

#### N-CHANNEL ENHANCEMENT MODE MOSFET

## **Product Summary**

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> max	I <sub>D</sub> max T <sub>A</sub> = +25°C
60V	2Ω @ V <sub>GS</sub> = 4.5V	340mA
007	2.5Ω @ V <sub>GS</sub> = 2.5V	300mA

## **Description and Applications**

This MOSFET is 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.

- Motor Control
- Power Management Functions
- Backlighting

## **Features and Benefits**

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- 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-Q100/101/200, 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/
- An Automotive-Compliant Part is Available Under Separate Datasheet (<u>DMN62D0UWQ</u>)

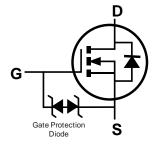
#### **Mechanical Data**

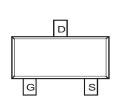
- Case: SOT323
- Case Material: Molded Plastic, "Green" Molding
  Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish Matte Tin Annealed over Alloy 42
  Leadframe. Solderable per MIL-STD-202, Method 208 @3
- Weight: 0.006 grams (Approximate)





SOT323 (Standard)





Top View

**Equivalent Circuit** 

Top View

## Ordering Information (Note 4)

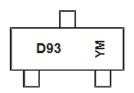
Part Number	Case	Packaging
DMN62D0UW-7	SOT323 (Standard)	3,000/Tape & Reel
DMN62D0UW-13	SOT323 (Standard)	10,000/Tape & Reel

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**



D93= Product Type Marking Code YM = Date Code Marking Y or  $\overline{Y}$  = Year (ex: I = 2021) M or  $\overline{M}$  = Month (ex: 9 = September)

Date Code Key

Year	2016		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Code	D			J	K	L	М	N	0	Р	R	S
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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

Characteristic		Symbol	Value	Unit	
Drain-Source Voltage		$V_{DSS}$	60	V	
Gate-Source Voltage		Vgss	±20	V	
Continuous Drain Current (Note 6) Vos. 451	Steady State	$T_A = +25$ °C $T_A = +70$ °C	I <sub>D</sub>	340 270	mA
Continuous Drain Current (Note 6) Vgs = 4.5V			lo	400 300	mA
Maximum Continuous Body Diode Forward Curren	ls	340	mA		
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%	%) (Note 6	IDM	1.2	Α	

## Thermal Characteristics (@TA = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit	
Total Power Dissipation (Note 5)		PD	320	mW	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	Davi	398	°C/W	
Thermal Resistance, Junction to Ambient (Note 5)	t<5s	RөJA	306	C/VV	
Total Power Dissipation (Note 6)		PD	470	mW	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	Davi	273	°C/W	
Thermal Resistance, Junction to Ambient (Note 6)	t<5s	RθJA	235	C/VV	
Operating and Storage Temperature Range		TJ, TSTG	-55 to +150	°C	

Notes: 5. Device mounted on FR-4 PCB, with minimum recommended pad layout.

