



FANSO Wuhan FANSO Technology Co., Ltd.

**SPECIFICATION
FOR LITHIUM BATTERY
锂电池技术规范**

Model: CR2477-T (T TYPE)

Approved By (批准)	
Department (部门)	
Name (姓名)	
Title (标题)	
Signature/Date (签名/日期)	

(Remarks: The above table shall be filled by customer 上表须由客户填写)

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DATE : 2017-02-01

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PRODUCT SPECIFICATION

产品技术规范

(TYPE: CR2477-T)

BATTERY SYSTEM 电池体系		MANGANESE DIOXIDE LITHIUM PRIMARY BATTERY 锂-二氧化锰扣式电池
BATTERY TYPE 电池型号		CR2477-T
NOMINAL VOLTAGE 标准电压		3.0V
BATTERY MODEL 电池型号		CR2477-T
NOMINAL CAPACITY 标准容量		1000mAh (ON CONTINUOUS DISCHARGE UNDER 4.7kΩ load to 2.0V end-point) (负载 4.7kΩ 连续放电至2.0V终止,)
STANDARD DISCHARGE CURRENT 标准放电电流		0.6mA
MASS 重量		APPROX. 10.5g
Service Life of the normal temperature 常温使用寿命		Initial period ≥1500hours, after 20 days storage at room temp ≥1480hours
Service Life of the 20 days After Storage At High Temperature 60°C 高温60°C储存20天后使用寿命		High temp storage 60°C for 20 days ≥1480 hours
Self-discharge 自放电率		≤2%
TERMINALS 接线端	CAP TERMINAL 正极壳 CASE TERMINAL 负极盖	SUS430 SUS430
OUTER DIMENSIONS 外观尺寸	DIAMETER 直径 OVERALL HEIGHT 总高	φ24.5(+0/-0.3)mm 7.0(+0/-0.4)mm
USABLE TEMPERATURE RANGE 使用温度范围		-40°C ~ +85°C
STORAGE TEMPERATURE RANGE 储存温度范围		0°C ~ 30°C

