

TECHNICAL SPECIFICATION

Lithium Manganese Dioxide Battery

Model: CR123A

Approved	Checked	Draft
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Revision Record

Version	Reviser	Revise page	Established Date	Revise reason
A	Wang Chao	All	2016.06.30	First Edition
B	Fu Hongli	Page 3&4	2016.10.19	1、 The notice is changed from contact in case continuous high temperature over +60℃ to over +40℃
C	Zhu Liang	Page 3	2016.12.1	1、 Add pulse cycles test

1. Scope

The document applies to CR123A (Li/MnO₂) battery supplied by EVE Energy Co., Ltd. Specify quality, test method, performance, quality assurance and matters need attention etc..

2. Nominal specification

2-1	Model	CR123A
2-2	Nominal Voltage	3.0V
2-3	Nominal Capacity	1400mAh (Nominal capacity is based on the standard discharge current and cut-off voltage 2.0V at 20±3°C.)
2-4	Standard Discharge Current	20mA
2-5	Max continuous Discharge Current	1A at 20±3°C
2-6	Dimension	See attached drawing
2-7	Weight	Approximately 17g
2-8	Appearance	Free from flaw, stain, deformation, leakage and other defects.
2-9	Temperature	Operating: -40~70°C (Note: Contact EVE in case continuous high- temperature over +40°C or low-temperature down to -10°C usage conditions.)
2-10	Recommendable Storage Condition	Temperature: 5°C~35°C Humidity: Less than 70%RH
2-11	Battery Composition	Lithium primary battery composed of cathode from manganese dioxide, anode from lithium, and electrolyte from organic solvent and lithium salt.

3. Battery characteristics

NO.	Item	Test Temperature	Value
3-1	Open circuit voltage	20±3°C.	3.0~3.3V
3-2	Impedance	20±3°C.	0.1~1Ω

3-3	Pulse Cycles	20±3℃.	1500cycles min (20±3℃) 700cycles min (-20±3℃) Pulse pattern:0.9A 3s ON 27s OFF,End Voltage:1.55V (20±3℃) End Voltage:1.20V (20±3℃)
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4. Test

4.1 Test condition

The test normal condition is as follow (unless otherwise specified)

Temperature: 20±3℃, Relative Humidity: 65±10%, Pressure: 1.0atm.

4.2 Test Instrument

Dimension measurement: Caliper with accuracy of ±0.02mm, or gauge with the same accuracy.

4.2.1 Voltmeter: The tolerance shall be ±0.01V and the input resistance rating shall be 10MΩ or more.

4.2.2 Exactitude resistance: accuracy of ±0.5%.

4.2.3 Impedance meter: accuracy of ±0.5%.

4.2.4 Constant temperature oven: accuracy of ±2℃.

4.2.5 Electronic scale: tolerance shall be ±0.01g.

4.3 Initial test

Batteries should be tested in the first 1 month after delivery

4.3.1 Outside dimensions

The gauge as specified in 4.2 is used. The result should meet the requirement of 2-6.

4.3.2 Weight

The gauge as specified in 4.2 is used. The result should meet the requirement of 2-7.

4.3.3 Open circuit voltage

Batteries should be stored for 12 hours at the normal conditions. Then at the same circumstance use voltmeter, specified in 4.2 to measure voltage between "+" and "-". Results should meet the

requirement of 3-1.

4.3.4 Impedence

Batteries should be stored for 12 hours at the normal conditions. Then at the same circumstance, use impedance meter, specified in 4.2 to measure impedance between "+" and "-". Result should meet the requirement of 3-2.

4.3.5 Temperature cycling test

The batteries are to be placed in a test chamber and subjected to the following cycles: raising the chamber temperature to $70\pm 3^{\circ}\text{C}$ within 30min and maintaining for 4h, then reducing the chamber temperature to $20\pm 3^{\circ}\text{C}$ and maintaining for 2h, then reducing to $-40\pm 3^{\circ}\text{C}$ and keep it for 4h, at last, raising to $20\pm 3^{\circ}\text{C}$ with 30min. Repeat the sequence for a further 9 cycles. Then check appearance at normal condition with naked eyes. Batteries should be of no leakage.

