

**N-CHANNEL ENHANCEMENT MODE MOSFET**

### Features

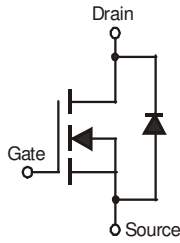
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

### Mechanical Data

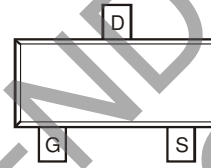
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Terminals Connections: See Diagram Below
- Weight: 0.008 grams (Approximate)



Top View



Internal Schematic



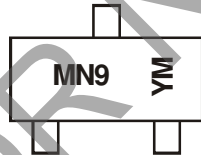
Top View

### Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2041L-7	SOT23	3000/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



MN9 = Product Type Marking Code  
 YM or YM = Date Code Marking for SAT  
 Y or Y = Year (ex: A = 2013)  
 M = Month (ex: 9 = September)

#### Date Code Key

Year	2009	2010	2011	2012	2013	2014	2015					
Code	W	X	Y	Z	A	B	C					
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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	20	V
Gate-Source Voltage			V <sub>GSS</sub>	±12	V
Continuous Drain Current (Note 5)	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	6.4	A
		T <sub>A</sub> = +70°C		4.5	
Pulsed Drain Current (Note 6)			I <sub>DM</sub>	30	A

### Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	0.78	W
Thermal Resistance, Junction to Ambient @ T <sub>A</sub> = +25°C	R <sub>θJA</sub>	161	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

Notes: 5. Device mounted on FR-4 PCB with minimum recommended pad layout.  
6. Repetitive rating, pulse width limited by junction temperature.

### 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>	20	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>	—	—	1.0	μA	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	0.5	—	1.2	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	20	28	mΩ	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 6.0A
		—	26	41		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 5.2A
Forward Transfer Admittance	Y <sub>fs</sub>	—	6	—	S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 6A
Diode Forward Voltage	V <sub>SD</sub>	—	0.7	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1.7A
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iss</sub>	—	550	—	pF	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	88	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	81	—		
Gate Resistance	R <sub>g</sub>	—	1.34	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (10V)	Q <sub>g</sub>	—	15.6	—	nC	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 10V, I <sub>D</sub> = 6A
Total Gate Charge (4.5V)	Q <sub>g</sub>	—	7.2	—	nC	V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 10V, I <sub>D</sub> = 6A
Gate-Source Charge	Q <sub>gs</sub>	—	1.0	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	1.9	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	4.69	—	ns	V <sub>DD</sub> = 10V, V <sub>GEN</sub> = 4.5V, R <sub>GEN</sub> = 1Ω, I <sub>D</sub> = 6.7A
Turn-On Rise Time	t <sub>r</sub>	—	13.19	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	22.10	—		
Turn-Off Fall Time	t <sub>f</sub>	—	6.43	—		

