

SHENZHEN GREENMAX TECHNOLOGY CO.,LTD



SPECIFICATION

SPEC No: Q/GJN1001

VER: A/0

Product: Lithium Manganese Dioxide Button Cell

Model: CR2032

Lithium Manganese Dioxide Button Cell Product Specification

Model: CR2032

	Signature	Date
Prepared		
Checked		
Approved		

Supplier: Shenzhen Greenmax Technology Co., LTD

Address: Huachuangda Industrial District, 46 District Xin'an Street,
Bao'an, Shenzhen, China

TEL: 86-755- 29497371

FAX: 86-755-23703178

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1. Purpose

1.1 Give some guidance for using our products.

2. Descriptions and Model

Table 1

Description	Model
Lithium manganese dioxide button battery	CR2032

3. Technical parameters

Table 2

No.	Items	Characteristics
1	Nominal Capacity	220mAh (Continuously discharged under 30k Ω load till 2.0V end-point voltage at the temperature of 23 $^{\circ}$ C \pm 3 $^{\circ}$ C).
2	Nominal Voltage	3V
3	Operating Temperature range	-20 \sim +60 $^{\circ}$ C
4	Self-discharge Rate Per year	\leq 3%
5	Max. Pulse Current *	16 mA
6	Max. Continuous Discharge Current *	4 mA
7	Max. Outline Dimensions	Diameter: 20.0 mm, Height: 3.2 mm
8	Structures	Manganese dioxide cathode, lithium anode, organic electrolyte, polypropylene separator and stainless iron cell can and cap, etc.
9	Weight for Reference	About 2.95g

* The max pulse current means that when a 40% discharged battery is discharged in this current for 15 seconds; the loaded voltage should be higher than 2.0V at 23 $^{\circ}$ C.

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* The max continuous discharge current means that when the battery is discharged in this current to 2.0V at 23 °C , 50% of nominal capacity could be obtained.

4. Characteristics and test method

4.1 Normal characteristics

Table 3

No.	Items	Standard		Test Method
1	Max. Outline Dimensions	Diameter ϕ 20.0 mm, Height 3.2 _{mm}		Measured by caliper with the precision of which is not less than 0.02mm or other equal precision instrument.
2	Appearance	The surfaces of the batteries are clean. The mark is clear. There should not be deformation、scar or leakage.		Visual inspection
3	Off-load Voltage	3.0~3.5V		The battery in delivery state should be stored for more than 24hours at the temperature of $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$, a relative humidity of 45%~75%, and the voltage between the two terminals should be measured with a voltmeter at the same ambient environment.
4	Nominal Capacity	220mAh		The samples should be stored for more than 24hours at $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$, 45%~75%RH. then be continuously discharged under 30k Ω load to 2.0V end-point voltage at the same ambient environment.
5	Terminals	The terminals should have good electro-conductibility. There is no rust 、 no leakage and no deformation.		Visual inspection
6	Temperature Characteristics	Discharged at lower temp.	60% of nominal capacity	The samples should be continuously discharged under 30k Ω load to 2.0V end-point voltage at $-20^{\circ}\text{C} \pm 2^{\circ}\text{C}$.
		Discharged at high temp.	99% of nominal capacity	The samples should be continuously discharged under 30k Ω load to 2.0V end-point voltage at $60^{\circ}\text{C} \pm 2^{\circ}\text{C}$.

4.2 Inspection for service output

4.2.1 twelve samples should be tested for service output.

4.2.2 If the average value is equal to or more than the value of table 3, and if the number of batteries showing a value less than 80% of the value of table 3 is 1 or less. The batteries are considered to conform to the requirement.

4.2.3 If the average value is less than the value of table 3 or if the number of batteries showing a value

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less than 80% is 2 or more, the test should be repeated with other 12 pieces. At the second test, if the average value is equal to or more than the value of table 3 and if the number of batteries showing a value less than 80% of the value of table 3 is 1 or less, these batteries are considered to conform to the requirement.

4.2.4 At above second test, if the average value is less than the value of table 3 or if the number of batteries showing a value less than 80% of the value of table 3 is 2 or more, the batteries are considered not to conform to the requirement. A third test should not be performed.

4.3 Safety Characteristics

Test report in page 12 ~ 14

Table 4

No.	Items	Standard	Test Method (Q/LX.J.013-2006)
A	Altitude Simulation Test	NL、NC、NR、NE、NF	At $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$, the batteries should be stored at the pressure of 11.6 KPa or less for at least six hours.
B	Temperature Cycling	NL、NC、NR、NE、NF	The batteries should be submitted to 150 temperature cycles from $60^{\circ}\text{C} \sim -10^{\circ}\text{C}$, and then be stored for more than 24 hours at $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$, 45%~75%RH.
C	Vibration	NM、NL、NV、NC、NR、NE、NF	The batteries should be subjected to a simple harmonic motion with amplitude of 0.8mm(1.6mm total maximum excursion). The frequency is to be varied at the rate of 1Hz per minute between 10 and 55Hz. The test should be last 90min~100min and the cell should be tested in two mutually perpendicular direction.

