WEIDY® 纬迪
电 容 器 专 业 制 造 商

安规陶瓷电容器规格承认书
APPROVAL SPECIFICATION FOR SAFETY CERAMIC CAPACITORS

客户 CUSTOMER			
客户料号 CUSTOMER P/N			
客户规格描述 CUST. SPEC			
规格描述 DESCRIPTION	WD Y1 222M 500VAC Y5V F10		
产品编码 PART NUMBER	**WYD2H222MF4S620001**		
日期 DATE	2024年6月29日	文件编号 DOC. NO.	WD-SPEC-002A

纬迪承认栏 APPROVED BY WEIDY			客户承认栏 APPROVED BY CUSTOMER	
批 准 APPROVED BY	审核 CHECK BY	制订 FORMULATE BY	批 准 APPROVED BY	审核 CHECK BY
趙光濤	彭少雄	鐘茂源		

深圳市纬迪实业发展有限公司 工程部 承认书专用章

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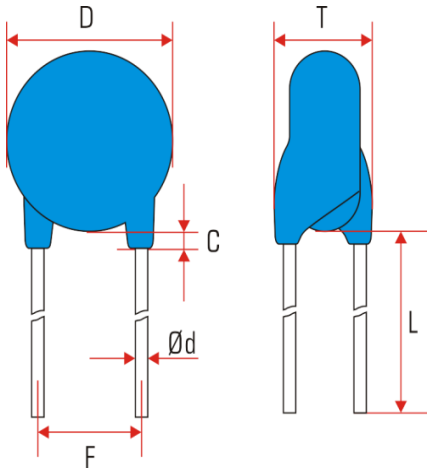
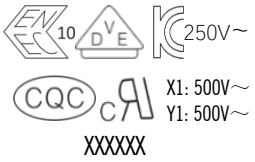
請確保我們的產品安裝到您的產品上前，已根據您的需求進行了評估。
Please make sure that your product has been evaluated in view of your specifications with our product being mounted to your product.
請您在使用我們的產品時，不要偏離此標準。
You are requested not to use our product deviating from this specification.

安规陶瓷电容器规格承认书
APPROVAL SPECIFICATION FOR SAFETY CERAMIC CAPACITORS

1. 承认产品规格表
Approval product specification sheet



本体颜色: 蓝色
BODY COLOR: SKY-BLUE
包封层: 环氧树脂(UL94 V-0)
COATING: EPOXY RESIN (UL94 V-0)
导线: 镀锡铜包钢线
LEAD WIRE: TIN-COATED COPPER CLAD STEEL WIRE
印字:
MARKING:



产品编码 Part number		WYD2H222MF4S620001	
规格描述 Description		WD Y1 222M 500VAC Y5V F10	
安规类别 Safety subclass		X1, Y1	
额定电压 Rated voltage		X1: 500V～ / Y1: 500V～	
电容量 Capacitance		2200PF ±20%	@ 1kHz 1Vrms, 25±2℃
损耗角正切 Tangent of loss angle		0.025 max	@ 1kHz 1Vrms, 25±2℃
耐电压 Testing voltage		No failure	@ 4000VAC (Charge/discharge 50mA max) 60s
绝缘电阻 Insulation resistance		10 000MΩ min	@ 500V 60s
温度特性 Temperature characteristics		Y5V (ΔC/C: +22%/-82% @ -25℃～+85℃)	
工作温度范围 Operating temperature range		-40˚C ～ +125˚C	
气候类别 Climatic category		40/125/21	
阻燃等级 Passive flammability category		C	
尺寸 DIMENSIONS	D (Diameter)	9.2	mm max
	T (Thickness)	5.5	mm max
	F (Lead spacing)	10.0	mm±1.0mm
	L (Lead length)	20	mm min
	ød (Lead diameter)	0.6	mm±0.10mm
	C (Coating height)	3.0	mm max

2. 概述
Introduction

2.1. 范围
Scope

本规格书适用于纬迪制造的安规陶瓷电容器。
This specification applies safety ceramic capacitors for WEIDY manufacture.

2.2. 应用
Applications

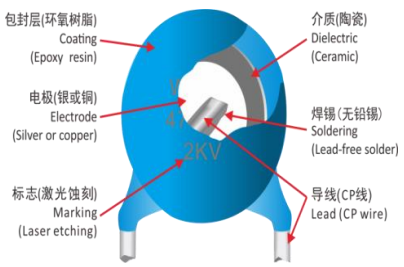
- ■ 工业和消费品
  Industrial and consumer
- ■ 初级与次级耦合
  Primary and secondary coupling (SMPS)
- ■ EMI/RFI抑制与滤波
  EMI / RFI suppression and filtering
- ■ 差模和(或)共模滤波
  Line-to-line and (or) line-to-ground filtering
- ■ 无变压器的DAA模块的D-A隔离和吸收杂音
  D-A isolation and noise absorption for DAA modems without transformers

2.3. 特点
Features

- ■ 操作温度高达125ºC
  Operating temperature range guaranteed up to 125 degrees
- ■ 符合IEC 60384-14标准要求，通过UL、VDE、ENEC和CQC安规认证
  Comply with IEC 60384-14 standard requirements, through UL, VDE, ENEC, CQC and KC safety certification.

认证标志 APPROVAL MARK	认证标准 APPROVAL STANDARDS	认证范围 SCOPE	认证证书号 CERTIFICATE NUMBER
c UL us	UL 60384-14 CSA E60384-1:14, CSA E60384-14:14	WYD: X1:AC500V Y1:AC250/300/400/500V 10pF to 4700pF; ±10%(K) or ±20%(M) WYE X1:AC400V Y2:AC125/250/300V 100pF to 10000pF; ±10%(K) or ±20%(M)	E334332
10 DVE	EN IEC 60384-14:2023-03 IEC 60384-14:2023		WYD: 40051104 WYE: 40051013
cqc	GB/T 6346.14-2023		WYD: CQC20001237500 WYE: CQC20001237499
KC	KC60384-1(2015-09), KC60384-14(2015-09)	AC250V Y1: 10pF to 4700pF; ±10%(K) or ±20%(M) Y2: 100pF to 10000pF; ±10%(K) or ±20%(M)	WYD: SU03125-20001A WYE: SU03125-20002A

- ■ 使用阻燃的环氧树脂包封（符合UL94 V-0标准）
  Coated with flame-retardant epoxy resin (conforming to UL94 V-0 standard)
- ■ 结构如右图所示
  The structure is shown right fig.



