

# PRODUCT SPECIFICATION

## 产品规格书

**PRODUCT:** Safety Standard Certified Ceramic Capacitors, Reinforced Insulation Type  
增强绝缘型安规陶瓷电容器

**TYPE:** AR-X1/Y1 Series(X1/Y1:500V~;1500Vdc)

**CUSTOMER:** \_\_\_\_\_

**DOC. NO.:** HW-C10-01  
\_\_\_\_\_  
\_\_\_\_\_

APPROVED BY CUSTOMER

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## Record of change 更改记录

Date 日期	Version 版次	Description 更改内容描述	Page 页次
2023/8/23	1	1 <sup>st</sup> edition 初版	



**1. Part Numbering 产品编码:**

(1)	(2~3)	(4~6)	(7)	(8~9)	(10)	(11~12)	(13)	(14)	(15~18)
E	AS	472	M	14	D	20	C	A	0000

**(1) Temperature characteristic 温度特性:**

Code 代码	T.C.温度特性	Cap. Change rate 容量变化率	Oper. Temp. 工作温度
S	SL(Class1)	-1000~+350ppm/°C (+20°C~+85°C)	-40°C~+125°C
B	Y5P(Class2)	±10% (-25°C~+85°C)	
E	Y5U(Class2)	-56% to +22% (-25°C~+85°C)	
F	Y5V(Class2)	-82% to +22% (-25°C~+85°C)	

**(2~3) Type/Class 型号/等级电压:**

AS: AR type, X1/Y1: 500Vac; 1500Vdc

**(4~6) Capacitance 静电容量(identified by 3-figure code 三位数表示): Ex. 120=12pF, 332=3300pF**
**(7) Capacitance tolerance 容量允差: J:±5%,K:±10%,M:±20%**
**(8~9) Normal body diameter dimension 本体直径: Dmax refer to the item 6 最大直径参考第 6 项**
**(10) Lead style 引线型状:**

Code 代码	Description 描述	Code 代码	Description 描述
B	Straight lead 直脚	X	Outside kink lead 外弯脚
D	Vertical kink lead 垂直弯脚	S	Straight kink lead 直弯脚

**(11~12) Packing mode and lead length 包装方式、脚长:**

Taping code 编带	Description 描述	Bulk code 散装	Description 描述
AM	Ammo box / Pitch:25.4 mm / Lead space10.0mm or 7.5mm	03	Lead length: 3.0mm
AS	Ammo box / Pitch:15.0 mm / Lead space10.0mm (for Y1 2200pF 以下产品)	3E	Lead length: 3.5mm
AT	Ammo box / Pitch:30.0 mm / Lead space10.0mm (for Y1 3300pF 以上产品)	04	Lead length: 4.0mm
		4E	Lead length: 4.5mm
		20	Lead length: 20mm

**(13) Lead length tolerance 脚长误差:**

Code 代码	Description 描述	Code 代码	Description 描述
A	±0.5 mm (Only for kink lead type)	C	Minimum.
B	±1.0 mm	D	Taping special purpose
K	±0.3 mm		

**(14) Lead space 脚距:**

Code 代码	Description 描述	Code 代码	Description 描述
0	10.0±0.5 mm	A	10.0±1 mm
C	12.5±0.5 mm	D	12.5±1 mm

**(15~18) Individual specification code 个别内控码:**

0000: Normal products, omit code. 表示标准品, 号码省略。

Any other four codes: Individual specification can't contain in above codes. 其它四码表示内控代码。

## 2. Applications 应用:

X/Y capacitors are used for AC line filters and primary-secondary coupling on switching power supplies and AC adapters applications, are also well-suited for applications that require keeping potentially disruptive or damaging line transients and EMI out of susceptible equipment, such as D-A isolation and noise absorption for DAA modems without transformers. X/Y 电容用于交流线路滤波器、开关电源初次级耦合及 AC 适配器, 也非常适合应用于线保护和抑制电磁干扰, 如无变压器 DAA 调制调解器的 D-A 绝缘和降噪。

## 3. Features 特点:

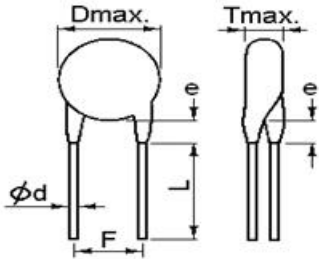
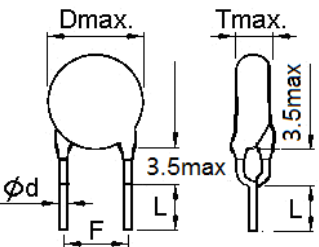
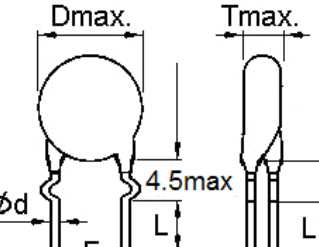
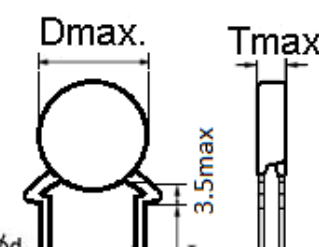
- 3.1 Compact size.体积小
- 3.2 Operating temperature range guaranteed up to 125 degrees C.工作温度上限可保证值达 125°C.
- 3.3 Dielectric strength: AC4000V.介电强度 4000Vac
- 3.4 Class X1/Y1 capacitors certified by UL/CUL/VDE/ENEC/CB/CQC.
- 3.5 Can be use with a component in appliances requiring reinforced insulation and double insulation based on UL1492, IEC60065 and IEC60950.依据标准 UL1492/IEC60065/IEC60950, 可与需要增强绝缘或双重绝缘的电气用品中的组件一起使用.
- 3.6 Coated with flame-retardant epoxy resin (conforming to UL94V-0 standard).涂有阻燃环氧树脂层(符合 UL94V-0 标准)
- 3.7 Comply with EU RoHS, and Halogen-free products 符合欧盟 RoHS 指令, 无卤产品.
- 3.8 Taping available for automatic insertion.可提供适合于自动插件需求的编带品.

