

High Voltage Ceramic Capacitors 高压陶瓷电容器
Class 2, 1KV,2KV,3KVdc Low-dissipation factor Hi-K type
2类 1KV/2KV/3KVdc 低损耗高介电常数型

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PRODUCT SPECIFICATION

产品规格书

PRODUCT: High Voltage Ceramic Capacitors

高压陶瓷电容器

TYPE: Class 2, 1KV,2KV,3KVdc Low-dissipation factor
Hi-K type

2类 1KV/2KV/3KVdc 低损耗高介电常数型

CUSTOMER: _____

DOC. NO.: HW-C05-01

APPROVED BY CUSTOMER

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Record of change 更改记录

Date 日期	Version 版次	Description 更改内容描述	Page 页次
2015/10/15	1	1 st edition 初版	

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1. Part Numbering 产品编码:

(1)	(2~3)	(4~6)	(7)	(8~9)	(10)	(11~12)	(13)	(14)	(15~18)
R	3A	102	K	07	D	20	C	A	0000

(1) Temperature characteristic 温度特性:

Code 代码	T.C.温度特性	Temp. rang 温度范围	Cap. Change rate 容量变化率	Oper. Temp. 工作温度
R	Y5R (Class2) (Low-DF, ≤0.2%)	-25°C~ +125°C	-33% to +15%	-25°C~ +125°C
L	Y5P (Class2) (Low-DF, ≤0.5%)	-25°C~ +85°C	±10%	

(2~3) Rate voltage 额定电压:

Code 代码	Rate voltage 额定电压	Code 代码	Rate voltage 额定电压
3A	1KVdc	3F	3KVdc
3D	2KVdc		

(4~6) Capacitance 静电容量(identified by 3-figure code 三位数表示): Ex. 101=100pF, 102=1000pF
(7) Capacitance tolerance 容量允差: K:±10%
(8~9) Normal body diameter dimension 本体直径: Dmax refer to the item 4 最大直径参考第4项
(10) Lead style 引线型状:

Code 代码	Description 描述	Code 代码	Description 描述
B	Straight lead 直脚	X	Outside kink lead 外弯脚
H	Inside kink lead 内弯脚	M	Double outside kink lead 双外弯脚
D	Vertical kink lead 垂直弯脚		

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

Taping code 编带	Description 描述	Bulk code 散装	Description 描述
AN	Ammo box / Pitch:12.7 mm / Lead space5.0mm	3E	Lead length: 3.5mm
AF	Ammo box / Pitch:15.0 mm / Lead space7.5mm	04	Lead length: 4.0mm
AM	Ammo box / Pitch:25.4 mm / Lead space10.0mm or 7.5mm	4E	Lead length: 4.5mm
AS	Ammo box / Pitch:15.0 mm / Lead space10.0mm	20	Lead length: 20mm

(13) Lead length tolerance 脚长误差:

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

(14) Lead space 脚距:

Code 代码	Description 描述	Code 代码	Description 描述
5	5.0±0.5 mm	E	5.0±1 mm
7	7.5±0.5 mm	M	7.5±1 mm
0	10.0±0.5 mm	A	10.0±1 mm

(15~18) Special specification code 特殊规格码:

0000: Normal products, omit code. 表示标准品, 号码省略。Any other four codes: Special specification can't contain in above codes.其它四码表示特殊规格品。

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2. Applications 应用:

Ideal for use on high-frequency pulse circuits such as a horizontal resonance circuit for CTV and snubber circuits for switching power supplies. 适合应用在交换式电源供应器中的高频脉冲电路, 如CTV和缓冲器中的横向谐振电路。

3. Features 特点:

- 3.1. Reduced heat dissipation permitted due to small dielectric loss of the ceramic material. 陶瓷材料较小介电损耗特性可降低热散逸。
- 3.2. Operating temperature range guaranteed up to 125 degrees C. 工作和温度上限可保证值达 125°C.
- 3.3. Coated with flame-retardant epoxy resin (conforming to UL94V-0 standard). 涂有阻燃环氧树脂层(符合 UL94V-0 标准)
- 3.4. Comply with EU RoHS, and Halogen-free products 符合欧盟 RoHS 指令, 但陶瓷体含铅(属豁免), 无卤产品: Cl=900ppm max., Br=900ppm max. Cl+Br=1500ppm max.
- 3.5. Taping available for automatic insertion. 可提供符合自动插件需求的编带产品

4. Class 2 (Low-dissipation) series parts list (2类瓷低损耗系列料号列表):

Part Number	Temp. Char.	Rated voltage	Cap.(pF)	Tol.	Dimension (mm)		
					D max.	T max.	Wire Dia. (φd)
R3A101K05*****0000	R(Y5R)	1000VDC	100	±10%	6.5	4.0	0.55±0.1
R3A151K05*****0000			150		6.5		
R3A221K05*****0000			220		6.5		
R3A271K05*****0000			270		6.5		
R3A331K05*****0000			330		6.5		
R3A391K05*****0000			390		6.5		
R3A471K05*****0000			470		6.5		
R3A561K06*****0000			560		7.5		
R3A681K06*****0000			680		7.5		
R3A821K07*****0000			820		8.5		
R3A102K07*****0000			1000		8.5		
R3A122K08*****0000			1200		9.5		
R3A152K08*****0000			1500		9.5		
R3A182K09*****0000			1800		10.5		
R3A222K10*****0000			2200		11.5		
R3A332K12*****0000			3300		13.5		
L3A221K05*****0000			L(Y5P)		1000VDC		
L3A271K05*****0000	270	6.5					
L3A331K05*****0000	330	6.5					
L3A391K05*****0000	390	6.5					
L3A471K05*****0000	470	6.5					
L3A681K05*****0000	680	6.5					
L3A821K05*****0000	820	6.5					
L3A102K05*****0000	1000	6.5					
L3A102K06*****0000	1000	7.5					
L3A152K07*****0000	1500	8.5					
L3A222K08*****0000	2200	9.5					
L3A332K10*****0000	3300	11.5					
L3A472K12*****0000	4700	13.5					

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Class 2 (Low-dissipation) series parts list (2类瓷低损耗系列料号列表—续):

