Upower

MC-ER14505

3.6V Lithium-thionyl chloride[Li-$SOCl_2$]
AA-size bobbin cell

No.	Revision	Author	Revision of Content	Revision Time
1	V1.0		First release	07-2025

1.Scope of application

This specification sheet is applicable to the MC-ER14505 produced by Master Battery, and specifies the performance indicators, testing methods, and safety precautions for use of the product.

2.Product type

Lithium thionyl chloride battery

3. Basic features

No.	Item	Features	Remark
3.1	Model	MC-ER14505	/
3.2	Nominal voltage	3.60V	Test at 25 ± 5 ºC under the condition of 36KΩ/0.1mA
3.3	Nominal voltage	2600mAh	25 ± 5 ºC, measured with 3.6K Ω/1mA and a cut-off voltage of 2.0V (the measured capacity may vary with storage time, current, and temperature, please consult Master Battery for details)
3.4	Operation temperature range	-55ºC~+85ºC	When the temperature is higher than the ambient temperature, it may cause capacity reduction and low voltage. Please consult Master Battery for details.

4.Appearance and structure

4.1 Appearance: The electrodes of the battery are without corrosion, and the battery body is without leakage, swelling, and deformation. The trademark film cover shrinks smoothly, and positive and negative terminals' markings are correct and clear.

4.2 Structure: The MC-ER14505 battery has a "bobbin" electrode structure. It adopts a hermetic sealing structure to prevent issues such as leakage and discharge under extreme environments.

5.Typical values of basic electrical performance

5.1 Testing items

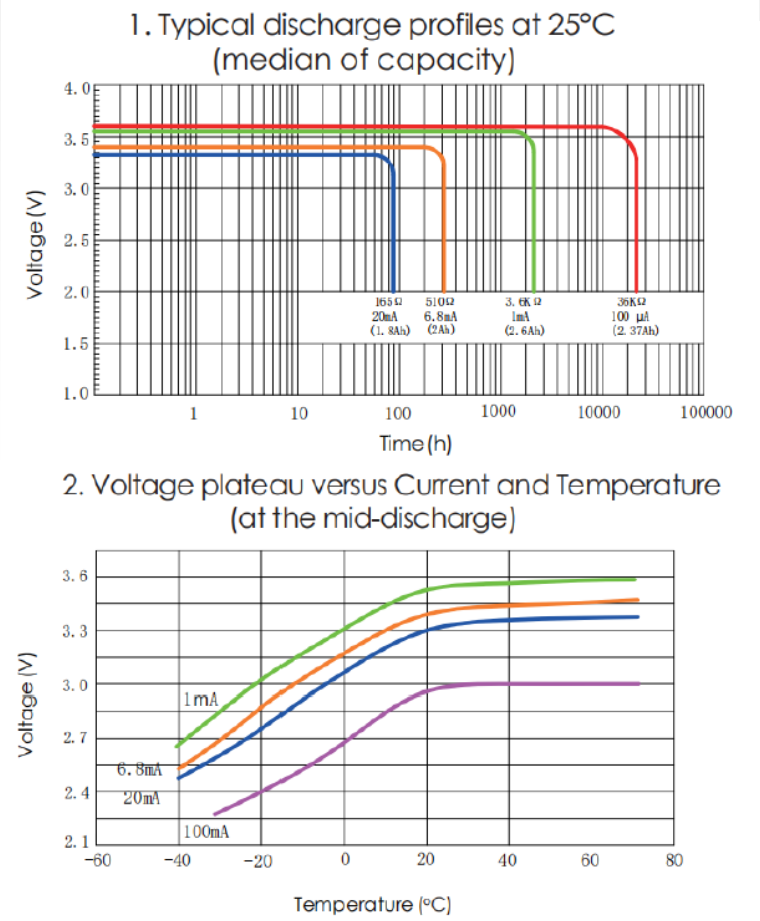
No.	Item	Test condition	25±5ºC New battery within 3 months	25±5ºC After 3 to 12 months storage
Typical values of voltage				
5.1.1	OCV	25±5ºC	3.64V~3.74V	3.64V~3.75V
5.1.2	CCV	25±5ºC 165Ω, end of 3s	3.25V	3.20V
Typical values of capacity				
5.1.3	Discharge capacity	25±5ºC 165Ω, end of 3s Battery upright (positive terminal up), cut off voltage 2.0V	1.8Ah	1.7Ah