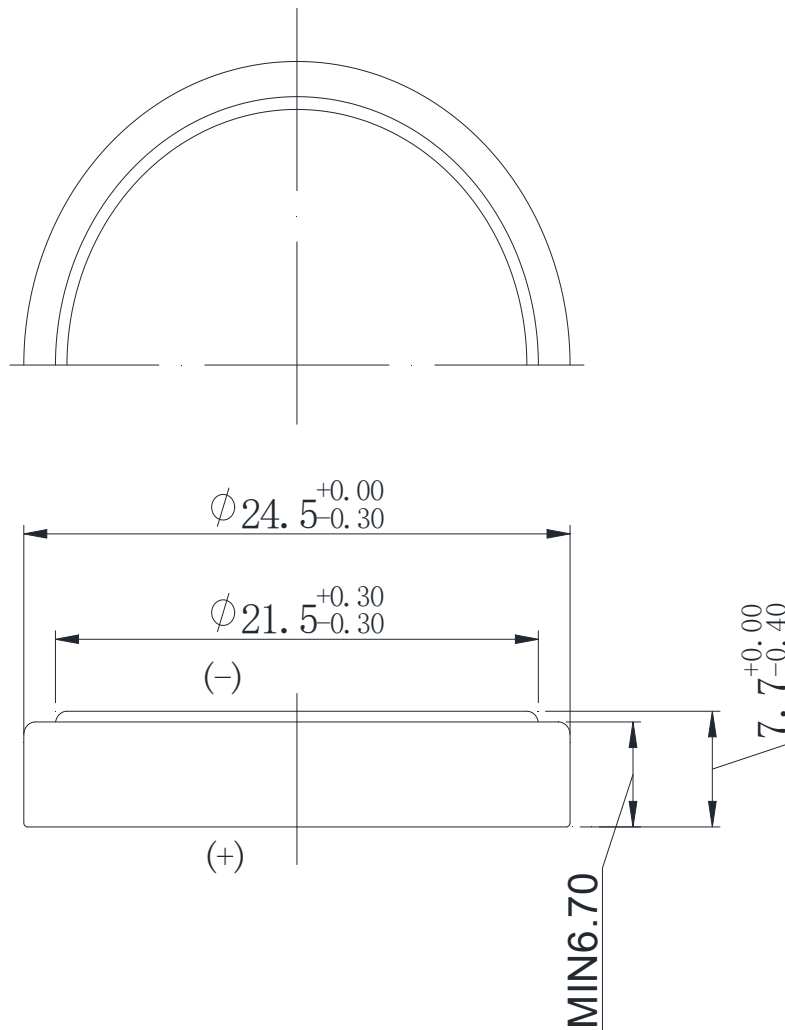


STORAGE HUMIDITY RANGE
储存湿度范围

35%~75%

The Dimensions Of CR2477-T 尺寸

Fig.1





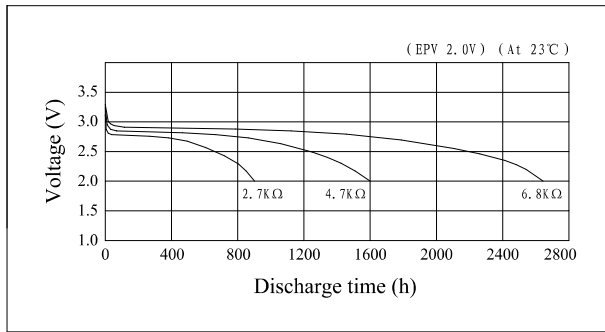
Lithium manganese dioxide battery

CR2477-T

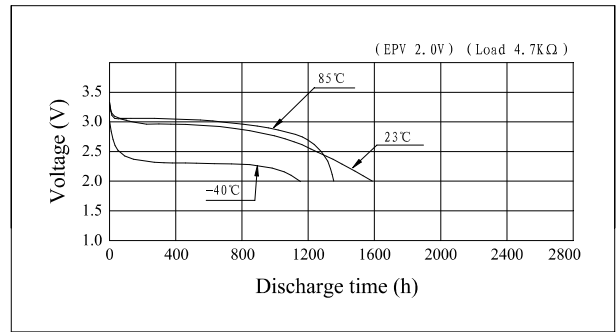
Specifications

Nominal Voltage	3V		A	$\phi 21.5$
Nominal Capacity	1000 (mAh)		B	$\phi 24.5^{+0.0}_{-0.3}$
Continuous standard load	4.7 (K Ω)		C	6.7 (Ref.)
Operating temperature	-40 ~ 85 $^{\circ}$ C		D	$7.7^{+0.0}_{-0.4}$
Weight	10.5 (g)			

