ASYMETRICAL DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

NEW PRODUCT

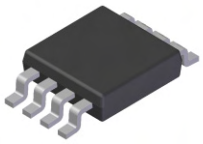
Features

- High Density UMOS with Schottky Barrier Diode
- Low Leakage Current at High Temp.
- High Conversion Efficiency
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Utilizes Diodes' Monolithic DIOFET Technology to Increase Conversion Efficiency
- 100% UIS and R_g Tested
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

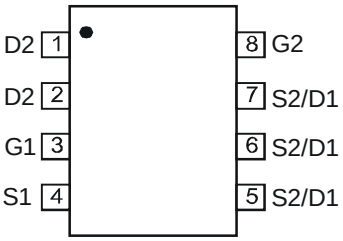
Mechanical Data

- 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: See Diagram Below
- Marking Information: See Page 8
- Ordering Information: See Page 8
- Weight: 0.072 grams (approximate)

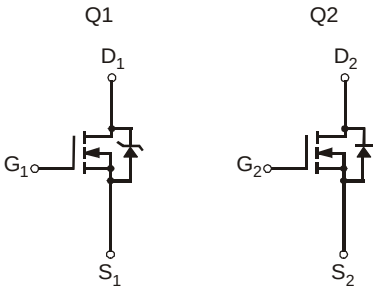
Diodes Schottky Integrated MOSFET



Top View



Top View
Internal Schematic



N-Channel MOSFET N-Channel MOSFET

Maximum Ratings – Q1 @T_A = 25°C unless otherwise specified

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	30	V
Gate-Source Voltage			V_{GSS}	±12	V
Continuous Drain Current (Note 3)	Steady State	T_A = 25°C T_A = 85°C	I_D	9.5 7.2	A
Pulsed Drain Current (Note 4)			I_{DM}	40	A
Avalanche Current (Notes 4 & 5)			I_{AR}	13	A
Repetitive Avalanche Energy (Notes 4 & 5) L = 0.3mH			E_{AR}	25.4	mJ

Maximum Ratings – Q2 @T_A = 25°C unless otherwise specified

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	30	V
Gate-Source Voltage			V_{GSS}	±25	V
Continuous Drain Current (Note 3)	Steady State	T_A = 25°C T_A = 85°C	I_D	9.5 7.5	A
Pulsed Drain Current (Note 4)			I_{DM}	40	A
Avalanche Current (Notes 4 & 5)			I_{AR}	13	A
Repetitive Avalanche Energy (Notes 4 & 5) L = 0.3mH			E_{AR}	25.4	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 3)	P_D	1.19	W
Thermal Resistance, Junction to Ambient @T_A = 25°C (Note 3)	$R_{\theta JA}$	107	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Notes:
1. No purposefully added lead.
2. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
3. Device mounted on FR-4 PCB with minimum recommended pad layout. The value in any given application depends on the user's specific board design.
4. Repetitive rating, pulse width limited by junction temperature.
5. I_{AR} and E_{AR} rating are based on low frequency and duty cycles to keep T_J = 25°C

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Electrical Characteristics – Q1 @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	-	-	V	V_{GS} = 0V, I_D = 1mA
Zero Gate Voltage Drain Current	I_{DSS}	-	-	0.1	mA	V_{DS} = 30V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	-	-	±100	nA	V_{GS} = ±12V, V_{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	-	2.4	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	-	10 12	15 18	mΩ	V_{GS} = 10V, I_D = 9A V_{GS} = 4.5V, I_D = 7A
Forward Transfer Admittance	$\|Y_{fs}\|$	-	14	-	S	V_{DS} = 10V, I_D = 9A
Diode Forward Voltage	V_{SD}	-	0.4	0.6	V	V_{GS} = 0V, I_S = 1A
Maximum Body-Diode + Schottky Continuous Current	I_S	-	-	5	A	-
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	-	1932	-	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	154	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	121	-	pF	
Gate Resistance	R_g	-	2.68	-	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (4.5V)	Q_g	-	18.1	-	nC	V_{DS} = 15V, V_{GS} = 10V, I_D = 9A
Total Gate Charge (10V)	Q_g	-	42.0	-	nC	
Gate-Source Charge	Q_{gs}	-	4.5	-	nC	
Gate-Drain Charge	Q_{gd}	-	4.0	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	6.16	-	ns	V_{GS} = 10V, V_{DS} = 15V, R_G = 3Ω, R_L = 1.7Ω
Turn-On Rise Time	t_r	-	7.22	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	36.76	-	ns	
Turn-Off Fall Time	t_f	-	5.38	-	ns	

