

General Description:

The GL160P04FA9 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications. The package form is TO-220F, which accords with the RoHS standard.

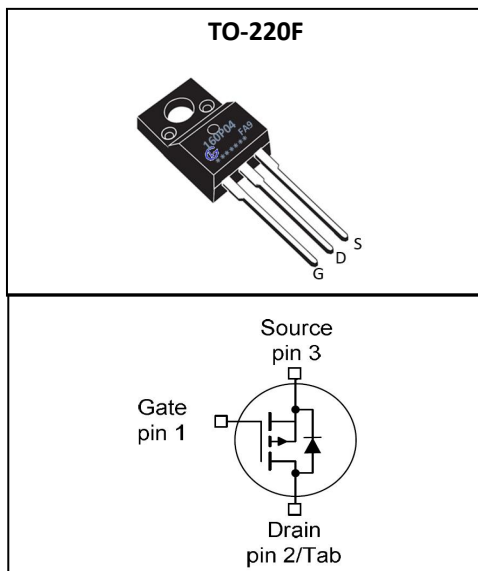
Features:

- Fast Switching
- Low Gate Charge and $R_{DS(on)}$
- 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}	-40	V
I_D	-160	A
P_D	125	W
$R_{DS(ON)max}$	5	$m\Omega$



Absolute ($T_c = 25^\circ\text{C}$ unless otherwise specified):

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	-40	V
I_D	Continuous Drain Current	-160	A
	Continuous Drain Current $T_c = 100^\circ\text{C}$	-90	A
I_{DM}^{a1}	Pulsed Drain Current	-360	A
V_{GS}	Gate-to-Source Voltage	± 20	V
$\frac{dv}{dt}^{a3}$	Peak Diode Recovery $\frac{dv}{dt}$	5.0	V/ns
P_D	Power Dissipation	125	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	$^\circ\text{C}$



GL160P04FA9

GL Silicon P-Channel Power MOSFET

Electrical Characteristics (T_c= 25 °C unless otherwise specified):

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Unit s
			Min.	Typ.	Max.	
V _{DSS}	Drain to Source Breakdown Voltage	V _{GS} =0V, I _D =-250μA	-40	--	--	V
Δ BV _{DSS} / Δ T _J	Bvdss Temperature Coefficient	ID=-250uA, Reference 25 °C	--	0.02	--	V/°C
I _{DSS}	Drain to Source Leakage Current	V _{DS} = -40, V _{GS} = 0V, T _a = 25 °C	--	--	-1	μA
		V _{DS} = -32V, V _{GS} = 0V, T _a = 125 °C	--	--	-250	
I _{GSS(F)}	Gate to Source Forward Leakage	V _{GS} = +20V	--	--	100	nA
I _{GSS(R)}	Gate to Source Reverse Leakage	V _{GS} = -20V	--	--	-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 =-80.0A	--	--	5.0	mΩ
		V _{GS} =-5.0V, I _D =-20.0A	--	--	8.0	mΩ
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = -250μA	-1.0	--	-3.0	V
Pulse width tp ≤ 380μs, δ ≤ 2%						

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g _{fs}	Forward Transconductance	V _{DS} =-10V, I _D =-80A	--	50	--	S
C _{iss}	Input Capacitance	V _{GS} = 0V V _{DS} = -25V f = 1.0MHz	--	11700	--	pF
C _{oss}	Output Capacitance		--	850	--	
C _{rss}	Reverse Transfer Capacitance		--	300	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
t _{d(ON)}	Turn-on Delay Time	R _L =-1.5 Ω V _{DD} = -20V V _{GS} = -10V R _G =1.5Ω	--	40	--	ns
t _r	Rise Time		--	20	--	
t _{d(OFF)}	Turn-Off Delay Time		--	90	--	
t _f	Fall Time		--	25	--	
Q _g	Total Gate Charge	I _D =-20.0A V _{DD} =-20V V _{GS} = -10V	--	120	--	nC
Q _{gs}	Gate to Source Charge		--	45	--	
Q _{gd}	Gate to Drain ("Miller") Charge		--	35	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)		--	--	-160	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	-360	A
V_{SD}	Diode Forward Voltage	$I_S = -160A, V_{GS} = 0V$	--	--	1.5	V
t_{rr}	Reverse Recovery Time	$I_S = -160A, T_J = 25^\circ C$	--	50	--	ns
Q_{rr}	Reverse Recovery Charge	$dI_F/dt = 100A/us, V_{GS} = 0V$	--	110	--	nC
Pulse width $t_p \leq 380\mu s, \delta \leq 2\%$						

