DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	I_D max T_A = +25°C
30V	20mΩ @ V_{GS} = 10V	6.9A
	27mΩ @ V_{GS} = 4.5V	5.8A

Description

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.

Applications

- Backlighting
- Power Management Functions
- DC-DC Converters

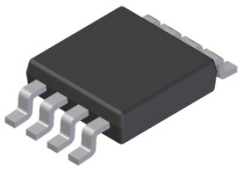
Features

- Dual N-Channel MOSFET
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- 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**

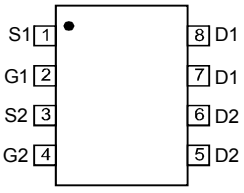
Mechanical Data

- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208
- Weight: 0.072grams (approximate)

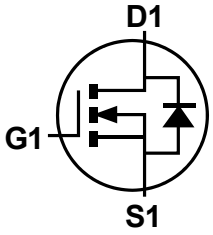
SO-8



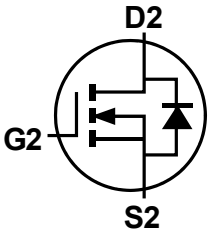
Top View



Top View
Internal Schematic



N-channel MOSFET



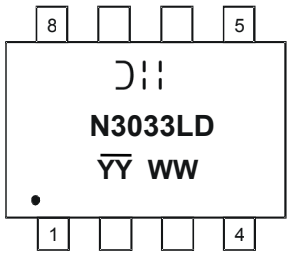
N-channel MOSFET

Ordering Information (Note 4)

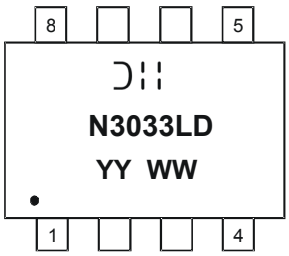
Part Number	Case	Packaging
DMN3033LSD-13	SO-8	2,500/Tape & Reel

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
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



Chengdu A/T Site



Shanghai A/T Site

= Manufacturer's Marking
N3033LD = Product Type Marking Code
YYWW = Date Code Marking
YY or $\overline{YY}$ = Year (ex: 13 = 2013)
WW = Week (01 - 53)
$\underline{YY}$ = Date Code Marking for SAT (Shanghai Assembly/ Test site)
$\overline{YY}$ = Date Code Marking for CAT (Chengdu Assembly/ Test site)

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	30	V
Gate-Source Voltage			V_{GSS}	±20	V
Drain Current (Note 5)	Steady State	T_A = +25°C T_A = +70°C	I_D	6.9 5.8	A
Pulsed Drain Current (Note 6)			I_{DM}	30	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P_D	2	W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62.5	°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}	30	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	100	nA	V_{DS} = 30V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
		—	—	1	µA	V_{GS} = ±25V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	1	—	2.1	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	—	13 22	20 27	mΩ	V_{GS} = 10V, I_D = 6.9A V_{GS} = 4.5V, I_D = 5A
Forward Transconductance	g_{fs}	—	7	—	S	V_{DS} =5V, I_D = 6.9A
Diode Forward Voltage (Note 7)	V_{SD}	0.5	—	1.2	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{iss}	—	725	—	pF	V_{DS} = 15V, V_{GS} = 0V f = 1MHz
Output Capacitance	C_{oss}	—	114	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	92	—	pF	
Gate Resistance	R_G	—	0.89	—	Ω	V_{GS} = 0V, V_{DS} = 0V, f = 1MHz
SWITCHING CHARACTERISTICS						
Total Gate Charge	Q_g	—	6.4 13	—	nC	V_{GS} = 4.5V, V_{DS} = 15V, I_D =5A V_{GS} = 10V, V_{DS} = 15V, I_D = 6.9A
Gate-Source Charge	Q_{gs}	—	1.9	—	nC	V_{GS} = 4.5V, V_{DS} = 15V, I_D = 6.9A
Gate-Drain Charge	Q_{gd}	—	3.2	—	nC	V_{GS} = 4.5V, V_{DS} = 15V, I_D = 6.9A
Turn-On Delay Time	$t_{d(on)}$	—	11	—	ns	V_{DD} = 15V, V_{GS} = 10V, R_D = 1.8Ω, R_G = 6Ω
Turn-On Rise Time	t_r	—	7	—	ns	
Turn-Off Delay Time	$t_{d(off)}$	—	63	—	ns	
Turn-Off Fall Time	t_f	—	30	—	ns	

Notes:
5. Device mounted on 2 oz. Copper pads on FR-4 PCB with $R_{\theta JA}$ = 62.5°C/W
6. Pulse width ≤10µS, Duty Cycle ≤1%.
7. Short duration pulse test used to minimize self-heating effect.

