

■TP 贴片交流(安规)陶瓷电容器--Y1 系列

TP Surface Mount AC (Safety) Ceramic Capacitor - Y1 Series



◆特征 Characteristics

- * 采用铜电极芯片。
- * Use copper electrode chips.
- * 介电强度（耐电压）：Y1：AC4000V，Class II 的设备上可只用一个电容。
- * Dielectric strength (voltage resistance): Y1: On Class II equipment, only one capacitor is required.
- * 封装层采用无卤素-阻燃环氧树脂（涂料符合 UL94V-0 规范/规格要求）。
- * Encapsulation layer uses halogen-free - flame-retardant epoxy resin (the coating complies with UL94V-0 specification/requirement).
- * 产品高度 2.5mm，较传统引脚型电容器产品高度有明显降低。
- * Product height is 2.5mm, significantly lower than the height of traditional pin-type capacitor products.
- * 使用温度范围-40℃~+125℃（含自身发热 20℃以内）。
- * Operating temperature range: -40℃ to +125℃ (including the internal heat of 20℃).
- * 编带包装适用于 SMT 表面安装技术。
- * Tape packaging is suitable for SMT surface mounting technology.

◆应用领域 Application Fields

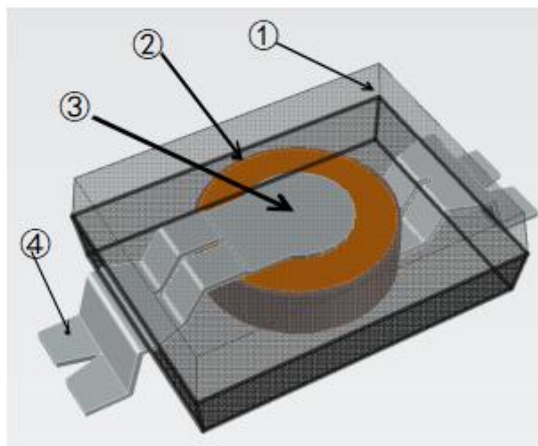
- * 应用在电子设备中作为跨电源线连接、天线耦合、旁路、滤波等。
- * It is applied in electronic devices for cross-powerline connections, antenna coupling, bypass, filtering, etc.
- * 适于 AC 适配器、充电器、开关电源等。
- * It is suitable for AC adapters, chargers, switching power supplies, etc.

◆型号表示法 Model designation Method

TP	Y1	YU	102	M	Y	C	W	T	P
产品类型 Product Type	产品系列 Product Series	温度特性 Temperature Characteristics	额定容量 Rated Capacity	容量偏差 Capacity Deviation	额定电压 Rated Voltage	引脚材质 Pin Material	脚型代码 Foot type Code	包装方式 Packaging Method	焊锡代码 Soldering Code
TP 贴片类 Surface Mount	Y1 系列 Y1 Series	SL: SL YP: Y5P YU: Y5U YV: Y5V	4R7: 4.7pF 330: 33pF 101: 100pF	J: ±5% K: ±10% M: ±20%	Y: 400VAC C: 500VAC	C:铜 Cu	W 外弯 Outward bend	T 卷带包装 Taping S 散装包装 Bulking	P 高温含铅焊锡 High temperature leaded solder
温度范围 Temperature range: -25℃~+85℃			标称容量以 pF 为单位，用 3 位数字表示。前两位数字表示有效数字，第三位为 0 的个数；R 表示小数点。 The nominal capacity is expressed in picofarads (pF) and is represented by three digits. The first two digits indicate the significant figures, and the third digit represents the number of zeros; R indicates the decimal point.						
容量允许偏差 Capacity tolerance deviation: SL: +140~-1000 PPM/℃ Y5P: ±10% Y5U: -56% to +22% Y5V: -82% to +22%									

◆产品结构 Product Structure

* 瓷介电容剖面图 Sectional View of Ceramic Capacitor

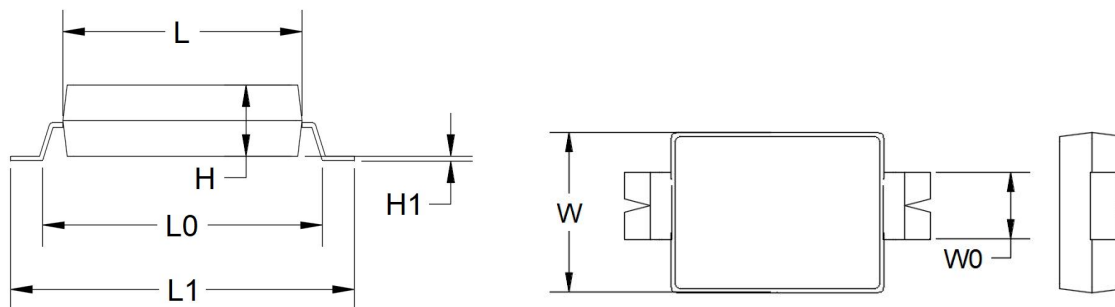


序号 NO.	名称 Name	材料 Materials
①	包封层 Coating	环氧树脂(UL94V-0) Epoxy molding compound (UL94V-0)
②	芯片 Chip	电极-陶瓷介质 Copper electrode - Ceramic medium
③	焊料 Solder	Sn-Pb-Ag 焊料 Sn-Pb-Ag solder
④	引脚 Lead Pin	镀锡铜 Tinned copper

*符合 RoHS 指令（2011/65/EU）及其修正案中的相关豁免条款（豁免 7(a)）。尽管产品内部某些部件含铅，但由于物理封装和阻隔设计，在正常使用条件下，铅不会释放到外部环境，不会对用户健康和环境造成风险。

It complies with the relevant exemption provisions of the RoHS Directive (2011/65/EU) and its amendments (Exemption 7(a)). Although certain components inside the product contain lead, due to the physical packaging and barrier design, under normal usage conditions, the lead will not be released into the external environment and will not pose risks to user health and the environment.

◆外观尺寸(单位: mm) Appearance dimension (unit: mm)



规格 Standard	L	W	H	H1	L0	L1	W0
400VAC/500VAC-Y1	8.0±0.3	6.0±0.3	2.40±0.15	0.15±0.15	9.9±0.3	11.4±0.3	2.5±0.2

◆规格尺寸 Specification Dimensions

* 规格清单表-额定电压 Specification List - Rated Voltage: Y1=400VAC

风华型号 FH Model	温度特性 TC	额定容量 Rated Capacity	容量偏差 Capacity Deviation	封装代码 Encapsulated Code
TPY1SL100JYCW*P	SL	10pF	±5%	8060
TPY1SL100KYCW*P	SL	10pF	±10%	8060
TPY1SL220JYCW*P	SL	22pF	±5%	8060
TPY1SL220KYCW*P	SL	22pF	±10%	8060
TPY1SL470JYCW*P	SL	47pF	±5%	8060
TPY1SL470KYCW*P	SL	47pF	±10%	8060
TPY1SL680JYCW*P	SL	68pF	±5%	8060




