



规格承认书

SPECIFICATION FOR APPROVAL



产品型号: 抑制电源电磁干扰用金属化聚丙烯薄膜电容器 MKP-X2
 (Product Type)

产品品号: _____
 (Ordering Code)

客户代号: _____
 (Customer Code)

客户料号: _____
 (Customer's P/N)

日期: 2021-7-3
 (Issue Date)



拟制 Prepared	审核 Checked	批准 Approved	客户承认签回 Approved by Customer
罗贵冲 2021-7-3	梁景明 2021-7-3	陈大俊 2021-7-3	

广东丰明电子科技有限公司

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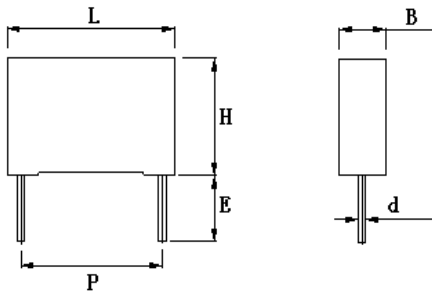
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1. 范围 Scope

此规范应用于抑制电源电磁干扰的金属化聚丙烯膜电容器，型号 MKP-X2。

This specification applies to metallized polypropylene film capacitors type name MKP-X2 ,used in electromagnetic interference suppression or across-the-line capacitor.

2. 规格尺寸 Dimensional drawing



BM P/N	BM P/N	C μ F	R.V VAC	DIMENSIONS 尺寸 (mm)					
				L \pm 1	B \pm 1	H \pm 1	P \pm 0.5	E	d \pm 0.05
2010200149	1X2H310K275-01	0.01	275	13	5	11	10	15 \pm 3	0.6
2010200037	1X2H322K275-01	0.022	275	13	5	11	10	15 \pm 3	0.6
2010200004	1X2H410K275-11	0.1	275	13	6	12	10	15 \pm 3	0.6
2010200014	1X2H410K275-13	0.1	275	18	6	12	15	15 \pm 3	0.8
2010200205	1X2H415K275-23	0.15	275	13	6	12	10	15 \pm 3	0.6
2010200124	1X2H422K275-24	0.022	275	18	7.5	13.5	15	15 \pm 3	0.8
2010200336	1X2H433K275-08	0.33	275	18	8.5	14.5	15	15 \pm 3	0.8
2010200370	1X2H447K275-15	0.47	275	18	10	15.8	15	15 \pm 3	0.8
2010200008	1X2H447K275-70	0.47	275	18	11	19	15	15 \pm 3	0.8
2010200432	1X2H468K275-21	0.68	275	18	11	19	15	15 \pm 3	0.8
2010200644	1X2H510K275-11	1	275	26.5	10	19	22.5	15 \pm 3	0.8
2010400153	1X2H410K310-A10	0.1	310	13	6	12	10	15 \pm 3	0.6
2010400128	1X2H410K310-A59	0.1	310	18	6	12	15	15 \pm 3	0.8

3. 产品介绍及用途

Type introduction And Applications

■ 依连接方式，对抑制电源电磁干扰用固定电容器定义了两大类，分别为 X 类和 Y 类。

Depending on the way they are connected, two principal classes of capacitors have been defined for fixed capacitors for electromagnetic interference suppression.

X 类电容器：一种适用于在电容器失效时不会导致电击危险的场合的电容器。

X capacitors: A type is suitable for use in situations where failure of the capacitor would not lead to danger of electrical shock.

