

JIERONG

# X2 抑制电源电磁干扰用电容器

编号

JR-WI-014A-001

制定日期

2020年5月12日

发行版次

V4.0

页次

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## 规格承认书

ROHS

SVHC

客户名称:

立创商城

客户料号:

C2843333

捷容料号:

K223K310VB3L12

规格型号:

X2 0.022UF 275V 310V P7.5

制作	客户确认 (签署)
朱亚平	
审核	
叶秋媚	
批准	
汤小荣	

(签认后, 敬请惠还一份)

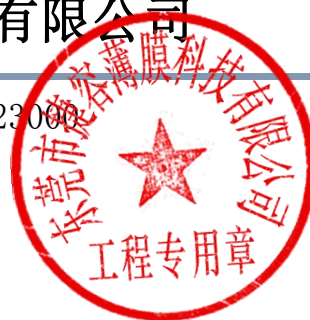
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## 2. 产品介绍

### Products Introduction

MPX 电容是由金属化聚丙烯薄膜，采用无感结构卷绕而成，引线采用镀锡铜包钢线，外部使用阻燃环氧粉体封装而成。具有良好的自愈功能和优良的阻燃性，符合UL94-V0标准。

MPX are wound with metallized polypropylene film dielectric, Non-inductive construction, tinned copper wire leads, and flame retardant epoxy resin coating.

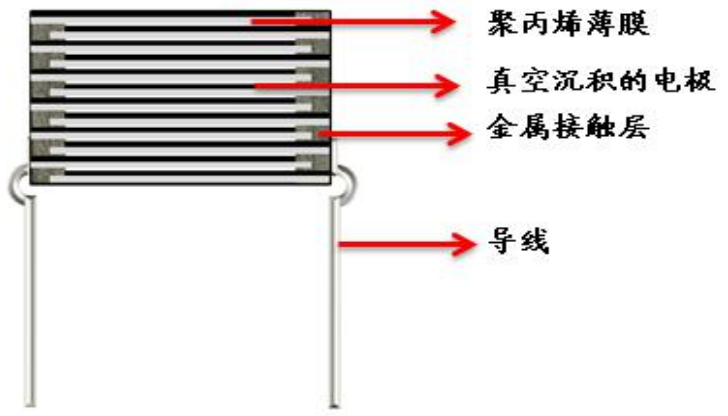
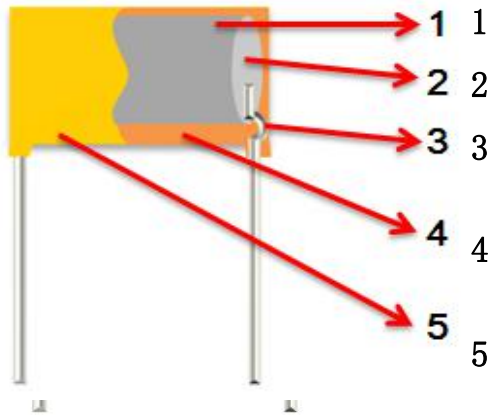
They have excellent features of self-healing and good flame retardant according to UL 94-V0

## 3. 产品结构和关键材料

### Construction and main materials of products

Metallized film construction

The internal structure



NO	关键材料 Main Materials	材料规格 Specification	备注 Remark
1	金属化聚丙烯薄膜 Metallized polypropylene Film	MPPZAH or MPPA (5~12 μm)	...
2	锌锡层 Zn, Sn line	锌+锌锡合金 Zn or Zn and Sn alloy	...
3	导线 Terminal	镀锡铜包钢线 (Φ0.6 or 0.8mm) CP (tinned copper wire leads)	允许偏差 ±0.05mm
4	封装材料 Sealed Material	环氧树脂 Epoxy resin	UL94-V0
5	塑胶外壳 Plastic Case	PBT	UL94-V0

注：以上材料均符合环保要求

Note: All of the Materials are in compliance with the requirements of ROHS AND REACH.

## 4. 典型应用

### Type application

本产品广泛应用于抑制电磁干扰和电源连接电路中，尤其是适用于使用电容器失效后不会导致触电的危险场合。

The Products Would widely used for the Interference suppressors and across-the-line capacitor applications. Suitable for used in situations where failure of the capacitor will not lead to danger of electric shock.