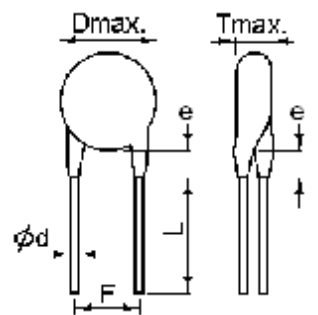
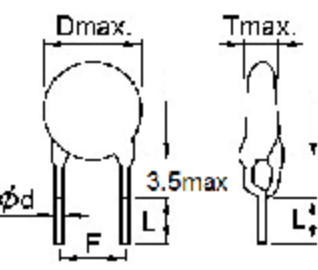
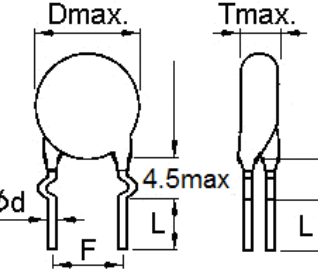
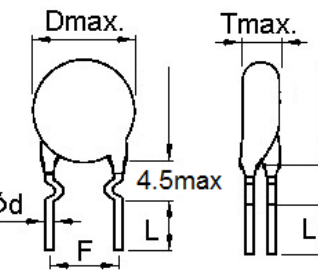
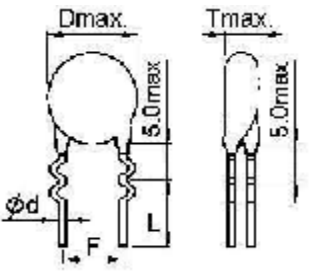
Part Number	Temp. Char.	Rated voltage	Cap.(pF)	Tol.	Dimension (mm)		
					D max.	T max.	Wire Dia. (φd)
R3D101K05*****0000	R(Y5R)	2000VDC	100	±10%	6.5	4.5	0.55±0.1
R3D151K05*****0000			150		6.5		
R3D221K05*****0000			220		6.5		
R3D271K05*****0000			270		6.5		
R3D331K05*****0000			330		6.5		
R3D391K06*****0000			390		7.5		
R3D471K06*****0000			470		7.5		
R3D561K07*****0000			560		8.5		
R3D681K07*****0000			680		8.5		
R3D821K08*****0000			820		9.5		
R3D102K09*****0000			1000		10.5		
R3D122K10*****0000			1200		11.5		
R3D152K11*****0000			1500		12.5		
R3D222K13*****0000			2200		14.5		
L3D221K05*****0000			L(Y5P)		2000VDC		
L3D271K05*****0000	270	6.5					
L3D331K05*****0000	330	6.5					
L3D391K05*****0000	390	6.5					
L3D471K05*****0000	470	6.5					
L3D561K06*****0000	560	7.5					
L3D681K06*****0000	680	7.5					
L3D821K07*****0000	820	8.5					
L3D102K07*****0000	1000	8.5					
L3D122K08*****0000	1200	9.5					
L3D152K08*****0000	1500	9.5					
L3D182K09*****0000	1200	10.5					
L3D222K10*****0000	2200	11.5					
L3D272K11*****0000	2700	12.5					
L3D332K13*****0000	3300	14.5					
L3D472K15*****0000	4700	16.5					
R3F101K05*****0000	R(Y5R)	3000VDC	100	±10%	6.5	5.0	0.55±0.1
R3F151K05*****0000			150		6.5		
R3F221K05*****0000			220		6.5		
R3F331K06*****0000			330		7.5		
R3F391K07*****0000			390		8.5		
R3F471K08*****0000			470		9.5		
R3F561K08*****0000			560		9.5		
R3F681K09*****0000			680		10.5		
R3F821K10*****0000			820		11.5		
R3F102K10*****0000			1000		11.5		
R3F152K13*****0000			1500		14.5		
R3F222K15*****0000			2200		16.5		

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5. Available code of lead type/lead length/lead space code (unit: mm):可适用的线脚类型、线脚长度、线脚脚距代码。

P/N (10-14)digits 料号第 10~14 码	Lead type 线型	Lead Length 线脚长度 (L)	Lead space 线 脚距离(F)	Packing 包装方式	Lead Configuration 线型外观图
B20C*	Type B Straight lead 直脚	20 min.	5/7.5/10 ± 1.0	Bulk 散料	
B03B*		3.0 ± 1.0			
B3EB*		3.5 ± 1.0			
B04B*		4.0 ± 1.0			
B4EB*		4.5 ± 1.0			
BA*D*		Refer to "6. Taping format"		Ammo taping 折叠编带	
D20C*	Type D Vertical kink lead 垂直弯脚	20 min.	5/7.5/10 ± 1.0	Bulk 散料	
D03A*		3.0 ± 0.5			
D3EA*		3.5 ± 0.5			
D04A*		4.0 ± 0.5			
D4EA*		4.5 ± 0.5			
DA*D*		Refer to "6. Taping format"		Ammo taping 折叠编带	
X20C*	Type X Outside kink lead 外弯脚	20 min	5/7.5/10 ± 1.0	Bulk 散料	
X03A*		3.0 ± 0.5			
X3EA*		3.5 ± 0.5			
X04A*		4.0 ± 0.5			
X4EA*		4.5 ± 0.5			
XA*D*		Refer to "6. Taping format"		Ammo taping 折叠编带	
H20C*	Type H Inside kink lead 内弯脚	20 min.	5/7.5/10 ± 1.0	Bulk 散料	
H03B*		3.0 ± 0.5			
H3EB*		3.5 ± 1.0			
H04B*		4.0 ± 1.0			
H4EB*		4.5 ± 1.0			
HA*D*		Refer to "6. Taping format"		Ammo taping 折叠编带	
M20C*	Type M Double outside kink lead 双外弯脚	20 min.	5/7.5/10 ± 1.0	Bulk 散料	
M03A*		3.0 ± 0.5			
M3EA*		3.5 ± 0.5			
M04A*		4.0 ± 0.5			
M4EA*		4.5 ± 0.5			

* Lead wire diameter 线脚直径 Φd : 0.55 +/-0.1mm

*e (Coating **extension** on leads 包封脚长): 2.0mm Max for straight lead style, not exceed the nethermost kink for kink lead.直脚品最大值 2.0mm, 弯脚品包封脚不低于最下方的折弯处。

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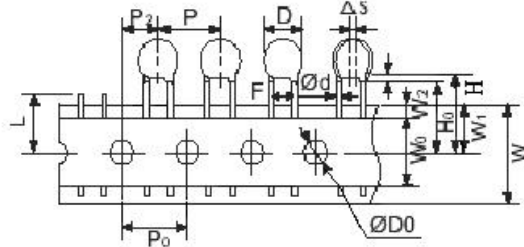
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6. Taping format for class 2 series (2类瓷系列编带型式):
• 15mm pitch/lead spacing 7.5mm taping

