

承認書

SPECIFICATION FOR APPROVAL

客 戶: 弼聖科技股份有限公司

CUSTOMER

日期
DATE 2014 年 5 月 30 日

廠牌
BRAND KTS

規格
DESCRIPT BUTTON CELL CR2032

仕野料號
OUR PART NO. BBBCR2032B

客戶料號
CUSTOMER PART NO. AC-133-RS

序號
REFERENCE NO

	Checkup 審核	Approved By 批准
Signature 簽名		

仕野股份有限公司

VIC-DAWN ENTERPRISE CO., LTD.

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R.O.C.

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1. Purpose

1.1 In order to avoid errors and deviations by different testing method or condition, we established this specification to define the battery model and test method of lithium battery manufactured by VIC-DAWN.

1.2 Give some guidance for using our products.

2. Description and Model

Table 1

Description	Model
Lithium manganese dioxide button battery	CR2032

3. Technical parameters

Table 2

No.	Items	Characteristics
1	Nominal Capacity	220mAh (or 2360h) (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 2%
5	Max. Pulse Current*	12 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 steel cell can and cap, etc.
9	Weight for Reference	about 3.2g

* 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.

* 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 (or 2360h)		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 $30\text{k}\Omega$ 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 $30\text{k}\Omega$ 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 $30\text{k}\Omega$ 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 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

Table 4

No.	Items	Standard	Test Method
A	Altitude Simulation Test	NL、NC、NR、NE、NF	At 20 °C ±2 °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°C ~-10°C ,and then be stored for more than 24hours at 23°C±3°C , 45%~75%RH.
C	Vibration	NM、NL、NV、NC、NR、NE、NF	The batteries should be subjected to a simple harmonic motion with an 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.

D	Shock	NM、NL、 NV、NC、 NR、NE、NF	The batteries should be secured to the testing machine by means of a rigid mount which will support all mounting surfaces of each test battery. Each battery should be subjected to a total of three shocks of equal magnitude. The shocks are to be applied in each of the three mutually perpendicular directions. Each shock is to be applied in a direction perpendicular to the face of the battery. For each shock the battery is to be accelerated in such a manner that, during the initial 3ms, the minimum average acceleration is $75 \times 9.8 \text{ m/s}^2$. The peak acceleration should be between $125 \times 9.8 \text{ m/s}^2 \sim 175 \times 9.8 \text{ m/s}^2$.
E	External Short Circuit	NT、NR NE、NF	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..
No.	Items	Standard	Test Method
F	Impact	NT、NE、NF	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. 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.
G	Crush	NT、NE、NF	A battery is to be crushed between two flat surfaces. The force for the crushing is to be applied by a hydraulic ram with a 32 mm (1.25 inch) diameter piston. The crushing is to be continued until a pressure reading of 17 MPa is reached on the hydraulic ram, resulting in an applied force of 13 KN. Once the maximum pressure has been obtained it is to be released. A coin or button battery is to be crushed with the flat surface of the battery parallel with the flat surfaces of the crushing apparatus. Each sample battery is to be subjected to a crushing force in only one direction.

H	Forced-discharge	NE、NF	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 .
I	Abnormal Charge	NE、NF	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
J	Free Drop	NV、NE、NF	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
K	Heating Test	NE、NF	The battery should be placed in an oven. The oven temperature should be increased at a rate of $5^{\circ}\text{C}\pm 2^{\circ}\text{C}$ per minute until the oven reached $130^{\circ}\text{C}\pm 2^{\circ}\text{C}$.The oven should be maintained at $130^{\circ}\text{C}\pm 2^{\circ}\text{C}$ for 10min.
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 $15^{\circ}\text{C}\sim 25^{\circ}\text{C}$ 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
$\pm 1\%$	$\pm 1\%$	$\pm 1\%$	$\pm 2^{\circ}\text{C}$	$\pm 0.1\%$	$\pm 0.1\%$	$\pm 0.1\%$

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

5. Packaging

Dimension of box	Net weight	Gross weight	Icons of box
355mm×285mm×215mm	13KG	14.1KG	

Normal package : 4000 pcs per box. (package figure is showed in appendix 3)

