



Specification of lithium/manganese dioxide cylindrical battery	
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Lithium/manganese dioxide cylindrical battery

CR18650

## Specification

Edition:A/1



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## 1 Scope

Lithium/manganese dioxide cylindrical battery, Model CR18650.

## 2 Technical parameters

- 2.1 Model: CR18650
- 2.2 Nominal voltage: 3V
- 2.3 Nominal capacity: 3300mAh(Continuously discharged under 1mA current till 2.0V end-voltage at the temperature of  $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$  )
- 2.4 Max. constant current:2000mA
- 2.5 Max. pulse current: 3000mA
- 2.6 Operating temperature range:  $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
- 2.7 Nominal weight:45g.
- 2.8 Max. Outer dimensions: Diameter: 18.5mm, Height:65.0 mm
- 2.9 Structures: Manganese dioxide cathode、 lithium anode、 organic electrolyte、 polypropylene separator and steel battery can and cap.
- 2.10 Self-discharging rate:  $\leq 1\%$  per year.

## 3 Characteristics and test method

### 3.1 Dimensions:

Measured with vernier caliper which the precision is not less than 0.02mm or other equal precision instruments. The result must conform to 2.8.

### 3.2 Off-load voltage:

The samples should be stored for more than 24hours at the temperature of  $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$ . On the same temperature condition, the voltage measured with the instrument stipulated in 4.3.2 should be not lower than 3V.

### 3.3 Discharge capacity:

The samples should be stored for more than 24hours at a temperature of  $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$ . Then be continuously discharged at  $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$  under 1mA current to 2.0V end-voltage. The discharge capacity should be not less than nominal capacity.

### 3.4 Leakage characteristics:

The samples should be stored for more than 30 days at the temperature of  $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$  and the relative humidity of 90%-95%RH, then take a view of them at the temperature of  $15^{\circ}\text{C} - 25^{\circ}\text{C}$  and relative humidity of 45%-75%RH, there must be no leakage and no rust batteries.

### 3.5 Terminals:

The terminals should have good electro conductivity. There is no rust、 no



leakage and no deformation .

### 3.6 Appearance:

Visual inspection: The surfaces of the batteries are clean. The mark is clear. There should not be deformation、 rust、 stain or leakage.

## 4 Test condition

### 4.1 Initial Test:

Means the test begin in three months after the battery finished.

### 4.2 Temperature、 humidity:

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

### 4.3 Test instruments:

4.3.1 Dimension: Vernier caliper which the precision is not less than 0.02mm or other equal precision instrument.

4.3.2 Voltage: DC voltmeters which the precision is not less than 0.25 class and inner resistor should be more than 1MΩ.

4.3.3 Exactitude resistance: Relative error is less than 0.5%.

4.3.4 Resistance box: Relative error is less than 0.5%.

4.3.5 Constant temperature and humidity oven : Tolerance shall be  $\pm 1.5^{\circ}\text{C}$  or below.

4.3.6 Battery-testing instrument: Tolerance shall be  $\pm 0.3\%$  or below.

## 5 Inspection for service output

5.1 6 samples shall be tested for service output

5.2 If the average value is equal to or more than the value of subparagraph 2.3, and if the number of batteries showing a value less than 80% of the value of subparagraph 2.3 is 0. The batteries are considered to conform to the requirement.

5.3 the value of subparagraph 2.3, or if the number of batteries showing a value less than 80% is 1 or more, the test shall be repeated with other 6 pieces. At the second test, if the average value is equal to or more than the value of subparagraph 2.3 and if the number of batteries showing a value less than 80% of the value of subparagraph 2.3 is 0, these batteries are considered to conform to the requirement.

5.4 At above second test, if the average value is less than the value of subparagraph 2.3, or if the number of batteries showing a value less than 80% of the value of subparagraph 2.3 is 1 or more, the batteries are considered not to conform to the requirement.

## 6 Warning



6.1 Do not short-circuit batteries.

Short-circuit may cause rupture、heat、leakage、possibly fire ,explosion etc.

