GL13P10A4

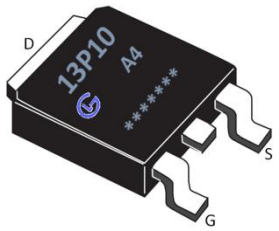
GL Silicon P-Channel Power MOSFET

General Description

The GL13P10A4 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-252, which accords with the RoHS standard.

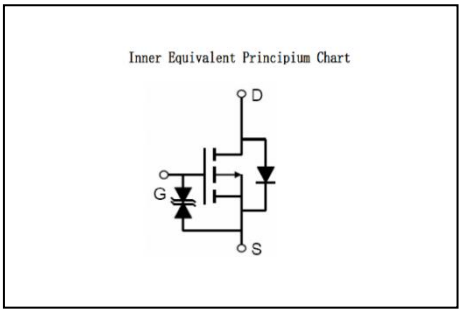
V_{DSS}	-100	V
I_D	-13	A
P_D	40	W
$R_{DS(ON)type}$	170	mΩ

TO-252



Features

- $R_{DS(ON)}$ <200mΩ @ V_{GS}=10V (Typ170mΩ)
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation



Applications

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

Absolute (Tc= 25℃ unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	-100	V
I_D	Continuous Drain Current	-13	A
I_{DM}	Pulsed Drain Current	-30	A
V_{GS}	Gate-to-Source Voltage	±20	V
P_D	Power Dissipation	40	W
E_{AS}	Single pulse avalanche energy[a5]	110	mJ
T_J, T_{stg}	Operating Junction and Storage Temperature Range	150, −55 to 150	℃

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

Thermal Characteristics

Symbol	Parameter	Typ.	Units
$R_{\theta JC}$	Junction-to-Case[a2]	0.9	℃/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	-100	--	--	V
I_{DSS}	Drain to Source Leakage Current	V_{DS}=-100V, V_{GS}= 0V,T_a=25℃	--	--	1.0	μA
$I_{GSS(F)}$	Gate to Source Forward Leakage	V_{GS}=+20V	--	--	10	μA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	V_{GS}=-20V	--	--	-10	μA

ON Characteristics[a3]						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	V_{GS}=-10V,I_D=-6.5A	--	170	200	mΩ
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	-1	--	-3	V
Pulse width tp≤380μs,δ≤2%						

Dynamic Characteristics[a4]						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g_{fs}	Forward Transconductance	V_{DS}=-15V,I_D=-5A	12	--	--	S
C_{iss}	Input Capacitance	V_{GS}=0V,V_{DS}=-25V f=1.0MHz	--	760	--	pF
C_{oss}	Output Capacitance		--	260	--	
C_{rss}	Reverse Transfer Capacitance		--	170	--	

Resistive Switching Characteristics[a4]						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=-50V,I_D=-10A V_{GS}=-10V,R_G=9.1Ω	--	14	--	ns
t_r	Rise Time		--	18	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	50	--	
t_f	Fall Time		--	18	--	
Q_g	Total Gate Charge	V_{DD}=-50V, I_D=-10A V_{GS}=-10V	--	25	--	nC
Q_{gs}	Gate to Source Charge		--	5	--	
Q_{gd}	Gate to Drain (“Miller”)Charge		--	7	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current [a2](Body Diode)		--	--	-13	A
V_{SD}	Diode Forward Voltage[a3]	I_S=-13A,V_{GS}=0V	--	--	-1.2	V

[a1]: Repetitive Rating: Pulse width limited by maximum junction temperature.

[a2]: Surface Mounted on FR4 Board, t≤10sec.

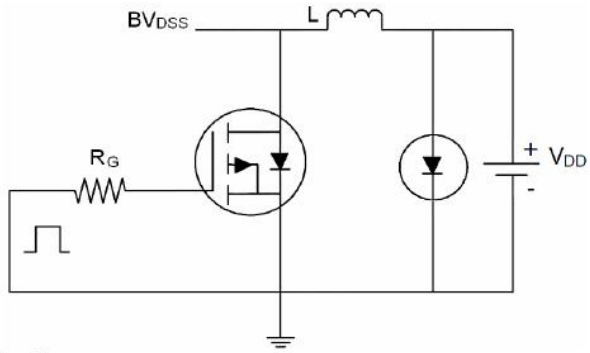
[a3]: Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%.