 Lead code: *BAFD7* & *DAFD7* & *XAFD7*
 HAFD7

• 12.7mm pitch/lead spacing 5mm taping

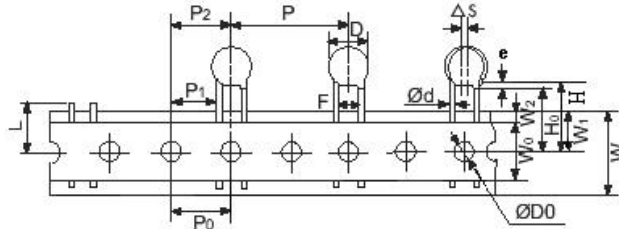
Lead code: *BAND5* & *DAFD5* & *HAND5*


• 25.4mm pitch/lead spacing 7.5mm taping

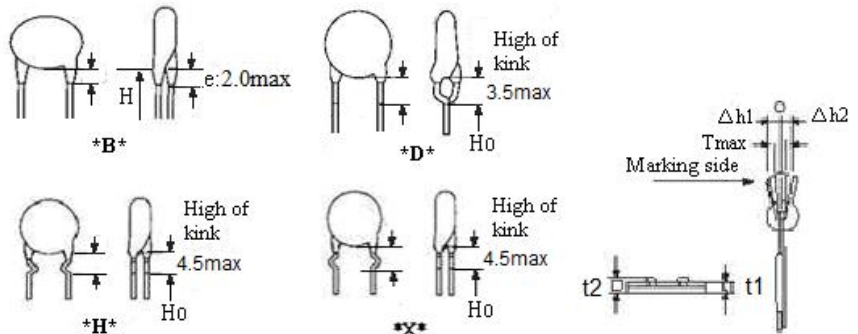
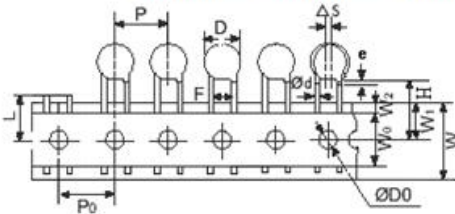
Lead code: *DAMD7* & *BAMD7* & *XAMD7* & *HAMD7*

• 25.4mm pitch/lead spacing 10mm taping

Lead code: *DAMD0* & *BAMD0* & *XAMD0* & *HAMD0*


• 15mm pitch/lead spacing 10mm taping

Lead code: *DASD0* & *BASD0* & *HASD0*



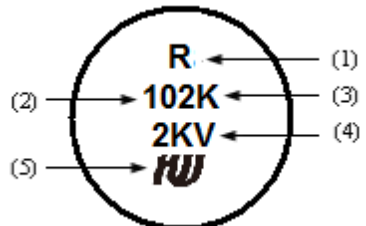

Part number code		*DAND5*/ *BAND5*/ *HAND5*	*BAFD7*/ *DAFD7*/ *XAFD7*/ *HAFD7*	*BAMD7*/ *DAMD7*/ *XAMD7*/ *HAMD7*	*BAMD0*/ *DAMD0*/ *XAMD0*/ *HAMD0*	*BASD0*/ *DASD0*/ *HASD0*
Item	Symbol	Dimensions(mm)				
Pitch of component 零件间距	P	12.7 ± 1	15.0 ± 2	25.4 ± 2	25.4 ± 2	15.0 ± 2
Pitch of sprocket 纸带孔中心距	P0	12.7 ± 0.3	15.0 ± 0.3	12.7 ± 0.3	12.7 ± 0.3	15.0 ± 0.3
Lead spacing 线脚中心距	F	5.0 ± 0.5	7.5 ± 0.5	7.5 ± 0.5	10.0 ± 0.5	10.0 ± 0.5
Length from hole center to component center 孔中心与零件中心距离	P2	6.35 ± 1.0	7.5 ± 1.0	12.7 ± 1.5	12.7 ± 1.5	/
Length from hole center to lead 线脚与孔中心距	P1	/	/	8.95 ± 1.5	7.7 ± 1.5	/
Body diameter 本体直径	D	Refer to previous page				
Deviation along tape, left or right 本体偏移	Δ S	0 ± 2.0				
Carrier tape width 纸带宽度	W	18.0 +1/-0.5				
Position of sprocket hole 定位孔位置	W1	9.0 ± 0.5				
Lead distance between the kink and center of sprocket hole 线脚高度(折弯至孔中心)	H0	16.0 ± 0.5 (For lead code: *D* & *X* & *H*)				
Lead distance between the bottom of body and the center of sprocket hole 线脚高度(本体底至孔中心)	H	20.0+1.5/-1.0 (For lead code: *B*)				
Diameter of sprocket hole 定位孔直径	D0	4.0 ± 0.2				
Lead diameter 线脚直径	φd	0.55±0.1				
Total tape thickness 载带总厚度	t1	0.6 ± 0.3				
Total thickness, tape and lead wire 载带总厚度	t2	1.5 max.				
Deviation across tape 零件前后偏移	Δ h1/Δ h2	2.0 max.				
Portion to cut in case of defect 裁脚后线脚长度	L	11.0 max.				
Hole-down tape width 胶带宽度	W0	8.0 min				
Hole-down tape distortion 胶带边缘距	W2	1.5 ± 1.5				
Coating extension on leads 线脚上包封脚长	e	2.0 max for straight lead style; Not exceed the kink leads for kink lead.				

