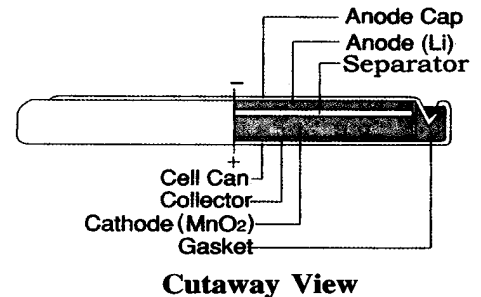


INTRODUCTION:

EXTRACELL'S button type lithium manganese dioxide lithium batteries utilize the chemically highly stable manganese dioxide for the positive material and lithium for the negative material. This gives a 3 volts nominal voltage, twice that of the conventional dry cell batteries (zinc – carbon batteries mercuric oxide batteries, silver oxide batteries and alkaline manganese batteries). The performance of **EXTRACELL** lithium button cells meets the requirements of both high drain usage and long – term reliability.

OUTSTANDING CHARACTERISTICS

1. The high nominal voltage of 3V means that now just one battery is enough to support a CMOS, S – RAM.
2. These batteries will last for a relatively long period of 4 to 5 years for low drain usage and a steady, reliable current is ensured.
3. The positive material is made of manganese dioxide which is chemically very stable and so the battery has a long service life. The low annual discharge rate of 2% or less facilitates a longer storing period.
4. The electrolyte used in **EXTRACELL** lithium batteries is a unique non-aqueous electrolyte which safeguards non – leakage. Therefore our batteries are perfect for memory back – up applications where long – term reliability is required.
5. Their new, high energy density design makes them lightweight, very compact and powerful.
6. They have been specially developed to perform at their capacity under the extremely wide temperature range of – 20°C to + 60°C.



PRECAUTIONS AND PROHIBITIONS

Under normal usage, these batteries can be used with complete assurance of safety. However, in the event they are improperly used, there is the danger that a serious explosion or leakage might occur. Please be careful to observe the following:

1. Precautions When Using Manganese Dioxide Lithium Batteries

A. Manganese dioxide lithium batteries are primary batteries, so they cannot be recharged.

- i) When used as a back up battery, to prevent current from the main power source from flowing into the circuit with the battery, use blocking diodes to prevent reverse current, as shown in the figure on the right.
- ii) Use a low current leakage type of diode, and choose it so that the charge capacity from a reverse current leak less than 1 – 2% of the nominal capacity.
- iii) For details regarding other uses of these batteries including power boosting, please contact us.

B. Do not connect a battery in series with the power source, which would result in increasing current flowing into the battery.

- C. When connecting a lead directly to a battery, do not directly solder or spot weld it on the battery. Be sure to use either a tab or a pin for the connection.
- D. When soldering, the temperature should not exceed 270°C, and soldering time should not be over 5 seconds.
- E. In the case of automated soldering, only the terminal should be immersed. Be careful not to let the battery stay immersed or fall into the solder.
- F. For equipment that generates heat, keep the battery away from the area that gets hot. When a battery must be close to a heat generating area, insulate the battery from the heat, making sure that the battery is not exposed to over 60°C.

2. Do Not Do The Following:

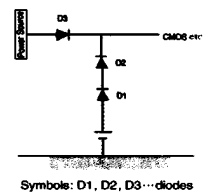
- A. The voltage of manganese dioxide lithium batteries is not compatible with the voltage of conventional batteries, such as manganese batteries (1.5V), alkaline batteries (1.5V), silver oxide batteries (1.55V), alkaline button batteries (1.5V), mercury batteries (1.4V), and thionyl chloride lithium batteries with new ones.
- B. Do not mix different type of batteries together, nor mix partially used batteries with new ones.
- C. Do not short – circuit the positive and negative terminals.
- D. Do not connect the positive and negative terminals in reverse polarity.
- E. Use batteries at normal temperatures, and never let the temperature exceed 60°C.
- F. Do not disassemble batteries, dispose of them in fire, heat them or submerge them in water, because there is the danger of combustion or explosion.
- G. Do not expose batteries to strong impact.

