

承认书

APPROVAL SHEET

客户 立創
CUSTOMER

客户料号
CUSTOMER P/N

规格描述
DESCRIPTION 250V/0.47UF/K/F10/直腳/L22/13*16*8/ZNR/灰殼

产品编码
PART NUMBER CF72E474KE1H130HB100

日期
DATE 2024-10-17

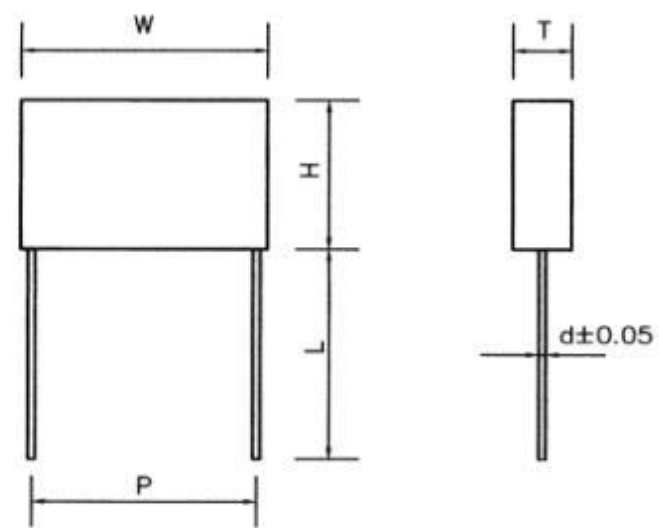
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批 准 APPROVED BY	审 核 CHECK BY	制订 FORMULATE BY	批 准 APPROVED BY	审 核 CHECK BY
彭少雄	吳成愛 样品承认章	胡明康		

东莞市德尔创电子有限公司
DONGGUAN DERSONIC ELECTRONIC CO., LTD.

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1. 规格尺寸

Specification & Dimensions



料号 P/N	品名规格 Specification	外形尺寸（单位：mm） Dimensions and Drawings					
		W ± 0.5	H ± 0.5	T ± 0.5	Lmin	d ± 0.05	P ± 0.8
CF72E474KE1H130HB100							
250V/0.47UF/K/F10/直脚/L22/13*16*8/ZNR/灰壳		13.0	16.0	8.0	20.0	0.6	10.0
以下空白							

2. 产品介绍

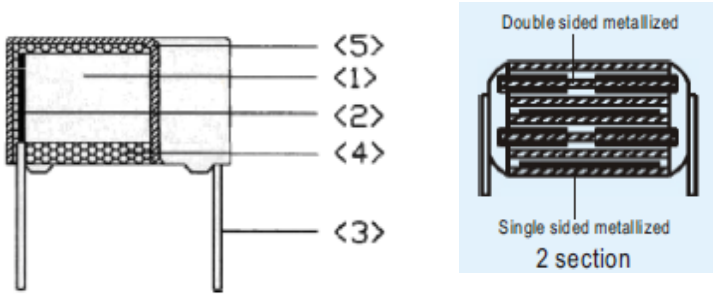
Products Introduction

MSB电容是由金属化聚丙烯串式薄膜，采用无感结构卷绕而成，引线采用镀锡铜线，外部使用阻燃塑胶外壳及阻燃环氧封装而成。具有良好的自愈功能和优良的阻燃性，符合UL94-V0标准。

PHB are winded with metallized polypropylene series film dielectric and double side metallized film Non-inductive construction,tinned copper leads,and encapsulated in plastic case with flame retardant epoxy resin sealed.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



N0	关键材料 Main Materials	材料规格 Specification	备注 Remark
1	金属化聚丙烯薄膜和双面聚酯膜 Metallized polypropylene and double side Film	MPPA (4~12um)	...
2	锌锡层 Zn,Sn line	锌或锌锡合金 Zn or Zn and Sn alloy	...
3	导线 Terminal	镀锡铜线 (Φ 0. 5, 0. 6 or 0. 8mm) CU(tinned copper leads)	镀锡层厚度7um以上
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

本产品用于电子灯具，汽车灯，镇流器，吸收突波，高脉冲，高电压，大电流，振荡电流场合。

The Products are suitable for lighting,car headlamp and ballast,High pulse,High voltage, , high current and oscillator circuits ect.

