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## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)}$                  | $I_D$<br>$T_A = +25^\circ\text{C}$ |
|---------------|-------------------------------|------------------------------------|
| 50V           | 1.6Ω @ $V_{GS} = 10\text{V}$  | 360mA                              |
|               | 2.5Ω @ $V_{GS} = 4.5\text{V}$ | 250mA                              |

## Description

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.

## Applications

- DC-DC Converters
- Power management functions
- Battery Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc

## Features

- Dual N-Channel MOSFET
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Small Surface Mount Package
- ESD protected to 2KV
- **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

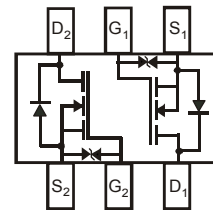
- Case: SOT363
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish annealed over Alloy 42 leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208<sup>Ⓔ</sup>
- Terminal Connections: See Diagram
- Weight: 0.006 grams (approximate)



SOT363



Top View

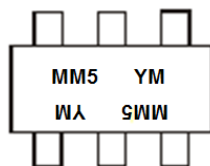

 Top View  
Internal Schematic

## Ordering Information (Note 4)

| Part Number   | Case   | Packaging         |
|---------------|--------|-------------------|
| DMN53D0LDW-7  | SOT363 | 3000/Tape & Reel  |
| DMN53D0LDW-13 | SOT363 | 10000/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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



MM5 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: B = 2014)  
 M = Month (ex: 9 = September)

### Date Code Key

| Year | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|------|------|------|------|------|------|------|------|
| Code | B    | C    | D    | E    | F    | G    | H    |

| 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** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic         | Symbol    | Value    | Unit |
|------------------------|-----------|----------|------|
| Drain Source Voltage   | $V_{DSS}$ | 50       | V    |
| Gate-Source Voltage    | $V_{GSS}$ | $\pm 20$ | V    |
| Drain Current (Note 5) | $I_D$     | 360      | mA   |

**Thermal Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic                                   | Symbol          | Value       | Unit               |
|--|-----------------|-------------|--------------------|
| Total Power Dissipation (Note 5)                 | $P_D$           | 310         | mW                 |
| Thermal Resistance, Junction to Ambient (Note 5) | $R_{\theta JA}$ | 411         | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range          | $T_J, T_{STG}$  | -55 to +150 | $^\circ\text{C}$   |

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic                          | Symbol       | Min | Typ | Max | Unit          | Test Condition  |
|---|--------------|-----|-----|-----|---------------|---|
| <b>OFF CHARACTERISTICS (Note 6)</b>     |              |     |     |     |               |   |
| Drain-Source Breakdown Voltage          | $BV_{DSS}$   | 50  | —   | —   | V             | $V_{GS} = 0V, I_D = 250\mu\text{A}$                                   |
| Zero Gate Voltage Drain Current         | $I_{DSS}$    | —   | —   | 1.0 | $\mu\text{A}$ | $V_{DS} = 50V, V_{GS} = 0V$   |
| Gate-Body Leakage                       | $I_{GSS}$    | —   | —   | 10  | $\mu\text{A}$ | $V_{GS} = \pm 20V, V_{DS} = 0V$                                       |
| <b>ON CHARACTERISTICS (Note 6)</b>      |              |     |     |     |               |   |
| Gate Threshold Voltage                  | $V_{GS(th)}$ | 0.8 | —   | 1.5 | V             | $V_{DS} = V_{GS}, I_D = 250\mu\text{A}$                               |
| Static Drain-Source On-Resistance       | $R_{DS(on)}$ | —   | —   | 1.6 | $\Omega$      | $V_{GS} = 10V, I_D = 500\text{mA}$                                    |
|   |              | —   | —   | 2.5 |               | $V_{GS} = 4.5V, I_D = 200\text{mA}$                                   |
|   |              | —   | —   | 4.5 |               | $V_{GS} = 2.5V, I_D = 100\text{mA}$                                   |
| Source-Drain Diode Forward Voltage      | $V_{SD}$     | —   | —   | 1.4 | V             | $V_{GS} = 0V, I_S = 500\text{mA}$                                     |
| <b>DYNAMIC CHARACTERISTICS (Note 7)</b> |              |     |     |     |               |   |
| Input Capacitance                       | $C_{iss}$    | —   | 46  | —   | pF            | $V_{DS} = 25V, V_{GS} = 0V$<br>$f = 1.0\text{MHz}$                    |
| Output Capacitance                      | $C_{oss}$    | —   | 5.3 | —   | pF            |   |
| Reverse Transfer Capacitance            | $C_{rss}$    | —   | 4.0 | —   | pF            |   |
| Total Gate Charge                       | $Q_g$        | —   | 0.6 | —   | nC            | $V_{GS} = 4.5V, V_{DS} = 10V,$<br>$I_D = 250\text{mA}$                |
| Gate-Source Charge                      | $Q_{gs}$     | —   | 0.2 | —   | nC            |   |
| Gate-Drain Charge                       | $Q_{gd}$     | —   | 0.1 | —   | nC            |   |
| Turn-On Delay Time                      | $t_{D(on)}$  | —   | 2.7 | —   | ns            | $V_{DD} = 30V, V_{GS} = 10V,$<br>$R_G = 25\Omega, I_D = 200\text{mA}$ |
| Turn-On Rise Time                       | $t_r$        | —   | 2.5 | —   | ns            |   |
| Turn-Off Delay Time                     | $t_{D(off)}$ | —   | 19  | —   | ns            |   |
| Turn-Off Fall Time                      | $t_f$        | —   | 11  | —   | ns            |   |

- Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.  
6. Short duration pulse test used to minimize self-heating effect.  
7. Guaranteed by design. Not subject to product testing.

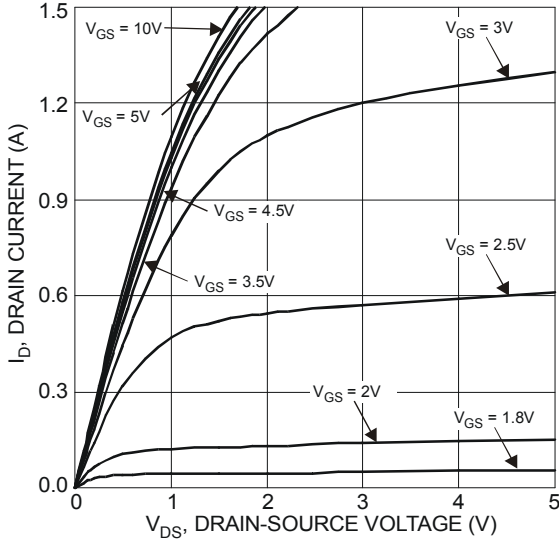


Figure 1 Typical Output Characteristics

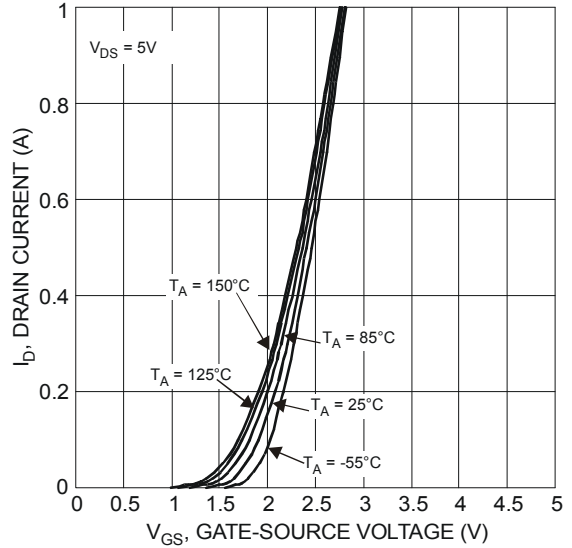


Figure 2 Typical Transfer Characteristics

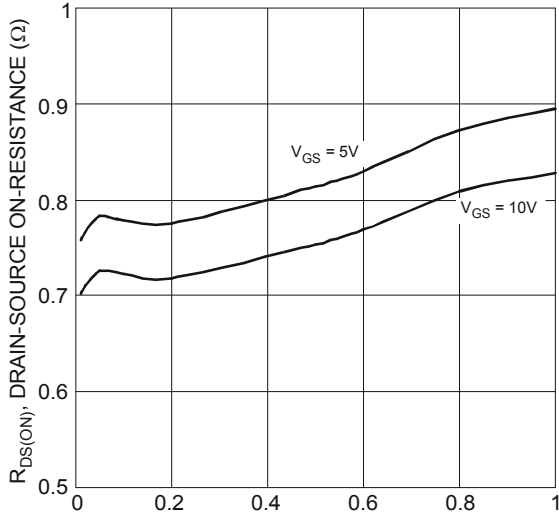


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

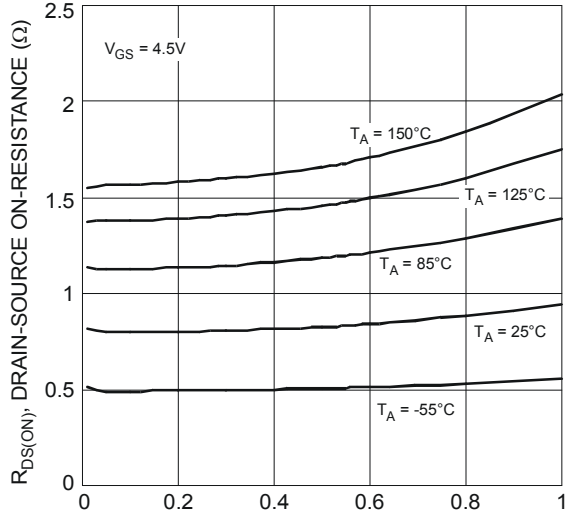


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

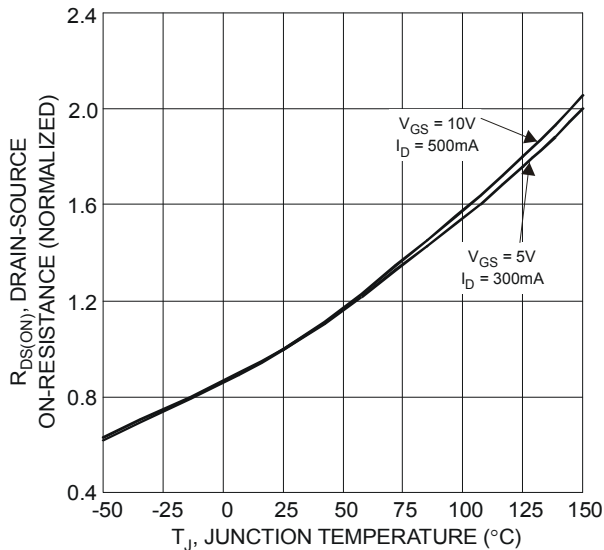


Figure 5 On-Resistance Variation with Temperature

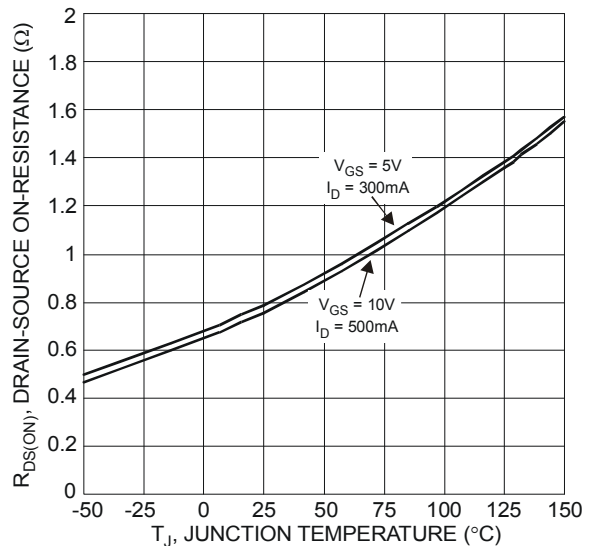


Figure 6 On-Resistance Variation with Temperature

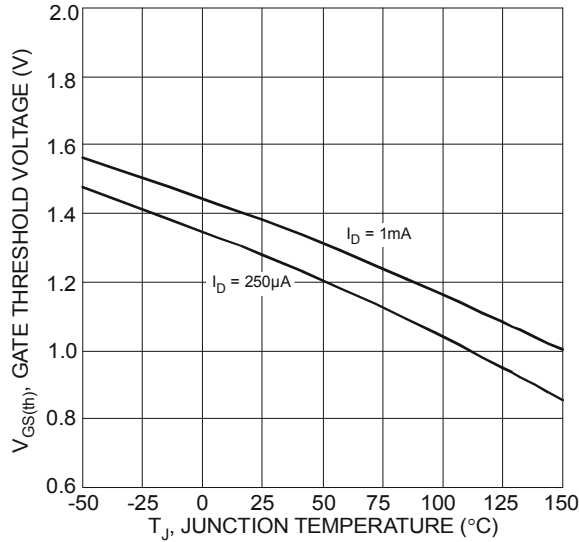


Figure 7 Gate Threshold Variation vs. Ambient Temperature