3. Precautions When Changing Batteries

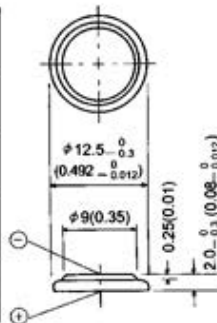
- A. The finished piece of electronic device to be so designed that the batteries cannot be inserted in reversed polarity. And even if they are inserted in reversed polarity, the device must be so designed that some safety party will short – circuit or that when the circuit is opened the reversed batteries will not be forcibly discharged.
- B. The following warning must be attached to place close to where the batteries are inserted of the finished piece of device: “Replace battery with (Battery manufacturer’s name or end – product manufacturer’s name) part No. () only. Using other batteries may lead to the risk of fire or explosion. See owner’s manual for safety instruction.”
- C. Also, in some part of the user’s instruction manual for the equipment, it must be stated where replacement batteries can be purchased, That manual must include the following warning: “WARNING, batteries may explode if mistreated. Do not recharge, disassemble or dispose of it in fire.”

4. Precautions When Storing Batteries

- A. When storing batteries, avoid places that are hot, humid or where moisture is likely to form.
- B. Do not expose batteries for direct sunlight nor to water, such as rain.
- C. Be careful that the battery is not short circuited, such as by improper packaging or assembling.
- D. When transporting batteries, avoid rough handling so as not to damage them by denting or deformation.
- E. When stacking shipping cartons with batteries, do not stack more than the number indicated on the cartons.
- F. To prevent batteries to be swallowed by children accidentally, please keep them out of children’s reach. In the case that they are swallowed, contact a physician immediately.

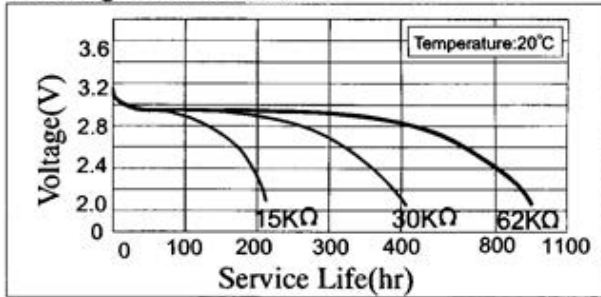


CR1220	
Nominal Voltage	3 (V)
Nominal Capacity	40 (mAH)
Load Resistance	62 (KΩ)
Weight	0.9 (g)