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7. Marking 印字:

Marking 印字标示		
Items 项目		
(1). Temp. char.	Y5R(R):Be marked "R"; Y5P(L):Be marked "L"	
(2). Rated capacitance 标称电容量	Identified by 3-Figure Code (三位数标示法): Ex. 100pF → "101", 2200pF → "222"	
(3). Capacitance tolerance 电容量允差	K: ±10%	
(4). Rated voltage 额定电压	1000Vdc	Marked with code: 1KV
	2000Vdc	Marked with code: 2KV
	3000Vdc	Marked with code: 3KV
(5). Manufacture trademark. 制造商标	 (When size code ≤06, this mark shall be omitted. 当尺寸码小于及等于06时, 此标示省略)	

8. Packaging 包装 :

Packing Type 包装方式	The code of 11th to 12th in P/N(料号 11~12 码)	MPQ 最小包装量 (Kpcs/Box)	Kpcs/Carton Kpcs/箱
Taping 编带	AN	1.5	15
	AF/AM/AS	1	10

Packing Type 包装方式	Lead length 线脚长	Size code of 8th to 9th in P/N(料号 8~9 码)	MPQ 最小包装 量(Kpcs/Bag)	Kpcs/Box Kpcs/盒	Kpcs/Carton Kpcs/箱
Bulk 散料	Long lead (L ≥ 16mm)	≤10	1	2	16
		11~16	0.5	1.5	12
	Short lead (L < 16mm)	≤06	1	6	48
		07~08	1	4	32
		09~10	1	3	24
		11~16	1	2	16

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

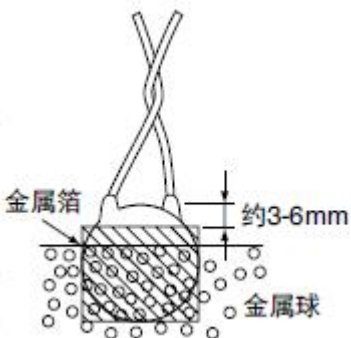
9.1 Operating Temperature Range 操作温度: -25 to +125°C

9.2 Test condition 测试条件:

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

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

9.3 Performance 性能:

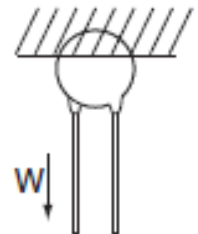
No	Items 项目	Performance 性能要求	Testing method 测试方法
9.3.1	Appearance and dimension 外观和尺寸	No visible defect, and the dimension are within specified range. 外观无明显缺陷, 尺寸符合规格。	The capacitor should be visually inspected for evidence of defect. 目视检查电容器是否存在任何缺陷。 Dimensions should be measured with slide calipers. 以游标卡尺量测尺寸。
9.3.2	Marking 印字标志	The marking shall be easily legible. 标志清晰易识别。	Visual check. 目视检查
9.3.3	Between terminals 端子间	No failure. 无失效	The capacitors shall not be damage when 200% rated voltage with 50mAmax. charging current are applied between the lead wires for 1~5sec. 电容器两线脚间施加 2 倍额定电压 1~5 秒(最大充放电电流 50mA), 不应有任何损坏。
	Dielectric Strength 抗电强度 Body Insulation 本体绝缘	No failure. 无失效	First, the terminals of the capacitor should be connected together. Then, as shown in the below figure, a metal foil should be closely wrapped around the body of the capacitor to the distance of about 2mm from each terminal. Then, the capacitor should be inserted into a container filled with metal balls of about 1mm diameter. Finally, 1.3KVdc is applied for 1~5sec between the capacitor lead wires and metal balls. 首先, 应将电容器的端子连接在一起, 然后如下图所示, 在距端子约2mm处将金属箔牢固地包裹在电容器上。再将电容器插入一个盛有直径约1mm金属小球的容器内。最后, 在电容器引线与金属球之间施加1.3KVdc 1~5秒。 
9.3.4	Insulation Resistance 绝缘电阻	10000MΩ or more. 最小 10000 MΩ	The insulation resistance shall be measured with DC500±50V within 60±5sec of charging. DC500±50V 条件下, 在充电 60±5 秒内测量绝缘电阻。

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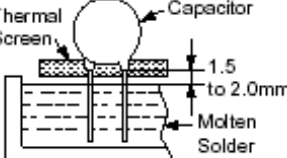
No	Items 项目	Performance 性能要求	Testing method 测试方法																										
9.3.5	Capacitance 电容量	Within specified tolerance. 在规定误差范围内	The capacitance shall be measured at 25±2°C with 1KHz±20% and 1.0±0.2V(rms.). 电容器应在温度 25±2°C、频率 1KHz±20%、电压 1.0±0.2Vrms 条件下测量。																										
9.3.6	Dissipation factor (D.F)	Y5R(R): 0.2% max. Y5P(L): 0.5% max.																											
9.3.7	Temperature Characteristic 温度特性	<table border="1"> <thead> <tr> <th>Char. 材质</th> <th>Capacitance Change 容量变化率</th> </tr> </thead> <tbody> <tr> <td>Y5R(R)</td> <td>-33% to +15%</td> </tr> <tr> <td>Y5P(L)</td> <td>±10%</td> </tr> </tbody> </table>	Char. 材质	Capacitance Change 容量变化率	Y5R(R)	-33% to +15%	Y5P(L)	±10%	The capacitance measurement shall be made at each step specified in Table 1. 应按照表 1 所规定各阶段测量电容量。 Table 1 表 1 <table border="1"> <thead> <tr> <th rowspan="2">Step 阶段</th> <th colspan="2">Temperature 温度 (°C)</th> </tr> <tr> <th>Y5R(R)</th> <th>Y5P(L)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>+25±2</td> <td>+25±2</td> </tr> <tr> <td>2</td> <td>-25±2</td> <td>-25±2</td> </tr> <tr> <td>3</td> <td>+25±2</td> <td>+25±2</td> </tr> <tr> <td>4</td> <td>+125±2</td> <td>+85±2</td> </tr> <tr> <td>5</td> <td>+25±2</td> <td>+25±2</td> </tr> </tbody> </table> Δ C(%)=(C2-C1)×100%/C1 Note注： C1 = Capacitance of step 3(阶段3之容量值) C2 = Capacitance as step 2 or step 4(阶段2或阶段4时之容量值) Pre-treatment 预处理: Capacitor shall be stored at 85±2°C for 1hour, then placed at *1room condition for 24±2hours before measurements. 电容器在测量前, 应在 85±2°C 环境中放置 1 小时然后在室温条件(如备注 1)下静置 24±2 小时。	Step 阶段	Temperature 温度 (°C)		Y5R(R)	Y5P(L)	1	+25±2	+25±2	2	-25±2	-25±2	3	+25±2	+25±2	4	+125±2	+85±2	5	+25±2	+25±2
Char. 材质	Capacitance Change 容量变化率																												
Y5R(R)	-33% to +15%																												
Y5P(L)	±10%																												
Step 阶段	Temperature 温度 (°C)																												
	Y5R(R)	Y5P(L)																											
1	+25±2	+25±2																											
2	-25±2	-25±2																											
3	+25±2	+25±2																											
4	+125±2	+85±2																											
5	+25±2	+25±2																											
9.3.8	Robustness of terminations 端子强度	Tensile 抗拉强度	Lead wire shall not cut off. Capacitor shall not be broken. 引线不应断开, 电容器不应破裂。																										
		Bending 弯曲强度	Each lead wire should be subjected to 5N of weight and bent 90° at the point of egress, in one direction, then returned to its original position and bent 90° in the opposite direction at the rate of one bend in 2 to 3 sec. 在引线出口处沿一个方向施加 5N、90°的弯曲压力, 然后恢复至原始状态。之后, 在 2 至 3 秒内再以相反方向施加一次 90°的弯曲压力。																										
9.3.9	Solderability of leads 引线可焊性	Lead wire should be soldered with uniform coating on the axial direction over 3/4 of the circumferential direction. 应轴向焊接引线, 焊料分布均匀, 覆盖周边 3/4 区域。	The lead wire of capacitor should be dipped into molten solder for 5 ± 0.5 sec. The depth of immersion is up to about 1.5 to 2.0 mm from the root of lead wires. Temp. of solder : Lead Free Solder (Sn-3Ag-0.5Cu) 245±5°C 将电容器引线在 245±5°C 熔焊料中浸泡 5± 0.5 秒, 浸泡深度为距引线根部约 1.5 至 2.0mm 处。 焊料温度: 无铅焊料(Sn-3Ag-0.5Cu) 245±5°C																										