## 4. Standard certification 标准认证 :

Safety institute 安规机构	Standard No. 标准	Subclass 小类	Rated voltage 额定工作电压	Certified No. 认证号码
UL	UL 60384-14	X1/Y1	500Vac / 1500Vdc	E480105(FOWX2)
cUL	CSA E60384-14			E480105(FOWX8)
CQC	IEC60384-14			CQC16001140450

**5. Available code of lead type/lead length/lead space code (unit: mm):**

可适用的线脚类型、线脚长度、线脚脚距代码。

P/N (10-14)digits 料号第 10~14 码	Lead type 线型	Lead Length 线脚长度 (L)	Lead space 线脚距离(F)	Packing 包装方式	Lead Configuration 线型外观图
B20CA	Type B Straight lead 直脚	20 min.	10 ± 1.0	Bulk 散料	
B03B0		3.0 ± 1.0	10 ± 0.5		
B3EB0		3.5 ± 1.0	10 ± 0.5		
B04B0		4.0 ± 1.0	10 ± 0.5		
B4EB0		4.5 ± 1.0	10 ± 0.5		
BA*D0		Refer to "7. Taping format"	10 ± 0.5	Ammo taping 折叠编带	
D20CA	Type D Vertical kink lead 垂直弯脚	20 min.	10 ± 1.0	Bulk 散料	
D03A0		3.0 ± 0.5	10 ± 0.5		
D3EA0		3.5 ± 0.5	10 ± 0.5		
D04A0		4.0 ± 0.5	10 ± 0.5		
D4EA0		4.5 ± 0.5	10 ± 0.5		
DA*D0		Refer to "7. Taping format"	10 ± 0.5	Ammo taping 折叠编带	
X20CA	Type X Outside kink lead 外弯脚	20 min	10 ± 1.0	Bulk 散料	
X03A0		3.0 ± 0.5	10 ± 0.5		
X3EA0		3.5 ± 0.5	10 ± 0.5		
X04A0		4.0 ± 0.5	10 ± 0.5		
X4EA0		4.5 ± 0.5	10 ± 0.5		
XA*D0		Refer to "7. Taping format"	10 ± 0.5	Ammo taping 折叠编带	
S20CA	Type S Straight kink lead 直弯脚	20 min	10 ± 1.0	Bulk 散料	
S03A0		3.0 ± 0.5	10 ± 0.5		
S3EA0		3.5 ± 0.5	10 ± 0.5		
S04A0		4.0 ± 0.5	10 ± 0.5		
S4EA0		4.5 ± 0.5	10 ± 0.5		
SA*D0		Refer to "7. Taping format"		Ammo taping 折叠编带	

 \* Lead wire diameter 线脚直径  $\Phi d$ : 0.55 +/-0.1mm

\*e (Coating extension on leads 包封脚长):

2.0mmMax for straight lead lead style, not exceed the nethermost kink for kink lead.

直脚品最大值 2.0mm, 弯脚品包封脚不低于最下方的折弯处。

**6. AR Type--Class X1/Y1 Parts list(AR-X1/Y1 系列料号列表):**

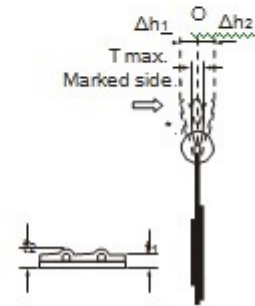
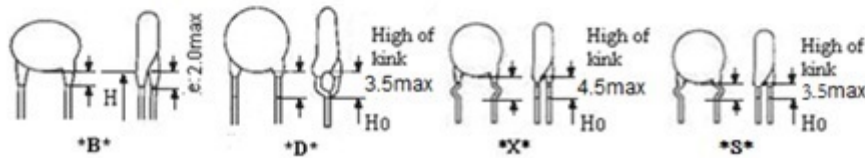
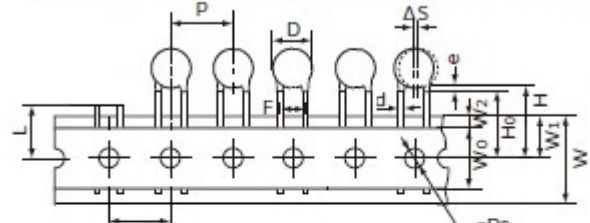
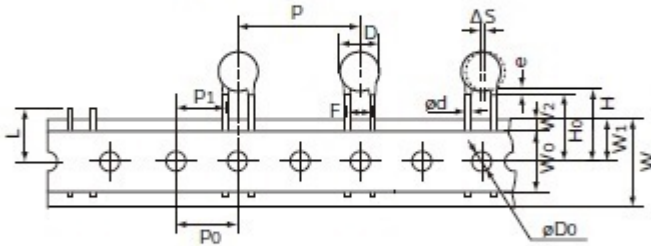
Part Number 料号	Temp. Char. 材质	Cap.(pF) 标称电容值	Tol. 电容允差	Dimension 尺寸 (mm)		
				D max. 最大产品 直径	T max. 最大产品 厚度	Lead wire Dia. (φd)线脚直径
SAS100J06*****0000	SL	10	±5%	7.0	5.0	0.55±0.1
SAS150J06*****0000		15		7.0		
SAS200J06*****0000		20		7.0		
SAS220J06*****0000		22		7.0		
SAS330J06*****0000		33		7.0		
SAS470J07*****0000		47		8.0		
SAS680J08*****0000		68		9.0		
BAS101K06*****0000	Y5P	100	±10%	7.0	5.0	
BAS151K06*****0000		150		7.0		
BAS221K06*****0000		220		7.0		
BAS331K07*****0000		330		8.0		
BAS471K07*****0000		470		8.0		
BAS561K08*****0000		560		9.0		
BAS681K09*****0000		680		10.0		
BAS821K09*****0000	820	10.0				
BAS102K10*****0000	1000	11.0				
EAS681M06*****0000	Y5U	680	±20%	7.0	5.0	
EAS102M07*****0000		1000		8.0		
EAS152M09*****0000		1500		10.0		
EAS222M10*****0000		2200		11.0		
EAS332M12*****0000		3300		13.0		
EAS392M13*****0000		3900		14.0		
EAS472M14*****0000		4700		15.0		
FAS102M06*****0000	Y5V	1000	±20%	7.0	5.5	
FAS152M07*****0000		1500		8.0		
FAS222M08*****0000		2200		9.0		
FAS332M09*****0000		3300		10.0		
FAS472M11*****0000		4700		12.0		

**7. Taping format for AR-X1/Y1 type (AR-X1/Y1 系列编带型式):**

- 25.4mm pitch/lead spacing 10mm taping  
Lead code: \*DAMD0\* & \*BAMD0\* & \*XAMD0\* & \*SAMD0\*

- 30mm pitch/lead spacing 10mm taping  
Lead code: \*DATD0\* & \*BATD0\* & \*XATD0\* & \*SATD0\*


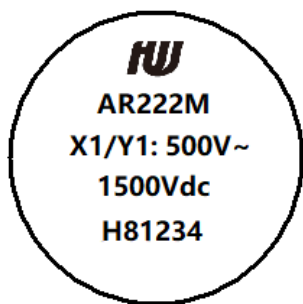
- 15mm pitch/lead spacing 10mm taping  
Lead code: \*DASD0\* & \*BASD0\* & \*SASD0\*



