

Product Summary

$V_{(BR)DSS}$	$R_{DS(on) \max}$	$I_D \max$ $T_A = +25^\circ C$
-20V	75m Ω @ $V_{GS} = -4.5V$	-4.6A
	110m Ω @ $V_{GS} = -2.5V$	-2.9A

Description

This MOSFET has been designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

- Backlighting
- Power Management Functions
- DC-DC Converters

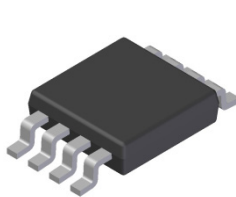
Features

- Low On-Resistance
- 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**

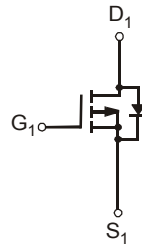
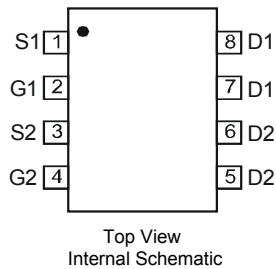
Mechanical Data

- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.072 grams (approximate)

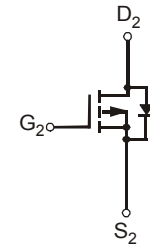
SO-8



Top View



P-Channel MOSFET



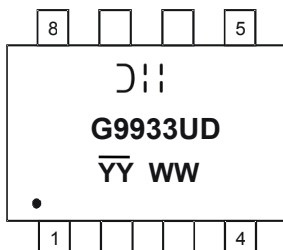
P-Channel MOSFET

Ordering Information (Note 4)

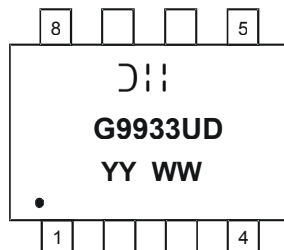
Part Number	Case	Packaging
DMG9933USD-13	SO-8	2,500 / Tape & Reel

- 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
 G9933UD = Product Type Marking Code
 YYWW = Date Code Marking
 YY or YY = Year (ex: 14 = 2014)
 WW = Week (01 - 53)
 YY = Date Code Marking for SAT (Shanghai Assembly/ Test site)
 YY = Date Code Marking for CAT (Chengdu Assembly/ Test site)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	-20	V
Gate-Source Voltage			V _{GSS}	±12	V
Continuous Drain Current (Note 5) V _{GS} = -4.5V	Steady State	T _A = +25°C	I _D	-4.6	A
		T _A = +85°C		-3	
Pulsed Drain Current (Note 6)			I _{DM}	-20	A

