

## Product Summary

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

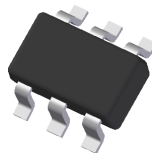
- Dual N-Channel MOSFET
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Small Surface Mount Package
- ESD protected to 2KV
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

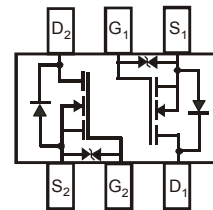
- Case: SOT363
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish annealed over Alloy 42 leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208<sup>(3)</sup>
- Terminal Connections: See Diagram
- Weight: 0.006 grams (approximate)



SOT363



Top View

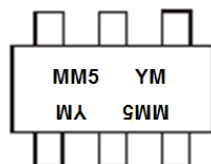

 Top View  
Internal Schematic

## 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<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic         | Symbol           | Value | Unit |
|------------------------|------------------|-------|------|
| Drain Source Voltage   | V <sub>DSS</sub> | 50    | V    |
| Gate-Source Voltage    | V <sub>GSS</sub> | ±20   | V    |
| Drain Current (Note 5) | I <sub>D</sub>   | 360   | mA   |

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

| Characteristic                                   | Symbol                            | Value       | Unit |
|--------------------------------------------------|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5)                 | P <sub>D</sub>                    | 310         | mW   |
| Thermal Resistance, Junction to Ambient (Note 5) | R <sub>θJA</sub>                  | 411         | °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                                                                                |
|-----------------------------------------|---------------------|-----|-----|-----|------|-----------------------------------------------------------------------------------------------|
| <b>OFF CHARACTERISTICS (Note 6)</b>     |                     |     |     |     |      |                                                                                               |
| Drain-Source Breakdown Voltage          | BV <sub>DSS</sub>   | 50  | —   | —   | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA                                                  |
| Zero Gate Voltage Drain Current         | I <sub>DSS</sub>    | —   | —   | 1.0 | μA   | V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V                                                   |
| Gate-Body Leakage                       | I <sub>GSS</sub>    | —   | —   | 10  | μA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V                                                  |
| <b>ON CHARACTERISTICS (Note 6)</b>      |                     |     |     |     |      |                                                                                               |
| Gate Threshold Voltage                  | V <sub>GS(th)</sub> | 0.8 | —   | 1.5 | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA                                    |
| Static Drain-Source On-Resistance       | R <sub>DS(on)</sub> | —   | —   | 1.6 | Ω    | V <sub>GS</sub> = 10V, I <sub>D</sub> = 500mA                                                 |
|                                         |                     | —   | —   | 2.5 |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 200mA                                                |
|                                         |                     | —   | —   | 4.5 |      | V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 100mA                                                |
| Source-Drain Diode Forward Voltage      | V <sub>SD</sub>     | —   | —   | 1.4 | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 500mA                                                  |
| <b>DYNAMIC CHARACTERISTICS (Note 7)</b> |                     |     |     |     |      |                                                                                               |
| Input Capacitance                       | C <sub>iss</sub>    | —   | 46  | —   | pF   | V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V<br>f = 1.0MHz                                     |
| Output Capacitance                      | C <sub>oss</sub>    | —   | 5.3 | —   | pF   |                                                                                               |
| Reverse Transfer Capacitance            | C <sub>rss</sub>    | —   | 4.0 | —   | pF   |                                                                                               |
| Total Gate Charge                       | Q <sub>g</sub>      | —   | 0.6 | —   | nC   | V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 10V,<br>I <sub>D</sub> = 250mA                      |
| Gate-Source Charge                      | Q <sub>gs</sub>     | —   | 0.2 | —   | nC   |                                                                                               |
| Gate-Drain Charge                       | Q <sub>gd</sub>     | —   | 0.1 | —   | nC   |                                                                                               |
| Turn-On Delay Time                      | t <sub>D(on)</sub>  | —   | 2.7 | —   | ns   | V <sub>DD</sub> = 30V, V <sub>GS</sub> = 10V,<br>R <sub>G</sub> = 25Ω, I <sub>D</sub> = 200mA |
| Turn-On Rise Time                       | t <sub>r</sub>      | —   | 2.5 | —   | ns   |                                                                                               |
| Turn-Off Delay Time                     | t <sub>D(off)</sub> | —   | 19  | —   | ns   |                                                                                               |
| Turn-Off Fall Time                      | t <sub>f</sub>      | —   | 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.

