

Technical specification

Li-MnO₂ Battery

Model : **CR123A**

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1. Scope

This technical specification applies to **CR123A** produced by Wuhan Fanso Technology Co.,Ltd.

2. Battery type

Lithium Manganese Dioxide battery (3.0V LiMnO₂ Battery)

3. General characteristics

No.	Item	Characteristics	Remarks
3.1	Model	CR123A	
3.2	Nominal voltage	3.0V	
3.3	Standard discharge current	5mA	
3.4	Nominal Capacity	1500mAh	5mA, 23±3°C , 2.0V cut off
3.5	Max constant current	1000mA	23±3°C , max current value with 50% normal capacity discharged to 1.5v cut-off
3.6	Max pulse current	2500mA	23±3°C下 , at 5mA with discharge depth of 50% normal capacity, at 2500mA for 15 seconds, yield battery voltage of no less than 2.0V
3.7	Operating temperature	-40 ~ +70°C	
3.8	Recommend storage	Temperature : 0 ~ 30°C Humidity : <70% RH	
3.9	External dimension	MaxΦ17×34.5	Refer to attached dimension drawing
3.10	Standard weight	Approx. 17g	
3.11	Annual self-discharge rate	≤2%	At 23±3°C and humidity <70% RH

4. Appearance and structure

4.1 Appearance

The battery trademark is intact, there is no shedding of components, no scratches, swollen, deformation, corrosion and rust, liquid leakage and other phenomena.

4.2 Structure

Fully sealed structure, built-in thermistor and explosion-proof device, high safety, positive and negative poles can be led out by means of welding tabs, leads and connectors for the convenience of users.

5. Typical electrical performance

Item	Test condition	Standard Value
Open Circuit Voltage	23±3°C	3.10V~3.3V
Load Voltage	23±3°C , 3.3Ω, at the final stage of 1 second	≥2.6V
Slow discharge capacity	23±3°C , 5mA , 2.0V cut-off	≥1500mAh
Rapid discharge capacity	23±3°C , 0.9A 3S ON 27S OFF, 1.55V cut-off	≥1500times

6. Safety and environmental performance

6.1 Environmental performance

6.1.1 Heating cycle test

Batteries are placed in a test chamber and subjected to the following cycles:

- a = 30min raise to 70±3°C, maintaining 4h.
- b = 30min release to 20±3°C, maintaining 2h.
- c = 30min release to -40±3°C, maintaining 4h.
- d = 30min raise to 20±3°C.
- e = Repeating the sequence for a 9cycles.
- f = after 10 cycles, battery be static placed for 7 days.

Pass/Fail criteria: no fire, no explode, no leakage.

6.1.2 Altitude Simulation

Sample batteries are to be stored for 6h at an absolute pressure of 11.6KPa(1.68psi) and a temperature of $20\pm 3^{\circ}\text{C}$ ($68\pm 5^{\circ}\text{F}$)

Pass/Fail criteria: No fire, no explode, no leakage

6.1.3 Drop test

Cell drop from 1.9m height onto cement ground (total 10 times).

Pass/Fail criteria: No fire, no explode, no leakage

6.1.4 Vibration test

Battery vibration frequency is to be varied at the rate of 1 Hz per minute between 10 and 55 Hz and last for 90 to 100 minutes, test in three mutually perpendicular directions.

Pass/Fail criteria: No fire, no explode, no leakage

6.2 Safety test

6.2.1 Heating

Battery is heated in a gravity convection or circulating air oven. The temperature of the oven is to be raised at a rate of $5\pm 3^{\circ}\text{C}$ per minute to a temperature of $130\pm 2^{\circ}\text{C}$ and remain for 10 minutes at that temperature before the test is discontinued.

Pass/Fail criteria: No fire, no explode

6.2.2 Impact

A test sample cell was placed on a flat surface. A 5/8 in. (15.8 mm) diameter steel bar was placed across the center of the sample. The length of the bar should be at least as long as the width of the sample. A 20 pound (9.1 kg) weight was dropped from a height of 24 ± 1 in. (610 ± 25 mm) on to the sample.

Pass/Fail criteria: No fire, no explode

6.2.3 Crush test

A cell was crushed between two flat hard surfaces (i.e. steel). The crushing was continued until a force of 3000 pounds (13kN±0.78kN) was applied by hydraulic piston with a diameter of 32mm. Press continued until pressure reach up to 17.2Mpa. Once the maximum pressure was obtained, it was released.

