

GL Silicon P-Channel Power MOSFET

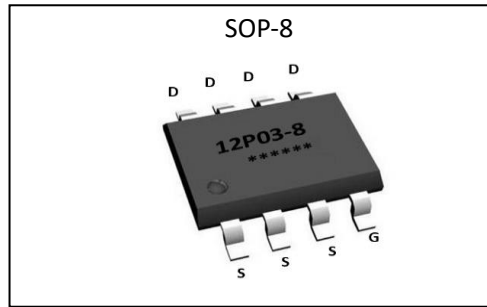
General Description :

The GL12P03-8 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 SOP-8, which accords with the RoHS standard.

V_{DSS}	-30	V
I_D	-12	A
P_D	3.0	W
$R_{DS(ON)type}$	11	m Ω

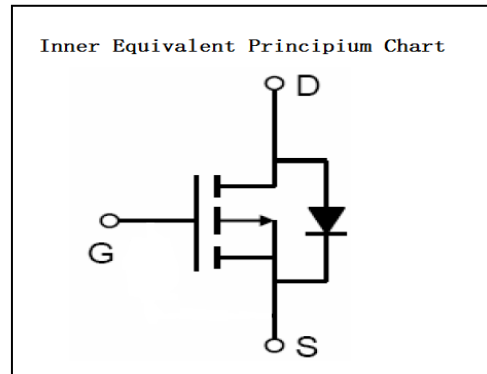
Features :

- $R_{DS(ON)} < 14m\Omega @ V_{GS}=10V$ (Typ11m Ω)
- 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 ($T_c = 25^\circ C$ unless otherwise specified) :

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	-30	V
I_D	Continuous Drain Current	-12	A
	Continuous Drain Current $T_c = 70^\circ C$	-10	A
I_{DM}^{a1}	Pulsed Drain Current	-48	A
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{as}^{a5}	L=0.5mH	140	mJ
dv/dt^{a3}	Peak Diode Recovery dv/dt	5.0	V/ns
P_D	Power Dissipation	3.0	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	150, -55 to 150	$^\circ C$
T_L	Maximum Temperature for Soldering	300	$^\circ C$



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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	$V_{GS}=0V, I_D=250\mu A$	-30	--	--	V
I_{DSS}	Drain to Source Leakage Current	$V_{DS}=-30V, V_{GS}=0V, T_a=25^\circ\text{C}$	--	--	1.0	μA
$I_{GSS(F)}$	Gate to Source Forward Leakage	$V_{GS}=+20V$	--	--	0.1	μA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	$V_{GS}=-20V$	--	--	-0.1	μA

ON Characteristics ^{a3}						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	$V_{GS}=-10V, I_D=-10A$	--	11	14	m Ω
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	-1	--	-3.0	V

Pulse width $t_p \leq 380\mu s, \delta \leq 2\%$

Dynamic Characteristics ^{a4}						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g_{fs}	Forward Transconductance	$V_{DS}=-5V, I_D=-10A$	20	--	--	S
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=-15V$ $f=1.0\text{MHz}$	--	1800	--	pF
C_{oss}	Output Capacitance		--	220	--	
C_{rss}	Reverse Transfer Capacitance		--	180	--	

Resistive Switching Characteristics ^{a4}						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=-15V, I_D=-10A$ $V_{GS}=-10V, R_G=3\Omega$	--	10	--	ns
t_r	Rise Time		--	9	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	26	--	
t_f	Fall Time		--	11	--	
Q_g	Total Gate Charge	$V_{DD}=-15V, I_D=-10A$ $V_{GS}=-10V$	--	25	--	nC
Q_{gs}	Gate to Source Charge		--	4.0	--	
Q_{gd}	Gate to Drain ("Miller") Charge		--	6	--	



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Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current ^{a2} (Body Diode)		--	--	-12	A
V_{SD}	Diode Forward Voltage ^{a3}	$I_S=-12A, V_{GS}=0V$	--	--	-1.5	V
t_{rr}	Reverse Recovery Time	$I_S=-12A, T_J = 25^\circ C$ $di_F/dt=100A/us,$ $V_{GS}=0V$	--	38	--	ns
Q_{rr}	Reverse Recovery Charge		--	30	--	nC

Symbol	Parameter	Typ.	Units
$R_{\theta JC}$	Junction-to-Case ^{a2}	41.7	°C/W

^{a1} : Repetitive Rating: Pulse width limited by maximum junction temperature.

