KNSCHA®
全球高端电容器制造商

东莞市科尼盛电子有限公司
DONGGUAN KNSCHA ELECTRONICS CO., LTD.

规格承认书
Specification for approval

客户名称: (Customer Name)	
产品名称: (Product Name)	瓷片电容(C/C) Ceramic Capacitor(C/C)
客户料号: (Customer part number)	
科尼盛料号: (KNSCHA number)	Y5V222M1KV16CC0035
型号规格: (Specifications)	C/C 222M/1KV P=5mm Y5V C/C 222M/1KV P=5mm Y5V

制 造 (Manufacture)			客 户 (Customer)		
Approval			Approval		
拟 制 (Fiction)	审 核 (Chief)	核 准 (Approval)	检 验 (Inspect)	审 核 (Chief)	核 准 (Approval)
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陶瓷电容器规格书
Specifications for ceramic capacitors

圆盘陶瓷电容器
Disc ceramic capacitors

Edition A0
2015-02-03
BULANC DANRY

RoHS H.F.
REACH

修订履历 Revision history

版本 Edition	修订时间 Revision time	修订摘要 Revision content	修订人 Revision People
A0	Feb 03,2015	首次制作 The first draft	BULANC DANRY

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1. 范围 Scope

本承认规格适用于电子设备中使用的具有确定温度系数(Ⅰ类介质)，具有高介电常数(Ⅱ类介质）和具有半导体性质(Ⅲ类介质）的瓷介固定电容器。

This standard is applicable to fixed capacitors of ceramic dielectric with a defined temperature coefficient (dielectric class Ⅰ, class Ⅱ, classⅢ), intended for use in electronic equipment.

2. 目的 Object

对这类瓷介固定电容器规定优先额定值和特性，试验和测量方法以及一般特性要求。

The principal object of this standard is to prescribe preferred ratings and characteristics and to select the appropriate tests and measuring methods and to give general performance requirements for ceramic dielectric capacitors.

3. 引用标准 Normative references

GB/T 2693-2001 (IDT IEC 60384-1:1999)电子设备用固定电容器 第 1 部分 总规范
Fixed capacitors for use in electronic equipment-
Part 1: Generic specification

GB/T 2828.1-2003 (IDT ISO 2859-1:1999) 计数抽样检验程序
第 1 部分 按接受限(AQL)检索的逐批检验抽样计划
Sampling procedures for inspection by attributes-
Part 1: Sampling schemes indexed by acceptance quality limit(AQL)for lot-blot inspection

GB/T 2471-1995 (IDT IEC 63:1963)：电阻器和电容器优先数系
Preferred number series for resistors and capacitors

GB/T 2691-1994 (IDT IEC 62:1992)：电阻器和电容器的标志代码
Marking codes for resistors and capacitors

GB/T 26572-2011：电子信息产品中有毒有害物质的限量要求
Requirements for concentration limits for certain hazardous substances in electronic information products

SJ/T 11364-2006：电子信息产品污染控制标识要求
Marking for control of pollution caused by electronic information products

GB/T 26125-2011：电子信息产品中有毒有害物质的检测方法
Testing methods for hazardous substances in electronic information products

2011/65/EU(RoHS2.0)：电子电气设备中限制使用某些有害物质指令
The Restriction of the use of certain Hazardous substances in Electrical and Electronic Equipment

2012/19/EU (WEEE2.0)：废旧电子电气设备指令
Waste Electrical and Electronic Equipment

2013/2/EU：欧盟关于包装和包装废弃物指令
Europe Parliament and Council Directive on Packaging and packaging waste

No1907/2006(REACH)：化学品注册、评估、许可和限制(高关注物质)
Registration, Evaluation, Authorization and Restriction of Chemicals(SVHC)

4. 术语和定义 Terms and definitions

4.1 Ⅰ类瓷介固定电容器 Fixed capacitors of ceramic dielectric, class Ⅰ

专门设计并用在低损耗，电容量稳定性高或要求温度系数有明确规定的谐振电路中的一种电容器。例如在电路中作温度补偿之用。

Designed with low loss, high stability of capacitance or temperature coefficient is required to have clearly defined the resonant circuit of a capacitor. For example, in the circuit for temperature compensation purposes.

4.2 Ⅱ类瓷介固定电容器 Fixed capacitors of ceramic dielectric, class Ⅱ

适用于旁路耦合或用在对损耗和电容量稳定性要求不高的电路中的,具有高介电常数的一种电容器。

Applied to the bypass coupling or do not ask for much of the loss and capacitance stability circuit, a capacitor with a high dielectric constant.

4.3 Ⅲ类瓷介固定电容器 Fixed capacitors of ceramic dielectric, class Ⅲ

适用于作旁路和耦合之用的电路中，具有半导体特征的一种电容器。

Apply for bypass and coupling circuit, a capacitor with semiconductor characteristics.

