



#### 20V N-CHANNEL ENHANCEMENT MODE MOSFET

#### **Product Summary**

V <sub>(BR)DSS</sub>	R <sub>DS(ON)</sub> max	I <sub>D</sub> max T <sub>A</sub> = 25°C
	$56mΩ @ V_{GS} = 4.5V$	2.8A
20V	$65m\Omega @ V_{GS} = 2.5V$	2.6A
	93mΩ @ V <sub>GS</sub> = 1.8V	2.2A
	140mΩ @ V <sub>GS</sub> = 1.5V	1.8A

### **Features and Benefits**

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Lead Free By Design/RoHS Compliant (Note 1)
- "Green" Device (Note 2)
- Qualified to AEC-Q101 standards for High Reliability

### **Description and Applications**

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.

- General Purpose Interfacing Switch
- Power Management Functions
- DC-DC Converters
- Analog Switch

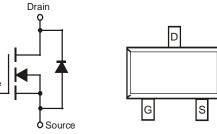
#### **Mechanical Data**

- Case: SOT323
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See diagram

Top View

- Terminals: Finish Matte Tin annealed over Alloy42 leadframe.
  Solderable per MIL-STD-202, Method 208
- Weight: 0.027 grams (approximate)





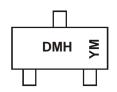
#### **Ordering Information (Note 3)**

Part Number	Case	Packaging	
DMN2065UW-7	SOT323	3000/Tape & Reel	

Notes: 1. No purposefully added lead.

- 2. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com.
- 3. For packaging details, go to our website at http://www.diodes.com.

# **Marking Information**



DMH = Product Type Marking Code YM = Date Code Marking Y = Year (ex: Y = 2011) M = Month (ex: 9 = September)

Date Code Key

Year	2011	1	2012		2013	20	14	2015		2016		2017
Code	Υ		Z		Α	[	3	С		D		Е
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	0	N	D



## Maximum Ratings @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Units		
Drain-Source Voltage			$V_{DSS}$	20	V
Gate-Source Voltage			$V_{GSS}$	±12	V
Continuous Drain Current (Note 5) V 45V	Steady State	$T_A = 25$ °C $T_A = 70$ °C	I <sub>D</sub>	2.8 2.3	А
Continuous Drain Current (Note 5) V <sub>GS</sub> = 4.5V	t<10s	$T_A = 25$ °C $T_A = 70$ °C	I <sub>D</sub>	3.1 2.6	А
Continuous Drain Current (Note EV) 4 9V	Steady State	$T_A = 25$ °C $T_A = 70$ °C	I <sub>D</sub>	2.2 1.7	Α
Continuous Drain Current (Note 5) V <sub>GS</sub> = 1.8V	t<10s	T <sub>A</sub> = 25°C T <sub>A</sub> = 70°C	I <sub>D</sub>	2.4 1.9	А
Pulsed Drain Current (10us pulse, duty cycle=1%)	I <sub>DM</sub>	30	Α		
Maximum Body Diode Forward Current (Note 4)	I <sub>S</sub>	1.2	Α		

