



#### **Product Summary**

V(BR)DSS	R <sub>DS(ON)</sub>	I <sub>D</sub> T <sub>A</sub> = +25°C
	2.0Ω @ V <sub>GS</sub> = 5.0V	300 mA
50V	2.5Ω @ V <sub>GS</sub> = 2.5V	200 mA

### **Description and Applications**

This new generation 50V N-Channel Enhancement Mode MOSFET has been designed to minimize RDS(on) and yet maintain superior switching performance. This device is ideal for use in Notebook battery power management and Load switch.

- Load switches
- Level switches

#### N-CHANNEL ENHANCEMENT MODE MOSFET

#### **Features and Benefits**

- Low On-Resistance
- Very Low Gate Threshold Voltage (1.0V max)
- Low Input Capacitance •
- Fast Switching Speed •
- Low Input/Output Leakage •
- ESD Protected Up To 2kV
- 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: SOT23

Drain

Source

- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish Matte Tin annealed over Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208

G

D

Top View

S

- Terminal Connections: See Diagram
- Weight: 0.008 grams (approximate)





SOT23

ESD PROTECTED TO 2kV

# Ordering Information (Note 4)

Part Number	Qualification	Case	Packaging
DMN5L06K-7	Commercial	SOT23	3000/Tape & Reel
DMN5L06KQ-7	Automotive	SOT23	3000/Tape & Reel

Gate Protection

Diode

Equivalent Circuit

Gate n

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.

2. See 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.

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 http://www.diodes.com/products/packages.html.

### **Marking Information**

Notes:

Date Code Ke	SV/				〕 	YM = Da Y = Yea	ate Code M r (ex: T = 2					
Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Code	Т	U	V	W	Х	Y	Z	А	В	С	D	E
Month	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	0	N	D

# DMN5L06K

Document number: DS30929 Rev. 8 - 2



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

Ch	aracteristic	Symbol	Value	Unit
Drain Source Voltage		V <sub>DSS</sub>	50	V
Gate-Source Voltage		V <sub>GSS</sub>	±20	V
Drain Current (Note 5)	Continuous Pulsed (Note 6)	ID	300 800	mA

### **Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	PD	350	mW
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	357	°C/W
Operating and Storage Temperature Range	TJ, T <sub>STG</sub>	-65 to +150	°C

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

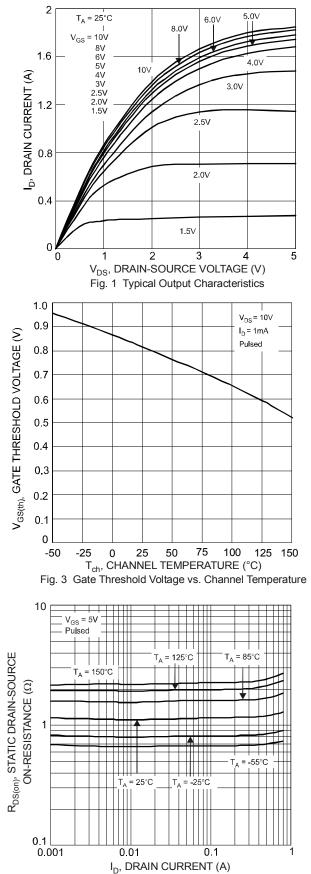
Characteristic		Symbol	Min	Тур	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)							
Drain-Source Breakdown Voltage		BV <sub>DSS</sub>	50			V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 10µA
Zero Gate Voltage Drain Current	@ T <sub>C</sub> = +25°C	I <sub>DSS</sub>	_	_	60	nA	V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V
Gate-Body Leakage		IGSS	_	_	1 500 50	μA nA nA	$V_{GS} = \pm 12V, V_{DS} = 0V$ $V_{GS} = \pm 10V, V_{DS} = 0V$ $V_{GS} = \pm 5V, V_{DS} = 0V$
ON CHARACTERISTICS (Note 7)							
Gate Threshold Voltage		V <sub>GS(th)</sub>	0.49	—	1.0	V	$V_{DS}$ = $V_{GS}$ , $I_D$ = 250 $\mu$ A
Static Drain-Source On-Resistance		R <sub>DS(ON)</sub>			3.0 2.5 2.0	Ω	$V_{GS}$ = 1.8V, I <sub>D</sub> = 50mA $V_{GS}$ = 2.5V, I <sub>D</sub> = 50mA $V_{GS}$ = 5.0V, I <sub>D</sub> = 50mA
On-State Drain Current		I <sub>D(ON)</sub>	0.5	1.4	_	А	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				-	-		
Input Capacitance		Ciss	_	—	50	pF	
Output Capacitance		Coss	_		25	pF	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V f = 1.0MHz
Reverse Transfer Capacitance		C <sub>rss</sub>	_		5.0	pF	

