GL19N40FA9

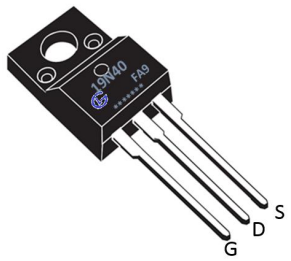
Silicon N-Channel Power MOSFET

V_{DSS}	400	V
I_D	19	A
$P_D(T_C=25℃)$	33	W
$R_{DS(ON).TYP.}$	0.225	Ω

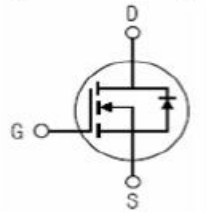
General Description:

GL19N40FA9, 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-220F which accords with the RoHS standard.

TO-220F



Inner Equivalent Principium Chart



Features:

- Fast Switching
- Low ON Resistance(R_{dson}≤0.25Ω)
- Low Gate Charge (Typical Data:40nC)
- Low Reverse transfer capacitances(Typical:12pF)
- 100% Single Pulse avalanche energy Test

Applications:

- Power switch circuit of adaptor and charger

Absolute (Tc=25℃ unless otherwise specified):

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	400	V
I_D	Continuous Drain Current	19	A
	Continuous Drain Current T_C=100 °C	12	A
I_{DM}[a1]	Pulsed Drain Current	76	A
V_{GS}	Gate-to-Source Voltage	±30	V
E_{As}[a2]	Single Pulse Avalanche Energy	750	mJ
E_{Ar}[a1]	Avalanche Energy ,Repetitive	40	mJ
I_{AR}[a1]	Avalanche Current	19	A
dv/dt[a3]	Peak Diode Recovery dv/dt	5.0	V/ns
P_D	Power Dissipation	33	W
	Derating Factor above 25°C	0.264	W/℃
T_J, T_{stg}	Operating Junction and Storage Temperature Range	150, −55 to 150	℃
T_L	Maximum Temperature for Soldering	300	℃

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	3.78	℃/ W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	℃/ W

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	400	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	I_D=250uA,Reference25℃	--	0.55	--	V/℃
I_{DSS}	Drain to Source Leakage Current	V_{DS}=400V, V_{GS}=0V,T_a=25℃	--	--	1.0	μA
		V_{DS}=320V, V_{GS}=0V,T_a=125℃	--	--	100	
$I_{GSS(F)}$	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=9.5A	--	0.225	0.25	Ω
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	2.0	--	4.0	V
g_{fs}	Forward Trans conductance	V_{DS}=15V,I_D=9.5A	--	15	--	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	--	1900	--	pF
C_{oss}	Output Capacitance		--	200	--	
C_{rss}	Reverse Transfer Capacitance		--	12	--	

Resistive Switching Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	I_D=19A,V_{DD}=200V V_{GS}=10V,R_g=25Ω	--	20	--	ns
tr	Rise Time		--	35	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	51	--	
t_f	Fall Time		--	55	--	
Q_g	Total Gate Charge	I_D=19A,V_{DD}=200V V_{GS}=10V	--	40	--	nC
Q_{gs}	Gate to Source Charge		--	9	--	
Q_{gd}	Gate to Drain (“Miller”)Charge		--	15	--	

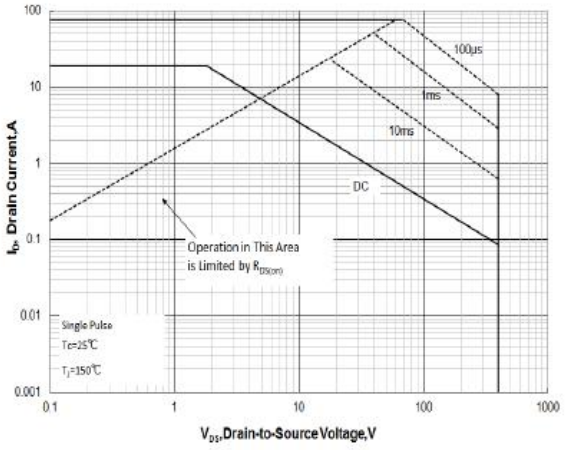
Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_{SD}	Continuous Source Current (Body Diode)		--	--	19	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	76	A
V_{SD}	Diode Forward Voltage	I_S=19A,V_{GS}=0V	--	--	1.5	V
t_{rr}	Reverse Recovery Time	I_S=19A,T_j=25℃	--	303	--	ns
Q_{rr}	Reverse Recovery Charge	dI_F/dt=100A/μs,V_{GS}=0V	--	1867	--	μC

