



规格承认书

SPECIFICATION FOR APPROVAL

产品名称: 金属化聚丙烯膜介质抗干扰电容器
Product Name: Metallized polypropylene film dielectric anti-interference capacitor
产品型号: MKP-X2
Product Type: MKP-X2
产品编码: _____
Product Code: _____
客户名称: 深圳华秋电子有限公司
Customers Name: _____
客户编码: _____
Customers Code: _____
日期: 2019.07.31
Issue Date: 2019.07.31

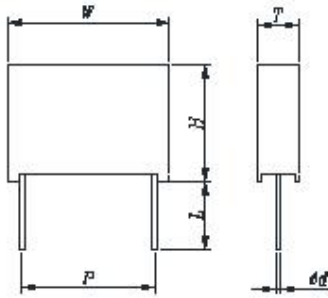


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MKP-X2 金属化聚丙烯薄膜介质抗干扰电容器
MKP-X2 Metallized polypropylene film dielectric anti-interference capacitor
■ 电容器外形图 Capacitor contour map

■ 特点

- 高温金属化聚丙烯膜做介质
- 抗 2500V 雷电脉冲冲击
- 符合 94-V0 阻燃要求

■ 主要用途

- 用于跨电源线抗干扰电路中
- 降压限流电路中

■ 技术要求 Technical requirements
■ Features

- High temperature metallized polypropylene film as medium
- Resistance to lightning impulse of 2500V
- Meet the fire retardant requirement of 94-v0

■ The main purpose

- Used in cross - wire anti - interference circuit
- In the voltage reducing and current limiting circuit

引用标准 Reference criteria	GB/T 14472 (IEC 60384-14)	
气候类别 Climate category	40/110/56	
阻燃等级 Flame retardant grade	B	
工作温度范围 Operating temperature range	-40°C~+110°C	
额定电压 Ur Rated voltage	275VAC; 310VAC f=50/60Hz	
电容量范围 Electricity capacity range	8200pF~10μF	
电容量偏差 Capacitance deviation	±5% (J), ±10% (K), ±20% (M)	
耐电压 Voltage resistance	极间 Between terminals	1000V (DC) 2S
	极壳 Between terminals to case	1500V 60S
损耗角正切值 Loss angle tangent	tg δ ≤ 0.0010 (+20°C ± 5°C, 1kHz) CN < 0.47 μF	
	tg δ ≤ 0.0020 (+20°C ± 5°C, 1kHz) CN ≥ 0.47 μF	
	tg δ ≤ 0.0020 (+20°C ± 5°C, 10kHz) CN < 0.47 μF	
	tg δ ≤ 0.0040 (+20°C ± 5°C, 10kHz) CN ≥ 0.47 μF	
绝缘电阻 Insulation resistance	R ≥ 15000MΩ, CN ≤ 0.33 μF	(20°C, 100V, 1min)
	RCN ≥ 5000S, CN > 0.33 μF	

■ 安全认证 Approvals

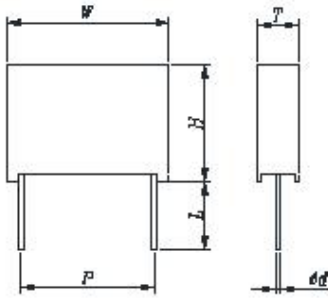
Mark	Specification	File Number
	IEC60384-14	CQC18001200754 Types:MPX/MKP,X2
	EN/IEC 60384-14	File No.: 40049209 AC 275V,X2, 0.0082μF to 10μF
	UL 60384-14 and CAN/CSA -E60384-14	File No.: E350995 310VAC 0.0082μF to 10μF

