

General Description:

The GL1S12N06LA3 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 TO-251, which accords with the RoHS standard.

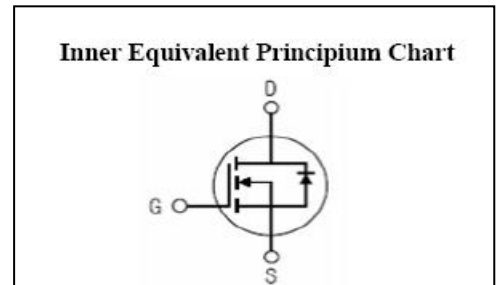
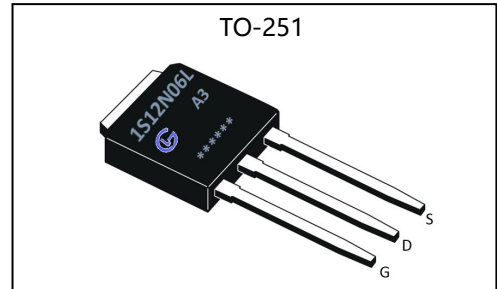
Features:

- 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	12	A
P_D	35	W
$R_{DS(ON)typ}$	58	mΩ



Absolute (Tc= 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 $T_C = 100\text{ }^{\circ}\text{C}$	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	35	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	$^{\circ}\text{C}$



GL1S12N06LA3

GL Silicon N-Channel Power MOSFET

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	$I_D=250\mu A, \text{Reference } 25^\circ C$	--	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	$V_{GS}=10V, I_D=6A$	--	58	85	mΩ
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	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	$V_{GS}=0V, V_{DS}=30V$ $f=1.0MHz$	--	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	--	

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 $tp \leq 380\mu s, \delta \leq 2\%$

Symbol	Parameter	Typ.	Units
$R_{\theta JC}$	Junction-to-Case	3.58	$^\circ C/W$

^{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}: $I_{SD} = 12A, di/dt \leq 100A/us, V_{DD} \leq BV_{DS}$, Start $T_J = 25^\circ C$

Test Circuit and Waveform

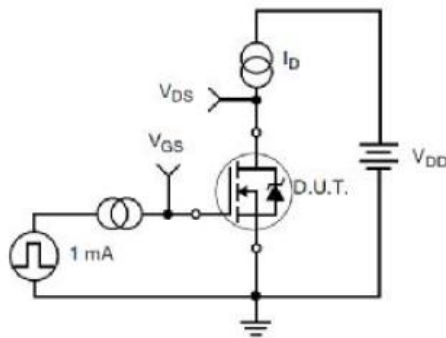


Figure 17. Gate Charge Test Circuit

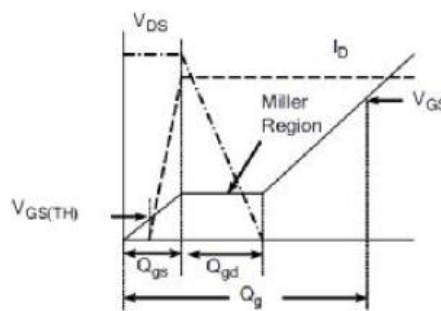


Figure 18. Gate Charge Waveform

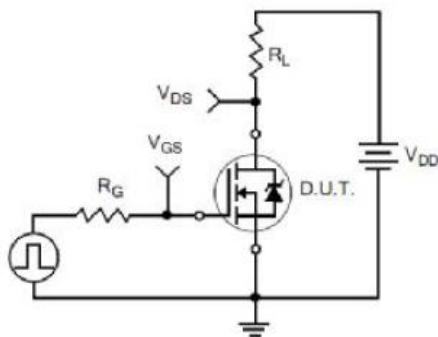


Figure 19. Resistive Switching Test Circuit

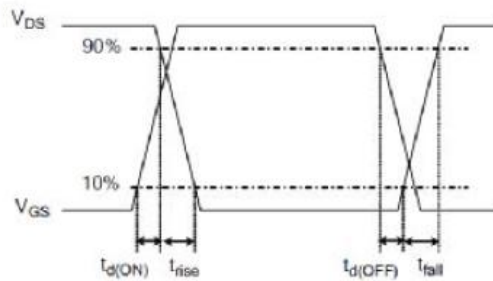


Figure 20. Resistive Switching Waveforms

Characteristics Curve:

