四川航昱微电子科技有限公司

SICHUAN HANYU MICROELECTRONICS TECHNOLOGY CO.，LTD.

RoHS
REACH

编号 NO：HYY1-24042301

产品规格承认书

Product Specification for Approval

客 户 名：
Customer：

产 品 品 名：
Description：塑封型Y1电容器

规 格 型 号：
Specifications：HYY1-B-3225-101K/AC500V

航昱微料号：
BLUESKY P/N：

客 户 料 号：
Customer P/N：

产 品 品 牌：
Product Brands：航昱微（商标）

制 作 日 期：
Production Date：2024-4-23

航昱微承认 BLUESKY Approval			客户承认 Customer's Approval		
制作 Producer	审核 Checked	批准 Approved	接收 Receive	审核 Checked	批准 Approved

公司名称：四川航昱微电子科技有限公司
* SICHUAN HANYU MICROELECTRONICS TECHNOLOGY CO.，LTD.
* 公司地址：四川省泸州市江阳区利民路二段9号
* 电　话：19182727601
* 网　址：http://www.hywdz.com

四川航昱微电子科技有限公司

SICHUAN HANYU MICROELECTRONICS TECHNOLOGY CO.，LTD.

修 改 记 录

Change Record

版次 Rev	修改日期 Change Date	修改内容 Change Content	修改原因 Change Reason
A0	2024-4-23	初次发行	

1. Scope[适用范围]

This specification applies to the CQC, VDE, ENEC10, KC and UL approved safety standard recognized ceramic capacitors.

本标准适用于通过CQC、VDE、ENEC10、KC与UL安规标准认证的陶瓷电容器。

2. Applications[用途]

Ideal for use as X/Y capacitors for AC line filter and primary-secondary coupling on switching power supplies and AC adapters.

X/Y电容器使用在开关电源供应器与AC适配器的滤波电路和耦合电路。

Ideal for use on D-A isolation and noise absorption for DAA modems without transformers.

可使用在没有变压器的DAA模块的D-A隔离和吸收杂音上。

3. Features[特点]

■ Operating temperature range guaranteed up to 125 degrees.
使用温度范围达到125℃。

■ Coated with flame-retardant epoxy resin (conforming to UL94V-0 standard).
使用阻燃的环氧树脂包封（符合UL94V-0标准）。

■ Available product for RoHS Restriction (EU Directive 2011/65/EU).
符合欧盟 RoHS 2.0（2011/65/EU 指令）标准。

■ Improved component design in a compact case.　　改善产品的设计空

■ Superior performance at high temperatBetter stability and reliability under hot and humid conditions
在湿热条件下有更好的稳定性和可靠性

■ SMD mountable disk varistors, suitable for lead-free reflow / wave soldering.
片式封装结构更适合回流焊和波峰焊

4. Standard Recognition[认证标准]

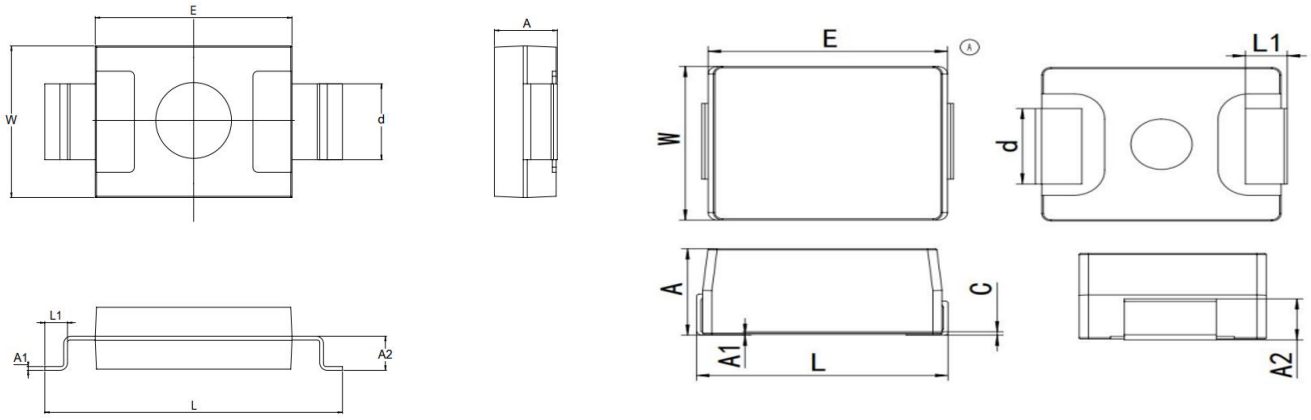
Country [国家]	Safety Organization [认证组织]	Standard No. [标准号]	Recognized No. [证书号]	Rated Voltage [额定电压]
			X1Y2	
U.S.,CSA [美国.加拿大]	cULus	UL 60384-14 CAS E60384-14	E319473	AC400V (400V~)
China [中国]	CCC	GB/T 6346.14	CQC13001095361	
ENEC [欧洲共同体]	ENEC	EN 60384-14	400036880	

