



GL59N25B47

Silicon N-Channel Power MOSFET

General Description

GL59N25B47, the silicon N-channel Enhanced VDMOSFET, is obtained by the self-aligned planar Technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. The transistor can be used in various power switching circuit for system miniaturization and higher efficiency. The package form is TO-247, which accords with the RoHS standard.

Features

- Fast Switching
- Low ON Resistance($R_{ds(on)} \leq 49m\Omega$)
- Low Gate Charge (Typical Data:150nC)
- Low Reverse transfer capacitances(Typical:290pF)
- 100% Single Pulse avalanche energy Test

Applications

- Power switch circuit of adaptor and charger

Absolute (Tc=25°C unless otherwise specified)

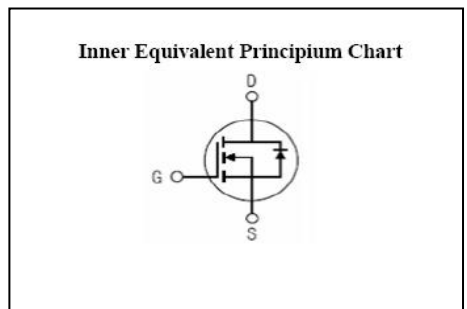
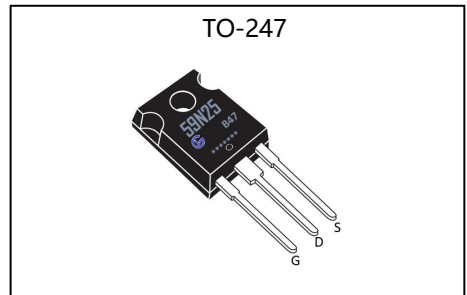
Symbol	Parameter	Rating	Units
V_{DSS}^{a1}	Drain-to-Source Voltage	250	V
I_D	Continuous Drain Current	59	A
	Continuous Drain Current $T_C=100^\circ C$	35	A
I_{DM}^{a2}	Pulsed Drain Current	236	A
V_{GS}	Gate-to-Source Voltage	± 30	V
E_{AS}^{a2}	Single Pulse Avalanche Energy	1600	mJ
dv/dt^{a3}	Peak Diode Recovery dv/dt	5	V/ns
P_D	Power Dissipation	392	W
	Derating Factor above $25^\circ C$	3.2	W/ $^\circ C$
T_J, T_{stg}	Operating Junction and Storage Temperature Range	175, -55 to 175	$^\circ C$
T_L	Maximum Temperature for Soldering	300	$^\circ C$

Caution Stresses greater than those in the "Absolute Maximum Ratings" may cause permanent damage to the device

Thermal Characteristics

Symbol	Parameter	Rating	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.32	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	40	$^\circ C/W$

V_{DSS}	250	V
I_D	59	A
$P_D(T_C=25^\circ C)$	392	W
$R_{DS(ON).MAX.}$	49	m Ω





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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	$V_{GS}=0V, I_D=250\mu A$	250	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	$I_D=250\mu A, \text{Reference } 25^\circ C$	--	0.22	--	V/°C
I_{DSS}	Drain to Source Leakage Current	$V_{DS}=250V, V_{GS}=0V, T_a=25^\circ C$	--	--	1	μA
		$V_{DS}=200V, V_{GS}=0V, T_a=125^\circ C$	--	--	10	
$I_{GSS(F)}$	Gate to Source Forward Leakage	$V_{GS}=+30V$	--	--	100	nA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	$V_{GS}=-30V$	--	--	-100	nA

ON Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	$V_{GS}=10V, I_D=30A$	--	--	49	mΩ
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	--	4.0	V
g_{fs}	Forward Trans conductance	$V_{DS}=15V, I_D=20A$	--	45	--	S
Pulse width <380μs; duty cycle <2%.						