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

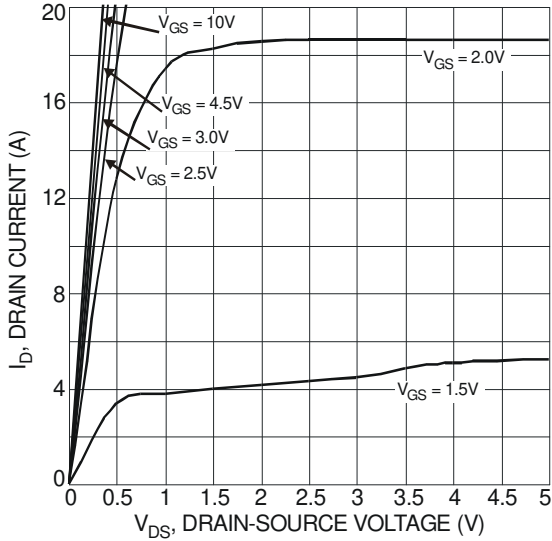


Fig. 1 Typical Output Characteristic

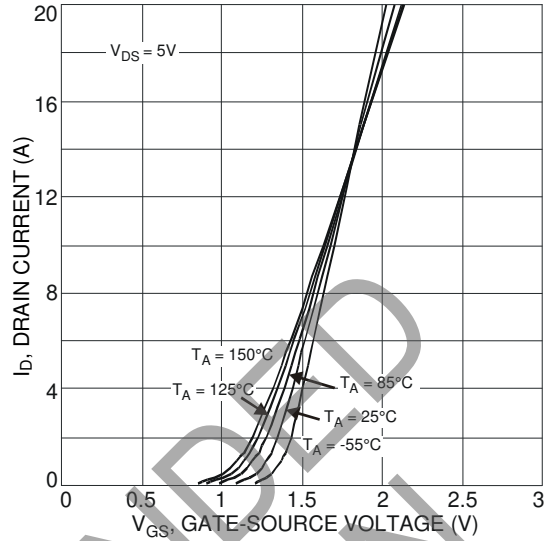


Fig. 2 Typical Transfer Characteristic

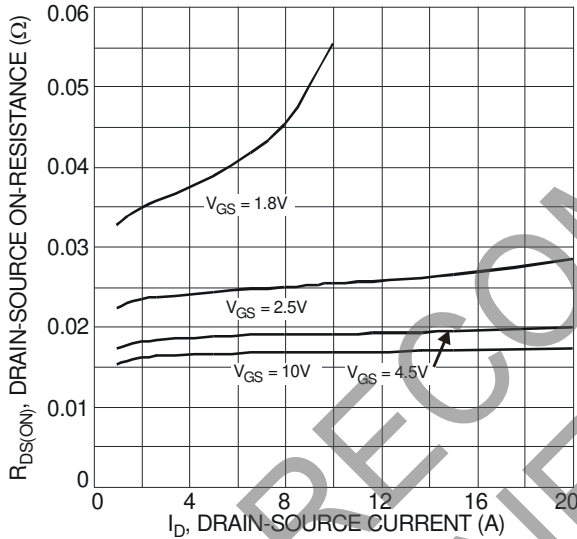


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

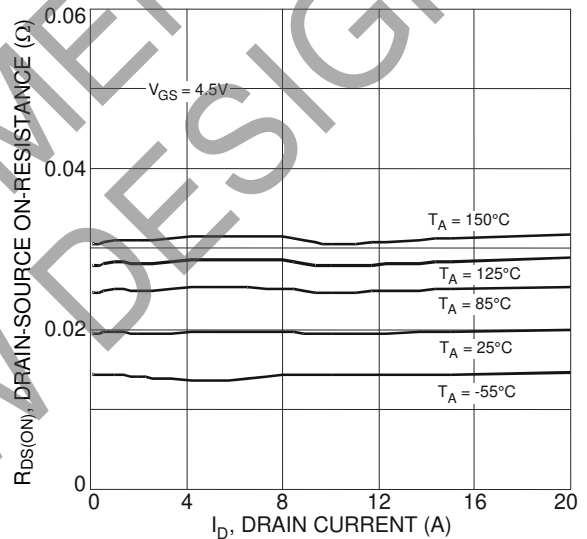


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

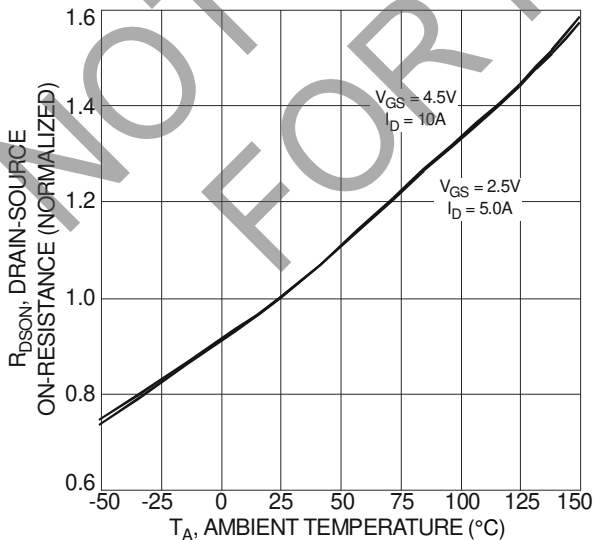


Fig. 5 On-Resistance Variation with Temperature

