

编号: I0001

承 认 书
APPROVAL SHEET

客户名称

CUSTOMER:

产品名称

PART NAME:

叠层片式铁氧体磁珠

Multilayer Chip Ferrite Beads

规格

SPECIFICATION:

CBG321609U471T

版本

VERSION:

A3

日期

DATE OF ISSUE:

2026-08-27

制 造 MANUFACTURER			客 户 CUSTOMER		
拟制 DESIGN	审核 CHECK	批准 APPROVAL	检验 INSPECTOR	审核 CHECK	批准 APPROVAL
徐雪枫	李文婧	郝澍钊			

■ 叠层片式铁氧体磁珠

Multilayer Chip Ferrite Beads



◆ 特征

Feature

- * 在同样的尺寸下较插装磁珠可产生较高的阻抗值
A unique terminal electrode structure ensures permissible current 6.0A(max).
- * 与传统的磁珠不同，片式磁珠无引线，只要简单的安装到 PCB 板上就可抑制 EMI 和 RFI
High impedance and EMI suppression effective over a wide frequency range.
- * 磁珠的形状和尺寸都符合 EIA 标准，可以利用 SMT 设备进行自动贴装
Suitable reflow and wave soldering.

◆ 应用

Application

- * 通信设备、计算机、液晶电视等电气设备的电源线或大电流信号线的噪声抑制。
Noise suppression in power lines or high current signal lines of electrical equipment such as communication equipment, computers and LCD TVs.

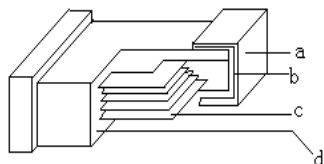
◆ 型号表示法

Part Number

CBG	321609	U	471	T
①	②	③	④	⑤

① 产品代号 Product Code		② 规格尺寸(L×W×T) Dimensions (mm)		③ 材料代号 Material Code	④ 阻抗(Ω) Impedance		⑤ 包装方式 Packaging Style	
CBG	叠层片式铁氧体磁珠 Multilayer Chip Ferrite Beads	060303	0.6×0.3×0.3	U X	示例		T	卷带盘装
		100505	1.0×0.5×0.5		Example			Tape &
		160808	1.6×0.8×0.8		660	66		Reel
		201209	2.0×1.2×0.9		471	470	B	散装 Bulk
		321609	3.2×1.6×0.9		152	1500		

◆ 产品结构 Product Structure

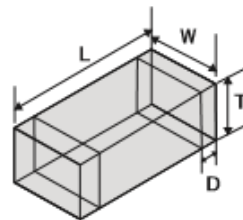


- a. 镀层 Ni/Sn plating
- b. 银层 Ag layer
- c. 内电极 Inner electrode
- d. 瓷体 Body

◆规格尺寸

Dimension

Part No	L(mm)	W(mm)	T(mm)	D(mm)
060303 (0201)	0.6±0.03 (0.020±0.003)	0.3±0.03 (0.010±0.003)	0.3±0.03 (0.010±0.003)	0.15±0.05 (0.010±0.002)
100505 (0402)	1.0±0.15 (0.040±0.006)	0.5±0.15 (0.020±0.006)	0.5±0.15 (0.020±0.006)	0.25±0.1 (0.010±0.004)
160808 (0603)	1.6±0.20 (0.063±0.008)	0.8±0.20 (0.031±0.008)	0.8±0.20 (0.031±0.008)	0.3±0.2 (0.01±0.008)
201209 (0805)	2.0±0.20 (0.079±0.008)	1.2±0.20 (0.047±0.008)	0.9±0.20 (0.035±0.008)	0.5±0.3 (0.020±0.012)
321609 (1206)	3.2±0.20 (0.126±0.008)	1.6±0.20 (0.063±0.008)	0.9±0.20 (0.035±0.008)	0.5±0.3 (0.020±0.012)



◆电性能参数

Electrical Characteristics

* 阻抗测试条件: E4982A 或等同仪器, 测试电压 50mV±5mV, 温度 15℃~35℃, 湿度 25%~75%。

Impedance testing conditions: E4982A or equivalent, test voltage 50mV ± 5mV, Temperature 15℃~35℃, Humidity 25%~75%.

