

COIN TYPE LITHIUM BATTERIES



Poly carbonmonofluoride (BR series) /manganese dioxide (CR series) lithium batteries

Overview

The Panasonic coin type lithium primary battery is a high-energy, high-density battery resulting from our extensive experience in battery technology. Provided with outstanding features, which conventional dry batteries cannot attain, this battery has a broad range of applications, such as the main power supply of clocks/watches and electronic notebooks, and the memory backup power supply for C-MOS RAM memories and microcomputer IC memories.

Panasonic meets different market needs with two types (30 sizes) of the product offering a wide capacity range (18mAh to 1000mAh): poly carbonmonofluoride lithium batteries (BR series) which exhibit stable performance at comparatively high environment temperatures, and manganese dioxide lithium batteries (CR series) which show excellence in comparatively large current applications like the alarm actuation in watches.

Features

- **Voltage about twice that of dry batteries**
The nominal voltage is as high as 3 V, approximately twice that of manganese and alkaline button batteries. A single lithium battery can replace two or three conventional batteries.
- **Excellent storability with minimal deterioration**
Minimal deterioration is not necessarily an inherent feature of lithium batteries. It is achieved by using chemically stable materials and superior production methodologies and sealing techniques. Panasonic coin type lithium batteries show an annual deterioration rate as low as about 1.0% at room temperature, meeting the requirement for a room-temperature storage period of more than 10 years.
- **Wide operating temperature range (-40°C to 85°C)**
Organic solvents are used for the electrolyte in lithium batteries. Therefore, the solidifying point of

- this electrolyte is much lower than that of the aqueous solution type electrolyte in manganese batteries, etc., enabling the use of lithium batteries in low-temperature regions. Panasonic coin type lithium batteries are mostly operable over the temperature range from -40°C to 85°C.
- **Strong leakage resistance**
The organic electrolyte liquid used in lithium batteries shows minimal creep. This feature, and our unique sealing technique, give our batteries very strong leakage resistance.
- **UL-recognized product**
Panasonic coin type lithium batteries have all acquired the component recognition of UL (Underwriters Laboratories Inc.) in U.S..(File No. MH12210)

SPECIFICATION TABLE

Poly carbonmonofluoride (BR series) lithium batteries

| Model No. | JIS | IEC | Electrical characteristics 20°C | | | Dimensions (Max.) | | Approx. weight (g) |
|-----------|-----|--------|---------------------------------|---------------------------|------------------|-------------------|-------------|--------------------|
| | | | Nominal voltage (V) | Nominal capacity *1 (mAh) | Continuous drain | Diameter (mm) | Height (mm) | |
| | | | | | Standard (mA) | | | |
| BR1216 | --- | --- | 3 | 25 | 0.03 | 12.5 | 1.60 | 0.6 |
| BR1220 | --- | --- | 3 | 35 | 0.03 | 12.5 | 2.00 | 0.7 |
| BR1225 | --- | BR1225 | 3 | 48 | 0.03 | 12.5 | 2.50 | 0.8 |
| BR1616 | --- | --- | 3 | 48 | 0.03 | 16.0 | 1.60 | 1.0 |
| BR1632 | --- | --- | 3 | 120 | 0.03 | 16.0 | 3.20 | 1.5 |
| BR2016 | --- | BR2016 | 3 | 75 | 0.03 | 20.0 | 1.60 | 1.5 |
| BR2020 | --- | BR2020 | 3 | 100 | 0.03 | 20.0 | 2.00 | 2.0 |
| BR2032 | --- | --- | 3 | 190 | 0.03 | 20.0 | 3.20 | 2.5 |
| BR2320 | --- | BR2320 | 3 | 110 | 0.03 | 23.0 | 2.00 | 2.5 |
| BR2325 | --- | BR2325 | 3 | 165 | 0.03 | 23.0 | 2.50 | 3.2 |
| BR2330 | --- | --- | 3 | 255 | 0.03 | 23.0 | 3.00 | 3.2 |
| BR3032 | --- | BR3032 | 3 | 500 | 0.03 | 30.0 | 3.20 | 5.5 |

* 1 Nominal capacity shown above is based on standard drain and cut off voltage down to 2.0 V at 20°C

Manganese dioxide (CR series) lithium batteries

| Model No. | JIS | IEC | Electrical characteristics 20°C | | | Dimensions (Max.) | | Approx. weight (g) |
|-----------|--------|--------|---------------------------------|---------------------------|------------------|-------------------|-------------|--------------------|
| | | | Nominal voltage (V) | Nominal capacity *1 (mAh) | Continuous drain | Diameter (mm) | Height (mm) | |
| | | | | | Standard (mA) | | | |
| CR1025 | CR1025 | CR1025 | 3 | 30 | 0.10 | 10.0 | 2.50 | 0.7 |
| CR1212 *2 | --- | --- | 3 | 18 | 0.10 | 12.5 | 1.20 | 0.5 |
| CR1216 | CR1216 | CR1216 | 3 | 25 | 0.10 | 12.5 | 1.60 | 0.7 |
| CR1220 | CR1220 | CR1220 | 3 | 35 | 0.10 | 12.5 | 2.00 | 1.2 |
| CR1612 | --- | --- | 3 | 40 | 0.10 | 16.0 | 1.20 | 0.8 |
| CR1616 | CR1616 | CR1616 | 3 | 55 | 0.10 | 16.0 | 1.60 | 1.2 |
| CR1620 | --- | CR1620 | 3 | 75 | 0.10 | 16.0 | 2.00 | 1.3 |
| CR1632 | --- | --- | 3 | 125 | 0.10 | 16.0 | 3.20 | 1.8 |
| CR2012 | CR2012 | CR2012 | 3 | 55 | 0.10 | 20.0 | 1.20 | 1.4 |
| CR2016 | CR2016 | CR2016 | 3 | 90 | 0.10 | 20.0 | 1.60 | 1.6 |
| CR2025 | CR2025 | CR2025 | 3 | 165 | 0.20 | 20.0 | 2.50 | 2.5 |
| CR2032 | CR2032 | CR2032 | 3 | 220 | 0.20 | 20.0 | 3.20 | 3.1 |
| CR2320 | CR2320 | CR2320 | 3 | 130 | 0.20 | 23.0 | 2.00 | 3.0 |
| CR2330 | CR2330 | CR2330 | 3 | 265 | 0.20 | 23.0 | 3.00 | 4.0 |
| CR2354 | --- | CR2354 | 3 | 560 | 0.20 | 23.0 | 5.40 | 5.9 |
| CR2412 | --- | --- | 3 | 100 | 0.20 | 24.5 | 1.20 | 2.0 |
| CR2477 | --- | --- | 3 | 1000 | 0.20 | 24.5 | 7.70 | 10.5 |
| CR3032 | --- | CR3032 | 3 | 500 | 0.20 | 30.0 | 3.20 | 7.1 |

* 1 Nominal capacity shown above is based on standard drain and cut off voltage down to 2.0 V at 20°C

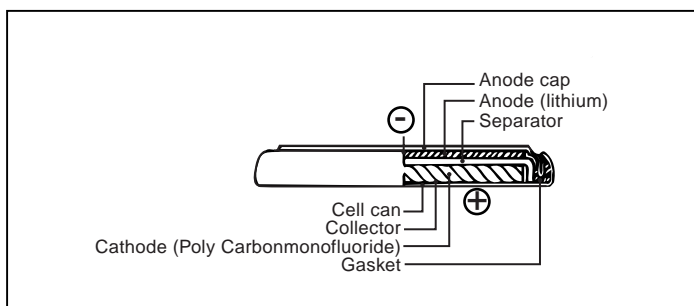
* 2 Under Development

COIN TYPE LITHIUM BATTERIES - CONTINUED

Applications

- Electronic watches (digital and analog)
- Memory backup for all types of devices (with tab terminal)
- Calculators, cameras, and electronic notebooks
- Electronic clinical thermometers
- Other compact, low power cordless equipment

Cutaway view (BR type)



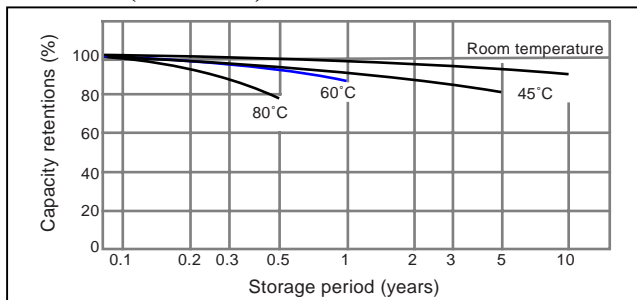
Coin type lithium batteries: size and model number

| Diameter mm | 30 | 24.5 | 23 | 20 | 16 | 12.5 | 10 |
|----------------|------------------|--------|------------------|------------------|------------------|------------------|--------|
| Height mm | | | | | | | |
| 7.7 | | CR2477 | | | | | |
| 5.4 | | | CR2354 | | | | |
| 3.2 | BR3032 CR3032 | | | BR2032 CR2032 | BR1632 CR1632 | | |
| 3.0 | | | BR2330 CR2330 | | | | |
| 2.5 | | | BR2325 | CR2025 | | BR1225 | CR1025 |
| 2.0 | | | BR2320 CR2320 | BR2020 | CR1620 | BR1220 CR1220 | |
| 1.6 | | | | BR2016 CR2016 | BR1616 CR1616 | BR1216 CR1216 | |
| 1.2 | | CR2412 | | CR2012 | CR1612 | △ CR1212 | |

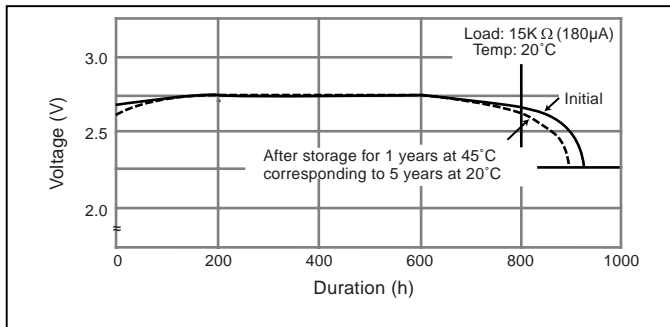
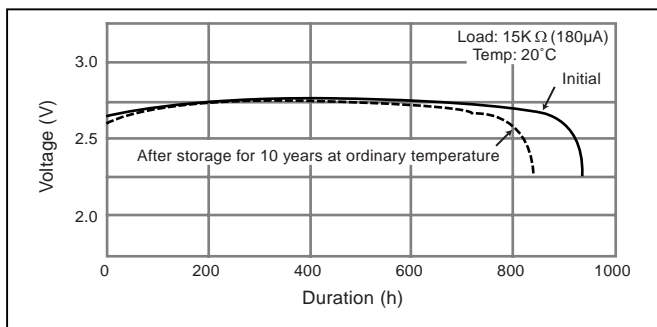
△ Under development

Characteristics

Shelf life (BR series)



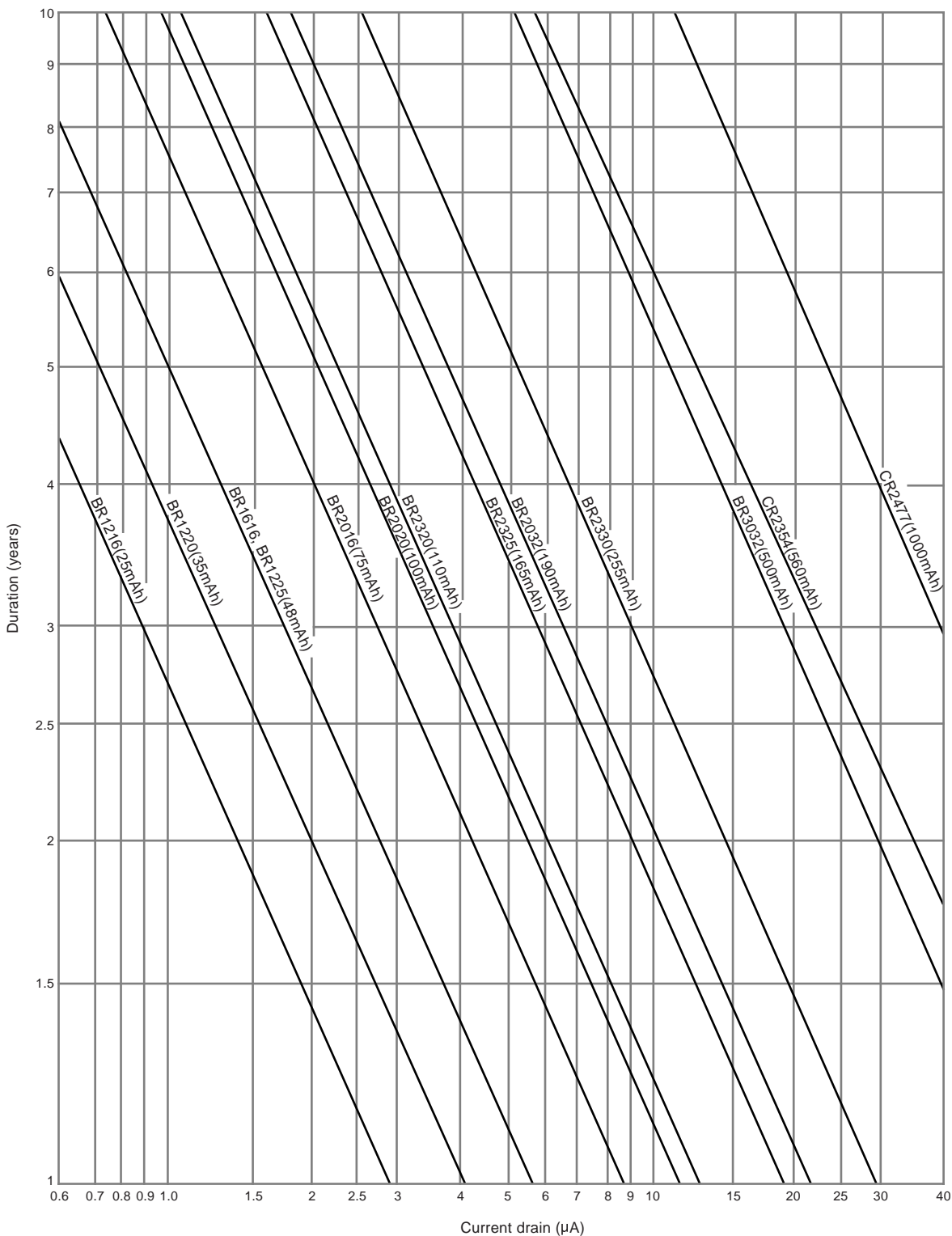
Storage characteristics (BR2325)



