



GL6P50A8

Silicon P-Channel Power MOSFET

General Description

GL6P50A8, the silicon P-channel Enhanced VDMOSFET, is produced using GL's proprietary planar Technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. The transistor can be used in various circuit for system miniaturization and higher efficiency. The package form is TO-220, which accords with the RoHS standard.

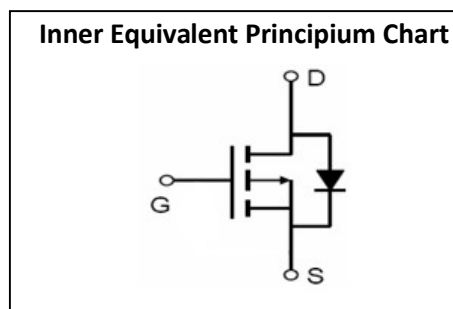
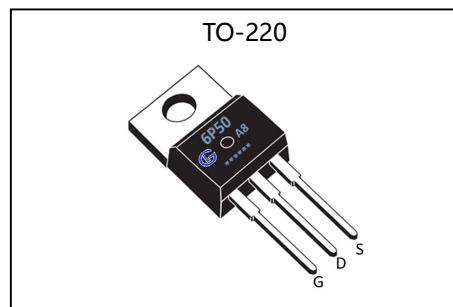
V_{DSS}	-500	V
I_D	-6	A
$P_D(T_C=25^{\circ}C)$	100	W
$R_{DS(ON).TYP.}$	1.7	Ω

Features

- Fast Switching
- Low ON Resistance
- Low Gate Charge
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

Applications

- Power switch circuit of adaptor and charger
- audio amplifier
- DC motor control
- variable switching power applications



Absolute (Tc=25°C unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	-500	V
I_D	Continuous Drain Current	-6	A
	Continuous Drain Current $T_C=100^{\circ}C$	-3.8	A
I_{DM}^{a1}	Pulsed Drain Current	-24	A
V_{GS}	Gate-to-Source Voltage	± 30	V
E_{AS}^{a2}	Single Pulse Avalanche Energy	400	mJ
E_{Ar}^{a1}	Avalanche Energy ,Repetitive	50	mJ
I_{AR}^{a1}	Avalanche Current	-3.3	A
dv/dt^{a3}	Peak Diode Recovery dv/dt	-5.0	V/ns
P_D	Power Dissipation	100	W
	Derating Factor above 25°C	0.8	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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Electrical Characteristics ($T_c = 25^\circ\text{C}$ unless otherwise specified)

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-500	--	--	V
$\Delta V_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	$I_D=-250\mu A, \text{Reference } 25^\circ\text{C}$	--	0.67	--	$V/^\circ\text{C}$
I_{DSS}	Drain to Source Leakage Current	$V_{DS}=-500V, V_{GS}=0V, T_a=25^\circ\text{C}$	--	--	-1.0	μA
		$V_{DS}=-400V, V_{GS}=0V, T_a=125^\circ\text{C}$	--	--	-250	
$I_{GSS(F)}$	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	$V_{GS}=-10V, I_D=-3A$	--	1.7	2.25	Ω
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-3.0	--	-5.0	V
g_{fs}	Forward Trans conductance	$V_{DS}=-15V, I_D=-2A$	--	3.0	--	S
Pulse width < 380 μ s; duty cycle < 2%.						

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=-25V$ $f=1.0\text{MHz}$	--	980	--	pF
C_{oss}	Output Capacitance		--	160	--	
C_{rss}	Reverse Transfer Capacitance		--	19	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_D=-3A, V_{DD}=-200V$ $V_{GS}=-10V, R_g=9.1\Omega$	--	10	--	ns
t_r	Rise Time		--	10	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	35	--	
t_f	Fall Time		--	18	--	
Q_g	Total Gate Charge	$I_D=-3A, V_{DD}=-400V$ $V_{GS}=-10V$	--	36	--	nC
Q_{gs}	Gate to Source Charge		--	8	--	
Q_{gd}	Gate to Drain ("Miller") Charge		--	18	--	



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Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_{SD}	Continuous Source Current (Body Diode)		--	--	-6	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	-24	A
V_{SD}	Diode Forward Voltage	$I_S = -6A, V_{GS} = 0V$	--	--	-1.5	V
t_{rr}	Reverse Recovery Time	$I_S = -6A, T_J = 25^\circ C$	--	280	--	ns
Q_{rr}	Reverse Recovery Charge	$di_F/dt = 100A/\mu s, V_{GS} = 0V$	--	2.0	--	μC

Thermal Characteristics

Symbol	Parameter	Rating	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.25	$^\circ C / W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	$^\circ C / W$

