



# 规格承认书

## SPECIFICATION FOR APPROVAL

产品名称: 金属化聚酯膜介质电容器  
 Product Name: Metallized polyester film dielectric capacitor  
 产品型号: CL21X/CL21  
 Product Type: \_\_\_\_\_  
 产品编码: 21X0250V473K05BLAY\*\*  
 Product Code: \_\_\_\_\_  
 客户名称: \_\_\_\_\_  
 Customers Name: \_\_\_\_\_  
 客户编码: \_\_\_\_\_  
 Customers Code: \_\_\_\_\_  
 日期: 2022. 08. 02  
 Issue Date: \_\_\_\_\_

<p>浙江七星电子股份有限公司 Zhejiang Qixing Electronics Corp., Ltd.</p>	<p>承认厂商 Approved by Customer</p>
<p>拟制 Drafted 审批 Examine and approve</p>	
<p>邵宇星 Yuxing Shao</p>	<p>李仲良 Zhongliang LI</p>



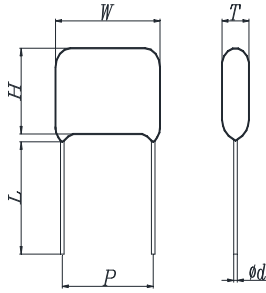
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# CL21X 金属化聚酯膜电容器

## CL21X Metallized polyester film capacitor



### ■ 特点

- 体积小、重量轻
- 自愈性好、可靠性高

### ■ 主要用途

- 旁路，隔直，耦合，退耦
- 脉冲，逻辑，定时，紧凑型节能灯
- LCD 监视器整流，汽车直流马达抑制干扰

### ■ Characteristic:

- Small size, Light weight.
- Excellent self-healing property and reliability.

### ■ Main purpose

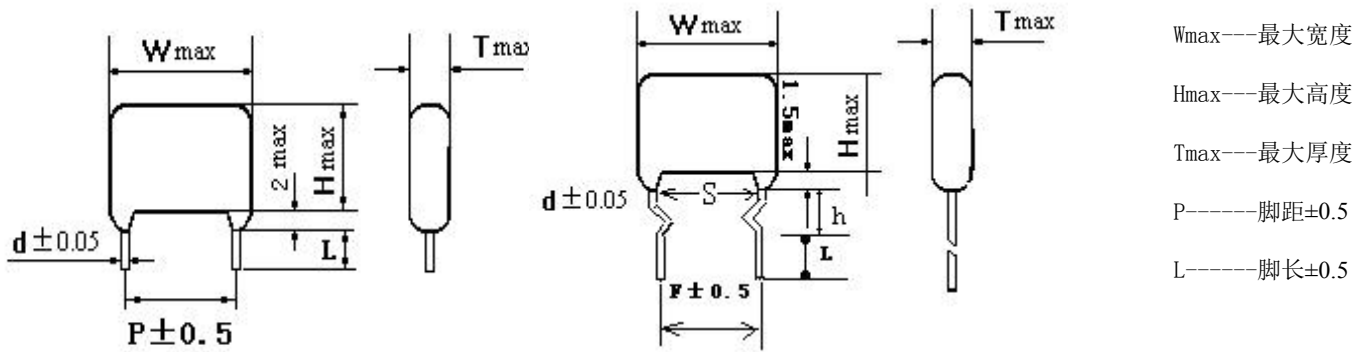
- Bypass, partition, coupling, decoupling.
- Pulse, logic, timing, compact CFL.
- LCD monitor rectification, automotive DC motor suppression interference

### ■ 技术要求 Technical requirements

引用标准 Reference criteria	GB/T 7332 (IEC 60384-2)		
气候类别 Climate category	55/105/56		
额定温度 Rated temperature	85°C		
工作温度 Operating temperature	-55°C~105°C (+85°C to +105°C: decreasing factor 1.25% per°C for Ur(dc))		
额定电压 Rated voltage	50/63v; 100v; 250v; 400v		
电容量范围 Electricity capacity range	0.001μF~2.2μF		
电容量偏差 Capacitance deviation	±5% (J), ±10% (K), ±20% (M)		
耐电压 Voltage resistance	1.4Ur (2s)		
损耗角正切值 Loss angle tangent	频率 Frequency	Cn ≤ 0.1 μF	C > 0.1 μF
	1KHz	tg δ ≤ 0.0080	tg δ ≤ 0.0100
	10KHz	tg δ ≤ 0.0120	tg δ ≤ 0.0150
	100KHz	tg δ ≤ 0.0250	-
绝缘电阻 Insulation resistance	Ur ≤ 100V	R ≥ 3750MΩ Cn ≤ 0.33 μF	+25 ± 5°C 10V
		IR ≥ 1250S Cn > 0.33 μF	1min
		IR ≥ 1000S Cn = 1~2.2 μF	
	Ur > 100V	R ≥ 15000 MΩ Cn ≤ 0.33 μF	+25 ± 5°C 100V
		IR ≥ 5000S Cn > 0.33 μF	1min
最大脉冲爬升: Maximum Pulse Climbing Rate: 若实际工作电压 U 比额定电压 Ur 低, 电容器可工作在更高的 dv/dt 场合, 这样 dv/dt 允许值应为右表值乘以 Ur/U If the actual working voltage U is lower than the rated voltage Or, the capacitor can work in a higher dv/dt case so that the dv/dt allowed value should be multiplied by the right table value Ur/U	Ur (V)	dV/dt (V/μs)	
	50V	75	
	63V	75	
	100V	85	
	250V	100	
	400V	150	