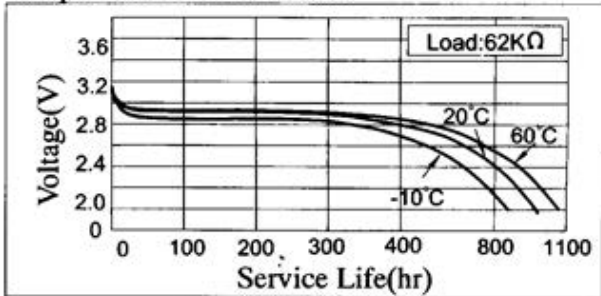


STANDARD CHARACTERISTICS

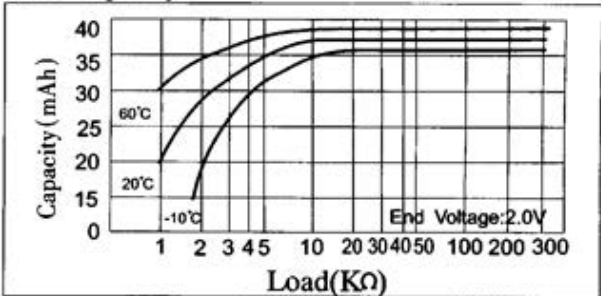
Discharge Characteristics



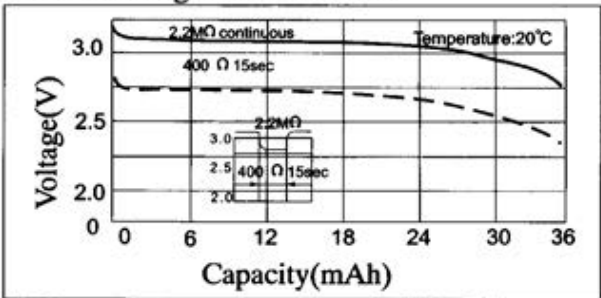
Temperature Characteristics



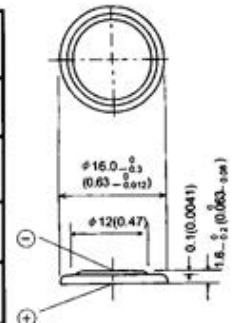
Load-capacity



Pulse Discharge Characteristics

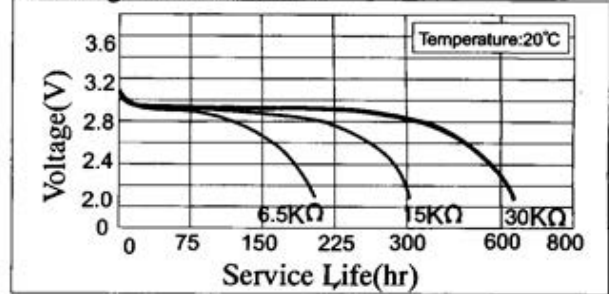


CR1616	
Nominal Voltage	3 (V)
Nominal Capacity	50 (mAH)
Load Resistance	47 (KΩ)
Weight	1.2 (g)

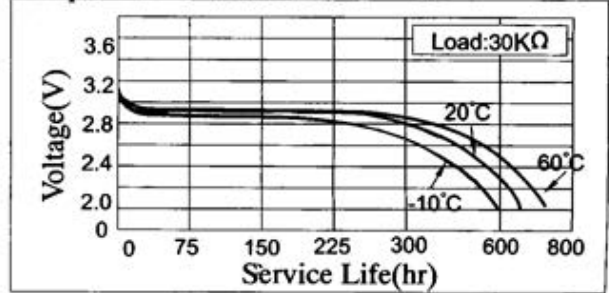


STANDARD CHARACTERISTICS

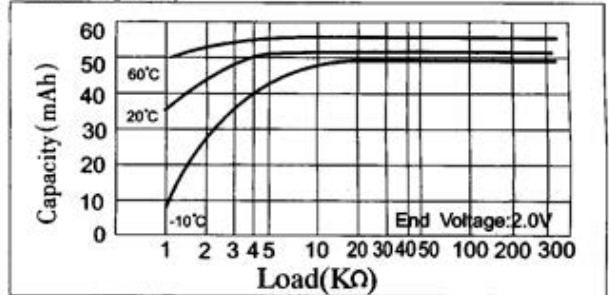
Discharge Characteristics



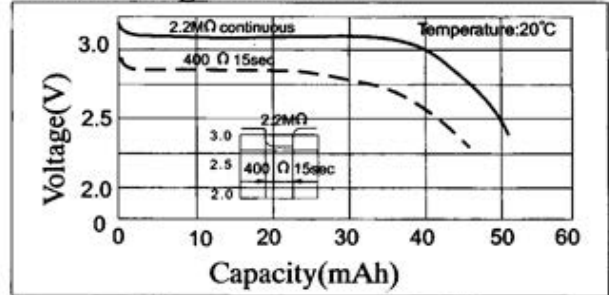
Temperature Characteristics



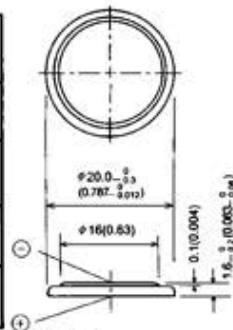
Load-capacity



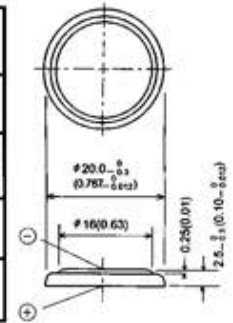
Pulse Discharge Characteristics



CR2016	
Nominal Voltage	3 (V)
Nominal Capacity	75 (mAh)
Load Resistance	30 (K Ω)
Weight	1.8 (g)

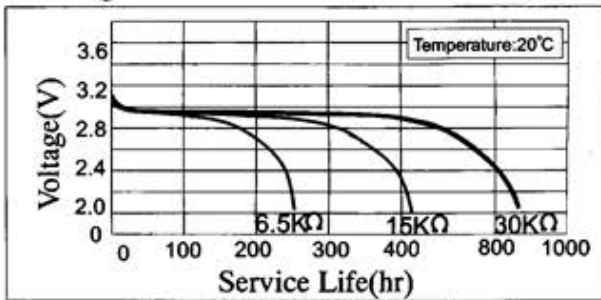


CR2025	
Nominal Voltage	3 (V)
Nominal Capacity	130 (mAh)
Load Resistance	15 (K Ω)
Weight	2.4 (g)



