

BR2N7002LK2Q

Rev.A Dec.-2023

描述 / Descriptions

SOT-23 塑封封装 N 沟道 MOS 场效应管。

N-CHANNEL MOSFET in a SOT-23 Plastic Package.

特征 / Features

灵敏的控制级触发电流和很低的维持电流。静电保护达 2KV，符合 AEC-Q101 标准高可靠性要求，无卤产品。

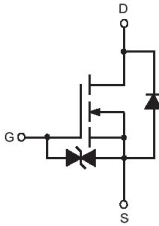
Sensitive gate trigger current and Low Holding current.ESD protected up to 2KV, Qualified to AEC-Q101 Standards for High Reliability, HF Product.

用途 / Applications

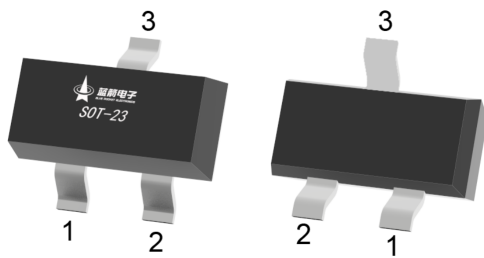
用作一般的开关和相位控制，满足汽车应用的严格要求。

Intended for use in general purpose switching and phase control applications, Meet the stringent requirements of automotive applications.

内部等效电路 / Equivalent Circuit



引脚排列 / Pinning



PIN1 : G

PIN 2 : S

PIN 3 : D

印章代码 / Marking

Marking	Q702LK
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极限参数 / Absolute Maximum Ratings(Ta=25°C)

参数 Parameter	符号 Symbol	数值 Rating	单位 Unit
Drain-Source Voltage	V_{DS}	60	V
Drain Current - Continuous	I_D (Ta=25°C)	360	mA
	I_D (Ta=100°C)	230	
Drain Current - Pulsed(Note 1)	I_{DM}	1200	mA
Gate-Source Voltage - Continuous	V_{GS}	±20	V
Power Dissipation	P_D	350	mW
Junction Temperature Range	T_j	150	°C
Storage Temperature Range	T_{stg}	-55~150	°C
Thermal resistance from junction to Ambient (Note 2)	$R_{\theta JA}$	300	°C/W
Thermal resistance from junction to solder point	$R_{\theta JSP}$	92	

Note 1) Pulse Width 10us, Duty Cycle 1%

Note 2) Surface-mounted on FR4 board using 1 sq in pad size with 1 oz Cu

电性能参数 / Electrical Characteristics(Ta=25°C)

参数 Parameter	符号 Symbol	测试条件 Test Conditions	最小值 Min	典型值 Typ	最大值 Max	单位 Unit
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS}=0$ $I_D=250\mu A$	60			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS}=0$ $V_{DS}=60V$			1.0	μA
Gate-Source Leakage current	I_{GSS}	$V_{DS}=0V$ $V_{GS}=\pm 20V$			±10	μA
Static Drain-Source On-Resistance	$R_{DS(on)(1)}$	$V_{GS}=10V$ $I_D=0.5A$		1.1	1.44	Ω
	$R_{DS(on)(2)}$	$V_{GS}=4.5V$ $I_D=0.02A$		1.2	2.25	
	$R_{DS(on)(3)}$	$V_{GS}=2.5V$ $I_D=0.1A$		1.6	4.05	
	$R_{DS(on)(4)}$	$V_{GS}=1.8V$ $I_D=0.01A$		2.7	6	
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V$ $I_S=500mA$			1.2	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$ $I_D=250\mu A$	0.5	0.9	1.0	V
Input Capacitance	C_{iss}	$V_{GS}=0V$, $f=1MHz$, $V_{DS}=20V$		25	50	pF
Output Capacitance	C_{oss}			11	25	
Reverse Transfer Capacitance	C_{rss}			2.5	5	
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS}=4.5V$, $V_{DS}=10V$; $I_D=200mA$		0.7		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.1		
Gate-to-Source Charge	Q_{GS}			0.3		
Gate-to-Drain Charge	Q_{GD}			0.1		