4.4 额定电压 rated voltage

额定电压是在额定温度下，可以连续施加在电容器引出端上的最大直流电压。

Either the r.m.s. operating voltage of rated frequency or the d.c. operating voltage, which may be applied continuously to the terminations of a capacitor at any temperature between the lower and the upper category temperatures.

4.5 损耗角正切 tangent of loss angle(tanδ)

在规定频率的正弦电压下，电容器的损耗功率除以电容器的无功功率。

The power loss of the capacitor divided by the reactive power of the capacitor at a sinusoidal voltage at a specified frequency.

4.6 上限类别温度 upper category temperature

电容器设计所确定的能连续工作和最高环境温度。

Maximum surface temperature for which the capacitor has been designed to operate continuously.

4.7 下限类别温度 lower category temperature

电容器设计所确定的能连续工作和最低环境温度。

Minimum surface temperature for which the capacitor has been designed to operate continuously.

4.8 电容量温度特性 temperature characteristic of capacitor

电容量温度特性是在一个不超出类别温度范围的给定温度范围内，所出现的电容量最大可逆变化。一般此变化表示相对 20℃时电容量的百分比。

The maximum reversible variation of capacitance produced over a given temperature range within the category temperature range, normally expressed as a percentage of the capacitance related to a reference temperature of 20℃.

5. 编码说明 How to order

JT	F	222	M	2G	F0	035	A	048	B
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩

① 类别 SERIES

CODE	类别名称 **SERIES**	材质 DIELECTRIC
CC1	Ⅰ类温度补偿型低压陶瓷电容器 Temperature-compensated low-voltage ceramic capacitors class Ⅰ	NP0,N80,N150,N220,N330,N470,N750, N3300,N4700,SL
CT1	Ⅱ类高介电常数型低压陶瓷电容器 High dielectric constant low-voltage ceramic capacitors class Ⅱ	Y5P,BN,Y5R,Y5U,Y5V,X7R,Z5V,Z5U
CS1	Ⅲ类半导体类陶瓷电容器 Semiconductor category ceramic capacitors class Ⅲ	Y5P,Y5U,Y5V
CC81	Ⅰ类温度补偿型高压陶瓷电容器 Temperature-compensated high-voltage ceramic	NP0,N80,N150,N220,N330,N470,N750, N3300,N4700,SL

	capacitors class Ⅰ	
CT81	Ⅱ类高介电常数型高压陶瓷电容器 High dielectric constant high-voltage ceramic capacitors class Ⅱ	Y5P,BN,X7R,Y5R,Y5U,Y5V,Y5T
CC4	Ⅰ类温度补偿型径向引线陶瓷电容器（独石电容器）Temperature compensation of radial lead ceramic capacitors class Ⅰ(monolithic capacitor)	NP0
CT4	Ⅱ类高介电常数型径向引线陶瓷电容器（独石电容器） Radial lead ceramic capacitors with high dielectric constant class Ⅱ (monolithic capacitor)	X7R Y5V
CC42	Ⅰ类温度补偿型轴向引线陶瓷电容器（独石电容器） Temperature compensation of axial lead ceramic capacitors class Ⅰ (monolithic capacitor)	NP0
CT42	Ⅱ类高介电常数型轴向引线陶瓷电容器（独石电容器） Axial lead with high dielectric constant ceramic capacitors class Ⅱ(monolithic capacitor)	X7R Y5V
JT	交流陶瓷电容器 Y1 AJC JT 系列 AC ceramic capacitors class Y1 JT Series	Y5P,Y5U,Y5V
JK	交流陶瓷电容器 Y2 AJC JK 系列 AC ceramic capacitors class Y2 JK Series	Y5P,Y5U,Y5V

② 材质 DIELECTRIC

CC1 CC81 系列（ppm/℃）		CT1 CT81 CS1 系列	
CODE	材质 DIELECTRIC	CODE	材质 DIELECTRIC
CH	NP0(0±60)	A	Y5E (±4.7%)
LH	N80(-80±60)	B	Y5P (±10%)
PH	N150(-150±60)	X	X7R (±15%)
RH	N220(-220±60)	LR	Y5R (±15%)
SH	N330(-330±60)	E	Z5U/Y5U (+22~-56%)
TH	N470(-470±60)	F	Z5V/Y5V (+22~-82%)
UJ	N750(-750±60)	LB	BN (±10%)
DL	N3300(-3300±500)	D	Y5T (+22~-33%)
EM	N4700(-4700±1000)		
SL	SL(+140~-1000)		

介质种类前面的数字表示类别，如 2B 表示Ⅱ类 B 特性，3B 表示Ⅲ类 B 特性。LR 和 LB 为低损耗材质，为含铅产品。Media type the number before the categories, such as 2B for class Ⅱ B properties, 3 B for class III B characteristics. LR and LB for low loss material，and which contains lead.