Part number code		*BAMD0* / *DAMD0* / *XAMD0* / *SAMD0*	*BATD0* / *DATD0* / *XATD0* / *SATD0*	*DASD0* / *BASD0* / *SASD0*
Item	Symbol	Dimensions(mm)		
Pitch of component 零件间距	P	25.4 ± 2	30.0 ± 2	15.0 ± 1
Pitch of sprocket 纸带孔中心距	P0	12.7 ± 0.3	15.0 ± 0.3	15.0 ± 0.3
Lead spacing 线脚中心距	F	10.0 ± 0.5		
Length from hole center to component center 孔中心与零件中心距离	P2	12.7 ± 1.5	15.0 ± 1.5	15.0 ± 1.5
Length from hole center to lead 线脚与孔中心距	P1	7.7 ± 1.5	10.0 ± 1.5	5 ± 0.7
Body diameter 本体直径	D	Refer to previous page		
Deviation along tape, life or right 本体偏移	ΔS	0 ± 2.0		
Carrier tape width 纸带宽度	W	18.0 +1/ -0.5		
Position of sprocket hole 定位孔位置	W1	9.0 ± 0.5		
Lead distance between the kink and center of sprocket hole 线脚高度(折弯至孔中心)	H0	18.0 +2.0/-0 (For lead code: *D* & *X* & *S*)		
Lead distance between the bottom of body and the center of sprocket hole 线脚高度(本体底至孔中心)	H	20.0+1.5/-1.0 (For lead code: *B*)		
Diameter of sprocket hole 定位孔直径	D0	4.0 ± 0.2		
Lead diameter 线脚直径	φd	0.55±0.1		
Total tape thickness 载带总厚度	t1	0.6 ± 0.3		
Total thickness, tape and lead wire 载带加线脚总厚度	t2	1.5 max.		
Deviation across tape 零件前后偏移	Δh1/Δh2	2.0 max.		
Portion to cut in case of defect 裁脚后线脚长度	L	11.0 max.		
Hole-down tape width 胶带宽度	W0	8.0 min		
Hole-down tape distortion 胶带边缘距	W2	1.5 ± 1.5		
Coating extension on leads 线脚上包封脚长	e	2.0 max for straight lead style; Not exceed the kink leads for kink lead.		



**8. Marking 印字:**

<b>1.Certified type 安规认证型号</b>	<b>AR</b>
<b>2.Nominal capacitance 标称容量</b>	<b>3-digit-system</b>
<b>3.Capacitance tolerance 容许差</b>	<b>J:±5%,K:±10%,M:±20%</b>
<b>4.Company trade mark 商标</b>	
<b>5.Products ID 产品识别号</b>	Abbreviation ex.: H 8 1234 → Last 4 digits of Lot No. ↓ → Month of manufacture: Last digits of year:      1: January A: 2015                            : B: 2016                            : C: 2017                            9: September :                                        O: October :                                        N: November X: 2038                            D: December Y: 2039 Z: 2040
<b>6. Class voltage 等级电压</b>	X1/Y1: 500V~ 1500Vdc
<b>7. Marking sample 印字图例:</b>	
	
* Marking by the laser.	

## 9. Specification and test method 规格及测试方法:

9.1 Operating Temperature Range 操作温度: -40 to +125°C

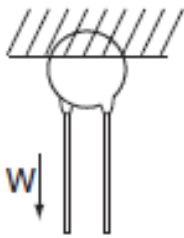
9.2 Test condition 测试条件:

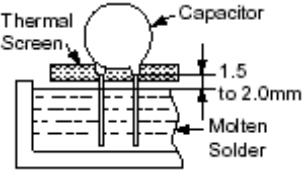
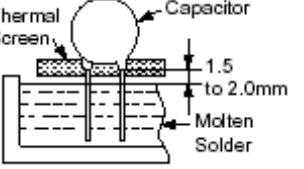
Test and measurement shall be made at the standard condition. (temperature 15~35°C, relative humidity 45~75% and atmospheric pressure 860~1060kPa). Unless otherwise specified herein. 除非另有说明, 测试和测量应在标准条件(温度 15~35°C, 相对湿度 45~75%, 大气压力 860~1060 kPa)下进行。

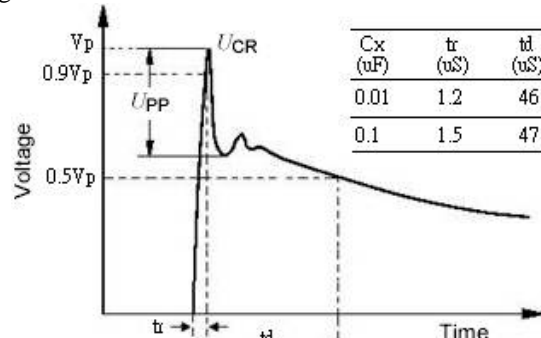
If doubt occurred on the value of measurement, and measurement was requested by customer capacitors shall be measured at the reference condition. (temperature 25 ± 2°C, relative humidity 60~70% and atmospheric pressure 860~1060kPa.) 如果对测试和测量结果有争议, 则以参考条件(温度 25 ± 2°C, 相对湿度 60~70%, 大气压力 860~1060 kPa)进行。

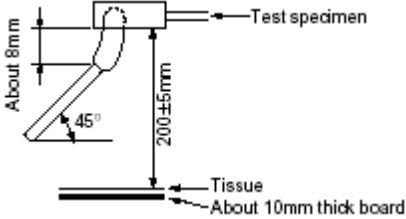
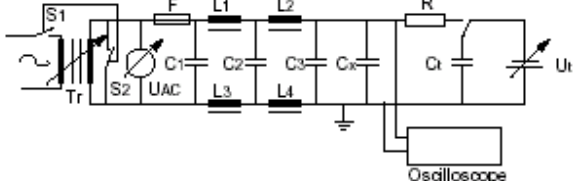
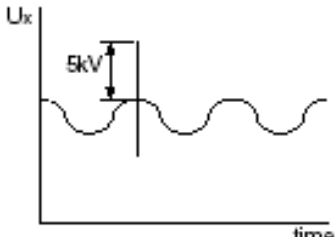
9.3 Performance 性能:

No	Items 项目	Performance 性能要求	Testing method 测试方法
9.3.1	Appearance and dimension 外观和尺寸	No visible defect, and the dimension are within specified range. 外观无明显缺陷, 尺寸符合规格。	The capacitor should be visually inspected for evidence of defect. 目视检查电容器是否存在任何缺陷。Dimensions should be measured with slide calipers. 以游标卡尺量测尺寸。
9.3.2	Marking 印字标志	The marking shall be easily legible. 标志清晰易识别。	Visual check. 目视检查
9.3.3	Between terminals 端子间	No failure. 无失效	The capacitors shall not be damage when AC4000V (rms.) are applied between the lead wires for 60sec. 电容器两线脚间施加交流有效值 4000Vac 时, 不应有任何损坏。(Charge/Discharge current ≤ 50mA. 最大充放电电流 50mA)
	Dielectric Strength 抗电强度 Body Insulation 本体绝缘	No failure. 无失效	First, the terminals of the capacitor should be connected together. Then, as shown in the below figure, a metal foil should be closely wrapped around the body of the capacitor to the distance of about 3 to 6mm from each terminal. Then, the capacitor should be inserted into a container filled with metal balls of about 1mm diameter. Finally, AC4000V (rms.) is applied for 60sec between the capacitor lead wires and metal balls. (Charge/Discharge current ≤ 50mA.) 首先, 应将电容器的端子连接在一起, 然后如下图所示, 在距端子约3~6mm处将金属箔牢固地包裹在电容器上。再将电容器插入一个盛有直径约1mm金属小球的容器内。最后, 在电容器引线与金属球之间施加4000V交流有效值电压60秒(最大充放电电流50mA)。 
9.3.4	Insulation Resistance 绝缘电阻	10000MΩ or more. 最小 10000 MΩ	The insulation resistance shall be measured with DC500±50V within 60±5sec of charging. DC500±50V 条件下, 在充电 60±5 秒内测量绝缘电阻。

No	Items 项目	Performance 性能要求	Testing method 测试方法																						
9.3.5	Capacitance 电容量	Within specified tolerance.在 规定误差范围内	The capacitance shall be measured at 25±2°C with 1kHz±20% (for Y5P&Y5U&Y5V) or 1MHz±20% (for SL) and 1.0±0.2V (rms.)																						
9.3.6	Dissipation Factor 损耗因素 (DF) or Q	Y5P、Y5U : DF≤2.5% Y5V : D.F. ≤5.0% SL : 30pF&above30pF(含)以上: Q ≥1000 Below 30PF 小于 30pF: Q ≥400+20 ×C	电容器应在温度 25±2°C、频率 1kHz±20% (针对材质 Y5P&Y5U&Y5V) 或 1MHz±20% (针对 SL 材质)、电压 1.0±0.2V (rms.)条件下测量。																						
9.3.7	Temperature Characteristic 温度特性	<table border="1"> <thead> <tr> <th>Char. 材质</th> <th>Capacitance Change 容量变化率</th> </tr> </thead> <tbody> <tr> <td>Y5P</td> <td>Within ±10%</td> </tr> <tr> <td>Y5U</td> <td>Within-56 ~ +22%</td> </tr> <tr> <td>Y5V</td> <td>Within -82 ~ +22%</td> </tr> <tr> <td>SL</td> <td>-1000~+350 ppm/°C (+20°C~+85°C)</td> </tr> </tbody> </table>	Char. 材质	Capacitance Change 容量变化率	Y5P	Within ±10%	Y5U	Within-56 ~ +22%	Y5V	Within -82 ~ +22%	SL	-1000~+350 ppm/°C (+20°C~+85°C)	The capacitance measurement shall be made at each step specified in Table 1. 应按照表 1 所规定各阶段测量电容量。 Table 1 表 1 <table border="1"> <thead> <tr> <th>Step 阶段</th> <th>Temperature 温度 (°C)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>+20±2</td> </tr> <tr> <td>2</td> <td>-25±2</td> </tr> <tr> <td>3</td> <td>+20±2</td> </tr> <tr> <td>4</td> <td>+85±2</td> </tr> <tr> <td>5</td> <td>+20±2</td> </tr> </tbody> </table> Pre-treatment 预处理: Capacitor shall be stored at 85±2°C for 1 hour, then placed at <sup>※1</sup> room condition for 24±2hours before measurements. 电容器在测量前, 应在 85±2°C环境中放置 1 小时然后 在室温条件(如备注 1)下静置 24±2 小时。	Step 阶段	Temperature 温度 (°C)	1	+20±2	2	-25±2	3	+20±2	4	+85±2	5	+20±2
Char. 材质	Capacitance Change 容量变化率																								
Y5P	Within ±10%																								
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2	-25±2																								
3	+20±2																								
4	+85±2																								
5	+20±2																								
9.3.8	Robustness of terminations 端子强度	Tensile 抗拉强度  Bending 弯曲强度	As shown in the figure at right, fix the body of the capacitor and apply a tensile weight gradually to each lead wire in the radial direction of the capacitor up to 10N and keep it for 10±1 sec. 如右图所示, 固定住电容器, 在引 线上逐步施加拉力直至 10N, 并保 持 10±1 秒。  Each lead wire should be subjected to 5N of weight and bent 90° at the point of egress, in one direction, then returned to its original position and bent 90° in the opposite direction at the rate of one bend in 2 to 3 sec. 在引线出口处沿一个方向施加 5N、90°的弯曲压力, 然 后恢复至原始状态。之后, 在 2 至 3 秒内再以相反方向 施加一次 90°的弯曲压力。																						
9.3.9	Solderability of leads 引线可焊性	Lead wire should be soldered with uniform coating on the axial direction over 3/4 of the circumferential direction. 应 轴向焊接引线, 焊料分布均 匀, 覆盖周边 3/4 区域。	The lead wire of capacitor should be dipped into molten solder for 5 ± 0.5 sec. The depth of immersion is up to about 1.5 to 2.0 mm from the root of lead wires. Temp. of solder : Lead Free Solder ( Sn-3Ag-0.5Cu) 245±5°C 将电容器引线在 245±5°C熔焊料中浸泡 5±0.5 秒, 浸泡深度为距引线根部约 1.5 至 2.0mm 处。 焊料温度: 无铅焊料(Sn-3Ag-0.5Cu) 245±5°C																						

No	Items 项目	Performance 性能要求	Testing method 测试方法
9.3.10	Appearance 外观	No marked defect. 无明显缺陷	As shown in figure, the lead wires should be immersed in solder of $350 \pm 10^\circ\text{C}$ or $260 \pm 5^\circ\text{C}$ up to 1.5 to 2.0 mm from the root of terminal for $3.5 \pm 0.5$ sec ( $10 \pm 1$ sec. for $260 \pm 5^\circ\text{C}$ ). 如图所示, 将引线浸泡在 $350 \pm 10^\circ\text{C}$ 或者 $260 \pm 5^\circ\text{C}$ 的焊料中 $3.5 \pm 0.5$ 秒, ( $260 \pm 5^\circ\text{C}$ 时, $10 \pm 1$ 秒), 其深度为距端子根部 1.5 至 2.0mm 处
	IR 绝缘电阻	1000 M $\Omega$ min.	
	Dielectric Strength 介电强度	Per item 9.3. 3 按照 9.3.3 项	
	Soldering Effect 焊接性 (Non-Preheat 不预热)	Capacitance 电容量  Y5P,Y5U,Y5V : Within $\pm 10\%$ SL: Within $\pm 2.5\%$ or $\pm 0.25\text{pF}$ , Whichever is larger. 取较大值。	
9.3.11	Appearance 外观	No marked defect. 无明显缺陷	First the capacitor should be stored at $120 \pm 0.5^\circ\text{C}$ for $60 \pm 0.5$ sec. Then, as in figure, the lead wires should be immersed solder of $260 \pm 0.5^\circ\text{C}$ up to 1.5 to 2.0 mm from the root of terminal for $7.5 \pm 0.1$ sec. 首先电容器应在 $120 \pm 0.5^\circ\text{C}$ 条件下存放 $60 \pm 0.5$ 秒, 然后, 如图所示, 将引线从端子根部开始 1.5 至 2.0mm 以下的地方浸泡在 $260 \pm 0.5^\circ\text{C}$ 温度下 $7.5 \pm 0.1$ 秒。
	IR 绝缘电阻	1000 M $\Omega$ min.	
	Dielectric Strength 介电强度	Per item 9.3. 3 按照 9.3.3 项	
	Soldering Effect 焊接性 (On-Preheat 预热)	Capacitance 电容量  Y5P,Y5U,Y5V : Within $\pm 10\%$ SL: Within $\pm 2.5\%$ or $\pm 0.25\text{pF}$ , Whichever is larger. 取较大值。	