* 直流电阻测试条件: RM3542A 或等同仪器, 温度 15℃~35℃, 湿度 25%~75%。

RDC Testing conditions: RM3542A or equivalent, Temperature 15℃~35℃, Humidity 25%~75%.

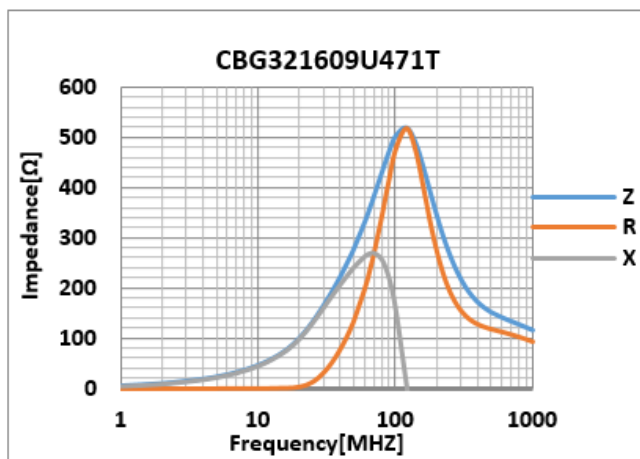
* 额定电流: 施加额定电流, 产品表面温升不超过 40℃。

Rated current: Apply the rated current, and the surface temperature rise of the product shall not exceed 40℃.

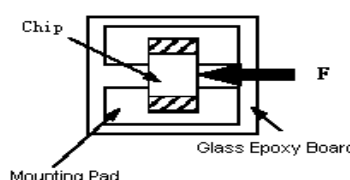
客户料号 Customers Part No.	型号 Part NO	精度范围 Tolerance (%)	标称阻抗 Impedance (Ω)	测试频率 Test frequency(MHz)	直流电阻 DCR (Ω)Max	额定电流 Ir (mA)Max
	CBG321609U471T	±25	470	100	0.30	600

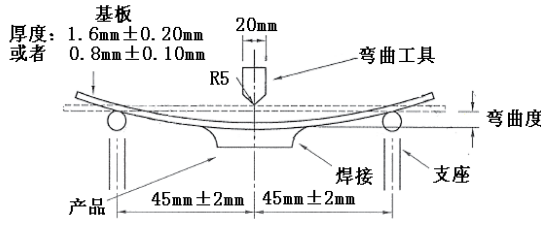
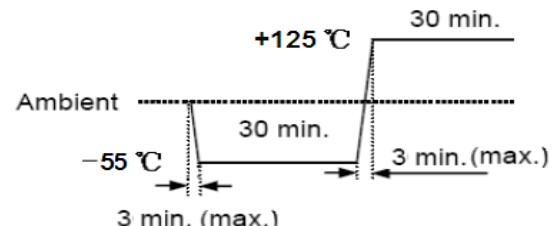
◆产品特性曲线图

