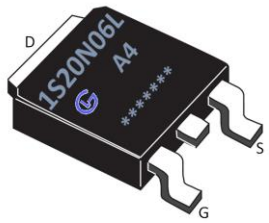
GL Silicon N-Channel Power MOSFET

V_{DSS}	60	V
I_D	20	A
P_D	45	W
$R_{DS(ON)}$	25	mΩ

General Description

The GL1S20N06LA4 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications. The package form is TO-252, which accords with the RoHS standard.

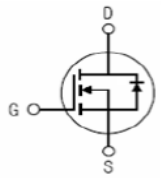
TO-252



Features

- Fast Switching
- Low Gate Charge and Rdson
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

Inner Equivalent Principium Chart



Applications

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

Absolute (Tc= 25℃ unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	60	V
I_D	Continuous Drain Current	20	A
	Continuous Drain Current T_C = 100 °C	14	A
I_{DM}	Pulsed Drain Current	60	A
V_{GS}	Gate-to-Source Voltage	±20	V
E_{AS} a2	Single Pulse Avalanche Energy	72	mJ
E_{AR} a1	Avalanche Energy ,Repetitive	18	mJ
I_{AR} a1	Avalanche Current	11	A
dv/dt a3	Peak Diode Recovery dv/dt	5.0	V/ns
P_D	Power Dissipation	45	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	175, −55 to 175	℃
T_L	Maximum Temperature for Soldering	300	℃

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Electrical Characteristics (Tc= 25℃ 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=250μA	60	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	I_D=250uA,Reference25℃	--	0.1	--	V/℃
I_{DSS}	Drain to Source Leakage Current	V_{DS}=60V, V_{GS}=0V,T_a=25℃	--	--	1	μA
		V_{DS}=48V,V_{GS}=0V,T_a=125℃	--	--	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=20A	--	25	30	mΩ
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	1.0	1.7	2.5	V
Pulse width tp≤380μs,δ≤2%						

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g_{fs}	Forward Transconductance	V_{DS}=5V, I_D=5A	11	--	--	S
C_{iss}	Input Capacitance	V_{GS}=0V V_{DS}=30V f=1.0MHz	--	500	--	pF
C_{oss}	Output Capacitance		--	60	--	
C_{rss}	Reverse Transfer Capacitance		--	25	--	

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=3.0Ω	--	5	--	ns
t_r	Rise Time		--	2.6	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	2.3	--	
t_f	Fall Time		--	5.5	--	
Q_g	Total Gate Charge	I_D=4.5A, V_{DD} =30V, V_{GS}=10V	--	47	--	nC
Q_{gs}	Gate to Source Charge		--	6	--	
Q_{gd}	Gate to Drain (“Miller”)Charge		--	14	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)		--	--	20	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	60	A
V_{SD}	Diode Forward Voltage	I_S=20A,V_{GS}=0V	--	--	1.5	V
t_{rr}	Reverse Recovery Time	I_S=10A,T_j = 25°C	--	35	--	ns
Q_{rr}	Reverse Recovery Charge	dI_F/dt=100A/us,V_{GS}=0V	--	50	--	nC
Pulse width tp≤380μs,δ≤2%						