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## 5. 特点

### Features

- 5.1 无感结构 Non-induction construction
- 5.2 优良的耐湿性 High moisture-resistance
- 5.3 自愈性 Self-healing property
- 5.4 阻燃性(符合UL 94V-0) Flame retardant type (compliance with UL 94V-0)
- 5.5 非常小的损耗 Very small loss
- 5.6 优秀的频率和温度特性 Excellent frequency and temperature characteristics
- 5.7 高绝缘阻值 High insulation resistance

## 6. 电气特性

### Electrical specifications

如无其他说明, 电气特性请参考IEC 60384-14:2005

Unless otherwise specified, electric characteristics shall refer to IEC 60384-14:2005

项目 Item	特性要求 Characteristic requirement		测试方法及条件 Test method&Condition			
气候类别 Climatic Category	40/110/56					
阻燃等级 Passive Flammability Class	B					
工作温度 Operating Temperature	-40°C ~ +110°C					
容量范围 Capacitance Range	0.0022 μF ~ 2.2 μF					
容量偏差 Capacitance Tolerance	±10% (K), ±20% (M)		1KHz, 1.0Vrms, 25°C			
额定电压 Rated Voltage	250VAC/275VAC/300VAC/305VAC/310VAC					
损耗角正切Dissipation Factor	1KHz < 0.10%		1KHz, 1.0Vrms, 25°C			
绝缘阻值 Insulation Resistance	C ≤ 0.33 μF	C > 0.33 μF	UR > 100V, 100VDC,			
	IR ≥ 15000MΩ	IR ≥ 6000s	60S, 20°C			
端子间电压 Withstand voltage Between Terminals	应无永久性击穿或飞弧 No permanent breakdown or flashover		4.3UR (d.c) 60s 25°C Cut off Current 10mA,			
端子与壳体间耐压 Withstand voltage Between Terminals and Case	应无永久性击穿或飞弧 No permanent breakdown or flashover		2UR+1500V (a.c) 60s 25°C ≥ 2000V (a.c) 25°C			
最大脉冲上升时间 MAX. Pulse rise time (dv/dt)	Lead spacing					
	7.5mm	10mm	15mm	22.5mm	27.5mm	37.5mm
	600V/μs	500V/μs	400V/μs	200V/μs	150V/μs	100V/μs

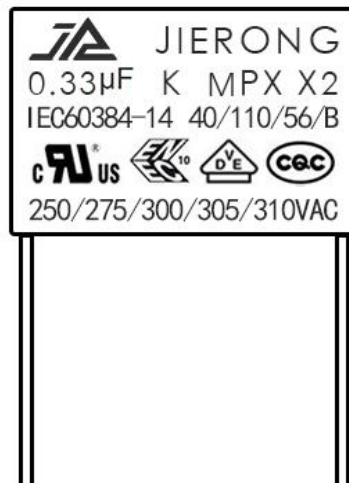
注: 额定电压定义: 在工作温度范围内, 电容持续运行的可承受电压。请不要将电容置于超过额定温度环境中长期工作, 会降低使用寿命或发生电击危险。

Note: Rated voltage is defined the voltage which shall be capable of applying to capacitors continuously in the operating temperature range. Please do not place the capacitors in more than the rated operating temperature environment in the long-term work. It can reduce the capacitor's life or cause an electric shock hazard.

## 7. 印字

### Marking





- (1) 商标 logo:  JIERONG
- (2) 静电容量 Capacitance: (334K , 0.33 μF)
- (3) 允许误差 Capacitance Tolerance: (K) ±10%的误差值
- (4) 额定电压 Rated Voltage: 250/275/300/305/310VAC
- (5) 产品类别 Product Class: X2
- (6) 产品材质 Product type: MPX
- (7) 气候类别 Climatic Category: 40/110/56
- (8) 阻燃等级 Passive Flammability Class: B
- (9) 中国安规认证标志 China approvals mark: 
- (10) 德国安规认证标志 Germany approvals mark: 
- (11) 欧盟安规认证标志 ENEC approvals mark: 
- (12) 美国安规认证标志 American approvals mark: 
- (13) 产品认证标准 Approval standard: IEC60384-14:



图例

## 8. 认证

### Approvals

序号 NO	国家 COUNTRY	认证标准 Approval standard			额定电压 RATED VOLTAGE
1	中国		CQC	IEC60384-14: 2005 中国质量认证中心自愿性认证	275~310VAC
2	德国		VDE	IEC60384-14: 2013 德国电子电气与信息技术工程师协	
3	欧盟		ENEC	IEC60384-14: 2013 欧洲标准电器认证	
4	美国/加拿大		UL	IEC60384-14: 2005 美国保险人实验室和CSA加拿大联合认证标志	

