



DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

V _{(BR)DSS}	R _{DS(ON)} max	I _D max T _A = +25°C (Note 6)
40)/	$31m\Omega$ @ $V_{GS} = 10V$	7.0A
40V	$50m\Omega$ @ $V_{GS} = 4.5V$	5.6A

Description and Applications

This 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.

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

Features and Benefits

- Low On-Resistance
- 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
- PPAP Capable (Note 4)

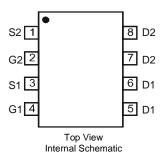
Mechanical Data

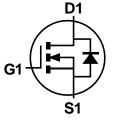
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound.
 UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See diagram
- Terminals: Finish Matte Tin Annealed over Copper Leadframe. (§3)
 Solderable per MIL-STD-202, Method 208
- Weight: 0.072 grams (Approximate)

SO-8

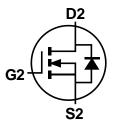


Top View





N-channel MOSFET



N-channel MOSFET

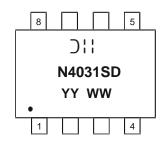
Ordering Information (Note 4)

Part Number	Case	Packaging
DMN4031SSDQ-13	SO-8	2,500/Tape & Reel

Notes:

- 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_grade_definitions/.
- 5. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information



Dil = Manufacturer's Marking
N4031SD = Product Type Marking Code
YYWW = Date Code Marking
YY or YY = Year (ex: 13 = 2013)
WW = Week (01 - 53)
YY = Date Code Marking



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

Characteristic				Symbol	Value	Units
Drain-Source Voltage	V_{DSS}	40	V			
Gate-Source Voltage				V _{GSS}	±20	V
Continuous Drain Current (Note 6)	V _{GS} = 10V	Steady State	$T_A = +25$ °C $T_A = +70$ °C	I _D	5.2 4.1	А
Continuous Drain Current (Note 6)	V _{GS} = 4.5V	Steady State	$T_A = +25$ °C $T_A = +70$ °C	ID	4.3 3.4	А
Continuous Drain Current (Note 7)	V _{GS} = 10V	Steady State	$T_A = +25$ °C $T_A = +70$ °C	I _D	7.0 5.6	А
Continuous Drain Current (Note 7)	V _{GS} = 4.5V	Steady State	$T_A = +25$ °C $T_A = +70$ °C	ID	5.8 4.7	А
Pulsed Drain Current (Note 8)				I _{DM}	20	А

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

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 6)	P_{D}	1.42	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 5)	$R_{ heta JA}$	88	°C/W
Total Power Dissipation (Note 7)	P_{D}	2.6	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 6)	$R_{ heta JA}$	48	°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	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 9)							
Drain-Source Breakdown Voltage	BV _{DSS}	40	_	_	V	$V_{GS} = 0V$, $I_D = 10mA$	
Zero Gate Voltage Drain Current	I _{DSS}	_	_	1	μA	$V_{DS} = 40V, V_{GS} = 0V$	
Gate-Source Leakage	I _{GSS}	_	_	±100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 9)							
Gate Threshold Voltage	$V_{GS(th)}$	1.6	2.4	3.0	V	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	
On-state drain current	I _{D(ON)}	20	_	_	Α	$V_{GS} = 10V, V_{DS} = 5A$	
Static Drain-Source On-Resistance	5	_	19	31	~ 0	$V_{GS} = 10V, I_D = 6A$	
Static Drain-Source On-Resistance	R _{DS (ON)}	_	44	50	mΩ	$V_{GS} = 4.5V, I_D = 5A$	
Forward Transfer Admittance	Y _{fs}	_	11	_	S	$V_{DS} = 5V, I_{D} = 6A$	
Diode Forward Voltage		_	0.74	1.0	V	V _{GS} = 0V, I _S = 1A	
DYNAMIC CHARACTERISTICS (Note 10)	V_{SD}		•		•		
Input Capacitance	C _{iss}	_	945	_	pF	.,	
Output Capacitance	C _{oss}	_	69	_	pF	$V_{DS} = 20V, V_{GS} = 0V,$ f = 1.0MHz	
Reverse Transfer Capacitance	C _{rss}	_	58	_	pF		
Gate Resistance	Rq	_	1.45	_	Ω	$V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz$	
Total Gate Charge (V _{GS} = 4.5V)	Qq	_	8.4	_	nC		
Total Gate Charge (V _{GS} = 10V)	Qq	_	18.6	_	nC	$V_{GS} = 10V, V_{DS} = 20V,$	
Gate-Source Charge	Q _{qs}	_	3.3	_	nC	I _D = 12A	
Gate-Drain Charge	Q_{qd}	_	2.2	_	nC	7	
Turn-On Delay Time	T _{D(on)}	_	6.4	_	ns		
Turn-On Rise Time	Tr	_	9.7	_	ns	V _{GS} = 10V, V _{DS} = 20V,	
Turn-Off Delay Time	$T_{D(off)}$	_	19.8	_	ns	$R_L=1.6\Omega$, $R_G=3\Omega$	
Turn-Off Fall Time	T _f	_	3.1	_	ns	7	

Notes: 6. Device mounted on FR-4 PCB, with minimum recommended pad layout. The value in any given application depends on user's specific board design.