电性能参数 / Electrical Characteristics(Ta=25°C)

参数 Parameter	符号 Symbol	测试条件 Test Conditions	最小值 Min	典型值 Typ	最大值 Max	单位 Unit
Turn-On Delay Time	$t_{d(ON)}$	$V_{GS}=10V, \quad V_{DD}=25V,$ $I_D=500mA, \quad R_G=25\ \Omega$		12.2		ns
Rise Time	t_r			9.0		
Turn-Off Delay Time	$t_{d(OFF)}$			55.8		
Fall Time	t_f			29		

电参数曲线图 / Electrical Characteristic Curve

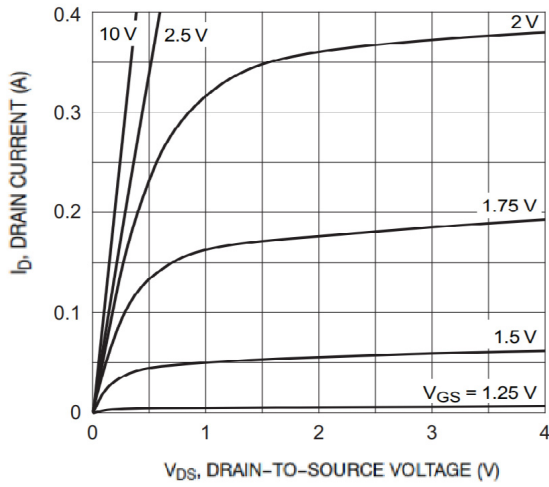


Figure 1. On-Region Characteristics

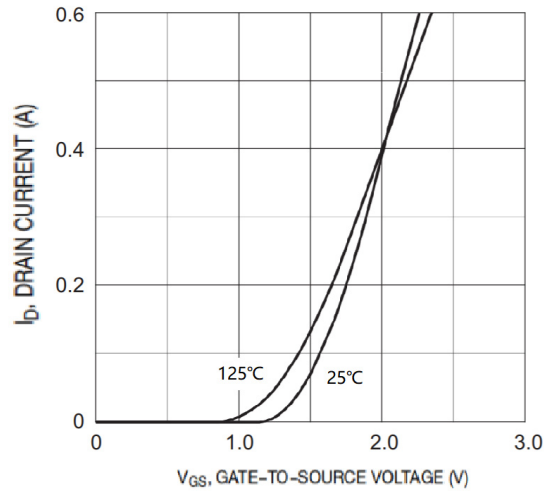


Figure 2. Transfer Characteristics

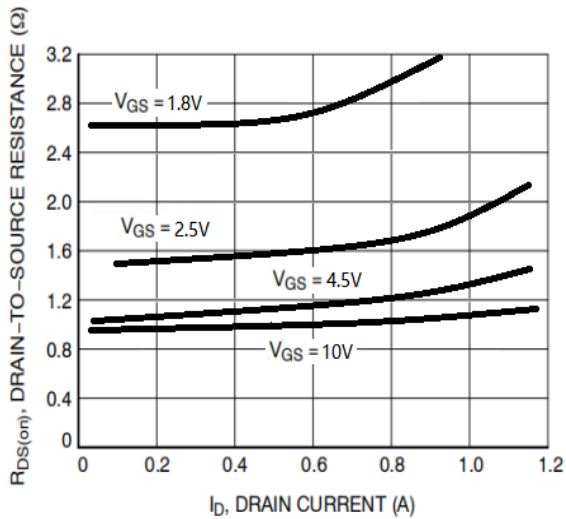


Figure 3. On-Resistance vs. Drain Current and Temperature

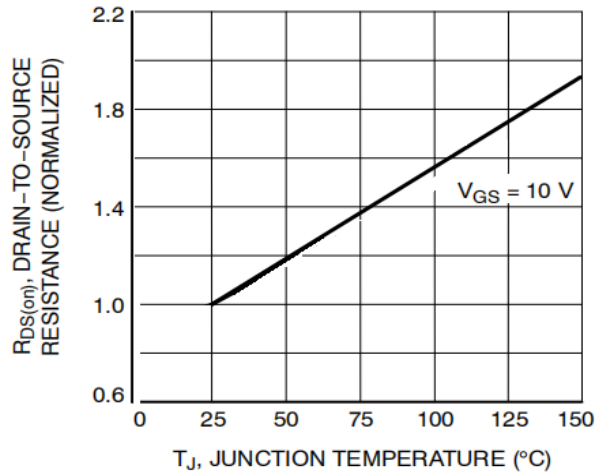