5.1 Battery type: CR2032

5.2 Brand: KTS

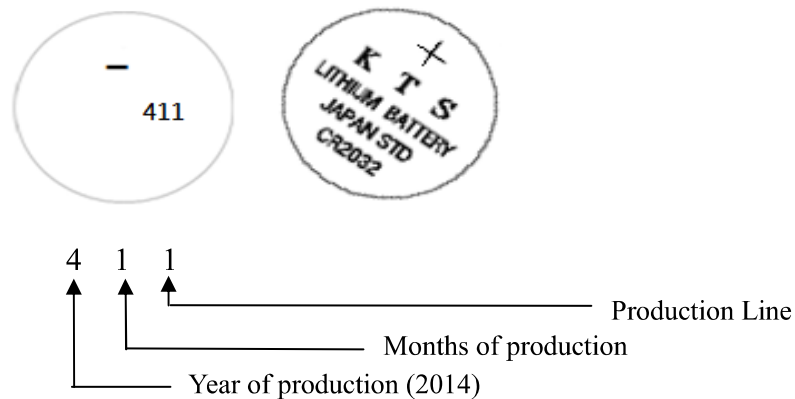
5.2 Nominal voltage: 3.0V

5.3 Polarity: +

5.4 Manufacturing marks: The year and month of production shall be marked on negative terminal when needed.

5.5 Producing sequence number: Marked on Negative.

Example :



January to October → 1 ~ 0

November, December → a , b

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 IEC standard, and have past UL20550, UN safety test.



BBCV2.MH20550
Lithium Batteries - Component

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Lithium Batteries - Component

[See General Information for Lithium Batteries - Component](#)

VIC-DAWN ENTERPRISE CO LTD

MH20550

5TH FL

2 ALLEY 1 SZU WEI LANE CHUNG CHENG RD

HSIN-TIEN CITY

TAIPEI HSIEN, 231 TAIWAN

Model	Primary Type ^(a)	Max Abnormal Charging Current, mA	Max Charge Voltage	Replacement ^(c) , (d)
CR2025	Lithium/manganese dioxide coin cells	10	—	User
CR2032	Lithium/manganese dioxide coin cells	10	—	User
CR1216	Lithium/manganese dioxide coin cells	3.5	—	User
CR1220	Lithium/manganese dioxide coin cells	10	—	User
CR1225	Lithium/manganese dioxide coin cells	10	—	User
CR1616	Lithium/manganese dioxide coin cells	2.5	—	User
CR1620	Lithium/manganese dioxide coin cells	2.5	—	User
CR2016	Lithium/manganese dioxide coin cells	10	—	User
CR2320	Lithium/manganese dioxide coin cells	10	—	User
CR2330	Lithium/manganese dioxide coin cells	10	—	User
CR2354	Lithium/manganese dioxide coin cells	10	—	User
CR2430	Lithium/manganese dioxide coin cells	15	—	User
CR2450	Lithium/manganese dioxide coin cells	15	—	User
CR2477	Lithium/manganese dioxide coin cells	15	—	User
CR2	Lithium/manganese dioxide cylindrical cells	25	—	User
CR123A (e)	Lithium/manganese dioxide cylindrical cells	25	—	User
CR17335	Lithium/manganese dioxide	25	—	User

(e)	cylindrical cells			
ER14250 (f)	Lithium thionyl chloride cells	15	8.0 V	Technician
ER14505 (f)	Lithium thionyl chloride cells	50	8.0 V	Technician
ER26500 (f)	Lithium thionyl chloride cells	100	8.0 V	Technician
Model	Secondary Type ^(b)	Max Charging Current, mA	Max Charge Voltage	Replacement ^(c) , (d)
LIR2450-II	lithium ion coin cells	37	—	User
LIR2450-III	lithium ion coin cells	46	—	Use
LIS383450A	Lithium ion Cell	600	4.5	Technician
LIS423048A	Lithium ion Cell	600	4.5	Technician
LIS433450A	Lithium ion Cell	700	4.5	Technician
LIS053048A	Lithium ion Cell	700	4.5	Technician
LIS063048A	Lithium ion Cell	850	4.5	Technician
LIS103450AR	Lithium ion Cell	1650	4.5	Technician
LIS363450A	Lithium ion Cell	600	4.5	Technician
LIS383455A	Lithium ion Cell	650	4.5	Technician
LIS413450A	Lithium ion Cell	650	4.5	Technician
LIS483040A	Lithium ion Cell	500	4.5	Technician
LIS483450A	Lithium ion Cell	780	4.5	Technician
LIS063448A	Lithium ion Cell	950	4.5	Technician
LIS631440A	Lithium ion Cell	280	4.5	Technician
LIS413455A	Lithium ion Cell	750	4.5	Technician
LIS103448A	Lithium ion Cell	1550	4.5	Technician
LIS631116	Lithium ion Cell	80	4.5	Technician
LIS393048	Lithium ion Cell	500	4.5	Technician
LIS493040	Lithium ion Cell	500	4.8	Technician
LIS493048	Lithium ion Cell	600	4.5	Technician
LIS562248	Lithium ion Cell	490	4.5	Technician
LIS583048	Lithium ion Cell	750	4.5	Technician
LIS983448	Lithium ion Cell	1550	4.5	Technician
LIS983450	Lithium ion Cell	1600	4.5	Technician
LIS983450R	Lithium ion Cell	1600	4.5	Technician
LIS483465	Lithium ion Cell	970	4.5	Technician
LIS081750V	Lithium ion Cell	500	4.5	Technician
LIS493040V	Lithium ion Cell	500	4.5	Technician
LIS723030V	Lithium ion Cell	550	4.5	Technician
LIS723030V	Lithium ion Cell	280	4.5	Technician
ML1220	Lithium/manganese dioxide coin cells	1	5	User

ML414R	Lithium/manganese dioxide coin cells	0.02	5	User
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(a) These cells and batteries are not rechargeable. The circuit containing the cells or batteries is to contain a protective component which prevents charging. The circuitry is to include a current limiting component which is intended to protect the cell or battery, in the event the protective component malfunctions, from a charging current in excess of the maximum abnormal charging current indicated.

