

# BR2N7002AK2

Rev.D Oct.-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.

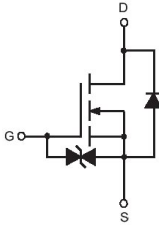
## 特征 / Features

灵敏的控制级触发电流和很低的维持电流。静电保护达 2KV，无卤产品。  
Sensitive gate trigger current and Low Holding current.ESD protected up to 2KV, HF Product.

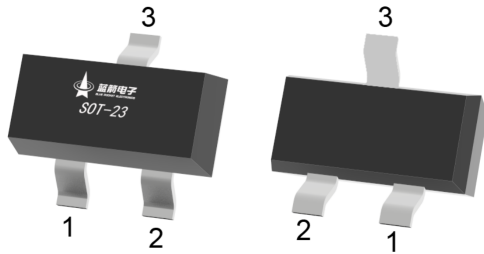
## 用途 / Applications

用作一般的开关和相位控制。  
Intended for use in general purpose switching and phase control 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	702K2
---------	-------

**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	$V_{DSS}$	60	V
Drain-Gate Voltage	$V_{DGR}$	60	V
Drain Current - Continuous	$I_D (Ta=25^\circ C)$	300	mA
	$I_D (Ta=85^\circ C)$	210	
Drain Current - Pulsed(Note 1)	$I_{DM}$	1200	mA
Gate-Source Voltage - Continuous	$V_{GSS}$	$\pm 20$	V
Power Dissipation	$P_D$	350	mW
Junction Temperature Range	$T_j$	150	$^\circ C$
Storage Temperature Range	$T_{stg}$	-55~150	$^\circ C$
Maximum Junction-to-Ambient(Note 2)	$R_{\theta JA}(\text{Steady State})$	300	$^\circ C/W$
	$R_{\theta JA}(t \leq 5s)$	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	$V_{DSS}$	$V_{GS}=0$ $I_D=250\mu A$	60			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS}=0$ $V_{DS}=60V$			1.0	$\mu A$
Gate-Source Leakage current	$I_{GSS}$	$V_{DS}=0V$ $V_{GS}=\pm 20V$			$\pm 10$	$\mu A$
Static Drain-Source On-Resistance	$R_{DS(on)(1)}$	$V_{GS}=10V$ $I_D=0.5A$			2.3	$\Omega$
	$R_{DS(on)(2)}$	$V_{GS}=5V$ $I_D=0.05A$		1.7	2.7	$\Omega$
Drain-Source Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V$ $I_S=250mA$			1.5	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$ $I_D=250\mu A$	1.0	1.5	2.5	V
Forward Transconductance	$Y_{fs}$	$V_{DS}=10V$ $I_D=0.2A$	80			mS
Input Capacitance	$C_{iss}$	$V_{GS}=0V$ , $f=1MHz$ , $V_{DS}=20V$			50	pF
Output Capacitance	$C_{oss}$				25	
Reverse Transfer Capacitance	$C_{rss}$				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	$t_{d(ON)}$	$V_{GS}=10V, V_{DD}=25V,$ $I_D=500mA, R_G=25\Omega$		35		ns
Rise Time	$t_r$			75		
Turn-Off Delay Time	$t_{d(OFF)}$			305		
Fall Time	$t_f$			260		

