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■ 片式排容 Multi-layer Ceramic Capacitor Array

◆ 特征

Feature

* 叠层独石结构, 具有高可靠性能

There is high reliability on monolithic structure of laminated layers.

- * 具有优良的焊接与耐焊性能,适用于回流焊接与波峰焊接
 And its character of excellent soldering ability and
 soldering resistance ability is suitable for reflow soldering and peak soldering.
- * 具有较高的容量且容量性能稳定
 It includes high and stable capacitance.
- * 节约空间:可以节省高达 50%的 PCB 空间位置, 提高装配密度 Space saving: CA can save 50% space of the PC board and improve the assembling density.
- * 更高的体积比容: 安装一块 CA 等于安装 4 块 0603 片容,减少安装次数,提高安装效率 Provide more capacitance per volumetric area: Efficiently use the side margins and thickness. Promoting mounting efficiency. One chip of CA equals to four chips of 0603 type capacitor. So it can reduce times of picking and placing.
- * 降低成本:减少放置的次数;缩短生产时间;减少设备管理费用;减少 PCB 费用
 Cost saving: Reduce times for picking and placing, reduce manufacturing time, reduce the cost for manage the equipments and reduce the cost of PCB.
- * 安装简易:可进行 SMT 编带包装,由贴片机高速贴片 Easy to picking and placing: SMT package, easy to mounting.
- * 提高线路板工作效率:可以减少印刷的线路。提高线路板的运转速度,提高工作效率
 Improve the working efficiency of the printed board: Reduce the amount of printed circuits and promote the working speed of the printed circuit.
- * 执行标准: GB/T 21041-2007 GB/T 21042-2007 Executive Standard: GB/T 21041-2007 GB/T 21042-2007

◆ 应用范围

Application

- * 适用于对元器件空间要求严格的 PCB,如手提电脑、PDA、无绳电话
 Applied in PCB which require strictly about space speed, such as notebook computer, PDA and portable telephone, etc.
- * 特别适用于输入、输出接口电路 CA is best suitable to use in I/O interface circuit.





◆型号表示法

How To Order 6124





Κ







介质种类 Dielectric Code					
介质种类 Dielectric Code	介质材料 Dielectric				
CG	C0G				
В	X7R				

В

Nominal Capacitance 表示方式 实际值 Express Actual Method Value 0R5 0.5 1R0 1.0 10×10^2 102

注: 头两位数字为有效数 字, 第三位数字为0的个 数; R 为小数点。

Note: the first two digits are significant; third digit denotes number of zeros; R=decimal point.

额定电压						
Rated Voltage						
单位(unit): Ŭ						
表示方式	实际值					
Express	Actual Value					
Method						
6R3	6.3					
500	50×10°					
201	20×10 ¹					
注:头两位	数字为有效数					

字, 第三位数字为0的个 数; R 为小数点。

Note: the first two digits are significant; third digit denotes number of zeros; R=decimal point.

1	包装方式 Package Styles							
表示方式	包装方式							
Express	Package							
Method	Styles							
	编带7寸							
	盘包装							
T	Braided 7							
	inch disc							
	packing							
	编带13寸							
	盘包装							
D	Braided							
	13 inch							
	disc							
	packing							

产品尺寸及类型 Product Size And Type								
尺寸 代码 Size Code	长 (英寸) L(inch)	宽 (英寸) W(inch)	内置单元 Elements Inside					
6124	0.06	0.12	4					

端头材料 Terminal Material Styles					
端头类别 Termination Styles	表示方式 Express Method				
三层电镀端头 Nickel Barrier Termination	N				

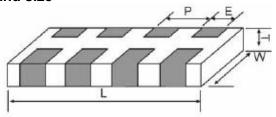
代 码 Code	А	В	С	D	F	G	J	К	М
误差 Toleran ce	±0.05pF	±0.10pF	±0.25pF	±0.50pF	±1%	±2%	±5%	±10%	±20%

备注: A、B、C、D 级误差适用于容量≤10pF 的产品。

Note: These Capacitance tolerance A, B, C, D are just applicable the capacitance that equals to or less than 10pF.