(b) These cells and batteries are rechargeable. The circuitry containing these cells or batteries is to contain protective components intended to protect the cells or batteries from currents in excess of the maximum charging current indicated.

(c) User — These cells and batteries are intended for use in applications subject to replacement by the user.

(d) Technician — These cells and batteries are intended for use in applications subject to replacement only by a trained service technician.

(e) These cells can be used two in series of the same model.

(f) These cells can be used in series with a maximum of 4 cells of the same model.

Marking: Company name or tradename "KTS" and model designation.
Last Updated on 2006-10-24

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8. Transportation

- The Batteries should be stored away from solarization, 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.

! 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.

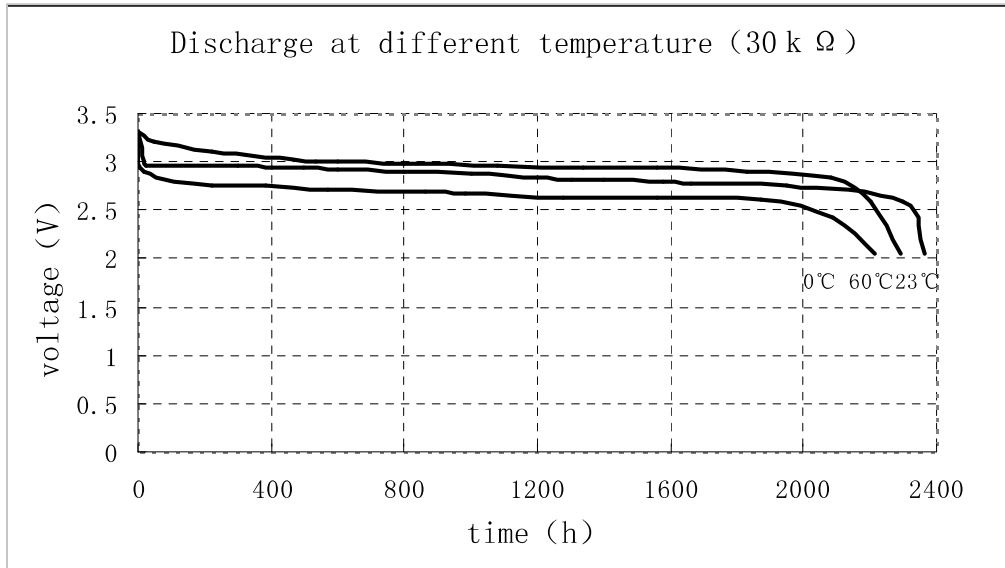
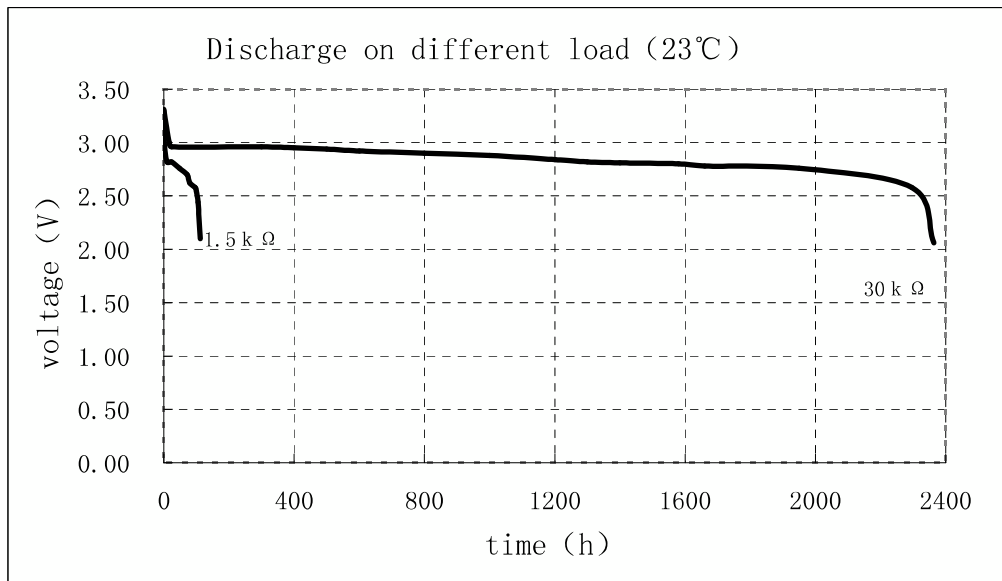
10. Storage

- 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 mussily.

