



鋁電解電容器

ALUMINIUM ELECTROLYTIC CAPACITORS

承 认 书

SPECIFICATION FOR APPROVAL

客 户: CUSTOMER:	立创商城
客 户 料 号: CUSTOMER PARTNUMBER:	
伯 鸿 料 号: BORHURNG PARTNUMBER:	CG222MDC20BP
型 号: SERIES:	SMR
规 格: SPECIFICATION:	2200 μ F16V/ Φ 13*20
日 期: DATE:	2024-3-19

客户承认栏 <i>APPROVAL COLUMN</i>			

承 制 <i>SUPPLIER</i>		
	黄永福	

<input type="checkbox"/> 伯鸿电子(肇庆)有限公司 广东省肇庆市端州一路沙湖工业区。 TEL: 758-2710158 FAX:758-2734058 BOR HURNG ELECTRONIC (ZHAOQING) CO.,LTD. ADD: SHAHU INDUSTRIAL ZONE DUANZHOU 1 RD.,ZHAOQING CITY GUANGDONG PR- OVINCE. TEL: 758-2710158 FAX:758-2734058	<input type="checkbox"/> 伯鸿电子公司 地址: 广东省东莞市长安镇德政中路239-7号莲盛大厦 TEL: 769-85366619 FAX: 769-85416647 BOR HURNG ELECTRONIC CO.,LTD. LIANSHENG BUILDING, 239-7 DEZHENG MIDDLE ROAD, CHANG'AN, DONGGUAN CITY, GUANGDONG PROVINCE. TEL: 769-85366619 FAX: 769-85416647
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伯 鸿 电 子 (肇 庆) 有 限 公 司
BOR HURNG ELECTRONIC (ZHAOQING) CO., LTD

承 认 内 容
FOR APPROVAL

客 户: CUSTOMER:		立创商城														
料号 P/N:		系列 Electrolytic Capacitors		规格 Specif.												
CG222MDC20BP		SMR		2200μF16V/Φ13*20												
电性能Electric characteristics																
工作电压 W. V. (V-DC)	标称容量 Nom. Cap. (μ F)	容量允差 Cap. Tol. (%) At 100/120Hz/25°C	外形尺寸 Case Size D×H(mm)	漏电流 L. C. (μ A) 2minutes/25°C	损失角 D. F. (%) At 100/120Hz/25°C											
16	2200	± 20 %	13*20	352	22											
ESR值 E. S. R. (Ω) At 100kHz/25°C	浪涌电压 S. V. (V-DC)	使用温度 Oper. Temp. (°C)	纹波电流 Rip. Cur (mA) At 100/120Hz/105°C	高温负荷 Load Life (HRS/105°C)	高温贮存 Shelf Life (HRS/105°C)											
/	20	-40~+105	710	2000	500											
高温负荷特性 Load Life	在105°C环境中对电容器施加额定工作电压连续2000小时, 经恢复后于常温25°C测试, 其性能符合下表要求 After applying rated working voltage for 2000 hours at 105°C and then being stabilized at +25°C, capacitors shall meet following limits															
	静电容量变化率 Capacitance change	初测值的 ± 20% 以内 Within ±20% of the initial measured value														
	损失角正切值 Dissipation Factor	不大于规定值的 200 % Less than 200% of the specified value														
	漏 电 流 Leakage Current	不大于规定值 Within specified value														
高温贮存特性 Shelf Life	在105°C环境中(不加电压)放置500小时, 经恢复后于常温25°C测试, 其性能符合下表要求 After storage for 500 hours at 105°C With no voltage applied and then being stabilized at +25°C, capacitors shall meet following limits															
	静电容量变化率 Capacitance change	初测值的 ± 20% 以内 Within ±20% of the initial measured value														
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	漏 电 流 Leakage Current	不大于规定值的 200 % Less than 200% of the specified value														
纹波电流修正系数 coefficient	频率系数Frequency coefficient															
	W.V (V)	Freq(Hz) Cap.(uF)	50 (60)	100 (120)	1K	10K	100K	温度系数Temperature coefficient								
	6.3~10		0.8	1	1.1	1.2	1.2	温度(°C) Temperature	+105	+85	+65					
	25~35	≤1000	0.8	1	1.5	1.7	1.7		系数 Factor	1.0	1.7	2.1				
		>1000	0.8	1	1.2	1.3	1.3									
	50~100	≤1000	0.8	1	1.6	1.9	1.9									
		>1000	0.8	1	1.2	1.3	1.9									
160~450		0.8	1	1.3	1.5	1.6										
尺寸 Diagram: (Unit:mm)	<table border="1" style="float: right;"> <tr><td>D</td><td>13.0</td></tr> <tr><td>H</td><td>20.0</td></tr> <tr><td>F</td><td>5.0</td></tr> <tr><td>d</td><td>0.6</td></tr> <tr><td>a</td><td>2.0</td></tr> </table>						D	13.0	H	20.0	F	5.0	d	0.6	a	2.0
	D	13.0														
H	20.0															
F	5.0															
d	0.6															
a	2.0															
胶管 Solder																
作成 Designer	钟秋燕	审核 Auditor				核准 Approved	黄永福									
客户承认 CUSTOMER SIGNATURE																



