



GL1S50N06L-D8

GL Silicon N-Channel Power MOSFET

General Description:

The GL1S50N06L-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 and two dies in this form.

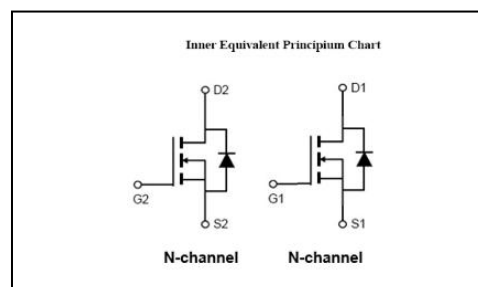
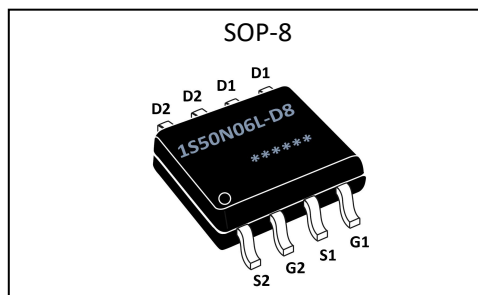
Features:

- Fast Switching
- Low Gate Charge and Rdson
- 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	50	A
P_D	2.1	W
$R_{DS(ON)TYP}$	14	m Ω



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

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	60	V
I_D	Continuous Drain Current	50	A
	Continuous Drain Current $T_C = 100^\circ\text{C}$	35	A
I_{DM}	Pulsed Drain Current	100	A
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}^{a2}	Single Pulse Avalanche Energy	300	mJ
E_{AR}^{a1}	Avalanche Energy ,Repetitive	50	mJ
I_{AR}^{a1}	Avalanche Current	38	A
dv/dt^{a3}	Peak Diode Recovery dv/dt	5.0	V/ns
P_D	Power Dissipation	2.1	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	175, -55 to 175	$^\circ\text{C}$
T_L	Maximum Temperature for Soldering	300	$^\circ\text{C}$



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Electrical Characteristics (Tc=25°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	$I_D=250\mu A$, Reference 25°C	--	0.1	--	V/°C
I_{DSS}	Drain to Source Leakage Current	$V_{DS}=60V, V_{GS}=0V, T_a=25^\circ C$	--	--	1	μA
		$V_{DS}=48V, V_{GS}=0V, T_a=125^\circ C$	--	--	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.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	$V_{GS}=10V, I_D=10A$	--	14	20	mΩ
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.7	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	$V_{DS}=5V, I_D=10A$	18	--	--	S
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=30V$ $f=1.0MHz$	--	2050	--	pF
C_{oss}	Output Capacitance		--	158	--	
C_{rss}	Reverse Transfer Capacitance		--	120	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_D=10A, V_{DD}=30V$ $V_{GS}=10V, R_G=3.0\Omega$	--	7.5	--	ns
t_r	Rise Time		--	5.0	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	28.0	--	
t_f	Fall Time		--	5.5	--	
Q_g	Total Gate Charge	$I_D=10A, V_{DD}=30V$ $V_{GS}=10V$	--	50	--	nC
Q_{gs}	Gate to Source Charge		--	6	--	
Q_{gd}	Gate to Drain ("Miller") Charge		--	15	--	

Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)		--	--	50	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	100	A
V_{SD}	Diode Forward Voltage	$I_S=10A, V_{GS}=0V$	--	--	1.5	V
t_{rr}	Reverse Recovery Time	$I_S=10A, T_J=25^\circ C$	--	30	--	ns
Q_{rr}	Reverse Recovery Charge	$dI_F/dt=100A/us, V_{GS}=0V$	--	40	--	nC

