

规格承认书

Specification for approval

产品名称: 22SK561 DEN-C 压敏电阻

Product Type: 22SK561 DEN-C Varistor

Shenzhen Shaoxin Electronics Co.Ltd

电话: +86-755-83239643 传真: +86-755-83238644

厂址: 深圳市龙岗区平湖街道上木古社区捷威工业城三期厂房A栋五楼

网址: <http://www.szshaoxin.com>

1. 适用范围：本规格书适用于本公司规格型号为 22SK561 DEN -C 的压敏电阻。
Scope: This specification is available for MOVs which product model is 22SK561 DEN -C.
2. 尺寸及结构说明： Dimensions and Structure: fig.1

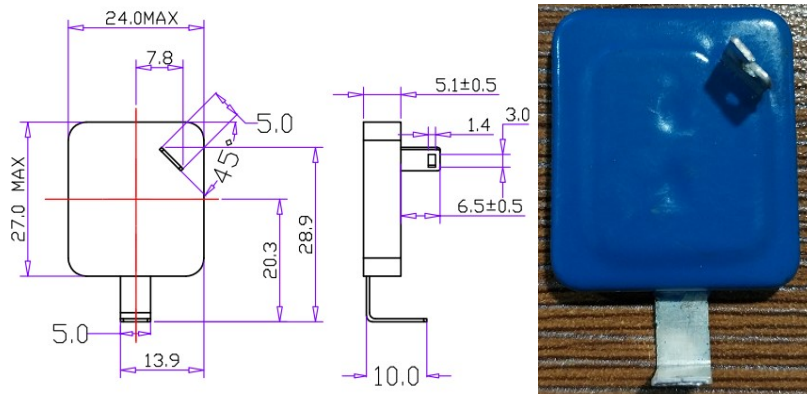


Fig. 1 Shape and Dimensions 单位: mm 未注公差小于 0.2 Unit: mm; Unremarked tolerances are less than 0.2

- 2.1. 电极：0.5 厚紫铜板，表面电镀银。
Lead: 0.5mm thick copper sheet, electroplated with silver on the surface.
- 2.2. 包封材料：蓝色环氧树脂
Coating material: blue epoxy

3. 产品标识 Marking On Product



4. 产品型号及编码说明 Specifications for Product Model and Product Code

- 4.1. 产品型号：见表 1. Product Model: Specified in Table 1.

表 1. 型号说明 Table 1. Product Model

		<u>22S</u>	<u>K</u>	<u>561</u>	<u>DEN- C</u>
		(1)	(2)	(3)	(4) (5)
编号 No.	条款含义 Item	字符 Digit	说明 Description		
(1)	芯片尺寸 Size	22S	Ceramic body dimension = 22*25 (+0.5~-0.7)mm. Typical: 40D, 34S, 32D, 25D, 22S, 20S		
(2)	电压公差等级 Tolerance of voltage	K	K: 允差± 10% Allowable tolerances: ± 10% J: 允差± 5% Allowable tolerances: ± 5%		
(3)	压敏电压 U _{1mA} Varistor Voltage	561	U _{1mA} =560V(504V~616V)		

续表 1. Table 1. Continued

(4)	引脚结构 Terminal Type	DEN	引脚结构命名 Terminal Type Code
(5)	包封 Coating	C	环氧树脂包封 Coated with blue epoxy

4.2. 产品编码：见表 2. Product Code: Specified in Table 2.

表 2. 产品编码说明 Table 2. Product Code

21024 (1)			
编号 No.	条款含义 Item	字符 Digit	说明 Description
(1)	日期代码 Date Code	21024	18: 生产年份 Year of Manufacturing 024: 生产批号 Production Batch
(2)	产品系列 Product Family	/	H: 高通流系列 Higher impulse current endurance. L: 低残压系列 Lower residual voltage.

