DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	I_D max T_A = 25°C (Note 5)
40V	31mΩ @ V_{GS} = 10V	7.0A
	50mΩ @ V_{GS} = 4.5V	5.6A

Description and Applications

This 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.

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

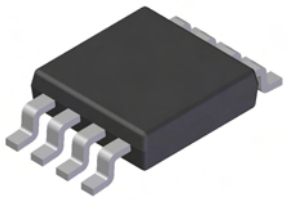
Features and Benefits

- Low On-Resistance
- Low Input/Output Leakage
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**
- **Qualified to AEC-Q101 standards for High Reliability**

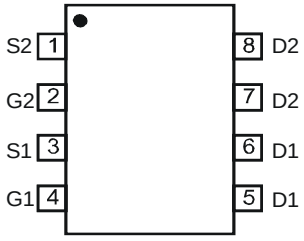
Mechanical Data

- 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. Solderable per MIL-STD-202, Method 208
- Weight: 0.072 grams (approximate)

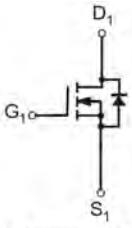
SO-8



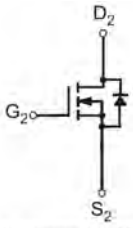
TOP VIEW



TOP VIEW
Internal Schematic



N-Channel MOSFET



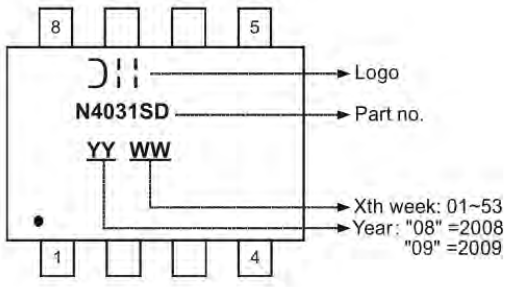
N-Channel MOSFET

Ordering Information (Note 3)

Part Number	Case	Packaging
DMN4031SSD-13	SO-8	2500/Tape & Reel

Notes: 1. No purposefully added lead.
2. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com.
3. For packaging details, go to our website at http://www.diodes.com.

Marking Information



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 4)	V_{GS} = 10V	Steady State	T_A = 25°C T_A = 70°C	I_D	5.2 4.1	A
Continuous Drain Current (Note 4)	V_{GS} = 4.5V	Steady State	T_A = 25°C T_A = 70°C	I_D	4.3 3.4	A
Continuous Drain Current (Note 5)	V_{GS} = 10V	Steady State	T_A = 25°C T_A = 70°C	I_D	7.0 5.6	A
Continuous Drain Current (Note 5)	V_{GS} = 4.5V	Steady State	T_A = 25°C T_A = 70°C	I_D	5.8 4.7	A
Pulsed Drain Current (Note 6)				I_{DM}	20	A

Thermal Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 4)	P_D	1.42	W
Thermal Resistance, Junction to Ambient @T_A = 25°C (Note 4)	$R_{\theta JA}$	88	°C/W
Total Power Dissipation (Note 5)	P_D	2.6	W
Thermal Resistance, Junction to Ambient @T_A = 25°C (Note 5)	$R_{\theta JA}$	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	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
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} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	1.6	2.4	3.0	V	V_{DS} = V_{GS}, I_D = 250μA
On-state drain current	$I_{D(ON)}$	20	-	-	A	V_{GS} = 10V, V_{DS} = 5A
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	-	19	31	mΩ	V_{GS} = 10V, I_D = 6A
		-	44	50		V_{GS} = 4.5V, I_D = 5A
Forward Transfer Admittance	$\|Y_{fs}\|$	-	11	-	S	V_{DS} = 5V, I_D = 6A
Diode Forward Voltage	V_{SD}	-	0.74	1.0	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	-	945	-	pF	V_{DS} = 20V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	69	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	58	-	pF	
Gate resistance	R_g	-	1.45	-	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	-	8.4	-	nC	V_{GS} = 10V, V_{DS} = 20V, I_D = 12A
Total Gate Charge (V_{GS} = 10V)	Q_g	-	18.6	-	nC	
Gate-Source Charge	Q_{gs}	-	3.3	-	nC	
Gate-Drain Charge	Q_{gd}	-	2.2	-	nC	
Turn-On Delay Time	$T_{D(on)}$	-	6.4	-	ns	V_{GS} = 10V, V_{DS} = 20V, R_L = 1.6Ω, R_G = 3Ω
Turn-On Rise Time	T_r	-	9.7	-	ns	
Turn-Off Delay Time	$T_{D(off)}$	-	19.8	-	ns	
Turn-Off Fall Time	T_f	-	3.1	-	ns	