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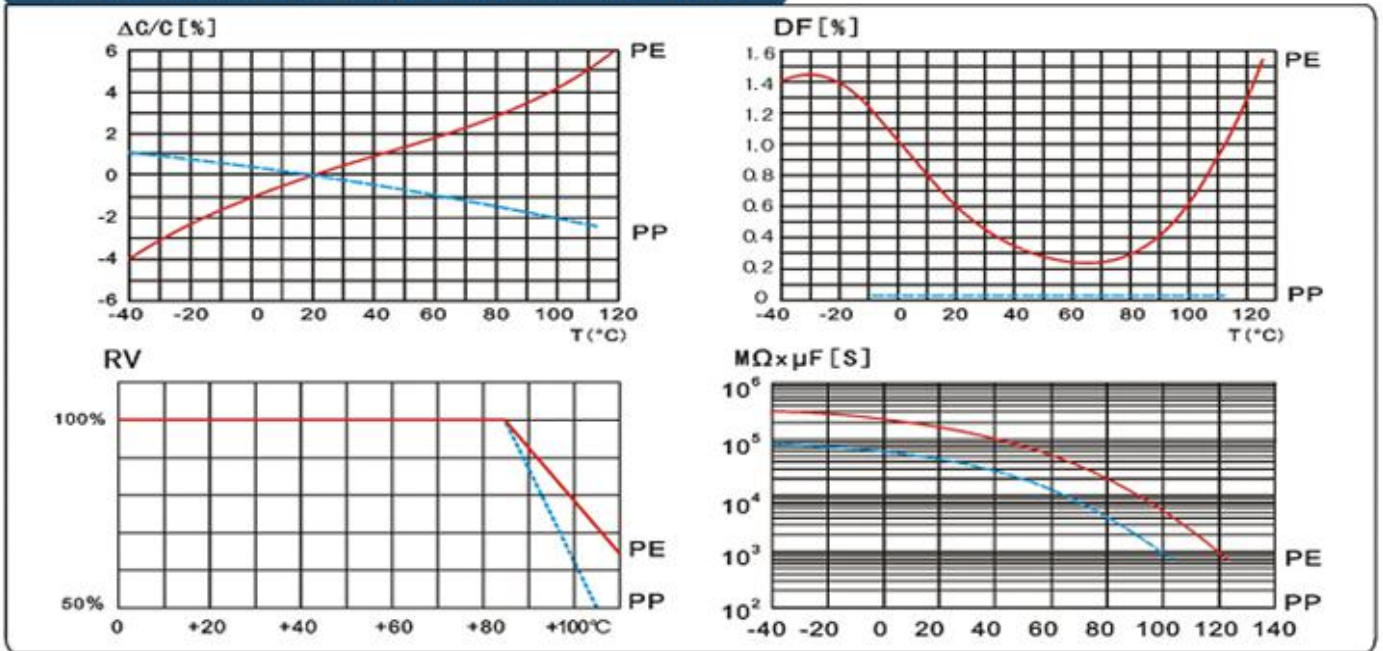
## 9. 温度特性