- ■ 可适用于自动化生产线
  Cost-saving automatic insertion available
- ■ 符合RoHS 2.0和REACH标准，无卤。
  Comply with RoHS 2.0 & REACH, halogen-free available

3. 通用特性

General specifications

类别 SUBCLASS	X1 / Y1 (WYD)	X1 / Y2 (WYE)
电容量范围 CAPACITANCE RANGE	10PF ～4700PF	100PF ～ 0.01UF
额定电压 RATED VOLTAGE	X1: 500VAC Y1: 250/300/400/500VAC	X1: 400VAC Y2: 125/250/300VAC
耐电压 TEST VOLTAGE (TV)	使用4000VAC(50HZ-60HZ，电流小于50MA)测量1分钟，无异常 THE CAPACITOR SHOULD NOT BE DAMAGED WHEN 4000VAC (50HZ-60HZ, 50MA MAX.) FOR 1 MINUTE.	使用2600VAC(50HZ-60HZ，电流小于50MA)测量1分钟，无异常 THE CAPACITOR SHOULD NOT BE DAMAGED WHEN 2600VAC (50HZ-60HZ, 50MA MAX.) FOR 1 MINUTE.
电容量 CAPACITANCE (C_R)	在25°C环境下使用1KHZ(＜100PF: 1MHZ或100KHZ)/1.0VRMS的条件进行测量，容量在允许误差范围内。 WITHIN THE SPECIFIED TOLERANCE. MEASURED AT 1KHZ (＜100PF: 1MHZ OR 100KHZ),1VRMS, 25°C	
损耗角正切 TANGENT OF LOSS ANGLE (TAN δ)	TANδ ≤0.025 测量条件同“电容量” MEASURED CONDITION SEE “CAPACITANCE”	
绝缘电阻 INSULATION RESISTANCE (IR)	使用500VDC测量1分钟，绝缘电阻不小于10 000 MΩ 10 000MΩ MINIMUM AT 500VDC FOR 1 MINUTE.	
温度特性 TEMPERATURE CHARACTERISTIC (TC)	Y5P, Y5U, Y5V	
气候类别 CLIMATIC CATEGORY	40/125/21	
阻燃等级 PASSIVE FLAMMABILITY CATEGORY	C	

■ Y电容分类

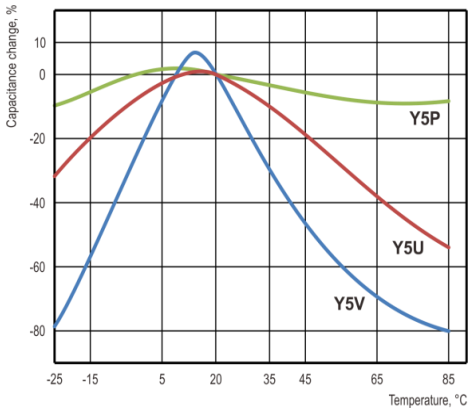
Class Y capacitors classification

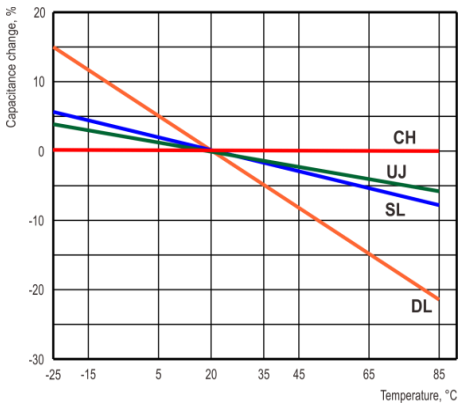
类别 SUBCLASS	跨接的绝缘类型 INSULATION BRIDGED TYPE	额定电压 RATED VOLTAGES	试验电压 VOLTAGE PROOF	峰值脉冲电压 PEAK IMPULSE VOLTAGE, Up (1.2/50us)
Y1	双重绝缘或增强绝缘 DOUBLE INSULATION OR REINFORCED INSULATION	≤500VAC	4KVAC	Up = 8.0 KV
Y2	基本绝缘或辅助绝缘 BASIC INSULATION OR SUPPLEMENTARY INSULATION	≥150VAC ≤500VAC	UR + 1.2KVAC WITH A MINIMUM OF 1.5VAC	Up= 5.0 KV
Y4	基本绝缘或辅助绝缘 BASIC INSULATION OR SUPPLEMENTARY INSULATION	＜150VAC	900VAC	Up = 2.5 KV

1. 本表数据来源IEC 60384-14-2023表2与表4
   THIS TABLE DATA SOURCES IEC 60384-14-2013 TABLE 2 AND TABLE 10
2. 双重绝缘、增强绝缘、基本绝缘与辅助绝缘的定义见IEC 61140
   FOR DEFINITIONS OF BASIC, SUPPLEMENTARY, DOUBLE AND REINFORCED INSULATION, SEE IEC 61140
3. 与额定脉冲电压和电源电压相关的过电压类别见IEC 60664-1
   OVERVOLTAGE CATEGORIES IN ASSOCIATION WITH RATED IMPULSE VOLTAGE AND RATED MAINS VOLTAGE ARE FOUND IN IEC 60664-1

■ 温度特性典型曲线图（仅供参考）

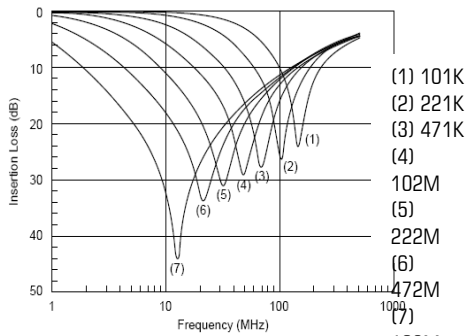
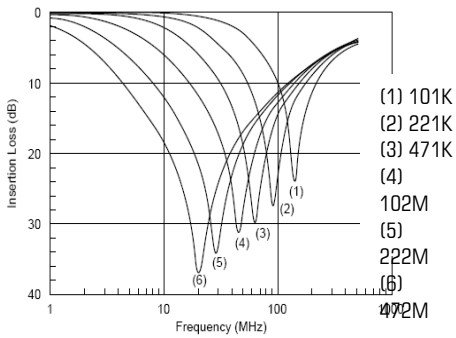
Typical temperature characteristic curves (for reference)