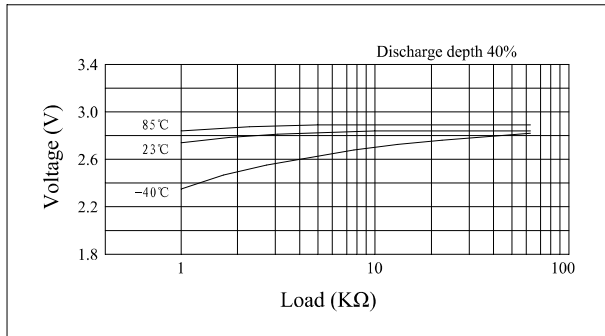
Discharge characteristics



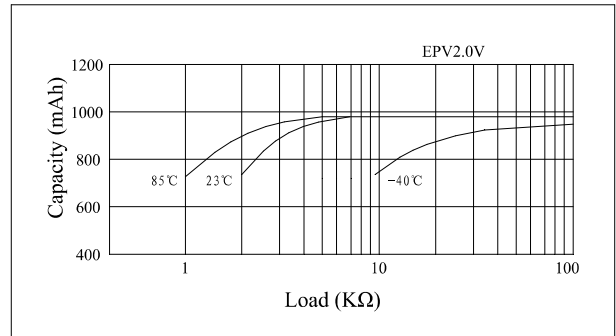
Temperature characteristics



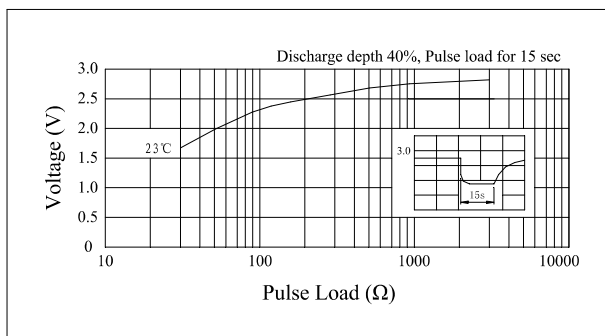
Load vs. Operating voltage



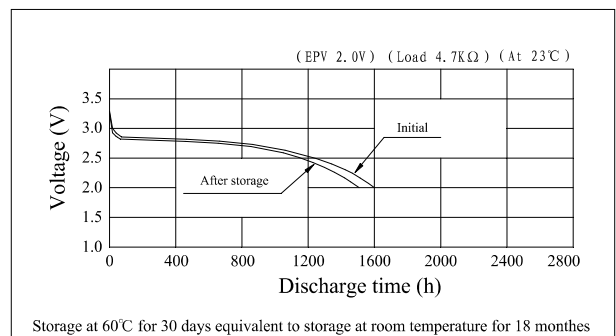
Load vs. Capacity



Pulse discharge characteristics



Storage characteristics





Precautions (注意事项)

● **Precautions in Designing** (设计注意事项)

To use the battery efficiently, observe the following precautions.
(为有效地使用电池, 请遵循以下注意事项)

1. Confirm the standard discharge current surely when batteries are used.
(使用电池时确认好标准放电电流)

※ This battery is not for heavy loading discharge.

(电池未加重负载放电)

Model 型号	Standard discharge current 标准放电电流
CR1025	0.1mA
CR1220	0.1mA
CR1620	0.1mA
CR1632	0.2mA
CR2016	0.1mA
CR2025	0.2mA
CR2032	0.2mA
CR2354	0.4mA
CR2430	0.2mA
CR2450	0.4mA
CR2477	0.6mA
CR3032	0.4mA

2. Maximum Allowable Charge Current to Battery

电池最大允许充电电流

A protection resistor is needed to prevent diode failure from allowing a large current to flow into the battery. The following table shows the maximum allowable charging current in the event of diode failure.

(保护电阻器用于阻止因二极管失效而导致大电流流入电池。以下表中列出万一二极管失效时最大允许充电电流)

Model 型号	Maximum allowable charging current 最大允许充电电流
CR1025	2.5mA
CR1220	2.5mA
CR1620	2.5mA
CR1632	2.5mA
CR2016	10mA
CR2025	10mA
CR2032	10mA
CR2354	10mA
CR2430	15mA
CR2450	15mA



CR2477	15mA
CR3032	15mA

[How to Calculate Protection Resistance R] (如何估算保护电阻R值)

Protection resistance R must exceed the value calculated in the following formula:

(保护电阻R值应超过以下公式估算的值)

$$R \geq \frac{V \text{ (Main power source voltage)}}{I \text{ (Maximum allowable charge current per battery)}}$$

※In this equation, the worst-case battery voltage (0) is assumed.

$$R \geq \frac{V \text{ (主电源电压)}}{I \text{ (每个电池最大允许充电电流)}}$$

※在这个方程式中，假定最坏电池电压为0V

3. Battery holder and battery chamber (电池座和电池室)

- (1) Design a battery chamber which the electric is not connected when a battery was reversed.
Describe the correct loading direction of battery surely and indelibly on a battery chamber.
(设计电池室以防因电池颠倒而引起的电流不通。描绘电池正确的加载方向于电池室里，确保其无疑并不可磨灭)
- (2) Design a battery chamber which other size batteries can not be inserted or connected.
(设计的电池室应无法嵌入或连接其它不同型号的电池)
- (3) Design a battery chamber which is outgassed easily. (设计的电池室应易通气)
- (4) Design a battery chamber preventing water entering. (设计的电池室应防水)
- (5) Add the feature of explosion protection to a battery chamber when it is sealed.
(电池室密封时应增加防爆功能的装置)
- (6) Set a battery chamber apart from heat source equipment.
(设计的电池室应远离热源设备)
- (7) Design a battery chamber which children can not pull out easily.
(设计的电池室小孩应不易拔出)