### TEMPERATURE CHARACTERISTICS

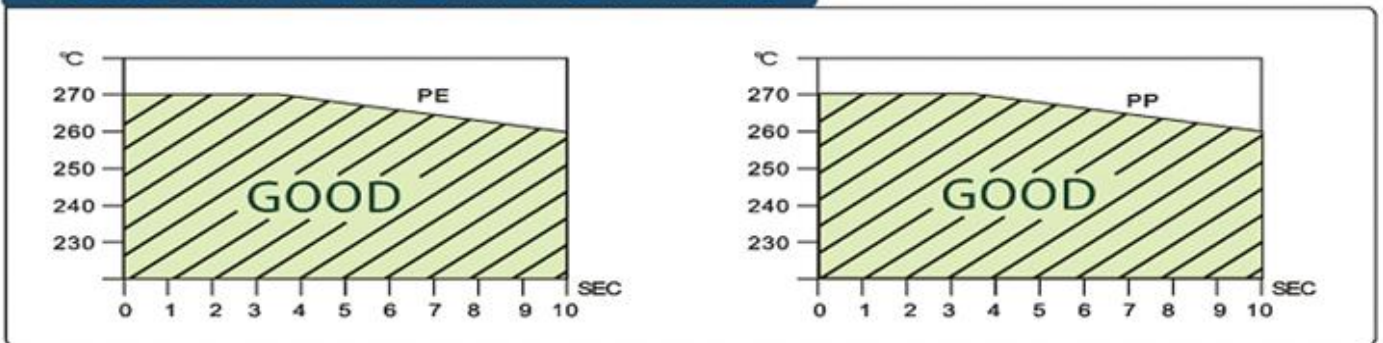
# CHARACTERISTICS

## TYPICAL GRAPHS

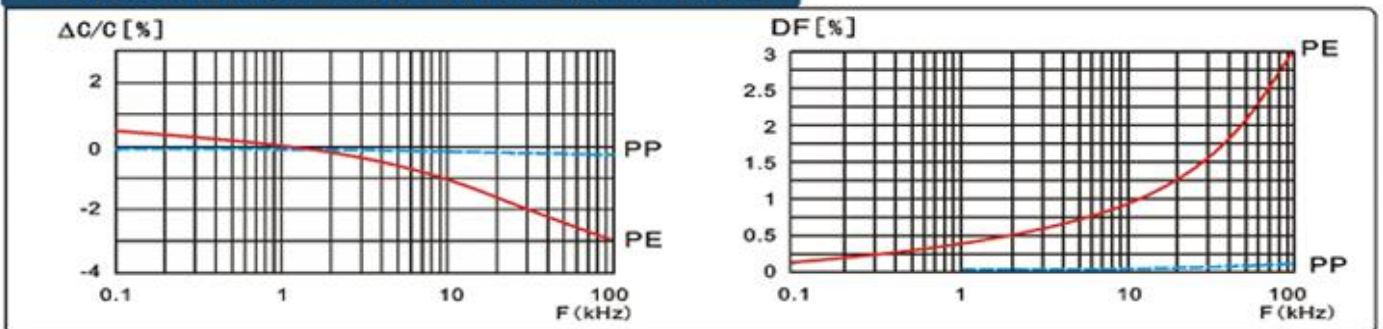
### TEMPERATURE CHARACTERISTICS



### SOLDERING TEMPERATURE VS. TIME



### FREQUENCY CHARACTERISTICS



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## 10. 使用指导

Guide in useage

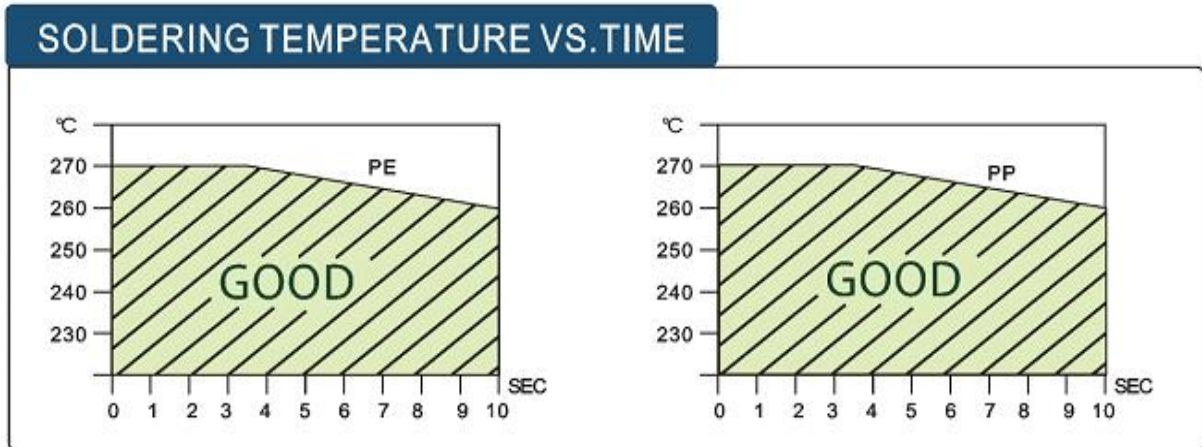
### 10.1 焊锡

Soldering

当焊接电容器时，焊锡热会通过引线端子和封装层传递到电容素子，因此必须注意高温和长时间焊接引起的电容电气特性衰减或损坏。请确认焊锡在以下温度范围内。

When soldering a capacitor, heat in soldering is conducted to the element of the capacitor from wire lead and an enclosure, and hence it should be noted that soldering under high temperature and long period may cause deterioration of characteristic or breakdown of capacitors.