Note: Due to the special chemical properties of batteries, the measured electrical performance may vary with storage time, current, and temperature. Please consult Master Battery for details.

5.2 Test equipment

1) Voltmeter：Voltmeter with an accuracy of not less than 0.25% should have an internal resistance of not less than 10M Ω.
2) Precision resistor: relative error less than 0.5%
3) Resistance box: relative error less than 0.5%
4) High and low temperature chambers: absolute error less than ± 2ºC
5) Battery discharger: The accuracy of voltage and current is ± 0.1% of FS

6.Battery characteristic curve



Note: The typical discharge curve of a single cell is for reference only and is not intended as a quality or inspection standard.

7.Environmental adaptation and safety performance
7.1 Environmental adaptability performance
7.1.1 Temperature Cycling Test

According to UL * testing requirements, the batteries are to be placed in a test container and subjected to the following cycles:

1) Raising the chamber-temperature to 70 ±3°C (158 ±5°F) within 30 minutes and keeping this temperature for 4 hours.
2) Reducing the chamber temperature to 20 ±3°C (68 ±5°F) within 30 minutes and keeping this temperature for 2 hours.
3) Reducing the chamber temperature to minus 40 ±3°C (minus 40 ±5°F) within 30minutes and keeping this temperature for 4 hours.
4) Raising the chamber temperature to 20 ±3°C (68 ±5°F) within 30 minutes andreconstructing the sequence for a further nine cycles.
5) After the 10th cycle, Battery to be placed for 7 days for inspection.

Judgment criteria: The samples do not explode or catch fire.

7.1.2 Altitude Simulation Test

According to UL * testing requirements, the batteries are stored for 6 hours at an absolute pressure of 11.6 kPa (1.68 psi) and a temperature of 20 ± 3°C (68 ± 5°F).

Judgment criteria: The samples do not explode or catch fire.

7.1.3 Free fall

According to IEC * testing requirements, each cell is dropped 6 times from a height of 1 meter onto a concrete floor. The cells or batteries are dropped to obtain impacts in random orientations.

Judgment criteria: The samples do not explode or catch fire.

7.1.4 Vibration Test

According to the testing requirements of UL *, the battery is to be subjected to simple, harmonious motion with an amplitude of 0.8 mm (0.03 inch) [1.6 mm (0.06 inch) total maximum excursion].
The incidence is to be varied at the rate of 1 hertz per minute between 10 and 55 hertz and return in not less than 90 nor more than 100 minutes. The battery is tested in three respectively perpendicular directions.
For a battery that has only two axes of symmetry, the battery is to be tested perpendicular to each axis.

Judgment criteria: The samples do not explode or catch fire.

7.2 Safety performance

7.2.1 Heating Test

According to UL * test requirements, the battery is to be heated in gravity convection or circulating air oven with an initial temperature of 20 ±5°C (68±9°F). The temperature of the oven is to be raised at a rate of 5 ±2°C (9±3.6°F) per minute to a temperature of 130 ±2°C (266±3.6°F) and remain for 10 min. The battery shall return to room temperature (20±5°C) and then test.

Judgment criteria: The samples do not explode or catch fire.

7.2.2 Impact Test

A test sample battery is to be placed on a flat surface. A 15.8 ±0.1-mm (5/8 ±0.004-in) diameter bar is to be placed across the center of the sample. A 9.1 ±0.46-kg (20 ±1-lb) weight is to be dropped from a height of 610 ±25 mm (24 ±1 in) onto the battery sample.

