

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON) MAX}$	Package	I_D $T_A = +25^\circ C$
30V	40m Ω @ $V_{GS} = 10V$	SC59	5.1A
	50m Ω @ $V_{GS} = 4.5V$		4.3A

Description

This new generation MOSFET has been 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

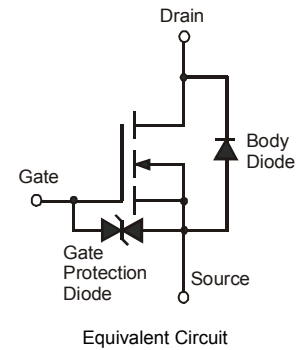
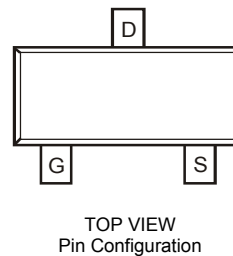
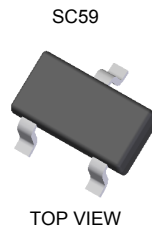
- Load Switch
- DC-DC Converters
- Power Management Functions

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

Mechanical Data

- Case: SC59
- Case Material – Molded Plastic. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Solderable per MIL-STD-202, Method 208 e3
- Terminal Connections: See Diagram
- Weight: 0.014 grams (approximate)

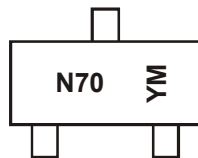


Ordering Information (Note 4)

Part Number	Case	Packaging
DMN3070SSN-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



N70 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year ex: Z = 2012
 M = Month ex: 9 = September

Date Code Key

Year	2010	2011	2012	2013	2014	2015	2016	2017
Code	X	Y	Z	A	B	C	D	E

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	Units
Drain-Source Voltage			V_{DSS}	30	V
Gate-Source Voltage			V_{GSS}	± 20	V
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	4.2 3.3	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	5.1 4	A
Continuous Drain Current (Note 6) $V_{GS} = 4.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	3.7 2.8	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	4.3 3.3	A
Pulsed Drain Current (10 μs pulse, duty cycle = 1%)			I_{DM}	60	A
Maximum Body Diode Forward Current (Note 6)			I_S	2	A

Thermal Characteristics

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$	P_D	0.78	W
	$T_A = +70^\circ\text{C}$		0.5	
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	$R_{\theta JA}$	160	$^\circ\text{C/W}$
	$t < 10\text{s}$		115	$^\circ\text{C/W}$
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	P_D	1.3	W
	$T_A = +70^\circ\text{C}$		0.8	
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	$R_{\theta JA}$	96	$^\circ\text{C/W}$
	$t < 10\text{s}$		68	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	18	$^\circ\text{C/W}$
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 24\text{V}, V_{GS} = 0\text{V}$
Gate-Body Leakage	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	1.1	—	2.1	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	24	40	m Ω	$V_{GS} = 10\text{V}, I_D = 4.2\text{A}$
		—	30	50		$V_{GS} = 4.5\text{V}, I_D = 2\text{A}$
Forward Transfer Admittance	$ Y_{fs} $	—	2.7	—	S	$V_{DS} = 5\text{V}, I_D = 4.2\text{A}$
Diode Forward Voltage	V_{SD}	—	0.75	1.0	V	$V_{GS} = 0\text{V}, I_S = 1\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	697	—	pF	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	97	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	67	—	pF	
Gate Resistance	R_g	—	1.47	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	Q_g	—	6	—	nC	
Total Gate Charge ($V_{GS} = 10\text{V}$)	Q_g	—	13.2	—		
Gate-Source Charge	Q_{gs}	—	2.2	—		
Gate-Drain Charge	Q_{gd}	—	1.8	—		
Turn-On Delay Time	$t_{D(ON)}$	—	4.3	—	ns	$V_{DD} = 15\text{V}, V_{GEN} = 10\text{V}, R_{GEN} = 6\Omega,$ $R_L = 15\Omega$
Turn-Off Delay Time	$t_{D(OFF)}$	—	4.4	—	ns	
Turn-On Rise Time	t_r	—	20.1	—	ns	
Turn-Off Fall Time	t_f	—	4.1	—	ns	
Reverse Recovery Time	t_{rr}	—	7.3	—	Ns	
Reverse Recovery Charge	Q_{rr}	—	7.9	—	nC	$I_F = 9\text{A}, di/dt = 500\text{A}/\mu\text{s}$