6. Device mounted on 1" x 1" FR-4 PCB with high coverage 2oz. Copper, single sided.



# **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	BVDSS	60	_		V	$V_{GS} = 0V, I_{D} = 10\mu A$		
Zero Gate Voltage Drain Current	IDSS	_	_	1.0	μΑ	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V		
Gate-Source Leakage	I <sub>GSS</sub>	_	_	±10	μΑ	$V_{GS} = \pm 20V, V_{DS} = 0V$		
ON CHARACTERISTICS (Note 7)								
Gate Threshold Voltage	V <sub>GS(TH)</sub>	0.5	_	1.0	V	$V_{DS} = 10V, I_{D} = 250\mu A$		
			1.2	2.0		$V_{GS} = 4.5V, I_{D} = 0.1A$		
Static Drain-Source On-Resistance	RDS(ON)		1.4	2.5	Ω	$V_{GS} = 2.5V, I_{D} = 0.05A$		
			1.8	3.0		$V_{GS} = 1.8V, I_D = 0.05A$		
Forward Transconductance	Y <sub>fs</sub>	_	1.8	_	S	V <sub>DS</sub> =10V, I <sub>D</sub> = 0.2A		
Diode Forward Voltage	V <sub>SD</sub>	_	0.8	1.3	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 115mA		
DYNAMIC CHARACTERISTICS (Note 8)	•		•	•				
Input Capacitance	Ciss	_	32	_	pF	.,		
Output Capacitance	Coss	_	3.9	_	pF	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V f = 1.0MHz		
Reverse Transfer Capacitance	Crss	_	2.4	_	pF	1 = 1.0lvin2		
Gate Resistance	Rg	_	101	_	Ω	$f = 1MHz$ , $V_{GS} = 0V$ , $V_{DS} = 0V$		
Total Gate Charge	Qg	_	0.5	_	nC	4.577.77		
Gate-Source Charge	Qgs	_	0.09	_	nC	Vgs = 4.5V, Vps = 10V, Ip = 250mA		
Gate-Drain Charge	Q <sub>gd</sub>	_	0.09	_	nC	1D = 250MA		
Turn-On Delay Time	tD(ON)	_	2.4	_	ns			
Turn-On Rise Time	tR	_	2.5	_	ns	V <sub>DD</sub> = 30V, V <sub>GS</sub> = 10V,		
Turn-Off Delay Time	tD(OFF)	_	22.6	_	ns	$R_G = 25\Omega$ , $I_D = 200mA$		
Turn-Off Fall Time	tF	_	12.5	_	ns			

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



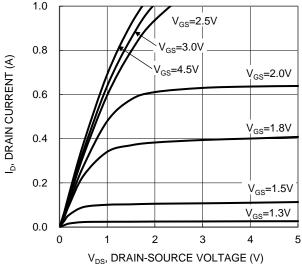


Figure 1. Typical Output Characteristic

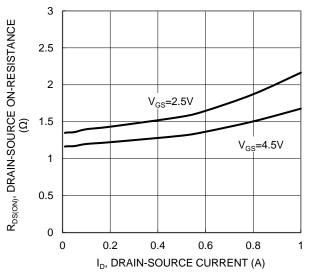


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

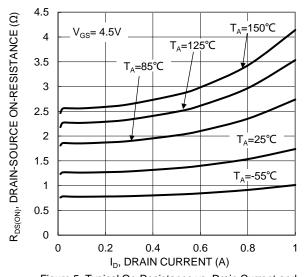
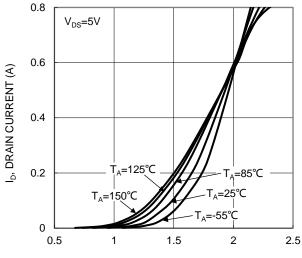


Figure 5. Typical On-Resistance vs. Drain Current and Temperature



V<sub>GS</sub>, GATE-SOURCE VOLTAGE (V) Figure 2. Typical Transfer Characteristic