BATTERY SELECTOR CHART

Discharge life as a function of operating current

Temp: 20°C
Cut off voltage: 2.0V

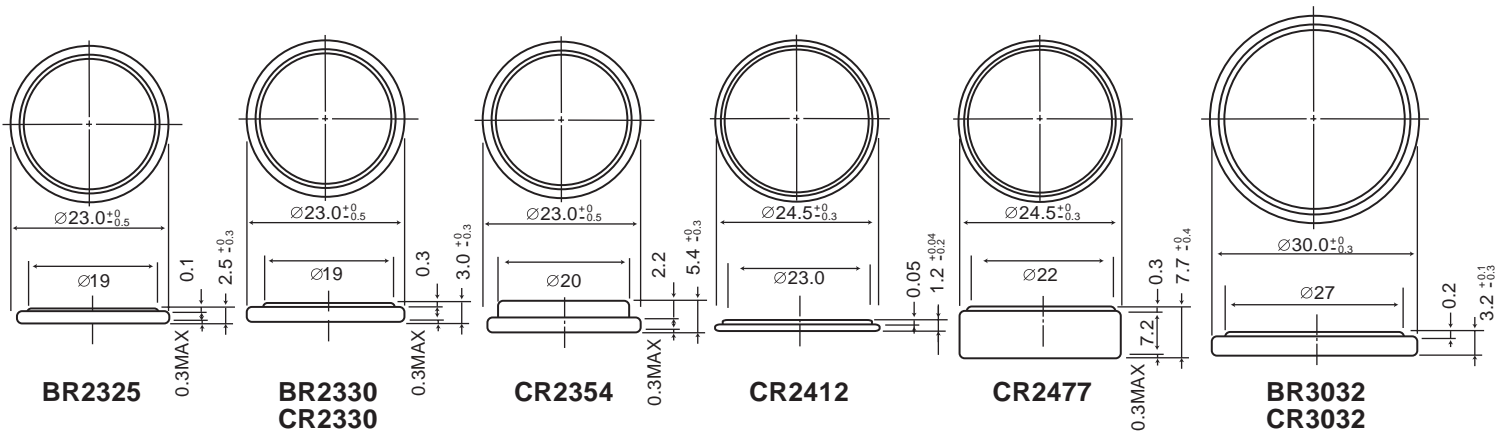
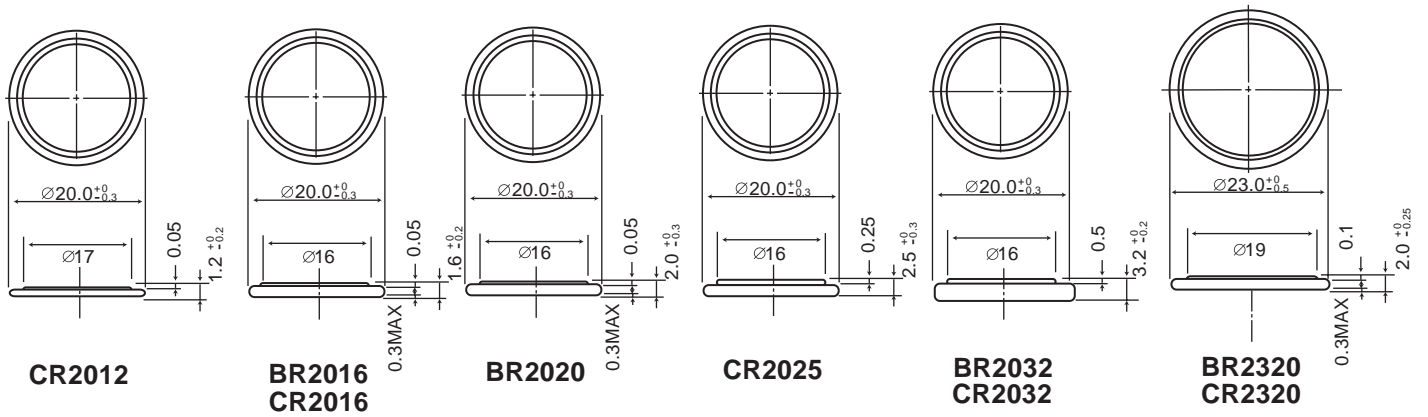
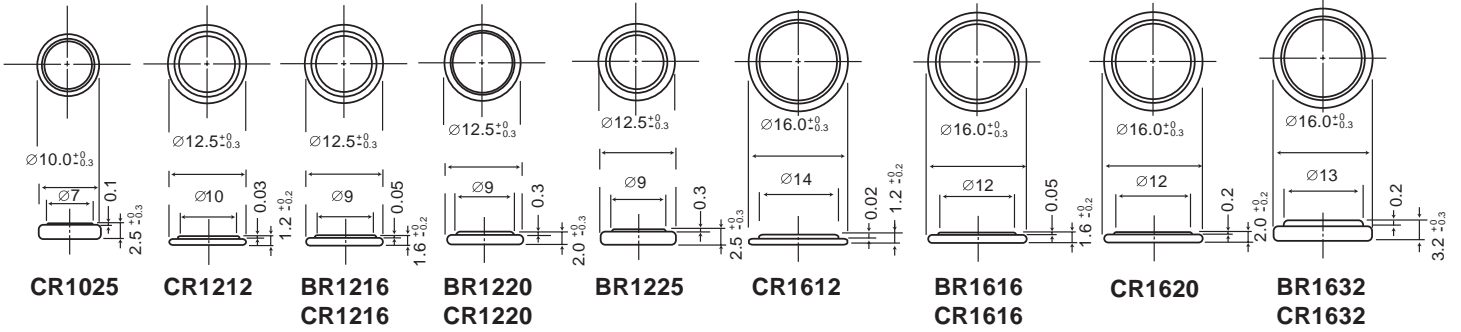
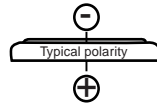


Formula:

$$\text{Duration (years)} = \frac{\text{Nominal capacity (mAh)}}{\text{Current drain (mA)} \times 24 \text{ (hours)} \times 365 \text{ (days)}}$$

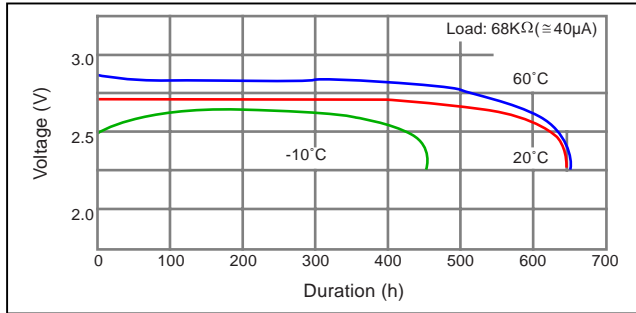
DIMENSIONS (MM)

The dimension data with no tolerance indicated are standard reference values.