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No	Items 项目	Performance 性能要求		Testing method 测试方法
9.3.10	Soldering heat resistance 耐焊接性	Appearance 外观	No marked defect. 无明显缺陷	First the capacitor should be stored at 120+0/-5 °C for 60 +0/-5 sec. Then, as in figure , the lead wires should be immersed solder of 260+0/-5 °C up to 1.5 to 2.0 mm from the root of terminal for 7.5+0/-1 sec. 首先电容器应在 120+0/-5 °C 条件下存放 60 +0/-5 秒 然后，如图所示，将引线从端子根部开始 1.5 至 2.0mm 以下的地方浸泡在 260+0/-5 °C 温度下 7.5+0/-1 秒。  Pre-treatment 预处理: Capacitor shall be stored at 85±2°C for 1hour.then placed at ※ 1room condition for 24±2hours before initial measurements. 预处理：初次测量之前，将电容器存放在 85±2°C 条件下 1 小时，然后在室温下存放 24±2 小时 Post-treatment 后处理: Capacitor shall be stored for 1 to 2hours at ※1room condition. 将电容器在室温下存放 1 至 2 小时
		Capacitance 电容量	±10%	
		Dielectric Strength 介电强度	Per item 9.3. 3 按照 9.3.3 项	
9.3.11	Humidity Loading 耐湿负荷	Appearance 外观	No marked defect. 无明显缺陷	Apply the rated voltage for 500+24/-0 hrs. at 40±2°C in 90 to 95% relative humidity. (Charge/Discharge current V50mA) Pre-treatment: Capacitor should be stored at 125±3°C for 1 hr., then placed at room condition* for 24±2 hrs. before initial measurements. Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition.* 在 40±2°C 及 90 至 95% 相对湿度条件下施加额定电压 500(+24-0)小时，（充/放电电流小于 50mA） 预处理： 初次量测之前，将电容器在 125±2°C 条件下存放 1 小时，然后在室温*1 条件下放置 24±2 小时。 后处理： 将电容器在室温*1 条件下放置 1 到 2 小时再量测。
		Capacitance 电容量	Capacitance change rate 电容量变化率: ±10%	
		Dissipation factor (D.F)	Y5R(R) : 0.6% Max Y5P(L) : 2.5% Max	
		Insulation Resistance 绝缘电阻	500MΩ min.	
9.3.12	High temperature loading 高温负荷	Appearance 外观	No marked defect. 无明显缺陷	Capacitors shall be subjected to a test of: 150% rated voltage with 50mAMax. For 1000(+48/-0) hours at 125°C ± 2°C, then dried for 1~2 hours and measured. 在125±2°C温度条件下施加1.5倍额定电压1000(+48/-0)小时，然后在室温*1下存放1到2小时再量测。
		Capacitance 电容量	Capacitance change rate 电容量变化率: ±10%	
		Dissipation factor (D.F)	Y5R(R) : 0.6% Max Y5P(L) : 2.5% Max	
		Insulation Resistance 绝缘电阻	1000MΩ min.	

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No	Items 项目	Performance 性能要求		Testing method 测试方法
9.3.13	Temperature cycle 温度循环	Appearance 外观	No marked defect. 无明显缺陷	The capacitor should be subjected to 5 temperature cycles: 电容器应执行如下5个温度周期之循环。 -25±3℃(30±3min) → 25℃(3min) → 125±3℃(30±3min) → 25℃(3min) .
		Capacitance 电容量	Capacitance change rate 电容量变化率: ±10%	
		Dissipation factor (D.F)	Y5R(R) : 0.6% Max Y5P(L) : 2.5% Max	
		Insulation Resistance 绝缘电阻	1000MΩ min.	
9.3.14	Vibration Resistance 耐振动性	Appearance 外观	No marked defect. 无明显缺陷	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. Apply for a total of 6 hrs., 2 hrs. each in 3 mutually perpendicular directions. 将电容器牢固地焊接在支撑引线上, 并以 10 至 55Hz 的频率范围进行振荡, 振幅 1.5mm, 并且按照 1 分钟的振荡变化速率由 10 至 55Hz, 然后返回至 10Hz 的频率。分别沿 3 个相互垂直的平面实施振荡, 每次 2 小时, 共 6 小时。
		Capacitance 电容量	Capacitance change rate 电容量变化率: ±10%	
		Dissipation factor (D.F)	Y5R(R) : 0.2% Max Y5P(L) : 0.5% Max	

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

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

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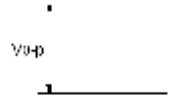
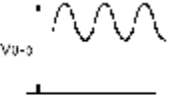


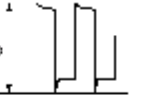
10. Cautions & notices 警告及注意事项:

10.1. Caution (Rating) 额定警告

10.1.1 Operating voltage 工作电压

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

When the voltage is 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. 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					

10.1.2 Operating Temperature and Self-generated Heat 工作温度和自生热

Keep the surface temperature of a capacitor below the upper limit of its rated operating temperature range. be sure to take into account the heat generated by the capacitor itself. When the capacitor is used in a high-frequency current, pulse current or similar current, it may self-generate heat due to dielectric loss. The applied voltage load (*) should be such that the capacitor's self-generated heat is within 15°C at an atmosphere temperature of 25°C . When measuring, use a thermocouple of small thermal capacity-k of $\phi 0.1\text{mm}$ in conditions where the capacitor is not affected by radiant heat from other components or surrounding ambient fluctuations.

