



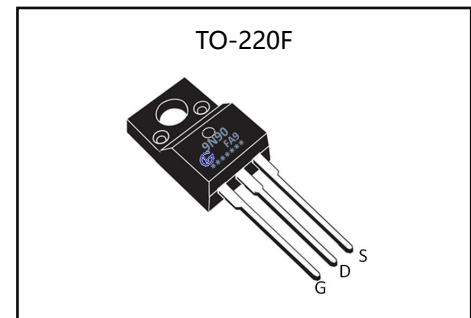
GL9N90FA9

Silicon N-Channel Power MOSFET

General Description

GL9N90FA9, 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.

V_{DSS}	900	V
I_D	9	A
$P_D(T_C=25^{\circ}C)$	67	W
$R_{DS(ON).TYP.}$	1.10	Ω

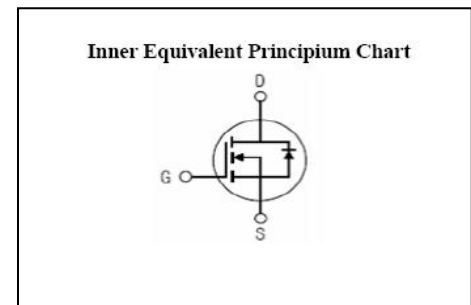


Features

- Fast Switching
- Low ON Resistance($R_{dson} \leq 1.4\Omega$)
- Low Gate Charge (Typical Data: 49nC)
- Low Reverse transfer capacitances(Typical:12pF)
- 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}	Drain-to-Source Voltage	900	V
I_D	Continuous Drain Current	9	A
	Continuous Drain Current $T_C=100^{\circ}C$	5.8	A
I_{DM}^{a1}	Pulsed Drain Current	36	A
V_{GS}	Gate-to-Source Voltage	± 30	V
E_{AS}^{a2}	Single Pulse Avalanche Energy	580	mJ
E_{AR}^{a1}	Avalanche Energy ,Repetitive	58	mJ
I_{AR}^{a1}	Avalanche Current	3.4	A
dv/dt^{a3}	Peak Diode Recovery dv/dt	5.0	V/ns
P_D	Power Dissipation	67	W
	Derating Factor above 25°C	0.54	W/°C
T_J, T_{stg}	Operating Junction and Storage Temperature Range	150, -55 to 150	°C
T_L	Maximum Temperature for Soldering	300	°C

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



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Thermal Characteristics

Symbol	Parameter	Rating	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.86	$^{\circ}\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	100	$^{\circ}\text{C}/\text{W}$

Electrical Characteristics (Tc= 25 $^{\circ}\text{C}$ unless otherwise specified)

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	900	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	$I_D=250\mu\text{A}$, Reference 25 $^{\circ}\text{C}$	--	0.60	--	V/ $^{\circ}\text{C}$
I_{DSS}	Drain to Source Leakage Current	$V_{DS}=900\text{V}, V_{GS}=0\text{V}, T_a=25^{\circ}\text{C}$	--	--	25	μA
		$V_{DS}=720\text{V}, V_{GS}=0\text{V}, T_a=125^{\circ}\text{C}$	--	--	250	
$I_{GSS(F)}$	Gate to Source Forward Leakage	$V_{GS}=+30\text{V}$	--	--	100	nA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	$V_{GS}=-30\text{V}$	--	--	-100	nA

ON Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	$V_{GS}=10\text{V}, I_D=4.5\text{A}$	--	1.1	1.4	Ω
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	2.0	--	4.0	V
g_{fs}	Forward Trans conductance	$V_{DS}=30\text{V}, I_D=4.5\text{A}$	--	9.2	--	S
Pulse width < 380 μs ; duty cycle < 2%.						

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}, V_{DS}=25\text{V}$ $f=1.0\text{MHz}$	--	2593	--	pF
C_{oss}	Output Capacitance		--	146	--	
C_{rss}	Reverse Transfer Capacitance		--	30	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_D=9\text{A}, V_{DD}=450\text{V}$ $V_{GS}=10\text{V}, R_g=12\Omega$	--	35	--	ns
t_r	Rise Time		--	41	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	134	--	
t_f	Fall Time		--	45	--	
Q_g	Total Gate Charge	$I_D=9\text{A}, V_{DD}=400\text{V}$ $V_{GS}=10\text{V}$	--	49	--	nC
Q_{gs}	Gate to Source Charge		--	13	--	
Q_{gd}	Gate to Drain ("Miller") Charge		--	17	--	