- Notes:
- Device mounted on FR-4 PCB with minimum recommended pad layout, single sided. The power dissipation P_D is based on $t < 10\text{s}$ $R_{\theta JA}$.
 - Device mounted on 1" x 1" FR-4 PCB with high coverage 2 oz. Copper, single sided. The power dissipation P_D is based on $t < 10\text{s}$ $R_{\theta JA}$.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

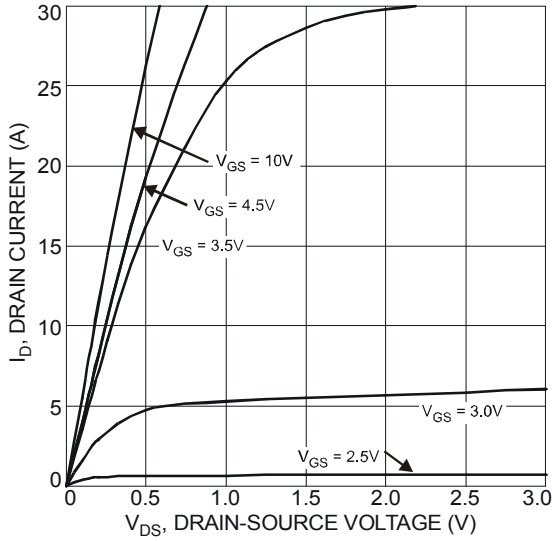


Figure 1 Typical Output Characteristic

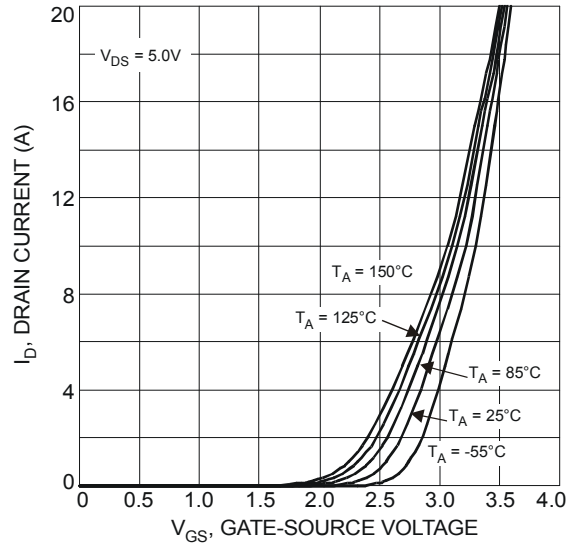


Figure 2 Typical Transfer Characteristics

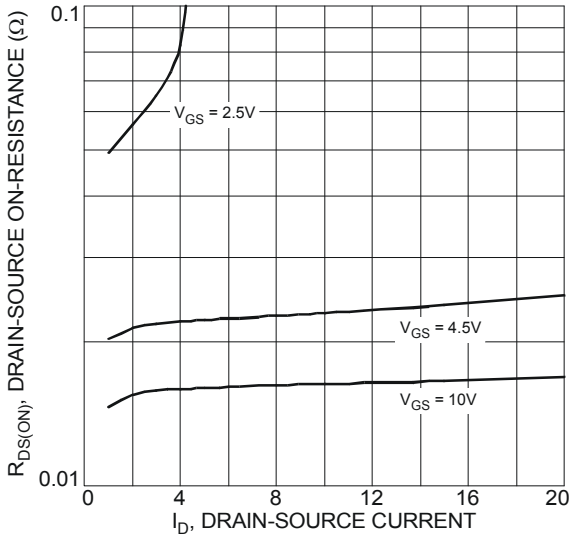


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

