

## Product Summary

| BV <sub>DSS</sub> | R <sub>DS(on)</sub> max       | I <sub>D</sub><br>T <sub>A</sub> = +25°C |
|-------------------|-------------------------------|------------------------------------------|
| 30V               | 30mΩ @ V <sub>GS</sub> = 10V  | 6A                                       |
|                   | 40mΩ @ V <sub>GS</sub> = 4.5V | 4A                                       |

## Description and Applications

This new generation small-signal enhancement mode MOSFET features low on-resistance and fast switching, making it ideal for high-efficiency power management applications.

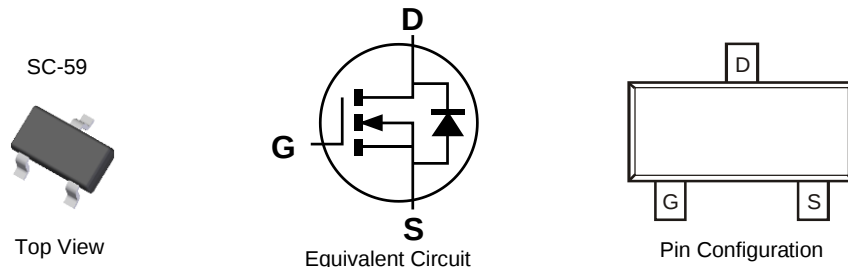
- Motor Control
- Backlighting
- DC-DC Converters
- Power Management Functions

## Features

- Low Gate Charge
- Low R<sub>DS(ON)</sub>
- 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 (Note 4)**

## Mechanical Data

- Case: SC-59
- Case Material - Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Finish - Matte Tin Annealed over Copper Leadframe;
- Solderable per MIL-STD-202, Method 208 Ⓔ3
- Weight: 0.014 grams (Approximate)

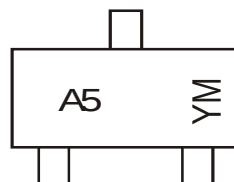


## Ordering Information (Note 5)

| Part Number    | Case  | Packaging          |
|----------------|-------|--------------------|
| DMN3033LSNQ-7  | SC-59 | 3,000/Tape & Reel  |
| DMN3033LSNQ-13 | SC-59 | 10,000/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> 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



A5 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: U = 2007)  
 M = Month (ex: 9 = September)

### Date Code Key

| Year | 2007 | ... | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|------|------|-----|------|------|------|------|------|------|------|------|
| Code | U    | ... | C    | D    | E    | F    | G    | H    | I    | J    |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code  | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | O   | N   | D   |

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                         | Symbol           | Value                  | Unit |
|----------------------------------------|------------------|------------------------|------|
| Drain-Source Voltage                   | V <sub>DSS</sub> | 30                     | V    |
| Gate-Source Voltage                    | V <sub>GSS</sub> | ±20                    | V    |
| Drain Current (Note 6) Continuous      | I <sub>D</sub>   | 6                      | A    |
|                                        |                  | 5                      |      |
|                                        |                  | T <sub>A</sub> = +25°C |      |
|                                        |                  | T <sub>A</sub> = +70°C |      |
| Pulsed Drain Current (Note 7)          | I <sub>DM</sub>  | 24                     | A    |
| Body-Diode Continuous Current (Note 6) | I <sub>S</sub>   | 2.25                   | A    |

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                           | Symbol                            | Value       | Unit  |
|----------------------------------------------------------|-----------------------------------|-------------|-------|
| Total Power Dissipation (Note 6)                         | P <sub>D</sub>                    | 1.4         | W     |
| Thermal Resistance, Junction to Ambient (Note 6) t ≤ 10s | R <sub>θJA</sub>                  | 90          | °C /W |
| Operating and Storage Temperature Range                  | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C    |

Notes: 6. Device mounted on 1"x1", FR-4 PC board with 2 oz. Copper and test pulse width t ≤ 10s.  
7. Repetitive Rating, pulse width limited by junction temperature.