5、Specifications[规格要求]

1. Appearance 外形尺寸

1-1. Marking 标志	Logo 公司商标 Y1B-101K/500V Product Spec. 产品规格 240103 Batch no. 生产批号

1-2.Dimensional Drawing (mm)尺寸



Size	E ±0.5	W ±0.5	A ±0.5	L ±0.5	A1 ±0.2	A2 ±0.2	C Max	L1 ±0.5	d ±0.1
3225	**7.8**	**6.0**	**2.45**	**11.8**	**0.18**	**1.3**		**1.0**	**3.0**
4032	**10.0**	**8.5**	**4.2**	**10.6**	**0.2**	**2.2**	**0.3**	**1.5**	**3.0**

焊盘尺寸 Welding disc size （单位mm）

Size	A	B	C
3225	**3.0**	**1.0**	**9.8**
4032	**3.0**	**1.5**	**8.0**

2.Part numbering 命名方式

HY- Y1- B- 3225- 101- K

HY	Y1	B	3225	101	K
HANGYUWEI Logo 航昱微 Logo	Plastic Y1-capacitors 塑封型 Y1 电容器	Temperature Characteristics 温度特性	Product Size 产品尺寸	Capacitance 电容量	Tolerance 允许偏差

6、Electrical Characteristics 电气参数

Y1系列					
型号（塑封型）	容量(PF)	电压(AC)	材质（温度特性）	误差	备注
HY-Y1-SL-3225-10-K	10	500	SL（SL）	K±10%	
HY-Y1-SL-3225-22-K	22	500	SL（SL）	K±10%	
HY-Y1-SL-3225-47-K	47	500	SL（SL）	K±10%	
HY-Y1-SL-3225-68-K	68	500	SL（SL）	K±10%	
HY-Y1-B-3225-101-K	100	500	Y5P(B)	K±10%	
HY-Y1-B-3225-151-K	150	500	Y5P(B)	K±10%	
HY-Y1-B-3225-221-K	220	500	Y5P(B)	K±10%	
HY-Y1-B-3225-271-K	270	500	Y5P(B)	K±10%	
HY-Y1-B-3225-331-K	330	500	Y5P(B)	K±10%	
HY-Y1-B-3225-471-K	470	500	Y5P(B)	K±10%	
HY-Y1-E-3225-471-M	470	500	Y5U(E)	M±20%	
HY-Y1-E-3225-681-M	680	500	Y5U(E)	M±20%	
HY-Y1-E-3225-102-M	1000	500	Y5U(E)	M±20%	
HY-Y1-E-3225-152-M	1500	500	Y5U(E)	M±20%	
HY-Y1-F-3225-222-M	2200	500	Y5V(F)	M±20%	
HY-Y1-B-4032-681-K	680	500	Y5P(B)	K±10%	
HY-Y1-B-4032-102-K	1000	500	Y5P(B)	K±10%	
HY-Y1-E-4032-222-M	2200	500	Y5U(E)	M±20%	
HY-Y1-E-4032-332-M	3300	500	Y5U(E)	M±20%	
HY-Y1-F-4032-472-M	4700	500	Y5V(F)	M±20%	

7、Specifications and Test Methods[标准与试验方法]

Test condition试验条件:

Test and measurement shall be made at the standard condition (Temperature 15~35℃, relative humidity 45~75% and atmospheric pressure 86~106Kpa).

试验与测试必须在标准条件（温度15~30℃，相对湿度45~75%，气压86~106Kpa）下进行。

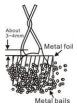
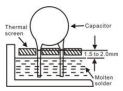
Unless otherwise specified herein. If doubt occurred on the value of measurement, and measurement was requested by customer capacitors shall be measured at the reference condition (Temperature 25±2℃, relative humidity 60~70% and atmospheric pressure 86~106Kpa.)