■ 插入损耗与频率特性

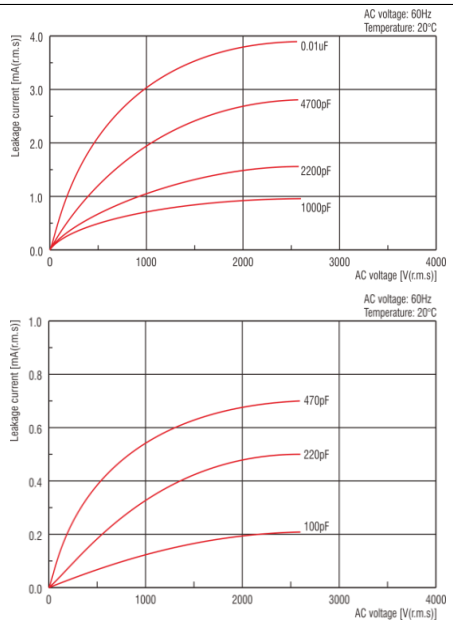
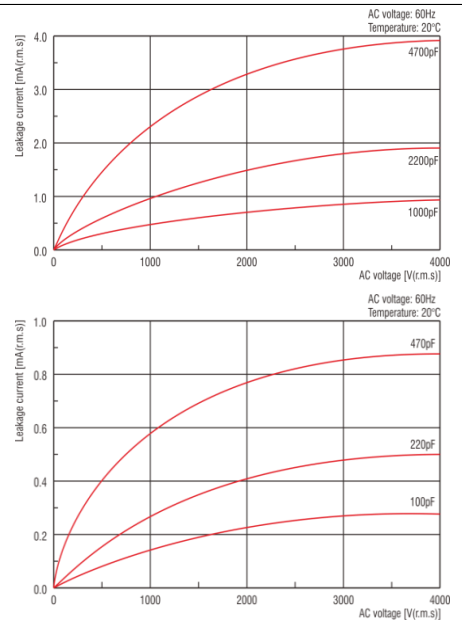
Insertion loss-frequency characteristics

X1 / Y2 (WYE)	X1 / Y1 (WYD)
	

SIGNAL POWER: 1mW
AC240V (R.M.S.) / 60HZ IS APPLIED ON THE CAPACITOR

■ 漏电流特性

Leakage current characteristics

X1 / Y2 (WYE)	X1 / Y1 (WYD)
	

4. 产品编码
Part Number

WYD	2H	222	M	F4	S	6	20	001
产品类别 Product type	额定电压 Rated voltage	标称容量 Nominal capacitance	容量偏差 Capacitance tolerance	温度特性 Temperature characteristics	脚型 Lead style	脚距 Lead spacing	脚长或编带包装方式 Lead length or tape packing	内部码 Inner code

■ 产品类别
Product type

WYD: X1Y1型安规陶瓷电容器
X1Y1 type Safety ceramic capacitors

WYE: X1Y2型安规陶瓷电容器
X1Y2 type Safety ceramic capacitors

■ 额定电压
Rated voltage

2E：250VAC　　2G: 400VAC

2F：300VAC　　2H: 500VAC

■ 标称容量
Nominal capacitance

用3位数表示，单位pF。如下所示：

In 3 digits, unit is pF, as shown in below:

222＝22×10＾2＝2200pF

■ 容量偏差
Capacitance tolerance

J: ±5%

K: ±10%

M: ±20%

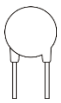
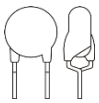
■ 温度特性
Temperature characteristics

B4: Y5P

E4: Y5U

F4: Y5V

■ 脚型
Lead style

代码 Code	S	K	V
脚型样式 Lead style drawing	 直脚 Straight Lead	 外弯脚 Outside kink Lead	 平行脚 Vertical kink Lead

■ 脚距
Lead spacing

3: 5.0±0.8mm

5: 7.5±1.0mm

6: 10.0±1.0mm

7: 12.5±1.0mm

■ 脚长或编带包装方式
Lead length or tape packing

● Lead length（ Bulk)

03: 3.0±0.5mm　　06: 6.0±1.0mm

3B: 3.2±0.5mm　　07: 7.0±1.0mm

3E: 3.5±0.5mm　　08: 8.0±1.0mm

3H: 3.8±0.5mm　　10: 10±2.0mm

04: 4.0±1.0mm　　12: 12±2.0mm

4E: 4.5±1.0mm　　20: 20mm min

05: 5.0±1.0mm　　25: 25mm min

● Taping

Initial code	Taping packaging	Final code	P/P0
R	Reel packing 卷盘包装 	1	P＝12.7mm/P0＝12.7mm
		2	P＝25.4mm/P0＝12.7mm
		3	P＝15.0mm/P0＝15.0mm
T	Ammo packing 折叠包装 	4	P＝30.0mm/P0＝15.0mm
		5	P＝15.0mm/P0＝15.0mm

NOTE:

T3, sprocket hole between leads;

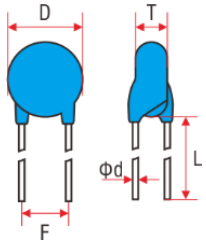
T5, sprocket hole between parts.

■ 内部码
Inter code

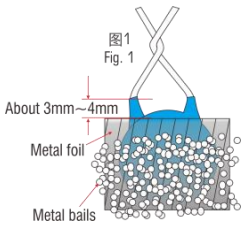
内部控制码，本规格书不作说明。

Inter control code will not be described in this an approval specifications.

