

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	$I_D$ $T_A = +25^\circ C$
50V	2.0Ω @ $V_{GS} = 10V$	360mA
	3.0Ω @ $V_{GS} = 5V$	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

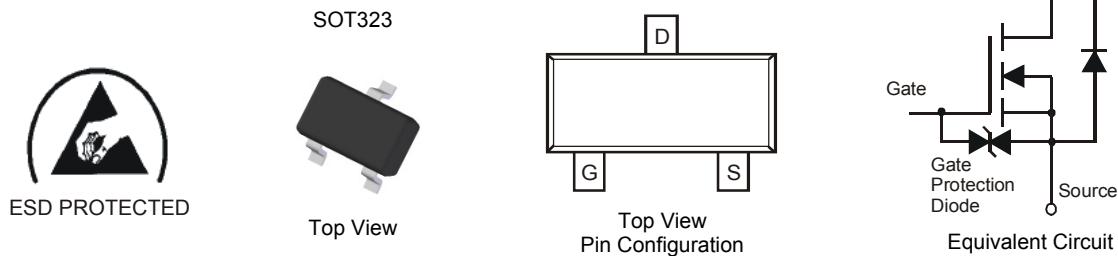
- DC-DC Converters
- Power management functions
- Battery Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc

## 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 (e3)
- Terminal Connections: See Diagram
- Weight: 0.006 grams (approximate)



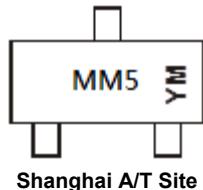
## Ordering Information (Note 4)

Part Number	Case	Packaging
DMN53D0LW-7	SOT323	3,000/Tape & Reel
DMN53D0LW-13	SOT323	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.
- 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	2011	2012	2013	2014	2015	2016	2017					
Code	Y	Z	A	B	C	D	E					
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

Maximum Ratings (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			$V_{DSS}$	50	V
Gate-Source Voltage			$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	360 250	mA
Continuous Drain Current (Note 6) $V_{GS} = 5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	250 200	mA
Pulsed Drain Current (10 $\mu\text{s}$ pulse, duty cycle = 1%)			$I_{DM}$	700	mA

 Thermal Characteristics (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

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

 Electrical Characteristics (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	50	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1.0	$\mu\text{A}$	$V_{DS} = 50\text{V}, V_{GS} = 0\text{V}$
Gate-Body Leakage	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 12\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	0.8	—	1.5	V	$V_{DS} = V_{GS}, I_D = 100\mu\text{A}$
Gate Threshold Voltage Temperature Coefficient (Note 8)	$\frac{\Delta V_{GS(TH)}}{\Delta T_J}$	—	-3.4	—	$\text{mV/}^\circ\text{C}$	—
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	—	—	2.0	$\Omega$	$V_{GS} = 10\text{V}, I_D = 270\text{mA}$
		—	—	3.0		$V_{GS} = 5\text{V}, I_D = 200\text{mA}$
Forward Transconductance	$g_{FS}$	80	—	—	$\text{mS}$	$V_{DS} = 10\text{V}, I_D = 200\text{mA}$
Diode Forward Voltage	$V_{SD}$	—	0.75	1.2	V	$V_{GS} = 0\text{V}, I_S = 115\text{mA}$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{iss}$	—	45.8	—	pF	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	5.3	—		
Reverse Transfer Capacitance	$C_{rss}$	—	3.9	—		
Total Gate Charge $V_{GS} = 10\text{V}$	$Q_g$	—	1.2	—	nC	$V_{GS} = 10\text{V}, V_{DS} = 10\text{V}, I_D = 250\text{mA}$
Total Gate Charge $V_{GS} = 4.5\text{V}$	$Q_g$	—	0.6	—		
Gate-Source Charge	$Q_{gs}$	—	0.2	—		
Gate-Drain Charge	$Q_{gd}$	—	0.1	—		
Turn-On Delay Time	$t_{D(on)}$	—	2.7	—	nS	$V_{DD} = 30\text{V}, V_{GS} = 10\text{V}, R_G = 25\Omega, I_D = 200\text{mA}$
Turn-On Rise Time	$t_r$	—	2.5	—		
Turn-Off Delay Time	$t_{D(off)}$	—	18.9	—		
Turn-Off Fall Time	$t_f$	—	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.

