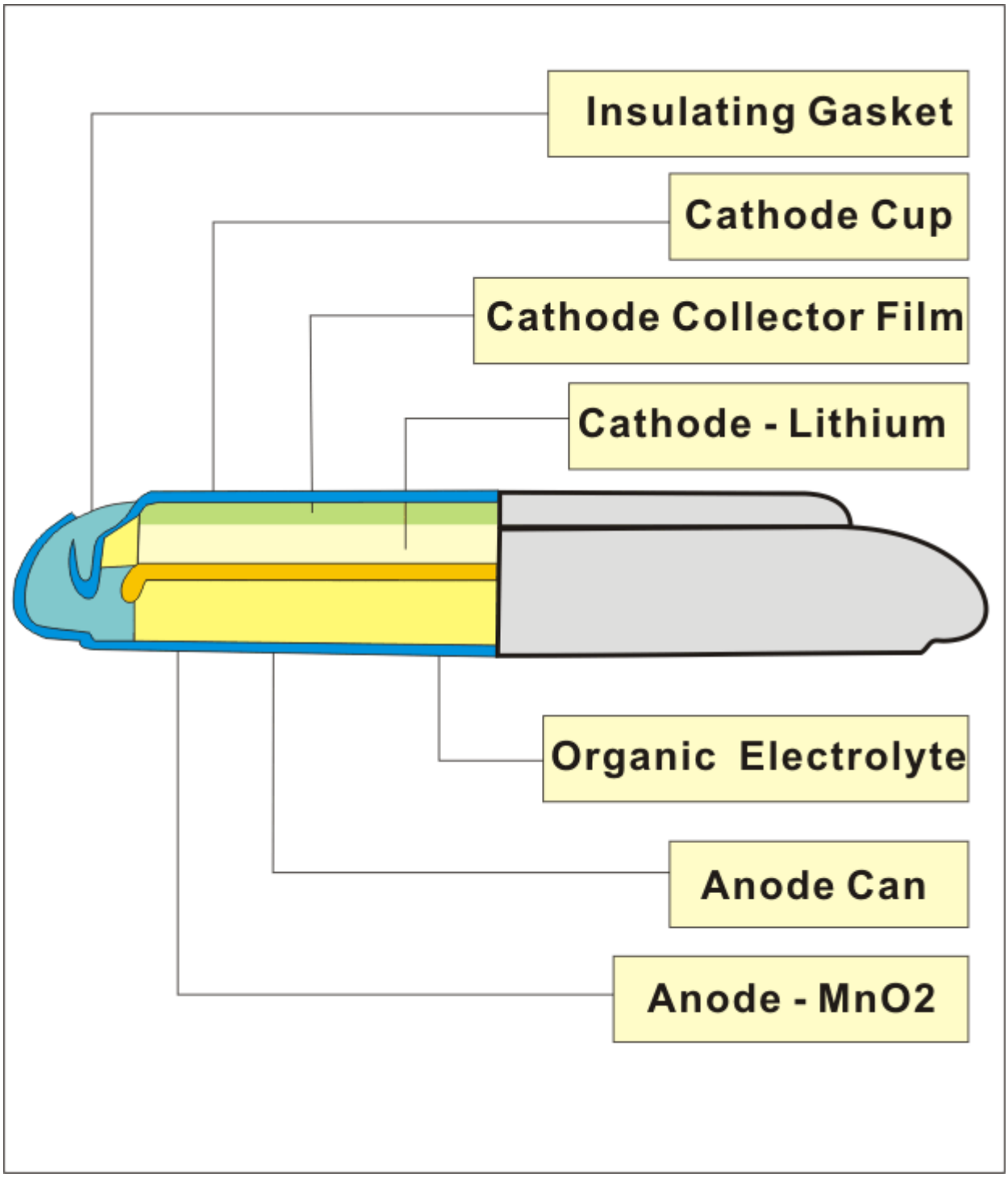
COIN CELL
CR2032

(Only for LED flash light)