TPY1SL680KYCW*P	SL	68pF	±10%	8060
TPY1YP101KYCW*P	Y5P	100pF	±10%	8060
TPY1YP151KYCW*P	Y5P	150pF	±10%	8060
TPY1YP221KYCW*P	Y5P	220pF	±10%	8060
TPY1YP331KYCW*P	Y5P	330pF	±10%	8060
TPY1YP471KYCW*P	Y5P	470pF	±10%	8060
TPY1YU471MYCW*P	Y5U	470pF	±20%	8060
TPY1YU681MYCW*P	Y5U	680pF	±20%	8060
TPY1YU102MYCW*P	Y5U	1000pF	±20%	8060
TPY1YU152MYCW*P	Y5U	1500pF	±20%	8060
TPY1YV222MYCW*P	Y5V	2200pF	±20%	8060

* 规格清单表-额定电压 Specification List - Rated Voltage: Y1=500VAC



风华型号 FH Model	温度特性 TC	额定容量 Rated Capacity	容量偏差 Capacity Deviation	封装代码 Encapsulated Code
TPY1SL100JCCW*P	SL	10pF	±5%	8060
TPY1SL100KCCW*P	SL	10pF	±10%	8060
TPY1SL220JCCW*P	SL	22pF	±5%	8060
TPY1SL220KCCW*P	SL	22pF	±10%	8060
TPY1SL470JCCW*P	SL	47pF	±5%	8060
TPY1SL470KCCW*P	SL	47pF	±10%	8060
TPY1SL680JCCW*P	SL	68pF	±5%	8060
TPY1SL680KCCW*P	SL	68pF	±10%	8060
TPY1YP101KCCW*P	Y5P	100pF	±10%	8060
TPY1YP151KCCW*P	Y5P	150pF	±10%	8060
TPY1YP221KCCW*P	Y5P	220pF	±10%	8060
TPY1YP331KCCW*P	Y5P	330pF	±10%	8060
TPY1YP471KCCW*P	Y5P	470pF	±10%	8060
TPY1YU471MCCW*P	Y5U	470pF	±20%	8060
TPY1YU681MCCW*P	Y5U	680pF	±20%	8060
TPY1YU102MCCW*P	Y5U	1000pF	±20%	8060
TPY1YU152MCCW*P	Y5U	1500pF	±20%	8060
TPY1YV222MCCW*P	Y5V	2200pF	±20%	8060

◆产品认证及产品丝印 Product Certification and Product printing labels

* 产品认证 Product Certification

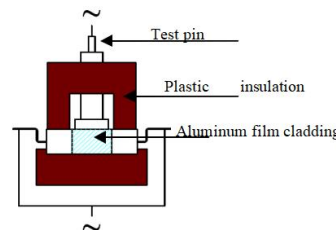
CT7 安规（交流） CT7 Safety Standard (AC)			
证书名称 Certificate Name	认证标志 Institutional logo	认证标准 Certification standards	Y1-系列 Y1 Series
中国 CQC		GB/T 6346.14-2023	CQC25001474437
欧洲 ENEC		EN IEC 60384-14:2023	No. ENEC-05319
北美 UL		UL 60384-14, 2nd Ed	E219015
CB 证书	—	EN IEC 60384-14:2023	US-45250-UL

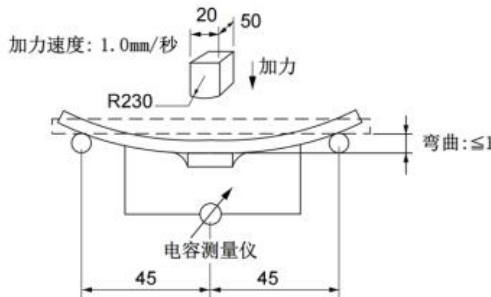
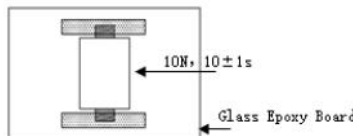
* 产品丝印 Product printing labels

序号 No.	标示名称 Label name	代码 Code	图例 Example diagram
1	风华商标 FH logo	FH	
2	产品类型 Product type	TP-Y1 贴片 Y1 系列 SMD Y1 Series	
3	安规认证 Safety certification		
4	温度特性(TC)	F(Y5V)	
5	标称容量 Nominal Capacity	222(2200pF)	
6	容量偏差 Capacity Deviation	M(±20%)	
7	额定电压 Rated Voltage	400VAC	
8	生产日期代码（批号） Production date code (Batch number)		

◆可靠性测试方法 Reliability Testing Method

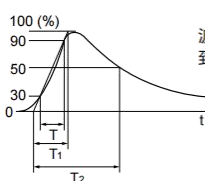
序号 No.	项目 Items	性能 Performance	试验条件 Test conditions (参考标准 Reference standard: IEC 60384-14: 2023)
1	外观构造及尺寸 Appearance, Structure and Dimensions	外观无异常，构造及尺寸依图示规定 The appearance shows no abnormalities. The structure and dimensions are in accordance with the illustrated specifications.	目视检验尺寸以游标卡尺测量 Visual inspection of dimensions is carried out using a vernier caliper for measurement.

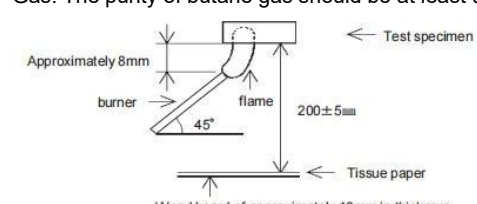
序号 No.	项目 Items		性能 Performance		试验条件 Test conditions (参考标准 Reference standard: IEC 60384-14: 2023)			
2	静电容量 Electrostatic capacitance		规定之容许误差以内 Within the allowable error range specified		C _R <100 pF, 测量频率: 1MHz C _R ≥100 pF, 测量频率: 1kHz 测量电压: 1.0 V ± 0.2 V			
3	损耗角正切值 Dissipation factor		SL	≤1.0%	测试温度: 25±2℃			
			Y5P	≤2.5%	C _R < 100 pF, Measurement frequency: 1 MHz			
			Y5U	≤3.0%	C _R ≥100 pF, Measurement frequency: 1 kHz			
			Y5V	≤3.5%	Measurement voltage: 1.0 V ± 0.2 V			
					Test temperature: 25±2℃			
4	绝缘电阻（端子间） Insulation resistance (Between terminals)		≥10000MΩ		测试电压 Test Voltage	500±50V DC	施加时间 Time	60s±5s
5	耐电压 Withstand voltage	端子间 Between terminals	无永久性击穿或飞弧 No permanent breakdown or arcing		测试电压 Test Voltage	Y1: 4000V AC		
					施加时间 Time	逐批检验 Batch-by-batch inspection: 3s		
						鉴定和周期检验 Periodic Test: 60s		
					漏电流 Leakage current: 5.0mA Max			
		充放电电流 Charge/discharge current: ≤50mA						
			端子与 外装间 Between terminal and Exterior cladding	无永久性击穿或飞弧 No permanent breakdown or arcing		<div></div> <p>首先, 将电容器的引脚连接在一起, 并将电容器本体用锡箔缠绕, 锡箔距离引脚在 2~3mm, 然后将电容器置于如图所示的测试夹具中, 施加 Y1（4000V AC）电压 60 秒钟。（充放电电流≤50mA）</p> <p>First, connect the pins of the capacitor together, wrap the capacitor body with tin foil, with the tin foil being 2 to 3 mm away from the pins. Then, place the capacitor in the test fixture as shown in the figure and apply a voltage of Y1 (4000V AC) for 60 seconds. (Current charging and discharging ≤ 50mA)</p>		

