





#### N-CHANNEL ENHANCEMENT MODE MOSFET

### **Product Summary**

V <sub>(BR)DSS</sub>	R <sub>DS(ON)</sub>	I <sub>D</sub> T <sub>A</sub> = +25°C
50V	2.0Ω @ V <sub>GS</sub> = 10V	360mA
300	3.0Ω @ V <sub>GS</sub> = 5V	250mA

### **Description**

This new generation 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**

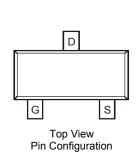
- DC-DC Converters
- Power management functions
- Battery Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc

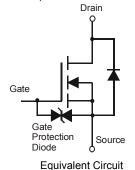
#### **Features**

- N-Channel MOSFET
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- ESD Protected Gate
- 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: SOT323
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish annealed over Alloy 42 leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208 <sup>3</sup>
- Terminal Connections: See Diagram
- Weight: 0.006 grams (approximate)





SOT323



**ESD PROTECTE** 

Top View

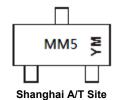
### Ordering Information (Note 4)

Part Number	Case	Packaging
DMN53D0LW-7	SOT323	3,000/Tape & Reel
DMN53D0LW-13	SOT323	10,000/Tape & Reel

Notes: 1. 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 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**



MM5 = Product Type Marking Code
YM = Date Code Marking for SAT (Shanghai Assembly/ Test site)
Y = Year (ex: A = 2013)
M = Month (ex: 9 = September)

Date Code Key

Year	201	1	2012		2013	20	14	2015		2016	2	2017
Code	Y		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	$V_{DSS}$	50	V		
Gate-Source Voltage	V <sub>GSS</sub>	±20	V		
Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V	Steady State	$T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$	I <sub>D</sub>	360 250	mA
Continuous Drain Current (Note 6) V <sub>GS</sub> = 5V	I <sub>D</sub>	250 200	mA		
Pulsed Drain Current (10µs pulse, duty cycle = 1%)	I <sub>DM</sub>	700	mA		

# 

Characteristic	Symbol	Value	Units	
Total Power Dissipation	(Note 5)	D	320	mW
Total Fower Dissipation	(Note 6)	$P_{D}$	420	IIIVV
Thermal Desistance, Junction to Ambient	(Note 5)	5	395	°C/W
Thermal Resistance, Junction to Ambient	(Note 6)	$R_{\theta JA}$	301	C/VV
Operating and Storage Temperature Range	$T_{J_i} T_{STG}$	-55 to 150	°C	

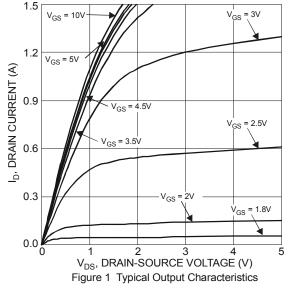
# **Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

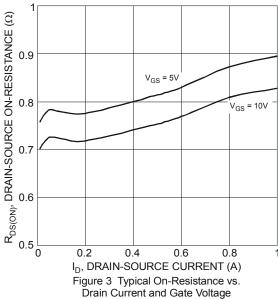
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	$BV_{DSS}$	50	_	_	V	$V_{GS} = 0V, I_D = 250\mu A$
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	_	_	1.0	μA	$V_{DS} = 50V, V_{GS} = 0V$
Gate-Body Leakage	I <sub>GSS</sub>	_	_	±10	μA	$V_{GS} = \pm 12V, V_{DS} = 0V$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	0.8	_	1.5	V	$V_{DS} = V_{GS}, I_{D} = 100 \mu A$
Gate Threshold Voltage Temperature Coefficient (Note 8)	$\frac{\Delta V_{GS(TH)}}{\Delta T_J}$	_	-3.4	_	mV/°C	_
Static Drain-Source On-Resistance	D	_	_	2.0	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 270mA
Static Dialii-Source Off-Resistance	R <sub>DS (ON)</sub>	_	_	3.0	1 12	V <sub>GS</sub> = 5V, I <sub>D</sub> = 200mA
Forward Transconductance	<b>g</b> FS	80	_	_	mS	V <sub>DS</sub> = 10V, I <sub>D</sub> = 200mA
Diode Forward Voltage	V <sub>SD</sub>		0.75	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 115mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C <sub>iss</sub>		45.8	_		
Output Capacitance	Coss		5.3	_	pF	$V_{DS} = 25V, V_{GS} = 0V$ f = 1.0MHz
Reverse Transfer Capacitance	C <sub>rss</sub>		3.9	_		1.5141112
Total Gate Charge V <sub>GS</sub> = 10V	$Q_g$	_	1.2	_		
Total Gate Charge V <sub>GS</sub> = 4.5V	$Q_g$		0.6	_	nC	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 10V,
Gate-Source Charge	$Q_{gs}$		0.2	_	110	I <sub>D</sub> = 250mA
Gate-Drain Charge	$Q_{gd}$	_	0.1	_		
Turn-On Delay Time	t <sub>D(on)</sub>	_	2.7	_		
Turn-On Rise Time	t <sub>r</sub>	_	2.5	_	nS	V <sub>DD</sub> = 30V, V <sub>GS</sub> = 10V,
Turn-Off Delay Time	t <sub>D(off)</sub>		18.9	_	113	$R_G = 25\Omega$ , $I_D = 200mA$
Turn-Off Fall Time	t <sub>f</sub>	_	11.0	_		