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Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_{SD}	Continuous Source Current (Body Diode)		--	--	9	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	36	A
V_{SD}	Diode Forward Voltage	$I_S=9A, V_{GS}=0V$	--	--	1.5	V
t_{rr}	Reverse Recovery Time	$I_S=9A, T_J=25^{\circ}C$	--	562	--	ns
Q_{rr}	Reverse Recovery Charge	$dI_F/dt=100A/\mu s, V_{GS}=0V$	--	3.5	--	uC

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

a2: $L=10mH$, $I_D=10.8A$, Start $T_J=25^{\circ}C$

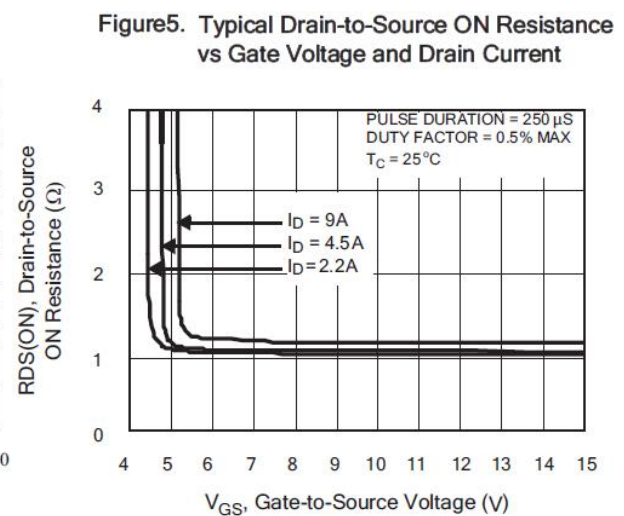
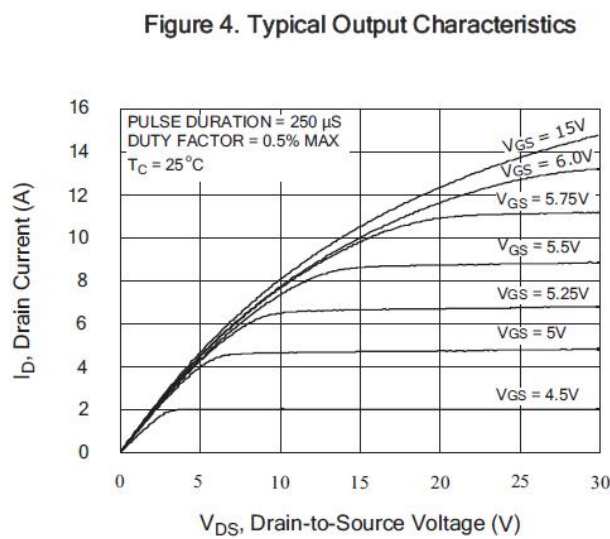
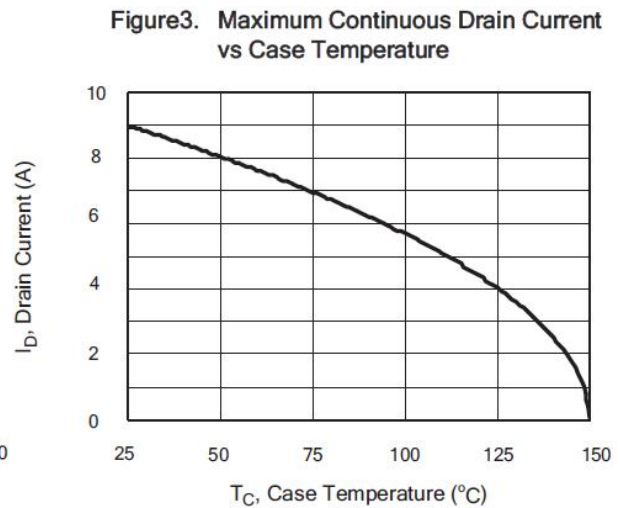
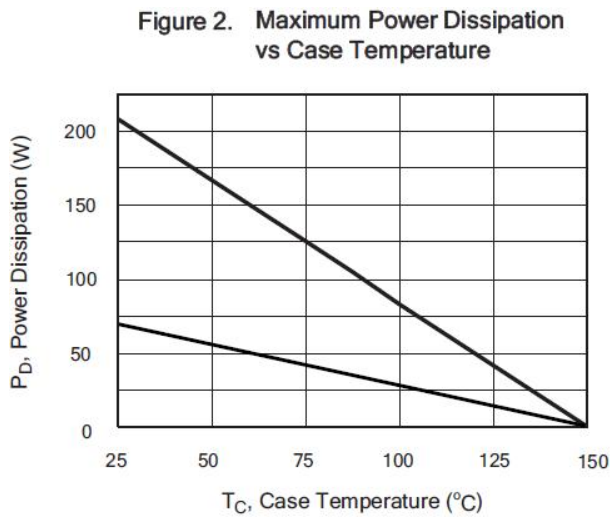
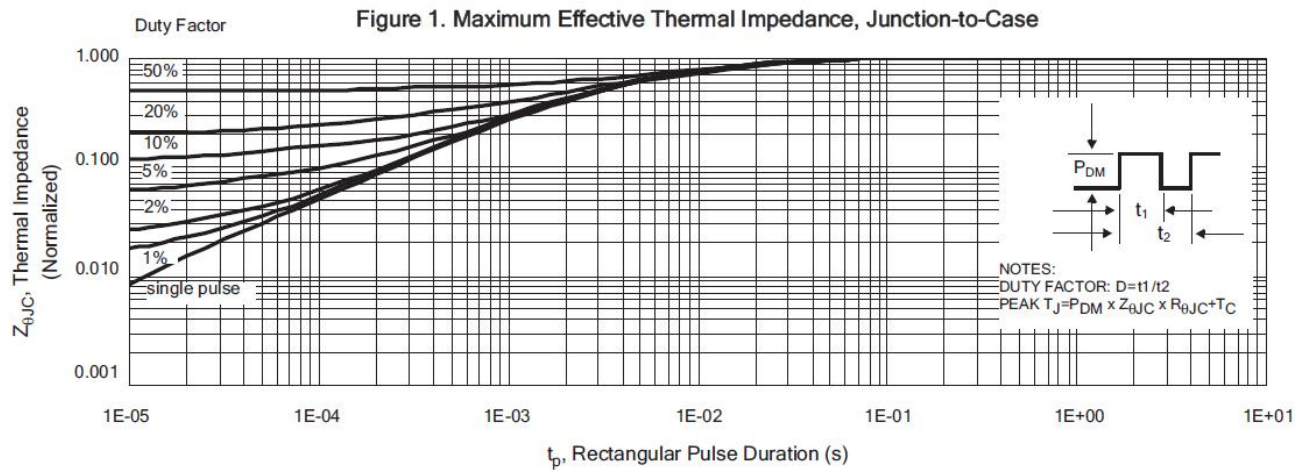
a3: $I_{SD}=9A, di/dt \leq 100A/\mu s, V_{DD} \leq BV_{DS}$, Start $T_J=25^{\circ}C$



