



GL50P03AD

GL Silicon P-Channel Power MOSFET

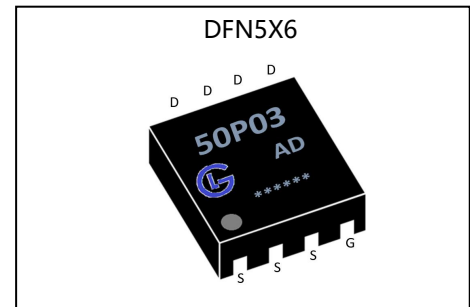
General Description

The GL50P03AD 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 DFN-5×6, which accords with the RoHS standard.

V_{DSS}	-30	V
I_D	-50	A
P_D	60	W
$R_{DS(ON)}$ TYPE	6	mΩ

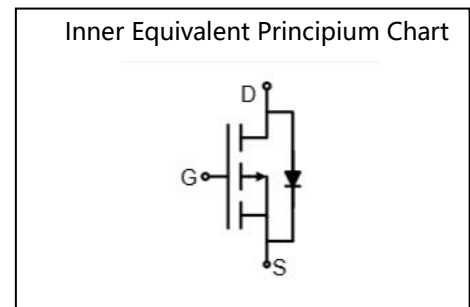
Features

- Fast Switching
- Low Gate Charge and $R_{DS(on)}$
- Low Reverse transfer capacitances



Applications

- Battery switching application
- Hard switched and high frequency circuits
- Power management



Absolute Maximum Ratings (TA= 25°C unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	-30	V
I_D	Continuous Drain Current $T_C = 25^\circ\text{C}$	-50	A
	Continuous Drain Current $T_C = 70^\circ\text{C}$	-40	A
I_{DM}^{a1}	Pulsed Drain Current	-200	A
V_{GS}	Gate-to-Source Voltage	± 20	V
P_D	Power Dissipation	60	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	150, -55 to 150	$^\circ\text{C}$
T_L	Maximum Temperature for Soldering	300	$^\circ\text{C}$

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	2.1	$^\circ\text{C/W}$



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Electrical Characteristics (Tc= 25°C unless otherwise specified)

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-30	-33	--	V
I_{DSS}	Drain to Source Leakage Current	$V_{DS}=-30V, V_{GS}=0V$	--	--	-1	μA
$I_{GSS(F)}$	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.	
$R_{DS(ON)1}$	Drain-to-Source On-Resistance	$V_{GS}=-10V, I_D=-20A$	--	6	9	m Ω
$R_{DS(ON)}$	Drain-to-Source On-Resistance	$V_{GS}=-4.5V, I_D=-10A$	--	10	15	m Ω
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0	-1.5	-2.0	V

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g_{fs}	Forward Transconductance	$V_{DS}=-15V, I_D=-10A$	--	20	--	S
C_{iss}	Input Capacitance	$V_{GS}=0V$	--	3000	--	pF
C_{oss}	Output Capacitance	$V_{DS}=-15V$	--	650	--	
C_{rss}	Reverse Transfer Capacitance	$f=1.0MHz$	--	550	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_D=-1.0A, V_{DS}=-15V$ $V_{GS}=-10V, R_G=6.0\Omega$	--	10	--	ns
t_r	Rise Time		--	15	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	110	--	
t_f	Fall Time		--	70	--	
Q_g	Total Gate Charge	$I_D=-10A, V_{DS}=-15V$ $V_{GS}=-10V$	--	60	--	nC
Q_{gs}	Gate to Source Charge		--	10.5	--	
Q_{gd}	Gate to Drain ("Miller") Charge		--	14.5	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Diode Forward Current		--	--	-50	A
V_{SD}	Diode Forward Voltage	$I_S=-15A, V_{GS}=0V$	--	--	-1.5	V