序号 No.	项目 Items	性能 Performance	试验条件 Test conditions (参考标准 Reference standard: IEC 60384-14: 2023)												
6	温度特性 Temperature characteristics	在允许规格范围内 Within the permitted specifications range	<p>预处理：初次测量之前，将电容器在 125±3℃条件下存放 1 小时，然后在室内条件下放置 24±2 小时。</p> <p>Pre-treatment: Before the initial measurement, the capacitor should be stored at 125 ± 3℃ for 1 hour, and then placed in an indoor environment for 24 ± 2 hours.</p> <p>依次按以下温度循环阶段测定：</p> <p>Measure successively in the following temperature cycling stages:</p> <table><tr><th>阶段 Step</th><th>温度 Temperature(℃)</th></tr><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></table>	阶段 Step	温度 Temperature(℃)	1	20℃±2℃	2	-25℃±2℃	3	20℃±2℃	4	85℃±2℃	5	20℃±2℃
阶段 Step	温度 Temperature(℃)														
1	20℃±2℃														
2	-25℃±2℃														
3	20℃±2℃														
4	85℃±2℃														
5	20℃±2℃														
7	基板弯曲 Board bending	无显著异常 No significant abnormalities	<p>将电容器焊接在下图所示的测试夹具上，施加下图所示的测试力；</p> <p>电容器应采用回流焊法焊接，并进行护理，以保证电容器不会受热冲击等破坏。</p>  <p>加力速度: 1.0mm/秒</p> <p>弯曲: ≤1</p> <p>电容测量仪</p>												
8	焊接强度 (剪切试验) Welding strength (Shear test)	引脚无偏移或发生其他不良 No offset of the pins or any other defects occurred.	<p>将电容器焊接在下图所示的测试夹具上，施加箭头所示方向的 10N 推力；</p> <p>电容器应采用回流焊法焊接，并进行护理，以保证电容器不会受热冲击等破坏。</p> <p>Weld the capacitor onto the test fixture as shown in the figure, and apply a 10N force in the direction indicated by the arrow;</p> <p>The capacitor should be soldered using the reflow soldering method and should be properly maintained to ensure that it is not damaged by thermal shock, etc.</p>  <p>10N, 10±1s</p> <p>Glass Epoxy Board</p>												

序号 No.	项目 Items		性能 Performance		试验条件 Test conditions (参考标准 Reference standard: IEC 60384-14: 2023)						
9	耐振性 Vibration resistance	外观 Appearance	无可见损伤 No visible damage		样品安装: 将电容器牢固地焊接在支撑引线上 扫频范围: 10Hz-55Hz; 振幅: 1.5mm 扫频速度: 10Hz→55Hz→10Hz 为一个循环, 单个循环时间≤1min; 振动时间: X、Y、Z 三轴各 2h, 共 6h Sample installation: Securely weld the capacitor to the support lead wire. Sweep frequency range: 10Hz - 55Hz. Amplitude: 1.5mm Sweep frequency speed: A cycle consists of 10Hz → 55Hz → 10Hz, and the duration of each cycle is ≤ 1 minute. Vibration time: 2 hours for each of the X, Y, and Z axes, totaling 6 hours.						
		静电容量 变化 Capacity change	ΔC/C ≤10%								
		损耗角 正切值 Dissipation factor	SL	≤1.0%							
			Y5P	≤2.5%							
			Y5U	≤3.0%							
			Y5V	≤3.5%							
10	可焊性 Weldability	引线表面均匀沾锡, 上锡面积不小于总面积的 75% The surface of the lead wire is evenly coated with tin, and the area of tin coating should be no less than 95% of the total area.		试验焊料 Solder	Sn96,5Ag3Cu,5						
				焊锡温度 Temperature	245℃±5℃						
				浸入时间 Time	2.0s±0.5s						
				上锡面积 The area of tin plating	≥75%						
11	耐焊接热 Resistance to welding heat	外观 Appearance	无可见损伤 No visible damage		预处理: 初次测量之前, 将电容器在 125±2℃条件下存放 1 小时, 然后在室内条件下放置 24±2 小时。 Pre-treatment: Before the initial measurement, the capacitor should be stored at 125 ± 2℃ for 1 hour, and then placed in an indoor environment for 24 ± 2 hours. 将电容器在 150℃至 180℃的温度下预热 90s±30s。 Preheat the capacitor at a temperature ranging from 150℃ to 180℃ for 90 ± 30 seconds. <table><tr><td>回流温度 Temperature</td><td>230℃~260℃</td></tr><tr><td>回流时间 Time</td><td>60 s±15 s</td></tr><tr><td>回流次数 Times</td><td>4</td></tr></table> 下一次回流焊应在样品温度降至室温后进行。 The next reflow soldering process should be carried out after the sample temperature has dropped to room temperature. 后处理: 将电容器在室内条件下存放至 24 小时。 Post-processing: Store the capacitor in an indoor environment for 24 hours.	回流温度 Temperature	230℃~260℃	回流时间 Time	60 s±15 s	回流次数 Times	4
		回流温度 Temperature	230℃~260℃								
		回流时间 Time	60 s±15 s								
		回流次数 Times	4								
		静电容量 变化 Capacity change	SL	ΔC/C ≤3%或 1pF (取较大者 Choose the larger one)							
			Y5P	ΔC/C ≤10%							
			Y5U								
			Y5V								
		耐电压 (端子间) Withstand Voltage	参照项目 5 内容 Refer to the content of Project 5								
		损耗角 正切值 Dissipation factor	SL	≤1.0%							
			Y5P	≤2.5%							
Y5U	≤3.0%										
Y5V	≤3.5%										
12	快速温变 Rapid temperature change	外观 Appearance	无可见损伤、标志清晰 No visible damage, clear markings		预处理: 在 150+0/-10℃的条件下放置 1h 进行热处理, 在室温下放置 24h±2h 后进行测量 TL=下限类别温度, TU=上限类别温度; 在 TL 或 TU 的放置时间: 30 分钟; TL 与 TU 间转换时间: 1 分钟之内; 循环次数: 100 次						
		静电容量 变化 Capacity change	SL: ΔC/C ≤5%或 0.5pF(取较大者 Choose the larger one) Y5P、Y5U、Y5V: ΔC/C ≤15%								