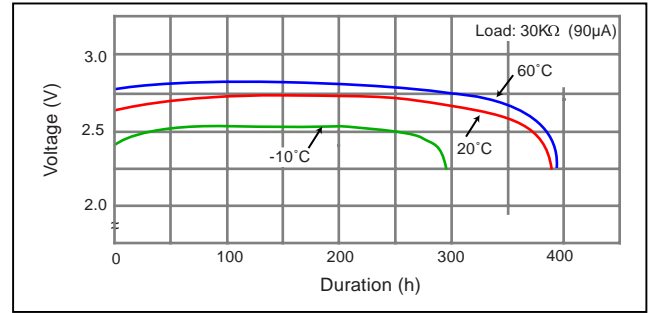
BR1216

Discharge temperature characteristics

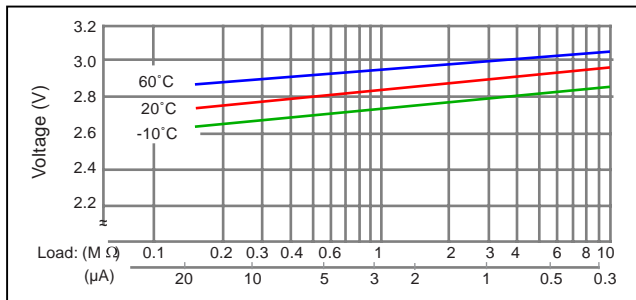


BR1220

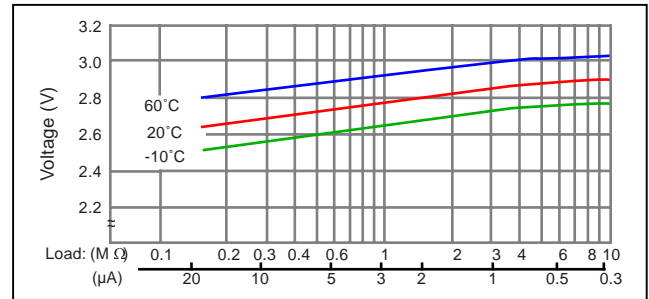
Discharge temperature characteristics



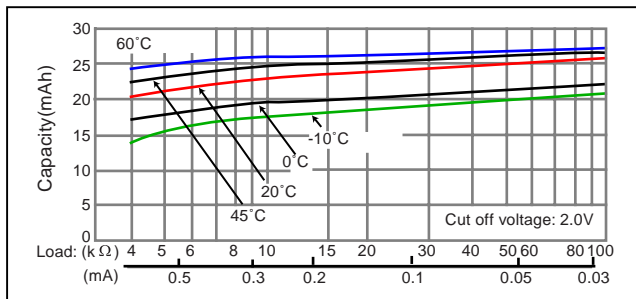
Operating voltage vs. load resistance



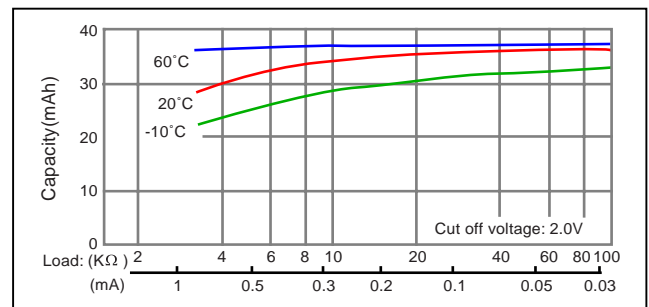
Operating voltage vs. load resistance



Capacity vs. load resistance

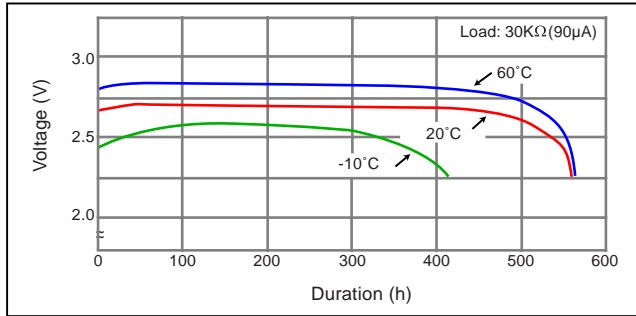


Capacity vs. load resistance



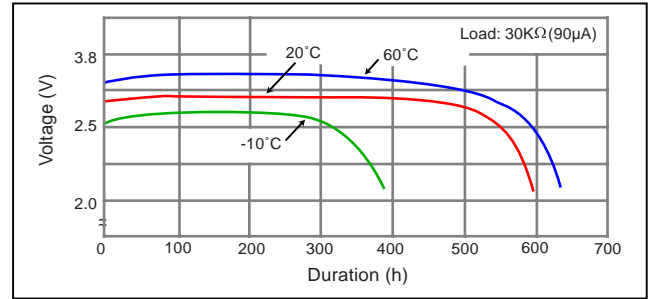
BR1225

Discharge temperature characteristics

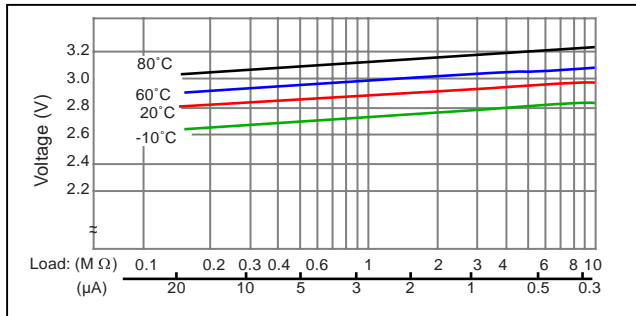


BR1616

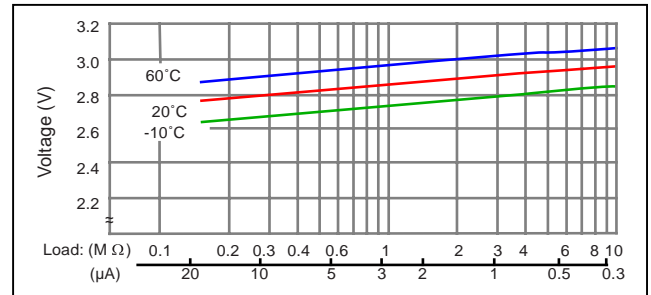
Discharge temperature characteristics



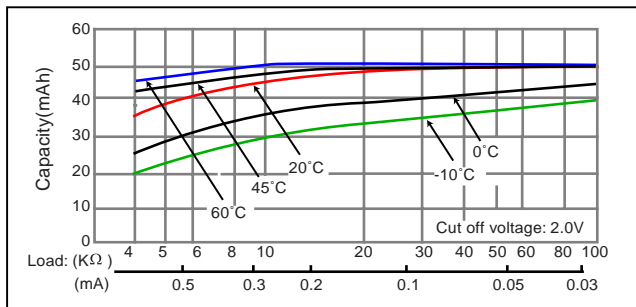
Operating voltage vs. load resistance



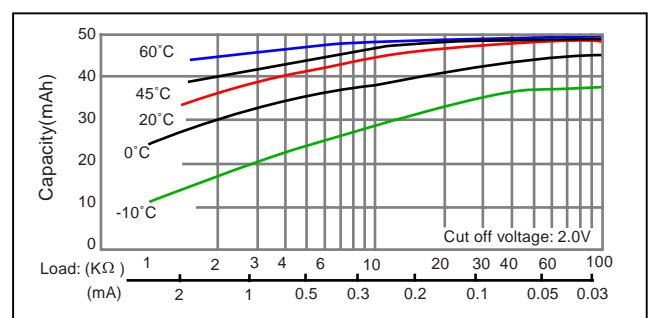
Operating voltage vs. load resistance



Capacity vs. load resistance

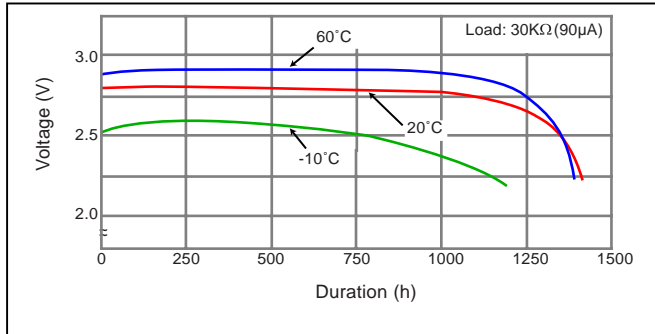


Capacity vs. load resistance



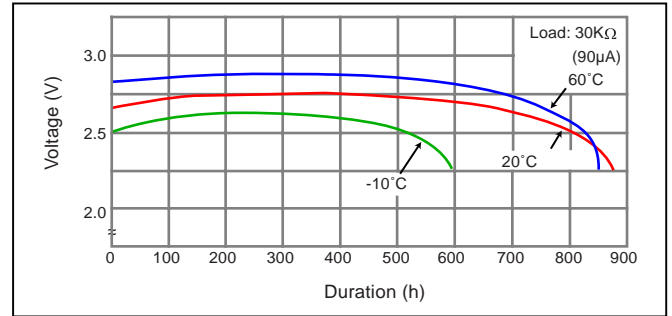
BR1632

Discharge temperature characteristics

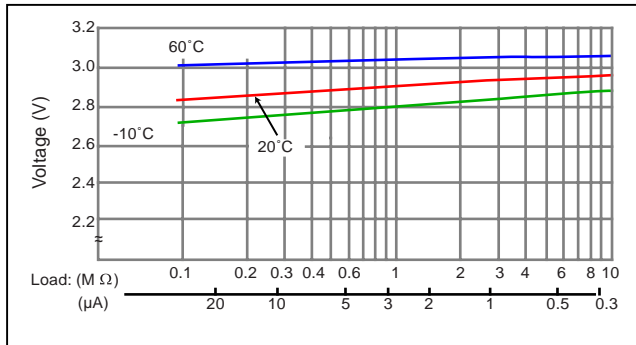


BR2016

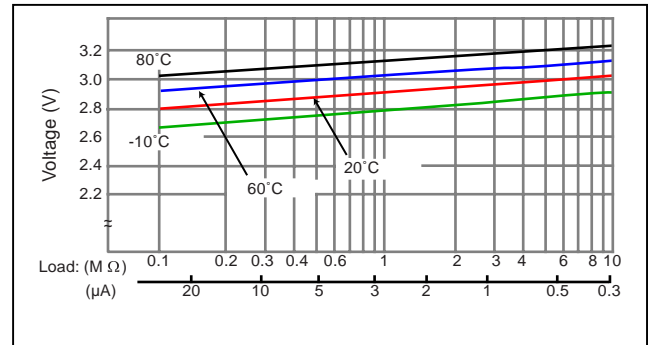
Discharge temperature characteristics



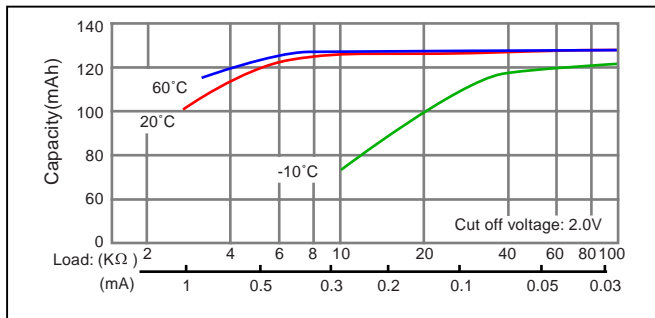
Operating voltage vs. load resistance



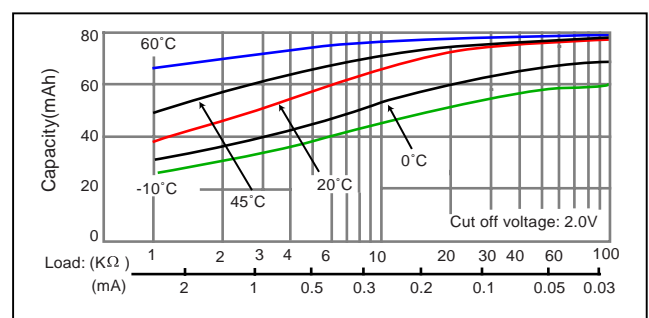
Operating voltage vs. load resistance



Capacity vs. load resistance

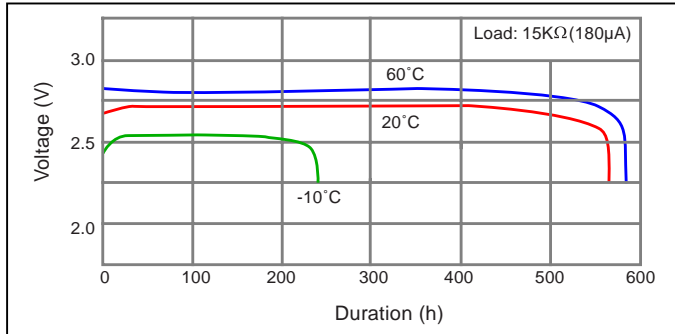


Capacity vs. load resistance



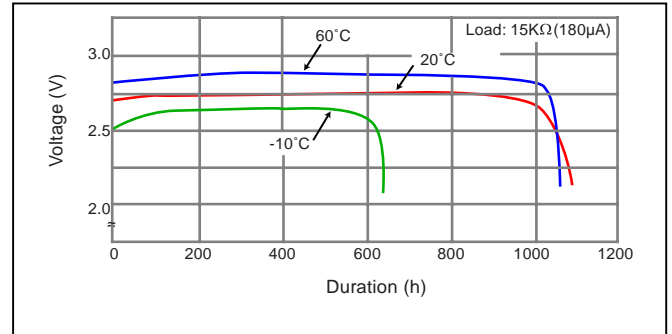
BR2020

Discharge temperature characteristics

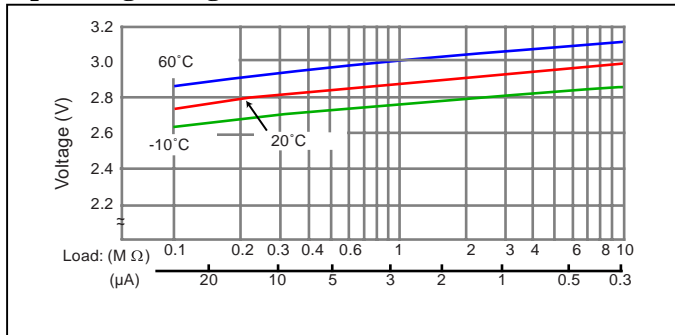


BR2032

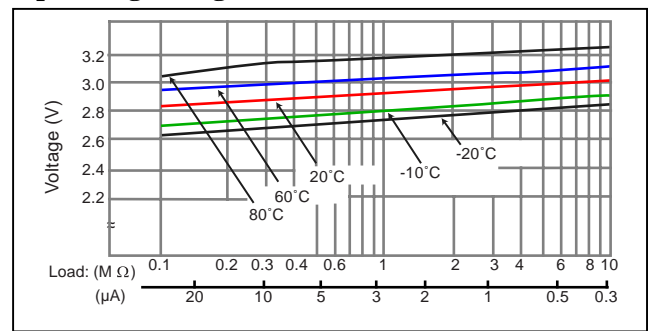
Discharge temperature characteristics



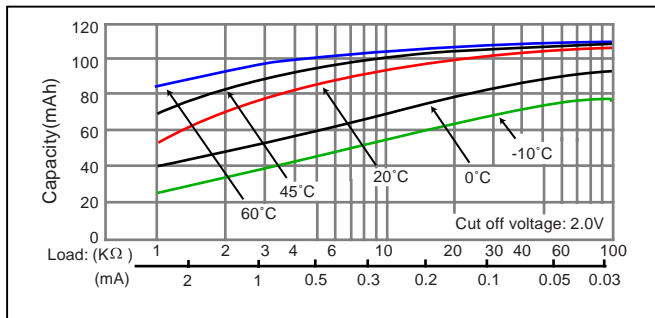
Operating voltage vs. load resistance



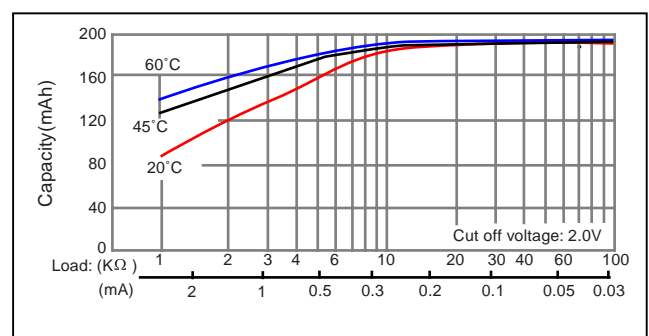
Operating voltage vs. load resistance



