## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ max | $I_D$ max $T_A$ = 25°C |
|---|---|---|
| 20V | 55mΩ @ $V_{GS}$ = 4.5V | 4.0A |
| | 70mΩ @ $V_{GS}$ = 2.5V | 3.5A |
| | 90mΩ @ $V_{GS}$ = 1.8V | 3.1A |
| | 130mΩ @ $V_{GS}$ = 1.5V | 2.5A |

## Features and Benefits

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- ESD Protected Gate
- **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**

## Description and Applications

This new generation MOSFET has been 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.

- General Purpose Interfacing Switch
- Power Management Functions

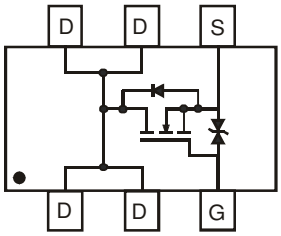
## Mechanical Data

- Case: SOT26
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.015 grams (approximate)


ESD PROTECTED

SOT26


Top View



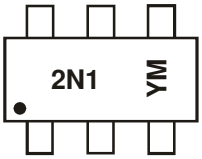
Top View
Internal Schematic

## Ordering Information (Note 4)

| Part Number | Case | Packaging |
|---|---|---|
| DMN2100UDM-7 | SOT26 | 3000/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. For packaging details, go to our website at http://www.diodes.com..

## Marking Information




2N1 = Marking Code
YM = Date Code Marking
Y = Year (ex: U = 2007)
M = Month (ex: 9 = September)

Date Code Key

| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | U | V | W | X | Y | Z | A | B | C | D | E |

| 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 @$T_A$ = 25°C unless otherwise specified

| Characteristic | | | Symbol | Value | Units |
|---|---|---|---|---|---|
| Drain-Source Voltage | | | $V_{DSS}$ | 20 | V |
| Gate-Source Voltage | | | $V_{GSS}$ | ±8 | V |
| Continuous Drain Current (Note 6) $V_{GS}$ = 4.5V | Steady State | $T_A$ = 25°C<br>$T_A$ = 70°C | $I_D$ | 4.0<br>3.1 | A |
| | t<10s | $T_A$ = 25°C<br>$T_A$ = 70°C | $I_D$ | 4.5<br>3.5 | A |
| Pulsed Drain Current (10µs pulse, duty cycle = 1%) | | | $I_{DM}$ | 13 | A |
| Maximum Body Diode Continuous Current | | | $I_S$ | 1.5 | A |

## Thermal Characteristics @$T_A$ = 25°C unless otherwise specified

| Characteristic | | Symbol | Value | Units |
|---|---|---|---|---|
| Total Power Dissipation (Note 5) | $T_A$ = 25°C | $P_D$ | 1 | W |
| | $T_A$ = 70°C | | 0.6 | |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady state | $R_{\theta JA}$ | 127 | °C/W |
| | t<10s | | 91 | |
| Total Power Dissipation (Note 6) | $T_A$ = 25°C | $P_D$ | 1.5 | W |
| | $T_A$ = 70°C | | 0.9 | |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady state | $R_{\theta JA}$ | 85 | °C/W |
| | t<10s | | 63 | |
| Thermal Resistance, Junction to Case (Note 6) | | $R_{\theta JC}$ | 3.1 | |
| 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 | $BV_{DSS}$ | 20 | — | — | V | $V_{GS}$ = 0V, $I_D$ = 250µA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | — | — | 1 | µA | $V_{DS}$ = 20V, $V_{GS}$ = 0V |
| Gate-Source Leakage | $I_{GSS}$ | — | — | ±1 | µA | $V_{GS}$ = ±8V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS (Note 7)** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | 0.6 | — | 1.0 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = 250µA |
| Static Drain-Source On-Resistance | $R_{DS\ (ON)}$ | — | 32 | 55 | mΩ | $V_{GS}$ = 4.5V, $I_D$ = 6A |
| | | — | 43 | 70 | | $V_{GS}$ = 2.5V, $I_D$ = 4.0A |
| | | — | 56 | 90 | | $V_{GS}$ = 1.8V, $I_D$ = 1.5A |
| | | — | 80 | 130 | | $V_{GS}$ = 1.5V, $I_D$ = 1.0A |
| Forward Transfer Admittance | $\|Y_{fs}\|$ | — | 8 | — | S | $V_{DS}$ =10V, $I_D$ = 6A |
| Diode Forward Voltage | $V_{SD}$ | — | 0.7 | 1.1 | V | $V_{GS}$ = 0V, $I_S$ = 2A |
| **DYNAMIC CHARACTERISTICS (Note 8)** | | | | | | |
| Input Capacitance | $C_{iss}$ | — | 555 | — | pF | $V_{DS}$ = 10V, $V_{GS}$ = 0V<br>f = 1.0MHz |
| Output Capacitance | $C_{oss}$ | — | 112 | — | pF | |
| Reverse Transfer Capacitance | $C_{rss}$ | — | 84 | — | pF | |
| Total Gate Charge | $Q_g$ | — | 8.8 | — | nC | $V_{DS}$ = 10V, $V_{GS}$ = 4.5V,<br>$I_D$ = 6.5A |
| Gate-Source Charge | $Q_{gs}$ | — | 1.4 | — | nC | |
| Gate-Drain Charge | $Q_{gd}$ | — | 3 | — | nC | |
| Turn-On Delay Time | $t_{D(on)}$ | — | 53 | — | ns | $V_{DS}$ = 10V, $I_D$ = 1.0A<br>$V_{GS}$ = 4.5V, $R_G$ = 6Ω |
| Turn-On Rise Time | $t_r$ | — | 78 | — | ns | |
| Turn-Off Delay Time | $t_{D(off)}$ | — | 561 | — | ns | |
| Turn-Off Fall Time | $t_f$ | — | 234 | — | ns | |

Notes:
5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate
7. Short duration pulse test used to minimize self-heating effect
8. Guaranteed by design. Not subject to production testing