◆外形及尺寸

Product shape and size



#II P T		尺寸代码				
型号 Type	L	W	Т	P	Е	Size code
6124	1.60±0.20	3.20±0.20	0.80±0.10	0.80±0.20	0.40±0.10	ZA



◆ 温度系数/特性

Temperature Coefficient /Characteristics

介质种类 Dielectric	参考温度点 Reference Temperature Point				
COG	25°C	0±30 ppm/℃	-55℃~125℃		
X7R	25°C	±15%	-55℃~125℃		

◆ 容量范围及其电压

Capacitance Range and Operating Voltage

尺寸 Dimension	6124										
材料 Dielectric		С	0G			X7	7R				
额定电压 Rated Voltage	16V	25V	50V	100V	16V	25V	50V	100V			
电容量 Capacitance											
0.5PF	ZA	ZA	ZA								
5 PF	ZA	ZA	ZA								
10 PF	ZA	ZA	ZA								
15 PF	ZA	ZA	ZA								
20 PF	ZA	ZA	ZA								
22 PF	ZA	ZA	ZA								
33 PF	ZA	ZA	ZA								
47 PF	ZA	ZA	ZA								
100 PF	ZA	ZA	ZA	ZA	ZA	ZA	ZA				
150 PF	ZA	ZA	ZA		ZA	ZA	ZA				
220 PF	ZA	ZA	ZA		ZA	ZA	ZA				
330 PF	ZA	ZA	ZA		ZA	ZA	ZA				
470 PF	ZA	ZA	ZA		ZA	ZA	ZA				
1000 PF	ZA	ZA	ZA		ZA	ZA	ZA				
2.2 nF					ZA	ZA	ZA				
3.3nF					ZA	ZA	ZA				
4.7nF					ZA	ZA	ZA				
6.8nF					ZA	ZA	ZA				
10 nF					ZA	ZA	ZA	ZA			
22 nF					ZA	ZA	ZA				
33 nF					ZA	ZA	ZA				
47 nF					ZA	ZA	ZA				
68 nF					ZA	ZA	ZA				
100 nF					ZA	ZA	ZA				
220 nF											



◆ 可靠性测试方法

Reliability Test Methods

二类介质规格测容量前需去老化处理:测试温度: 25°C±3°C,测试湿度: <70%RH. 电容器 150°C热处理 1h±10min,放置 24±2h 后测量。

The second type of medium specification needs to be aged before measuring the capacity: test temperature: $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$, test humidity: < 70%RH. The capacitors were heat treated at 150 °C for 1 hour ± 10 minutes and measured after 24 ± 2 hours of placement.

项目 Item		Т	技术规构 echnical Spec				测试方法 Test Method and R	Remarks	
容量	I 类 Class I	应符合	↑指定的误差级 d be within the	及别	标称容量 Capacita nce ≤1000pF >1000	测试频率 Measuring Frequency 1MHz±10%	测试电压 Measuring Voltage 1.0±0.2Vrms		
Capacitance	川类 Class II		↑指定的误差纫 d be within th		erance.	测试电压: Test Tempe Test Frequ	25°C±3°C 1KHz±10% 1.0±0.2Vrms erature: 25°C±3°C ency: 1KHz±10% e: 1.0±0.2Vrms		
	I 类 Class I		nF, Ri≥50000) nF, Ri•C _R ≥50			测试电压:额定电压 测试时间:60±5 秒 测试湿度:≤75% 测试温度: 25℃±3℃ 测试充放电电流:≤50mA Measuring Voltage: Rated Voltage Duration: 60±5s Test Humidity: ≤75% Test Temperature: 25℃±3℃ Test Current: ≤50mA			
绝缘电阻(IR) Insulation Resistance	II 类 Class II		nF, Ri≥10000 5 nF, Ri•C _R ≥10						
	类			DF		标称容量 Capacita nce	测试频率 Measuring Frequency	测试电压 Measuring Voltage	
损耗角正切	Class I	≤1/ (400+20C) ≤0.1%				C<30 pF C≥30pF	1MHz±10%	1.0±0.2Vrms	
(DF, tano) Dissipation Factor	川类 Class II	X7R	≥50V ≤250×10 ⁻⁴	25V ≤350×10 ⁻⁴	16V ≤500×10 ⁻⁴				
介质耐电强度 (DWV) Dielectric Withstanding Voltage	不应有介质 No breakdo				时间: 1~5 Measuring \	Voltage: 0% Rated Vo	电电流:不应超过!	50% Rated	
端头结合强度 Termination Adhesion	外观无可见损伤 No visible damage.				如图所示:慢慢施加一个 5N 的力(T) 到电容侧面瓷体上,并保持 60+1 秒。 As shown in the picture, Slowly apply a T force to the porcelain body on the side of the capacitor and hold for 60+1 seconds.				
可焊性 Solderability	solder.	见损伤. % of the	e terminal ele : No visible da		Preheating 无铅焊料: 浸锡温度: 浸锡时间: Lead-frees	2±0.5s soldering perature: 245±5°C	20℃; 10~30s.		