Figure 4 On-Resistance Variation with Temperature

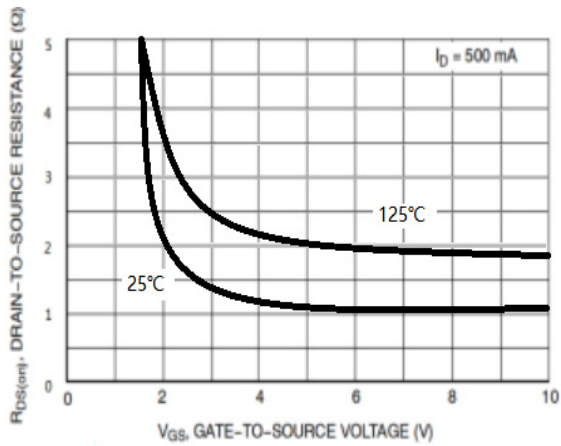


Figure 5. On-Resistance vs. Gate-to-Source Voltage

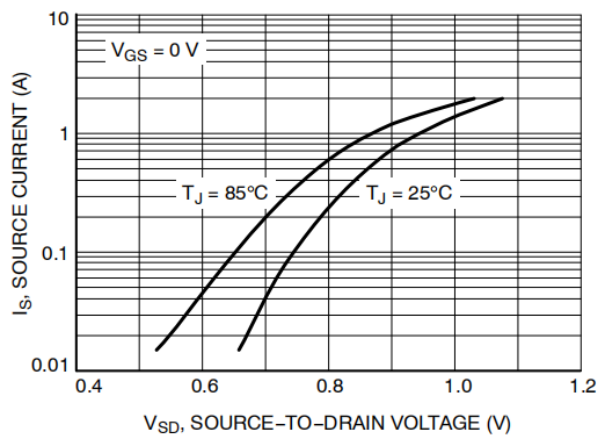


Figure 6 Diode Forward Voltage vs. Current

电参数曲线图 / Electrical Characteristic Curve

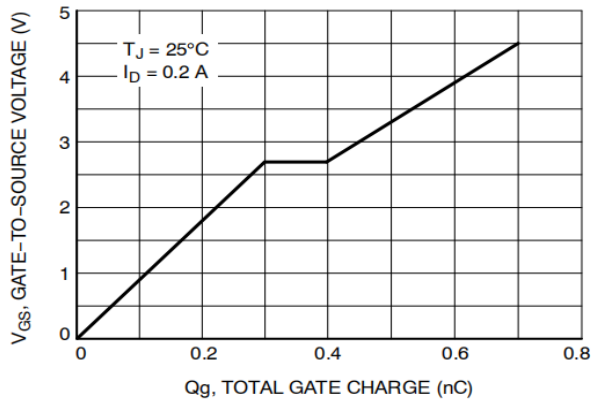


Figure 7. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