除非另有说明，如果对测量结果有疑问和被特别要求的情况下，电容必须在基准条件（温度25±2℃，相对湿度50~80%，气压86~106Kpa）下进行测试。

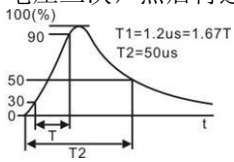
Performance (Apply to Class X1Y1 & X1Y2)性能（适用于X1Y1与X1Y2）

No.	Item 项目		Specification 标准	Testing Method 试验方法
1	Appearance and Dimensions 外观与尺寸		No marked defect on appearance form and dimensions are within specified range. 外观形状没有明显的缺点和尺寸在标准范围内。	The capacitor should be visually inspected for evidence of defect. 电容必须用目视检查其明显的缺点。 Dimensions should be measured with slide calipers. 尺寸用游标卡尺测量。
2	Marking 标示		To be easily legible 清晰易于识别。	The capacitor should be visually inspected. 目视检查。
3	Capacitance 容量		Within specified tolerance 在指定的允差范围内。	The capacitance and dissipation factor should be measured at 25°C with 1±0.1KHz and AC5V(r.m.s.) max. 容量与耗散因素必须在25℃下，使用1±0.1KHz和不大于5V电压下测量。
4	Dissipation Factor (D.F.) 耗散因素		B, E：D.F.≤2.5% F：D.F.≤5.0%	
5	Insulation Resistance (I.R.) 绝缘电阻		6000MΩ min. 6000MΩ最小。	The insulation resistance should be measured with DC500±50V within 60±5 sec. of charging. The voltage should be applied to the capacitor through a resistor of 1MΩ. 绝缘电阻必须在500±50V条件下充电60±5秒后进行测试，测试电压应用在电容时必须通过1MΩ的电阻。
6	Dielectric Strength 介质强度	Between Lead Wires 两导线间	No failure 没有不合格。	The capacitor should not be damaged when test voltages of Table 1 are applied between the lead wires for 60 sec. (Charge/Discharge current ≤50mA) 电容在被表1的测试电压施加两导线间60秒后不被破坏。（充放电流不大于50mA） <Table 1>

Type	Test Voltage[测试电压]
X1Y2	AC2600V (r.m.s.)
X1Y1	AC4000V (r.m.s.)

<table>
<tr>
<td></td>
<td></td>
<td>Body Insulation
本体绝缘</td>
<td>No failure
没有不合格。</td>
<td>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 Table 2 is applied for 60 sec. between the capacitor lead wires and metal balls.
首先，将电容器的端子拧在一起，然后如右图所示，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，最后施加如图2所示的AC电压60秒种。
 
<Table 2>
<table><tr><th>Type</th><th>Test Voltage</th></tr><tr><td>X1Y2</td><td>AC2600V(r.m.s.)</td></tr><tr><td>X1Y1</td><td>AC4000V(r.m.s.)</td></tr></table></td>
</tr>
<tr>
<td>7</td>
<td>Temperature Characteristics
温度特性</td>
<td></td>
<td><table><tr><th>Char.
特性</th><th>Capacitance Change
容量变化率</th></tr><tr><td>B</td><td>Within ±10%</td></tr><tr><td>E</td><td>Within +22/-56%</td></tr><tr><td>F</td><td>Within +22/-82%</td></tr></table>(Temp. range[温度范围]: -25 to +85°C)</td>
<td>The capacitance measurement should be made at each step specified in Table 3.
电容器必须按照表3中的每一步骤进行测量。
<Table 3>
<table><tr><th>Step[步骤]</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th></tr><tr><td>Temperature [温度] (℃)</td><td>20 ±2</td><td>-25 ±2</td><td>20 ±2</td><td>85 ±2</td><td>20 ±2</td></tr></table></td>
</tr>
<tr>
<td>8</td>
<td>Solderability of Leads
可焊性</td>
<td></td>
<td>Lead wire should be soldered with uniform coating on the axial direction over 3/4 of the circumferential direction.
导线必须有3/4以上的面积均匀附着焊锡。</td>
<td>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.电容器的导线必须浸入焊料中2±0.5秒钟。浸入深度离导线根部1.5-2.0mm。
 
Temp. of solder: 焊锡温度：
Lead Free Solder (Sn-3Ag-0.5Cu) 245±5°C
无铅焊锡（Sn-3Ag-0.5Cu）245±5°C。
H63 Eutectic Solder（Pb37/Sn63）235±5°C
易溶解的H63号锡（Pb37/Sn63）235±5°C</td>
</tr>
<tr>
<td rowspan="2">9</td>
<td rowspan="2">Soldering Effect (Non -Preheat)
耐焊接热</td>
<td>Appearance
外观</td>
<td>No marked defect
没有可见损伤</td>
<td rowspan="2">As shown in figure, the lead wires should be immersed in solder of 350±10°C or 260±5°C up to 1.5 to 2.0mm from the root of terminal for 3.5±0.5 sec. (10±1 sec. for 260±5°C).
如图所示，导线浸入离导线根部1.5-2.0mm处、锡温为350±10°C或260±5°C中3.5±0.5秒（260°C为10±1</td>
</tr>
<tr>
<td>Capacitance Change
容量变化率</td>
<td>Within ±20%（Char. B: ±10%）
在±20%（B特性为±10%）范围内</td>
</tr>
</table>