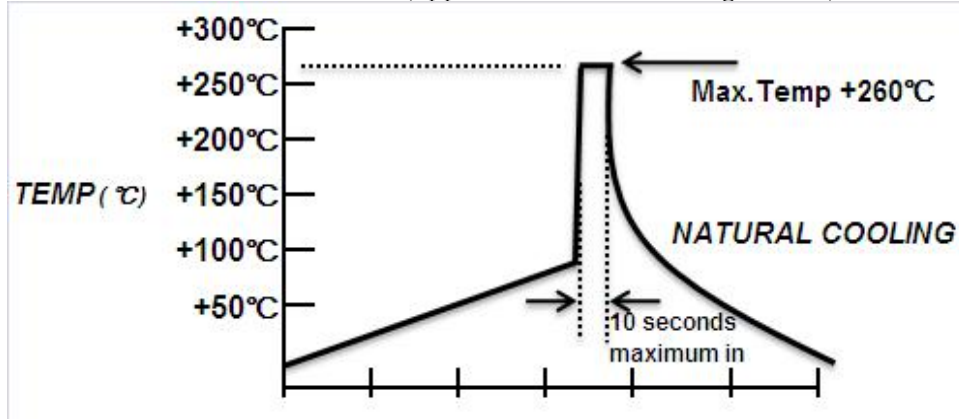
Be sure to solder within the following temperature condition range.



### 10.2 波峰焊

FLOW / WAVE SOLDERING

PRODUCTS: FILM CAPACITORS (Application of Through-Hole)



### 10.3 烙铁焊接

soldering iron

当使用烙铁焊接时，烙铁尖端温度不得超过350°C，焊接时间不超过5秒

When using soldering iron, iron tip temperature less than 350°C, Soldering time(sec.) within 5 seconds.



## 11. 环保要求

### Environment requirement

11.1 符合RoHS要求 Compliance with the requirement of RoHS.

11.2 符合REACH要求 Compliance with the requirement of REACH.

11.3 符合无卤（如要求） Without Halogen(as required).

11.4 附件2为第三方测试的RoHS和REACH报告

Please see the attachment 2 for the test reports of the RoHS and Reach by a third party .

## 12. 参考标准

### Reference standards

GB-T2693-2001 (IDT IEC 60384-1-2008) 电子设备用固定电容器 第1部分 总规范

GB-T14472-1988 电子设备用固定电容器 第16部分 分规范 金属化聚丙烯膜介质直流固定电容器

IEC-60384-14-2005 电子设备用固定电容器 第16部分 分规范 金属化聚丙烯膜介质直流固定电容器

GB-T 2828.1-2003 计数抽样检验程序 第1部分 按接收质量限(AQL)检索逐批检验抽样计划

GB-T2693-2001 (IDT IEC 60384-1-2008) Fixed capacitors for use in electronic equipment - Part 1: Generic specification

GB-T14472-1988 Fixed capacitors for use in electronic equipment - Part 16:Sectional specification: Fixed metallized polypropylene film D.C. capacitor

IEC-60384-14-2005 Fixed capacitors for use in electronic equipment - Part 16:Sectional specification: Fixed metallized polypropylene film D.C. capacitor

GB-T 2828.1-2003 Sampling procedures for inspection by attributes—Part 1:

Sampling schemes indexed by acceptance quality limit (AQL)for lot-by-lot inspection (ISO 2859-1:1999, IDT)

## 13. 包装

### Packing

13.1 塑料袋最小包装，数量100、200、300、500、1000PCS

Plastic bag is the minimum packing.the quantity are100、200、300、500、1000PCS.

袋内放置产品合格环保标识标签，包括料号，规格，数量，LOT批号，生产日期等

The label of the RoHS include the product name、specification、quantity、lot No、manufacture date etc.

13.2 N袋小包装装一内箱

One inner box have N PCS bags

内箱尺寸为（长×宽×高）=23×30×30cm

Inner box size (L×W×H) =23×30×30cm

有环保标识

Marking for RoHS AND SVHC

13.3 两内箱装一外箱

One outer box have two Inner boxes

外箱尺寸为（长×宽×高）=48×32.2×33cm

Outer box size (L×W×H) =48×32.2×33cm

有环保标识

Marking for RoHS AND SVHC

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## 14. 存储条件

### Storage conditions

14.1 请注意，长时间产品暴露在空气中会导致引线氧化，焊接性能衰减。

It should be noted that the solderability of the terminals may be deteriorated when stored barely in an atmosphere for a long periods

14.2 不能放置在高温高湿环境中，请遵循以下存储条件（原包装下保存）

It shouldn't be located in particularly high temperature and high humidity, it must submit to the following conditions(keeping in the original package)

