



30V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV _{DSS}	R _{DS(ON)} max	I _D max T _A = +25°C
	5.5mΩ @ V _{GS} = 10V	15A
30V	$7.5 \text{m}\Omega$ @ $V_{GS} = 4.5 \text{V}$	12A

Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

Description and Applications

This MOSFET is designed to minimize the on-state resistance (R_{DS(ON)}) yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

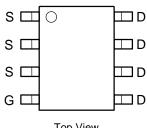
- Motor Control
- Backlighting
- Power Management Functions
- DC-DC Converters

Mechanical Data

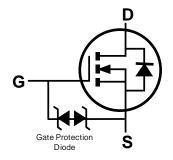
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound.
 UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminal Connections Indicator: See Diagram Below
- Terminals: Finish—Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.074 grams (Approximate)







Top View Internal Schematic



Equivalent Circuit

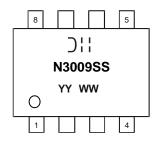
Ordering Information (Note 4)

Part Number	Case	Packaging
DMN3009SSS-13	SO-8	2500/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



☐ Samufacturer's Marking
☐ N3009SS = Product Type Marking Code
☐ YYWW = Date Code Marking
☐ YY or YY = Year (ex: 18 = 2018)
☐ WW = Week (01 to 53)



Maximum Ratings (@ $T_A = +25$ °C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit		
Drain-Source Voltage			V_{DSS}	30	V
Gate-Source Voltage	V _{GSS}	±20	V		
Continuous Drain Current (Note 6) $V_{GS} = 10V$ Steady $T_A = +25^{\circ}C$ State $T_A = +70^{\circ}C$			I _D	15 12	А
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I _{DM}	80	Α
Maximum Continuous Body Diode Forward Current (Note 6)			I _S	2.7	Α
Avalanche Current (Note 7) L = 0.1mH			I _{AR}	33	Α
Repetitive Avalanche Energy (Note 7) L = 0.1mH			E _{AR}	55	mJ

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

Characteristic			Symbol	Value	Unit
Total Power Dissipation (Note 5)	Steady State	$T_A = +25$ °C	P_D	1.4	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\Theta JA}$	101	°C/W	
Total Power Dissipation (Note 6) Steady State		T _A = +25°C	P_D	1.8	W
Thermal Resistance, Junction to Ambient (Note 6)		Steady State	$R_{\Theta JA}$	73	°C/W
Thermal Resistance, Junction to Case (Note 6)		R _{eJC}	7.6	C/VV	
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 8)							
Drain-Source Breakdown Voltage	BV _{DSS}	30	_	_	٧	$V_{GS} = 0V, I_D = 250\mu A$	
Zero Gate Voltage Drain Current	I _{DSS}	_	_	1	μΑ	$V_{DS} = 30V, V_{GS} = 0V$	
Gate-Source Leakage	I _{GSS}	_	_	±100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 8)	ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	1	1.5	2.5	V	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	
Static Drain-Source On-Resistance	D	_	4.5	5.5	mΩ	$V_{GS} = 10V, I_D = 15A$	
Static Diani-Source On-Resistance	R _{DS(ON)}	_	5.5	7.5		$V_{GS} = 4.5V, I_D = 15A$	
Diode Forward Voltage	V_{SD}	_	0.75	1.2	V	$V_{GS} = 0V$, $I_S = 1A$	
DYNAMIC CHARACTERISTICS (Note 9)							
Input Capacitance	C _{iss}	_	2,000	_	рF	45)/)/ 6)/	
Output Capacitance	Coss	_	315	_	pF	$V_{DS} = 15V, V_{GS} = 0V,$ - f = 1.0MHz	
Reverse Transfer Capacitance	C _{rss}	_	247	_	pF	1 - 1.000112	
Gate Resistance	Rg	_	2.2	_	Ω	$V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz$	
Total Gate Charge (V _{GS} = 4.5V)	Qg	_	20	_	nC		
Total Gate Charge (V _{GS} = 10V)	Qg	_	42	_	nC	\/ 45\/ L 45A	
Gate-Source Charge	Q _{qs}	_	4.7	_	nC	$V_{DS} = 15V, I_D = 15A$	
Gate-Drain Charge	Q _{qd}	_	7.4	_	nC		
Turn-On Delay Time	t _{D(ON)}	_	3.9	_	ns		
Turn-On Rise Time	t _R	_	4.1	_	ns	V _{DD} = 15V, V _{GS} = 10V,	
Turn-Off Delay Time	t _{D(OFF)}	_	31	_	ns	$R_G = 3.3\Omega, I_D = 15A$	
Turn-Off Fall Time	t _F	_	15	_	ns		
Reverse Recovery Time	t _{RR}	_	15	_	ns	1 45A -11/-14 400A/	
Reverse Recovery Charge	Q _{RR}	_	6.0	_	nC	I _F = 15A, di/dt = 100A/μs	