Symbol	Parameter	Typ.	Units
$R_{\theta JA}$	Junction-to-Ambient	3.3	℃/W

[a1]: Repetitive rating; pulse width limited by maximum junction temperature

[a2]: EAS condition : T_j=25 ,V_{DD}=℃ 30V,V_G=10V,L=0.5mH,R_g=25Ω

[a3]: I_{SD} =10A,di/dt ≤100A/us,V_{DD}≤BV_{DS}, Start T_J=25℃

Test Circuits

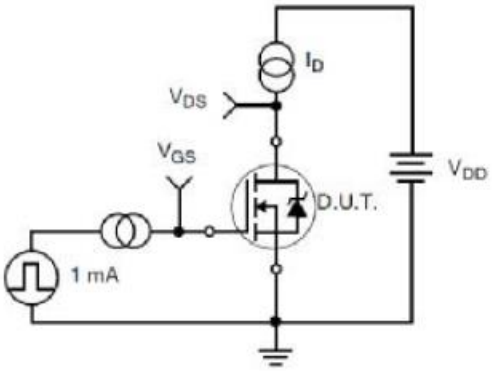


Figure 17. Gate Charge Test Circuit

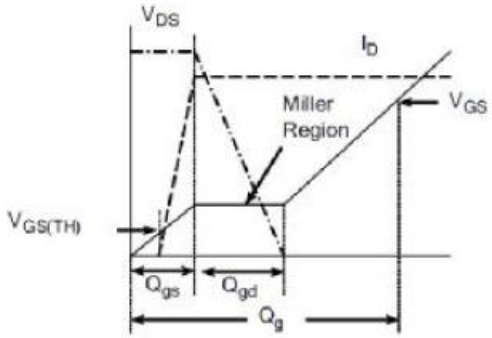


Figure 18. Gate Charge Waveform

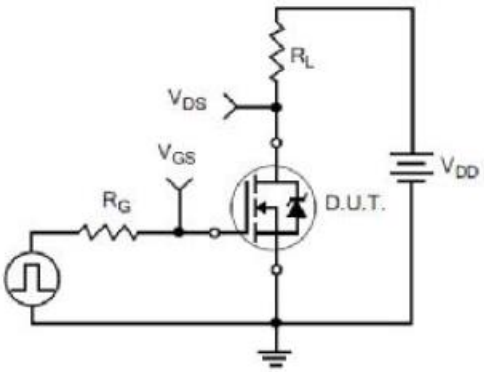


