

## Product Summary

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

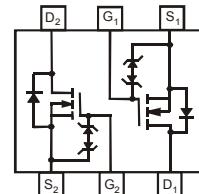
- Dual N-Channel MOSFET
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface Mount Package
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- Qualified 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)



Top View


 Top View  
 Internal Schematic

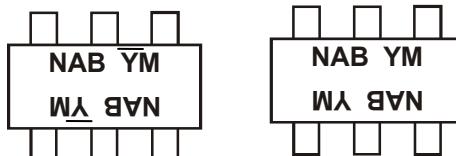
## Ordering Information (Note 4)

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

| Characteristic                |              | Symbol    | Value      | Units |
|-------------------------------|--------------|-----------|------------|-------|
| Drain-Source Voltage          |              | $V_{DSS}$ | 20         | V     |
| Gate-Source Voltage           |              | $V_{GSS}$ | $\pm 8$    | V     |
| Drain Current (Note 5)        | Steady State | $I_D$     | 540<br>390 | mA    |
| Pulsed Drain Current (Note 6) |              | $I_{DM}$  | 1.5        | A     |

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

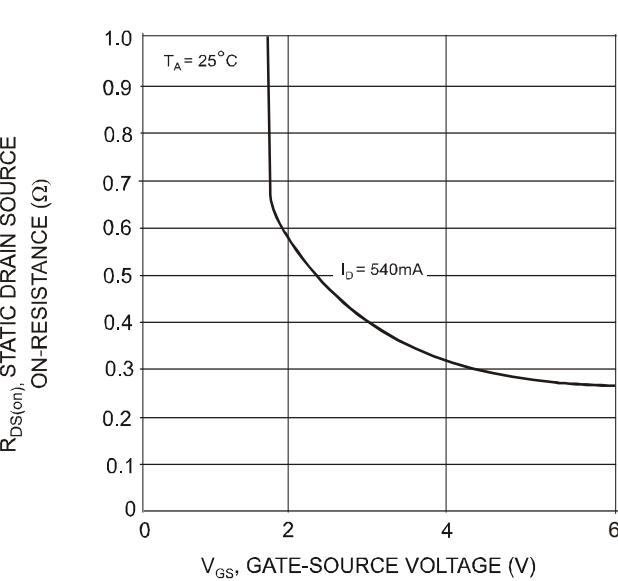
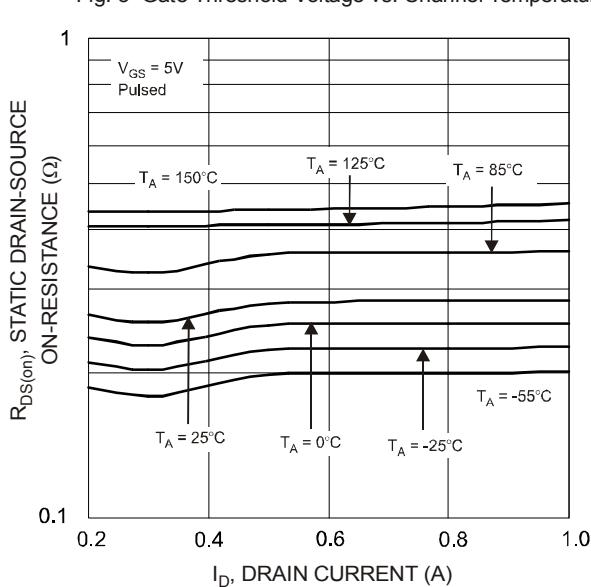
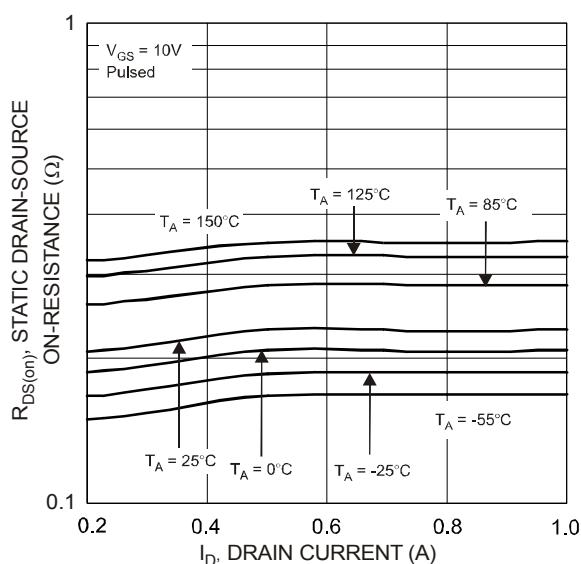
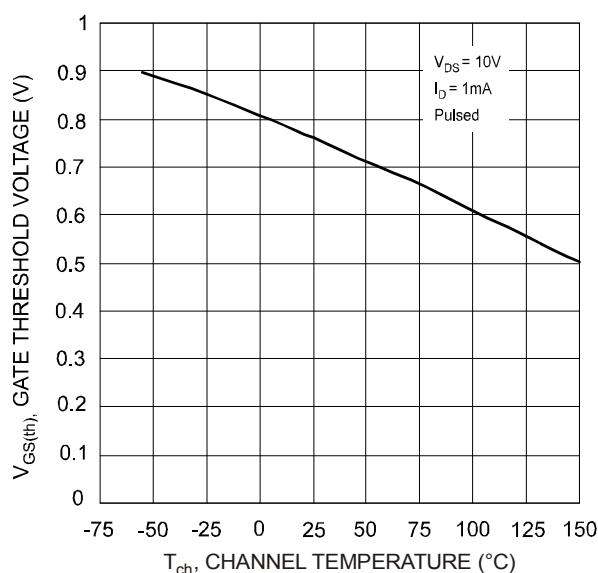
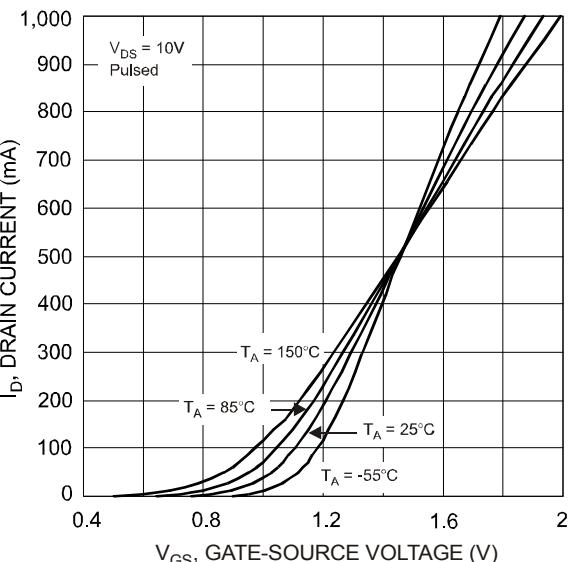
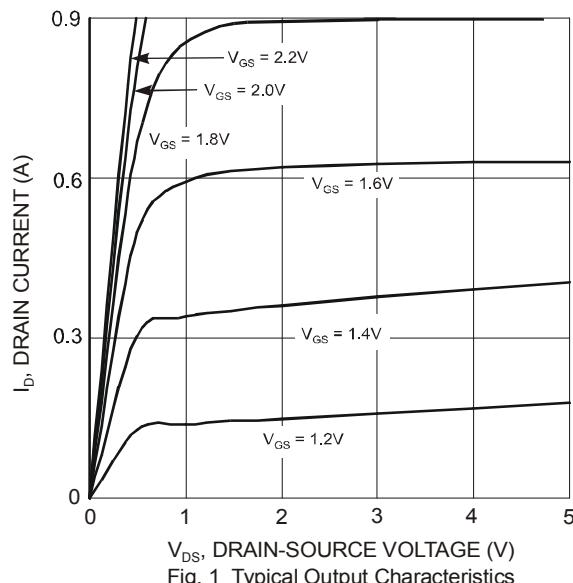
| Characteristic                          | Symbol          | Value       | Units |
|---|-----------------|-------------|-------|
| Total Power Dissipation (Note 5)        | $P_D$           | 200         | mW    |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 625         | °C/W  |
| Operating and Storage Temperature Range | $T_J, T_{STG}$  | -65 to +150 | °C    |