275VAC/305VAC (P=7.5)						275VAC/305VAC (P=10)							
电容量 CAP	电容器外形尺寸 Capacitor dimensions					电容器代码 Part number	电容量 CAP	电容器外形尺寸 Capacitor dimensions					电容器代码 Part number
	T	H	W	P	Φd			T	H	W	P	Φd	
0.0082	4	9	10	7.5	0.6	X2-0275A822K7A**	0.01	4	9	13	10	0.6	X2-0275A103K10**
0.01	4	9	10	7.5	0.6	X2-0275A103K7A**	0.012	4	9	13	10	0.6	X2-0275A123 K10**
0.012	4	9	10	7.5	0.6	X2-0275A123K7A**	0.015	4	9	13	10	0.6	X2-0275A153 K10**
0.015	4	9	10	7.5	0.6	X2-0275A153K7A**	0.018	4	9	13	10	0.6	X2-0275A183 K10**
0.018	4	9	10	7.5	0.6	X2-0275A183K7A**	0.022	4	9	13	10	0.6	X2-0275A223 K10**
0.022	4	9	10	7.5	0.6	X2-0275A223K7A**	0.027	4	9	13	10	0.6	X2-0275A273 K10**
0.027	4	9	10	7.5	0.6	X2-0275A273K7A**	0.033	4	9	13	10	0.6	X2-0275A333 K10**
0.033	5	11	10	7.5	0.6	X2-0275A333K7A**	0.039	5	11	13	10	0.6	X2-0275A393 K10**
0.039	5	11	10	7.5	0.6	X2-0275A393K7A**	0.047	5	11	13	10	0.6	X2-0275A473 K10**
0.047	5	11	10	7.5	0.6	X2-0275A473K7A**	0.056	6	12	13	10	0.6	X2-0275A563 K10**
0.056	6	12	10	7.5	0.6	X2-0275A563K7A**	0.068	6	12	13	10	0.6	X2-0275A683 K10**
0.068	6	12	10	7.5	0.6	X2-0275A683K7A**	0.1	6	12	13	10	0.6	X2-0275A104 K10**
							0.12	7	13	13	10	0.6	X2-0275A124 K10**
							0.15	8	14	13	10	0.6	X2-0275A154 K10**
							0.18	8	14	13	10	0.6	X2-0275A184 K10**
							0.22	8	14	13	10	0.6	X2-0275A224 K10**
275VAC/305VAC (P=15)						275VAC/305VAC (P=22.5)							
电容量 CAP	电容器外形尺寸 Capacitor dimensions					电容器代码 Part number	电容量 CAP	电容器外形尺寸 Capacitor dimensions					电容器代码 Part number
	T	H	W	P	Φd			T	H	W	P	Φd	
0.012	5	11	18	15	0.6	X2-0275A123K15**	0.15	6	15	26.5	22.5	0.8	X2-0275A154K22**
0.015	5	11	18	15	0.6	X2-0275A153 K15**	0.18	6	15	26.5	22.5	0.8	X2-0275A184 K22**
0.018	5	11	18	15	0.6	X2-0275A183 K15**	0.22	6	15	26.5	22.5	0.8	X2-0275A224 K22**
0.022	5	11	18	15	0.6	X2-0275A223 K15**	0.27	6	15	26.5	22.5	0.8	X2-0275A274 K22**
0.027	5	11	18	15	0.6	X2-0275A273 K15**	0.33	6	15	26.5	22.5	0.8	X2-0275A334 K22**
0.033	5	11	18	15	0.6	X2-0275A333 K15**	0.39	6	15	26.5	22.5	0.8	X2-0275A394 K22**
0.047	5	11	18	15	0.6	X2-0275A473 K15**	0.47	7	16	26.5	22.5	0.8	X2-0275A474 K22**
0.056	5	11	18	15	0.6	X2-0275A563 K15**	0.56	7	16	26.5	22.5	0.8	X2-0275A564 K22**
0.068	5	11	18	15	0.6	X2-0275A683 K15**	0.68	8.5	17	26.5	22.5	0.8	X2-0275A684 K22**
0.082	5	11	18	15	0.6	X2-0275A823 K15**	0.82	10	18.5	26.5	22.5	0.8	X2-0275A824 K22**
0.1	5	11	18	15	0.6	X2-0275A104 K15**	1.0	10	18.5	26.5	22.5	0.8	X2-0275A105 K22**
0.12	5	11	18	15	0.6	X2-0275A124 K15**	1.2	11	20	26.5	22.5	0.8	X2-0275A125 K22**
0.15	5	11	18	15	0.6	X2-0275A154 K15**	1.5	12	22	26.5	22.5	0.8	X2-0275A155 K22**
0.18	6	12	18	15	0.6	X2-0275A184 K15**	1.8	15.5	24.5	26.5	22.5	0.8	X2-0275A185 K22**
0.22	7.5	13.5	18	15	0.6	X2-0275A224 K15**	2.2	14.5	29.5	26.5	22.5	0.8	X2-0275A225 K22**
0.27	8.5	14.5	18	15	0.6	X2-0275A274 K15**							
0.33	9	15	18	15	0.8	X2-0275A334 K15**							
0.39	9	15	18	15	0.8	X2-0275A394 K15**							
0.47	10	16	18	15	0.8	X2-0275A474 K15**							
0.56	10	16	18	15	0.8	X2-0275A564 K15**							
0.68	11	19	18	15	0.8	X2-0275A684 K15**							
0.82	11	19	18	15	0.8	X2-0275A824K15**							