Thermal Characteristics

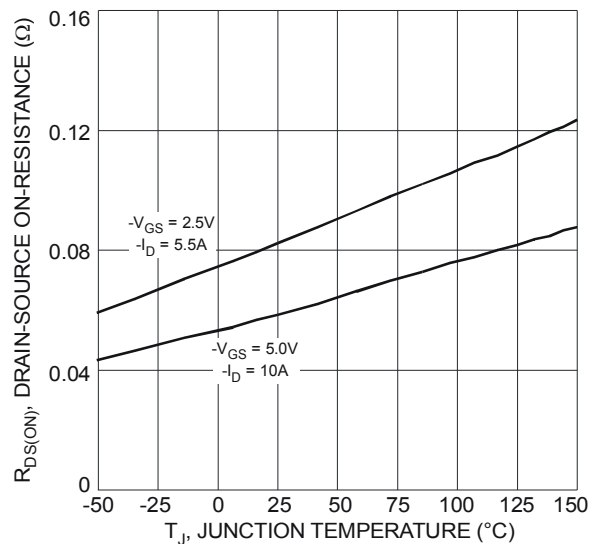
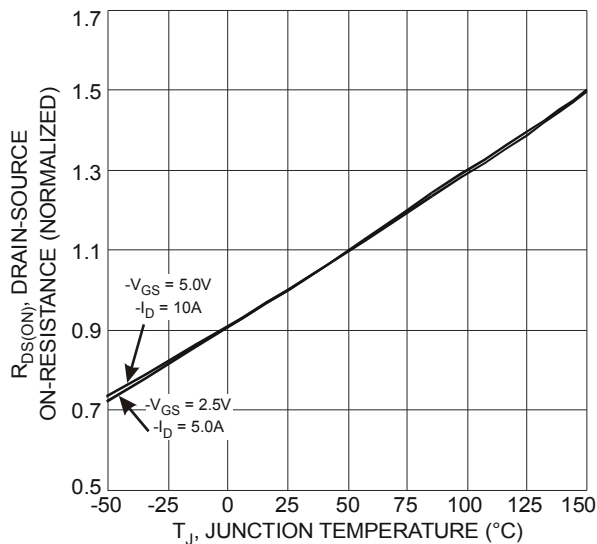
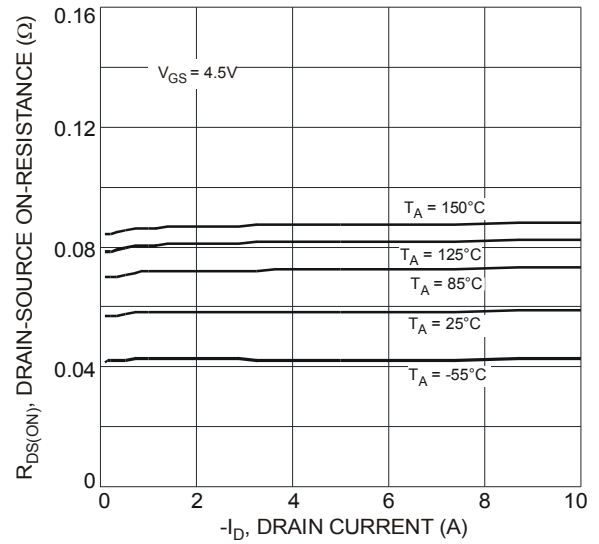
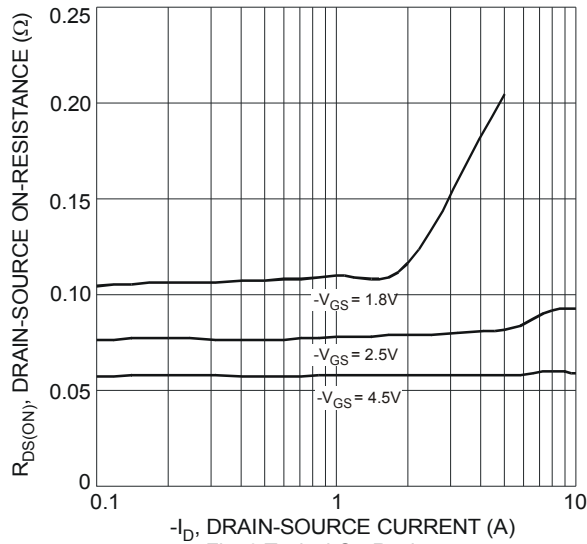
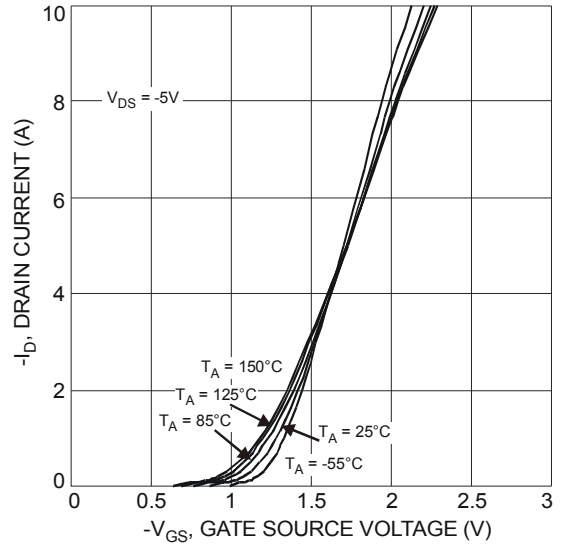
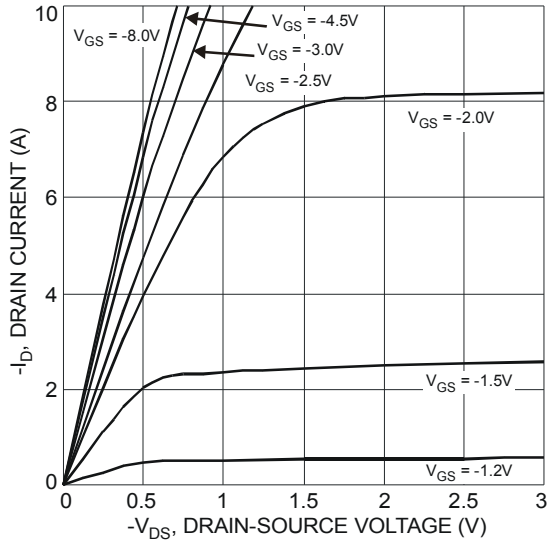
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P _D	1.15	W
Thermal Resistance, Junction to Ambient @T _A = +25°C	R _{θJA}	109	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Notes: 5. Device mounted on FR-4 PCB, with minimum recommended pad layout.
6. Repetitive rating, pulse width limited by junction temperature.