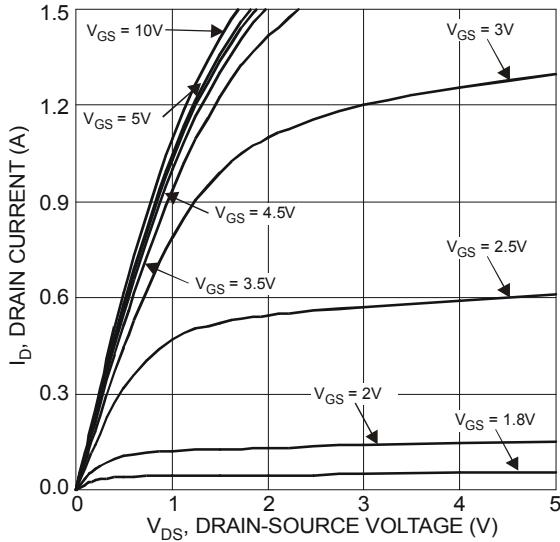


Figure 1 Typical Output Characteristics

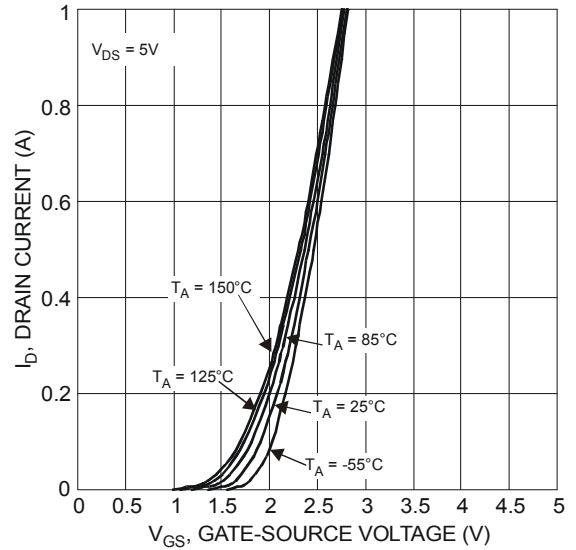


Figure 2 Typical Transfer Characteristics

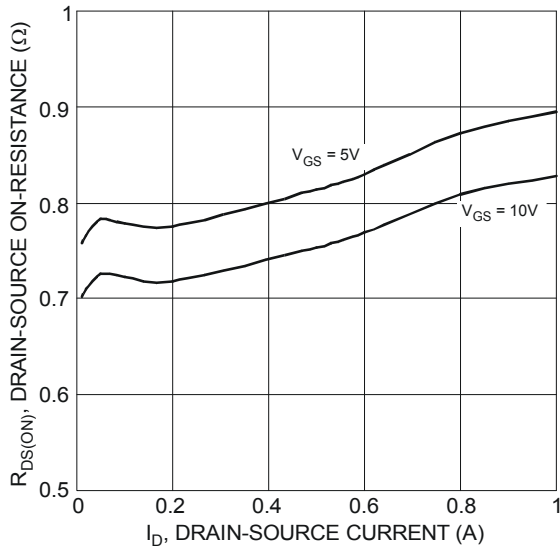


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

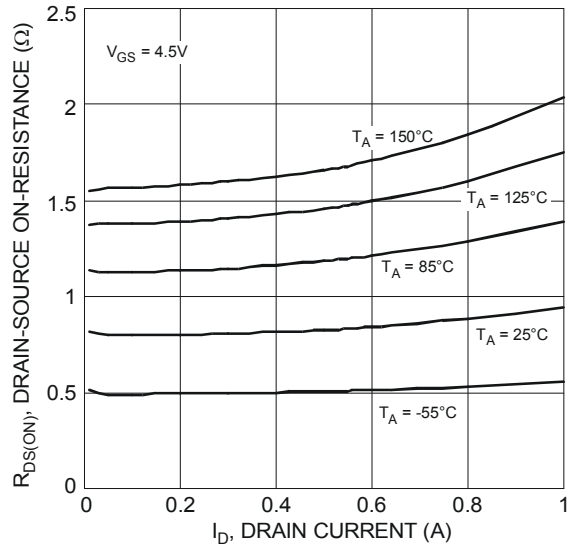


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

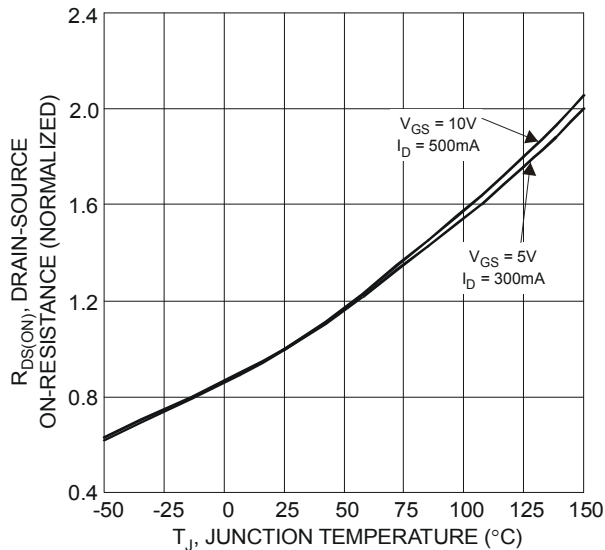


Figure 5 On-Resistance Variation with Temperature