275VAC/305VAC (P=27.5)							275VAC/305VAC (P=37.5)						
电容量 CAP	电容器外形尺寸 Capacitor dimensions					电容器代码 Part number	电容量 CAP	电容器外形尺寸 Capacitor dimensions					电容器代码 Part number
	T	H	W	P	Φd			T	H	W	P	Φd	
0.39	9	18	32	27.5	0.8	X2-0275A394K27**	1.5	11	22	41.5	37.5	1.0	X2-0275A155K37**
0.47	9	18	32	27.5	0.8	X2-0275A474 K27**	1.8	11	22	41.5	37.5	1.0	X2-0275A185K37**
0.56	9	18	32	27.5	0.8	X2-0275A564 K27**	2.2	13	24	41.5	37.5	1.0	X2-0275A225K37**
0.68	9	18	32	27.5	0.8	X2-0275A684 K27**	2.7	13	24	41.5	37.5	1.0	X2-0275A275K37**
0.82	9	18	32	27.5	0.8	X2-0275A824 K27**	3.3	14	28	41.5	37.5	1.0	X2-0275A335K37**
1.0	9	18	32	27.5	0.8	X2-0275A105 K27**	3.9	16	30	41.5	37.5	1.0	X2-0275A395K37**
1.2	11	20	32	27.5	0.8	X2-0275A125 K27**	4.7	16	30	41.5	37.5	1.0	X2-0275A475K37**
1.5	11	20	32	27.5	0.8	X2-0275A155 K27**	5.6	18.5	33.5	41.5	37.5	1.0	X2-0275A565K37**
1.8	13	22	32	27.5	0.8	X2-0275A185 K27**	6.8	18.5	33.5	41.5	37.5	1.0	X2-0275A685K37**
2.2	13	25	32	27.5	0.8	X2-0275A225 K27**	8.2	22	37	41.5	37.5	1.0	X2-0275A825K37**
							10	26	41	41.5	37.5	1.0	X2-0275A106K37**

■承认规格登记表 Size and specification

●尺寸 (mm) (T*H*W)



W---宽度 Breadth(W±0.5)

H---高度 Height(H±0.5)

T---厚度 Thickness(T±0.5)

P----引线距 Lead from (P±0.5)

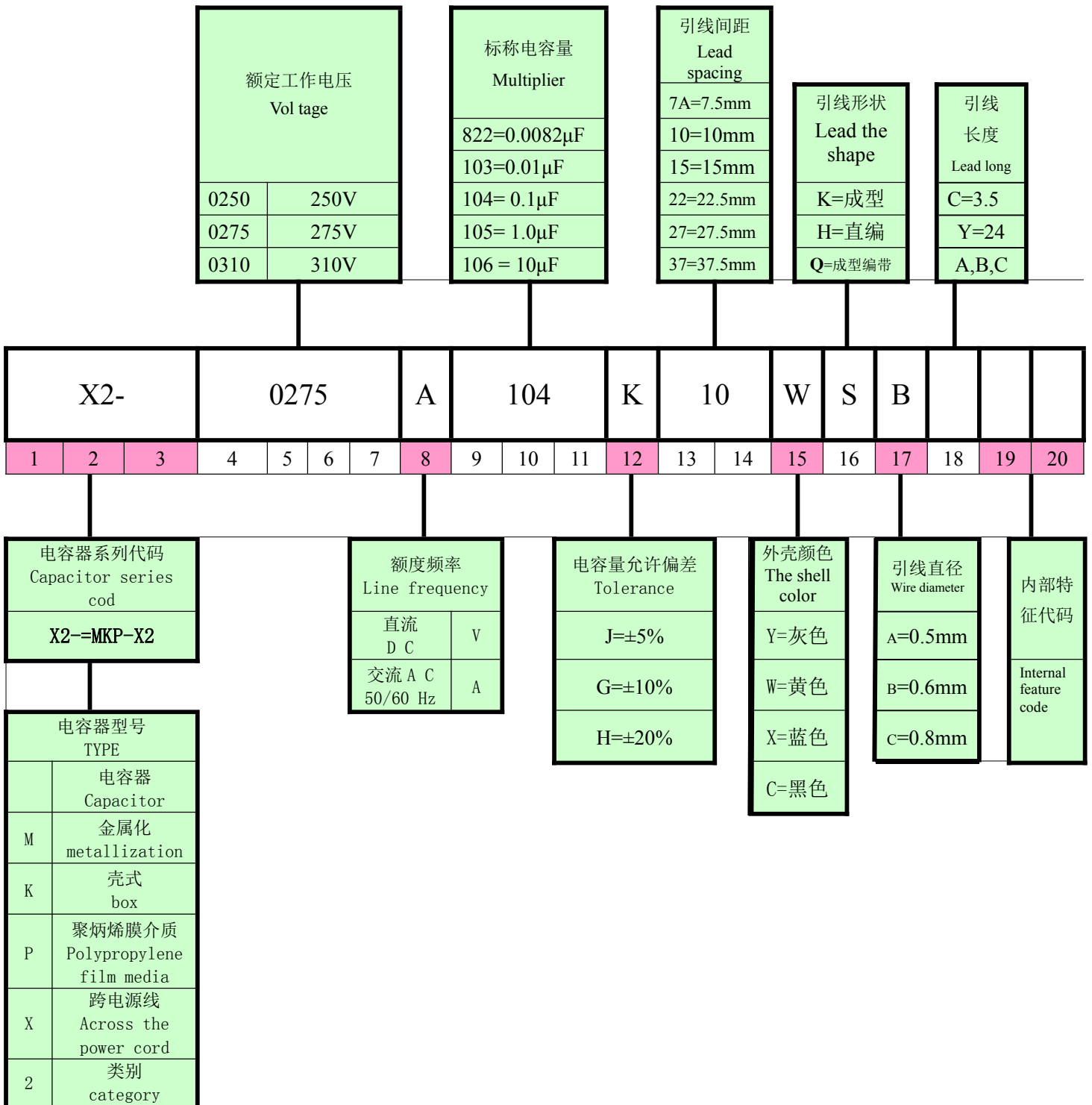
L---引线长 Lead long(L±2.0)

