

## Lithium Manganese Battery Technology Specification

**Reference** PLI012

**Part name** Lithium Manganese Battery

**Model No** CR2032 220mAh 3.0V

**Serial No** \_\_\_\_\_

# 1 Scope

The specification applies to CR2032 (Li/MnO<sub>2</sub>)

# 2 Characteristics and Performance

- 2.1 Battery type CR2032
- 2.2 Nominal voltage 3.0 V
- 2.3 Normal capacity 220 mAh (15KΩ to cut-off voltage 2.0V at 23°C±3°C时 15KΩ 2.0V)
- 2.4 Operating temperature range -20-60°C
- 2.5 Storage temperature range 25±15°C
- 2.6 Normal weight 3.0g
- 2.7 Structure and Outside dimensions : Fig1.
- 2.8: Performance

### CR2032 Performance

Table 1.

Item	Condition	Test temperature	Characteristic	
Open circuit voltage	No load	23°C ± 3°C	3.05-3.45V	
			3.05-3.45V	
Load voltage	15kΩ, after 5s	23°C ± 3°C	3.00-3.45V	
			3.00-3.45V	
Discharge Capacity	Continually discharge at 15kΩ resistance to cut-off voltage 2.0V	23°C ± 3°C	Normal	1100h
			The lowest	1000h

Table 2.

Item	Condition	Characteristic
Fast Discharge Capacity	Continually discharge at 3kΩ resistance to cut-off voltage 2.0V	210h
Self-discharge rate	The normal temperature and humidity under normal storage for 12 months	Less than 5%

### 3 Test

#### 3.1 Conditions

Temperature :  $25 \pm 15^{\circ}\text{C}$ , Relative Humidity:  $65 \pm 10\%$  Pressure: 1.0atm, (unless otherwise specified) .

#### 3.2 Measure Instrument

3.2.1 Dimensional measurement Caliper with accuracy  $\pm 0.02\text{mm}$

3.2.2 Voltmeter this has an accuracy of  $\pm 0.2\%$  and impedance of above  $10\text{M}\Omega$ . -3-

3.2.3 Exactitude resistance tolerance should be  $\pm 0.5\%$ .

3.2.4 Resistance box tolerance should be  $\pm 0$ .

3.2.5 constant temperature oven tolerance should be  $\pm 2^{\circ}\text{C}$ .

3.3 Initial test Cells should be tested in the first 3 months after production

3.4 Outside dimensions

The measuring instrument as specified 3.2.1 is used. The result should meet the requirement of 2.7.

3.5 Open circuit voltage :

Cells should be stored for not less than 24 hours at the normal conditions as specified 3.1, at the same circumstance use voltmeter,

specified in 3.2.2 to measure voltage between "+" and "-". Results should meet the requirement of table 1

### 3.6 Load voltage

Cells should be stored for not less than 24 hours at the normal conditions as specified 3.1, at the same circumstance, Parallel connect meter and 15kΩ resistance specified in 3.2.2 to measure voltage between "+" and "-". Result should meet the requirement of table 1

### 3.7 Discharge capacity

Cells should be stored for not less than 24 hours at the normal conditions as specified 3.1, Continually discharge at 15kΩ resistance to cut-off voltage 2.0v. Results should meet the requirement of table 1

### 3.8 Appearance No scathe, no crackle, no rust, no dirty spots, and mark clearly

### 3.9 Terminal arrangement Have good conduction performance, no deformation and leakages

- 4 -

### 3.10 leakage proof characteristic

Store sample cells 30 days at  $45 \pm 3^\circ\text{C}$ , relative humidity below 70%, then check appearance at normal temperature and normal humidity with naked eyes. Cells should be no leakage

### 3.11 Self-discharge rate

Self-discharge rate can calculated as below equation, result should meet the requirement of table 2

$$\text{Self-discharge rate (\%)} = \frac{A1-A2}{A1} \times 100\%$$

A1 — Cell average discharge capacity in initial period

A2 — average discharge capacity after storage

### 3.12 Vibration Test

The battery is to be subjected to simple harmonic motion with amplitude of 0.8mm. The frequency is to be varied at the rate of 1 Hz per minute between 10 and 55 Hz, and return back between 90 and 100 minutes. The battery is to be tested in three mutually perpendicular directions

### 3.13 Drop Test

Cell should be dropped 10 times from the height of 1.9m onto cement ground. Result should be no leakage, no fire and no explosion