BRIEF SPECIFICATION

Model: CR2032
Nominal Voltage: 3.0V
Nominal Capacity:210mAh
Standard Discharge with load: 15KΩ
Weight: 3.1g
Stainless steel container
ISO9001 Certified
UL Certified MH20555
Manufacturer: EEMB Co., Ltd.
Website: http://eemb.com

Lithium Coin battery structure



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EEMB CR2032 Coin Cell

STANDARD SPECIFICATION

1. SUBJECT

This specification presents typical and guaranteed ex-work values of the Lithium Manganese Dioxide Coin Cells (Li / MnO_2), of Model CR2032

Manganese dioxide (MnO_2) is used for the active cathode material, and high voltage, high activity lithium metal for the anode material. Battery discharge reactions are as follows:

Anode reaction: $Li - Li^{+} + e^{-}$
Cathode reaction: $Mn^{(IV)}O_2 + Li^{+} + e^{-} - Mn^{(III)}O_2$ (Li+)
Total reaction: $Mn^{(IV)}O_2 + Li^{+} - Mn^{(III)}O_2$ (Li+)

2. LI-MnO_2 BUTTON CELL FEATURES AND APPLICATIONS

Features:

- Light Weight, High Voltage and High Energy Density
- Excellent Stable Discharge Characteristics
- Outstanding Temperature Characteristics
- Excellent Leakage Resistance
- Excellent Long-term Reliability

Applications:

- Watches
- Calculators
- PC notebooks
- Electronic Keys
- Card-Type Radios
- IC Cards
- Memory Cards
- Medical Equipment
- CMOS memory backup

3. GENERAL SPECIFICATION

3.1

Item		Unit	Specifications	Conditions
Nominal Voltage		V	3.0	Standard Discharge
Nominal Capacity		mAh	210	Standard discharge with load 15kΩ
Instantaneous short-circuit current		mA	≥ 120	Time ≤ 0.5 second
Off-load voltage		V	≥ 3.2	Without load
Operating temperature		℃	-20~60	
Standard Weight		g	3.1	Unit cell
Service output	Initial	Standard	1180h	Continuous discharge with load 15kΩ, till 2.0V end-voltage
	After 12 months storage	Standard	1110h	
Red LED light flash test		Times	≥ 500 000	Pulse discharge with 6pcs red LED light, flash each 1.5 second till 1.6V end-voltage
Blue LED light flash test		Times	≥ 2 000 000	Pulse discharge with 6pcs blue LED light, flash each 1.5 seconds till 2.0V end-voltage

3.2

ITEM	CONDITIONS	CHARACTERISTICS	
Thermal durability	Kept for 20 days at 60℃±3℃, then continuously discharge with 15kΩ load, till 2.0V end-voltage	standard	1110h
Self-discharge rate	Stored for 12 months at normal temperature and humidity	≤ 5%	

4. PERFORMANCE AND TEST METHODS

Unless otherwise stated, all the testing is carried out under the condition: environmental temperature, 20℃~25℃; environmental humidity, 65±20%. Please refer to Table 4.1

4.1 Characteristics

No	ITEM	TEST METHODS	STANDARED	
1	Dimension	Using vernier caliper (accuracy≥0.02) while avoiding short-circuit	Diameter	20.0 (-0.2) mm
			Height	3.2 (-0.2) mm