Symbol	Parameter	Typ.	Units
$R_{\theta JA}$	Junction-to-Ambient	2.5	$^\circ C/W$

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

^{a3}: $I_{SD} = -160A, di/dt \leq 100A/us, V_{DD} \leq BV_{DS}, \text{Start } T_J = 25^\circ C$

Typical Electrical and Thermal Characteristics

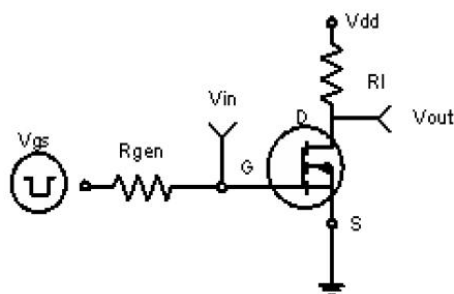


Figure 1: Switching Test Circuit

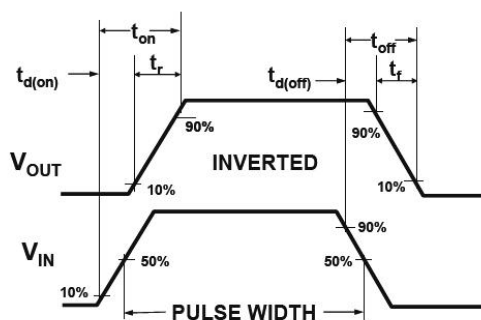


Figure 2: Switching Waveforms

Typical Electrical and Thermal Characteristics (Curves)