## ■ 电容器外形尺寸 Capacitor dimensions

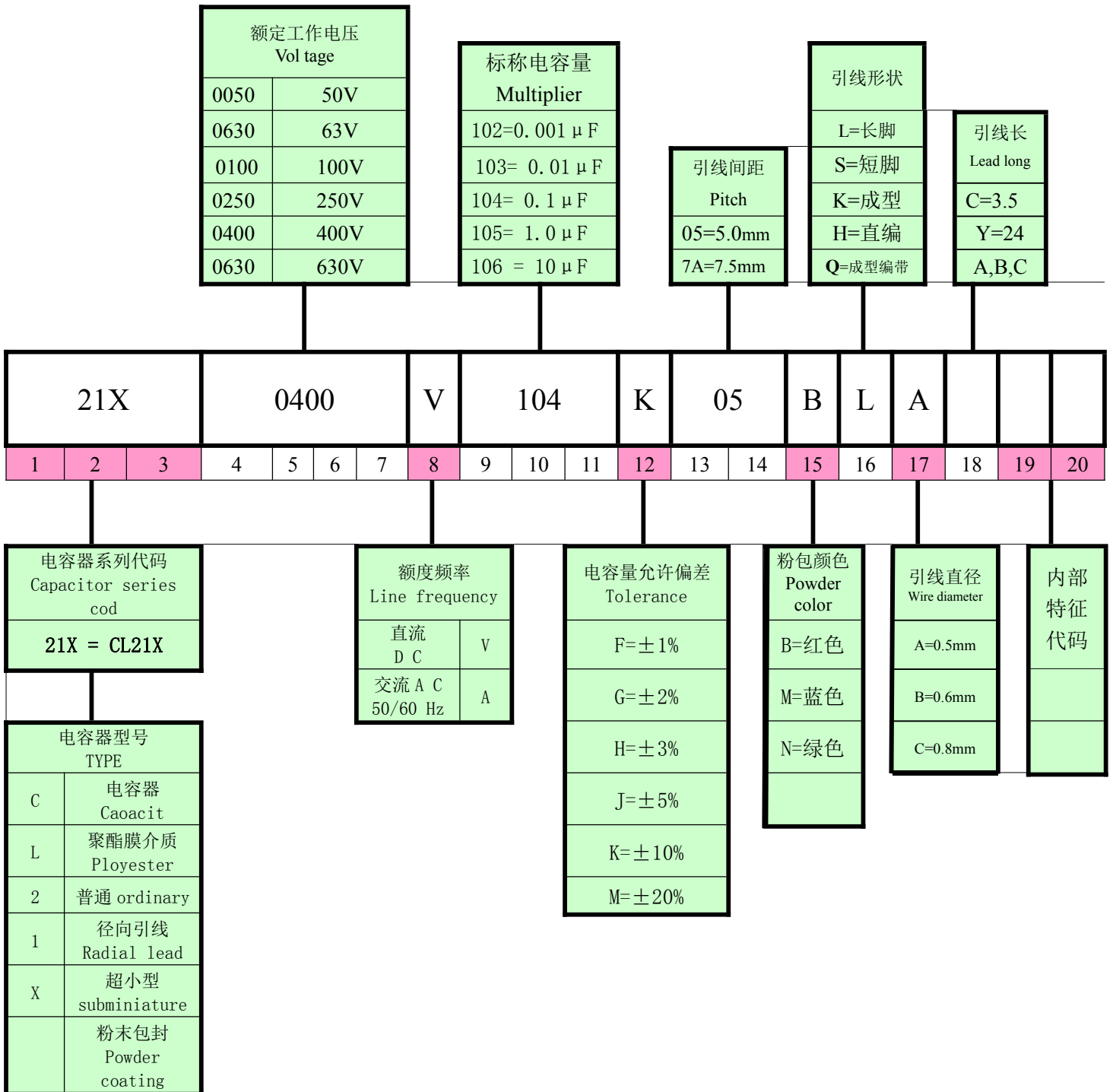
50V/63V (40VAC)							100V (63VAC)						
电容量 CAP	电容器外形尺寸 Capacitor dimensions					电容器代码 Part number	电容量 CAP	电容器外形尺寸 Capacitor dimensions					电容器代码 Part number
	T	H	W	P	Φd			T	H	W	P	Φd	
0.001	3.5	6.0	7.3	5.0	0.5	21X0063V102****	0.001	3.5	6.0	7.3	5.0	0.5	21X0100V102****
0.0015	3.5	6.0	7.3	5.0	0.5	21X0063V152****	0.0015	3.5	6.0	7.3	5.0	0.5	21X0100V152****
0.0022	3.5	6.0	7.3	5.0	0.5	21X0063V222****	0.0022	3.5	6.0	7.3	5.0	0.5	21X0100V222****
0.0033	3.5	6.0	7.3	5.0	0.5	21X0063V332****	0.0033	3.5	6.0	7.3	5.0	0.5	21X0100V332****
0.0047	3.5	6.0	7.3	5.0	0.5	21X0063V472****	0.0047	3.5	6.0	7.3	5.0	0.5	21X0100V472****
0.01	4.0	6.5	7.3	5.0	0.5	21X0063V103****	0.01	4.0	6.5	7.3	5.0	0.5	21X0100V103****
0.015	4.0	6.5	7.3	5.0	0.5	21X0063V153****	0.015	4.0	6.5	7.3	5.0	0.5	21X0100V153****
0.022	4.0	6.5	7.3	5.0	0.5	21X0063V223****	0.022	4.0	6.5	7.3	5.0	0.5	21X0100V223****
0.033	4.0	6.5	7.3	5.0	0.5	21X0063V333****	0.033	4.0	6.5	7.3	5.0	0.5	21X0100V333****
0.047	4.0	6.5	7.3	5.0	0.5	21X0063V473****	0.047	4.0	6.5	7.3	5.0	0.5	21X0100V473****
0.068	4.0	6.5	7.3	5.0	0.5	21X0063V683****	0.068	4.0	6.5	7.3	5.0	0.5	21X0100V683****
0.1	4.0	6.5	7.3	5.0	0.5	21X0063V104****	0.1	4.5	7.5	7.3	5.0	0.5	21X0100V104****
0.15	4.5	7.0	7.3	5.0	0.5	21X0063V154****	0.15	4.5	7.5	8.5	5.0	0.5	21X0100V154****
0.22	4.5	7.0	8.5	5.0	0.5	21X0063V224****	0.22	5.0	7.5	8.5	5.0	0.5	21X0100V224****