Product Characteristic Curve



◆可靠性测试方法
Reliability Test Method

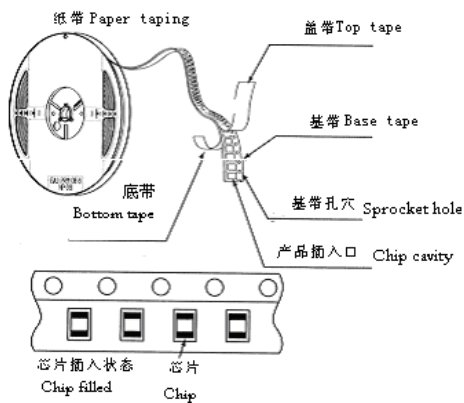
序号 No.	项目 Items	要求 Requirements	试验方法及备注 Test Methods and Remarks
1	工作温度范围 Operating Temperature Range	-55℃~+125℃	包含产品表面温升 Includes product surface temperature rise
2	可焊性 Solder ability	无可见机械损伤； 电极面 95%以上(0603电极面 75%以上)覆盖新的焊料。 No mechanical damage. 95% (75% for 0603 series) or more of electrode area shall be coated by new solder.	预处理: 蒸汽老化 1 h 焊料: (96.5%Sn/3.0%Ag/0.5%Cu) 焊锡 焊锡温度: 245℃±3℃ 浸锡深度:10mm 浸锡时间 :3±0.3s 浸渍到助焊剂约:3 ~ 5 s Steam Ageing:1h Solder 96.5%Sn/3.0%Ag/0.5%Cu of the Sn solder. Solder temperature: 245±3℃ Immersion tin depth:10mm Duration : 3±0.3s Dip performance to a flux of about:3 ~ 5 s
3	耐焊接热 Resistance to Soldering Heat	无可见机械损伤。 阻抗变化率小于±30%。 No mechanical damage. Inductance : Impedance change: within ±30%	预热温度: 120℃~150℃ 预热时间: 60s 焊料: (96.5%Sn/3.0%Ag/0.5%Cu) 焊锡 浸锡温度: 260℃±5℃ 浸锡深度:10mm 浸锡时间 : 10±1s 浸渍到助焊剂约:3~5 s Preheating temperature: 120℃ to 150℃ Preheating time: 60s Solder 96.5%Sn/3.0%Ag/0.5%Cu of the Sn solder. Solder temperature: 260℃±5℃ Immersion tin depth:10mm Duration : 10±1s Dip performance to a flux of about:3~5 s
4	端电极强度 Adhesion of electrode	端电极与磁体不应受损, 无可见机械损伤。 The termination and body should be no damage.	施加力: 0603 系列为 2N; 1005 系列为 5N ; 1608 系列为 7N ; 2012、3216 系列为 10N。 保持时间: 10±1S Applied force: 2N force for 0603 series; 5N force for 1005 series; 7N force for 1608 series; 10N force for 2012、3216 series. Keep time : 10±1S 
5	耐低温 Low temperature resistance	无可见机械损伤, 阻抗变化率小于±30%。 No mechanical damage. Impedance change: within ±30%	试验温度:-55±2℃ 试验时间:1000 ⁺²⁴ ₋₀ h Temperature:-55±2℃ Testing time: 1000 ⁺²⁴ ₋₀ h

序号 No.	项目 Items	要求 Requirements	试验方法及备注 Test Methods and Remarks
6	抗弯强度 Bending strength	无可见机械损伤 No mechanical damage	测试基板:玻璃环氧树脂基板 加压速度为 (1 ± 0.5) mm/s, 弯度:2mm, 保持时间 $20s \pm 1s$ Testing board: glass epoxy-resin substrate For (1 ± 0.5) mm/s compression speed, curvature: 2mm, hold time $20s \pm 1s$. 
7	振动 Vibration	无可见机械损伤, 阻抗变化率小于 $\pm 30\%$ 。 No mechanical damage. Impedance change: within $\pm 30\%$	振幅:1.5mm 试验时间:沿三个垂直方向各做 2 小时 频率范围:10Hz~55Hz~10Hz (1 分钟) Amplitude modulation: 1.5mm Test time: A period of 2h in each of 3 mutually perpendicular directions. Frequency range: 10Hz to 55Hz to 10Hz for 1min.
8	耐高温 High temperature resistance	无可见机械损伤, 阻抗变化率小于 $\pm 30\%$ 。 No mechanical damage. Impedance change: within $\pm 30\%$	试验时间: 1000^{+24}_0 h 试验温度: $125 \pm 2^\circ\text{C}$ Testing time: 1000^{+24}_0 h Temperature: $125 \pm 2^\circ\text{C}$
9	恒定湿热 Static Humidity	无可见机械损伤, 阻抗变化率小于 $\pm 30\%$ 。 No mechanical damage. Impedance change: within $\pm 30\%$	湿度:90%~95% RH, 温度: $60^\circ\text{C} \pm 2^\circ\text{C}$ 试验时间: 1000^{+24}_0 h Humidity: 90% to 95% RH Temperature: $60^\circ\text{C} \pm 2^\circ\text{C}$ Testing time: 1000^{+24}_0 h
10	高温负载 High temperature load	无可见机械损伤, 阻抗变化率小于 $\pm 30\%$ 。 No mechanical damage. Impedance change: within $\pm 30\%$	施加电流: 额定电流 试验时间: 1000^{+24}_0 h 试验温度: $85^\circ\text{C} \pm 2^\circ\text{C}$ impose current: at room Testing time: 1000^{+24}_0 h Temperature: $85 \pm 2^\circ\text{C}$
11	温度冲击 Temperature Shock	无可见机械损伤, 阻抗变化率小于 $\pm 30\%$ 。 No mechanical damage. Impedance change: within $\pm 30\%$	温度: -55°C, 30 ± 3 分钟 $+125^\circ\text{C}$, 30 ± 3 分钟 循环次数: 100 Temperature: -55°C for $30 \pm 3\text{min}$ $+125^\circ\text{C}$ for $30 \pm 3\text{min}$ Number of cycles: 100 
注: 以上要求测试电性能的项目, 应试验后在标准条件下放置 24 小时后测试。 Note: When there are questions concerning, measurement shall be made after 24 ± 2hrs of recovery under the standard condition.			

