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版本号: 1



广东风华高新科技股份有限公司
GUANGDONG FENGHUA ADVANCED TECHNOLOGY HOLDING CO., LTD.

承 认 书

APPROVAL SHEET

客户名称

CUSTOMER : _____

产品名称

低感抗片式电容器

PART NAME: _____

LOW INDUCTANCE MLCC

规格

SPECIFICATION: _____

0508~0612 TYPE

版本

VERSION: _____

日期

DATE OF ISSUE: _____

制 造 MANUFACTURER			客 户 CUSTOMER		
拟制 DESIGN	审核 CHECK	批准 APPROVAL	检验 INSPECTOR	审核 CHECK	批准 APPROVAL



低感抗片式电容器 Low Inductance MLCC

一、概述

- ※ 低感抗多层陶瓷电容器通过改变与端头结合部分的长宽比，做成低而宽的产品，提高电极的导电率和导电面积，降低 ESR 和 ESL，减少电流变化的电压下降引起的电压干扰。从而使系统达到低损耗、高效率、高速运行的目的。
- ※ 适合回流焊接。

二、用途

- ※ 适用于高速微处理器
- ※ 适用于芯片模块（MCM）中心流噪声的抑制。
- ※ 适用于高速数字设备。

一、Features

- ※ Low inductance MLCC is short and wide products by change the length over width ratio of the section that connected with the termination. This can increase the conductivity and current conducting area, reduce ESR and ESL, reduce the noise disturbance due to voltage decreasing caused by current change, then make the whole system has low dissipation factor, high efficiency and high speed.
- ※ Suitable for reflow soldering.

二、Applications

- ※ High-speed micro processor.
- ※ Reduce multi chip module center current noise
- ※ High speed digital equipment.

三、型号规格表示方法及温度特性

HOW TO ORDER & Temperature Coefficient /Characteristics

<u>0508</u>	<u>B</u>	<u>102</u>	<u>K</u>	<u>500</u>	<u>N</u>	<u>T</u>
①	②	③	④	⑤	⑥	⑦



PRODUCT SIZE AND PRODUCT TYPE

代码 Code	长(英寸) L(inch)	宽(英寸) W(inch)
0508	0.05	0.08
0612	0.06	0.12

② 介质种类 DIELECTRIC STYLE

介质种类(Dielectric Code)	CG	B	F
介质材料 (Dielectric)	COG	X7R	Y5V

③ 标称容量 NOMINAL CAPACITANCE

单位(unit): pF

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

④ 容量误差 CAPACITANCE TOLERANCE

代码(Code)	J	K	M
误差(Tolerance)	±5.0%	±10%	±20%

⑤ 额定电压 RATED VOLTAGE

单位(unit): V

表示方式 (Express Method)	实际值 (Actual Value)	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.
6R3	6.3	
500	50×10^0	
201	20×10^1	
102	10×10^2	
...	...	



⑥ 端头材料 TERMINAL MATERIAL STYLES

端头类别 (Termination Styles)	表示方式 (Express Method)
纯银端头 (Silver Solderable Termination)	S
纯铜端头 (Copper Solderable Termination)	C
三层电镀端头 (Nickel Barrier Termination)	N

⑦ 包装方式 PACKAGE STYLES

B	T
散包装 (Bulk Bag)	编带包装 (Taping Package)

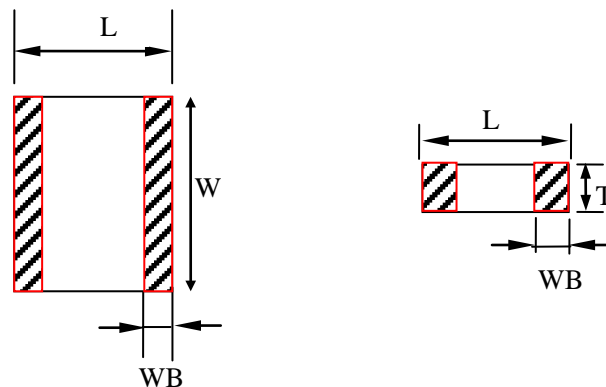
温度系数/特性 Temperature Coefficient /Characteristics

介质种类 Dielectric	参考温度点 Reference Temperature Point	标称温度系数 Temperature Coefficient	工作温度范围 Operation Temperature Range
COG	20°C	0±30 ppm/°C	-55°C ~ 125°C
X7R	20°C	±15%	-55°C ~ 125°C
Y5V	20°C	-80% ~ +30%	-25°C ~ 85°C

备注：I 类电容器标称温度系数和允许偏差是采用温度在 20°C 和 85°C 之间的电容量变化来确定的。

Note: Nominal temperature coefficient and allowed tolerance of class I are decided by the changing of the capacitance between 20°C and 85°C.