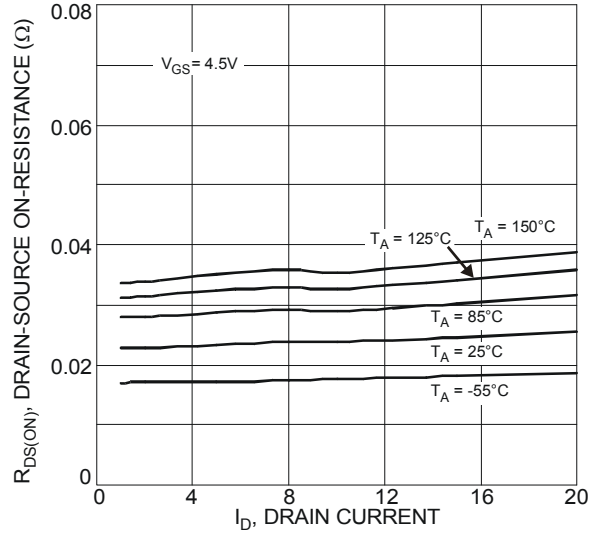


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

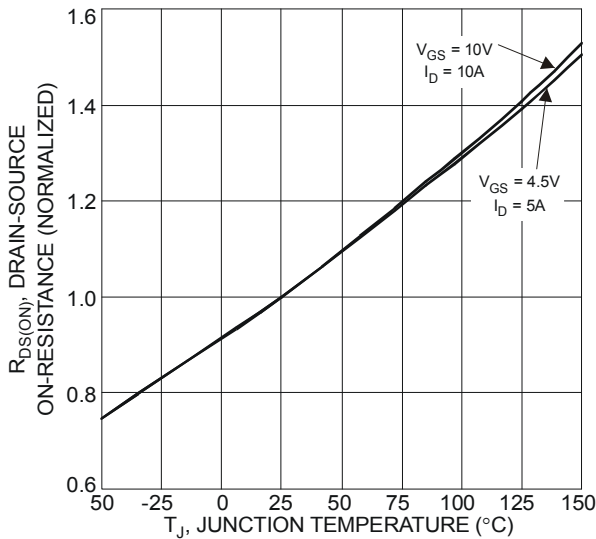


Figure 5 On-Resistance Variation with Temperature

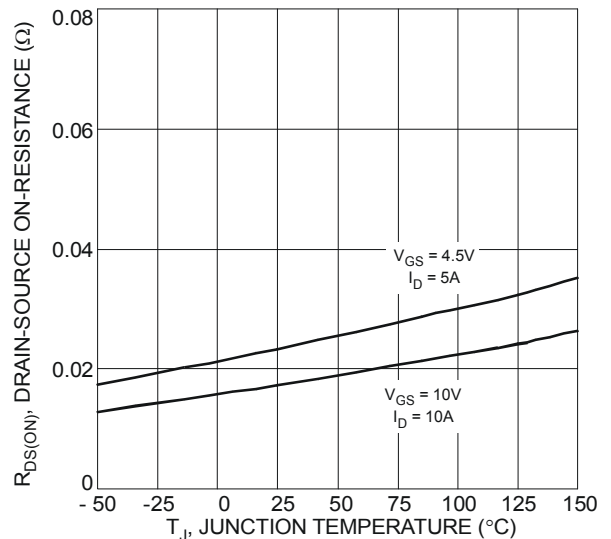


Figure 6 On-Resistance Variation with Temperature

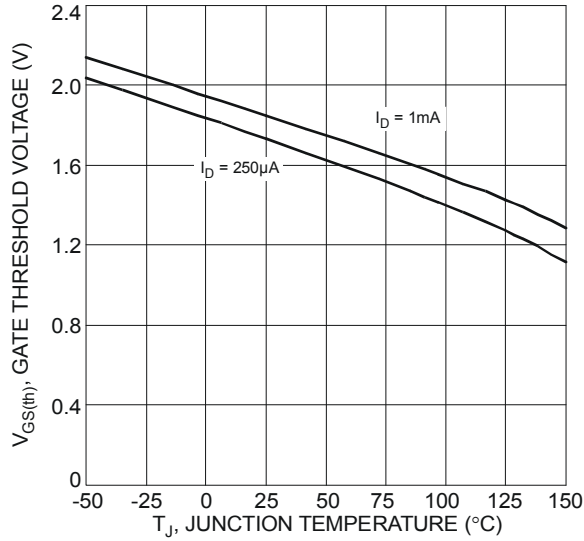


Figure 7 Gate Threshold Variation vs. Ambient Temperature

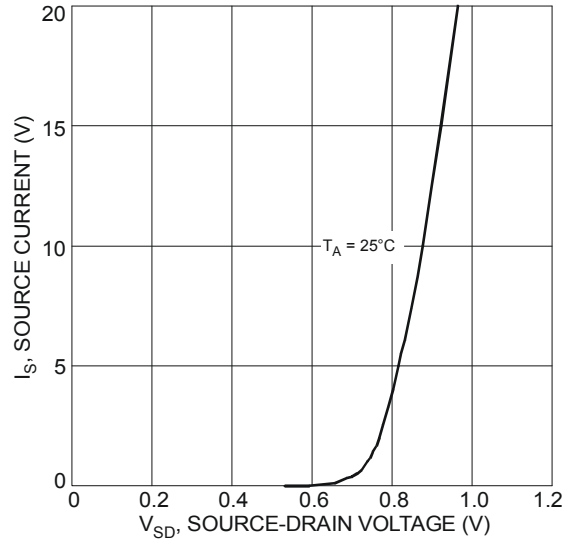


Figure 8 Diode Forward Voltage vs. Current

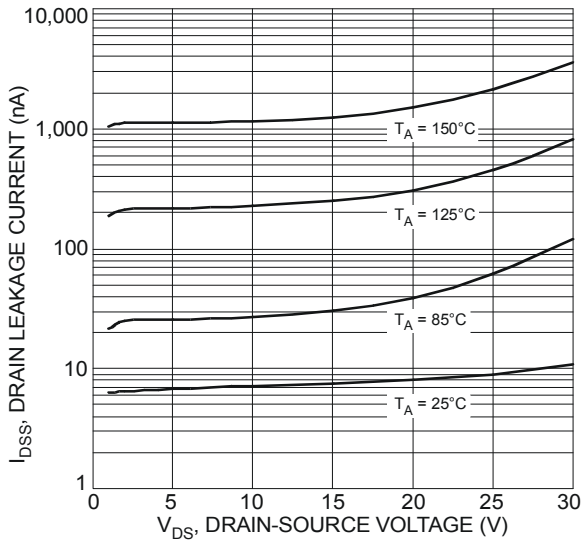


Figure 9 Typical Drain-Source Leakage Current vs. Voltage