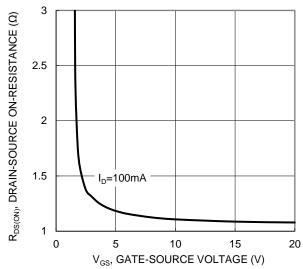


Figure 4. Typical Transfer Characteristic

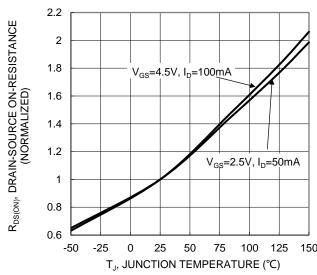


Figure 6. On-Resistance Variation with Junction Temperature



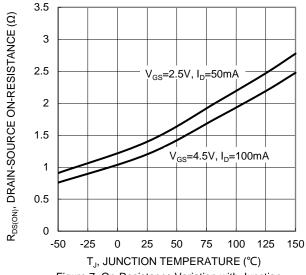


Figure 7. On-Resistance Variation with Junction Temperature

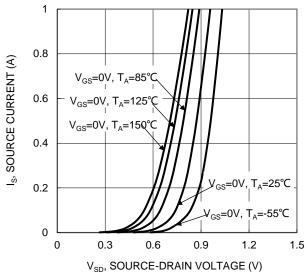


Figure 9. Diode Forward Voltage vs. Current

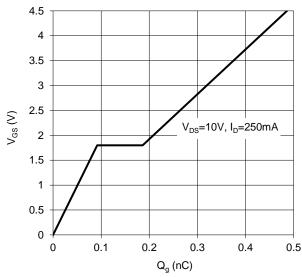


Figure 11. Gate Charge

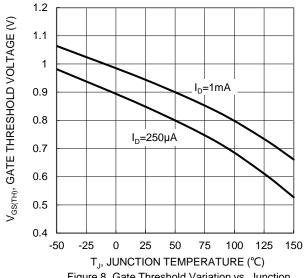
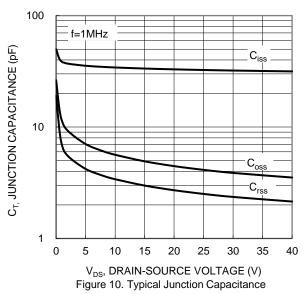


Figure 8. Gate Threshold Variation vs. Junction Temperature



10 R<sub>DS(ON)</sub> LIMITED ,=100µs ID, DRAIN CURRENT (A) 0.1 P<sub>w</sub>=100ms T<sub>J(Max)</sub>=150℃ 0.01 T<sub>A</sub>=25° ℃ £10s Single Pulse DC DUT on 1\*MRP board V<sub>GS</sub>=10V 0.001 0.1 10 100 V<sub>DS</sub>, DRAIN-SOURCE VOLTAGE (V)

Figure 12. SOA, Safe Operation Area



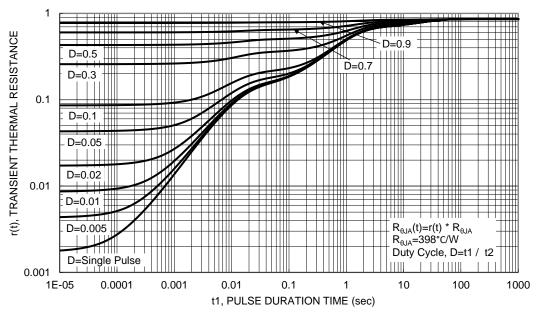


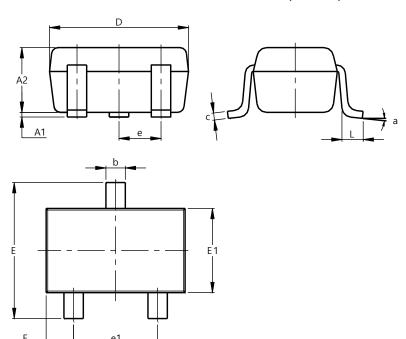
Figure 13. Transient Thermal Resistance



# **Package Outline Dimensions**

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

### SOT323 (Standard)

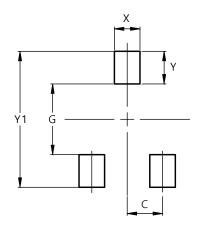


SOT323 (Standard)							
Dim	Min	Max	Тур				
A1	0.00	0.10	0.05				
A2	0.80	1.00	0.90				
b	0.20	0.40	0.30				
С	0.08	0.18	0.13				
D	1.80	2.20	2.00				
Е	2.00	2.45	2.225				
E1	1.15	1.35	1.25				
е	-		0.65				
e1	1.20	1.40	1.30				
F	0.25	0.475	0.3625				
L	0.25	0.46	0.355				
а	0°	8°					
All Dimensions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

# **Suggested Pad Layout**

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

### SOT323 (Standard)



Dimensions	Value
Dilliensions	(in mm)
С	0.650
G	1.300
Х	0.470
Y	0.600
Y1	2.500



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