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品 质 说 明
CONTENTS OF QUNLITY

一、电气特性:

ELECTRICAL CHARACTERISTIC

项次 NO.	项目 ITEM	规格值 SPECIFICATION	测试方法 TEST METHOD
1.1	额定电压 Rated Voltage	参考制品(系列)规格说明 See contents of the products	测定仪器: LCR 测试仪 Test Meter: LCR meter 测定频率: 100/120Hz Measuring frequency
1.2	静电容量 Capacitance		
1.3	散逸因素(损失角) Dissipation Factor		
1.4	泄漏电流 Leakage Current	测定仪器: LC 测试仪 Test Meter: LC meter 在 25℃施加额定工作电压 X 分钟后测定泄漏电流。 Dc leakage current shall be measured after X minutes application of the Dc rated working voltage. X: 参考制品(系列)规格说明 See contents of the products	
1.5	浪涌试验 Surge test	(1) 静电容量变化: 初期值的±20%以内 Capacitance change: Within±20% of the initial measured value. (2) 损失角: 不大于初期值的±200% Dissipation factor: Less than ±200% of the initial measured value. (3) 泄漏电流: 不大于规定值 Leakage current: Within initial specify- ed value.	电容器在常温下, 以每 6 分钟为一周期, 其中施加浪涌电压 30 秒, 放电 5 分 30 秒, 经过 1000 周期。 Applying rated surge voltage for 30 ± 5 seconds and then discharge for 5minutes 30seconds at room temperature. This cycle Shall be repeated for 1000 cycles. Duration Of one cycle is 6±0.5 minutes.
1.6	温度特性 Temperature characteristics	(1) 低温阻抗比: 低于规定值 Low temperature impedance stability: Less than specified value. (2) 泄露电流: 不大于规定值 500% Leakage current: less than 500% of the specified value.	(1) 测定静电容量及阻抗 (Z , 25℃, 100/120Hz) Step1. Measure the capacitance and impedance. (2) 达到热平衡 2 小时后测定阻抗 (Z , -25℃, -40℃, 100/120Hz) Step2. Measure the impedance at thermal be lance after 2 hours. (3) 同(1) (4) 达到热平衡 2 小时后测定阻抗 Step4. Measure the capacitance at thermal be lance after 2 hours.