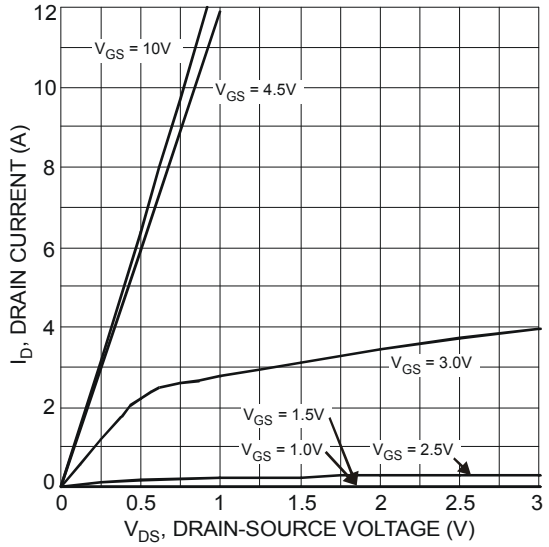


Fig. 1 Typical Output Characteristics

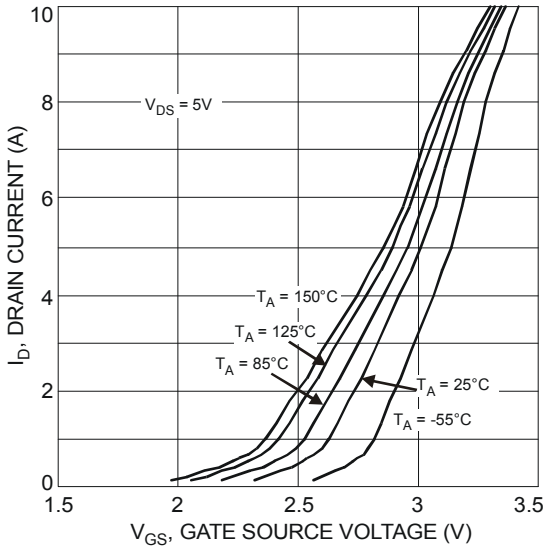


Fig. 2 Typical Transfer Characteristics

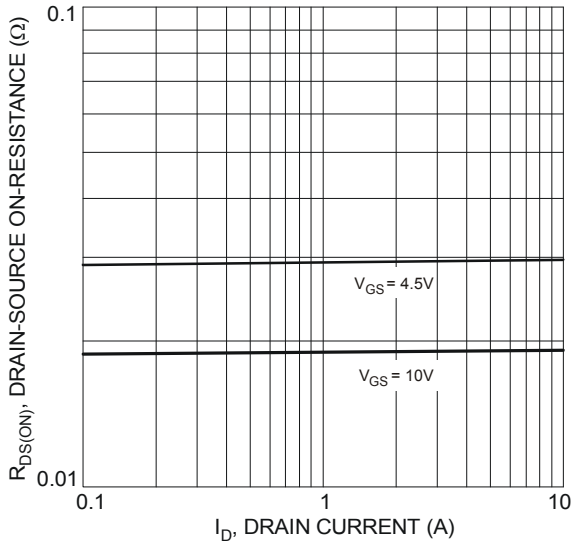


Fig. 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

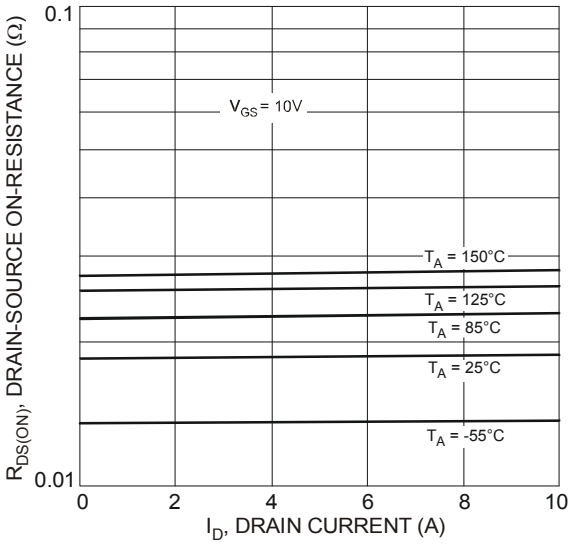


Fig. 4 Typical Drain-Source On-Resistance
vs. Drain Current and Temperature

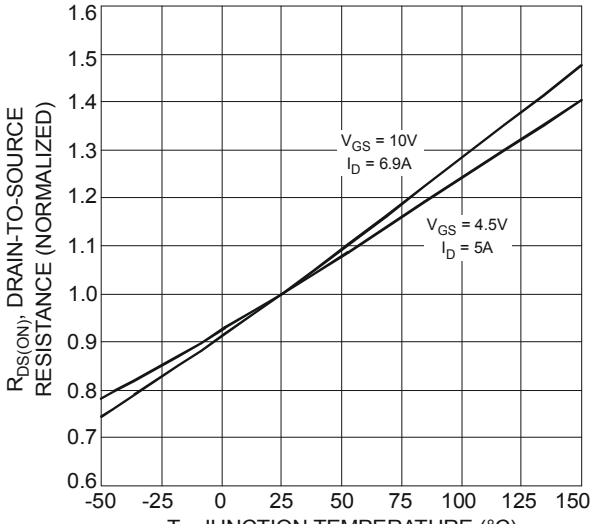


