



## **Specification Approval Sheet**

Name: Alkaline Zinc and Manganese buckle type laminate battery

Model: AKYGA 23A SPEC: 12V / 48mAh

#### 1. Essentials



This technical specification is used for mercury-free alkaline buckle cascade battery, model 23A.

#### 1. 1 Model

Our factory:23A; Duracell: MS21/MN21; Eveready:A23;

Varta: V23GA; China: LR23/L1028

#### 1. 2 Inner single cell reference standard

IEC 60086-1(2011)—Primary Batteries—Part 1: General

IEC 60086-5(2011)—Primary Batteries—Part 5: Safety of batteries with aqueous electrolyte

#### 2. Chemical composition Molecular formula

Zinc-manganese dioxide (basic electrolyte)

(-) Zn|KOH|MnO<sub>2</sub>(+)

3. Nominal voltage: 12.0 volt

4. Average weight: 8.00 g

## 5. Nominal capacity: 48mAh

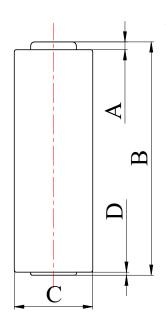
**48mAh** (Under the condition of  $20k\Omega$  resistance at  $20 \pm 2$  ° C, the discharge current is less than 0.10 mA, the discharge time is 24 h/d, the end voltage is 6.0 V)

## 6. Battery profile dimensions diagram

Size item	Data range
A(Positive projectionsize)	Min=0.60 mm
B(Total battery height)	27.50-28.50mm
$C(Battery outer diameter $ $\Phi)$	9.70-10.30 mm
D(Negative electrode- convex size)	Min=0 mm

Battery maximum size:  $\Phi$  10.30X28.50mm

Battery minimum size: Φ9.70X27.50 mm







## 7. Battery performance

(Conditions: The measured temperature is  $20\pm2^{\circ}$ C)

Battery category	No-load voltage(V)	Short circuit current (mA)	Acceptance Standard	
New electricity(Within 30 days of receipt)	≥ 12.30	≥ 300	MIL CTD 105E Class II	
Suitable for storage for 12 months	≥ 12.10	≥ 250	MIL-STD-105E, Class II  Double Sampling	
Suitable for storage for 24 months	≥ 12.00	≥ 200	AQL=0.25	

Note: See item 12 for suitable storage.

## 8. Output (discharge)

(Conditions: load resistance value accuracy  $\pm$  0.5%, test ambient temperature is 20  $\pm$  2 °C Celsius, humidity 35%~75%, new power test within 30 days after receiving the goods)

	Discharge condition	S	Minimum avera	ge discharge time
Discharge load standard	Discharge time every day	End voltage	New battery	Store at room temperature for 12 months
20 k Ω	24 hr	9.00 V	75 hrs	65 hrs
	24 hr	6.00Vt	110hrs	99 hrs

#### Acceptance Standard:

- 1) 9 pieces of battery will be tested for each discharging standard;
- 2) The result of the average discharging time from each discharging standard shall be equal to or more than the average minimum time requirement; and no more than one battery has a service output less than 80% of the specified requirement;
- 3) One re-test is allowed to confirm the previous result.



## 9. Safety performance—External short circuit

Item	Condition	Periods	Characteristics	Acceptance Standard
Over-discharge	Discharge to 3.0V,or discharge for 24 hours after the discharge test is completed		The batteries do not explode	N=9,Ac=0,Re=1
Positive and negative short circuit	temperature: 20—60°C Humidity: 4090%	24 hours	The batteries do not explode	N=9,Ac=0,Re=1

## 10. Battery mark

The following will be indicated outside the battery

- (1) model: A23 L1028
- (2) Battery key points: printed on the surface.
- (3) Battery Positive and Negative Extreme Symbols, The "+" direction indicates the positive electrode of the battery, Also in extreme representation by red glue circle. The "-" number represents the negative electrode of the battery, and it is extremely represented by the black rubber circle.
- (4) The date of the production batch number is marked on the inner box of the outer package or on the card packing paper card.