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2	Off-load voltage	Using multimeter (accuracy≥0.25%) internal resistance ≥1MΩ	≥ 3.2V
3	Instantaneous short-circuit current	Time of short-circuit should be less than 0.5 second and avoid repeated test within half an hour	≥120mA
4	Appearance	Eyeballing	Bright, clean, no rust, no leakage, And no flaw
5	Capacity	Continuously discharge for 8 hours with load 15kΩ, temperature at 20~25℃, humidity at 65±20% till 2.0v end-voltage (for fresh battery only: within 3 months)	≥ 1180 h
6	Red LED light flash test	Pulse discharge with red LED light, temperature at 20~25℃, humidity at 65±20%, flash each 1.5 seconds till 1.6v end-voltage (for fresh battery only: within 3 months)	≥ 500,000
	Blue LED light flash test	Pulse discharge with blue LED light, temperature at 20~25℃, humidity at 65±20%, flash each 1.5 seconds till 2.0v end-voltage (for fresh battery only: within 3 months)	≥ 2,000,000
7	Vibration test	Put battery on the platform of the vibrations machine, start the machine and adjust the frequency form 10 times per minute to 15 times per minute. keep it running for an hour	Characteristics keep stability
8	Leakage at high temperature test	Stored under temperature at 60℃ and relative humidity (RH) below 75% for 7 days	No leakage allowed
9	Over discharge Test	After 2.0v end-voltage, continuously discharged for 5 hours	No leakage allowed

5. PRECAUTIONS IN USING

- Use Nickel-plated iron or stainless steel for the terminals that contact the battery.
- Make sure that terminal contact pressure is 50g minimum, for a stable contact.
- Keep the battery and contact terminal surfaces clean and free from moisture and foreign matter.
- 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.)
- When the batteries are piled up in a disorderly way, their positive and negative terminals may short-circuit, consuming some batteries while charging others, causing them to explode.
- Lithium batteries that are almost exhausted can output a voltage that is almost the same as that of a new battery: Please does not judge a battery only with a Voltmeter. Avoid using a mixture of old and new batteries; replace all batteries in a set with new one.
- Lithium batteries require a period of time to reach their normal voltage again after even a slight short circuit. Therefore, should the battery is short-circuited, wait an adequate long time for batteries to recover before measuring their electrical characteristics.
- Use a high impedance (1M or higher) voltmeter to measure battery voltage.
- 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 them.

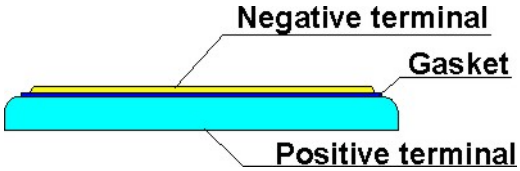
6. STORAGE AND MOUNT

The cell should be preferably stored in dry and cool conditions. (Temperature: 0~30℃; RH≤75%)

Button lithium batteries need special method to avoid short-circuiting before and after they are installed. As short circuits tend to occur in the following cases, please take care when handing the batteries.

6.1. Overlapping Batteries

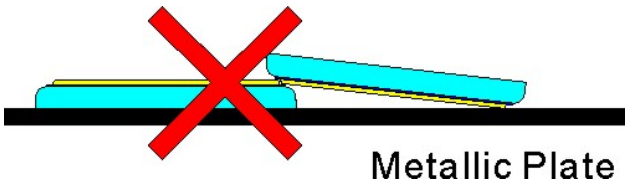
A Button lithium battery is shaped as shown below. It has exposed positive and negative metallic surfaces with a thin cylindrical seal, called the gasket, in between.



When batteries are overlapped or mixed together in a disorder way, their positive and negative terminals touch each other, causing short circuits.

6.2. Batteries put in a Metallic Container or on a Metallic Plate

Similar to the overlapping battery problem, when 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 the placement

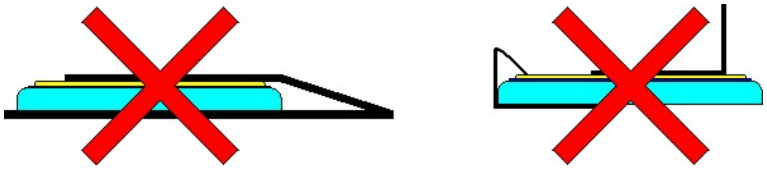


6.3. When a Battery is Held with Tweezers

When held with a pair of metallic tweezers as shown below, the battery short-circuits through the tweezers

6.4. When Battery Lead Plates Touch Each Other

When battery lead plates bend and touch each other or either terminal, the battery short-circuits.