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

a2: $L = 10mH$, $I_D = -9.5A$, Start $T_J = 25^\circ C$

a3: $I_{SD} = -8A$, $di/dt \leq 100A/\mu s$, $V_{DD} \leq BV_{DS}$, Start $T_J = 25^\circ C$

Characteristics Curves

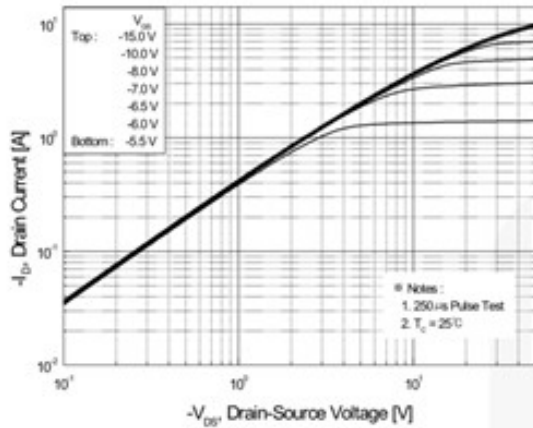


Figure 1. On-Region Characteristics

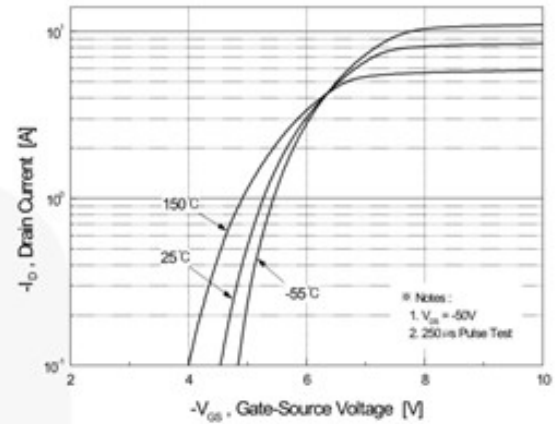


Figure 2. Transfer Characteristics

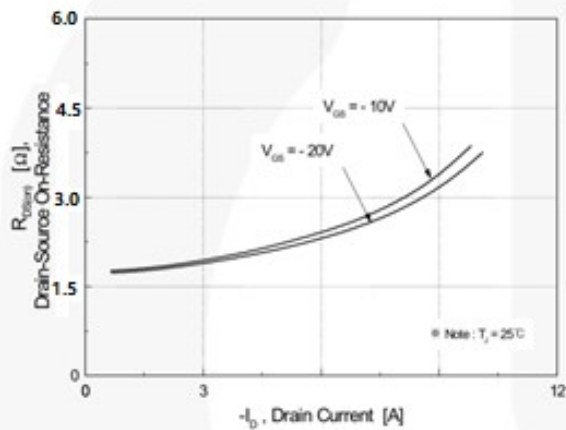


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

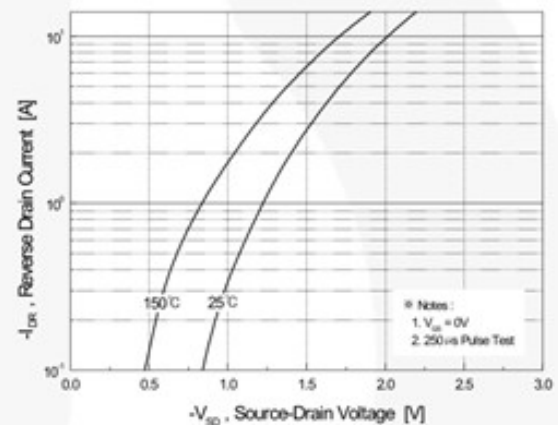


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