Capacity vs. load resistance

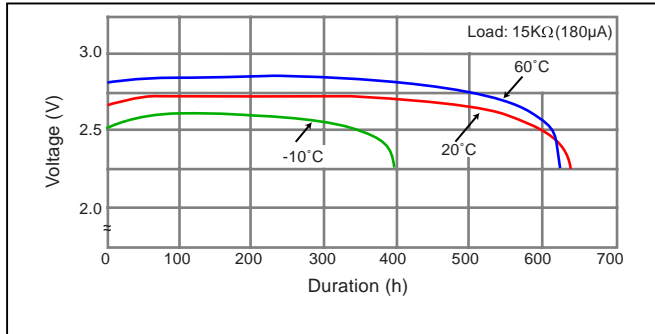


Capacity vs. load resistance

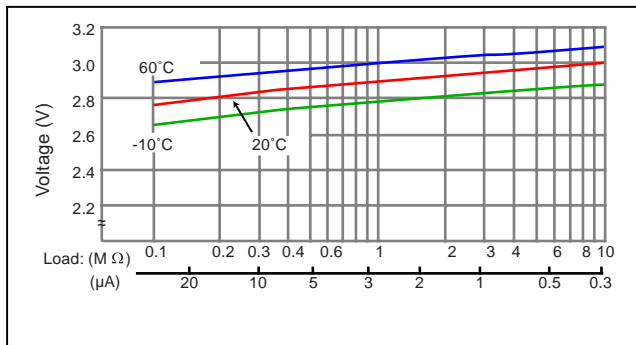


BR2320

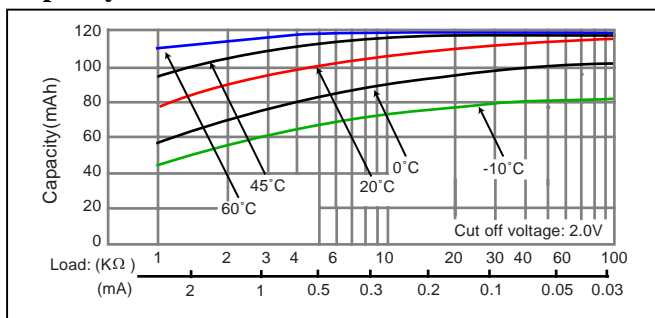
Discharge temperature characteristics



Operating voltage vs. load resistance

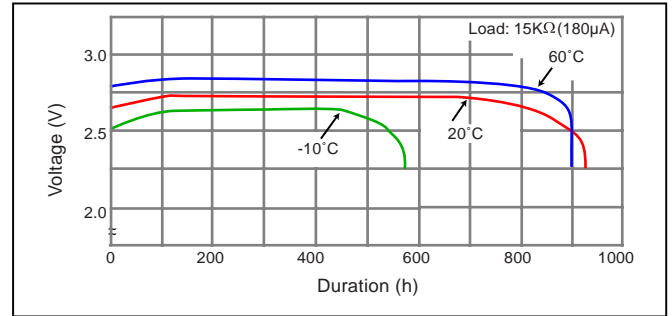


Capacity vs. load resistance

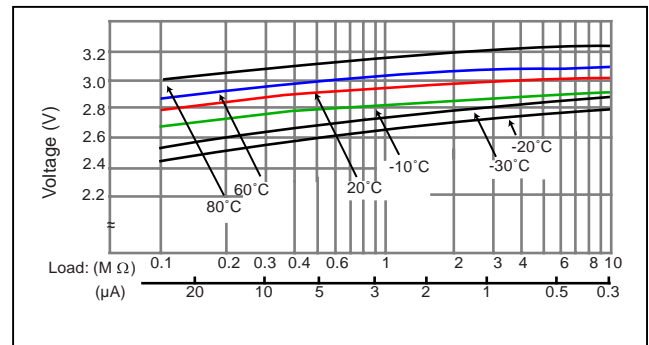


BR2325

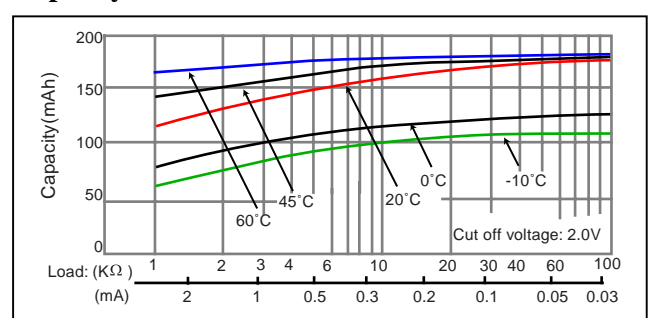
Discharge temperature characteristics



Operating voltage vs. load resistance

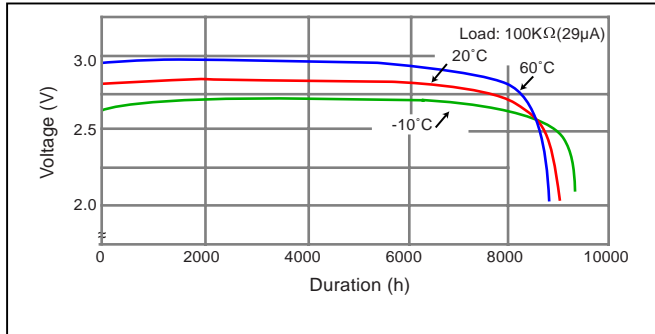


Capacity vs. load resistance



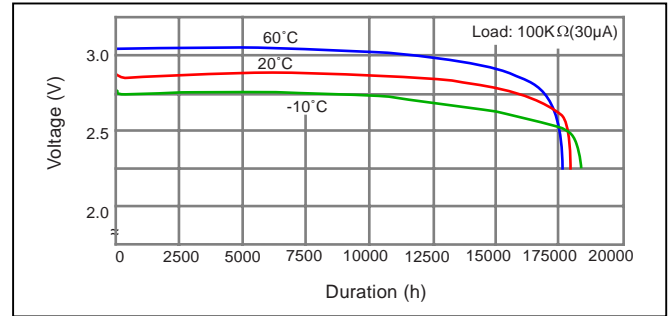
BR2330

Discharge temperature characteristics

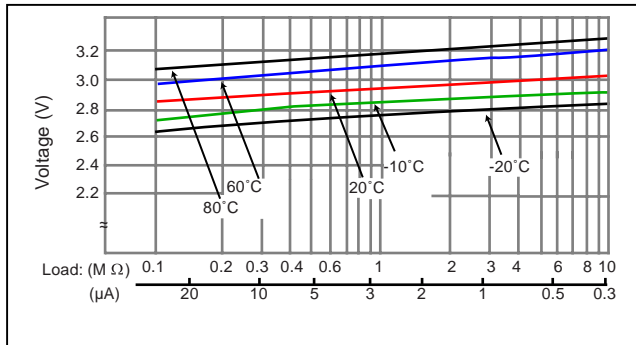


BR3032

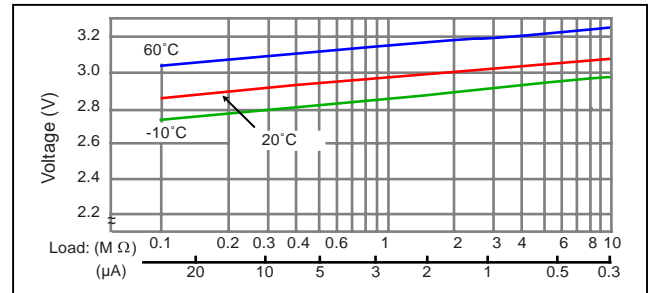
Discharge temperature characteristics



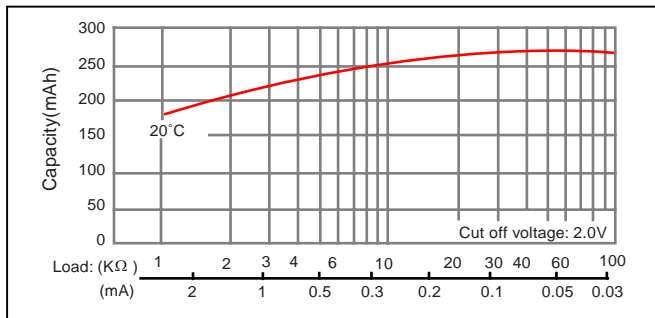
Operating voltage vs. load resistance



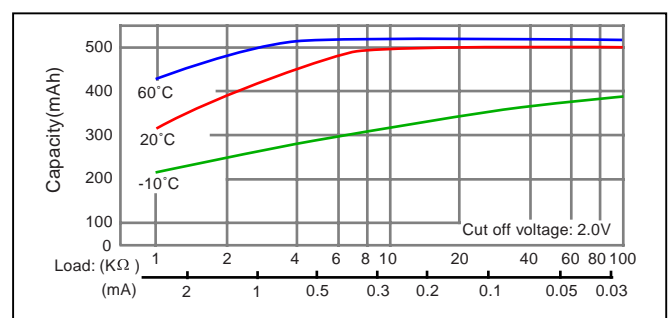
Operating voltage vs. load resistance



Capacity vs. load resistance

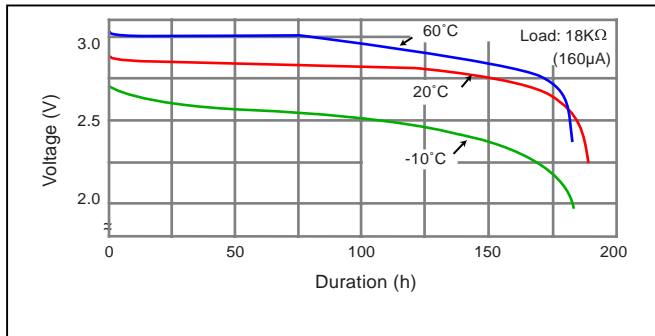


Capacity vs. load resistance



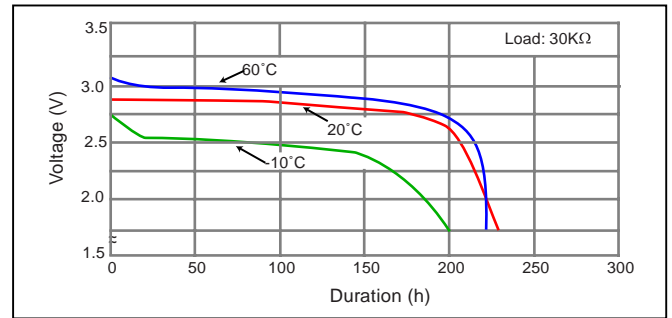
CR1025

Discharge temperature characteristics

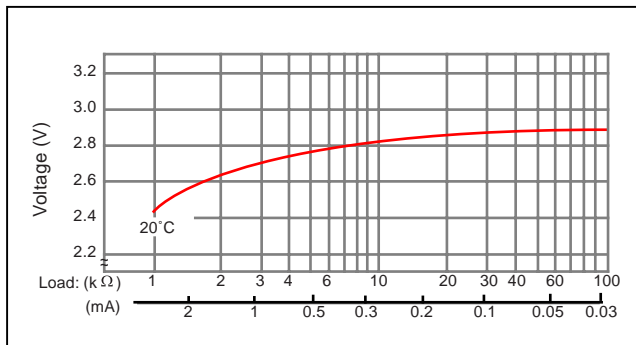


CR1212

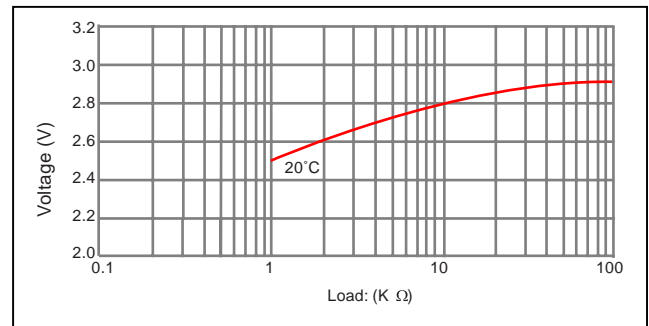
Discharge temperature characteristics



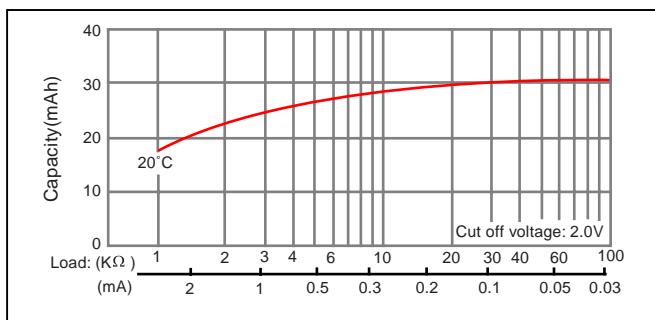
Operating voltage vs. load resistance



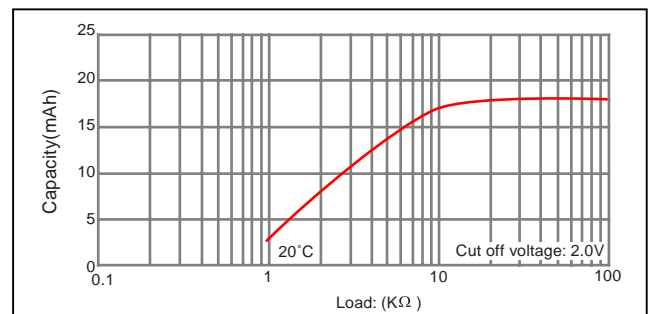
Operating voltage vs. load resistance



Capacity vs. load resistance

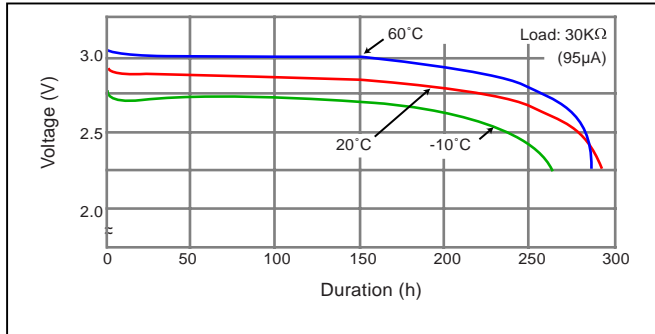


Capacity vs. load



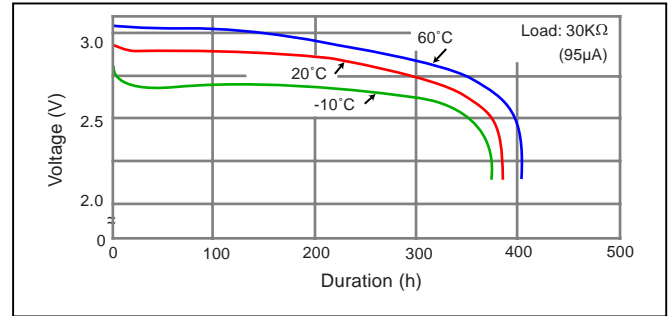
CR1216

Discharge temperature characteristics

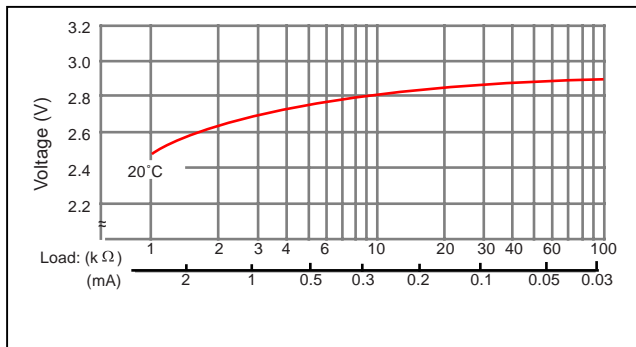


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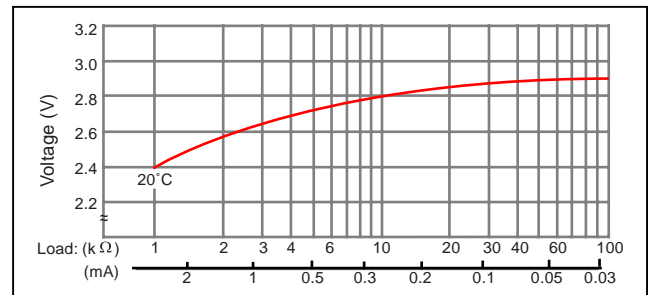
Discharge temperature characteristics