No	Items 项目	Performance 性能要求	Testing method 测试方法									
9.3.12	Humidity 耐湿 (Under steady State 稳态)	Appearance 外观	No marked defect. 无明显缺陷									
		Capacitance 电容量	Y5P : Within $\pm 10\%$ Y5U : Within $\pm 20\%$ Y5V : Within $\pm 30\%$ SL: Within $\pm 2.5\%$ or $\pm 0.25\text{pF}$ , Whichever is large. 取较大									
		D.F.	Y5P, Y5U : 5.0% max. Y5V : 7.5% max.									
		Q	SL: Below 30PF 小于 30pF: $Q \geq 100 + 10 \times C/3$ 30pF & above 30pF (含) 以上: $Q \geq 200$									
9.3.13	Humidity Loading 耐湿负荷	I.R.	Y5P&Y5U&Y5V : 3000M $\Omega$ min. SL: 1000M $\Omega$ min.									
		Dielectric Strength 介电强度	Per Item 9.3.3 按照 9.3.3 项									
		Appearance 外观	No marked defect. 无明显缺陷									
9.3.14	Life 寿命	Appearance 外观	No marked defect. 无明显缺陷									
		Capacitance 电容量	Y5P&Y5U&Y5V : Within $\pm 20\%$ SL: Within $\pm 3\%$ or $\pm 0.3\text{pF}$ , Whichever is large. 取较大值。									
		I.R.	3000M $\Omega$ min. SL: 1000M $\Omega$ min.									
		Dielectric Strength 介电强度	Per Item 9.3.3 按照 9.3.3 项									
			<p>Impulse Voltage 脉冲电压</p> <p>Each individual capacitor shall be subjected to 8kV impulses for three times. After the capacitors are applied to life test. 完成寿命测试后，均应对每个电容器实施 8KV 的脉冲电压 3 次</p> <p>Fig. 2</p>  <table border="1" data-bbox="1228 1344 1436 1467"> <thead> <tr> <th>Cx (uF)</th> <th>tr (uS)</th> <th>td (uS)</th> </tr> </thead> <tbody> <tr> <td>0.01</td> <td>1.2</td> <td>46</td> </tr> <tr> <td>0.1</td> <td>1.5</td> <td>47</td> </tr> </tbody> </table> <p>The specimen capacitors are placed in a circulating air oven for a period of 1000 hours. The air in the oven is maintained at a temperature of 125<math>\pm 3^{\circ}\text{C}</math>. Throughout the test, the capacitors are subjected to an AC850Vrms.alternating voltage of mains frequency, except that once each hour the voltage is increased to AC1000V(rms.) for 0.1 sec. 在 125<math>\pm 3^{\circ}\text{C}</math> 的条件下施加电压 1000 小时，在测试过程中，外加电压 AC850Vrms，但每小时一次将电压增大至 AC1000Vrms</p> <p>Then capacitor shall be stored for 1 to 2 hours at <sup>*1</sup>room condition. 然后在室温<sup>*1</sup>下存放 1 到 2 小时</p>	Cx (uF)	tr (uS)	td (uS)	0.01	1.2	46	0.1	1.5	47
Cx (uF)	tr (uS)	td (uS)										
0.01	1.2	46										
0.1	1.5	47										

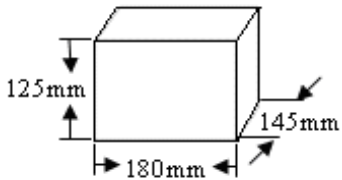
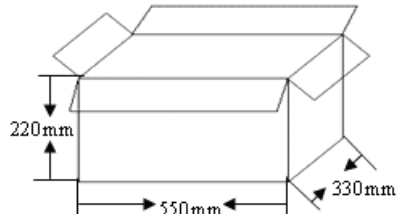
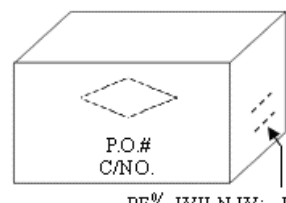
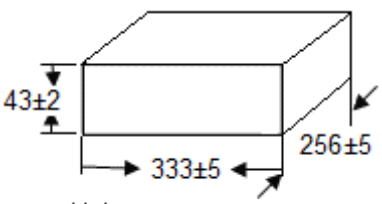
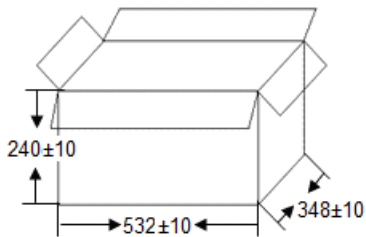
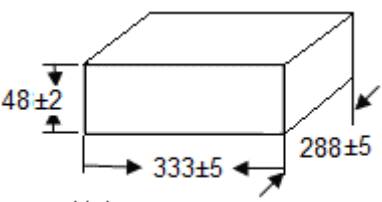
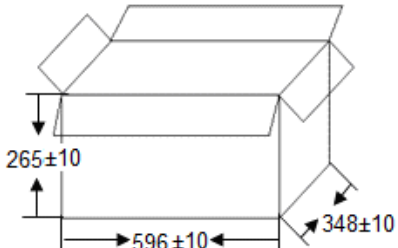
No	Items 项目	Performance 性能要求	Testing method 测试方法
9.3.15	Passive Flammability 被动可燃性	The burning time shall not be exceeded the time 30 sec. The tissue paper shall not ignite. 燃烧时间不超过 30 秒，薄纸不燃烧	The capacitor under test shall be held in the position which best promotes burning. Each specimen shall only be exposed once to flame.测试的电容器应在燃烧效果最佳的位置。每个样品应一次性燃烧 Time of exposure to flame: 30sec. 燃烧时间: 30 秒 Length of flame : 12±1mm 火焰尺寸: 12±1mm Gas burner : Length 35mm min. 喷烧器: 至少35mm长 Inside Dia. : 0.5±0.1mm 内径: 0.5±0.1mm Outside Dia. : 0.9mm max. 外径: 最大9mm Gas : Butane gas Purity 95% min. 气体: 纯度为95%以上的丁烷 Fig. 7 
9.3.16	Active Flammability 主动可燃性	The cheesecloth shall not be on fire. 粗棉布不燃烧	The specimens shall be individually wrapped in at least one but more than two complete layers of cheesecloth. The specimens shall be subjected to 20 discharges. The interval between successive discharges shall be 5 sec. The UAC shall be maintained for 2 min after the last discharge. 应将电容器单独包裹在至少一层粗棉布中，但不得超过 2 层，然后，对电容器实施 20 次放电。逐次放电间隔应为 5 秒，实施最后一次放电后，应保持 UAC 2 分钟。 Fig. 6  <p>                         C1,2 : 1μF±10%                      L1 to 4 : 1.5mH±20%                          C3 : 0.033μF±5% 10kV              16A Rod core choke                          Ct : 3μF±5% 10kV                      R : 100Ω±2%                          Cx : Capacitor under test              UAC : UR±5%                          F : Fuse, Rated 10A                      UR : Rated Voltage                          Ut : Voltage applied to Ct                     </p> <p>                         Cx: 电容器 (测试对象)    F: 保险丝 额定电压 10A                          UR: 额定电压                      Ut: 施加到 Ct 上                     </p> 