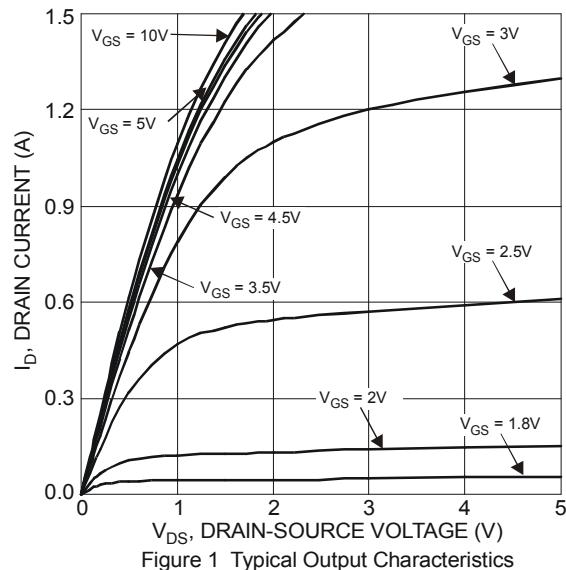


Figure 1 Typical Output Characteristics

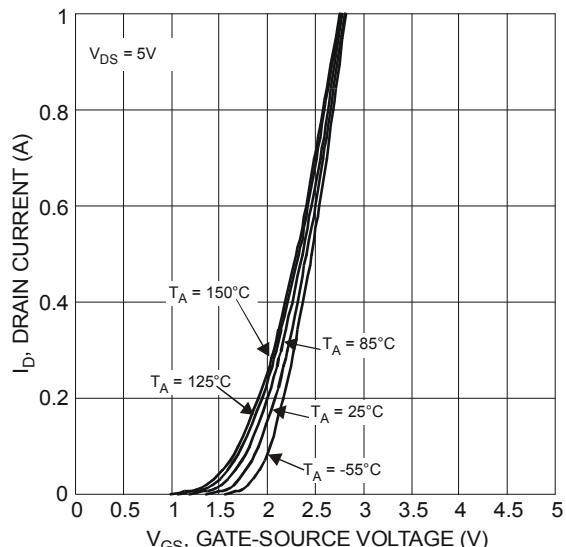


Figure 2 Typical Transfer Characteristics

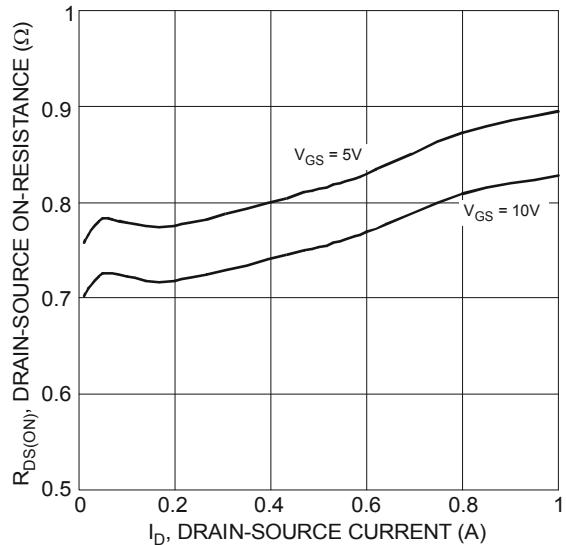


Figure 3 Typical On-Resistance vs.  
Drain Current and Gate Voltage

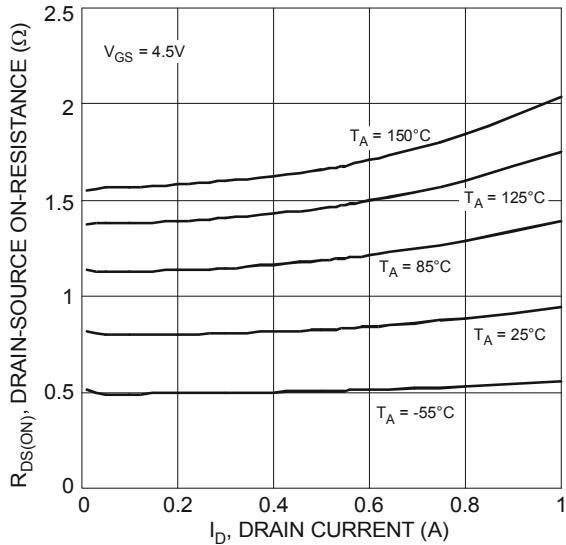


Figure 4 Typical On-Resistance vs.  
Drain Current and Temperature

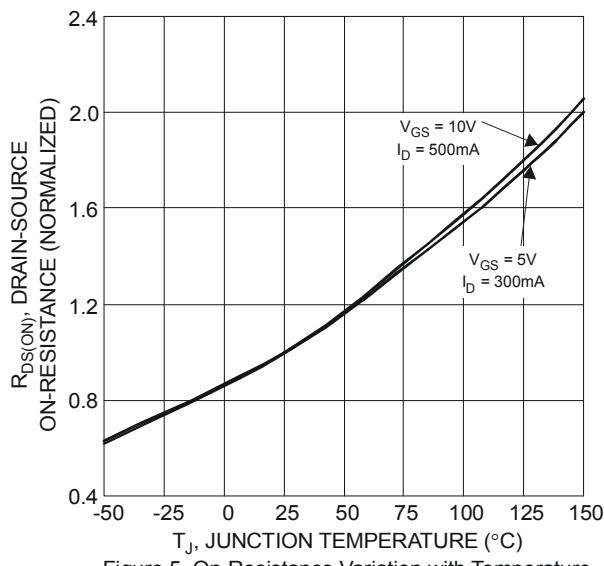


Figure 5 On-Resistance Variation with Temperature