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

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Characteristics Curves

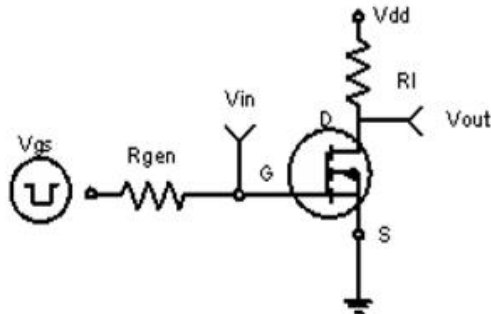


Figure 1: Switching Test Circuit

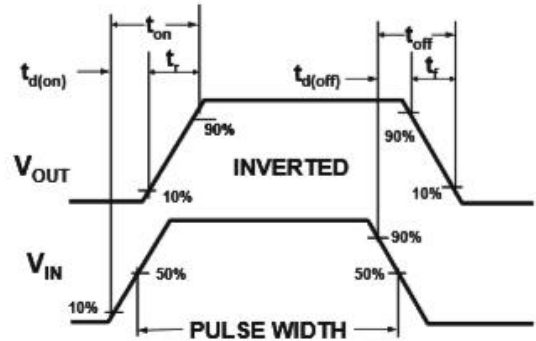


Figure 2: Switching Waveforms

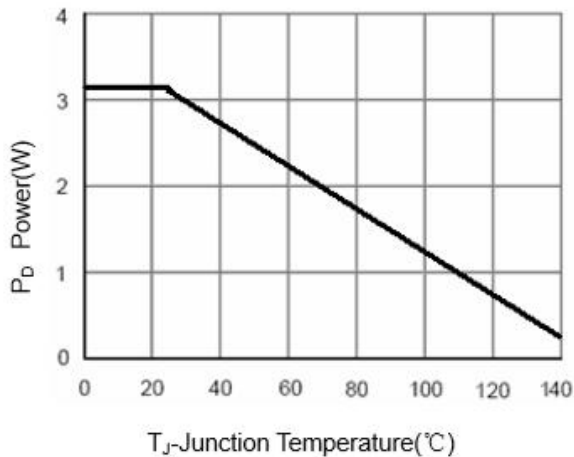


Figure 3 Power Dissipation

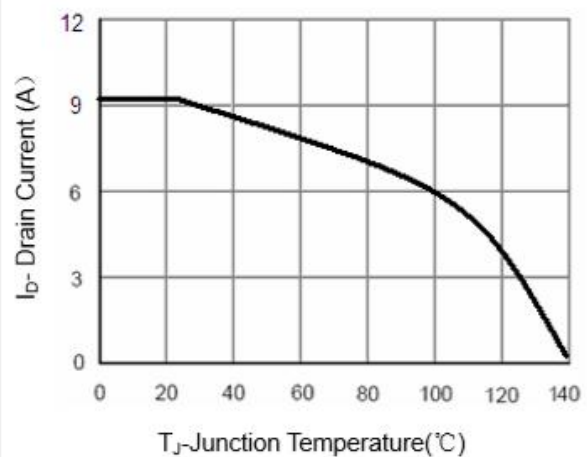


