



**THE DATASHEET OF  
DMN53D0LW-7**



## Product Summary

BV <sub>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
	3.0Ω @ V <sub>GS</sub> = 5V	250mA

## Description and Applications

This new generation MOSFET has been designed to minimize the on-state resistance (R<sub>DS(ON)</sub>) yet maintain superior switching performance, making it ideal for high-efficiency power-management applications.

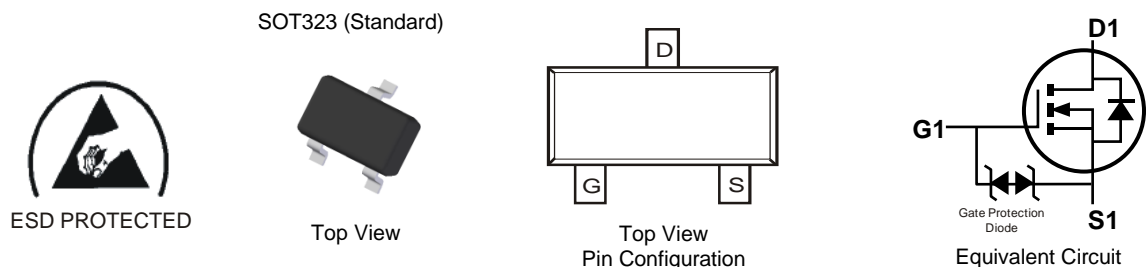
- DC-DC converters
- Power-management functions
- Battery operated systems and solid-state relays
- Drivers: relays, solenoids, lamps, hammers, displays, memories, transistors, etc.

## Features and Benefits

- 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)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. <https://www.diodes.com/quality/product-definitions/>**

## Mechanical Data

- Package: SOT323
- Package 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)

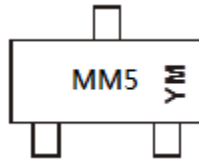


## Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMN53D0LW-7	SOT323 (Standard)	3,000	Tape & Reel
DMN53D0LW-13	SOT323 (Standard)	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



MM5 = Product Type Marking Code  
 YM = Date Code Marking  
 Y or  $\bar{Y}$  = Year (ex: L = 2024)  
 M or  $\bar{M}$  = Month (ex: 9 = September)

### Date Code Key

Year	2013	...	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Code	A	...	L	M	N	P	R	S	T	U	V	W

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	Unit	
Drain-Source Voltage	$V_{DS}$	50	V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V	
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	$I_D$	Steady State $T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	360 250	mA
Continuous Drain Current (Note 6) $V_{GS} = 5\text{V}$		Steady State $T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	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	Unit	
Total Power Dissipation	$P_D$	(Note 5)	320	mW
		(Note 6)	420	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	(Note 5)	395	$^\circ\text{C/W}$
		(Note 6)	301	
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$	

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.

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	50	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1.0	μA	V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V
Gate-Body Leakage	I <sub>GSS</sub>	—	—	±10	μA	V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	0.8	—	1.5	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 100μA
Gate Threshold Voltage Temperature Coefficient (Note 8)	$\frac{\Delta V_{GS(TH)}}{\Delta T_J}$	—	-3.4	—	mV/°C	—
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	0.73	2.0	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 270mA
		—	0.77	3.0		V <sub>GS</sub> = 5V, I <sub>D</sub> = 200mA
Forward Transconductance	g <sub>FS</sub>	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
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iss</sub>	—	45.8	—	pF	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	5.3	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	3.9	—		
Total Gate Charge V <sub>GS</sub> = 10V	Q <sub>g</sub>	—	1.2	—	nC	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 10V, I <sub>D</sub> = 250mA
Total Gate Charge V <sub>GS</sub> = 4.5V	Q <sub>g</sub>	—	0.6	—		
Gate-Source Charge	Q <sub>gs</sub>	—	0.2	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	0.1	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	2.7	—	ns	V <sub>DD</sub> = 30V, V <sub>GS</sub> = 10V, R <sub>G</sub> = 25Ω, I <sub>D</sub> = 200mA
Turn-On Rise Time	t <sub>R</sub>	—	2.5	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	18.9	—		
Turn-Off Fall Time	t <sub>F</sub>	—	11.0	—		

Notes: 7. Short duration pulse test used to minimize self-heating effect.  
8. Guaranteed by design. Not subject to production testing.