Notes:
4. Device mounted on FR-4 PCB, with minimum recommended pad layout. The value in any given application depends on user's specific board design
5. Device mounted on 1" x 1" FR-4PCB with high coverage 1 oz. Copper, single sided.
6. Repetitive rating, pulse width limited by junction temperature.
7. Short duration pulse test used to minimize self-heating effect
8. Guaranteed by design. No subject to production testing.

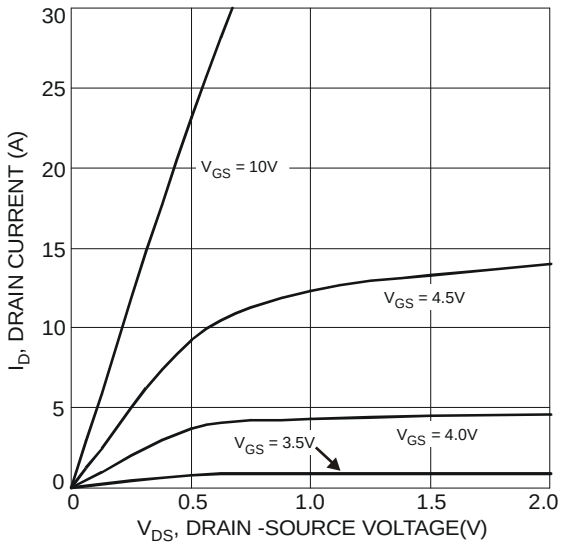