X 类电容被划分为两个子类 X1、X2、X3。

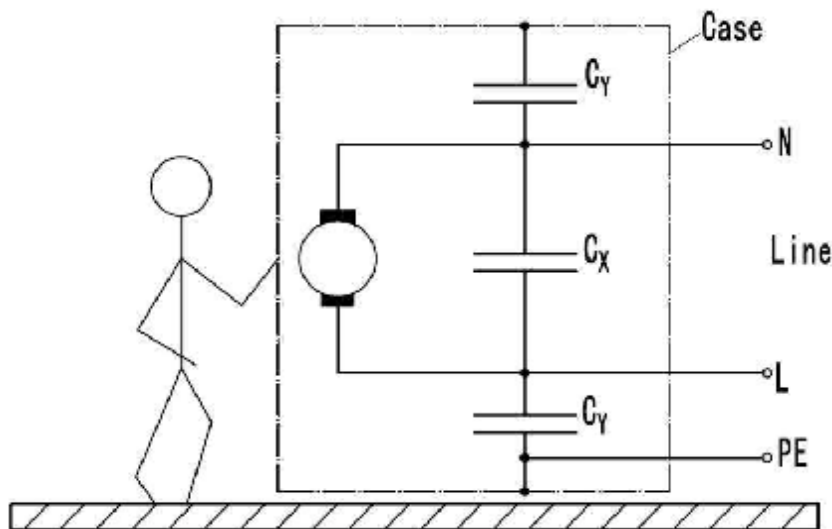
Class X capacitor are divided into three subclasses X1、X2、X3.

Y 类电容器：一种适用于在电容器失效时会导致电击危险的场合的电容器。

Y capacitors: A type is suitable for use in situations where failure of the capacitor could lead to danger of electrical shock.

Y 类电容被划分为三个子类 Y1、Y2、Y3、Y4。

Class Y capacitor are divided into four subclasses Y1、Y2、Y3、Y4.



C_x : 抑制电容器功能（类别）X

C_x : Suppression capacitors-Function (or class) X

C_y : 抑制电容器功能（类别）Y

C_y : Suppression capacitors-Function (or class) Y

以上说明显示了使用 X 和 Y 电容器对电动机的保护和抑制作用。

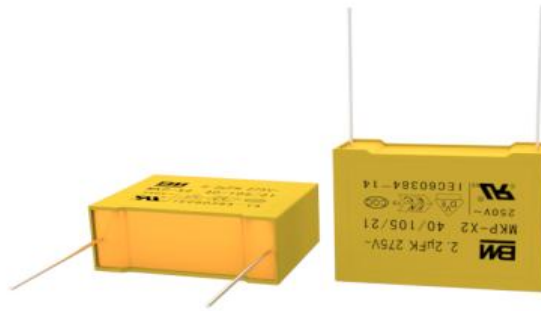
The examples above show protection and suppression of a motor by using X and Y capacitors.

■ 产品工艺

Product process technology

MKP-X2 电容采用真空蒸镀铝加厚工艺的金属化聚丙烯薄膜卷绕的无感结构, 芯体两端喷涂无铅环保合金线, 电极由镀锡铜包钢线导线引出, 外部组装符合 UL94-V0 阻燃级 PBT 外壳, 并用阻燃环氧树脂料灌封。

MKP-X2 are consist of a non-inductive wound cell of metallized polypropylene film, end-spray layers sprayed with lead-free alloy metal wire, and weld with Tin plated copper covered steel wire, potting and encapsulation material qualified in according with UL94V-0.



■ 产品应用范围

typical applications

MKP-X2 抑制电源电磁干扰电容器, 用于电源跨线路等抗干扰场合, 适用于使用的电容器失效后不会导致触电的危险场合。

MKP-X2 Type for electromagnetic interference suppression, Used in across-the-line,interference suppression circuit or applicatio, Suitable for used in situations where failure of the capacitor will not lead to danger or electric shock.

4. 产品特点

Features

■ 无感结构

Non-induciton construction

■ 金属化聚丙烯, 良好的自愈性

Metallized polypropylene structure, self-healing property

■ 低损耗, 稳定的频率及温度特性

Low DF, stable frequency and temperature performance

■ 优异的阻燃性能 (符合 UL94V-0)

Flame retardant type (compliance with UL94-V0)

■ 用于电源跨线路等抗干扰场合

Used in across-the-line,interference suppression circuit.