项目 Item		技术规 Technical Spe			测试方法 Test Method and Remarks			
耐焊接热 Resistance to Soldering Heat	Appearar	类 Class	Cla ,取较 5PF, ± 5% nage.At least 98	II类 ass II =15% 5% of the	Recovery condition. Room temperature			
抗弯曲强度 Resistance to Flexure of Substrate (Bending Strength)	外观:无 Appearar ΔC/C: I类: ≤ II类: ≤	可见损伤. nce: No visible damago ±5%或±0.5pF,取两5 ≤±10% ≤±5% or ±0.5pF,which	e. 者中最大者		施压速度 应在弯曲 Test Boa Speed: The mea	反: PCB 弯曲深度: 1mm 是: 1mm/sec. 由状态下进行测量。 20 45±2 45±2 45±2 ard:PCB Warp: 1mm 1mm/sec. asurement should be made with the position.	弯曲深度 se board in the	
温度循环 Temperature Cycle	项目 Item ΔC/C 无可见损 No visible	□类 Class □ <=±1%或±1PF,取 较大值 <±1% or ±1pF, whichever is larger 伤 e damage.	类 Class -15% ~+15%	外 观	循环次数 Cycling 阶段 Step 1 2 3	Initial Measurement 按: 5次,一个循环分以下 4 步: Times: 5 times, 1 cycle, 4 steps: 温度(Temperature)(℃) 下限温度(Low- category temp.): COG/X7R:-55 常温(Normal temp.):+20 上限温度(Up- category temp.): COG/X7R:+125 常温(Normal temp.):+20 数置(恢复)时间: 24±2h ry time after test:24±2h	时间 (Time) 30min 2~3min 30min 2~3min	
耐湿负荷 Humidity load	I 类: ±7.5%或±0.75pF,取两者之中较大者 II 类: X7R: ≤±12.5% Class I: ±7.5% or ±0.75pF, whichever is larger. Class II: ≤±12.5% DF ≤2 倍初始标准 Not more than twice of initial value. Class I Ri≥5000MΩ或 Ri•C _R ≥50S 取两者之中较小者。Ri≥5000MΩ或 Ri•C _R ≥50S whichever is smaller. IR Class I Ri≥1000MΩ或 Ri•C _R ≥10S 取两者之中较小者。Ri≥1000MΩ或 Ri•C _R ≥10S 取两者之中较小者。Ri≥1000MΩ或 Ri•C _R ≥10S whichever is smaller. 外观: 无损伤 Appearance: No visible damage.					0±2℃ 湿度:90~95%RH 质定电压 时间:500 小时 放置缩 引:24±2h 小时 ature: 40±2℃ Humidity: 90~95% · Rated Voltage Duration: 500h ry conditions: Room temperature ry Time::24h±2h		

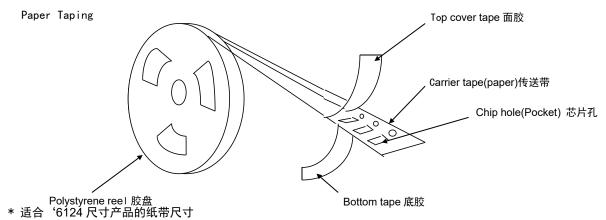


项目	技术规格			测试方法		
Item	Technical Specification			Test Method and Remarks		
寿命试验 Life Test	ΔC /C DF	I 类 Class I II 类 Class	≤±3%或±0.3pF, 取两者之中较大者≤±3%或±0.3pF, whichever is larger.-20% ~ +20%	Test Method and Remarks 电压: 2 倍额定工作电压 时间: 1000 小时 温度: 125℃(COG、X7R) 充电电流: 不应超过 50mA 放置条件: 室温 放置时间: 24±2h 小时; Applied Voltage: 2*Ur,except the table 1 Duration: 1000h. Temperature: 125℃(COG、X7R) Charge/ Discharge Current: 50mA max. Recovery Conditions: Room Temperature Recovery Time: :24h±2h		
	外观:无损伤 Appearance: No visible damage.					