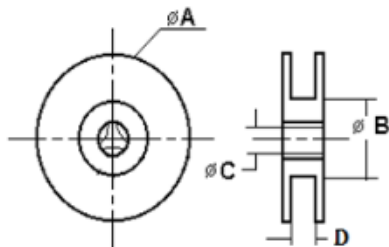
◆包装

Packaging

● 编带图 Taping drawings



● 卷盘尺寸 Reel dimensions (Unit: mm)

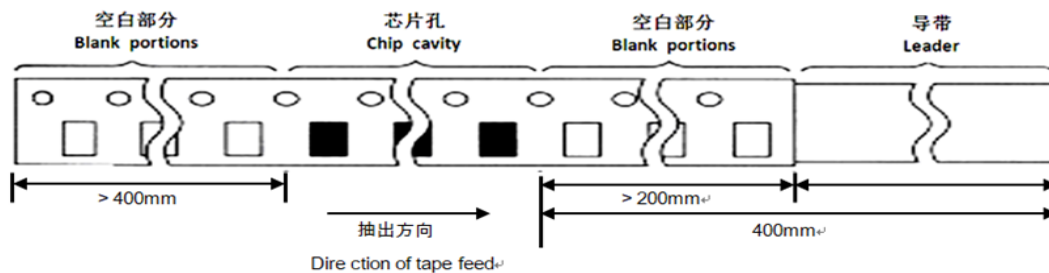


型号 Size	A	B	C	D
7 inch	178±2.0	60±2.0	13.0±1.0	9.5±2.0

说明：7 inch 适用 060303、100505、160808、201209、321609、322513 尺寸。

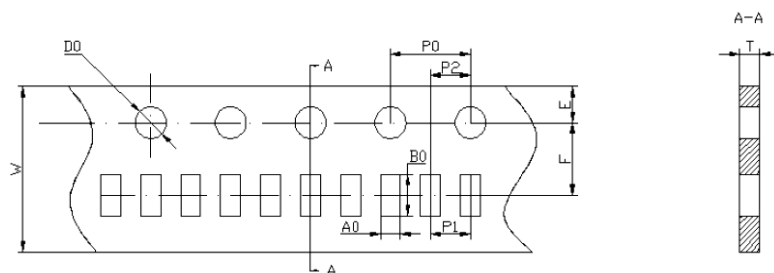
Note: 7 inch is available in 060303, 100505, 160808, 201209, 321609, 322513 sizes.