四、外形尺寸



型号规格	L	W	T	WB
0508	1.20±0.10	2.00±0.20	0.80±0.10	0.25±0.10
0612	1.60±0.10	3.20±0.20	0.80±0.15	0.25±0.10



五、电容量范围

项目	0508								
	COG			X7R			Y5V		
尺寸									
工作电压	16V	25V	50V	16V	25V	50V	16V	25V	50V
电容量									
0.5PF	Yellow	Green	Yellow						
5 PF	Yellow	Green	Yellow						
10 PF	Yellow	Green	Yellow						
20 PF	Yellow	Green	Yellow						
22 PF	Yellow	Green	Yellow						
33 PF	Yellow	Green	Yellow						
47 PF	Yellow	Green	Yellow						
100 PF	Yellow	Green	Yellow	Green	Yellow	Green			
150 PF	Yellow	Green	Yellow	Green	Yellow	Green			
220 PF	Yellow	Green	Yellow	Green	Yellow	Green			
330 PF	Yellow	Green	Yellow	Green	Yellow	Green			
470 PF	Yellow	Green	Yellow	Green	Yellow	Green			
1000 PF	Yellow	Green	Yellow	Green	Yellow	Green	Yellow	Green	Yellow
2.2nF	Yellow	Green	Yellow	Green	Yellow	Green	Yellow	Green	Yellow
3.3nF	Yellow	Green	Yellow	Green	Yellow	Green	Yellow	Green	Yellow
4.7nF				Green	Yellow	Green	Yellow	Green	Yellow
6.8nF				Green	Yellow	Green	Yellow	Green	Yellow
10 nF				Green	Yellow	Green	Yellow	Green	Yellow
22 nF				Green	Yellow	Green	Yellow	Green	Yellow
33 nF				Green	Yellow	Green	Yellow	Green	Yellow
47 nF				Green	Yellow	Green	Yellow	Green	Yellow
68 nF				Green	Yellow	Green	Yellow	Green	Yellow
100 nF				Green	Yellow	Green	Yellow	Green	Yellow
220nF							Yellow	Green	Yellow
330 nF							Yellow	Green	Yellow
470 nF							Yellow	Green	Yellow



五、电容量范围

项目	0612								
	COG			X7R			Y5V		
尺寸									
工作电压	16V	25V	50V	16V	25V	50V	16V	25V	50V
电容量									
0.5PF									
5 PF									
10 PF									
22 PF									
33 PF									
47 PF									
100 PF									
220 PF									
330 PF									
470 PF									
1000 PF									
2.2nF									
3.3nF									
4.7nF									
6.8nF									
10 nF									
22 nF									
33 nF									
47 nF									
68 nF									
100 nF									
220nF									
330 nF									
470 nF									
1uF									
2.2uF									



六、可靠性测试 Reliability Test

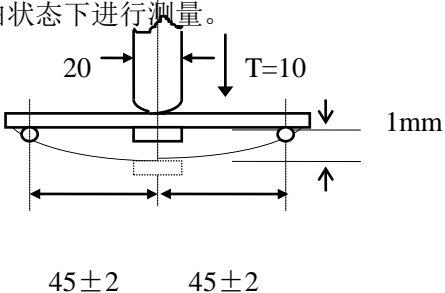
项目 Item	技术规格 Technical Specification				测试方法 Test Method and Remarks		
容量 Capacitance	I类 Class I	应符合指定的误差级别 Should be within the specified tolerance.			标称容量 Capacitance	测试频率 Measuring Frequency	测试电压 Measuring Voltage
					≤1000pF	1MHz±10%	1.0±0.2Vrms
			>1000 pF	1KHz±10%			
	II类 Class II	应符合指定的误差级别 Should be within the specified tolerance.			测试温度: 25℃±3℃ Test Temperature: 25℃±3℃ C≤10μF: 测试频率: 1KHz±10% 测试电压: 1.0±0.2Vrms Test Frequency: 1KHz±10% Test Voltage: 1.0±0.2Vrms		
损耗角正切 (DF, tan δ) Dissipation Factor	I类 Class I	DF			标称容量 Capacitance	测试频率 Measuring Frequency	测试电压 Measuring Voltage
		≤0.56%			Cr<5 pF	1MHz±10%	1.0±0.2Vrms
		1.5[(150/Cr)+7]×10 ⁻⁴			5pF≤Cr<50 pF	1MHz±10%	
		≤0.15%			50pF≤Cr≤1000 pF	1MHz±10%	
		≤0.15%			>1000 pF	1KHz±10%	
损耗角正切 (DF, tan δ) Dissipation Factor	II类 Class II	X7R	≥50V	25V	16V	C≤10μF 测试频率: 1KHz±10% 测试电压: 1.0±0.2Vrms Test Frequency: 1KHz±10% Test Voltage: 1.0±0.2Vrms	
			≤2.5%	≤3.5%	≤5.0%		
		Y5V	≥25V		16V		
			≤7.0% (C<1.0μF)	≤12.5%			
		≤9.0% (C≥1.0μF)					