	（不预热）	I.R. 绝缘电阻	1000MΩ min 1000MΩ最小	秒）。 Per-treatment: 预处理： Capacitor should be stored at 85±2°C for 1 hr., and then placed at room condition for 24±2 hrs. before initial measurements. 电容器必须先贮存在85±2°C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。 Post-treatment: 试验后处理： Capacitor should be stored for 1 to 2 hrs. at room condition. 电容必须存放在室温下1-2小时。
		Dielectric Strength 介质强度	Per Item 6 见项目6。	
10	Soldering Effect (On -Preheat) 耐焊接热（预先加热）	Appearance 外观	No marked defect 没有可见损伤	First the capacitor should be stored at 120+0/-5°C for 60+0/-5 sec. Then, as in figure (see Item 9), the lead wires should be immersed solder of 260+0/-5°C up to 1.5 to 2.0mm from the root of terminal for 7.5+0/-1 sec. 首先将电容器贮存在120+0/-5°C条件下60+0/-5秒，然后，如图（见项目9），将导线浸入离根部1.5-2.0mm处260+0/-5°C的锡温中7.5+0/-1秒。 Per-treatment and Post-treatment see Per Item 9. 预处理与试验后处理见项目9。
		Capacitance Change 容量变化率	Within ±20%（Char. B: ±10%） 在±20%（B特性为±10%）范围内	
		I.R. 绝缘电阻	1000MΩ min 1000MΩ最小	
		Dielectric Strength 介质强度	Per Item 6 见项目6。	
11	Vibration Resistance 振动阻力	Appearance 外观	No marked defect 没有可见损伤	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. 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。 Apply for a total of 6 hrs., 2 hrs each in 3 mutually perpendicular directions. 总时间六个小时，每两小时在相互垂直方向来回三次。
		Capacitance 容量	Within the specified tolerance 在允差范围内	
		D.F. 耗散因素	B, E：D.F.≤2.5% F：D.F.≤5.0%	
12	Humidity (Under Steady State) 耐湿性（稳定状态）	Appearance 外观	No marked defect 无可见损伤	Set the capacitor for 500±12 hrs. at 40±2°C in 90 to 95% relative humidity. 电容保持在温度为40±2°C、相对湿度为90-95%条件下500±12小时。 Post-treatment: 试验后处理： Capacitor should be stored for 1 to 2 hrs. at room condition. 电容必须贮存在室温条件下一至二小时。
		Capacitance Change 容量变化率	B, E：Within ±10% F：Within ±15%	
		D.F. 耗散因素	B, E：D.F.≤5.0% F：D.F.≤7.5%	
		I.R. 绝缘电阻	3000MΩ min 3000MΩ最小。	
		Dielectric Strength 介质强度	Per Item 6 见项目6。	
13	Humidity Loading 耐湿负荷	Appearance 外观	No marked defect 无可见损伤。	Apply the rated voltage for 500±12 hrs. at 40±2°C in 90 to 95% relative humidity. 电容保持在温度为40±2°C、相对湿度为90-95%条件下施加额定电压500±12小时。 Post-treatment:
		Capacitance Change 容量变化率	B, E：Within ±10% F：Within ±15%	

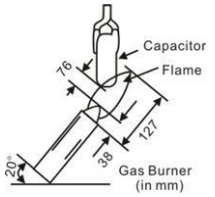
<table>
<tr><td></td><td></td><td>D.F.
耗散因素</td><td>B, E：D.F.≤5.0%
F：D.F.≤7.5%</td><td rowspan="3">试验后处理：
Capacitor should be stored for 1 to 2 hrs. at room condition.
电容必须贮存在室温条件下一至二小时。</td></tr>
<tr><td></td><td></td><td>I.R.
绝缘电阻</td><td>3000MΩ min
3000MΩ最小。</td></tr>
<tr><td></td><td></td><td>Dielectric Strength
介质强度</td><td>Per Item 6
见项目6。</td></tr>
<tr><td rowspan="4">14</td><td rowspan="4">Life Test
寿命试验</td><td>Appearance
外观</td><td>No marked defect
没有可见损伤。</td><td rowspan="4">Impulse Voltage
尖峰电压
Each individual capacitor should be subjected to a 5kV (Type X1Y1: 8kV) impulses for three times. After the capacitors are applied to life test.
每个供试验电容必须承受5KV（X1Y1为8KV）尖峰电压三次，然后再进行寿命试验。
 

