



# GL1503

## GL Silicon N-Channel Power MOSFET

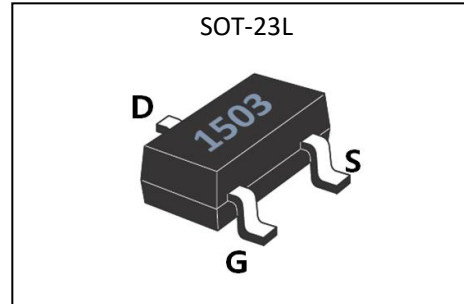
### General Description

The GL1503 uses advanced planar 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-23L, which accords with the RoHS standard.

$V_{DSS}$	150	V
$I_D$	3	A
$P_D$	1.5	W
$R_{DS(ON)max}$	1.25	$\Omega$

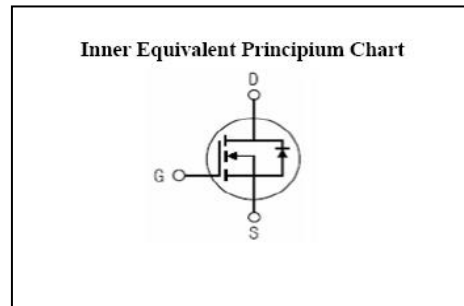
### Features

- $R_{DS(ON)} < 1.25\Omega @ V_{GS}=10V$
- High density cell design for ultra low  $R_{dsn}$
- 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 (Tc= 25°C unless otherwise specified)

Symbol	Parameter	Rating	Units
$V_{DSS}$	Drain-to-Source Voltage	150	V
$I_D$	Continuous Drain Current	3	A
$I_{DM}$	Pulsed Drain Current	12	A
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$P_D$	Power Dissipation	1.5	W
$T_J, T_{stg}$	Operating Junction and Storage Temperature Range	175, -55 to 175	$^{\circ}C$

Caution Stresses greater than those in the "Absolute Maximum Ratings" may cause permanent damage to the device



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Electrical Characteristics (T<sub>c</sub>= 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	150	--	--	V
I <sub>DSS</sub>	Drain to Source Leakage Current	V <sub>DS</sub> =150V, 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)1</sub>	Drain-to-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =1.5A	--	--	1.25	Ω
R <sub>DS(ON)2</sub>	Drain-to-Source On-Resistance	V <sub>GS</sub> =3V, I <sub>D</sub> =1.0A	--	--	1.35	Ω
V <sub>GS(TH)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.4	--	1.5	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> =15V, I <sub>D</sub> =2A	--	2.1	--	S
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V f=1.0MHz	--	651	--	pF
C <sub>oss</sub>	Output Capacitance		--	25	--	
C <sub>rss</sub>	Reverse Transfer Capacitance		--	5.5	--	

### 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> =75V, R <sub>L</sub> =10Ω V <sub>GS</sub> =10V, R <sub>G</sub> =3Ω	--	7	--	ns
t <sub>r</sub>	Rise Time		--	12	--	
t <sub>d(OFF)</sub>	Turn-Off Delay Time		--	27	--	
t <sub>f</sub>	Fall Time		--	7	--	
Q <sub>g</sub>	Total Gate Charge	V <sub>DD</sub> =75V, I <sub>D</sub> =3A V <sub>GS</sub> =10V	--	4.3	--	nC
Q <sub>gs</sub>	Gate to Source Charge		--	1.4	--	
Q <sub>gd</sub>	Gate to Drain ( "Miller" )Charge		--	1.6	--	



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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)		--	--	3	A
$V_{SD}$	Diode Forward Voltage <sup>a3</sup>	$I_S=3A, V_{GS}=0V$	--	--	1.2	V

### Thermal Characteristics

Symbol	Parameter	Typ.	Units
$R_{\theta JA}$	Junction-to-Ambient <sup>a2</sup>	100	°C/W

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

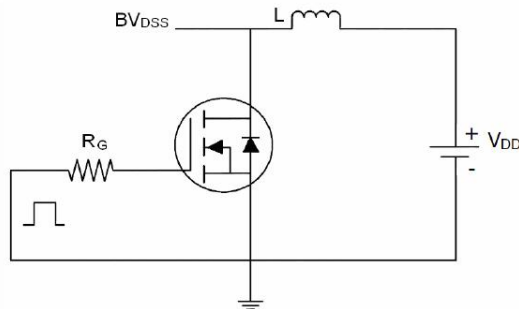
<sup>a2</sup>: Surface Mounted on FR4 Board,  $t \leq 10\text{sec}$ .

