

GL Silicon N-Channel Power MOSFET

General Description:

The GL300N06A8L 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-220AB, which accords with the RoHS standard.

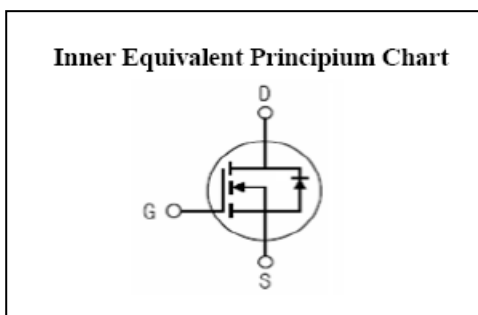
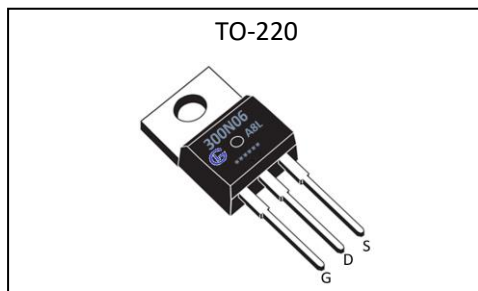
Features:

- 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	313	A
P_D	333	W
$R_{DS(ON)type}$	1.5	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 (Si limited)	313	A
	Continuous Drain Current $T_C = 100\text{ }^{\circ}\text{C}$ (Si limited)	221	A
	Continuous Drain Current $T_C = 25\text{ }^{\circ}\text{C}$ (Package limited)	120	A
I_{DM}	Pulsed Drain Current	1252	A
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}^{a2}	Single Pulse Avalanche Energy	1800	mJ
dv/dt^{a3}	Peak Diode Recovery dv/dt	5.0	V/ns
P_D	Power Dissipation	333	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	$^{\circ}\text{C}$

**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
$\Delta V_{DSS}/\Delta T_J$	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	$V_{GS}=10V, I_D=100A$	--	1.5	2.3	mΩ
$R_{DS(ON)}$	Drain-to-Source On-Resistance	$V_{GS}=4.5V, I_D=50A$	--	2.5	3.5	mΩ
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	--	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	$V_{DS}=5V, I_D=50A$	180	--	--	S
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=30V$ $f=1.0MHz$	--	5600	--	pF
C_{oss}	Output Capacitance		--	2200	--	
C_{rss}	Reverse Transfer Capacitance		--	880	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_D=20A, V_{DD}=30V$ $V_{GS}=10V, R_G=2.5\Omega$	--	24	--	ns
t_r	Rise Time		--	12	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	70	--	
t_f	Fall Time		--	25	--	
Q_g	Total Gate Charge	$I_D=20A, V_{DD}=30V$ $V_{GS}=10V$	--	98	--	nC
Q_{gs}	Gate to Source Charge		--	15	--	
Q_{gd}	Gate to Drain ("Miller") Charge		--	19	--	

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Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)		--	--	313	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	1252	A
V_{SD}	Diode Forward Voltage	$I_S=100A, V_{GS}=0V$	--	--	1.5	V
t_{rr}	Reverse Recovery Time	$I_S=100A, T_j = 25^\circ C$	--	110	--	ns
Q_{rr}	Reverse Recovery Charge	$dI_F/dt=100A/us, V_{GS}=0V$	--	200	--	nC