Pass/Fail criteria: No fire, no explode

6.2.4 Forced discharge

A completely discharged cell is to be force-discharged by connecting it in series with fully charged cells of the same kind. The number of fully charged cells to be connected in series with the discharged cell is to equal the maximum number less one of the cells to be covered for series use, the circuit load resistance less than 0.1Ω. The sample is to discharge until a fire or explosion is obtained, or until it has reached a completely discharge state of less than 0.2V and battery case temperature has returned to ±10°C(+18°F) of ambient temperature.

Pass/Fail criteria : No fire, no explode

6.2.5 External Short-circuit

Connect the battery positive and negative terminal with Cu wire(internal resistance < 0.1 ohm), battery was discharged until a fire or explosion was obtained, or until it had reached a completely discharged and the cell case temperature had returned to room temperature.

Pass/Fail criteria: No fire, no explode

6.2.6 Forced recharging

Tested battery is subjected to a charging current of three times of the current specified by the manufacturer by connecting to DC-power. The specified charging current is to be obtained by connecting a resistor of specified size and value.

The test time is calculated from the formula below:

$$T_c = 2.5 \times C / (3 \times I_c)$$

In which

T_c ——charge time (h)

C ——Nominal capacity (Ah) ;

I_c ——charging current specified by manufacturer.(A)

Pass/Fail criteria : No fire, no explode

7. Inspection

FANSO will 100% inspect the open circuit voltage and load voltage of the batteries, and test capacity, appearance and dimensions on a sampling basis for each delivery before shipment

Regarding incoming inspection, FANSO recommends the sampling plan of GB2828.1.2012

No.	Item	Sampling (GB2828.1.2012)	
		QC level	AQL
7.1	Open Circuit voltage	II	0.065
7.2	Load voltage	II	0.065
7.3	Appearance	II	1.0
7.4	Dimension	S-1	1.0
7.5	Capacity	As destructive testing, the customer can determine on the basis of the actual situation.	

8. Storage

Battery should be placed in cool ,dry and clean environment, and the recommended surrounding temperature is 0 ~ 30°C with humidity level of less than 70% RH , far away from the fire and heat source and not contact with corrosive substance.

9. Usage safety

9.1 Important Notes

- 9.1.1 Before use, do not remove the battery from the original packaging.
- 9.1.2 Do not scattered placed the battery together in order to avoid accidental short circuit.
- 9.1.3 Do not heat the battery above 80°C or incinerated.
- 9.1.4 Do not charge or short the battery.
- 9.1.5 Do not mixed with different brand, model or type batteries.
- 9.1.6 Do not mix the new and used batteries.
- 9.1.7 Do not disassembly or open battery.
- 9.1.8 Do not reversely contact the positive and negative terminals.
- 9.1.9 Do not solder directly on the battery surface.
- 9.1.10 Do not test environment and safety under extrusion without any protection.
- 9.1.11 Do not throw the battery to water.

10. Transportation

10.1 Batteries should be protected against sunlight, fire, rain, immersion, and corrosive substances in transportation.

11. Important Notice

11.1 Any complaint should be responded to FANSO within one year from delivery time. If battery found defective within this date, FANSO will offer qualified cells to all FANSO customers during this quality guarantee period.

11.2 In practical applications, customer should be responsible for the compatibility and reliability of the battery and the device.

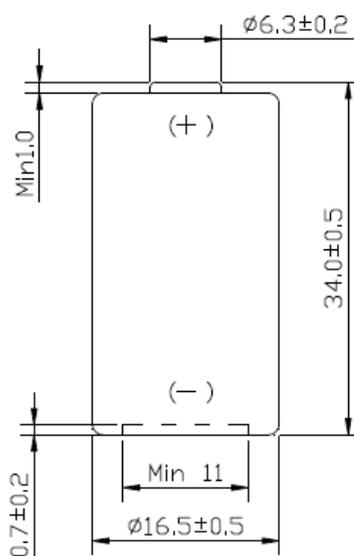
11.3 In any of the following circumstances, FANSO will not take any responsibility: the client' s fails of appropriate treatment, operation, installation, testing, maintenance and inspection of the battery, or do not follow the instructions provided in the specification, notes, terms, and other FANSO instructions.

11.4 This specification is effective after 6 months if not received further questions or response from customer within six months from the date of receipt this datasheet.

12. Statement

Before use FANSO batteries, please operate or use the battery strictly according to the battery datasheet, any misuse may result in safety problem and cause body hurt or property loss. Fanso will not be responsible for any unexpected accident due to misuse or not use according to the specific requirements or important notes written in this specification.

13. Battery dimension



Unit : mm