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

| Characteristic                      | Symbol              | Min | Typ               | Max                 | Unit          | Test Condition   |
|-------------------------------------|---------------------|-----|-------------------|---------------------|---------------|--|
| <b>OFF CHARACTERISTICS (Note 7)</b> |                     |     |                   |                     |               |  |
| Drain-Source Breakdown Voltage      | $BV_{DSS}$          | 20  | —                 | —                   | V             | $V_{GS} = 0\text{V}, I_D = 10\mu\text{A}$  |
| Zero Gate Voltage Drain Current     | $I_{DSS}$           | —   | —                 | 1                   | $\mu\text{A}$ | $V_{DS} = 16\text{V}, V_{GS} = 0\text{V}$  |
| Gate-Source Leakage                 | $I_{GSS}$           | —   | —                 | $\pm 1$             | $\mu\text{A}$ | $V_{GS} = \pm 4.5\text{V}, V_{DS} = 0\text{V}$   |
| <b>ON CHARACTERISTICS (Note 7)</b>  |                     |     |                   |                     |               |  |
| Gate Threshold Voltage              | $V_{GS(\text{th})}$ | 0.5 | —                 | 1.0                 | V             | $V_{DS} = V_{GS}, I_D = 250\mu\text{A}$  |
| Static Drain-Source On-Resistance   | $R_{DS(\text{ON})}$ | —   | 0.4<br>0.5<br>0.7 | 0.55<br>0.70<br>0.9 | $\Omega$      | $V_{GS} = 4.5\text{V}, I_D = 540\text{mA}$<br>$V_{GS} = 2.5\text{V}, I_D = 500\text{mA}$<br>$V_{GS} = 1.8\text{V}, I_D = 350\text{mA}$ |
| Forward Transfer Admittance         | $ Y_{fs} $          | 200 | —                 | —                   | ms            | $V_{DS} = 10\text{V}, I_D = 0.2\text{A}$   |
| Diode Forward Voltage (Note 7)      | $V_{SD}$            | 0.5 | —                 | 1.4                 | V             | $V_{GS} = 0\text{V}, I_S = 115\text{mA}$   |
| <b>DYNAMIC CHARACTERISTICS</b>      |                     |     |                   |                     |               |  |
| Input Capacitance                   | $C_{iss}$           | —   | —                 | 150                 | pF            | $V_{DS} = 16\text{V}, V_{GS} = 0\text{V}$<br>$f = 1.0\text{MHz}$   |
| Output Capacitance                  | $C_{oss}$           | —   | —                 | 25                  | pF            |  |
| Reverse Transfer Capacitance        | $C_{rss}$           | —   | —                 | 20                  | pF            |  |

Notes:

- 5. Device mounted on FR-4 PCB.
- 6. Pulse width  $\leq 10\mu\text{s}$ , Duty Cycle  $\leq 1\%$ .
- 7. Short duration pulse test used to minimize self-heating effect.