4. Interface and terminal (交界面和接线端)

- (1) Make sufficient quality and shape for electric connection.
(为电连接确保足够的质量和形状)
- (2) Design an attached circuit which prevents the batteries reversed.
(设计附属电路以防电池颠倒)
- (3) Shape the battery preventing from being reversed. (设计电池形状以防其被颠倒)
- (4) Do not solder or weld to batteries directly. (切勿直接焊接电池)

5. List the precautions (注意事项列表)

- (1) Main body (机身)
Specify the loading direction of battery on battery chamber.
(在电池室内明确说明电池的加载方向)
- (2) Manual (指南)
List the precautions how to handle batteries. (列出如何操作电池的预防措施)



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6. Do not solder the battery directly. Excessive heating may cause deformation of the battery components such as the gasket, which may lead to the battery swelling, leakage, explosion or ignition. (切勿直接焊接电池。过热会造成电池构件变形，例如密封胶圈的变形可能导致电池膨胀，漏液，爆炸或着火)
7. Observe the soldering condition for the tabbed battery to be specified by the manufacturer. Choose the tabbed battery if soldering is required.
Excessive heating may cause deformation of the gasket, leakage or performance deterioration of the battery. Assure not to exceed the battery temperature higher than 60°C at soldering. (遵循制造商指定的标签电池的焊接条件。如果需要焊接，请选择标签电池。过热会造成密封胶圈变形，漏液或电池性能退化。确保焊接时电池温度不超过60°C)
8. Use iron or stainless steel for the terminals that contact the battery. (使用铁或不锈钢作为连接电池的接线端材料)
9. Make sure that terminal contact pressure is 100g minimum for stable contact. (确保在持续接触时，接线端触点压力最低限度为100g)
10. Keep the battery contact terminal surfaces clean and free from moisture and foreign matter. (保持电池接触端点表面洁净，没有水分和杂质)
11. Before inserting the battery, check the battery contact terminals to make sure they are normal, not bent or damaged. Bent terminals may not make good contact with the battery or may cause it to short-circuit. (在嵌入电池前，检查电池接触端点确保他们是正常的，没有弯曲或损害。弯曲的接线端可能导致无法良好地连接电池或引起短路)
12. Do not overdischarge the battery lower than 0V. It may lead to reversed polarity and cause ignition, heating, leakage or explosion. (电池切勿过放电至低于0V。它可能导致反极性，引起着火，变热，漏液或爆炸)
13. Lithium Manganese Dioxide Battery that is almost exhausted still maintains high output voltage that is almost the same as that of a fresh battery. Avoid using a mixture of old and new batteries; replace all batteries in a set with new ones. (锂-二氧化锰电池耗尽时仍可保持高的输出电压，几乎与新的电池无异。避免新旧电池混用，请整套更换新电池)
14. Lithium Manganese Dioxide Battery requires considerable time to regain their normal voltage after even a slight short-circuit. Therefore, should the battery be short-circuited, wait an adequate time for the battery to recover before measuring its electrical characteristics. (锂-二氧化锰电池需要相当长的时间恢复到它们的正常电压即便是轻微短路。因此，短路的电池在测量其电性能前，需要足够的时间恢复)
15. Use a high impedance (1MΩ or higher) voltmeter to measure battery voltage. (使用高阻抗 (1MΩ or 以上) 电压表测量电池电压)
16. Battery characteristics vary with type and grade, even when batteries are the same size and shape. When replacing batteries with new ones, be sure to carefully check the symbols and numbers on each battery. (电池特性随型号和级别而变化，即便是同样大小和形状。在更换新电池时，务必仔细检查每个电池上的符号和数字)
17. Please design equipment so that infants cannot easily remove batteries and swallow them.