●.规格 Specification:

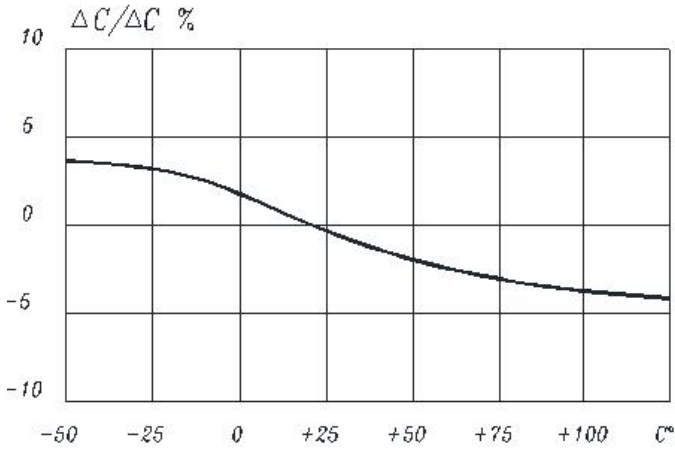
序号 NO	客户料号 Customer NO	七星料号 Spec NO	规格型号 Specification	尺寸 Size T*H*W*P	线径 Line	脚长 Length	备注 Note
1	--	X2-0275A104K 10WLBY**	X2-275VAC104K	6*12*13*10	0.6	24	-
2	--	X2-0275A224K 10WLBY**	X2-275VAC224K	6*12*13*10	0.6	24	-
3	--	X2-0275A474K 10WLBY**	X2-275VAC474K	8*14*13*10	0.6	24	-

■ 电容器编码说明 Capacitor coding specification

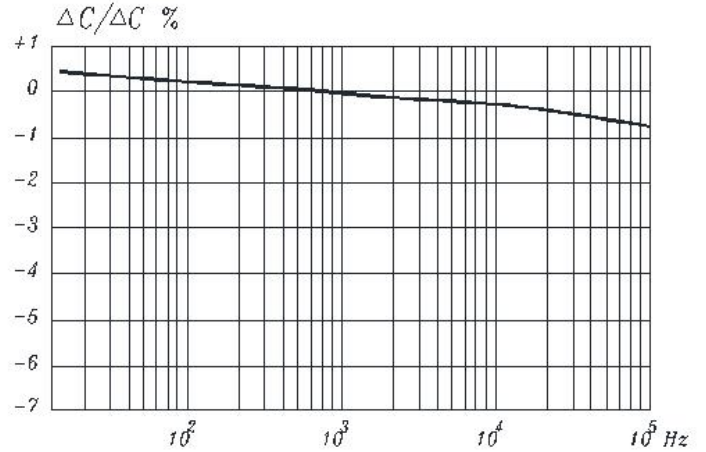
● 20 位电容器代码如下：The code of the 20-bit capacitor at the center is as follows:



