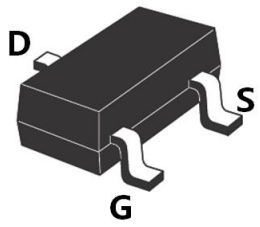
GL Silicon N-Channel Power MOSFET

General Description

The GL3400K 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}	30	V
I_D	5.8	A
P_D	0.35	W
$R_{DS(ON)MAX}$	30	mΩ

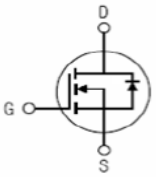
SOT-23



Features

- $R_{DS(ON)}$ <30mΩ @ V_{GS}=10V
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

Inner Equivalent Principium Chart



Applications

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

Absolute (Tc= 25℃ unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	30	V
I_D	Continuous Drain Current	5.8	A
I_{DM}	Pulsed Drain Current	30	A
V_{GS}	Gate-to-Source Voltage	±12	V
P_D	Power Dissipation	0.35	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	150, −55 to 150	℃

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

Thermal Characteristics

Symbol	Parameter	Typ.	Units
$R_{\theta JA}$	Junction-to-Ambient[a2]	357	℃/W

GL Silicon N-Channel Power MOSFET

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	30	--	--	V
I_{DSS}	Drain to Source Leakage Current	V_{DS}=24V, V_{GS}= 0V,T_a=25℃	--	--	1.0	μA
$I_{GSS(F)}$	Gate to Source Forward Leakage	V_{GS}=+12V	--	--	0.1	μA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	V_{GS}=-12V	--	--	-0.1	μA

ON Characteristics[a3]						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	V_{GS}=10V,I_D=5.8A	--	--	30	mΩ
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	0.7	--	1.4	V
Pulse width tp≤380μs,δ≤2%						

Dynamic Characteristics[a4]						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g_{fs}	Forward Transconductance	V_{DS}=5V,I_D=5A	8	--	--	S
C_{iss}	Input Capacitance	V_{GS}=0V,V_{DS}=15V f=1.0MHz	--	--	1050	pF
C_{oss}	Output Capacitance		--	99	--	
C_{rss}	Reverse Transfer Capacitance		--	77	--	

Resistive Switching Characteristics[a4]						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=10V,R_L=2.7Ω V_{GS}=10V,R_G=3Ω	--	--	5	ns
t_r	Rise Time		--	--	7	
$t_{d(OFF)}$	Turn-Off Delay Time		--	--	40	
t_f	Fall Time		--	--	6	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V_{SD}	Diode Forward Voltage[a3]	I_S=1A,V_{GS}=0V	--	--	1	V

[a1]: Repetitive Rating: Pulse width limited by maximum junction temperature.
[a2]: Surface Mounted on FR4 Board, t≤10sec.
[a3]: Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%.
[a4]: Guaranteed by design, not subject to production

Test Circuits

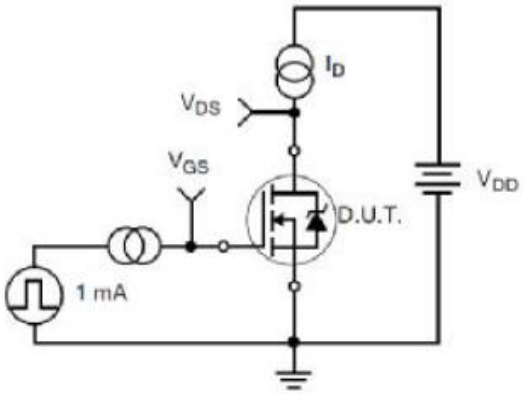


Figure 17. Gate Charge Test Circuit

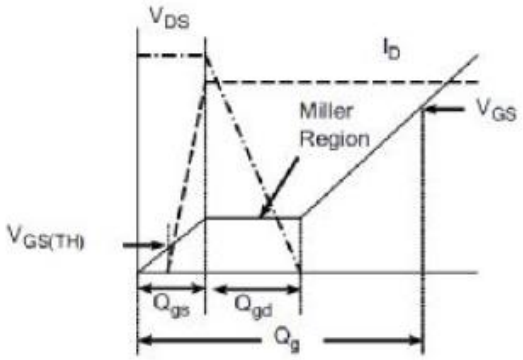


Figure 18. Gate Charge Waveform

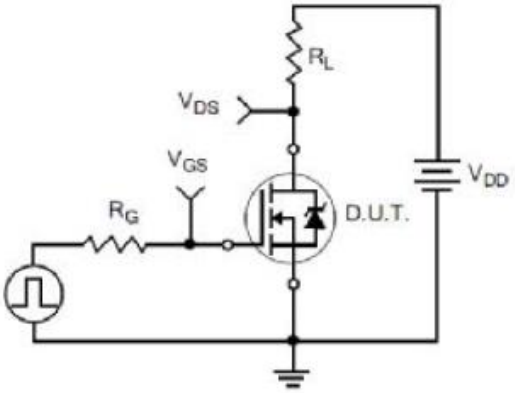


Figure 19. Resistive Switching Test Circuit

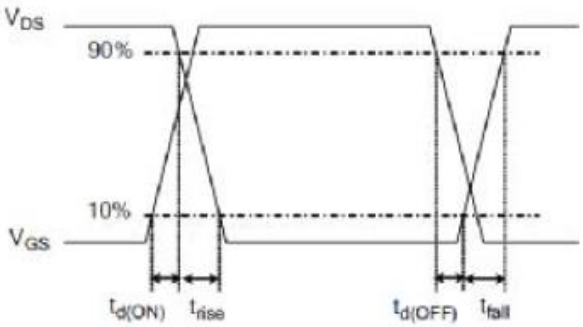


Figure 20. Resistive Switching Waveforms

Characteristics Curves

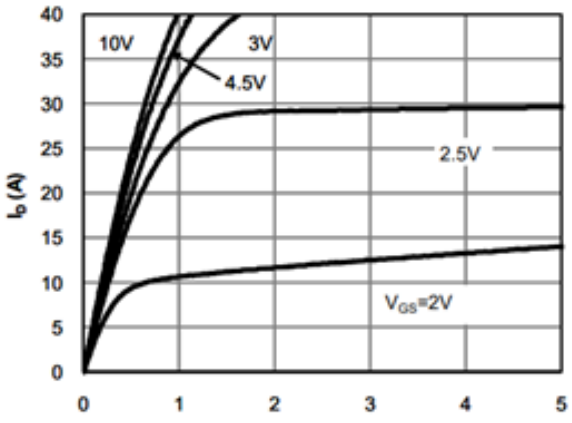


Fig 1: On-Region Characteristics (Note E)

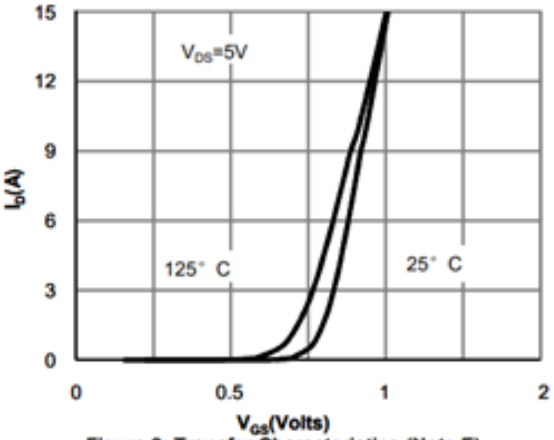


Figure 2: Transfer Characteristics (Note E)

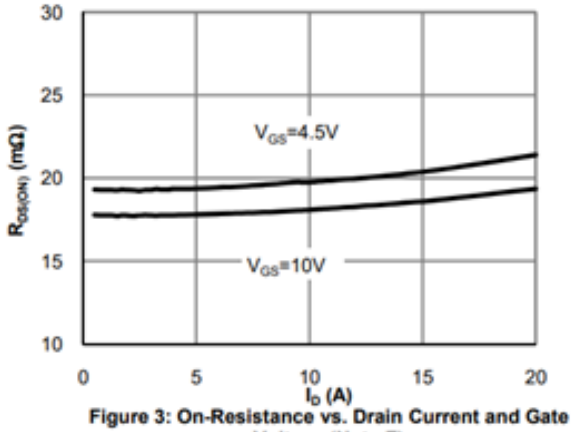


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

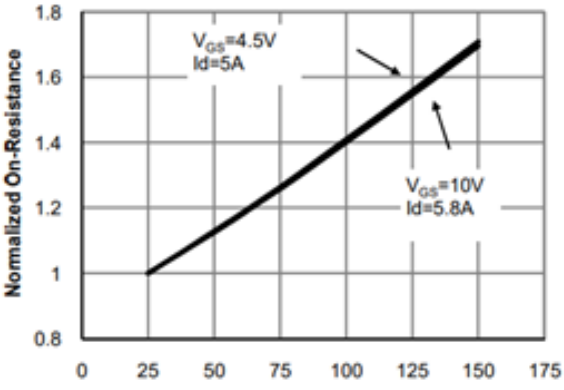


Figure 4: On-Resistance vs. Junction Temperature (Note E)

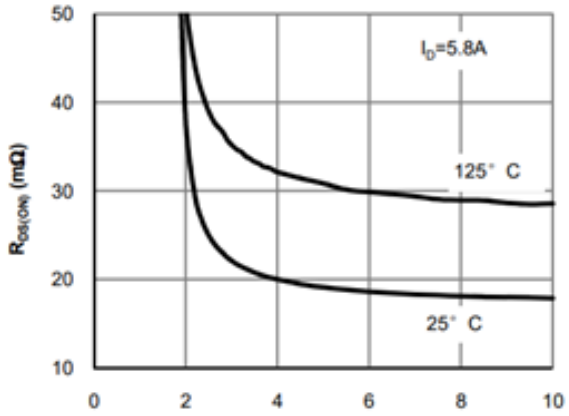


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

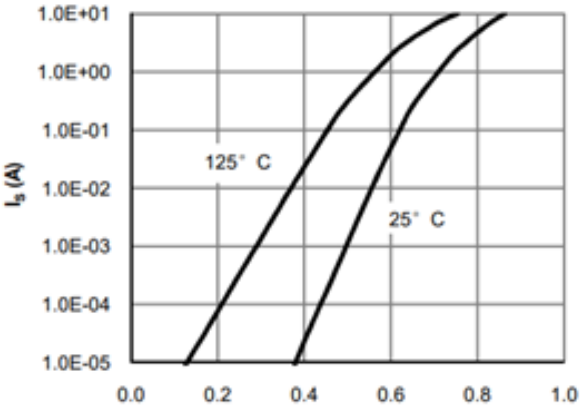


Figure 6: Body-Diode Characteristics (Note E)

GL Silicon N-Channel Power MOSFET

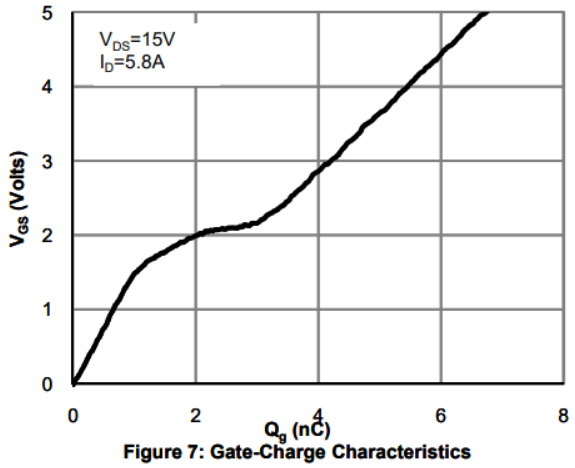


Figure 7: Gate-Charge Characteristics

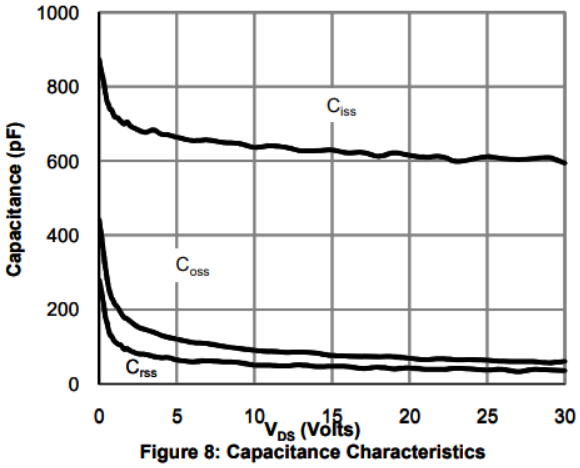


Figure 8: Capacitance Characteristics

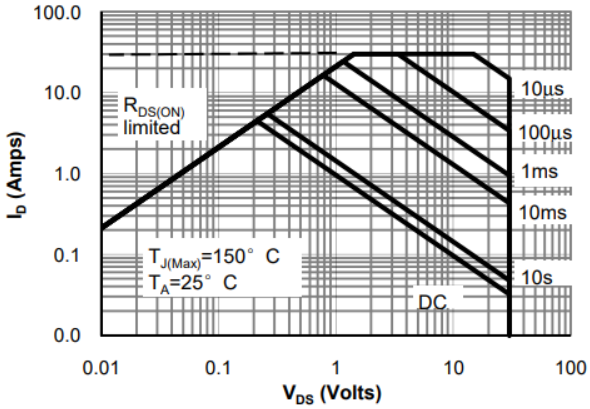


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

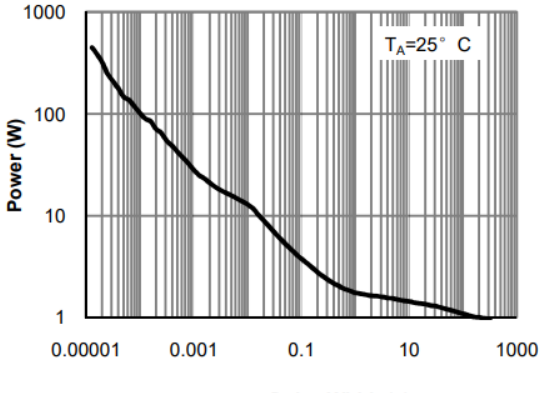


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

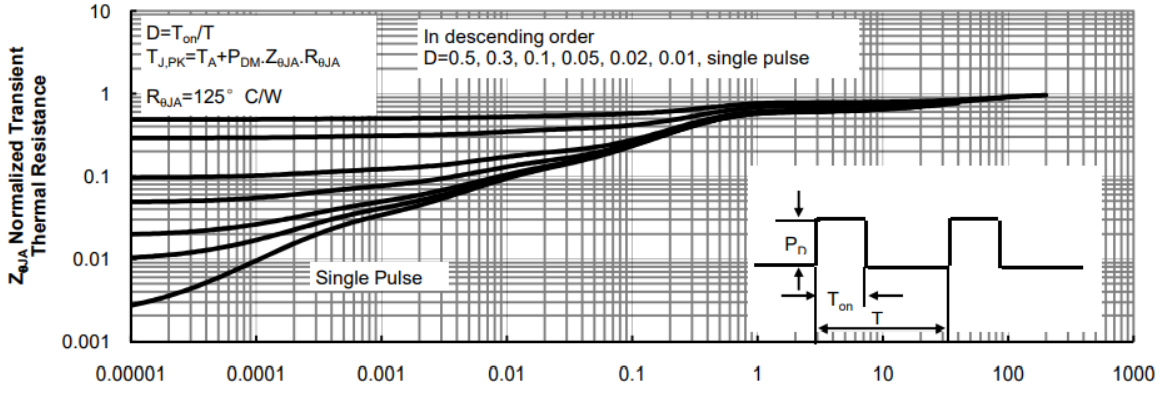


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)