

## Product Summary

|               |                                |                                    |
|---------------|--------------------------------|------------------------------------|
| $V_{(BR)DSS}$ | $R_{DS(on) \max}$              | $I_D$<br>$T_A = +25^\circ\text{C}$ |
| 20V           | 0.55Ω @ $V_{GS} = 4.5\text{V}$ | 540mA                              |

## Description

This 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

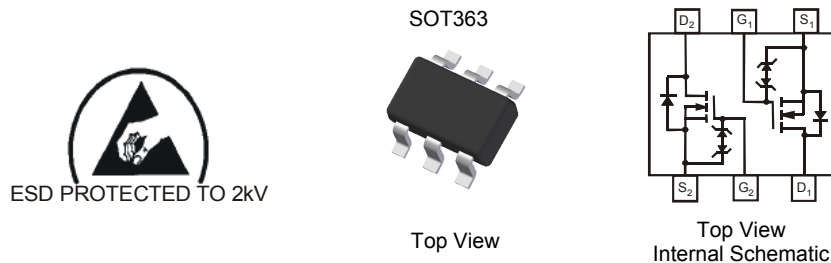
- Load Switch

## Features

- Dual N-Channel MOSFET
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface Mount Package
- 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, "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 Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.006 grams (approximate)

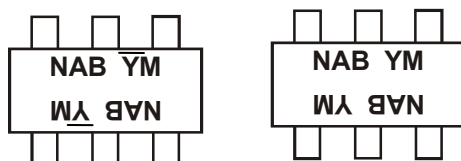


## Ordering Information (Note 4)

| Part Number  | Case   | Packaging        |
|--------------|--------|------------------|
| DMN2004DWK-7 | SOT363 | 3000/Tape & Reel |

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  - 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.
  - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  - For packaging details, go to our website at <http://www.diodes.com/products/packages.html>

## Marking Information



NAB = Product Type Marking Code  
 YM = Date Code Marking for SAT (Shanghai Assembly/ Test site)  
 YM = Date Code Marking for CAT (Chengdu Assembly/ Test site)  
 Y or Ȳ = Year (ex: A = 2013)  
 M = Month (ex: 9 = September)

### Date Code Key

| Year  | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| Code  | T    | 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<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                |              |                        | Symbol           | Value | Units |
|-------------------------------|--------------|------------------------|------------------|-------|-------|
| Drain-Source Voltage          |              |                        | V <sub>DSS</sub> | 20    | V     |
| Gate-Source Voltage           |              |                        | V <sub>GSS</sub> | ±8    | V     |
| Drain Current (Note 5)        | Steady State | T <sub>A</sub> = +25°C | I <sub>D</sub>   | 540   | mA    |
|                               |              | T <sub>A</sub> = +85°C |                  | 390   |       |
| Pulsed Drain Current (Note 6) |              |                        | I <sub>DM</sub>  | 1.5   | A     |