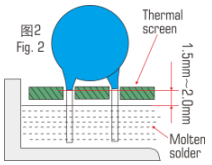
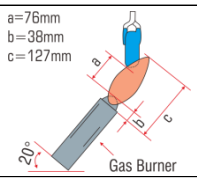
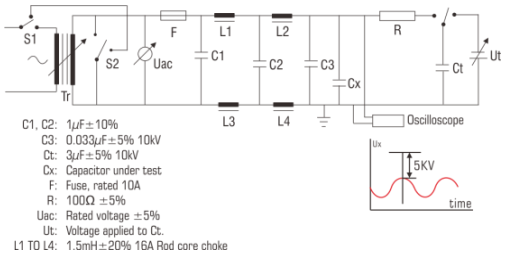
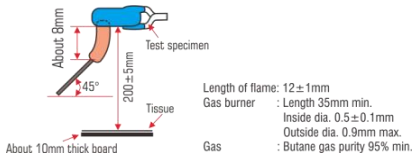
5. 规格清单
Specification list

TYPE		WYD			WYE		
SAFETY SUBCLASS		X1: 500V～ Y1: 250/300/400/500V～			X1: 400V～ Y2: 125/250/300V～		
T. C.		Y5P	Y5U	Y5V	Y5P	Y5U	Y5V
TOLERANCE		±10%	±20%	±20%	±10%	±20%	±20%
Dimensions (D mm max / T mm max)	10PF	7.0 / 4.5					
	15PF	7.0 / 4.5					
	22PF	8.0 / 4.5					
	33PF	7.0 / 4.5					
	47PF	8.0 / 4.5					
	56PF	8.0 / 4.5					
	68PF	9.2 / 4.5					
	82PF	11.0 / 4.5					
	100PF	7.5 / 5.5			7.0 / 4.5		
	150PF	7.5 / 5.5			7.0 / 4.5		
	220PF	7.5 / 5.5			7.0 / 4.5		
	330PF	8.5 / 5.5			7.0 / 4.5		
	470PF	8.5 / 5.5	7.5 / 5.5		8.0 / 4.5		
	560PF	10.0 / 5.5	7.5 / 5.5		8.0 / 4.5		
	680PF	10.0 / 5.5	8.5 / 5.5		8.5 / 4.5		
	820PF	11.0 / 5.5	8.5 / 5.5		9.0 / 4.5		
	1000PF	12.0 / 5.5	8.5 / 5.5	7.5 / 5.5	10.0 / 4.5	8.5 / 5.5	7.0 / 4.5
	1500PF		9.5 / 5.5	8.5 / 5.5		8.0 / 4.5	8.5 / 5.5
	2200PF		11.0 / 5.5	9.2 / 5.5		11.0 / 5.5	9.0 / 5.5
	3300PF		14.0 / 5.5	11.0 / 5.5		12.0 / 4.5	11.0 / 5.5
	3900PF		15.0 / 5.5	12.0 / 5.5		12.0 / 4.5	12.0 / 4.5
	4700PF		16.0 / 5.5	12.0 / 5.5		14.0 / 4.5	12.0 / 4.5
	5600PF						12.0 / 4.5
	6800PF						12.0 / 4.5
	10000PF						15.0 / 4.5
Dimensions (mm)	F	10.0±1.0			7.5±1.0 / 10.0±1.0		
	L	20 min (可定制编带或其它脚长 Taping or Other lead length can be customized)					
	Ød	0.60±0.10					

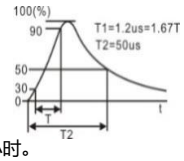
6. 标准与试验方法
Specifications and Testing Method

No.	项目 Item		标准 Specifications	试验方法 Testing Method
1	外观与尺寸 Appearance (APP) and Dimension		外观形状没有明显的缺点，尺寸在标准范围内。 No marked defect on appearance form and dimensions are within specified range.	电容必须用目视检查其明显的缺点。 The capacitor should be visually inspected for evidence of defect. 尺寸用游标卡尺测量。 Dimensions should be measured with slide calipers.
2	标志 Marking		清晰易于识别 To be easily legible	目视检查。 The capacitor should be visually inspected.
3	容量 Capacitance (C_R)		在误差范围内 Within specified tolerance	容量与损耗角正切(Q值)在25±1ºC下，使用1kHz(SL使用1MHz或100kHz)和1Vrms下测量。 The capacitance, tan δ (Q value) should be measured at 25ºC ± 1ºC with 1kHz (SL: 1MHz or 100kHz) and AC1.0V (r.m.s.).
4	损耗角正切 Tangent of loss angle (tan δ)		0.025 max	
5	绝缘电阻 Insulation Resistance (IR)		10 000MΩ min	在两导线间施加500VDC进行测量，时间不超过1分钟（如果绝缘电阻达到要求值时，试验可以在更短的时间内结束）。 The insulation resistance should be measured with a DC 500V at normal temperature and humidity and less than 1 min. of charging (The test may be terminated in a shorter time, if the required value of insulation resistance is reached).
6	耐电压 Voltage proof (TV)	导线间 Between Lead Wires	无失效。 No failure	在电容器两导线间施加下表电压60s后不被破坏（充/放电流不大于50mA） The capacitor should not be damaged when test voltages of following table are applied between the lead wires for 60 sec. (Charge/Discharge current ≤50mA) Type / WYE / WYD Voltage proof / 2500Vac / 4000Vac
		本体绝缘 Body insulation	无失效。 No failure	首先，将电容器的端子拧在一起，如右图所示，将金属箔包住电容器离端子3-4mm的本体，接着将电容器插入盛着直径为1mm的金属球的容器中，最后施加下表所示的电压60秒种 First, the terminals of the capacitor should be connected together. Then, as shown in figure at right, a metal foil should be closely wrapped around the body of the capacitor to the distance of about 3 to 4mm from each terminal. Then, the capacitor should be inserted into a container filled with metal balls of about 1mm diameter. Finally, AC voltage of following table is applied for 60 sec. between the capacitor lead wires and metal balls.  Type / WYE / WYD Voltage proof / 2500Vac / 4000Vac
7	导线抗张强度 Terminal Tensile Strength		导线无折断，电容无破损。 Lead wire should not be cut off. Capacitor should not be broken.	固定电容器的本体，使电容器每支导线均承受10N垂直力，保持10±1秒钟。 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.
8	导线抗折强度 Terminal Bending Strength		导线无折断，电容无破损。 Lead wire should not be cut off. Capacitor should not be broken.	电容器导线应承受5N重量，然后向外弯折成90º，然后回复到原来位置；接着往反方向弯折90º，再复原；弯折一次2-3秒钟。 Each lead wire should be subjected to 5N weight and then a 90º bend, at the point of egress, in one direction, return to original position, and then apply a 90º bend in the opposite direction at the rate of one bend in 2 to 3 sec.
9	振动 Vibration Resistance	APP	没有可见损伤 No marked defect	将电容器导线焊稳和调整振动频率范围为10-55Hz、总振幅为1.5mm，振动从10Hz到55Hz，然后再回到10Hz，大约一分钟。 The capacitor should be firmly soldered to the supporting lead wire and vibrated at a frequency range of 10 to 55Hz, 1.5mm in total amplitude, with about a 1 minute rate of vibration change from 10Hz to 55Hz and back to 10Hz. 总时间六个小时，每两小时在相互垂直方向来回三次。 Apply for a total of 6 hrs., 2 hrs each in 3 mutually perpendicular directions.
		C_R	在允许误差范围风 Within the specified tolerance	
		tan δ	Per Item 4	