4.3.6 Vibration Test

This test shall be carried out by the following condition according to UN Manual of test and Criteria, Part III, sub-section 38.3.4.5. Amplitude: 0.8mm; Frequency: 7 Hz to 200 Hz; Duration: 15 minutes; Directions: X Y Z; Duration: 15 minutes, 12 times (each direction).

4.3.7 Appearance

Deformation or tarnish shall be visually checked. The result should meet the requirement of 2-8.

5. Security

Through America UL1642 security certification testing, certification number is MH28717.

6. Mark

6.1 Battery type : CR123A

6.2 Battery brand name: EVE

6.3 Mark: "MM", "YY" stand for "month" and "year"

6.4 Polarity: "+" stand for cathode, "-" stand for anode

7. Incoming inspection

Before shipping, EVE will 100% check open circuit voltage of the battery (OCV) and the load voltage. Also EVE will sampling tests the battery capacity, visual appearance and size.

As for the customer's incoming inspection, EVE recommended sampling according to

GB2828.1-2003, GB2829-2002 standard.

Table 1 Acceptability quality level

No	Item	Technical request	Check level	AQL
1	Dimension	2-6	S-2	0.65
2	Appearance	2-8	II	1.0
3	Open circuit voltage	3-1	II	0.4

Table 2 Sampling amount

Lot size	Sampling amount
≤3200	32
3200~10 000	50
>10 000	80

8. Package

The batteries are packed as the agreement of the customer and supplier. The box should have the eligible identifiers and QC PASS mark.

9. Transportation

The battery out of factory is full of electric power, so avoid fierce shake, strike and squeeze. Avoid the direct sunshine and raining.

10. Warnings and Cautions

Lithium batteries contain volatile materials such as lithium, organic solvents and other chemical ingredients. Incorrect handling of lithium batteries may result in heat generation, fire or explosion, with the risk of personal injury or damage. To prevent accidents when handling batteries, be sure to follow the following precautions.

- Do not short circuit, charge or make the anode and the cathode reversed.
- Do not force-discharge, squeeze, puncture or burn the battery
- Do not disassemble the battery
- The battery should be taken off from instrument when it is consumed to cut-off voltage, and dispose according to local laws, or hand it to professional recycle institution.
- Do not mix different types of batteries.

- Do not expose the battery in the environment of over 85°C.
- Do not solder directly onto battery, please use wire or nickel sheet by spot welding.
- Store the battery by original pack to avoid any possibility of external short circuit.
- Don't store the battery in ESD bag and foam.
- Don't store battery in electric metal surface.
- Do not stack or jumble batteries.
- Don't pack battery connected with any kinds of lead random in paper box or pack belt.
- Batteries shall be far away from children, and take measures to prevent the swallow as much as possible

11. Modification of this specification

Modification must be carried out after the prior mutual agreement. All accident or issues caused by any events that are neither defined nor described in this specification, mutual discussion shall take place for the resolution.

12. Important notes

- 1) The batteries are warranted to conform to the description contained in this specification for a period of twelve [12] months from the ex-factory date without use, any claim by customer (apparatus manufacturer or distributor) must be pointed out within such period. During that warranty period, if the batteries are proved to become defective under proper stored and handled, EVE will replace the batteries for free.
- 2) Customers are responsible to confirm and assure the matching and reliability of batteries under actual application.
- 3) EVE shall not warrant or be responsible in any case where customers fail to carry out proper handing, operating, installation, testing and maintaining batteries, or don't follow the instruction, cautions, warnings, notes provided in this specification and other EVE's reasonable instructions or advises.
- 4) This product specification will be validated assuming that it is accepted when it is not returned within six months from the date of issue.

13. Remark of production duty

Customers must strictly operate according to specification and advises of EVE ENERGY CO., LTD. Operation at temperature different from ambient may lead to reduced capacity and lower voltage reading at the beginning of pulses. EVE will be exemption from liability if the batteries are improper used or abused and then cause fire, explosion, the human body or property damage.

14. Drawing

