

江西富隆电子科技有限公司

JiangXi Follon Electronics Technology Co.,Ltd

承 认 书

客户名称: _____

客户料号: _____

供应商名称: 江西富隆电子科技有限公司

供应商料号: EFRA016BK471M0611

产 品 型 号: FRA 16V470uF 6.3*11

承 认 日 期: 2026 年 1 月 21 日

厂商承认

Supplier Approval

核准 Approved by	审 核 Checked by	拟制 Prepared By
王大兵	王江涛	邹艺

客户承认

Customer Approval

核准 Approved by	会 签 Countersign	拟制 Prepared By



公司全名: 江西富隆电子科技有限公司

公司地址: 江西省 九江市湖口县 高新技术产业园海山科技园区数字经济产业园区
南区 35 号楼

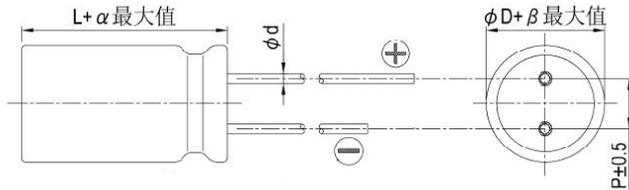
EFRA016BK471M0611

FOLLON ELECTRONICS CORP.

FRA 16V470 μ F 6.3 ϕ × 11L

Diagram of Dimensions 尺寸图:

Unit: mm



ϕD	6.3
L	11
P	3.5
ϕd	0.6
α	1.0
β	0.5

Items 项目	Performance 性能				
Category Temperature Range 工作温度范围	-55°C ~ +105°C				
Capacitance Tolerance 容量误差	-20 % ~ +20 % (120 Hz, 20°C)				
Leakage Current 漏电流	$I \leq 1504 \mu A$ After 2 minutes				
Dissipation Factor (Tan δ) 损失角	≤ 0.12 (120 Hz, 20°C)				
E. S. R. 等效串联电阻	$< 14 m\Omega$ (100k ~ 300kHz, 20°C)				
Ripple Current (rms) 纹波电流	3900 mA (100kHz, 105°C)				
Ripple Current & Frequency Multipliers 纹波电流与频率修正系数	Frequency (Hz) 频率	120Hz	1KHz	10KHz	100KHz~
	Multiplier 系数	0.05	0.3	0.7	1.0
Endurance 耐久性	Test Time 寿命时间	2000Hrs			
	Capacitance Change 容量变化率	Within ± 20 % of initial value			
	Dissipation factor 损失角	Less than 150% of specified value			
	E. S. R. 等效串联电阻	Less than 150% of specified value			
	Leakage Current 漏电流	Within specified value			
Moisture Resistance 耐湿无负荷	Test Condition 测试条件	at 60°C with 90~95% after 1000 hrs			
	Capacitance Change 容量变化率	Within ± 20 % of initial value			
	Dissipation factor 损失角	Less than 150% of specified value			
	E. S. R. 等效串联电阻	Less than 150% of specified value			
	Leakage Current 漏电流	Within specified value			
Standards 参考标准	JIS C 5101-1				

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.
Voltage treatment: Applying DC rated voltage to the capacitors for 2 hours at 105°C.