六、可靠性测试 Reliability Test

项目 Item	技术规格 Technical Specification		测试方法 Test Method and Remarks	
绝缘电阻 (IR) Insulation Resistance	I类 Class I	$C \leq 10 \text{ nF}$, $R_i \geq 50000 \text{ M}\Omega$ $C > 10 \text{ nF}$, $R_i \cdot C_R \geq 500 \text{ S}$	测试电压: 额定电压 测试时间: 60 ± 5 秒 测试湿度: $\leq 75\%$ 测试温度: $25^\circ\text{C} \pm 3^\circ\text{C}$ 测试充放电电流: $\leq 50 \text{ mA}$ Measuring Voltage: Rated Voltage Duration: $60 \pm 5 \text{ s}$ Test Humidity: $\leq 75\%$ Test Temperature: $25^\circ\text{C} \pm 3^\circ\text{C}$ Test Current: $\leq 50 \text{ mA}$	
	II类 Class II	X7R		$C \leq 25 \text{ nF}$, $R_i \geq 10000 \text{ M}\Omega$ $C > 25 \text{ nF}$, $R_i \cdot C_R > 100 \text{ S}$
		Y5V		$C \leq 25 \text{ nF}$, $R_i \geq 4000 \text{ M}\Omega$ $C > 25 \text{ nF}$, $R_i \cdot C_R > 100 \text{ S}$
	介质耐电强度(DWV) Dielectric Withstanding Voltage	不应有介质被击穿或损伤 No breakdown or damage.		测量电压: I类: 300% 额定电压 II类: 250% 额定电压 时间: 1~5 秒 充/放电电流: 不应超过 50mA Measuring Voltage: Class I :300% Rated voltage Class II :250% Rated voltage Duration: 1~5s Charge/ Discharge Current: 50mA max.
可焊性 Solderability	上锡率应大于 95% 外观: 无可见损伤. At least 95% of the terminal electrode is covered by new solder. Visual Appearance: No visible damage.		将电容在 $80 \sim 120^\circ\text{C}$ 的温度下预热 10~30 秒. Preheating conditions: $80 \text{ to } 120^\circ\text{C}$; 10~30s.	
			有铅焊料: (Sn/Pb: 63/37) 无铅焊料: 浸锡温度: $235 \pm 5^\circ\text{C}$ 浸锡温度: $245 \pm 5^\circ\text{C}$ 浸锡时间: $2 \pm 0.5 \text{ s}$ 浸锡时间: $2 \pm 0.5 \text{ s}$ Solder Temperature: $235 \pm 5^\circ\text{C}$ Solder Temperature: $245 \pm 5^\circ\text{C}$ Duration: $2 \pm 0.5 \text{ s}$ Duration: $2 \pm 0.5 \text{ s}$	