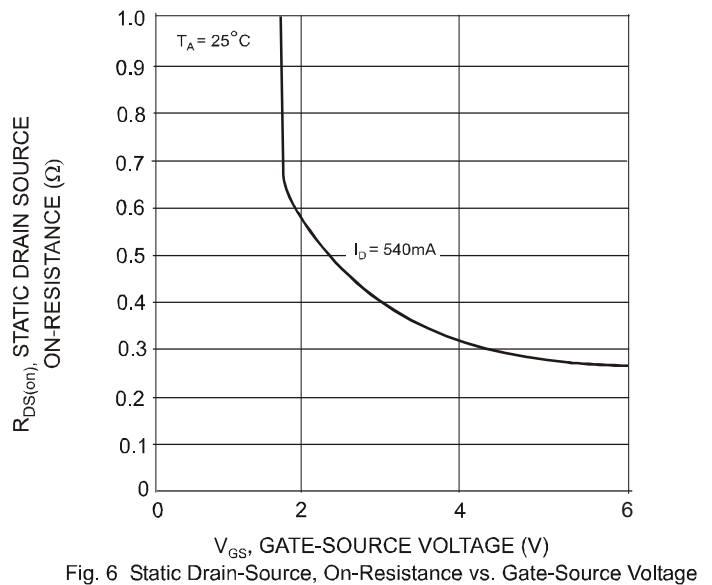
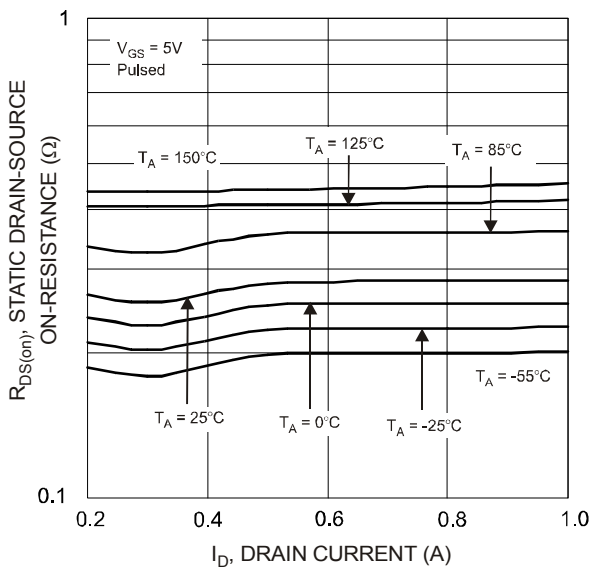
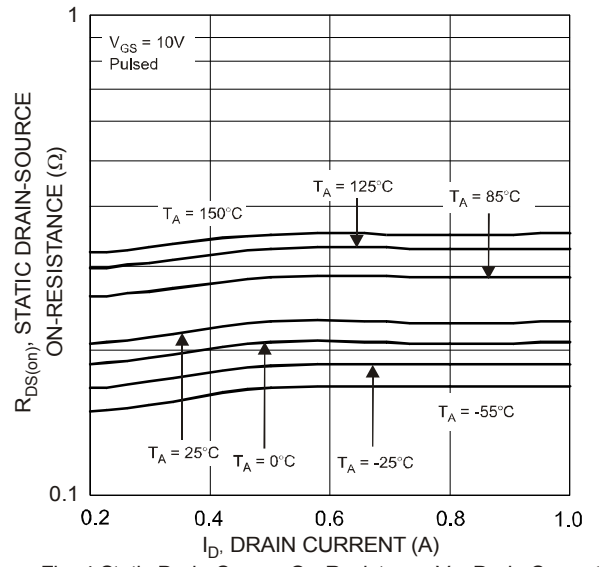
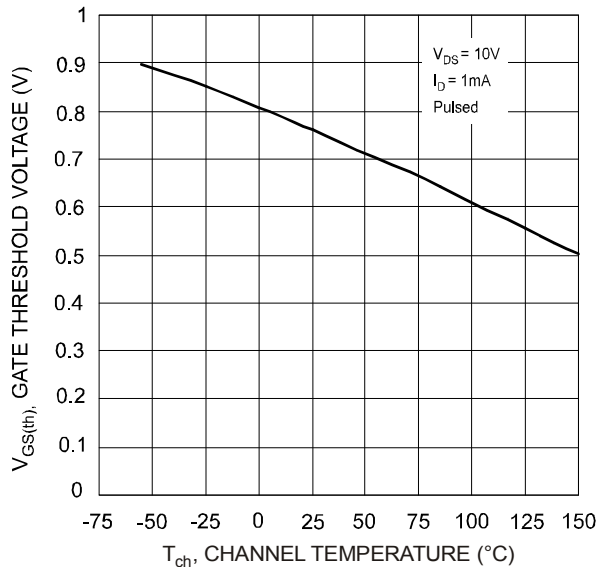
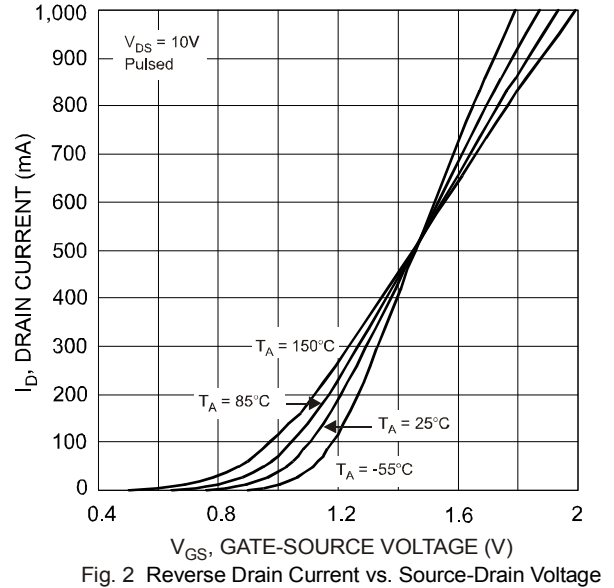
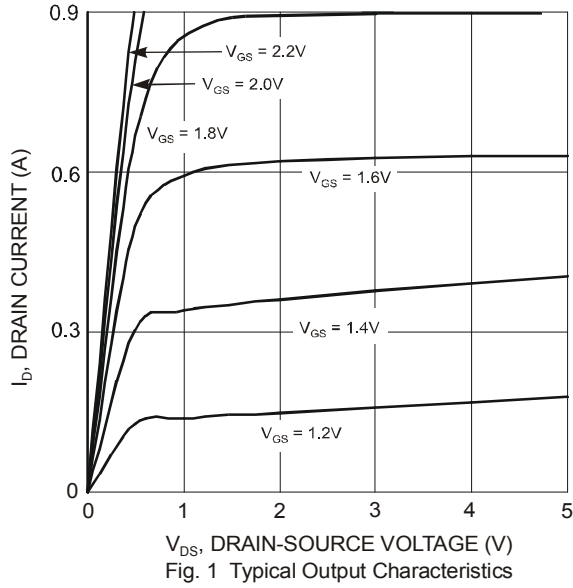
**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                          | Symbol                            | Value       | Units |
|---|-----------------------------------|-------------|-------|
| Total Power Dissipation (Note 5)        | P <sub>D</sub>                    | 200         | mW    |
| Thermal Resistance, Junction to Ambient | R <sub>θJA</sub>                  | 625         | °C/W  |
| Operating and Storage Temperature Range | T <sub>J</sub> , T <sub>STG</sub> | -65 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 7)</b> |                     |     |     |      |      |  |
| Drain-Source Breakdown Voltage      | BV <sub>DSS</sub>   | 20  | —   | —    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 10μA                |
| Zero Gate Voltage Drain Current     | I <sub>DSS</sub>    | —   | —   | 1    | μA   | V <sub>DS</sub> = 16V, V <sub>GS</sub> = 0V                |
| Gate-Source Leakage                 | I <sub>GSS</sub>    | —   | —   | ±1   | μA   | V <sub>GS</sub> = ±4.5V, V <sub>DS</sub> = 0V              |
| <b>ON CHARACTERISTICS (Note 7)</b>  |                     |     |     |      |      |  |