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

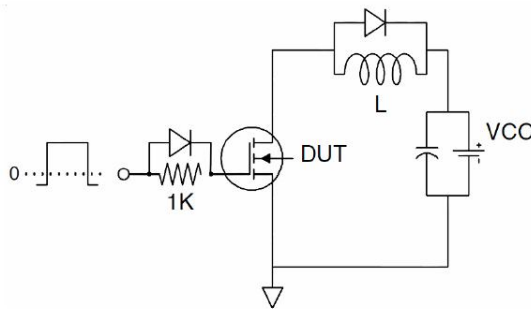
<sup>a4</sup>: Guaranteed by design, not subject to production

### Test Circuits

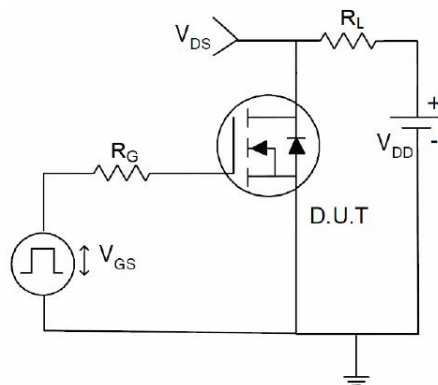
#### 1) EAS test Circuit



#### 2) Gate charge test Circuit



#### 3) Switch Time Test Circuit





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### Characteristics Curves

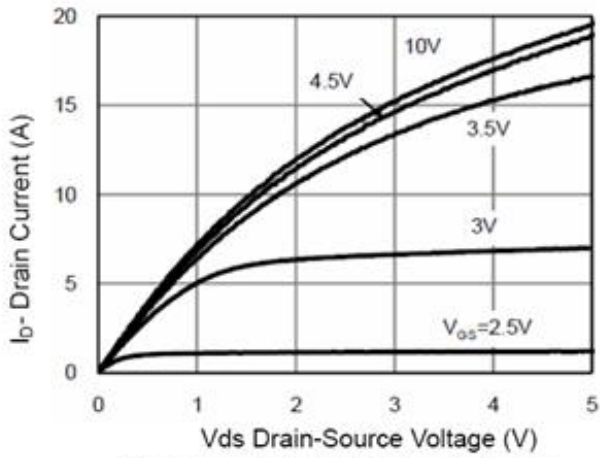


Figure 1 Output Characteristics

