®

GL15N50FA9

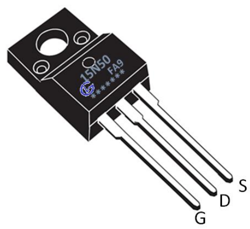
Silicon N-Channel Power MOSFET

V_{DSS}	500	V
I_D	15	A
$P_D(T_C=25℃)$	70	W
$R_{DS(ON).TYP.}$	0.29	Ω

General Description

GL15N50FA9, 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.

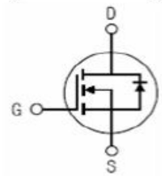
TO-220F



Features

- Fast Switching
- Low ON Resistance(R_{dson}≤0.35Ω)
- Low Gate Charge
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

Inner Equivalent Principium Chart



Applications

- Power switch circuit of adaptor and charger

Absolute (Tc=25℃ unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	500	V
I_D	Continuous Drain Current	15	A
I_{DM} [a1]	Pulsed Drain Current	60	A
V_{GS}	Gate-to-Source Voltage	±30	V
E_{AS} [a2]	Single Pulse Avalanche Energy	1200	mJ
P_D	Power Dissipation	70	W
	Derating Factor above 25°C	0.56	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
$R_{θJC}$	Thermal Resistance, Junction-to-Case	1.79	℃/ W
$R_{θJA}$	Thermal Resistance, Junction-to-Ambient	100	℃/ 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	500	--	--	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}=500V, V_{GS}=0V,T_a=25℃	--	--	1.0	μA
		V_{DS}=400V, 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=7.5A	--	0.29	0.35	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=15A	--	18	--	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	--	2350	--	pF
C_{oss}	Output Capacitance		--	230	--	
C_{rss}	Reverse Transfer Capacitance		--	25	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	I_D=15A,V_{DD}=250V V_{GS}=10V,R_g=6.1Ω	--	15	--	ns
t_r	Rise Time		--	30	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	50	--	
t_f	Fall Time		--	40	--	
Q_g	Total Gate Charge	I_D=15A,V_{DD}=250V V_{GS}=10V	--	50	--	nC
Q_{gs}	Gate to Source Charge		--	12	--	
Q_{gd}	Gate to Drain (“Miller”)Charge		--	20	--	

Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_{SD}	Continuous Source Current (Body Diode)		--	--	15	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	60	A
V_{SD}	Diode Forward Voltage	I_S=15A,V_{GS}=0V	--	--	1.5	V
t_{rr}	Reverse Recovery Time	I_S=15A,T_j=25℃ dI$_F$/dt=100A/μs,V_{GS}=0V	--	580	--	ns
Q_{rr}	Reverse Recovery Charge		--	4.5	--	μC