温度 Temperature: 35°C MAX

相对湿度 Relative humidity: 60% MAX

14.3 存储时间：最长12个月（以包装袋上标注的生产日期为准）

Storage period: 12 months max

(from the manufacturing date marked on the label in package bag)

## 15. 可靠性实验

### Reliability test

15.1 测试条件：除非另有规定，所有试验和测量均应在GB2421—81第4.3条（IEC68-1第5.3条）中规定的试验用标准大气条件下进行，条件如下：

Test condition: Unless otherwise specified, all tests and measurements shall be made under standard atmospheric conditions for testing as given in GB2421-81 NO. 4.3 (IEC68-1 NO. 5.3), AS follows

温度 Temperature: 15°C—35°C

相对湿度 Relative humidity: 25%—75%

气压 Air pressure: 86—106Kpa (860—1060mbra)

15.2 如对测试结果有任何疑问，则按一下限制测试：

If there may be any doubt on the results, measurements shall be made within the following limits.

环境温度 Ambient temperature: 25±2°C

环境湿度 Relative humidity: 50~70%

15.3 电性参数参考

IEC 60384-1:2008 ,

IEC 60384-14:2005,

IEC 60068-2-2;

IEC 60068-2-21

Electric characteristics shall refer to IEC 60384-1:2008 ,

IEC 60384-14:2005,

IEC 60068-2-2;

IEC 60068-2-21

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## 15.4 电性参数

### Electric characteristics

项目 Item	特性要求 Characteristic requirement		测试方法及条件 Test method&Condition			
容量范围 Capacitance Range	0.0022 $\mu$ F ~ 2.2 $\mu$ F		IEC60384-14 4.2.2 IEC60384-14.7			
容量偏差 Capacitance Tolerance	$\pm 10\%$ (K) $\pm 20\%$ (M)		1KHz, 1.0Vrms, 25°C			
额定电压 Rated Voltage	250VAC/275VAC/300VAC/305VAC/310VAC					
损耗角正切 Dissipation Factor	1KHz < 0.10%		1KHz, 1.0Vrms, 25°C			
绝缘阻值 Insulation Resistance	$C \leq 0.33 \mu$ F	$C > 0.33 \mu$ F	$U_R > 100$ VDC, 60s, 25°C			
	$IR \geq 15000$ M $\Omega$	$IR \geq 6000$ s				
端子间电压 Withstand voltage Between Terminals	应无永久性击穿或飞弧 No permanent breakdown or flashover		4.3U <sub>R</sub> (d.c) 60s Cut off Current 10mA, ARC=OFF, Voltage raising time 5~10s,			
端子与壳体间耐压 Withstand voltage Between Terminals and Case	应无永久性击穿或飞弧 No permanent breakdown or flashover		2U <sub>R</sub> +1500V(a.c) 60s $\geq 2000$ V(a.c)			
最大脉冲上升时间 MAX. Pulse rise time (dv/dt)	Lead spacing					
	7.5mm	10mm	15mm	22.5mm	27.5mm	37.5mm
	600V/ $\mu$ s	500V/ $\mu$ s	400V/ $\mu$ s	200V/ $\mu$ s	150V/ $\mu$ s	100V/ $\mu$ s

## 15.5 寿命实验

### Life Test

NO.	项目 Item	特性要求 Characteristic requirement	测试方法及条件 Test method&Condition		
1	端子强度 Terminal Strength	拉伸强度 Pull Strength  无可见机械损伤 There shall be no visible mechanical damage	线径mm	荷重	时间
			wire diameter	Load	Time
			$\leq 0.5$	5N	10S
			$0.5 < d \leq 0.8$	10N	10S
			$0.8 < d \leq 1.25$	20N	10S
			IEC60384-14 C4.3 IEC60384-1 C4.13 IEC60068 2-21 Test Ua1		
	端子强度 Terminal Strength	弯曲强度 Bending Strength  无可见机械损伤 There shall be no visible mechanical damage	线径mm	荷重	次数
			wire diameter	Load	Times
			$\leq 0.5$	5N	90°C × 4
			$0.5 < d \leq 0.8$	5N	90°C × 4
			$0.8 < d \leq 1.25$	5N	90°C × 4
			IEC60384-14 C4.3 IEC60384-1 C4.13 IEC60068 2-21 Test Ua1		