(请设计装备以致小孩不易移动和吞食)

18. Consult the sales representative, when series or parallel connection of several batteries is required. (如有必要多个电池串联或并联, 请咨询销售代表)

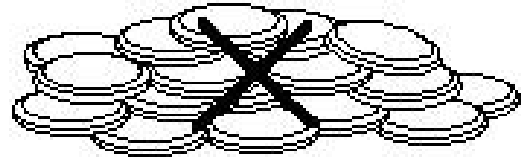
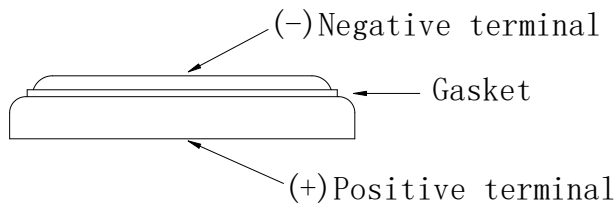
●Precautions for Mounting (安装注意事项)

Unlike other electronic components, Lithium Manganese Dioxide Battery(Coin-type) may be externally short-circuited before and after it is installed in circuit boards and without the power being turned on. This causes power drainage. As a result, the battery may lose its capacity before the equipment is even used. As short-circuits tend to occur in the following cases, please take care when handling the battery.

(不同其它电子零件, 锂-二氧化锰电池(扣式)在安装到电路板前后可能会外部短路, 同时动力未开启。这会造成动力流失。因此, 甚至在设备使用之前电池就可能会损失它的容量。例如短路发生在以下情况下, 请谨慎操作电池)

1. Overlapping Batteries (重叠电池)

Lithium Manganese Dioxide Battery is shaped as shown below. It has exposed positive(+)and negative(-) metallic surfaces with a thin cylindrical seal, called the gasket, inbetween them. When the batteries are overlapped or mixed together in a disorderly way, their positive(+)and negative(-)terminals touch each other, causing short-circuits. (锂-二氧化锰电池形状如下所示。它敞开的正极与负极间仅仅由一圈很窄的环状(密封圈)相隔离, 当电池杂乱地重叠堆放时, 它们的正极(+)和负极(-)端会相互接触而造成短路)



2. The Batteries Put in a Metallic Container or on a Metallic Plate

(将电池放入金属容器或金属盘里)

Similar to the overlapping battery problem, when the batteries are put in a metallic container or on a metallic plate, their positive(+)and negative(-)terminals may short-circuit through the conductive surface, depending on how the batteries are position.

(与重叠电池问题相似, 当电池放到金属容器或金属盘里, 它们的正极(+)和负极(-)端可能会通过导电性的表面和电池的位置而造成短路)

3. When The Battery is Held with Metallic Tweezers (当用金属镊子夹电池时)

When held with a pair of metallic tweezers as shown, the battery short-circuits through the tweezers. (当用一副金属镊子夹电池时, 电池通过金属镊子短路)

4. When The Battery Lead Plates Touch Each Other (当电池引线相互接触时)

When the battery lead plates bend and touch each other or other either terminal, the battery short-circuits. (当电池引线弯曲并相互接触或其它接线端接触时, 电池短路)

5. Solder Bridges (焊桥)

Solder may bridge between circuit board conductors, causing a short-circuit and draining the battery. (焊接可能桥连电路板导体, 造成短路, 耗尽电池)



6. Short-circuits through Soldering Irons (通过烙铁短路)

Similar to solder bridging, when the circuit board wiring is short-circuited by a soldering iron for an extended period the battery is drained and consumed. Complete short-circuits through soldering irons within 5 seconds. (与焊桥相似, 当电路板线路被烙铁超时接触时引起短路, 电池能量将会流失并耗尽。通过烙铁短路应在5秒内结束)

7. Short-circuits through Piled Circuit Boards (通过堆叠的电路板短路)

When circuit boards with the batteries are piled on top of one another, their conductive traces may touch and form a battery discharge circuit that consumes the battery's power.

(当加载电池的电路板相互堆叠, 它们导电性的线路会接触而形成电池放电电路消耗电池能量)

8. Discharge through Conductive Electrostatic Prevention Mats

(通过导电的防静电垫短路)

Conductive mats are widely used to prevent static electricity from destroying semiconductors. If a circuit board with mounted battery is put on a conductive mat, the soldered conductors may touch the mat, providing a discharge path for the battery.