Judgment criteria: The samples do not explode or catch fire.

7.2.3 Crush Test

According to UL * test requirements: at+20°C, the cell is to be crushed between two flat surfaces. The force for the crushing is to be applied by a hydraulic ram or similar force mechanism. The flat surfaces are to be brought in contact with the cells and the crushing is to be continued until an applied force of 13 ±1 kN (3000 ±224 lbs) is reached. Once the maximum force has been obtained it is to be released.

Judgment criteria: The samples do not explode or catch fire.

7.2.4 External short circuit

According to UL* test requirements, at room temperature, the positive and negative terminals of the battery are short-circuited using a copper wire with resistance <0.1Ω, until the battery catches fire or explodes, or until the battery is fully discharged to 0.2V and the case temperature returns to within ±10°C of ambient temperature.

Judgment criteria: The samples do not explode or catch fire.

7.2.5 Forced charging

According to UL* test requirements, the battery is subjected to a charging current three times the manufacturer's normally specified charging current, with the battery connected to a DC power supply. The specific charging current is achieved by connecting a resistor of special size and specification in series. The test duration is calculated using the following formula:

tc=2.5*C/(3*Ic)
tc—Charing time (h)；C—Capacity (Ah)；Ic—0.010A

Judgment criteria: The samples do not explode or catch fire.

7.2.6 Forced discharge

According to UL* test requirements, a fully discharged cell is forcibly connected in series with new cells of the same type, with the total number of cells in series matching the actual application. The resulting battery pack undergoes a short-circuit test. The positive and negative terminals are connected to a copper wire with resistance less than 0.1Ω. The discharge continues until the cell catches fire, leaks electrolyte, or until the voltage drops to 0.2V and the case temperature returns to within ±10°C of ambient temperature, at which point the test terminates.

Judgment criteria: The samples do not explode or catch fire.

The safety test in the text refers to the following standards:

UL Underwriters Laboratories' Lithium Battery Standard - UL 1642- Fifth Edition -2012.
IEC International Electrotechnical Commission International Safety Standard for Lithium Batteries "IEC 60086-4- Third Edition -2012
If there are any revisions to the above standard documents in the future, the latest released version shall prevail.

8. Product identification

8.1 Label and Marking

The label of a battery includes the battery model, nominal voltage,
positive and negative electrode markings, safety warnings, batch code, manufacturer information, and other related information.

8.2 Batch code

The batch code is represented by "MMYY". For example, the code "MAY 21"
indicates that the battery was produced in May 2021.

9. QC Inspection suggestions

For finished cells, Master Battery will conduct 100% inspection of OCV/CCV and visual inspection of appearance, and randomly check the discharge capacity of each batch. Unless otherwise specified, appearance and electrical performance testing must be completed within 45 days of receiving the battery (electrical performance may vary with storage time and temperature, please consult Master Battery for details). The following are HCB's suggested sampling plan and standards:

No.	Item	Sampling plan (Execute according to GB2828.1-2012 standard)	
		Inspection level	AQL
9.1	Dimensions	S-1	1.0
9.2	OCV	II	0.065
9.3	CCV	II	0.065
9.4	Capacity Test	II	0.065
9.5	Appearance	II	1.0

Note: If requested by the customer, it can also be executed based on the customer's testing items and sampling plan.

10.Storage

1) Batteries should be used and stored away from static electricity.
2) The battery should be stored in an environment with a temperature range of 10°C to25°C (not exceeding 30°C) and ≤ 75%.
3) They should be kept away from heat sources and direct sunlight, ensuringcleanliness, coolness, dryness, ventilation, and not affected by climate.
4) The stacking height of batteries depends on the packaging strength. Generally, thestacking height of cartons should not exceed 1.5 meters, and wooden boxes should not exceed 3 meters.
5) Batteries should be stored and displayed in their original packaging. After removingthe packaging, batteries should not be stacked randomly, as it may cause short circuits and damage to the batteries.
6) Do not put batteries together with metal items such as necklaces, hair clips, coins, orscrews in a pocket or bag, and do not store batteries together with the above items.