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

Symbol	Parameter	Typ.	Units
$R_{\theta c}$	Junction-to-Case	0.45	$^\circ C/W$

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

Test Circuit and Waveform

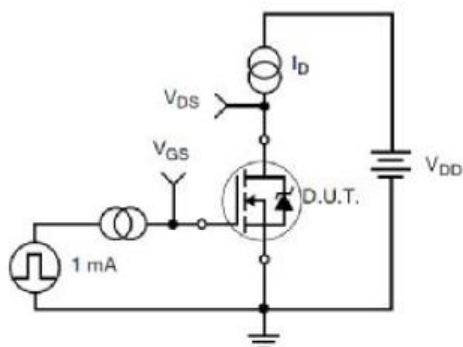


Figure 17. Gate Charge Test Circuit

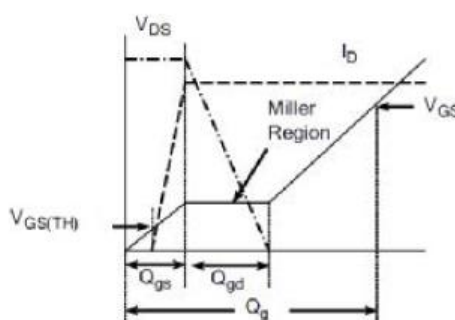


Figure 18. Gate Charge Waveform

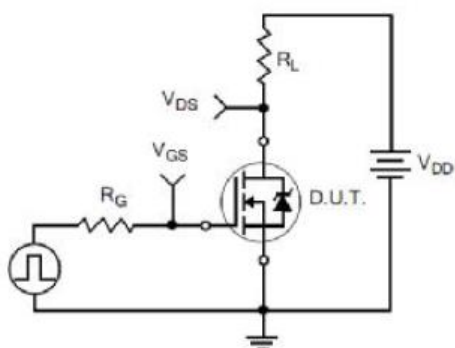


Figure 19. Resistive Switching Test Circuit

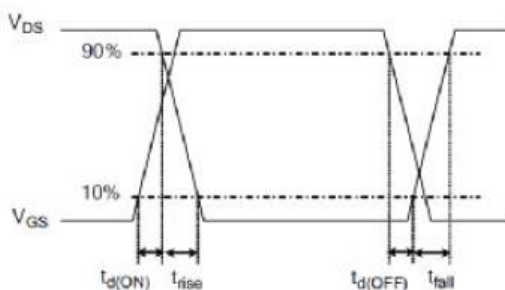


Figure 20. Resistive Switching Waveforms

Characteristics Curve

