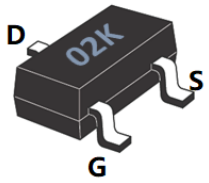
GL Silicon N-Channel Power MOSFET

General Description

The GL2N7002K 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, which accords with the RoHS standard.

V_{DSS}	60	V
I_D	0.3	A
P_D	0.35	W
$R_{DS(ON)max}$	2.5	Ω

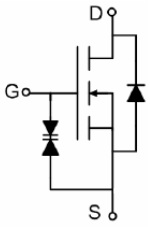
SOT-23



Features

- Fast Switching
- Low Gate Charge and Rdson
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

Inner Equivalent Principium Chart



Applications

- PWM applications
- Load switch
- Power management

Absolute (Tc=25℃ unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	60	V
I_D	Continuous Drain Current	0.3	A
	Continuous Drain Current T_C = 100 °C	0.19	A
I_{DM}[a1]	Pulsed Drain Current	0.9	A
V_{GS}	Gate-to-Source Voltage	±20	V
dv/dt [a3]	Peak Diode Recovery dv/dt	5.0	V/ns
P_D	Power Dissipation	0.35	W
VESD(G-S)	Gate source ESD (HBM-C= 100pF, R=1.5kΩ)	2000	V
T_J, T_{stg}	Operating Junction and Storage Temperature Range	150, −55 to 150	℃
T_L	Maximum Temperature for Soldering	300	℃

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

Electrical Characteristics (Tc= 25℃ 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=-250μA	60	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	I_D=-250uA,Reference25℃	--	0.1	--	V/℃
I_{DSS}	Drain to Source Leakage Current	V_{DS}=60,V_{GS}=0V,T_a=25℃	--	--	1	μA
		V_{DS}=48V,V_{GS}=0V,T_a=125℃	--	--	250	
$I_{GSS(F)}$	Gate to Source Forward Leakage	V_{GS} =+20V	--	--	10	μA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	V_{GS} =-20V	--	--	-10	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=0.5A	--	--	2.5	Ω
$R_{DS(ON)}$	Drain-to-Source On-Resistance	V_{GS}=4.5V,I_D=0.3A	--	--	3.5	Ω
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	1.0	1.7	2.5	V
Pulse width tp≤380μs,δ≤2%						

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g_{fs}	Forward Transconductance	V_{DS}=10V, I_D=0.2A	0.1	5.0	--	S
C_{iss}	Input Capacitance	V_{GS} =0V,V_{DS}=15V f=1.0MHz	--	20	--	pF
C_{oss}	Output Capacitance		--	12	--	
C_{rss}	Reverse Transfer Capacitance		--	4.4	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	I_D =0.2A,V_{DD} = 15V V_{GS} =10V,R_G = 3.0Ω	--	10	--	ns
tr	Rise Time		--	45	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	15	--	
t_f	Fall Time		--	10	--	
Q_g	Total Gate Charge	I_D =0.3A,V_{DD} =15V V_{GS} = 10V	--	1.7	--	nC
Q_{gs}	Gate to Source Charge		--	0.9	--	
Q_{gd}	Gate to Drain (“Miller”)Charge		--	1.3	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)		--	--	0.3	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	0.9	A
V_{SD}	Diode Forward Voltage	I_S=0.3A,V_{GS}=0V	--	--	1.5	V
t_{rr}	Reverse Recovery Time	I_S=0.3A,T_j = 25°C	--	40	--	ns
Q_{rr}	Reverse Recovery Charge	dI_F/dt=100A/us,V_{GS}=0V	--	120	--	nC
Pulse width tp≤380μs,δ≤2%						

Thermal Characteristics

Symbol	Parameter	Typ.	Units
$R_{\theta JA}$	Junction-to-Ambient	350	℃/W

[a1]: Repetitive rating; pulse width limited by maximum junction temperature
[a3]: I_{SD} =0.3A,di/dt ≤100A/us,V_{DD}≤BV_{DS}, Start T_J=25℃