| Gate Threshold Voltage              | V <sub>GS(th)</sub> | 0.5 | —   | 1.0  | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA |
| Static Drain-Source On-Resistance   | R <sub>DS(on)</sub> | —   | 0.4 | 0.55 | Ω    | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 540mA             |
|                                     |                     |     | 0.5 | 0.70 |      | V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 500mA             |
|                                     |                     |     | 0.7 | 0.9  |      | V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 350mA             |
| Forward Transfer Admittance         | Y <sub>fs</sub>     | 200 | —   | —    | ms   | V <sub>DS</sub> = 10V, I <sub>D</sub> = 0.2A               |
| Diode Forward Voltage (Note 7)      | V <sub>SD</sub>     | 0.5 | —   | 1.4  | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 115mA               |
| <b>DYNAMIC CHARACTERISTICS</b>      |                     |     |     |      |      |  |
| Input Capacitance                   | C <sub>iss</sub>    | —   | —   | 150  | pF   | V <sub>DS</sub> = 16V, V <sub>GS</sub> = 0V<br>f = 1.0MHz  |
| Output Capacitance                  | C <sub>oss</sub>    | —   | —   | 25   | pF   |  |
| Reverse Transfer Capacitance        | C <sub>rss</sub>    | —   | —   | 20   | pF   |  |