Fig. 5 On-Resistance Variation with Temperature

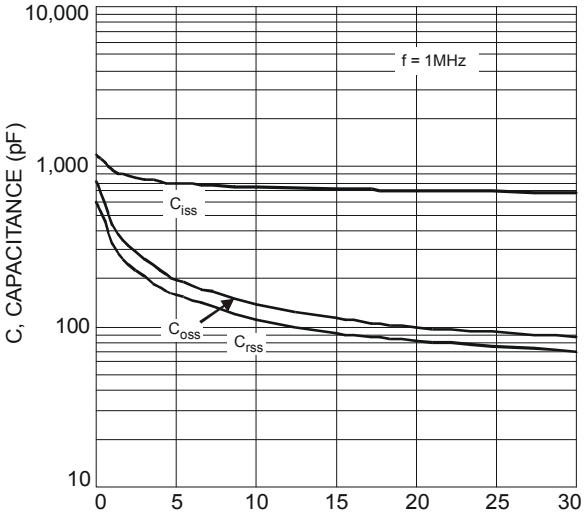


Fig. 6 Typical Capacitance

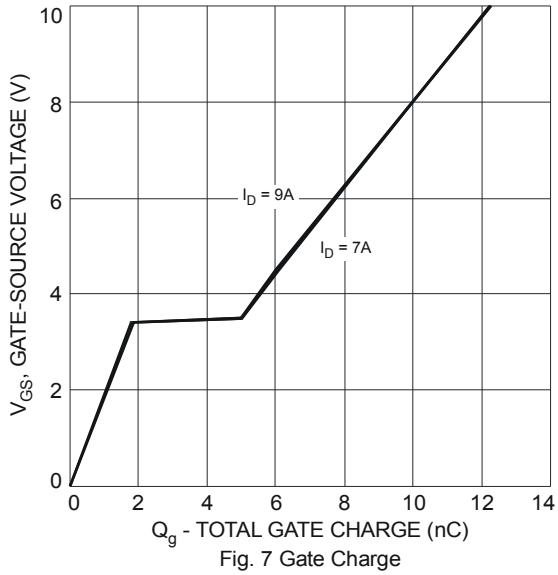


Fig. 7 Gate Charge

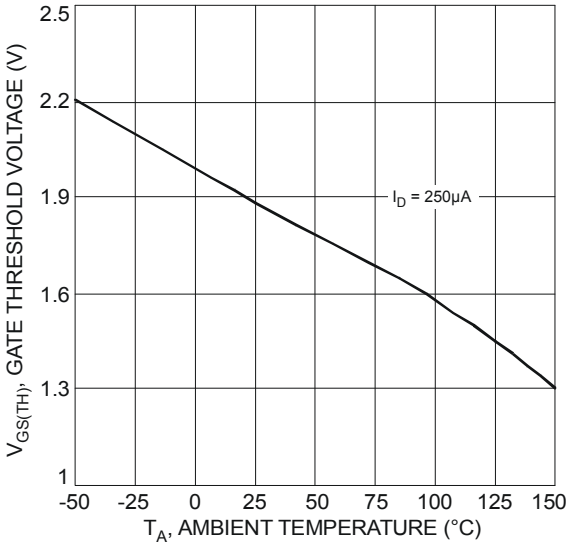


Fig. 8 Gate Threshold Variation vs. Ambient Temperature

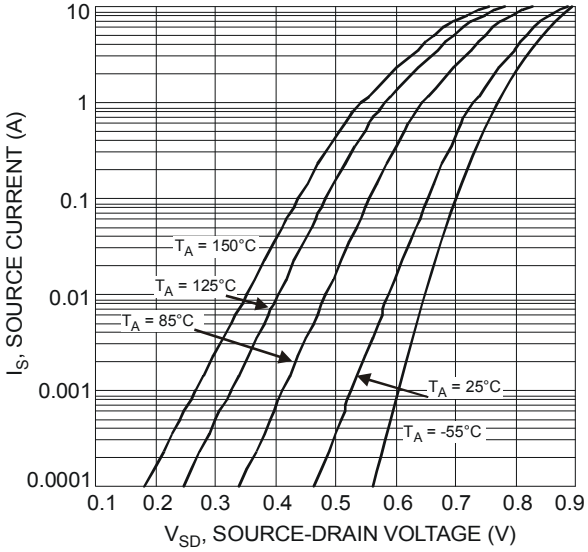


Fig. 9 Diode Forward Voltage vs. Current

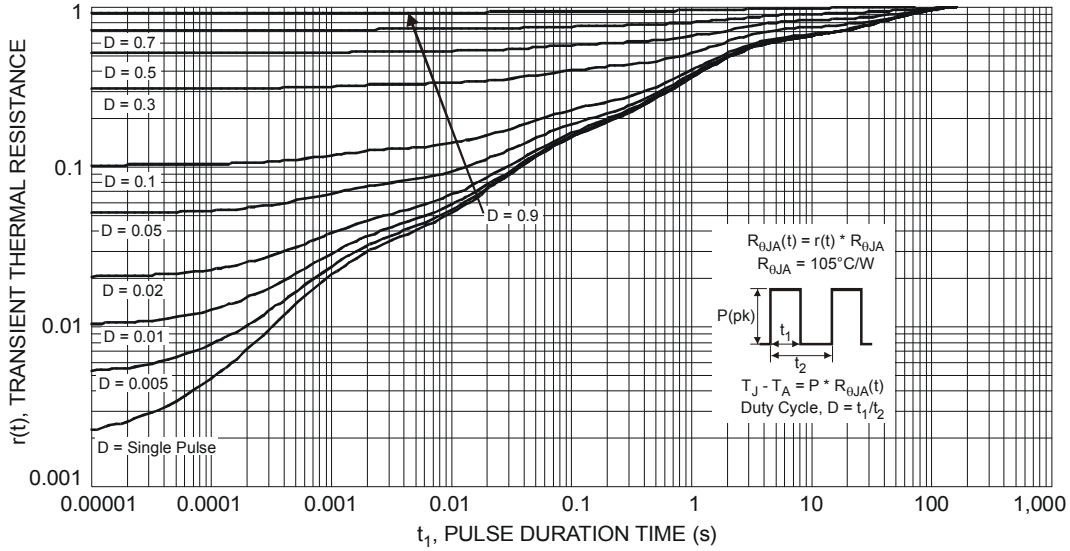
