

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ Max               | $I_D$ Max<br>$T_A = +25^\circ\text{C}$ |
|---------------|--------------------------------|--|
| -20V          | 0.9Ω @ $V_{GS} = -4.5\text{V}$ | -0.53A                                 |
|               | 1.4Ω @ $V_{GS} = -2.5\text{V}$ | -0.44A                                 |

## Description

This MOSFET is 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

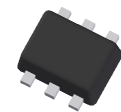
- Battery Charging
- Power Management Functions
- DC-DC Converters
- Portable Power Adaptors

## Features

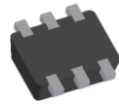
- Dual P-Channel MOSFET
- Low On-Resistance
- Very Low Gate Threshold Voltage  $V_{GS(TH)} < 1\text{V}$
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- ESD Protected Gate
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**

## Mechanical Data

- Case: SOT563
- 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 Ⓔ3
- Weight: 0.006 grams (Approximate)

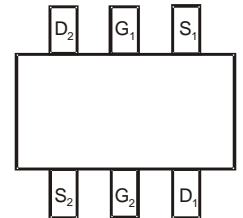
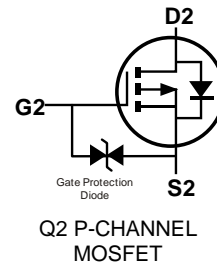
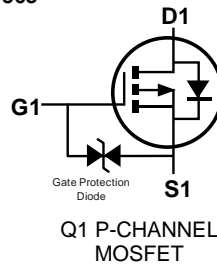


Top View



Bottom View

SOT563

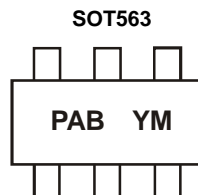

 Top View  
Pin Out

## Ordering Information (Note 4)

| Part Number | Case   | Packaging         |
|-------------|--------|-------------------|
| DMP2004VK-7 | SOT563 | 3,000/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) com 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



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

### Date Code Key

| Year | 2007 | ... | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|------|------|-----|------|------|------|------|------|------|------|
| Code | U    | ... | C    | D    | E    | F    | G    | H    | I    |

| 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     |
| Continuous Drain Current (Note 5) V <sub>GS</sub> = -4.5V | Steady State | T <sub>A</sub> = +25°C | I <sub>D</sub>   | -0.53 | A     |
|   |              | T <sub>A</sub> = +70°C |                  | -0.44 |       |
| Continuous Drain Current (Note 5) V <sub>GS</sub> = -2.5V | Steady State | T <sub>A</sub> = +25°C | I <sub>D</sub>   | -0.44 | A     |
|   |              | T <sub>A</sub> = +70°C |                  | -0.35 |       |
| Pulsed Drain Current (Note 6)                             |              |                        | I <sub>DM</sub>  | -1.8  | A     |

**Thermal Characteristics**

| Characteristic                          | Symbol                            | Value       | Units |
|---|-----------------------------------|-------------|-------|
| Total Power Dissipation (Note 5)        | P <sub>D</sub>                    | 400         | mW    |
| Thermal Resistance, Junction to Ambient | R <sub>θJA</sub>                  | 312         | °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> = -250μA               |
| Zero Gate Voltage Drain Current         | I <sub>DSS</sub>    | —    | —   | -1.0 | μA   | V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V                |
| Gate-Source Leakage                     | I <sub>GSS</sub>    | —    | —   | ±1.0 | 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> | —    | 0.7 | 0.9  | Ω    | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -430mA            |
|   |                     |      | 1.1 | 1.4  |      | V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -300mA            |
|   |                     |      | 1.7 | 2.0  |      | V <sub>GS</sub> = -1.8V, I <sub>D</sub> = -150mA            |
| Forward Transfer Admittance             | Y <sub>fs</sub>     | 200  | —   | —    | mS   | V <sub>DS</sub> = -10V, I <sub>D</sub> = -0.2A              |
| Diode Forward Voltage (Note 5)          | V <sub>SD</sub>     | -0.5 | —   | -1.2 | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 115mA                |
| <b>DYNAMIC CHARACTERISTICS (Note 8)</b> |                     |      |     |      |      |   |
| Input Capacitance                       | C <sub>ISS</sub>    | —    | —   | 175  | pF   | V <sub>DS</sub> = -16V, V <sub>GS</sub> = 0V<br>f = 1.0MHz  |
| Output Capacitance                      | C <sub>OSS</sub>    | —    | —   | 30   | pF   |   |
| Reverse Transfer Capacitance            | C <sub>RSS</sub>    | —    | —   | 20   | pF   |   |

- Notes:
5. Device mounted on FR-4 PCB, with minimum recommended pad layout.
  6. Device mounted on minimum recommended pad layout test board, 10μs pulse duty cycle = 1%.
  7. Short duration pulse test used to minimize self-heating effect.
  8. Guaranteed by design. Not subject to product testing.