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## 15.5 寿命实验 Life Test

NO.	项目 Item	特性要求 Characteristic requirement	测试方法及条件 Test method&Condition
2	可焊性 Solderability	端子引线周围至少95%的面积均匀附锡,且本体无破裂等损坏现象 锡料成分Sn 97.5%+ Ag 2%+Cu 0.5% At least 95% of the Circumference of the Lead wire.Around load surface dipped into with new soler, the body be no visible damage.	焊锡温度: 235±5℃ Solder temp 浸渍时间: 2.0±0.5s Immersion time IEC60384-14 C4.5 IEC60384-1 C4.15 IEC60068-2-20 Test Ta
3	耐焊接热 Resistance to Soldering heat	外观 Appearance	无可见损伤,标志清晰 No visible damage, The marking shall be legible
		容量变化 Capacitance Variation	$\Delta C/C \leq 5\%$
		损耗 Dissipation Factor	$\Delta \text{tg } \delta < 0.0080 \text{ } C_R \leq 1.0 \mu\text{F}$ $\Delta \text{tg } \delta < 0.0050 \text{ } C_R > 1.0 \mu\text{F}$ at 1KHz
		耐电压 Withstand Voltage	4.3U <sub>R</sub> (d.c) 60s耐电压后无击穿或飞弧 No permanent breakdown or flashover
	绝缘电阻 Insulation Resistance	$\Delta R/R \leq 50\%$	焊锡温度: 260±5℃ Solder temp 浸渍时间: 10±1s Immersion time 恢复时间1-2小时 Then recovery at ordinary condition 1~2hours IEC60384-14 C4.4 IEC60384-1 C4.14 IEC60068-2-20 Test Ta
4	耐久性 Endurance	外观 Appearance	无可见损伤,标志清晰 No visible damage, The marking shall be legible
		容量变化 Capacitance Variation	$\Delta C/C \leq 5\%$
		损耗 Dissipation Factor	$\Delta \text{tg } \delta < 0.0080 \text{ } C_R \leq 1.0 \mu\text{F}$ $\Delta \text{tg } \delta < 0.0050 \text{ } C_R > 1.0 \mu\text{F}$ at 1KHz
		耐电压 Withstand Voltage	4.3 U <sub>R</sub> (d.c) 60s耐电压后无击穿或飞弧 No permanent breakdown or flashover
	绝缘电阻 Insulation Resistance	$\Delta R/R \leq 50\%$	温度Temp: 110±3℃ 持续时间: 1000+48H Duration: 施加电压voltage: 1.25 U <sub>R</sub> (a.c.)50Hz 每小时施加1000vac 0.1s once every hour increase to 1000vac for 恢复时间至少16小时 Then recovery at ordinary condition at least 16 hours IEC60384-14 C4.12 IEC60384-1 C4.23 IEC60068-2-2
5	稳态湿热 Damp heat, steady state	外观 Appearance	无可见损伤,标志清晰 No visible damage, The marking shall be legible
		容量变化 Capacitance Variation	$\Delta C/C \leq 5\%$
		损耗 Dissipation Factor	$\Delta \text{tg } \delta < 0.0080 \text{ } C_R \leq 1.0 \mu\text{F}$ $\Delta \text{tg } \delta < 0.0050 \text{ } C_R > 1.0 \mu\text{F}$ at 1KHz
		耐电压 Withstand Voltage	4.3U <sub>R</sub> (d.c) 60s耐电压后无击穿或飞弧 No permanent breakdown or flashover
	绝缘电阻 Insulation Resistance	$\Delta R/R \leq 50\%$	温度Temp: 40±2℃ 湿度: 90-95RH Humidity 持续时间: 56 day Duration 电容不施加电压 恢复时间1-2小时 Then recovery at ordinary condition 1-2 hours IEC60384-14 C4.11 IEC60384-1 C4.22 IEC60068-2-78 Test Cab