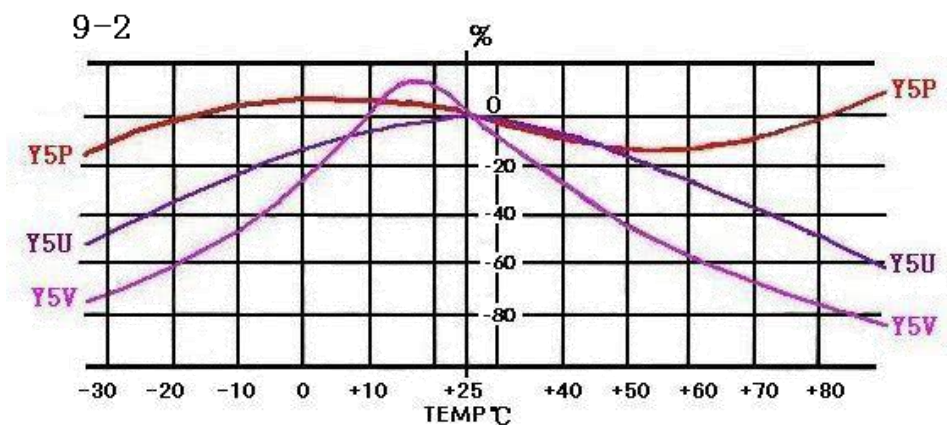
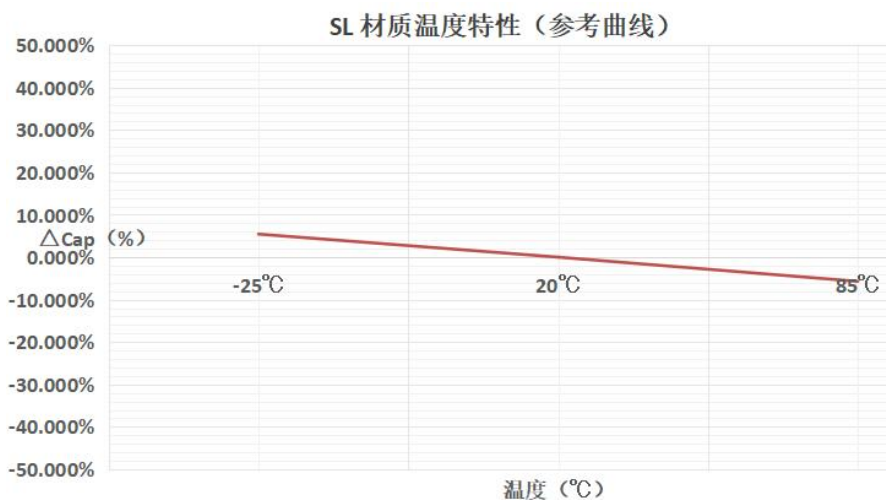
序号 No.	项目 Items	性能 Performance	试验条件 Test conditions (参考标准 Reference standard: IEC 60384-14: 2023)
	损耗角 正切值 Dissipation factor	损耗因数: ≤初始规格上限 DF: ≤ initial specification upper limit	后处理: 室温放置 24h±2h 后进行测量 Pre-treatment: Heat treatment was conducted at 150+0/-10℃ for 1 hour, and then measured at room temperature after being left for 24 hours ± 2 hours. TL = Lower limit category temperature, TU = Upper limit category temperature; The duration of placement at TL or TU: 30 minutes; The conversion time between TL and TU: within 1 minute; Number of cycles: 100 times Post-treatment: Measured after being left at room temperature for 24 hours ± 2 hours.
	耐电压 (端子间) Withstand Voltage	参照项目 5 内容 Refer to the content of Project 5	
	绝缘电阻 Insulation resistance	≥10000MΩ	
13	外观 Appearance	无可见损伤、标志清晰 No visible damage, clear markings	进行此试验前应首先进行如下试验: 项目: 板弯曲 项目: 焊接强度 (施加 5N 测试力) Y5P、Y5U、Y5V 系列进行预处理。 预处理: 电容器应在室温环境下放置 24±2h 温度: 40℃±2℃; 相对湿度: 93%±3% 持续时间: 21d 后处理: 将电容器在室内条件下存放至 1 至 2 小时。 Before conducting this test, the following tests should be carried out first: Project: Plate Bending Project: Welding Strength (Applying a 5N test force) The Y5P, Y5U, and Y5V series undergo pre-treatment. Pre-treatment: The capacitor should be placed in a room temperature environment for 24 ± 2 hours. Temperature: 40℃ ± 2℃; Relative humidity: 93% ± 3% Duration: 21 days Post-treatment: Store the capacitor in an indoor environment for 1 to 2 hours.
	静电容量 变化 Capacity change	SL	
		Y5P	
		Y5U	
		Y5V	
	损耗角 正切值 Dissipation factor	SL	
	耐电压 (端子间) Withstand Voltage	参照项目 5 内容 Refer to the content of Project 5	
14	外观 Appearance	无可见损伤、标志清晰 No visible damage, clear markings	进行此试验前应首先进行如下试验: 项目: 板弯曲 项目: 焊接强度 (施加 5N 测试力) Y5P、Y5U、Y5V 系列进行预处理。 预处理: 电容器应在室温环境下放置 24±2h 温度: 40℃±2℃; 相对湿度: 93%±3% 施加电压: 额定电压 UR; 持续时间: 21d 后处理: 将电容器在室内条件下存放至 1 至 2 小时。 Before conducting this test, the following tests should be carried out first: Project: Plate Bending
	静电容量 变化 Capacity change	SL	
		Y5P	
		Y5U	
		Y5V	
	损耗角 正切值 Dissipation factor	SL	
	耐电压 (端子间) Withstand Voltage	参照项目 5 内容 Refer to the content of Project 5	

序号 No.	项目 Items		性能 Performance		试验条件 Test conditions (参考标准 Reference standard: IEC 60384-14: 2023)
		耐电压 (端子间) Withstand Voltage	参照项目 5 内容 Refer to the content of Project 5		Project: Welding Strength (Applying a 5N test force) The Y5P, Y5U, and Y5V series undergo pre-treatment. Pre-treatment: The capacitor should be placed in a room temperature environment for 24 ± 2 hours.
		绝缘电阻 Insulation resistance	>3000MΩ		Temperature: 40℃ ± 2℃; Relative humidity: 93% ± 3% Voltage: Rated voltage; Duration: 21 days Post-treatment: Store the capacitor in an indoor environment for 1 to 2 hours.
15	耐久性 Endurance test	外观 Appearance	无可见损伤、标志清晰 No visible damage, clear markings		进行此试验前应首先进行如下试验： 项目：板弯曲
		静电容量 变化 Capacity change	SL	\ΔC/C ≤10%	项目：焊接强度（施加 5N 测试力）
			Y5P、Y5U、Y5V	\ΔC/C ≤15%	Before conducting this test, the following tests should be carried out first: Project: Plate Bending
		损耗角 正切值 Dissipation factor	SL	DF: ≤1.5X 初始规格上限 DF: ≤ 1.5X initial specification upper limit	Project: Welding Strength (Applying a 5N test force) 在试验前，应对每个电容器实施（Y1: 8KV）三次电压脉冲。
			Y5P、Y5U、Y5V	DF: ≤5.0X 初始规格上限 DF: ≤ 5.0X initial specification upper limit	Before the experiment, a voltage pulse of (Y1: 8KV) should be applied to each capacitor three times.
		耐电压 (端子间) Withstand Voltage	参照项目 5 内容 Refer to the content of Project 5		 <p>波前时间 (T1) =1.2μs=1.67T 到达电压半值的时间 (T2) =50μs</p>
		绝缘电阻 Insulation resistance	> 1000MΩ		Y5P、Y5U、Y5V 系列进行预处理。 The Y5P, Y5U, and Y5V series undergo pre-treatment. 预处理：在 150+0/-10℃下放置 60±5min，然后在室温下放置 24±2h 后进行初始测量。 Pre-treatment: Place at 150℃+0/-10℃ for 60 ± 5 minutes, then leave at room temperature for 24 ± 2 hours before conducting the initial measurement. 在 125+2/-0℃及相对湿度低于 50%的条件下施加 170%UR 的电压 1000 小时。 此外，每小时将电压升至 1000VAC（有效值）并持续 0.1 秒。电压通过 47Ω±5%电阻施加到每个电容上。 Apply a voltage of 170% UR for 1000 hours under the conditions of 125 ± 2 / -0 °C and a relative humidity lower than 50%. Furthermore, the voltage will be raised to 1000VAC (effective value) every hour and maintained for 0.1 s. The voltage is applied to each capacitor through a 47Ω ± 5% resistor. 后处理：室温放置 24±2 h 后进行测量