5. 安全认证

Safety Approvals

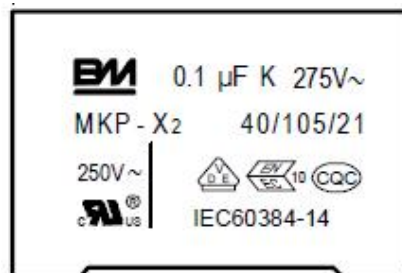
	CQC (中国)	GB/T6346.14-2015, MKP-X2, 275Vac/305Vac/310Vac, 0.01~10μF, 40/105/21, 40/110/56, 证书号 (Certificate No.): CQC04001010677
	VDE-ENEC (欧盟)	EN60384-14:2013, MKP-X2, 275Vac/305Vac/310Vac, 0.01~10μF, 40/105/21, 40/110/56, 证书号 (Certificate No.): 40025702
	UL/CUL (美国/加拿大)	UL60384-14:2009, MKP-X2, 250Vac/275Vac/310Vac, 0.01~10μF, 40/105/21, 40/110/56, 证书号 (Certificate No.): E345487
	KC (韩国)	K60384-14(2006-12), MKP-X2, 275Vac 0.01~10μF, 40/105/21, 证书号 (Certificate No.): SU03048-10004B/10003B/10002B/10001B/13001A/13002A

6. 标识说明

Marking Introduction

举例:

For example :

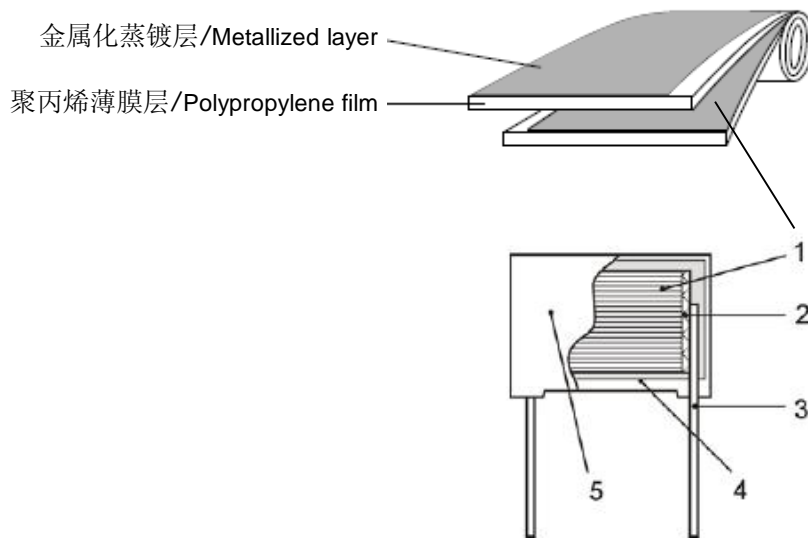


NO.	ITEM	EXPLAIN
1		丰明公司 LOGO: BM LOGO
2	0.1μF K	容值与偏差 Capacitance and tolerance: 0.1μF, K=±10%
3	275V~ 250V~	额定电压 Rated voltage: 275Vac、250Vac
4	MKP-X2	产品型号 Product type: MKP-X2
5	40/105/21	气候类别 Climatic category: 40/105/21
6		安规认证 Safety approval: VDE/ENEC/CQC/UL/CUL
7	IEC60384-14	产品标准 Standard: IEC60384-14

7. 产品结构及主材

Construction and Component

■ 产品结构图 Construction



■ 材料构成清单 Component List

项次 Item	构成部位 Component	材料名称/材质 Material
1	素子 Element	金属化聚丙烯薄膜 Metallized PP film
2	喷金层 Metal spray layer	锌线和锌锡合金线 Zn and Zn-Tin alloy wire
3	导针 Leads	镀锡铜包钢线 Tin plated copper covered steel wire
4	灌封胶 Potting compound	UL94V0 级阻燃环氧树脂 Flame retardant epoxy resin(UL94V0)
5	塑胶外壳 Enclosure	UL94V0 级阻燃 PBT 材质 Flame retardant PBT plastic(UL94V0)
5.1	本体印字 Marking	激光刻印 Laser

8. 环保要求

Compliance with environment requirement

■ 符合 RoHS 要求 Compliance with the requirement of RoHS.

■ 符合 REACH 要求 Compliance with the requirement of REACH.

9. 包装说明

Packing

■ 包装方式:

包装袋与纸箱, 根据客户订单数量, 确定使用大或小的外包装箱。

Package bag and Carton, Packing with small or big carton depends on customer's purchase quantity.