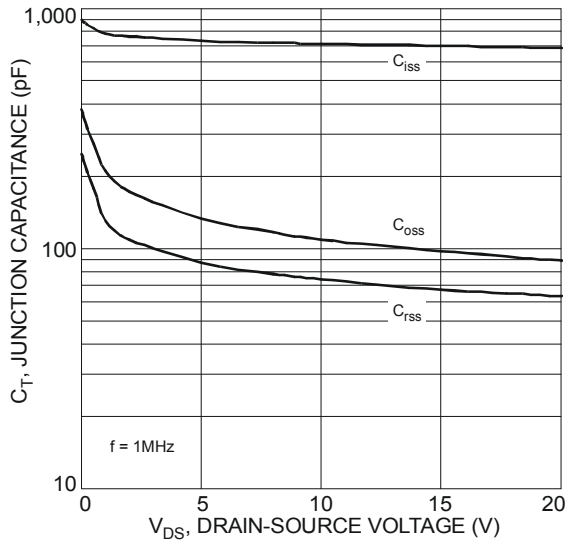


Figure 10 Typical Junction Capacitance

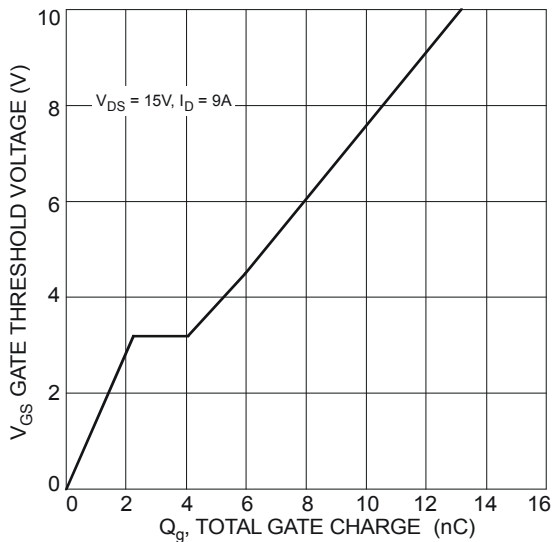
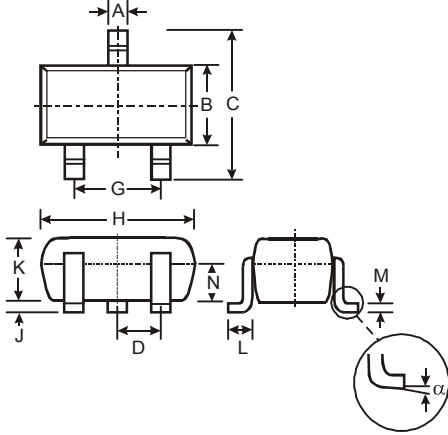


Figure 11 Gate Charge

Package Outline Dimensions

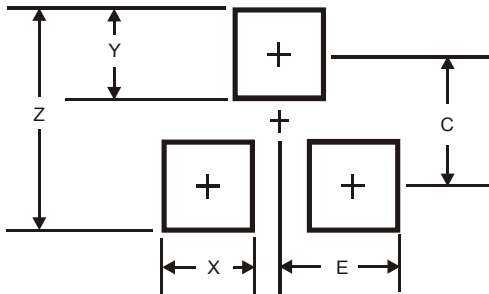
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SC59			
Dim	Min	Max	Typ
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	-	-	0.95
G	-	-	1.90
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
N	0.70	0.80	0.75
α	0°	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	3.4
X	0.8
Y	1.0
C	2.4
E	1.35

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