Typical Electrical And Thermal Characteristics

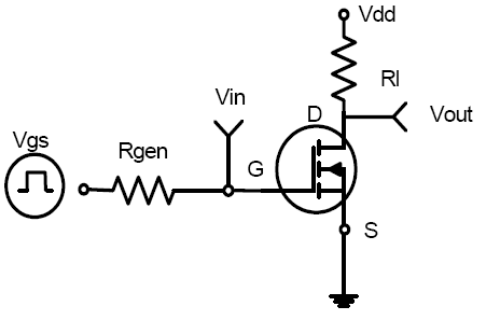


Figure 1:Switching Test Circuit

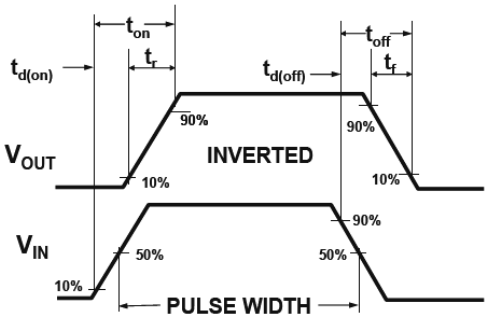


Figure 2:Switching Waveforms

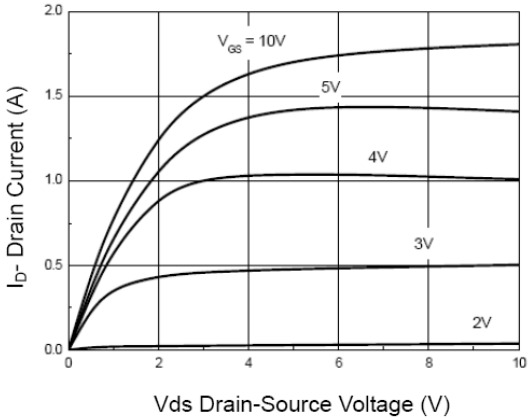


Figure 3 Output Characteristics

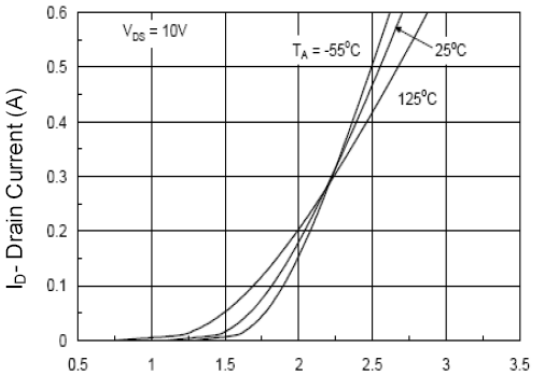


Figure 4 Transfer Characteristics

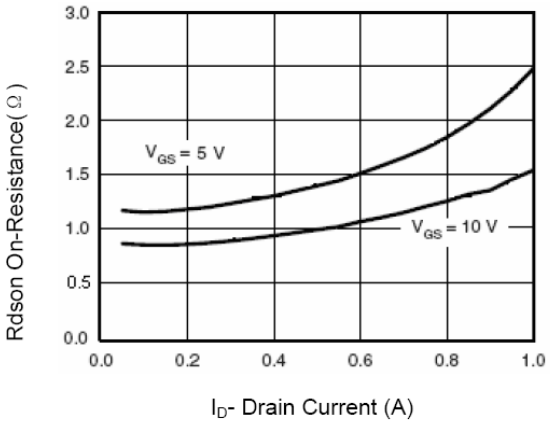


Figure 5 Drain-Source On-Resistance

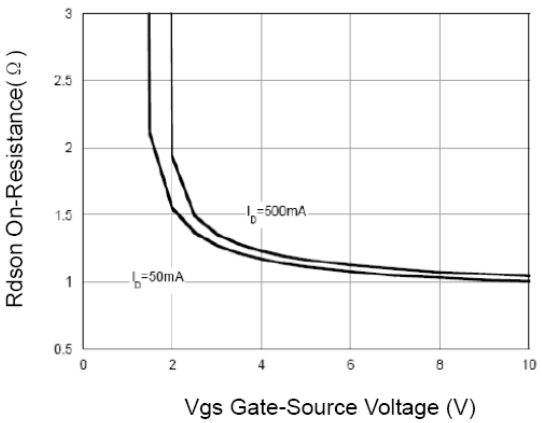