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 非常小的损耗和温升 Very low loss and small inherent temperature rise.
- 5.6 优秀的频率和温度特性 Excellent frequency and temperature characteristics
- 5.7 适合高频高电流脉冲应用 Suitable where applies high frequency and high current puls

6. 电气特性

Electrical specifications

如无其他说明，电气特性请参考IEC 60384-16

Unless otherwise specified,electric characteristics shall refer to IEC 60384-16

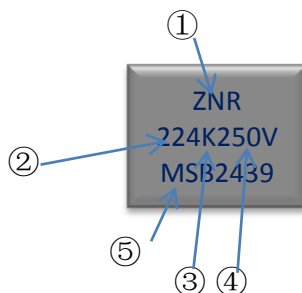
项目 Item	特性要求 Characteristic requirement						测试方法及条件 Test method&Condition	
气候类别 Climatic Category	40/110							
阻燃等级 Passive Flammability Class	B							
工作温度 Operating Temperature	-40℃ ~ +110℃							
容量范围 Capacitance Range	0. 001uF~2. 2uF							
容量偏差 Capacitance Tolerance	± 5% (J) , ± 10% (K) , ± 20% (M)						1KHz , 1. 0Vrms , 20℃	
额定电压 Rated Voltage	250V/450V/630V/800V/1000V/1250V/1600V/2000VDC							
损耗角正切 Dissipation Factor		C≤0.47μ F	0.47μ F<C≤1.0μ F		C>1.0μ F		1KHz , 1. 0Vrms , 20℃	
	1KHZ	0.10%	0.10%		0.10%			
	10KHZ	0.20%	0.40%		0.80%			
	100KHZ	0.60%						
绝缘阻值 Insulation Resistance		C≤0.33μ F		C≥0.33μ F			Ur > 100V, 100VDC, 60S, 20℃	
		IR ≥ 50000MΩ		IR ≥ 10000s				
				or ≥ 10000MΩ • Uf				
端子间电压 Withstand voltage Between Terminals	应无永久性击穿或飞弧 No permanent breakdown or flashover						1.6Ur(d.c) 60s Cut off Current 10mA , ARC=OFF, Voltage raising time 5 ~ 10s, pulse rise ≤150v/us	
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 ≥ 2000V(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/us	500V/us	400V/us	200V/us	150V/us	100V/us	

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 reduces the capacitor's life or cause an electric shock hazard.

7. 印字 Marking



(1) 商标 logo: ZNR

(2) 静电容量 Capacitance: 224

(3) 允许误差 Capacitance Tolerance: +10% (K)