Fig. 1 Typical Output Characteristics

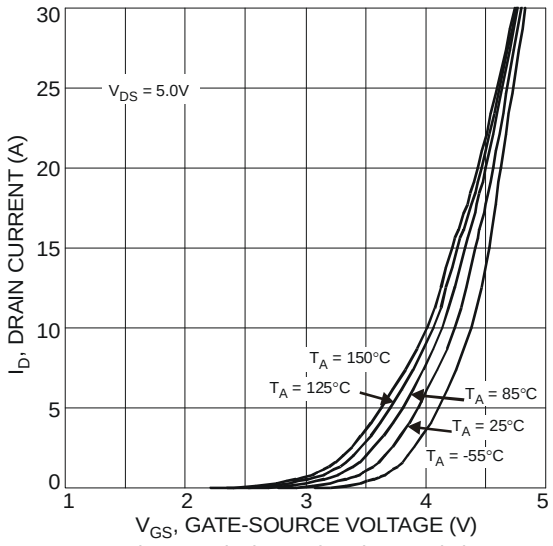


Fig. 2 Typical Transfer Characteristics

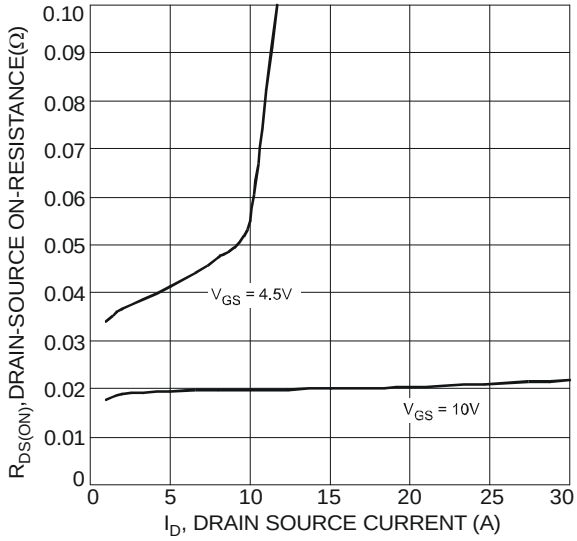


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

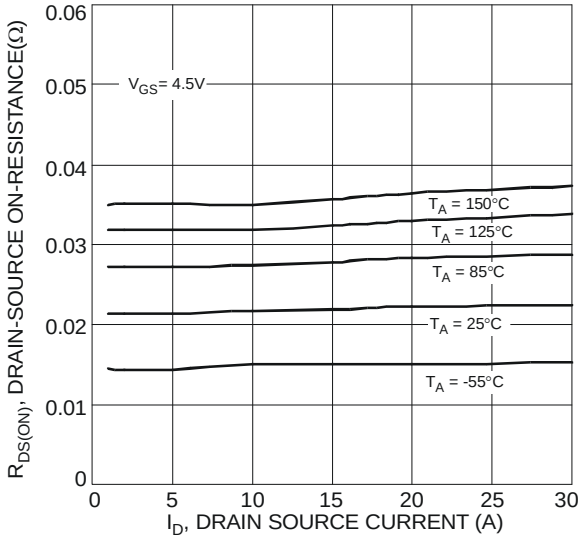


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

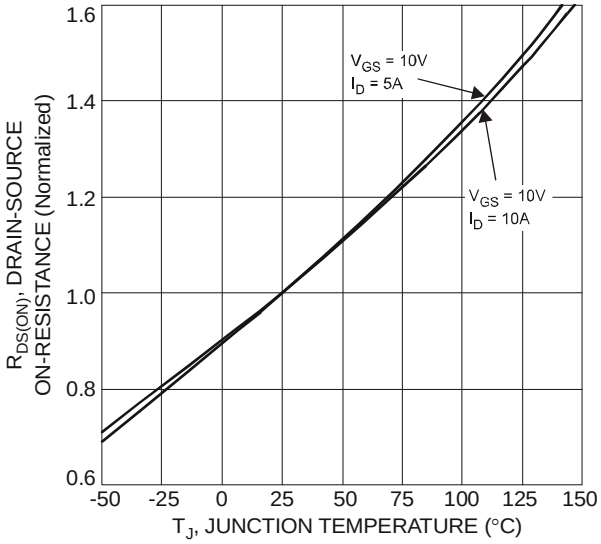


Fig. 5 On-Resistance Variation with Temperature

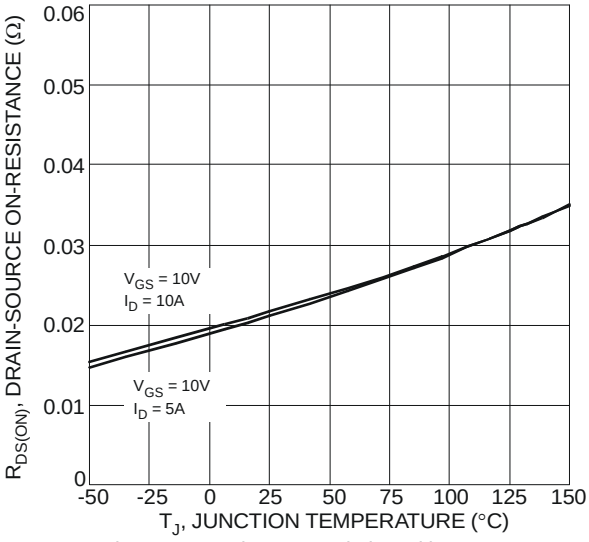


Fig. 6 On-Resistance Variation with Temperature