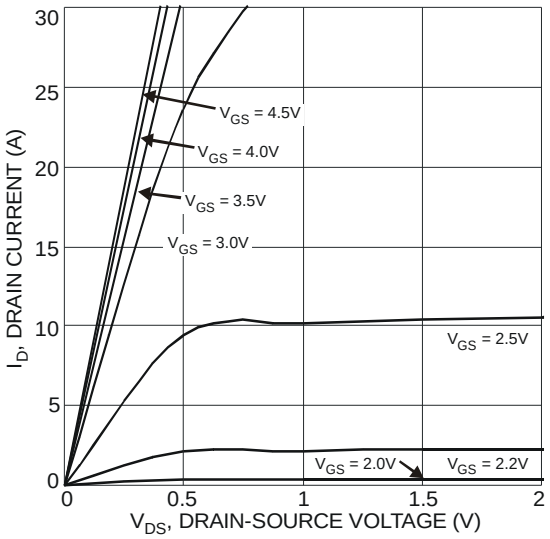

Fig. 1 Typical Output Characteristic

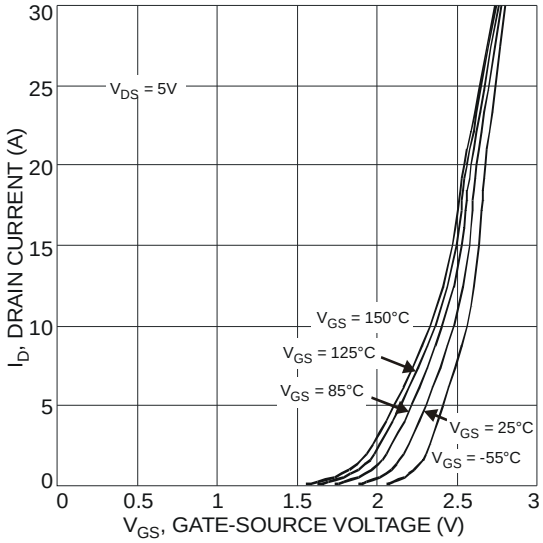

Fig. 2 Typical Transfer Characteristic

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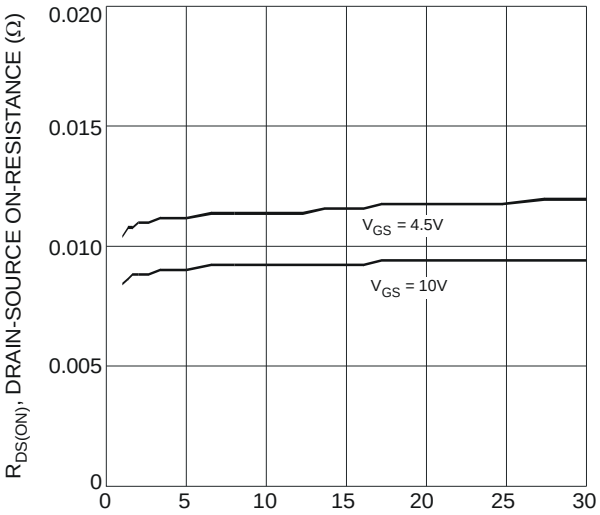