Apply a voltage of Table 4 for 1000 hrs. at 125+2/-0°C, and relative humidity of 50% max.
使用表4所要求的电压在125+2/-0°C和相对湿度不超过50%的条件下1000小时。
<Table 4>
<table><tr><th>Applied Voltage[使用电压]</th></tr><tr><td>AC425V(r.m.s.), except that once each hour the voltage is increased to AC1000V(r.m.s.) for 0.1 sec.
AC425V，另在每小时将电压增加AC1000V，时间0.1秒。</td></tr></table>
Post-treatment:
试验后处理：
Capacitor should be stored for 1 to 2 hrs. at *room condition.
电容必须贮存在室温条件下一至二小时。</td></tr>
<tr><td>Capacitance Change
容量变化率</td><td>Within ±20%（Char. F: ±30%）
在±30%（F特性为±20%）范围内</td></tr>
<tr><td>I.R.
绝缘电阻</td><td>3000MΩ min
3000MΩ最小</td></tr>
<tr><td>Dielectric Strength
介质强度</td><td>Per Item 6
见项目6。</td></tr>
</table>

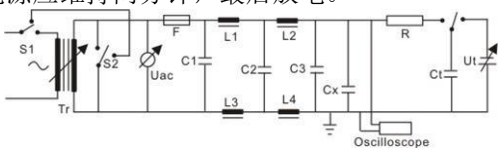
"Room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa.

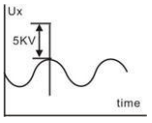
[室温是指温度为15-30°C、相对湿度为45-75%、气压为86-106Kpa的条件]。

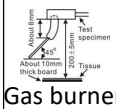
<table>
<tr><th>No.</th><th colspan="2">Item
项目</th><th>Specification
标准</th><th>Testing Method
试验方法</th></tr>
<tr><td>15</td><td colspan="2">Flame Test

火焰试验</td><td>The capacitor flame discontinues as follows.
电容离开火焰后自动熄灭。
<table><tr><th>Cycle
周期</th><th>Time (sec.)
时间（秒）</th></tr><tr><td>1 to 4</td><td>30</td></tr><tr><td>5</td><td>60</td></tr></table></td><td>The capacitor should be subjected to applied flame for 15 sec. and then removed for 15 sec. until 5 cycles are completed.
电容应放在火焰中15秒钟，然后离开15秒种，如此重复5次。
 
</td></tr>
<tr><td rowspan="2">16</td><td rowspan="2">Robustness of Terminations

端子韧性</td><td>Tensile
伸长</td><td rowspan="2">Lead wire should not be cut off. Capacitor should not be broken.
导线无折断，电容无破损。</td><td>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。</td></tr>
<tr><td>Bending
弯折</td><td>Each lead wire should be subjected to 5N weight and then a 90° bend, at the point of egress, in one direction, return to original position, and then apply a 90° bend in the opposite direction at the rate of one bend in 2 to 3 sec.
电容器导线应承受5N重量，然后向外弯折成90°，然后回复到原来位置；接着往反方向弯折90°，再复原；弯折一次2-3秒钟。</td></tr>
<tr><td>17</td><td colspan="2">Active Flammability

主动可燃性</td><td>The cheese-cloth should not be on fire.
纱布不着火。</td><td>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.
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。
 

C1, 2: 1UF±10%
C3: 0.033UF±5% 10KV
Ct: 3UF±5% 10KV
Cx: Capacitor under test供试验电容
F: Fuse, Rated 10A 保险丝，额定10A
R: 100Ω±5%
Ur: Rated Voltage 额定电压
Ut: Voltage applied to Ct. 用在Ct上电压表
L1 to 4: 1.5mH±20% 16A Rod core choke
 
</td></tr>
</table>

<table>
<tr><td>18</td><td colspan="2">Passive Flammability
被动可燃性</td><td>The burning time should not exceed 30 sec. The tissue paper should not ignite.
燃烧时间不超过30秒，棉纸不被点燃。</td><td>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: 30 sec.
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。
 
