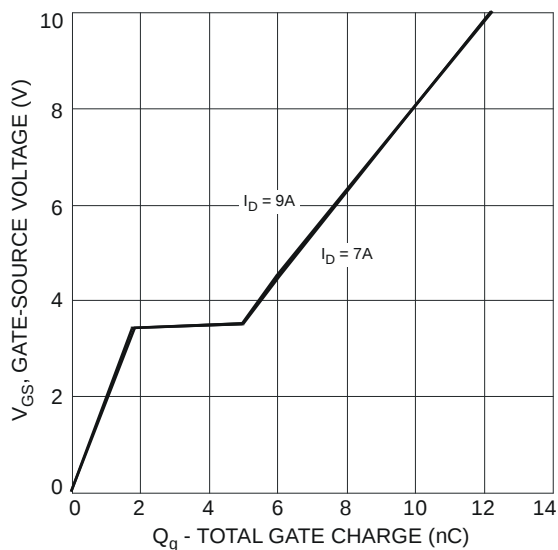
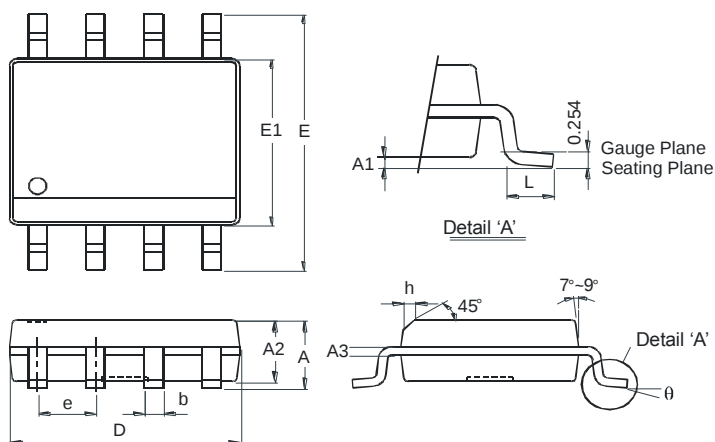


Fig. 6 Typical Capacitance



## Package Outline Dimensions

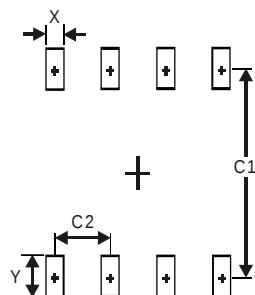
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| 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 AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



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

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