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

Symbol	Parameter	Typ.	Units
$R_{\theta JA}$	Junction-to-Ambient	60	$^\circ C/W$

^{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

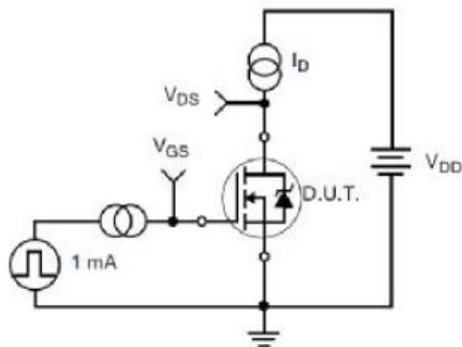


Figure 17. Gate Charge Test Circuit

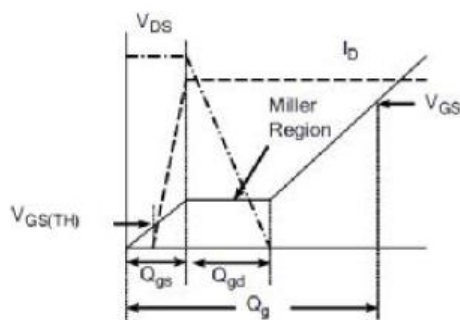


Figure 18. Gate Charge Waveform

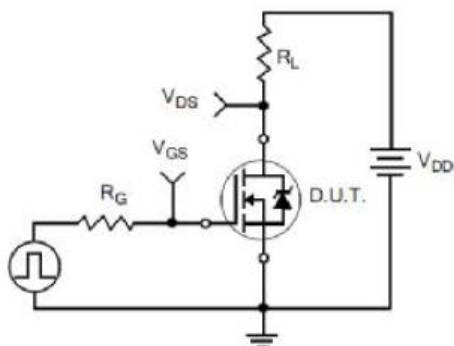


Figure 19. Resistive Switching Test Circuit

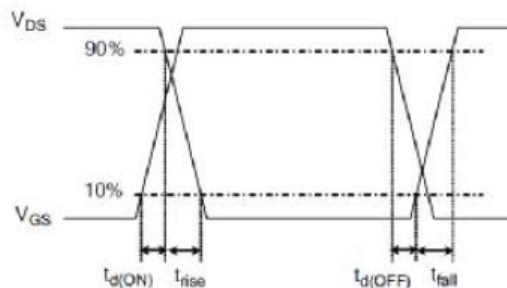


Figure 20. Resistive Switching Waveforms

Typical Electrical and Thermal Characteristics (Curves)

