

## GL Silicon N-Channel Power MOSFET

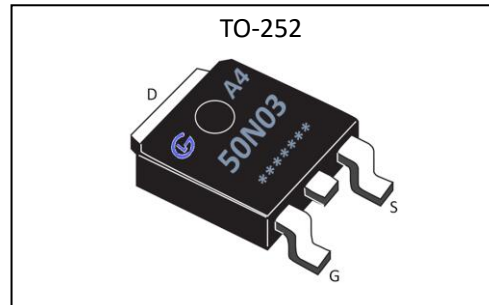
### General Description :

The GL50N03A4 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 TO-252, which accords with the RoHS standard.

$V_{DSS}$	30	V
$I_D$	50	A
$P_D$	60	W
$R_{DS(ON)type}$	8.0	m $\Omega$

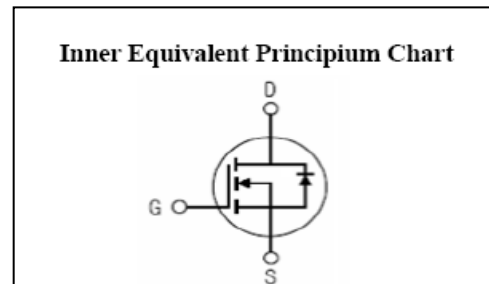
### Features :

- $R_{DS(ON)} < 11m\Omega @ V_{GS}=10V$  (Typ8.0m $\Omega$ )
- 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	50	A
$I_{DM}$	Pulsed Drain Current	200	A
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$P_D$	Power Dissipation	60	W
$E_{AS}$	Single pulse avalanche energy <sup>a5</sup>	70	mJ
$T_J, T_{stg}$	Operating Junction and Storage Temperature Range	175 , -55 to 175	$^\circ C$



# GL50N03A4

无锡光磊电子科技有限公司

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

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V <sub>DSS</sub>	Drain to Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	30	--	--	V
I <sub>DSS</sub>	Drain to Source Leakage Current	V <sub>DS</sub> =30V, V <sub>GS</sub> = 0V, T <sub>a</sub> = 25°C	--	--	1.0	μA
I <sub>GSS(F)</sub>	Gate to Source Forward Leakage	V <sub>GS</sub> = +20V	--	--	0.1	μA
I <sub>GSS(R)</sub>	Gate to Source Reverse Leakage	V <sub>GS</sub> = -20V	--	--	-0.1	μA

ON Characteristics <sup>a3</sup>						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
R <sub>DS(ON)</sub>	Drain-to-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =25A	--	8.0	11	mΩ
V <sub>GS(TH)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0	1.6	3.0	V

Pulse width tp≤380μs, δ≤2%

Dynamic Characteristics <sup>a4</sup>						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =25A	15	--	--	S
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =15V f=1.0MHz	--	1800	--	pF
C <sub>oss</sub>	Output Capacitance		--	240	--	
C <sub>rss</sub>	Reverse Transfer Capacitance		--	180	--	

Resistive Switching Characteristics <sup>a4</sup>						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
t <sub>d(ON)</sub>	Turn-on Delay Time	V <sub>DD</sub> =10V, I <sub>D</sub> =25A V <sub>GS</sub> =10V, R <sub>G</sub> =1.8Ω	--	10	--	ns
t <sub>r</sub>	Rise Time		--	9	--	
t <sub>d(OFF)</sub>	Turn-Off Delay Time		--	30	--	
t <sub>f</sub>	Fall Time		--	6	--	
Q <sub>g</sub>	Total Gate Charge	V <sub>DD</sub> =10V, I <sub>D</sub> =25A V <sub>GS</sub> =10V	--	23	--	nC
Q <sub>gs</sub>	Gate to Source Charge		--	8	--	
Q <sub>gd</sub>	Gate to Drain ( "Miller" )Charge		--	4.5	--	

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### Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$I_S$	Continuous Source Current <sup>a2</sup> (Body Diode)		--	--	50	A
$V_{SD}$	Diode Forward Voltage <sup>a3</sup>	$I_S=50A, V_{GS}=0V$	--	--	1.2	V

Symbol	Parameter	Typ.	Units
$R_{\theta JC}$	Junction-to-Case <sup>a2</sup>	2.5	°C/W

<sup>a1</sup> : Repetitive Rating: Pulse width limited by maximum junction temperature.