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}	-20	—	—	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	-1	μA	V _{DS} = -16V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±12V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(th)}	-0.45	—	-1.1	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(on)}	—	55	75	mΩ	V _{GS} = -4.5V, I _D = -4.8A
		—	76	110		V _{GS} = -2.5V, I _D = -1A
Forward Transfer Admittance	Y _{fs}	—	10	—	S	V _{DS} = -9V, I _D = -3.4A
Diode Forward Voltage	V _{SD}	—	-0.8	-1.2	V	V _{GS} = 0V, I _S = -2A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	608.4	—	pF	V _{DS} = -6V, V _{GS} = 0V f = 1MHz
Output Capacitance	C _{oss}	—	81.5	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	72.4	—	pF	
Gate Resistance	R _g	—	44.91	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge	Q _g	—	6.5	—	nC	V _{DS} = -10V, V _{GS} = -4.5V, I _D = -3.2A
Gate-Source Charge	Q _{gs}	—	0.9	—	nC	
Gate-Drain Charge	Q _{gd}	—	1.5	—	nC	
Turn-On Delay Time	t _{D(on)}	—	12.45	—	ns	V _{DS} = -10V, V _{GS} = -4.5V, R _L = 10Ω, R _G = 1Ω, I _D = -1A
Turn-On Rise Time	t _r	—	10.29	—	ns	
Turn-Off Delay Time	t _{D(off)}	—	46.52	—	ns	
Turn-Off Fall Time	t _f	—	22.19	—	ns	

Notes: 7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.