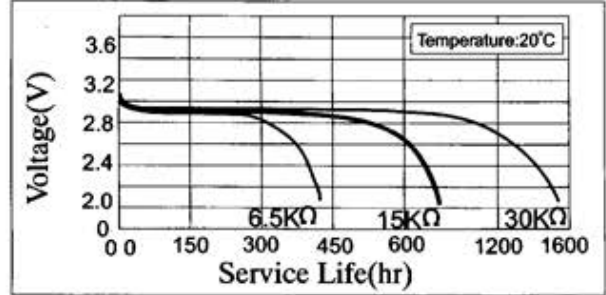
STANDARD CHARACTERISTICS

Discharge Characteristics

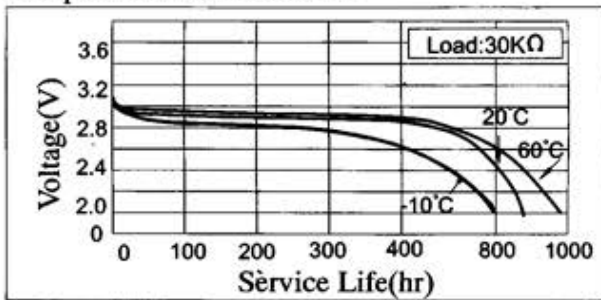


STANDARD CHARACTERISTICS

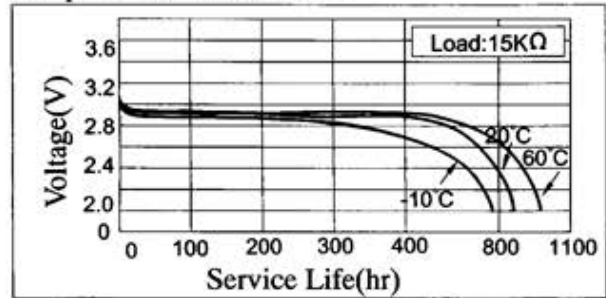
Discharge Characteristics



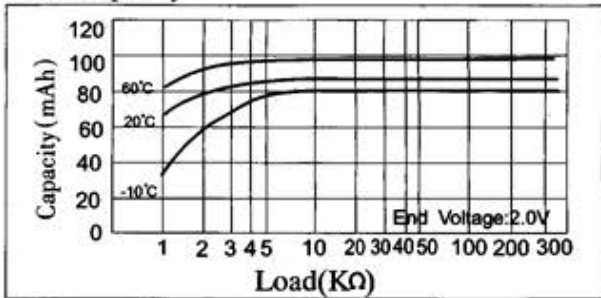
Temperature Characteristics



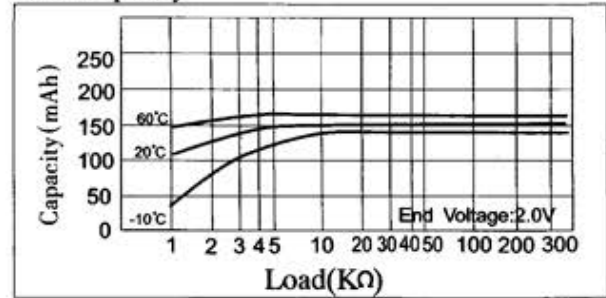
Temperature Characteristics



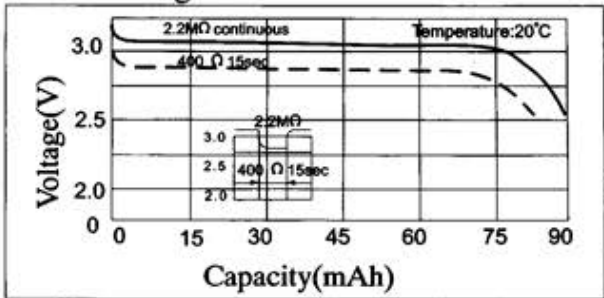
Load-capacity



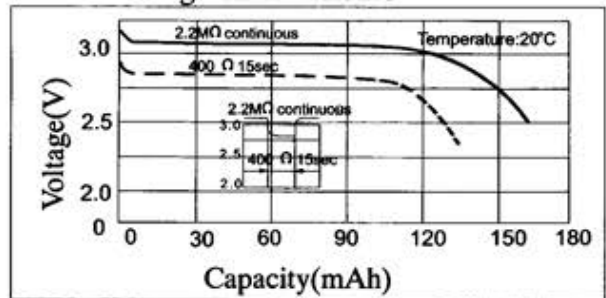