11. Declaration

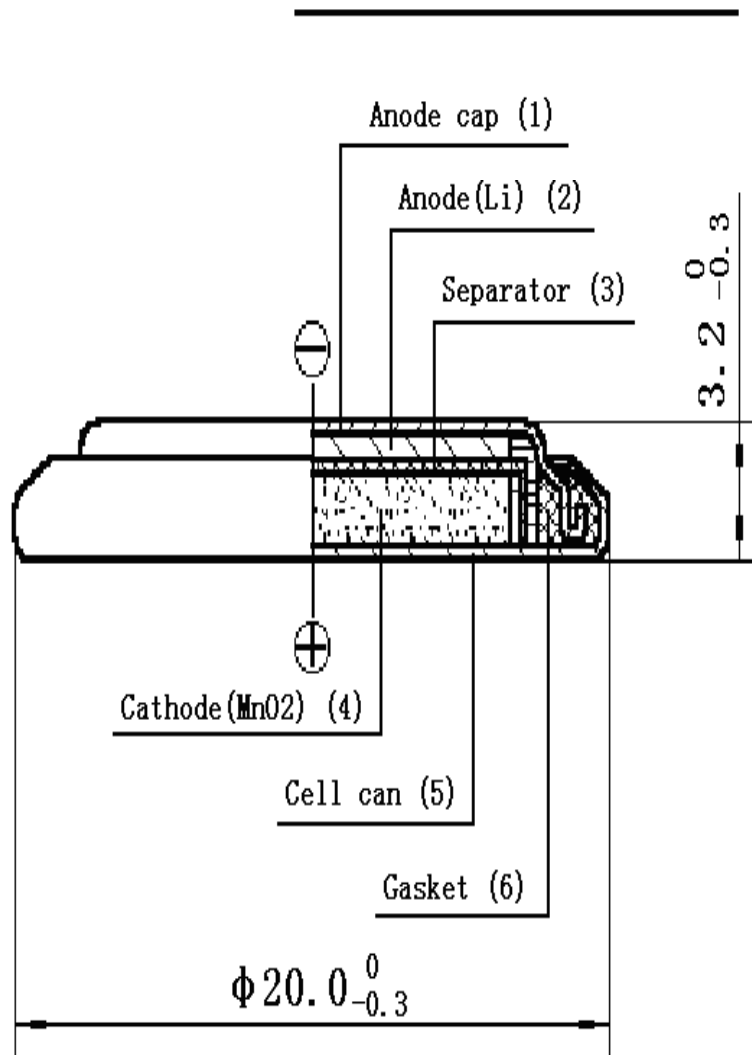
- Please contact with VIC-DAWN Electronic Co., Ltd. If you have any question with this specification.
- VIC-DAWN Electronic Co., Ltd keeps the right to change the specification.

Appendix 1: CR2032 discharge curves



Appendix 2: CR2032 Cross Section Draw

CR2032 Cross section view



Appendix 3: Structure Figure of Package

Structure Figure of Package

CR2032 4000 Pcs Per Box

1. Battery (-)



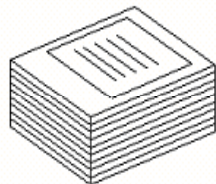
(+)

2. 20Pcs Per Plate

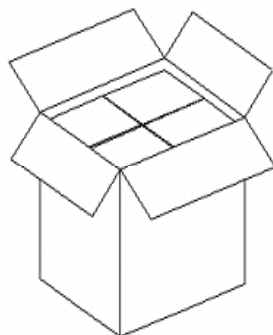


Outline Dimensions of
Plate: 136×166×7

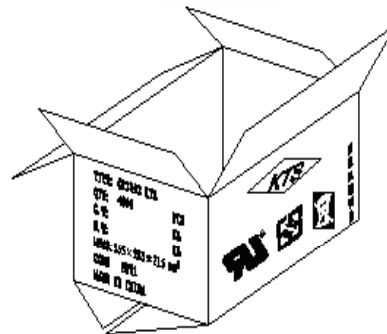
3. 10 Plates Per Min Package



4. 20 Min Package Per Box



Sample of box



In the requirements of "Packaging storage and transportation mark icon GB191-2000", "up, for fear of rain, handle with care" signs and "KEEP AWAY FROM THE HEAT AND MOISTURE" are printed on one side of box. The other side of box printing as shown in figure words.

Outline Dimensions of

Box: 355×285×215

Net: 13 kg

Gross: 14.1 kg