[a4]: Guaranteed by design, not subject to production

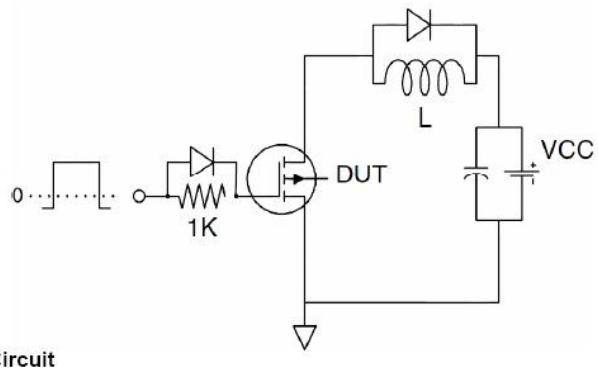
[a5]: EAS condition: Tj=25℃,V_{DD}=-50V,V_G=-10V,L=0.5mH,Rg=25Ω

Test Circuits

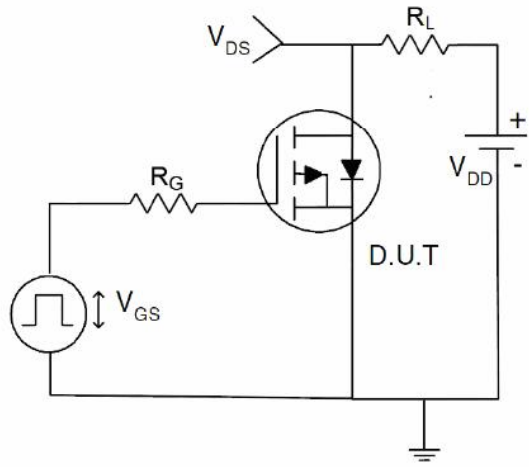
1) E_{AS} Test Circuit



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



Characteristics Curves

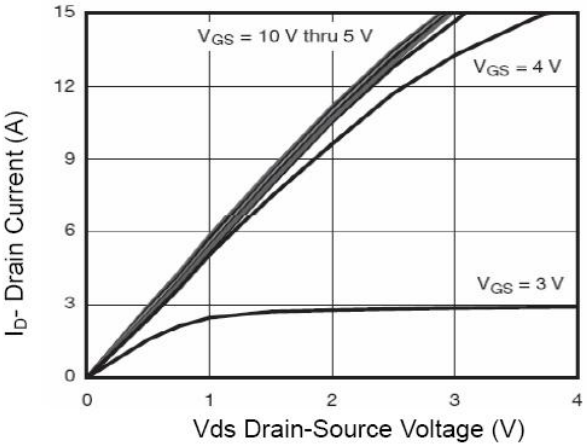


Figure 1 Output Characteristics

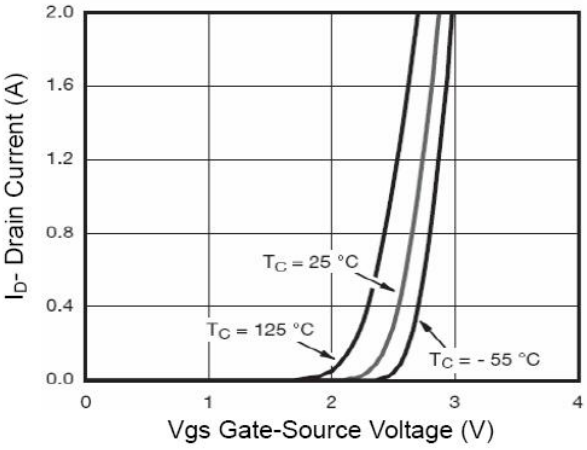