0.33	5.5	8.5	9.5	5.0	0.5	21X0063V334****	0.33	5.5	8.5	9.5	5.0	0.5	21X0100V334****
0.47	6.0	9.0	9.5	5.0	0.5	21X0063V474****	0.47	6.0	10	9.5	5.0	0.5	21X0100V474****
0.68	6.5	10	9.5	5.0	0.6	21X0063V684****	0.68	7.5	12	9.5	5.0	0.6	21X0100V684****
1.0	8.5	12	9.5	5.0	0.6	21X0063V105****	1.0	10	14	9.5	5.0	0.6	21X0100V105****
250V (160VAC)							400V (200VAC)						
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	
0.001	3.5	6.0	7.3	5.0	0.5	21X0250V102****	0.001	3.5	6.0	7.3	5.0	0.5	21X0400V102****
0.0015	3.5	6.0	7.3	5.0	0.5	21X0250V152****	0.0015	3.5	6.0	7.3	5.0	0.5	21X0400V152****
0.0022	3.5	6.0	7.3	5.0	0.5	21X0250V222****	0.0022	3.5	6.0	7.3	5.0	0.5	21X0400V222****
0.0033	3.5	6.0	7.3	5.0	0.5	21X0250V332****	0.0033	4.0	6.5	7.3	5.0	0.5	21X0400V332****
0.0047	3.5	6.0	7.3	5.0	0.5	21X0250V472****	0.0047	4.0	6.5	7.3	5.0	0.5	21X0400V472****
0.01	4.0	6.5	7.3	5.0	0.5	21X0250V103****	0.01	4.5	7.5	11	5.0	0.5	21X0400V103****
0.015	4.0	6.5	7.3	5.0	0.5	21X0250V153****	0.015	5.0	8.0	11	5.0	0.5	21X0400V153****
0.022	4.5	7.0	7.3	5.0	0.5	21X0250V223****	0.022	5.5	8.5	11	5.0	0.6	21X0400V223****
0.033	4.5	7.0	7.3	5.0	0.5	21X0250V333****	0.033	6.0	9.0	11	5.0	0.6	21X0400V333****
0.047	4.5	7.0	7.3	5.0	0.5	21X0250V473****	0.047	6.5	9.5	11	5.0	0.6	21X0400V473****
0.068	4.5	8.0	9.5	5.0	0.5	21X0250V683****	0.1	6.3	10.5	7.5	5.0	0.5	21X0400V104****
0.1	4.5	8.0	9.5	5.0	0.5	21X0250V104****	0.1	7.0	11.0	11	5.0	0.6	21X0400V104****
0.15	5.5	9.0	9.5	5.0	0.6	21X0250V154****							
0.22	8.0	12	9.5	5.0	0.6	21X0250V224****							