Figure 19. Resistive Switching Test Circuit

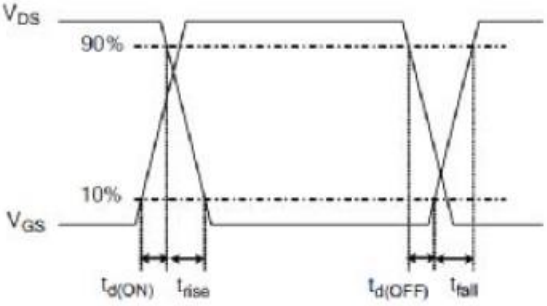


Figure 20. Resistive Switching Waveforms

Characteristics Curves

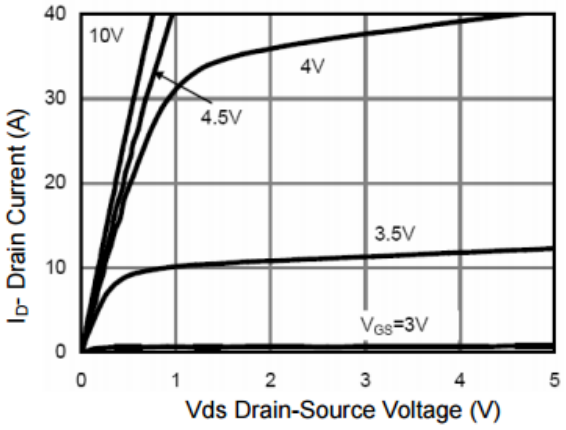


Figure 1 Output Characteristics

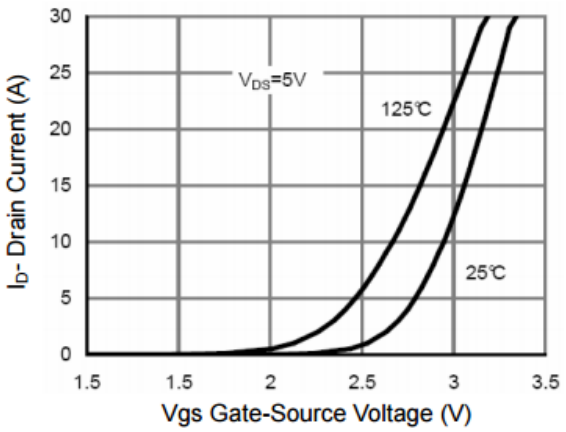


Figure 2 Transfer Characteristics

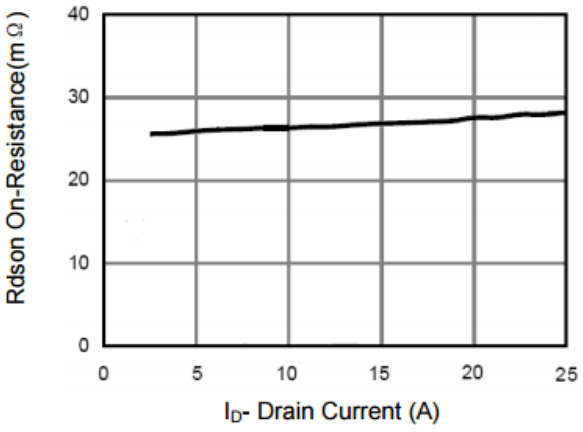


Figure 3 Rdson- Drain Current

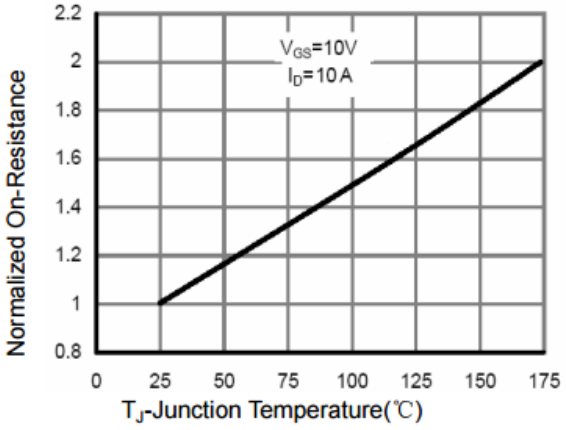


Figure 4 Rdson-Junction Temperature

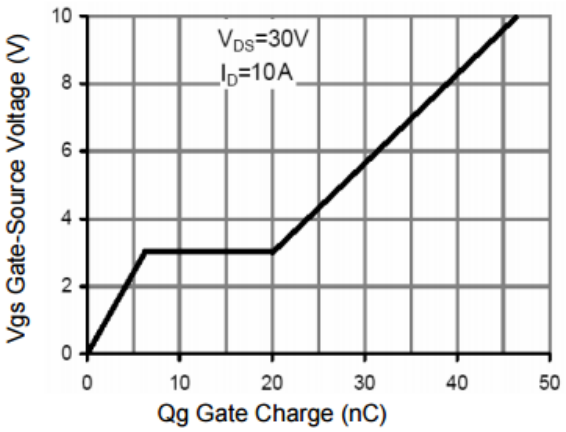


Figure 5 Gate Charge