(4) 额定电压 Rated Voltage: 250V/450V/ 630V/800V/1000V/1250V/1600V/2000VDC

(5) 产品类别 Product Class: MSB

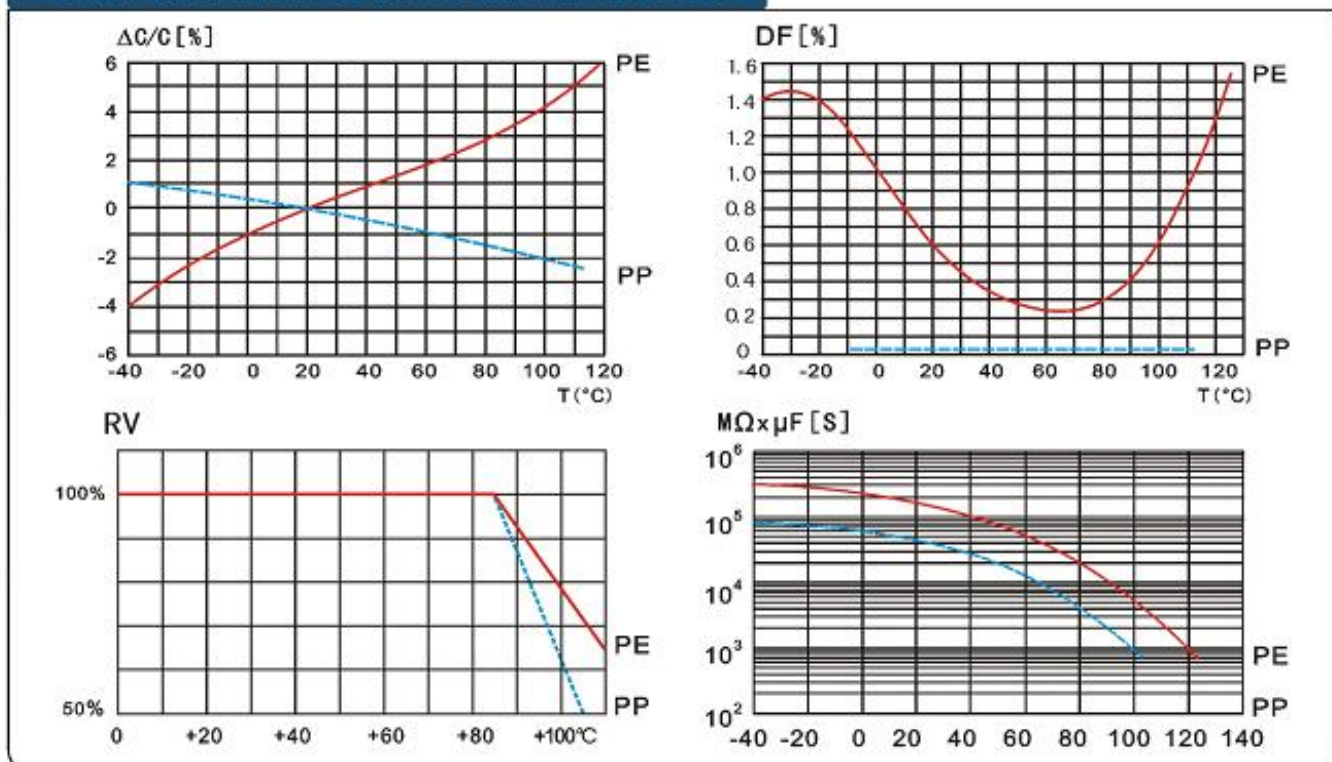
8. 温度特性

TEMPERATURE CHARACTERISTICS

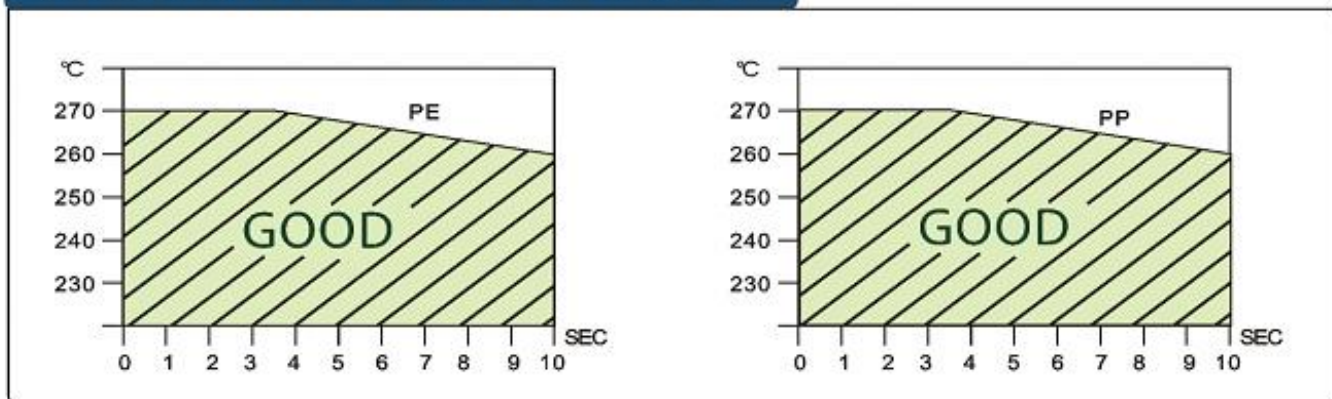
CHARACTERISTICS

TYPICAL GRAPHS

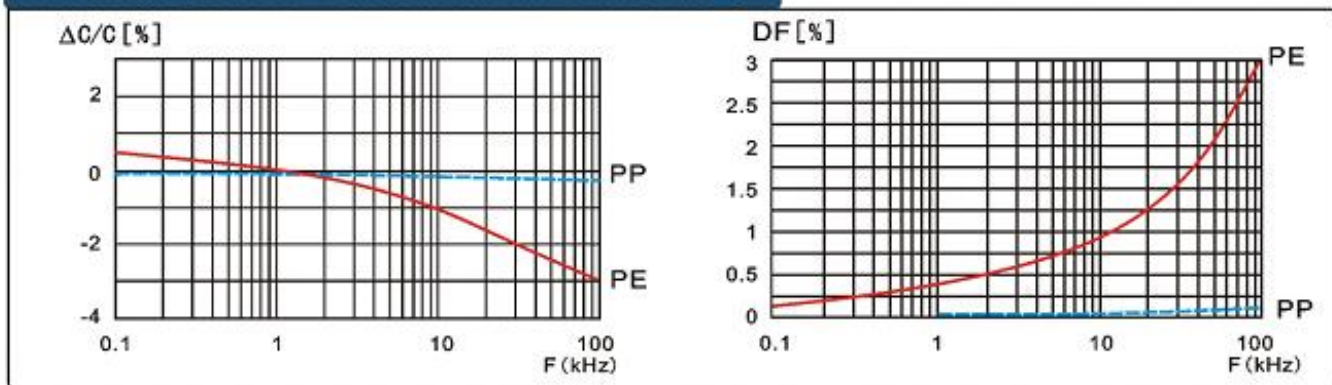