**■承认规格登记表 Size and specification**
**●尺寸 (mm) (T\*H\*W)**

**●.规格 Specification:**

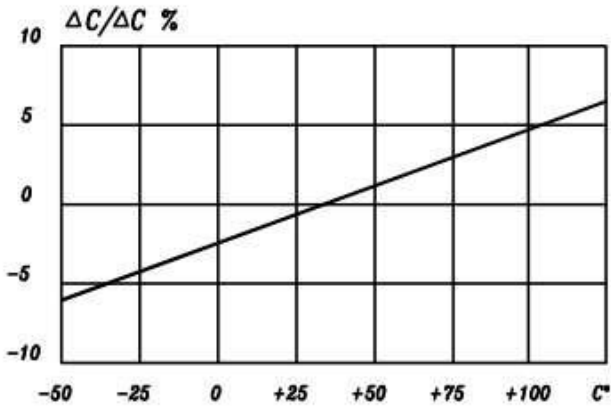
序号 NO	客户料号 Customer NO	七星料号 Spec NO	规格型号 Specification	尺寸 Size T*H*W*P	线径 Line	脚长 Length	备注 Note
1	--	21X0250V473 K05BLAY**	CL21X-250V473K	4.8*9.0*7.2*5.0	0.5	≥20	--

**■ 电容器编码说明 Capacitor coding specification**

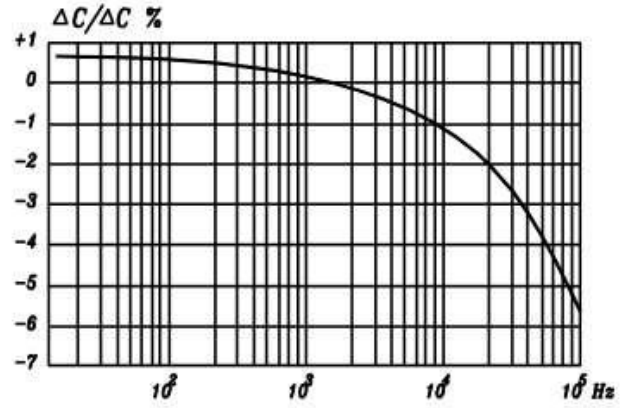
● 20 位电容器代码如下：The code of the 20-bit capacitor at the center is as follows:



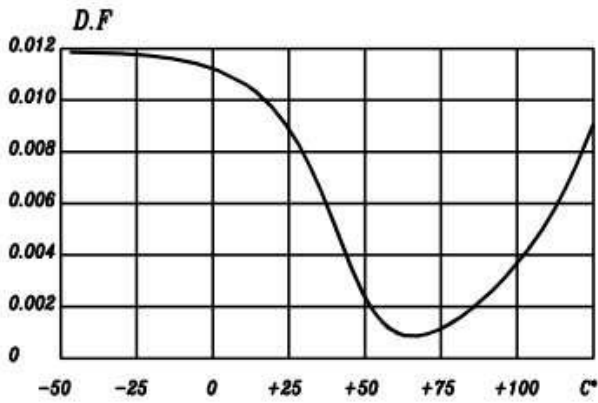
■特性曲线图 Characteristic curve



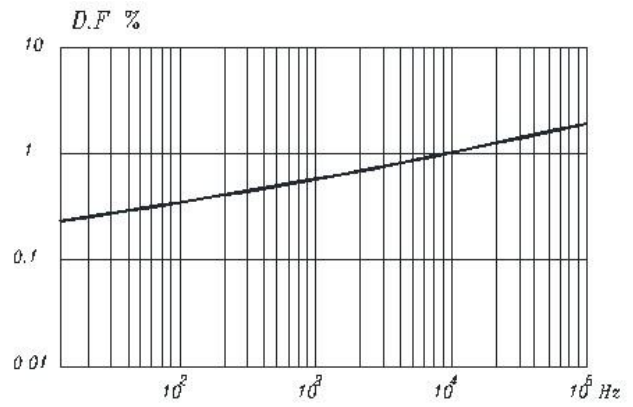
电容量随温度变化的曲线 (1KHz)  
Is the temperature curve of the capacitance



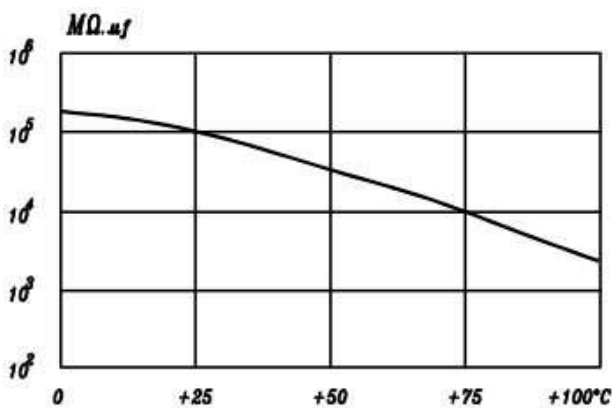
电容量随频率变化的曲线  
Capacitance may vary in frequency