*如对象测之值有任何疑问, 可进行电压补偿后再进行量测。电压补偿方式, 将电容器置于 105°C 环境中, 持续供给 2 小时之直流额定电压。

标识: Marking

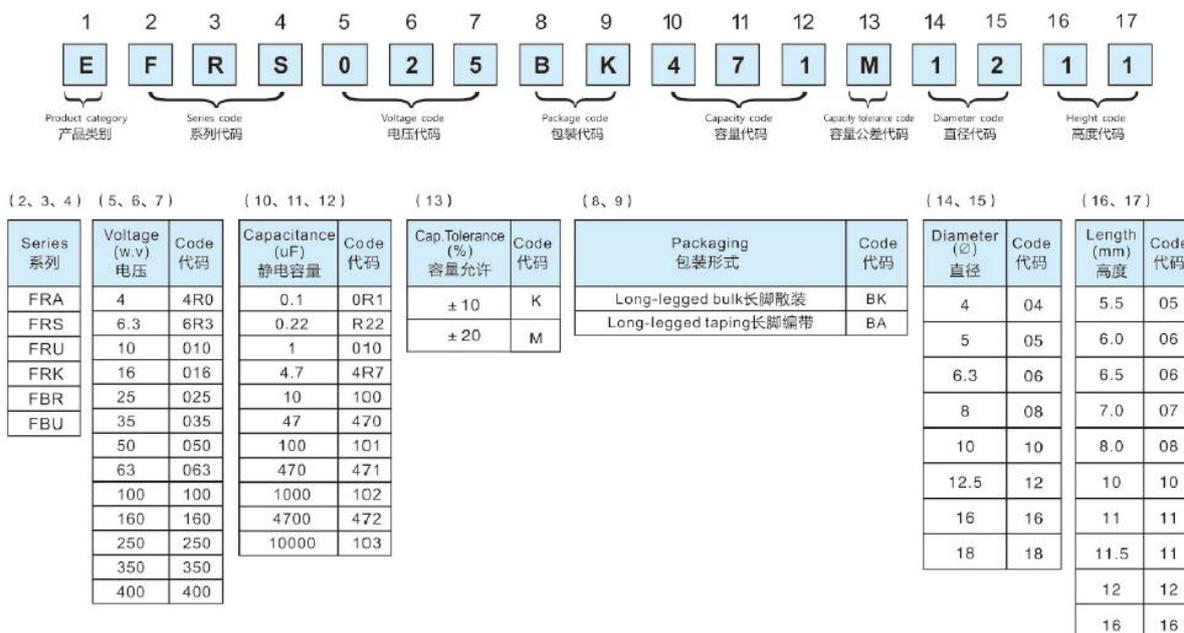
电容器标识内容如下:

- 产品系列:
Manufacture's mark
- 额定电压和标称容量:
Rated voltage and nominal capacitance
- 负极标识:
Negative polarity



1. 电容器代码标志: Explanation of Part Number

Radial EXPLANATION OF PART NUMBERS 插件产品编码规则



2. 铝电解电容器一般使用注意事项

Application guideline for aluminum electrolytic capacitors.

A) 电路设计: Circuit Design

1) 充分考虑电容器使用和安装条件在产品目录的规定范围内。

Please make sure the environmental and mounting conditions to which the capacitor will be exposed are within the conditions specified in catalogue.

2) 工作温度和施加的纹波电流应在产品目录的规定范围内。

Operating temperature and applied ripple shall be within specification.

3) 在设计电路时, 应选择符合寿命要求的产品。

Appropriate capacitors which comply with the life requirement of the products should be selected when designing the circuit.

4) 铝电解电容器是有极性的, 不应加反向电压或交流电压。对可能出现反向电压的电路, 应选择双极性电容器。注意: 即使双极性电容器, 也不能直接用于纯交流电路。

Aluminum electrolytic capacitors are polar. Make sure that no reverse voltage or AC voltage is applied to the capacitors. Please use bi-polar capacitors for a circuit that can possibly see reversed polarity.

Note: Even bi-polar capacitors cannot be used for AC voltage application.

5) 对需要快速和频繁充放电的电路, 不应使用铝电解电容器而应选择特别设计的具有长寿命的电容器。

Do not use aluminum electrolytic capacitors in a circuit that requires rapid and very frequent charge discharge. In this type of circuit, it is necessary to use a special design capacitor with extended life characteristics.

6) 不应使用过载电压。Do not apply excess voltage.

① 直流电压与纹波电压叠加后的峰值电压不应超过额定工作电压。

Please pay attention to that the peak voltage, which is DC voltage overlapped by ripple current, will not exceed the rated voltage.

② 若2个以上电容器串联, 应确保施加电压低于额定值, 而且要并联一个平衡电阻, 以使每个电容器所加电压相等。

In the case where more than 2 aluminum electrolytic capacitors are used in series, please make sure that applied voltage will be lower than rated voltage and the voltage will be applied to each capacitor equally by using a balancing resistor in parallel with the capacitor

- ③ 若 2 个以上电容器串联，应确保施加电压低于额定值，而且要并联一个平衡电阻，以使每个电容器所加电压相等。

In the case where more than 2 aluminum electrolytic capacitors are used in series, please make sure that applied voltage will be lower than rated voltage and the voltage will be applied to each capacitor equally by using a balancing resistor in parallel with the capacitor

7) 电容器不能应用于下述环境条件下：

Aluminum electrolytic capacitors shall not be used under the following environmental conditions:

- ①(a) 电容器被暴露于水（包括浓缩液）、盐水或油中。

Capacitors will be exposed to water (including condensation), brine or oil.