TEMPERATURE CHARACTERISTICS



SOLDERING TEMPERATURE VS. TIME



FREQUENCY CHARACTERISTICS



9. 使用指导

Guide in useage

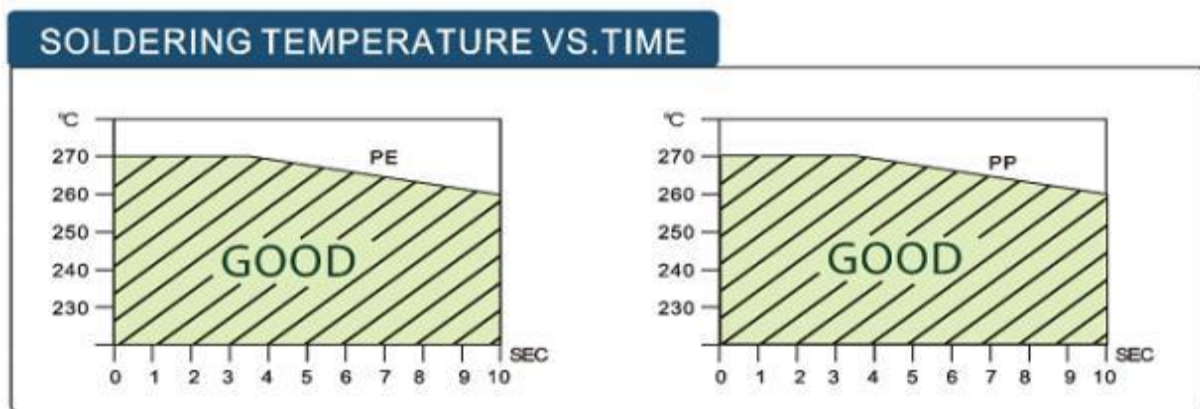
9.1 焊锡

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外包封层损坏。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 Coating breakdown of capacitors.