Figure 1. On-Region Characteristics

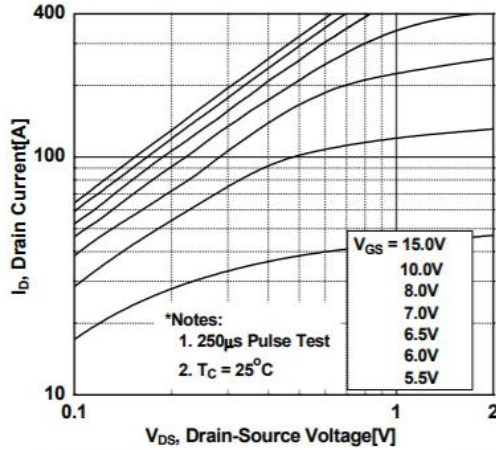


Figure 2. Transfer Characteristics

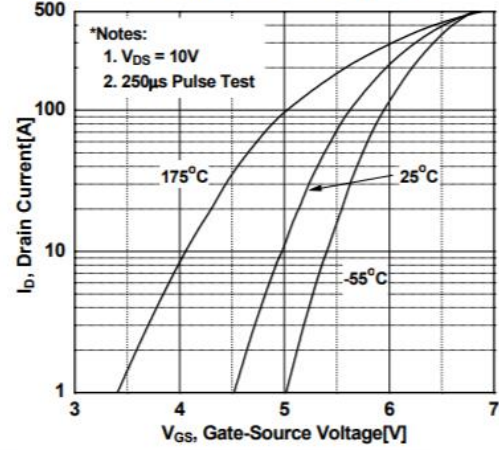


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

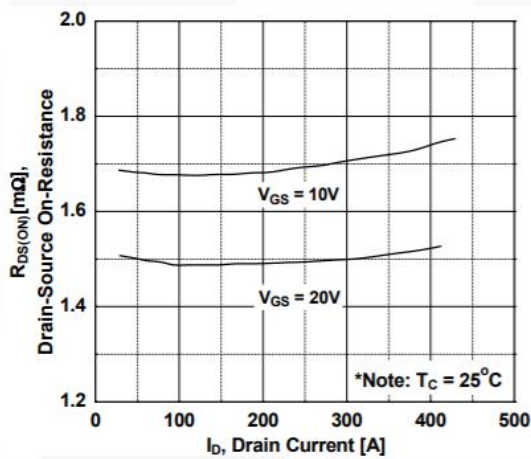


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

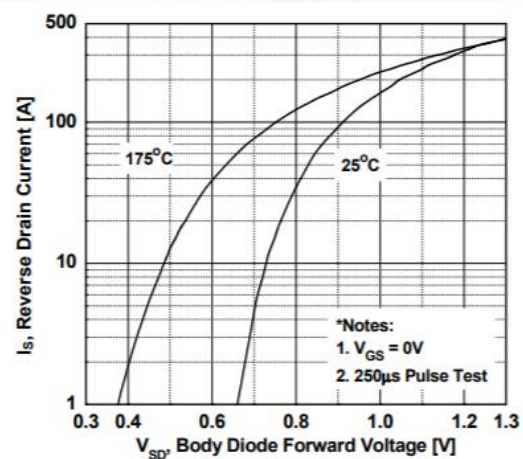


Figure 5. Capacitance Characteristics

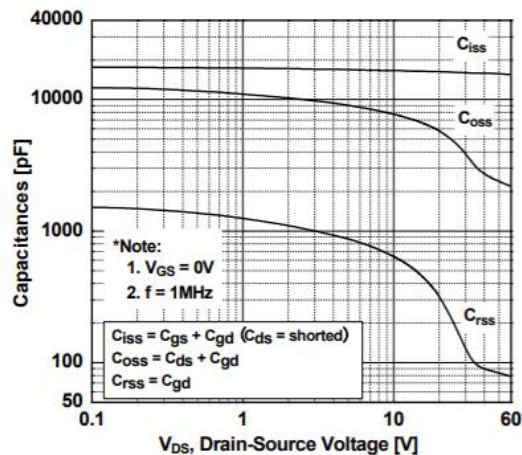


Figure 6. Gate Charge Characteristics

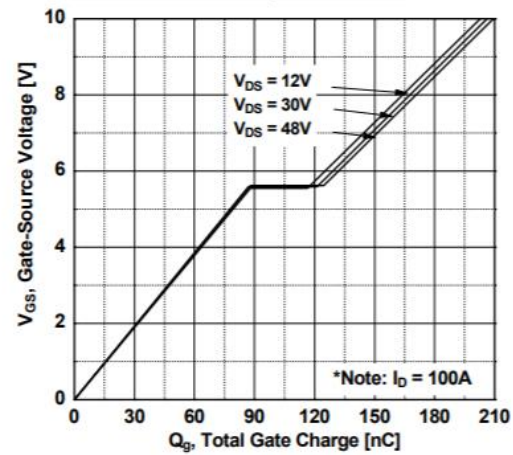


Figure 7. Breakdown Voltage Variation vs. Temperature