# X2 抑制电源电磁干扰用电容器

**JIERONG**

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V4.0

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## 15.5 寿命实验 Life Test

NO.	项目 Item	特性要求 Characteristic requirement	测试方法及条件 Test method&Condition
6	干热 Dry heat	外观 Appearance	无可见损伤, 标志清晰 No visible damage, The marking shall be legible.
		容量变化 Capacitance Variation	$\Delta C/C \leq 5\%$
		损耗 Dissipation Factor	$\Delta \text{tg} \delta < 0.0080 \ C_R \leq 1.0 \ \mu\text{F}$ $\Delta \text{tg} \delta < 0.0050 \ C_R > 1.0 \ \mu\text{F}$ at 1KHz
		耐电压 Withstand Voltage	$4.3 U_R$ (d.c) 60s耐电压后无击穿或飞弧 No permanent breakdown or flashover
		绝缘电阻 Insulation Resistance	$\Delta R/R \leq 50\%$
7	寒冷 Cold	外观 Appearance	无可见损伤, 标志清晰 No visible damage, The marking shall be legible.
		容量变化 Capacitance Variation	$\Delta C/C \leq 5\%$
		损耗 Dissipation Factor	$\Delta \text{tg} \delta < 0.0080 \ C_R \leq 1.0 \ \mu\text{F}$ $\Delta \text{tg} \delta < 0.0050 \ C_R > 1.0 \ \mu\text{F}$ at 1KHz
		耐电压 Withstand Voltage	$4.3 U_R$ (d.c) 60s耐电压后无击穿或飞弧 No permanent breakdown or flashover
		绝缘电阻 Insulation Resistance	$\Delta R/R \leq 50\%$
8	浪涌 Surge	外观 Appearance	无可见损伤, 标志清晰 No visible damage, The marking shall be legible.
		容量变化 Capacitance Variation	$\Delta C/C \leq 5\%$
		损耗 Dissipation Factor	$\Delta \text{tg} \delta < 0.0080 \ C_R \leq 1.0 \ \mu\text{F}$ $\Delta \text{tg} \delta < 0.0050 \ C_R > 1.0 \ \mu\text{F}$ at 1KHz
		耐电压 Withstand Voltage	$4.3 U_R$ (d.c) 60s耐电压后无击穿或飞弧 No permanent breakdown or flashover
		绝缘电阻 Insulation Resistance	$\Delta R/R \leq 50\%$

温度Temp:  $105 \pm 2^\circ\text{C}$

持续时间: 16H  
Duration

恢复时间不低于4小时  
Then recovery at ordinary condition at least 4 hours

IEC60384-14 C4.11.2  
IEC60384-1 C4.21.2

IEC60068-2-2, test Bb

温度Temp:  $-40 \pm 2^\circ\text{C}$

持续时间: 4H  
Duration

恢复时间不低于4小时  
Then recovery at ordinary condition at least 4 hours

IEC60384-14 C4.11.4  
IEC60384-1 C4.21.4

IEC60068-2-1, test Ab

When  $C_R \leq 1.0 \ \mu\text{F}$   
UP = 2.5kv

When  $C_R > 1.0 \ \mu\text{F}$   
UP = 2.5kv/ $\sqrt{C}$   
time:10s

Cycle times:24次  
前三次脉冲没有发生自愈性击穿, 则可停止, 为合格

IEC60384-14 C4.13

IEC60060-1

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NO.	项目 Item	特性要求 Characteristic requirement	测试方法及条件 Test method&Condition
9	充放电 Charge and discharge	外观 Appearance	无可见损伤, 标志清晰 No visible damage, The marking shall be legible
		容量变化 Capacitance Variation	$\Delta C/C \leq \pm 10\%$
		损耗 Dissipation Factor	$\Delta \text{tg} \delta < 0.0080$ $C_R \leq 1.0 \mu\text{F}$ $\Delta \text{tg} \delta < 0.0050$ $C_R > 1.0 \mu\text{F}$ at 1KHz
		耐电压 Withstand Voltage	$4.3 U_R$ (d.c) 60s耐电压后无击穿或飞弧 No permanent breakdown or flashover
		绝缘电阻 Insulation Resistance	$\Delta R/R \leq 50\%$
10	振动 Vibration	外观 Appearance	无可见损伤, 标志清晰 No visible damage, The marking shall be legible
11	碰撞或冲击 Bump	外观 Appearance	无可见损伤, 标志清晰 No visible damage, The marking shall be legible
12	阻燃试验 Passive flammability test	火焰等级: B Category of flammability 火焰时间: 10s Flame exposure time 最大燃烧时间: 10s Maximum burning time	次数 number of bumps: 1000 or 4000 加速度 Acceleration: 400 m/s <sup>2</sup> Pulse duration: 6 ms IEC60384-14 C4.8 IEC60384-1 C4.18 IEC 60068-2-29, test Eb,
13	自燃试验 Active flammability test	缠绕在电容上的薄纱布应不会燃烧, 电测量不要求。 The cheesecloth around the capacitor shall not burn with a flame. No electrical measurements are required.	施加电压为2.5KV的20个脉冲电压, 每个电压5秒 20 surge pulses at 2.5 KV (pulse every 5s) IEC60384-14 C4.18