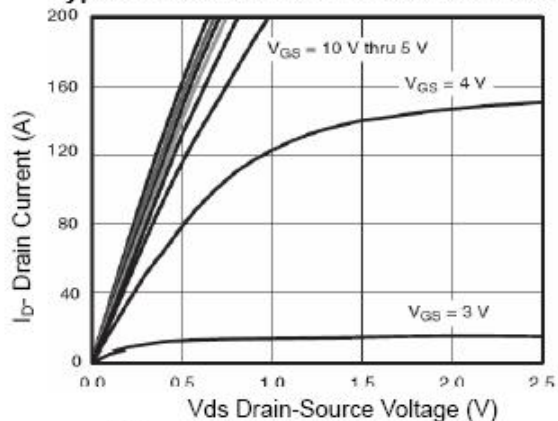


Figure 1 Output Characteristics

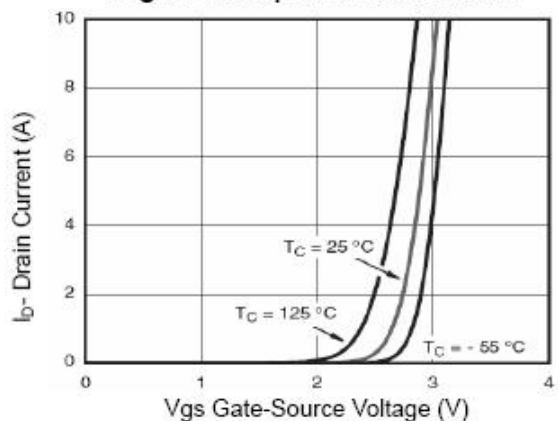


Figure 2 Transfer Characteristics

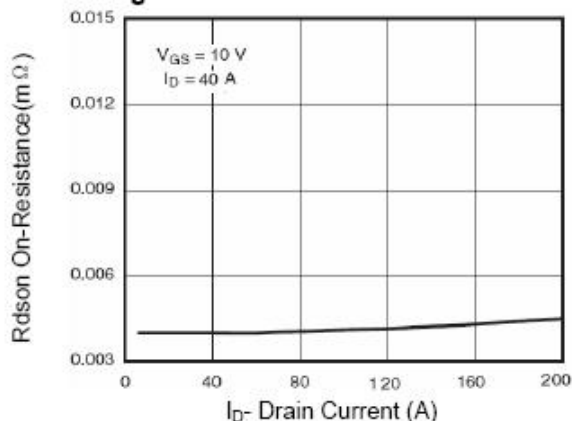


Figure 3 $R_{DS(on)}$ - Drain Current

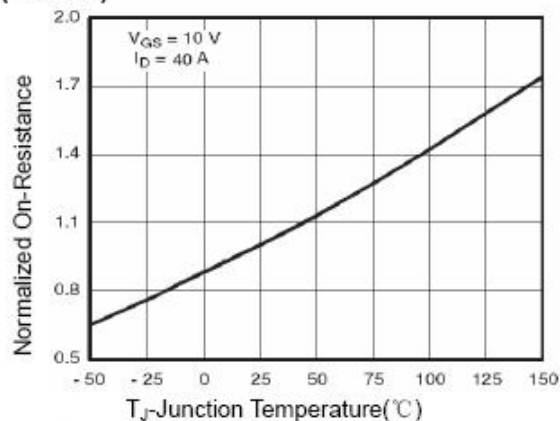


Figure 4 $R_{DS(on)}$ -Junction Temperature

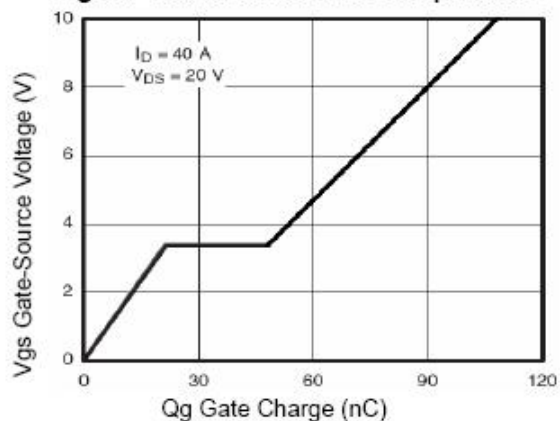


Figure 5 Gate Charge

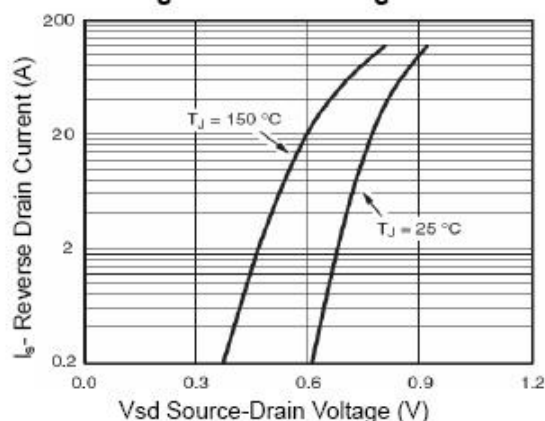


Figure 6 Source- Drain Diode Forward



GL160P04FA9

GL Silicon P-Channel Power MOSFET