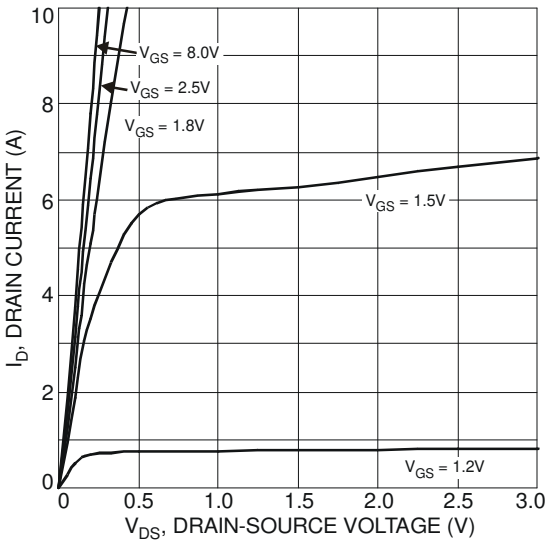



Fig. 1 Typical Output Characteristic

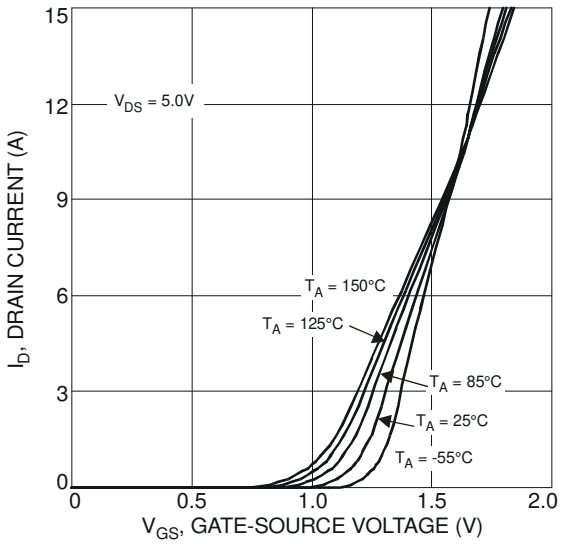



Fig. 2 Typical Transfer Characteristics

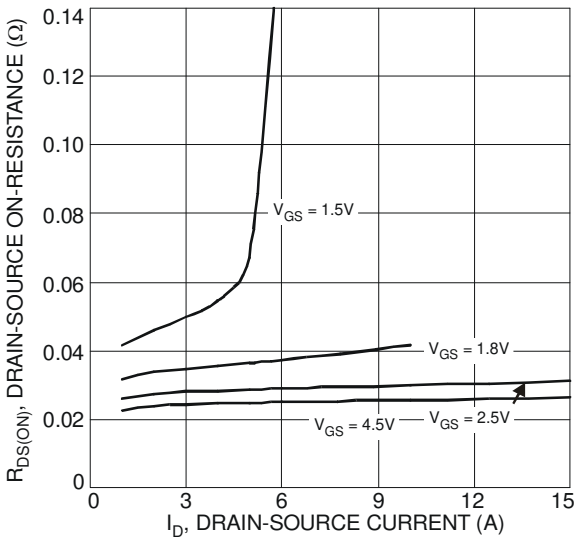



Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

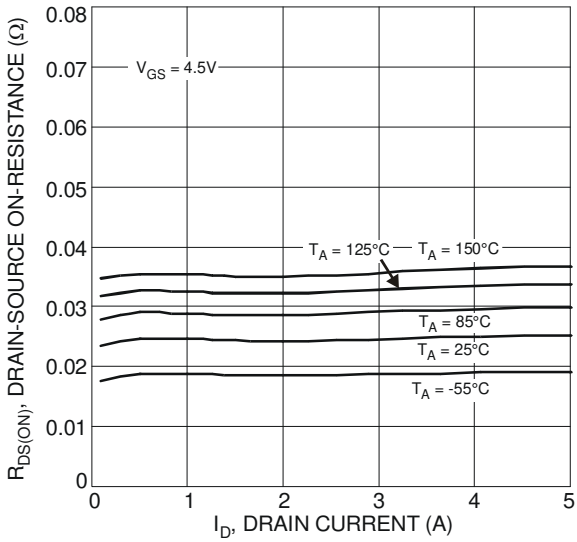



Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

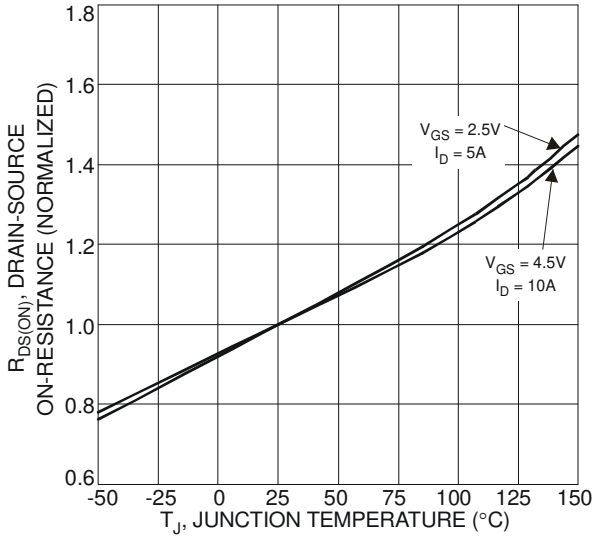



Fig. 5 On-Resistance Variation with Temperature