Notes:

- 5. Device mounted on FR-4 substrate PCB, 2oz copper, with minimum recommended pad layout. 6. Device mounted on FR-4 substrate PCB, 2oz copper, with 1inch square copper plate.
- 7. I_{AR} and E_{AR} ratings are based on low frequency and duty cycles to keep $T_J = +25$ °C.
- 8. Short duration pulse test used to minimize self-heating effect.
- 9. Guaranteed by design. Not subject to product testing.





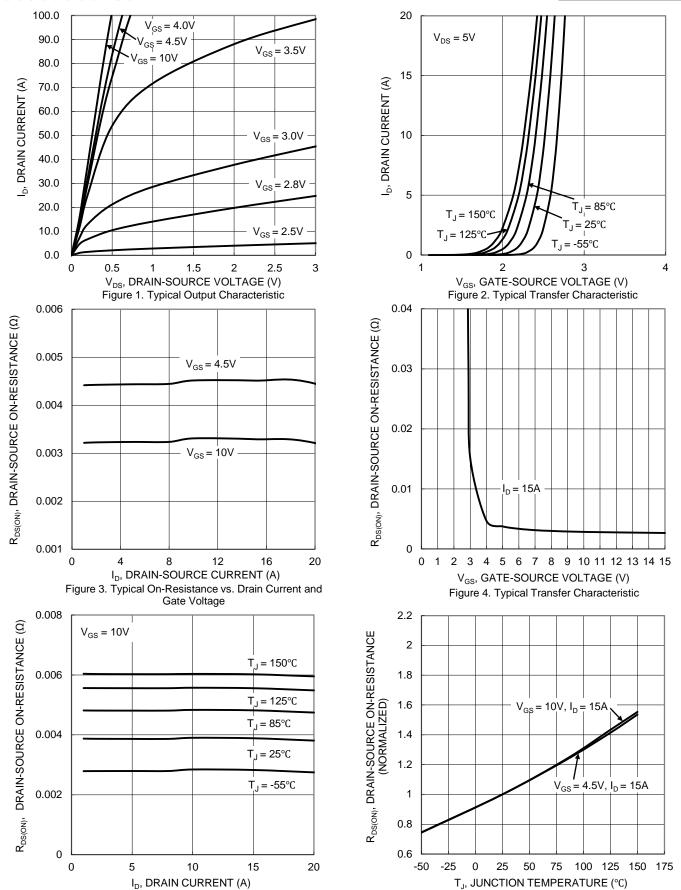


Figure 5. Typical On-Resistance vs. Drain Current

and Junction Temperature

Figure 6. On-Resistance Variation with Junction

Temperature





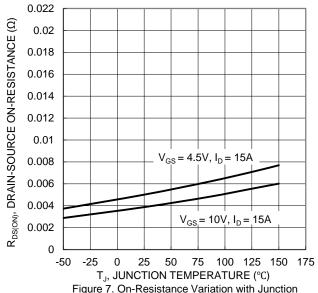


Figure 7. On-Resistance Variation with Junction Temperature

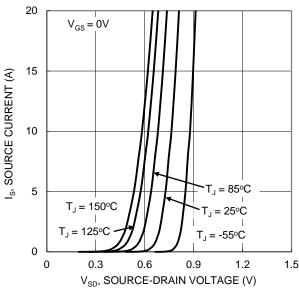


Figure 9. Diode Forward Voltage vs. Current 10 8 6 V_{GS} (V) 4 2 $V_{DS} = 15V, I_{D} = 15A$ 0 0 5 10 15 20 25 30 35 40 45 Q_g (nC) Figure 11. Gate Charge

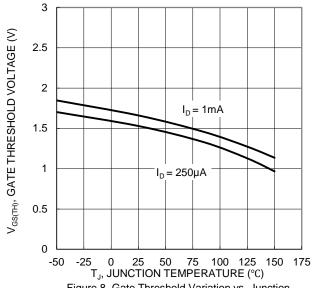
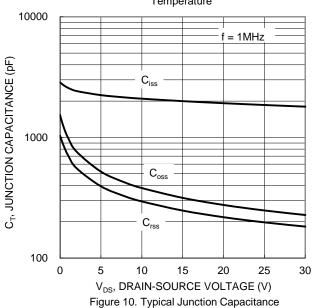


Figure 8. Gate Threshold Variation vs. Junction Temperature