Notes: 5. Device mounted on FR-4 PCB

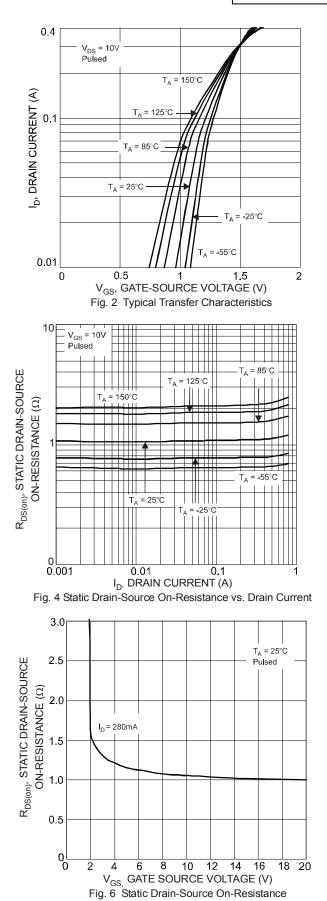
6. Pulse width ≤10mS, Duty Cycle ≤1%.
7. Short duration pulse test used to minimize self-heating effect.





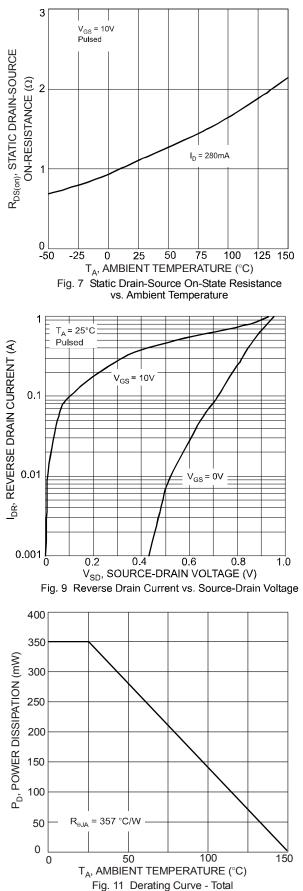


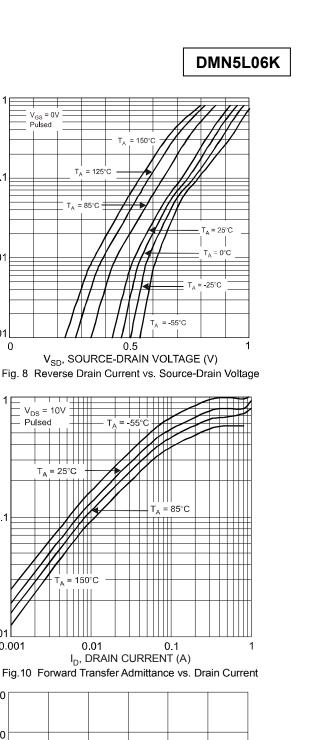


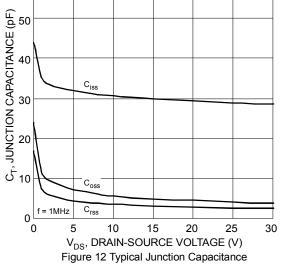


vs. Gate-Source Voltage









I<sub>DR</sub>, REVERSE DRAIN CURRENT (A)

0.1

0.01

0.001

 $|\gamma_{f_{S}}|,$  FORWARD TRANSFER ADMITTANCE (S)

0.1

0.01

60

0.001

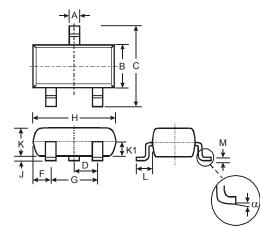
0

Pulsed



# **Package Outline Dimensions**

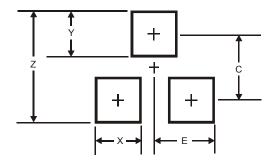
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SOT23							
Dim	Min	Max	Тур				
Α	0.37	0.51	0.40				
В	1.20	1.40	1.30				
С	2.30	2.50	2.40				
D	0.89	1.03	0.915				
F	0.45	0.60	0.535				
G	1.78	2.05	1.83				
Н	2.80	3.00	2.90				
J	0.013	0.10	0.05				
κ	0.903	1.10	1.00				
K1	-	-	0.400				
L	0.45	0.61	0.55				
М	0.085	0.18	0.11				
α	0°	8°	-				
All	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	2.9
Х	0.8
Y	0.9
С	2.0
E	1.35



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