Figure 4 Drain Current

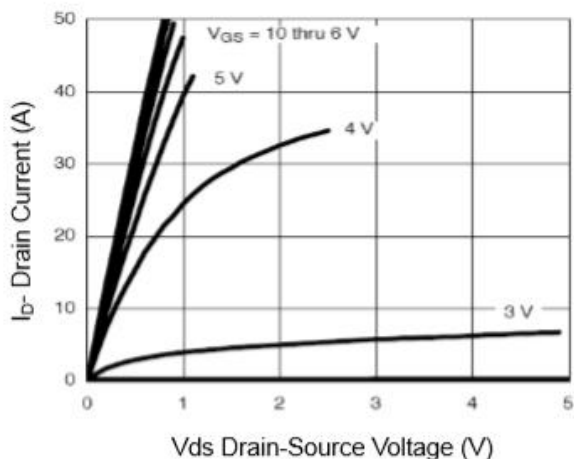


Figure 5 Output Characteristics

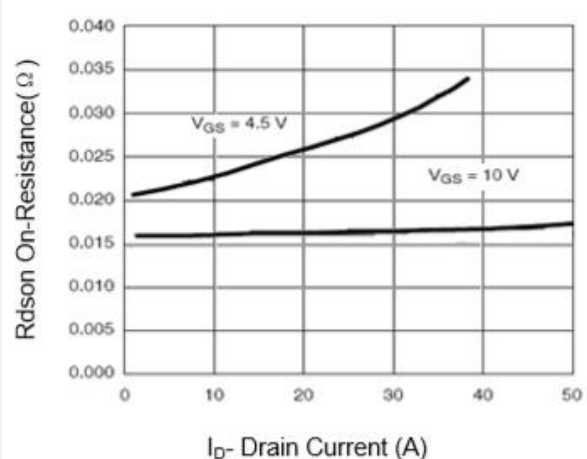


Figure 6 Drain-Source On-Resistance

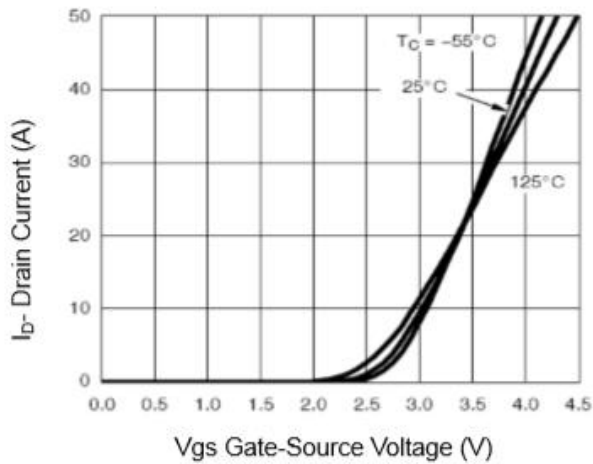


Figure 7 Transfer Characteristics

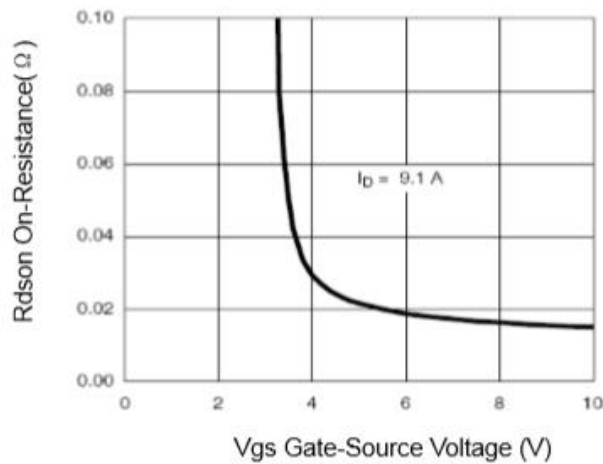


Figure 9 $R_{DS(on)}$ vs V_{GS}

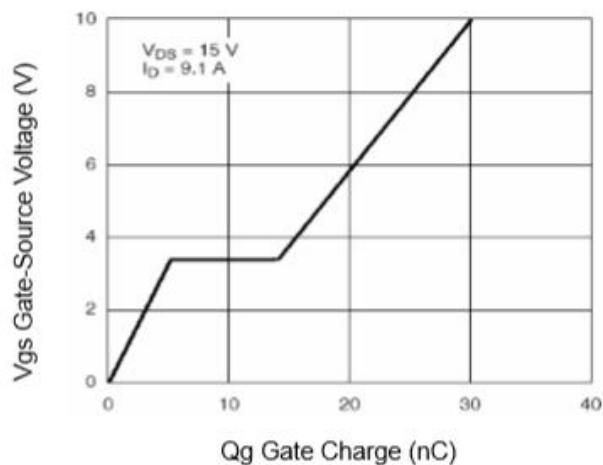


Figure 11 Gate Charge