序号 No.	项目 Items	性能 Performance	试验条件 Test conditions (参考标准 Reference standard: IEC 60384-14: 2023)
			Post-treatment: Measure after leaving at room temperature for 24±2 hours.
16	脉冲电压 Pulse voltage	无永久性击穿或飞弧 No permanent breakdown or arcing	<p>每个电容器施加 24 次脉冲，脉冲间隔≥10s，峰值电压：8KV(Y1)</p> <p>24 次脉冲中有连续 3 次以上，未发生自愈性击穿或闪火的情况为通过。</p> <p>Each capacitor is subjected to 24 pulses, with a pulse interval of ≥ 10s. Peak voltage: 8KV (Y1).</p> <p>If among the 24 pulses, there are 3 or more consecutive pulses without self-healing breakdown or flashover, it is considered passed.</p>
17	阻燃性 Flame retardancy	燃烧时间不超过 10 秒，薄纸不燃烧 The burning time is no more than 10 seconds. The thin paper does not catch fire.	<p>被测电容器应置于火焰外焰处。且每个样品只能燃烧一次。</p> <p>置于火焰时间：10 秒。</p> <p>火焰长度：12±1mm</p> <p>燃气燃烧器：最小长度 35 毫米</p> <p>内径：0.5±0.1mm</p> <p>外径：0.9mm max</p> <p>气体：丁烷气体纯度至少为 95%。</p> <p>The test capacitor should be placed in the outer flame of the fire. And each sample can only be burned once.</p> <p>Duration of placement in the flame: 10 seconds.</p> <p>Flame length: 12 ± 1 mm</p> <p>Gas burner: Minimum length 35 mm</p> <p>Inner diameter: 0.5 ± 0.1 mm</p> <p>Outer diameter: 0.9 mm max</p> <p>Gas: The purity of butane gas should be at least 95%.</p> 
18	耐溶剂性 Solvent resistance	无可见损伤 No visible damage 参考项目 2~5 内容 Refer to the contents of items 2 to 5	<p>使用的溶剂：30±5%异丙醇和 70±5%微化物</p> <p>溶剂温度：23±5℃</p> <p>电容器应浸没在溶剂中 5±0.5 秒</p> <p>恢复时间：8hours</p> <p>The used solvent: 30±5% isopropanol and 70±5% surfactant</p> <p>Solvent temperature: 23±5℃</p> <p>The capacitor should be immersed in the solvent for 5±0.5 seconds</p> <p>Recovery time: 8 hours</p>

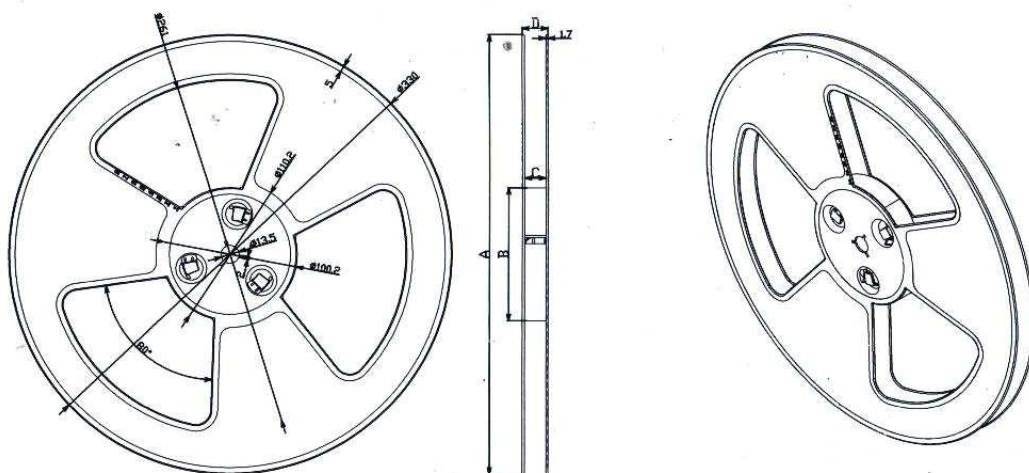
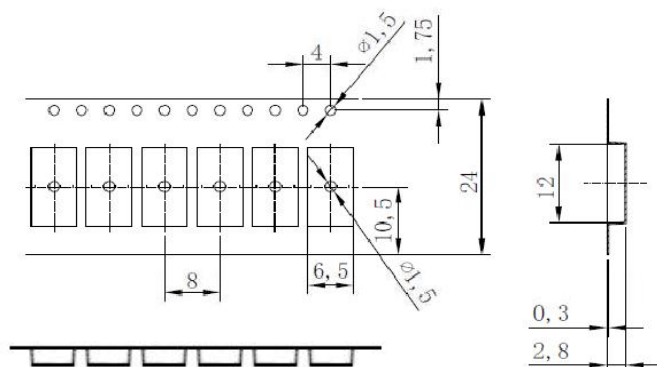
序号 No.	项目 Items	性能 Performance	试验条件 Test conditions (参考标准 Reference standard: IEC 60384-14: 2023)
19	标志耐溶剂性 Solvent resistance of the mark	标志清晰 Clear signage	使用的溶剂: 30±5%异丙醇和 70±5%微化物 溶剂温度: 23±5℃ 电容器应浸没在溶剂中 5±0.5 秒, 用纱布擦拭标志 10 次。 The used solvent: 30 ± 5% isopropanol and 70 ± 5% surfactant Solvent temperature: 23 ± 5℃ The capacitor should be immersed in the solvent for 5 ± 0.5 seconds, and wiped with gauze 10 times.
预处理(仅针对 II 类电容器): 在 140℃~150℃下预热 1h±10min 后, 在室温下放置 24±2h。 实验结束后处理(仅针对 II 类电容器): 在 140℃~150℃下预热 1h±10min 后, 在室温下放置 24±2h。 Pre-treatment (only for type II capacitors): Preheat at 140℃~150℃ for 1h±10min, then leave at room temperature for 24±2h. Post-experiment treatment (only for type II capacitors): Preheat at 140℃~150℃ for 1h±10min, then leave at room temperature for 24±2h. “室内条件”—— 温度: 15℃~35℃, 相对湿度: 25%~75 %, 大气压力: 86kPa~106kPa "Indoor conditions" - Temperature: 15℃ to 35℃, Relative humidity: 25% to 75%, Atmospheric pressure: 86kPa to 106kPa			