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

a2： L=10mH, I_D=15A, Start T_J=25℃

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Characteristics Curves

Figure 1. Maximum Effective Thermal Impedance, Junction-to-Case

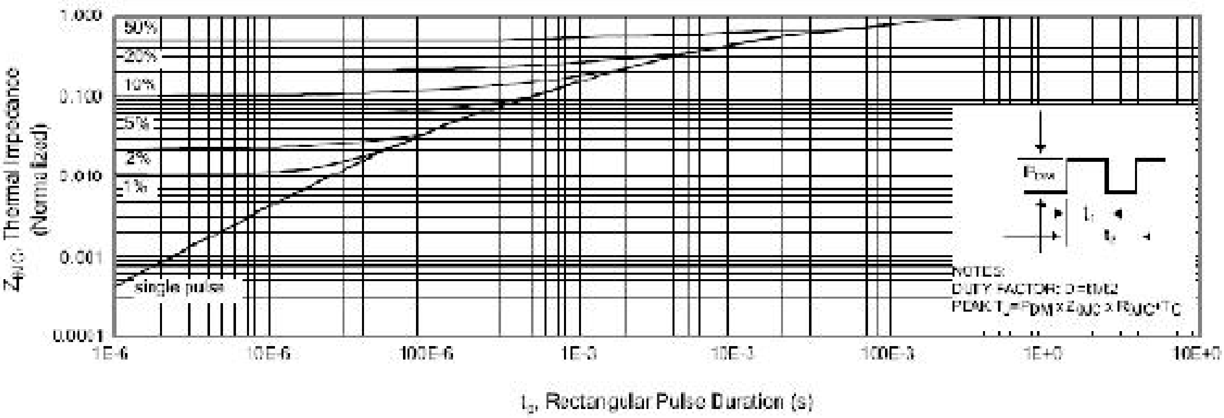

Figure 2. Maximum Power Dissipation vs Case Temperature

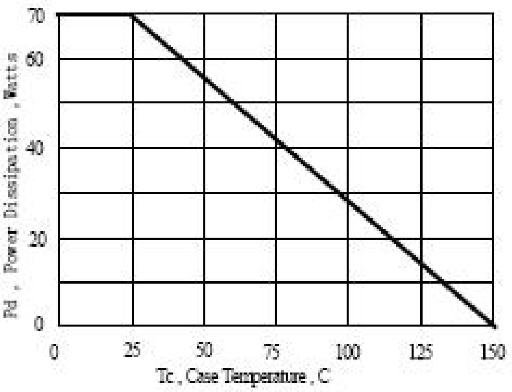

Figure 3. Maximum Continuous Drain Current vs Case Temperature

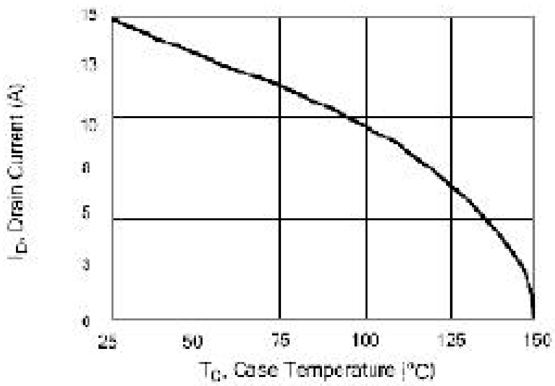

Figure 4. Typical Output Characteristics

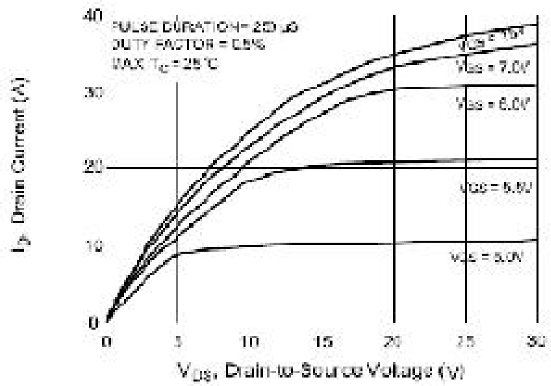

Figure 5. Typical Drain-to-Source ON Resistance vs Gate Voltage and Drain Current

