



GL1S12N06L-D8

GL Silicon N-Channel Power MOSFET

General Description:

The GL1S12N06L-D8 uses advanced trench technology and design to provide excellent RDS(ON) with low gate charge. It can be used in a wide variety of applications. The package form is SOP-8, which accords with the RoHS standard.

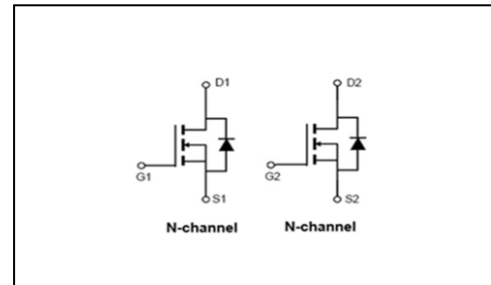
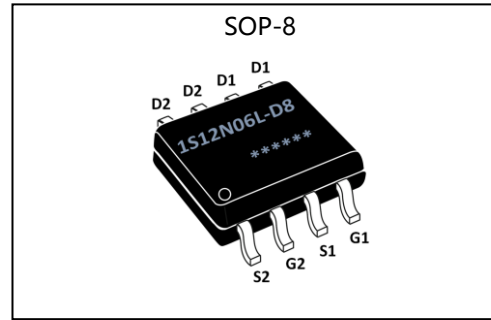
Features:

- Fast Switching
- Low Gate Charge and Rds(on)
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

Applications:

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

V _{DSS}	60	V
I _D	12	A
P _D	35	W
R _{DS(ON)typ}	58	mΩ



Absolute (T_c= 25°C unless otherwise specified):

Symbol	Parameter	Rating	Units
V _{DSS}	Drain-to-Source Voltage	60	V
I _D	Continuous Drain Current	12	A
	Continuous Drain Current T _C = 100 °C	8.5	A
I _{DM}	Pulsed Drain Current	48	A
V _{GS}	Gate-to-Source Voltage	±20	V
E _{AS} ^{a2}	Single Pulse Avalanche Energy	30	mJ
E _{AR} ^{a1}	Avalanche Energy ,Repetitive	10	mJ
I _{AR} ^{a1}	Avalanche Current	6	A
dv/dt ^{a3}	Peak Diode Recovery dv/dt	5.0	V/ns
P _D	Power Dissipation	2	W
T _J , T _{stg}	Operating Junction and Storage Temperature Range	175, -55 to 175	°C
T _L	Maximum Temperature for Soldering	300	°C



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Electrical Characteristics ($T_c = 25^\circ\text{C}$ unless otherwise specified):

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	$I_D=250\mu A, \text{Reference } 25^\circ\text{C}$	--	0.1	--	V/ $^\circ\text{C}$
I_{DSS}	Drain to Source Leakage Current	$V_{DS}=60V, V_{GS}=0V, T_a=25^\circ\text{C}$	--	--	1	μA
		$V_{DS}=48V, V_{GS}=0V, T_a=125^\circ\text{C}$	--	--	250	
$I_{GSS(F)}$	Gate to Source Forward Leakage	$V_{GS}=+20V$	--	--	1	μA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	$V_{GS}=-20V$	--	--	-1	μA

ON Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)1}$	Drain-to-Source On-Resistance	$V_{GS}=10V, I_D=6A$	--	58	75	m Ω
$R_{DS(ON)2}$	Drain-to-Source On-Resistance	$V_{GS}=4.5V, I_D=6A$	--	65	85	m Ω
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	0.8	1.4	2.5	V
Pulse width $t_p \leq 380\mu s, \delta \leq 2\%$						

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g_{fs}	Forward Transconductance	$V_{DS}=15V, I_D=3A$	2	--	--	S
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=30V$ $f=1.0\text{MHz}$	--	250	--	pF
C_{oss}	Output Capacitance		--	35	--	
C_{rss}	Reverse Transfer Capacitance		--	20	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_D=2A, V_{DD}=30V$ $V_{GS}=10V, R_G=3.0\Omega$	--	6	--	ns
t_r	Rise Time		--	15	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	15	--	
t_f	Fall Time		--	10	--	
Q_g	Total Gate Charge	$I_D=3A, V_{DD}=30V$ $V_{GS}=10V$	--	6.6	--	nC
Q_{gs}	Gate to Source Charge		--	1.2	--	
Q_{gd}	Gate to Drain ("Miller") Charge		--	1.5	--	