## 11. Caution for Use

- (1) Since the battery is not manufactured for recharging, there are risks of electrolyte leakage or causing damage to the device if the battery is charged.
- (2) The battery shall be installed with its "+" and "-" polarity in correct position, otherwise may cause short-circuit.
- (3) Short-circuiting, heating, disposing of into fire and disassembling the battery are prohibited.
- (4) Battery cannot be forced discharge, which leads to excess internal gas generation and, may result in bulging, leakage and de-crimping of cap.
- (5) New and used batteries cannot be used at the same time, when replaced batteries recommend to replace all and with the same brand type.



- (6) Used batteries should be removed from appliance in case of over-discharge, otherwise it will cause leakage & damage to the device.
- (7) Direct soldering is prohibited ,which will damage the battery.
- (8) Battery should be kept out of the reach of children in case of being swallowed.
- (9) The battery should not be disassembled or deformed.

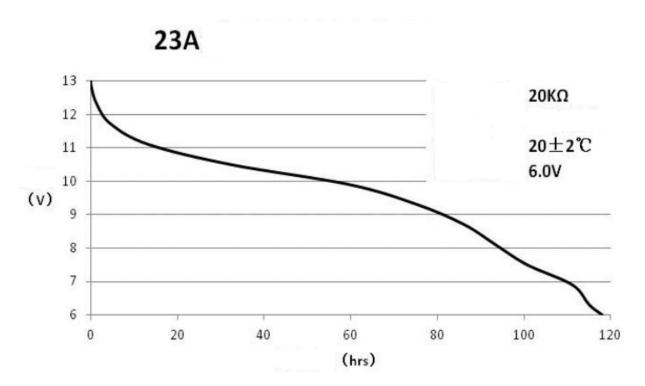
### 12. Shelf Life

- (1) Can be stored for 1 year at room temperature and suitable environment (Temperature  $20\pm2^{\circ}$ °C, Humidity  $55\%\pm20\%$ ) .
- (2) After one year of storage period, the battery can retain more than 90% of the capacity.

#### 13. Discharge Curve

(Discharge testing environment Temperature  $20\pm2^{\circ}$ C, Humidity  $55\%\pm20\%$ RH)

Discharge method: use a  $20k\Omega$  resistor, the resistance accuracy is  $\pm$  5%, connect the tested battery in series, and the discharge curve of continuous discharge for 24 hours a day is shown in the table below.

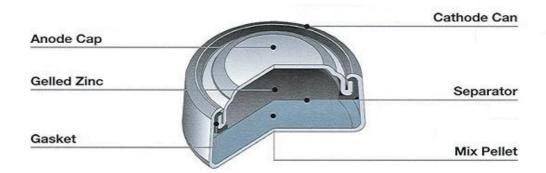




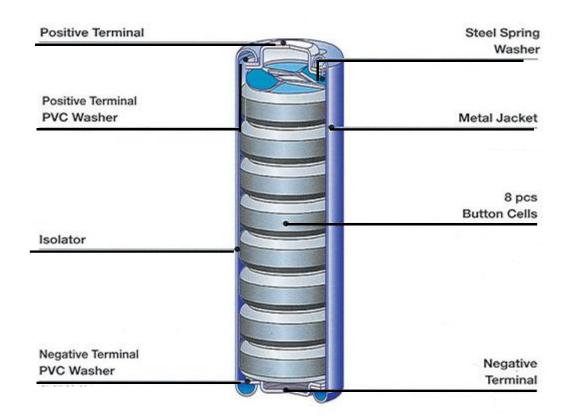
## 14. Battery structure diagram

#### 14. 1 Structure diagram of the inner single-cell battery

- 1) The positive electrode shell is punched with single light or double light iron;
- 2) The negative electrode cover adopts Baosteel iron material as the base material, and the surface of the copper layer is plated with indium tin.



# 14. 2 Overall combination of laminated battery structure diagram STRUCTURAL DIAGRAM OF A23 BATTERY A23





- 1) The metal shell adopts horse skin, environmental protection color printing production process or labeling production process.
- 2) The spring sheet is made of stainless steel with a wavy shape at four corners to ensure battery contact and combined battery safety.
- 3) Environmental friendly black PET material to ensure that the battery is moisture-proof and other external radiation.
- 4) Both the positive and negative electrode caps are made of iron material.