1000 R_{DS(ON)} Limited 100ms 10ms 100 = 1ms ID, DRAIN CURRENT (A) 10 $T_{J(Max)} = 150$ °C T_C = 25°C 0.1 Single Pulse DUT on $P_W = 10s$ 1*MRP Board DC $V_{GS} = 10V$ 0.01 0.1 100 10 V_{DS} , DRAIN-SOURCE VOLTAGE (V) Figure 12. SOA, Safe Operation Area



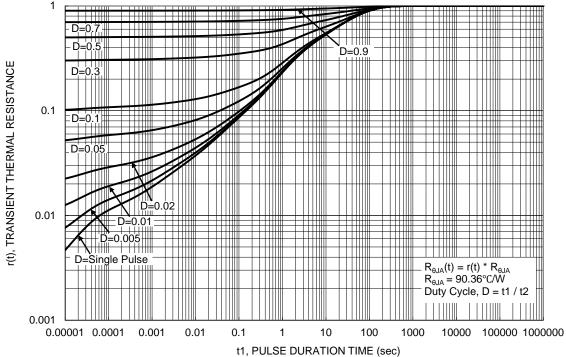
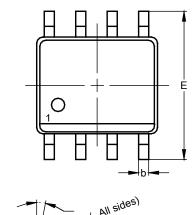


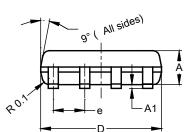
Figure 13. Transient Thermal Resistance

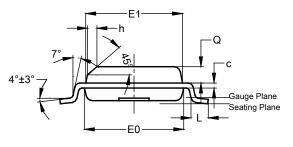


Package Outline Dimensions

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







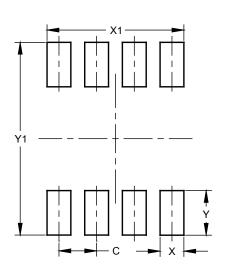
SO-8

SO-8

SO-8						
Dim	Min	Max	Тур			
Α	1.40	1.50	1.45			
A1	0.10	0.20	0.15			
b	0.30	0.50	0.40			
С	0.15	0.25	0.20			
D	4.85	4.95	4.90			
Е	5.90	6.10	6.00			
E1	3.80	3.90	3.85			
E0	3.85	3.95	3.90			
е			1.27			
h	-		0.35			
L	0.62	0.82	0.72			
q	0.60	0.70	0.65			
All Dimensions in mm						

Suggested Pad Layout

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



Dimensions	Value (in mm)				
С	1.27				
Х	0.802				
X1	4.612				
Y	1.505				
V1	6 50				



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