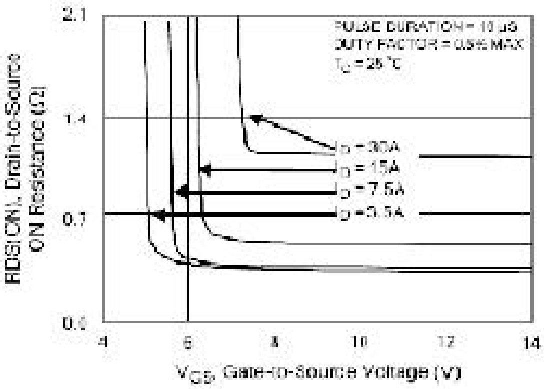

Figure 6. Maximum Peak Current Capability

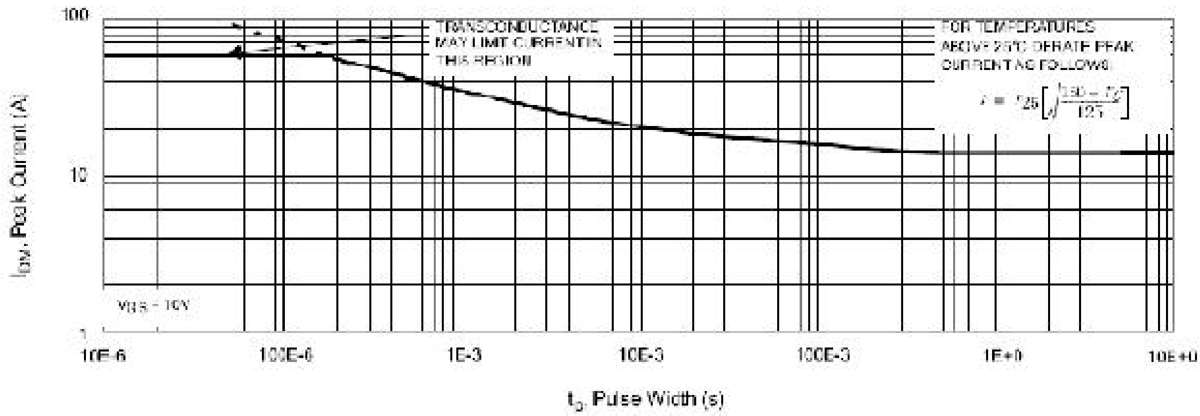

Figure 7. Typical Transfer Characteristics

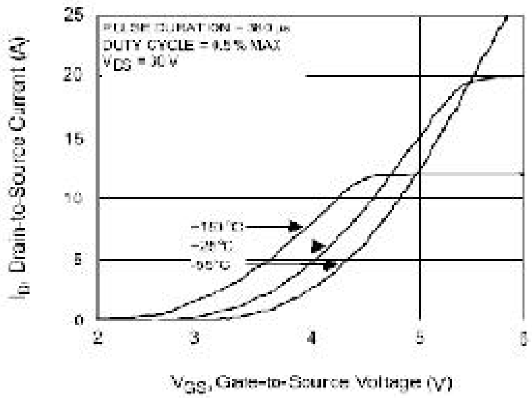

Figure 8. Unclamped Inductive Switching Capability

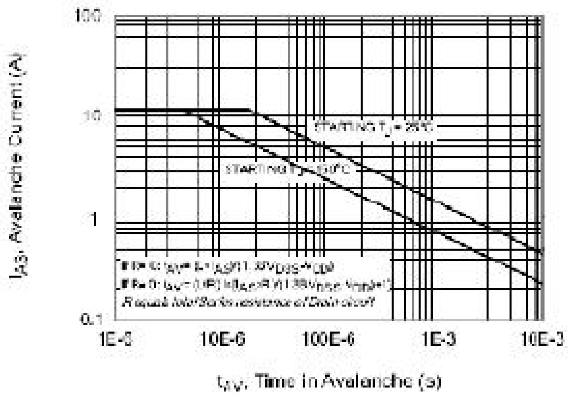

Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current

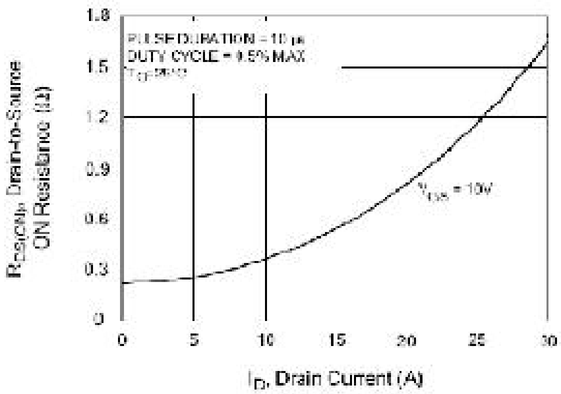

Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature