



# GL3401K

## GL Silicon P-Channel Power MOSFET

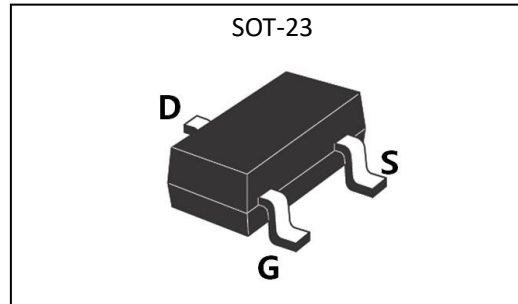
### General Description:

The GL3401K 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
$I_D$	-4.1	A
$P_D$	1.2	W
$R_{DS(ON)MAX}$	55	m $\Omega$

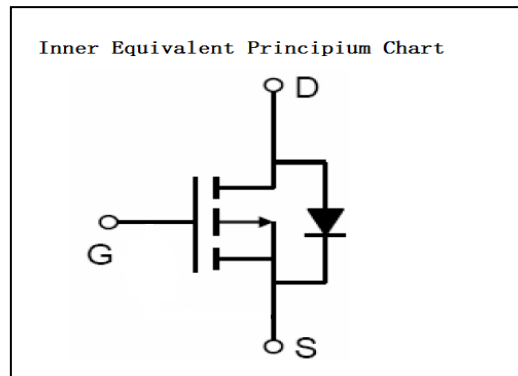
### Features:

- $R_{DS(ON)} < 55m\Omega @ V_{GS}=10V$
- 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 (Tc= 25°C unless otherwise specified):

Symbol	Parameter	Rating	Units
$V_{DSS}$	Drain-to-Source Voltage	-30	V
$I_D$	Continuous Drain Current	-4.1	A
$V_{GS}$	Gate-to-Source Voltage	$\pm 12$	V
$P_D$	Power Dissipation	1.2	W
$T_J, T_{stg}$	Operating Junction and Storage Temperature Range	150, -55 to 150	$^{\circ}C$

Symbol	Parameter	Typ.	Units
$R_{\theta JA}$	Junction-to-Ambient <sup>a2</sup>	104.1	$^{\circ}C/W$



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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> =-24V, 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> = +12V	--	--	0.1	μA
I <sub>GSS(R)</sub>	Gate to Source Reverse Leakage	V <sub>GS</sub> = -12V	--	--	-0.1	μA

### ON Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
R <sub>DS(ON)1</sub>	Drain-to-Source On-Resistance <sup>a1</sup>	V <sub>GS</sub> = -10V, I <sub>D</sub> = -4.2A	--	--	55	mΩ
R <sub>DS(ON)2</sub>	Drain-to-Source On-Resistance <sup>a1</sup>	V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -3.5A	--	--	65	mΩ
R <sub>DS(ON)3</sub>	Drain-to-Source On-Resistance <sup>a1</sup>	V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -1A	--	--	75	mΩ
V <sub>GS(TH)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	-0.5	--	-1.3	V

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

### Dynamic Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g <sub>fs</sub>	Forward Transconductance <sup>a1</sup>	V <sub>DS</sub> = -5V, I <sub>D</sub> = -5A	7	--	--	S
C <sub>iss</sub>	Input Capacitance <sup>a2</sup>	V <sub>GS</sub> =0V, V <sub>DS</sub> = -15V f=1.0MHz	--	954	--	pF
C <sub>oss</sub>	Output Capacitance <sup>a2</sup>		--	115	--	
C <sub>rss</sub>	Reverse Transfer Capacitance <sup>a2</sup>		--	77	--	

### Resistive Switching Characteristics<sup>a2</sup>

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
t <sub>d(ON)</sub>	Turn-on Delay Time	V <sub>DD</sub> = -15V, R <sub>L</sub> = -3.6Ω V <sub>GS</sub> = -10V, R <sub>G</sub> =6Ω	--	--	6.3	ns
t <sub>r</sub>	Rise Time		--	--	3.2	
t <sub>d(OFF)</sub>	Turn-Off Delay Time		--	--	38.2	
t <sub>f</sub>	Fall Time		--	--	12	

### Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V <sub>SD</sub>	Diode Forward Voltage <sup>a1</sup>	I <sub>S</sub> = -1A, V <sub>GS</sub> =0V	--	--	-1	V

### Typical Electrical and Thermal Characteristics

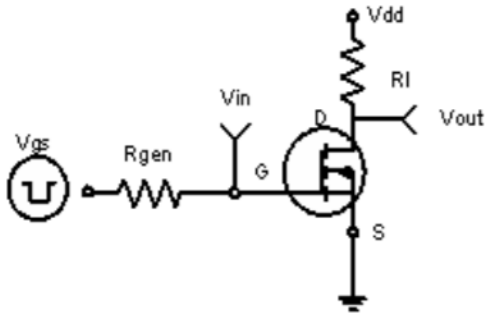


Figure 1: Switching Test Circuit

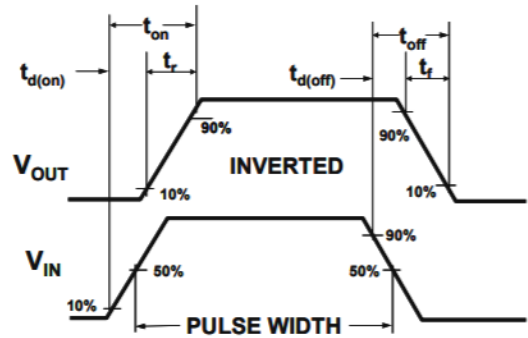


Figure 2: Switching Waveforms

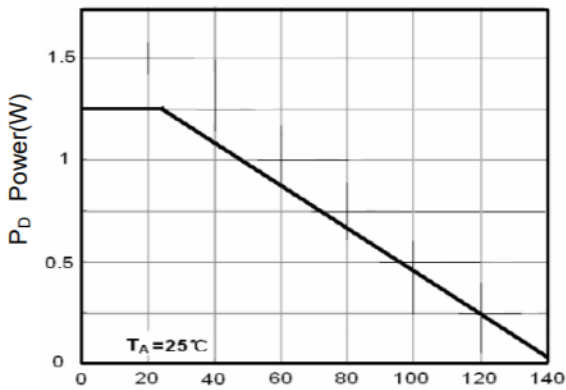


Figure 3 Power Dissipation

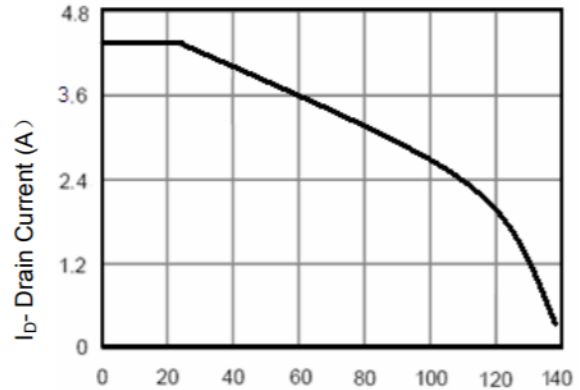


Figure 4 Drain Current

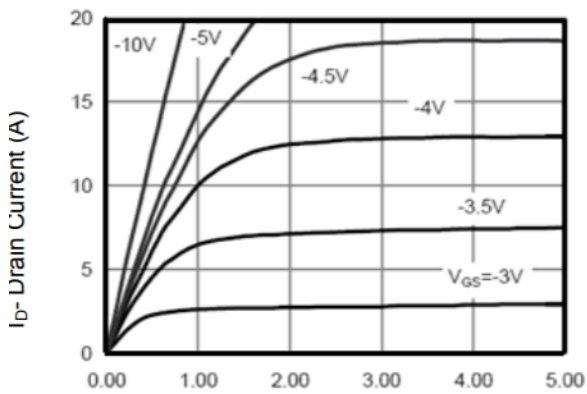


Figure 5 Output Characteristics

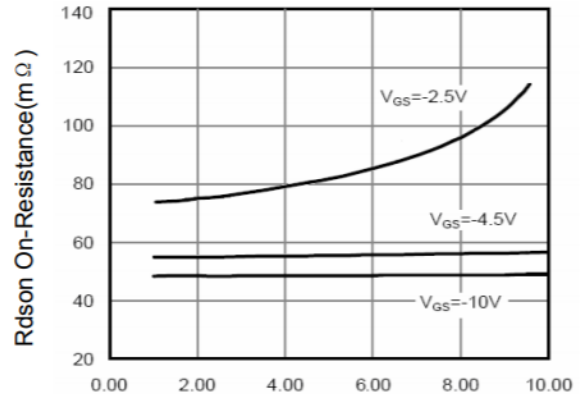


Figure 6 Drain-Source On-Resistance



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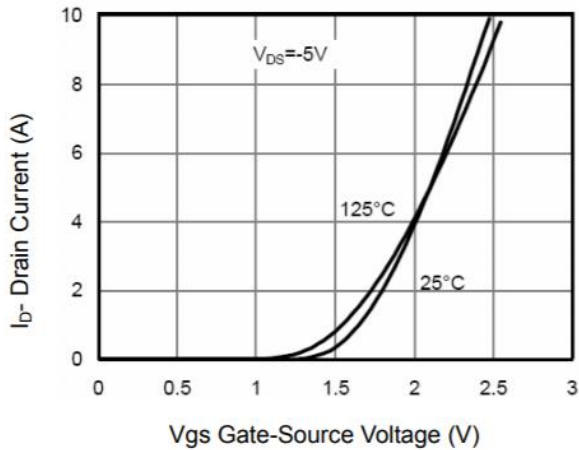


Figure 7 Transfer Characteristics

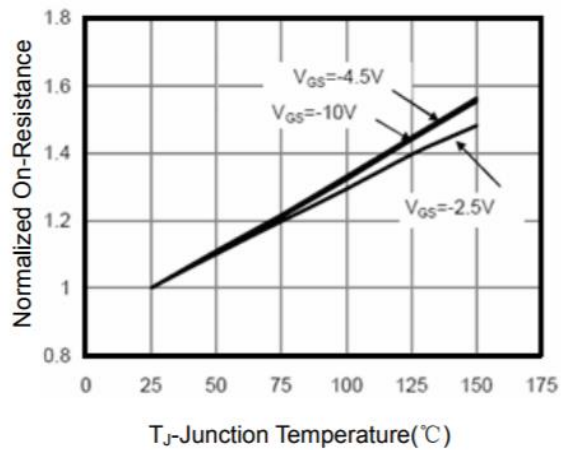


Figure 8 Drain-Source On-Resistance

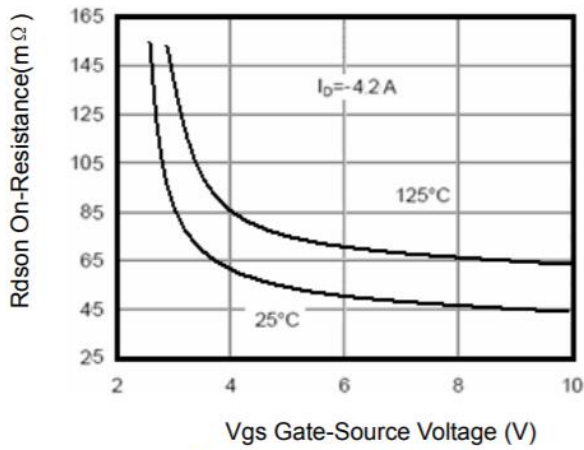


Figure 9 Rds(on) vs Vgs

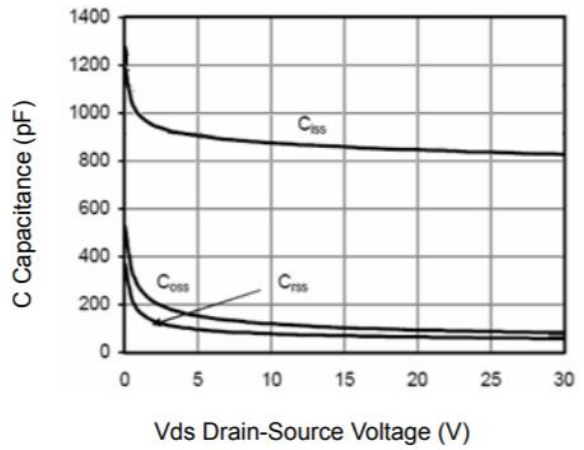


Figure 10 Capacitance vs Vds

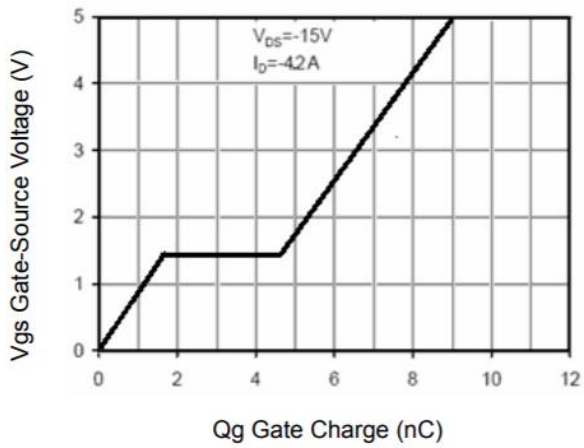


Figure 11 Gate Charge

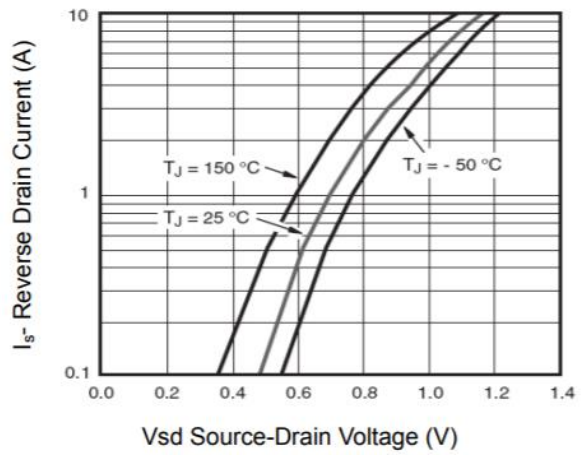


Figure 12 Source-Drain Diode Forward



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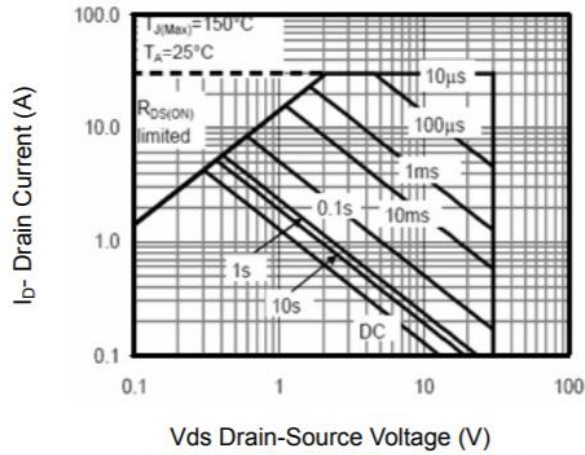


Figure 13 Safe Operation Area

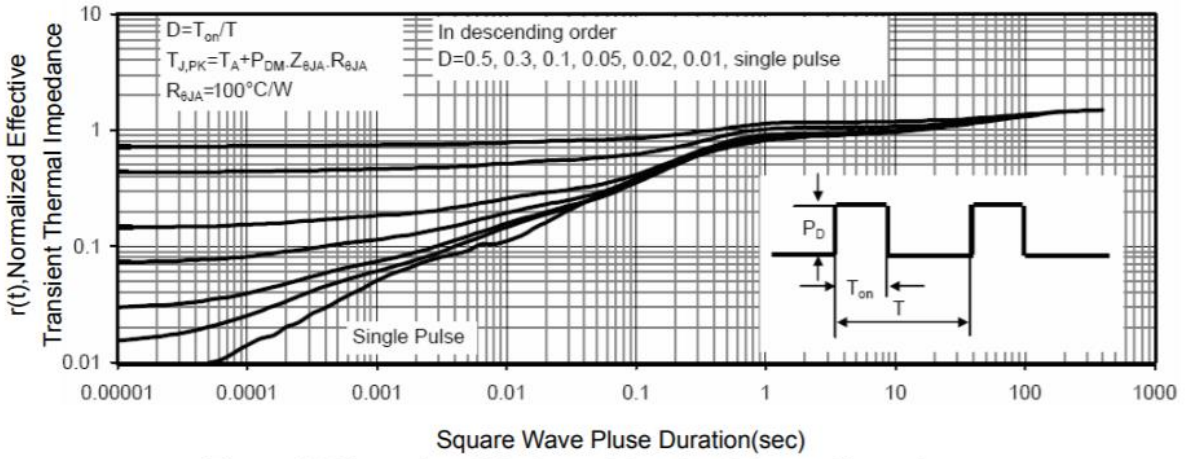


Figure 14 Normalized Maximum Transient Thermal Impedance