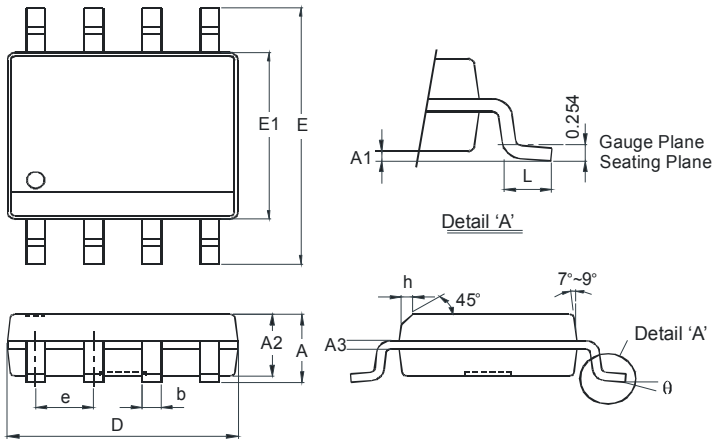


Fig. 10 Transient Thermal Response

Package Outline Dimensions

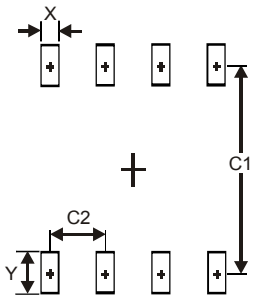
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



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

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



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

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