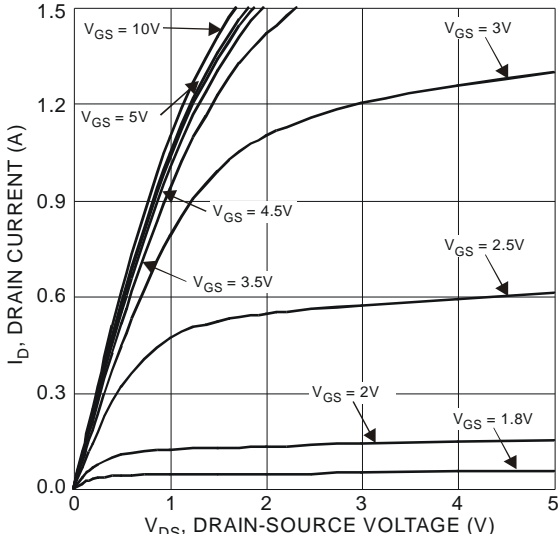


Figure 1 Typical Output Characteristics

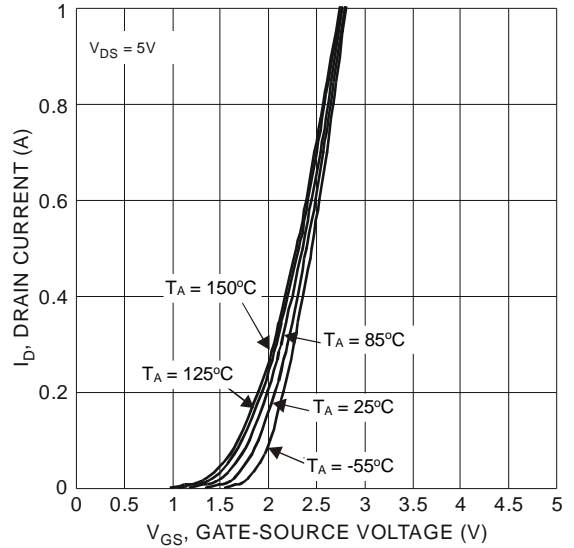


Figure 2 Typical Transfer Characteristics

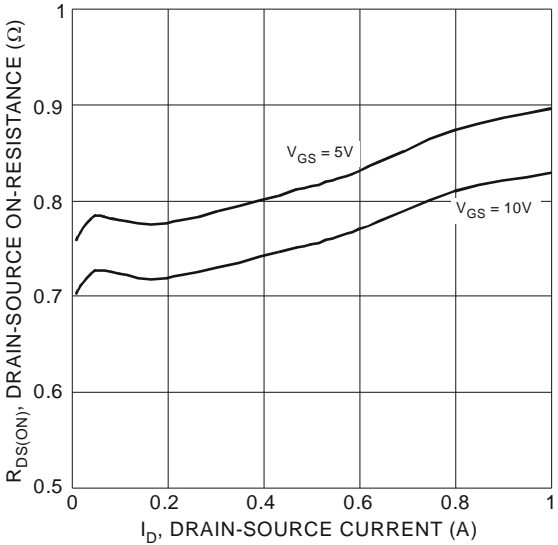


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

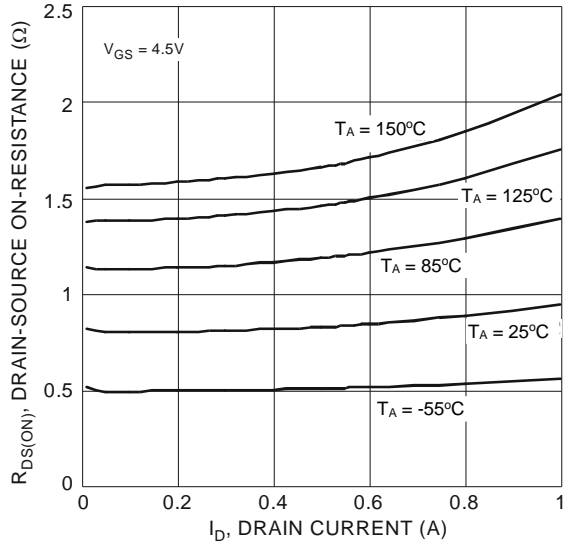


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

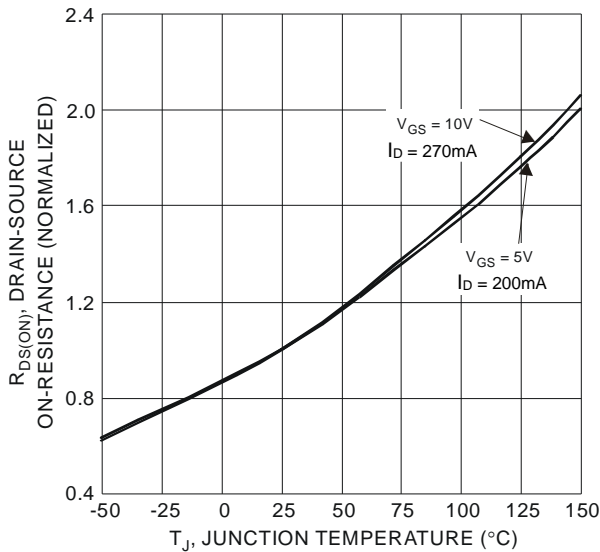