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

a2: L=10mH, I_D=13A, Start T_J=25℃

a3: I_{SD}=19A,di/dt ≤100A/us,V_{DD}≤BV_{DS}, Start T_J=25℃

Characteristics Curve:



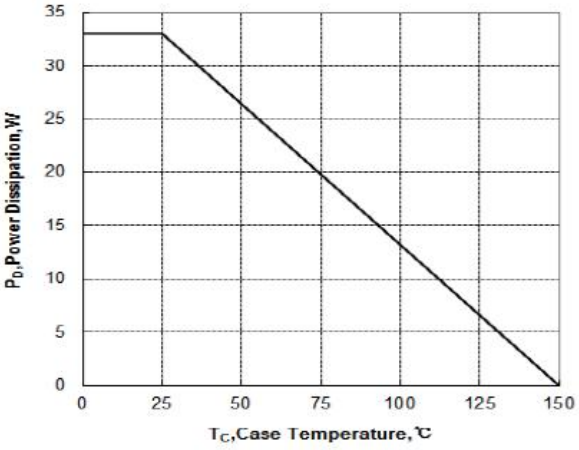


Figure 1 Maximum Power dissipation vs Case Temperature

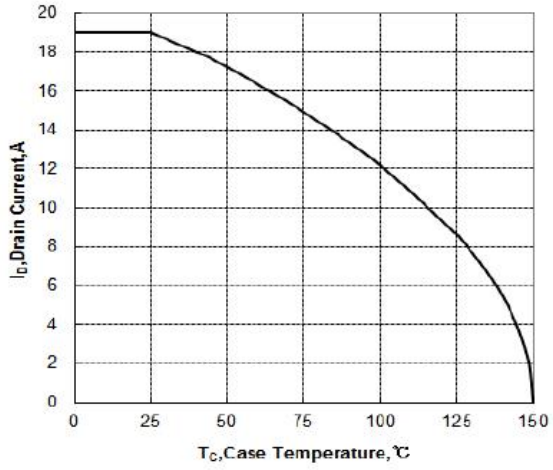


Figure 2 Maximum Continuous Drain Current vs Case Temperature

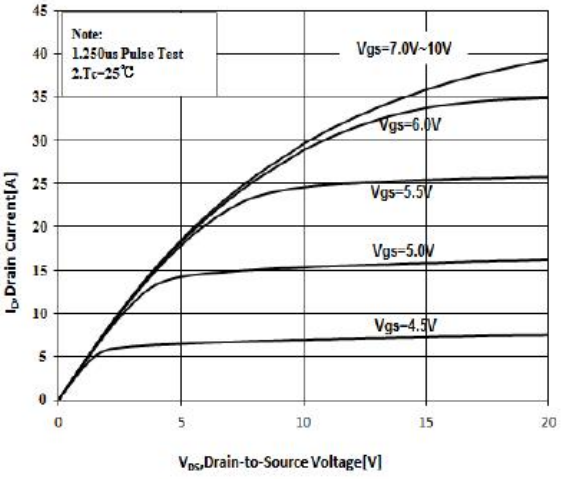


Figure 3 Typical Output Characteristics