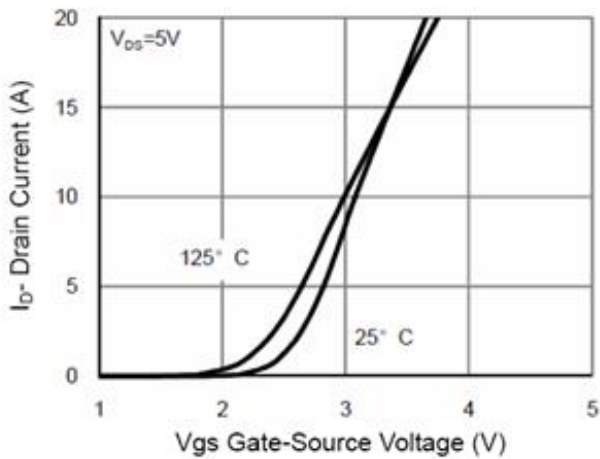


Figure 2 Transfer Characteristics

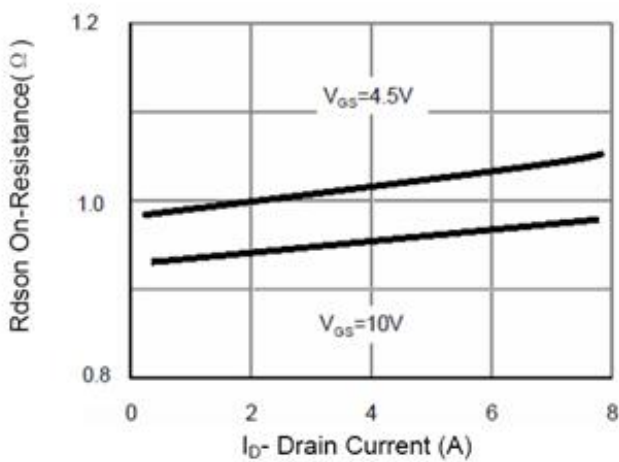


Figure 3  $R_{DS(on)}$  vs  $I_D$

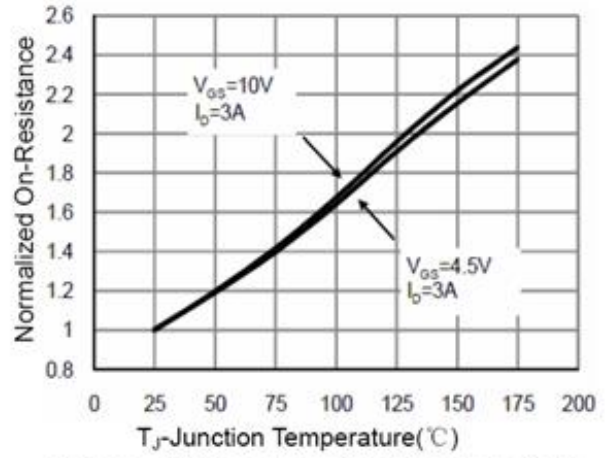


Figure 4  $R_{DS(on)}$  vs  $T_J$

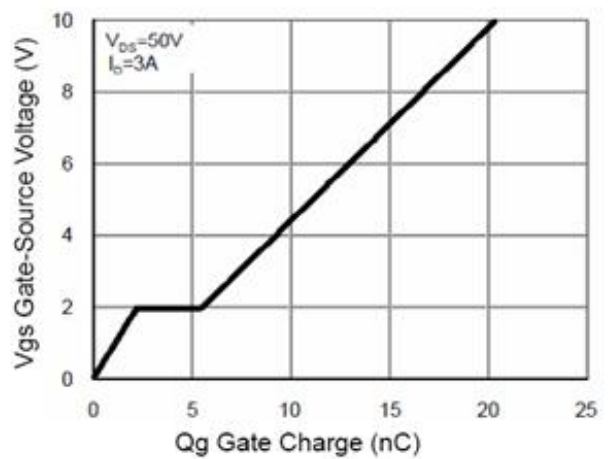


Figure 5 Gate Charge

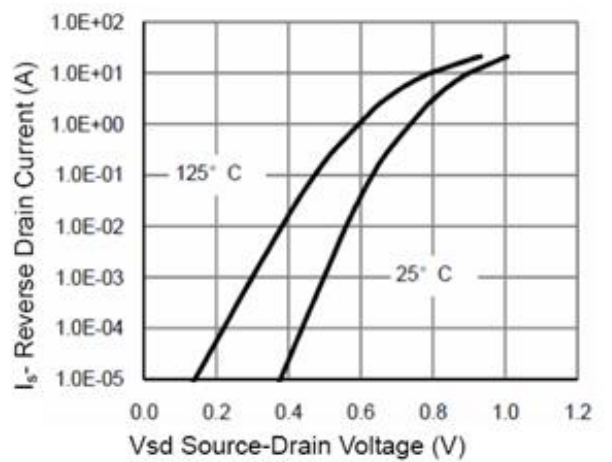


Figure 6 Source-Drain Diode Forward



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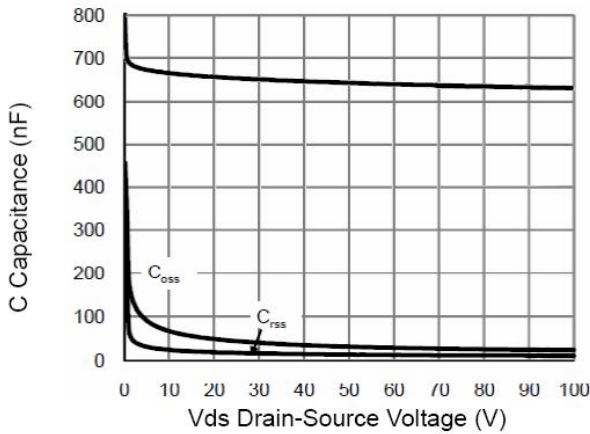