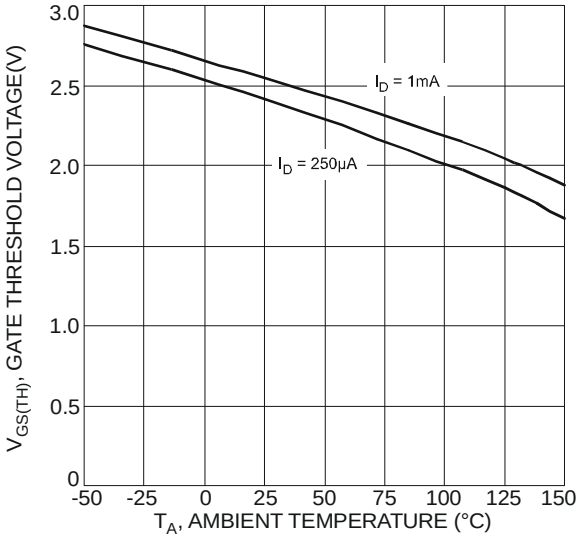


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

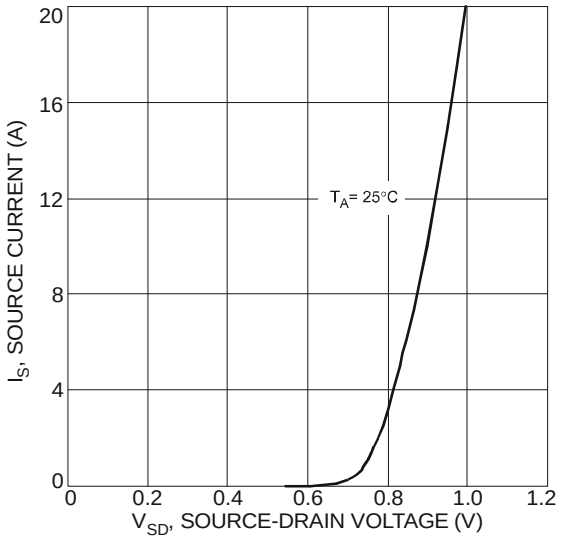


Fig. 8 Diode Forward Voltage vs. Current

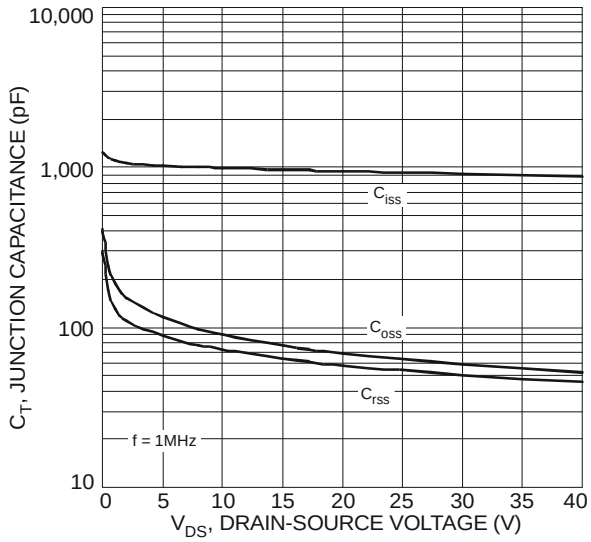


Fig. 9 Typical Junction Capacitance

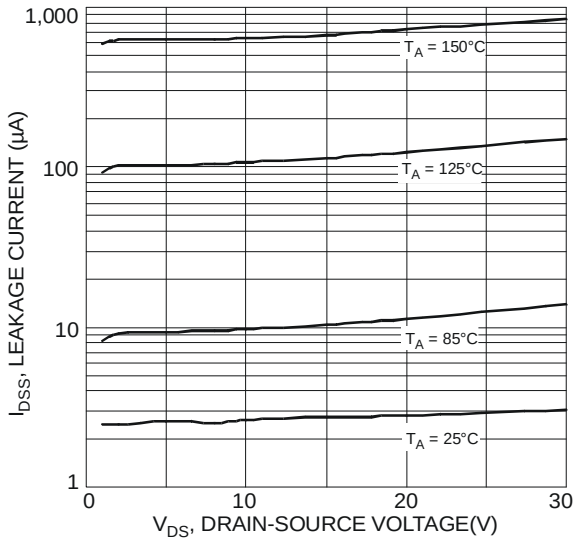


Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

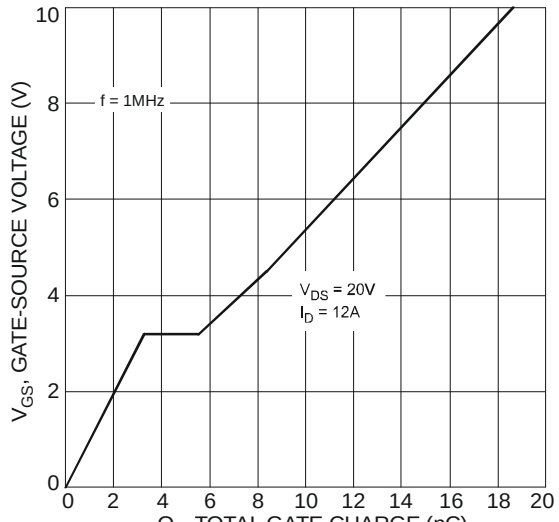


Fig. 11 Gate-Charge Characteristics