安规陶瓷电容器规格承认书
APPROVAL SPECIFICATION FOR SAFETY CERAMIC CAPACITORS

序 No.	项目 Item		标准 Specifications	试验方法 Testing Method
10	可焊性 Solderability of Lead		导线必须有3/4以上的面积均匀附着焊锡 Lead wire should be soldered with uniform coating on the axial direction over 3/4 of the circumferential direction.	将电容导线浸入焊料中2±0.5秒钟，浸入深度离导线根部1.5-2.0mm。 The lead wire of a capacitor should be dipped into molten solder for 2±0.5 sec. The depth of immersion is up to about 1.5 to 2.0mm from the root of lead wires. 焊锡温度 ： 245±5ºC Solder temp.: 245±5ºC
11	耐焊接热 Soldering Effect	APP	没有可见损伤 No marked defect	如图所示，导线浸入离根部1.5-2.0mm处、锡温为260±5ºC锡槽中10±1秒。 As shown in figure, the lead wires should be immersed in solder of 260±5ºC up to 1.5 to 2.0mm from the root of terminal for 10±1.0s  预处理：电容器必须先贮存在85±2ºC条件下1小时，然后在室温下存放24±2小时，再进行初始测量。 Pre-treatment: Capacitor should be stored at 85±2ºC for 1h, and then placed at room condition for 24±2h. before initial measurements. 试验后处理：电容必须存放在室温下1-2小时。 Post-treatment: Capacitor should be stored for 1~2h. at room condition.
		Δ C/C	Y5P: ±10% Y5U, Y5V: ±20%	
		IR	2 000MΩ min	
		TV	Per Item 6	
12	针焰试验 Flame Test		电容离开火焰后自动熄灭。 The capacitor flame discontinues as follows.	电容应放在火焰中15秒钟，然后离开15秒种，如此重复5次。 The capacitor should be subjected to applied flame for 15 sec. and then removed for 15 sec. until 5 cycles are completed. 
13	自燃性 Active Flammability		纱布不着火 The cheese-cloth should not be on fire.	This test is not applicable to Y1 capacitors. 单个电容器应用纱布全部包住至少一层，但不多于两层。电容应承受放电20次，每次放电间隔5秒钟。AC电源应维持两分钟，最后放电。 The capacitor should be individually wrapped in at least one but not more than two complete layers of cheese-cloth. The capacitor should be subjected to 20 discharges. The interval between successive discharges should be 5 sec. The UAC should be maintained for 2 min. after the last discharge. 
14	阻燃性 Passive Flammability		燃烧时间不超过30秒，棉纸不被点燃。 The burning time should not exceed 30 sec. The tissue paper should not ignite.	电容器在下面试验中，火焰在适当的位置被最大燃烧，各个试验样品应只承受一次燃烧，燃烧时间：30秒钟。 The capacitor under test should be held in the flame in the position which best promotes burning. Each specimen should only be exposed once to the flame. Time of exposure to flame: 30s. 
15	耐湿负荷 Humidity Loading	APP	没有可见损伤 No marked defect	电容保持在温度为40±2ºC、相对湿度为90-95%条件下施加额定电压500±12小时。 Apply the rated voltage for 500±12 hrs. at 40±2ºC in 90 to 95% relative humidity. 试验后处理：电容必须贮存在室温条件下一至二小时。 Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition.
		Δ C/C	Y5P: ±10% Y5U, Y5V: ±15%	
		tan δ	Y5P, Y5U: 0.050 max Y5V: 0.075 max	
		IR	5 000MΩ min	
		TV	Per Item 6	