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



损耗角正切值随温度变化的曲线  
The curve of the tangential value of loss Angle varying with frequency



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

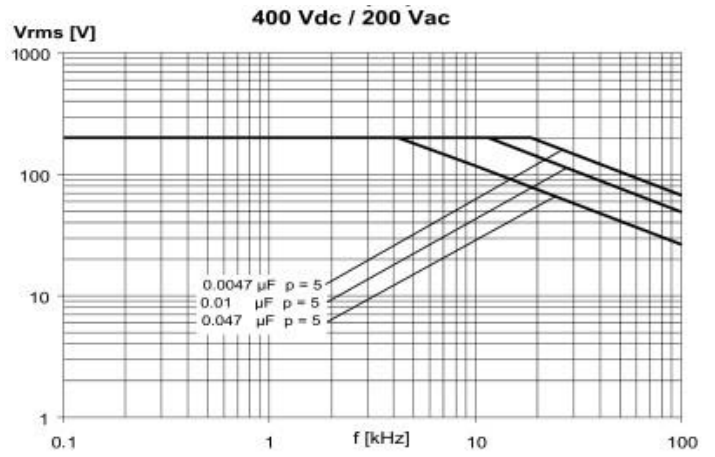
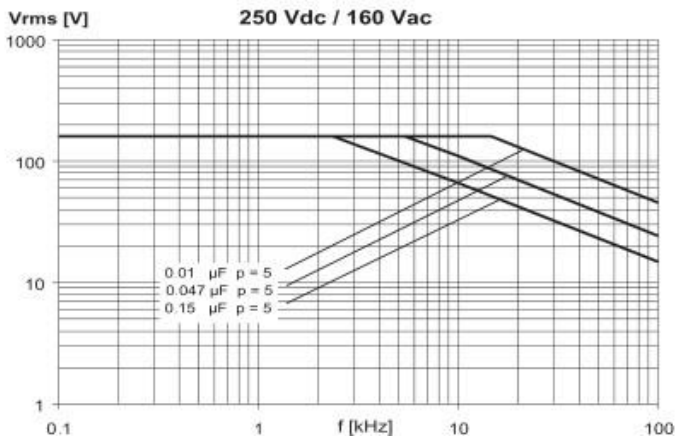
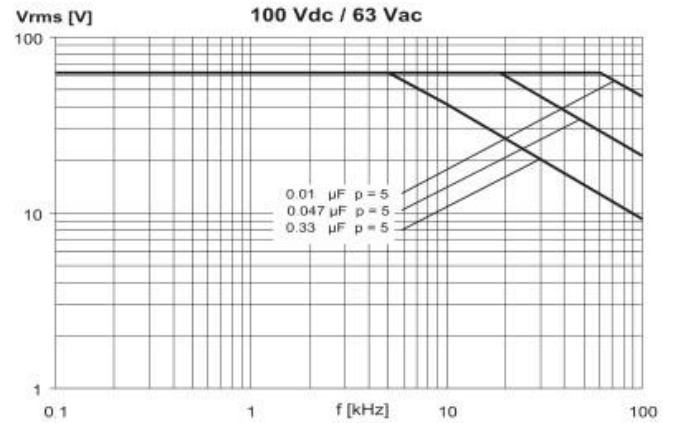
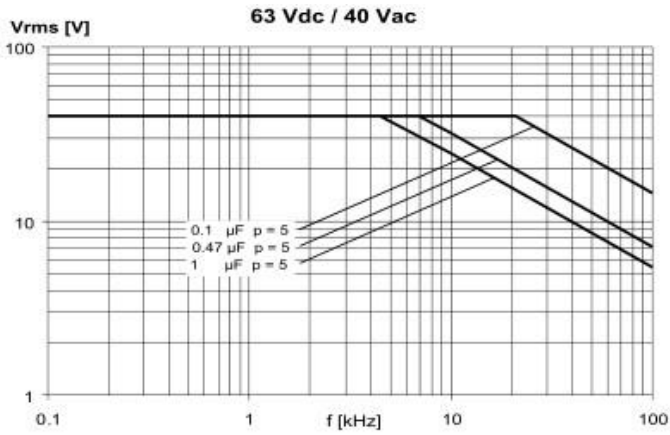
### ■性能及测试方法 Performance and test methods