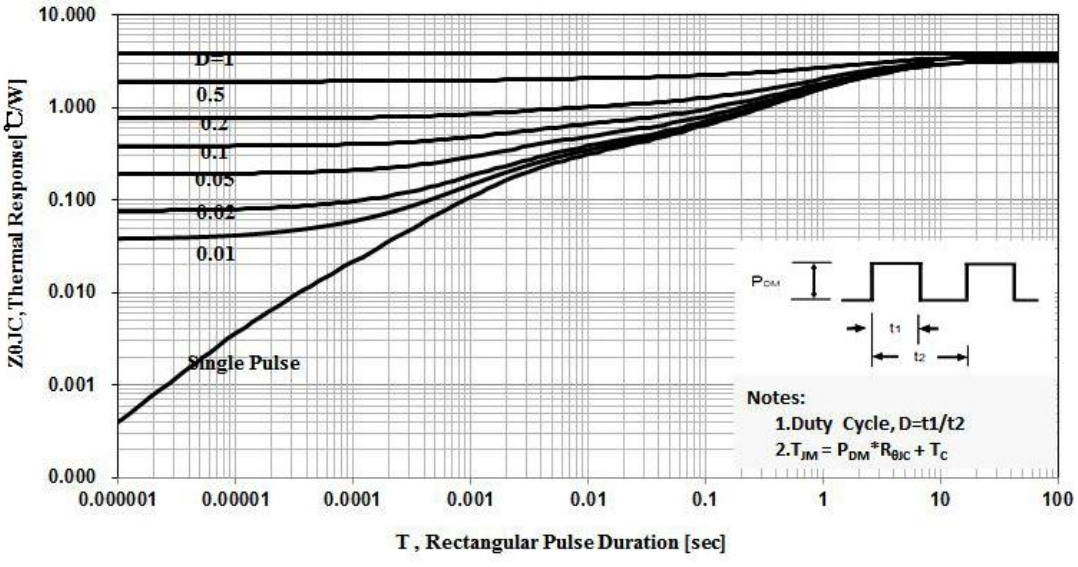


Figure 4 Maximum Effective Thermal Impedance , Junction to Case

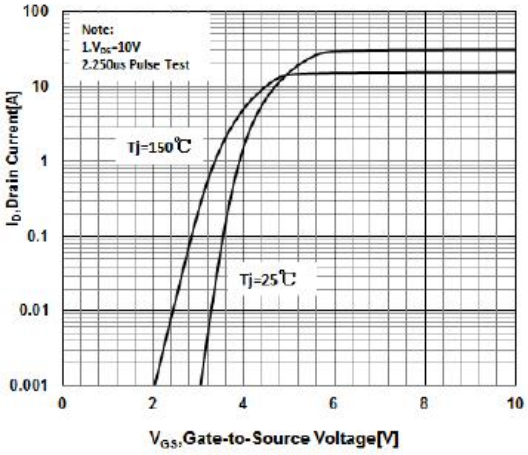


Figure 5 Typical Transfer Characteristics

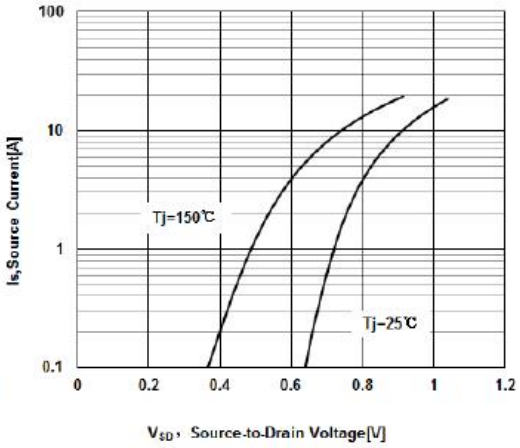


Figure 6 Typical Body Diode Transfer Characteristics

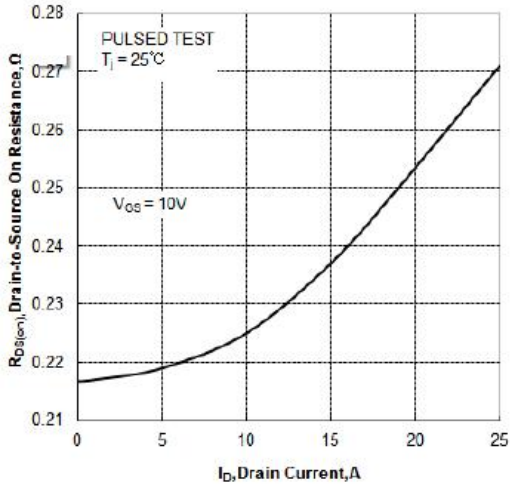


Figure 7 Typical Drain to Source ON Resistance vs Drain Current

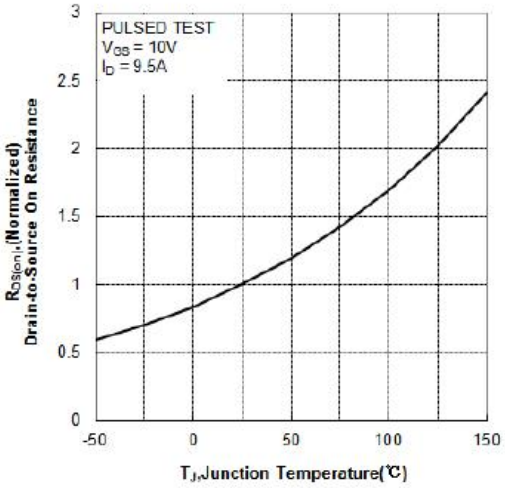