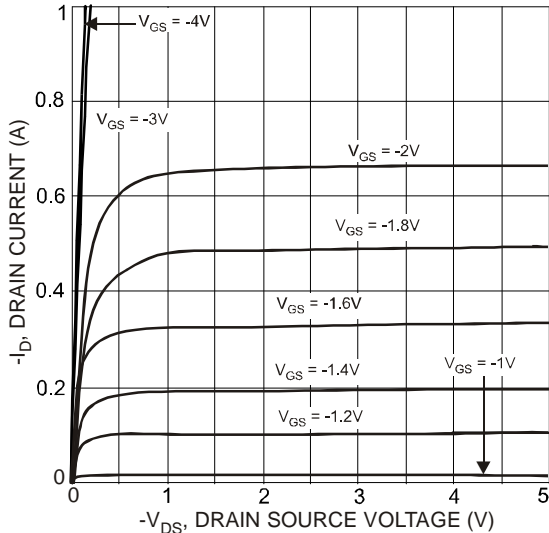


Fig. 1 Typical Output Characteristics

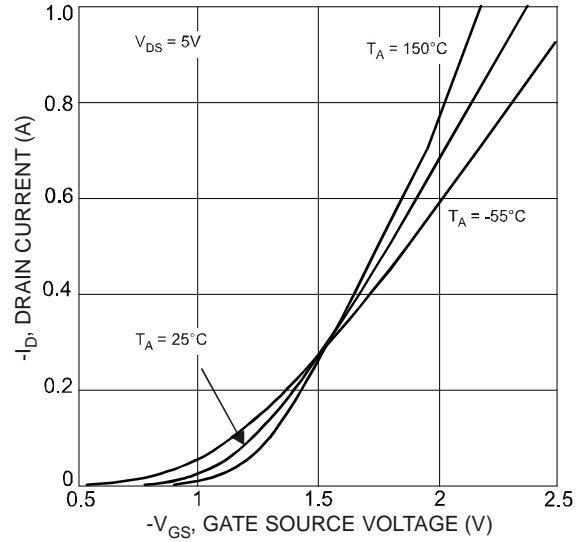


Fig. 2 Typical Transfer Characteristics

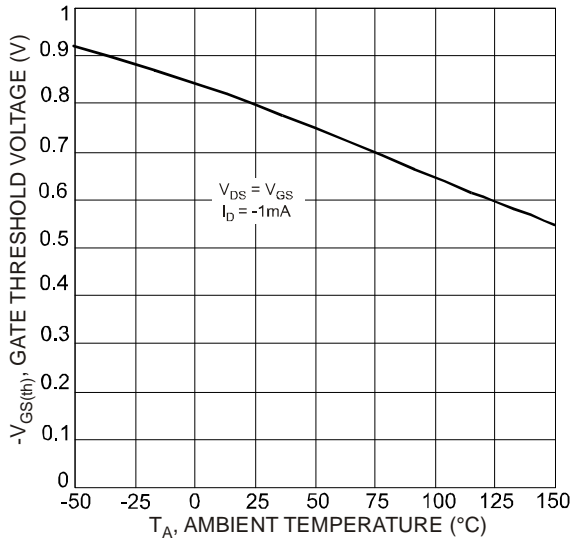


Fig. 3 Gate Threshold Voltage vs. Ambient Temperature

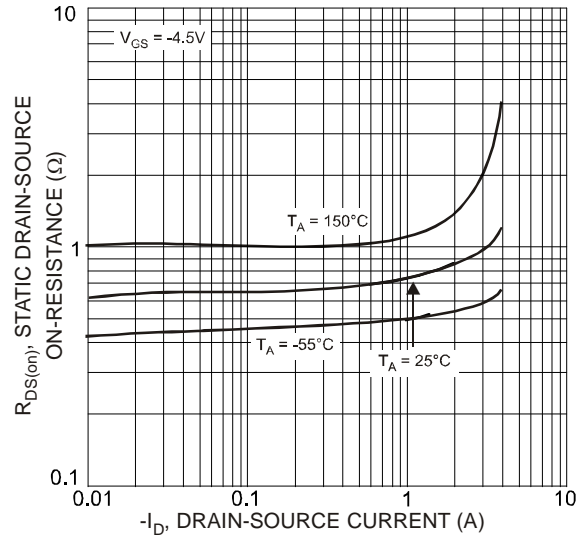


Fig. 4 Static Drain-Source On-Resistance vs. Drain Current

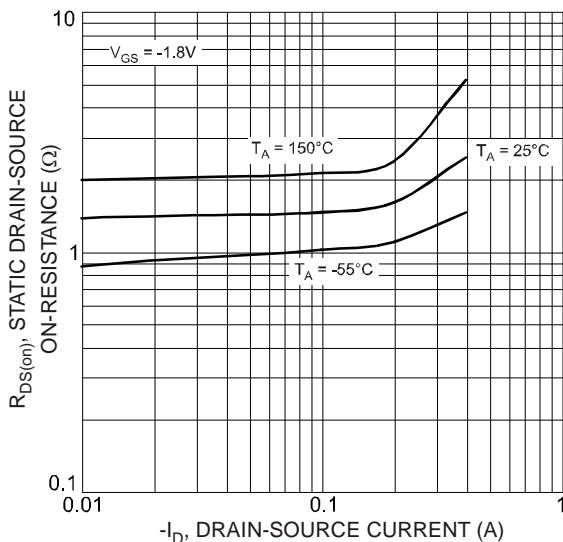


Fig. 5 Static Drain-Source On-Resistance vs. Drain Current

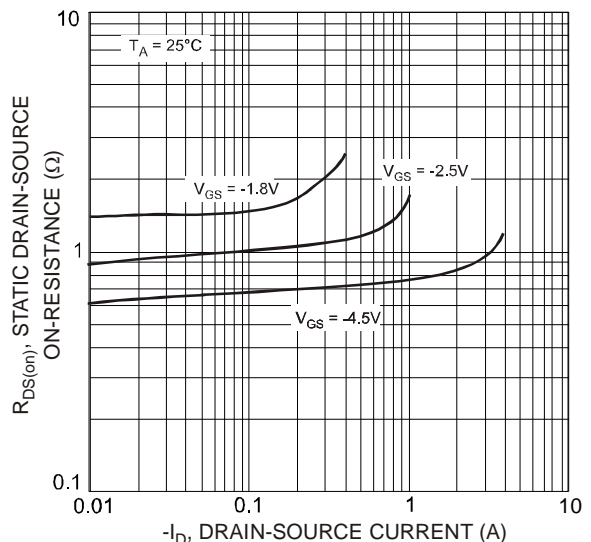


Fig. 6 Static Drain-Source On-Resistance vs. Drain-Source Current

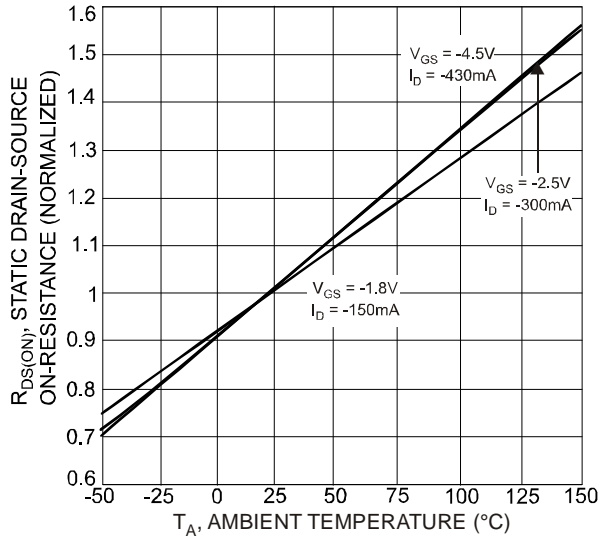


Fig. 7 Static Drain-Source On-State Resistance vs. Ambient Temperature