电容器的表面温度应保持在额定工作温度范围的上限以下。务必考虑到电容器的自生热。电容器在高频电流、冲激电流等中使用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°C 周围温度条件下不超过 15°C 范围。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他组件的散热或周围温度波动影响。

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.) 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)

10.1.3 Fail-Safe 失效安全性

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

10.1.4 Load Reduction and Self-generated Heat During Application of High-frequency and

High-voltage 在施加高频和高电压过程中的负荷降低与自生热:

Due to the low self-heating characteristics of low dissipation capacitors, the allowable electric power of these capacitors is generally much higher than that of B characteristic capacitors. However, in case the self heating temperature is 15°C under a high-frequency voltage whose peak-to-peak value equals the capacitor's rated voltage, the capacitor's power consumption may exceed it's allowable electric power. 由于低热散逸电容器所具有的低自生热特性, 此类电容器的允许电功率一般均高于B特性电容器。但是, 在峰间幅值等于电容器额定电压的高频电压条件下, 当自热温度达到 15°C 时, 电容器的功率消耗会超过其允许电功率。

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Therefore, when using the Low D.F. series in a high-frequency and high-voltage circuit with a frequency of 1kHz or higher, make sure that the Vp-p values including the DC bias, do not exceed the applied voltage value specified in Table 1. 因此，在将Low DF,SL特性系列电容器用在频率为1kHz或以上的高频高压电路中时，应确保包括直流偏压在内的Vp-p值不超过表1所规定之施加电压值(若有安全疑虑,则需提高安全系数,降压使用,即提高选用规格之直流额定电压产品)。

Also make sure that the self-heating temperature (the difference between the capacitor's surface temperature and the capacitor's ambient temperature) at an ambient temperature of 25°C does not exceed the value specified in Table 1. 同时，还应确保25°C周围温度条件下的自生热温度(电容器表面温度与电容器周围温度之间的温度差)不超过表1所规定的温度值。

[Table 1] Allowable conditions at high frequency<表 1> 高频状态下的允许条件:

DC rated voltage 直流额定电压	Allowable conditions at High-frequency *3 高频允许条件		Capacitor's ambient temp. *2 电容器周围温度
	Applied voltage (Max.) 外加电压(最大)	Self-heating temp.(25°C ambient temp.)*1 自生热温度(周围温度 25°C)	
1KV	600Vp-p	15°C Max.	-25 ~ +125°C
	1000Vp-p	5°C Max.	
2KV	1000Vp-p	10°C Max.	
	2000Vp-p	5°C Max.	
3KV	3000Vp-p	5°C Max.	

Failure to follow the above cautions (items 1.1 to 1.4) may result, worst case, in a short circuit and cause fuming or partial dispersion when the product is used. 未能遵循上面的警告(项目 1.1 到 1.4),严重情况下,会引起短路,冒烟或局部损坏。

Because of influence of harmonics, when the applied voltage is a rectangular wave or pulse wave voltage (instead of a sine wave voltage), the heat generated by the capacitor is higher than the value obtained by application of the sine wave with the same fundamental frequency. Roughly calculated for reference, the allowable voltage for a rectangular wave or pulse wave corresponds approximately to the allowable voltage for a sine wave whose fundamental frequency is twice as large as that of the rectangular wave or pulse wave. This allowable voltage, however, varies depending on the voltage and current waveforms. Therefore, you are requested to make sure that the self-heating temperature is not higher than the value specified in Table 1. 由于受谐波影响,当外加电压为矩形波或脉冲波电压(而非正弦波电压)时,电容器的自生热会高于以相同的基础频率施加之正弦波电压所获得的温度值。为了参考作粗略计算,矩形波或脉冲波的容许电压大致等于正弦波允许电压的一半。但是,该允许电压随电压和电流波形的不同而有所变化。因此,一定要确保自生热温度不高于表1所规定之温度值。如果周围温度在 85 至 125°C之间,则应进一步降低所施加的电压。

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Fig 1: Relationship Between Applied Voltage and Self-heating Temperature (Allowable Self-heating Temp. at 25°C Ambient Temp.) <图 1> 外加电压与自生热温度时间之间的关系 (25°C周围温度条件下的允许自生热温度)

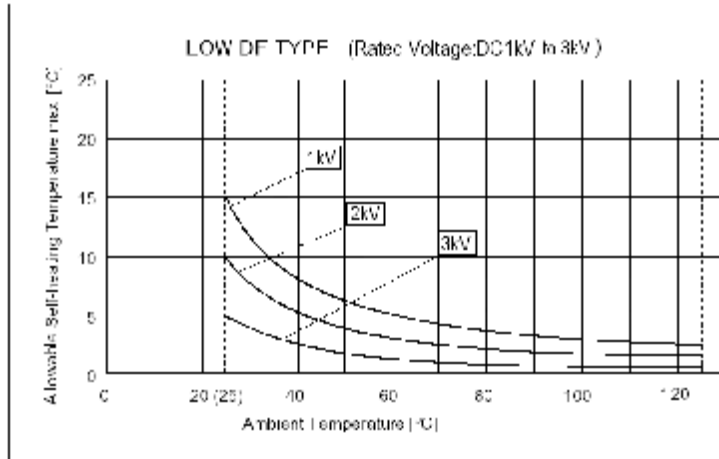
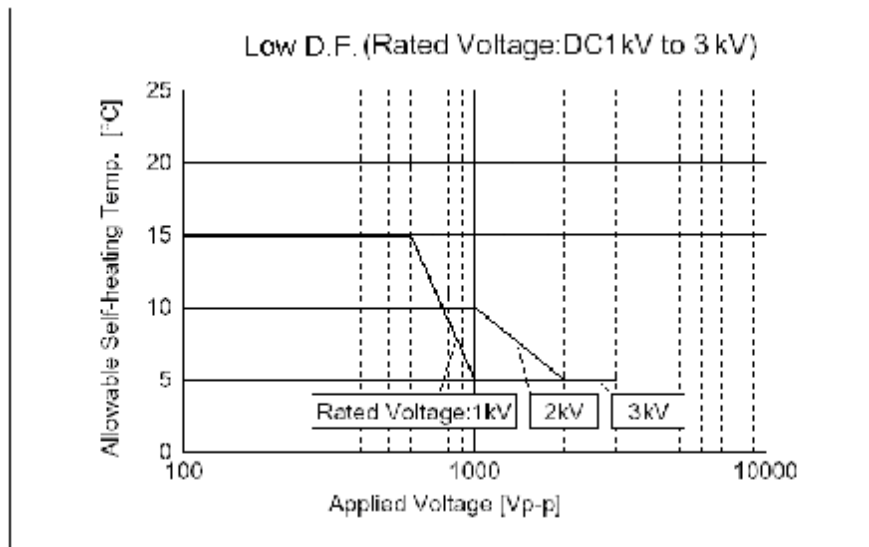


