

GL Silicon N-Channel Power MOSFET

General Description

The GL6009AS-8 uses advanced trench technology and design to provide excellent RDS(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.

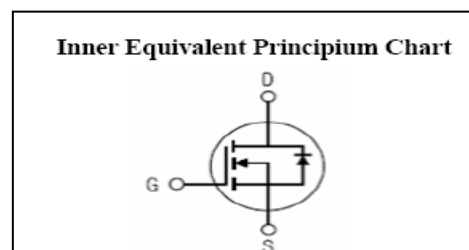
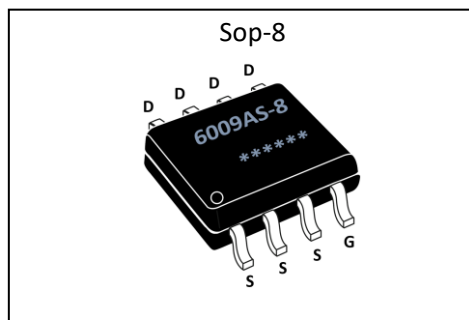
Features

- Fast Switching
- Low Gate Charge and Rdson
- 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}	60	V
I_D	9	A
P_D	2.6	W
$R_{DS(ON)TYPE}$	11	mΩ



Absolute (Tc= 25°C unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	60	V
I_D	Continuous Drain Current	9	A
	Continuous Drain Current $T_C = 100^\circ\text{C}$	6.5	A
I_{DM}	Pulsed Drain Current	36	A
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}^{a2}	Single Pulse Avalanche Energy	50	mJ
E_{AR}^{a1}	Avalanche Energy ,Repetitive	11	mJ
I_{AR}^{a1}	Avalanche Current	5	A
dv/dt^{a3}	Peak Diode Recovery dv/dt	5.0	V/ns
P_D	Power Dissipation	2.6	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	$^\circ\text{C}$

**GL Silicon N-Channel Power MOSFET****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	$V_{GS}=0V, I_D=250\mu A$	60	--	--	V
$\Delta V_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	$I_D=250\mu A$, Reference 25°C	--	0.1	--	V/°C
I_{DSS}	Drain to Source Leakage Current	$V_{DS}=60V, V_{GS}=0V, T_a=25^\circ C$	--	--	1	μA
		$V_{DS}=48V, V_{GS}=0V, T_a=125^\circ C$	--	--	250	
$I_{GSS(F)}$	Gate to Source Forward Leakage	$V_{GS}=+20V$	--	--	1	μA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	$V_{GS}=-20V$	--	--	-1	μA

ON Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	$V_{GS}=10V, I_D=9A$	--	11	14	mΩ
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.7	2.5	V
Pulse width $t_p \leq 380\mu s, \delta \leq 2\%$						

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g_{fs}	Forward Transconductance	$V_{DS}=5V, I_D=9A$	25	--	--	S
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=30V$ $f=1.0MHz$	--	2200	--	pF
C_{oss}	Output Capacitance		--	270	--	
C_{rss}	Reverse Transfer Capacitance		--	240	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_D=9A, V_{DD}=30V$ $V_{GS}=10V, R_G=3.0\Omega$	--	8.8	--	ns
t_r	Rise Time		--	7.1	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	33	--	
t_f	Fall Time		--	6.0	--	
Q_g	Total Gate Charge	$I_D=9A, V_{DD}=30V$ $V_{GS}=10V$	--	61	--	nC
Q_{gs}	Gate to Source Charge		--	8.5	--	
Q_{gd}	Gate to Drain ("Miller") Charge		--	17.6	--	

GL Silicon N-Channel Power MOSFET
Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)		--	--	9	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	36	A
V_{SD}	Diode Forward Voltage	$I_S=9A, V_{GS}=0V$	--	--	1.5	V
t_{rr}	Reverse Recovery Time	$I_S=9A, T_J = 25^\circ C$	--	30	--	ns
Q_{rr}	Reverse Recovery Charge	$dI_F/dt=100A/us, V_{GS}=0V$	--	45	--	nC

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

Symbol	Parameter	Typ.	Units
$R_{\theta JA}$	Junction-to-Ambient	48	$^\circ C/W$

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

^{a2}: EAS condition : $T_J=25^\circ C, V_{DD}=30V, V_G=10V, L=0.5mH, R_g=25\Omega$