步骤 Step	温度 Temperature	放置时间 Storage time
1	25℃±2℃	30 minutes
2	<input type="checkbox"/> -25℃±3℃/ <input type="checkbox"/> -40℃±3℃	2 hours
3	25℃±2℃	15 minutes
4	<input type="checkbox"/> 85℃±2℃/ <input type="checkbox"/> 105℃±2℃	2 hours

二、机械特性:

MECHANICAL CHARACTERISTICS

项次 NO.	项目 ITEM	规格值 SPECIFICATION	测试方法 TEST METHOD																				
2.1	端子强度 Terminal strength	<p>(A)测量静电容量时，不能有接触不良，开路或短路。 When the capacitance is measured, there shall be no intermittent contacts, or open- or short-circuiting.</p> <p>(B)不能有如端子受损之类的机械特性上的损伤。 There shall be no such mechanical damage as terminal damage etc.</p>	<p>(A)拉力试验 Pull test 将电容器本体垂直固定，于端子部加如下表所示之荷重，经 10 秒后，端子不可有断开，其他异状。</p> <p>①引线型</p> <table border="1"> <thead> <tr> <th>端子线直径 d (mm)</th> <th>荷重 load (kg)</th> </tr> </thead> <tbody> <tr> <td>≤0.45</td> <td>0.5</td> </tr> <tr> <td>0.50~0.80</td> <td>1</td> </tr> <tr> <td>1.0~1.25</td> <td>2</td> </tr> </tbody> </table> <p>②焊针型</p> <table border="1"> <thead> <tr> <th>端子直径 d (mm)</th> <th>荷重 load (kg)</th> </tr> </thead> <tbody> <tr> <td>焊针端子</td> <td>2</td> </tr> </tbody> </table> <p>The capacitor shall withstand the constant tensile force specified between the body and each lead for 10 seconds without damage either mechanical or electrical.</p> <p>(B)弯曲度试验: Bending test</p> <table border="1"> <thead> <tr> <th>端子线直径 d (mm)</th> <th>荷重 load (kg)</th> </tr> </thead> <tbody> <tr> <td>≤0.45</td> <td>0.25</td> </tr> <tr> <td>0.50~0.80</td> <td>0.5</td> </tr> <tr> <td>1.0~1.25</td> <td>1</td> </tr> </tbody> </table> <p>将电容器本体保持垂直状况，依下表规定荷重加于端子线，然后慢慢将本体向水平方向弯曲 90°，再回复原位，再朝反方向弯曲 90°，此为一周率，如此作两周率（每周率时间为 5 秒）端子线不可断开或其他异状。 With the capacitor in a vertical position apply the load specified axially to each lead. The capacitor shall be rotated slowly from the vertical to the horizontal position, back to the vertical position, The 90° in the opposite direction and back the original position.</p>	端子线直径 d (mm)	荷重 load (kg)	≤0.45	0.5	0.50~0.80	1	1.0~1.25	2	端子直径 d (mm)	荷重 load (kg)	焊针端子	2	端子线直径 d (mm)	荷重 load (kg)	≤0.45	0.25	0.50~0.80	0.5	1.0~1.25	1
端子线直径 d (mm)	荷重 load (kg)																						
≤0.45	0.5																						
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≤0.45	0.25																						
0.50~0.80	0.5																						
1.0~1.25	1																						
2.2	耐振性 Vibration proof	<p>(1)外观: 无异常 Appearance: No abnormal</p> <p>(2)静电容量: 稳定 Capacitance: No unsteady</p> <p>(3)容量变化: 初始值的±5%之内 Capacitance change: Within ±5% of the initial measured.</p>	<p>(1) 将电容器Φ10 以下尺寸，端子线固定本体 4mm 处，Φ10 以上尺寸直接固定本体在机板振动器上。</p> <p>(2) 振动器以 60 秒为一周期，上半周期 30 秒由振动周率 10Hz 达到 55Hz，下半周期 30 秒由 55Hz 降到 10Hz，振幅 1.5mm，如此往复操作。</p> <p>(3) 振动时间应在彼此互相成垂直的方向，各振动 2 小时（共 6 小时）。</p> <p>(1) The capacitor under test shall be mounted by means of the mounting device specified in the individual standard of directly to the vibration table firmly.</p> <p>(2) Range of vibration frequency 10Hz to 55Hz total amplitude 15mm rate of frequency vibration to be such as to vary from 10Hz to 55Hz and return to 10Hz in about 60 seconds and thus repeated.</p> <p>(3) Test shall be conducted unless otherwise specified for 2 hours each (total 6 h).</p>																				
2.3	焊锡性 Solder ability	<p>浸入锡溶液部份至少应有 3/4 以上附着新锡。 The liquid tin must at here to no less than 3/4 this section.</p>	<p>将电容器端子线浸入 230±5℃锡溶液至离本体 4±0.8mm 处，经 2±0.5秒后取出。 The section from the base to 4±0.8mm of the capacitor terminal must be immersed in 230±5℃ liquid tin for 2±0.5 seconds.</p>																				