Fig2. Dependence of Allowable Self-heating Temperature on Ambient Temperature. <图 2> 自生热温度与周围温度的相关性

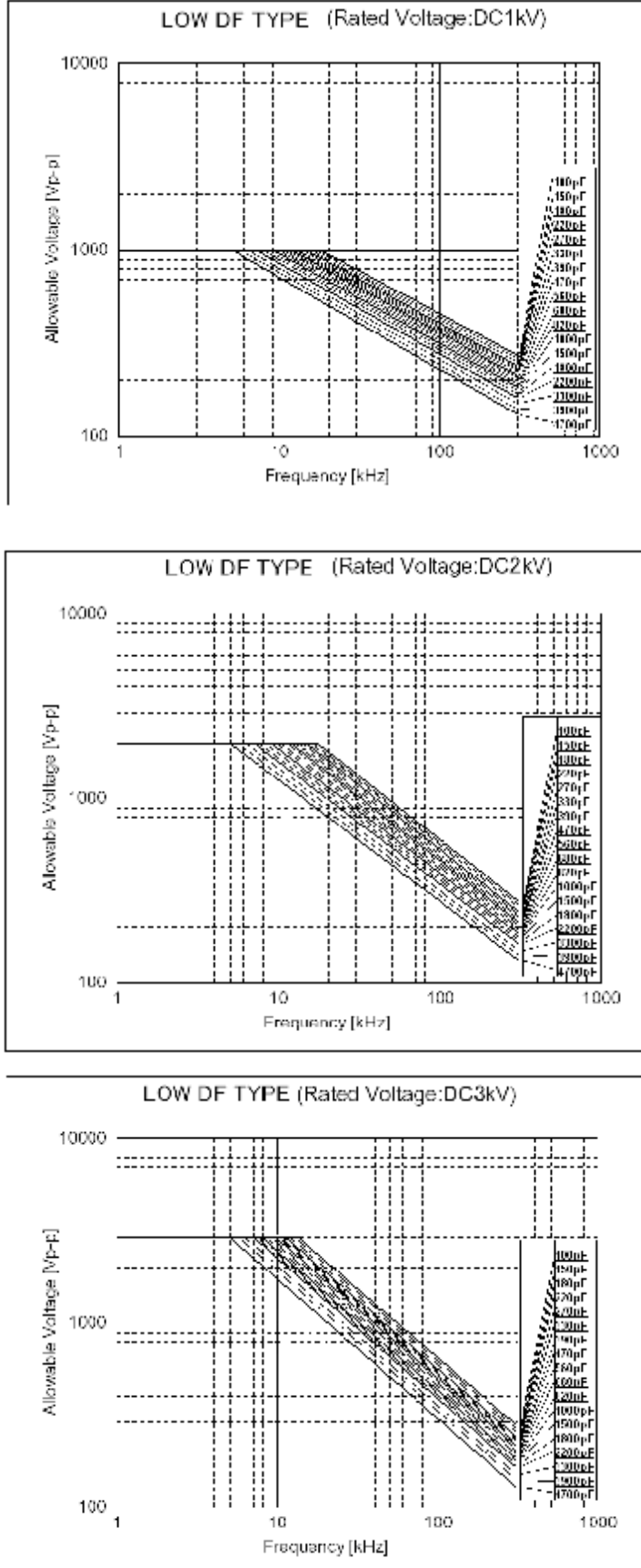


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Fig 3: Allowable Voltage (Sine Wave Voltage) – Frequency Characteristics (At Ambient Temperature of 105°C or less) <图 3> 允许电压 (正弦波电压)–频率特性 (在 105°C 或以下周围温度时)



High Voltage Ceramic Capacitors 高压陶瓷电容器
Class 2, 1KV,2KV,3KVdc Low-dissipation factor Hi-K type
2类 1KV/2KV/3KVdc 低损耗高介电常数型

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10.2. Caution (Storage and operating condition) 警告（保管与使用条件）**10.2.1 Operating and storage environment 使用与保管环境**

The insulating coating of capacitors does not form a perfect seal; therefore, do not use or store capacitors in a corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. And avoid exposure to moisture. Before cleaning, bonding or molding this product, verify that these processes do not affect product quality by testing the performance of a cleaned, bonded or molded product in the intended equipment. Store the capacitors where the temperature and relative humidity do not exceed -10 to 40 degrees centigrade and 15 to 85 %.

Use capacitors within 6 months. 电容器的绝缘涂层不具有良好密封作用；因此，请勿将电容器存放在腐蚀性气体中，尤其是存在氯气、硫气、酸、碱、盐等的场所。同时应防潮。在对本产品进行清洗、覆膜或封膜前，请先在制定设备上测试经清洗、覆膜或封膜的产品性能，以确定上述过程不会影响产品质量。电容器应存放则在温度及相对湿度不超出-10 到40℃.及15至85%范围的场所。请在6个月内使用电容器。

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

10.3. Caution (Soldering and Mounting) 警告（焊接与安装）:**10.3.1 Vibration and impact: 震荡与冲击**

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

使用时请勿使电容器或引线受到过度冲击或震荡。

10.3.2 Soldering: 焊接

When soldering this product to a PCB/PWB, do not exceed the solder heat resistance specification of the capacitor. Subjecting this product to excessive heating could melt the internal junction solder and may result in thermal shocks that can crack the ceramic element. 将该产品焊接在 PCB/PWB 上时，不应超出电容器的耐焊热性规格。本产品过热会使内部接点锡焊料熔化，导致温度骤变，从而造成陶瓷组件产生裂纹。