^{a3}: $I_{SD}=9A, di/dt \leq 100A/us, V_{DD} \leq BV_{DS}, \text{Start } T_J=25^\circ C$

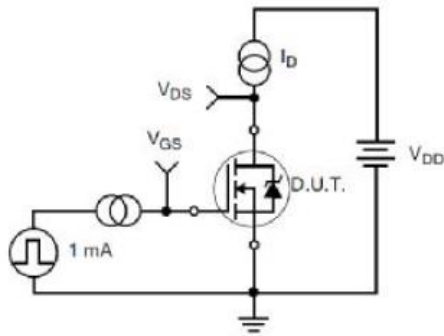
Test Circuit and Waveform


Figure 17. Gate Charge Test Circuit

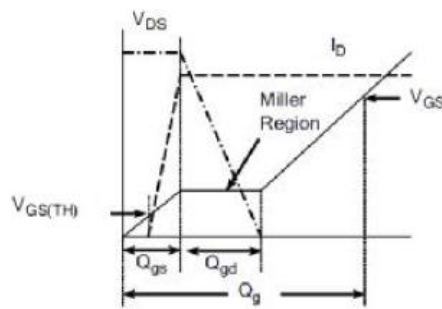


Figure 18. Gate Charge Waveform

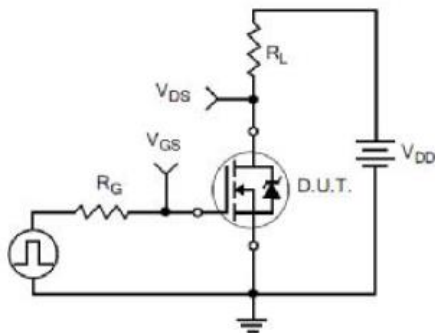


Figure 19. Resistive Switching Test Circuit

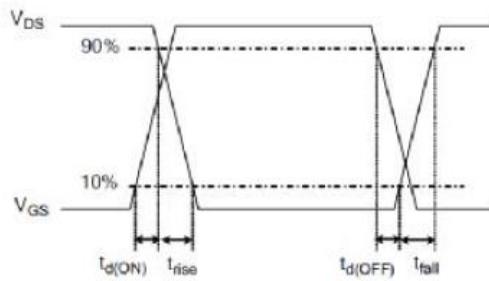
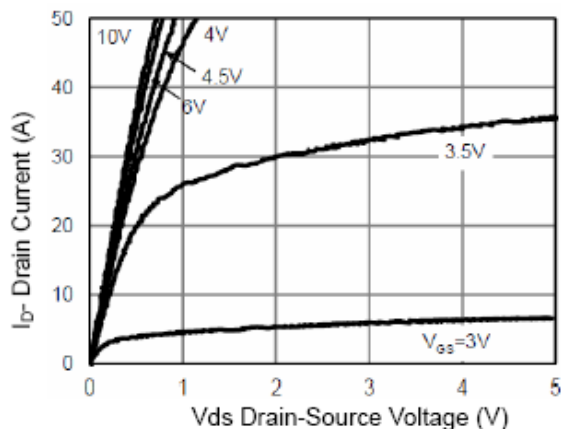
