

Product Summary

BV _{DSS}	R _{DS(ON)} max	I _D max T _A = +25°C
-30V	7.5mΩ @ V _{GS} = -10V	-12A
	10.2mΩ @ V _{GS} = -4.5V	-10A

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

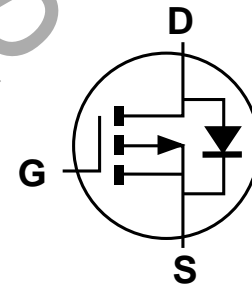
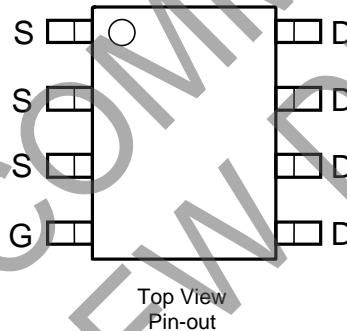
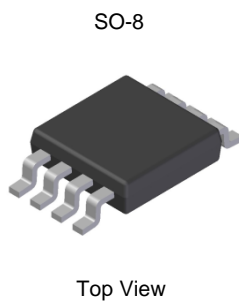
- Backlighting
- Power Management Functions
- DC-DC Converters

Features 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)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([DMG4413LSSQ](#))**

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 Below
- Terminals: Finish — Matte Tin Annealed over Copper Lead Frame. Solderable per MIL-STD-202, Method 208 (Ⓢ)
- Weight: 0.074 grams (Approximate)

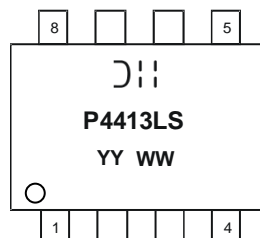
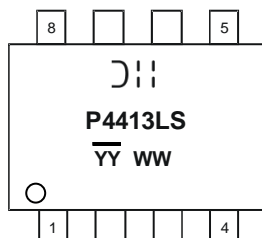


Ordering Information (Note 4)

Part Number	Case	Packaging
DMG4413LSS-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



- ⌋|| = Manufacturer's Marking
- P4413LS = Product Type Marking Code
- YYWW = Date Code Marking
- YY or YY = Year (ex: 18 = 2018)
- WW = Week (01 to 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}	-30	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	-12 -10	A
	t < 10s	T _A = +25°C T _A = +70°C	I _D	-22 -17	A
Continuous Drain Current (Note 6) V _{GS} = -4.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	-10 -8	A
	t < 10s	T _A = +25°C T _A = +70°C	I _D	-18 -14	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I _{DM}	-45	A
Maximum Body Diode Continuous Current			I _S	-4	A

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	1.7	W
	T _A = +70°C		1.1	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	74	°C/W
	t < 10s		22	
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	2.2	W
	T _A = +70°C		1.4	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	56	°C/W
	t < 10s		17	
Thermal Resistance, Junction to Case (Note 6)	Steady State	R _{θJC}	2.5	
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}	—	—	-1	µA	V _{DS} = -30V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±1	µA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	-1.1	-1.6	-2.1	V	V _{DS} = V _{GS} , I _D = -250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	6.3	7.5	mΩ	V _{GS} = -10V, I _D = -13A V _{GS} = -4.5V, I _D = -10A
Forward Transconductance	g _{fs}	—	26	—	S	V _{DS} = -15V, I _D = -13A
Diode Forward Voltage	V _{SD}	—	-0.7	-1.0	V	V _{GS} = 0V, I _S = -2.7A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	4965	—	pF	V _{DS} = -15V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{oss}	—	1487	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	711	—	pF	
Gate Resistance	R _G	—	7.3	—	Ω	V _{DS} = 0V, V _{GS} = 0V f = 1.0MHz
SWITCHING CHARACTERISTICS (Note 8)						
Total Gate Charge	Q _G	—	46	—	nC	V _{DS} = -15V, V _{GS} = -5V I _D = -13A
Gate-Source Charge	Q _{GS}	—	17	—		
Gate-Drain Charge	Q _{GD}	—	16	—		
Turn-On Delay Time	t _{D(ON)}	—	15	—	ns	V _{DS} = -15V, V _{GS} = -10V, I _D = -1A, R _G = 6.0Ω
Rise Time	t _R	—	9	—		
Turn-Off Delay Time	t _{D(OFF)}	—	160	—		
Fall Time	t _F	—	66	—		