安规陶瓷电容器规格承认书
APPROVAL SPECIFICATION FOR SAFETY CERAMIC CAPACITORS

序 No.	项目 Item		标准 Specifications	试验方法 Testing Method
16	寿命试验 Life Test	APP	没有可见损伤 No marked defect	每个供试验电容必须承受5kV（Y1为8kV）脉冲电压三次，然后再进行寿命试验。 Each individual capacitor should be subjected to a 5kV (8kV for Y1) impulses for three times. After the capacitors are applied to life test.  在125＋2/-0ºC的条件下使用下表所要求的电压进行1000小时。 Apply a voltage of following table for 1000 hrs. at 125＋2/-0ºC 试验电压Applied Voltage 1.7倍额定电压，另在每小时将电压增加AC1000V，时间0.1秒 1.7 times rated voltage, except that once each hour the voltage is increased to AC1000V(rms) for 0.1s. 试验后处理：电容必须贮存在室温条件下一至二小时。 Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition.
		IR	5 000MΩ min	
		Δ C/C	Y5P: ±10% Y5U, Y5V: ±15%	
		TV	如第6项 Per Item 6	
17	温度循环 Temp. and Immersion Cycle	APP	没有可见损伤 No marked defect	电容器应承受五次温度循环，然后连续交替循环两次。 The capacitor should be subjected to 5 temperature cycles, then consecutively to 2 immersion cycles. 温度循环 Temperature Cycle Step Temperature(ºC) Time 1 -40＋0/-3 30 min. 2 Room temperature 3 min. 3 125＋3/-0 30 min. 4 Room temperature 3 min. 交替循环 Immersion Cycle Step Temperature(ºC) Time Immersion water 1 65＋5/-0ºC 0±3 min. Clean water 2 15ºC 15 min. Salt water 预处理: 电容器必须先贮存在85±2ºC条件下1小时，然后在室温下存放24±2小时，再进行初始测量。 Pre-treatment: Capacitor should be stored at 85±2ºC for 1 hr., then placed at room condition for 24±2 hrs. 试验后处理：电容必须贮存在室温条件下24±2小时。 Post-treatment: Capacitor should be stored for 24±2 hrs. at room condition.
		Δ C/C	Y5P: ±10% Y5U, Y5V: ±15%	
		tan δ	Per Item 4	
		IR	5 000MΩ min	
		TV	Per Item 6	

7. 測量和使用注意事項
Measuring and Application Notice

7.1. 測量注意事項
Measurement notice

請在以下條件下測量。
Please measure under the following conditions.

7.1.1. 標準大氣條件
Standard atmospheric conditions

除非另有規定，所有試驗和測量應按在IEC 60068-1:2013的4.3中規定的試驗用標準大氣條件下進行。
Unless otherwise specified, all tests and measurements shall be made under standard atmospheric conditions for testing as given in 4.3 of IEC 60068-1:2013.

溫度Temperature	相對濕度Relative humidity	氣壓Air pressure
15ºC～35ºC	25%～75%	86kPa～106kPa

在進行測量之前，電容器應在測量溫度下存放足夠時間，以使整個電容器都達到這一溫度。爲此目的，規定與試驗後恢復時間同樣的時間，通常是足夠的。
Before the measurements are made, the capacitor shall be stored at the measuring temperature for a time sufficient to allow the entire capacitor to reach this temperature. The period as prescribed for recovery at the end of a test is normally sufficient for this purpose.

在標準大氣條件下進行測量，其測量結果存在爭議時應采用仲裁溫度（見7.1.3）重復測量。
Test and measurement shall be made under standard atmospheric conditions for testing, in the event of a dispute, the measurements shall be repeated using one of the referee temperatures (as given in 7.1.3).

當按某一順序進行試驗時，一個試驗的最後測量可以作爲下一試驗的初始測量。
When tests are conducted in a sequence, the final measurements of one test may be taken as the initial measurements for the succeeding test.

在測量期間，不應使電容器受到氣流、陽光直射或可能引起誤差的其他影響。
During measurements the capacitor shall not be exposed to draughts, direct sunlight or other influences likely to cause error.

7.1.2. 恢復條件
Recovery conditions

除非另有規定，恢復應在試驗用標準大氣條件（見7.1.1）下進行。
Unless otherwise specified recovery shall take place under the standard atmospheric conditions for testing (7.1.1).

如果恢復必須在嚴格控制的條件下進行，應采用IEC 60068-1:2013中4.4.1的控制條件。
If recovery under closely controlled conditions is necessary, the controlled recovery conditions of 4.4.1 of IEC 60068-1:2013 shall be used.

除非有關規範另有規定，恢復時間應爲1h～2h。
Unless otherwise specified in the relevant specification, a duration of 1 h to 2 h shall be used.

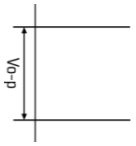
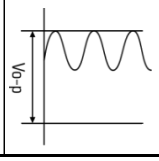
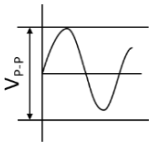
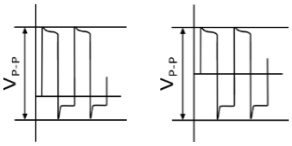
7.1.3. 仲裁條件
Referee conditions

在仲裁情況下，應選用IEC 60068-1:2013中4.2中規定的仲裁試驗用標準大氣條件。
For referee purposes, one of the standard atmospheric conditions for referee tests taken from 4.2 of IEC 60068-1:2013, as given in table 1 below, shall be selected:

溫度Temperature	相對濕度Relative humidity	氣壓Air pressure
25ºC±1ºC	48%～52%	86kPa～106kPa

7.2. 工作電壓
Operating voltage

嚮電容器施加的電壓切勿超過額定電壓。
The voltage applied to the capacitor must not exceed the rated voltage.

電壓 Voltage	直流電壓 DC Voltage	直流+交流電壓 DC+AC Voltage	交流電壓 AC Voltage	脈沖電壓 Pulse Voltage
測量位置 Positional Measurement				

在交流電路或紋波電流電路中使用直流額定電壓電容器時，請務必將外加電壓的Vp-p值或包含直流偏置電壓的Vo-p值維持在額定電壓範圍內。
When DC-rated capacitors are to be used in AC or ripple current circuits, be sure to maintain the Vp-p value of the applied voltage or the Vo-p which contains DC bias within the rated voltage range.

若嚮電路施加電壓，開始或停止時可能會因諧振或切換產生暫時的異常電壓。請務必使用額定電壓範圍包含這些異常電壓的電容器。
When the voltage is applied to the circuit, starting or stopping may generate irregular voltage for a transit period because of resonance or switching. Be sure to use a capacitor with a rated voltage range that includes these irregular voltages.

7.3. 工作溫度與自生熱
Operating temperature and self-generated heat

適用於Y5P、Y5U、Y5V特性。
Apply to Y5P, Y5U, Y5V char.

電容器的表面溫度應保持在其額定工作溫度範圍的上限以下。務必考慮到電容器的自生熱。
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.