Figure 6 Rdson vs Vgs

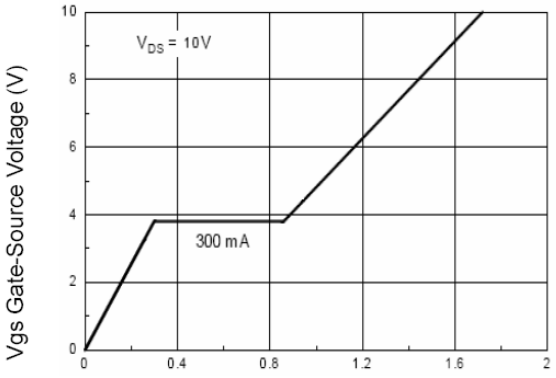


Figure 7 Gate Charge

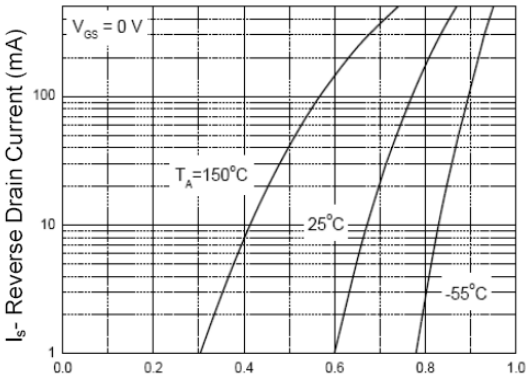


Figure 8 Source-DrainDiode Forward

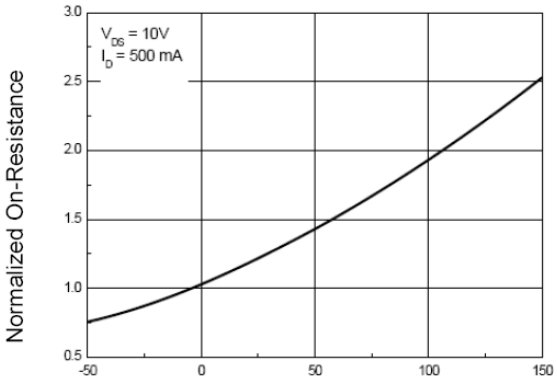


Figure 9 Drain-Source On-Resistance

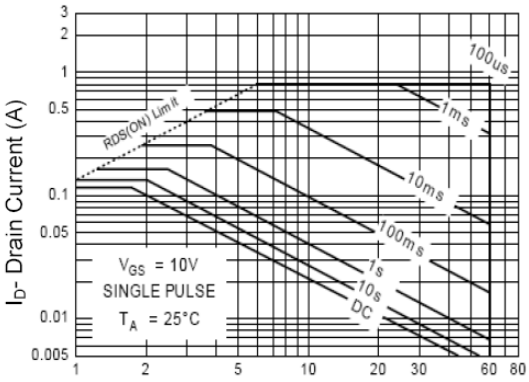


Figure 10 Safe Operation Area

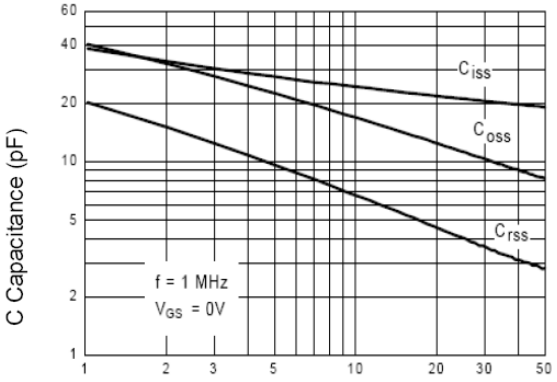


Figure 11 Capacitance vs Vds

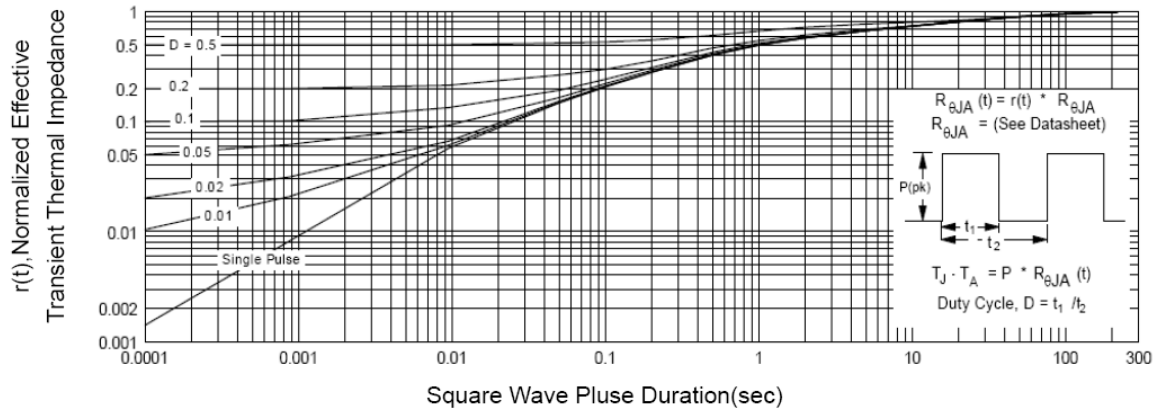


Figure 12 Normalized Maximum Transient Thermal Impedance