项目 Item	技术规格 Technical Specification			测试方法 Test Method and Remarks	
耐焊接热 Resistance to Soldering Heat	项目 Item	NPO	X7R	Y5V	将电容在 100~200℃ 的温度下预热 10±2 分钟. 浸锡温度: 265±5℃ 浸锡时间: 10±1s 然后取出溶剂清洗干净,在 10 倍以上的显微镜底下观察 放置时间: 24±2 小时 放置条件: 室温 Preheating conditions: 100 to 200℃; 10±2min. Solder Temperature: 265±5℃ Duration: 10±1s Clean the capacitor with solvent and examine it with a 10X(min.) microscope. Recovery Time: 24±2h Recovery condition: Room temperature
	ΔCC	≤±0.5%	-5~+10%	-10~+20%	
	DF	同初始标准 Same to initial value.			
	IR	同初始标准 Same to initial value.			
	外观: 无可见损伤 上锡率: ≥95% Appearance: No visible damage. At least 95% of the terminal electrode is covered by new solder.				
抗弯曲强度 Resistance to Flexure of Substrate (Bending Strength)	外观: 无可见损伤. Appearance: No visible damage.			试验基板: Al ₂ O ₃ 或 PCB 弯曲深度: 1mm 施压速度: 0.5mm/sec. 单位: mm 应在弯曲状态下进行测量。  Test Board: Al ₂ O ₃ or PCB Warp: 1mm Speed: 0.5mm/sec. Unit: mm The measurement should be made with the board in the bending position.	
	ΔC/C	≤±10%			
端头结合强度 Termination Adhesion	外观无可见损伤 No visible damage.			施加的力: 5N 时间: 10±1S Applied Force: 5N Duration: 10±1S	