Fig. 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

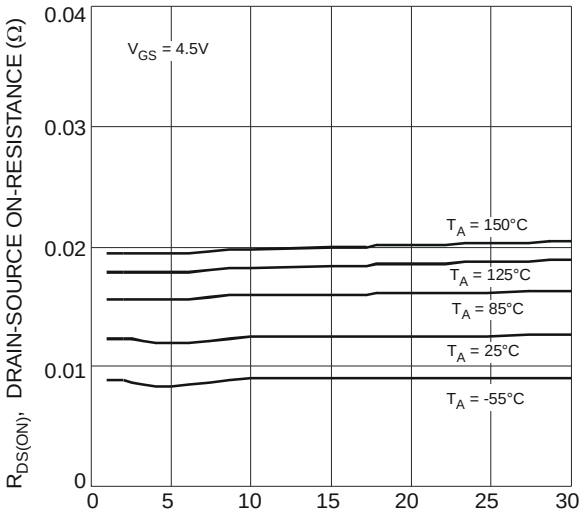

Fig. 4 Typical On-Resistance
vs. Drain Current and Temperature

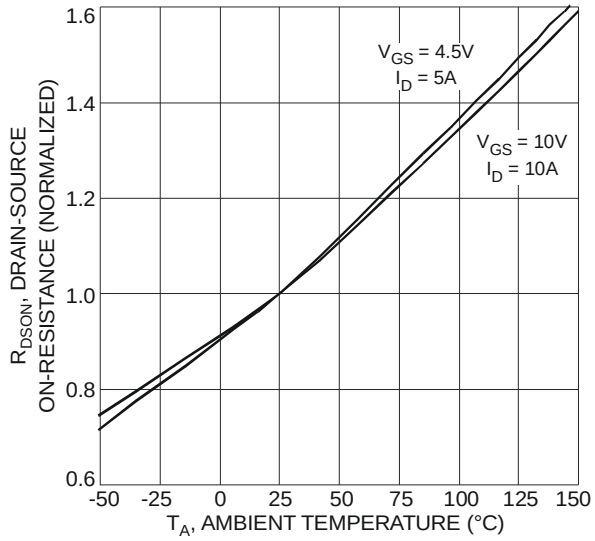

Fig. 5 On-Resistance Variation with Temperature

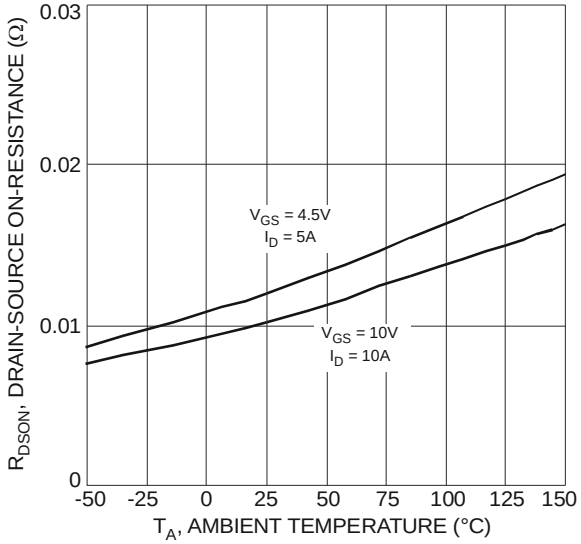

Fig. 6 On-Resistance Variation with Temperature

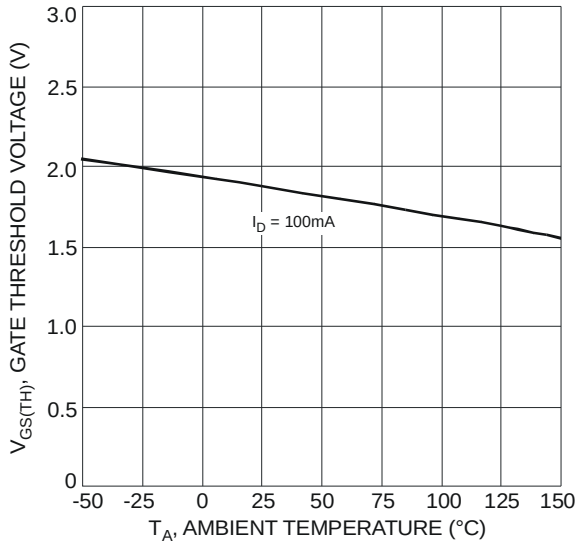

Fig. 7 Gate Threshold Variation vs. Ambient Temperature

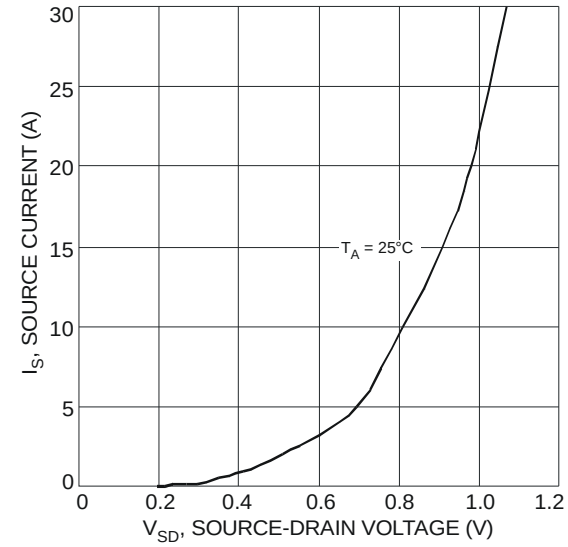

Fig. 8 Diode Forward Voltage vs. Current

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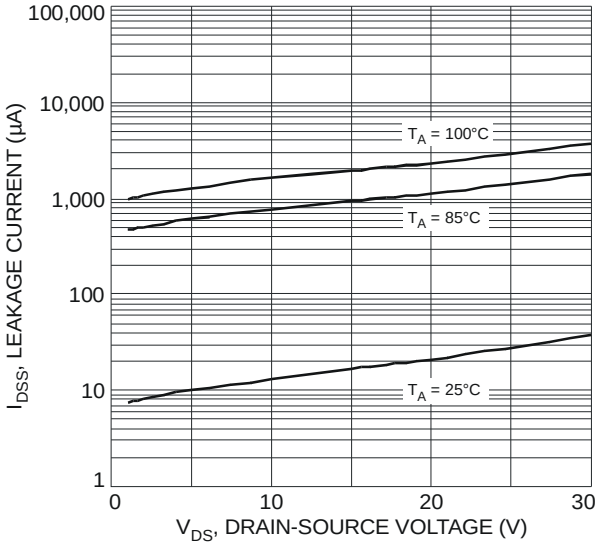

Fig. 9 Typical Leakage Current vs. Drain-Source Voltage

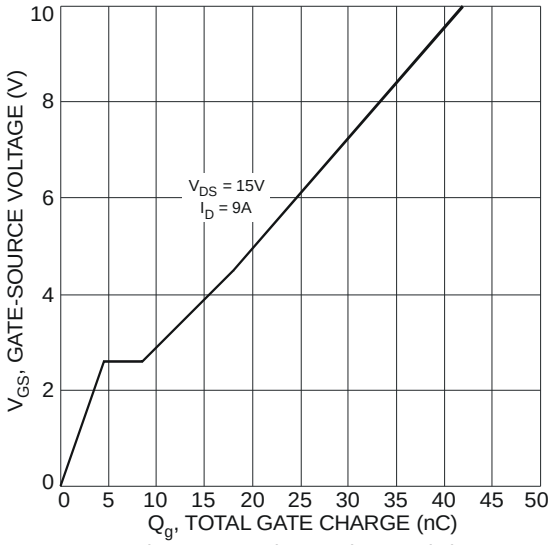

Fig. 10 Gate-Charge Characteristics

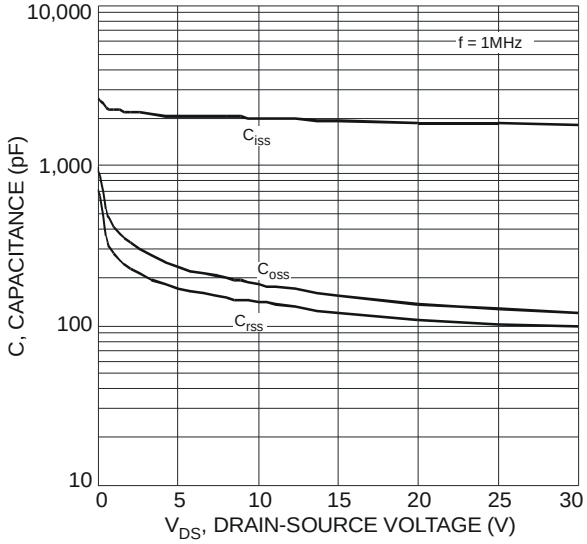

Fig. 11 Typical Total Capacitance

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Electrical Characteristics – Q2 @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
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}	-	-	+100	nA	V_{GS} = +25V, V_{DS} = 0V
		-	-	-800		V_{GS} = -25V, V_{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	-	2.3	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	-	12	15.8	mΩ	V_{GS} = 10V, I_D = 9A
			16	23		V_{GS} = 4.5V, I_D = 7A
Forward Transfer Admittance	$\|Y_{fs}\|$	-	8	-	S	V_{DS} = 10V, I_D = 9A
Diode Forward Voltage	V_{SD}	-	0.65	1.0	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	-	675	-	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	98	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	90	-	pF	
Gate Resistance	R_g	-	1.6	-	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (4.5V)	Q_g	-	7.8	-	nC	V_{DS} = 15V, V_{GS} = 10V, I_D = 9A
Total Gate Charge (10V)	Q_g	-	16.0	-	nC	
Gate-Source Charge	Q_{gs}	-	1.9	-	nC	
Gate-Drain Charge	Q_{gd}	-	2.6	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	5.05	-	ns	V_{GS} = 10V, V_{DS} = 15V, R_G = 3Ω, R_L = 1.7Ω
Turn-On Rise Time	t_r	-	9.21	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	20.76	-	ns	
Turn-Off Fall Time	t_f	-	4.94	-	ns	

Notes: 6. Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to production testing.