No	Items 项目	Performance 性能要求	Testing method 测试方法															
9.3.17	Appearance 外观	No marked defect. 无明显缺陷	The capacitor should be subjected to 100 temperature cycles, 对电容器执行100个温度周期 <Temperature Cycle time: 5cycles> <table border="1" data-bbox="842 465 1321 631"> <thead> <tr> <th>Step</th> <th>Temperature(°C)</th> <th>Time(min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-40±3</td> <td>30</td> </tr> <tr> <td>2</td> <td>Room temp.25</td> <td>3</td> </tr> <tr> <td>3</td> <td>125±3</td> <td>30</td> </tr> <tr> <td>4</td> <td>Room temp.25</td> <td>3</td> </tr> </tbody> </table> Pre-treatment 预处理: Capacitor shall be stored at 85±2°C for 1hour.then placed at <sup>*1</sup> room condition for 24±2hours. 将电容器在 85±2°C 条件下存放 1 小时, 然后在室温下存放 24±2 小时 Post-treatment: Capacitor shall be stored for 1 to 2hours at <sup>*1</sup> room condition 后处理: 将电容器在室温下存放 1 至 2 小时	Step	Temperature(°C)	Time(min)	1	-40±3	30	2	Room temp.25	3	3	125±3	30	4	Room temp.25	3
	Step	Temperature(°C)		Time(min)														
	1	-40±3		30														
	2	Room temp.25		3														
	3	125±3		30														
	4	Room temp.25		3														
Char.	Cap. Change	DF / Q																
SL	≅±5%	Q ≅ 275+5/2C (C < 30pF) Q ≅ 350 (C ≅ 30pF)																
Y5P	≅±10%	DF ≅ 5.0%																
Y5U, Y5V	≅±20%	DF ≅ 7.5%																
I.R.		3000MΩ min.																
Dielectric strength 介电强度		Per Item 9.3.3 按照 9.3.3 项																

※1. "Room condition" Temperature: 15~35, Relative humidity: 45~75%, Atmospheric pressure: 860~1060kPa

※1. 室温条件: 温度为 15~35℃, 相对湿度为 45~75%, 大气压为 860~1060kPa

**10.Packing specification 包装说明：**
**10.1 Packing size 包装尺寸：**

	Box 内盒	Carton 外箱
Bulk 散料品		  PF% WV N.W: KG KPCS GW: KG <b>(Eight boxes in a carton)</b>
Ammo 折叠编带品	 Unit:mm	 Unit:mm <b>(Ten boxes in a carton)</b> PF% WV N.W: KGS
Ammo 折叠编带品	 Unit:mm	 Unit:mm <b>(Ten boxes in a carton)</b> PF% WV N.W: KGS

**10.2 Packing quantity 包装数量：**

Packing type 包装型式	The code of 11 <sup>th</sup> to 12 <sup>th</sup> in P/N 料号第 11 至 12 码	MPQ 最小包装量 (Kpcs/Box)
Taping 编带	AM (The size code $\leq 11$ ) and AS	1
	AM (The size code $\geq 12$ ) and AT	0.5

Packing type 包装型式	Lead length 引线长	The code of 8 <sup>th</sup> to 9 <sup>th</sup> in P/N 料号第 8 至 9 码	MPQ 最小包装量 (Kpcs/Bag)	Kpcs/Box
Bulk 散料品	Long lead 长脚 (L $\geq 16$ mm)	$\leq 07$	0.5	3
		08~12	0.5	1.5
		$\geq 13$	0.5	1
	Short lead 短脚 (L < 16mm)	$\leq 07$	1	5
		08~12	0.5	3
		13~14	0.5	2
		$\geq 15$	0.2	1



## 11. Notices 注意事项:

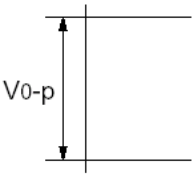
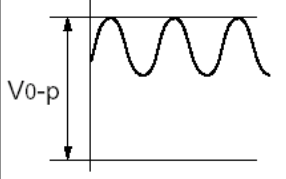
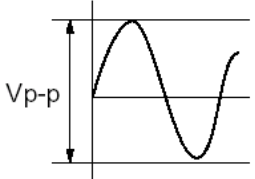
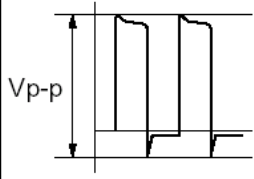
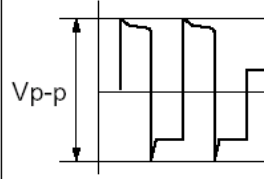
### 11.1 Caution (Rating) 额定警告:

#### (1). Operating Voltage 工作电压

Be sure to maintain the  $V_{p-p}$  value of the applied voltage or the  $V_{o-p}$  which contains DC bias within the rated voltage range. 在交流电路或纹波电流电路中使用电容器时，请务必将外加电压的  $V_{p-p}$  值或包含直流偏置电压的  $V_{o-p}$  值维持在额定电压范围内。

When the voltage is started to apply to the circuit or it is stopped applying, the irregular voltage may be generated for a transit period because of resonance or switching. Be sure to use a capacitor within rated voltage containing this irregular voltage.