Length of flame[火焰长度]: 12±1mm
Gas burner: Length[长] 35mm min.[最小]
[煤气火焰]：Inside Dia.[内部直径] 0.5±0.1mm
Outside Dia[外部直径]. 0.9mm max.[最大]
Gas[煤气]: Butane gas Purity[丁烷煤气纯度] 95% min[最小].</td></tr>
<tr><td rowspan="5">19</td><td rowspan="5">Temperature and Immersion Cycle
温度交替循环</td><td>Appearance
外观</td><td>No marked defect
无可见损伤</td><td rowspan="5">The capacitor should be subjected to 5 temperature cycles, then consecutively to 2 immersion cycles.
电容器应承受五次温度循环，然后连续交替循环两次。
<Temperature Cycle[温度循环]>
<table><tr><th>Step</th><th>Temperature (℃)</th><th>Time (min)</th></tr><tr><td>1</td><td>-25+0/-3</td><td>30</td></tr><tr><td>2</td><td>Room temp.</td><td>3</td></tr><tr><td>3</td><td>125+3/-0</td><td>30</td></tr><tr><td>4</td><td>Room temp.</td><td>3</td></tr></table>Cycle time: 5 cycle
<Immersion Cycle[交替循环]>
<table><tr><th>Step</th><th>Temperature (℃)</th><th>Time (min)</th><th>Immersion Water</th></tr><tr><td>1</td><td>65+5/-0</td><td>0±3</td><td>Clean water</td></tr><tr><td>2</td><td>15</td><td>15</td><td>Salt Water</td></tr></table>Cycle time: 2 cycle
Per-treatment[预处理]:
Capacitor should be stored at 85±2°C for 1 hr., then placed at room condition for 24±2 hrs.
电容器必须先贮存在85±2°C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。
Post-treatment[试验后处理]:
Capacitor should be stored for 24±2 hrs. at room condition.
电容必须贮存在室温条件下24±2小时。</td></tr>
<tr><td>Capacitance Change
容量变化率</td><td>B, E：Within ±20%
F：Within ±30%</td></tr>
<tr><td>D.F.
耗散因素</td><td>B, E：D.F.≤5.0%
F：D.F.≤7.5%</td></tr>
<tr><td>I.R.
绝缘电阻</td><td>3000MΩ min
3000MΩ最小。</td></tr>
<tr><td>Dielectric Strength
介质强度</td><td>Per Item 6
见项目6。</td></tr>
</table>

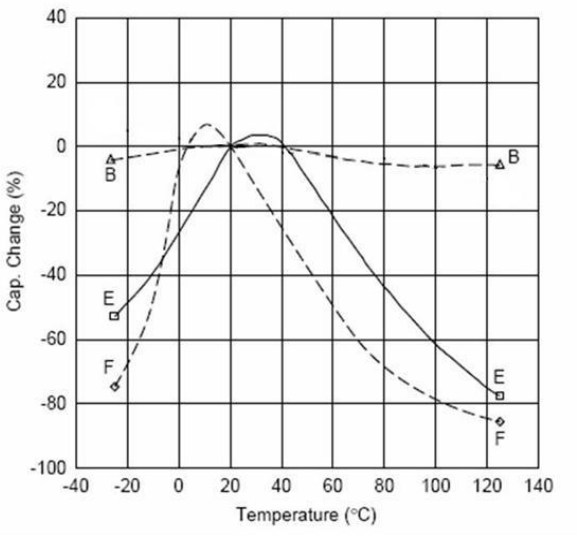
"Room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa.

[室温是指温度为15-30°C、相对湿度为45-75%、气压为86-106Kpa的条件]。

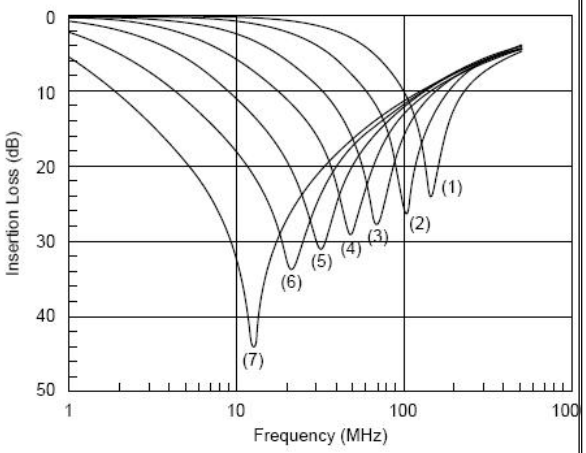
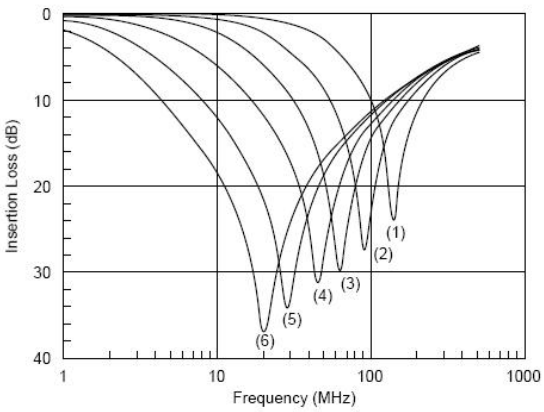
8、Related instructions and precautions[相关说明与注意事项]

8.1. Appendix: Temperature Characteristic Curves温度特性

B: Y5P E: Y5U F: Y5V



8.2. Appendix: Insertion Loss-Frequency Characteristics内部损失与频率特性

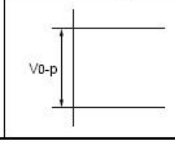
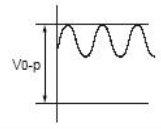
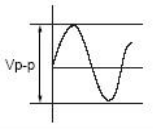
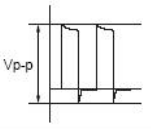
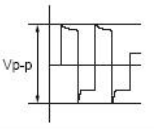
X1 Y2		X1 Y1	
			