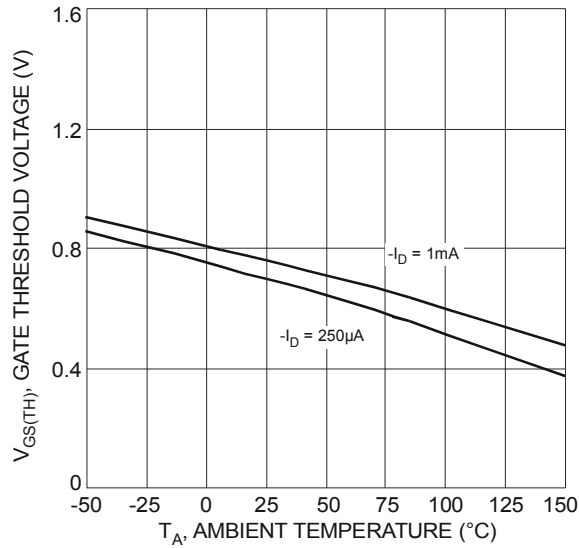


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

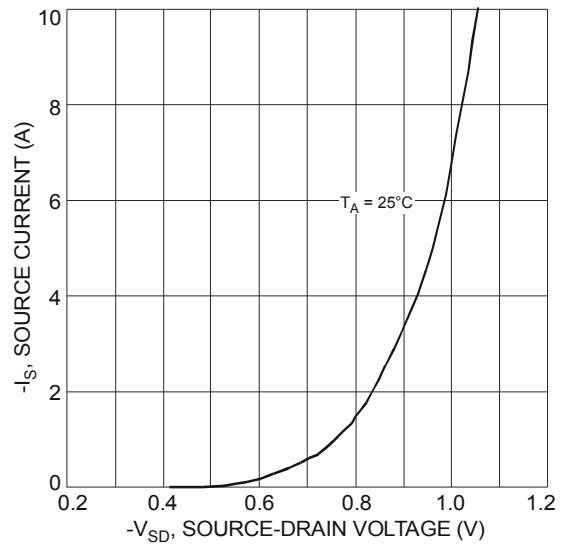


Fig. 8 Diode Forward Voltage vs. Current

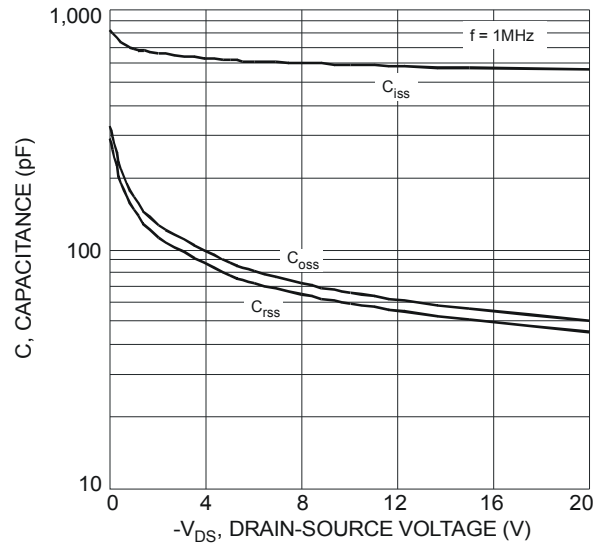


Fig. 9 Typical Total Capacitance

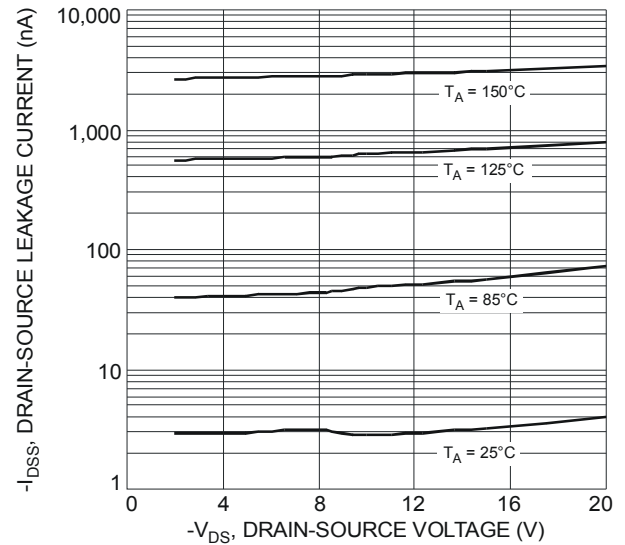


Fig. 10 Typical Drain-Source Leakage Current vs. Drain-Source Voltage

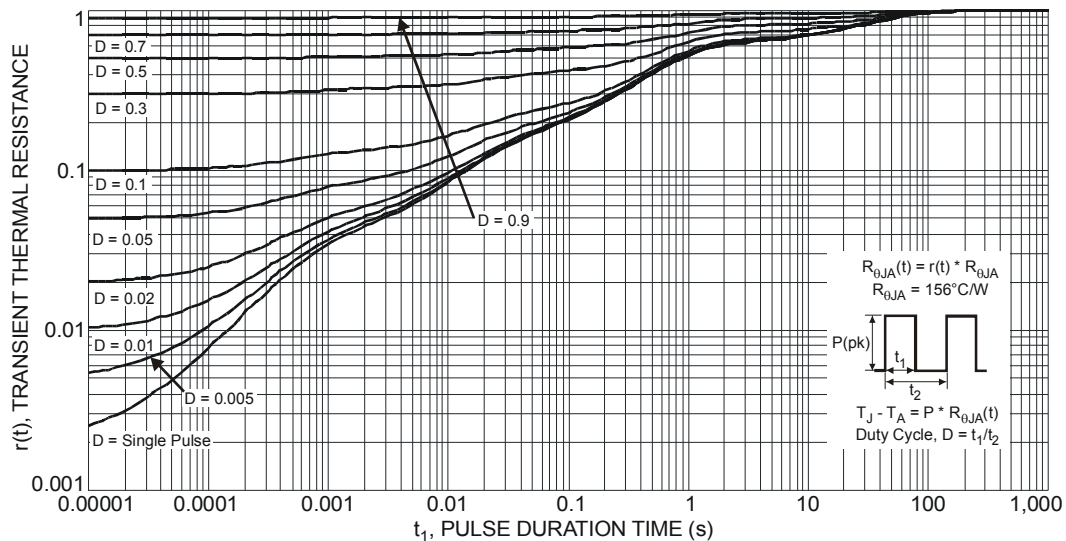
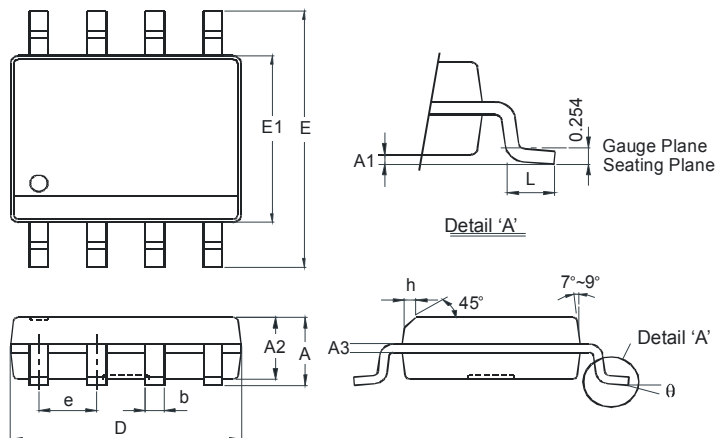


Fig. 11 Transient Thermal Response

Package Outline Dimensions

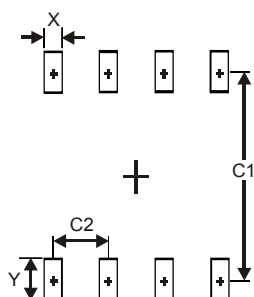
Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



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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