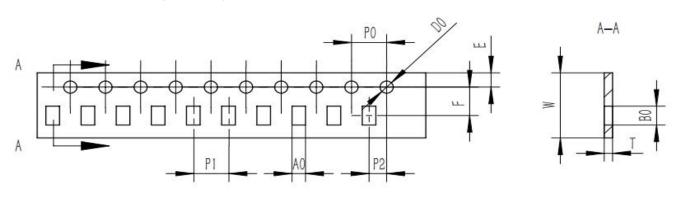
◆ 包装

Package

* 纸带卷盘结构



Dimensions of paper taping for 6124 types



代号Code 纸带规格 paper size	A0	В0	W	F	E	P1	P2	P0	D0	Т
6124	1.80	3.40	8.00	3.50	1.75	4.00	2.00	4.00	1.55	1.10
	± 0.20	± 0.20	± 0.20	± 0.05	± 0.10	± 0.10	± 0.10	± 0.10	-0/+0.05	Max

注意: *表示此处对尺寸的要求非常精确。

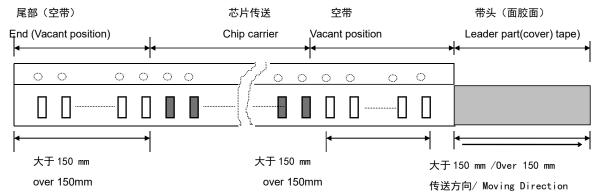
Note: The place with "*" means where needs exactly dimensions.



Unit: mm

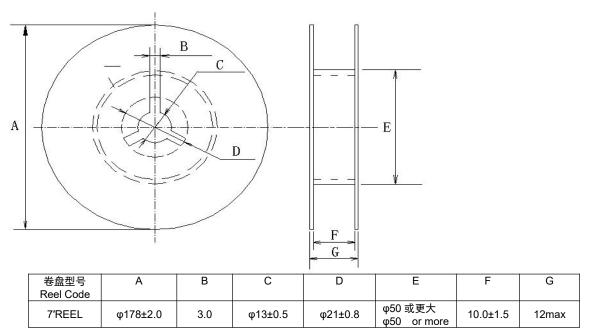
* 传送带的前后结构

Structure of leader part and end part of the carrier paper



* 卷盘尺寸

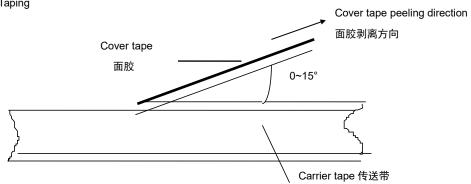
Reel dimensions (unit: mm)



* 关于卷带的说明: 面胶剥离强度

Taping specification: top tape peeling strength

* 纸带 Paper Taping





标准: 0.1N<剥离强度<0.7N

Standard: 0.1N < peeling strength < 0.7N

在剥离时,纸带不能有纸碎,也不能粘在底、面胶上。

No paper dirty remains on the scotch when peeling, and sticks to top and bottom tape.

* 包装数量

Packing Quantity

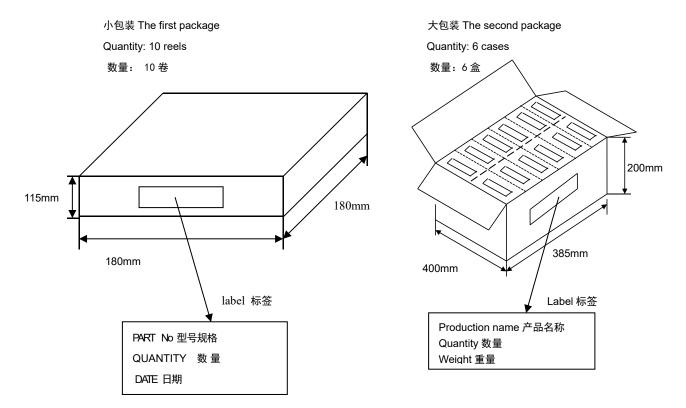
尺寸代码 SizeCode	厚度 Thickness	纸带卷盘(PT)	胶带卷盘(ET)
6124	0.80±0.10	4000	

注意:包装的形式和数量可根据客户的要求来定。

Note: We can choose packing style and quantity can be according to the customer's requirement.