Signal power[信号功率]: 1mW AC240V (r.m.s.) / 60Hz is applied on the capacitor.[电容承受AC240V/60Hz电压]			
(1) 101K (2) 221K (3) 471K	(4) 102M (5) 222M (6) 472M (7) 103M	(1) 101K (2) 221K (3) 471K	(4) 102M (5) 222M (6) 472M

8.3. Appendix: Caution (Rating)警告（额定值）

1. Operating Voltage使用电压

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. 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.

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，请务必将外加电压的Vp-p值或包含直流偏置电压的Vo-p值维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。

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

2. Operating Temperature and Self-generated Heat (Apply to B/E/F Char.)

工作温度与自生热（适用于B、E、F特性）

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 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℃ under the condition where the capacitor is subjected at an atmosphere temperature of 25℃. 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. 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其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、脉冲电流或相似电流中使用时可能会因介电损耗发出自生热。外加电压应使自生热等负荷在25℃大气温度条件下不超过20℃范围。测量时应使用ø0.1mm小热容量（K）的热电偶，而且电容器不应受到其它元件的散热或环境温度波动影响。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耐压测试条件

(1) Test Equipment测试设备

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.

交流耐电压的测试所使用的设备应能产生与 50/60Hz 相似的正弦波。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。

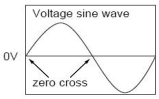
(2) Voltage Applied Method电压施加方法

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. 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. 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.

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。

ZERO Cross is the point where voltage sine wave passes 0V. See figure at right. 过零点是指电压正弦通过 0V 的位置。参见右图。



4.Fail-Safe自动防故障

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.
电容器失效可能会导致短路。务必在本产品上适当提供例如熔丝等自动防故障功能元件，这有助于消除可能发生的电击、火灾或冒烟等现象。如果在交流输入线路与接地之间使用电容器（线间旁路电容器），请考虑在每条交流线路上使用熔丝，以防发生事故，例如短路。

8.4. Appendix: Caution (Storage and Operating Condition)警告（贮存与使用条件）

Operating and storage environment使用和贮存环境

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 5 to 40 degrees centigrade and 20 to 70%. Use capacitors within 6 months after delivered.
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。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。电容器应存放在温度及相对湿度分别不超出5-40℃及20-70％范围的场所。请在6个月内使用电容器。

8.5. Appendix: Caution (Soldering and Mounting)警告（焊锡和安装）

1. Vibration and impact振动与碰撞

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

2. Soldering焊锡

When soldering this product to a PCB/PWB, do not exceed the solder heat resistance Specifications (see Item 9 of page 9) 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.
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(见第9页项目9)。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 capacitor with a soldering iron, it should be performed in the following conditions. Temperature of iron-tip: 360 degrees C. max. Soldering iron wattage: 40W max. Soldering time: 3.0 sec. max.
当使用烙铁进行手工焊锡时，应该遵照下列条件：焊锡温度360℃最大，烙铁头不超过40W，焊锡时间不超过3.0秒。

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

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。
In case of 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.
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。

The variation in thickness of adhesive, molding resin or coating may cause a outer coating resin cracking and/or ceramic element cracking of a capacitor in a temperature cycling.
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。

8.6. Appendix: Caution (Handling)警告（处理）

Vibration and impact振动和冲击

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

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，并引起冒烟或局部离散。

8.7. Appendix: Notice (Soldering and Mounting)注意事项（焊锡和安装）

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

To perform ultrasonic cleaning, observe the following conditions.
要进行超声波清洗，请遵照以下条件。
Rinse bath capacity: Output of 20 watts per liter or less.
清洗槽容量：每升输出20瓦特或以下。
Rinsing time: 5 min. maximum.
清洗时间：最长5分钟。
Do not vibrate the PCB/PWB directly.
请勿振动 PCB/PWB。
Excessive ultrasonic cleaning may lead to fatigue destruction of the lead wires.
过度的超声波清洗可能导致导线损坏。

8.8. Appendix: Notice (Rating)注意事项（额定值）

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

(1) In case of SL char.SL特性

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

(2) In case of B/E/F char.B、E、F特性

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

2．Performance check by equipment使用设备进行性能检查

Before using a capacitor, check that there is no problem in the equipment's performance and the specifications.
使用电容器之前，请先检查设备的性能和特性没有问题。
Generally speaking, CLASS 2 (B/E/F 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.
一般而言，二类瓷（B、E、F特性）陶瓷电容器的静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量值变化