项目 Item	技术规格 Technical Specification	测试方法 Test Method and Remarks																														
温度循环 Temperature Cycle	$\Delta C/C$: I 类: $\leq \pm 1\%$ 或 $\pm 1pF$, 取两者中最大者 II 类: B: $\leq \pm 10\%$ E: $\leq \pm 20\%$ Class I: $\leq \pm 1\%$ or $\pm 1pF$, whichever is larger. Class II: B: $\leq \pm 10\%$ E: $\leq \pm 20\%$	预处理* (2 类): 上限类别温度, 1 小时 恢复: $24 \pm 1h$ 初始测量 循环次数: 5 次, 一个循环分以下 4 步: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>阶段</th> <th>温度 (°C)</th> <th>时间 (分钟)</th> </tr> </thead> <tbody> <tr> <td>第 1 步</td> <td>下限温度 ($NPO/X7R/X5R: -55$ $Y5V: -25 Z5U: +10$)</td> <td>30</td> </tr> <tr> <td>第 2 步</td> <td>常温 (+20)</td> <td>2~3</td> </tr> <tr> <td>第 3 步</td> <td>上限温度 ($NPO/X7R/X5R: +125$ $Y5V/Z5U: +85$)</td> <td>30</td> </tr> <tr> <td>第 4 步</td> <td>常温 (+20)</td> <td>2~3</td> </tr> </tbody> </table> 试验后放置 (恢复) 时间: $24 \pm 2h$ Preheating conditions: up-category temperature, 1h Recovery time: $24 \pm 1h$ Initial Measurement Cycling Times: 5 times, 1 cycle, 4 steps: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Time (min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Low- category temp. ($NPO/X7R/X5R: -55$ $Y5V: -25 Z5U: +10$)</td> <td>30</td> </tr> <tr> <td>2</td> <td>Normal temp. (+20)</td> <td>2~3</td> </tr> <tr> <td>3</td> <td>Up- category temp. ($NPO/X7R/X5R: +125$ $Y5V/Z5U: +85$)</td> <td>30</td> </tr> <tr> <td>4</td> <td>Normal temp. (+20)</td> <td>2~3</td> </tr> </tbody> </table> Recovery time after test: $24 \pm 2h$	阶段	温度 (°C)	时间 (分钟)	第 1 步	下限温度 ($NPO/X7R/X5R: -55$ $Y5V: -25 Z5U: +10$)	30	第 2 步	常温 (+20)	2~3	第 3 步	上限温度 ($NPO/X7R/X5R: +125$ $Y5V/Z5U: +85$)	30	第 4 步	常温 (+20)	2~3	Step	Temperature (°C)	Time (min)	1	Low- category temp. ($NPO/X7R/X5R: -55$ $Y5V: -25 Z5U: +10$)	30	2	Normal temp. (+20)	2~3	3	Up- category temp. ($NPO/X7R/X5R: +125$ $Y5V/Z5U: +85$)	30	4	Normal temp. (+20)	2~3
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潮湿试验 Moisture Resistance	<table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">$\Delta C/C$</td> <td>I 类: $\leq \pm 2\%$ 或 $\pm 1pF$, 取两者之中较大者 II 类: B: $\leq \pm 10\%$ E: $\leq \pm 30\%$ Class I: $\leq \pm 2\%$ or $\pm 1pF$, whichever is larger. Class II: B: $\leq \pm 10\%$ E: $\leq \pm 30\%$</td> </tr> <tr> <td>DF</td> <td>≤ 2 倍初始标准 Not more than twice of initial value.</td> </tr> <tr> <td rowspan="2">IR</td> <td>I 类: $R_i \geq 2500M \Omega$ 或 $R_i \cdot C_R \geq 25S$ 取两者之中较小者. Class I: $R_i \geq 2500M \Omega$ 或 $R_i \cdot C_R \geq 25S$ whichever is smaller.</td> </tr> <tr> <td>II 类: $R_i \geq 1000M \Omega$ 或 $R_i \cdot C_R \geq 25S$ 取两者之中较小者. Class II: $R_i \geq 1000M \Omega$ 或 $R_i \cdot C_R \geq 25S$ whichever is smaller.</td> </tr> <tr> <td colspan="2">外观: 无损伤 Appearance: No visible damage.</td> </tr> </table>	$\Delta C/C$	I 类: $\leq \pm 2\%$ 或 $\pm 1pF$, 取两者之中较大者 II 类: B: $\leq \pm 10\%$ E: $\leq \pm 30\%$ Class I: $\leq \pm 2\%$ or $\pm 1pF$, whichever is larger. Class II: B: $\leq \pm 10\%$ E: $\leq \pm 30\%$	DF	≤ 2 倍初始标准 Not more than twice of initial value.	IR	I 类: $R_i \geq 2500M \Omega$ 或 $R_i \cdot C_R \geq 25S$ 取两者之中较小者. Class I: $R_i \geq 2500M \Omega$ 或 $R_i \cdot C_R \geq 25S$ whichever is smaller.	II 类: $R_i \geq 1000M \Omega$ 或 $R_i \cdot C_R \geq 25S$ 取两者之中较小者. Class II: $R_i \geq 1000M \Omega$ 或 $R_i \cdot C_R \geq 25S$ whichever is smaller.	外观: 无损伤 Appearance: No visible damage.		温度: $40 \pm 2^\circ C$ 湿度: 90~95%RH 时间: 500 小时 放置条件: 室温 放置时间: 24 小时 (I 类); 48 小时 (II 类) Temperature: $40 \pm 2^\circ C$ Humidity: 90~95%RH Duration: 500h Recovery conditions: Room temperature Recovery Time: 24h (Class1) or 48h (Class2)																					
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项目 Item	技术规格 Technical Specification		测试方法 Test Method and Remarks
寿命试验 Life Test	$\Delta C/C$	I 类: $\leq \pm 2\%$ 或 $\pm 1pF$ 取两者之中较大者 II 类: B: $\leq \pm 20\%$ E: $\leq \pm 30\%$ Class I : $\leq \pm 2\%$ or $\pm 1pF$, whichever is larger. Class II : B: $\leq \pm 20\%$ E: $\leq \pm 30\%$	电压: 1.5 倍额定工作电压 时间: 1000 小时 充电电流: 不应超过 50mA 放置条件: 室温 放置时间: 24 小时 (I 类), 或 48 小时 (II 类), Applied Voltage: $1.5 \times$ Rated Voltage Duration: 1000h Charge/ Discharge Current: 50mA max. Recovery Conditions: Room Temperature Recovery Time: 24h (Class 1), or 48h (Class2)
	DF	≤ 2 倍初始标准 Not more than twice of initial value.	
	IR	I 类: $R_i \geq 4000M\Omega$ 或 $R_i \cdot C_R \geq 40S$ 取两者之中较小者. Class I : $R_i \geq 4000M\Omega$ 或 $R_i \cdot C_R \geq 40S$ whichever is smaller.	
		II 类: $R_i \geq 2000M\Omega$ 或 $R_i \cdot C_R \geq 50S$ 取两者之中较小者. Class II : $R_i \geq 2000M\Omega$ 或 $R_i \cdot C_R \geq 50S$ whichever is smaller.	
外观: 无损伤 Visual Appearance: No visible damage.			

注解:

专门预处理* (仅对 2 类电容器):

将电容器放在上限类别温度或按详细规范中可能规定的更高温度下经 1h 后, 接着在试验的标准大气条件下恢复 $24 \pm 1h$ 。

Note: Pretreatment (only for class2 capacitor)

Pretreatment (only for class2 capacitor) is a method to treat the capacitor before measurement. First, place the capacitor in the up-category temperature or other specified higher temperature environment for 1hour. Then recovery the capacitor at standard pressure conditions for 24 ± 1 hours。

※以最新版本的内容为准