◆产品特性曲线图 Temperature characteristic curve graph



◆包装 Packaging

* 编带样式及尺寸 Tape style and size



单位: mm

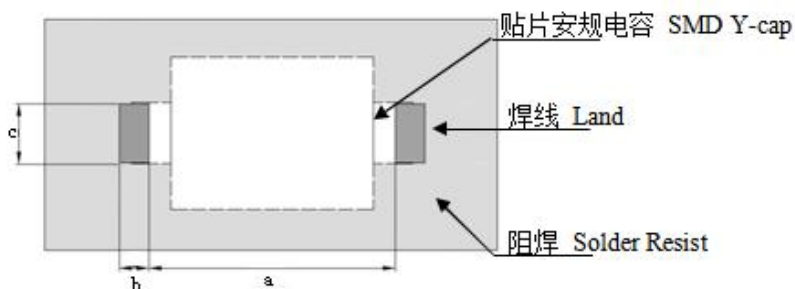
代码 Code	A	B	C	D
尺寸 Size	330±1.8	100±0.7	24±0.4	27.4±0.4

* 包装数量 Packaging quantity

圆盘尺寸(mm) Disc size	包装数量 (Kpcs/盘) Packaging quantity	内箱盘数 Number of inner boxes	外箱数量 (Kpcs/箱) Number of inner boxes	内箱尺寸(mm) Inner box dimensions
330	2.5	10	25.0	长*宽*高 L*W*H : 360*360* 320

◆推荐安装/焊接方法 Recommended installation/welding method

* 推荐焊接条件 Recommended welding conditions



代码 Code	封装尺寸 Encapsulated size	a(mm)	b(mm)	c(mm)
尺寸 Size	8.0×6.0	≥8.0 (可适用 Applicable)	2.2±0.1	2.6±0.1
		9.9±0.1 (推荐 Recommendation)		

* 焊接建议 Welding Suggestions

1. 回流焊:

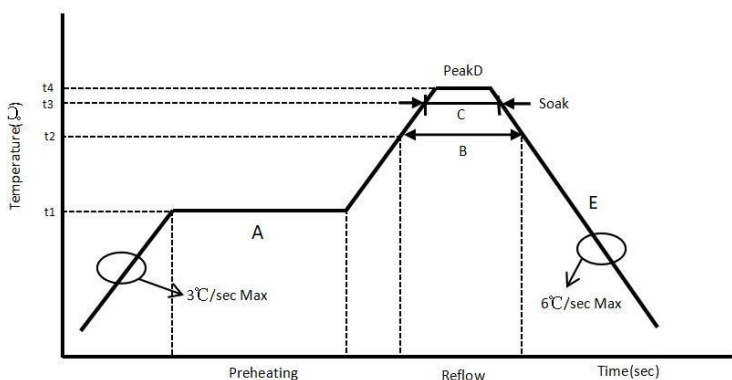
* 焊接电容器时, 应在以下条件下进行 When welding capacitors, the following conditions should be followed.

* 焊接温度: 最大 280℃ Welding temperature: Maximum 280℃.

* 焊接时间: 最大 30 秒 Welding time: Maximum 30 seconds.

* 预热温度: 最大 200℃ Preheating temperature: Maximum 200℃.

* 回流焊温度曲线图 Solder reflow temperature curve diagram:



t1	175±25℃	预热 A	120±60s
t2	215±10℃	回流焊	110±20% s
t3	230±10℃	浸没 C	30±20% s
t4	275±5℃	波峰 D	20±10s

* 当焊接温度低于锡的熔点时, 贴片镀锡端子的可焊性将下降。使用之前请确认贴片镀锡端子的可焊性

* 焊接区出风口及内部空间最高温度不能超过 280℃, 温度超过时, 会造成产品发生失效。由于超温使用所造成的不良, 我司不予承担责任。

* When the welding temperature is lower than the melting point of tin, the solderability of the surface-mounted tin-plated terminals will decrease. Please confirm the solderability of the surface-mounted tin-plated terminals before use.

* The maximum temperature of the exhaust outlet and internal space of the welding area cannot exceed 280℃. If the temperature exceeds this limit, it will cause product failure. Any defects caused by excessive temperature use shall not be the responsibility of our company.

◆波峰焊

- * 焊接电容器时，应在以下条件下进行 When welding capacitors, the following conditions should be followed.
- * 焊接温度：最大 280℃ Welding temperature: Maximum 280℃.
- * 焊接时间：最大 30 秒 Welding time: Maximum 30 seconds.
- * 预热温度：最大 200℃ Preheating temperature: Maximum 200℃.
- * 预热时间：最大 180 秒 Preheating time: Maximum 180 seconds.

◆烙铁焊

- * 将本产品焊接至 PCB/PWB 时，不得超过电容器的焊接耐热性规格。将本产品过度加热可能会熔化内部连接焊料，并可能导致热冲击，从而导致陶瓷元件开裂。
- * 用烙铁焊接电容器时，应在下列条件下进行。
- * 烙铁尖温度：最大 400℃
- * 烙铁瓦数：最大 50 瓦。
- * When soldering this product onto a PCB/PWB, do not exceed the soldering temperature limit specified for the capacitor. Excessive heating of this product may cause the internal soldering material to melt and result in thermal shock, which could lead to cracking of the ceramic component.
- * When soldering the capacitor with a soldering iron, the following conditions should be followed.
- * Soldering iron tip temperature: maximum 400℃
- * Soldering iron wattage: maximum 50 watts.

◆储存方法 Storage method

- ①绝缘环氧树脂模制电容器未形成完美的密封；因此，不要在腐蚀性的环境中使用或储存电容器，尤其是氯化物气体、硫化物气体、酸、碱、盐或类似物质都存在的环境，还要避免暴露在潮湿的环境中。为了避免水分的吸收，电容器应包装在防潮的密封袋里。
- ②电容器应在以下条件中储存，并在交付后 6 个月内使用。（温度：10~30℃ 湿度：60%max）
- ③贴片电容的元件湿敏等级为 MSL3，请在打开防潮包装后 168 小时内焊接封闭电容器。打开后，将电容器储存在装有干燥剂和湿敏卡的防潮包装中，并保持上述状态。
- ④如果储存期超过 6 个月或打开包装后封闭湿敏卡的指示颜色发生变化，则在焊接前进行烘烤（125℃，24 小时）
- ① The insulating epoxy resin molded capacitor does not form a perfect seal; therefore, do not use or store the capacitor in corrosive environments, especially in environments where chloride gas, sulfide gas, acids, bases, salts or similar substances exist. Also, avoid exposure to damp conditions. To prevent water absorption, the capacitor should be packaged in a moisture-proof sealed bag.
- ② The capacitor should be stored under the following conditions and used within 6 months after delivery. (Temperature: 10 - 30℃; Humidity: 60% max)
- ③ The component's humidity-sensitive grade of the surface mount capacitor is MSL3. Please solder and seal the capacitor within 168 hours after opening the moisture-proof packaging. After opening, store the capacitor in a moisture-proof packaging containing desiccant and humidity-sensitive cards, and maintain the above conditions.
- ④ If the storage period exceeds 6 months or the color of the humidity-sensitive card after opening the packaging changes, perform a baking process (125℃, 24 hours) before soldering.