电参数曲线图 / Electrical Characteristic Curve

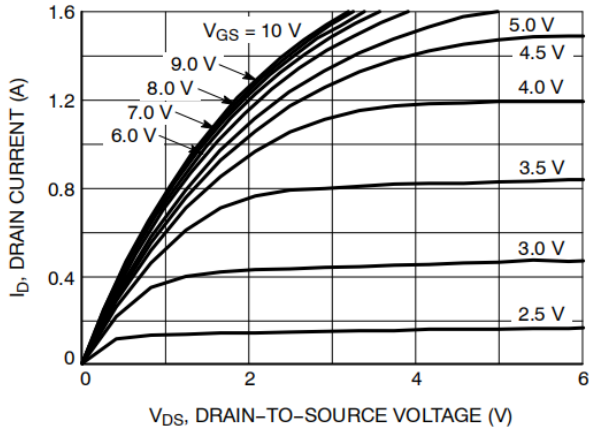


Figure 1. On-Region Characteristics

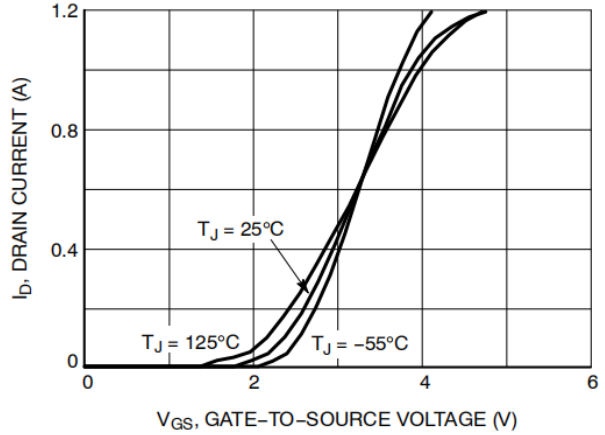


Figure 2. Transfer Characteristics

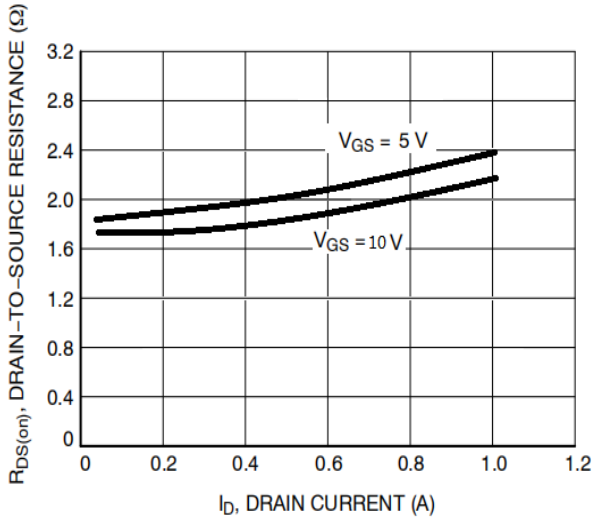


Figure 3. On-Resistance vs. Drain Current and Temperature

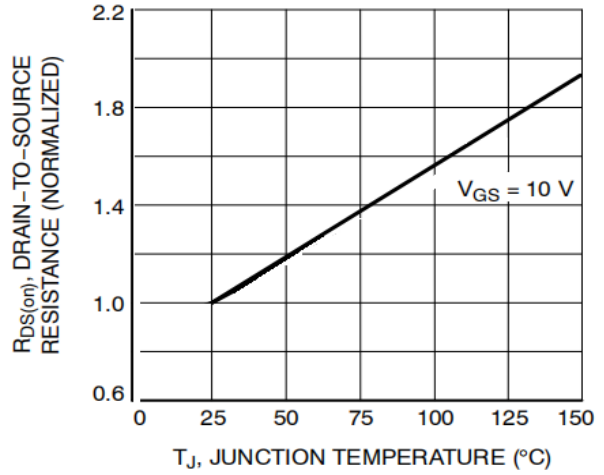


Figure 4 On-Resistance Variation with Temperature

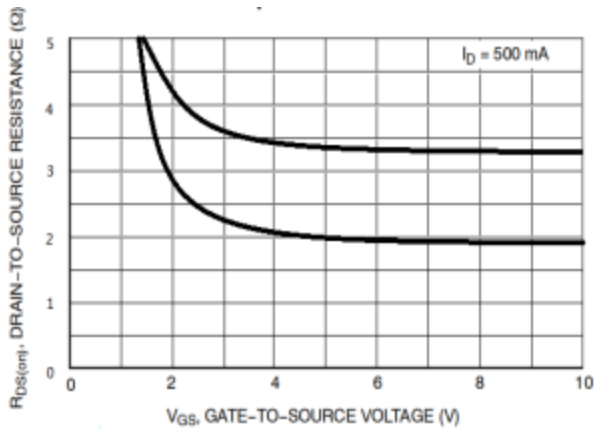