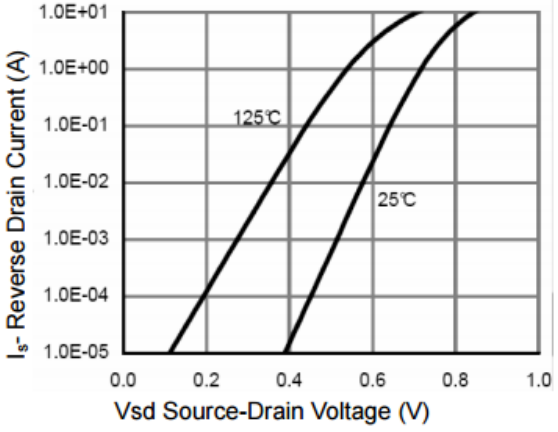


Figure 6 Source- Drain Diode Forward

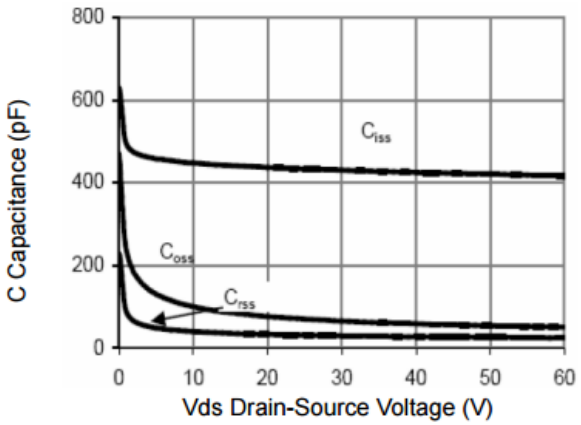


Figure 7 Capacitance vs Vds

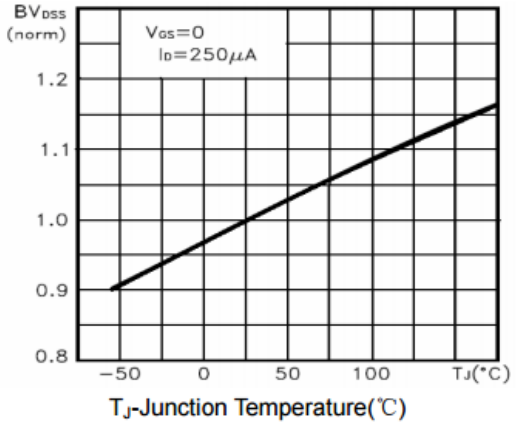


Figure 9 BV_{DSS} vs Junction Temperature

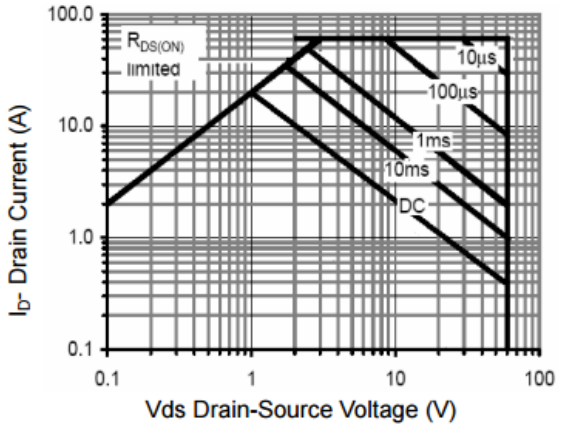


Figure 8 Safe Operation Area

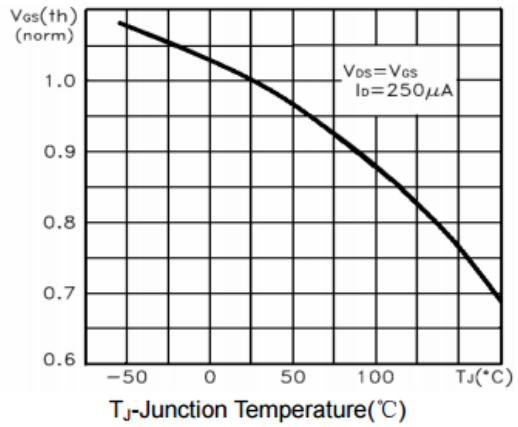
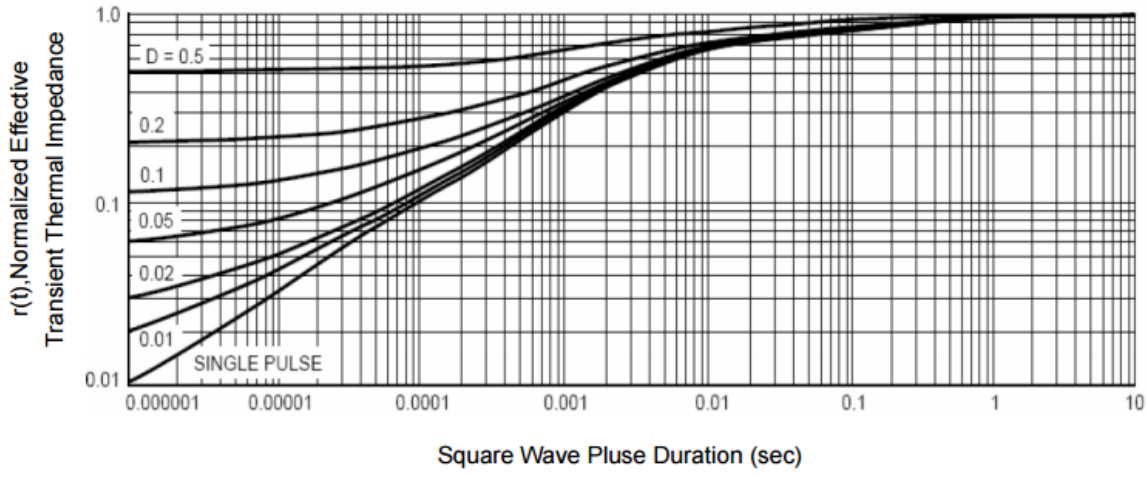


Figure 10 $V_{GS(th)}$ vs Junction Temperature



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