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Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)		--	--	12	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	48	A
V_{SD}	Diode Forward Voltage	$I_S=12A, V_{GS}=0V$	--	--	1.5	V
t_{rr}	Reverse Recovery Time	$I_S=10A, T_j = 25^\circ C$	--	28	--	ns
Q_{rr}	Reverse Recovery Charge	$di_F/dt=100A/us, V_{GS}=0V$	--	38	--	nC

Pulse width $t_p \leq 380\mu s, \delta \leq 2\%$

Symbol	Parameter	Typ.	Units
$R_{\theta Ja}$	Junction-to-Ambient	75	$^\circ C/W$

^{a1}: Repetitive rating; pulse width limited by maximum junction temperature

^{a2}: EAS condition : $T_j=25^\circ C, V_{DD}=30V, V_G=10V, L=0.5mH, R_g=25\Omega$

^{a3}: $I_{SD} = 10A, di/dt \leq 100A/us, V_{DD} \leq BV_{DS}, \text{Start } T_j=25^\circ C$

Test Circuit and Waveform

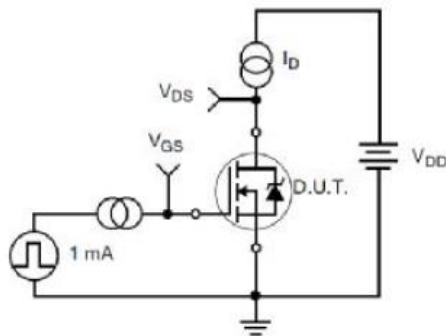


Figure 17. Gate Charge Test Circuit

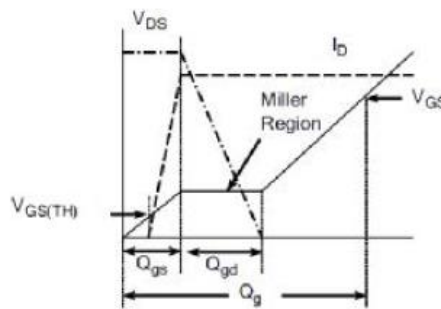


Figure 18. Gate Charge Waveform

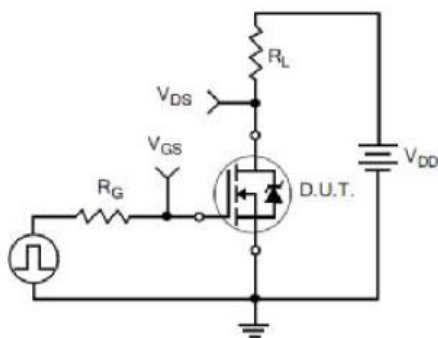


Figure 19. Resistive Switching Test Circuit

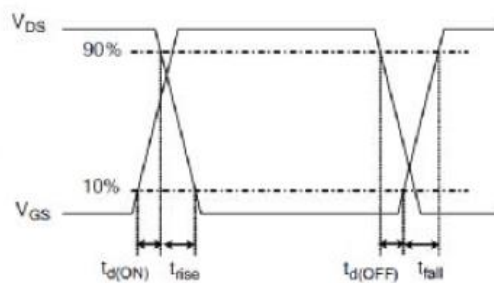


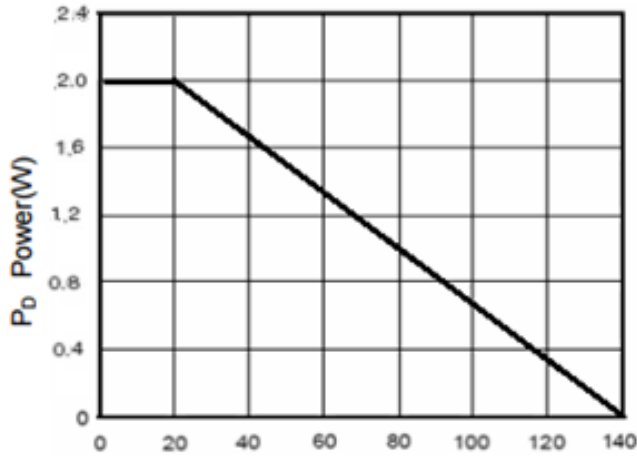
Figure 20. Resistive Switching Waveforms