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                             | Symbol              | Min | Typ      | Max      | Unit | Test Condition                                                                              |
|--------------------------------------------|---------------------|-----|----------|----------|------|---------------------------------------------------------------------------------------------|
| <b>STATIC PARAMETERS</b>                   |                     |     |          |          |      |                                                                                             |
| Drain-Source Breakdown Voltage             | BV <sub>DSS</sub>   | 30  | —        | —        | V    | I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V                                                |
| Zero Gate Voltage Drain Current            | I <sub>DSS</sub>    | —   | —        | 1<br>5   | μA   | V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V                                                 |
|                                            |                     |     |          |          |      |                                                                                             |
|                                            |                     |     |          |          |      | T <sub>J</sub> = 25°C                                                                       |
|                                            |                     |     |          |          |      | (Note 9) T <sub>J</sub> = 55°C                                                              |
| Gate-Body Leakage Current                  | I <sub>GSS</sub>    | —   | —        | ±100     | nA   | V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V                                                |
| Gate Threshold Voltage                     | V <sub>GS(th)</sub> | 1.0 | —        | 2.1      | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA                                  |
| Static Drain-Source On-Resistance (Note 8) | R <sub>DS(on)</sub> | —   | 25<br>36 | 30<br>40 | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 6A<br>V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 5A   |
| Forward Transconductance (Note 8)          | g <sub>FS</sub>     | —   | 5        | —        | S    | V <sub>DS</sub> = 10V, I <sub>D</sub> = 8A                                                  |
| Diode Forward Voltage (Note 8)             | V <sub>SD</sub>     | —   | 0.7      | 1.1      | V    | I <sub>S</sub> = 2.25A, V <sub>GS</sub> = 0V                                                |
| <b>DYNAMIC PARAMETERS (Note 9)</b>         |                     |     |          |          |      |                                                                                             |
| Total Gate Charge                          | Q <sub>g</sub>      | —   | 10.5     | —        | nC   | V <sub>GS</sub> = 5V, V <sub>DS</sub> = 15V, I <sub>D</sub> = 6A                            |
| Gate-Source Charge                         | Q <sub>gs</sub>     | —   | 3.8      | —        | nC   | V <sub>GS</sub> = 10V, V <sub>DS</sub> = 15V, I <sub>D</sub> = 6A                           |
| Gate-Drain Charge                          | Q <sub>gd</sub>     | —   | 2.9      | —        | nC   | V <sub>GS</sub> = 10V, V <sub>DS</sub> = 15V, I <sub>D</sub> = 6A                           |
| 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   |                                                                                             |
| Input Capacitance                          | C <sub>iss</sub>    | —   | 755      | —        | pF   | V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V<br>f = 1.0MHz                                   |
| Output Capacitance                         | C <sub>oss</sub>    | —   | 136      | —        | pF   |                                                                                             |
| Reverse Transfer Capacitance               | C <sub>rss</sub>    | —   | 108      | —        | pF   |                                                                                             |

Notes: 8. Test pulse width t = 300ms.  
9. Guaranteed by design. Not subject to production testing.