Notes:

- 5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
- 6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout
- 7 .Short duration pulse test used to minimize self-heating effect.
  8. Guaranteed by design. Not subject to production testing.







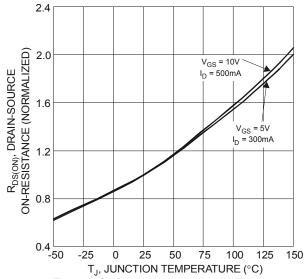
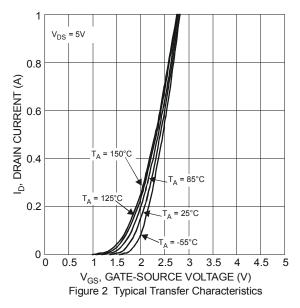
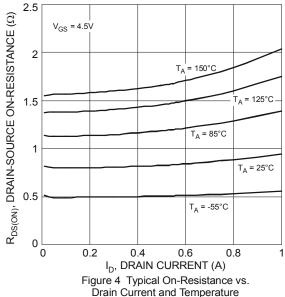


Figure 5 On-Resistance Variation with Temperature





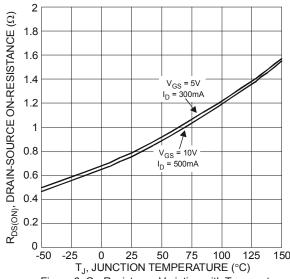


Figure 6 On-Resistance Variation with Temperature



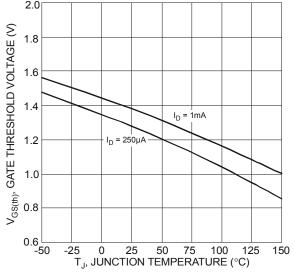
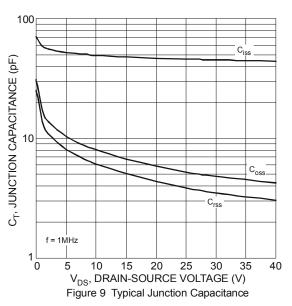
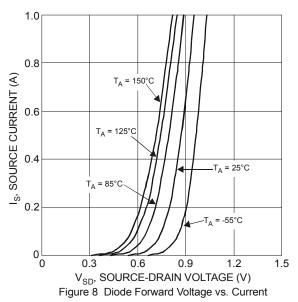
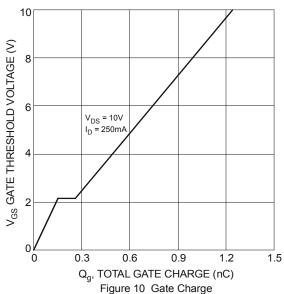


Figure 7 Gate Threshold Variation vs. Ambient Temperature

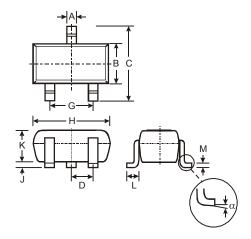






### **Package Outline Dimensions**

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

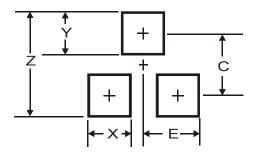


SOT323							
Dim	Min	Max	Тур				
Α	0.25	0.40	0.30				
В	1.15	1.35	1.30				
С	2.00	2.20	2.10				
D	-	-	0.65				
G	1.20	1.40	1.30				
Н	1.80	2.20	2.15				
J	0.0	0.10	0.05				
K	0.90	1.00	1.00				
L	0.25	0.40	0.30				
M	0.10	0.18	0.11				
α	0°	8°	-				
All Dimensions in mm							



### Suggested Pad Layout

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



Dimensions	Value (in mm)				
Z	2.8				
Х	0.7				
Υ	0.9				
С	1.9				
E	1.0				

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