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D	External Short Circuit	NT、NR NE、NF	<p>The batteries to be tested should be temperature stabilized so that its external case temperature reaches $55 \pm 2 \text{ }^{\circ}\text{C}$ and then the batteries should be subjected to a short circuit condition with a total external resistance of less than 0.1 ohm at $55 \pm 2 \text{ }^{\circ}\text{C}$. This short circuit condition is continued for at least one hour after the battery external case temperature has returned to $55 \pm 2 \text{ }^{\circ}\text{C}$. The battery must be observed for a further six hours for the test to be concluded. The battery to be tested should have endured vibration and shock test. Otherwise the battery endured altitude simulation test should be test.</p>
E	Impact	NT、NE、NF	<p>The test sample battery is to be placed on a flat surface. A 15.8 mm diameter bar is to be placed across the centre of the sample. A 9.1 kg mass is to be dropped from a height of $610 \pm 25 \text{ mm}$ onto the sample.</p> <p>The battery is to be impacted with the flat surface of the sample parallel to the flat surface and the 15.8 mm diameter curved surface lying across its centre. The battery should be impacted for one time.</p>
F	Forced-discharge	NE 、NF	<p>Each battery should be forced discharged at ambient temperature of $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$ by connecting it in series with a 12 V D.C. power supply at an initial current equal to the maximum discharge current specified by the manufacturer. Each battery should be forced discharged for a time equal to the time in which a new cell is discharged to 2.0V.</p>
G	Abnormal Charge	NE、NF	<p>Sample batteries are to be connected reversely with a D.C. power supply, and subjected to a constant charging current at 3 times the I_c</p>
H	Free Drop	NV、NE、NF	<p>The not-discharged battery is to be dropped from a height of 1m onto a concrete surface. Each sample is to be dropped six times, two times in each direction. The sample should be examined 1 hours after testing</p>
No.	Items	Standard	Test Method

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Additional requirement:

Distortion: Distortion should be reported with the cause.

venting: If electrolyte leaks from the vent area without vent operation, it should be considered as leakage.

NM: no weight loss

NL : no leakage

NV: no venting

NF: no fire

NC : no short circuit

NR: no rupture

NE: no explosion

NT: no overheating (the temperature at the surface of battery not exceed 150°C)

4.4 Test condition

4.4.1 State of batteries:

The batteries should be in three months after the batteries been finished. The time when the batteries been finished is marked on the surface of batteries.

4.4.2 Normal testing environment:

If no special requirement, test should be made under the temperature of 15°C~25°C and relative humidity of 45%-75%.

4.4.3 Test precision:

The measuring tolerances relative to the specified or actual values should be within these range :

Voltage	Current	Capacity	Temperature	Time	Weight	Dimension
±1%	±1%	±1%	±2°C	±0.1%	±0.1%	±0.1%

These tolerances include all errors caused by precision of testing instrument, testing method and testing process.

5. Packaging and Marking

Dimension of box	Net weight	Gross weight
32.5×26.5×22.5 cm	16.5 KG	19KG

Normal package: 6000 pcs per box.

6. Environment requirement

The product does not contain controlled substances of level 1.

7. Producing standard and certification

Our batteries are produced according with the MSDS report, and have past UN38.3、SGS test

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8. Transportation

- The Batteries should be stored away from polarization, fire, rain, water, and never put together with corrosive during transportation.
- Vibration and shock during transportation and load-and-unload should be restrict to a minimum level.
- The height should not exceed 1.5m for cardboard packages.
- The batteries if transported by sea should be stored away from ship engines during prolonged transit, and not left for long periods in unventilated environment during summer.

9. Information for safety

! Danger

- Do not overheat batteries or dispose of batteries in fire.
- Do not put batteries in water or moisten them.
- Do not put batteries together with metalwork such as necklace, coins, etc in one bag, or store them together
- Do not short-circuit batteries.
- Do not inset batteries in reverse. Observe the + and – markings on battery and equipment.
- Do not disassemble batteries.
- Do not weld or solder directly to batteries.
- Do not use deformed batteries or batteries with serious scar.
- Read the guide carefully before using batteries. Unsuitable operation will make batteries overheat, fire, explode, destroy or reduce battery's capacity.

! Warning

- Do not place the battery in heater, washer or high-pressure container.
- Do not use the battery together with different kind of or different type of battery.
- Stop using when the battery become heat, emit smell or appear other abnormality during use, or storing.
- Do not recharge the battery.
- Do not force-discharge the battery.
- Keep away from the battery when the battery is leakage or emit abnormal smell.
- Wash yourself quickly when the electrolyte infiltrate to your skin or clothes.
- Wash your eyes with clean water quickly and go to hospital for further check if the electrolyte infiltrate to your eyes.
- Please contact with us in advance If two or more batteries are to be connected in a series and / or placed in a parallel arrangement.