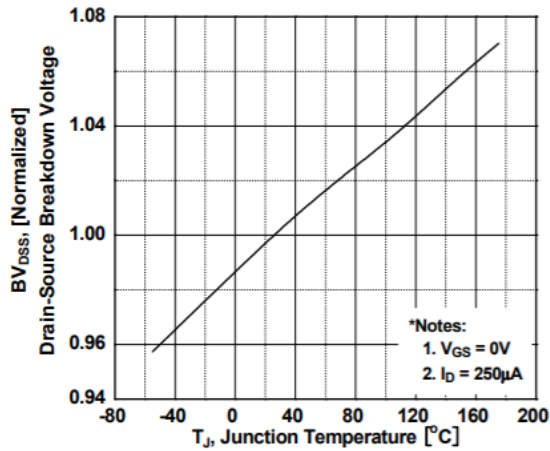


Figure 8. On-Resistance Variation vs. Temperature

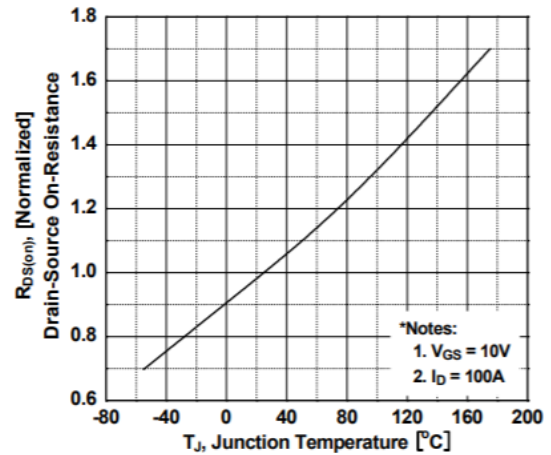


Figure 9. Maximum Safe Operating Area

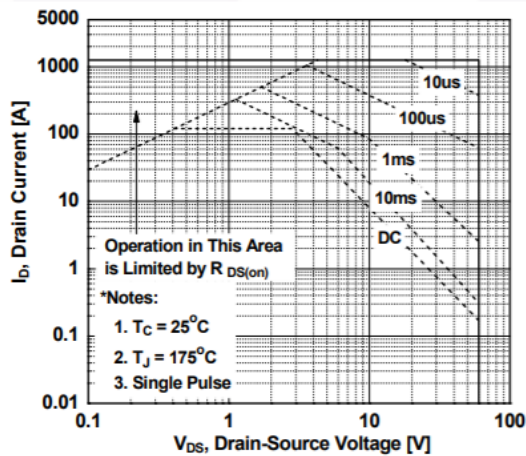


Figure 10. Maximum Drain Current vs. Case Temperature

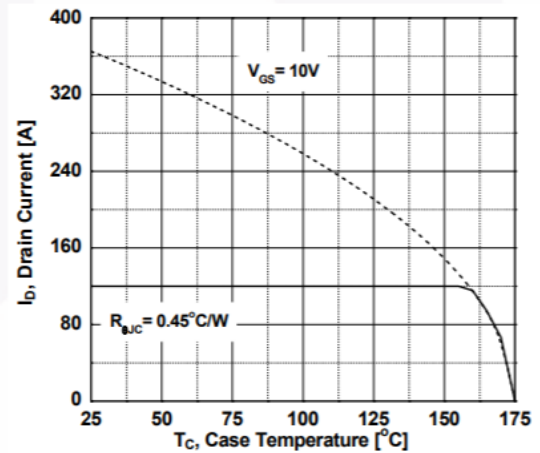


Figure 11. Unclamped Inductive Switching Capability

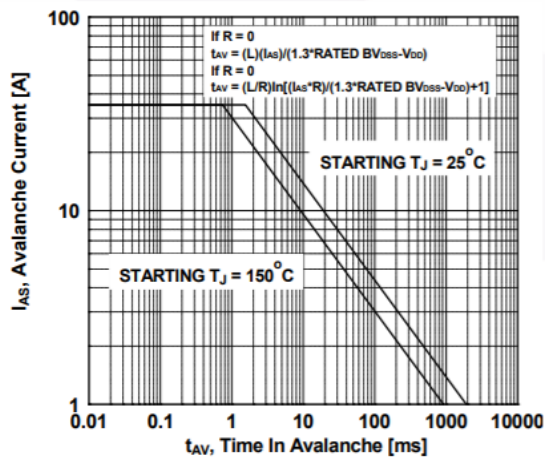


Figure 12. Eoss vs. Drain to Source Voltage

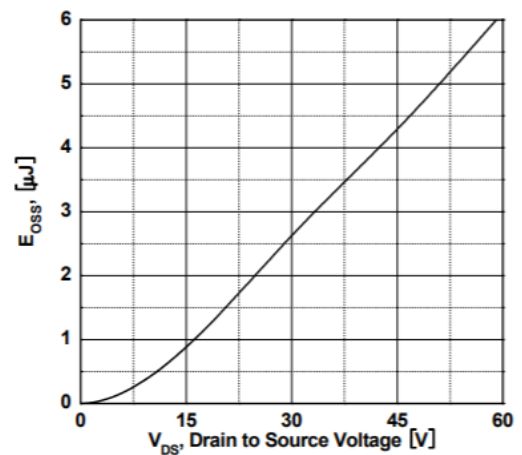


Figure 13. Transient Thermal Response Curve