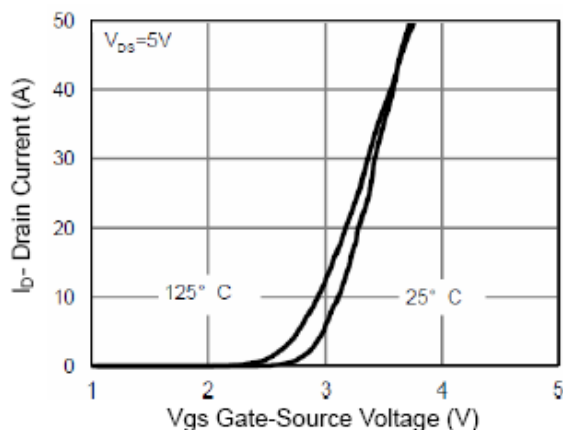
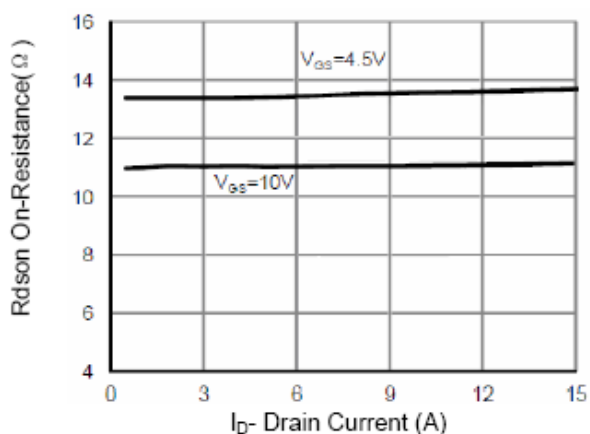
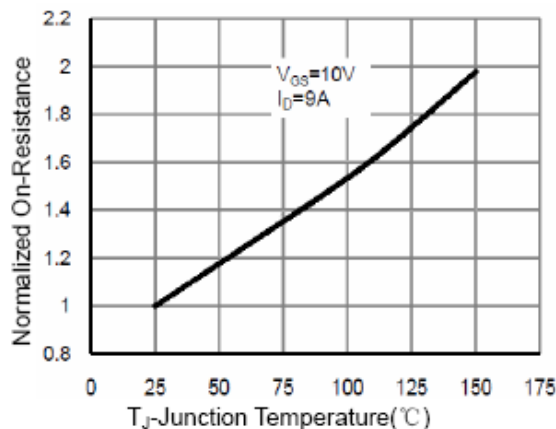
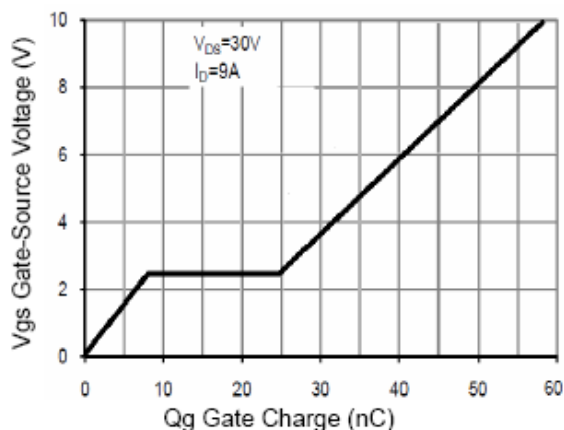
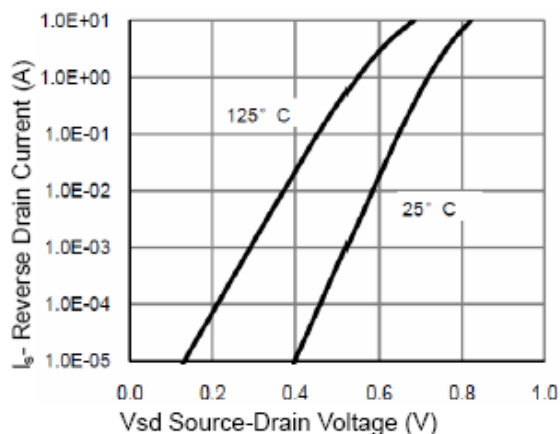
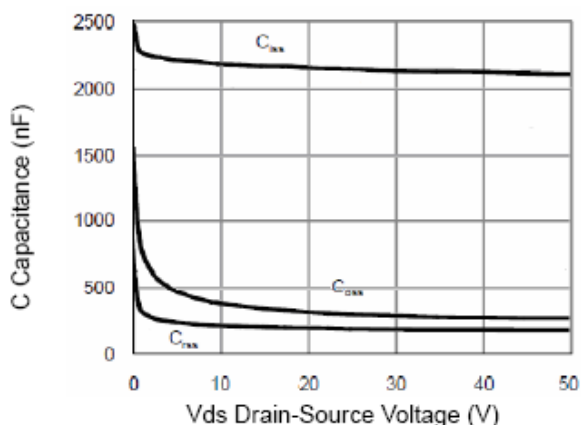
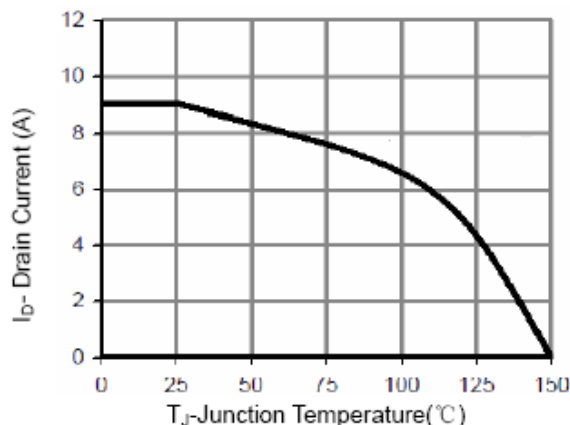
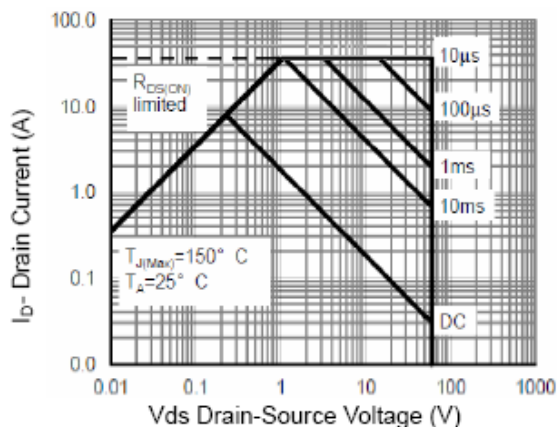
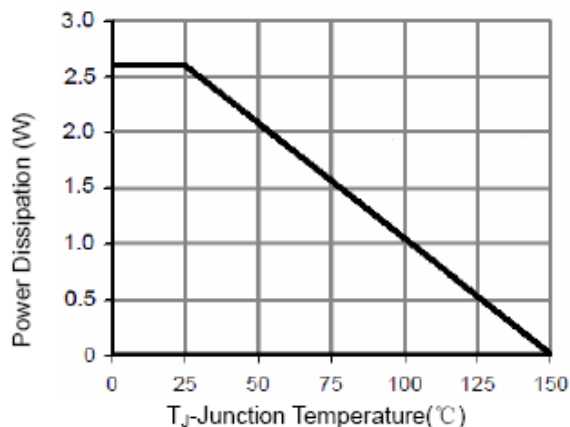
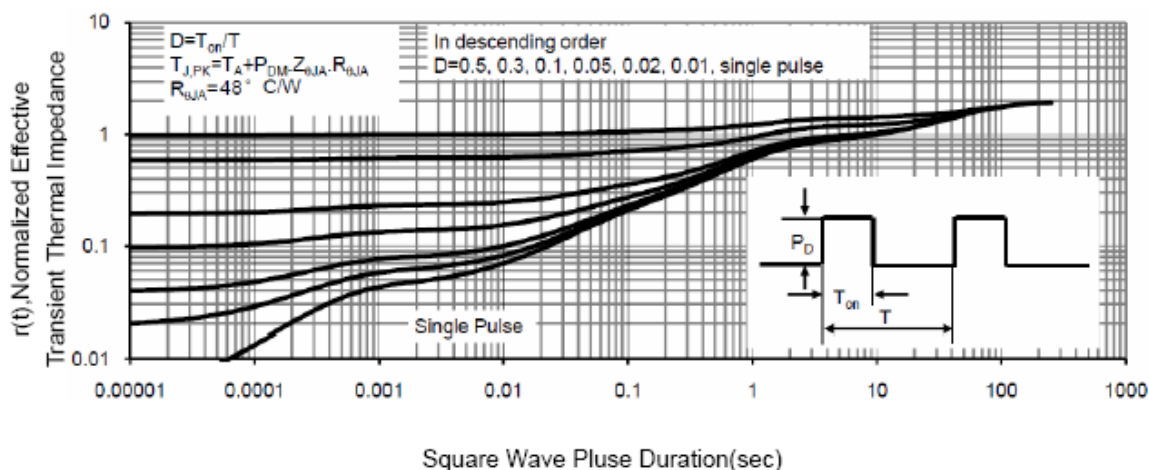


Figure 20. Resistive Switching Waveforms

Typical Electrical and Thermal Characteristics (Curves)

Figure 1 Output Characteristics

Figure 2 Transfer Characteristics

Figure 3 Rdson- Drain Current

Figure 4 Rdson-Junction Temperature

Figure 5 Gate Charge

Figure 6 Source- Drain Diode Forward


Figure 7 Capacitance vs Vds

Figure 9 Current De-rating

Figure 8 Safe Operation Area

Figure 10 Power De-rating

Figure 11 Normalized Maximum Transient Thermal Impedance

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