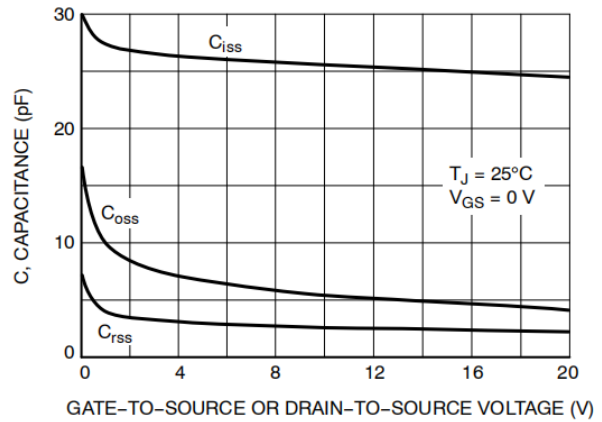


Figure 8. Capacitance Variation

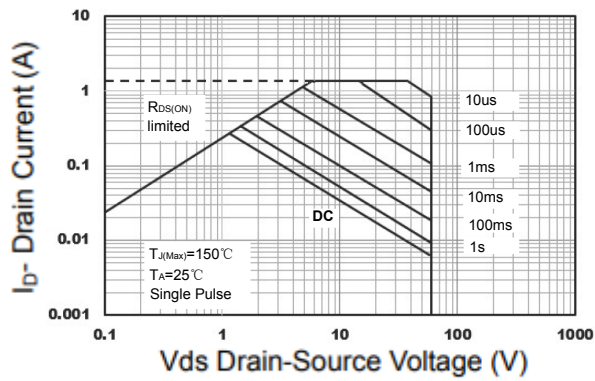


Figure 9 : Safe Operation Area

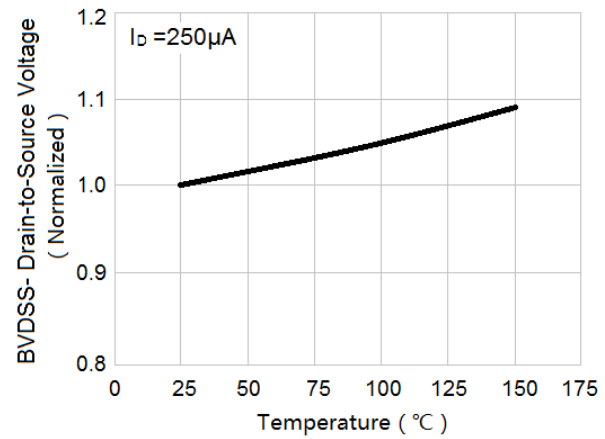


Figure 10 : Breakdown Voltage vs. Temperature

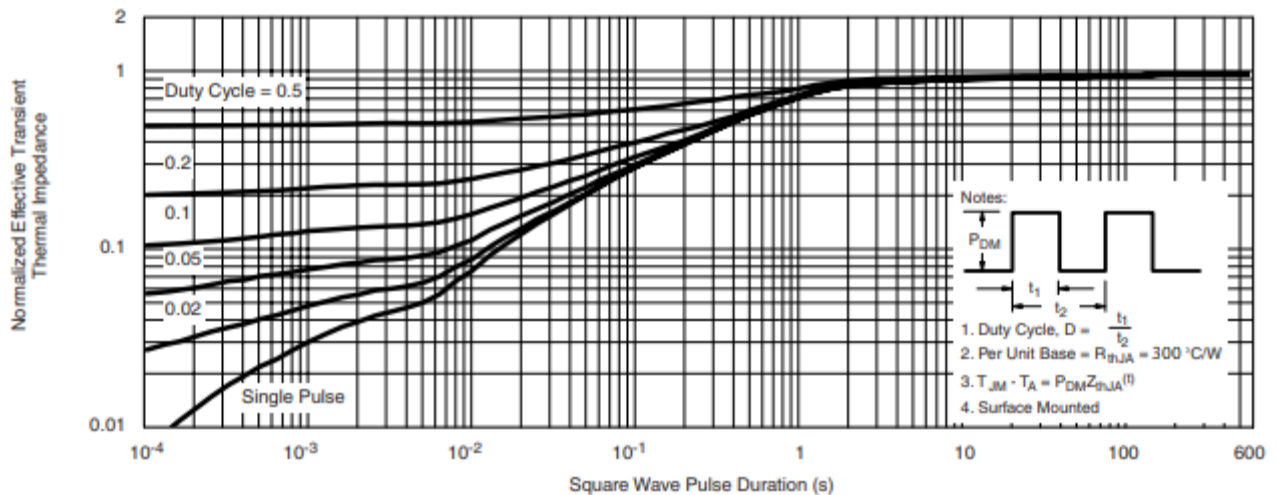
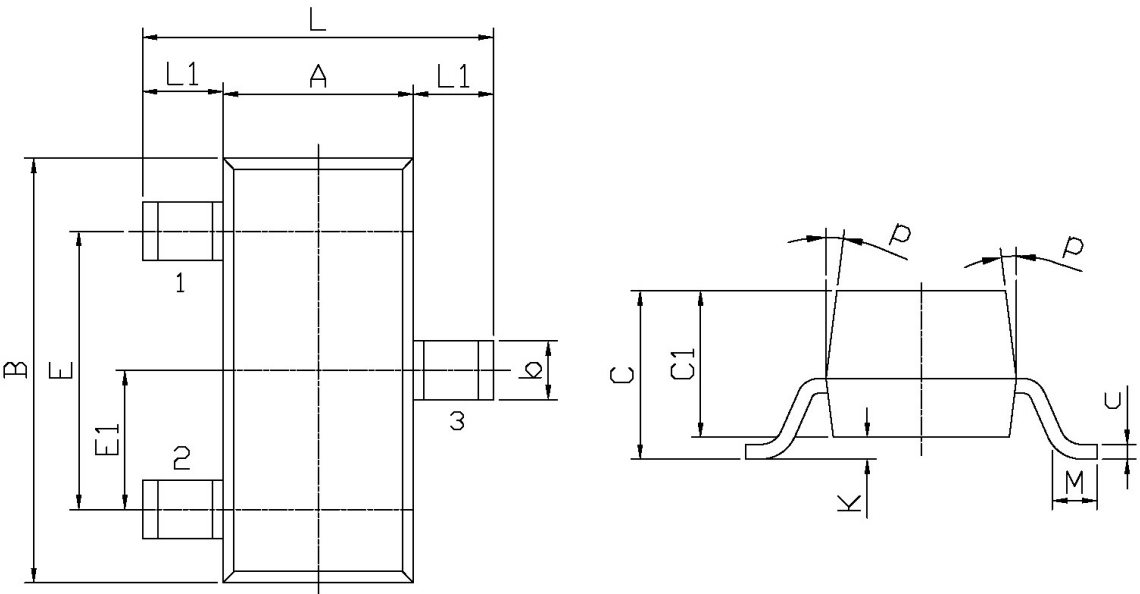