Load-capacity

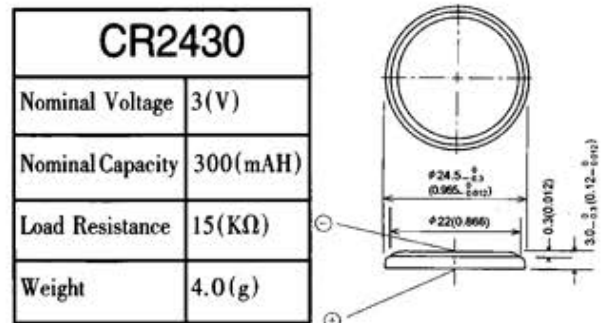
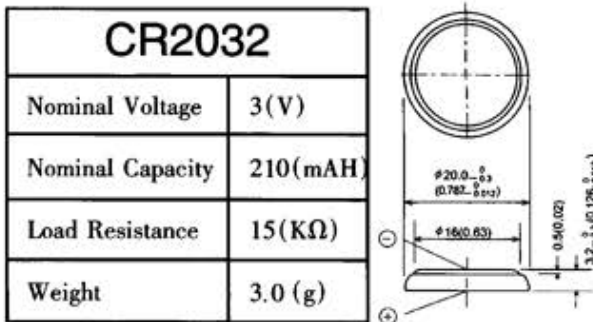


Pulse Discharge Characteristics

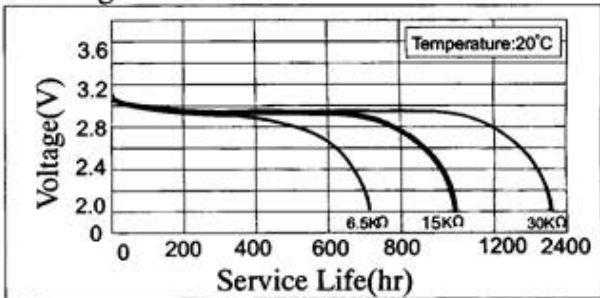


Pulse Discharge Characteristics

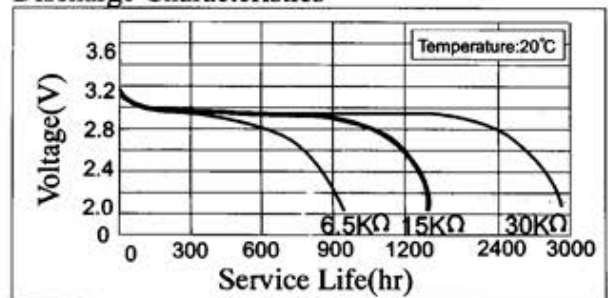




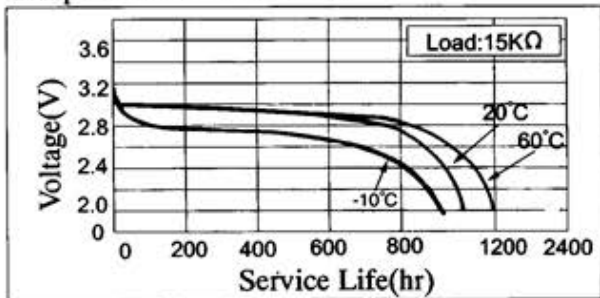
STANDARD CHARACTERISTICS
Discharge Characteristics



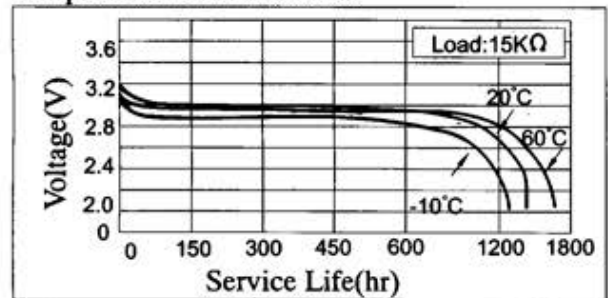
STANDARD CHARACTERISTICS
Discharge Characteristics



