

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)} \text{ max}$        | $I_D \text{ max}$<br>$T_A = +25^\circ\text{C}$ |
|---------------|---------------------------------|------------------------------------------------|
| 50V           | 2m $\Omega$ @ $V_{GS} = 5V$     | 280mA                                          |
|               | 2.5m $\Omega$ @ $V_{GS} = 2.5V$ | 258mA                                          |
|               | 3m $\Omega$ @ $V_{GS} = 1.8V$   | 235mA                                          |

## 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

- General Purpose Interfacing Switch

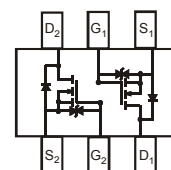
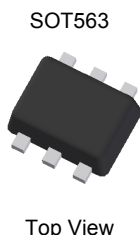
## DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

## Features

- Low On-Resistance
- Very Low Gate Threshold Voltage, 1.0V max
- 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)**
- ESD Protected up to 2kV**
- Qualified to AEC-Q101 standards for High Reliability**
- PPAP Capable (Note 4)**

## 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 (e3)
- Weight: 0.006 grams (approximate)



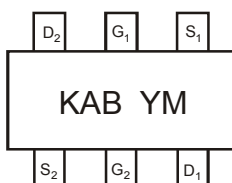
DMN5L06VK

## Ordering Information (Note 5)

| Part Number   | Case   | Packaging          |
|---------------|--------|--------------------|
| DMN5L06VKQ-7  | SOT563 | 3,000/Tape & Reel  |
| DMN5L06VKQ-13 | SOT563 | 10,000/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) 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.
  - Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to [http://www.diodes.com/quality/product\\_compliance\\_definitions/](http://www.diodes.com/quality/product_compliance_definitions/).
  - For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information (Note 6)



KAB = Product Type Marking Code  
YM = Date Code Marking  
Y = Year (ex: A = 2013)  
M = Month (ex: 9 = September)

### Date Code Key

| Year | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|------|------|------|------|------|------|------|------|
| Code | A    | B    | C    | D    | E    | F    | G    |

| 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   |

Note: 6. Package is non-polarized. Parts may be on reel in orientation illustrated, 180° rotated, or mixed (both ways).

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

| Characteristic                             | Symbol           | Value | Unit |
|--------------------------------------------|------------------|-------|------|
| Drain Source Voltage                       | V <sub>DSS</sub> | 50    | V    |
| Drain-Gate Voltage R <sub>GS</sub> ≤ 1.0MΩ | V <sub>DGR</sub> | 50    | V    |
| Gate-Source Voltage                        | V <sub>GSS</sub> | ±20   | V    |
| Continuous Pulsed                          |                  | ±40   |      |
| Drain Current (Note 7)                     | I <sub>D</sub>   | 280   | mA   |
|                                            | I <sub>DM</sub>  | 1.5   | A    |