③容量 CAPACITANCE

CODE	CAPACITANCE
0P5	0.5PF
050	5PF
100	10PF
500	50PF
101	100PF
102	1000PF
223	22000PF

④容量误差 CAPACITANCE TOLERANCE

CODE	TOLERANCE
C	±0.25PF
D	±0.5PF
J	±5%
K	±10%
M	±20%
S	+50/-20%
Z	+80/-20%

电容量代码由三位数组成，前面两位数字表示有效数字，后一位数字表示有效数字后零的个数。Codes for capacitance shall be find expression in three numbers. The first two digits are significant, and the third digit is number of zero.

⑤额定电压额定 RATED VOLATGE

第一文字	第二文字										
	A	B	C	D	E	F	G	H	I	J	K
0	1.0	1.5	1.6	2.0	2.5	3.0	4.0	5.0	6.0	6.3	8.0
1	10	15	16	20	25	30	40	50	60	63	80
2	100	150	160	200	250	300	400	500	600	630	800
3	1 000	1 500	1 600	2 000	2 500	3 000	4 000	5 000	6 000	6 300	8 000
4	10 000	15 000	16 000	20 000	25 000	30 000	40 000	50 000	60 000	63 000	80 000

注：单位为 V Note: unit v
例如：2A 表示 100V For example: 2A 100V

⑥脚距 LENGTH PITCH

CODE	脚距 LENGTH PITCH
F2	2.5±0.5mm
F3	3.3±0.5mm
F5	5.0±0.8mm
F7	7.5±0.8mm
F0	10.0±0.8mm

⑦包装方式/脚长 PACKING STYLE OR LENGTH

编带 TAPE(ex)	
CODE	包装方式 **packing style**
T16	K 脚编带 L16 盒装 K PIN taping L16 boxed
T20	直脚编带 L20 盒装 Straight PIN taping L20 boxed
散装 Bulk(ex)	
CODE	脚长 LENGTH
030	3.0mm
035	3.5mm
250	25mm

⑧引线型式 LEAD STYLE

CODE	型别 style
A	直脚型 straight
B	内 K 型 inside kink
C	外 K 型 outside kink
D	前后侧弯型 front and back curve
E	平膊 flat shoulder

⑨芯片尺寸 DIELECTRIC DIAMTER

CODE	尺寸 diameter
048	4.8mm
115	11.5mm

⑩包封 COATING

CODE	材料 MATERIAL
B	蓝色环氧树脂包封 BLUE EPOXY RESIN
P	酚醛树脂包封 PHENOLIC RESIN

6. 电容量、电压与尺寸表 Capacitance and dimension

CT1 和 CT81 类电容器的电容量、电压与外形尺寸的关系见下表：

Capacitance value & rated voltage, product diameter

产品型号及尺寸代码	额定直流电压	标称电容量 电容量温度系数组别					尺寸（mm）			
		2B/2X	LR	BN	2E	2F	Dmax	Tmax	F	d ±0.05
CT1-05	50V	101～152	/	/	222～502	102～103	5.5	4.0	5.0	0.50
CT1-06		182～332	/	/	822～103	103	6.5	4.0	5.0	
CT1-08		392～562	/	/		103～153	8.0	4.0	5.0	
CT1-10		682	/	/		153～223	10.0	4.0	5.0	
CT1-12		822～103	/	/			12.5	4.0	5.0	
CT1-05	500V	101～561	/	/	102～222	102～332	5.5	4.0	5.0	0.50 0.55
CT1-06		681～122	/	/	272～392	392～562	6.5	4.0	5.0	
CT1-08		152～272	/	/	472～682	682	8.0	4.0	5.0	
CT1-10		332～392	/	/	103～123	822～103	10.0	4.0	5.0	
CT1-12		472～682	/	/		123～223	12.5	4.0	5.0	
CT1-14		822～103	/	/		333	14.0	4.0	5.0	
CT81-06	1KV	101～681	101～471	101～102	821～222	102～272	6.5	4.0	5.0	0.50
CT81-08		821～152	561～102	102～182	272～392	332～682	8.0	4.0		
CT81-10		182～222	122～182	222～332	472～682	103	10.0	4.0		
CT81-12		272～472	22～2272	392～472	822～103	103	12.5	4.0	7.5 10.0	0.55
CT81-14		562	332～392	562		223	14.0	4.0		
CT81-16		682	472	682			16.0	4.0		
CT81-18		103		103		333473	18.0	4.0		
CT81-06	2KV	101～471	151～331	101～561	102～122	102～222	6.5	5.0	5.0	0.50
CT81-08		561～102	391～561	681～102	152～222	272～332	8.0	5.0		
CT81-10		122～181	681～102	122～152	272～392	392～562	10.0	5.0		