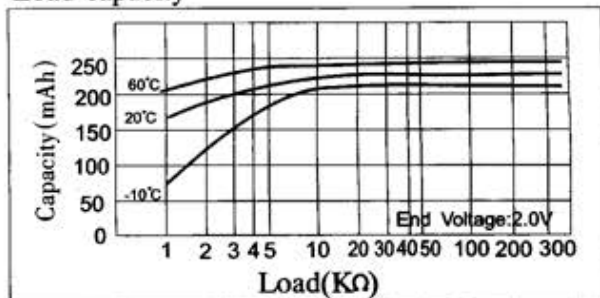
Temperature Characteristics



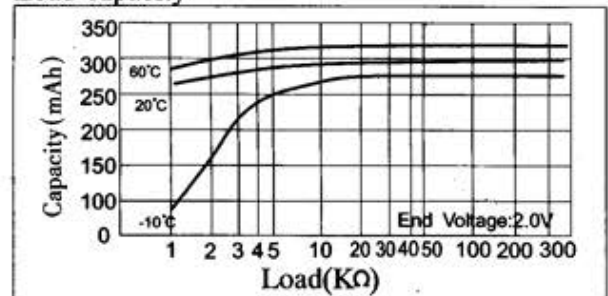
Temperature Characteristics



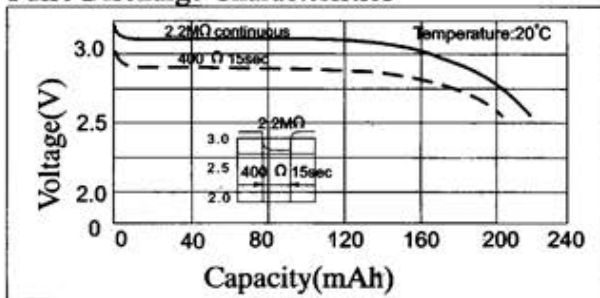
Load-capacity



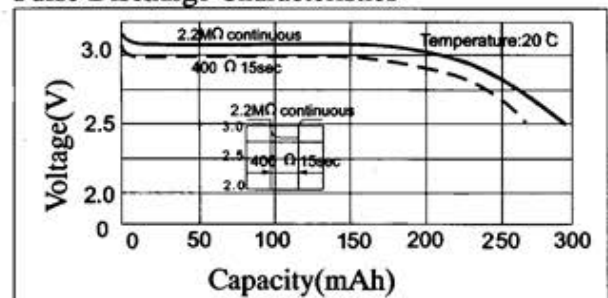
Load-capacity



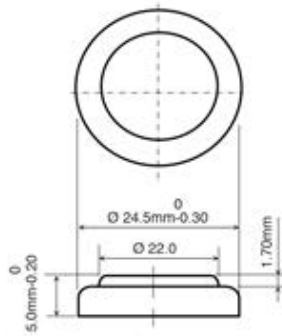
Pulse Discharge Characteristics



Pulse Discharge Characteristics

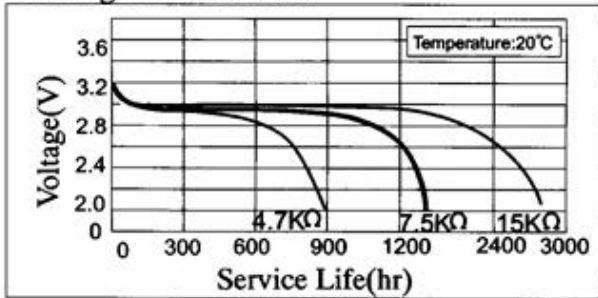


CR2450	
Nominal Voltage	3(V)
Nominal Capacity	530(mAH)
Load Resistance	7.5(K Ω)
Weight	6.2(g)