Figure 7 Capacitance vs Vds

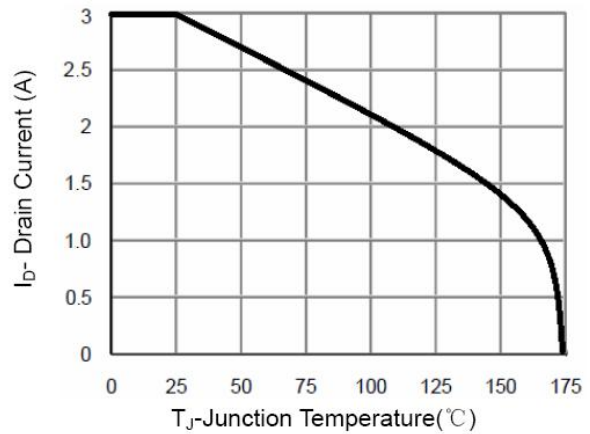


Figure 9  $BV_{DSS}$  vs Junction Temperature

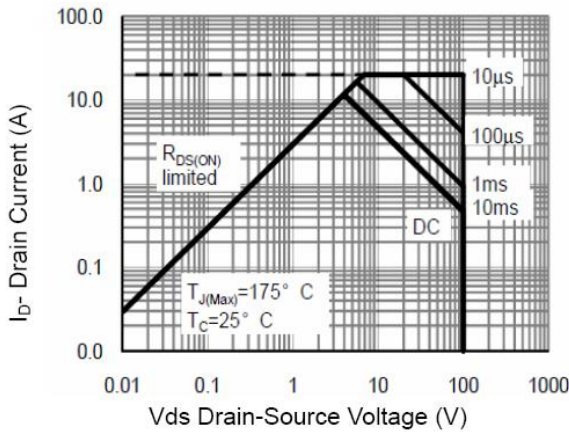


Figure 8 Safe Operation Area

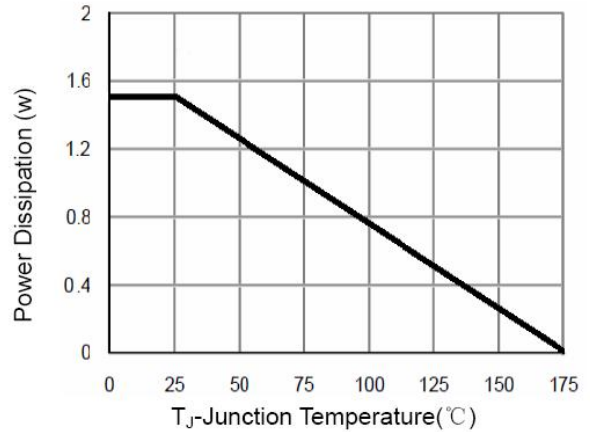


Figure 10 Power De-rating

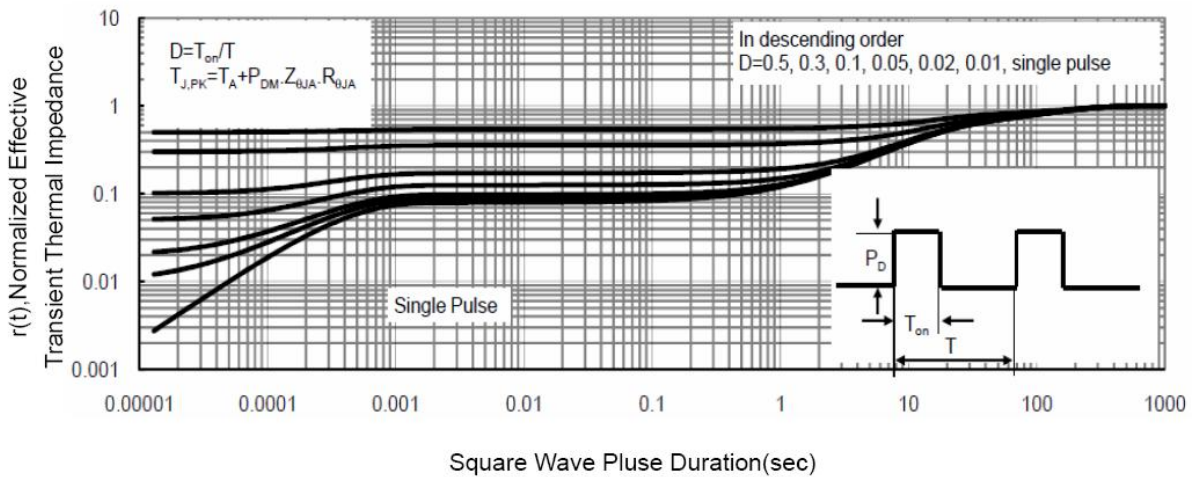


Figure 11 Normalized Maximum Transient Thermal Impedance