若向电路施加电压，开始或停止时可能会因谐振或切换产生暂时的异常电压。请务必使用额定电压范围包含这些异常电压的电容器。

DC Voltage	DC+AC Voltage	AC Voltage	Pulse Voltage (1)	Pulse Voltage (2)
				

#### (2). Operating Temperature and Self-generated Heat 工作温度和自生热

Keep the surface temperature of a capacitor below the upper limit of its rated operating temperature range. Be sure to take into account the heat generated by the capacitor itself. When the capacitor is used in a high-frequency current, pulse current or the like, it may have the self-generated heat due to dielectric-loss. Applied voltage should be the load such as self-generated heat is within  $20^{\circ}\text{C}$  on the condition of atmosphere temperature  $25^{\circ}\text{C}$ . When measuring, use a thermocouple of small thermal capacity-K of  $\phi 0.1\text{mm}$  and be in the condition where capacitor is not affected by radiant heat of other components and wind of surroundings. Excessive heat may lead to deterioration of the capacitor's characteristics and reliability. (Never attempt to perform measurement with the cooling fan running. Otherwise, accurate measurement cannot be ensured.)

电容器的表面温度应保持在额定工作温度范围的上限以下。务必考虑到电容器的自生热。外加电压应使自生热等负荷在  $25^{\circ}\text{C}$  周围温度条件下不超过  $20^{\circ}\text{C}$  范围。测量时应使用  $\phi 0.1\text{mm}$  小容量的 (K) 的热电偶，而且电容器不应受到其它散热组件的散热或周围温度波动影响。过热可能会导致电容器特性及可靠性下降。(切勿在冷却风扇运转时进行测量。否则无法确保测量数据的精确性)

#### (3). Test condition for withstanding Voltage 耐电压的测试条件

##### I. Test Equipment 测试设备

Test equipment for AC withstanding voltage shall be used with the performance of the wave similar to 50/60 Hz sine waves. 交流耐电压的测试设备应具有能够产生类似于 50/60Hz 正弦波的性能。

If the distorted sine wave or over load exceeding the specified voltage value is applied, the defective may be caused. 如果施加变形的正弦波或超过规定电压值的过载电压，则可能会导致故障。

## II. Voltage Applied Method 电压外加方法

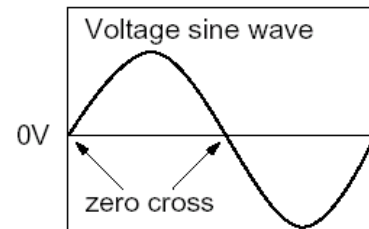
When the withstanding voltage is applied, capacitor's lead or terminal shall be firmly connected to the output of the withstanding voltage test equipment, and then the voltage shall be raised from near zero to the test voltage. 施加耐电压时, 电容器的引线或端子应与耐压测试设备的输出端连接牢固, 然后再将电压从近零增加到测试电压。

If the test voltage without the raise from near zero voltage would be applied directly to capacitor, test voltage should be applied with the \*zero cross. At the end of the test time, the test voltage shall be reduced to near zero, and then capacitor's lead or terminal shall be taken off the output of the withstanding voltage test equipment. 如果测试电压不从近零逐渐提高而是直接施加在电容器上, 则施加时应包含过零点\*。测试结束时, 测试电压应降至近零, 然后再将电容器引线或端子从耐压测试设备的输出端取下。

If the test voltage without the raise from near zero voltage would be applied directly to capacitor, the surge voltage may arise, and therefore, the defective may be caused.

如果测试电压不从近零逐渐提高而是直接施加在电容器上, 则可能会出现浪涌电压, 从而导致故障。

ZERO CROSS is the point where voltage sine wave pass 0V.- See the right figure. \* 过零点是指电压正弦0V的位置。参见右图:



### (4). Fail-Safe 失效安全性

When capacitor would be broken, failure may result in a short circuit. Be sure to provide an appropriate fail-safe function like a fuse on your product if failure would follow an electric shock, fire or fume. 当电容器损坏时, 失效可能会导致短路。为了避免在短路时引起触电、冒烟、火灾等危险情况, 请在电路中使用熔丝等组件来设置自动防障功能。

Failure to follow the above cautions may result, worst case, in a short circuit and cause fuming or partial dispersion when the product is used. 使用本产品时如忽略上述警告事项, 则在严重情况下可能导致短路, 并引起冒烟或局部损毁。

## 11.2 Caution (Storage and operating condition) 警告 (保管与使用条件):

### Operating and storage environment 使用与保管环境

The insulating coating of capacitors does not form a perfect seal; therefore, do not use or store capacitors in a corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. And avoid exposure to moisture. Before cleaning, bonding, or molding this product, verify that these processes do not affect product quality by testing the performance of a cleaned, bonded or molded product in the intended equipment. Store the capacitors where the temperature and relative humidity do not exceed -10 to 40 degrees centigrade and 15 to 85 %. Use capacitors within 6 months. 电容器的绝缘涂层不具有良好密封作用; 因此, 请勿将电容器存放在腐蚀性气体中, 尤其是存在氯气、硫气、酸、碱、盐等的场所。同时应防潮。在对本产品进行清洗、覆膜或封膜前, 请先在制定设备上测试经清洗、覆膜或封膜的产品的性能, 以确定上述过程不会影响产品质量。电容器应存放则在温度及相对湿度不超出-10 到 40°C. 及 15 至 85% 范围的场所。请在 6 个月内使用电容器。

"Failure to follow the above cautions may result, worst case, in a short circuit and cause fuming or partial dispersion when the product is used." 使用本产品时如忽略上述警告事项, 则在严重情况下可能导致短路, 并引起冒烟或局部损毁。

### 11.3 Caution (Soldering and Mounting):警告（焊接与安装）：

#### 11.3.1 Vibration and impact:震荡与冲击

Do not expose a capacitor or its leads to excessive shock or vibration during use.

使用时请勿使电容器或引线受到过度冲击或震荡。

#### 11.3.2 Soldering:焊接

When soldering this product to a PCB/PWB, do not exceed the solder heat resistance specification of the capacitor. Subjecting this product to excessive heating could melt the internal junction solder and may result in thermal shocks that can crack the ceramic element.

将该产品焊接在 PCB/PWB 上时，不应超出电容器的耐焊热性规格。本产品过热会使内部接点锡焊料熔化，导致温度骤变，从而造成陶瓷组件产生裂纹。

When soldering capacitor with a soldering iron, it should be performed in following conditions.当使用烙铁焊接电容器时，应遵循以下条件。

Temperature of iron-tip: 400 degrees C. max. 烙铁头温度：最高400℃.

Soldering iron wattage: 50W max. 烙铁功率：最大50W

Soldering time: 3.5 sec. max. 焊接时间：最多 3.5 秒

#### 11.3.3 Cleaning (ultrasonic cleaning):清洗（超声波清洗）

To perform ultrasonic cleaning, observe the following conditions.