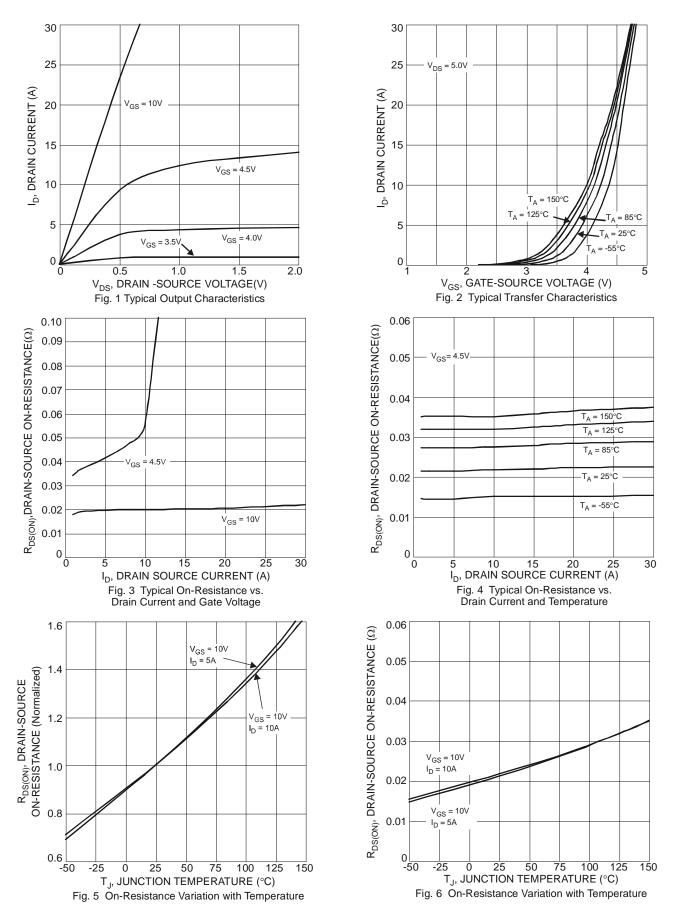
^{7.} Device mounted on 1" x 1" FR-4PCB with high coverage 1 oz. Copper, single sided.

^{8.} Repetitive rating, pulse width limited by junction temperature.

^{9.} Short duration pulse test used to minimize self-heating effect.

^{10.} Guaranteed by design. No subject to production testing.







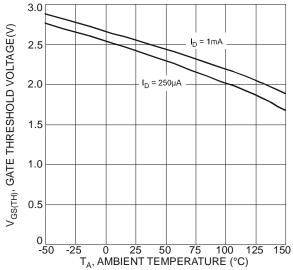
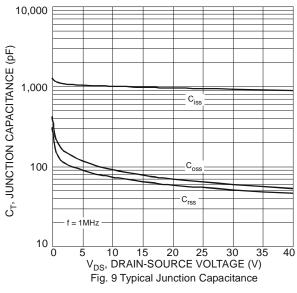
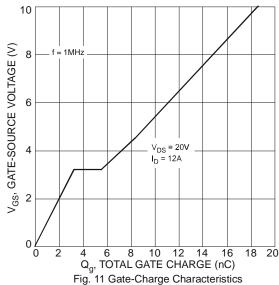
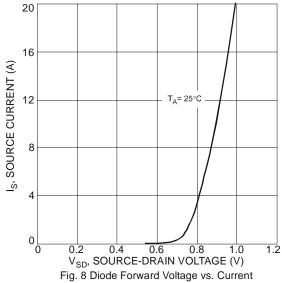


Fig. 7 Gate Threshold Variation vs. Ambient Temperature







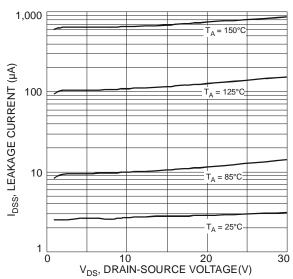
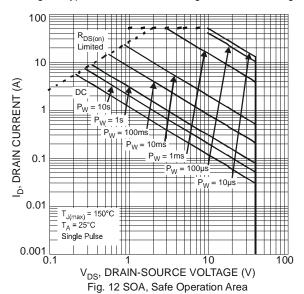


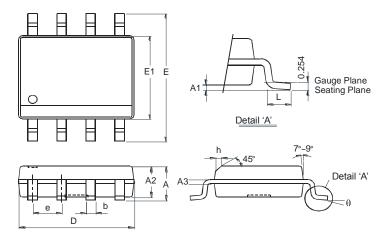
Fig. 10 Typical Drain-Source Leakage Current vs. Voltage





Package Outline Dimensions

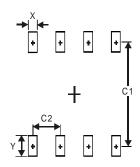
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SO-8					
Dim	Min	Max			
Α	-	1.75			
A1	0.10	0.20			
A2	1.30	1.50			
A3	0.15	0.25			
b	0.3	0.5			
D	4.85	4.95			
Е	5.90	6.10			
E1	3.85	3.95			
е	1.27 Typ				
h	-	0.35			
L	0.62	0.82			
θ	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)			
Х	0.60			
Y	1.55			
C1	5.4			
C2	1.27			



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