<sup>a2</sup> : Surface Mounted on FR4 Board,  $t \leq 10\text{sec}$ .

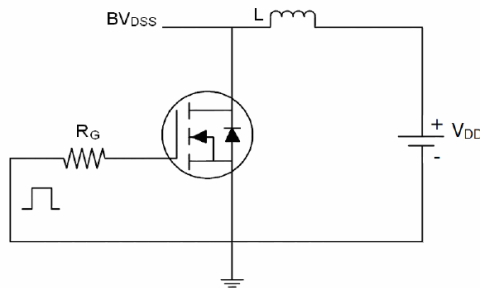
<sup>a3</sup> : Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

<sup>a4</sup> : Guaranteed by design, not subject to production

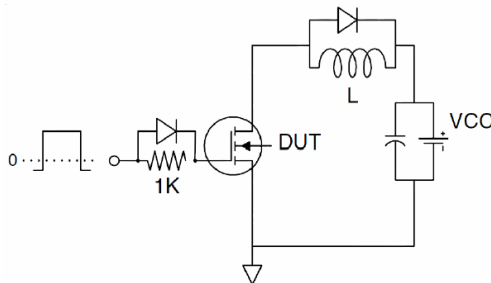
<sup>a5</sup> : EAS condition :  $T_j=25^\circ\text{C}, V_{DD}=15\text{V}, V_{GS}=10\text{V}, L=1.0\text{mH}, R_g=25\Omega$

### Test circuit

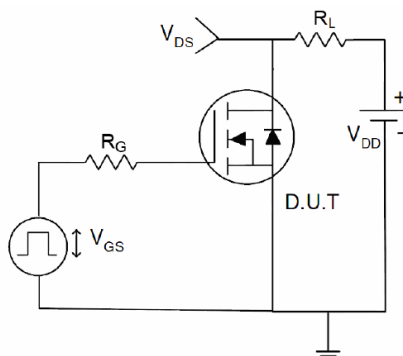
#### 1) E<sub>AS</sub> test Circuits



#### 2) Gate charge test Circuit:



#### 3) Switch Time Test Circuit:



### Characteristics Curve :

Wuxi Guang Lei electronic technology co., LTD



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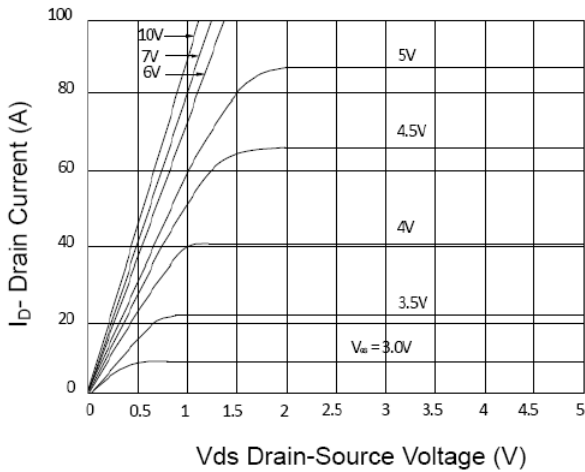