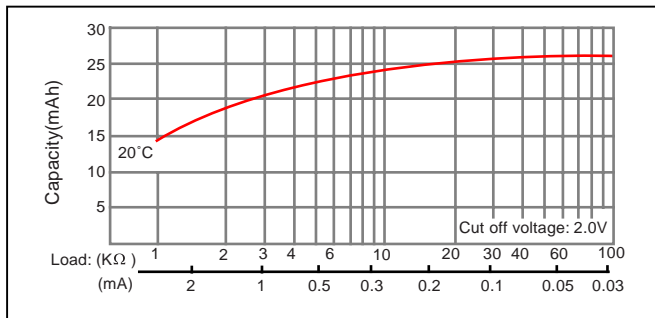
Operating voltage vs. load resistance



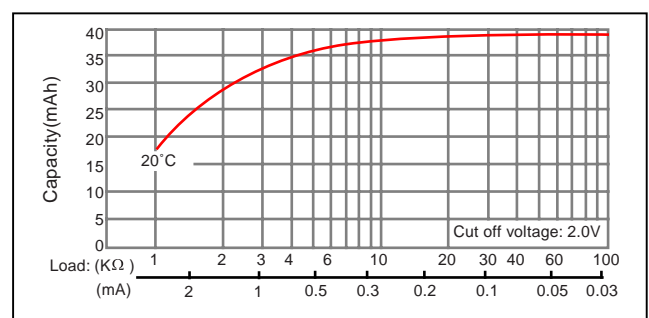
Operating voltage vs. load resistance



Capacity vs. load resistance

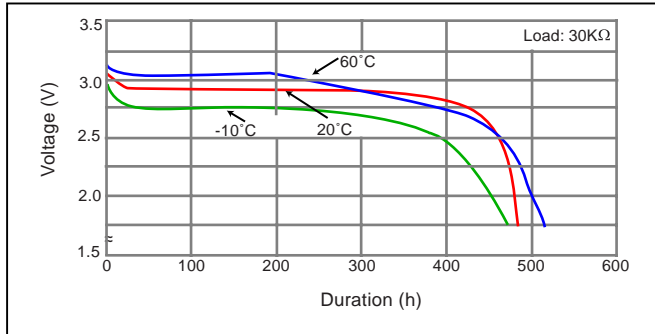


Capacity vs. load resistance



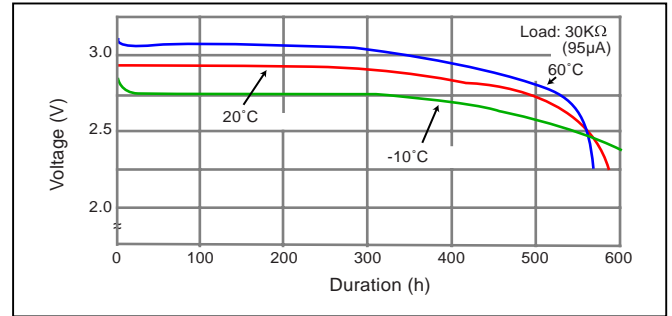
CR1612

Discharge temperature characteristics

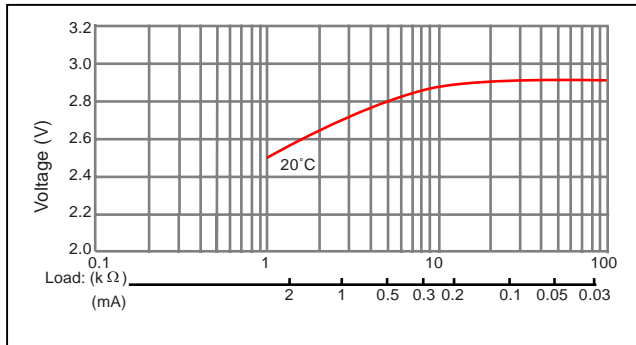


CR1616

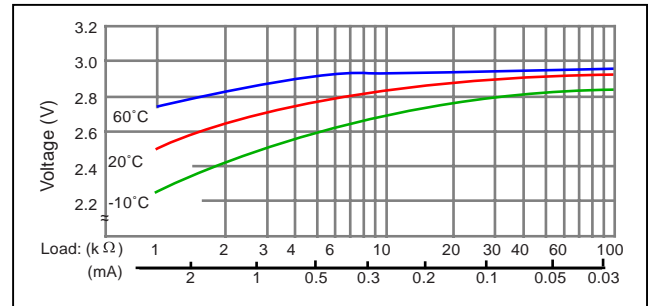
Discharge temperature characteristics



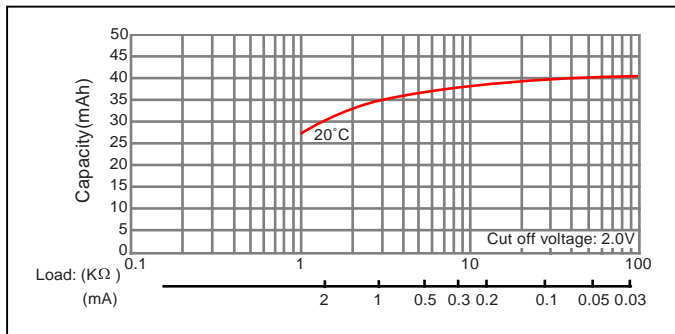
Operating voltage vs. load resistance



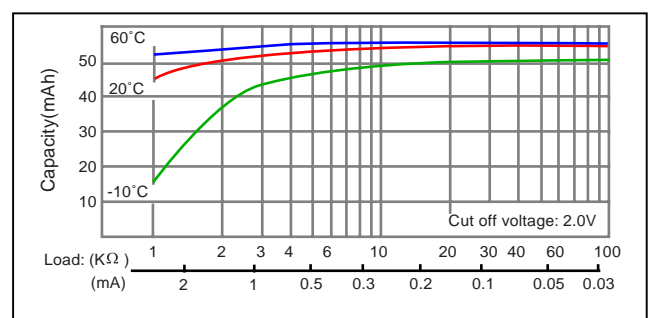
Operating voltage vs. load resistance



Capacity vs. load resistance

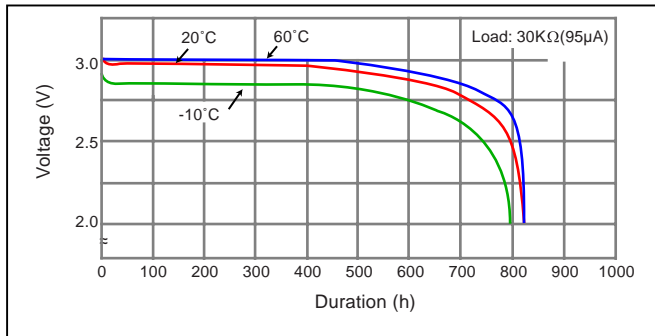


Capacity vs. load resistance



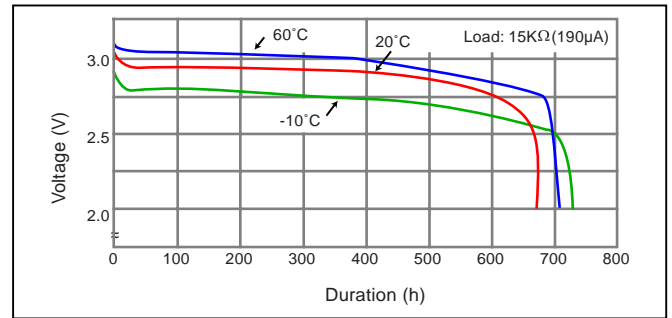
CR1620

Discharge temperature characteristics

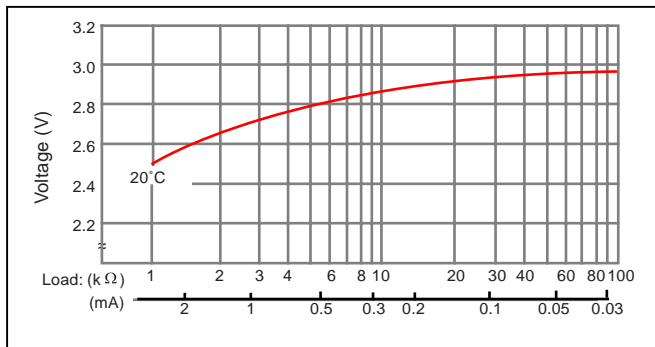


CR1632

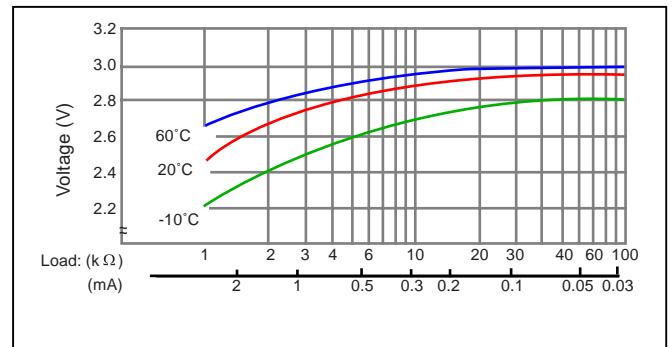
Discharge temperature characteristics



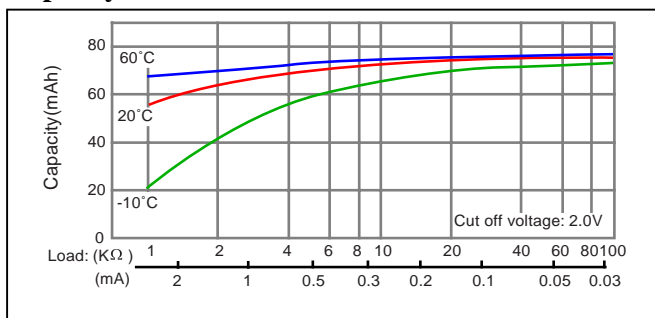
Operating voltage vs. load resistance



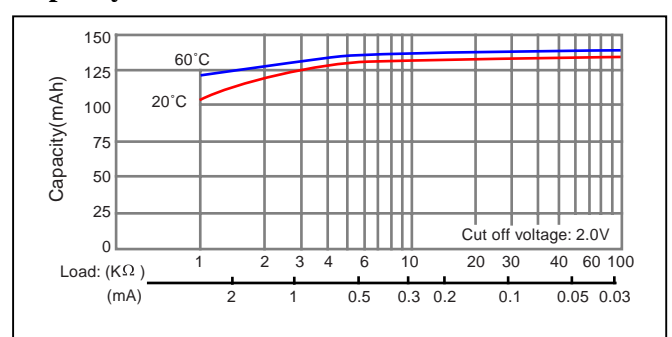
Operating voltage vs. load resistance



Capacity vs. load resistance

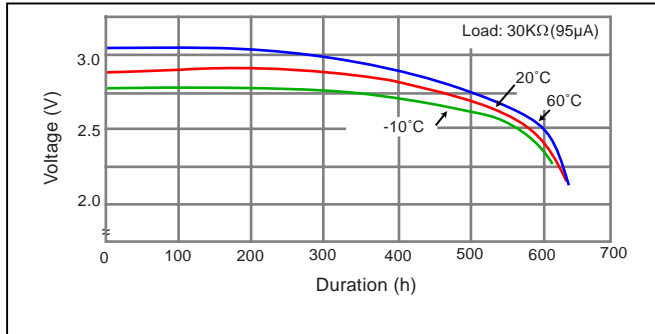


Capacity vs. load resistance



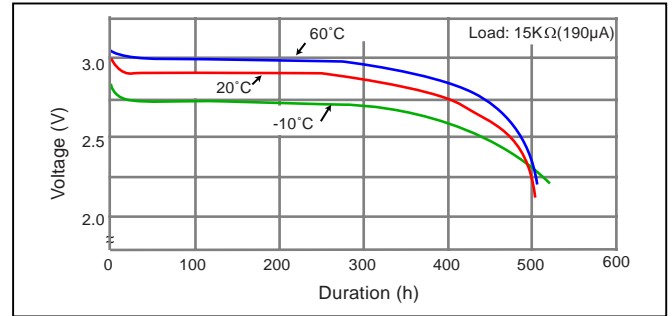
CR2012

Discharge temperature characteristics

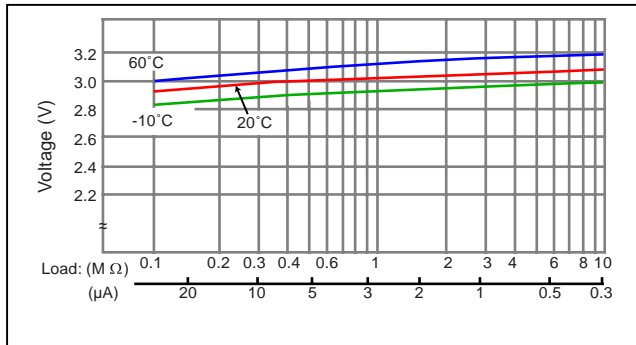


CR2016

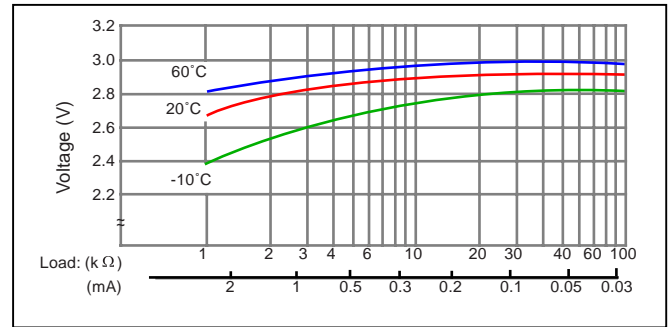
Discharge temperature characteristics



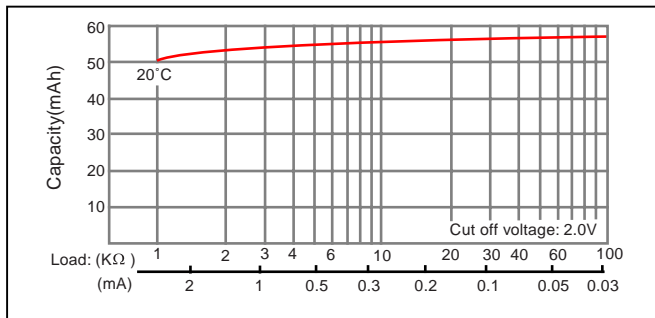
Operating voltage vs. load resistance



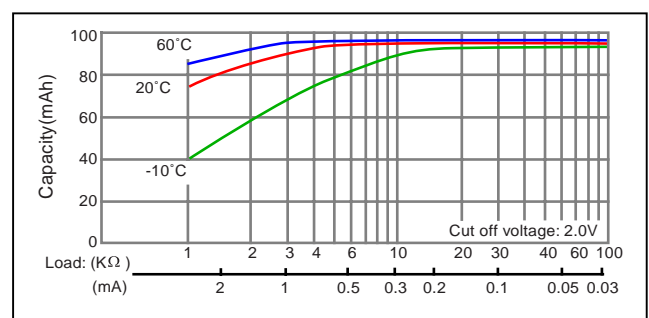
Operating voltage vs. load resistance



Capacity vs. load resistance

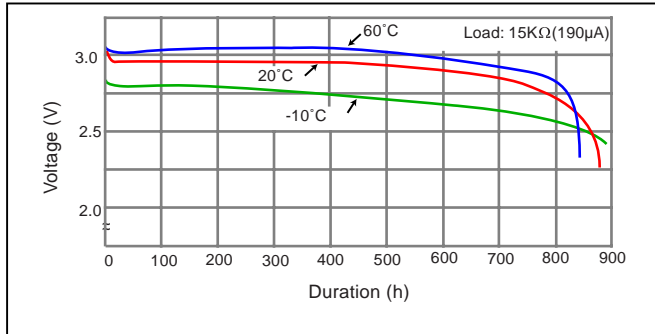


Capacity vs. load resistance



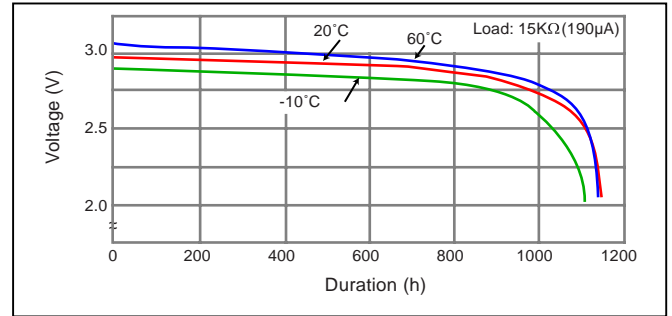
CR2025

Discharge temperature characteristics

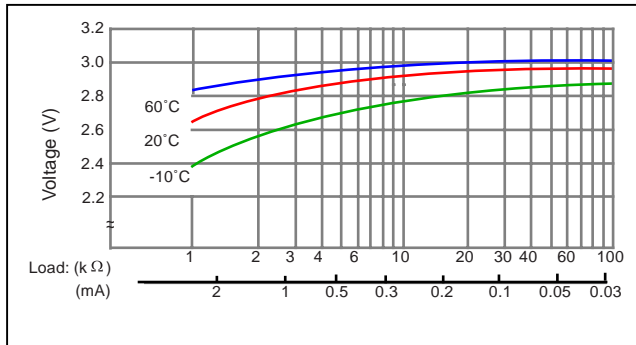


CR2032

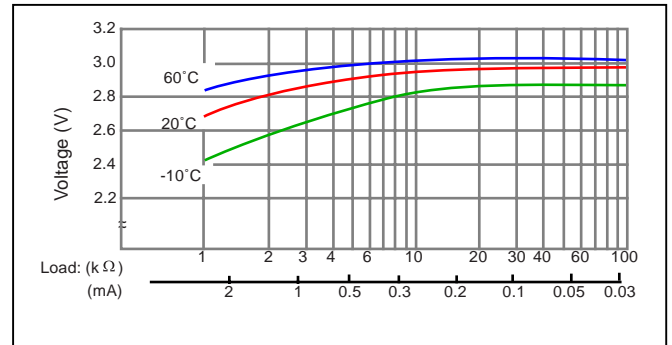
Discharge temperature characteristics



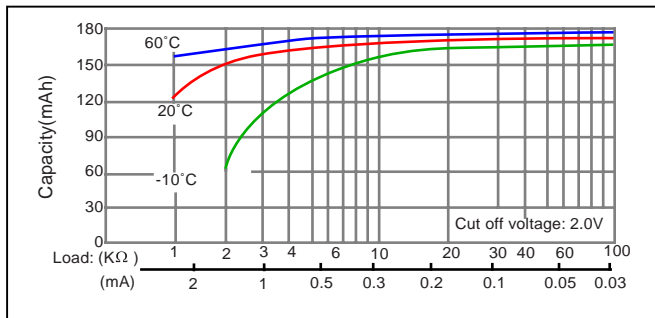
Operating voltage vs. load resistance



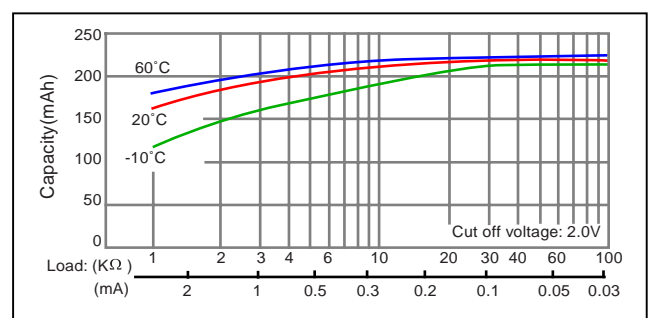
Operating voltage vs. load resistance



Capacity vs. load resistance

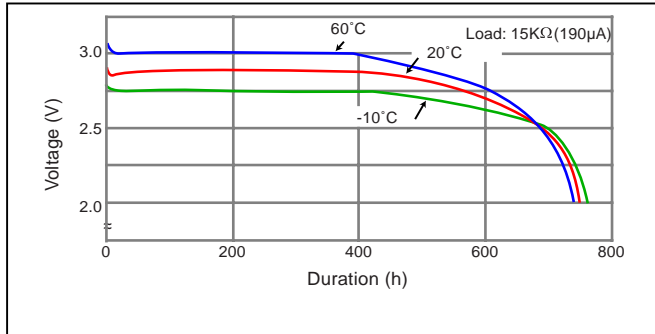


Capacity vs. load resistance



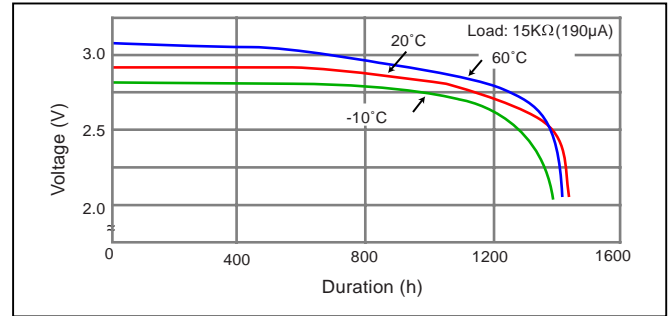
CR2320

Discharge temperature characteristics

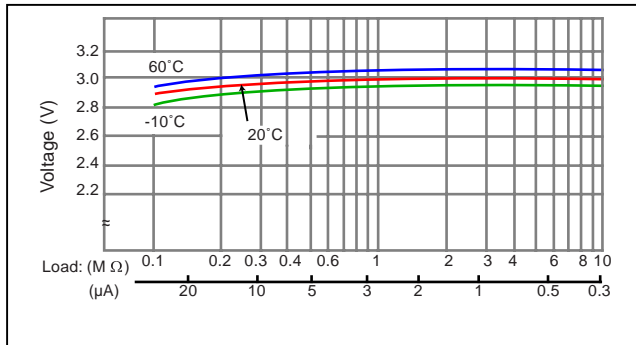


CR2330

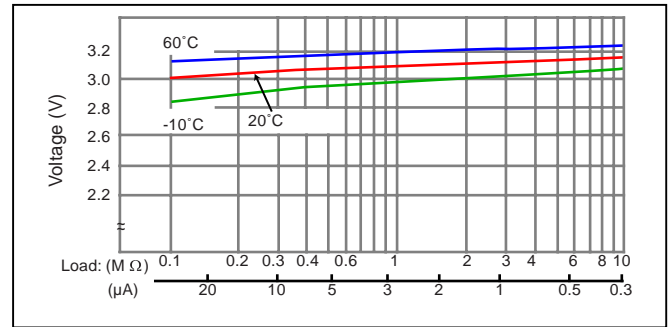
Discharge temperature characteristics



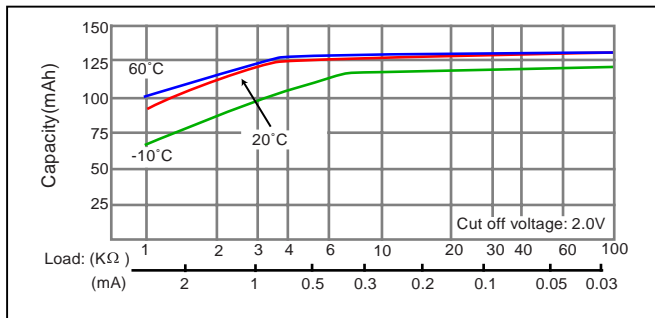
Operating voltage vs. load resistance



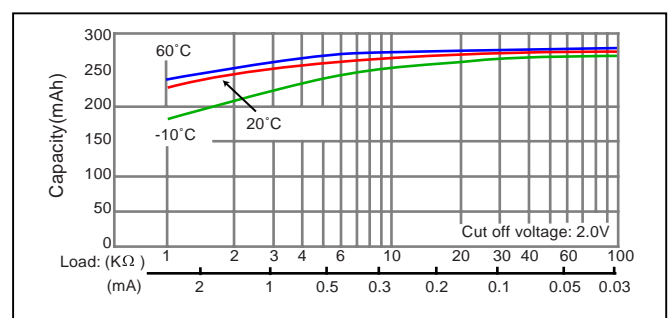
Operating voltage vs. load resistance



Capacity vs. load resistance

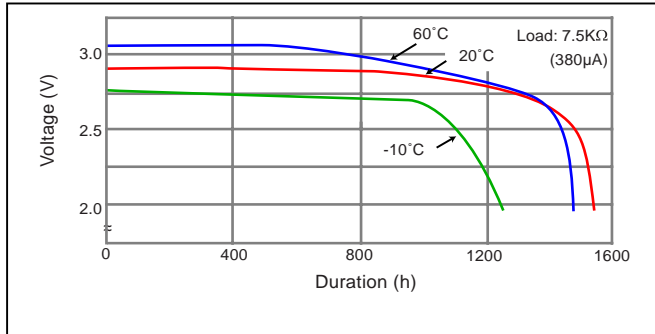


Capacity vs. load resistance



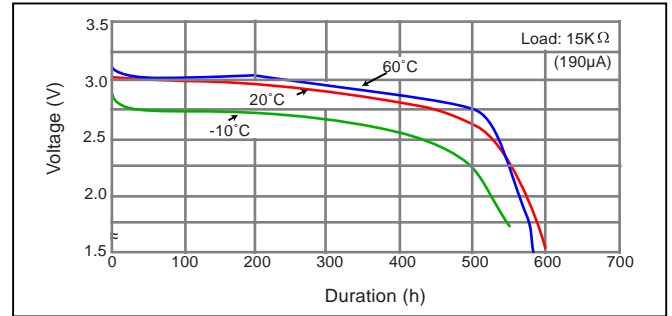
CR2354

Discharge temperature characteristics

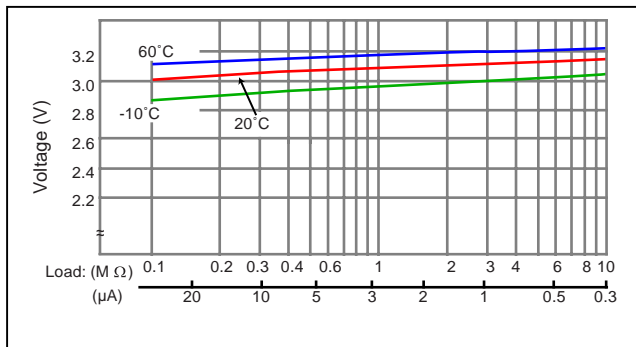


CR2412

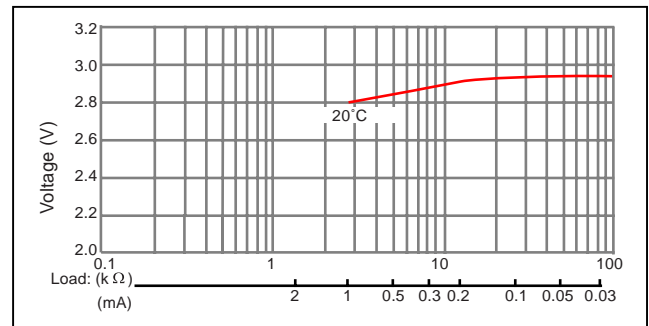
Discharge temperature characteristics



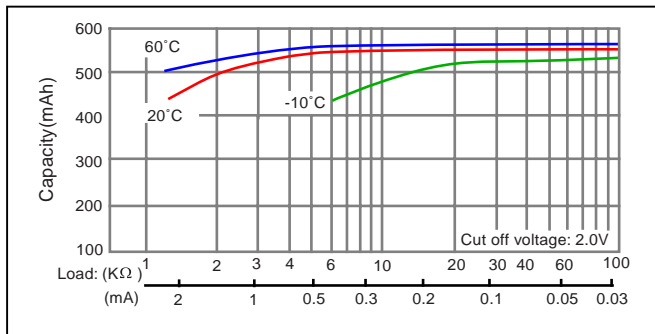
Operating voltage vs. load resistance



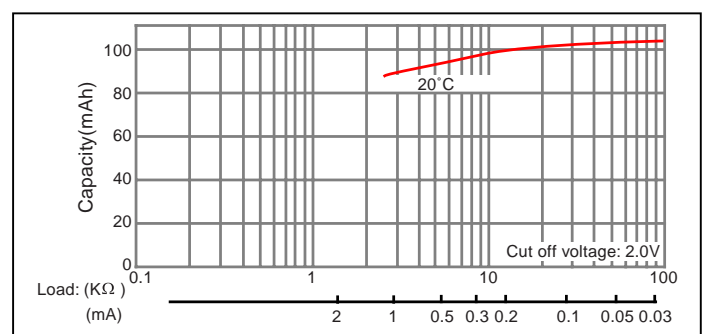
Operating voltage vs. load resistance



Capacity vs. load resistance

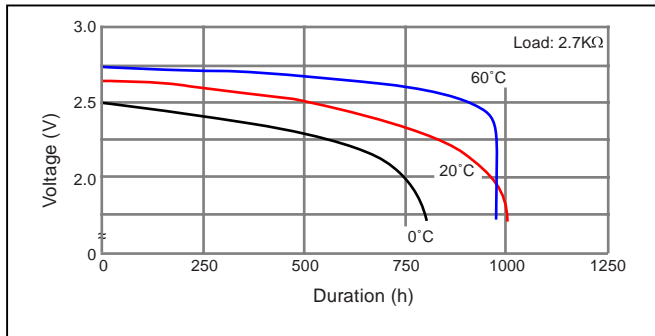


Capacity vs. load resistance



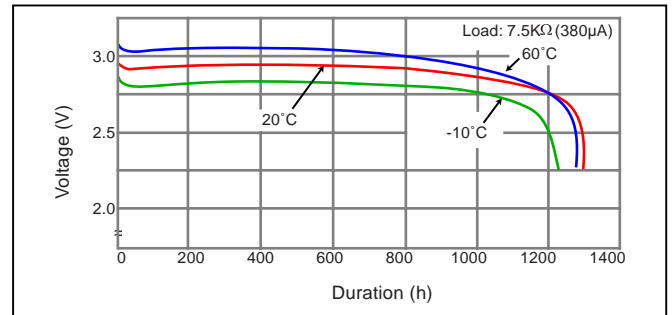
CR2477

Discharge temperature characteristics

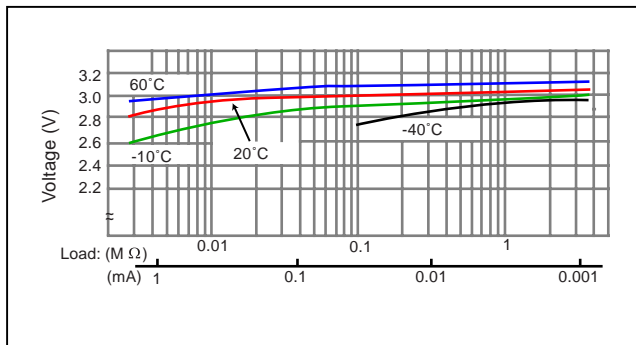


CR3032

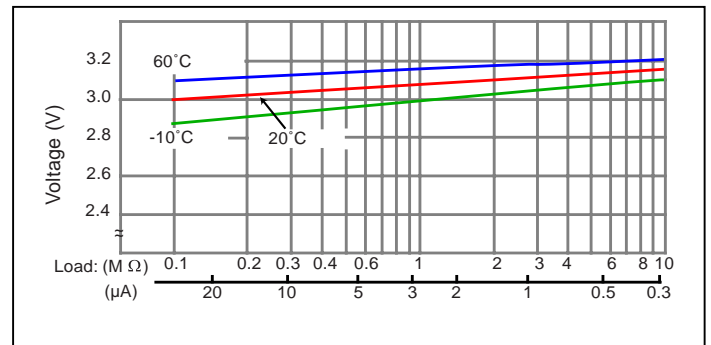
Discharge temperature characteristics