2.4	防爆试验 Pressure proof	防爆装置必须动作 The pressure relief device shall open in such a way.	施加逆向额定电压、电流最大 1A。 Applying the inverse rated voltage with electricities 1 A max. 注: 1. 此要求适用于直径 8mm 或以上。 2. 试验开始, 经 30 分钟后防爆装置仍不动作, 试验终止。 Note: 1. This requirement applies to capacitors with a diameter of 8 mm or more. 2. When the pressure relief device does not open even 30 minutes after commencement of the test, the test may be ended. 试验回路 Test circuit  <p style="margin-left: 200px;">Cx: 试验电容器 A: 直流电流表 Dc current meter S: 开关 Swith</p>
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三、信赖试验:
RELIABILITY PROOF

项次 NO.	项目 ITEM	规格值 SPECIFICATION	测试方法 TEST METHOD
3.1	焊锡耐热性 Solder heat resistance	(1)外观: 不明显损伤和电解液漏出 Appearance: no visible damage or leakage of electrolyte. (2)容量变化: 初始值的±10%以内 Capacitance change: within ±10% of the initial measured value. (3)损失角: 低于规定值 DF: less than specified value. (4)泄漏电流: 低于规定值 Leakage current: less than specified value.	将电容器端子线浸入 260℃±5℃锡溶液至离本体 4mm 处, 经 10±1 秒后取出, 于常温下放置, 1 小时以上, 2 小时以内, 再测定其值。 电容器过波峰焊所承受的温度为 150±5℃, 时间为 20±5 秒。 The section from the base to 4 mm of the capacitor terminal must be immersed in 260℃±5℃, liquid tin 10±1 seconds. then, after removing, The following specifications shall be satisfied when the capacitor terminal is restored to 25℃ within two hours or over an hour. The capacitor wave ridge has welded the temperature which withstands for 150±5℃, time for 20±5 second.
3.2	耐湿性(稳态) Moisture resistance (steady state)	(1)外观: 无显著异状 Appearance is good (2)容量变化: 初始值之±2%以内 Capacitance change: within ±2% of the initial measured value. (3)损失角: 低于规定值 DF: less than specified value. (4)泄漏电流: 低于规定值 Leakage current: less than specified value.	电容器在 40℃±2℃, 相对湿度 90~95%的条件下放置 120±6 小时。 Subject the capacitors to 40℃±2℃ and 90% to 95% relative humidity for 120±6 hours.
3.3	高温负荷 Load life	判定标准依该制品(系列)规格说明 Standard of judgment is according to contents of the products.	将电容器置于 □85℃或 □105℃ 或 □130℃±2℃的恒温空气循环室内, 施加额定纹波电流 Y 小时后取出, 置于常温 25℃16 小时后测定其值。 After applying rated ripple current for Y hours at□85℃ or □105℃or □105℃±2℃, the measurements shall meet the contents of the products. Measurements shall be performed after exposed for 16 hours at room temperature after application of DC rated voltage to the capacitor for Z minutes. Y、Z: 见该制品(系列)规格值说明。 See contents of the products