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

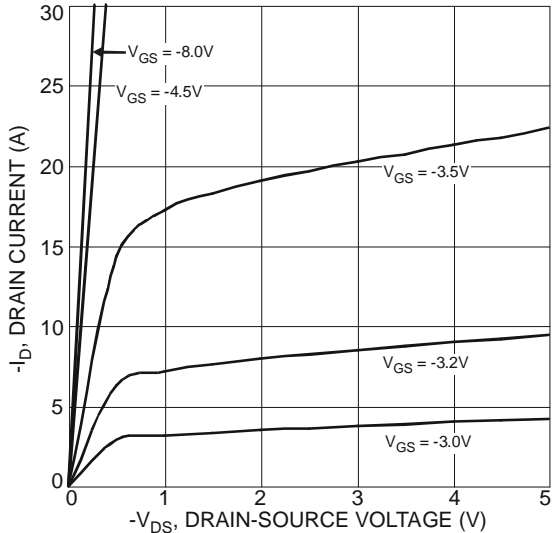


Fig. 1 Typical Output Characteristic

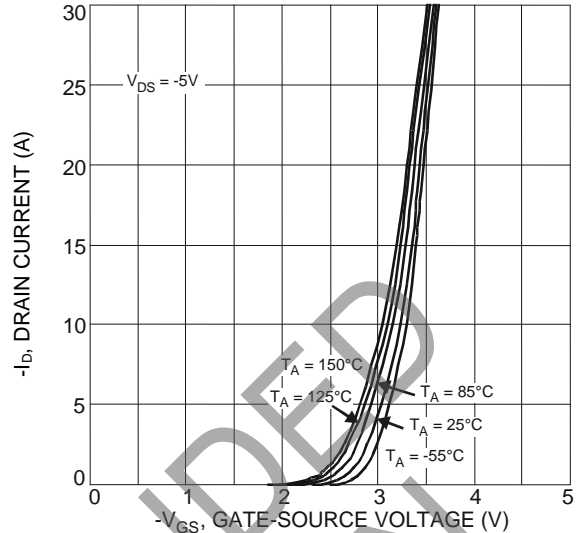


Fig. 2 Typical Transfer Characteristic

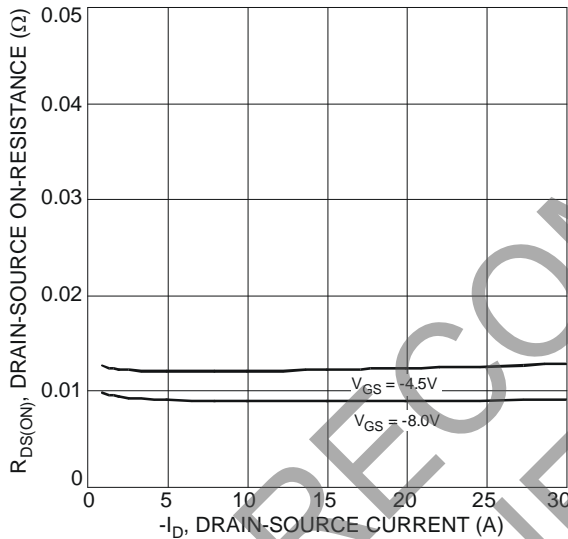


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

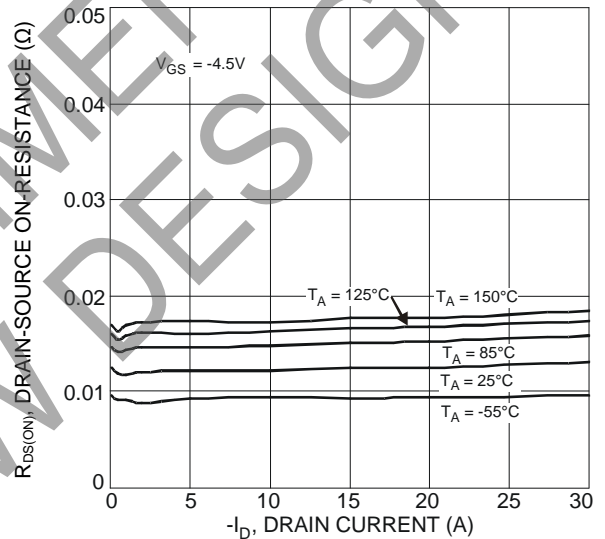


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

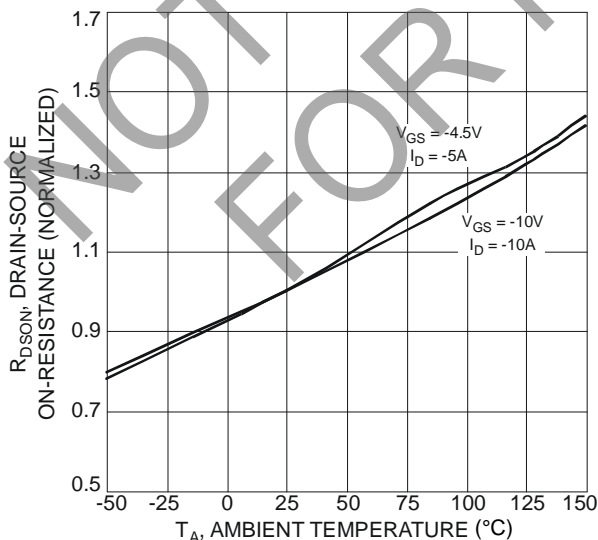


Fig. 5 On-Resistance Variation with Temperature