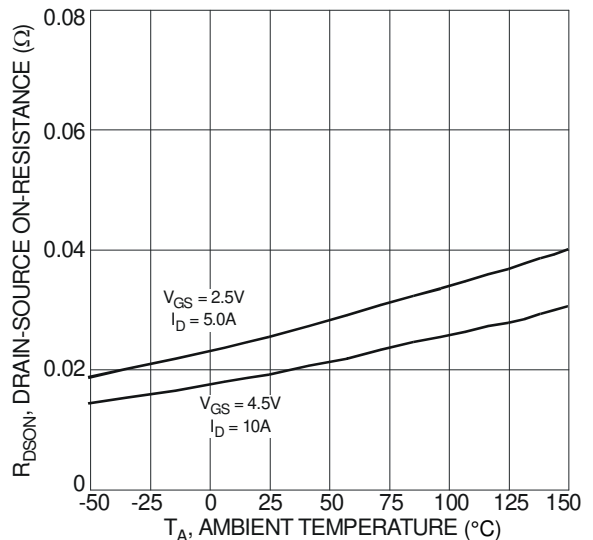


Fig. 6 On-Resistance Variation with Temperature

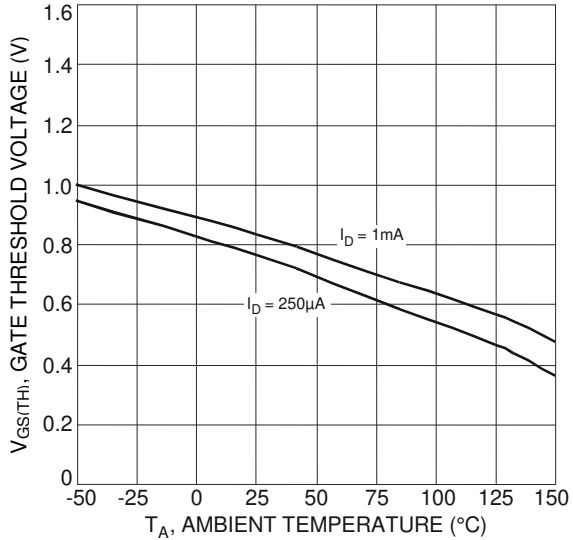


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

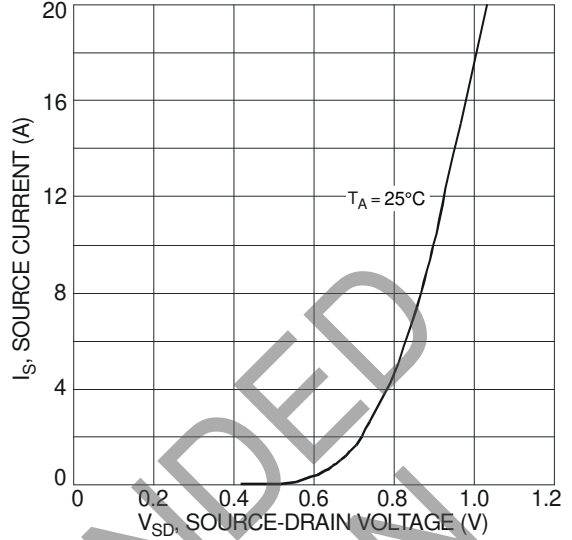


Fig. 8 Diode Forward Voltage vs. Current

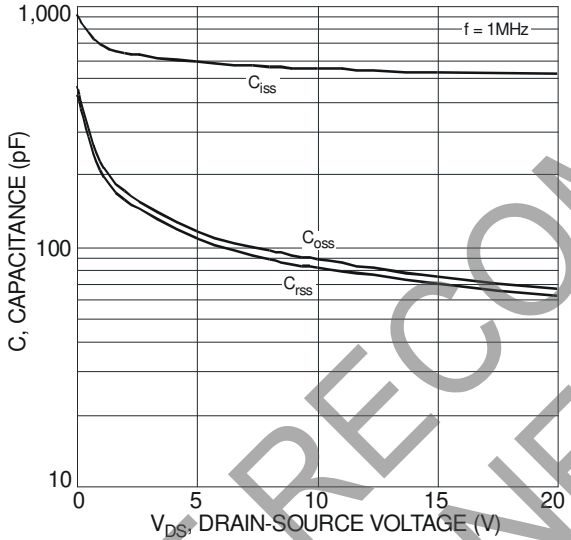


Fig. 9 Typical Total Capacitance

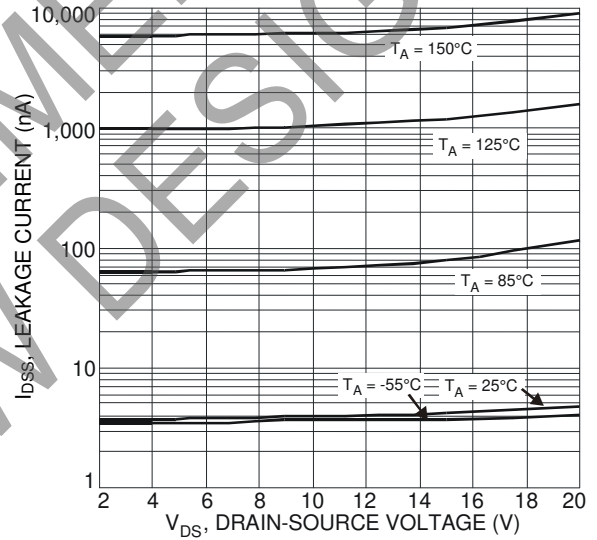


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

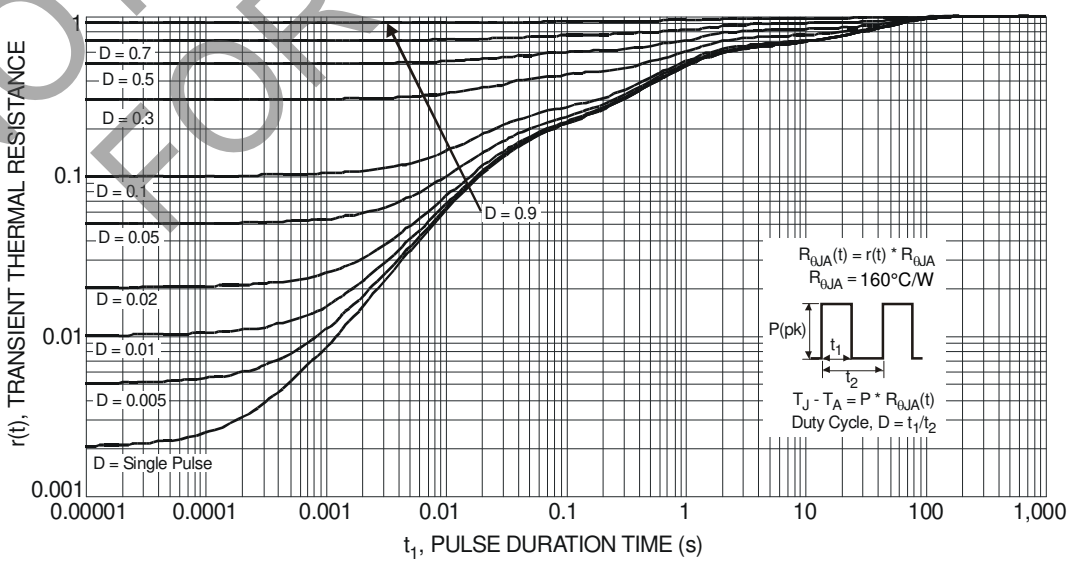
