N-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	I_D T_A = +25°C
20V	10Ω @ V_{GS} = 4.5V	0.5A
	14Ω @ V_{GS} = 2.5V	0.5A
	25Ω @ V_{GS} = 1.5V	0.1A

Features

- Low On-Resistance
- **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**

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.

Mechanical Data

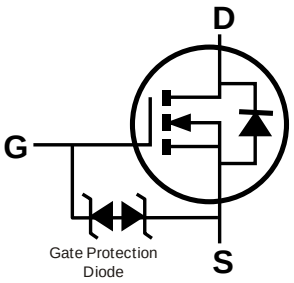
- Case: SC59
- Case Material - Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Finish Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Marking Information: See Page 3
- Ordering & Date Code Information: See Page 3
- Weight: 0.014 grams (approximate)

Applications

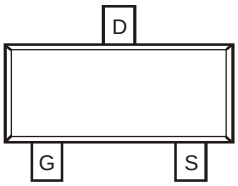
- Notebook Computer
- Portable Phone
- PCMCIA Cards and Battery Powered Circuits

SC59

TOP VIEW



EQUIVALENT CIRCUIT



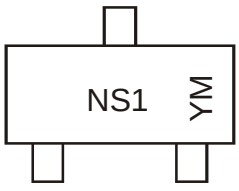
TOP VIEW
Pin Out Configuration

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2112SN-7	SC59	3000/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



Date Code Key

Year	2007	2008	2009	…	2012	2013	2014	2015	2016	2017	2018
Code	U	V	W	…	Z	A	B	C	D	E	F

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°C unless otherwise specified)

Characteristic		Symbol	Value	Units
Drain-Source Voltage		V_{DSS}	20	V
Gate-Source Voltage	Continuous	V_{GSS}	± 8	V
Drain Current	Continuous Pulsed	I_D	1.2 4.0	A

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

Characteristic	Symbol	Value	Units
Total Power Dissipation	P_d	500	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	250	°C /W
Operating and Storage Temperature Range	T_j, T_{STG}	-55 to +150	°C

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

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 5)							
Drain-Source Breakdown Voltage		BV_{DSS}	20	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current	@ T_j = +25°C	I_{DSS}	—	—	10	µA	V_{DS} = 20V, V_{GS} = 0V
Gate-Body Leakage		I_{GSS}	—	—	± 10	µA	V_{GS} = ± 8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 5)							
Gate Threshold Voltage		$V_{GS(th)}$	0.5	—	1.2	V	V_{DS} = 10V, I_D = 1.0mA
Static Drain-Source On-Resistance		$R_{DS\ (ON)}$	—	—	0.10 0.14 0.25	Ω	V_{GS} = 4.5V, I_D = 0.5A V_{GS} = 2.5V, I_D = 0.5A V_{GS} = 1.5V, I_D = 0.1A
Forward Transfer Admittance		$\|Y_{fs}\|$	—	4.2	—	S	V_{DS} = 10V, I_D =0.5A
Diode Forward Voltage		V_{SD}	—	0.8	1.1	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 6)							
Input Capacitance		C_{iss}	—	220	—	pF	V_{DS} = 10V, V_{GS} = 0V f = 1.0MHz
Output Capacitance		C_{oss}	—	120	—	pF	
Reverse Transfer Capacitance		C_{rss}	—	45	—	pF	
SWITCHING CHARACTERISTICS (Note 6)							
Turn-On Delay Time		$t_{D(ON)}$	—	10	—	ns	V_{DD} = 5V, I_D = 0.5A, V_{GS} = 10V, R_{GEN} = 50Ω
Turn-Off Delay Time		$t_{D(OFF)}$	—	75	—	ns	
Turn-On Rise Time		t_r	—	15	—	ns	
Turn-Off Fall Time		t_f	—	65	—	ns	

Notes: 5. Short duration pulse test used to minimize self-heating effect.
6. Guaranteed by design. Not subject to product testing.