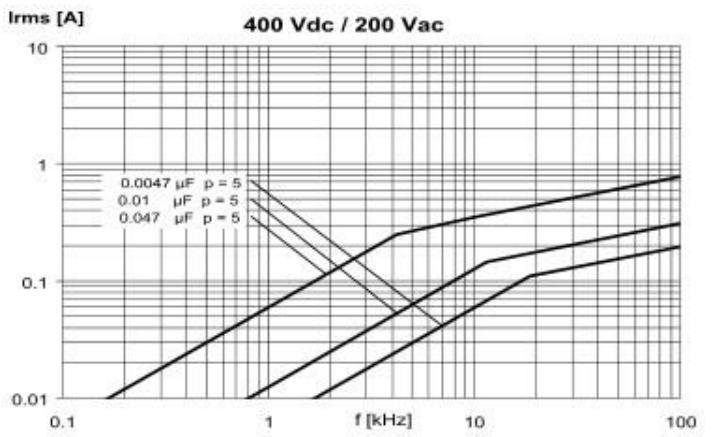
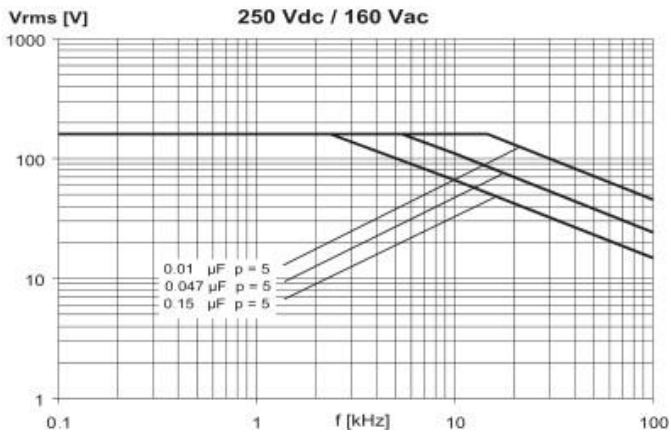
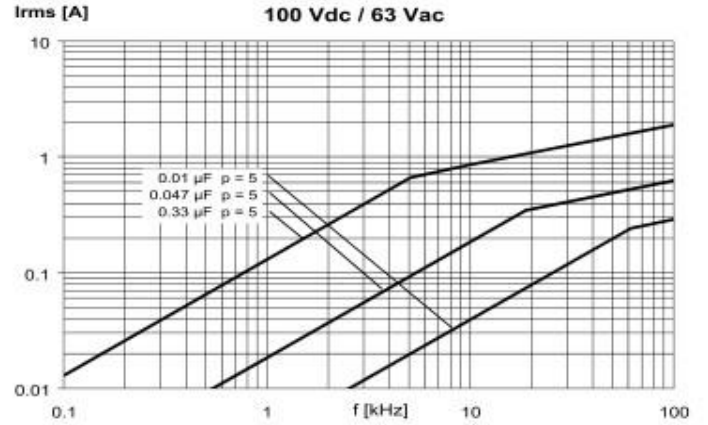
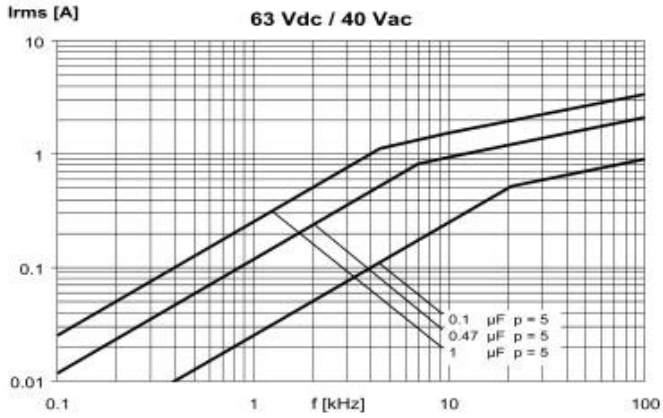
No	项目 Item	性能与判据 Performance and criteria	测试方法 Test method (IEC60384-2)
1	电容量允许偏差 Capacitance tolerance	$\pm 5\%$ (J), $\pm 10\%$ (K), $\pm 20\%$ (M)	
2	损耗角的正切 Tangent of the loss angle	$\text{tg } \delta \leq 0.0080$ (1KHz) $\text{tg } \delta \leq 0.0120$ (10KHz)	典型测量频率: 1KHz Typical measuring frequency: 1KHz
3	耐电压 Dielectric strength	无飞弧或击穿 There shall be no breakdown or flashover	1.4Ur 2sec
4	绝缘电阻 Insulation resistance	Ur $\leq$ 100V R $\geq$ 3750M $\Omega$ Cn $\leq$ 0.33 $\mu$ F IR $\geq$ 1250S Cn $>$ 0.33 $\mu$ F IR $\geq$ 1000S Cn=1~2.2 $\mu$ F	充电电压 Ur $\leq$ 100V Charging voltage 10v 环境温度 20 $^{\circ}$ C, 测量时间 60S
5	可焊性 Solder ability	Good quality of tinning 镀锡良好	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 & 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 Ual: 拉力 Pull: $\phi$ d=0.5mm 5N $\phi$ d=0.6mm 10N 弯曲试验 bend Ub: 弯力 The quill 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	$\Delta C/C \leq \pm 2\%$ 相对于初始值 Relative to the initial value. $\text{tg } \delta \leq 0.015$ (10KHz)	
7	初始测量 Initial measurement	电容量与损耗 Capacitance & 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= -55 $^{\circ}$ C $\Theta$ b= +105 $^{\circ}$ 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 <sup>2</sup>