(导电垫广泛用于防止静电破坏半导体。如果安装电池的电路板放在导电垫上, 焊接的导体会接触到导电垫, 从而为电池提供了放电电路)

9. Improper Battery Mounting Polarity (不正确的电池极性安装)

When the battery's positive (+) and negative (-) terminals are reversed with respect to the battery mounting's polarity marks, the battery may be discharged, depending on the type of electric circuit. (当电池的正极 (+) 和负极 (-) 端相对电池极性安装标识而言颠倒安装时, 电池可能会因电路的类型而放电)

10. Solder (焊接)

When the battery lead plates are dipped in a molten solder bath, the battery is temporarily short-circuited. Therefore, complete dipping within 5 seconds. (当电池引线金属片同时浸入软焊料浴中, 电池会暂时短路。因此, 浸渍应在5秒内完成)

● Handling Precautions (操作注意事项)

Please read and observe the following precautions thoroughly.

Lithium Manganese Dioxide Battery contains flammable materials, such as organic solvent. Improper battery handling may cause leakage, heating, explosion or ignition of the battery, which may lead to injury or product failure. (请彻底地阅读并遵循以下注意事项。)

(锂-二氧化锰电池含有易燃材料, 例如有机溶剂。操作电池不当会引起电池漏液, 发热, 爆炸或着火, 甚至会造成受伤或产品不合格)

<WARNING> <警告>

(1) Never charge the battery. Charging the battery may cause seethe of the battery electrolyte or increase of the battery internal pressure. Leakage, heating, explosion or ignition of the battery may be caused as a result of it. (切勿对电池充电。对电池充电会导致电池电解液沸腾或增加电池内部压力。正因如此, 可能会导致电池漏液, 发热, 爆炸或着火)

(2) Keep away from infants. If infant happens to swallow the battery, consult a doctor immediately. (远离小孩。如果发生小孩吞食, 请立即咨询医师)

(3) In case of eye contact with the battery electrolyte, immediately flush eyes thoroughly with water, and consult a doctor.

(万一电池电解液入眼, 立即用水彻底地冲涮眼睛并咨询医师)



- (4) In case the battery electrolyte happen to come into mouth, gargle well enough and consult a doctor immediately. (万一电池电解液入口, 充分地漱口并立即咨询医师)
- (5) Do not heat or disposed in fire or water. Do not modify or disassemble the battery. It may damage the gasket, and may cause ignition, heating, leakage or explosion.
(切勿加热或丢入火、水中处理。切勿改变或分解电池。这样做可能会破坏密封胶圈, 从而导致着火, 发热, 漏液或爆炸)
- (6) Do not short-circuit positive (+) and negative (-) terminals. Keep away from metal or other conductive materials. Jumbling the batteries of direct contact with positive (+) and negative (-) terminals and metal or other conductive materials may cause short.
(切勿让正极(+)、负极(-)端短路。远离金属或其它导电性的材料。把电池与金属或其它导电性的材料混在一起而使电池正极(+)、负极(-)端直接接触会导致电池短路)
- (7) When the battery is stored or disposed, isolate positive (+) and negative (-) terminals of the battery to avoid those terminals touch each other.
(当电池要被保存或处理, 隔离电池的正极(+)、负极(-)端以免这些接线端相互接触)
- (8) Insert the battery with positive (+) and negative (-) terminals correctly oriented.
(按正确的正极(+)、负极(-)端方向嵌入电池)

<PRECAUTIONS> <防范>

- (1) Do not put the battery into microwave oven or drying machine.
(不要将电池放入微波炉或烘干机中)
- (2) Do not drop, apply excessive damage or deform the battery.
(不要跌落, 使用过度损坏或变形的电池)
- (3) Do not mix the used battery together with the new battery or different type of batteries.
(不要与新电池或不同型号的电池混合使用)
- (4) Do not store the battery in high temperature and high humidity location and where the battery is exposed to sunlight to avoid performance deterioration, swelling or leakage, of the battery.
(不要将电池储存在高温高湿的场所或暴露于阳光下, 以防电池性能退化, 膨胀或漏液)