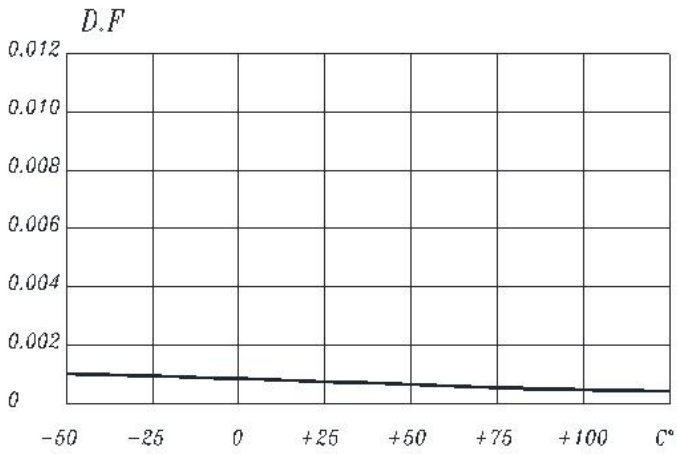
■特性曲线图 Characteristic curve



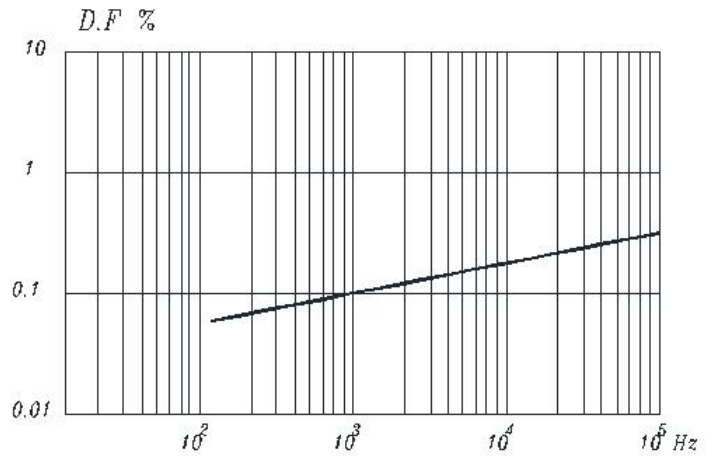
电容量随温度变化的曲线 (1kHz)
Is the temperature curve of the capacitance



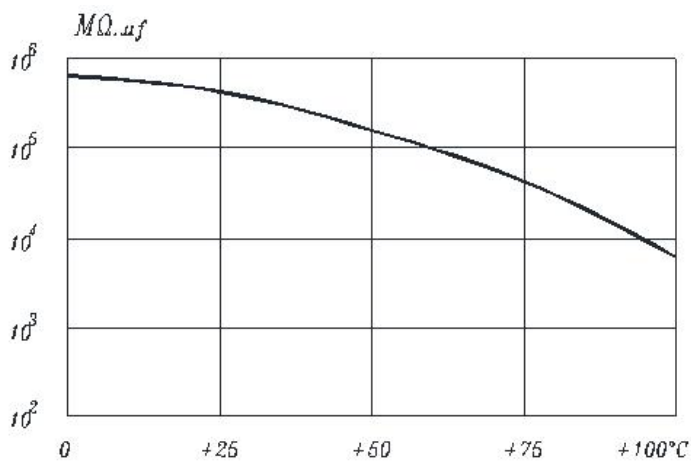
电容量随频率变化的曲线
Capacitance may vary in frequency



损耗角正切值随温度变化的曲线 (1kHz)
The curve of the tangent of loss Angle with temperature



损耗角正切值随频率变化的曲线
Curve of the change of the tangent value of the loss angle with frequency