Figure 5 On-Resistance Variation with Temperature

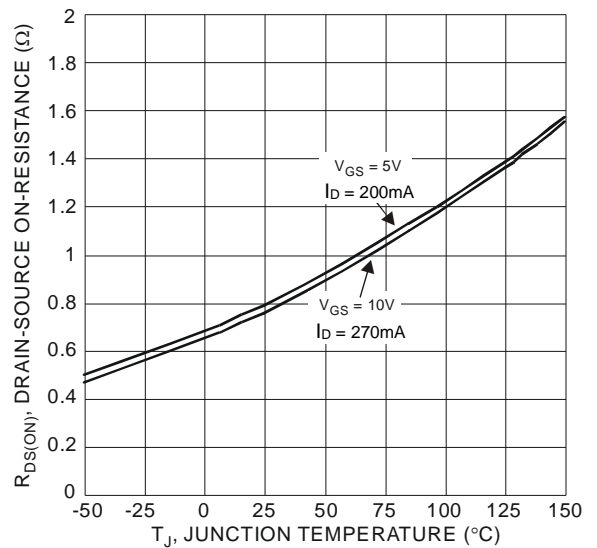


Figure 6 On-Resistance Variation with Temperature

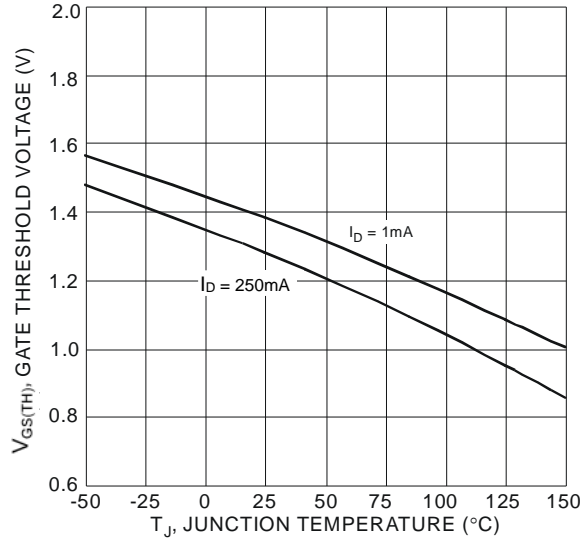


Figure 7 Gate Threshold Variation vs. Junction Temperature

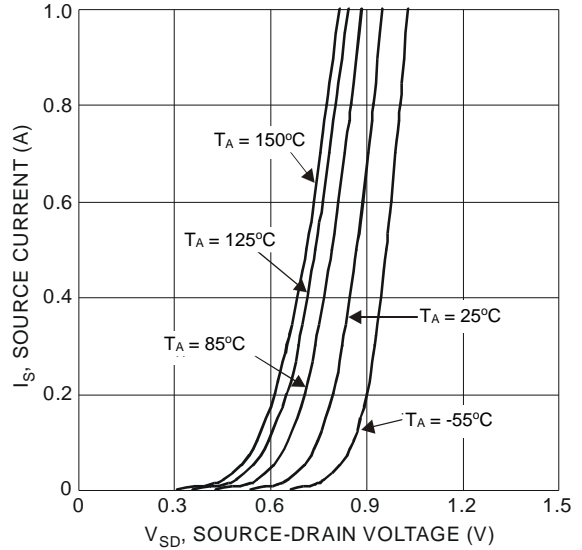


Figure 8 Diode Forward Voltage vs. Current

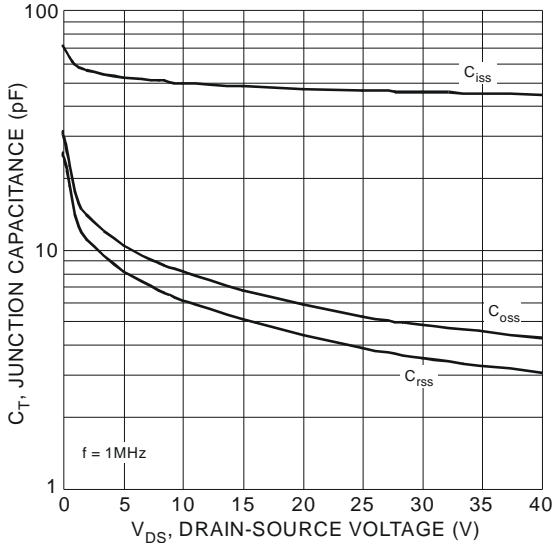


Figure 9 Typical Junction Capacitance