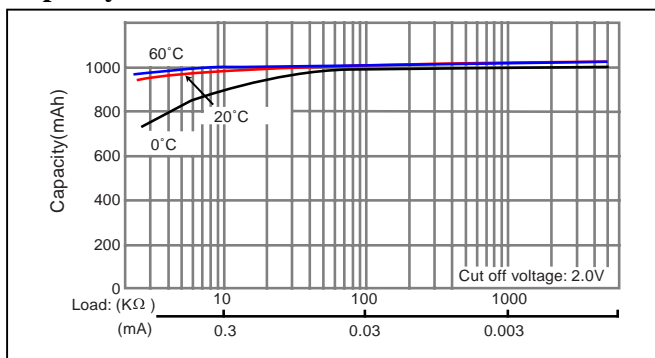
Operating voltage vs. load resistance



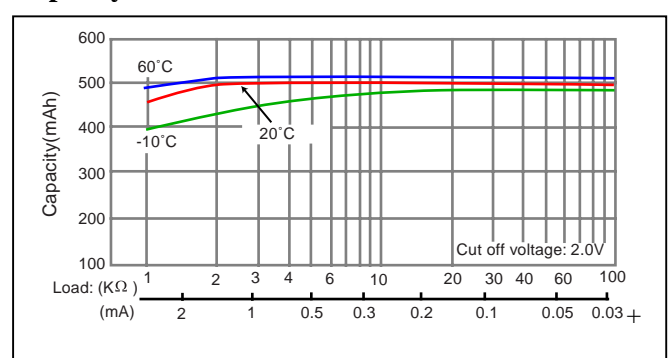
Operating voltage vs. load resistance



Capacity vs. load resistance



Capacity vs. load resistance



RECOGNITION

Panasonic lithium batteries hold UL recognition as follows: (As of March 1998)

File No. MH12210

Type

BR-C, BR-A, BR-AH, BR-AG, BR-2/3A, BR-2/3AH

BR-2/3AG, BR-2/3AA, BR-1/2A, BR-E2

BR-E3, BR-P2, CR2, CR-P2, 2CR5, CR123A

BR3032, BR2330, BR2330A, BR2325, BR2320

BR2032, BR2477A, BR2020, BR2016, BR1632

BR1632A, BR1616, BR1225, BR1225A, BR1220

BR1216, BR435, BR425

CR3032, CR2477, CR2412, CR2354, CR2330, CR2320

CR2032, CR2025, CR2016, CR2012, CR1632, CR1620

CR1616, CR1612, CR1220, CR1216, CR1212, CR1025

VL3032, VL2330, VL2320, VL2020, VL1220, VL1216

VL621

ML2020, ML621, ML616

In the use of lithium batteries, the conditions stated below must be satisfied. For details, consult Panasonic **Condition 1.** A protective resistor should be inserted in series to the battery for protecting the battery from the charge current in case of conductive destruction of the diode. Protective resistance value must be decided so that the charge current expected when the diode is destroyed is below the values specified in the table to the right.

Condition 2. Replacement of lithium batteries should be carried out by trained technicians since the batteries are intended as integral components for a device's circuit. Lithium batteries, except for * marked models in the table on the right, are user replaceable as far as certain conditions are met. Contact us for details.

Condition 3. Lithium batteries should be used at ordinary temperatures not exceeding 100°C.

Models BR1225A and BR1632A should be used at ordinary temperatures not exceeding 150°C.

Condition 4. The number of batteries to be used in series should be four, at the maximum. They must all be replaced at the same time. The current through the batteries should be no greater than the current allowable for the number of batteries in the series.

Condition 5. Vanadium pentoxide lithium rechargeable batteries should be charged with a current no greater than 300 mA.

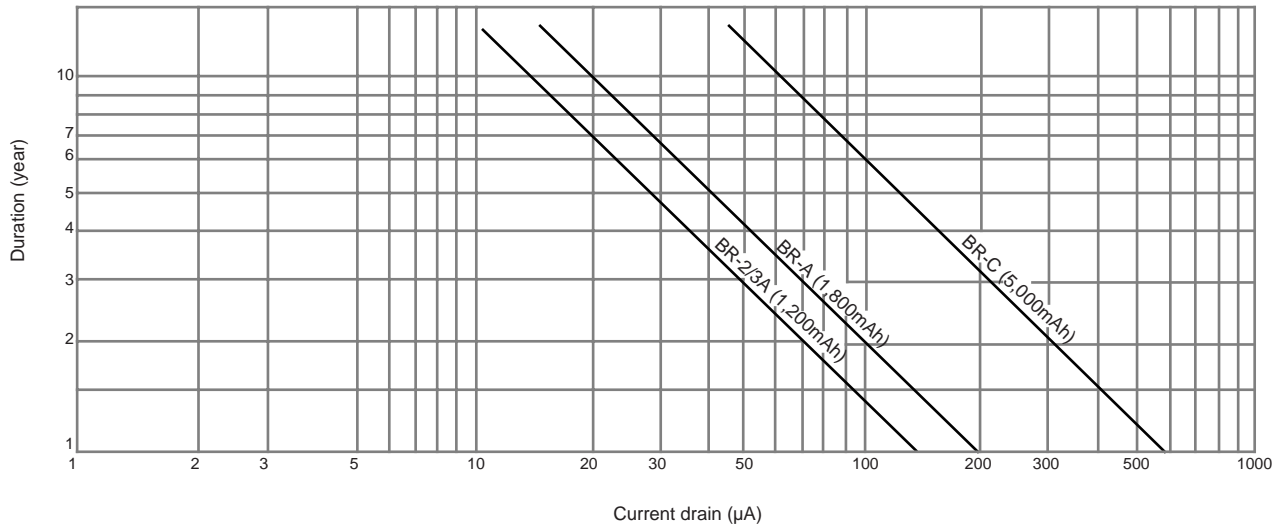
| Shape | Type | Model No. | Maximum allowable charge current (mA) |
|------------------|----------------------|-----------|---------------------------------------|
| Cylindrical type | (CF)n/Li | *BR-C | 20 |
| | | *BR-A | 15 |
| | | BR-AH | |
| | | BR-2/3A | 10 |
| | | BR-2/3AH | |
| | | BR-2/3AA | 5 |
| | | BR-1/2A | 5 |
| | | BR-E2 | 10 |
| Cylindrical type | MnO ₂ /Li | BR-E3 | 10 |
| | | BR-P2 | 10 |
| | | CR2 | 20 |
| | | CR123A | 25 |
| Coin type | (CF)n/Li | 2CR5 | 25 |
| | | CR-P2 | 25 |
| | | BR2477A | 5 |
| | | *BR3032 | 5 |
| | | *BR2330 | 5 |
| | | BR2330A | 5 |
| | | BR2325 | 5 |
| | | BR2320 | 5 |
| | | *BR2032 | 5 |
| | | *BR2020 | 5 |
| | | BR2016 | 4 |
| | | BR1632A | 4 |
| | | BR1632 | 4 |
| | | BR1616 | 4 |
| BR1225A | 3 | | |
| BR1225 | 3 | | |
| BR1220 | 3 | | |
| BR1216 | 3 | | |
| Coin type | MnO ₂ /Li | *CR3032 | 10 |
| | | *CR2447 | 10 |
| | | CR2412 | 4 |
| | | *CR2354 | 10 |
| | | *CR2330 | 10 |
| | | *CR2320 | 5 |
| | | CR2032 | 5 |
| | | CR2025 | 5 |
| | | CR2016 | 4 |
| | | CR2012 | 4 |
| | | CR1632 | 4 |
| | | CR1620 | 4 |
| | | CR1616 | 4 |
| | | CR1612 | 3 |
| | | CR1220 | 3 |
| | | CR1216 | 3 |
| CR1212 | 2 | | |
| CR1025 | 2 | | |
| Pin type | (CF)n/Li | BR435 | 0.2 |
| | | BR425 | 0.1 |