Figure 11 : Normalized Thermal Transient Impedance, Junction-to-Ambient

外形尺寸图 / Package Dimensions

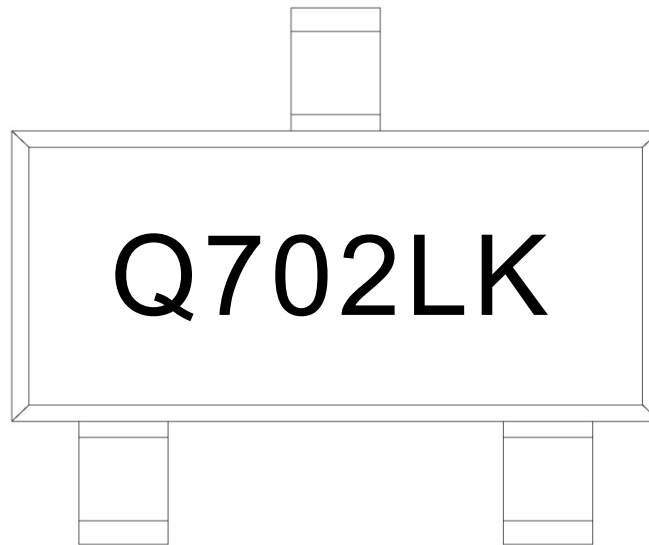
SOT-23

单位：mm



Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
L	2.2	2.7	C	1.30Max	
L1	0.45	0.65	C1	0.90	1.20
A	1.15	1.50	c	0.05	0.20
B	2.70	3.10	K	0	0.10
E	1.70	2.10	M	0.20MIN	
E1	0.85	1.05	P	7°	
b	0.35	0.55			

印章说明 / Marking Instructions



说明：

Q： 为汽车无卤产品标识

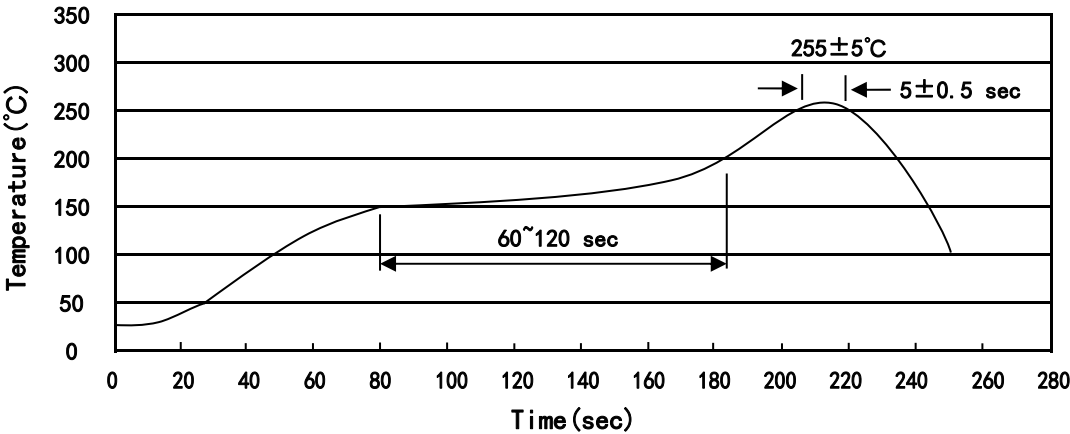
702LK： 为型号代码

Note:

Q: Automobile halogen-free product Code

702LK: Product Type Code

回流焊温度曲线图(无铅) / Temperature Profile for IR Reflow Soldering(Pb-Free)



- 说明：
- Note:
- 1、预热温度 150 ~ 200℃，时间 60 ~ 120sec;

1.Preheating:150~200℃, Time:60~120sec.

2、峰值温度 255±5℃，时间持续为 5±0.5sec;

2.Peak Temp.:255±5℃, Duration:5±0.5sec.

3、焊接制程冷却速度为 2 ~ 10℃/sec.

3.Cooling Speed: 2~10℃/sec.

耐焊接热试验条件 / Resistance to Soldering Heat Test Conditions

温度：260±5℃ 时间：10±1 sec. Temp.:260±5℃ Time:10±1 sec

包装规格 / Packaging SPEC.

卷盘包装 / REEL

Package Type 封装形式	Units 包装数量					Dimension 包装尺寸 (unit: mm ³)		
	Units/Reel 只/卷盘	Reels/Inner Box 卷盘/盒	Units/Inner Box 只/盒	Inner Boxes/Outer Box 盒/箱	Units/Outer Box 只/箱	Reel	Inner Box 盒	Outer Box 箱
SOT-23	3,000	10	30,000	6	180,000	7" ×8	180×120×180	390×385×205

使用说明 / Notices