绝缘电阻随温度变化的曲线 (1kHz)
The curve of insulation resistance to temperature

■性能及测试方法 Performance and test methods

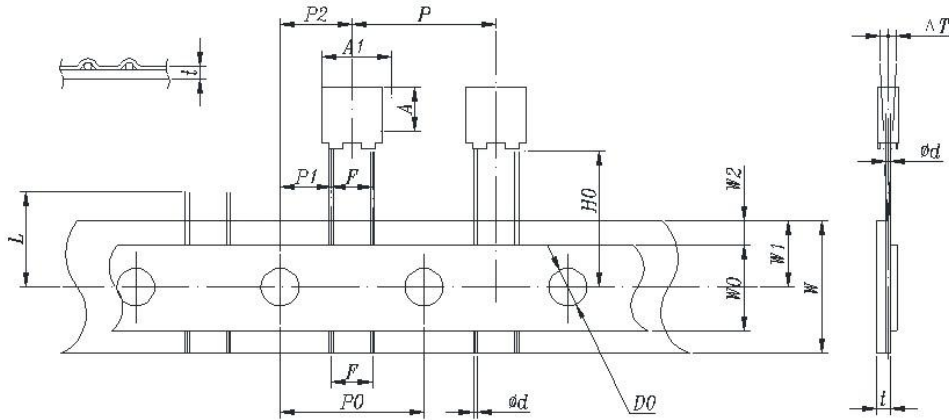
No	项目 Item	性能与判据 Performance and criteria	测试方法 Test method (IEC60384-2)
1	电容量允许偏差 Capacitance tolerance	$\pm 5\%$ (J), $\pm 10\%$ (K), $\pm 20\%$ (M)	
2	损耗角的正切 Tangent of the loss angle	$\text{tg } \delta \leq 0.0010$ (1KHz) $\text{tg } \delta \leq 0.0020$ (10KHz)	典型测量频率: 1KHz Typical measuring frequency: 1KHz
3	耐电压 Dielectric strength	无飞弧或击穿 There shall be no breakdown or flashover	极间 Between terminals 1000V (DC) 2sec 极壳 Between terminals to case 1500V 60S
4	绝缘电阻 Insulation resistance	$R \geq 15000M\Omega$, $C_n \leq 0.33\mu F$ $IR \geq 5000S$ $C_n > 0.33\mu F$	充电电压 $U_r = 100V$ Charging voltage 100v 环境温度 20°C, 测量时间 60S
5	可焊性 Solder ability	Tin plating is good, and the surface infiltration area of lead wire is more than 90% 镀锡良好, 引线表面浸润面积 $\geq 90\%$	锡炉温度 Soldre temperature $245^\circ C \pm 5^\circ C$ 浸渍时间 Immersion time $2.S \pm 0.5S$
6	初始测量 Initial measurement	电容量与损耗 Capacitance & $\text{tg } \delta$ (10KHz)	
	引线抗拉强度 Terminal strength	外观无可见损伤 There shall be no visible damage	拉力试验 Tension U_{al} : 拉力 Pull: $\phi d = 0.5mm$ 5N $\phi d = 0.6mm$ 10N 弯曲试验 bend U_b : 弯力 The pull of bend $\phi d = 0.5mm$ 2.5N $\phi d = 0.6mm$ 5N 端子应向每个方向弯曲 2 次 The terminals shall be bent 2times in each direction
	耐焊接热 Resistance to solder heat	无可见损伤 There shall be no visible damage	锡炉温度 Soldre temperature $260^\circ C \pm 5^\circ C$ 浸渍时间 Immersion time $10.S \pm 1S$
	最后的测量 Final measurement	$\Delta C/C \leq \pm 5\%$ 相对于初始值 Relative to the initial value. $\text{tg } \delta \leq 0.0020$ (10KHz)	
7	初始测量 Initial measurement	电容量与损耗 Capacitance & $\text{tg } \delta$ (10KHz)	
	温度快速变化 Rapid change of temperature	外观无可见损伤 There shall be no visible damage	$\Theta_a = -40^\circ C$ $\Theta_b = +110^\circ C$ 持续的时间 = 30 分钟 5 个周期, 5cycles, Duration: = 30min