BATTERY SELECTION CHART

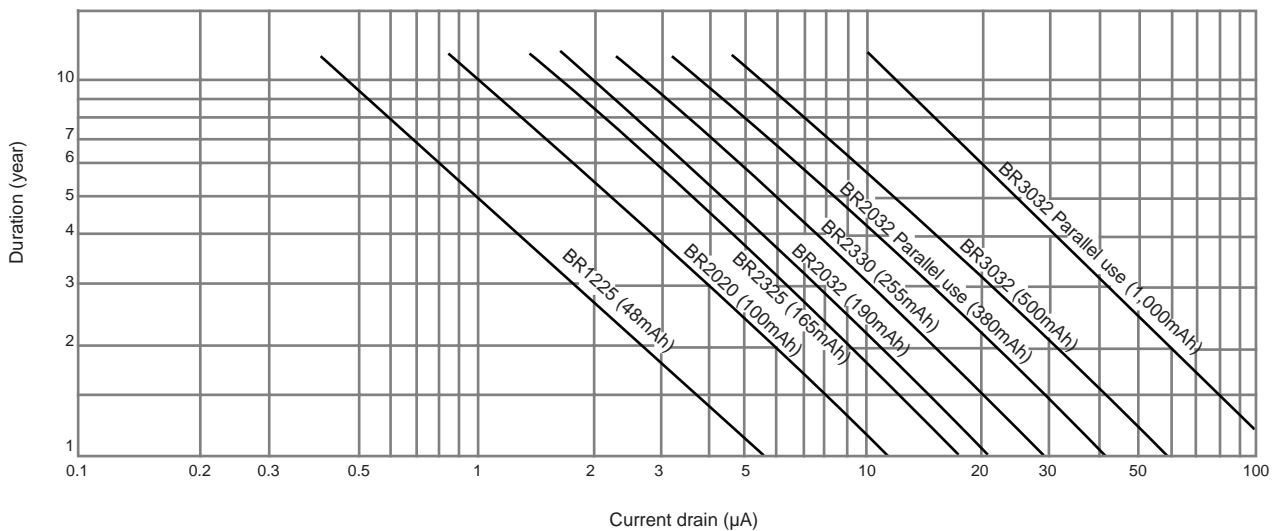
Current drain vs. Duration

Temp: 20°C
Initial cut off voltage: 2.0V

Cylindrical Type



Coin Type



Formula:

$$\text{Duration (years)} = \frac{\text{Nominal capacity (mAh)}}{\text{Current drain (mA)} \times 24 \text{ (hours)} \times 365 \text{ (days)}}$$

COIN TYPE LITHIUM PRIMARY- BATTERIES (BR & CR SERIES)

Specification Table (Coin type lithium batteries with terminals for memory backup application)

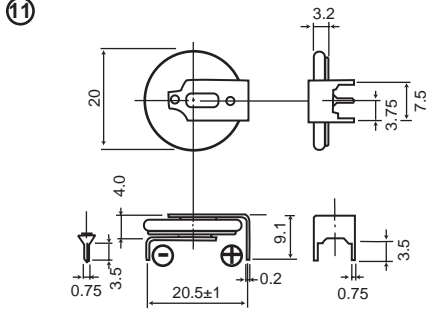
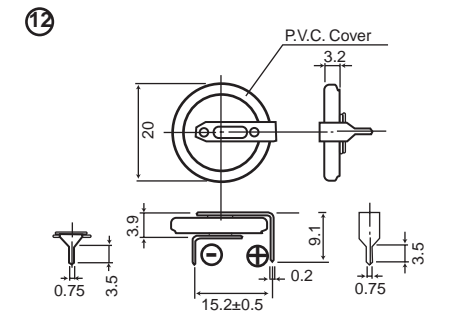
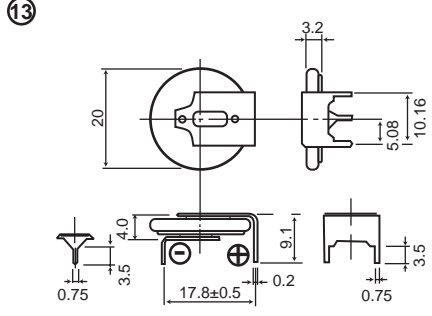
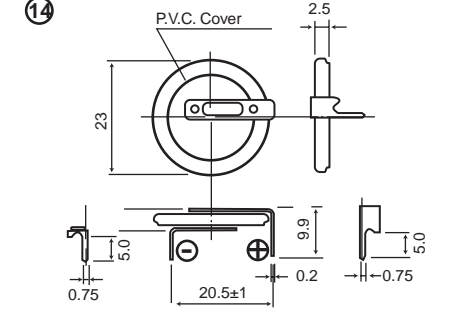
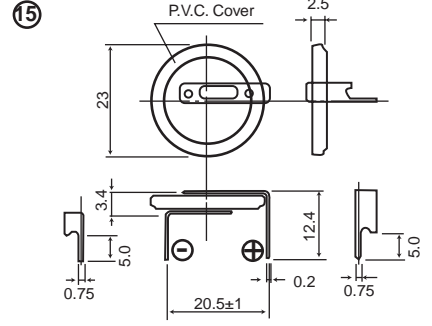
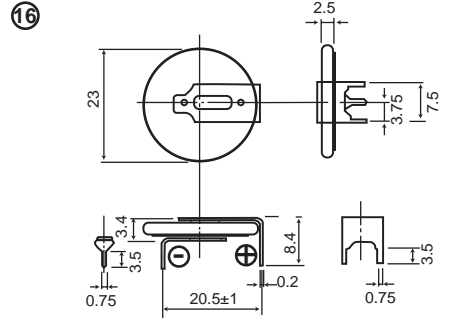
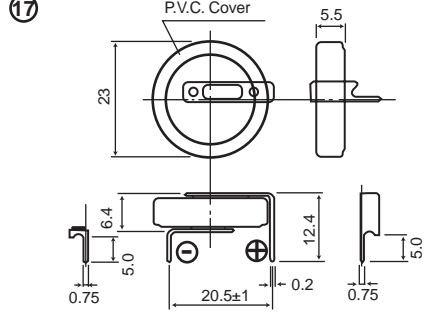
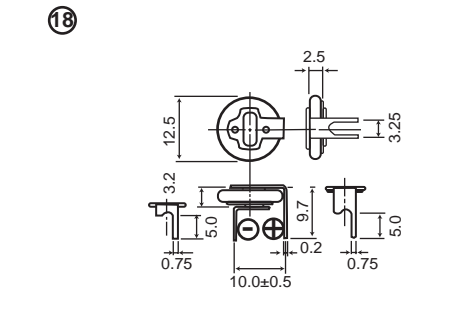
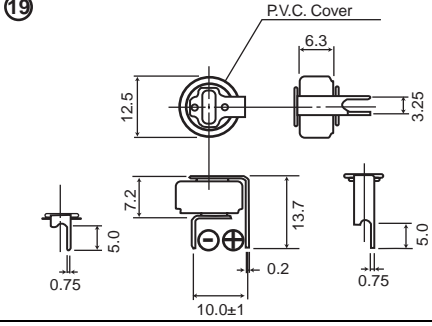
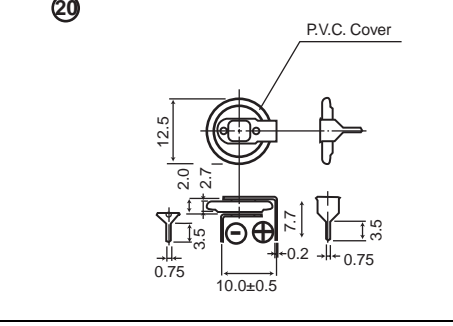
| Type | Model No. | P.V.C. Cover | | Configuration chart No. | Characteristics | | Product Availability | | CR | |
|--------|-----------|-------------------|----------------------|-------------------------|---------------------|------------------------|----------------------|---------|--------------|------------------------|
| | | With P.V.C. cover | Without P.V.C. cover | | Nominal Voltage (V) | Nominal capacity (mAh) | Standard | Special | Availability | Nominal capacity (mAh) |
| H type | CR2477 | /1HF | /1HE | 1 | 3 | 1,000 | ⊗ | | | |
| | CR2354 | /1HF | /1HE | 2 | 3 | 560 | ⊗ | | | |
| | | /1GUF | /1GU | 3 | 3 | 560 | | ⊗ | | |
| | BR2330 | /1HF | /1HE | 4 | 3 | 255 | ⊗ | | ⊗ | (265mAh) |
| | | /1HH | | 5 | 3 | 255 | ⊗ | | ⊗ | (265mAh) |
| | | /1GUF | /1GU | 6 | 3 | 255 | | ⊗ | ⊗ | (265mAh) |
| | | /1HF1 | /1HE1 | 24 | 3 | 255 | | | ⊗ | (265mAh) |
| | CR2330 | | /1GU7 | 7 | 3 | 265 | | | | |
| | BR2032 | /1HF1 | /1HF1 | 8 | 3 | 190 | ⊗ | | ⊗ | (220mAh) |
| | | /1HM | | 9 | 3 | 190 | ⊗ | | ⊗ | (220mAh) |
| | | | /1HG | 11 | 3 | 190 | | ⊗ | ⊗ | (220mAh) |
| | | /1HS | /1HSE | 12 | 3 | 190 | ⊗ | | ⊗ | (220mAh) |
| | | /1GUF | /1GU | 13 | 3 | 190 | | ⊗ | ⊗ | (220mAh) |
| | CR2032 | /1HF | /1HE | 23 | 3 | 190 | | | ⊗ | (220mAh) |
| | CR2032 | | /1HU3 | 22 | 3 | 220 | | | | |
| | BR2325 | /1HC | /1HB | 14 | 3 | 165 | ⊗ | | | |
| | | /1HM | | 15 | 3 | 165 | ⊗ | | | |
| | | | /1HG | 16 | 3 | 165 | | ⊗ | | |
| | | /2HC | | 17 | 6 | 165 | | ⊗ | | |
| | BR1225 | /1HC | /1HB | 18 | 3 | 48 | ⊗ | | | |
| /2HC | | | 19 | 6 | 48 | | ⊗ | | | |
| BR1220 | /1HF | /1HE | 20 | 3 | 35 | ⊗ | | ⊗ | (35mAh) | |
| CR1220 | | /1HM5 | 10 | 3 | 35 | | ⊗ | | | |
| CR1632 | /1HF | /1HE | 21 | 3 | 125 | | ⊗ | | | |
| V type | CR2477 | /1VC | /1VB | 25 | 3 | 1,000 | ⊗ | | | |
| | CR2354 | /1VC | /1VB | 26 | 3 | 560 | ⊗ | | | |
| | BR2330 | /1VC | /1VB | 27 | 3 | 255 | | | ⊗ | (265mAh) |
| | | /1GVF | /1GV | 29 | 3 | 255 | | ⊗ | ⊗ | (265mAh) |
| | BR2032 | /1VC1 | | 30 | 3 | 190 | ⊗ | | ⊗ | (220mAh) |
| | | /1VC3 | | 32 | 3 | 190 | | ⊗ | ⊗ | (220mAh) |
| | | /1GVF | /1GV | 33 | 3 | 190 | | ⊗ | ⊗ | (220mAh) |
| | CR2032 | /1VS1 | | 31 | 3 | 220 | | ⊗ | | |
| | BR3032 | /1VC | | 28 | 3 | 500 | | ⊗ | ⊗ | (500mAh) |
| | BR2325 | /1VN | | 34 | 3 | 165 | | ⊗ | | |
| /1VC2 | | | 35 | 3 | 165 | ⊗ | | | | |
| BR1220 | /1VC | /1VB | 36 | 3 | 35 | ⊗ | | ⊗ | (35mAh) | |
| Others | CR1616 | | /1F2 | 38 | 3 | 55 | | ⊗ | | |
| | BR3032 | /1F2 | | 37 | 3 | 500 | ⊗ | | ⊗ | (500mAh) |
| | BR2032 | /1T2 | | 39 | 3 | 190 | ⊗ | | ⊗ | (220mAh) |
| | | /1F4 | | 40 | 3 | 190 | | ⊗ | ⊗ | (220mAh) |
| | | /1F2 | | 42 | 3 | 190 | ⊗ | | ⊗ | (220mAh) |
| | BR2330 | /1F3 | | 43 | 3 | 255 | ⊗ | | ⊗ | (265mAh) |
| | | /1F4C | | 41 | 3 | 255 | | ⊗ | ⊗ | (265mAh) |
| | BR2016 | /1F2 | | 44 | 3 | 75 | ⊗ | | ⊗ | (90mAh) |
| | BR1225 | /1VF | /1F4 | 45 | 3 | 48 | ⊗ | | | |
| | BR1220 | /1VC | | 46 | 3 | 35 | ⊗ | | ⊗ | (35mAh) |

Many other items with terminals are available. Please contact Panasonic for details