5. 电气性能 Electrical Performance

表 3. 电性能参数表 Table 3. Electric Parameters

技术特性 Technical Feature	技术参数 Technical Parameters	参照标准 Standard
压敏电压 Varistor Voltage($U_{1mA(DC)}$)	560V(504V~616V)	IEC 61051
漏电流 Leakage Current	$\leq 7\mu A$ (75% of $U_{1mA(DC)}$, 25℃)	IEC 61051
电容量 Capacitance @1KHZ	1400pF	IEC 61051
最大连续工作电压 Maximum Continuous Operating Voltage U_c	AC:350V/DC:450V	IEC 61051
工频发热点 The surface hottest spot of MOV under power overload	From the closest edge of the MOV $\geq 4mm$	QJ/YG-001-2014
残压 residual Voltage (I_n)	1350V (I_n :10KA)	IEC 61643.11
标称放电电流(15 次) Nominal Discharge Current I_n (15 pulses)	10KA	IEC 61643.11
最大放电电流(1 次) Maximum Discharge Current I_{max} (1 pulses)	25KA	IEC 61643.11
单次脉冲最大能量 Single-Pulse Maximum Energy (2ms)	640J	IEC 61643.331
绝缘耐压 Dielectric Voltage	$\geq 1700V(1000 V+2U_c)$	UL 1449 (Third Edition)
工频电流耐受 Endurance to Power current	$I \geq 1A$; $t \geq 3s$	QJ/YG-001-2014
湿热耐受 Damp Heat Resistance	6 个循环 6 cycles	QJ/YG-001-2014
加速老化寿命 Endurance at Upper Category Temperature	$U_{r.m.s.}=0.95U_{1mA}/1.414 (\geq U_c)$, 115 $\pm$ 2℃, 1000 hrs	QJ/YG-001-2014

续表 3. Table 3. Continued

不降额工作温度范围 Operating Temperature Range Without Derating	-40℃～+85℃	CECC 42000
存储温度 Storage Temperature Range	-40℃～+85℃	IEC 60068-2-2

6. 测试方法与合格标准 Test Method and Pass Criteria

6.1. 工频发热点检查 Examine the surface hottest spot of MOV under power overload

6.1.1. 测试方法：任取 4 只 MOV，测量其压敏电压 U_{1mA} ，施加有效值约为 $0.8 \sim 0.9U_{1mA}$ 的工频电压，使流过 MOV 的工频电流为 $30 \sim 80mA$ ，用红外热像仪监测表面温度，在最高温点温度为 $110 \sim 140^\circ C$ 时拍照并检查最高温度点位置。

Test Method: Select 4 new MOVs randomly, measure the varistor voltage. Apply a power frequency voltage with effective value is about $0.8 \sim 0.9U_{1mA}$ to each MOV to make the power current pass through is between $30 \sim 80 mA$. Monitor the surface temperature of the sample with Infrared Thermal Imager. Take a picture when the temperature of the hottest spot is between $110 \sim 140^\circ C$ and check the position of the hottest spot.

6.1.2. 合格判据： Pass Criteria:

最高温度点与芯片最近边缘的距离大于 4mm 或发热均匀无明显最高温度点。

The distance of the hottest spot to the closest edge of the MOV must not be less than 4 mm, or, the MOV is homogenous in heating and no obvious hottest spot occur.

6.2. 残压与冲击电流 Residual Voltage and Discharge Current

6.2.1. 测试方法：任取 4 只 MOV，测量并记录其初始压敏电压和泄漏电流，正反各测量一次 I_n 下残压；施加 15 次正极性 I_n 的 8/20 脉冲电流：分成 3 组，每组 5 次冲击；每次冲击间隔时间 60 秒；每组冲击间隔时间 25～30 分钟。用 $0.75I_{max}$ 冲击一次，冷却至室温；用 I_{max} 再冲击一次。再次正反各测量一次 I_n 下残压；再测量压敏电压和泄漏电流；检查外观。

Test Method: Select 4 new MOVs randomly, measure the initial varistor voltage and leakage current. Apply 1 positive polarity and 1 negative polarity 8/20 impulse current with I_n (10kA) respectively to each sample to measure its residual voltage of two sides. Then apply 3 groups of 5 positive polarity 8/20 impulse current with I_n (10kA) to the sample. The interval between the impulses is 50 s – 60 s, the interval between the groups is 25 min –30 min. After the MOV cool down to ambient temperature, applied 1 positive polarity 8/20 impulse current with $0.75I_{max}$ (17.25kA) to it, and after cool down to ambient temperature, applied 1 positive polarity 8/20 impulse current with I_{max} (25kA) to it. Repeat the process of measuring residual voltage at the beginning. Measure the varistor voltage and leakage current again after it cools. Make a visual inspection.