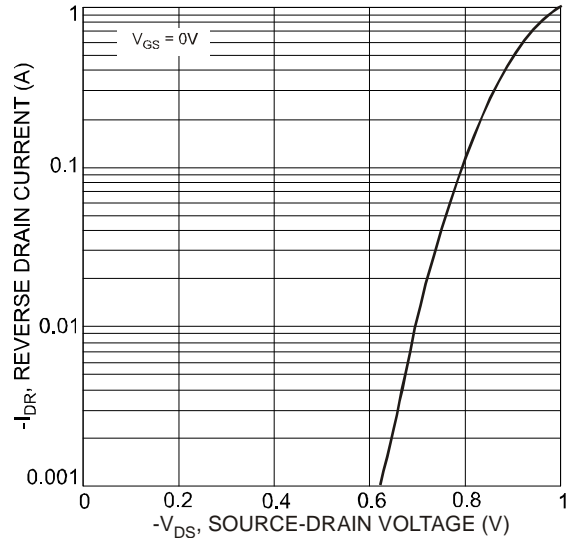


Fig. 8 Reverse Drain Current vs. Source-Drain Voltage

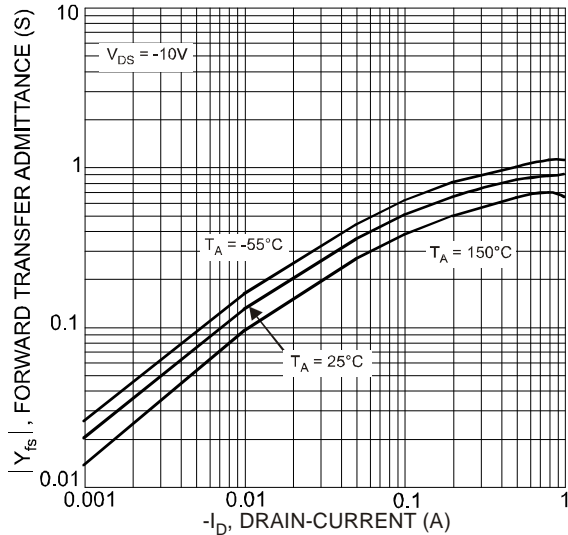


Fig. 9 Forward Transfer Admittance vs. Drain-Current

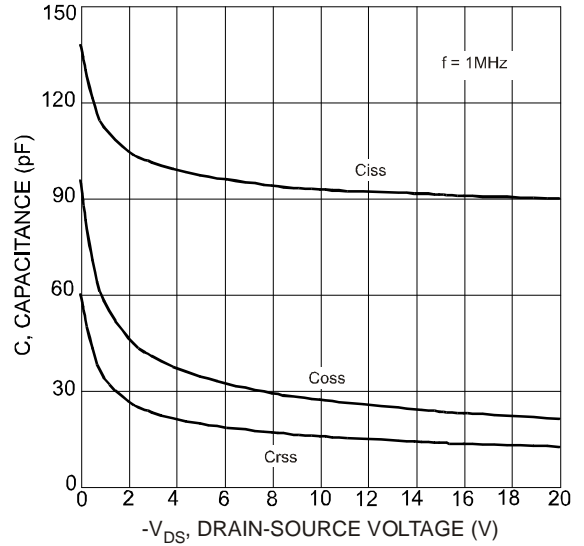
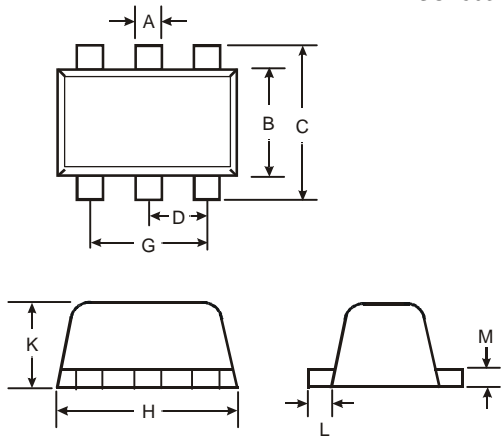


Fig. 10 Typical Capacitance

**Package Outline Dimensions**

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

**SOT563**

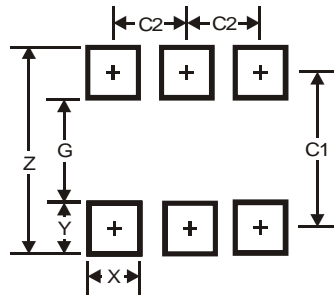


| SOT563               |      |      |      |
|----------------------|------|------|------|
| Dim                  | Min  | Max  | Typ  |
| A                    | 0.15 | 0.30 | 0.20 |
| B                    | 1.10 | 1.25 | 1.20 |
| C                    | 1.55 | 1.70 | 1.60 |
| D                    | -    | -    | 0.50 |
| G                    | 0.90 | 1.10 | 1.00 |
| H                    | 1.50 | 1.70 | 1.60 |
| K                    | 0.55 | 0.60 | 0.60 |
| L                    | 0.10 | 0.30 | 0.20 |
| M                    | 0.10 | 0.18 | 0.11 |
| All Dimensions in mm |      |      |      |

**Suggested Pad Layout**

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

**SOT563**



| Dimensions | Value (in mm) |
|------------|---------------|
| Z          | 2.2           |
| G          | 1.2           |
| X          | 0.375         |
| Y          | 0.5           |
| C1         | 1.7           |
| C2         | 0.5           |

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