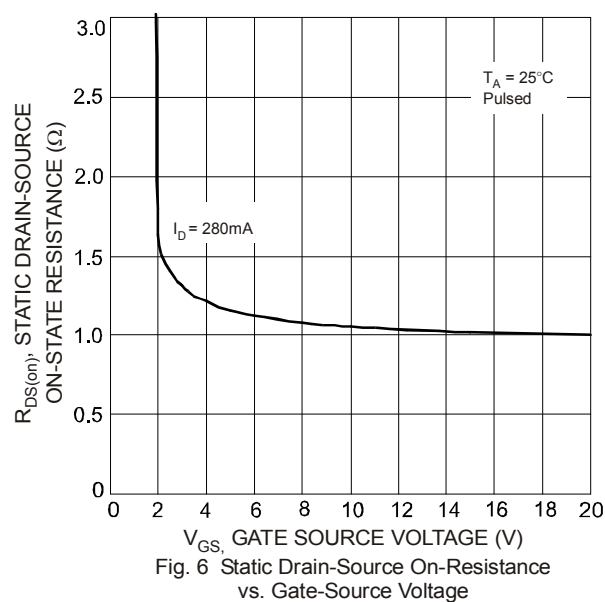
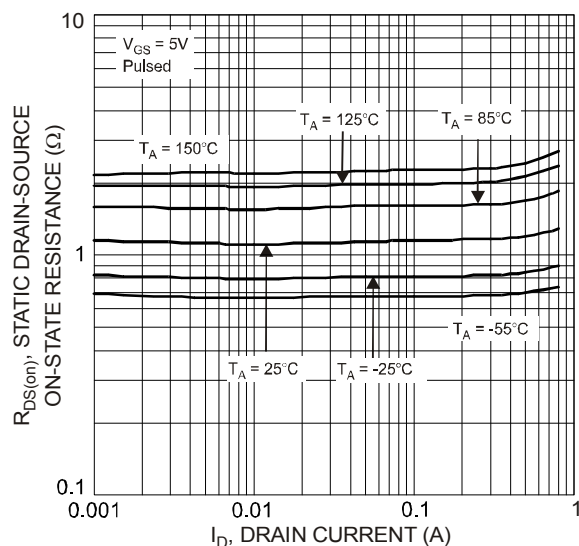
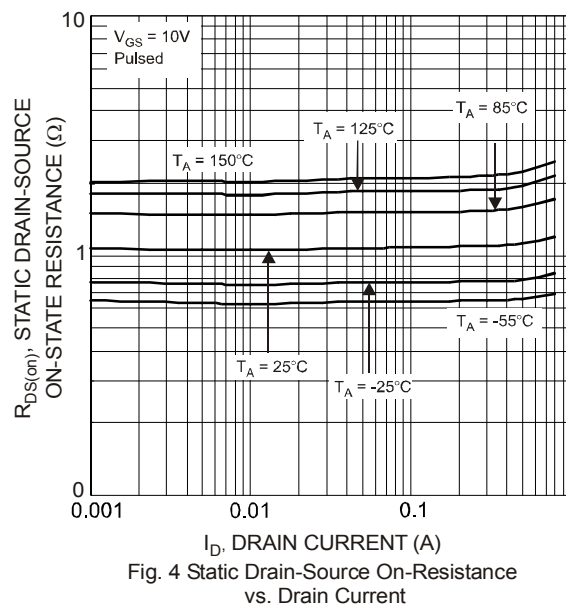
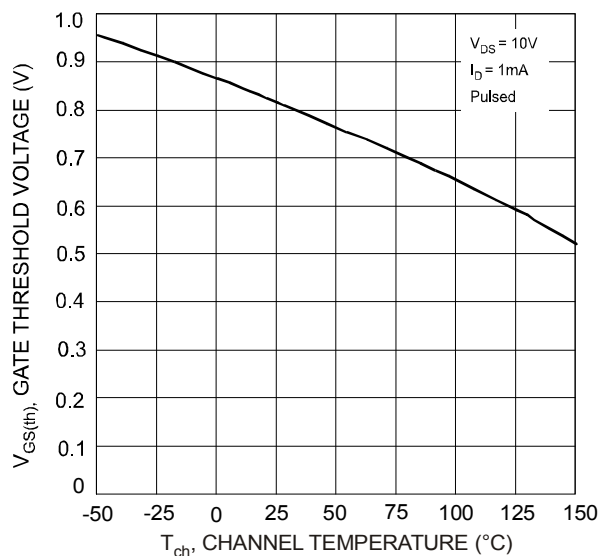
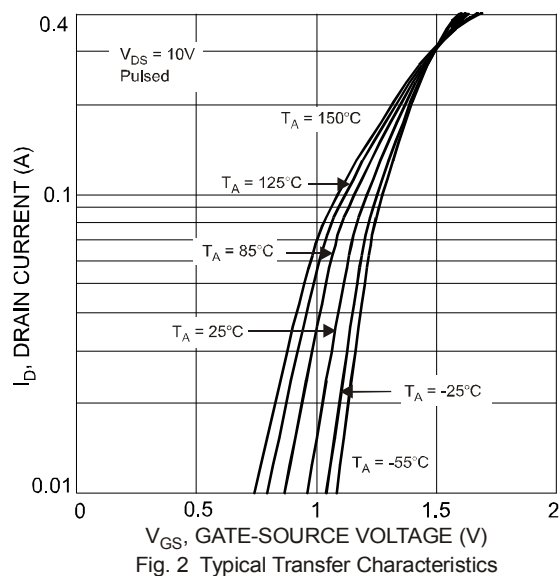
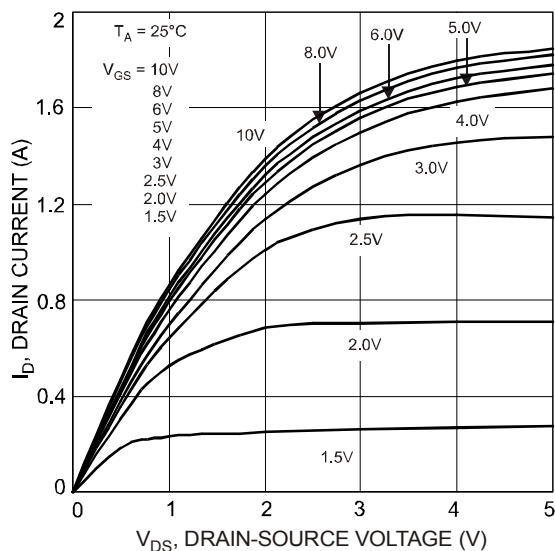
**Thermal Characteristics**