- Notes:
5. Device mounted on FR-4 PCB.
  6. Pulse width ≤10μs, Duty Cycle ≤1%.
  7. Short duration pulse test used to minimize self-heating effect.



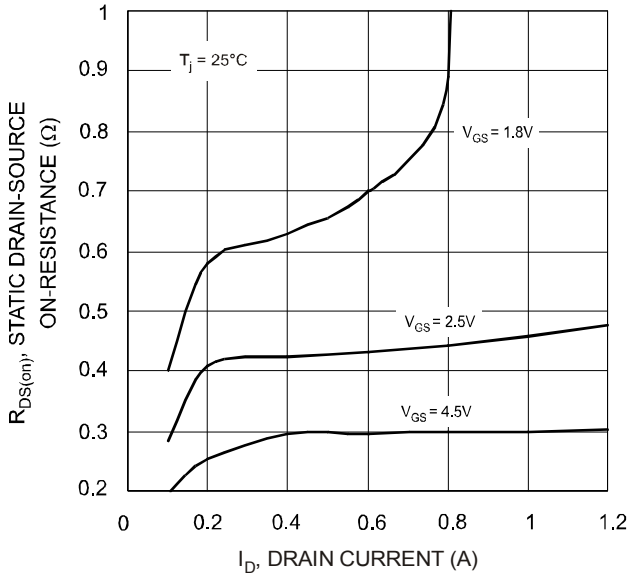


Fig. 7 On-Resistance vs. Drain Current and Gate Voltage

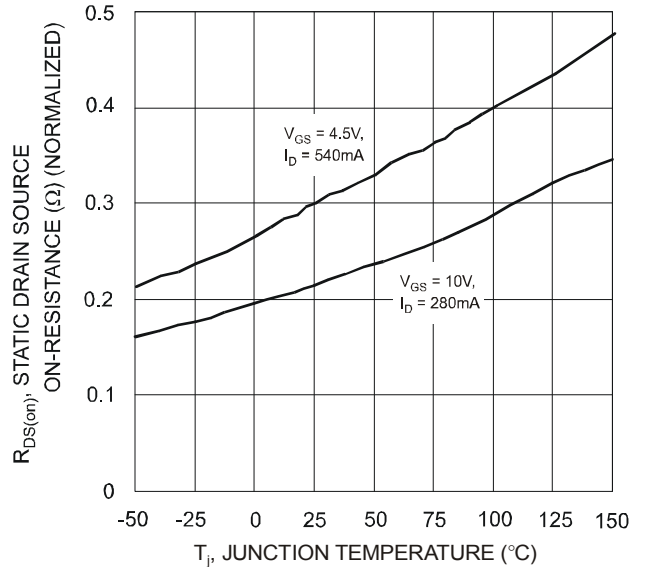


Fig. 8 Static Drain-Source, On-Resistance vs. Temperature

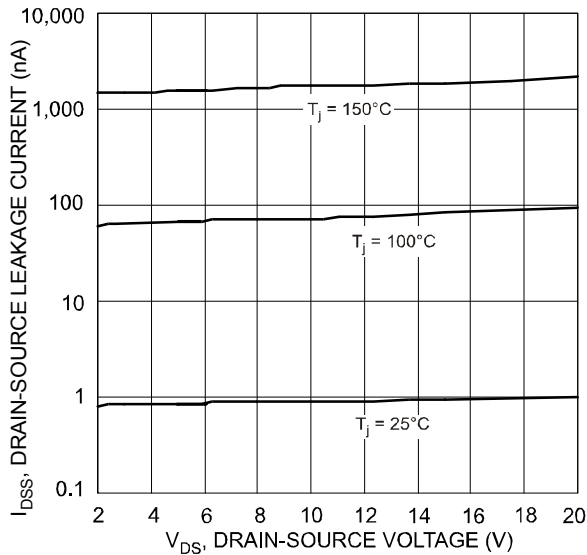


Fig. 9 Drain Source Leakage Current vs. Voltage

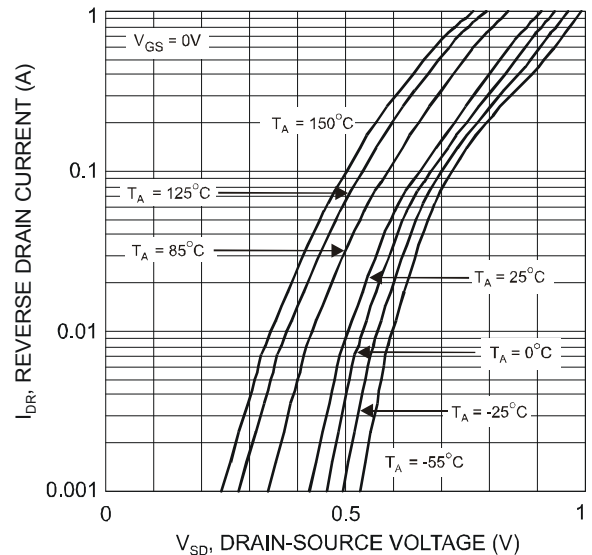


Fig. 10 Reverse Drain Current vs. Source-Drain Voltage

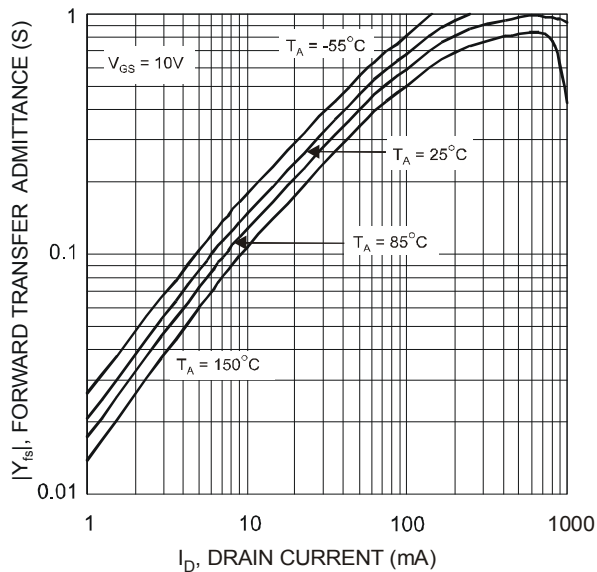


Fig. 11 Forward Transfer Admittance vs. Drain Current

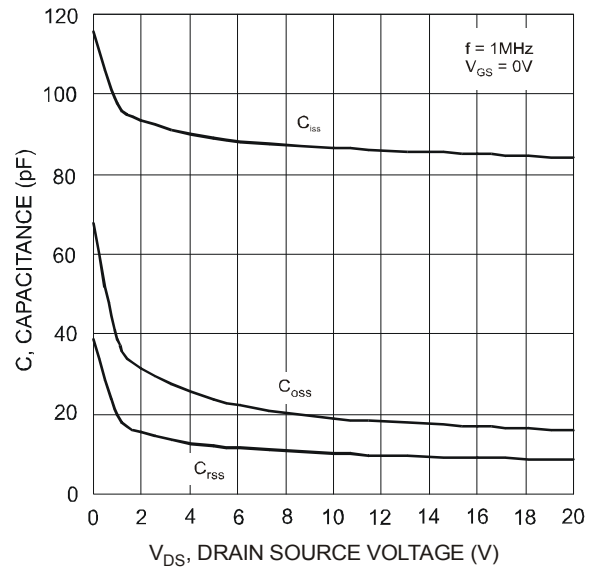
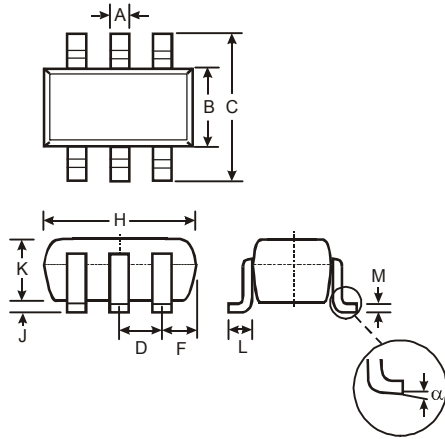


Fig. 12 Capacitance Variation

**Package Outline Dimensions**

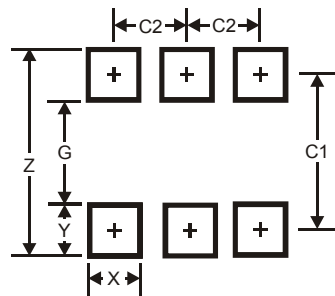
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| SOT363               |          |      |
|----------------------|----------|------|
| Dim                  | Min      | Max  |
| A                    | 0.10     | 0.30 |
| B                    | 1.15     | 1.35 |
| C                    | 2.00     | 2.20 |
| D                    | 0.65 Typ |      |
| F                    | 0.40     | 0.45 |
| H                    | 1.80     | 2.20 |
| J                    | 0        | 0.10 |
| K                    | 0.90     | 1.00 |
| L                    | 0.25     | 0.40 |
| M                    | 0.10     | 0.22 |
| α                    | 0°       | 8°   |
| All Dimensions in mm |          |      |

**Suggested Pad Layout**

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