- 5 -

### 3.14 Short- circuit test

The cell is to be short-circuited by connecting the positive and negative terminals of the cell with copper wire having a resistance about  $0.1\Omega$ . Cell is to be completely discharged or its surface temperature has returned to ambient temperature. During the process, cell should be no fire and no explosion

## 4 Mark

4.1 Cell type CR2032

4.2 Nominal voltage 3V

4.4 Polarity +

## 5 Inspection rules

5.1 Deliver inspection: Depending on GB2828

Table 3

Number	Test	Item	IL	AQL
1	Dimensions	3.4	S-2	0.4
2	Appearance	3.8	II	1.0
3	Open circuit voltage	3.6	II	0.4
4	Discharge capacity	3.7	--	--

5.2 Routine inspection: Depending on GB2829 and QB/T2389

## 6. Inspection for service output

6.1 9 samples shall be tested for service output

6.2 If the average value is equal to or more than the value of table 1, and if the number of batteries showing a value less than 80% of the value of table 1 is 1 or less. The batteries are considered to conform to the requirement. -6-

6.3 If the average value is less than the value of table 1, or if the number of batteries showing a value less than 80% is 2 or more, the test shall be repeated with other 9 pieces. At the second test, if the average value is equal to or more than the value of table 1, and if the number of batteries showing a value less than 80% of the value of table 1 is 1 or less, these batteries are considered to conform to the requirement.

6.4 At above second test, if the average value is less than the value of table 1, or if the number of batteries showing a value less than 80% of the value of table 1 is 2 or more, the batteries are considered not to conform to the requirement. third test shall not be performed.

## 7 Display and storage

7.1 Batteries shall be stored in well-ventilated dry and cool conditions

7.2 Battery cartons should not be piled up in several layers, or should not exceed a specified height

7.3 Batteries should not be exposed to direct sun ray for a long time or placed in areas where they get wet by rain.

7.4 Do not mix unpacked batteries so as to avoid mechanical damage and/or short circuit among each other

## 8 Storage life

Storage life of batteries are two years long at  $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$  and RH  $60 \pm 15\%$

## 9 Warnings and Cautions

9.1 Do not short circuited, recharge, heat, disassemble nor dispose in fire

9.2 Do not force-discharge.

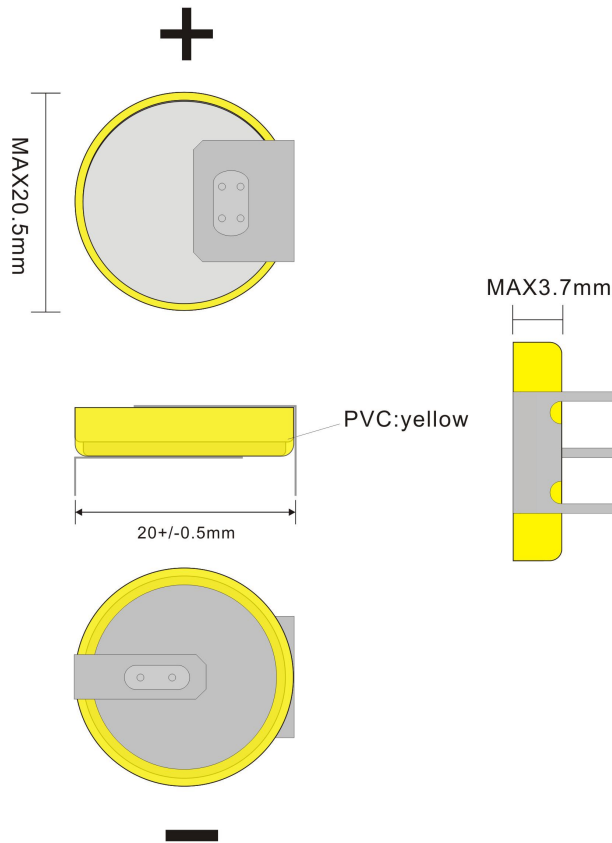
9.3 Do not make the anode and the cathode reversed

9.4 Do not solder directly

9.5 Keep battery out of children's reach 9.6 Do not store or use in the environment of over  $85^{\circ}\text{C}$ .

**10 Note** According to the need, this technical specification may be modified at any time. For more information, please consult with us

Fig1. Structure of CR2032



- 8 -