● 导带及空格部分 Leader and blank portion



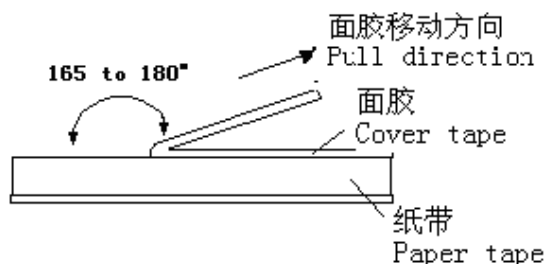
● 编带尺寸 Taping dimensions (Unit: mm)

* 纸带 Paper tape



Part NO.	A0	B0	W	F	E	P1	P2	P0	D0	T
060303	0.38±0.03	0.68±0.03	8.00±0.10	3.50±0.05	1.75±0.05	2.00±0.05	2.00±0.05	4.00±0.10	1.55±0.05	0.42±0.03
100505	0.59±0.10	1.12±0.10	8.00±0.20	3.50±0.10	1.75±0.20	2.00±0.10	2.00±0.10	4.00±0.20	1.55±0.10	0.60±0.10
160808	1.05±0.20	1.85±0.20	8.00±0.20	3.50±0.10	1.75±0.20	4.00±0.20	2.00±0.10	4.00±0.20	1.55±0.10	0.95±0.10
201209	1.45±0.20	2.35±0.20	8.00±0.20	3.50±0.10	1.75±0.20	4.00±0.20	2.00±0.10	4.00±0.20	1.55±0.10	0.95±0.10
321609	1.90±0.20	3.46±0.20	8.00±0.20	3.50±0.10	1.75±0.20	4.00±0.20	2.00±0.10	4.00±0.20	1.55±0.10	0.95±0.10

* 剥离力检验 Peeling off force



(1) 盖带的剥离力：沿面胶移动方向拉时要求剥离力为 0.1N~0.7N。

Peeling force should be 0.1~0.7N pulling in the direction of arrow.

(2) 剥离速度：300mm/min。

Speed of peeling off: 300mm/min.

(3) 在纸带剥落时，面胶不能有破损，不能粘纸带。

The cover bond should not be damaged and bond the tape when it peeled off.

型号 Size	321609	201212	201209	160808	100505	060303
每卷数量 REEL	4000	3000	4000	4000	10000	15000
每盒数量 BOX	40000	30000	40000	40000	100000	150000
每箱数量 CASE	240000	180000	240000	240000	600000	900000

● 标签粘贴位置 Label stick station

卷盘标签 Reel label	纸盒标签 Carton label	纸盒标签 Carton label	外箱标签 Outer box label
			

◆ 推荐焊接条件 Recommend Soldering Conditions

● 焊接条件 Soldering Conditions

* 产品适用于回流焊。

Products can be applied to reflow soldering.

* 焊接要求

(1) 预热时，产品表温与焊料温度的温差最大不允许超出 150℃，焊接完冷却时，产品表温与溶剂温度之

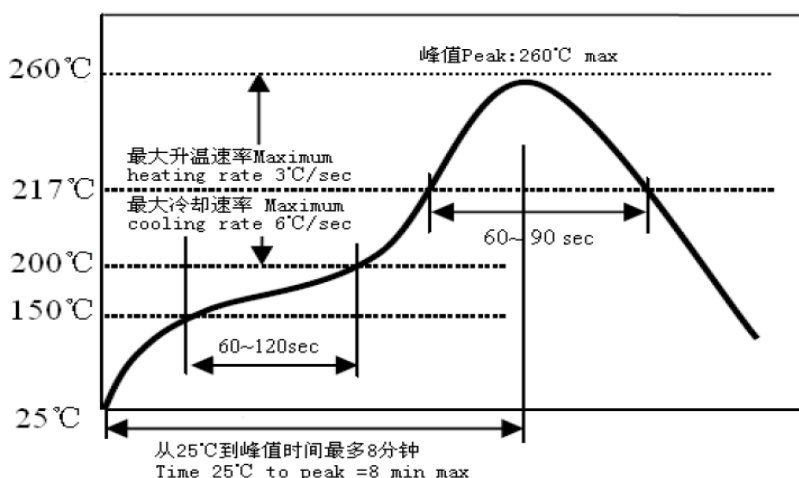
间的温差最大不超过 100℃。预热不足有可能引发产品表面裂纹，从而导致产品品质下降。

Pre-heating should be in such a way that the temperature difference between solder and ferrite surface is limited to 150℃ max. Also cooling into solvent after soldering should be in such way that the temperature difference is limited to 100℃ max. Un-enough pre-heating may cause cracks on the ferrite, resulting in the deterioration of product quality.