# Thermal Characteristics @T<sub>A</sub> = 25°C unless otherwise specified

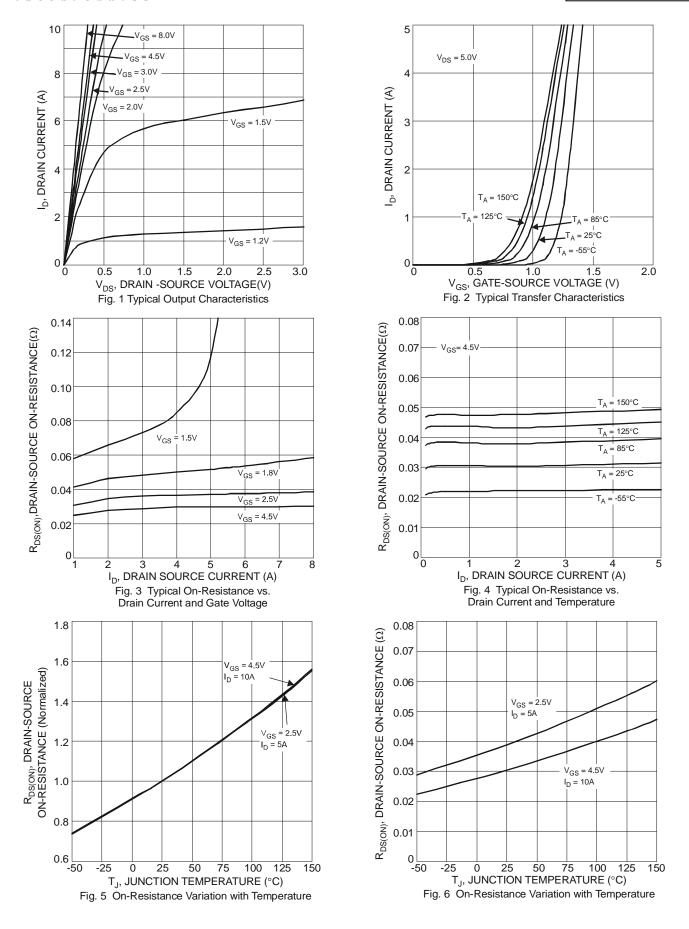
Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 4)		$P_{D}$	0.43	W
Thermal Resistance, Junction to Ambient (Note 4)	Steady state	D	296	°C/W
Thermal Resistance, Junction to Ambient (Note 4)	t<10s	$R_{\theta JA}$	252	°C/W
Total Power Dissipation (Note 5)		$P_{D}$	0.7	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	Б	178	°C/W
Thermal Resistance, Junction to Ambient (Note 5)	t<10s	$R_{\theta JA}$	151	°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

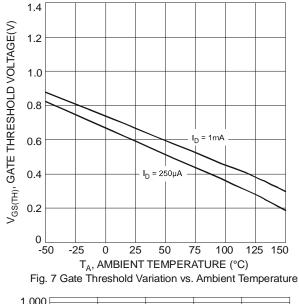
Characteristic		Symbol	Min	Тур	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)							
Drain-Source Breakdown Voltage		$BV_{DSS}$	20	-	-	V	$V_{GS} = 0V$ , $I_D = 1mA$
Zero Gate Voltage Drain Current	$@T_c = 25^{\circ}C$	I <sub>DSS</sub>	-	-	1	μΑ	$V_{DS} = 20V, V_{GS} = 0V$
Gate-Source Leakage		I <sub>GSS</sub>	-	-	±1	μA	$V_{GS} = \pm 10V, V_{DS} = 0V$
ON CHARACTERISTICS (Note 6)							
Gate Threshold Voltage		$V_{GS(th)}$	0.35	-	1.0	V	$V_{DS} = V_{GS}$ , $I_D = 250\mu A$
			-	52	56		$V_{GS} = 4.5V, I_D = 2A$
Static Drain-Source On-Resistance		D	-	59	65	mΩ	$V_{GS} = 2.5V, I_D = 2A$
Static Drain-Source On-Resistance		R <sub>DS (ON)</sub>	-	60	93	11177	$V_{GS} = 1.8V, I_D = 1A$
			-	75	140		$V_{GS} = 1.5V, I_D = 0.5A$
Forward Transfer Admittance		Y <sub>fs</sub>	-	7	-	S	$V_{DS} = 5V, I_{D} = 3.8A$
Diode Forward Voltage		V <sub>SD</sub>	-	0.7	1.0	V	$V_{GS} = 0V, I_{S} = 1A$
DYNAMIC CHARACTERISTICS (Note 7)							
Input Capacitance		C <sub>iss</sub>	-	400.0	-	pF	V 40V V 0V
Output Capacitance		Coss	-	73.8	-	pF	$V_{DS} = 10V, V_{GS} = 0V,$ -f = 1.0MHz
Reverse Transfer Capacitance		Crss	-	65.6	-	pF	71 = 1.0IVIH2
Total Gate Charge		Qg	-	5.4	-	nC	V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 10V,
Gate-Source Charge		$Q_{gs}$	-	0.7	-	nC	I <sub>D</sub> = 6A
Gate-Drain Charge		Q <sub>gd</sub>	-	1.4	-	nC	
Turn-On Delay Time		t <sub>D(on)</sub>	-	3.5	-	ns	
Turn-On Rise Time	Turn-On Rise Time		-	9.7	-	ns	$V_{DD} = 10V, V_{GS} = 5V,$
Turn-Off Delay Time		t <sub>D(off)</sub>	-	23.8	-	ns	$R_L = 1.7\Omega$ , $R_G = 6\Omega$ ,
Turn-Off Fall Time		t <sub>f</sub>	-	7.2	-	ns	