- (b) 周围环境中存在有硫化氢、亚硫酸、亚硝酸、氯气、溴气、溴化甲烷、氨气等有毒气体。

Ambient conditions that include toxic gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, bromine, methyl bromide, ammonium, etc.

- (c) 周围环境中存在有臭氧、紫外线及辐射。

Ambient conditions that expose the capacitor to ozone, ultraviolet ray and radiation.

- ② 严重的振动及机械冲击超过产品目录的规定范围。

Severe vibration and physical shock conditions that exceed specification.

振动的测试条件如下：

Vibration test condition: 振动频率范围： 10-55-10Hz

vibration frequency range: 10~55~10Hz 扫描频率： 10-55-10Hz/分钟

sweep rate: 10~55~10Hz/minute 扫描方式： 对数

sweep method: logarithmic 振幅或加速度： 1.5mm (最大加速度为 10G)

amplitude or acceleration: 1.5mm (max. acceleration is 10G)

振动方向： X、Y、Z 方向 direction of vibration: X, Y, Z direction

测试时间： 每个方向 2 小时 testing time: 2 hours per each direction

冲击一般不适用. Shock is not applicable normally.

如有特殊要求，请与我们联系。

If a particular condition is required, please contact our sales office.

- 9) 设计线路板时应确保发热元器件不靠近铝电解电容器或 PC 板的另一面，避免其正好在电容器下面。

Do not design a circuit board that the heat generating components are placed near the aluminum electrolytic capacitor or on the reverse side of PC board, if that just under the capacitor.

- 10) 设计线路板时应考虑到电容器的电性能可能随温度和频率的变化而变化。

Electrical characteristics may vary depending on changes in temperature and frequency. Please consider this variation when you design circuits.

- 11) 当 2 个以上电容器并联时，应考虑到通过这些电容器的电流平衡。

When you install more than 2 capacitors in parallel, please consider the balance of current flowing into the capacitors.

- 12) 在双面线路板上安装电容器时，电容器的安装位置应避开多余的基板孔和过孔。

While mounting capacitors on double-side PC board, the capacitors should be away from those unnecessary base plate holes and connection holes.

B) 安装: Mounting

- 1) 一旦电容器经过安装及加载，不要再试图用于其他线路板或其他用途。

Once a capacitor has been assembled in the set and power applied, do not attempt to re-use the capacitor in other circuits or application.

- 2) 贮存超过 2 年的电容器，其漏电流可能增大。若漏电流增大，请使用 1KΩ 电阻做放电处理。

Leakage current of the capacitors that have been stored for more than 2 years may increase. When leakage current has increased, please perform a voltage treatment using a 1kΩ resistor.

- 3) 在将电容器安装在 PC 板之前，请确认其规格和极性。

Please confirm specifications and polarity before installing capacitors on the PC board.

4) 不要将电容器掉在地上, 或不要使用掉在地上的电容器.

Do not drop capacitors on the floor, nor use a capacitor that was dropped.

5) 安装时请不要损伤电容器. Do not deform the capacitor during installation.

6) 清洗: Cleaning

① 不能用卤化清洗剂清洗电容器。如必须使用卤化清洗剂, 请与我们销售部门联系。

Do not clean capacitors with halogenated cleaning agent. However, if it is necessary to clean with halogenated cleaning agent, please contact our sales office.

② 推荐清洗方法: Recommended cleaning method

使用范围: 任何类型及规格 Applicable: Any type, any ratings

清洗方法: 浸泡、超声波或其他方法的总清洗时间应在 2 分钟内。清洗剂温度应在 40℃ 以下。清洗后, 应将电容器与 PC 板一起用热风吹至少 10 分钟。热风温度应低于电容器工作温度。水洗后若不充分吹干, 可能导致外观不良, 如座板发胀等。

Cleaning conditions : Total cleaning time shall be within 2 minutes by immersion, ultrasonic or other methods. Temperature of the cleaning agents shall be 40℃ or below. After cleaning, capacitors should be dried by using hot air for the minimum 10 minutes along with the PC board mounted. Hot air temperature should be within the maximum operating temperature of the capacitor. Insufficient dryness after water rinse may cause appearance problems, such as bottom-plate bulge and etc.

③ 避免使用破坏臭氧层的清洗剂以保护环境。

Avoid using ozone destructive substances as cleaning agents for protecting global environment.