6.5. Solder Bridges

Solder may bridge between board conductors, short-circuiting and draining battery.

6.6. Short-circuited though Soldering Iron

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 manual soldering within 5 seconds.

6.7. Shorts through Piled Circuit Board

When circuit boards with 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.

6.8. Discharge through Conductive Electrostatic Prevention Mats

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

6.9. Improper Battery Mounting Polarity

When the battery's positive (+) and negative (-) terminals are backward with respect to the battery mounting's polarity marks, the battery may be discharged, depending on the type of electric circuit.

6.10. Solder

When the battery's lead plates are dipped in a molten solder bath, the battery is temporarily short-circuited. Therefore, complete dipping within 5 seconds.

7. SAFETY

Battery Handing Precautions to Ensure Complete Safety

Lithium batteries contain inflammable materials, such as lithium and organic solvents. Improper battery handing, particularly during transit and storage, may cause heating, explosions and fires.

Please strictly observe the precautions below in handing lithium batteries.

WARNING!

- DO NOT recharge, short-circuit, disassemble, deform, heat or place the battery near a direct flame. This battery contains flammable materials such as lithium and organic solvent and performing any of the above actions could cause it to ignite explode or become damaged.
- Keep this battery out of the reach of children. If it is swallowed, contact a physician immediately.
- When storing the battery or throwing it away, be sure to cover it with tape. If the battery comes into contact with other metal objects, it could ignite or become damaged.

CAUTION!

Closely observe the following precautions. If the battery is used incorrectly, it could leak or become damaged, causing device trouble or injury.

- Insert the battery with the "+" and "-" ends correctly oriented.
- If the battery is used together with new batteries, do not use it with a different type of battery.
- Do not apply solder directory to the battery.
- Avoid storing the battery in direct sunlight, or in excessively hot and humid locations.

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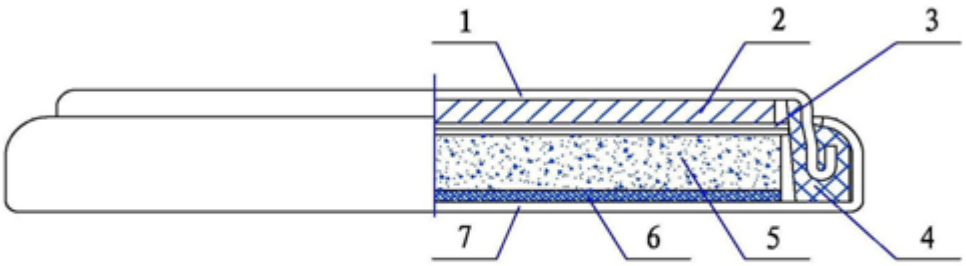
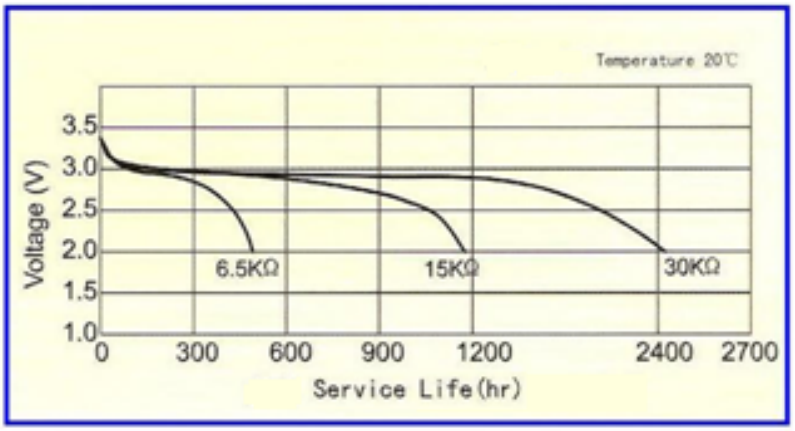
9. CUTWAY DIAGRAM