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=25V$ $f=1.0MHz$	--	4330	--	pF
C_{oss}	Output Capacitance		--	650	--	
C_{rss}	Reverse Transfer Capacitance		--	80	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_D=59A, V_{DD}=125V$ $V_{GS}=10V, R_g=1.8\Omega$	--	75	--	ns
t_r	Rise Time		--	590	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	110	--	
t_f	Fall Time		--	190	--	
Q_g	Total Gate Charge	$I_D=59A, V_{DD}=125V$ $V_{GS}=10V$	--	90	--	nC
Q_{gs}	Gate to Source Charge		--	18	--	
Q_{gd}	Gate to Drain ("Miller") Charge		--	40	--	



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Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_{SD}	Continuous Source Current (Body Diode)		--	--	59	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	236	A
V_{SD}	Diode Forward Voltage	$I_S=59A, V_{GS}=0V$	--	--	1.5	V
t_{rr}	Reverse Recovery Time	$I_S=59A, T_j=25^\circ C$	--	220	--	ns
Q_{rr}	Reverse Recovery Charge	$di_F/dt=100A/\mu s, V_{GS}=0V$	--	4.6	--	μC

a1: $T_J=+25^\circ C$ to $+175^\circ C$

a2: Repetitive rating: pulse width limited by maximum junction temperature