^{a2} : Surface Mounted on FR4 Board, $t \leq 10sec$.

^{a3} : Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

^{a4} : Guaranteed by design, not subject to production

^{a5} : $T_J=25^\circ C, V_{DD}=15V, V_G=10V, L=0.5Mh$

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Typical Electrical and Thermal Characteristics

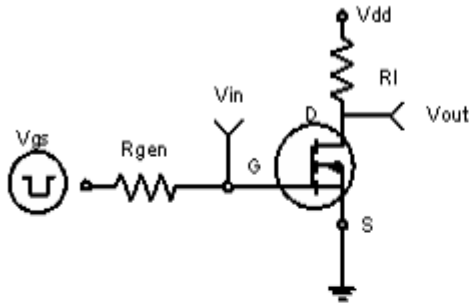


Figure 1: Switching Test Circuit

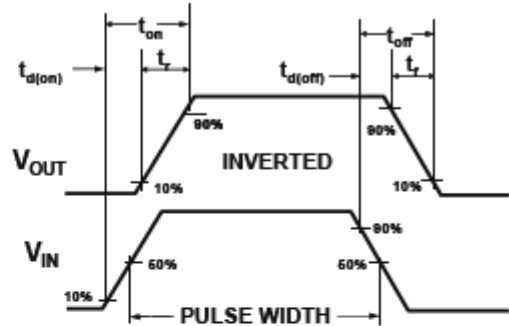


Figure 2: Switching Waveforms

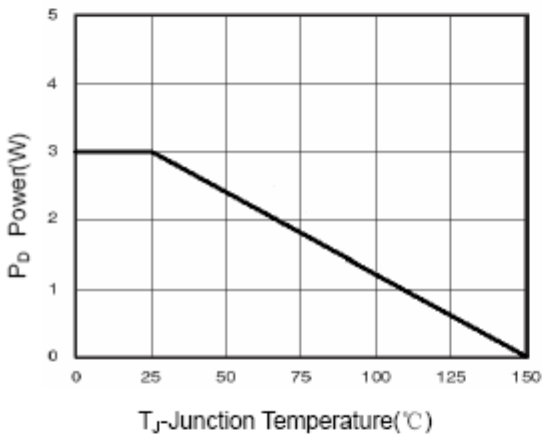


Figure 3 Power Dissipation

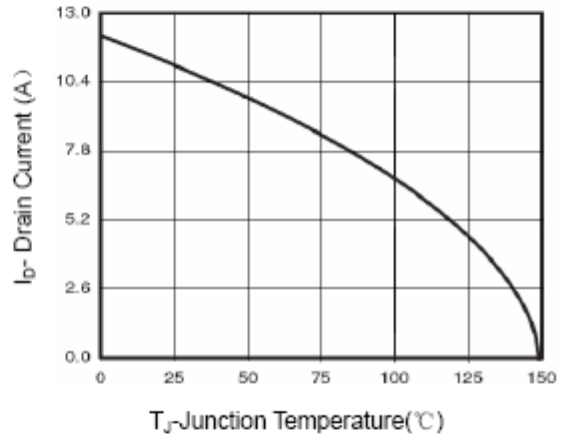


Figure 4 Drain Current

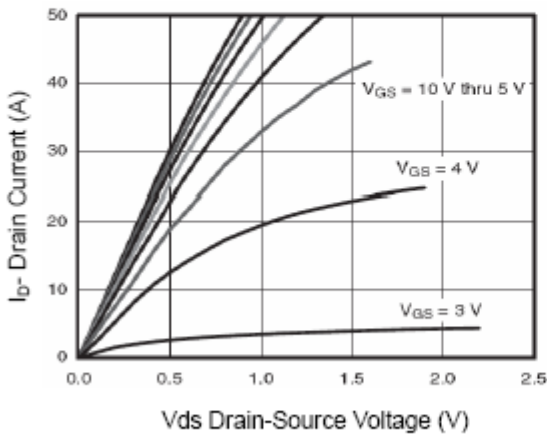


Figure 5 Output Characteristics

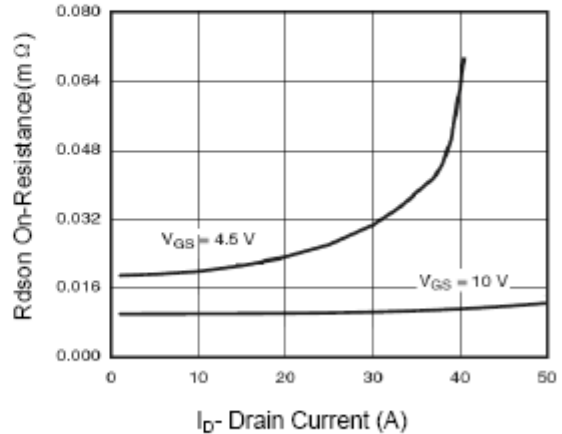


Figure 6 Drain-Source On-Resistance



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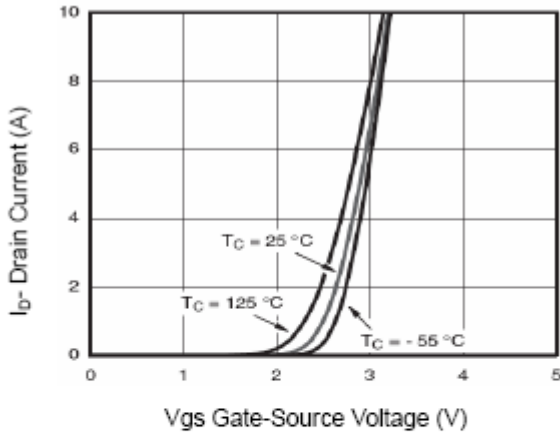