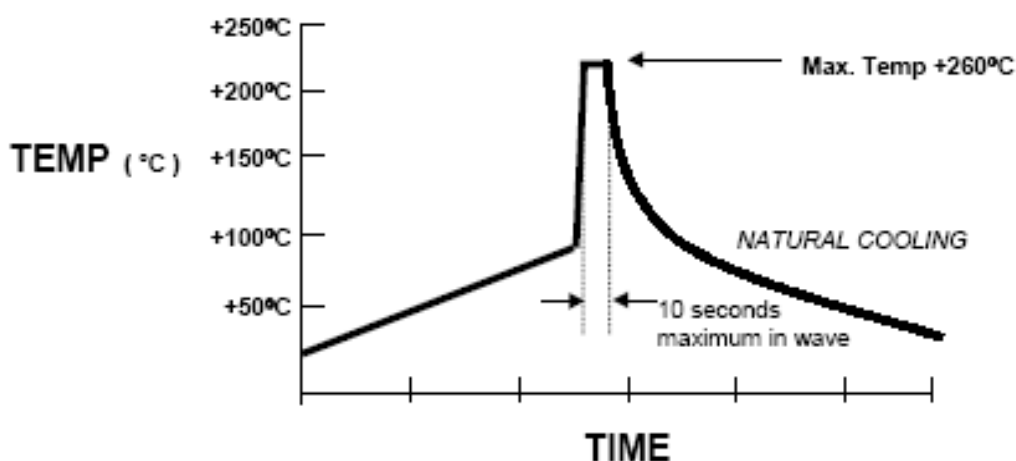
Be sure to solder within the following temperature condition range.



9.2 流焊/波峰焊

FLOW / WAVE SOLDERING

PRODUCTS: FILM CAPACITORS (Application of Through-Hole)



9.3 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.

10. 环保要求

Environment requirement

- 10.1 符合ROHS要求 Compliance with the requirement of ROHS.
- 10.2 符合REACH要求 Compliance with the requirement of REACH.
- 10.3 符合无卤（如要求） Without Halogen(as required).

11. 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

GB10190 电子设备用固定电容器

IEC-60384-16 电子设备用固定电容器

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-10190 Fixed capacitors for use in electronic equipment

IEC-60384-16 Fixed capacitors for use in electronic equipment

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)

12. 存储条件

Storage conditions

12.1 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

12.2 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℃ 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: Losse: 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℃ - 35℃

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: 20±2℃

环境湿度 Relative humidity: 50~70%

15.3 电性参数参考 IEC 60384-1:2008 , IEC 60384-16, IEC 60068-2-2; IEC 60068-2-21

Electric characteristics shall refer to IEC 60384-1:2008 , IEC 60384-16, IEC 60068-2-2; IEC 60068-2-21

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	0.001uF ~ 2.2uF						IEC60384-16 4.2.2 IEC60384-1 4.7	
容量偏差 Capacitance Tolerance	± 5% (J) , ± 10% (K) , ± 20% (M)						1KHz , 1.0Vrms , 20℃	
额定电压 Rated Voltage	250V/630V/800V/1000V/1200V/1250V/1600V/20							
损耗角正切 Dissipation Factor		C≤0.47μ F	0.47μ F<C≤1.0μ F	C>1.0μ F	1KHz , 1.0Vrms , 20℃			
	1KHZ	0.10%	0.10%	0.10%				
	10KHZ	0.20%	0.40%	0.80%				
	100KHZ	0.60%						
绝缘阻值 Insulation Resistance		C≤0.33μ F	C≥0.33μ F		Ur > 100V, 100VDC, 60S, 20℃			
		IR ≥ 50000MΩ	IR ≥ 10000s					
		or ≥ 10000MΩ • Uf						
端子间电压 Withstand voltage Between Terminals	应无永久性击穿或飞弧 No permanent breakdown or flashover						1.6Ur(d.c) 60s Cut off Current 10mA , ARC=OFF, Voltage raising time 5 ~ 10s, pulse rise ≤ 150v/us	
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 ≥ 2000V(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/us	500V/us	400V/us	200V/us	150V/us		100V/us