			三个方向每个方向各 2h 共 6h Ferequance10~500HZ Amplitude0.75m;Acceleration98m/ S <sup>2</sup> 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 <sup>2</sup> 脉冲持持续时间 : 6ms Bump times: 4000 Acceleration: 390m/S <sup>2</sup> Duration of pulse: 6ms	
	最后的测量 Final measurement	$\Delta C/C \leq \pm 5\%$ 相对于初始值 Relative to the initial value. $\text{tg } \delta \leq 0.015$ (10KHz) IR $\geq 50\%$ 规定值 of the rated value		
8	初始测量 Initial measurement	电容量与损耗 Capacitance & $\text{tg } \delta$ (10KHz)		
	干热 Dry heat		+105 <sup>0</sup> C 持续 16 小时 +105 <sup>0</sup> 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		-55 <sup>0</sup> C 持续 2h -55 <sup>0</sup> C lasts for 2 hours	
	气候顺序 Climate sequence	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 <sup>0</sup> C~35 <sup>0</sup> C 大气压 8.5kpa 持续 1 小时 The pressure of 15 <sup>0</sup> C~35 <sup>0</sup> 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 $\Delta C/C \leq \pm 5\%$ 相对于初始值 Relative to the initial value. $\text{tg } \delta \leq 0.015$ (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 value. $\text{tg } \delta \leq 0.015$ (10KHz) IR $\geq 50\%$ 规定值 of the rated value	试验温度: 40 $\pm$ 2 <sup>0</sup> C 相对湿度: 93 $\pm$ 2% RH 试验时间: 56 天 Temperature: 40 $\pm$ 2 <sup>0</sup> C Humidity: 93 $\pm$ 2% RH Duration:56days	
10		外观无可见损伤, 标志清晰 There shall be no evidence of deformation And the marking shall be legible	试验温度: +85 <sup>0</sup> C/+105 <sup>0</sup> C $\pm$ 2 <sup>0</sup> C 施加电压: 1.25 $\times$ UR/1.25Uc	



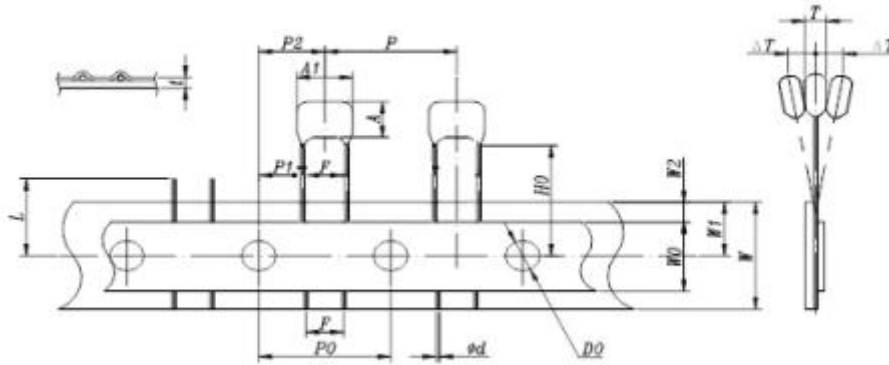
	耐久性 Endurance	$\Delta C/C \leq \pm 5\%$ 相对于初始值 Relative to the initial value. $\text{tg } \delta \leq 0.015$ (10KHz) $IR \geq 50\%$ 规定值 of the rated value	$(U_c = 0.5 U_R)$ 试验时间: 1000 h Temperature: $+85^\circ\text{C}/+105^\circ\text{C} \pm 2^\circ\text{C}$ Voltage: $1.25 \times U_R / 1.25 U_c$ $(U_c = 0.5 U_R)$ Duration: 1000h
<b>11</b>	温度特性 Temperature characteristic	在 b, d, f 点上进行电容量测量 <b>在下限类别温度<math>-55^\circ\text{C}</math>时的特性:</b> $-10\% \leq (C_b - C_d) / C_d \leq +10\%$ <b>在上限类别温度<math>+105^\circ\text{C}</math>时的特性:</b> $0\% \leq (C_b - C_d) / C_d \leq +10\%$ Measuring capacitance at test point b,d,f: Characteristic at lower category temperature $-55^\circ\text{C}$ $-10\% \leq (C_b - C_d) / C_d \leq +10\%$ Characteristic at upper category temperature $+105^\circ\text{C}$ $0\% \leq (C_b - C_d) / C_d \leq +10\%$	静态方法:电容器应依次保持以下温度: a ( $20 \pm 2^\circ\text{C}$ ), b ( $-55 \pm 3^\circ\text{C}$ ), d ( $20 \pm 2^\circ\text{C}$ ), f ( $+105 \pm 3^\circ\text{C}$ ), g ( $20 \pm 2^\circ\text{C}$ ) Static method :the Capacitors should be kept at the following temperature in turn: a ( $20 \pm 2^\circ\text{C}$ ), b ( $-55 \pm 3^\circ\text{C}$ ), d ( $20 \pm 2^\circ\text{C}$ ), f ( $+105 \pm 3^\circ\text{C}$ ), g ( $20 \pm 2^\circ\text{C}$ )
<b>12</b>	充放电 Charging and discharging	$\Delta C/C \leq \pm 5\%$ 相对于初始值 Relative to the initial value. $\text{tg } \delta \leq 0.015$ (10KHz) $IR \geq 50\%$ 规定值 of the rated value	Times:10000 Duration of charging:0.5S Duration of discharging:0.5S Charging :rated voltage Charging resistance: $220/C_r$ ( $\Omega$ ) Discharging resistance: $R = 10/C_r$ ( $\Omega$ ) or $20 \Omega$ ( whichever is the greater ) Cr: rated capacitance 充放电次数: 10000 次 充电持续时间:0.5S 放电持续时间:0.5S 充电电压为额定电压 充电电阻: $220/C_r$ ( $\Omega$ ) 放电电阻: $R = 10/C_r$ ( $\Omega$ ) 或 $20 \Omega$ ( 取较大者 ) Cr:为标称电容量