6.2.2. 合格判据： Pass Criteria:

a. 初始压敏电压 U_{1mA} : Initial varistor voltage U_{1mA} : 504～616V;

b. 初始漏电流 I_L : Initial Leakage Current I_L : $\leq 7\mu A$ (75% of U_{1mA} (DC)).

c. 后面测得的压敏电压不得低于初值的 $\leq 90\%$ ，但上升不做限定；漏电流 $\leq 100\mu A$ 。

The varistor voltage measured later shall not be less than 90% of its initial value, but the

upward change is not limited. The leakage current shall be $\leq 100\mu\text{A}$.

- d. 最后测量的残压最高值与开始测得的最低值相比，增大低于 10%。

The higher residual voltage measured at last compare with the lower one measured at the beginning, the increased proportion shall not be more than 10%.

- e. 外观检查不得出现目视可见的物理破坏。

No visible damage is allowed.

6.3. 工频电流耐受（周期性试验：若无变更 1 次/3 个月）

Endurance to Power Current (Cycling Test: 1 time / 3 months if no change)

- 6.3.1. 测试方法：随机抽取 5 只新 MOV，测量并记录其压敏电压 $U_{1\text{mA}}$ ，依次在 MOV 两引出端施加有效值为 $1.05 \sim 1.10U_{1\text{mA}}$ 的工频过电压，使约 1A 的工频电流流过 MOV，记录击穿时间，或电极焊锡完全熔融，电极与瓷体分离并切断电路。

Test Method: Select 5 new MOVs randomly, measure the varistor voltage $U_{1\text{mA}}$. Apply power frequency voltage with effective value is about $1.05 \sim 1.10U_{1\text{mA}}$ between the two leads of each sample to keep the power current pass through the sample is about 1 ampere. Records the time before the sample been punched, or, the soldering tin of copper sheet leads been fully melted to make one or two copper leads separate from ceramic body and cause disconnection.

- 6.3.2. 合格判据： Pass Criteria:

电极焊锡完全熔融造成电极与芯片分离切断电路、芯片无击穿；或者同时满足 a 和 b:

The soldering tin of copper leads been fully melted and one or two copper leads separate from ceramic body and cause disconnection without internal puncturing, or, both criteria a and criteria b must be met.

- a. MOV 发生击穿时间 $\geq 3\text{s}$;

The endurance time of the MOV punched by power current shall not be less than 3 seconds.

- b. 击穿点与芯片最近边缘的距离大于 4mm。

The distance of the punch- through hole in ceramic body to its closest edge must not be less than 4 mm.

6.4. 耐潮性 Damp Heat Resistance Test

- 6.4.1. 测试方法：随机抽取 5 只新 MOV，测量并记录其压敏电压 $U_{1\text{mA}}$ 和泄漏电流 I_L ，置于自来水沸水中煮 30 分钟，自然冷却 2h 后擦干表面测量其压敏电压 $U_{1\text{mA}}$ 和泄漏电流 I_L ；再煮再测量，如此再重复 5 个循环。过程中注意 MOV 不可直接接触锅底。

Test Method: Select 5 new MOVs randomly, measure the varistor voltage and leakage current. Put the samples in boiling tap-water and boil for 30 min. Take the samples out and cool for 2 hours naturally. Rub the surface dry and measure the varistor voltage and leakage current. Repeat this process for 5 times. It must be noticed that the samples could not touch the bottom of the boiler directly during boiling.

- 6.4.2. 合格判据： Pass Criteria:

- a. 压敏电压不得低于初值的 $\leq 95\%$;

The varistor voltage measured at last shall not be less than 95% of its initial value.

b. 漏电流 $\leq 20\mu\text{A}$ 。The leakage current shall be $\leq 20\mu\text{A}$ (75% of $U_{1\text{mA}}$ (DC)).