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
			≤0.5	5N	10S
			0.5<d≤0.8	10N	10S
			0.8<d≤1.25	20N	10S
			IEC60384-16 C4.3 IEC60384-1 C4.13 IEC60068 2-21 Test Ua1		
	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	Time s
			≤0.5	5N	90℃×4
			0.5<d≤0.8	5N	90℃×4
			0.8<d≤1.25	5N	90℃×4
			IEC60384-16 C4.3 IEC60384-1 C4.13 IEC60068 2-21 Test Ua1		
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	焊锡温度：235±5℃ Solder temp		
		At least 95% of the Circumference of the Lead wire.Around lead surface dipped into with new solder, the body be no visible damage.	浸渍时间：2.0±0.5S Immersion time IEC60384-16 C4.5 IEC60384-1 C4.15 IEC60068-2-20 Test Ta		
3	耐焊接热 Resistance to Soldering heat	外观 Appearance	焊锡温度：260±5℃ Solder temp		
		容量变化 Capacitance Variation	浸渍时间：10±1S Immersion time		
		损耗 Dissipation Factor	恢复时间1-2小时 Then recovery at ordinary condition		
		耐电压 Withstand Voltage	1~2hours IEC60384-16 C4.5		
		绝缘电阻 Insulation Resistance	IEC60384-1 C4.14 IEC60068-2-20 Test Ta		

NO.	项目 Item	特性要求 Characteristic requirement	测试方法及条件 Test method&Condition
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	$\Delta C/C \leq \pm 10\%$
		损耗 Dissipation Factor	$\Delta \tan \delta < 0.0080$ $CR \leq 1.0 \mu F$ $\Delta \tan \delta < 0.0050$ $CR > 1.0 \mu F$ at 1KHZ
		耐电压 Withstand Voltage	1.6 UR (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: $110 \pm 3^\circ C$ 持续时间: Duration 1000+48h 施加电压voltage: 1.25 Ur(a.c.) 50hz 每小时施加1000vac 0.1s once every hour increase to 1000vac for 0.1s 恢复时间至少16小时 Then recovery at ordinary condition at least 16 hours IEC60384-16 C4.14 IEC60384-1 C4.23 IEC60068-2-2
5	稳态湿热 Damp heat, steady	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	$\Delta C/C \leq \pm 5\%$
		损耗 Dissipation Factor	$\Delta \tan \delta < 0.0080$ $CR \leq 1.0 \mu F$ $\Delta \tan \delta < 0.0050$ $CR > 1.0 \mu F$ at 1KHZ
		耐电压 Withstand Voltage	1.6 UR (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: $40 \pm 2^\circ C$ 湿度: 90-95%RH 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 IEC60384-16 C4.12 IEC60384-1 C4.22 IEC60068-2-78 Test Cab
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	$\Delta C/C \leq \pm 5\%$
		损耗 Dissipation Factor	$\Delta \tan \delta < 0.0080$ $CR \leq 1.0 \mu F$ $\Delta \tan \delta < 0.0050$ $CR > 1.0 \mu F$ at 1KHZ
		耐电压 Withstand Voltage	1.6 UR (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: $110 \pm 2^\circ C$ 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 IEC60384-16 C4.11.2 IEC60384-1 C4.21.2 IEC60068-2-2, test Bb