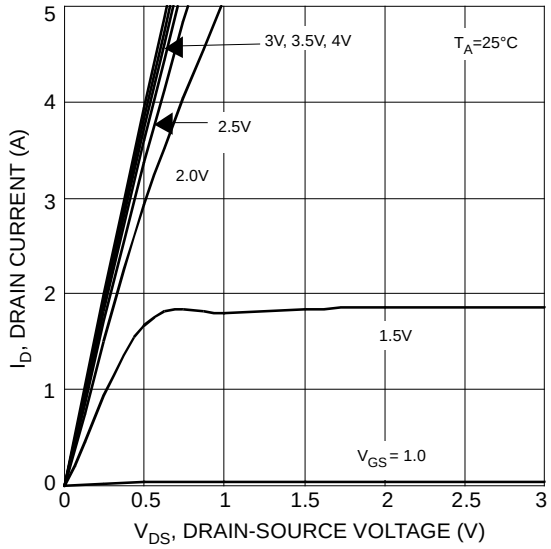


Fig. 1 Typical Output Characteristics

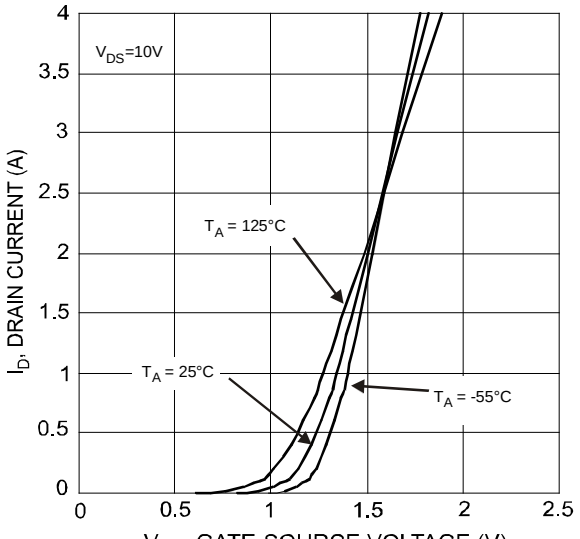


Fig. 2 Typical Transfer Characteristics

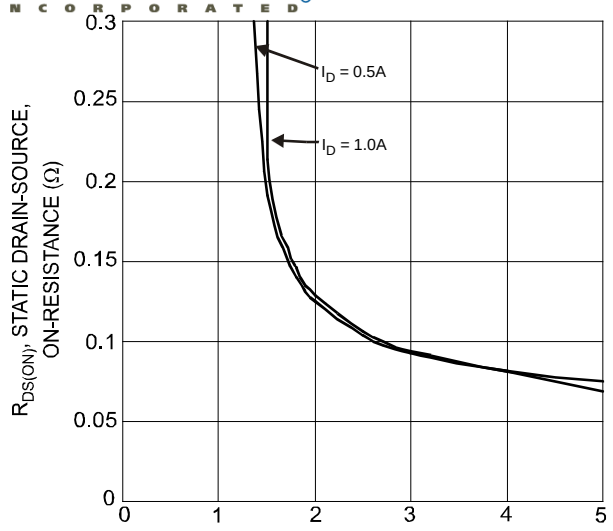


Fig. 3 On-Resistance vs. Gate Voltage

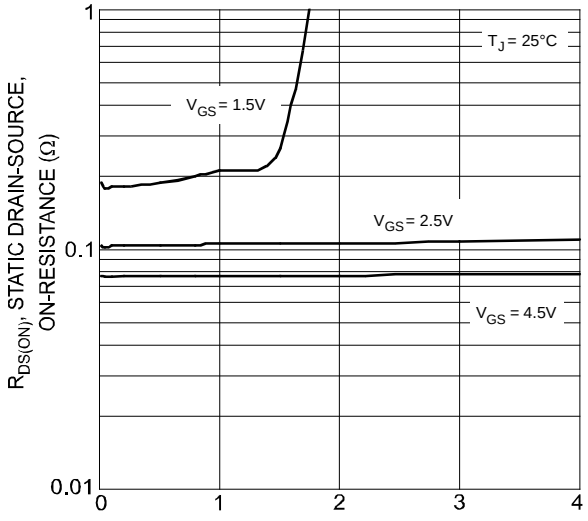


Fig. 4 On-Resistance vs. Drain Current

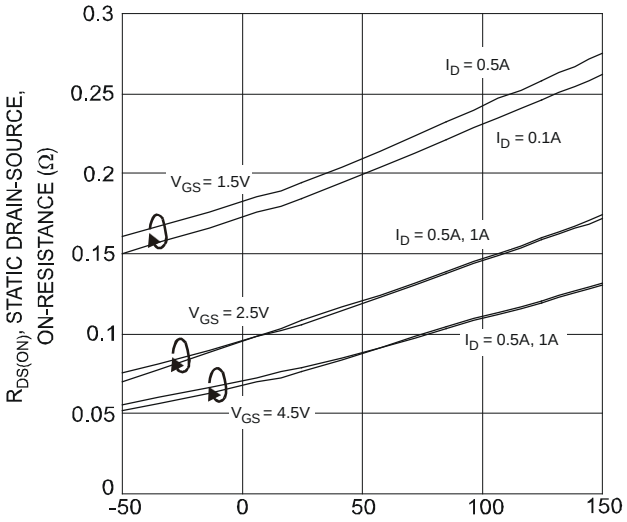


Fig. 5 On-Resistance Variation with Temperature

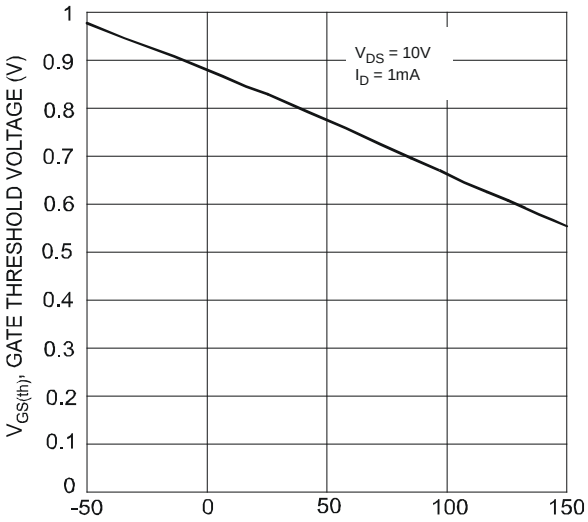


Fig. 6 Gate Threshold Voltage vs. Temperature

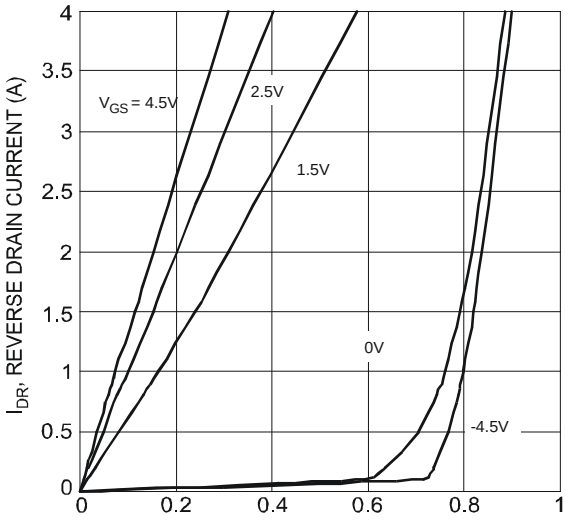


Fig. 7 Reverse Drain Current vs. Source-Drain Voltage