| Characteristic                                   | Symbol                            | Value       | Unit |
|--------------------------------------------------|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 7)                 | P <sub>D</sub>                    | 250         | mW   |
| Thermal Resistance, Junction to Ambient (Note 7) | R <sub>θJA</sub>                  | 500         | °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                                                                                                                                  |
|------------------------------------------------------------------------------------------|----------------------|--------------|-------------|-------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| OFF CHARACTERISTICS (Note 8)                                                             |                      |              |             |                   |                |                                                                                                                                                 |
| Drain-Source Breakdown Voltage                                                           | BV <sub>DSS</sub>    | 50           | —           | —                 | V              | V <sub>GS</sub> = 0V, I <sub>D</sub> = 10μA                                                                                                     |
| Zero Gate Voltage Drain Current @ T <sub>C</sub> = +25°C                                 | I <sub>DSS</sub>     | —            | —           | 60                | nA             | V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V                                                                                                     |
| Gate-Body Leakage                                                                        | I <sub>GSS</sub>     | —            | —           | 1<br>500<br>50    | μA<br>nA<br>nA | V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V<br>V <sub>GS</sub> = ±10V, V <sub>DS</sub> = 0V<br>V <sub>GS</sub> = ±5V, V <sub>DS</sub> = 0V     |
| ON CHARACTERISTICS (Note 8)                                                              |                      |              |             |                   |                |                                                                                                                                                 |
| Gate Threshold Voltage @T <sub>J</sub> = +25°C<br>@T <sub>J</sub> = +0°C~ +85°C (Note 8) | V <sub>GS(th)</sub>  | 0.49<br>0.30 | —           | 1.0<br>1.2        | V              | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA                                                                                      |
| Static Drain-Source On-Resistance                                                        | R <sub>DS (ON)</sub> | —<br>—<br>—  | —<br>—<br>— | 3.0<br>2.5<br>2.0 | Ω              | V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 50mA<br>V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 50mA<br>V <sub>GS</sub> = 5.0V, I <sub>D</sub> = 50mA |
| On-State Drain Current                                                                   | I <sub>D(ON)</sub>   | 0.5          | 1.4         | —                 | A              | V <sub>GS</sub> = 10V, V <sub>DS</sub> = 7.5V                                                                                                   |
| Forward Transconductance                                                                 | Y <sub>fs</sub>      | 200          | —           | —                 | mS             | V <sub>DS</sub> =10V, I <sub>D</sub> = 0.2A                                                                                                     |
| Source-Drain Diode Forward Voltage                                                       | V <sub>SD</sub>      | 0.5          | —           | 1.4               | V              | V <sub>GS</sub> = 0V, I <sub>S</sub> = 115mA                                                                                                    |
| DYNAMIC CHARACTERISTICS (Note 9)                                                         |                      |              |             |                   |                |                                                                                                                                                 |
| Input Capacitance                                                                        | C <sub>iss</sub>     | —            | —           | 50                | pF             | V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V<br>f = 1.0MHz                                                                                       |
| Output Capacitance                                                                       | C <sub>oss</sub>     | —            | —           | 25                | pF             |                                                                                                                                                 |
| Reverse Transfer Capacitance                                                             | C <sub>rss</sub>     | —            | —           | 5.0               | pF             |                                                                                                                                                 |