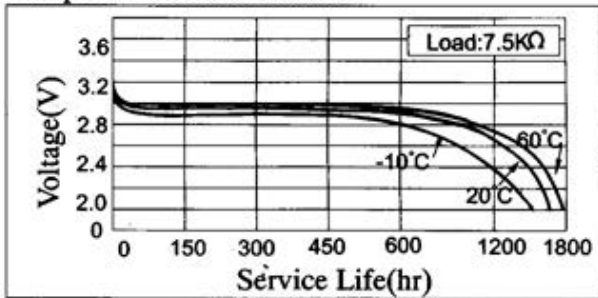


STANDARD CHARACTERISTICS

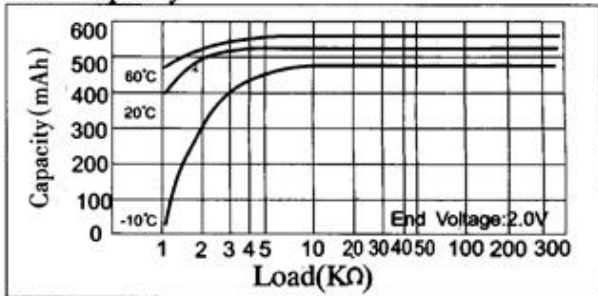
Discharge Characteristics



Temperature Characteristics



Load-capacity



Pulse Discharge Characteristics

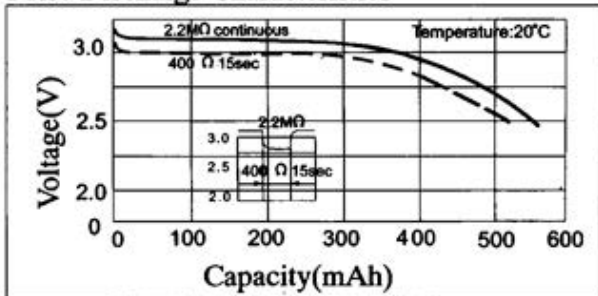


Table Of Battery Specifications

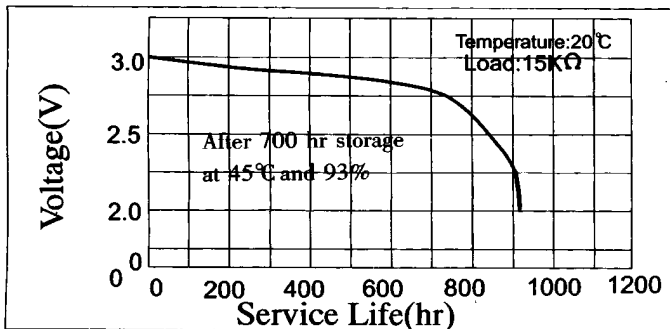
Model No.	Nominal Voltage (V)	Nominal Capacity (mAh)	Standard Current (mA)	Continuous Current (Max) (mA)	Pulse Current (Max) (mA)	Max Dimensions (mm)	Weight (Grams) approx.
CR1220	3	40	0.1	0.2	5	∅12.5x2.0	0.9
CR1616	3	50	0.1	0.3	8	∅16.0x1.6	1.2
CR1620	3	68	0.1	0.3	8	∅16.0x2.0	1.3
CR2016	3	75	0.1	0.3	10	∅20.0x1.6	1.8
CR2025	3	130	0.2	0.5	15	∅20.0x2.5	2.2
CR2032	3	210	0.2	0.5	15	∅20.0x3.2	2.8
CR2430	3	300	0.2	1	15	∅24.5x3.0	4.2
CR2450	3	530	0.2	1	15	∅24.5x5.0	6.2

<p>30/26552-00 LMB2032V3CS</p>	<p>30/26588-00 LMB2032H3CS</p>	<p>30/26642-00 LMB2032H2CS</p>
<p>30/26558-00 LMB2430V3CS</p>	<p>30/26591-00 LMB2450H3CS</p>	<p>30/26643-00 LMB2032H2CSL</p>
<p>30/26561-00 LMB2450V3CS</p>	<p>30/26612-00 LMB2032VA2CS</p>	<p>30/26649-00 LMB2430H2CSL</p>
<p>30/26582-00 LMB2032H3CS</p>	<p>30/26618-00 LMB2430VA2CS</p>	<p>30/26653-00 LMB2450H2CSL</p>
<p>30/26621-00 LMB2450VA2CS</p>	<p>30/26648-00 LMB2430H2CSL</p>	