C) 安装后

In the Equipment

1) 不要直接用手接触电容器正负极. Do not directly touch terminal by hand.

2) 不要在正负极之间用导体连接, 也不要不要在电容器及其附近溅撒导电液体, 如酸碱溶液等。

Do not link positive terminal and negative terminal by conductor, nor spill conductible liquid such as alkaline or acidic solution on or near the capacitor.

3) 在使用环境中应避免溅上水或油, 避免阳光直射、紫外线照射、辐射、有毒气体、振动或机械冲击。

Please make sure that the ambient conditions where the set is installed are free from spilling water or oil, direct sunlight, ultraviolet rays, radiation, poisonous gases, vibration or mechanical shock.

D) 维护和检验

Maintenance and Inspection

请定期检测安装在工业设备上的电容器。检测项目如下:

Please periodically inspect the aluminum capacitors that are installed in industrial equipment. The following items should be checked:

外观: 明显缺陷, 如防爆阀打开、电解液泄露等。

Appearance: remarkable abnormality such as pressure relief vent opening, electrolyte leaking, etc.

电性能: 电容量、损耗角正切、漏电流等, 具体数据参见产品目录和相关产品规格书。

Electrical characteristics: capacitance, dielectric loss tangent, leakage current and etc., which are specified in catalogue or alternate product specification.

E) 紧急情况 In an Emergency

1) 若看见因防爆阀动作而产生的烟气, 请关闭主开关或拔开离合器。

If you see smoke due to operation of safety vent, please turn off the main switch or pull out the plug from the outlet.

2) 若吸入气体或咽下电解液, 应立即用水清洗口腔和喉咙。

If you breathe the gas or ingest the electrolyte, please wash out your mouth and throat with water immediately.

3) 若皮肤沾上电解液, 请用肥皂和水清洗干净.

If your skin is exposed to the electrolyte, please wash it away using soap and water.

F) 储存 Storage

1) 不要将电容器储存在温度和湿度高的地方, 储存环境应为温度: 5°C-35°C, 相对湿度: <75%, 储存地点: 室内.

Do not keep capacitor in high temperature and high humidity atmosphere.

Storage conditions should be: Temperature: 5°C~35°C, Humidity: lower than 75%; Place :

Indoor

2) 避免电容器的储存环境中水、盐水或油。

Avoid ambient conditions where capacitors are covered with water, brine or oil.

3) 避免电容器暴露在臭氧、紫外线或辐射中.

Avoid ambient conditions where capacitors are exposed to ozone, ultraviolet ray or radiation.

G) 处置 Disposal

请用下面任何一种方法处置电容器:

Please take either of the following methods in disposing capacitors.

1) 在电容器壳体上开孔或将电容器压碎后焚烧.

Incinerate them after crushing capacitors or making a hole on the capacitor body.

2) 如不能进行焚烧, 请交给废物处理机构进行填埋.

If incineration is not applicable, hand them over to a waste disposal agent and have them buried in landfills

(M) 注意 MPORTANT NOTICE

MPORTANT NOTICE

注意

Jiangxi Follon Electronic Technology Co., Ltd. / Guangdong Follon Electronic Technology Co., Ltd. (FOLLON) reserves the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any products or services. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete.

江西富隆电子科技有限公司 / 广东富隆电子科技有限公司（以下简称富隆）保留对产品、服务、文档的任何修改、更正、提高、改善和其他改变，或停止提供任何产品和服务的权利。客户在下单和生产前应确保所得到的信息是最新、最完整的。

FOLLON assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using FOLLON components. 富隆对相关应用的说明和协助以及客户产品的板级设计不承担任何责任。

FOLLON products are not authorized for use in safety-critical applications (such as life support devices or systems) where a failure of the FOLLON product would reasonably be expected to affect the safety or effectiveness of that devices or systems.

富隆的产品并未授权用于诸如生命维持设备等安全性极高的应用中。

The acknowledgement document provided by FOLLON sales personnel shall prevail. The information included herein is believed to be accurate and reliable. However, FOLLON assumes no responsibility for its use; nor for any infringement of patents or other rights of third parties which may result from its use.

以富隆销售人员提供的承认书文档为准。本文中的相关信息是精确和可靠的，但富隆并不对其负责，也不对任何可能的专利和第三方权利的侵害负责。

If you have any questions, please contact our sales personnel.

如果您有任何疑问，请联系我们的销售人员。