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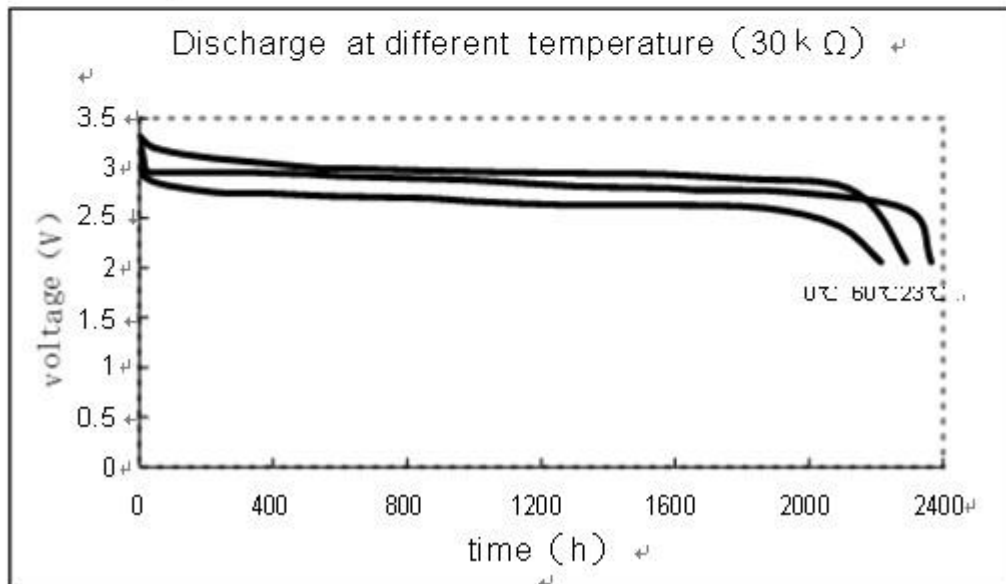
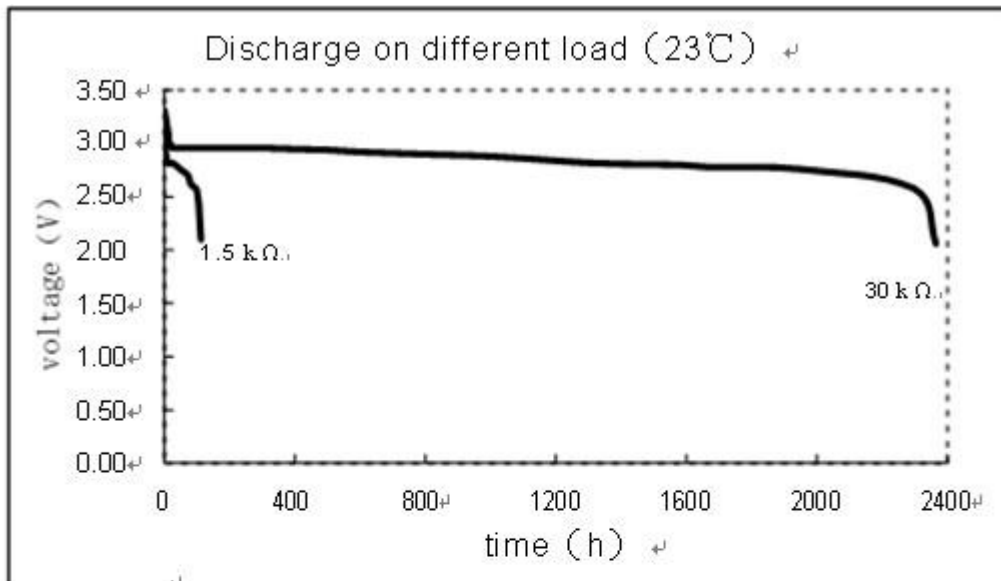
! Caution

- Keep the battery away from the children, avoid being swallowed.
- Read the guide carefully and pay attention to the guide when using the battery.
- Read the instrument guide carefully before installing the battery or uninstalling the battery from the instrument.
- Take out of the battery when the life of the battery is over.
- Take out of the battery and keep it under the condition of low temperature and low humidity when the battery is not used for a long time.
- Clean the battery with dry cloth before use if the connection of the battery is dirty.
- Battery should be used and stored far from the electrostatic place.

10. Storage

- The batteries should be stored at 10°C~25°C (never exceed 30°C) , 45%~75%RH.
- The batteries should not be stored next to heat sources nor in direct sunlight. The storage area should be clean, cool, dry, ventilated and weatherproof.
- The height to which batteries may be stacked is clearly dependent on the strength of the packaging. As a general rule, this height should not exceed 1.5m for cardboard packages nor 3m for wooden cases.
- Store and display batteries in their original package. The batteries may be short-circuited or damaged if been unpacked and stacked messily.

Appendix 1: CR2032 discharge curves



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Product Configuration:

