

## GL Silicon N-Channel Power MOSFET

### General Description :

The GL4N04A-D6 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 SOT-23-6, which accords with the RoHS standard.

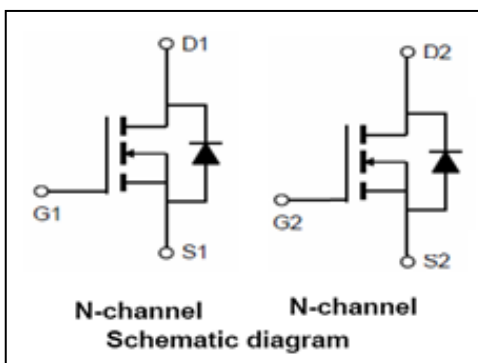
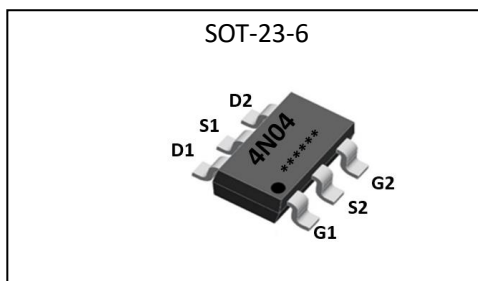
### Features :

- Fast Switching
- Low Gate Charge and  $R_{DS(on)}$
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

### Applications :

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

$V_{DSS}$	40	V
$I_D$	4	A
$P_D$	1.15	W
$R_{DS(ON)TYPE}$	50	mΩ



### Absolute ( $T_c = 25^\circ\text{C}$ unless otherwise specified ) :

Symbol	Parameter	Rating	Units
$V_{DSS}$	Drain-to-Source Voltage	40	V
$I_D$	Continuous Drain Current	4	A
	Continuous Drain Current $T_c = 100^\circ\text{C}$	3.2	A
$I_{DM}$	Pulsed Drain Current	16	A
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$dv/dt^{a3}$	Peak Diode Recovery $dv/dt$	5.0	V/ns
$P_D$	Power Dissipation	1.15	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	$V_{GS}=0V, I_D=250\mu A$	40	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	$I_D=250\mu A, \text{Reference } 25^\circ C$	--	0.1	--	V/°C
$I_{DSS}$	Drain to Source Leakage Current	$V_{DS} = 40V, V_{GS}= 0V, T_a = 25^\circ C$	--	--	1	$\mu A$
		$V_{DS} = 48V, V_{GS}= 0V, T_a = 125^\circ C$	--	--	250	
$I_{GSS(F)}$	Gate to Source Forward Leakage	$V_{GS} = +20V$	--	--	1	$\mu A$
$I_{GSS(R)}$	Gate to Source Reverse Leakage	$V_{GS} = -20V$	--	--	-1	$\mu A$

**ON Characteristics**

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)1}$	Drain-to-Source On-Resistance	$V_{GS}=10V, I_D=2A$	--	55	70	mΩ
$R_{DS(ON)2}$	Drain-to-Source On-Resistance	$V_{GS}=4.5V, I_D=1.8A$	--	75	90	mΩ
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	1.5	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	$V_{DS}=10V, I_D = 2A$	4	--	--	S
$C_{iss}$	Input Capacitance	$V_{GS} = 0V, V_{DS} = 20V$ $f = 1.0MHz$	--	500	--	pF
$C_{oss}$	Output Capacitance		--	40	--	
$C_{rss}$	Reverse Transfer Capacitance		--	25	--	

**Resistive Switching Characteristics**

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_D = 2A, V_{DD} = 30V$ $V_{GS} = 10V, R_G = 3.0\Omega$	--	3	--	ns
$t_r$	Rise Time		--	5.1	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	18	--	
$t_f$	Fall Time		--	4.2	--	
$Q_g$	Total Gate Charge	$I_D = 2A, V_{DD} = 30V$ $V_{GS} = 10V$	--	3.8	--	nC
$Q_{gs}$	Gate to Source Charge		--	1.3	--	
$Q_{gd}$	Gate to Drain ( "Miller" ) Charge		--	1.2	--	

## 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)		--	--	2	A
$I_{SM}$	Maximum Pulsed Current (Body Diode)		--	--	8	A
$V_{SD}$	Diode Forward Voltage	$I_S=2A, V_{GS}=0V$	--	--	1.5	V
$t_{rr}$	Reverse Recovery Time	$I_S=2A, T_j = 25^\circ C$	--	11	--	ns
$Q_{rr}$	Reverse Recovery Charge	$dI_F/dt=100A/us, V_{GS}=0V$	--	20	--	nC

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

Symbol	Parameter	Typ.	Units
$R_{\theta JA}$	Junction-to-Ambient	150	$^\circ C/W$

<sup>a1</sup> : Repetitive rating; pulse width limited by maximum junction temperature

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

<sup>a3</sup> :  $I_{SD}=2A, di/dt \leq 100A/us, V_{DD} \leq BV_{DS}, \text{Start } T_j=25^\circ C$

### Test Circuit and Waveform

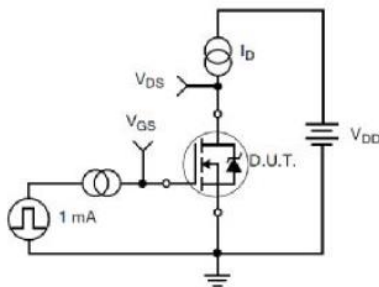


Figure 17. Gate Charge Test Circuit

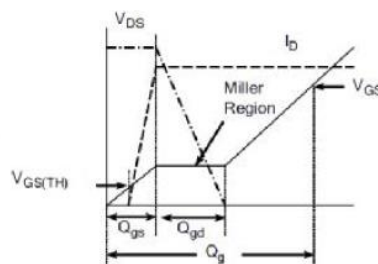


Figure 18. Gate Charge Waveform

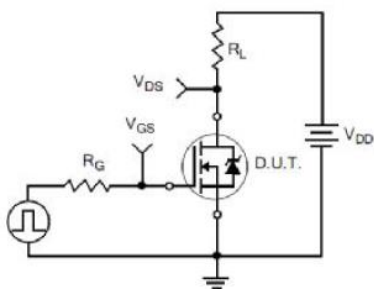


Figure 19. Resistive Switching Test Circuit

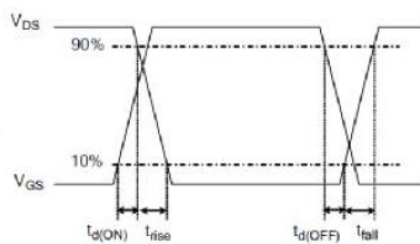


Figure 20. Resistive Switching Waveforms

Company : Wuxi Guang Lei electronic technology co., LTD

TEL : 13961734102 Mr.yuan

Wuxi Guang Lei electronic technology co., LTD