a3: $I_{SD}=59A, di/dt \leq 100A/\mu s, V_{DD} \leq BV_{DS}, T_J=175^\circ C$



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Characteristics Curves

Figure 1. On-Region Characteristics

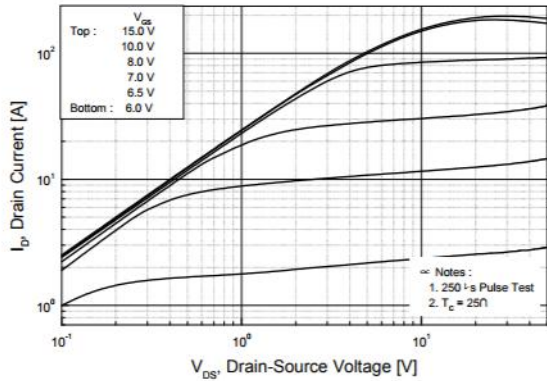


Figure 2. Transfer Characteristics

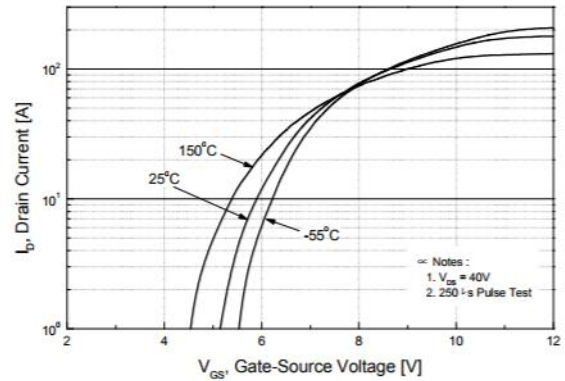


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

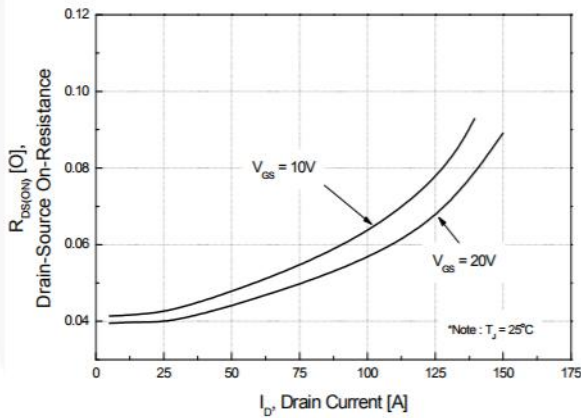


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

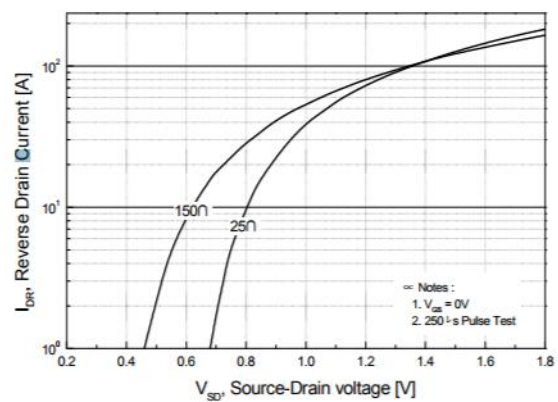


Figure 5. Capacitance Characteristics

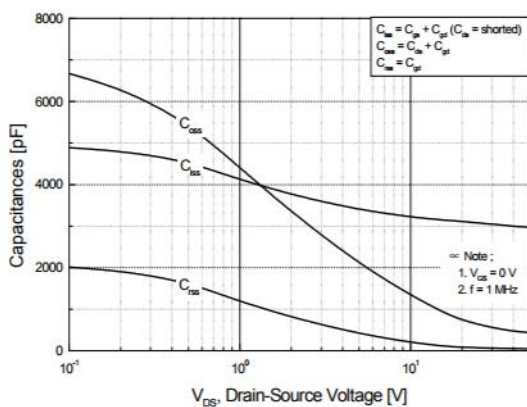


Figure 6. Gate Charge Characteristics

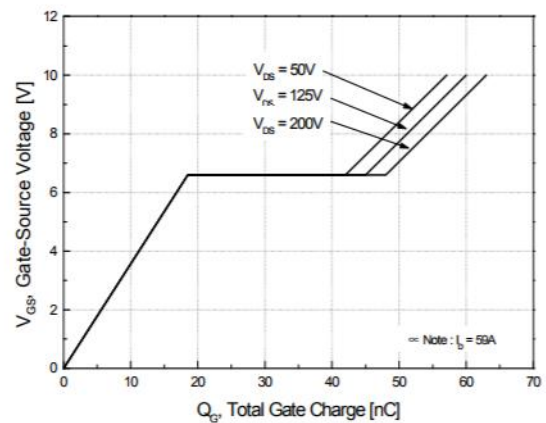


Figure 7. Breakdown Voltage Variation vs. Temperature

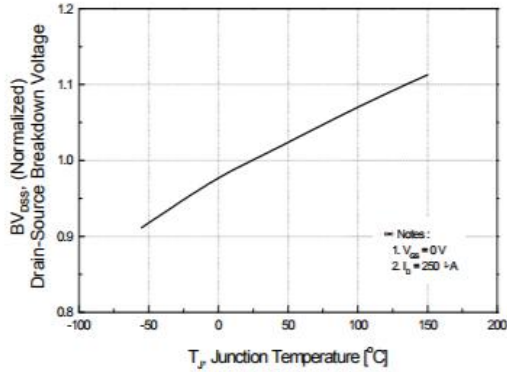


Figure 8. On-Resistance Variation vs. Temperature

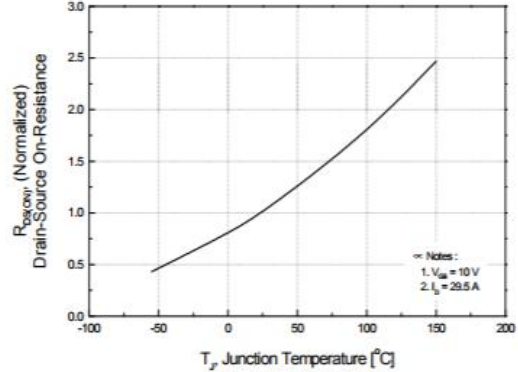


Figure 9. Maximum Safe Operating Area

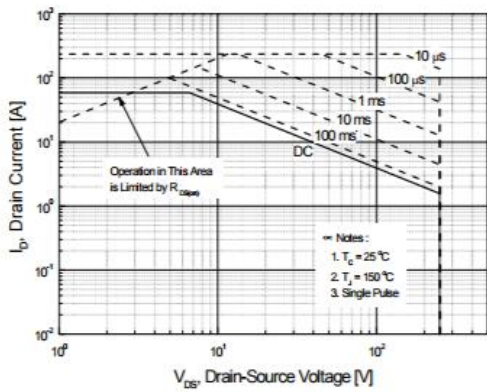


Figure 10. Maximum Drain Current vs. Case Temperature

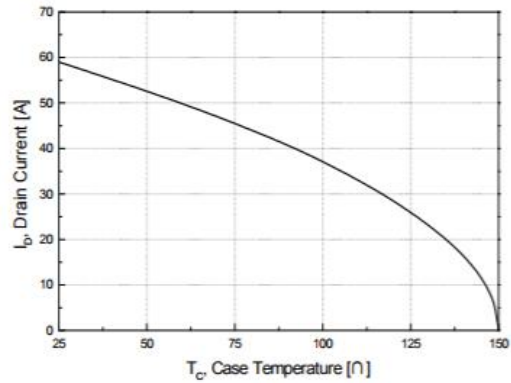


Figure 11. Transient Thermal Response Curve