Figure 5. On-Resistance vs. Gate-to-Source Voltage

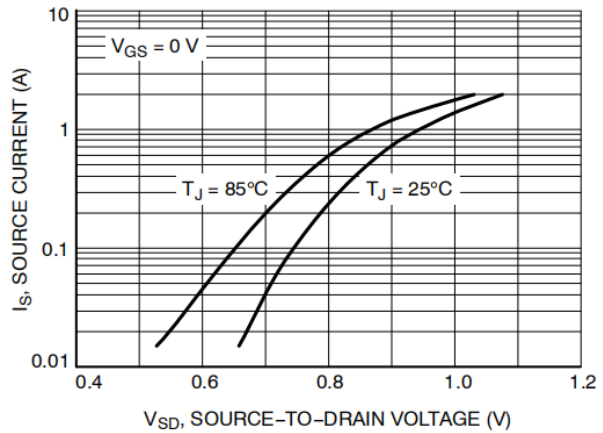
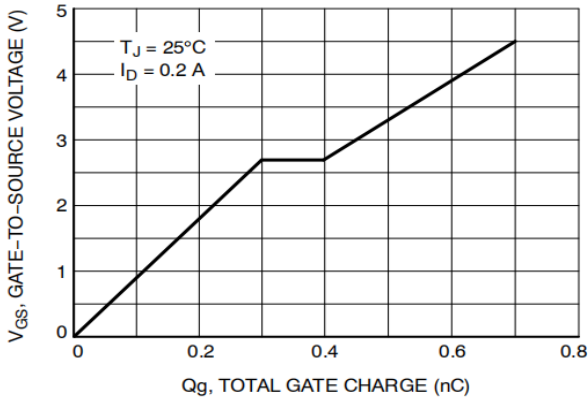
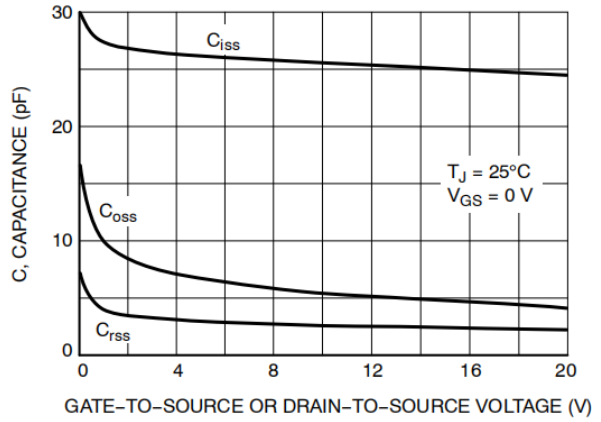


Figure 6 Diode Forward Voltage vs. Current

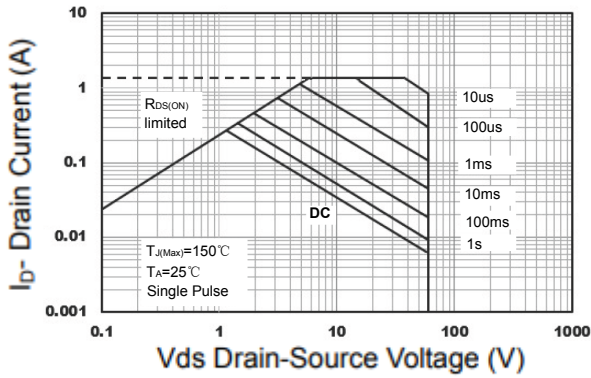
**电参数曲线图 / Electrical Characteristic Curve**



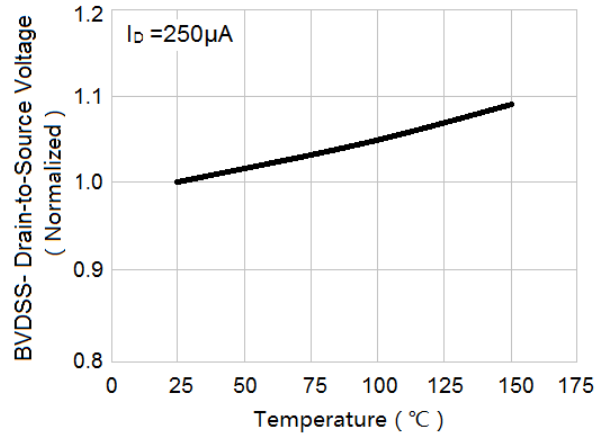
**Figure 7 . Gate-to-Source and Drain-to-Source Voltage vs. Total Charge**