		振动 Vibration	外观无可见损伤 There shall be no visible damage	频率:10 ~ 500HZ 振幅 0.75mm 或加速度 98m/S ² 三个方向每个方向各 2h 共 6h Ferequance10~500HZ Amplitude0.75m;Acceleration98m/S ² Amplitude 3 direction 2h per direction Duration 6h
		碰撞 Bump	外观无可见损伤 There shall be no visible damage	碰撞次数: 4000 次 加速度: 390m/S ² 脉冲持续时间 : 6ms Bump times: 4000 Acceleration: 390m/S ² Duration of pulse: 6ms
		最后的测量 Final measurement	$\Delta C/C \leq \pm 10\%$ 相对于初始值 Relative to the initial value. $\text{tg } \delta \leq 0.0020$ (10KHz) $IR \geq 50\%$ 规定值 of the rated value	
8	气候顺序 Climate sequence	初始测量 Initial measurement	电容量与损耗 Capacitance & $\text{tg } \delta$ (10KHz)	
		干热 Dry heat		+105 ⁰ C 持续 16 小时 +105 ⁰ C lasts for 16 hours
		循环湿热 Damp heat ,Cyclic		试验 Db, 严酷度 b, 第一次循环 Test Db, Severity: b, the first cycle
		寒冷 Cold		-40 ⁰ C 持续 2h -40 ⁰ C lasts for 2 hours
		低气压 Low air pressure	在试验最后 1 分钟施加 Ur 时, 不得有永久性击穿或飞弧及外壳有害变形 There shall be no permanent down ,flashover or other harmful deformation when applying Ur at the last 1minute	15 ⁰ C~35 ⁰ C 大气压 8.5kpa 持续 1 小时 The pressure of 15 ⁰ C~35 ⁰ C air is 8.5kpa for 1 hour
		循环湿热 Damp heat ,Cyclic		试验 Db, 严酷度: b, 其余循环试验结束后, 施加 Ur 1 分钟 Test Db, Severity: b, the other cycles, Applying Ur for 1minute after the test finished
		最后的测量 Final measurement	外观无可见损伤 There shall be no evidence of deformation $\Delta C/C \leq \pm 10\%$ 相对于初始值 Relative to the initial value. $\text{tg } \delta \leq 0.0020$ (10KHz) $IR \geq 50\%$ 规定值 of the rated value	
9	稳态湿热 Damp heat steady state	外观无可见损伤, 标志清晰 There shall be no evidence of deformation And the marking shall be legible $\Delta C/C \leq \pm 5\%$ 相对于初始值 Relative to the initial	试验温度: 40 ± 2 ⁰ C 相对湿度: 93 ± 2% RH 试验时间: 56 天 Temperature: 40 ± 2 ⁰ C Humidity: 93 ± 2% RH Duration: 56 days	

		value. $\text{tg } \delta \leq 0.0015$ (10KHz) $\text{IR} \geq 50\%$ 规定值 of the rated value	
10	脉冲试验 Impulse test	电容器无永久性击穿 或飞弧	加脉冲次数: 24 max 峰值电压: 2500v Pulse rate 24 max Peak voltage 2500v
11	耐久性 Endurance	外观无可见损伤, 标志清晰 There shall be no evidence of deformation And the marking shall be legible $\Delta C/C \leq \pm 10\%$ 相对于初始值 Relative to the initial value. $\text{tg } \delta \leq 0.0020$ (10KHz) $\text{IR} \geq 50\%$ 规定值 of the rated value	试验温度: $+110^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 施加电压: $1.25 \times U_R$ 每小时电压升至 1000v, 持续时间 0.1S 试验时间: 1000 h Temperature: $+110^{\circ}\text{C} \pm 2^{\circ}\text{C}$ Voltage: $1.25 \times U_R$ The voltage rises to 1000v per hour Duration 0.1s Duration: 1000h
12	阻燃性试验 Flame retardant test	离开火焰后, 任一电容器继续 燃烧的时间不超过 30 秒, 且燃烧的 滴落物不应引燃在其下铺设的棉 纸. After leaving the flame, any capacitor shall continue to burn for no more than 30 seconds, and the dripping shall not ignite the cotton paper provided under it.	火焰高度: 12 ± 1 (mm) 在试验的电容器下辅垫棉纸, 每个试 验样品在火焰上暴露一次。 在火焰上暴露时间见下表 Flame height: $12 + 1$ (mm) Each test sample was exposed once to the flame under the test capacitor pad cotton paper. Exposure time to the flame is shown below 10S $250 < V(\text{mm}^3) \leq 500$ 20S $500 < V(\text{mm}^3) \leq 1750$ 30S $1750 < V(\text{mm}^3)$
13	自燃性试验 Spontaneous combustion test	缠绕在电容器上的纱布应不被火 焰燃烧。 Gauze wound around capacitor should not be burned by flame.	样品用未处理过的纯棉布缠绕 至少一层但不能多于两层, 每一样品 应能承受贮能电容器放电 20 次; 每 两次放电之间的间隔应为 5S。 缠绕在电容器上的纱布应不被火焰 燃烧。 The sample shall be wrapped with unprocessed pure cotton cloth in at least one layer but not more than two layers, each sample shall be able to withstand 20 discharge of storage capacitors; The interval between each discharge should be 5S. Gauze wound around capacitor should not be burned by flame. 贮能电容器充电电压 $U_i = 2.5\text{KV } 0\% \sim +7\%$ Storage capacitor charging voltage $U_i = 2.5\text{kv } 0\% \sim +7\%$