CT81-12		222～272	122～152	182～272	472～682	682～103	12.5	5.0	7.5 10.0	0.55
CT81-14		332～392	222	332	103	103	14.0	5.0		
CT81-16		472	272～332	392～472		153	16.0	5.0		
CT81-18		562～682	392	562～682		223	18.0	5.0		
CT81-06	3KV	101～331		101～331	102	102～152	6.5	6.0	7.5 10.0	0.55
CT81-08		391～561	151～331	391～471	122～152	182～222	8.0	6.0		
CT81-10		681～102	391～681	681～122	182～272	272～392	10.0	6.0		
CT81-12		122～182	821～102	152～182	332～472	472～682	12.5	6.0		
CT81-14		222		222～272	562～682	103	14.0	6.0		
CT81-06	6KV	101～271	/	101～221	471～561	102	6.5	7.0	7.5 10.0	0.55
CT81-08		331～391	/	331～391	681～102	152～182	8.0	7.0		
CT81-10		471～680	/	471～681	122～182	222～272	10.0	7.0		
CT81-12		821～122	/	102	222～332	332～472	12.5	7.0		
CT81-14		152～182	/		392	562～682	14.0	7.0		

7. 电容器结构图 The constituent parts of capacitor

Design1

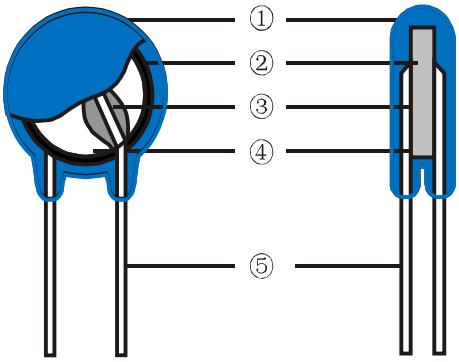


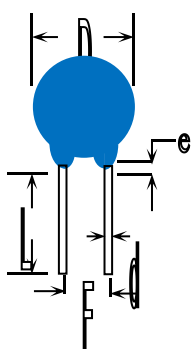
Table 3

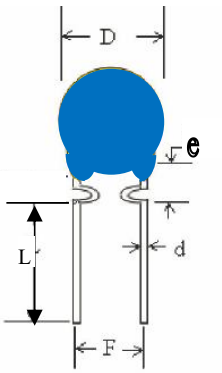
NO.	部位名称 constituent	材料 material
①	包封层 Coating	环氧树脂 Epoxy resin 酚醛树脂 phenolic resin
②	陶瓷介质 Ceramic medium	陶瓷 Ceramic
③	焊接点 Solder	焊锡 Soldering tin
④	电极 Electrode	银浆 Silver oxide
⑤	引脚 Lead Frame	CP 线 CP wire

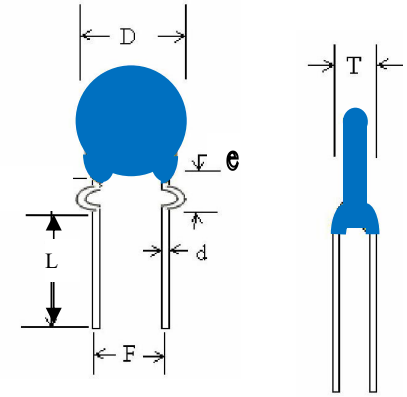
8. 外型图及尺寸代码 Figure and code of dimension

Design2

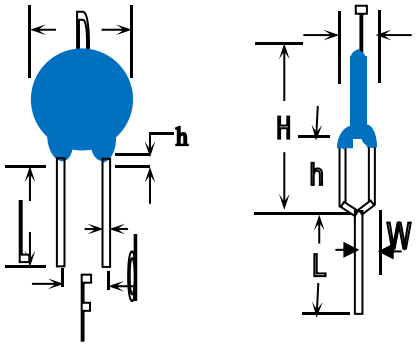
TYPE A： 直脚 Straight **TYPE B：** 内 K 脚 Inside Kink **TYPE C：** 外 K 脚 Outside Kink



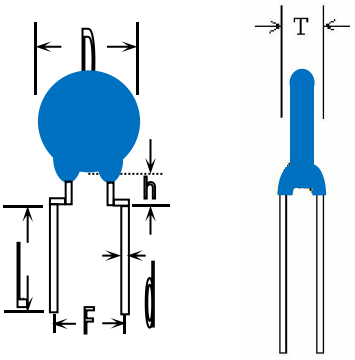




TYPE D： 前后弯 Front and back curve



TYPE E： 平膊 flat shoulder



9. 环境管理物质含量控制要求 Requirements for concentration limits for certain hazardous substances

