



DMN6140L

60V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

V _{(BR)DSS}	R _{DS(on) max}	I _D T _A = +25°C
60V	$140 \text{m}\Omega$ @ $V_{GS} = 10 \text{V}$	2.3A
60 V	170mΩ @ $V_{GS} = 4.5V$	2.1A

Description

This new generation MOSFET is 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
- Analog Switch

Features and Benefits

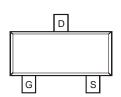
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

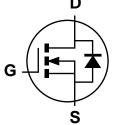
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound;
 UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish Matte Tin Annealed over Copper Leadframe.
 Solderable per MIL-STD-202, Method 208 @3
- Weight: 0.0072 grams (Approximate)







Pin Configuration



Equivalent Circuit

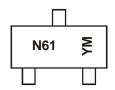
Ordering Information (Note 4)

Part Number	Case	Packaging
DMN6140L-7	SOT23	3,000/Tape & Reel
DMN6140L-13	SOT23	10,000/Tape & Reel

Notes:

- 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- 2. 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



N61 = Marking Code YM = Date Code Marking Y = Year (ex: Y = 2011) M = Month (ex: 9 = September)

Date Code Key

Year	201	1	2012		2013	20	14	2015		2016	2	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 (@ $T_A = +25$ °C, unless otherwise specified.)

Characteristic		Symbol	Value	Units	
Drain-Source Voltage		V _{DSS}	60	V	
Gate-Source Voltage			V _{GSS}	±20	V
		$T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$	I _D	1.6 1.2	А
Continuous Drain Current (Note 5) V _{GS} = 10V	t<10s	$T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$	I _D	2.0 1.6	А
State $T_{\Lambda} = +70^{\circ}$ C		$T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$	I _D	2.3 1.8	А
Continuous Drain Current (Note 6) V _{GS} = 10V	t<10s	$T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$	I _D	2.9 2.3	А
Maximum Continuous Body Diode Forward Current	I _S	1.5	Α		
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I _{DM}	10	Α

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

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	$T_A = +25^{\circ}C$	р	0.7	W
Total Power Dissipation (Note 5)	$T_A = +70^{\circ}C$	P_{D}	0.4	VV
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	В	183	°C/W
Thermal Resistance, Junction to Ambient (Note 3)	t<10s	$R_{\theta JA}$	115	C/VV
Total Power Dissipation (Note 6)	$T_A = +25^{\circ}C$	D	1.3	W
Total Power Dissipation (Note 6)	$T_A = +70^{\circ}C$	P_D	0.8	VV
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	D	94	
Thermal Resistance, Junction to Ambient (Note 6)	t<10s	$R_{\theta JA}$	61	°C/W
Thermal Resistance, Junction to Case		$R_{ heta JC}$	39	
Operating and Storage Temperature Range		$T_{J_1}T_{STG}$	-55 to +150	°C

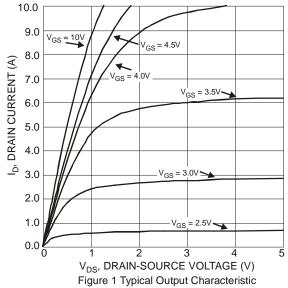
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

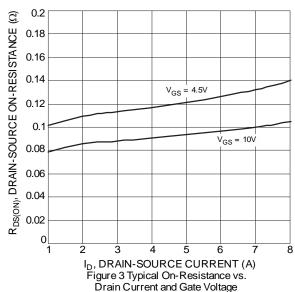
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition		
OFF CHARACTERISTICS (Note 7)								
Drain-Source Breakdown Voltage	BV _{DSS}	60	_	_	V	$V_{GS} = 0V, I_D = 250\mu A$		
Zero Gate Voltage Drain Current	I _{DSS}		_	1	μΑ	$V_{DS} = 60V, V_{GS} = 0V$		
Gate-Source Leakage	I _{GSS}	_	_	±100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$		
ON CHARACTERISTICS (Note 7)								
Gate Threshold Voltage	V _{GS(th)}	1		3	V	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$		
Static Drain-Source On-Resistance			92	140	mΩ	$V_{GS} = 10V, I_D = 1.8A$		
Static Drain-Source On-Resistance	R _{DS(ON)}		115	170	11122	$V_{GS} = 4.5V, I_D = 1.3A$		
Forward Transfer Admittance	Y _{fs}	_	2.2	_	S	$V_{DS} = 15V, I_{D} = 1.8A$		
Diode Forward Voltage	V_{SD}	_	0.75	1.0	V	$V_{GS} = 0V, I_{S} = 0.45A$		
DYNAMIC CHARACTERISTICS (Note 8)								
Input Capacitance	C _{iss}	_	315	_		V _{DS} = 40V, V _{GS} = 0V f = 1.0MHz		
Output Capacitance	Coss	-	18	_	pF			
Reverse Transfer Capacitance	C _{rss}	_	16	_				
Gate Resistnace	R_g	_	0.65	_	Ω	$V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz$		
Total Gate Charge (V _{GS} = 10V)	Qg	_	8.6			V _{DS} = 30V, I _D = 1.8A		
Total Gate Charge (V _{GS} = 5V)	Qg	_	4.1	_	nC			
Gate-Source Charge	Q _{gs}		1.0		IIC			
Gate-Drain Charge	Q_{gd}	_	1.7	_				
Turn-On Delay Time	t _{D(on)}		2.6					
Turn-On Rise Time	tr	_	3.6	_		$V_{DS} = 30V, V_{GS} = 10V,$ $R_G = 6.0\Omega, I_D = 1.8A$		
Turn-Off Delay Time	t _{D(off)}	_	16.3	_	ns			
Turn-Off Fall Time	t _f	_	2.7	_				
Reverse Recovery Time	t _{rr}	_	16.8	_	ns	1 4 0 4 - 11/-14 4 4 0 0 0 4 / 1 - 2		
Reverse Recovery Charge	Q _{rr}	_	9.0	_	- nC I _F = 1.8A, di/dt =100A/μs			