Figure 1 Output Characteristics

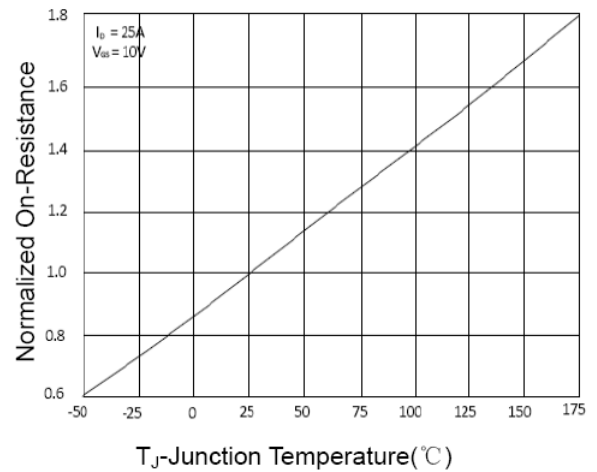


Figure 4 Rds(on)-Junction Temperature

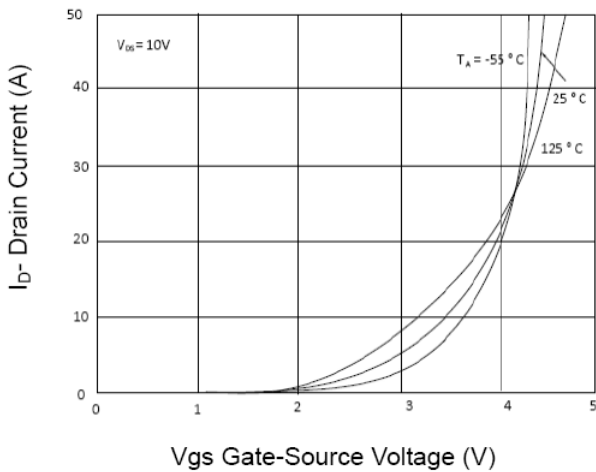


Figure 2 Transfer Characteristics

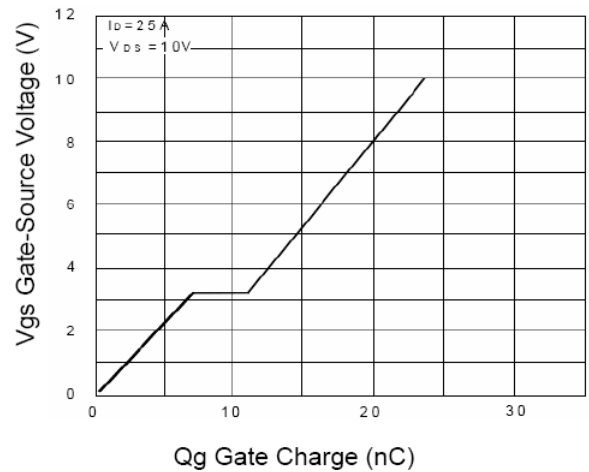


Figure 5 Gate Charge

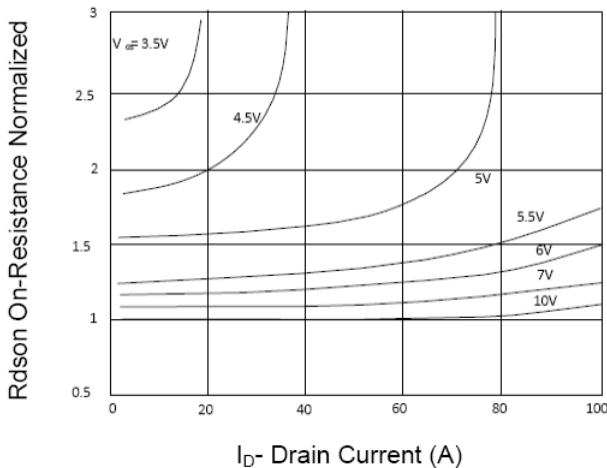


Figure 3 Rds(on)- Drain Current

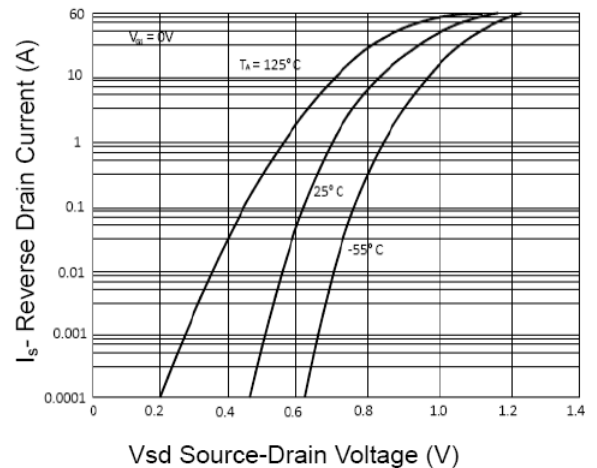


Figure 6 Source- Drain Diode Forward



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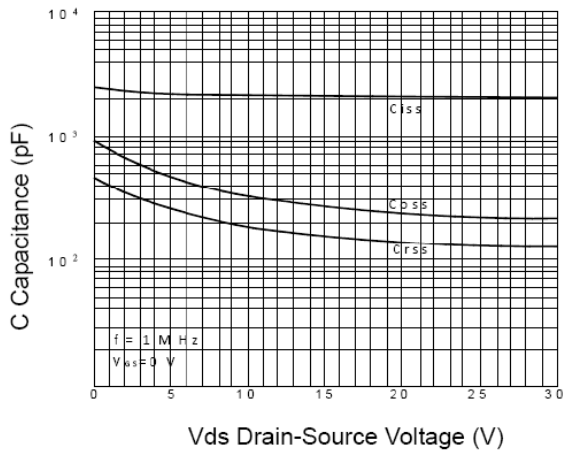