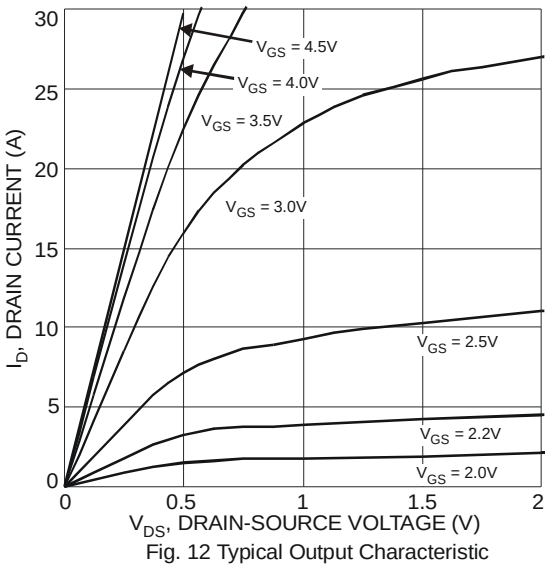

Fig. 12 Typical Output Characteristic

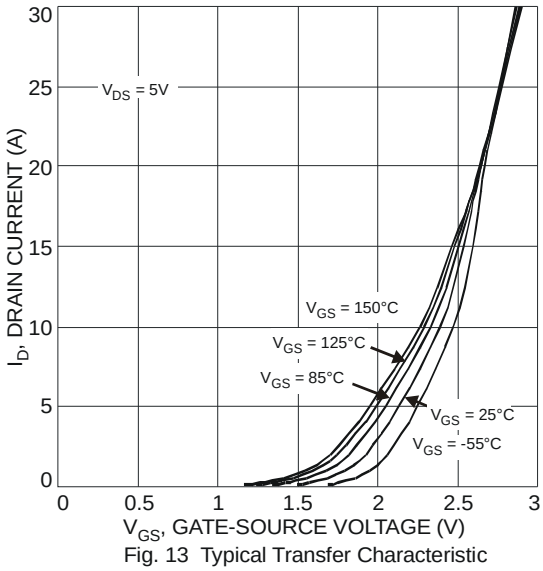

Fig. 13 Typical Transfer Characteristic

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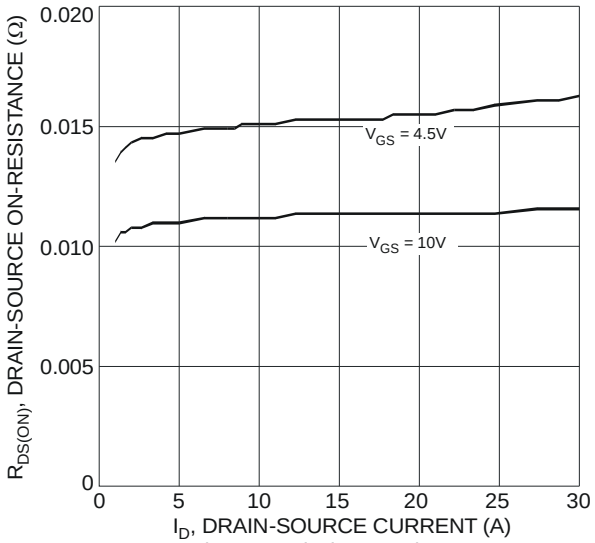