電容器在高頻電流、脈沖電流等中使用時可能會因介電損耗發出自生熱。外加電壓應使自生熱等負荷在25ºC周圍溫度條件下不超過20ºC範圍。
When the capacitor is used in a high frequency current, pulse current or similar current, it may have self-generated heat due to dielectric loss. Applied voltage load should be such that self-generated heat is within 20˚C under the condition where the capacitor is subjected at an atmosphere

測量時應使用ø0.1mm小熱容量（K）的熱電偶，而且電容器不應受到其它元件的散熱或環境溫度波動影響。
When measuring, use a thermocouple of small thermal capacity-k of ø0.1mm under conditions where the capacitor is not affected by radiant heat from other components or wind from surroundings.

過熱可能會導致電容器特性及可靠性下降。
Excessive heat may lead to deterioration of the capacitor's characteristics and reliability.

（切勿在冷卻風扇運轉時進行測量。否則無法確保測量數據的精確性。）
(never attempt to perform measurement with the cooling fan running. Otherwise, accurate measurement cannot be ensured.)

7.4. 耐電壓的測試條件
Test condition for withstanding voltage

7.4.1. 測試設備
Test equipment

交流耐壓的測試設備應具有能夠產生類似於50/60Hz正弦波的性能。如果施加變形的正弦波或超過規定電壓值的過載電壓後，則可能會導致故障。
Test equipment for ac withstanding voltage should be used with the performance of the wave similar to 50/60Hz sine wave. If the distorted sine wave or overload exceeding the specified voltage value is applied, a defect may be caused.

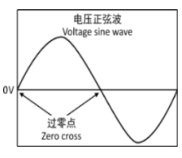
7.4.2. 電壓外加方法
Voltage applied method

測試耐電壓時，電容器的引線或端子應與耐電壓測試設備的輸出端連接牢固；然後再將電壓從近零增加到測試電壓(速度150V/s)。
When the withstanding voltage is applied, capacitor's lead or terminal should be firmly connected to the output of the withstanding voltage test equipment, and then the voltage should be raised from near zero to the test voltage (rising speed 150V/s).

如果測試電壓不從近零逐漸提高而是直接施加在電容器上，則施加時應包含過零點。測試結束時，測試電壓應降到近零；然後再將電容器引線或端子從耐電壓測試設備的輸出端取下。
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 should be reduced to near zero, and then capacitor's lead or terminal should be taken off the output of the withstanding voltage test equipment.

如果測試電壓不從近零逐漸提高而是直接施加在電容器上，則可能會出現浪湧電壓，從而導致故障。
If the test voltage without the raise from near zero voltage would be applied directly to capacitor, the surge voltage may arise, and therefore, a defect may be caused.

過零點是指電壓正弦通過0V的位置。參見右圖。
Zero cross is the point where voltage sine wave passes 0V. See figure at right.



7.5. 失效安全性
Fail-safe

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元件来设置自动防故障功能。
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 result in an electric shock, fire or fuming.

7.6. 电容器容量变化
Capacitance change of capacitors

7.6.1. SL特性
SL char.

电容量可能会因环境温度或外加电压而发生轻微变化。若要将本产品用于时间常数电路，请与我公司联系
Capacitance might change a little depending on a surrounding temperature or an applied voltage. Please contact us if you use for the constant time circuit.

7.6.2. Y5P、Y5U、Y5V特性
Y5P, Y5U, Y5V char.

电容器具有老化特性；因此，电容器若长时间使用，其静电容量会逐渐降低。而且，静电容量还可能会因环境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。
Capacitors have an aging characteristic, whereby the capacitor continually decreases its capacitance slightly if the capacitor is left on for a long time. Moreover, capacitance might change greatly depending on the surrounding temperature or an applied voltage. So, it is not likely to be suitable for use in a constant time circuit.

若需详情，请与我公司联系。
Please contact us if you need detailed information.

7.7. 使用设备检查
Performance check by equipment

使用电容器之前，请先检查设备的性能和特性没有问题。
Before using a capacitor, check that there is no problem in the equipment's performance and the specifications.

一般而言，二类瓷(Y5P、Y5U、Y5V特性)陶瓷电容器的静电容量具有电压和温度相关特性。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量值变化的影响，如漏电流和静噪特性。
Generally speaking, class 2 (Y5P, Y5U, Y5V char.) Ceramic capacitors have voltage dependence characteristics and temperature dependence characteristics in capacitance. So, the capacitance value may change depending on the operating condition in the equipment. Therefore, be sure to

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。
Moreover, check the surge-proof ability of a capacitor in the equipment, if needed, because the surge voltage may exceed specific value by the inductance of the circuit.

7.8. 贮存与使用条件
Operating and storage environment

电容器绝缘包封层不是完美的密封形式，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、盐等场所，同时应防潮。
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.

在对本产品进行清洗、焊接或成型前，请先在指定设备上测试经清洗、焊接或成型的产品的性能，以确定上述过程不会影响产品质量。
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.

电容器应存放在温度及相对湿度分别不超出5～40ºC及15～70%范围的场所。请在6个月内使用电容器。
Store the capacitors where the temperature and relative humidity do not exceed 5 to 40 degrees centigrade and 15 to 70%. Use capacitors within 6 months after delivered.

7.9. 焊锡和安装
Soldering and mounting

7.9.1. 振动与碰撞
Vibration and impact

使用时请勿使电容器受到过度冲击或振动。
Do not expose a capacitor or its lead to excessive shock or vibration during use.

7.9.2. 焊锡
Soldering

当在PCB/PWB焊锡这个产品时，不要超过电容器的焊锡耐热性标准。过度的热量会使电容器内部焊锡熔化，可能导致热冲击而使陶瓷介质出现暗裂。
When soldering this product to a PCB/PWB, do not exceed the solder heat resistance specifications 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.

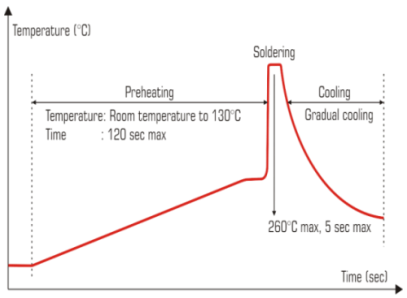


Fig.: Wave-soldering temperature-time profile to recommend

当使用烙铁进行手工焊锡时，应该遵照下列条件：
When soldering capacitor with a soldering iron, it should be performed in the following conditions.