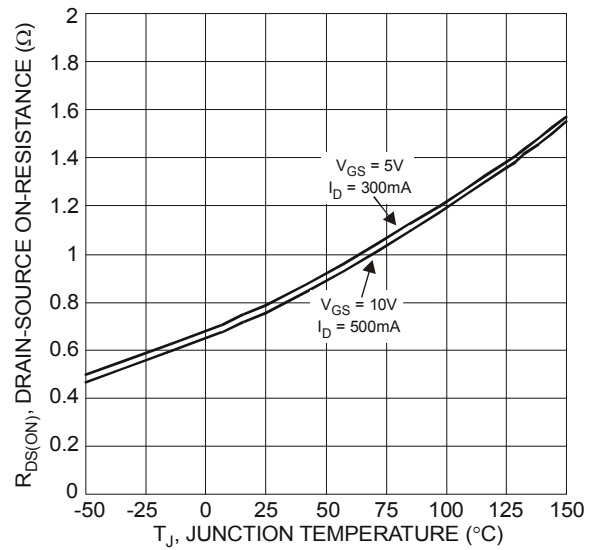


Figure 6 On-Resistance Variation with Temperature

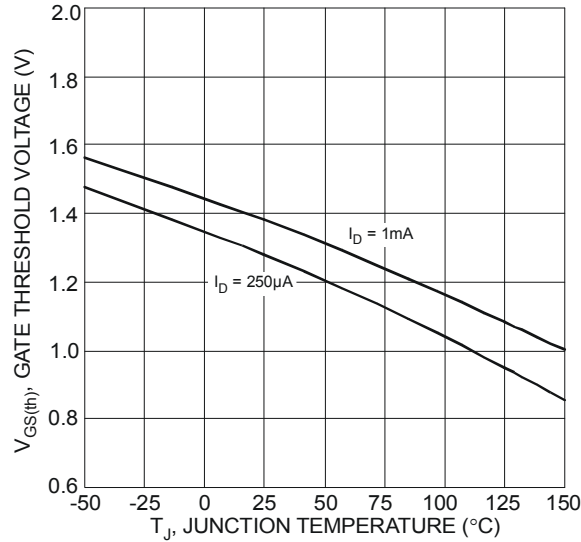


Figure 7 Gate Threshold Variation vs. Ambient Temperature

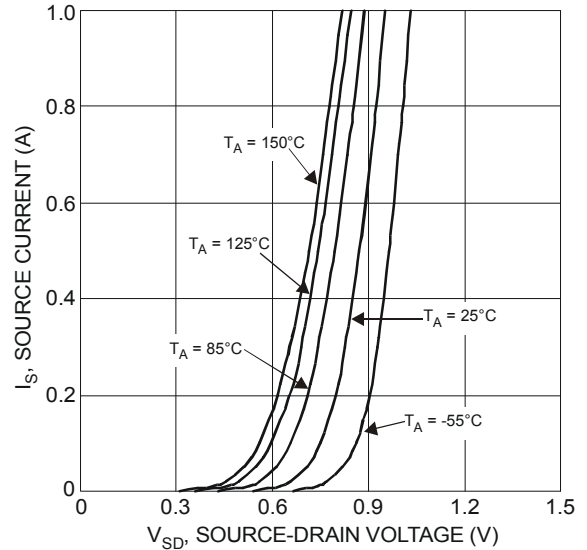


Figure 8 Diode Forward Voltage vs. Current

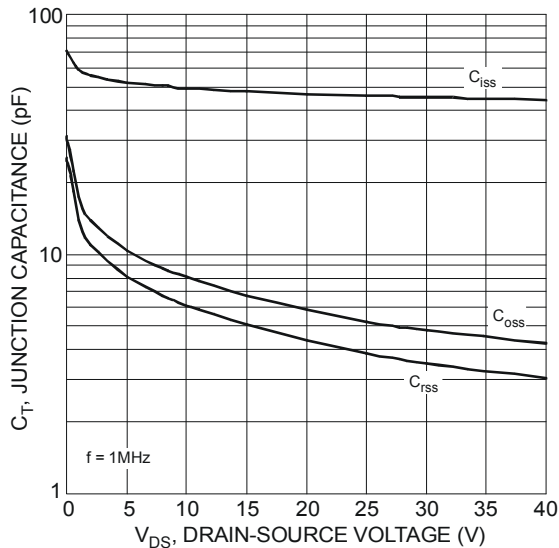


Figure 9 Typical Junction Capacitance

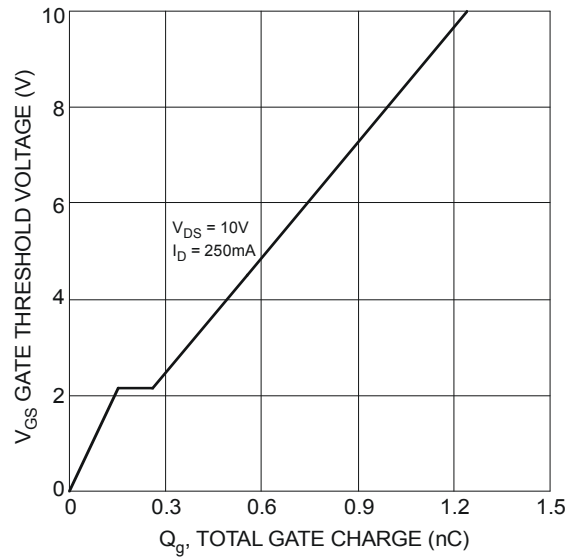
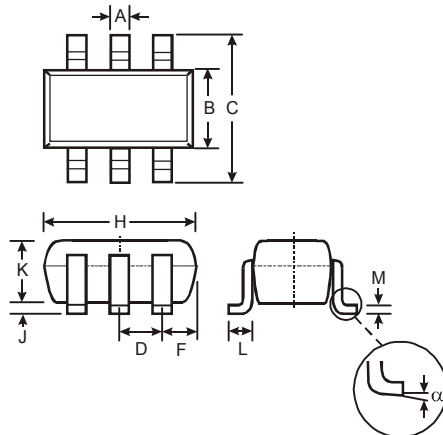


Figure 10 Gate Charge

## Package Outline Dimensions

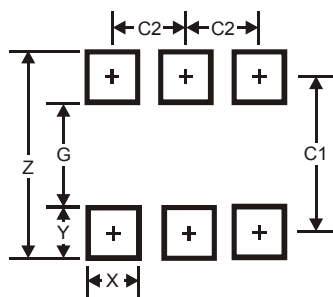
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| 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°   | -     |
| 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          | 2.5           |
| G          | 1.3           |
| X          | 0.42          |
| Y          | 0.6           |
| C1         | 1.9           |
| C2         | 0.65          |

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