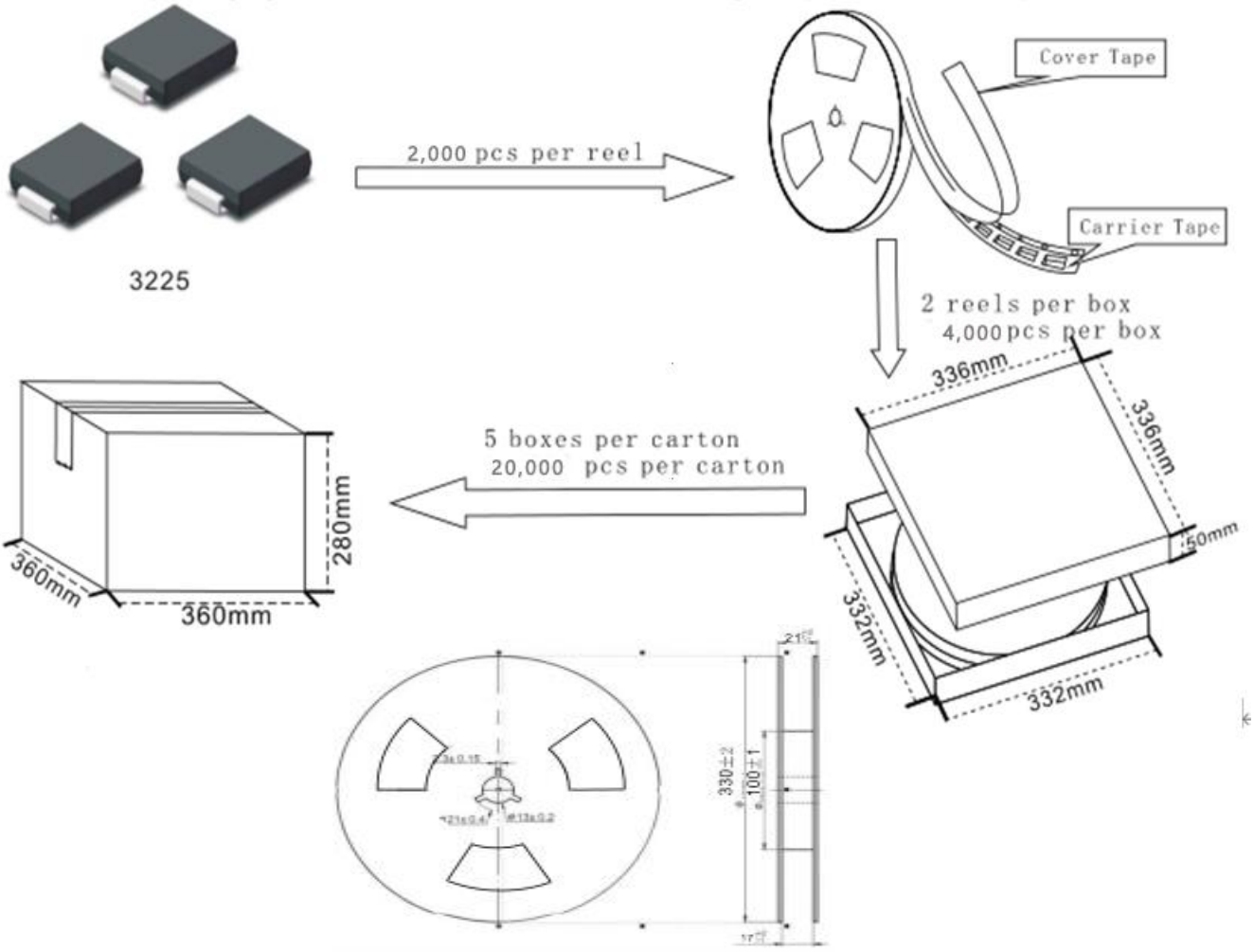
的影响，如漏电流和静噪特性。

Therefore, be sure to confirm the apparatus performance of receiving influence in the capacitance value change of a capacitor, such as leakage current and noise suppression characteristic. 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.

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。

9、Packing method and minimum number of packages[包装方式]

1.The method of packaging and dimension are shown as below figure. (Dimension in mm)



Type	*A_0* ±0.2	*B_0* ±0.2	*K_0* ±0.2	*T* ±0.1	*D_0* +0.1/-0	*D1* +0.1/-0	*P1* ±0.10	*P2* ±0.10	*P_0* ±0.10	*W* ±0.30	*E* ±0.10	*F* ±0.2
3225	6.2	12.2	3.05	0.3	1.5	1.5	12.0	6.0	12.0	24.0	1.75	11.5
4032	8.5	11.5	4.85	0.3	1.5	1.5	12.0	6.0	12.0	24.0	1.75	11.5