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



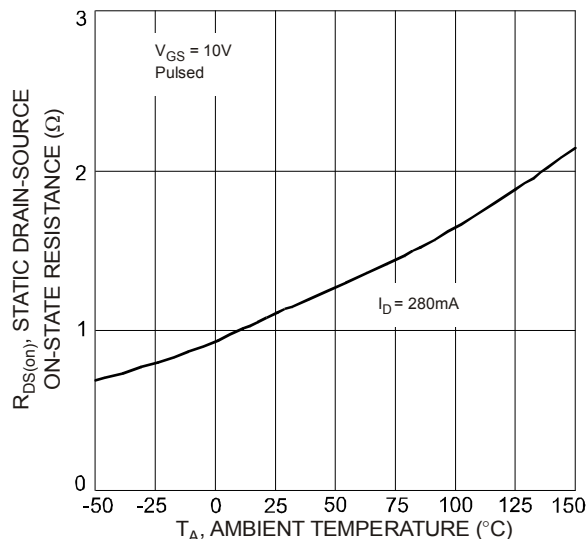


Fig. 7 Static Drain-Source On-State Resistance vs. Ambient Temperature

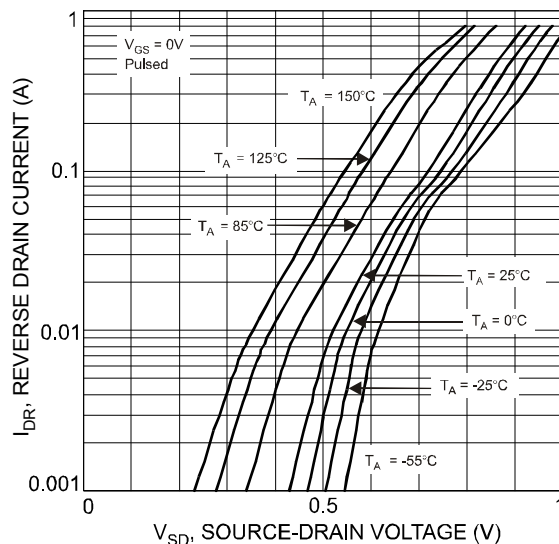


Fig. 8 Reverse Drain Current vs. Source-Drain Voltage

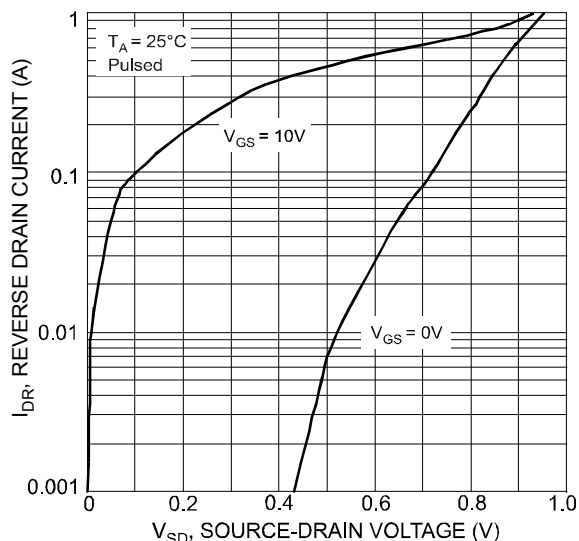


Fig. 9 Reverse Drain Current vs. Source-Drain Voltage

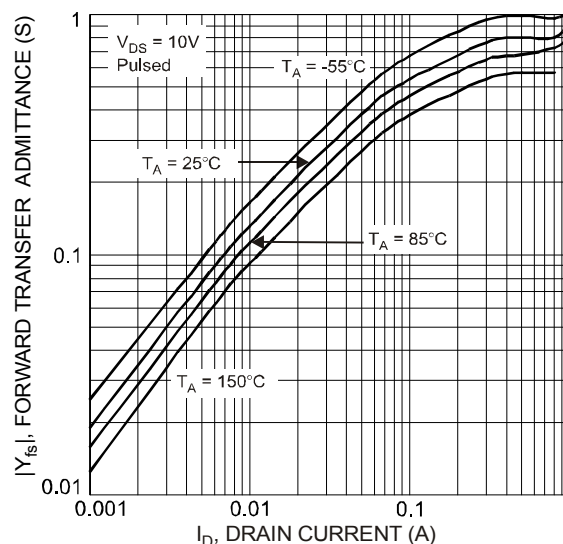