**■最大电压 (Vr.m.s) / 频率表 (正弦波形 / 环境温度 ≤ 40° C)**
**MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)**


**■最大电流 (I<sub>r.m.s</sub>) / 频率表 (正弦波形/环境温度 ≤ 40° C)**
**MAX. CURRENT (I<sub>r.m.s</sub>) VERSUS FREQUENCY (sinusoidal wave-form / T<sub>h</sub> ≤ 40°C)**


■ 产品编带尺寸 Product tape size

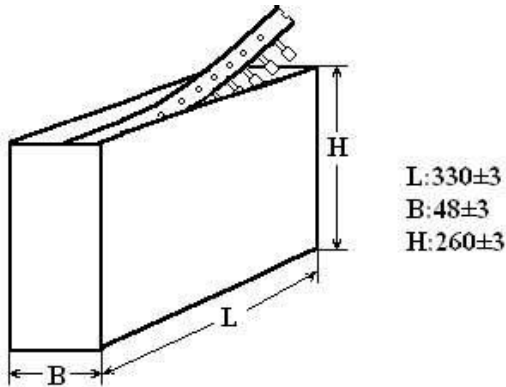
● 外形图 The contour map



● 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	P0	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	0~5.0	/
引线至孔中心高度 Height of component from tape center	Ho	18.0	±0.5
送带孔直径 Feed hole dia	Do	φ 4.0	±0.3
编带总厚度 Tape thickness	t	0.4	±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



■ 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

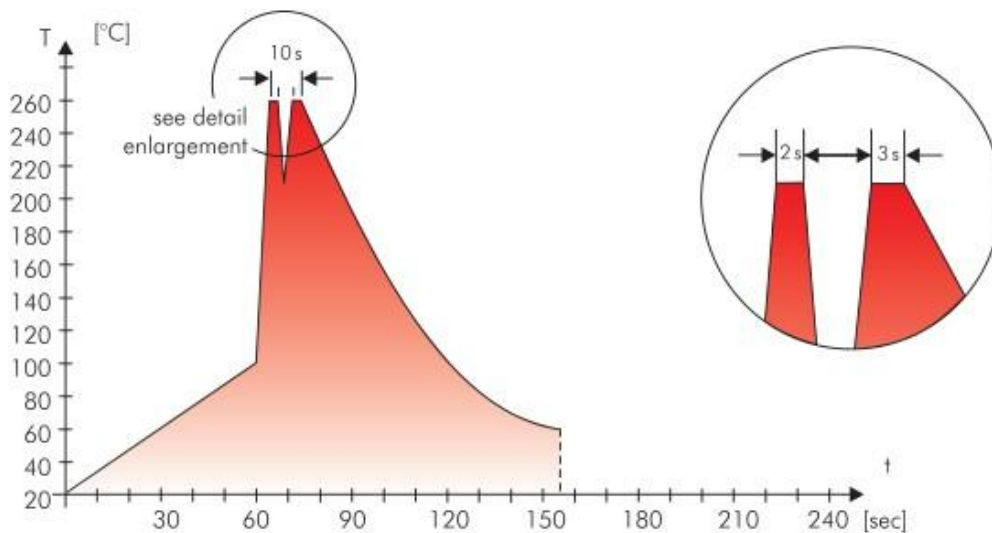
Internal temperature of the capacitor must be kept as follows:

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