RoHS2.0 2011/65/EU　　卤素 halogen　　REACH No1907/2006

Table 4

物质名称 Substances	限制含量 concentration (unit: ppm)
镉及镉化合物 Cadmium and cadmium compounds	<100
铅及铅化合物 Lead and lead compounds	<1000
汞及汞化合物 Mercury and mercury compounds	<1000
六价铬及六价铬化合物 Hexavalent chromium compounds	<1000
多溴联苯 PBBS Polubrominated biphenyls	<1000
多溴联苯醚 PBDES Polubrominated diphenylethers	<1000
镉+铅+汞+六价铬（包装材料） Cd+Pb+ Hg + Cr^{+6}(packing materials)	<100
氯 Cl	<900
溴 Br	<900
氯+溴 Cl+Br	<1500
REACH 高关注物质 SVHC	<1000

10. 性能与试验 Performance and test

CLASS Ⅱ

<table>
<tr><th>N0.</th><th>试验项目
Test item</th><th colspan="2">性能要求
performance requirements</th><th>试验条件
Conditions of test</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">适用温度范围
Operating temperature rang</td><td>B、E、F、R</td><td>-25～+85℃，包括电容器自身发热
Includes capacitors heating</td><td rowspan="2">可在此温度范围内连续使用
This continuous use temperature range</td></tr>
<tr><td>X</td><td>-55～+125℃，包括电容器自身发热
Includes capacitors heating</td></tr>
<tr><td>2</td><td>外观和尺寸检查
Appearance and size check</td><td colspan="2">元件表面清洁，无异物附着，标志清晰，无可见损伤，尺寸符合规定要求
Component surfaces clean, as attachment, mark clear, no visible damage, dimensional compliance requirements</td><td>目测检查产品外观
尺寸用游标卡尺检查
Visually inspect the product appearance
Dimension checked by calipers.</td></tr>
<tr><td>3</td><td>电容量
capacitance</td><td colspan="2">在允许的偏差等级范围内
Within the scope of the permitted deviation level</td><td rowspan="2">温度：25 ±3℃
Testing temperature
频率：f=1KHz±20%
Testing frequency
电压：1.0±0.1Vrms
Testing voltage</td></tr>
<tr><td>4</td><td>损耗角正切
(tanδ)</td><td colspan="2">2B、2E、2X：tgδ≤0.025
LR、LB: tgδ≤0.005
2F: tgδ≤0.05</td></tr>
<tr><td>5</td><td>绝缘电阻
Insulation resistance</td><td colspan="2">IR≥10GΩ</td><td>
<table>
<tr><th>额定电压
Rated voltage</th><th>测试电压
applied voltage</th><th>时间
time</th><th>电流
current</th></tr>
<tr><td>50、 500V</td><td>U_R</td><td>60±5s</td><td>≤0.05A</td></tr>
<tr><td>1KV、2KV
3KV、6KV</td><td>500V</td><td>60±5s</td><td>≤0.05A</td></tr>
</table>
</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">耐电压
voltage proof</td><td>端子之间
Between lead wire</td><td rowspan="2">无击穿或飞弧
No permanent break-down or flashover during the test period</td><td>
<table>
<tr><th>额定电压
Rated voltage</th><th>测试电压
applied voltage</th><th>时间
time</th><th>电流
current</th></tr>
<tr><td>50、500V</td><td>2.5U_R</td><td>1～5s</td><td>≤0.05A</td></tr>
<tr><td>1KV</td><td>2U_R</td><td>1～5s</td><td>≤0.05A</td></tr>
<tr><td>2KV、3KV</td><td>2000VDC</td><td>60s</td><td>≤0.05A</td></tr>
<tr><td>6KV</td><td>1.5U_R</td><td>1～5s</td><td>≤0.05A</td></tr>
</table>
</td></tr>
<tr><td>端子与外壳之间
Body insulation</td><td>使用金属小球法，施加电压 DC1500V 测试 1-5s，充放电电流≤0.05A
Used by metal balls, voltage application DC1500V testing 1-5s, charge and discharge current ≤ 0.05A</td></tr>
</table>