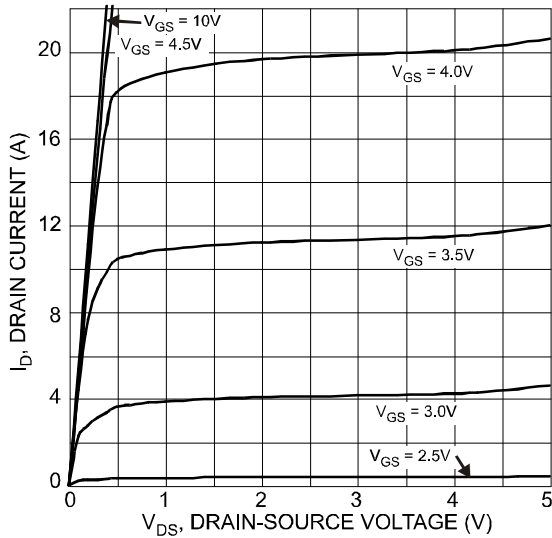


Fig. 1 Typical Output Characteristics

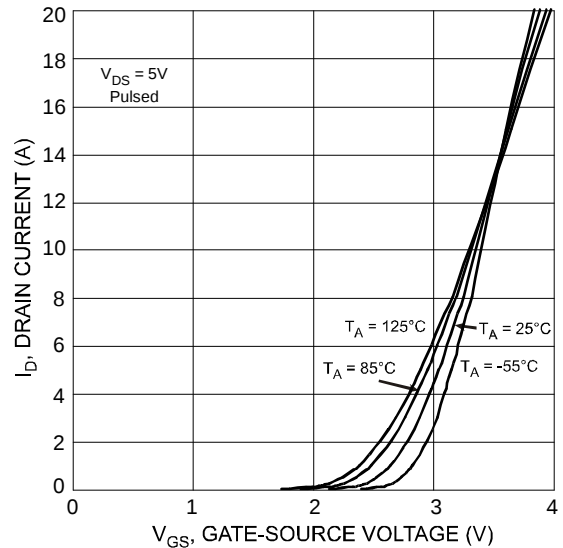


Fig. 2 Typical Transfer Characteristics

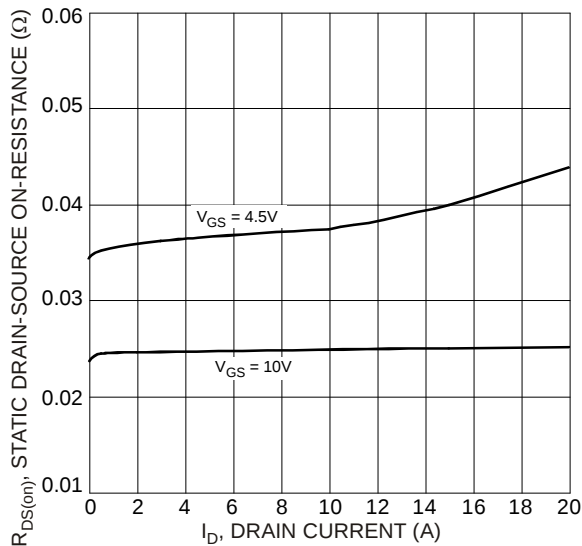


Fig. 3 On-Resistance vs. Drain Current and Gate Voltage

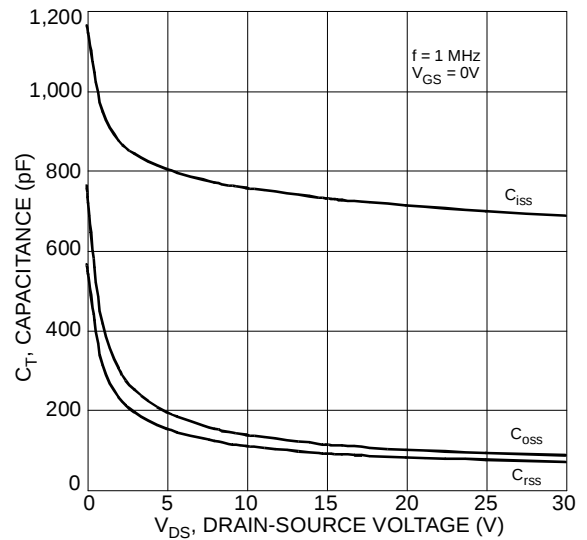


Fig. 4 Typical Total Capacitance

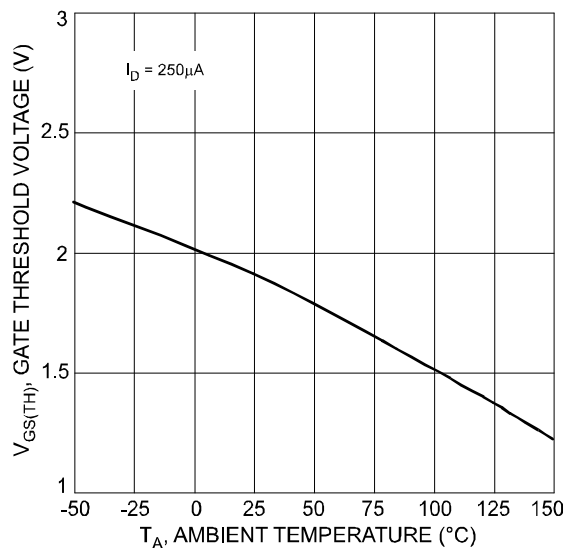


Fig. 5 Gate Threshold Voltage vs. Ambient Temperature

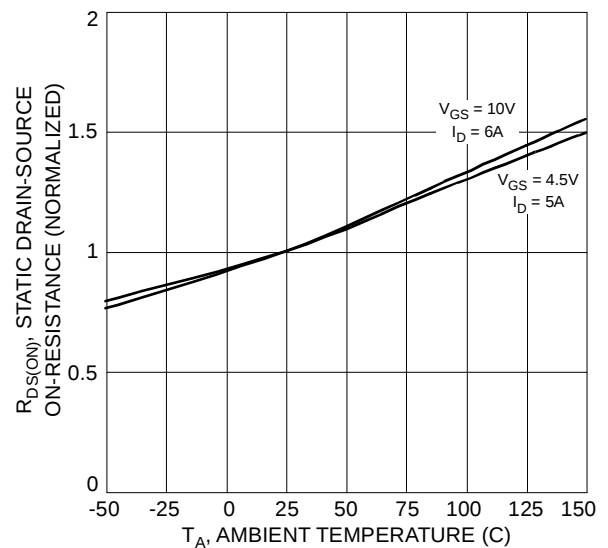


Fig. 6 Normalized Static Drain-Source On-Resistance vs. Ambient Temperature

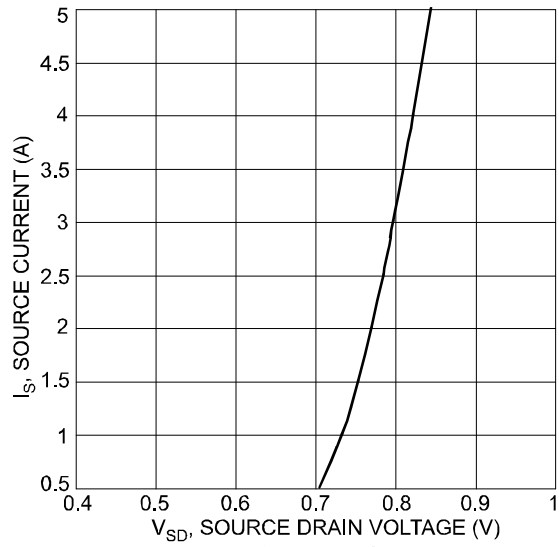
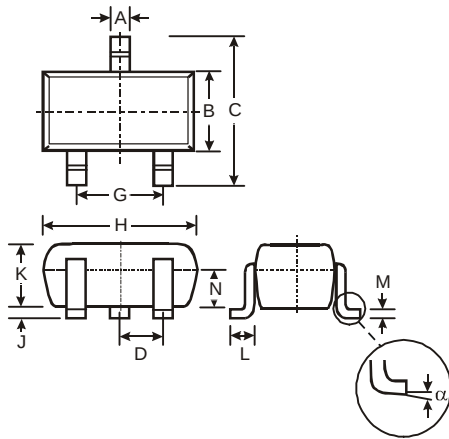


Fig. 7 Reverse Drain Current vs. Source-Drain Voltage

## Package Outline Dimensions

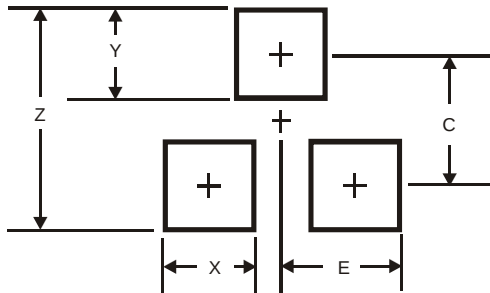
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| SC-59                |       |      |      |
|----------------------|-------|------|------|
| Dim                  | Min   | Max  | Typ  |
| A                    | 0.35  | 0.50 | 0.38 |
| B                    | 1.50  | 1.70 | 1.60 |
| C                    | 2.70  | 3.00 | 2.80 |
| D                    | -     | -    | 0.95 |
| G                    | -     | -    | 1.90 |
| H                    | 2.90  | 3.10 | 3.00 |
| J                    | 0.013 | 0.10 | 0.05 |
| K                    | 1.00  | 1.30 | 1.10 |
| L                    | 0.35  | 0.55 | 0.40 |
| M                    | 0.10  | 0.20 | 0.15 |
| N                    | 0.70  | 0.80 | 0.75 |
| $\alpha$             | 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) |
|------------|---------------|
| Z          | 3.4           |
| X          | 0.8           |
| Y          | 1.0           |
| C          | 2.4           |
| E          | 1.35          |

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