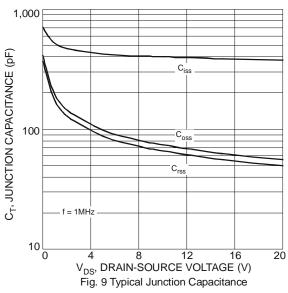
Device mounted on FR-4 substrate PC board, with minimum recommended pad layout.
 Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
 Short duration pulse test used to minimize self-heating effect.
 Guaranteed by design. Not subject to product testing.

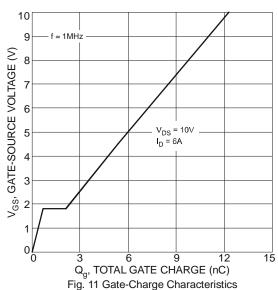


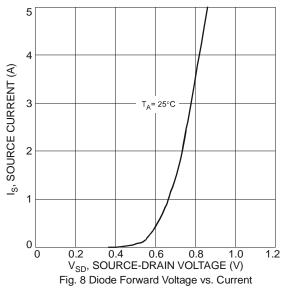












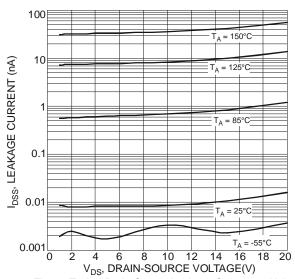
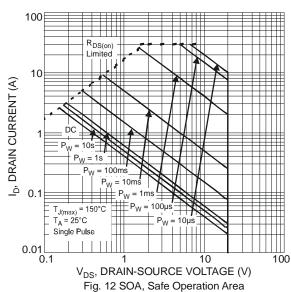
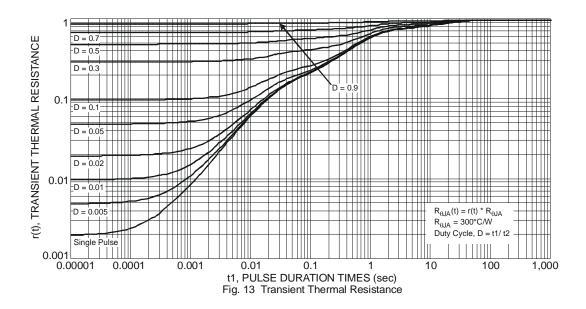


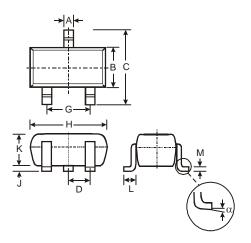
Fig. 10 Typical Drain-Source Leakage Current vs. Voltage





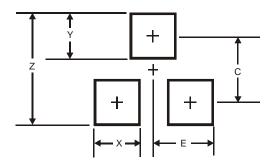


# **Package Outline Dimensions**



SOT323							
Dim	Min	Max	Тур				
Α	0.25	0.40	0.30				
В	1.15	1.35	1.30				
С	2.00	2.20	2.10				
D	-	-	0.65				
G	1.20	1.40	1.30				
Н	1.80	2.20	2.15				
J	0.0	0.10	0.05				
K	0.90	1.00	1.00				
L	0.25	0.40	0.30				
M	0.10	0.18	0.11				
α	0°	8°	1				
All Dimensions in mm							

# **Suggested Pad Layout**



Dimensions	Value (in mm)
Z	2.8
Х	0.7
Y	0.9
С	1.9
Е	1.0



#### **IMPORTANT NOTICE**

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel. Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

#### LIFE SUPPORT

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

- A. Life support devices or systems are devices or systems which:
  - 1. are intended to implant into the body, or
  - 2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.
- B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

Copyright © 2011, Diodes Incorporated

www.diodes.com