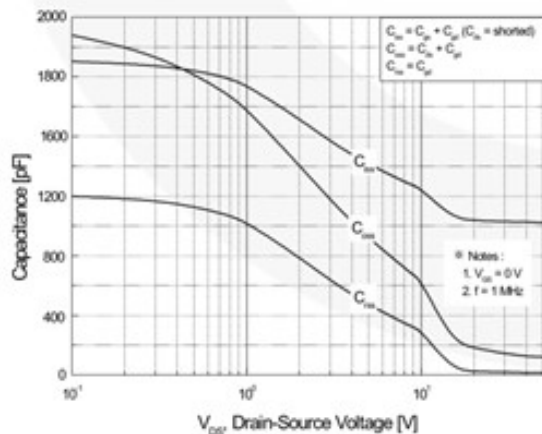


Figure 5. Capacitance Characteristics

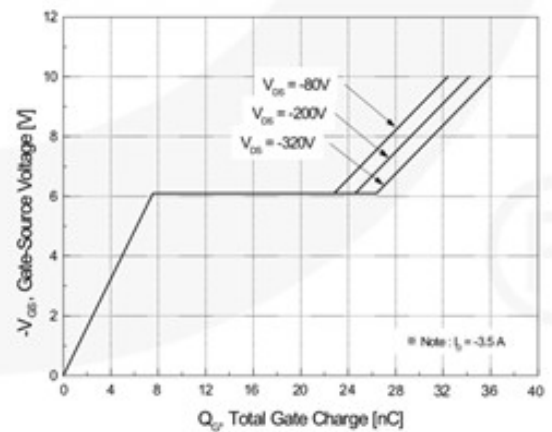


Figure 6. Gate Charge Characteristics

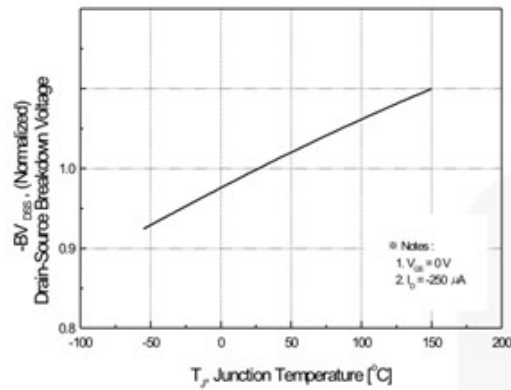


Figure 7. Breakdown Voltage Variation vs. Temperature

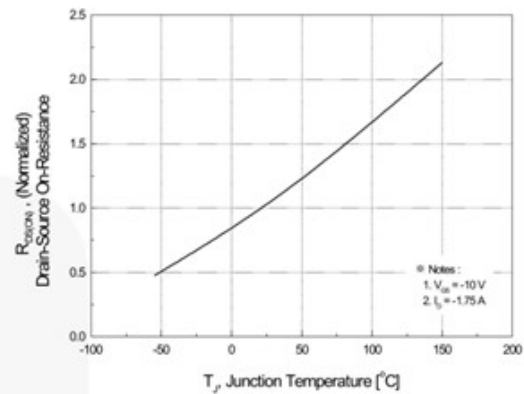


Figure 8. On-Resistance Variation vs. Temperature

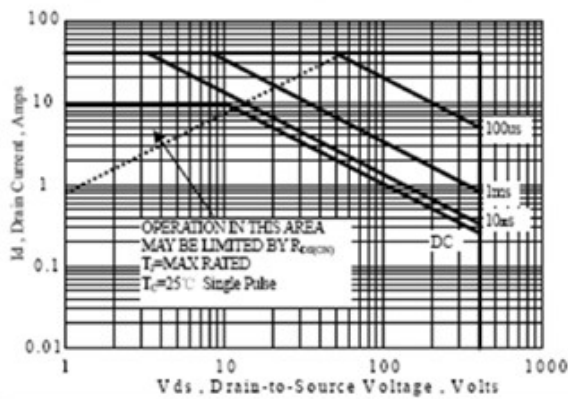


Figure 9. Maximum Safe Operating Area

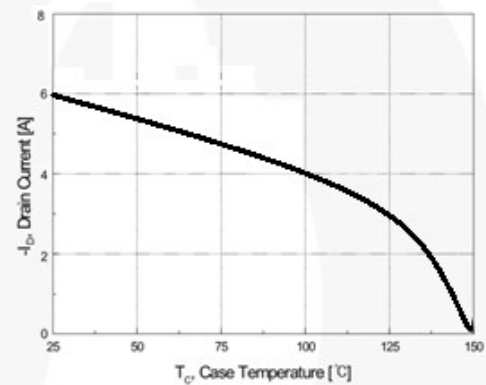


Figure 10. Maximum Drain Current vs. Case Temperature

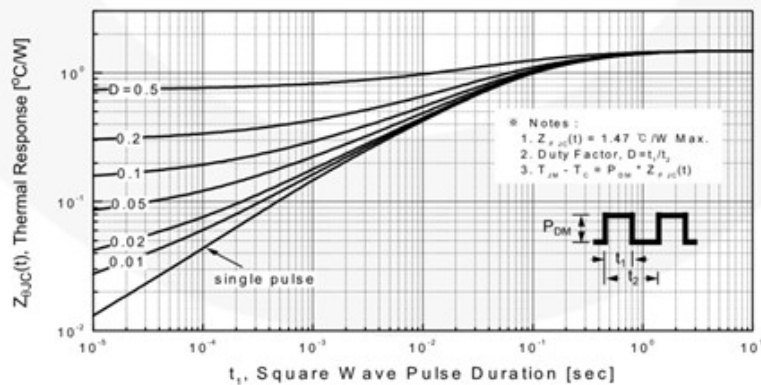


Figure 11. Transient Thermal Response Curve