Fig. 10 Forward Transfer Admittance vs. Drain Current

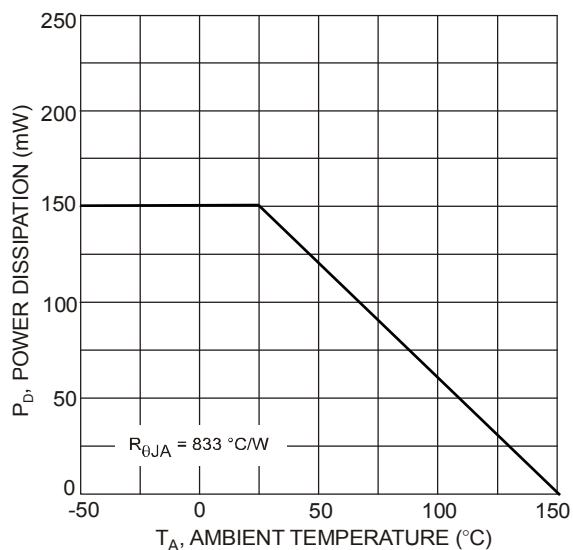
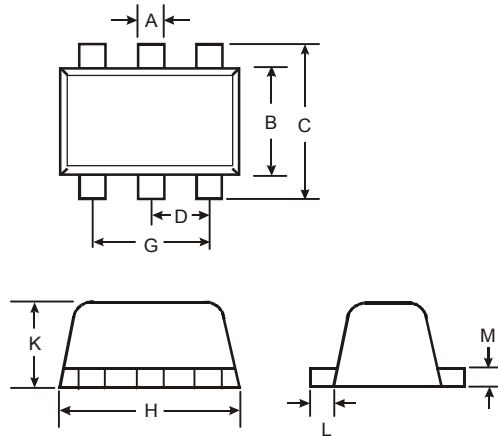


Fig. 11 Derating Curve - Total

## Package Outline Dimensions

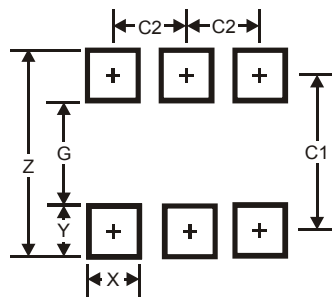
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| 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.



| 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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