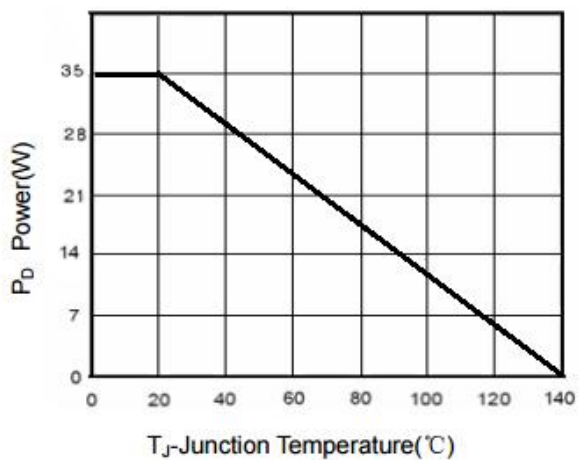


Figure 3 Power Dissipation

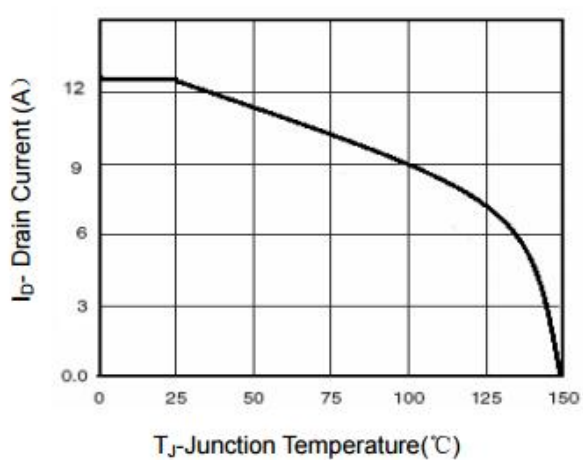


Figure 4 Drain Current

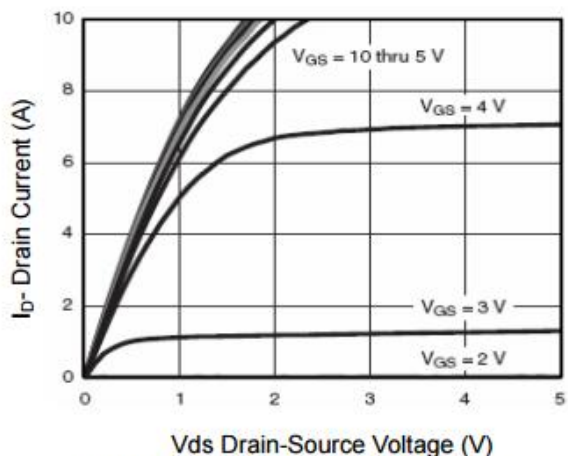


Figure 5 Output Characteristics

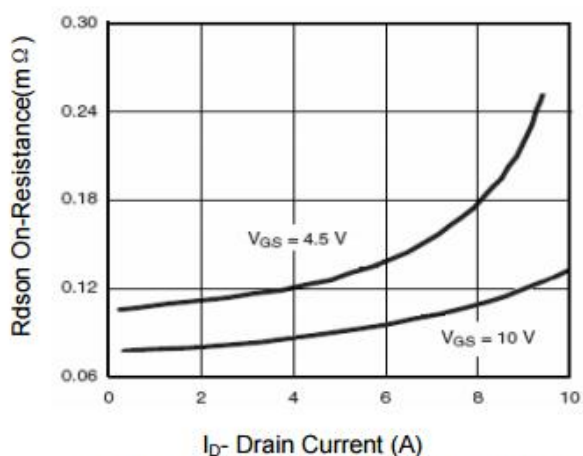


Figure 6 Drain-Source On-Resistance

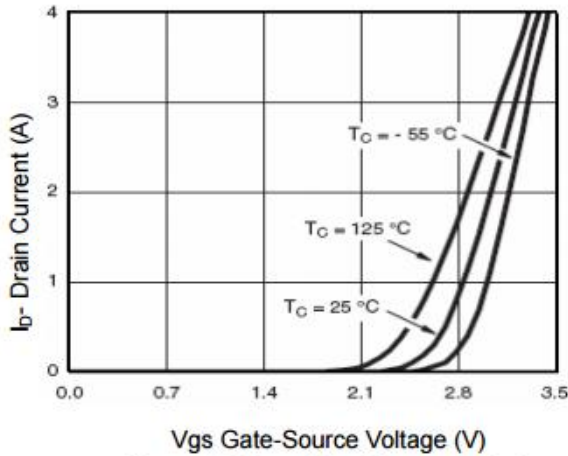


Figure 7 Transfer Characteristics