(2) 产品要在以下画出的曲线允许的范围内进行焊接。其它焊接条件可能引起产品电极的腐蚀。当焊接重复时，允许的时间为第一次做的累计时间。

Products should be soldered within the following allowable range indicated by the slanted line. The excessive soldering conditions may cause the corrosion of the electrode. When soldering is repeated, allowable time is the accumulated time.

● 回流焊曲线 Reflow soldering profile



- (1) 预热条件: 150 ~ 200℃/ 60 ~ 120 秒;
Preheat condition: 150 ~200℃/60~120sec
- (2) 允许大于 217℃时间: 60—90 秒;
Allowed time above 217℃: 60~90sec
- (3) 最大温度: 260 ℃;
max temp: 260 ℃
- (4) 最高温的最大时间: 10 秒;
max time at max temp: 10 sec
- (5) 焊膏: Sn/3.0Ag/0.5Cu;
Solder paste: Sn/3.0Ag/0.5Cu
- (6) 回流焊次数: 最多 2 次;
Allowed Reflow time: 2x max

● 手工焊接 Iron soldering

- (1) 烙铁温度: 350℃
Soldering Iron Temperature: 350℃
- (2) 功率: 最大为 30w
With a maximum power of 30w
- (3) 烙铁停留时间: < 5s (注意不要将烙铁碰到产品端电极)
Time: < 5w (Take care not to apply the tip of the soldering iron to the terminal electrodes)



◆清洗 Cleaning

● 清洗条件 Cleaning Conditions

- (1) 清洗温度: 60°C (最高)
Cleaning temperature : 60°C max
- (2) 清洗时间: 1 分钟 (最少)
Cleaning time: 1 minute min.
- (3) 超声波功率: 最大为 200w
Ultrasonic output power: 200w max

◆存储要求 Storage Requirements

● 存储期限 Storage period

距电感公司出厂检验时间 1 年内, 产品可以使用检验时间可以通过包装外侧标记的检验号确认。若时间超过 1 年, 应检查焊接性能后方可使用。

Products which inspected inductor company over 1 year ago should be examined and used, which can be Confirmed with inspection No. marked on the container. Solder ability should be checked if this period is exceeded.

● 存储条件 Storage conditions

- (1) 存放货物的库房应满足以下条件: 温度: -10 ~ +40°C, 相对湿度: 30 ~ 70%。

Products should be storage in the warehouse on the following conditions:

Temperature : -10~+40°C Humidity: 30~70% relative humidity

- (2) 禁止将产品保管在腐蚀性物质中, 如硫磺、氯气或酸, 否则将引起端头氧化, 导致降低焊接性。

Don't keep products in corrosive gases such as sulfur, chlorine gas or acid , or it may case oxidization of Electrodes resulting in poor solder ability.

- (3) 为了避免受潮气、灰尘等物质的影响, 产品应保管于货架上。

Products should be stored on the palette for the prevention of the influence from humidity, dust and so on.

- (4) 产品保管在库房中, 应避免热冲击、振动以及直接光照等等。

Products should be stored in the warehouse without heat shock, vibration, direct sunlight and so on.

- (5) 产品应密封包装。

Products should be stored under the airtight packaged condition.

◆ODS (消耗臭氧层物质) 的使用情况 Usage Of ODS

对于以下所列物质, 我公司在生产过程中绝不使用。

ODS: CCl₄ (四氯化碳)、HCFC 等。

For ODS listed below , we don't use in process.

ODS: CCl₄, HCFC, etc.

◆注意事项 Notes

- (1) 若本次承认的为“整体无铅”产品, 则表明该产品符合 RoHS 指令的要求。

If the parcel label on product is "Unitary lead free" that indicate the products in accord with ROHS appointed requests.

(2) 本承认书保证我司产品作为一个单体时的质量情况, 当我司产品被安装到贵公司产品上时请保证贵司的产品已根据贵司的规范进行了有效评价和确认。

This product specification guarantees the quality of our product as a single unit, Please make sure that your product has been evaluated and confirmed against your specifications when our product is mounted to your product.