Figure 7 Transfer Characteristics

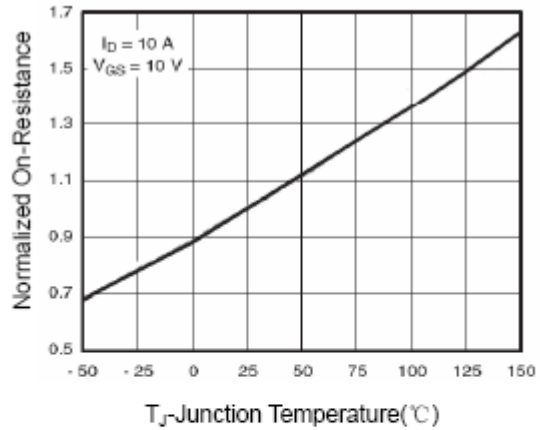


Figure 8 Drain-Source On-Resistance

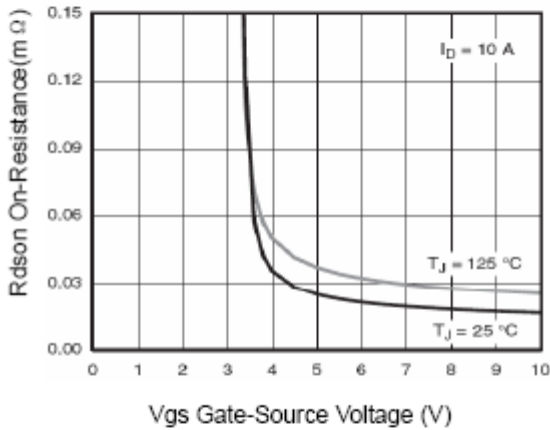


Figure 9 Rdson vs Vgs

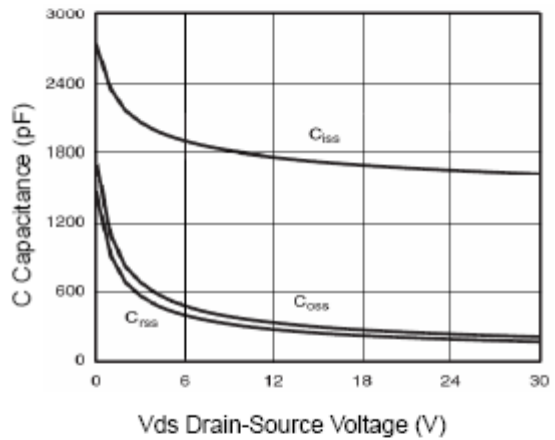


Figure 10 Capacitance vs Vds

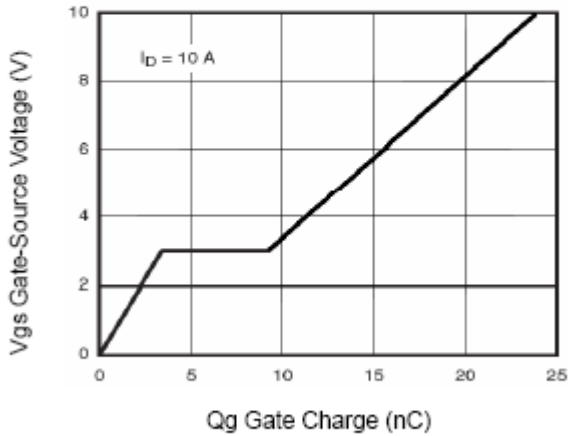


Figure 11 Gate Charge