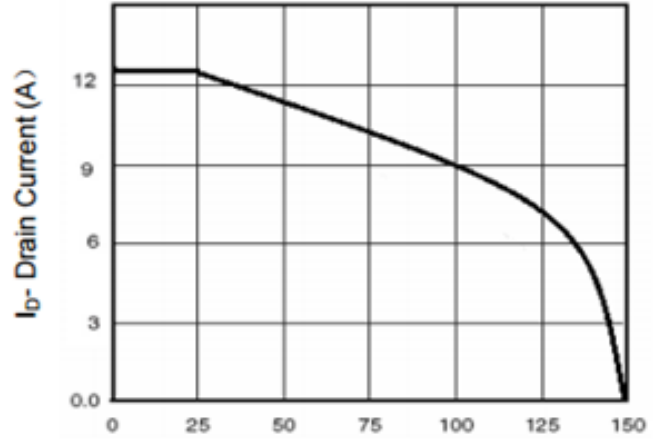
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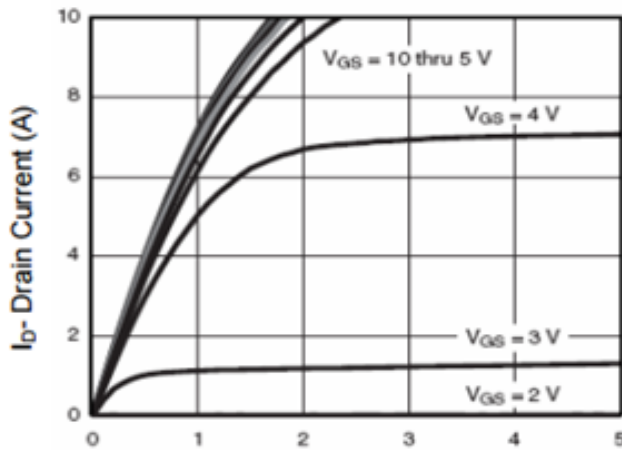
Characteristics Curve:



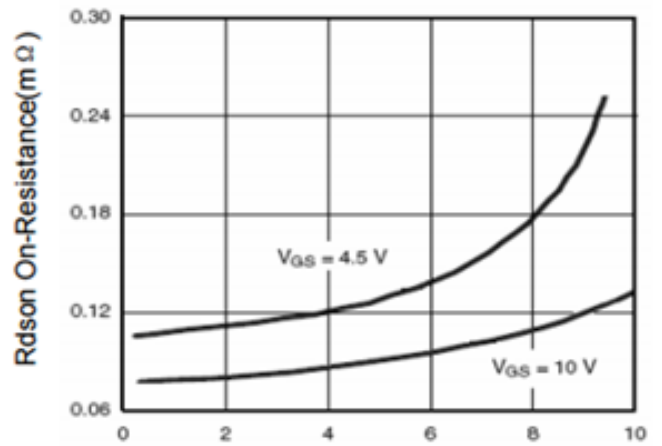
T_J -Junction Temperature (°C)
Figure 3 Power Dissipation



T_J -Junction Temperature (°C)
Figure 4 Drain Current



$V_{GS} = 10$ thru $5V$
 $V_{GS} = 4V$
 $V_{GS} = 3V$
 $V_{GS} = 2V$
 V_{DS} Drain-Source Voltage (V)
Figure 5 Output Characteristics



$V_{GS} = 4.5V$
 $V_{GS} = 10V$
 I_D -Drain Current (A)
Figure 6 Drain-Source On-Resistance



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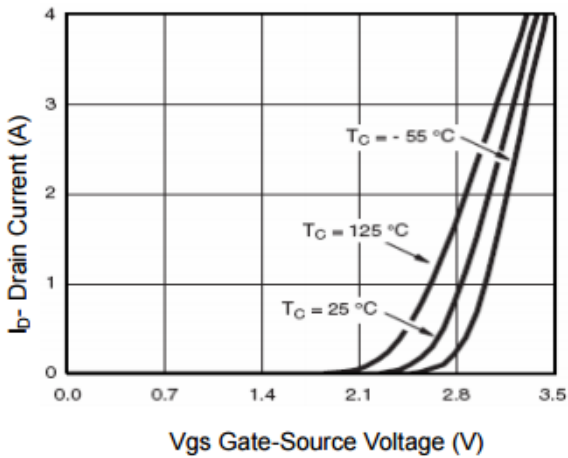