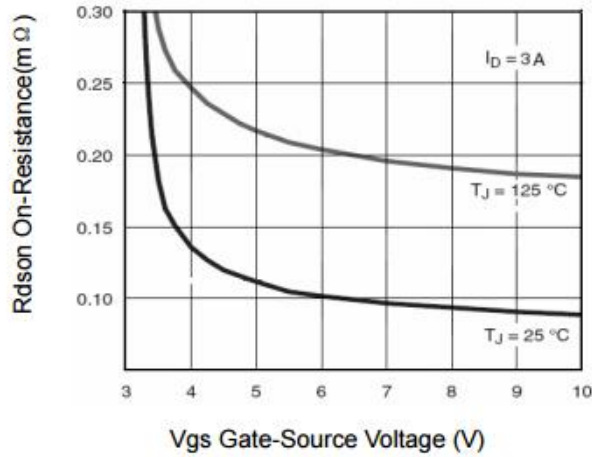


Figure 9 Rdson vs Vgs

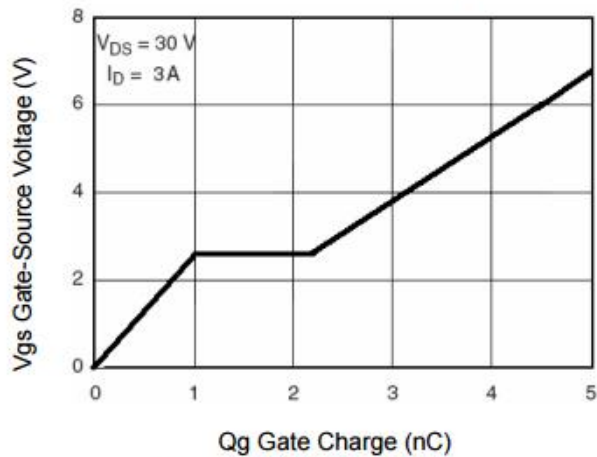


Figure 11 Gate Charge

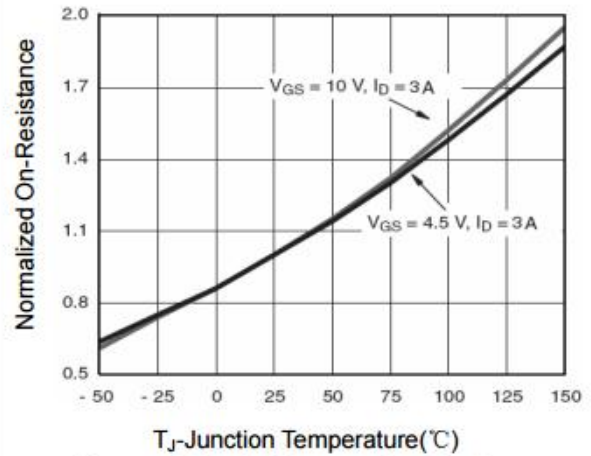


Figure 8 Drain-Source On-Resistance

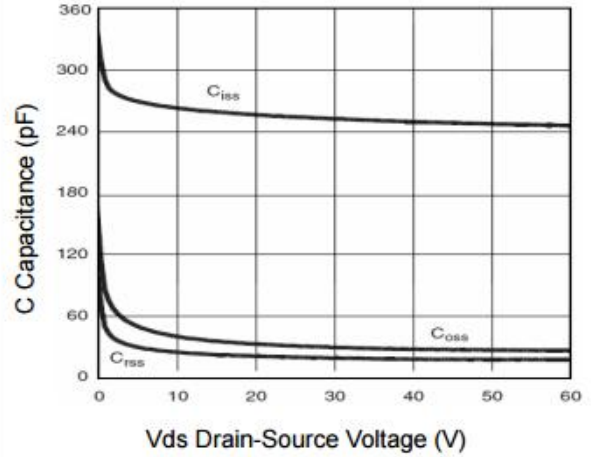


Figure 10 Capacitance vs Vds

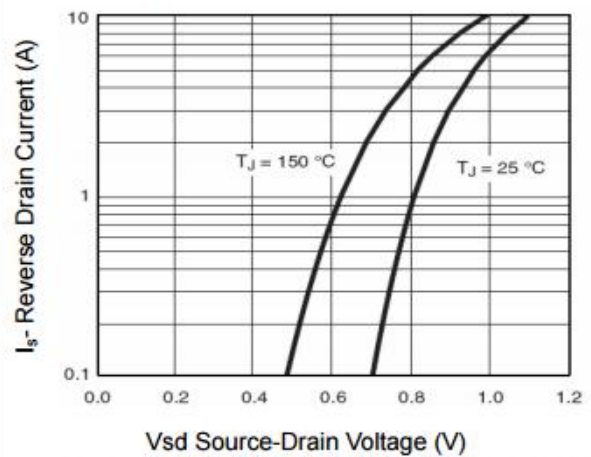


Figure 12 Source- Drain Diode Forward