续表：

<table>
<tr><th>N0.</th><th colspan="2">试验项目
Test item</th><th colspan="2">性能要求
performance requirements</th><th>试验条件
Conditions of test</th></tr>
<tr><td>7</td><td colspan="2">温度特性
Temperature characteristic</td><td colspan="2">2B：(-10%～+10%)
2X：(-15%～+15%)
LR：(-15%～+15%)
2E：(-56%～+22%)
2F: (-80%～+30%)
LB：(-10%～+10%)</td><td>在下列阶段温度测量容量值：基准 T3
Temperature measurements in the following phase capacity value: (for T3 in base)
<table><tr><th>步骤
step</th><th>温度
Temperature</th></tr><tr><td>T1</td><td>20±2</td></tr><tr><td>T2</td><td>-25±2</td></tr><tr><td>T3</td><td>20±2</td></tr><tr><td>T4</td><td>85/125±2</td></tr><tr><td>T5</td><td>20±2</td></tr></table></td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">引出端强度
Robustness of terminations</td><td>拉力
tensile</td><td colspan="2">引线无断裂，本体无损伤，无可见损伤
Lead wire shall not cut off.
Capacitor shall not be broken.
No visible damage.</td><td>将电容器固定，在引线引出端紧固 10N 的砝码并持续 10 秒 Fixed capacitor’s body, Lead wire fastening a weight of 5N or 10N and keep for 10s
<table><tr><th>引线直径
S(mm)</th><th>拉力
tensile</th></tr><tr><td>0.35＜S≤0.5</td><td>5N</td></tr><tr><td>0.5＜S≤0.8</td><td>10 N</td></tr></table></td></tr>
<tr><td>弯曲
bending</td><td colspan="2">无可见损伤
Lead wire shall not cut off.
Capacitor shall not be broken.
No visible damage.</td><td>在每个方向上连续进行两次弯曲，拉力 F=5N
Two times in a row in each direction bending, tension F=5N</td></tr>
<tr><td>9</td><td colspan="2">耐焊接热
Resistance to soldering heat</td><td>外观检查
Appearance check</td><td>无可见损伤，标志清晰
no visible damage</td><td rowspan="4">不预先干燥，采用焊槽法，引线插入 t=1.6mm，孔径Φ=1.0mm 电路板中,离锡面 2mm
Without prior drying, welding method, lead insert t=1.6mm, diameter ϕ =1.0mm circuit boards, Tin 2mm
<table><tr><td>焊锡温度
Solder bath temperature</td><td>260±10℃</td></tr><tr><td>焊锡时间
Solder time</td><td>5±0.5S</td></tr></table>在标况下恢复 24±2 小时测量
Measurement of recovery for 24 ± 2 hours under standard conditions</td></tr>
<tr><td>容量变化率
Capacitance change</td><td>2B、2X :±10%max
LR: ±15%max
2E、2F:±20%max
BN: ±10%max</td></tr>
<tr><td>绝缘电阻
Insulation resistance</td><td>IR≥4000MΩ</td></tr>
<tr><td>耐电压
voltage proof</td><td>无击穿或飞弧
No permanent break-down or flashover during the test period</td></tr>
<tr><td>10</td><td colspan="2">可焊性
solderability</td><td colspan="2">包锡良好，在 3 秒内流合。
Good tinning as evidenced by free flowing of the solder with wetting of the terminations or solder shall flow within 3s.</td><td>不预先干燥，采用焊槽法，引线插入 t=1.6mm,孔径Φ=1.0mm 电路板中,离锡面 2mm
Without prior drying, welding method, lead insert t=1.6mm, diameter ϕ =1.0mm circuit boards, Tin 2mm
<table><tr><td>焊锡温度
Solder bath temperature</td><td>260±10℃</td></tr><tr><td>焊锡时间
Solder bath temperature</td><td>2±0.5S</td></tr></table></td></tr>
</table>

11	温度快速变化（温度循环） Rapid change of temperature (temperature cycling)	外观检查： 无可见损伤，标志清晰 Appearance check No visible damage. mark clear.	以下步骤为 1 个循环，循环 5 次 Following step 1 loop, loop 5 times 步骤 step / 温度 Temperature / 时间 time 1 / -25±2℃ / 30minutes 2 / 20±2℃ / 3minutes 3 / 85±2℃ 2X:125±2℃ / 30minutes 4 / 20±2℃ / 3minutes
12	振动 vibration	最后检查、测量和要求： 无可见损伤，标志清晰 容量：-20%≤ΔC/C≤+20% Appearance check and measurement: No visible damage. mark clear. Capacitance：-20%≤ΔC/C≤+20%	频率 frequency： 10-55-10Hz 1minute 振幅 amplitude of vibration： 1.5mm 方向 direction: 上下、左右、前后 high and low, left and right, front and back side 时间 time： 2hours 状态 condition： 正弦波振动 sinusoidal wave
13	冲击 shock	最后检查、测量和要求： 外观：标志清晰，本体无可见损伤 容量：-20%≤ΔC/C≤+20% Appearance check and measurement: No visible damage. mark clear. Capacitance：-20%≤ΔC/C≤+20%	条件 condition： 加速度 accelerated speed：490m/s2 脉冲持续时间 pulse duration：11ms 方向 direction：X Y Z 次数 number of times：3times

续表：

N0.	试验项目 Test item	性能要求 performance requirements		试验条件 Conditions of test
14	稳态湿热 Damp heat steady state	外观检查 Appearance check	无可见损伤，标志清晰 No visible damage. mark clear.	温度 temperature：40±2℃ 相对湿度 Relative humidity：93±3% 时间 time：500（+24/-0）Hours 标况下恢复 24±2 小时后测量 Measurement of recovery for 24 ± 2 hours under standard conditions
		容量变化率 capacitance change	2B、2X：±10%max LR、LB：±15max 2E：±20max 2F：±30max	
		损耗角正切 Dissipation factor	2B、2X：0.050max 2E、2F：0.070max LR、LB：0.070max	
		绝缘电阻 Insulation resistance	2000MΩmin	