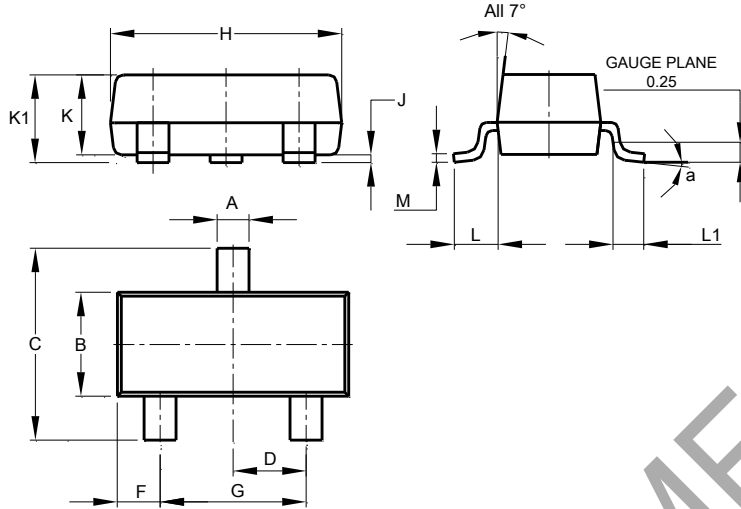


Fig. 11 Transient Thermal Response

**Package Outline Dimensions**

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

**SOT23**

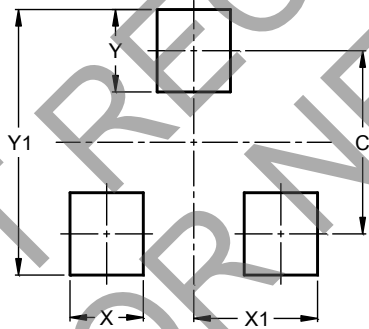


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

**Suggested Pad Layout**

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

**SOT23**



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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