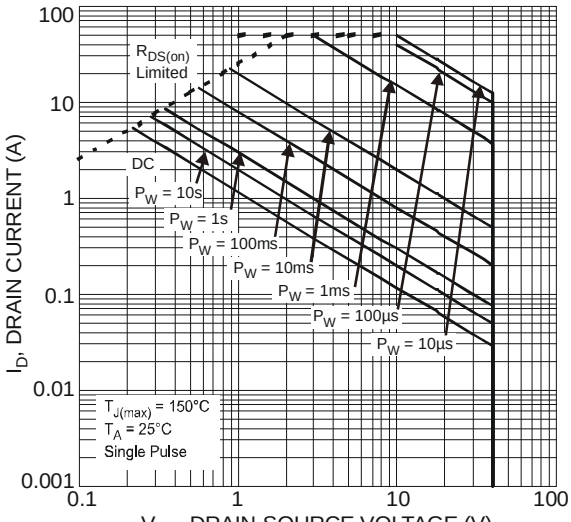
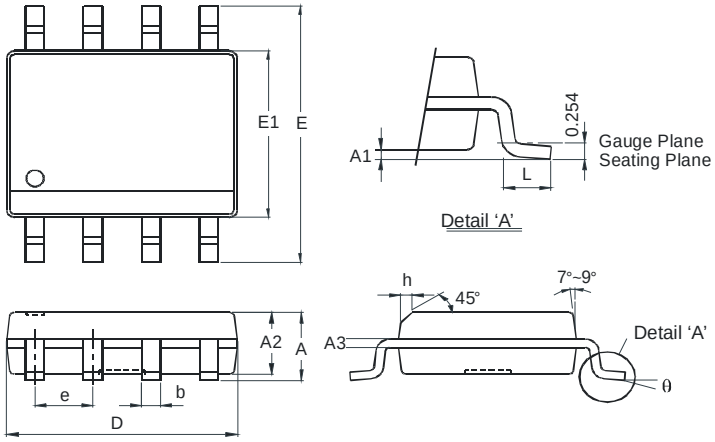


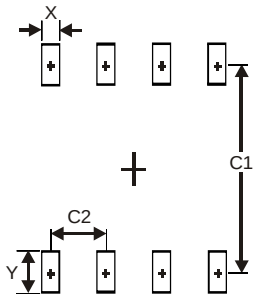
Fig. 12 SOA, Safe Operation Area

Package Outline Dimensions



SO-8		
Dim	**Min**	**Max**
A	-	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
E	5.90	6.10
E1	3.85	3.95
e	1.27 Typ	
h	-	0.35
L	0.62	0.82
θ	0°	8°
All Dimensions in mm		

Suggested Pad Layout



Dimensions	Value (in mm)
X	0.60
Y	1.55
C1	5.4
C2	1.27

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