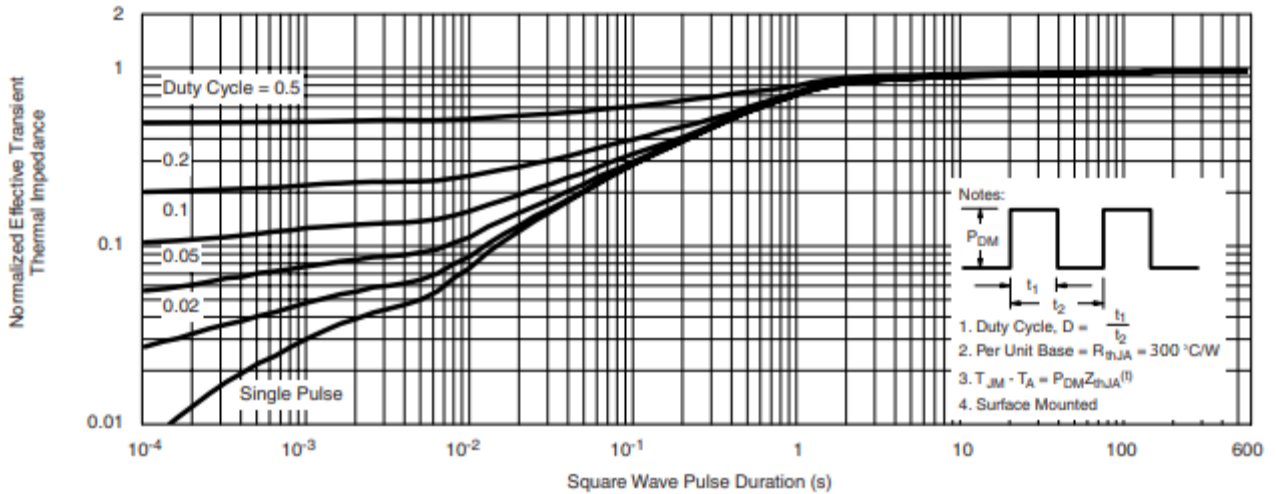
**Figure 8 . Capacitance Variation**



**Figure 9 : Safe Operation Area**



**Figure 10 : Breakdown Voltage vs. Temperature**

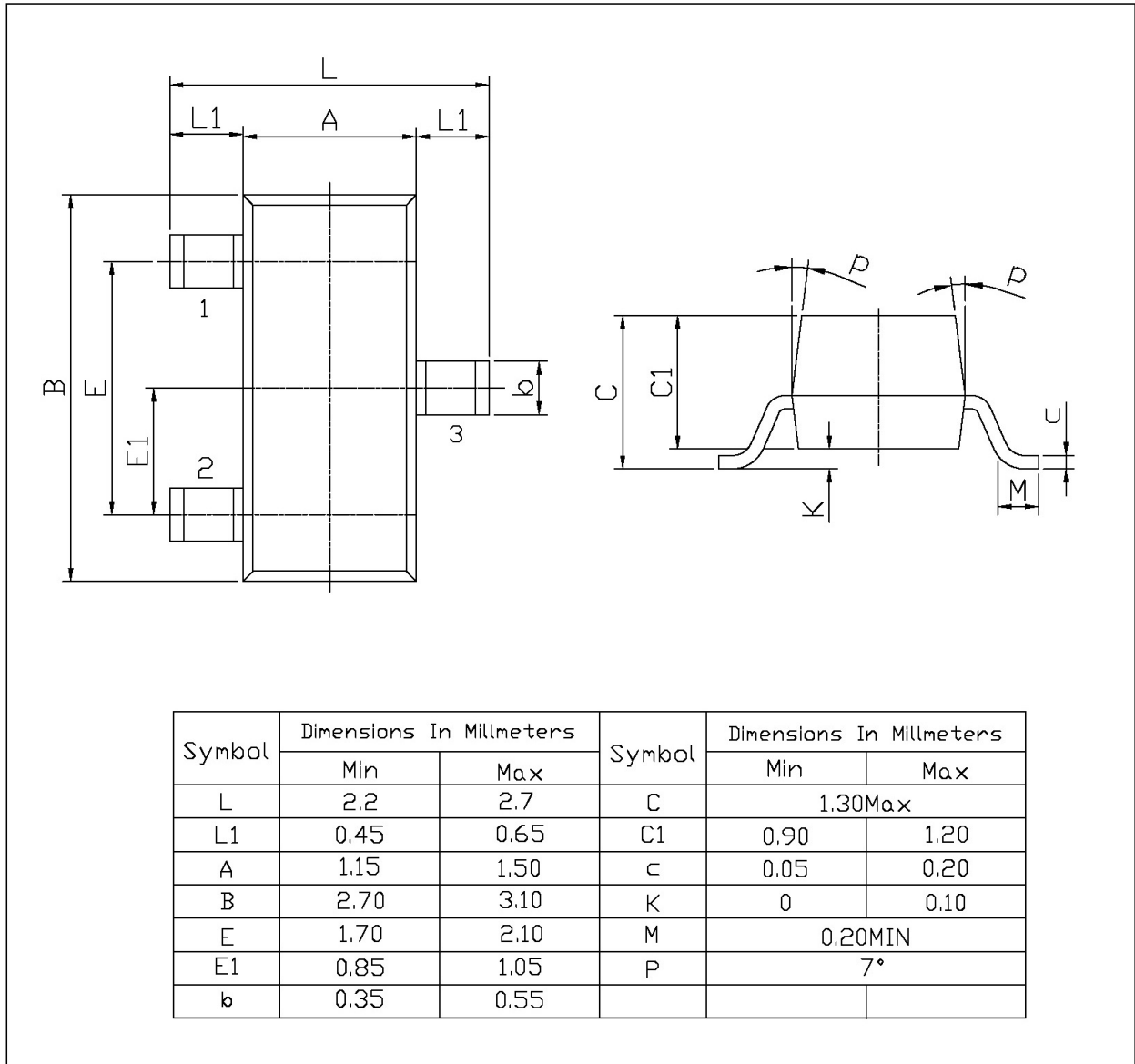


**Figure 11 : Normalized Thermal Transient Impedance, Junction-to-Ambient**

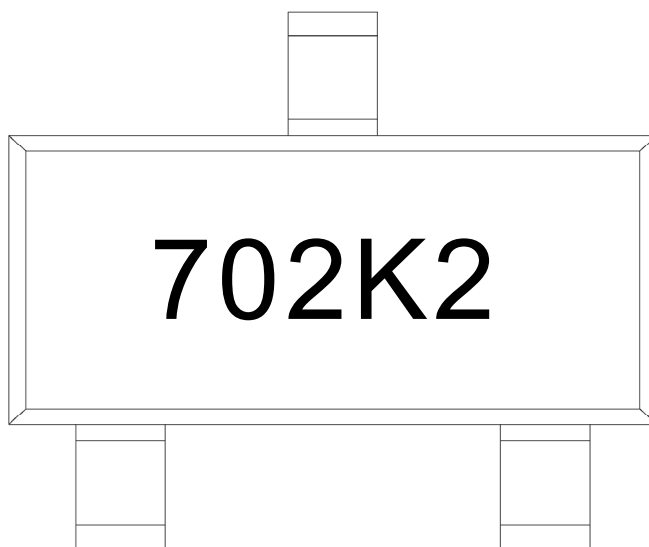
## 外形尺寸图 / Package Dimensions

SOT-23

单位: mm



印章说明 / Marking Instructions



说明：

702K2： 为型号代码

Note:

702K2: Product Type Code

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


说明：

- 1、预热温度 150~180°C，时间 60~90sec;
- 2、峰值温度 245±5°C，时间持续为 5±0.5sec;
- 3、焊接制程冷却速度为 2~10°C/sec.

Note:

- 1.Preheating:150~180°C, Time:60~90sec.
- 2.Peak Temp.:245±5°C, Duration:5±0.5sec.
3. Cooling Speed: 2~10°C/sec.

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

温度：260±5°C

时间：10±1 sec.

Temp.:260±5°C

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 <sup>3</sup> )		
	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**