

**DUAL N-CHANNEL ENHANCEMENT MODE MOSFET**

## Features

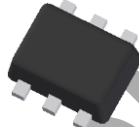
- Dual N-Channel MOSFET
- Low On-Resistance
- Very Low Gate Threshold Voltage, 1.0V Max
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface Mount Package
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **ESD Protected up to 2kV**
- This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability.  
<https://www.diodes.com/quality/product-definitions/>
- An Automotive-Compliant Part is Available Under Separate Datasheet ([DMN5L06VKQ](#))

## Mechanical Data

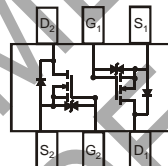
- Package: SOT563
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.006 grams (Approximate)



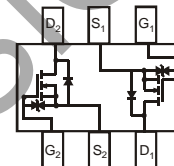
ESD protected up to 2kV



SOT563  
Top View



DMN5L06VK



DMN5L06VAK  
DMN5010VAK

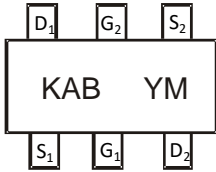
## Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMN5L06VK-7	SOT563	3,000	Tape & Reel
DMN5L06VK-7A	SOT563	3,000	Tape & Reel
DMN5L06VK-13	SOT563	10,000	Tape & Reel
DMN5L06VK-13A	SOT563	10,000	Tape & Reel
DMN5L06VAK-7	SOT563	3,000	Tape & Reel
DMN5L06VAK-7A	SOT563	3,000	Tape & Reel
DMN5L06VAK-13	SOT563	10,000	Tape & Reel
DMN5L06VAK-13A	SOT563	10,000	Tape & Reel
DMN5010VAK-7	SOT563	3,000	Tape & Reel
DMN5010VAK-7A	SOT563	3,000	Tape & Reel
DMN5010VAK-13	SOT563	10,000	Tape & Reel
DMN5010VAK-13A	SOT563	10,000	Tape & Reel

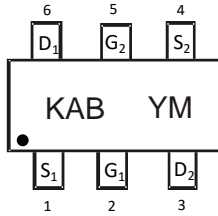
- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

**Marking Information** (Notes 5 & 6)

**DMN5L06VK-7/-13 (Note 5)**

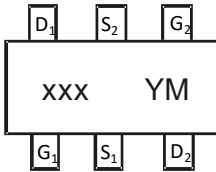


**DMN5L06VK-7A/-13A (Note 6)**

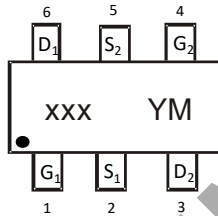


KAB= DMN5L06VK Product Type  
Marking Code  
YM= Date Code Marking  
Y = Year (ex: J = 2022)  
M = Month (ex: 9 = September)

**DMN5L06VAK-7/-13 (Note 5)  
DMN5010VAK-7/-13 (Note 5)**



**DMN5L06VAK-7A/-13A (Note 6)  
DMN5010VAK-7A/-13A (Note 6)**



xxx = Product Type Marking Code:  
KAE or KAE or KAC  
YM= Date Code Marking  
Y = Year (ex: J = 2022)  
M = Month (ex: 9 = September)

**Date Code Key**

<b>Year</b>	<b>2006</b>	...	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>
<b>Code</b>	T	...	J	K	L	M	N	O	P	R	S	T
<b>Month</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
<b>Code</b>	1	2	3	4	5	6	7	8	9	O	N	D

- Notes: 5. Package is non-polarized. Parts may be on reel in orientation illustrated, 180° rotated, or mixed (both ways).  
6. Part number with suffix 7A and 13A designates devices marked with a Pin 1 indicator. There is no other difference between both devices.