■ 内外包装标签(卡)(Label on plastic bag and Carton)

内包装袋标签示意图(qualified label)

安规类电容器合格证 MKP-X2 FZOR-7.5.3-11 11A2	
客户料号	
品 号	
额定容量	μF □ J $\pm 5\%$ □ K $\pm 10\%$ □ M $\pm 20\%$
额定电压	275VAC/250VAC
数 量	□ 整数 PCS □ 尾数 PCS
生产批号	
包装工号	
检 验 员	
包装日期	



10. 储存条件

Storage Conditions

■ 长时间暴露在空气中会导致引线焊接性能下降。避免温度剧烈变化、阳光直射、露天堆放和腐蚀气体。

It should be noted that the solderability of the terminals may be deteriorated when Stored barely in an atmosphere for a long periods. Avoid severe temperature changes, atmp here, direct exposure to the sun beams and corrosive atmosphere.

■ 不能暴露在高温和高湿环境中, 请遵循以下储存条件(原包装下保存)。

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

最高温度 Temperature: 35°C MAX.

相对湿度 Relative humidity: 70%RH MAX.

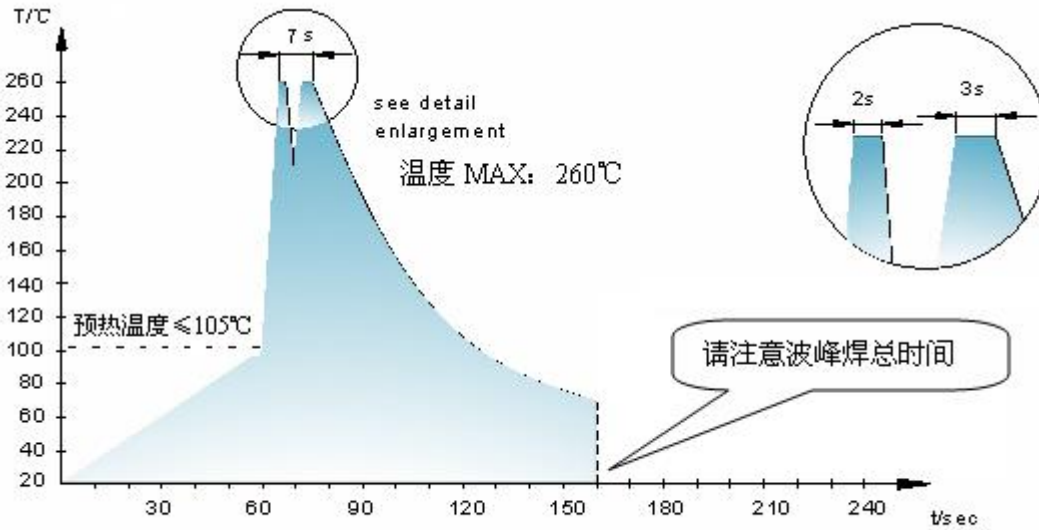
■ 储存时间: 最长 12 个月(以包装标注的生产日期为准)

Storage period: Loose 12 months max(form the manufacturing date marked on the label in package bag)

储存超过一年后, 使用前请务必对电气特性和引线可焊接性重新进行检验

Capacitor stored mote than a year should be examined for their electric characteristics and solderability before use

■ 无铅波峰焊 When used with flow soldering(no lead):