(3) 如果贵司对我司产品的试用已超过了本测试规范所界定的产品功能与应用范围, 对于此所引发的失效我司将不予保证。

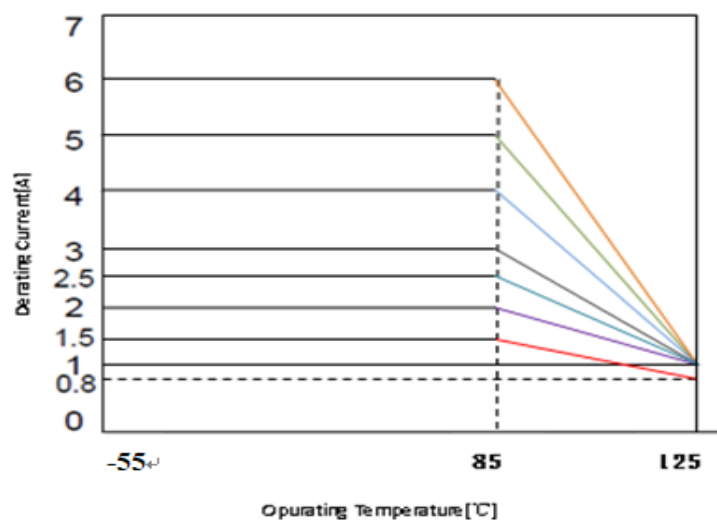
We can't warrant against failure caused by any use of our product has exceeded the product functions

and application fields defined in this test specification.

◆备注 Remark

当工作温度超过+85℃时, 额定电流>1A 的铁氧体磁珠的额定电流必须降额使用。具体请根据工作温度使用图示的降额曲线。

When Operating temperatures exceed +85℃, derating of current is necessary for chip ferrite beads for which rated current is 1A and over. Please apply the derating curve shown in chart according to the operating temperature.



■ 修订履历 Revision of resume

版本 Version	日期 Date	修订内容 Revised content	修订人 Revision author
18.01	2018-5-21	首次发行 Initial issue	徐雪枫
20.01	2020-5-28	修改了可靠性试验项目抗弯强度试验方法及要求 Modified the bending strength test method and requirements of reliability test items.	徐雪枫
21.01	2021-5-6	修改了可靠性试验项目抗弯强度试验方法，修改了温度循环为温度冲击。 Modified the reliability test item of bending strength test method, changed the temperature cycling items into temperature shocking . 删除了跌落试验内容。 Deleted the drop test item.	徐雪枫
21.02	2021-11-8	修改了可靠性试验项目工作温度范围、修改了耐低温/耐高温/温度冲击试验温度条件， Modified the working temperature range of reliability test items, modified the temperature conditions of low temperature resistance/high temperature resistance/temperature impact test. 增加了额定电流降额使用说明 added the usage instructions of rated current derating	徐雪枫
22.01	2022-3-28	修改了电性能参数，修改了存储期限。 Modified the electrical characteristics; modified the storage period.	徐雪枫
A0	2024-05-16	修改版本命名，删除焊接、清洗、存储要求 Modified the version name to delete the welding, cleaning, and storage requirements	何佳明
A1	2025-03-10	增加焊接、清洗、存储要求 Add welding, cleaning, and storage requirements 删除可靠性试验耐焊接热项目关于上锡率的要求 Remove the requirement for soldering rate in the reliability test for resistance to soldering heat. 更新频率曲线 Update frequency curve 修改卷盘尺寸命名 Modify the naming of reel sizes	李文婧
A2	2025-05-08	修改卷盘尺寸适用说明 Modify the reel dimensions guidelines 更新 CBG201209U151T 频率曲线 Update CBG201209U151T frequency curve	郑权伟
A3	2026-05-10	将“误差范围”更名为“精度范围”； Rename 'Margin of Error' to 'Accuracy Range'; 修正了 1608 与 2012 规格纸带 P ₁ 标准；	李文婧

		Corrected the P1 standards for 1608 and 2012 specification paper tapes . 更新卷盘标签示图 Update the disk label diagram 修改可焊性项目预处理说明 Modify pre-treatment instructions for solderability items	
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