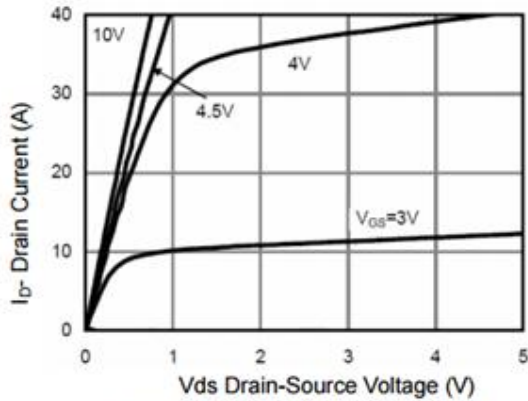


Figure 1 Output Characteristics

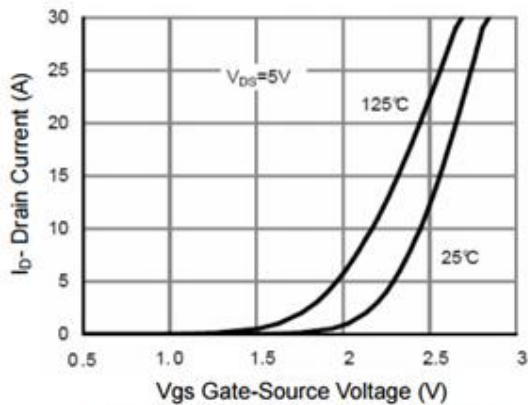


Figure 2 Transfer Characteristics

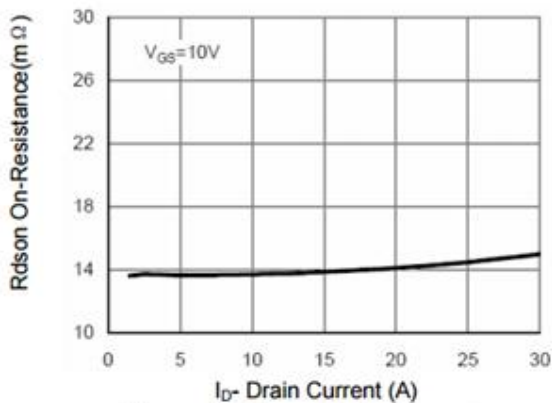


Figure 3 Rdson- Drain Current

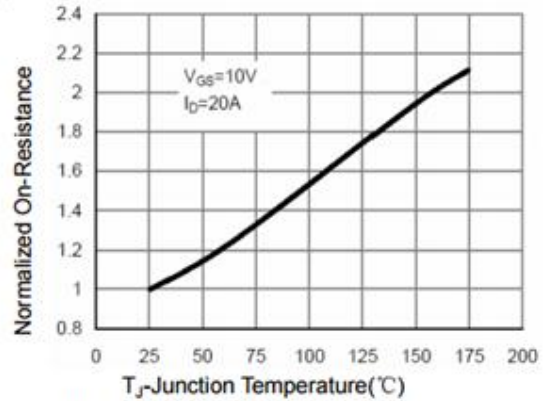


Figure 4 Rdson-Junction Temperature

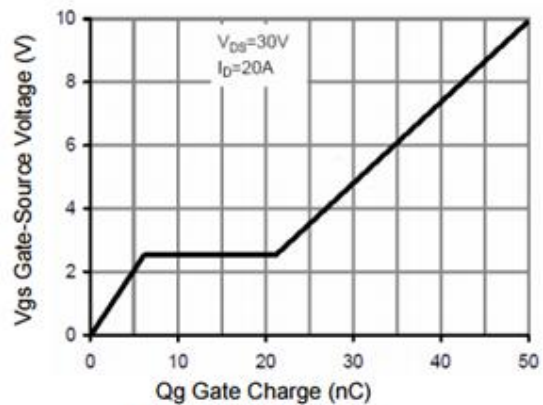


Figure 5 Gate Charge

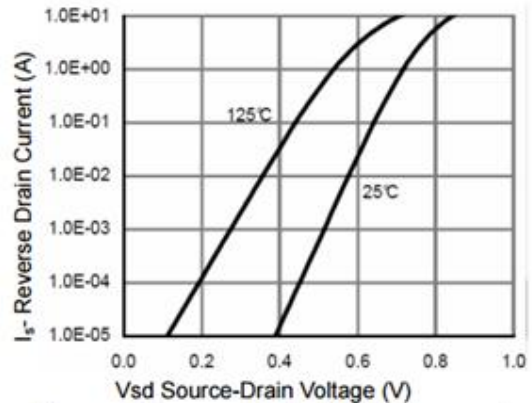


Figure 6 Source- Drain Diode Forward