Typical temperature/time graph for double wave soldering

预热总时间≤60S; 链条速度: 1.2m/60S或者更快

Total preheating time≤60S; Chain speed: 1.2m/60S or even more

11. 技术规范

Technical specification

项次 No.	检测项目 Test item	性能 Performance	检测方法 Test method
1	容量范围 Capacitance Range	0.01μF~10μF	Measure at 1KHz(20°C~25°C) IEC60384-14 4.2.2
2	容量偏差 Capacitance Tolerance	规定范围内偏差 Within specified tolerance J: ±5%; K: ±10%; M: ±20%	Measure at 1KHz(20°C~25°C) IEC60384-14 4.2.2
3	损耗角正切 Dissipation factor	≤0.0010	Measure at 1KHz(20°C~25°C) IEC60384-14 4.2.3
4	额定电压 Rated Voltage	275VAC/310VAC 50/60Hz	IEC60384-14
5	耐压测试 Withstand Voltage	应无永久性击穿及飞弧 No permanent breakdown or flashover	IEC60384-14 4.2.1
	端子与端子间(T-T) Terminal-Terminal		4.3U _R (DC) / 60sec 电压爬升时间: 5~10sec, 漏电流 10mA, ARC=OFF Voltage increasing time5~10sec,cut off current 10mA,ARC=OFF
	端子与外壳间 Terminal-Case		2050VAC, 50/60HZ, 60sec
6	绝缘电阻 Insulation Resistance	C _N ≤0.33μF; IR≥15000MΩ	IEC60384-14 4.2.5 充电电压 charge voltage: 100V 充电时间 charge time: 60sec 温度 Test temp: 20°C~25°C
		C _N >0.33μF; IR≥5000 S	

项次 No.	检测项目 Test item	性能 Performance	检测方法 Test method
7	端子强度测试 Terminal strength	端子脚无可见的破损 There shall be no visible damage	IEC60384-14 4.3
	拉伸强度 Pull Strength		拉力 Tense: 0.5<d≤0.8 ,10N 时间 Time: 10sec
	弯曲强度 Bending Strength		弯力 Bend: 0.5<d≤0.8 5N 端子相对方向进行两次弯曲 Bent 2 times each direction
8	耐焊接热 Resistance to Solder heat	外观无可见的损伤,标志清晰,容量变化率 $\Delta C/C \leq \pm 5\%$ There should be no visible damage, $\Delta C/C \leq \pm 5\%$	IEC60384-14 4.4 焊锡温度 Solder temp:260±5℃; 浸入时间 Immersion time: 10±1sec 恢复时间 2 小时 Then recovery at ordinary Condition 2 hours
9	可焊性 Solderability	焊锡覆盖面积达浸沾表面积 95% 以上 At least 95% of the Circumference of the lead wire,Around load Surface dipped into with new solder	IEC60384-14 4.5 焊锡温度 Solder temp: 245±5℃ 浸入时间 Immersion time: 2.5±0.5sec
10	温度快速变化 Rapid change of temperature	外观无可见的损伤 There should be no visible damage	IEC60384-14 4.6 $\theta_A = -40^\circ\text{C}$, $\theta_B = +105^\circ\text{C}$ 循环周期:5 次, 5 cycles 周期时间:30 分钟 Duration=30min
11	干热性 Dry heat	应无可见损坏,印章清晰 There should be no visible damage, legible marking. 容量变化率 $\Delta C/C \leq \pm 5\%$ Capacitance change $\Delta C/C \leq \pm 5\%$ 损耗角增加: Increase of $\tan\delta$	IEC60384-14 4.11.2 温度 Temp: 105℃ 时间 Duration: 16H 恢复时间 2 小时 Then recovery at ordinary Condition 2 hours
12	耐寒性 Cold Resistance	$C_R \leq 1\mu\text{F}$: ≤ 0.008 (10KHz) $C_R > 1\mu\text{F}$: ≤ 0.005 (1KHz) 耐压: 应无永久性的击穿或飞弧 Dielectric strength: there shall be no permanent breakdown or flashover. 绝缘电阻(IR): >50%的额定值 IR >50% *Rate value	IEC60384-14 4.11.4 温度 Temp: -40℃ 时间 Duration: 2H 恢复时间 2 小时 Then recovery at ordinary Condition 2 hours
13	稳态湿热 Damp heat steady state	应无可见损坏, 容量变化率 $\Delta C/C \leq \pm 5\%$ There should be no visible damage, Capacitance change $\Delta C/C \leq \pm 5\%$ 损耗角增加: Increase of $\tan\delta$: $C_R \leq 1\mu\text{F}$: ≤ 0.008 (10KHz) $C_R > 1\mu\text{F}$: ≤ 0.005 (1KHz) 耐压: 应无永久性的击穿或飞弧 Dielectric strength: there shall be no permanent breakdown or flashover. 绝缘电阻(IR): >50%的额定值 IR >50% *Rate value	IEC60384-14 4.12 相对湿度 Humidity: 93%RH 温度 Temp: 40℃ 持续时间 Duration: 21 day 恢复时间 2 小时 Then recovery at ordinary Condition 2 hours