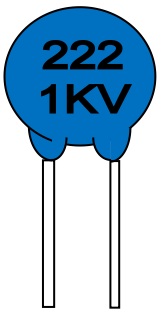
15	稳态湿热(负荷) Damp heat steady state (charge)	外观检查 Appearance check	无可见损伤，标志清晰 No visible damage. mark clear.	温度 temperature: 40±2℃ 相对湿度 Relative humidity: 93±3% 电压 voltage: 额定电压 Rated voltage 时间 time: 500（+24/-0）小时 标况下恢复 24±2 小时后测量 Measurement of recovery for 24 ± 2 hours under standard conditions
		容量变化率 capacitance change	2B、2X：±10%max LR、LB：±15max 2E：±20ax 2F：±30max	
		损耗角正切 Dissipation factor	2B、2X：0.050max LR、2E、2F：0.070max BN：0.070max	
		绝缘电阻 Insulation resistance	5000MΩmin	
16	耐久性 Endurance	外观检查 Appearance check	无可见损伤，标志清晰 No visible damage. mark clear.	温度 temperature: 125±2 ℃ (2X)85±2 ℃ (2B 2R 2E 2F BN) 电压 voltage: 1.5 倍额定电压 时间 time: 1000（+48/-0）小时 标况下恢复 24±2 小时内测量 Measurement of recovery for 24 ± 2 hours under standard conditions
		容量变化率 capacitance change	2B、2X、LR、2E：±20%max 2F: ±30%max LB：±20%max	
		损耗角正切 Dissipation factor	2B、2X：0.050max LR、2E、2F：0.070max LB：0.070max	
		绝缘电阻 Insulation resistance	5000MΩmin	

注：上述测试均在标况下进行，“标况”解释如下 Note: the above tests are conducted under standard conditions, the "standard conditions" are explained in the following 当测试结果有争议是，仲裁标况为 When the test results are at issue, the arbitration：

温度 temperature	相对湿度 temperature	气压 air pressure
15～35℃	45～85℃	86～106kPa

温度 temperature	相对湿度 temperature	气压 air pressure
25±1℃	48～52%	86～106kPa

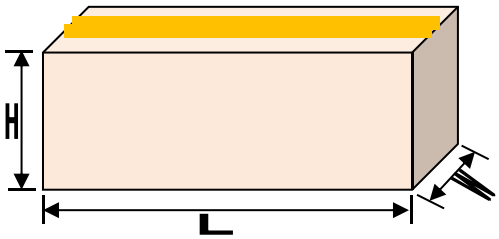
11. 印字 Marking



包装 Packing

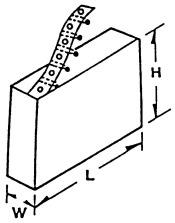
A: 散装 bulk (1000PCS/bag)

L*H *W=35*14*14cm

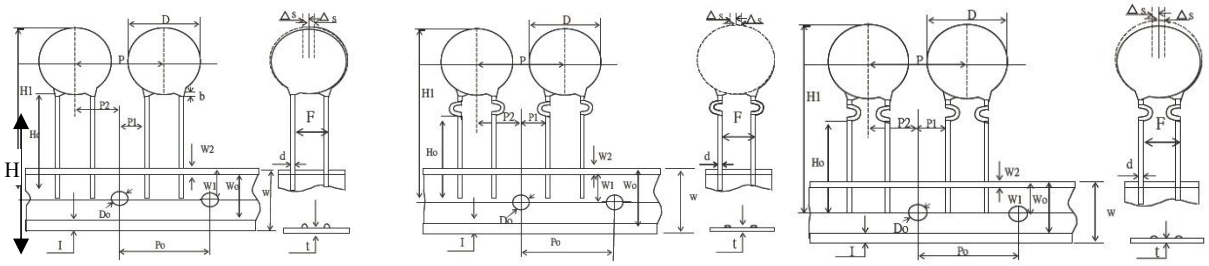


B: 编带 TAPE (2000PCS/BOX)