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

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

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

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

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

To perform ultrasonic cleaning, observe the following conditions. 当进行超声波清洗时，应遵循以下条件

Rinse bath capacity: Output of 20 watts per liter or less. 洗涤槽容量：20瓦特输出功率或以下

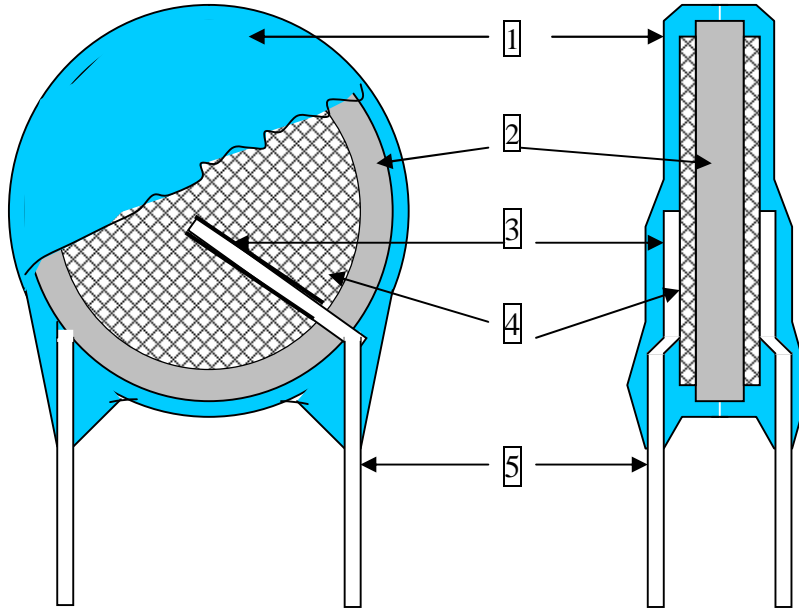
Rinsing time: 5 min maximum. 清洗时间：最多5分钟

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

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

过度的超声波清洗会导致引线的过载损坏。

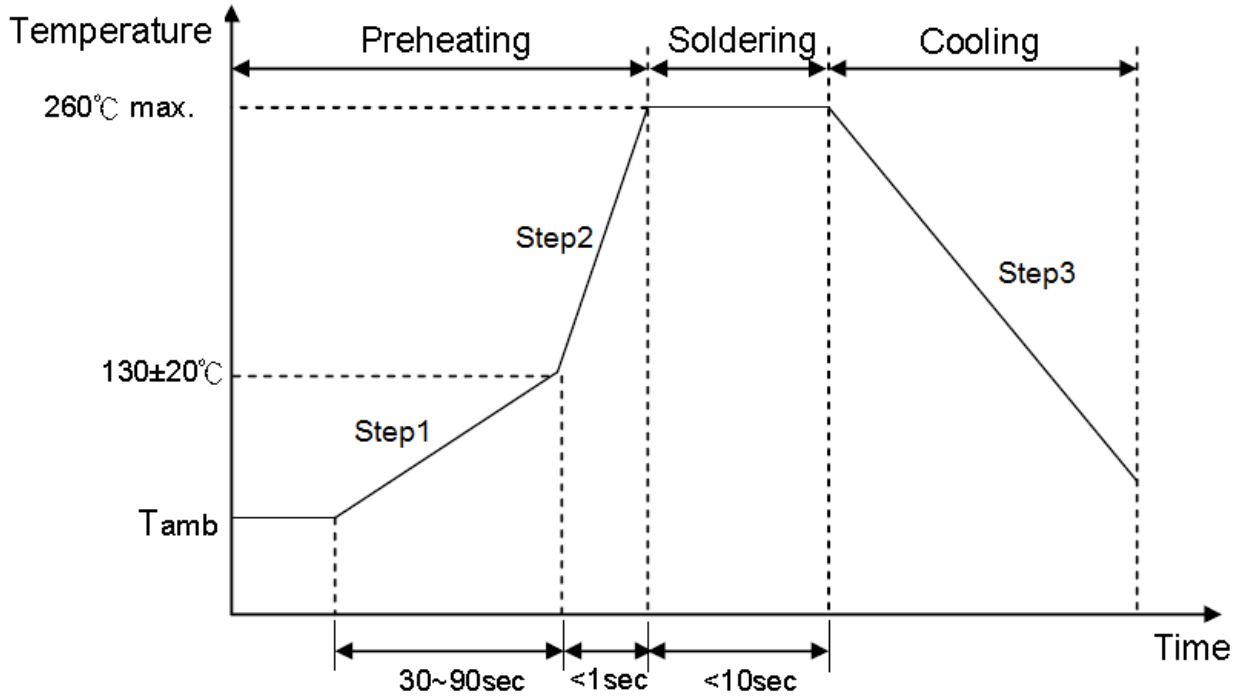
"Failure to follow the above cautions may result, worst case, in a short circuit and cause fuming or partial dispersion when the product is used." 使用本产品时如忽略上述警告事项，则在严重情况下可能导致短路，并引起冒烟或局部损毁。

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

Remarks 摘要：

No.	Part name 名称	Material 材料	Model/Type 型号	Component 组成
1	Insulation Coating 绝缘涂层	Epoxy polymer 环氧聚合物	1.EF-150 2.PCE-300	Epoxy resin、Pigment 环氧树脂、颜料
2,4	Dielectric Element 电介质层	Ceramic 陶瓷片	Y5R(R) Y5P(L)	BaTiO ₃
3	Solder 焊料	Tin-alloy 锡合金	Sn/Ag; Sn/Ag/Cu	Sn/Ag; Sn/Ag/Cu
5	Leads wire 引线	Tinned copper clad steel wire 镀锡铜包钢线	0.55±0.1mm	Substrate metal: Fe & Cu Surface plating: Sn 底料: Fe & Cu 镀层: Sn

12. Soldering recommendation 焊接条件建议:

12.1 Wave soldering profile 波峰焊:



Step1: (1~3)°C/sec

Step2: Approx. 200°C/sec

Step3: 5°C/sec Max

12.2 Recommended reworking conditions with soldering iron 重工铬铁焊:

Item	Conditions
Temperature of Soldering Iron-tip	350°C (max.)
Soldering Time	3 sec (max.)
Distance from Varistor	2 mm (min.)