项次 No.	检测项目 Test item	性能 Performance	检测方法 Test method
14	振动 Vibration	外观无可见的损伤 There should be no visible damage,	IEC60384-14 4.7 位移 0.75mm 或加速度 98m/s ² Amplitude 0.75mm or acceleration 98m/s ² (两者取较小者), (whichever is the smaller values) 振动频率:10~500HZ, 三个方向,每 2 小时/方向,共 6 个小时 2h each direction, total 6h
15	碰撞 Bump	外观无可见的损伤,容量变化率 $\Delta C/C < \pm 5\%$ There should be no visible damage $\Delta C/C < \pm 5\%$	IEC60384-14 4.8 4000 次,加速度 400m/s ² , 4000 times ,acceleration 400m/s ² , 脉冲持续时间: 6ms. Pulse duration 6ms.
16	耐久性 Endurance test	应无可见损坏,容量变化率 $\Delta C/C \leq \pm 10\%$ There should be no visible damage, Capacitance change $\Delta C/C \leq \pm 10\%$ 损耗角增加: Increase of Tan δ : $C_R \leq 1\mu F: \leq 0.008$ (10KHz) $C_R > 1\mu F: \leq 0.005$ (1KHz) 耐压: 应无永久性的击穿或飞弧 Dielectric strength: there shall be no permanent breakdown or flashover. 绝缘电阻(IR): >50%的额定值 IR > 50% *Rate value	IEC60384-14 4.14 温度 Temp:105°C 施加电压 Applied Voltage: 1.25U _R 每隔一小时将电压升高至 1000vac, 持续 0.1 秒: The voltage should be subjected to 1000rms for 0.1s every one hour during test. 持续时间 Duration: 1000H 恢复时间 2 小时 Then recovery at ordinary Condition 2 hours
17	充电和放电 Charge and Discharge	容量变化率 $\Delta C/C < \pm 10\%$ Capacitance change $\Delta C/C \leq \pm 10\%$ 损耗角增加: Increase of Tan δ : $C_R \leq 1\mu f: \leq 0.008$ (10khz) $C_R > 1\mu f: \leq 0.005$ (1khz) 耐压:应无永久性的击穿或飞弧 Dielectric strength: there shall be no permanent breakdown or flashover 绝缘电阻(IR):>50%的额定值 IR>50% *Rate value	IEC60384-14 4.15 试验次数:10,000 次 充电时间:0.5 秒, 放电时间:0.5 秒 充电电压:550vdc, 充电电阻: $R = \frac{220 \times 10^{-5}}{C_N} \Omega$ 或将充电电流限制在 1A 以下(取其大者) 放电电阻: $R = \frac{550}{C_R \times dU/dt} = \frac{5.50}{C_R} (\Omega)$ dv/dt:最大 100v/us, Times: 10,000 Duration of charge:0.5sec Duration of discharge:0.5sec Charging voltage:550vdc Charge resistor:220/C _R (Ω) or The limited current should be no more than 1A, (whichever the resistance value is the greater)