Figure 7 Capacitance vs Vds

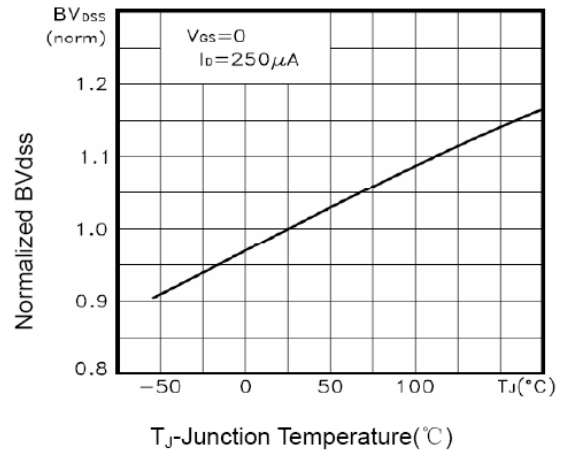


Figure 9  $BV_{DSS}$  vs Junction Temperature

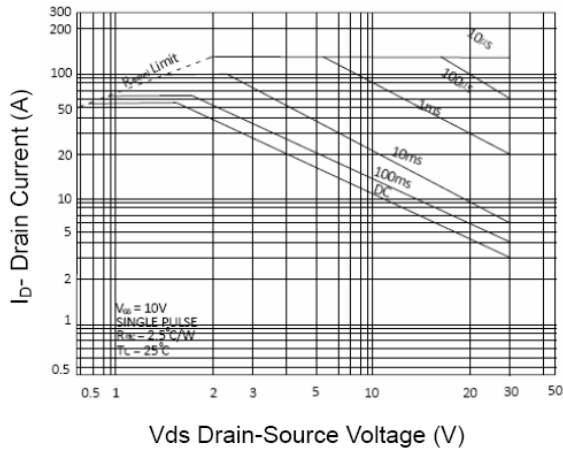


Figure 8 Safe Operation Area

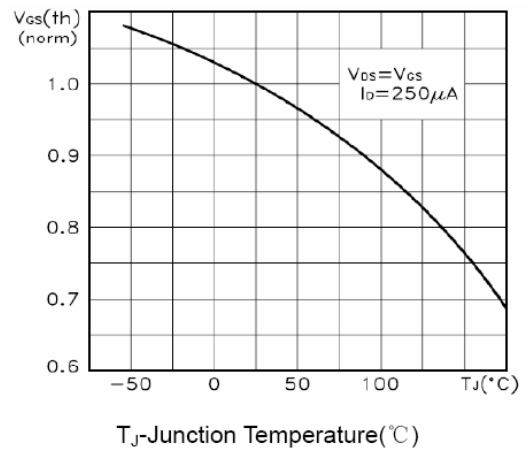


Figure 10  $V_{GS(th)}$  vs Junction Temperature

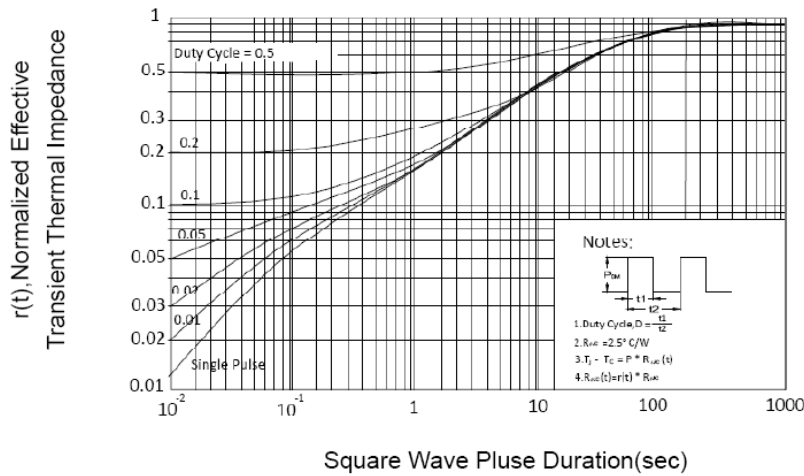


Figure 11 Normalized Maximum Transient Thermal Impedance

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