6.5. 加速老化寿命（周期性试验，若无变更 1 次/年）

Endurance at Upper Category Temperature (Cycling Test: 1 time / 1 year if no change)

6.5.1. 测试方法：随机抽取 4 只新 MOV，测量并记录其压敏电压 $U_{1\text{mA}}$ 和泄漏电流 I_L ，置于老化试验箱并连接好，施加有效值为 $0.95U_{1\text{mA}}/1.414$ （若低于 U_c 则按 U_c ）的工频电压，将温度升至 115°C ，连续运行 1000 小时。除非样品损坏否则中途不得中断。取出样品自然冷却 2 小时后测量其压敏电压 $U_{1\text{mA}}$ 和泄漏电流 I_L

Test Method: Select 4 new MOVs randomly, measure the varistor voltage and leakage current. Put them in the test oven and connect correctly. Apply power frequency voltage with effective value $U_{\text{r.m.s.}} = 0.95U_{1\text{mA}}/1.414$ (if lower than U_c then apply U_c) to each sample. Heat the test oven until its internal ambient temperature raise to 115°C and keep for 1000 hrs. Unless the sample been damaged or it should not be interrupted. Take the samples out and cool for 2 hours naturally. Measure the varistor voltage and leakage current.

6.5.2. 合格判据：Pass Criteria:

a. 压敏电压不得低于初值的 $\leq 90\%$;

The varistor voltage measured at last shall not be less than 90% of its initial value.

b. 漏电流 $\leq 100\mu\text{A}$ ；The leakage current shall be $\leq 100\mu\text{A}$ (75% of $U_{1\text{mA}}$ (DC)).

c. 不得出现物理损坏。No visible damage is allowed.

7. 温度降额：Temperature Derating

如果工作温度超过 85°C ，MOV 的最大持续运行电压 MCOV、最大能量耐受、最大冲击电流水平将会如图 2. 出现降额，降额系数约为-2.5%。

When operating temperature exceeds 85°C , the power, the Max. Continuous Operation Voltage, the Max. Surge Current and the Max. Energy should be derated as fig.2., the derated coefficient

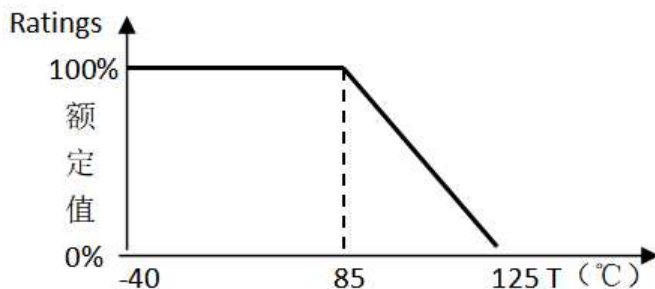


Fig.2. Temperature Derating Curve

8. RoHS 符合声明：RoHS Compliant Declaration

我们在此保证本批交付产品符合欧盟2011 / 65 /EU. RoHS指令要求。

We hereby declare that the components delivered to your company are compliant with RoHS directive 2011 / 65 /EU.

9. 产品储存 Warehouse Storage of Products

9.1. 存放条件 Storage Condition:

推荐长期存储条件 Recommend Long-term Storage Condition:

存储温度 Storage Temperature: $-10^\circ\text{C} \sim +40^\circ\text{C}$;

相对湿度 Relative Humidity: $\leq 75\text{RH}$.

不要将本产品存放在有腐蚀性气体或阳光直接照射的环境中保管。

Please keep the products away from corrosive atmosphere and sunlight.

9.2. 存储期限：1 年 Period of Storage: 1 Year。

10. 注意事项：Note:

10.1. 装配时不要用丙酮等溶剂清洗本产品，以免破坏本产品的封装层；

When assembly, please don't use acetone and other solvents to clean products, so as not to destroy enclosure.

10.2. 装配时应避免出现如敲击等作业方式，避免造成本产品出现机械损伤；

When assembly, please avoid knocking and such practices, so as not to make mechanical damage on products.

10.3. 应用本产品的设备必须有可靠的接地线与大地相连。

Equipment in which the products are used must have reliable grounding to the earth.