NO.	项目 Item	特性要求 Characteristic requirement	测试方法及条件 Test method&Condition
7 寒冷 Cold	外观 Appearance	无可见损伤, 标志清晰 No visible damage, The marking shall be legible.	温度Temp: $-40 \pm 2^{\circ}\text{C}$
	容量变化 Capacitance Variation	$\Delta C/C \leq \pm 5\%$	持续时间: 4h Duration
	损耗 Dissipation Factor	$\Delta \text{tg}\delta < 0.0080$ $\text{CR} \leq 1.0\mu\text{F}$ $\Delta \text{tg}\delta < 0.0050$ $\text{CR} > 1.0\mu\text{F}$ at 1KHZ	恢复时间不低于4小时 Then recovery at ordinary condition at least 4 hours
	耐电压 Withstand Voltage	1.6 UR (d.c) 60S耐电压后无击穿或飞弧 No permanent breakdown or flashover	IEC60384-16 C4.11.4 IEC60384-1 C4.21.4
	绝缘电阻 Insulation Resistance	$\Delta R/R \leq 50\%$	IEC60068-2-1, test Ab
8 脉冲 Impulse voltage	外观 Appearance	无可见损伤, 标志清晰 No visible damage, The marking shall be legible.	When $\text{CR} \leq 1.0\mu\text{F}$ UP = 2.5 kV
	容量变化 Capacitance Variation	$\Delta C/C \leq \pm 5\%$	When $\text{CR} > 1.0\mu\text{F}$ UP = 2.5kV/ $\sqrt{C}$ time:10s
	损耗 Dissipation Factor	$\Delta \text{tg}\delta < 0.0080$ $\text{CR} \leq 1.0\mu\text{F}$ $\Delta \text{tg}\delta < 0.0050$ $\text{CR} > 1.0\mu\text{F}$ at 1KHZ	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
	耐电压 Withstand Voltage	1.6 UR (d.c) 60S耐电压后无击穿或飞弧 No permanent breakdown or flashover	IEC60384-16 C4.13
	绝缘电阻 Insulation Resistance	$\Delta R/R \leq 50\%$	IEC60060-1
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.	Test voltage: $1.414 \times \text{UR (d.c.)}$
	容量变化 Capacitance Variation	$\Delta C/C \leq \pm 10\%$	Cycle times:10000 Dv/Dt:100 V/ μs . resistor: $(220 \times 10^{-6} / \text{CR}) \Omega$
	损耗 Dissipation Factor	$\Delta \text{tg}\delta < 0.0080$ $\text{CR} \leq 1.0\mu\text{F}$ $\Delta \text{tg}\delta < 0.0050$ $\text{CR} > 1.0\mu\text{F}$ at 1KHZ	
	耐电压 Withstand Voltage	1.6 UR (d.c) 60S耐电压后无击穿或飞弧 No permanent breakdown or flashover	IEC60384-16 C4.15 IEC60384-1 C4.27
	绝缘电阻 Insulation Resistance	$\Delta R/R \leq 50\%$	

NO.	项目 Item	特性要求 Characteristic requirement	测试方法及条件 Test method&Condition
#	振动 Vibration	外观 Appearance 无可见损伤, 标志清晰 No visible damage, The marking shall be legible.	上下左右前后三个方向 各2H, 频率10-55Hz 振幅0.75mm或98m/S ² 3 directions at 2 hours each 10-55Hz at 0.75mm or 98m/s ² IEC60384-16 C4.7 IEC60384-1 C4.17 IEC 60068-2-6, test Fc,
#	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.	次数 number of bumps: 1 000 or 4 000 加速度 Acceleration: 400 m/s ² Pulse duration: 6 ms IEC60384-16 C4.8 IEC60384-1 C4.18 IEC 60068-2-29, test Eb,
#	阻燃试验 Passive flammabil ity 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	UL94-V0 IEC60384-16 C4.17 IEC60384-1 C4.38 IEC60695-11-5.
#	自燃试验 Active flammabil ity 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) IEC60384-16 C4.18