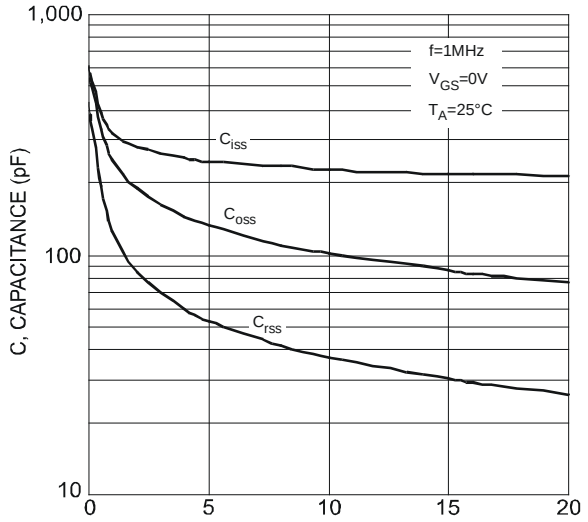
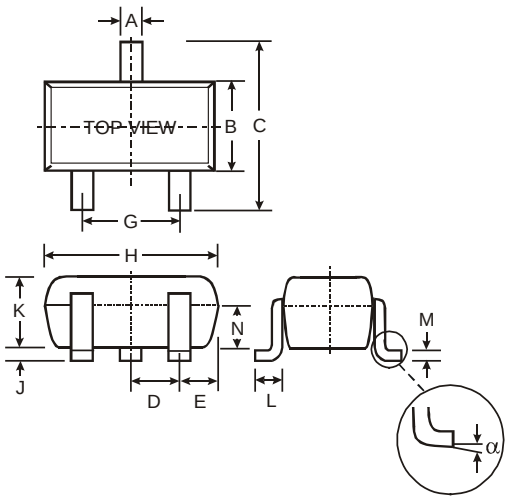


Fig. 8 Typical Junction Capacitance

Package Outline Dimensions

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



SC59		
Dim	**Min**	**Max**
A	0.35	0.50
B	1.50	1.70
C	2.70	3.00
D	0.95	
E	—	—
G	1.90	
H	2.90	3.10
J	0.013	0.10
K	1.00	1.30
L	0.35	0.55
M	0.10	0.20
N	0.70	0.80
α	0°	8°
All Dimensions in mm		

Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for latest version.

Dimensions	Value (in mm)
Z	4.0
G	1.2
X	0.9
Y	1.4
C	2.6
E	0.95

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