6.2 Do not dispose the battery in fire.

Above 85°C temperature may cause gasket distortion and leakage、 fire or explosion.

6.3 Do not weld or solder directly to batteries for long time.

Solder on the terminals of the battery directly for long time may cause heat generation and result in battery leakage or explosion.

6.4 Do not charge batteries

Charging may cause gas evolution or internal short circuiting, followed by fire or explosion etc.

6.5 Do not force discharge batteries

The batteries over-discharged by external power source or other batteries connected in a series may cause explosion、 leakage、 heat generation or explosion.

6.6 Do not disassemble batteries

Disassemble the battery may cause battery distortion followed by explosion.

6.7 Do not mix old and new batteries together

Using old and new batteries together may lead to charging or over-discharging because of the different voltage or capacity, followed by explosion/ leakage/ heat generation.

6.8 Do not reverse the positive and negative terminals when mounting the battery

The improper connection of the battery may lead to short-circuiting, charging or forced-discharging, followed by heat generation or explosion.

6.9 Do not swallow by mistake

Keep the batteries away from children. If batteries are swallowed by mistake, immediately contact a doctor.

6.10 Do not throw away battery randomly.

Please dispose the batteries in accordance with appropriate federal, state and local regulations.

6.11 Do not use the battery in obturator.

6.12 Do not throw the battery into water.

6.13 Storing the battery in dry and ventilated environment. Never irradiated directly and caught in rain.

6.14 Stop using the battery when leakage, heat generation .

6.15 Before designing and using the battery, read the manual and contact our technical department, please.

## **7 Storage、transport、process of battery**

7.1 Do not highly vibrate and drop the battery when transport, etc.

7.2 Storage

Store the battery in dry and ventilated environment. Never irradiate directly.



Please store the batteries at the temperature of 10°C ~ 30°C, humidity of 60%RH or less. High temperature and humidity would make the characteristics of battery decline.

### 7.3 Solder

7.3.1 Do not solder on terminal of the battery directly. Soldering must be done by tabs or leads only. Even then, the soldering temperature must be lower than 350°C, in 3 sec or 250°C, in 10 sec. High temperature and long time may cause heat gathered. It's dangerous.

7.3.2 Tabs can be soldered on the battery terminals directly by spot-welding. The parameters of the spot-welder must be adjusted carefully to avoid the battery being perforated, changing voltage and temperature rising above 65°C.

7.3.3 Other welding method must be tested before using.

### 7.4 Cleaning and drying

7.4.1 Washing the battery with conductive liquid may cause discharging or short circuit.

7.4.2 If the temperature exceed 85°C, the battery may cause gasket distortion and leakage, fire or explosion.

7.5 Battery must be replaced by technician following items must be noticed when designing.

7.6 The product must be designed to prevent the polarity reverse, or if the battery can be reversed the battery must be protected by any component to avoid being over discharged and charged.

7.7 There must be statements on the equipment: Only this type of battery can be used, using other type of battery is dangerous. Please read the manual carefully.

7.8 The manual of the equipment must include the method of replacing battery. There must be have following statements: wrong using of the battery may cause fire, explosion. Don't disassemble, heat crush the battery. Keep battery far away children. Replace as quickly as possible.

7.9 There must be have following statements on the smallest package:

Warning: Fire and burn hazard. Do not recharge, short circuit, over discharge, crush, disassemble, heat above 100°C (212° F) or incinerate. Keep battery far away from children put them in original package until ready to use. Dispose of used batteries promptly.