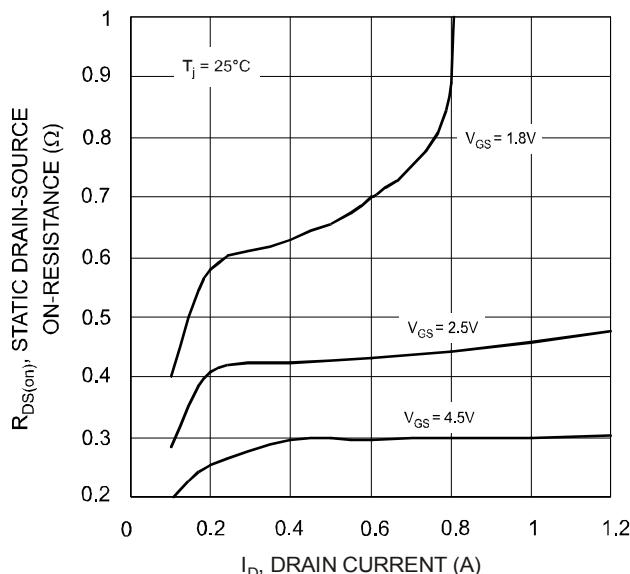


Fig. 7 On-Resistance vs. Drain Current and Gate Voltage

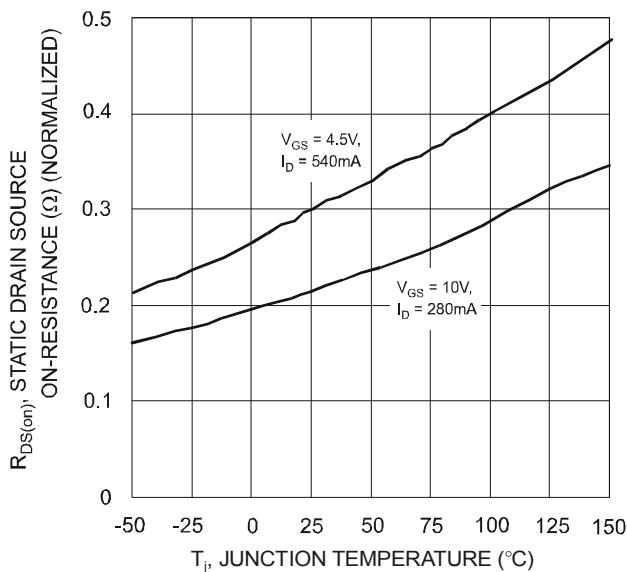


Fig. 8 Static Drain-Source, On-Resistance vs. Temperature

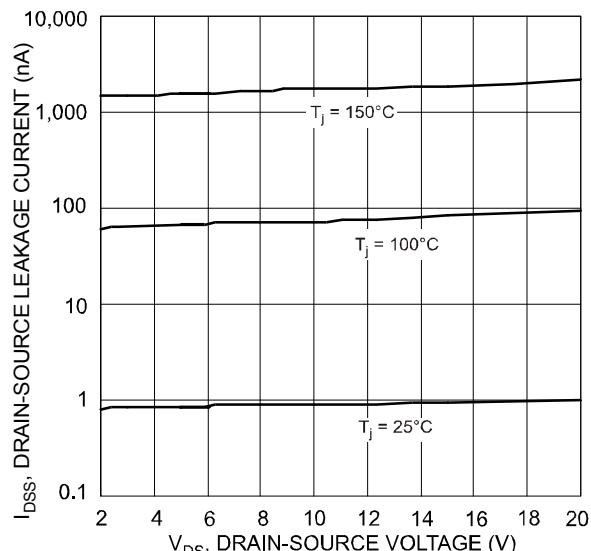


Fig. 9 Drain Source Leakage Current vs. Voltage

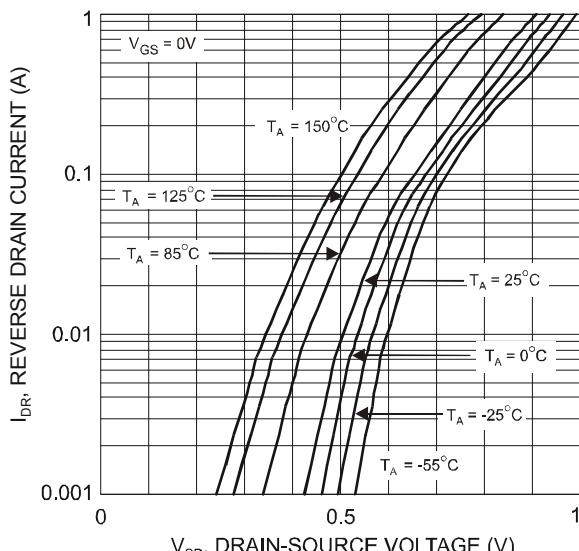


Fig. 10 Reverse Drain Current vs. Source-Drain Voltage

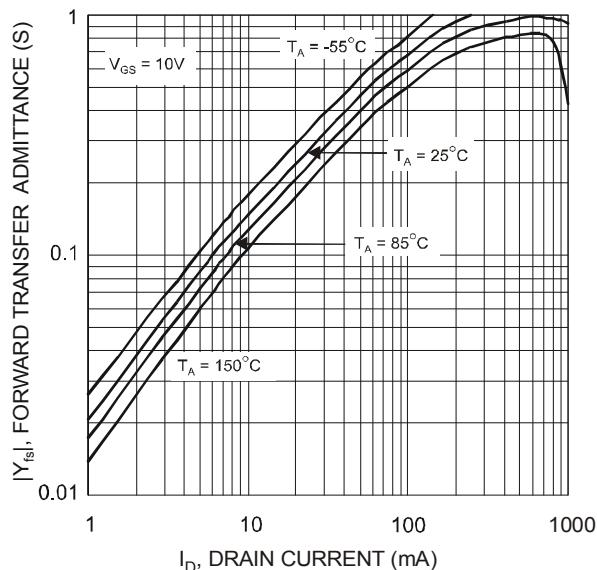