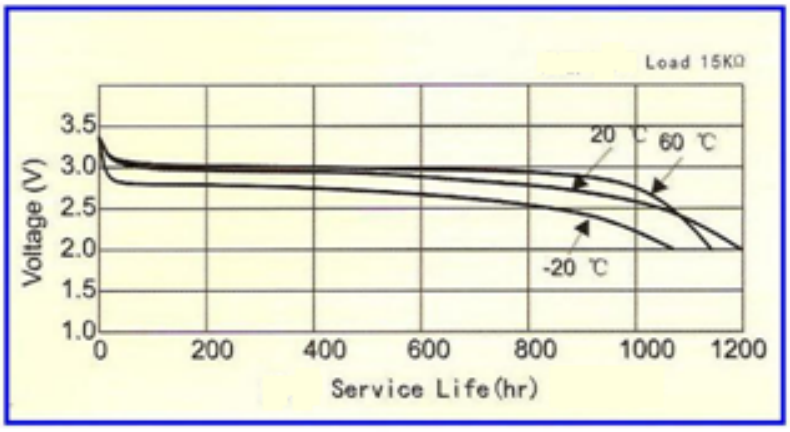
1、Cathode Shell　2、Cathode (slice of lithium)　3、Septum　4、Gasket
5、Anode (MnO_2)　6、Anode collector net　7、Anode shell

10. DISCHARGE CHARACTERISTICS

Discharge Characteristics



Temperature Characteristics



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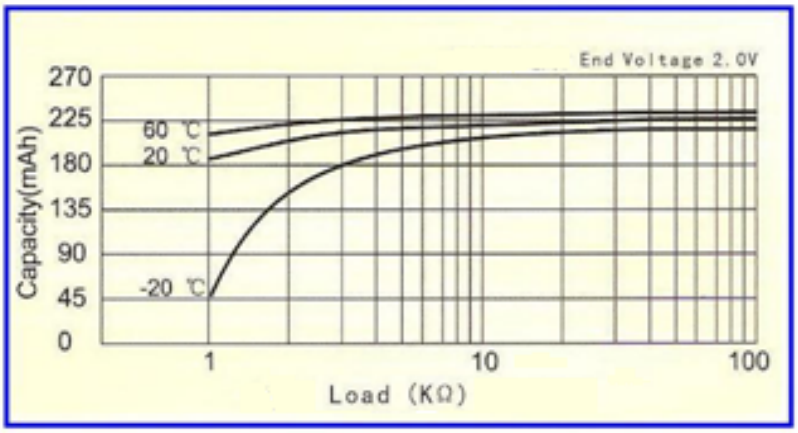
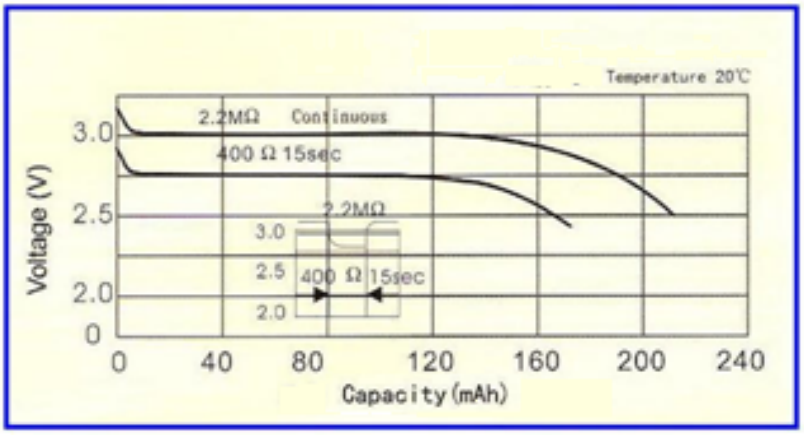
Load-capacity



Pulse Discharge Characteristics



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