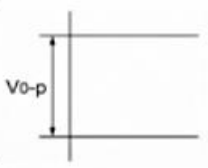
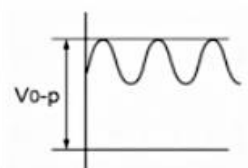
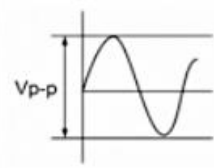
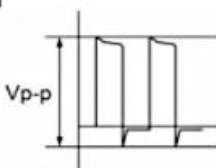
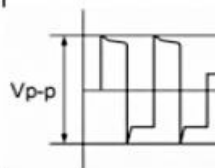
◆使用前的注意事项 Pre-use precautions

- * 工作电压 Working voltage

在交流电路或纹波电流电路中使用直流额定电压电容器时，请务必确保外加电压的 Vp-p 值或包含直流偏置电压的 Vo-p 值保持在额定电压范围内。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不规则电压，请务必使用额定电压范围大于此不规则电压的电

容器。

When using DC rated voltage capacitors in AC circuits or ripple current circuits, it is essential to ensure that the V_{p-p} value of the applied voltage or the V_{o-p} value including the DC bias voltage remains within the rated voltage range. If a voltage is applied to the circuit, temporary irregular voltages may occur due to resonance or switching when starting or stopping. Therefore, it is necessary to use capacitors with a rated voltage range greater than this irregular voltage.

直流电压 DC voltage	直流+交流电压 DC+AC voltage	交流电压 AC voltage	冲击电压 (1) Pulse voltage(1)	冲击电压 (2) Pulse voltage(2)
				

* 工作温度和自身发热 Working temperature and self-heating

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，务必考虑到电容器自身发出的热量。电容器在高频电流、冲击电流等使用时可能会因介电损耗自身发热，所施加之正弦波电压的频率应低于 300kHz。外加电压应使其自生热等负荷在 25℃ 周围温度条件下不超过 20℃ 范围（SL 材质 5℃），测量时应使用 $\phi 0.1\text{mm}$ 小热容量的 (K) 的热电偶，而且电容器不应受到其它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）。

The surface temperature of the capacitor should be kept below the upper limit of its rated operating temperature range, taking into account the heat generated by the capacitor itself. When the capacitor is used in high-frequency currents, impulse currents, etc., it may generate heat due to dielectric loss. The applied sinusoidal voltage frequency should be lower than 300 kHz. The applied voltage should ensure that the self-generated heat and other loads do not exceed 20℃ within the temperature range of 25℃ (5℃ for SL material) at the time of measurement. A $\phi 0.1\text{mm}$ small heat capacity (K) thermocouple should be used for measurement, and the capacitor should not be affected by the heat dissipation of other components or temperature fluctuations in the surrounding environment. Overheating may lead to a decrease in the characteristics and reliability of the capacitor (Do not measure when the cooling fan is running, otherwise the accuracy of the measurement data cannot be ensured).

* 耐电压的测试条件 Test conditions for withstanding voltage

测试设备 Testing equipment

交流耐电压的测试设备应具有能够产生类似于 50/60Hz 正弦波的功能，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。

The testing equipment for alternating voltage withstand capability should be capable of generating a function similar to a 50/60Hz sine wave. If distorted sine waves or overload voltages exceeding the specified value are applied, it may cause faults.

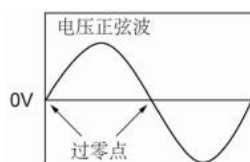
电压外加方法 Voltage application method

施加耐电压时，电容器的引线或端子应与耐电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。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，测试电压应降到近零，然后再将电容器引线或端子从耐电压测试设备的输出端取下。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。

When applying the withstand voltage, the leads or terminals of the capacitor should be firmly connected to the output terminal of the withstand voltage testing equipment, and then the voltage should be increased from nearly zero to the test voltage. If the test voltage is not gradually raised from nearly zero but is directly applied to the capacitor, then during the application process, the zero point should be included. At the end of the test, the test voltage should be reduced to nearly zero, and then the leads or terminals of the capacitor should be disconnected from the output terminal of the withstand voltage testing equipment. If the test voltage is not gradually raised from nearly zero but is directly applied to the capacitor, then a surge voltage may occur, which could lead to a fault.

过零点是指电压正弦通过 0V 的位置。

The zero-crossing point refers to the position where the voltage sine wave passes through 0V.



参见右图 Refer to the right figure:

* 失效安全性 Failure safety

电容器损坏时，失效可能会导致短路。为了避免再短路时引起出点、冒烟、火灾等危险情况，请在电路中使用熔丝等原件来设置自动故障功能。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，并引起冒烟或局部离散。

* 电容器的电容量变化

1. SL 特性：电容量由于周围的温度或施加的电压可能会改变一点点。如果应用于严格的时间常数电路，与我公司联系。

2. B、E、F 特性：电容器具有老化特性；因此，电容器若长时间使用，其电容量会逐渐降低。而且，静电容量还可能会因周围温度或外加电压而发生巨大变化，所以不适合用于时间常数电路。

若需详情，请与我公司联系。

When a capacitor is damaged, failure may cause a short circuit. To avoid dangerous situations such as sparking, smoking, or fire when a short circuit occurs again, use components like fuses in the circuit to set up an automatic fault prevention function. If you ignore the above warning when using this product, it may lead to a short circuit in severe cases and cause smoking or local disintegration.

* Changes in capacitor capacitance

1. SL characteristic: The capacitance may change slightly due to the surrounding temperature or applied voltage. If used in a strictly time constant circuit, contact our company.

2. B, E, F characteristics: The capacitor has aging characteristics; therefore, if used for a long time, its capacitance will gradually decrease. Moreover, the electrostatic capacity may also change significantly due to the surrounding temperature or applied voltage, so it is not suitable for use in time constant circuits.

For details, please contact our company.

* 使用设备进行性能检查 Perform performance checks using the equipment

使用电容器之前，请先检查设备的性能和特性没有问题。

一般而言，2 类陶瓷电容器（B、E、F 特性）的电容量具有电压相关特性和温度相关特性。所以，其电容值可能会随设备的工作条件而发生变化。因此，一定要确认仪器接收性能对电容器的静电容值变化的影响，如漏电流和静噪特性。此外，必要时还要检查电容器在设备中的防电涌性能，因为通过电路的感应，浪涌电压可能会超过规定值。

Before using the capacitor, please first check that the performance and characteristics of the equipment are in good condition.

Generally speaking, the capacitance of type 2 ceramic capacitors (with characteristics B, E, and F) has voltage-related and temperature-related characteristics. Therefore, their capacitance values may change depending on the operating conditions of the equipment. Therefore, it is necessary to confirm the impact of the instrument's receiving performance on the static capacitance value of the capacitor, such as leakage current and static noise characteristics. In addition, when necessary, it is also necessary to check the surge protection performance of the capacitor in the equipment, because through the induction of the circuit, the surge voltage may exceed the specified value.