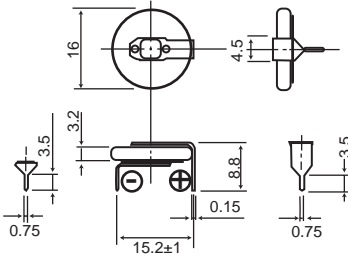
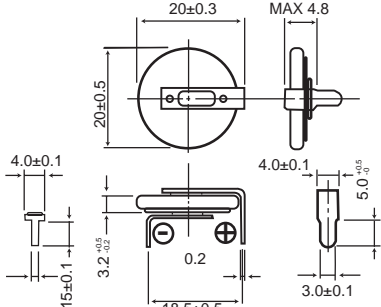
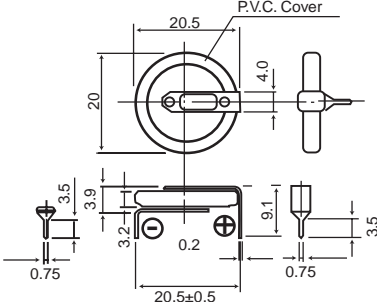
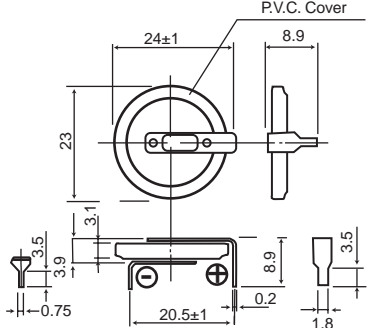
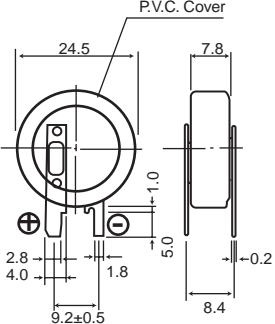
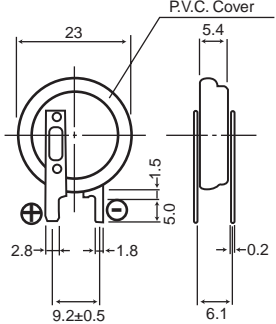
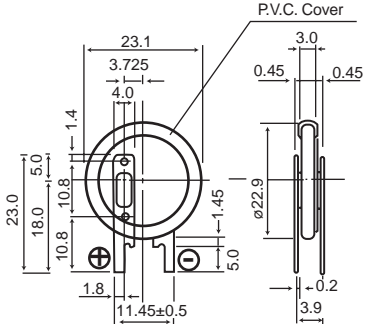
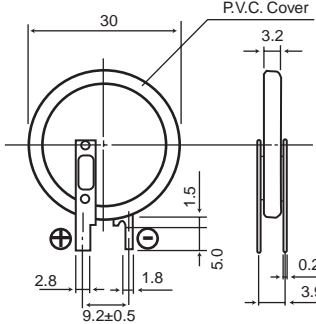
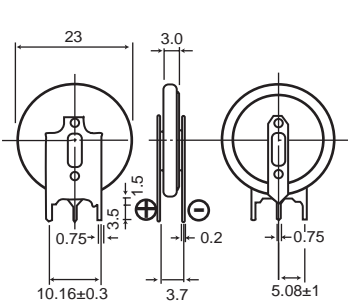
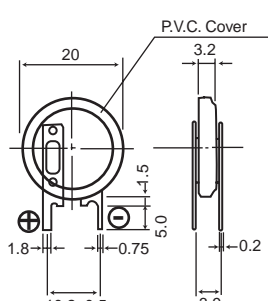
DIMENSIONS (MM)

| Model No. | Dimension (mm) | Model No. | Dimensions (mm) |
|--------------------|----------------|------------------------|-----------------|
| CR2477/1HF 1HE | ① | CR2354 /1HF 1HE | ② |
| CR2354/1GUF 1GU | ③ | BR/CR2330/1HF 1HE | ④ |
| BR/CR2330/1HH | ⑤ | BR/CR2330/1GU 1GUF | ⑥ |
| CR2330/1GU7 | ⑦ | BR/CR2032/1HF1 1HE1 | ⑧ |
| BR/CR2032/1HM | ⑨ | CR1220/1HM5 | ⑩ |

DIMENSIONS (MM) - CONTINUED

| Model No. | Dimension (mm) | Model No. | Dimensions (mm) |
|------------------------|---|-----------------------|---|
| BR/CR2032/1HG |  | BR/CR2032/1HS 1HSE |  |
| BR/CR/2032/1GUF 1GU |  | BR2325/1HC 1HB |  |
| BR2325/1HM |  | BR2325/1HG |  |
| BR2325/2HC |  | BR1225/1HC 1HB |  |
| BR1225/2HC |  | BR/CR1220/1HF 1HE |  |

DIMENSIONS (MM) - CONTINUED

| Model No. | Dimension (mm) | Model No. | Dimensions (mm) |
|-------------------------------------|--|--------------------------------------|--|
| CR1632/1HE 1HF | 21  | CR2032/1HU3 | 22  |
| BR/CR2032/1HF 1HE | 23  | BR/CR2330/1HF1 1HE1 | 24  |
| CR2477/1VC 1VB | 25  | CR2354/1VC 1VB | 26  |
| BR/CR2330/1VC 1VB | 27  | BR/CR3032/1VC | 28  |
| BR/CR2330/1GVF 1GV | 29  | BR/CR2032/1VC1 | 30  |

DIMENSIONS (MM) - CONTINUED

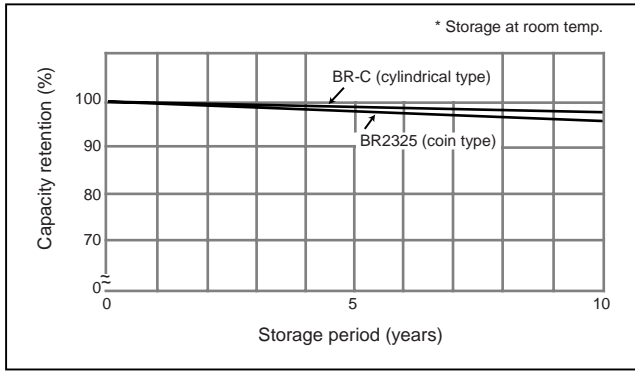
| Model No. | Dimension (mm) | Model No. | Dimensions (mm) |
|-----------------------|----------------|----------------------|-----------------|
| CR2032/1VS1 | | BR/CR2032/1VC3 | |
| BR/CR2032/1GVF 1GV | | BR2325/1VN | |
| BR2325/1VC2 | | BR/CR1220/1VC 1VB | |
| BR/CR3032/1F2 | | CR1616/1F2 | |
| BR/CR2032/1T2 | | BR/CR2032/1F4 | |

DIMENSIONS (MM) - CONTINUED

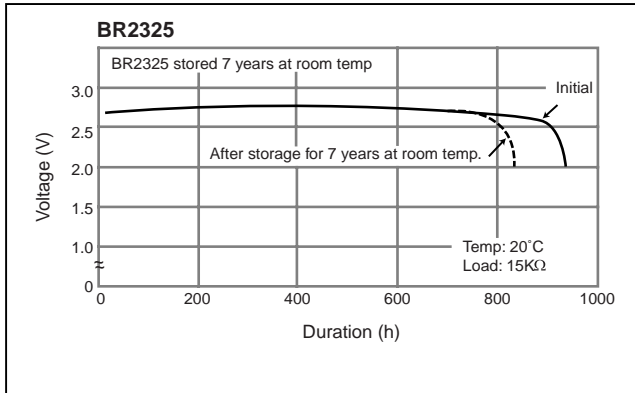
| Model No. | Dimension (mm) | Model No. | Dimensions (mm) |
|-------------------|----------------|---------------|-----------------|
| BR/CR2330/1F4C | <p>④①</p> | BR/CR2330/1F2 | <p>④②</p> |
| BR/CR2330/1F3 | <p>④③</p> | BR/CR2016/1F2 | <p>④④</p> |
| BR1225/1F4 1VF | <p>④⑤</p> | BR/CR1220/1FC | <p>④⑥</p> |

CHARACTERISTICS

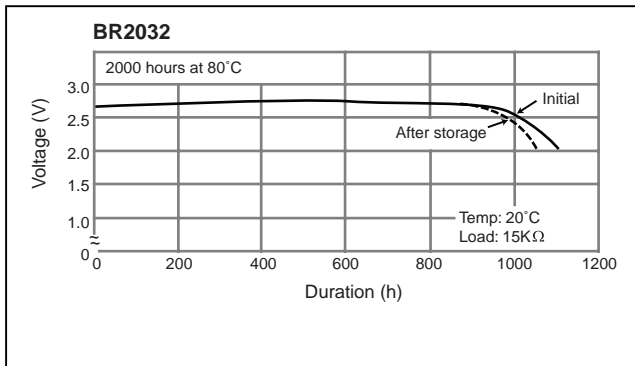
Storage characteristics (BR coin type)



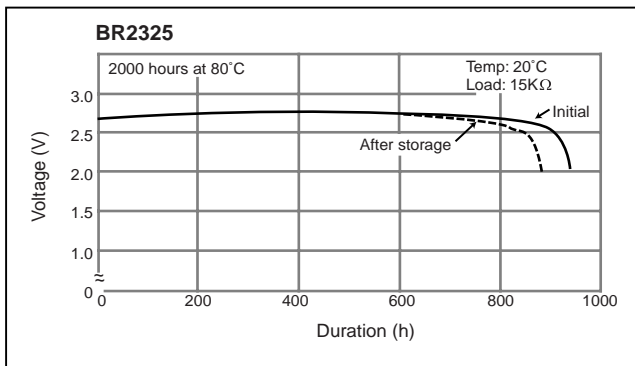
Long term storage characteristics: BR2325



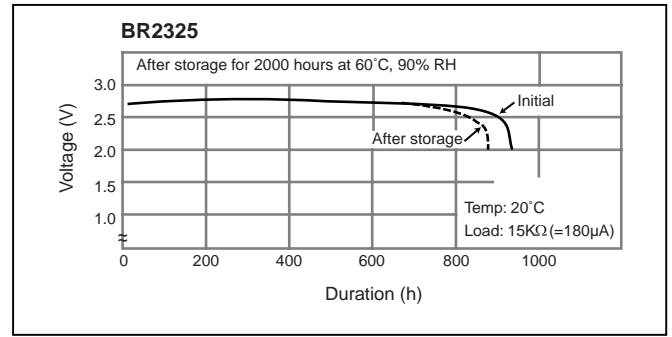
High temperature storage characteristics (80°C): BR2032



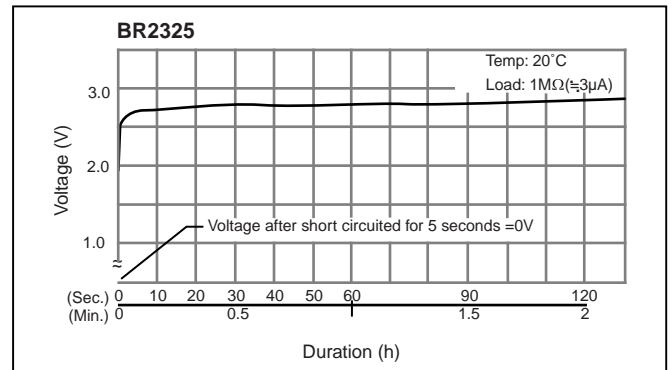
High temperature storage characteristics (80°C): BR2325



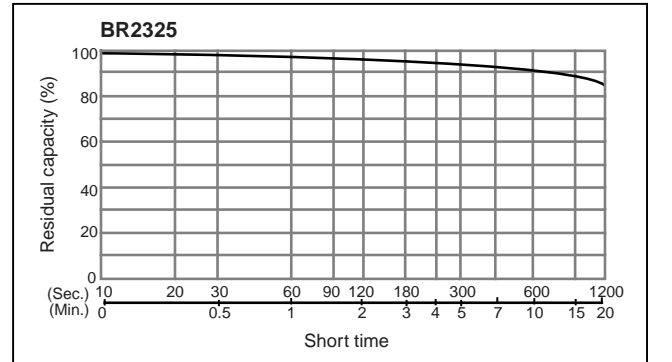
High temperature and high humidity storage characteristics



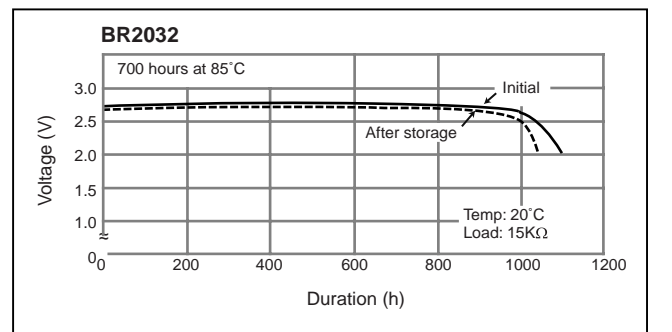
Example of voltage recovery after short-circuited: BR2325



Capacity retention after short-circuited: BR2325

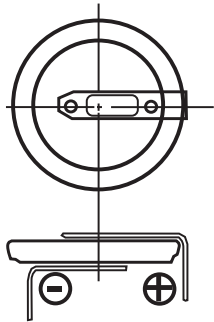


High temperature storage characteristics (80°C): BR2032

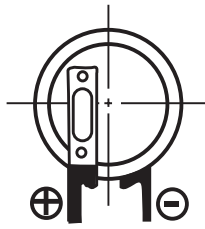


MOUNTING EXAMPLES

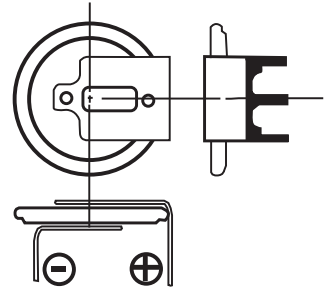
H Type



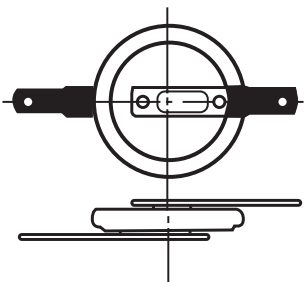
V Type



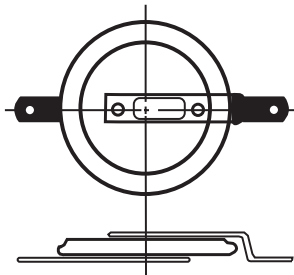
G Type



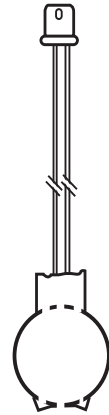
T Type



F Type



S Type



PRECAUTIONS

Please be sure to observe the following instructions. Improper handling of batteries may cause deterioration of their performance.

1. Short

- When batteries are shorted, it takes time for the voltage to recover. Checking should not be done immediately. Because shorting also leads to deterioration of capacity, avoid shorting batteries except in dip-soldering.
- For measuring voltage, select an instrument with high input impedance (10 M Ω or higher).

2. Charge

- Non-rechargeable batteries require an inverse current blocking diode in the equipment circuit. The inverse current of the diode must be very small. For coin type lithium batteries, select a diode whose total charging capacity is within 3 % of the nominal capacity of the concerned battery; and for cylindrical type lithium batteries, select a diode of total charging capacity within 1 % of the battery nominal capacity.

3. Battery terminal soldering

When mounting batteries onto circuits, do not solder directly to batteries; instead use batteries with terminals. When soldering batteries with terminals, observe the following directions:

- **Never use reflow soldering**
In reflow soldering, the battery body is directly heated to high temperatures, causing solution leakage; deterioration of battery performance; or danger of rupture or ignition.
- **Soldering with a soldering iron**
Take care not to touch the battery body directly with the soldering iron. Maintain the iron tip temperature at 350°C; perform soldering quickly (within 5 seconds).
- **Automatic dip-soldering**
Do not allow the temperature of the battery body to exceed 85°C. Use caution; it is possible to have a temperature rise in the battery after dipping due to ambient heat depending on the temperature conditions in the dipping device. The basic conditions should be: Solder dipping bath temperature of

up to 260°C, dipping time of within 5 seconds, and within twice dipping.

4. Cleaning and drying

- Make sure to use a non-conductive cleaning solution. In a conductive solution, batteries may discharge, causing deterioration of battery performance such as voltage drop. Make sure to dry batteries at a temperature below 85°C. If the temperature of the battery body exceeds 85°C, the gasket may be deformed by heat, causing solution leakage or deterioration of battery performance.

5. Mounting

- Position batteries so that the inter-electrode insulation is not spoiled by foreign materials, such as dust.
- Avoid exposing batteries to high temperatures for a long period of time by positioning them away from high-temperature locations.
- Do not place a battery-mounted PC board, etc. on a conductive table during assembly, or the batteries may short.
- Do not bring a battery-mounted PC board, etc. into contact with conductive antistatic mats during transportation, as this will form a discharge circuit, draining battery capacity. Substitute an insulative material for the mat.

6. Handling batteries

- Avoid inversion of polarity, disassembling, heating or exposure to high temperatures, and direct application of solder or spot-welding.
- Do not apply an excessive force to battery terminals as the terminals may become detached or broken.
- Wear gloves or finger caps of rubber or cotton when handling batteries to keep them clean.
- For long-term storage, keep batteries below ordinary temperature and humidity, to help avoid deterioration of capacity due to shorting, etc.

7. UL standard

- In handling/using UL-standard application batteries, observe the conditions outlined in this handbook.