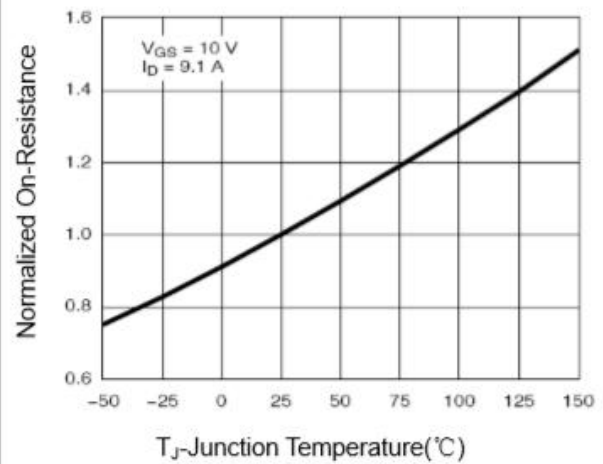


Figure 8 Drain-Source On-Resistance

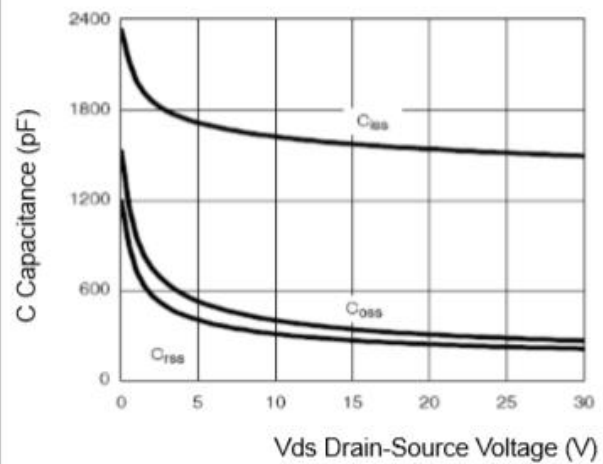


Figure 10 Capacitance vs V_{DS}

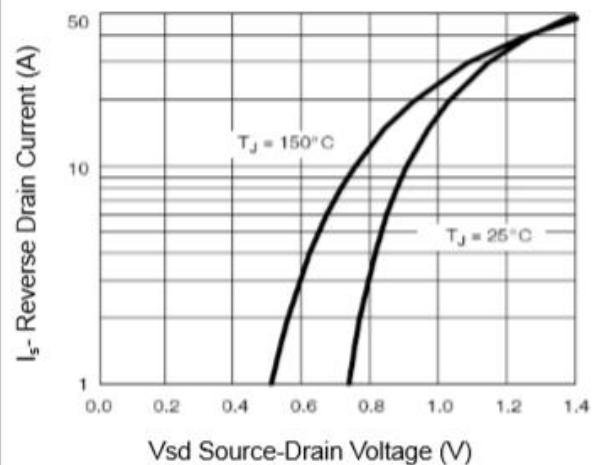


Figure 12 Source- Drain Diode Forward

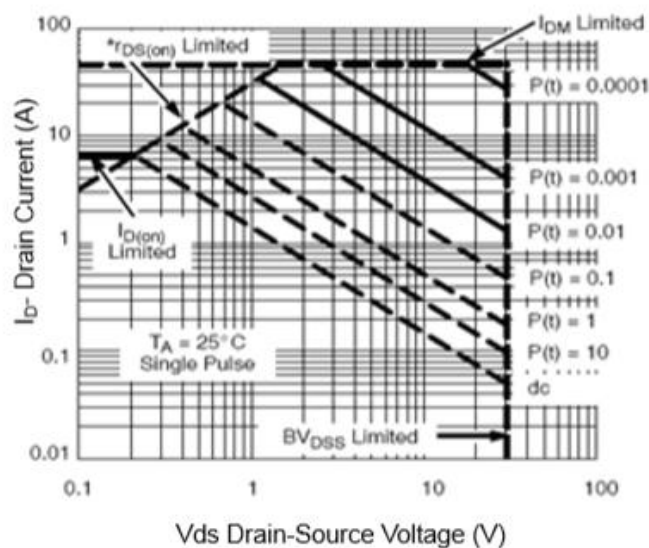


Figure 13 Safe Operation Area

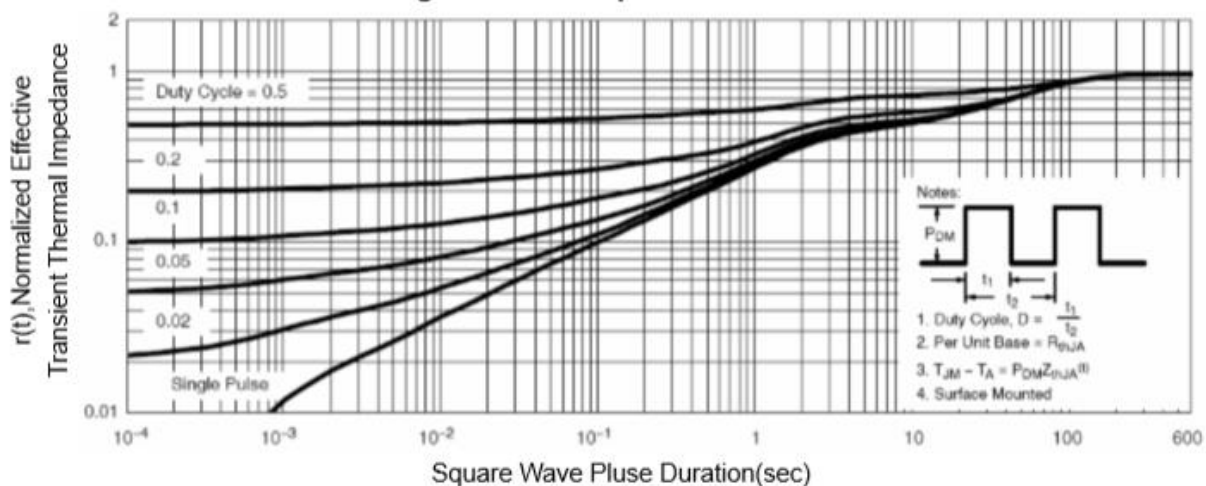


Figure 14 Normalized Maximum Transient Thermal Impedance