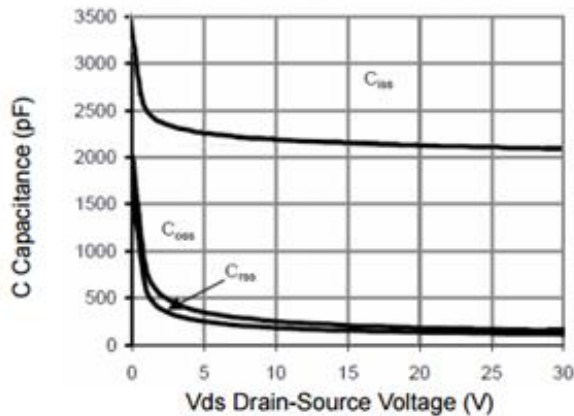


Figure 7 Capacitance vs Vds

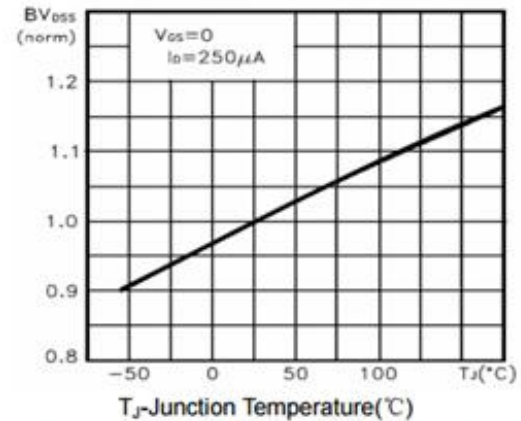


Figure 9 BV_{dss} vs Junction Temperature

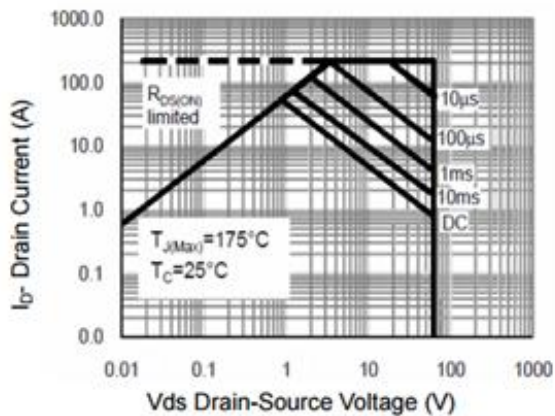


Figure 8 Safe Operation Area

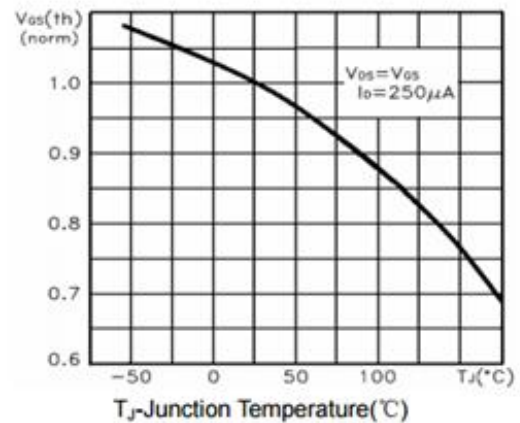


Figure 10 $V_{GS(th)}$ vs Junction Temperature

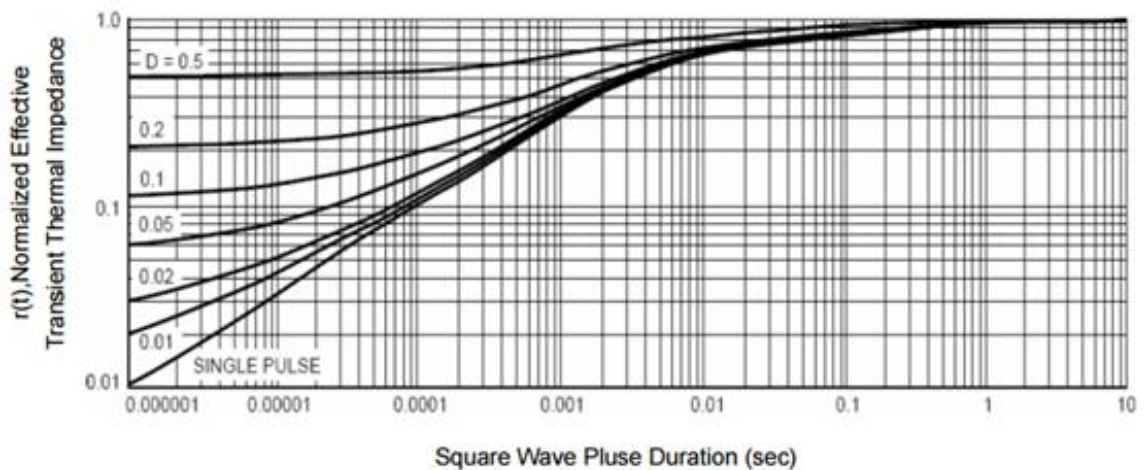


Figure 11 Normalized Maximum Transient Thermal Impedance