* 外包装

Outer packing



◆储存注意事项

*MLCC 的储存条件:相对湿度为 $20^{\circ}70\%$,储存温度为 $5^{\circ}40^{\circ}$ C,建议温度低于 30° C。

- *MLCC 的性能可能会受到储存条件的影响,交货后请立即使用。高温高湿条件、长期储存可能会导致包装材料变质、产品端头电极氧化。如自交付后已超过六个月,使用前检查包装、外观等。如果交付后超过一年,在使用前要检查可焊性。
- * 不要将电容器存放在含有腐蚀性气体(例如硫化氢、二氧化硫、氯气、氨气等)的环境中。
- * 不要在阳光直射下或高湿度条件下储存电容器。

♦ Storage Precautions

- * Storage Conditions for MLCC: Relative humidity: 20~70%, storage temperature: 5~40°C, recommended temperature is below 30°C.
- * The performance of MLCCs may be affected by storage conditions. Please use immediately after delivery. High temperature and high humidity conditions, or long-term storage, may lead to packaging material deterioration and oxidation



of the product's end electrodes. If it has been over six months since delivery, check the packaging and appearance before use. If it has been over a year, check the solderability before use.

- * Do not store capacitors in environments containing corrosive gases (e.g., hydrogen sulfide, sulfur dioxide, chlorine, ammonia, etc.).
- * Do not store capacitors under direct sunlight or in high humidity conditions.

◆使用前注意事项

- *安装前的信息
- 1、不要重复使用从设备上拆下的电容器。
- 2、确认额定容量、额定电压等电气特性。
- 3、确认施加电压下的电容特性。
- 4、确认使用下的机械应力。
- 5、确认长期存放的电容器的可焊性。
- 6、在测量电容之前,对长期存放的电容器进行热处理。

◆ Precautions Before Use

Pre-installation Information

- 1. Do not reuse capacitors removed from equipment.
- 2. Confirm electrical characteristics such as rated capacitance and rated Voltage.
- 3. Confirm the capacitor characteristics under applied Voltage.
- 4. Confirm the mechanical stress under use conditions.
- 5. Confirm the solderability of capacitors stored for long periods.
- 6. Perform heat treatment on capacitors that have been stored for a long time before measuring capacitance.

◆应用限制 Application Restrictions

- 2、不推荐用于下列高可靠性应用场景,包括但不限于: 航天设备、医疗设备、航空设备、原子能设备、灾难预防设备、犯罪预防设备、电加热设备、燃烧设备、公共信息网络设备、数据处理设备、军事设备、发电控制设备、安全设备、车载设备、交通信号设备、运输设备和海底设备。
- 3、除非您事先获得风华的书面同意,否则风华不对您或第三方因将我们的产品用于第 2 点设备而产生的任何损害承担任何责任。
- 1. Our products are intended for use in general consumer electronic devices (such as household appliances, office equipment, information and communication devices, AV equipment, OA equipment, including but not limited to mobile phones and PCs), based on general applications and standard uses under normal operating and usage conditions.
- 2. Our products are not recommended for the following high-reliability application scenarios, including but not limited to: aerospace equipment, medical devices, aviation equipment, atomic energy equipment, disaster prevention equipment, crime prevention equipment, electric heating equipment, combustion equipment, public information network devices, data processing equipment, military equipment, power generation control equipment, safety equipment, vehicle-mounted devices, traffic signal equipment, transportation equipment, and underwater equipment.
- 3. Unless you have prior written consent from Fenghua, Fenghua is not liable for any damages caused to you or third parties by using our products in the devices mentioned in point 2.
- * 焊接的条件与相关图表

Soldering Condition and Profile

为避免因温度的突然变化而引起的芯片开裂或局部爆炸的现象发生,请按有关温度曲线图表来进行.(请参考附页中的图表)

To avoid the crack problem by sudden temperature change, follow the temperature profile in the adjacent graph (refer to the graph in the enclosure page).



Manual Soldering * 手工焊接

手工焊接很容易因为芯片局部受热不均而引起瓷体微裂或局部爆炸的现象, 在焊接时, 如果操作者不小心, 会使烙铁头直接同电容芯片的 瓷体部分接触, 这样很容易使电容芯片因热冲击而受损或出现其他意外. 因此, 使用电烙铁手工焊接时应仔细操作, 并对电烙铁的尖端的选择 和尖端温度控制应多加小心.

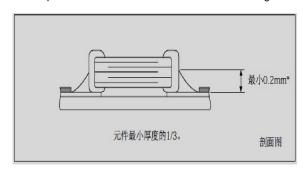
Manual soldering can pose a great risk of creating thermal cracks in capacitors. The hot soldering iron tip comes into direct contact with the end terminations, and operator's careless may cause the tip of the soldering iron to come into direct contact with the ceramic body of the capacitor. Therefore the soldering iron must be handled carefully, and pay much attention to the selection of the soldering iron tip and temperature contact of the tip.