Fig. 14 Typical On-Resistance vs. Drain Current and Gate Voltage

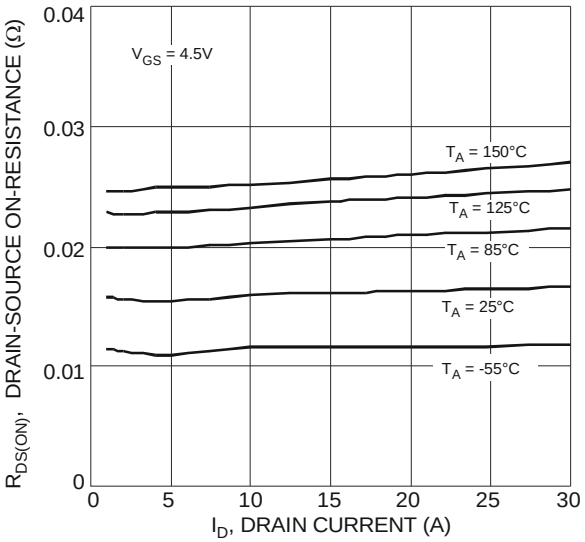

Fig. 15 Typical On-Resistance vs. Drain Current and Temperature

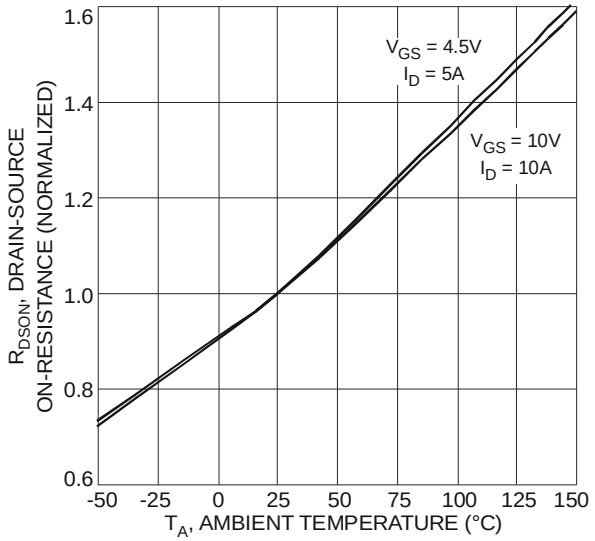

Fig. 16 On-Resistance Variation with Temperature

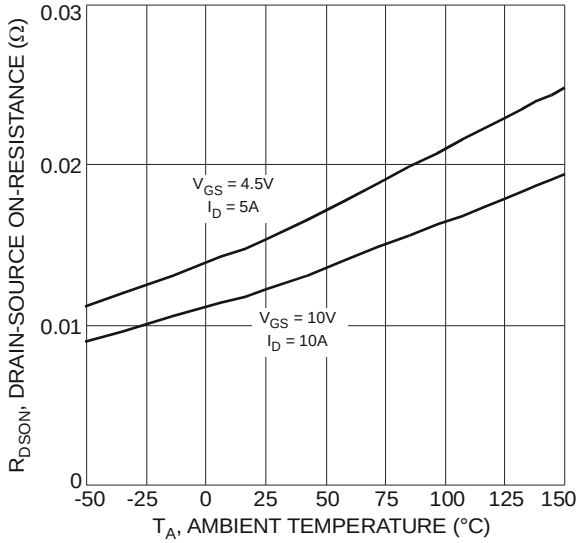

Fig. 17 On-Resistance Variation with Temperature

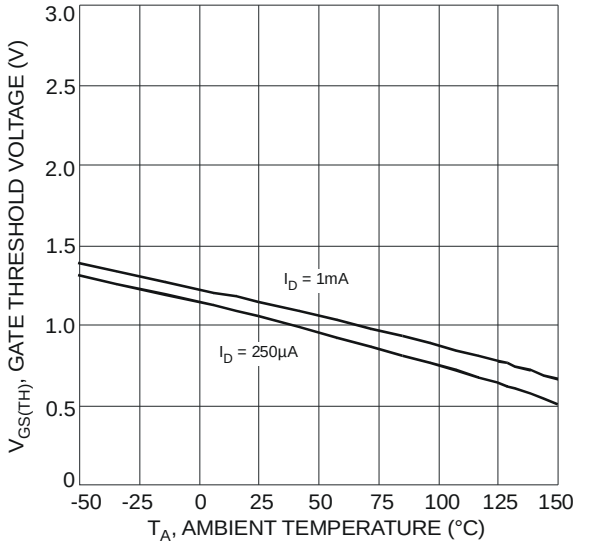

Fig. 18 Gate Threshold Variation vs. Ambient Temperature

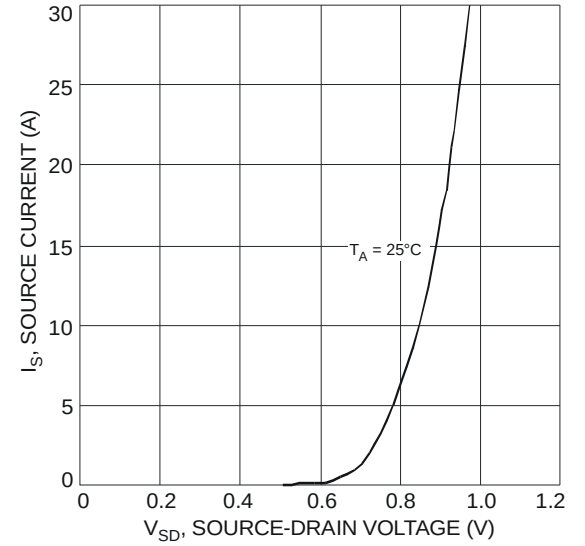

Fig. 19 Diode Forward Voltage vs. Current

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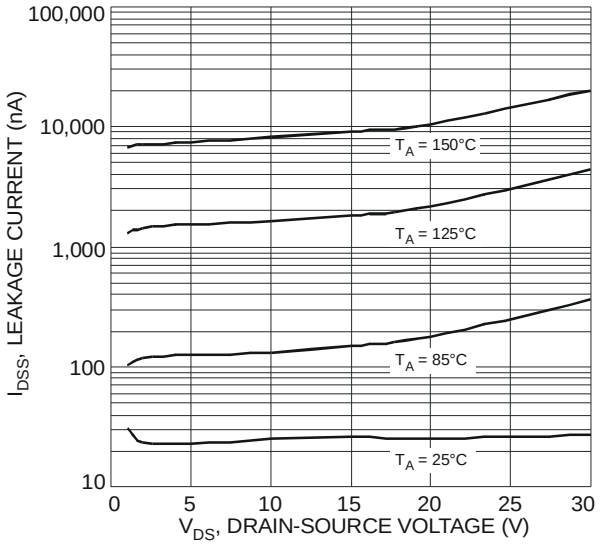