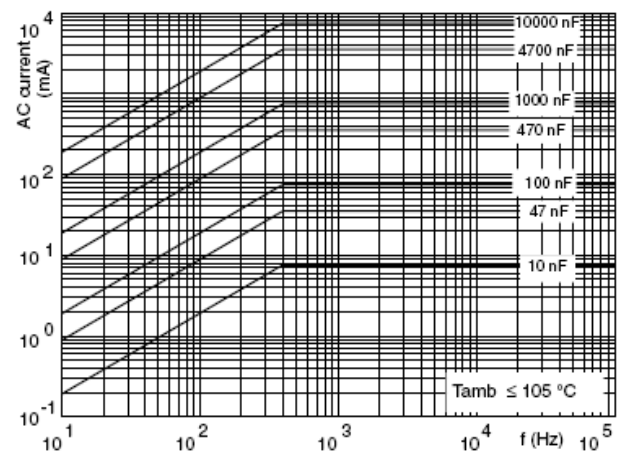
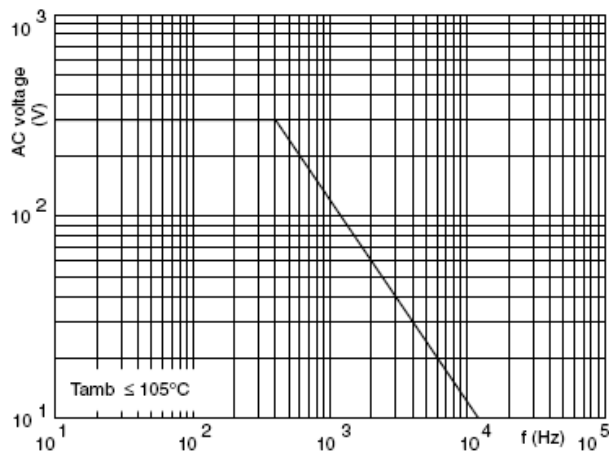
项次 No.	检测项目 Test item	性能 Performance	检测方法 Test method
18	阻燃性试验 Passive flammability	任一试验电容器在离开火源后持续燃烧的时间不能超过 30 秒,其燃烧下落物不能将下面的纱棉引燃 The flaming time of each sampling capacitor shall not go beyond 30sec after it is taken apart from the flame. Drop of each capacitor caused by the flame shall not fire the tissue below.	参照 4.17 节 Ref 4.17 clause 采用针炎测试法,阻燃等级 C 级 Needle flame test The category of flammability :C 暴露次数:1 次 Expose time:1time 产品体积 暴露时间 Capacitor volume Exposing time 250<V(mm3)≤500 s=20 秒 500<V(mm3)≤1750 s=30 秒 V(mm3)>1750 s=60 秒

12. 特性曲线图

Charac teristic curve

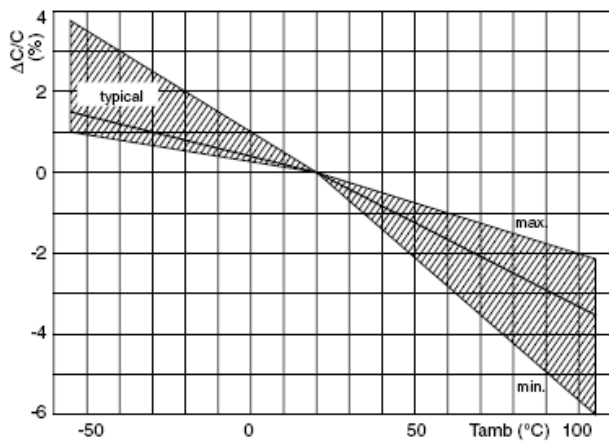
最大有效值流额定交流电压及电流对比工作频率曲线图

MAXIMUM RMS VOLTAGE AND AC CURRENT (SINEWAVE) AS A FUNCTION OF FREQUENCY



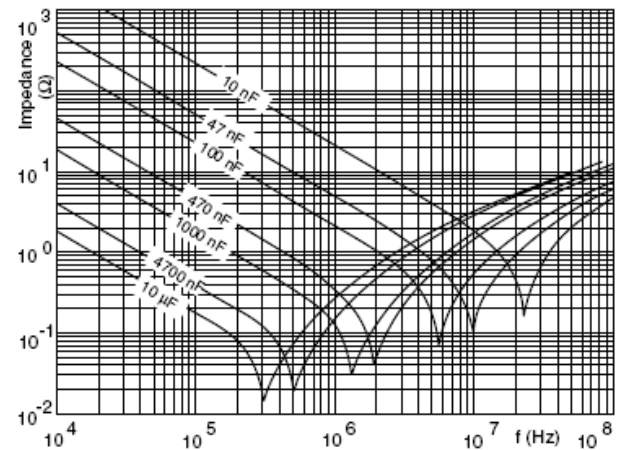
容量变化率对比工作温度曲线图

CAPACITANCE



电容阻抗对比工作频率曲线图

IMPEDANCE



13. 处置

Disposal

薄膜电容器都可以处理、回收或再利用。但是，处置时必须遵守各自国家的相关法律规定。

All film capacitors can be disposed of, reused or recycled. However as disposal is regulated by national law, the respective national provisions have to be observed.