Figure 2 Transfer Characteristics

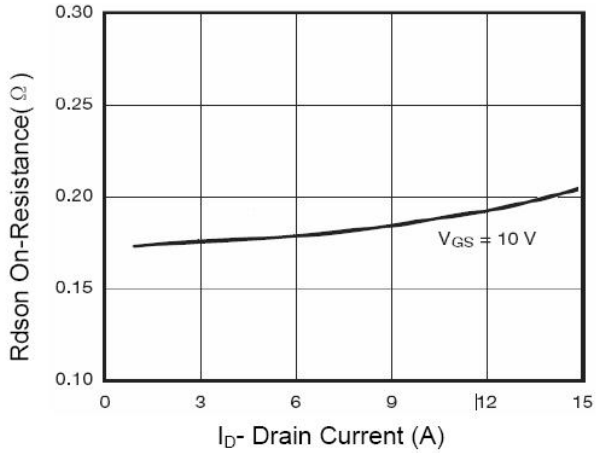


Figure 3 Rdson- Drain Current

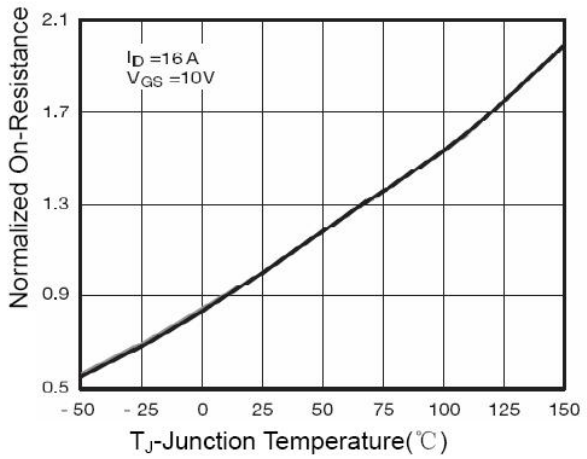


Figure 4 Rdson-JunctionTemperature

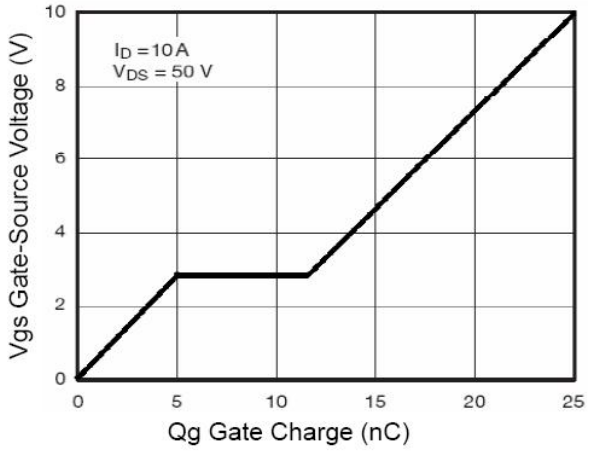


Figure 5 Gate Charge

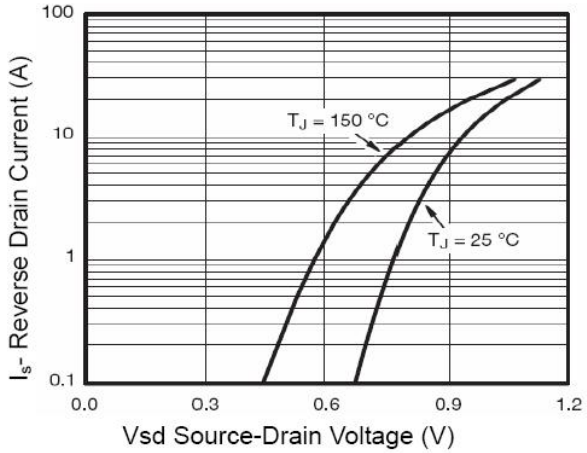


Figure 6 Source- Drain Diode Forward

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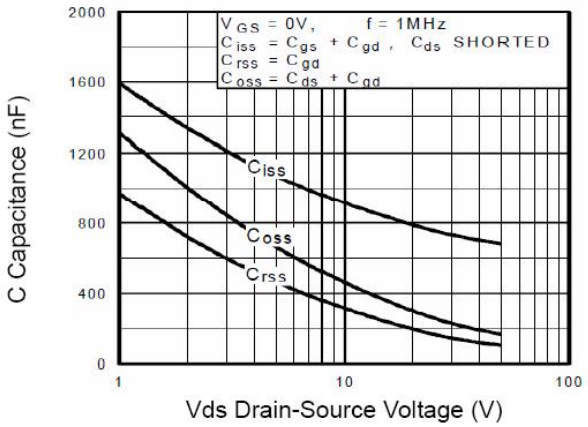