■ 产品编带尺寸 Product tape size

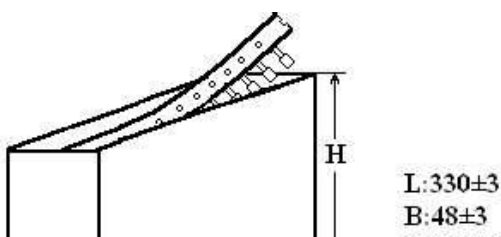
● 外形图 The contour map



● 编带尺寸表 Taping Dimensions

名称	代号	标准尺寸 (mm)	允许误差 (mm)
电容器间距 Taping pitch	P	12.7	±1.0
送带孔距离 Feed hole pitch	Po	12.7	±0.3
电容器与带孔位置 capacitor and hole location	P1	3.85	±0.7
	P2	6.35	±1.3
引线直径 Wire diameter	φ d	0.5/0.6	±0.05
引出线 成型间距	F	5.0	+0.6
			-0.2
电容器侧面倾斜 The capacitor slopes sideways	Δ T	0	±2.0
载体纸带宽度 Carrier tape width	W	18.0	+1.0
			-0.5
热熔胶带纸宽度 Hold down tape width	W0	12.0	±0.5
送带孔位置 Hold position	W1	9.0	+0.75
			-0.5
胶带纸位置 Hold down tape sition	W2	0~3.0	/
引线至孔中心高度 Height of component from tape center	Ho	16.0	±0.5
送带孔直径 Feed hole dia	Do	φ 4.0	±0.3
编带总厚度 Tape thickness	t	0.7	±0.2
引线剪断高度 Height of lead shearing	L	≤11	/

● 径向编带包装箱尺寸 Box sizes for Ammo-pack



A=48±3; B=260±3; C=330±3

■ 波峰焊接 Wave soldering

电容器的内部温度必须

保持如下:

聚 酯: 预热温度+ 125° C

聚丙烯: 预热温度+ 100° C

单波峰焊接

焊接浴温度: T=260°C

停留时间: 5 秒

双波峰焊接

焊接浴温度: T=260°C

停留时间: 5 秒

由于不同的焊接工艺和

热量要求图形仅作为推荐

Internal temperature of the capacitor must be kept as follows:

Polyester: preheating: T max. T 125° C

Polypropylene: preheating: T max. T 100° C

Single wave soldering

Soldering bath temperature: T 260° C

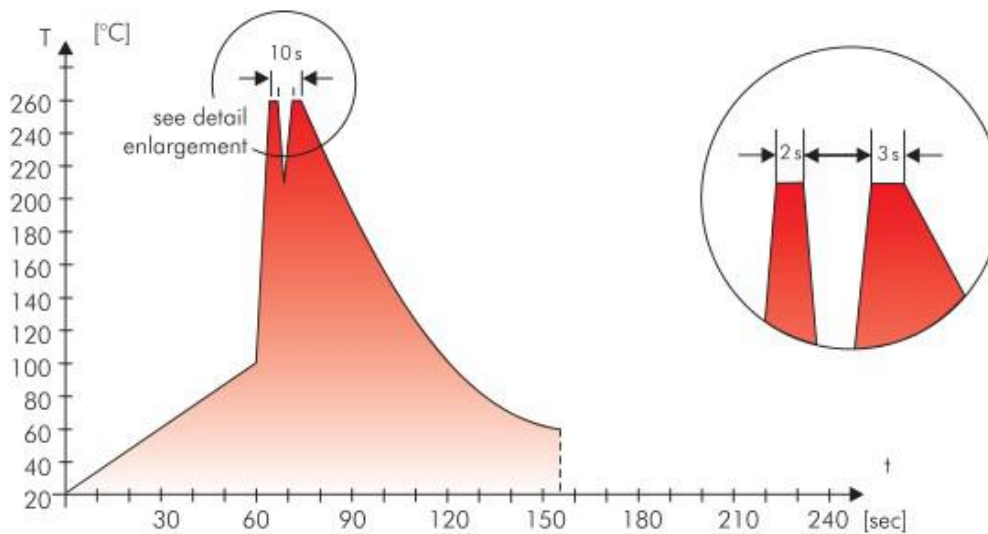
Dwell time: t 5 sec

Double wave soldering

Soldering bath temperature: T 260° C

Dwell time: St 5 sec

Due to different soldering processes and heat requirements the graphs are to be regarded as a recommendation only.



双波焊接的典型温度/时间图

Typical temperature/time graph for double wave soldering