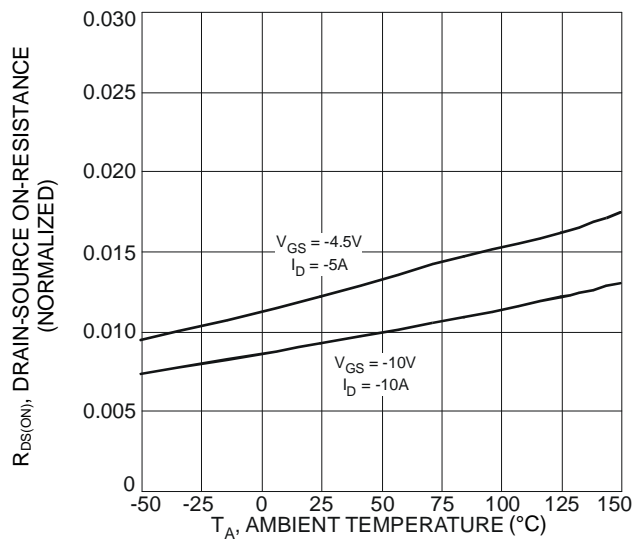


Fig. 6 On-Resistance Variation with Temperature

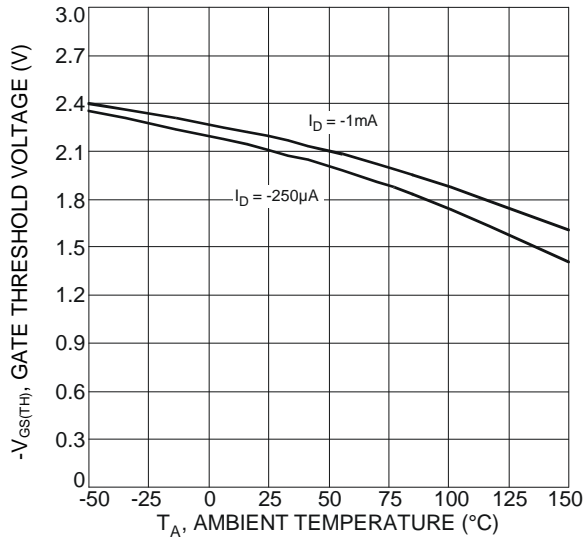


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

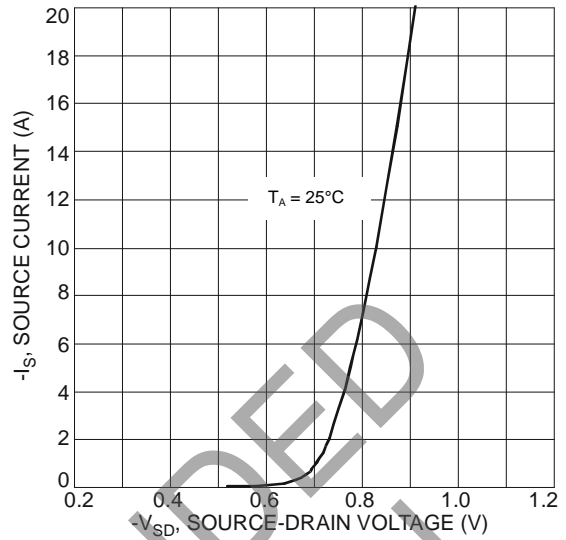


Fig. 8 Diode Forward Voltage vs. Current

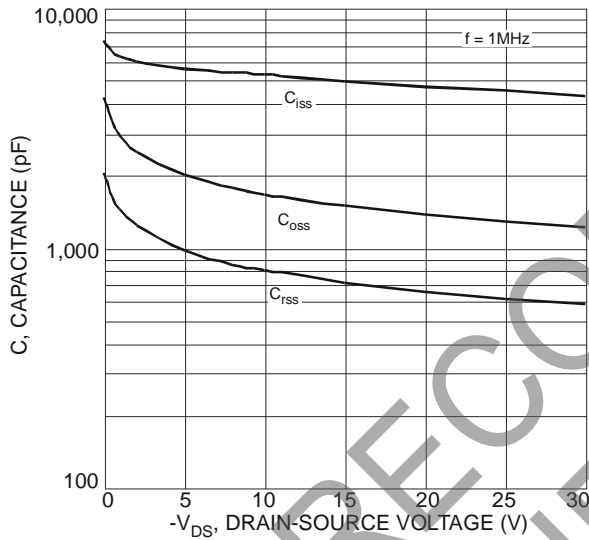


Fig. 9 Typical Total Capacitance

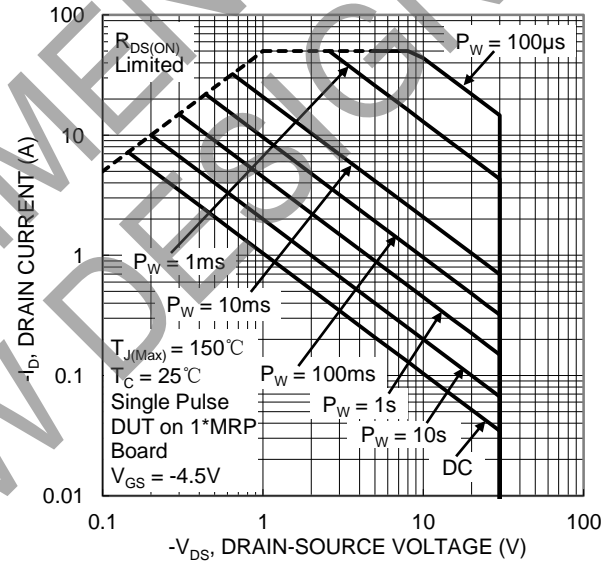
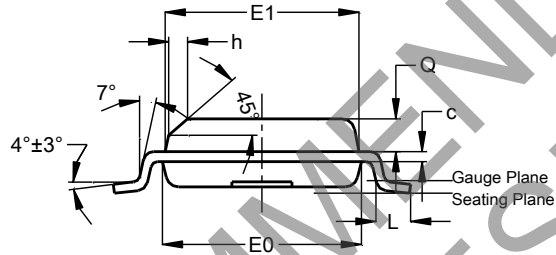
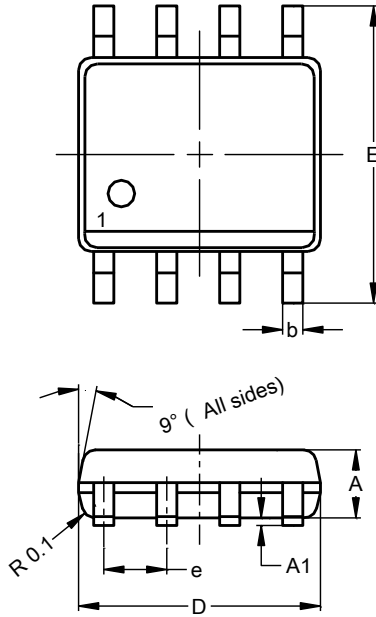


Fig. 10 SOA, Safe Operation Area

Package Outline Dimensions

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

SO-8

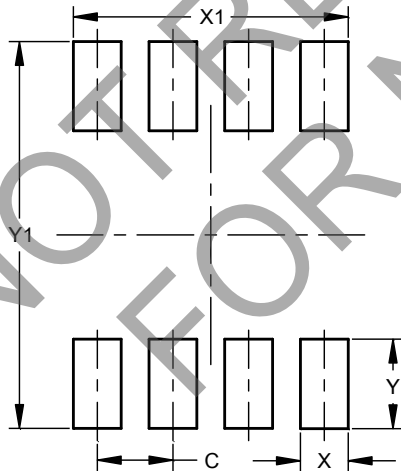


SO-8			
Dim	Min	Max	Typ
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	-	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65
All Dimensions in mm			

Suggested Pad Layout

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

SO-8



Dimensions	Value (in mm)
C	1.27
X	0.802
X1	4.612
Y	1.505
Y1	6.50

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