当进行超声波清洗时，应遵循以下条件

Rinse bath capacity: Output of 20 watts per liter or less.

洗涤槽容量：20瓦特输出功率或以下

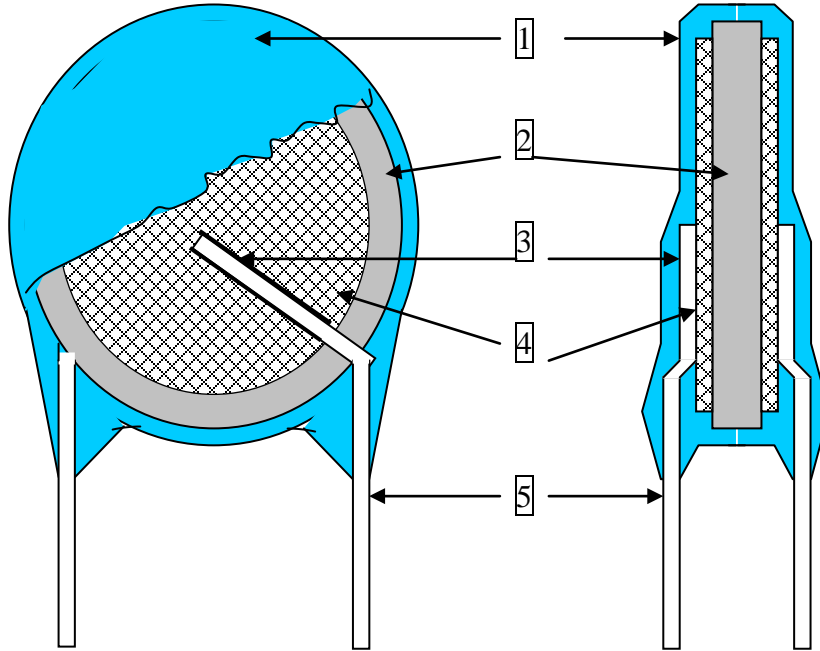
Rinsing time:5 min maximum. 清洗时间：最多5分钟

Do not vibrate the PCB/PWB directly.不要直接震荡PCB/PWB

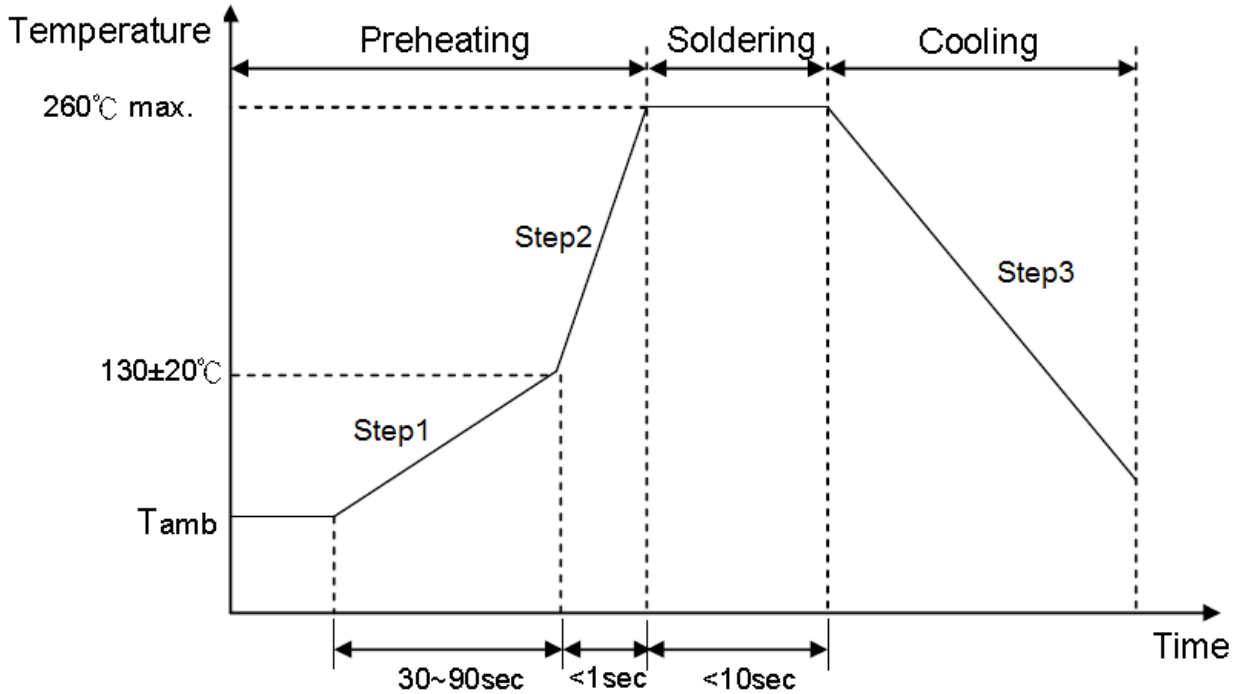
Excessive ultrasonic cleaning may lead to fatigue destruction of the lead wires.

过度的超声波清洗会导致引线的过载损坏。

"Failure to follow the above cautions may result, worst case, in a short circuit and cause fuming or partial dispersion when the product is used." 使用本产品时如忽略上述警告事项，则在严重情况下可能导致短路，并引起冒烟或局部损毁。

**12. Drawing of internal structure and material list 结构图和材料列表:**

**Remarks 摘要:**

No.	Part name 名称	Material 材料	Model/Type 型号	Component 组成
1	Insulation Coating 绝缘涂层	Epoxy polymer 环氧聚合物	1.EF-150 2.PCE-300	Epoxy resin、Pigment (Blue / UL 94 V-0 / ) 环氧树脂、颜料
2,4	Dielectric Element 电介质层	Ceramic 陶瓷片	SL/Y5P/Y5U/Y5V	BaTiO <sub>3</sub>
3	Solder 焊料	Tin-alloy 锡合金	Sn/Ag; Sn/Ag/Cu	Sn/Ag; Sn/Ag/Cu
5	Leads wire 引线	Tinned copper clad steel wire 镀锡铜包钢线	0.55 ± 0.1mm	Substrate metal: Fe & Cu Surface plating: Sn 底料: Fe & Cu 镀层: Sn

**13. Soldering recommendation 焊接条件建议:**
**13.1 Wave soldering profile 波峰焊:**


Step1:  $(1\sim3)^\circ\text{C/sec}$   
 Step2: Approx.  $200^\circ\text{C/sec}$   
 Step3:  $5^\circ\text{C/sec Max}$

**13.2 Recommended reworking conditions with soldering iron 重工烙铁焊:**

Item	Conditions
Temperature of Soldering Iron-tip	$350^\circ\text{C (max.)}$
Soldering Time	3 sec (max.)
Distance from Capacitor	2 mm (min.)