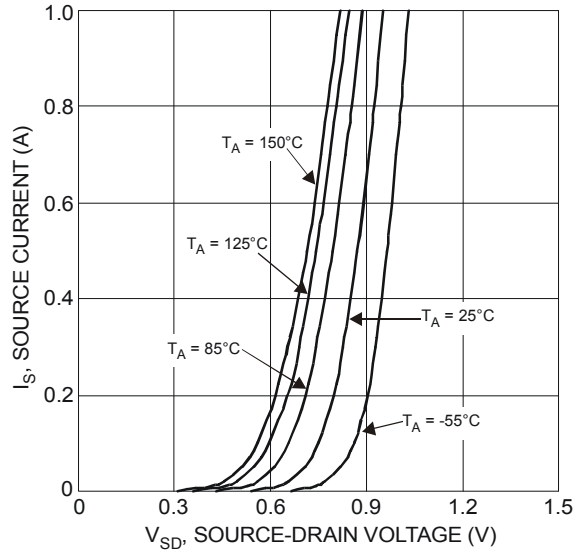


Figure 8 Diode Forward Voltage vs. Current

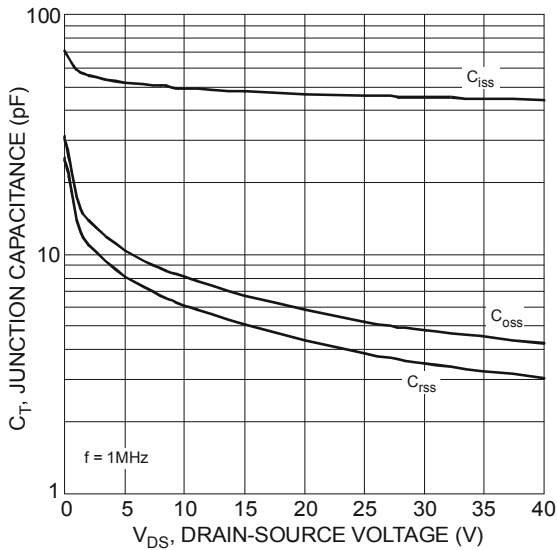


Figure 9 Typical Junction Capacitance

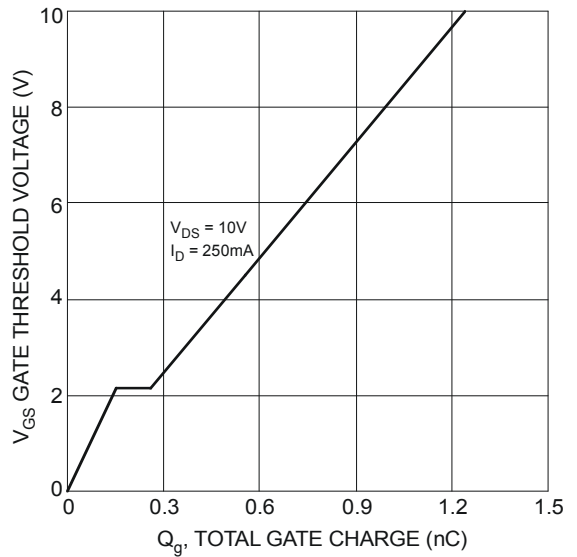
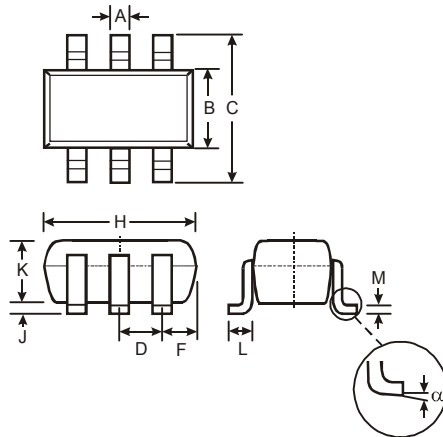


Figure 10 Gate Charge

## Package Outline Dimensions

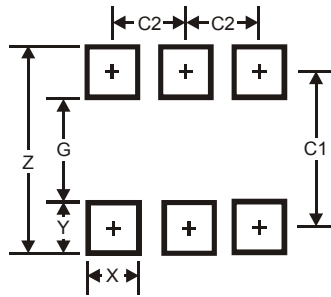
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| SOT363                      |          |      |       |
|-----------------------------|----------|------|-------|
| Dim                         | Min      | Max  | Typ   |
| A                           | 0.10     | 0.30 | 0.25  |
| B                           | 1.15     | 1.35 | 1.30  |
| C                           | 2.00     | 2.20 | 2.10  |
| D                           | 0.65 Typ |      |       |
| F                           | 0.40     | 0.45 | 0.425 |
| H                           | 1.80     | 2.20 | 2.15  |
| J                           | 0        | 0.10 | 0.05  |
| K                           | 0.90     | 1.00 | 1.00  |
| L                           | 0.25     | 0.40 | 0.30  |
| M                           | 0.10     | 0.22 | 0.11  |
| α                           | 0°       | 8°   | -     |
| <b>All Dimensions in mm</b> |          |      |       |

**Suggested Pad Layout**

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



| Dimensions | Value (in mm) |
|------------|---------------|
| Z          | 2.5           |
| G          | 1.3           |
| X          | 0.42          |
| Y          | 0.6           |
| C1         | 1.9           |
| C2         | 0.65          |

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