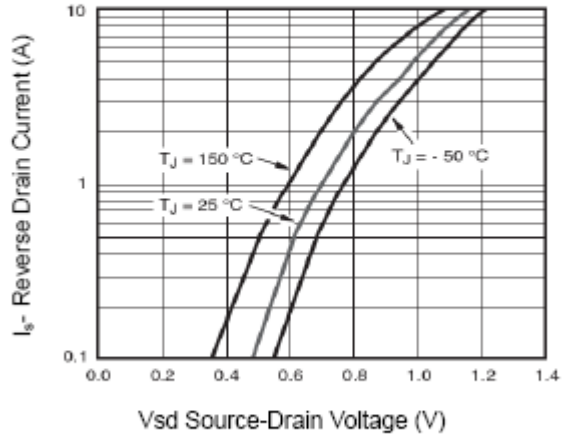


Figure 12 Source- Drain Diode Forward

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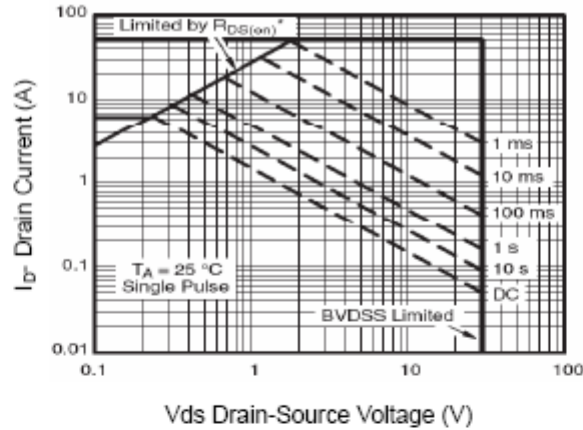


Figure 13 Safe Operation Area

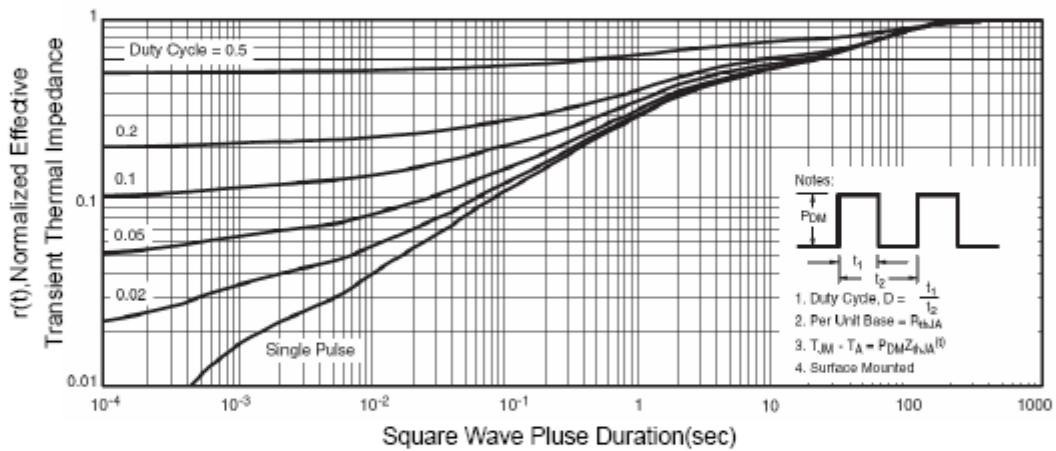


Figure 14 Normalized Maximum Transient Thermal Impedance

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