Figure 7 Capacitance vs Vds

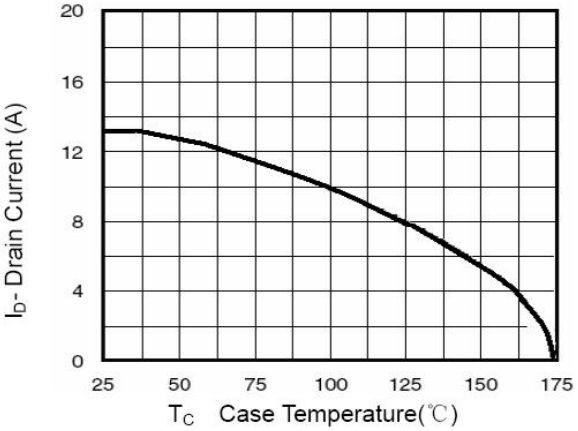

Figure 9 Drain Current vs Case Temperature

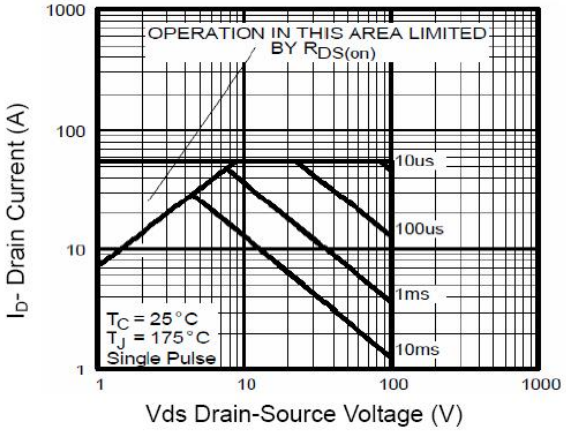

Figure 8 Safe Operation Area

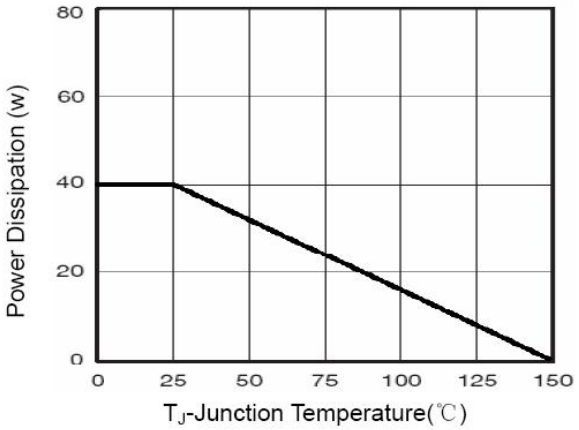

Figure 10 Power De-rating

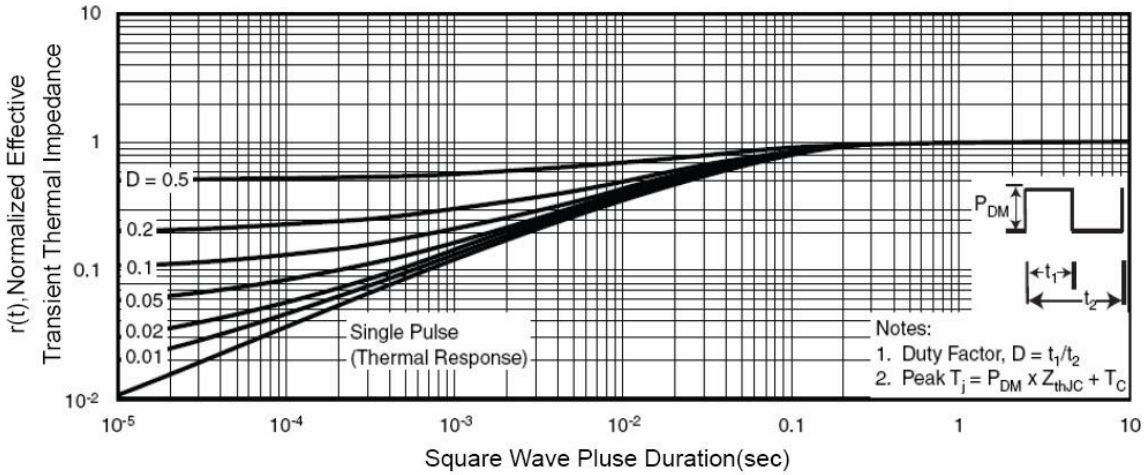

Figure 11 Normalized Maximum Transient Thermal Impedance