## 8 Package

Figure 1

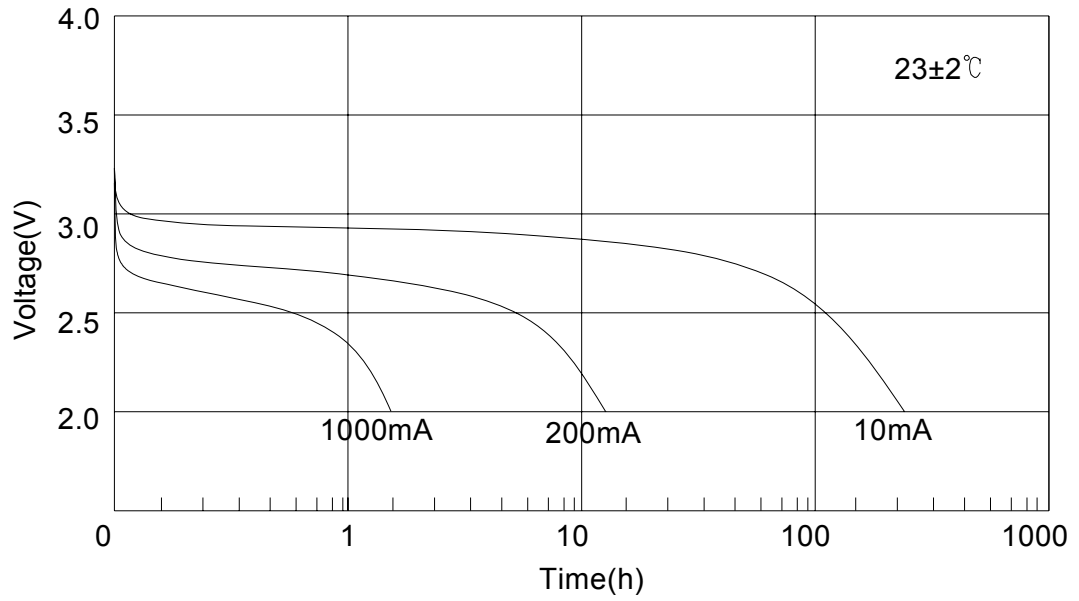


Figure 2

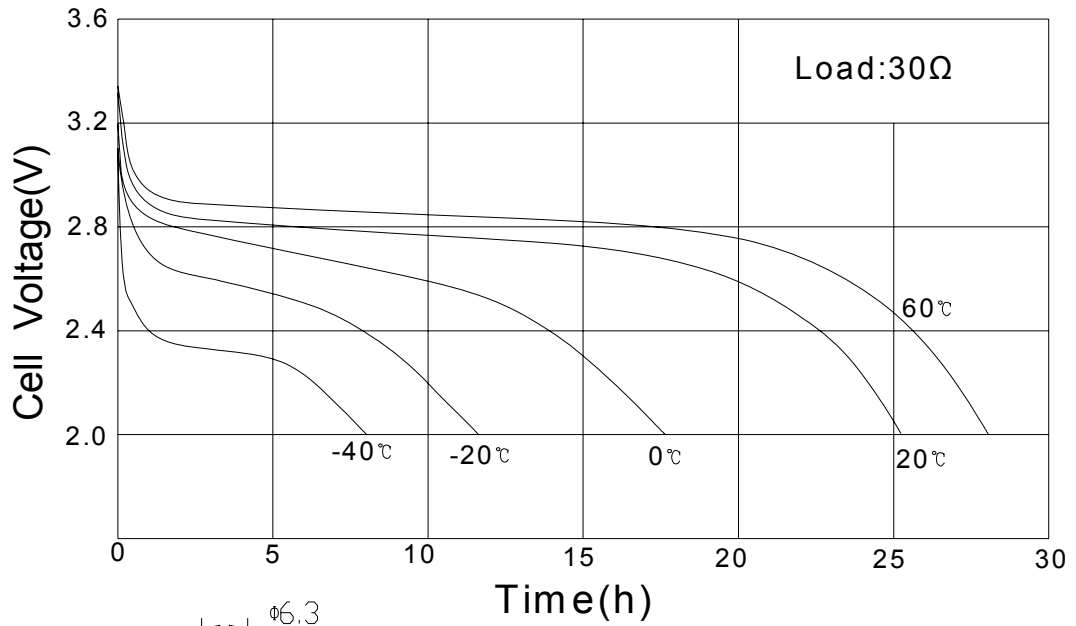


Figure 3