Figure 7 Transfer Characteristics

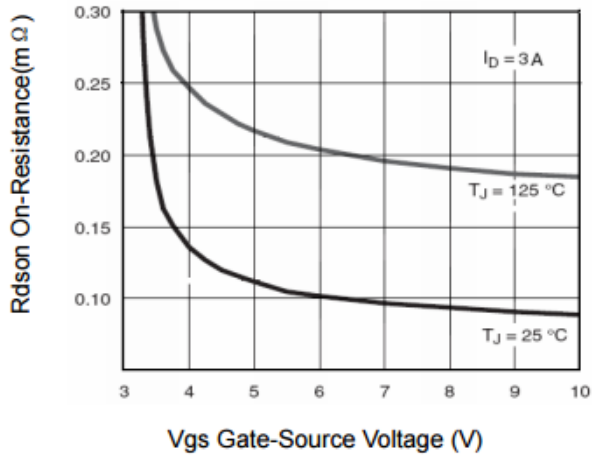


Figure 9 Rdson vs Vgs

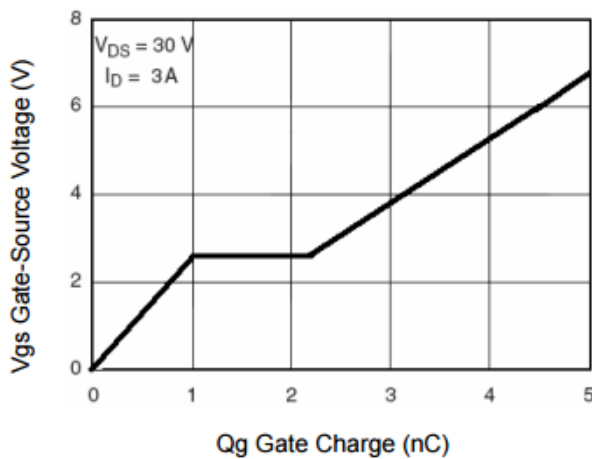


Figure 11 Gate Charge

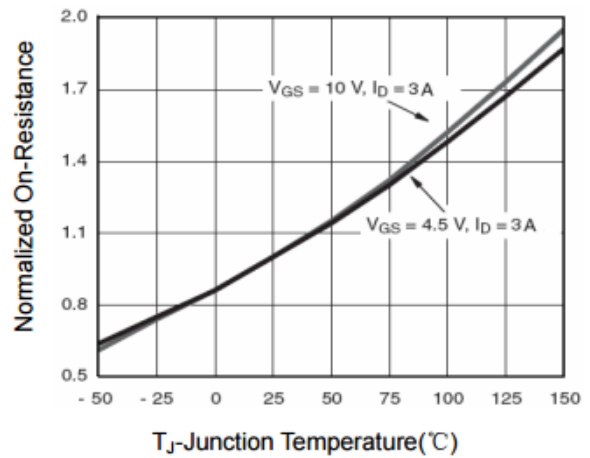


Figure 8 Drain-Source On-Resistance

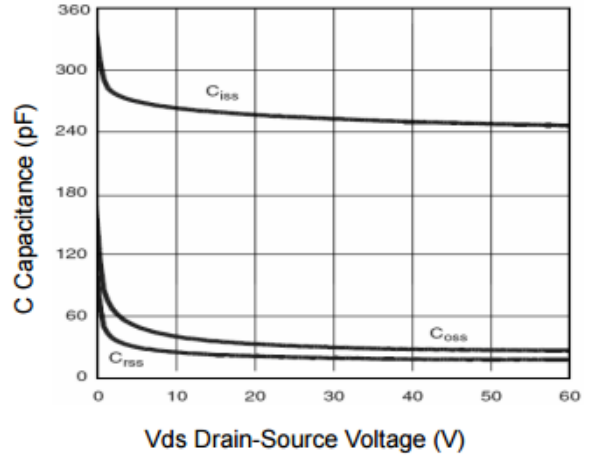


Figure 10 Capacitance vs Vds

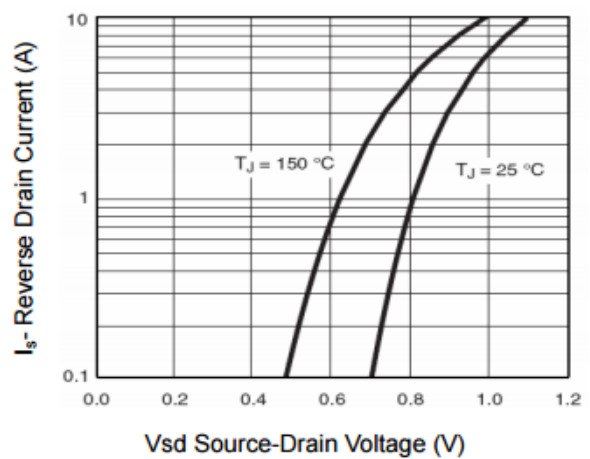


Figure 12 Source- Drain Diode Forward