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Characteristics Curves



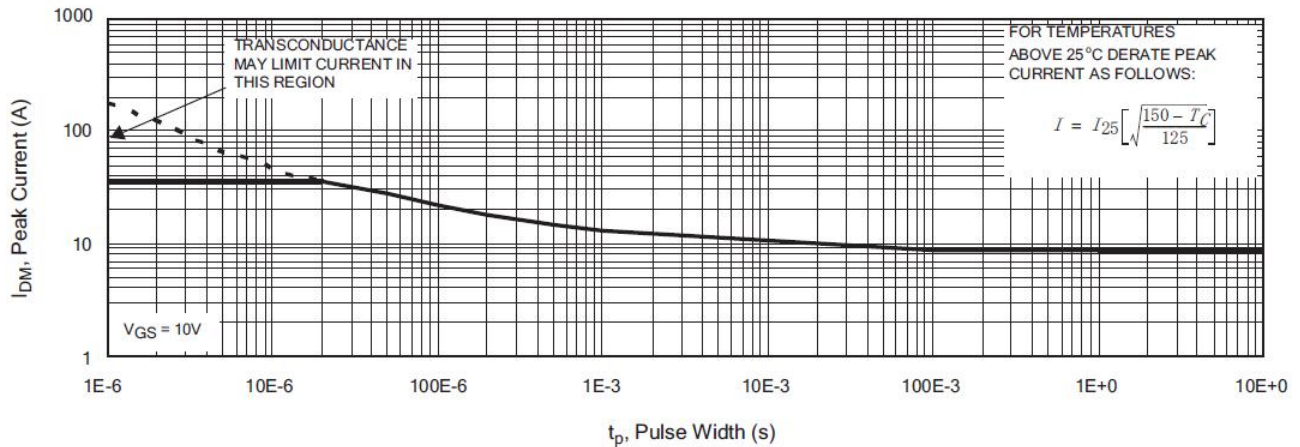


Figure 7. Typical Transfer Characteristics

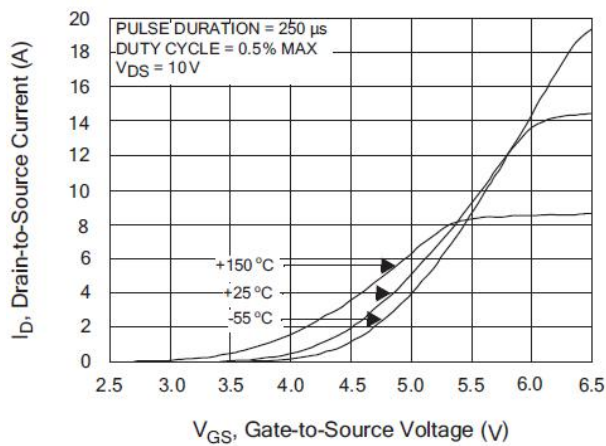


Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current

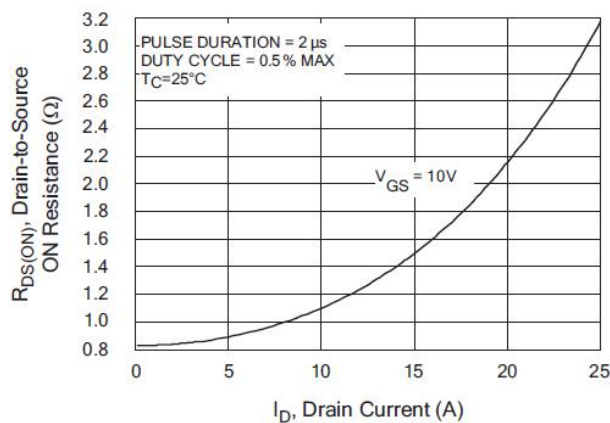


Figure 8. Unclamped Inductive Switching Capability

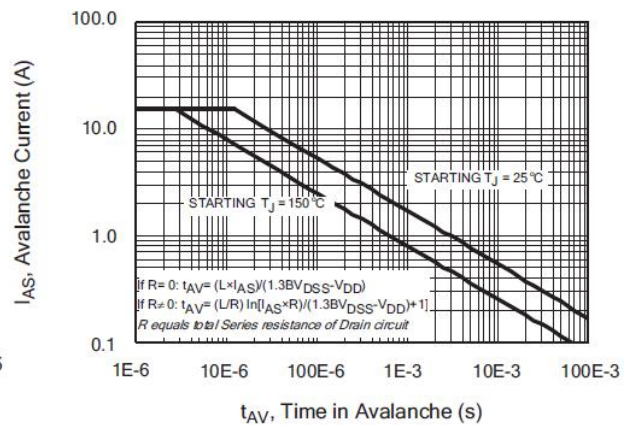
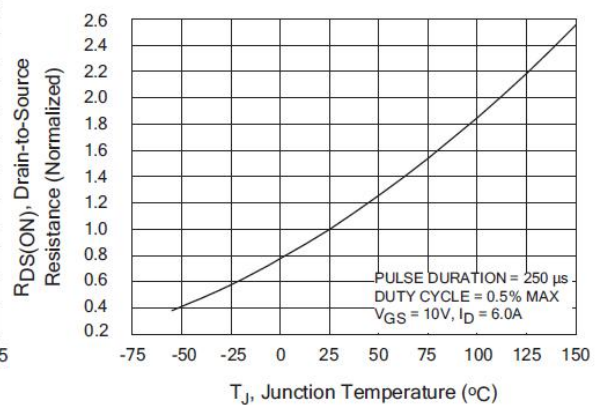


Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature



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Figure 11. Typical Breakdown Voltage vs Junction Temperature