L*H*W=33.5*25*4.2cm



编带脚距 Capacitors on tape type pitch 2.5/5.0/7.5/10mm



参数 Parameter	符号 Symbol	尺寸规格 Taping Specifications(unit: mm)				
		Pitch2.5	Pitch5.0	Pitch 7.5	Pitch 10	Tolerance
线径 lead diameter	Φd	0.45	0.45	0.55	0.55	±0.1
电容间距 pitch between capacitors	p	12.7	12.7	12.7	25.4	±1.0
孔间距 feed-hole pitch	P_0	12.7	12.7	12.7	12.7	±0.3
孔中心到脚中心距离 feed-hole centre to lead centre	P_1	5.1	3.85	2.6	7.7	±0.7
脚距 lead spacing	F	2.5	5.0	7.5	10.0	±1.0
本体偏斜误差 component alignment	ΔS	0	0	0	0	±3.0
纸带宽度 tape width	w	18.0	18.0	18.0	18.0	±0.5
热熔胶带宽度 hold-down tape width	W_0	8-12	8-12	8-12	8-12	-
孔中心到纸带边宽度 hole position	W_1	9.0	9.0	9.0	9.0	±0.5
留边宽度 hold-down tape position	W_2	0-3.0	0-3.0	0-3.0	0-3.0	-
编带脚长 seated height to tape center	H_0	-	16.0	16.0	16.0	±1.0
	H	20	20	20	20	±1.0
电容到孔中心总体高度 maximum component height	H_1	37.0	37.0	37.0	37.0	MAX
孔径 feed-hole diameter	D_0	4.0	4.0	4.0	4.0	±0.3
编带纸带总厚度 total tape thickness	t	0.65	0.65	0.65	0.65	±0.2

12. 贮存 Storage

防潮，防尘，防压，防跌倒，防酸碱物质，避免阳光直射和结露。The capacitors are must not storage in a corrosive atmosphere, where supplied or chloride gas,acid,alkali or salt are present. Exposure of the components to moisture, should be avoided.

电容器可在额定的气侯类别温度范围内短期(3 个月)贮存。Capacitors can be stored for short periods at any temperature within the entire range of category temperature.

电容器长时间贮存时需要满足下列条件： For long storage periods, however, the

following conditions should be observed:

■贮存温度：Storage temperature:-25 to +40℃

■贮存湿度：不超过 80%，并无结露现象

Maximum relative humidity 85%,no dew allowed on the capacitor.

■贮存期限：最大 12 个月 Maximum duration 12months.

13. 敬告和警告 Cautions and warnings

1. 用户进行的重复耐电压试验可能损坏电容器，故试验后的电容器不可以当合格品再使用。Attention is drawn to the fact that repetition of the voltage proof test by the user may damage the capacitor.

2. 电容器在 PCB 板上安装时要求 PCB 板孔径需与电容器脚距相吻合,相反可能会导致电容器与 PCB 板焊接不良,电容器引脚断裂或本体破坏而损坏电容器。Do not place the capacitor a PC board whose hole space differs from the specified lead space.

3. 避免任何挤压，弯折，外部撞击。Avoid any compressive, tensile or flexural stress.

4. 在电容器上进行树脂成型时，应事先咨询我司相关技术人员。Please consult us first if you wish to embed the capacitor in plastic resins.

5. 焊接于 PCB 板的电容器不可用力移动或将本体用力倾斜。Do not move the capacitor after it has been soldered to the board.

6. 不可于焊接于 PCB 板后的电容将板提取，可能破坏电容焊接和包封层破损。Do not pick up the PC board by the soldered capacitor.

14.陶瓷电容器知识 general knowledge for ceramic Capacitors

1 容量和损耗测试 for capacitance and Dissipation factor(tanδ) :

1.1 用测试夹具紧密接触或夹住电容两脚进行测试读数，不可用手拿着电容本体进行测试。因手温传给电容本体后会影响电容的容量和损耗，造成测试结果有出入而引起误判。The capacitor is tested after be clamped with the test tool, can't take the capacitor' s noumenon for test with hand. Capacitance and dissipation factor are not exact because of temperature in hand and test result is not right.

1.2 耐压测试后的产品在进行容量和损耗测试前必须是电容已经放置 24 小时以上，并且在测试时需将电容两引脚进行短路放电，避免残余电量损坏测试仪表。The capacitor's capacitance and Dissipation factor after voltage tested may not test before the capacitor is stored for 24 hours after voltage test.the capacitor must be discharge between leads before test, or else voltage of remainder attaint test apparatus.

2 耐压测试 for Voltage proof:

先调节好测试用耐压仪的测试电压性质，数值，最大电流和测试时间，再用测试仪两电源输出端夹子夹住电容的两支引脚，且两夹具的内间距不能小于电容脚距（若两夹具的内间距小于电容脚距时，在充电测试中会因爬电距离过小产生飞弧，瞬间在电容内部产生大电流而破坏电容结构。Charge to capacitor after AC or DC Voltage, value, time and current are seted in test apparatus, clamping capacitor's lead with clamp for test apparatus

output. Space between clamps for test apparatus output must meet standard，or else flashover will be happened between two leads if space is too small. Capacitor's configuration was be destroyed if great current will be happened in capacitor for moment.

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