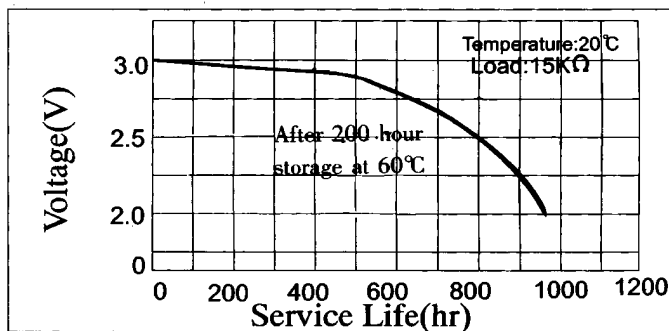
SAFETY TESTS(CR2032)

TEST TYPE	TEST CONDITIONS	RESULTS
Vibration Test	Vibration width: 1.0mm, Frequency 10 – 55Hz Withdraw: 1minute, X, Y axes at 2 hrs each.	* No leakage detected. * No abnormalities in battery characteristics.
Strength Test	For the initial 3msec, impact acceleration was 75G, with additional acceleration impact reaching a maximum value 125 – 175G on each axis(X, Y).	* No leakage detected. * No abnormalities in battery characteristics.
Drop Test	Dropping vertically from a height of 75cm 10 times.	* No leakage detected. * No abnormalities in battery characteristics.
High temperature Storage Test	Storage for 24 hours at 80°C	* No leakage detected. * No abnormalities in battery characteristics.
Temperature Cycle Test	- 10°C / 60°C, alternating 3 hours at each	* No leakage detected. * No abnormalities in battery characteristics.
Short Circuit Test	Short – circuiting for 48 hours continuously	* There is no battery leakage, explosion, or combustion. * The battery temperature peaked 5 times after the short – circuiting was started.
Charge Test	Charging at 10µA	* When charge was 2% of the nominal capacity, there were no abnormalities in battery functioning. * Also, when charge was 10% of the nominal capacity, there was no explosion or combustion.

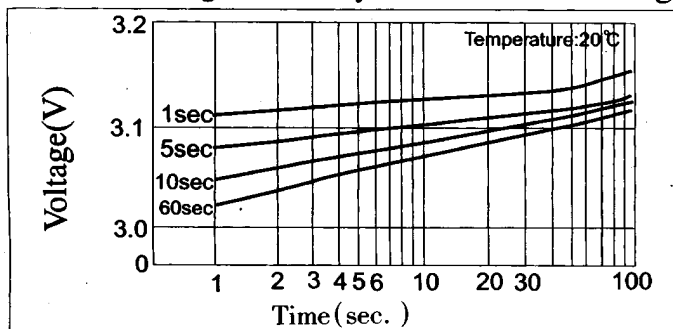
CR2032 High – Temperature High – Humidity Storage Characteristics



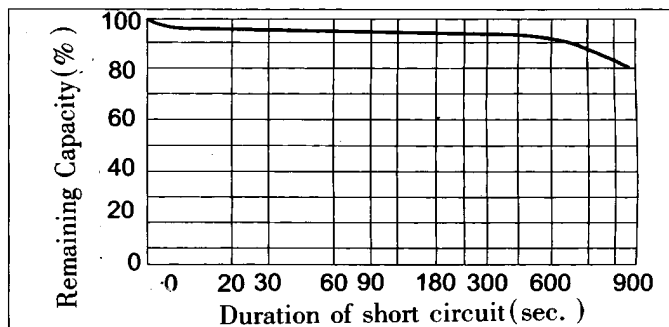
CR2032 Long – term High Temperature Storage Characteristics



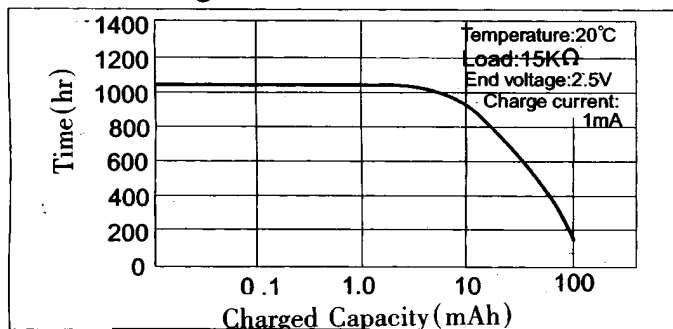
CR2032 Voltage Recovery after Short Circuiting



CR2032. Remaining Capacity and Duration of Short Circuit



CR2032 Charge Test



CR2032 Storage Characteristics