焊锡温度：320ºC最大
Temperature of iron-tip: 320 degrees C. Max.

烙铁头：不超过40W
Soldering iron wattage: 40W max.

焊锡时间：不超过3.0秒
Soldering time: 3.0 sec. Max.

7.9.3. 压焊、树脂涂层与包封
Bonding, resin molding and coating

在压焊、树脂涂层和封膜之前，请先使用指定设备确认对产品没有影响，然后再进行使用。
Before bonding, molding or coating this product, verify that these processes do not affect the quality of capacitor by testing the performance of the bonded, molded or coated product in the intended equipment.

在粘合、树脂涂层、封膜的干燥、硬化条件使用到有机溶剂（乙酸乙酯、甲基乙酮、甲苯等），可能会破坏电容器的包封树脂，而造成短路不良。
In case the amount of applications, dryness/hardening conditions of adhesives and molding resins containing organic solvents (ethyl acetate, methyl ethyl ketone, toluene, etc.) Are unsuitable, the outer coating resin of a capacitor is damaged by the organic solvents and it may result, worst case, in a short circuit.

粘合、树脂涂层、封膜厚度的偏差可能会在冷却与加热过程中使电容器的包封树脂和/或陶瓷介质破裂。
The variation in thickness of adhesive, molding resin or coating may cause outer coating resin cracking and/or ceramic element cracking of a capacitor in a temperature cycling.

7.9.4. 清洗（超声波清洗）
Cleaning (ultrasonic cleaning)

要进行超声波清洗，应遵守下列条件。
To perform ultrasonic cleaning, observe the following conditions.

清洗槽容量：每升输出功率20瓦特或以下。
Rinse bath capacity: output of 20 watts per liter or less.

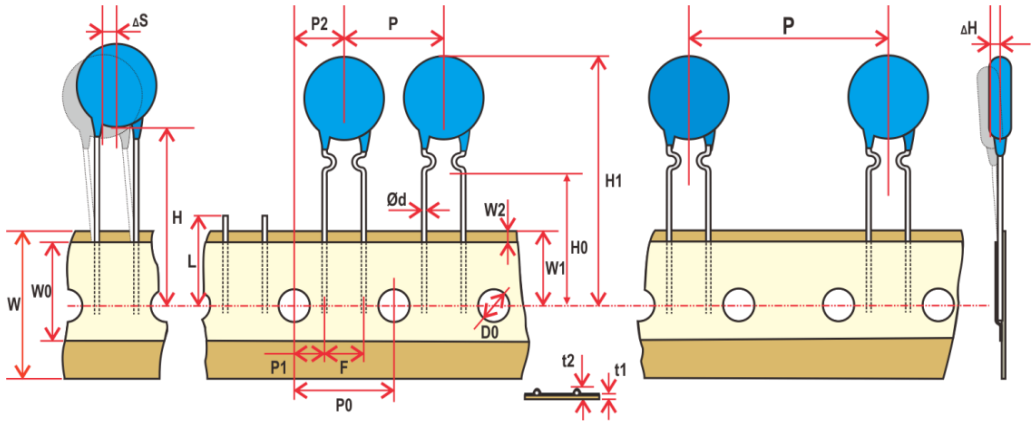
清洗时间：最多5分钟。
Rinsing time: 5 min. Maximum.

不得直接振动 pcb/pwb。
Do not vibrate the pcb/pwb directly.

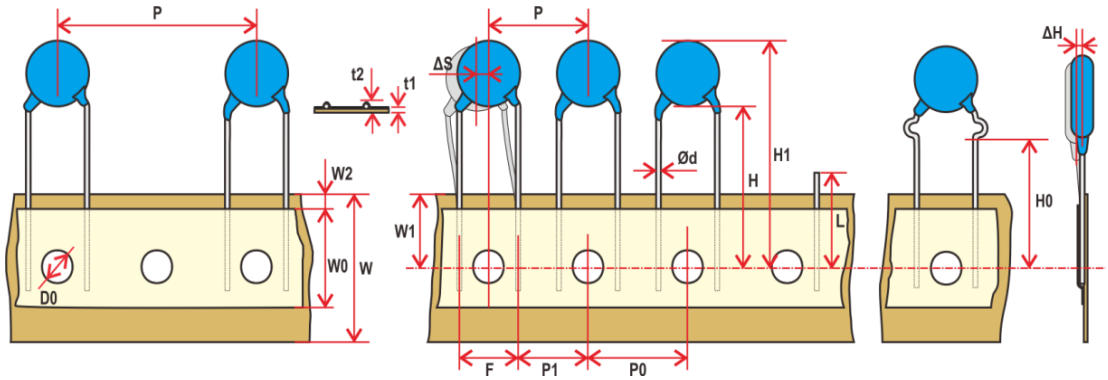
过度的超声波清洗会导致导线的过载损坏。
Excessive ultrasonic cleaning may lead to fatigue destruction of the lead wires.

8. 编带规格
Taping specifications

■ Method 1 : sprocket hole between parts



■ Method 2: sprocket hole between leads



Item		Symbol	Specification (mm)	Remarks
Lead-wire diameter		Ød	0.60±0.10	
Pitch of component		P	#N/A	
Feed hole pitch		P0	#N/A	Cumulative pitch error: 1.0mm/20 pitch
Feed hole center to lead		P1	#N/A	
Lead-to-lead distance		F	10±0.8	
Component alignment		Δh	≤2.0	
Deviation along tape, Left or right		ΔS	≤1.3	
Tape width		W	18.0+1.0/-0.5	
Hold-down tape width		W0	≥7.0	
Hole position		W1	9.0+0.75/-0.5	
Hole-down tape position		W2	≤3.0	
Height of component from tape center	Straight lead	H	18.0+2/-0	
	Kinked lead	H0	16.0±0.5	
Component height		H1	≤40	
Feed hole diameter		D0	4.0±0.3	
Total tape thickness		t1	≤0.9	Ground paper: 0.5±0.1mm
Total thickness, tape and lead wire		t2	≤1.5	
Length of snipped		L	≤11.0	