Fig. 11 Forward Transfer Admittance vs. Drain Current

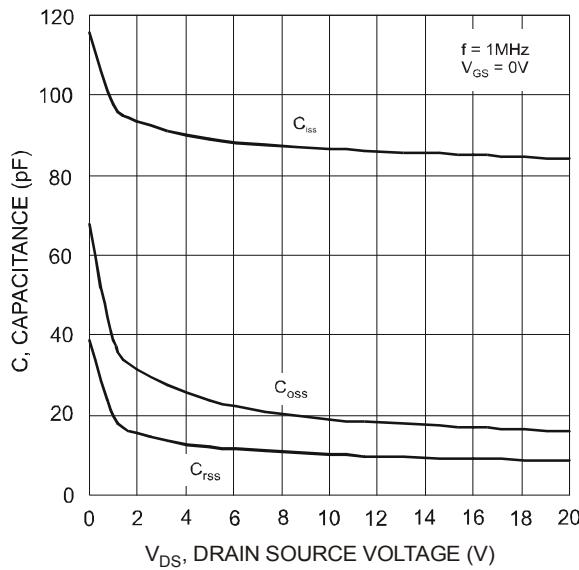
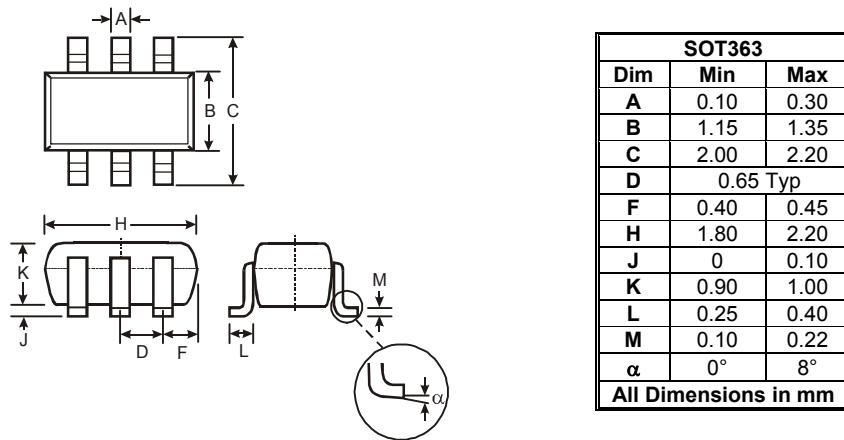


Fig. 12 Capacitance Variation

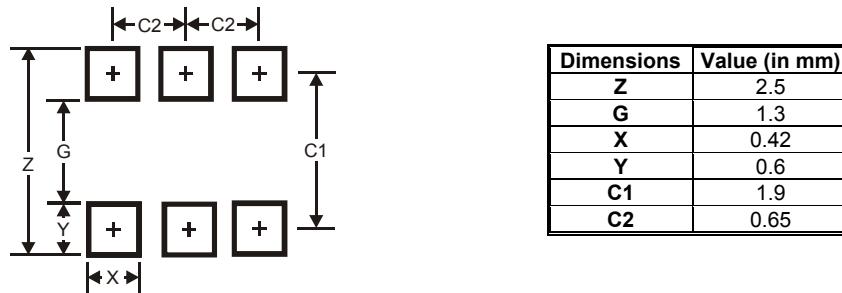
## Package Outline Dimensions

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



## Suggested Pad Layout

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



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