Figure 8 Typical Drian to Source on Resistance vs Junction Temperature

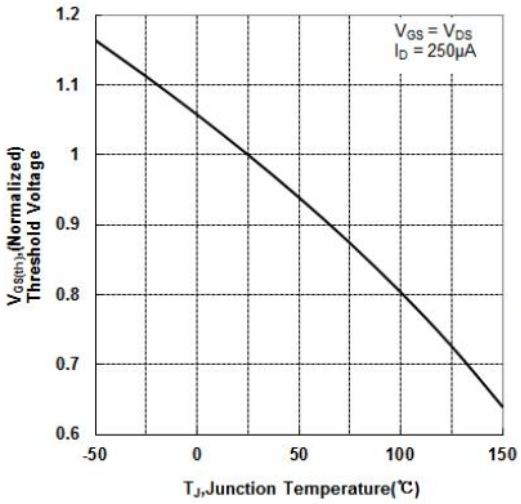


Figure 9 Typical Theshold Voltage vs Junction Temperature

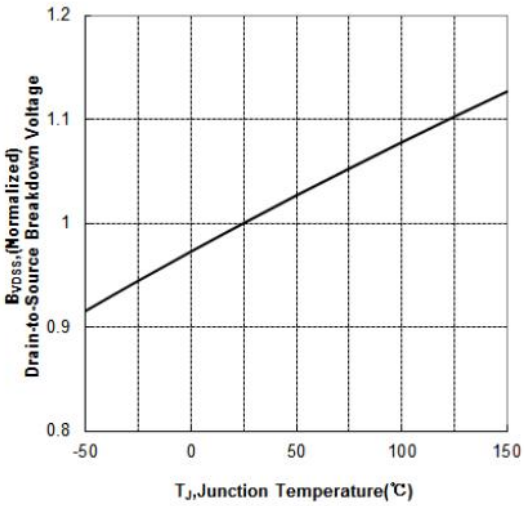


Figure 10 Typical Breakdown Voltage vs Junction Temperature

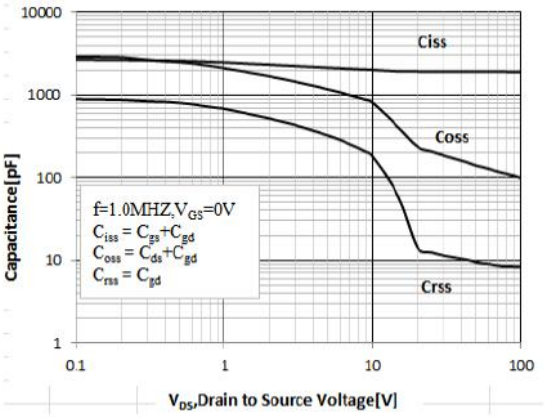


Figure 11 Typical Capacitance vs Drain to Source Voltage

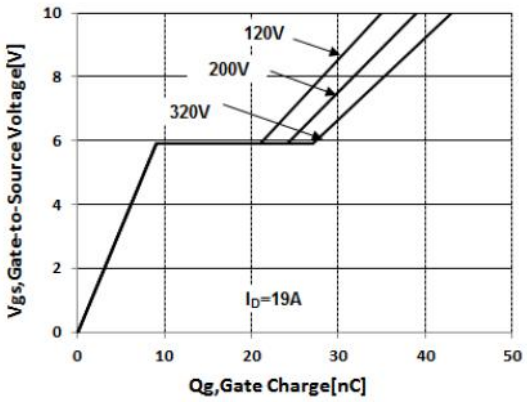


Figure 12 Typical Gate Charge vs Gate to Source Voltage