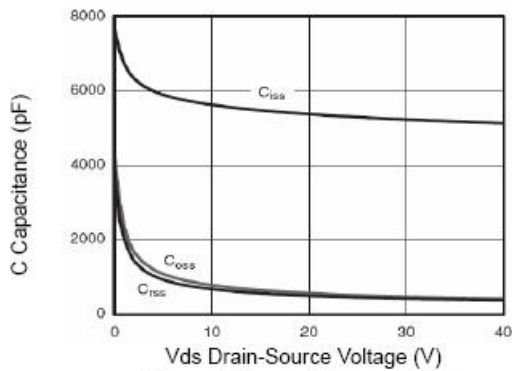


Figure 7 Capacitance vs Vds

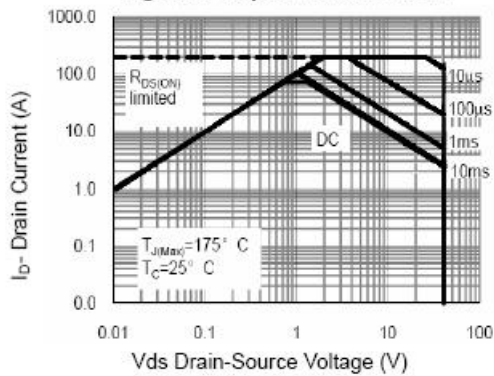


Figure 8 Safe Operation Area

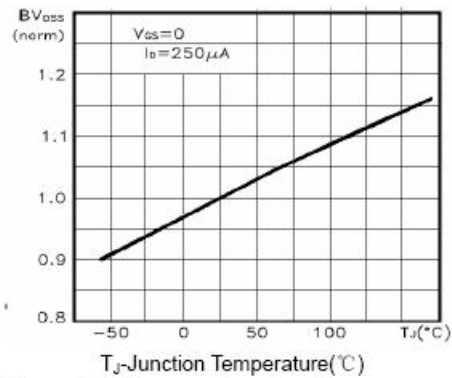


Figure 9 BV_{DSS} vs Junction Temperature

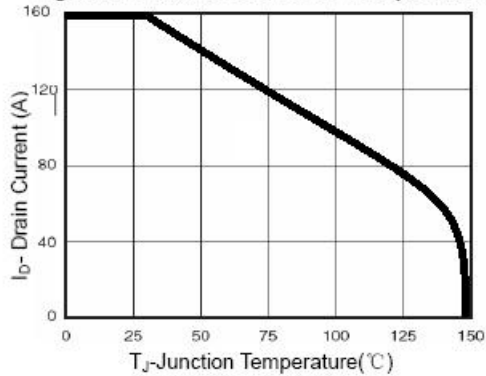


Figure 10 ID Current Derating vs Junction Temperature

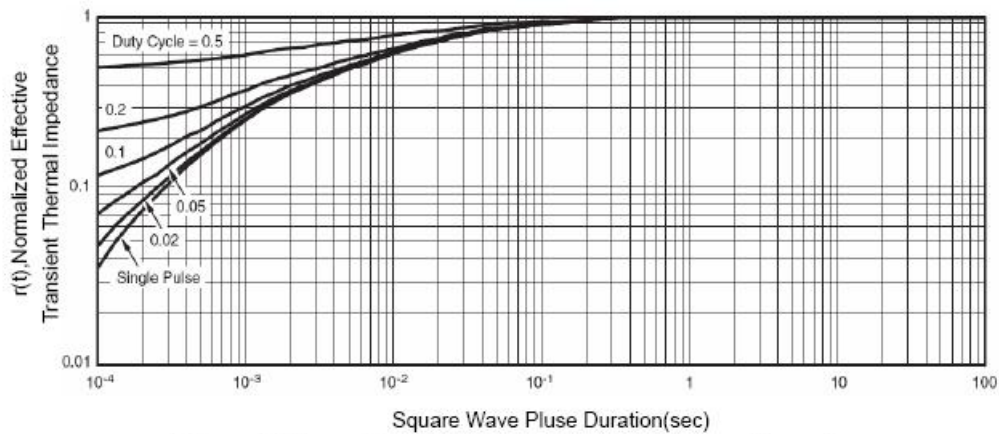


Figure 11 Normalized Maximum Transient Thermal Impedance

Company:
Wuxi
Guang
Lei
Electronic
Technology
Co., LTD
TEL: 139
617
341
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Mr.
Yuan