NOT RECOMMENDED FOR NEW DESIGN

### 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
		±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
<b>OFF CHARACTERISTICS (Note 8)</b>						
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	I <sub>DSS</sub>	—	—	60	nA	V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V
Gate-Body Leakage	I <sub>GSS</sub>	—	—	1	μA	V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V V <sub>GS</sub> = ±10V, V <sub>DS</sub> = 0V V <sub>GS</sub> = ±5V, V <sub>DS</sub> = 0V
				500	nA	
				50	nA	
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	0.49 0.30	—	1.0 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>	—	—	3.0	Ω	V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 50mA V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 50mA V <sub>GS</sub> = 5.0V, I <sub>D</sub> = 50mA
				2.5		
				2.0		
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
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iss</sub>	—	—	50	pF	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V 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 product testing.

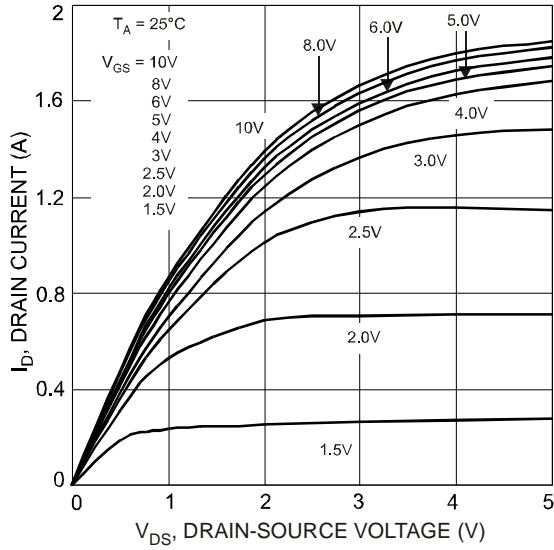


Fig. 1 Typical Output Characteristics

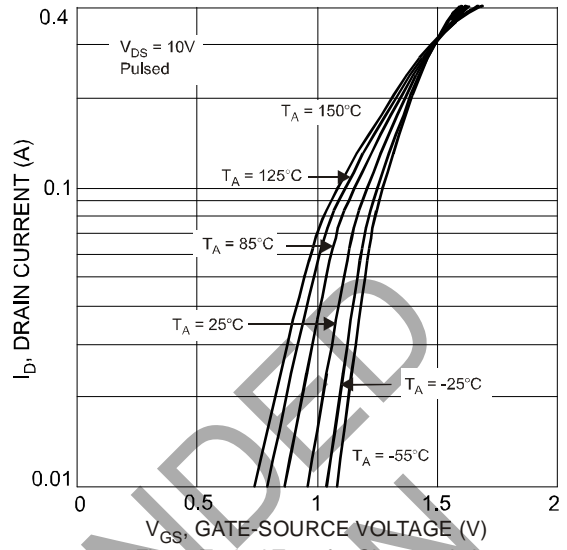


Fig. 2 Typical Transfer Characteristics

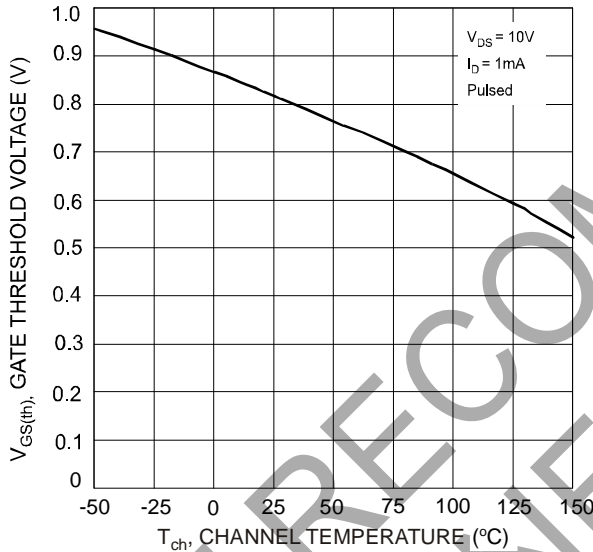


Fig. 3 Gate Threshold Voltage vs. Channel Temperature

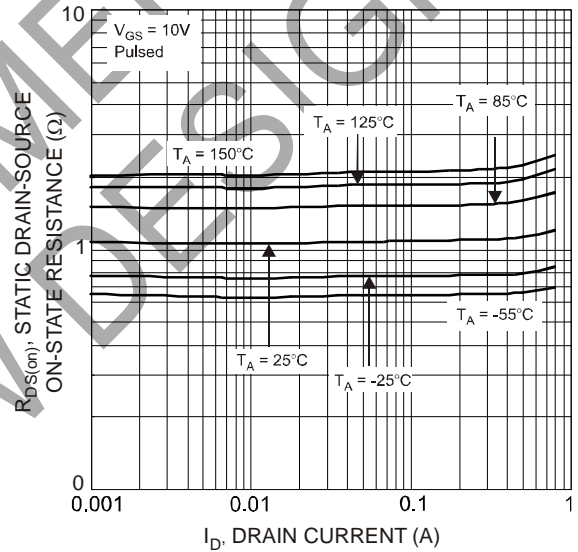


Fig. 4 Static Drain-Source On-Resistance vs. Drain Current

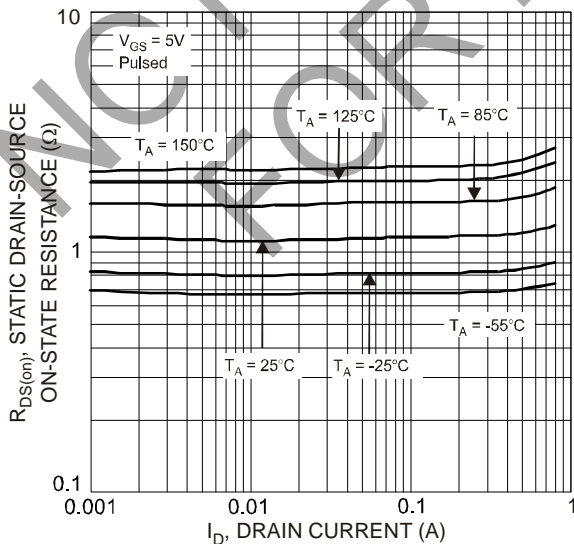


Fig. 5 Static Drain-Source On-Resistance vs. Drain Current

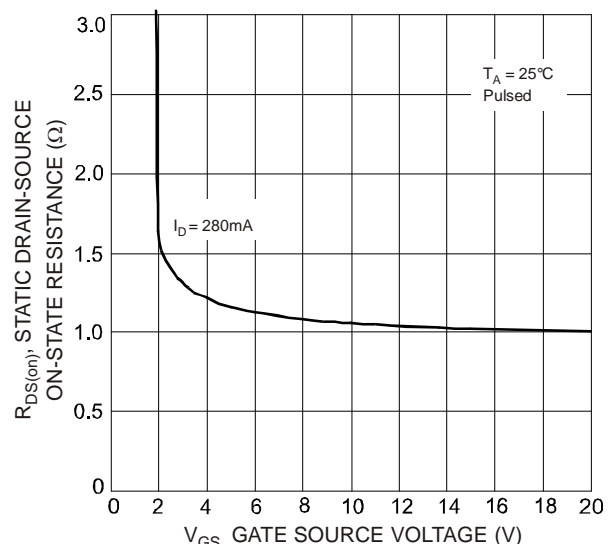


Fig. 6 Static Drain-Source On-Resistance vs. Gate-Source Voltage

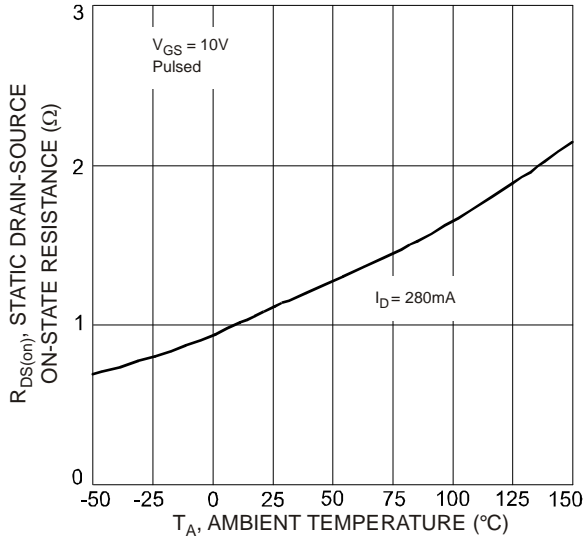


Fig. 7 Static Drain-Source On-State Resistance vs. Ambient Temperature

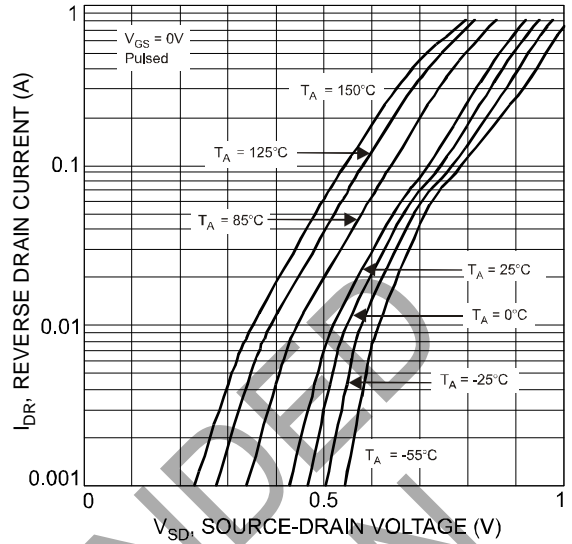


Fig. 8 Reverse Drain Current vs. Source-Drain Voltage

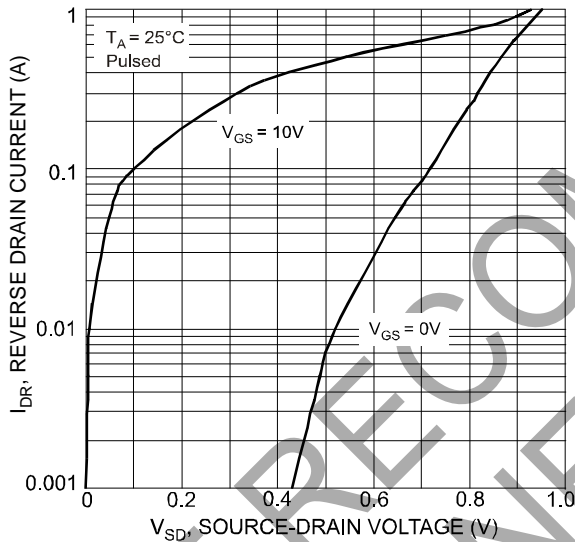


Fig. 9 Reverse Drain Current vs. Source-Drain Voltage

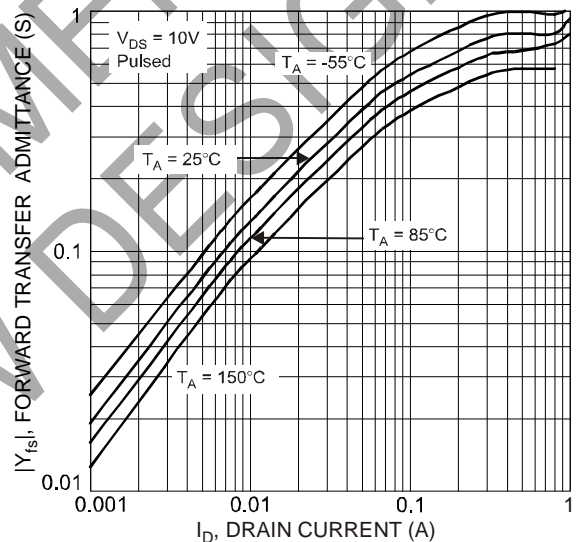


Fig. 10 Forward Transfer Admittance vs. Drain Current

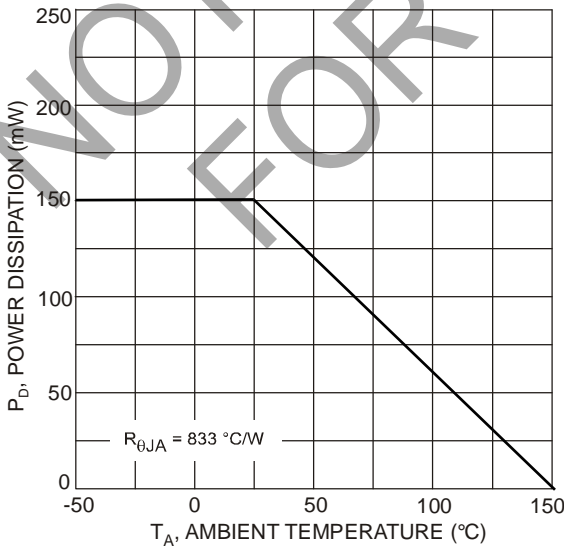
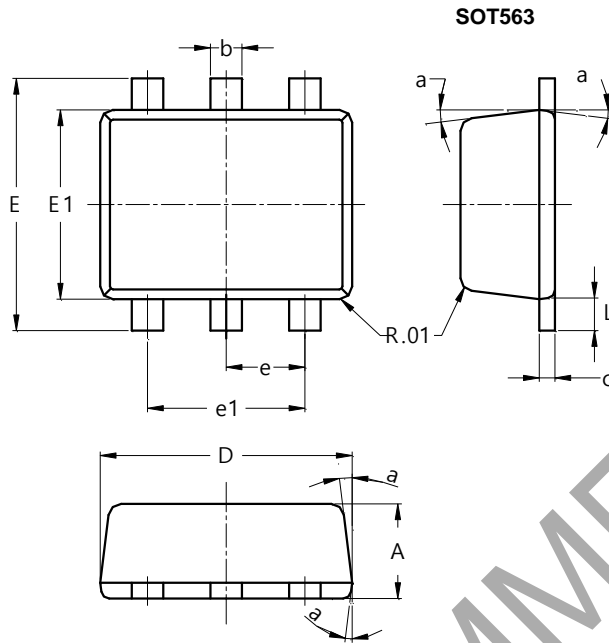


Fig. 11 Derating Curve - Total

**Package Outline Dimensions**

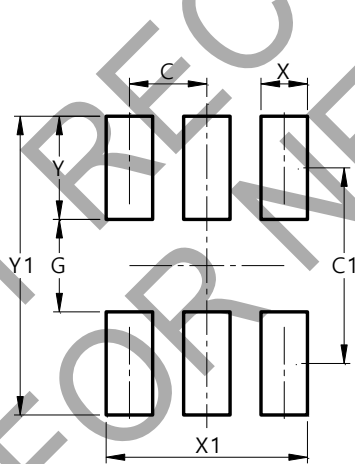
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



SOT563			
Dim	Min	Max	Typ
A	0.55	0.60	--
b	0.15	0.30	0.20
c	0.10	0.18	0.11
D	1.50	1.70	1.60
E	1.55	1.70	1.60
E1	1.10	1.25	1.20
e	--	--	0.50
e1	0.90	1.10	1.00
L	0.10	0.30	0.20
a	8°	9°	7°
All Dimensions in mm			

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.



Dimensions	Value (in mm)
C	0.500
C1	1.270
G	0.600
X	0.300
X1	1.300
Y	0.670
Y1	1.940

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