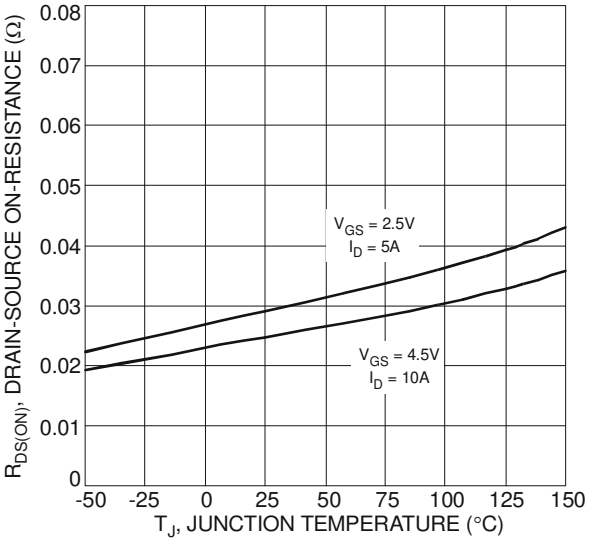



Fig. 6 On-Resistance Variation with Temperature

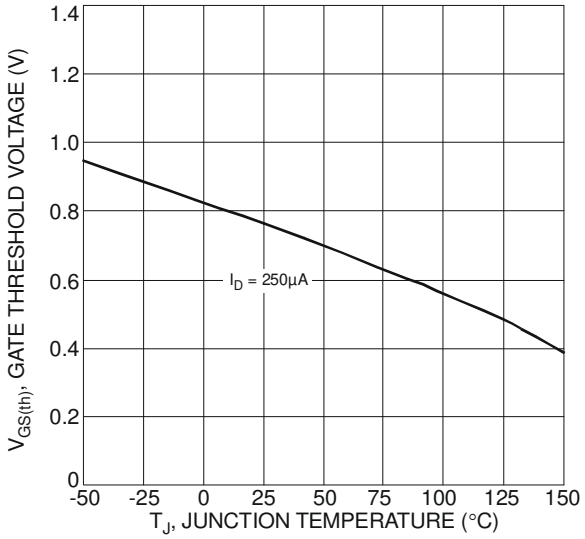



Fig. 7 Gate Threshold Variation vs. Ambient Temperature

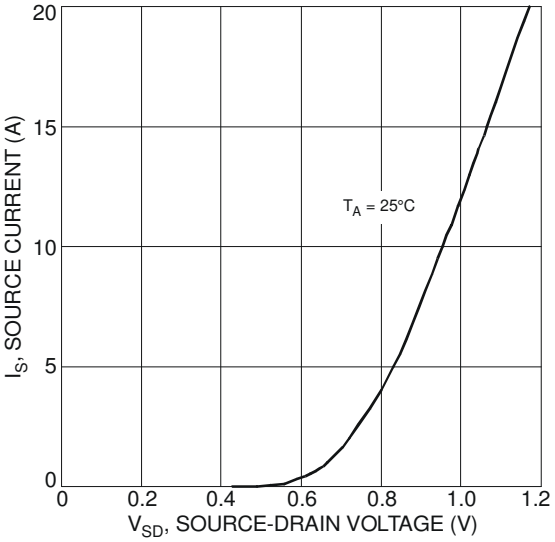



Fig. 8 Diode Forward Voltage vs. Current

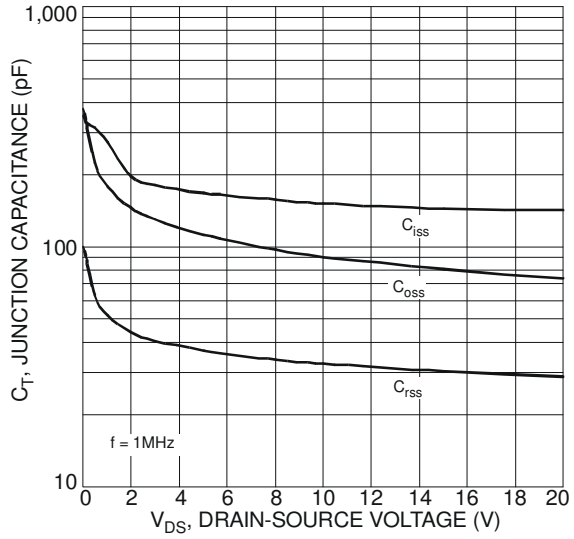



Fig. 9 Typical Junction Capacitance

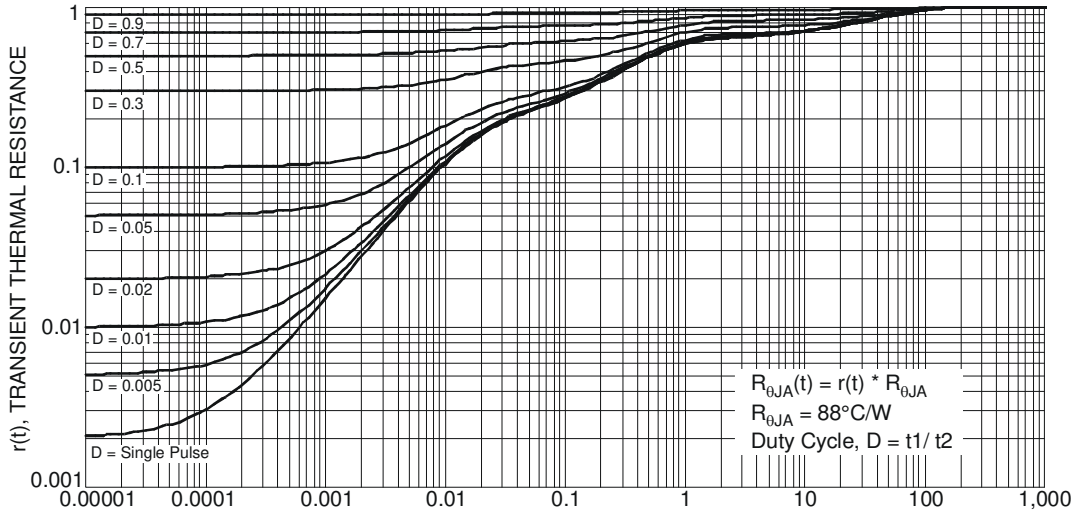
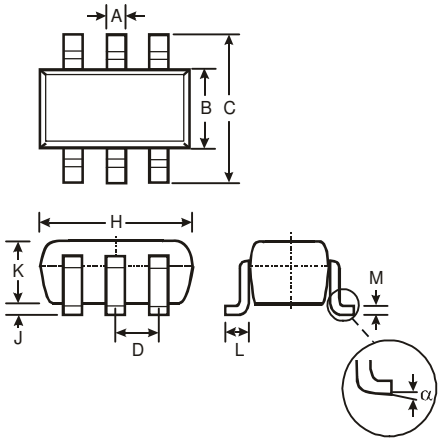


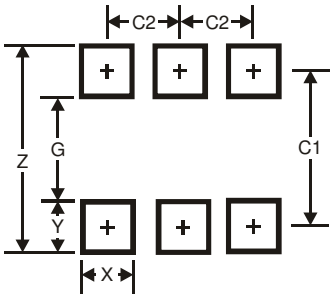

Fig. 10 Transient Thermal Resistance

## Package Outline Dimensions




| SOT26 | | | |
|---|---|---|---|
| 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 |
| 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 |
| α | 0° | 8° | — |
| All Dimensions in mm | | | |

## Suggested Pad Layout




| Dimensions | Value (in mm) |
|---|---|
| Z | 3.20 |
| G | 1.60 |
| X | 0.55 |
| Y | 0.80 |
| C1 | 2.40 |
| C2 | 0.95 |

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