* 推荐焊料用量

Recommended Soldering amounts

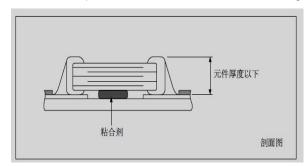
回流焊接的最佳焊料用量

The optimal solder fillet amounts for re-flow soldering



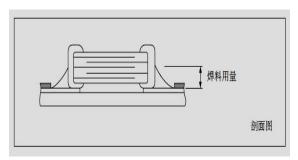
波峰焊接的最佳焊料用量

The optimal solder fillet amounts for wave soldering



使用烙铁返修时的最佳焊料量

The optimal solder fillet amounts for reworking by using soldering iron



* 推荐焊接方式

Recommended Soldering Method

规格尺寸 Size	温度特性 Temperature Characteristics	容量范围 Capacitance	焊接方式 Soldering Method
6124	COG	1	R
6124	X7R	1	R

焊接方式 Soldering method: R—回流焊 Reflow soldering

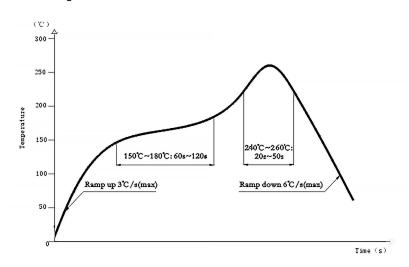
W—波峰焊 Wave Soldering



◆ 推荐焊接温度曲线图

The temperature profile for soldering

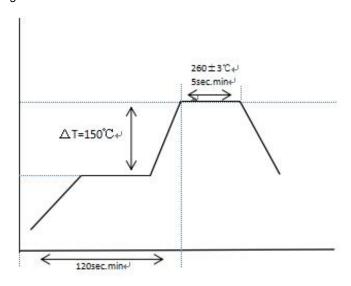
* 回流焊接(Re-flow soldering)



在预热时,请将焊接温度与芯片表面温度之间的温差维持在 T≤150°C。

While in preheating, please keep the temperature difference between soldering temperature and surface temperature of chips as: T≤150 °C.

* 波峰焊接(Wave soldering)



在预热时,请将焊接温度与芯片表面温度之间的温差维持在 T≤150°C。

While in preheating, please keep the temperature difference between soldering temperature and surface temperature of chips as: T≤150 ℃.

* 备注:产品规格书仅供设计选型参考用,不作为交货依据。

Note: The product specification is for design and selection reference only and shall not serve as a basis for delivery.



■修订履历 Revision History

版本 Version	日期 Date	修订内容 Revision Content	修订人 Reviser
A0001	2024-1-15	新版格式要求重新整理整版内容。	***
		Reorganize the entire content	
		according to the new version format	
		requirements.	
A0002	2025-1-25	新版格式要求重新整理整版内容。	***
		Reorganize the entire content	
		according to the new version format	
		requirements.	
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- 注: 1.上述所提供之内容为产品规格说明。在产品未变更时,风华保有修改此内容不另行通知之所有权利,任何产品变更将会以 P C N 通知客户。
 - 1. The content provided above is the produce specification, if the product is not changed, FENGHUA reserves all the right to modify this content without prior notice, any product change will be notified to the customer by PCN.
 - 2.产品规格书中,同规格同容量同温度特性可交付的高电压型号规格,可以完全覆盖低压;同规格同容量同电压产品,温度特性 X7R 产品 可覆盖 X7S,X7T,X6S,X5R (如 6124B/104K500NT 可以覆盖 6124BS104K500NT,6124BT104K500NT,6124DS104K50NT,6124DS104K50NT,6124DS104K50NT,6124DS104K50NT,6124DS104K50NT,6124DS104K50NT,6124DS104K50NT,6124DS104K50NT,6124DS10
 - 2. In the product specification, deliverable high-Voltage models with the same specifications, capacity, and temperature characteristics can fully cover the low-Voltage models. For products with the same specifications, capacity, and Voltage, X7R temperature characteristic products can cover X7S, X7T, X6S, and X5R (e.g., 6124B/104K500NT can cover 6124BS104K500NT,6124BT104K500NT, 6124DS104K500NT, 6124X/104K500NT). Therefore, detailed model specifications will not be listed separately in the specification.