



Specification Approval sheet



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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|MnO₂(+)

3. Nominal voltage : 12.0 volt

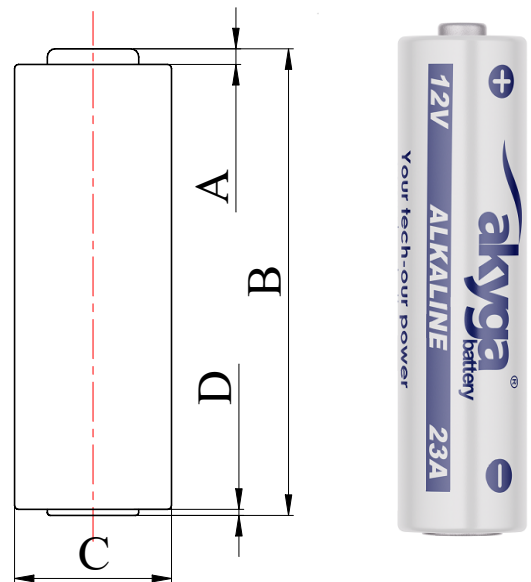
4. Average weight : 8.00 g

5. Nominal capacity: 48mAh

48mAh (Under the condition of 20kΩ resistance at 20 ± 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 projection-size)	Min=0.60 mm
B(Total battery height)	27.50-28.50mm
C(Battery outer diameter Φ)	9.70-10.30 mm
D(Negative electrode-convex size)	Min=0 mm



Battery maximum size: Φ 10.30X28.50mm

Battery minimum size: Φ 9.70X27.50 mm

7. *Battery performance*

(Conditions: The measured temperature is $20 \pm 2^{\circ}\text{C}$)

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

Note: See item 12 for suitable storage.

8. *Output (discharge)*

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

Discharge conditions			Minimum average 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℃ Humidity: 40--90%	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.

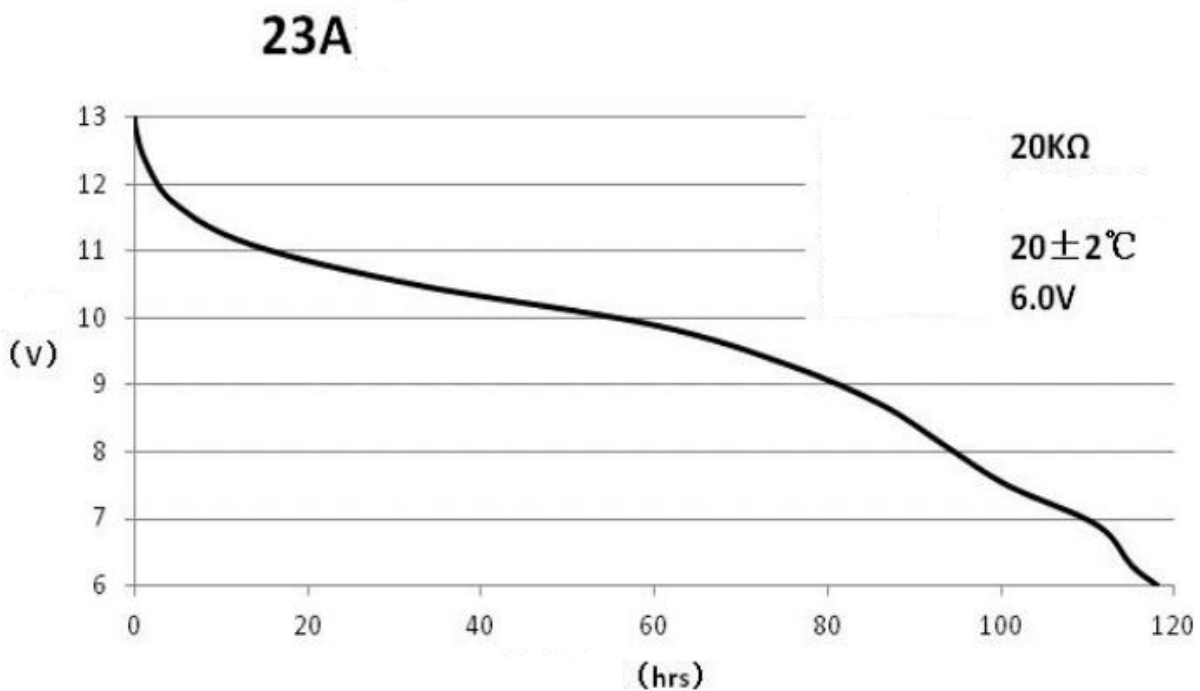
12. Shelf Life

- (1) Can be stored for 1 year at room temperature and suitable environment
(Temperature $20 \pm 2^\circ\text{C}$, Humidity $55\% \pm 20\%$) 。
- (2) After one year of storage period, the battery can retain more than 90% of the capacity.
- (3) Storage Life 5 years.