Fig. 20 Typical Leakage Current vs. Drain-Source Voltage

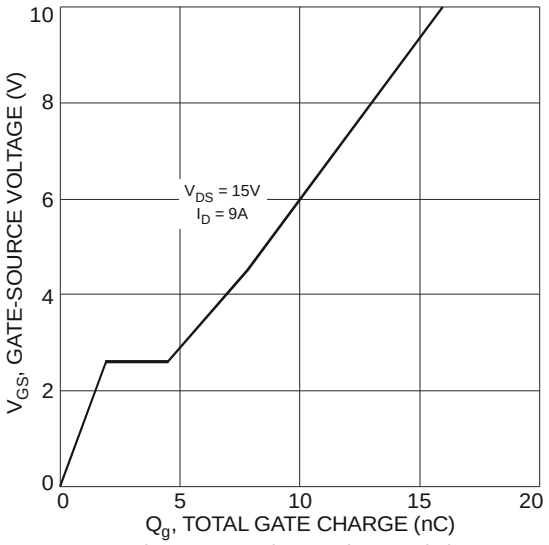


Fig. 21 Gate-Charge Characteristics

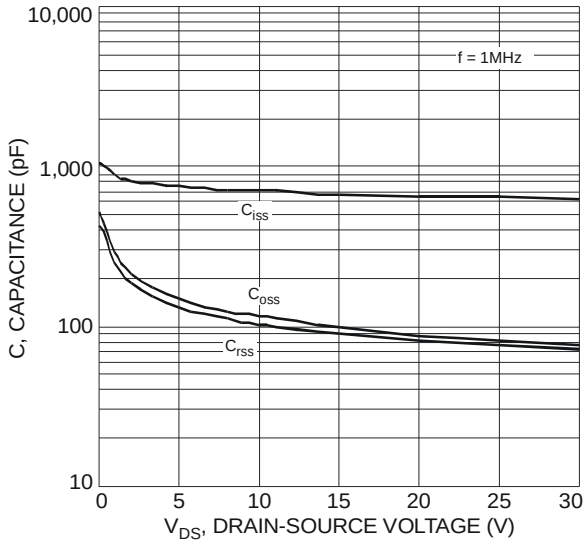


Fig. 22 Typical Total Capacitance

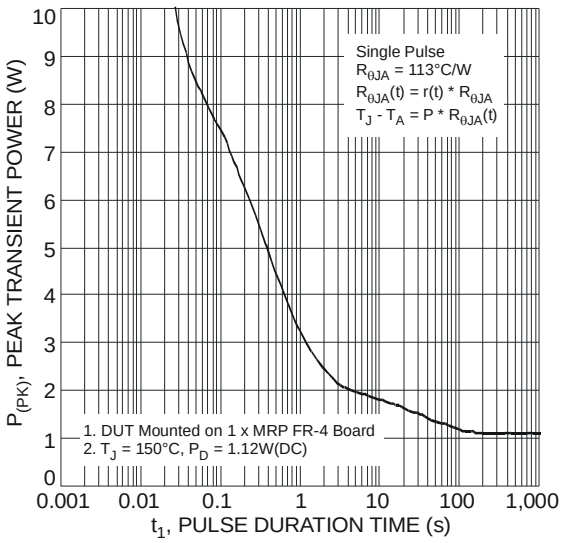


Fig. 23 Single Pulse Maximum Power Dissipation

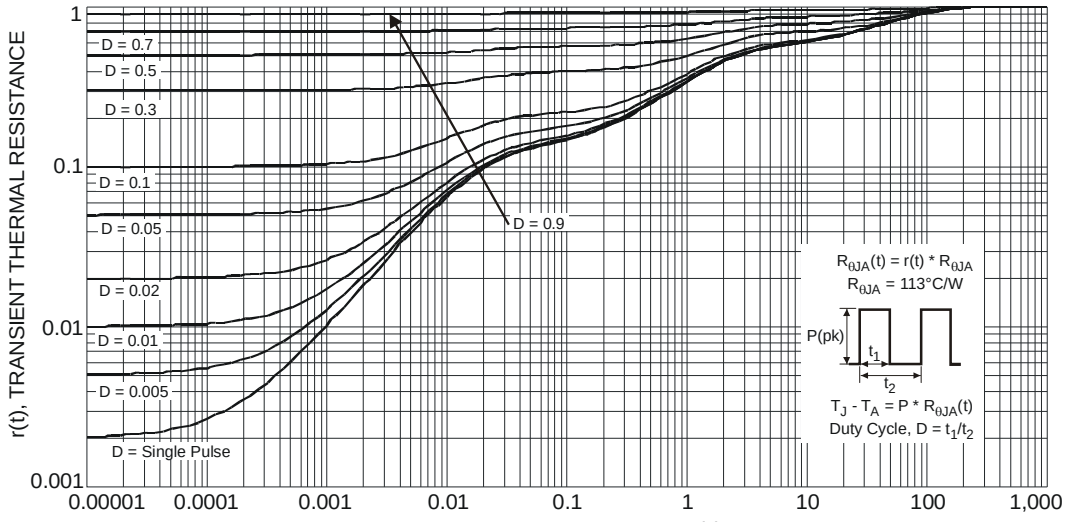


Fig. 24 Transient Thermal Response

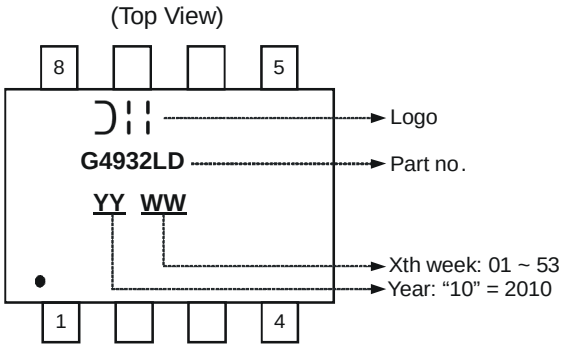
NEW PRODUCT

Ordering Information (Note 8)

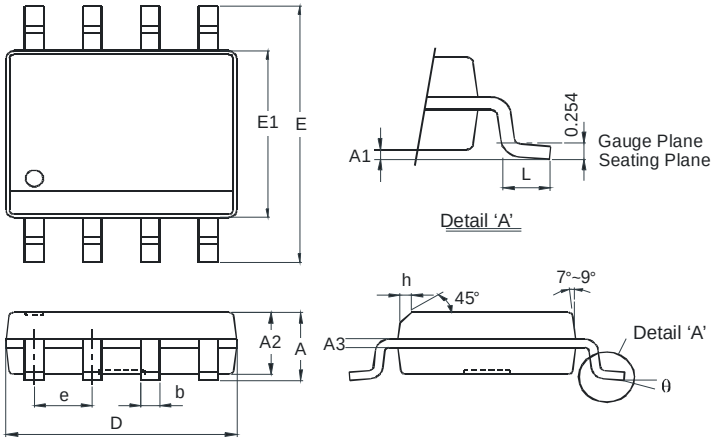
Part Number	Case	Packaging
DMG4932LSD-13	SO-8	2500 / Tape & Reel

Notes: 8. For packaging details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

Marking Information

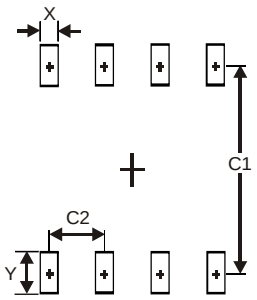


Package Outline Dimensions



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

NEW PRODUCT

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1. are intended to implant into the body, or
2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

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