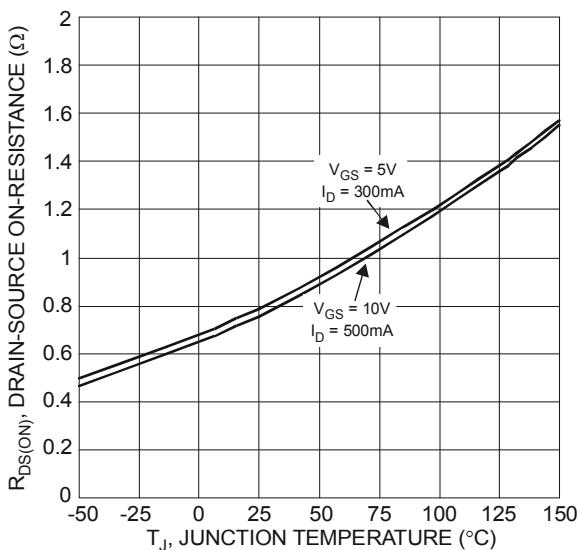


Figure 6 On-Resistance Variation with Temperature

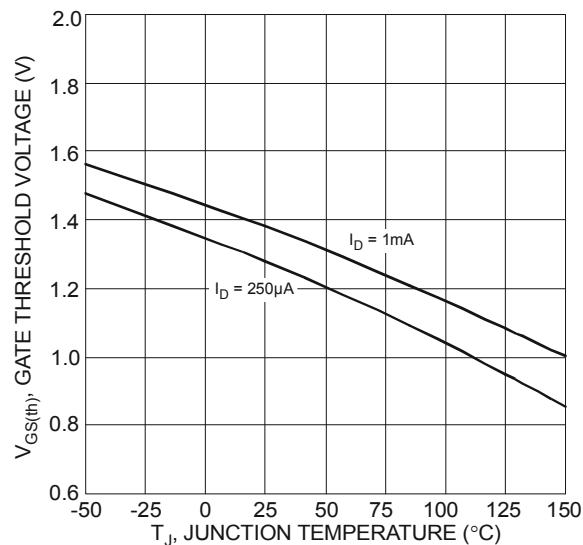


Figure 7 Gate Threshold Variation vs. Ambient Temperature

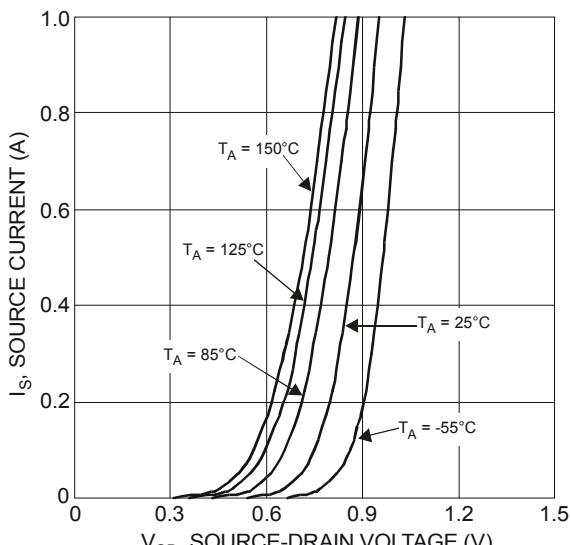


Figure 8 Diode Forward Voltage vs. Current

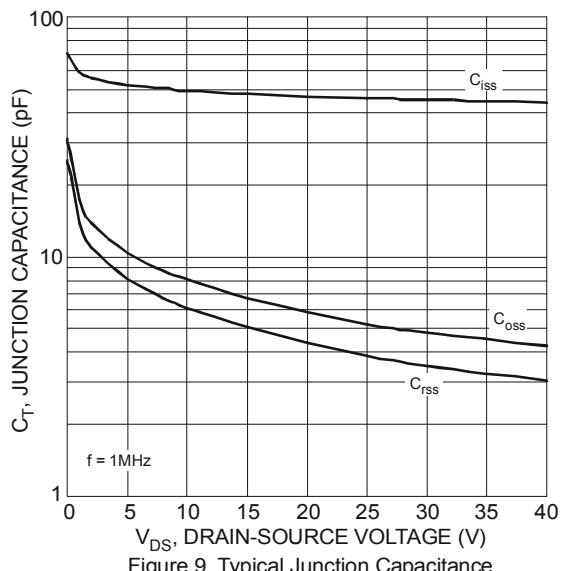


Figure 9 Typical Junction Capacitance

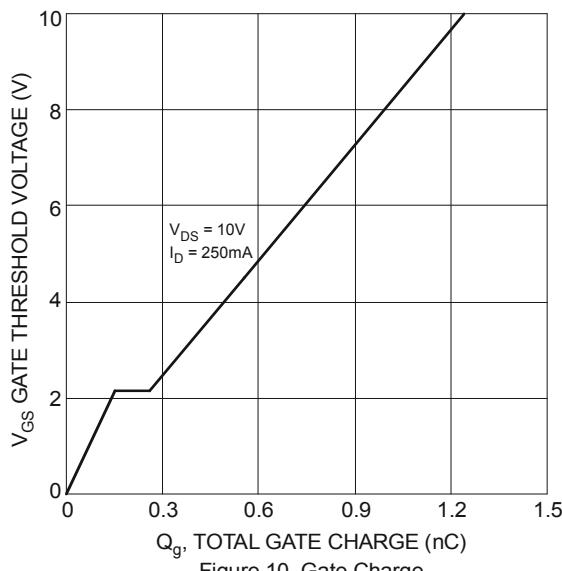
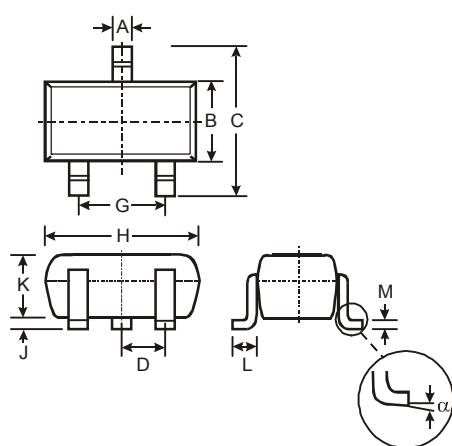


Figure 10 Gate Charge

## Package Outline Dimensions

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

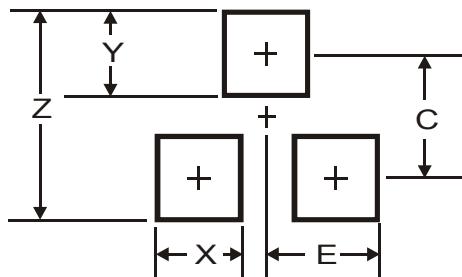


SOT323			
Dim	Min	Max	Typ
A	0.25	0.40	0.30
B	1.15	1.35	1.30
C	2.00	2.20	2.10
D	-	-	0.65
G	1.20	1.40	1.30
H	1.80	2.20	2.15
J	0.0	0.10	0.05
K	0.90	1.00	1.00
L	0.25	0.40	0.30
M	0.10	0.18	0.11
$\alpha$	0°	8°	-

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
X	0.7
Y	0.9
C	1.9
E	1.0

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