13. Discharge Curve

(Discharge testing environment Temperature $20 \pm 2^\circ\text{C}$, Humidity $55\% \pm 20\% \text{RH}$)

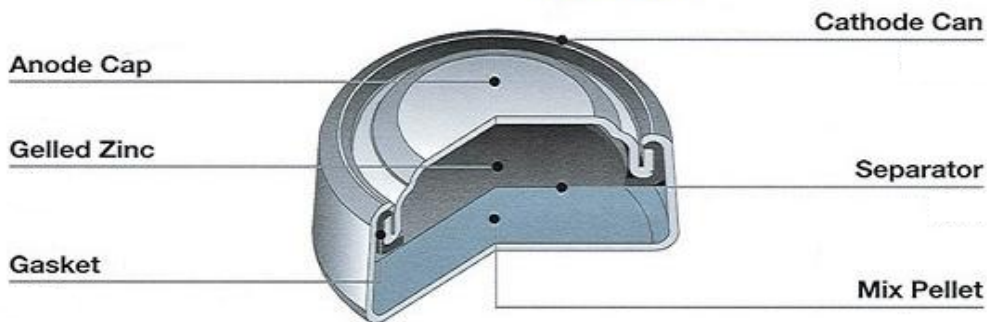
Discharge method: use a 20k Ω resistor, the resistance accuracy is $\pm 5\%$, connect the tested battery in series, and the discharge curve of continuous discharge for 24 hours a day is shown in the table below.



14. Battery structure diagram

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

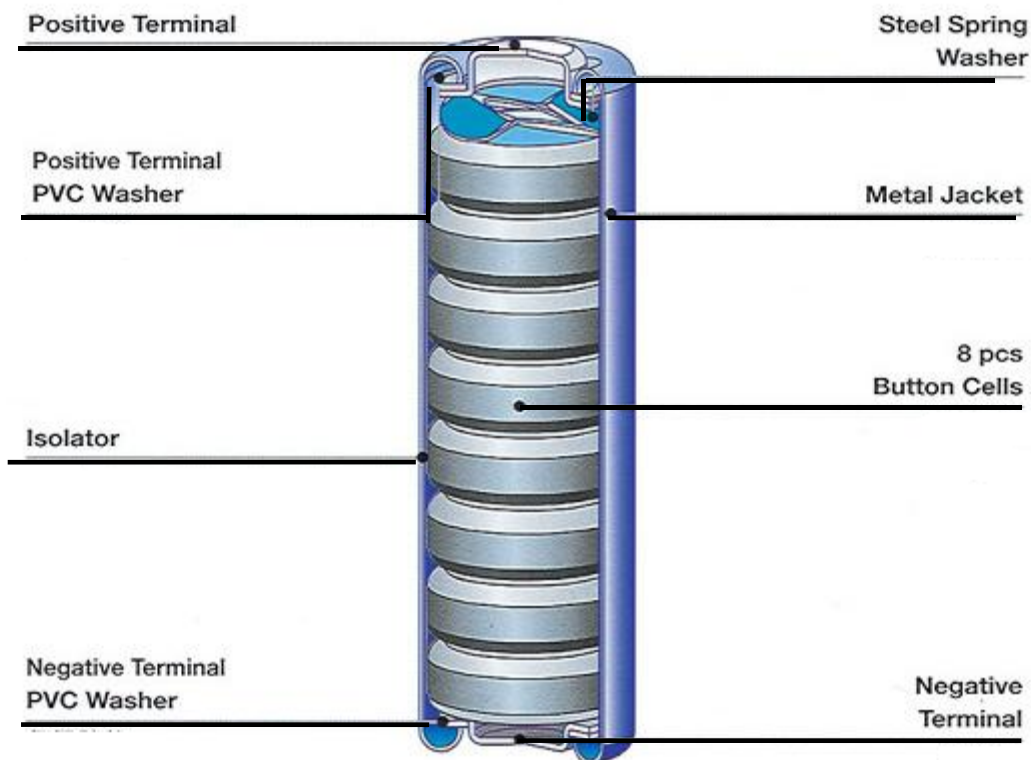
- 1) The positive electrode shell is punched with single light or double light iron;
- 2) The negative electrode cover adopts Baosteel iron material as the base material, and the surface of the copper layer is plated with indium tin.



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.