3.4	高温无负荷 Shelf life	判定标准依该制品规格说明 Standard of judgment is according to contents of the products.	在 $\square 85^{\circ}\text{C}$ 或 $\square 105^{\circ}\text{C}$ 或 $\square 130^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 环境中（不加电压）放置 500 小时后，按以下条件测试，测试在室温放置 16 小时，施加直流额定电压 K 分钟后进行。 After storage for y hours at $\square 85^{\circ}\text{C}$ or $\square 105^{\circ}\text{C}$ or $\square 130^{\circ}\text{C} \pm 2^{\circ}\text{C}$ without voltage application, Measurements shall be preferment after exposed for 1 to 2 hours at room temperature after application of DC rated voltage to the capacitor of 2 minutes. K: 见该制品（系列）规格值说明。See contents of the products
3.5	低温储存 Storage at low temperature	(1)容量变化：初始值 $\pm 10\%$ 以内 Capacitance change: within $\pm 10\%$ of the initial value. (2)损失角：低于规定值 DF: Less than specified value. (3)泄漏电流：低于规定值 Leakage current: less than specified value.	电容器在 $\square -25^{\circ}\text{C}$ 或 $\square -40^{\circ}\text{C} \pm 3^{\circ}\text{C}$ 环境中(不加电压)储存 96 ± 4 小时之后在标准大气压中放置 16 小时以上，然后进行测试。 The capacitor shall be storage at temperature of $\square -25^{\circ}\text{C}$ or $\square -40^{\circ}\text{C} \pm 3^{\circ}\text{C}$ for 96 ± 4 hours, without voltage a placations. And then the capacitors shall be subjected conditions for 16 hours or more after which measurement shall be made.

四、标识：

MARKING

电容器上的标识包括：

Marking on capacitors include

1.  商标
 trademark

2. 标称静电容量
Nominal capacitance

3. 工作电压
Working voltage

4. 极性
Polarity

5. 工作温度范围
Operating temperature rage

6. 胶管颜色：■黑色 \square 墨绿色 \square 咖啡色 \square 紫色 \square 宝石蓝 \square 桔红色
Sleeving pipe basicc colour: ■Black colour \square Dark yellowish green colour \square Coffee colour
 \square Purple colour \square Blue colour \square orange colour

7. 胶管材质：■PET \square PVC
Hose material: ■PET \square PVC



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鋁 電 解 電 容 器 存 放 環 境 與 控 制

Storage Conditions and Control for Aluminum Electrolytic Capacitor

1. 環境溫度：5°C~35°C，環境相對濕度：75度以下。

Store the capacitor at a temperature of 5°C to 35°C and at a relative humidity of less than 75%.

2. 存放環境不應有陽光直射，不宜高溫。

Store the capacitor in low temperature places free from direct sun shine.

3. 存放環境不能有鹽分、油含量高的霧氣。

Store the capacitor in places free from oil vapor、salt water vapor.

4. 存放在遠離氯氣、氨氣、硫化氫、亞硫酸、硝酸等有害氣體含量高的地方。

Store the capacitor in places far from toxic gases (chlorine、ammonium、hydrogensulfide、sumptuous acid、nitric acid, etc).

5. 存放環境不能有臭氧、紫外線或輻射。

Store the capacitor in place free from Ozone、ultraviolet ray or radiation.



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使用清潔劑之注意事項

Detergents needing attention

鋁電解電容器會受含有碳化氫鹵素溶劑之侵蝕，下列為各種安全與不安全之清潔劑，為避免不必要的損失，您所使用有關印刷基板之清潔劑名稱請事先告知本公司。

Hydrogen carbide liquid and halogen liquid can cause Aluminium Electrolytic Capacitor to corrode. Some of Safe and Unsafe detergent are as follows.

安全Safe	不安全Unsafe
二甲苯	1. 1. 2-三氯乙烷
Dimethybenzene	1. 1. 2-trichloroethane
甲醇	1. 1. 2-三氯乙烷
Methanol	1. 1. 2-trichloroethane
乙醇	四氯化碳
Ethanol	Tetrachloroethylene
丙醇	哥羅仿（無色揮發性液體）
Propanol	Chloroform(colorlessvolatilizableliquid)
丁醇	二氯甲烷
Butanol	Dichloromethane
去垢劑	三氯甲烯
Detergent	Trichlorelethylene