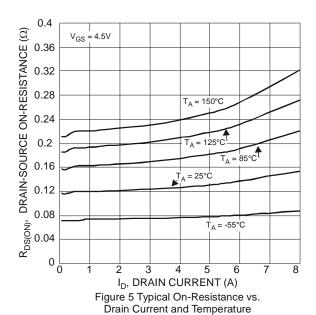
Notes

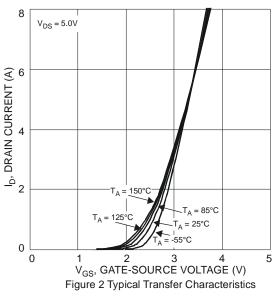
- 5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
- 6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1in. square copper plate.
- 7 .Short duration pulse test used to minimize self-heating effect.
- 8. Guaranteed by design.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

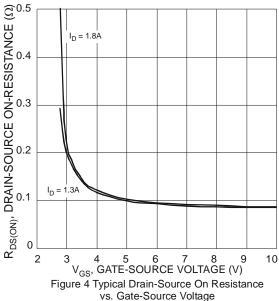












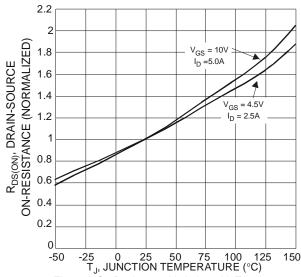
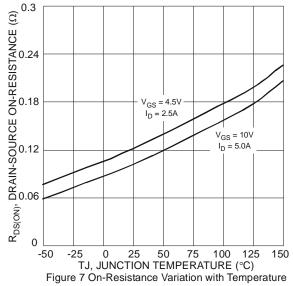
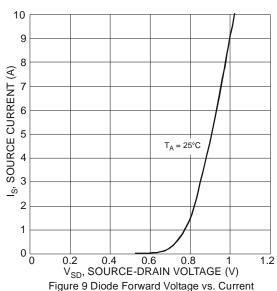
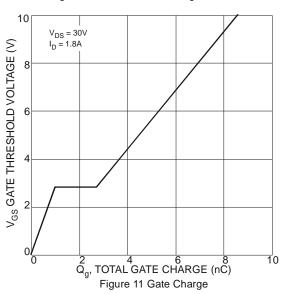


Figure 6 On-Resistance Variation with Temperature









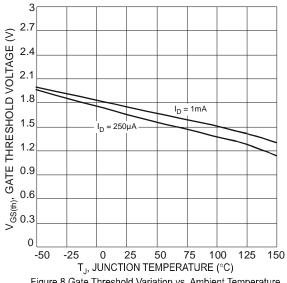
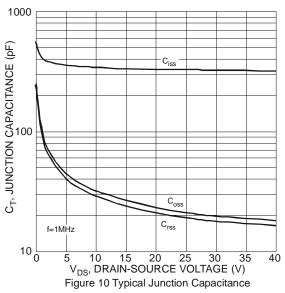
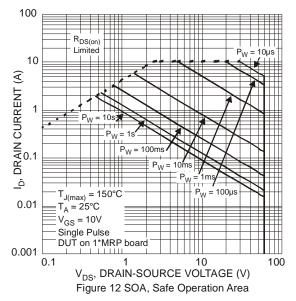
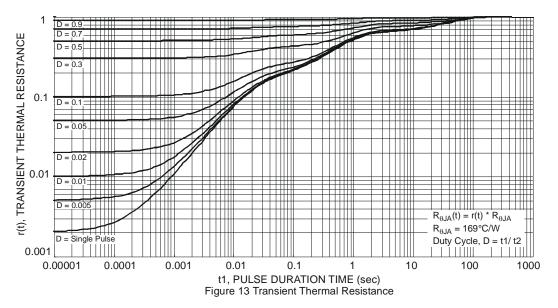


Figure 8 Gate Threshold Variation vs. Ambient Temperature



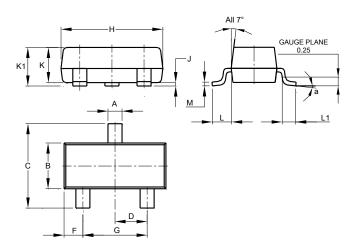






Package Outline Dimensions

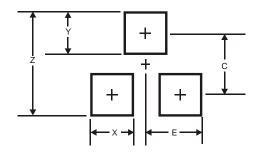
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



SOT23							
Dim	Min	Max	Тур				
Α	0.37	0.51	0.40				
В	1.20	1.40	1.30				
С	2.30	2.50	2.40				
D	0.89	1.03	0.915				
F	0.45	0.60	0.535				
G	1.78	2.05	1.83				
Н	2.80	3.00	2.90				
7	0.013	0.10	0.05				
K	0.890	1.00	0.975				
K1	0.903	1.10	1.025				
٦	0.45	0.61	0.55				
L1	0.25	0.55	0.40				
М	0.085	0.150	0.110				
α	α 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	2.9
Х	0.8
Υ	0.9
С	2.0
E	1.35



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