11.Transportation

1) During transportation, batteries should be kept away from direct sunlight, fire, rain,water immersion, and corrosive substances.
2) The impact and vibration during transportation and loading/unloading should beminimized.
3) When transporting batteries over long distances, such as by sea, they should be keptaway from the engine; Should not be prolonged in an unventilated environment during summer.

12.Safety

1) Do not over discharging, squeezing, burning, or heating.
2) Do not short-circuit or charge the battery.
3) Do not disassemble batteries.
4) Do not heat or use beyond the allowed temperature range.
5) Do not weld directly on the surface of the battery.
6) Do not use batteries with serious injuries or deformations.
7) Do not place batteries in heating device, washing machines, or high-pressurecontainers.
8) Do not use batteries together with dry cells or other primary batteries, nor to usebatteries of different packaging, models, or brands together. Do not mix use old and new batteries.

13.Important Notice

1) The battery is guaranteed to meet the specifications covered in the datasheet for 12months from the date of manufacture (it is recommended to activate the battery after 6 months of storage; please consult Master Battery for activation procedures). Any questions (from equipment manufacturers or distributors) please be raised within this period. During this warranty period, if the battery is proven to be defective, Master Battery will promptly provide a non-defective, qualified battery.

2) In practical applications, customers are responsible for confirming and ensuring the compatibility and reliability of batteries and devices.

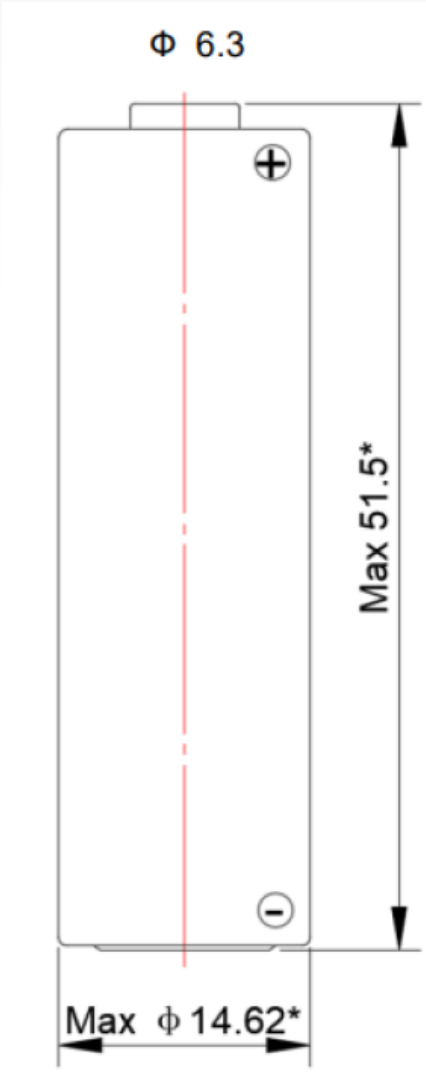
3) Master Battery shall not be held responsible in the following circumstances: if the customer fails to properly handle, operate, install, test, maintain, or inspect the battery, or fails to follow the instructions, precautions, notes provided in this specification sheet, as well as HCB's other instructions and recommendations.

4) If this specification sheet is not returned within 6 months of issuance, it will beconsidered accepted by the customer and will take effect.

14.Disclaimer

Before using the battery, it is necessary to strictly follow this specification sheet for operation. Using it at temperatures higher than the ambient temperature may reduce its service life. Misuse can cause the battery to heat up, explode, and result in human injury or property damage. Master Battery Co., Ltd. will not be held responsible for any accidents caused by failure to operate according to the product specifications.

15.Drawing



Dimensions in mm

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