* 焊接、安装与使用 Welding, installation and usage

振荡与冲击 Vibration and Impact

使用时请勿使电容器或引线受到过度冲击或振荡。

过度冲击或振荡会对安装在电路板上的引线造成疲劳破坏。

请采取措施，使用粘合剂、封膜树脂或其它涂层将电容器固定在电路板上。使用指定设备进行固定时，请确认固定措施对产品不会造成影响。

When using, please avoid subjecting the capacitors or leads to excessive shock or vibration.

Excessive shock or vibration can cause fatigue damage to the leads installed on the circuit board.

Please take measures to fix the capacitors on the circuit board using adhesives, encapsulation resins or other coatings. When using

specified equipment for fixation, please confirm that the fixation measures will not affect the product.

焊接 Welding

当将本产品焊接到 PCB/PWB 上时, 不得超过电容器的耐焊热性规格。本产品如果过热, 可能导致内部连接点锡焊料熔化, 导致温度骤变, 从而使陶瓷元件产生裂纹。

当使用烙铁焊接电容器时, 应遵循以下条件:

烙铁头温度: 最高 400℃

烙铁功率: 最大 50W

焊接时间: 最多 3.5 秒

When attaching this product to a PCB/PWB, do not exceed the soldering thermal resistance specifications of the capacitor. If this product overheats, it may cause the solder on the internal connection points to melt, resulting in a sudden temperature change and causing cracks in the ceramic components.

When using a soldering iron to solder capacitors, the following conditions should be followed:

Soldering iron tip temperature: Maximum 400°C

Soldering iron power: Maximum 50W

Soldering time: Up to 3.5 seconds

粘合、树脂封膜和树脂涂敷 Bonding, resin sealing film and resin coating

在对本产品进行粘合、封膜或施加涂层前, 请先在指定设备上测试经粘合、封膜或涂敷的产品的性能, 以确定上述过程不会影响电容器的质量。

当含有有机溶剂(乙酸乙酯、甲基乙基酮、甲苯等)的粘合剂和封膜树脂的使用量、干燥/硬化条件不适当时, 有机溶剂可能损坏电容器的外涂层树脂, 最坏条件下可能导致短路。

粘合剂、封膜树脂和有机溶剂的厚度变化也会造成电容器表面树脂涂层和陶瓷元件在温度周期变化过程中产生裂纹。

Before conducting bonding, sealing or coating operations on this product, it is necessary to test the performance of the bonded, sealed or coated product on the designated equipment to ensure that the above processes do not affect the quality of the capacitor.

When the usage amount of adhesives and sealing resins containing organic solvents (such as ethyl acetate, methyl ethyl ketone, toluene, etc.) and the drying/hardening conditions are inappropriate, the organic solvents may damage the outer coating resin of the capacitor. In the worst case, it may even lead to short circuits.

Changes in the thickness of adhesives, sealing resins and organic solvents can also cause cracks in the surface resin coating of the capacitor and ceramic components during temperature cycle variations.

粘合、树脂封膜和树脂涂敷后的处理 Bonding, resin sealing film and resin coating treatment

焊接后, 当外涂层很热(超过 100℃)时, 外涂层会变得很软、易碎。因此, 请注意不要对涂层施加机械冲击力。

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, 并引起冒烟或局部离散。

After welding, when the outer coating is very hot (above 100°C), it becomes very soft and fragile. Therefore, please be careful not to apply mechanical impact force to the coating.

If the above warning matters are ignored when using this product, in severe cases, it may cause a short circuit and result in smoke or local detachment.

* 清洗(超声波清洗) Cleaning (Ultrasonic cleaning)

进行超声波清洗时, 应遵守下列条件:

洗涤槽容量: 每升输出 20W 或更少。洗涤时间: 最长 5 分钟。

不得直接振荡 PCB/PWB。超声波清洗过度可能导致引线疲劳性破坏。

When conducting ultrasonic cleaning, the following conditions should be followed:

Washing tank capacity: 20W or less per liter of output. Washing time: up to 5 minutes.

PCB/PWB must not be directly vibrated. Excessive ultrasonic cleaning may cause fatigue damage to the leads.

* 应用限制 Application Instructions

- ① 本规格书中记载的产品规格仅适用在通用标准用途意义上使用的一般电子设备（影音设备、家电设备、娱乐设备、通信设备、计算机设备、个人设备、办公设备、计测设备等），并且仅限于一般电子设备常规的操作和使用方法。
- ② 对于要求高安全性与高可靠性的应用场景，或因设备故障、失误操作、运行异常可能导致人身伤亡、财产损失及重大社会影响的特定用途（如下），本公司不对产品的适用性、性能表现及品质提供任何保证。

- ① The product specifications recorded in this specification are applicable only to general electronic devices (audio-visual equipment, household appliances, entertainment equipment, communication equipment, computer equipment, personal devices, office equipment, measuring and testing equipment, etc.) used in general standard purposes, and are limited to the normal operation and usage methods of general electronic devices.
- ② For applications requiring high safety and reliability, or for specific purposes where equipment failure, improper operation, or abnormal operation may result in personal injury, property loss, and significant social impact (such as the following), our company does not provide any guarantees regarding the applicability, performance, and quality of the products.

1、	航空，航天设备 Aerospace and aviation equipment	6、	运输设备（汽车，电车，船舶等） Transportation equipment (cars, trams, ships, etc.)
2、	军用设备 Military equipment	7、	电热用品，燃烧设备 Electric heating appliances, combustion equipment
3、	交通工具控制设备 Transportation vehicle control equipment	8、	核动力相关设备 Nuclear power-related equipment
4、	医疗设备 Medical equipment	9、	防灾防盗设备 Disaster prevention and theft prevention equipment
5、	发电控制设备 Power generation control equipment	10、	其他被认定为特定用途的应用 Other applications that have been identified as being for specific purposes

- ③ 若客户拟在本产品目录所说明的适用范围、使用条件之外使用产品，或计划将产品用于特定用途，敬请事先向本公司相关部门咨询。本公司将根据客户实际需求，协同商议与本产品目录所记载内容不同的使用方案。
- ④ 除非客户事先获得本公司的书面同意，否则对于客户或第三方因将本公司产品用于第②点所述特定用途而产生的任何损害，本公司均不承担任何责任。
- ③ If the customer intends to use the product beyond the applicable scope and usage conditions specified in this product catalogue, or plans to use the product for specific purposes, please consult the relevant department of our company in advance. Our company will, based on the actual needs of the customer, jointly discuss and formulate alternative usage plans that differ from the contents recorded in this product catalogue.
- ④ Unless the customer obtains the written consent of our company in advance, our company shall not be liable for any damages incurred by the customer or a third party due to the use of our products for the specific purposes mentioned in point 2.

◆修订履历 Modification Log

版本 Version	日期 Date	修订内容 Revision Content	修订人 Reviser
A0	2025-11-20	新修订	陆雨
A1	2025-12-18	增加产品引脚站高尺寸标示 修改：建议焊盘尺寸	李志才