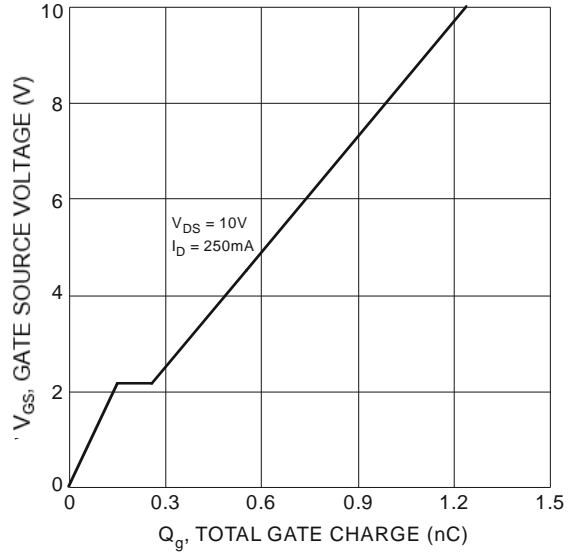


Figure 10 Gate Charge

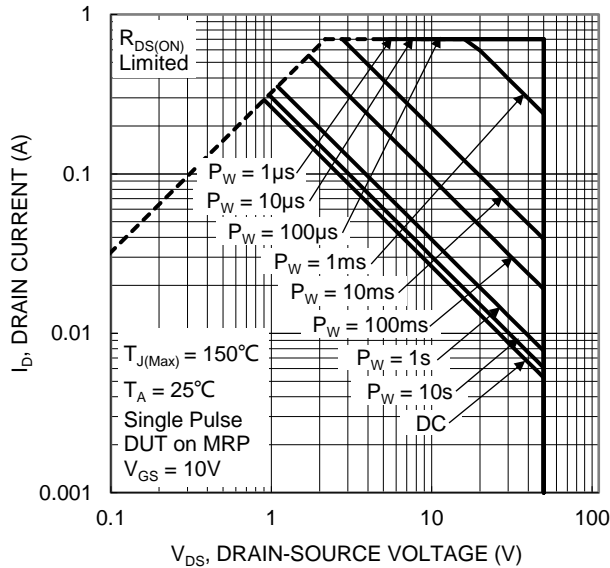
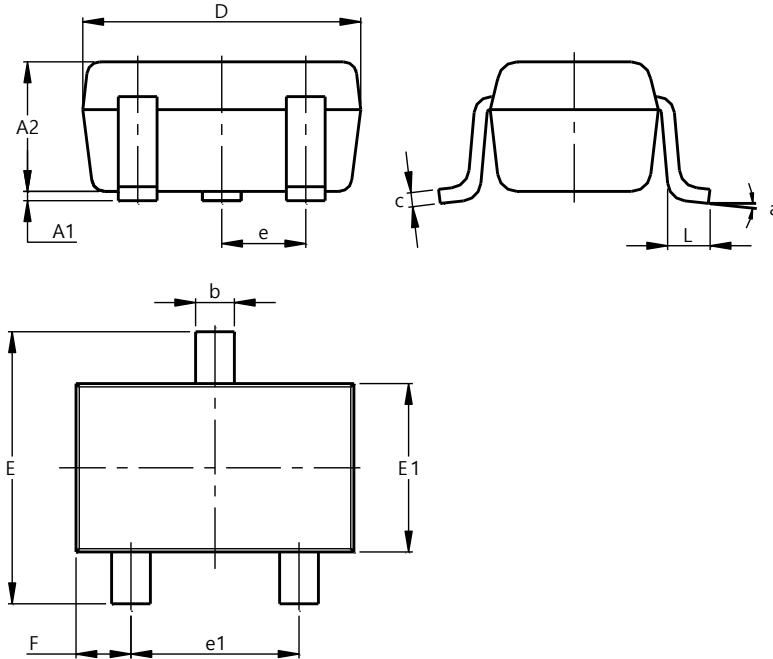


Figure 11 SOA, Safe Operation Area

**Package Outline Dimensions**

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

**SOT323 (Standard)**

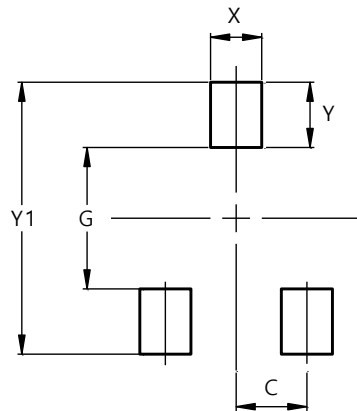


SOT323 (Standard)			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.80	1.00	0.90
b	0.20	0.40	0.30
c	0.08	0.18	0.13
D	1.80	2.20	2.00
E	2.00	2.45	2.225
E1	1.15	1.35	1.25
e	--	--	0.65
e1	1.20	1.40	1.30
F	0.25	0.475	0.3625
L	0.25	0.46	0.355
a	0°	8°	--
<b>All Dimensions in mm</b>			

**Suggested Pad Layout**

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

**SOT323 (Standard)**



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.470
Y	0.600
Y1	2.500

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