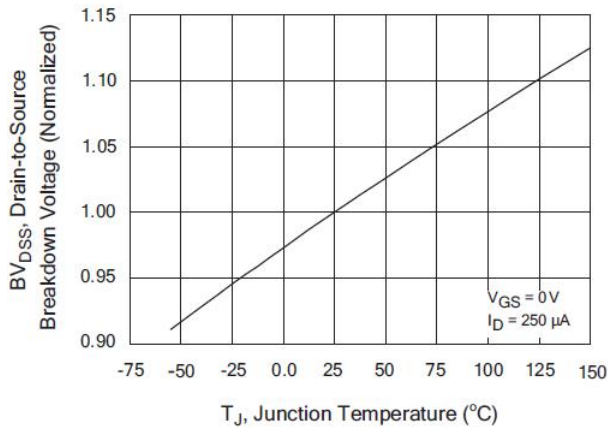


Figure 12. Typical Threshold Voltage vs Junction Temperature

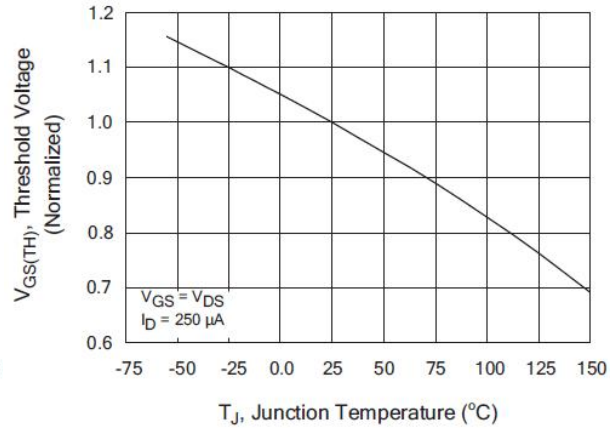


Figure 13. Maximum Forward Bias Safe Operating Area

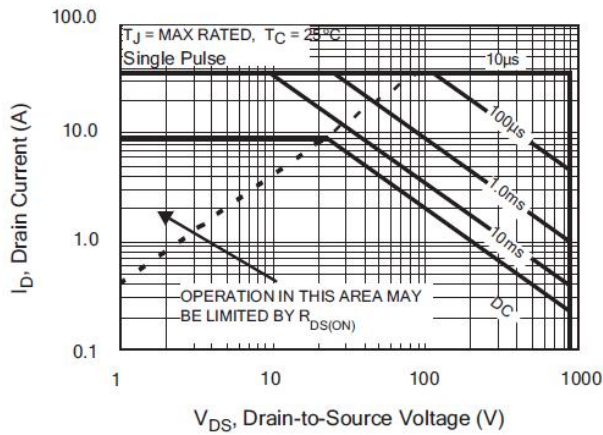


Figure 14. Typical Capacitance vs Drain-to-Source Voltage

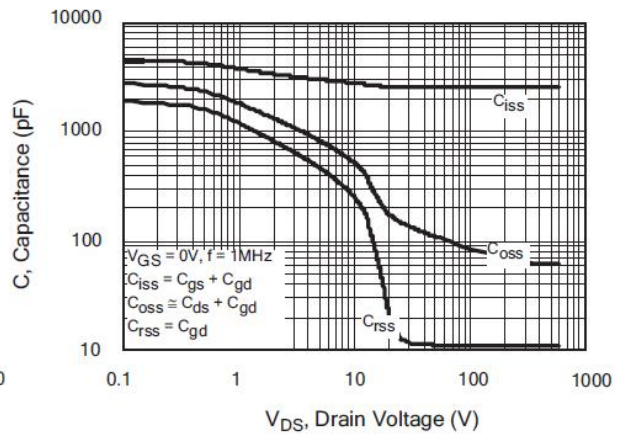


Figure 15. Typical Gate Charge vs Gate-to-Source Voltage

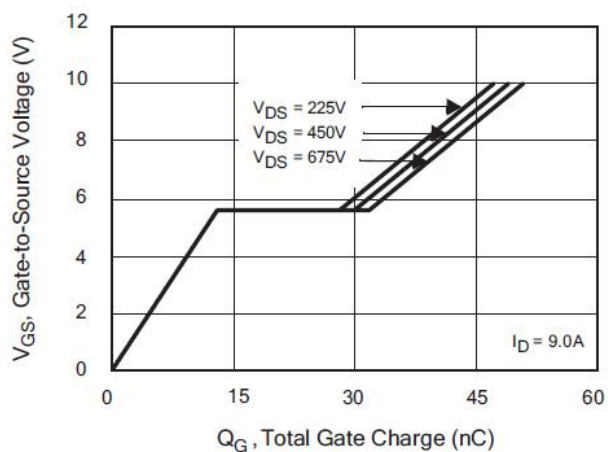


Figure 16. Typical Body Diode Transfer Characteristics

