

Control
number




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| SPECIFICATION | |
| LITHIUM BATTERY | |
| Ordering Code : | CR2 |
| Model Code : | CR2 |

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|---------------------|
| Approved by |
| Division/Department |
| Name |
| Title |
| Signature/date |

ISSUED
08,28,2013
PT. Panasonic Gobel Energy Indonesia

Date of Issued : Aug,28,2013

PT. Panasonic Gobel Energy Indonesia

| Approved | Checked | Drafted |
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1. Application Range

This specification applies to Manganese dioxide lithium batteries manufactured by Panasonic Corporation

2. Nominal Specification

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| 2-1 Model Number | CR2 |
| 2-2 Nominal Voltage | 3V |
| 2-3 Nominal Capacity | 850mAh (Nominal capacity is based on the standard discharge current and cut-off voltage 1.8V at 20°C.) |
| 2-4 Standard Discharge Current | 20mA |
| 2-5 Maximum Continuous Discharge Current | 1A at 20°C |
| 2-6 Dimensions | See attached drawing |
| 2-7 Mass | Approximately 11g |
| 2-8 Appearance | No noticeable deformation |
| 2-9 Temperature | Operation -20 to +60°C (Non condensing) Storage -20 to +45°C (Non condensing) (Note: Contact Panasonic in case continuous high-temperature over +60°C usage conditions.) |
| 2-10 Recommendable Storage Condition | Temperature: 5°C to 35°C Humidity: Less than 70%RH |
| 2-11 Battery Composition | Lithium primary battery composed of cathode from Manganese dioxide, anode from lithium, and electrolyte from organic solvent and lithium salt. |

3. Characteristics

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| 3-1 Open Circuit Voltage | |
| 3-1-1 Initial | Between 3.0 and 3.5V (The measuring method described in item 5-4-1.) |
| 3-1-2 After 1 year (storage at 25±5°C) | Between 3.0 and 3.5V (The measuring method described in item 5-4-1.) |
| 3-2 Impedance | |
| 3-2-1 Initial | Between 0.1 and 1.0 Ω (The measuring method described in item 5-4-2.) |
| 3-1-2 After 1 year (storage at 25±5°C) | Between 0.1 and 1.0 Ω (The measuring method described in item 5-4-2.) |
| 3-3 Duration (Pulse cycles) | |
| 3-3-1 Initial | 950cycles MIN. (20±3°C) 500cycles MIN. (-20±3°C) (The measuring method described in item 5-4-3.) |
| 3-3-2 After 1 year (storage at 25±5°C) | 950cycles MIN. (20±3°C) 500cycles MIN. (-20±3°C) (The measuring method described in item 5-4-3.) |
| 3-4 Vibration Resistance | Deterioration of performance (3-1) shall not occur after the test described in item 5-4-4. |
| 3-5 High Temperature Storage | The battery shall not show leakage or salting after the high temperature storage described in item 5-4-5. |

4. Test Condition

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| 4-1 Test Condition | Unless otherwise specified the test shall be carried out at, Temperature : $25 \pm 5^{\circ}\text{C}$ Humidity : $65 \pm 10\% \text{RH}$ |
| 4-2 Test Timing | The test shall be started within a month from delivered day. |
| 4-3 Measurement Instrument | |
| 4-3-1 Voltage Meter | Input impedance : $\geq 10 \text{M}\Omega$ |
| 4-3-2 Battery Impedance Meter | Measurement error : $\leq 0.5\%$ Sine-wave AC method (1kHz, 0.1mA) (As a general, Agilent Technologies LCR Meter [4338B] is recommended.) |
| 4-3-3 Caliper | Class 1 of JIS B 7507:1993 |
| 4-3-4 Balance | Sensitivity : $\leq 100 \text{mg}$ |

5. Measuring Method

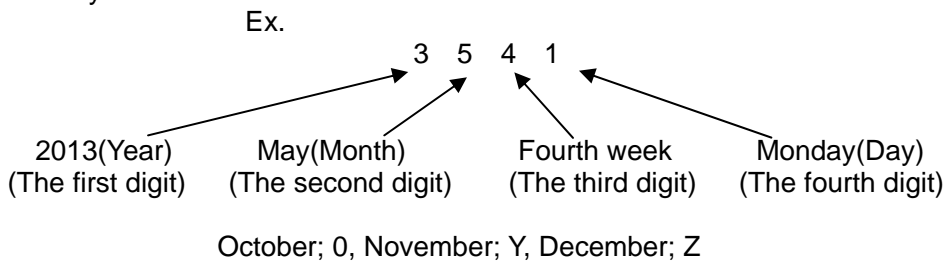
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|--------------------------------|--|
| 5-1 Dimensions | This shall be measured with the caliper described in item 4-3-3. |
| 5-2 Mass | This shall be measured with the balance described in item 4-3-4. |
| 5-3 Appearance | Deformation or tarnish shall be checked by visual observation method. |
| 5-4 Characteristics | |
| 5-4-1 Open Circuit Voltage | This shall be measured with the voltage meter described in item 4-3-1. |
| 5-4-2 Impedance | This shall be measured with the impedance meter described in item 4-3-2. |
| 5-4-3 Duration (Pulse cycles) | This shall be measured by pulse discharge method. The condition is Test temperature : $20 \pm 3^{\circ}\text{C}$ $-20 \pm 3^{\circ}\text{C}$ Pulse pattern : 0.9A 3secON \Leftrightarrow 27secOFF End voltage : $1.55 \text{V} (20 \pm 3^{\circ}\text{C})$ $1.20 \text{V} (-20 \pm 3^{\circ}\text{C})$ |
| 5-4-4 Vibration Test | This test shall be carried out by the following condition according to UN Manual of Test and Criteria, Part III, sub-section 38.3.4.5, Amplitude: 0.8mm Frequency: 7 \Leftrightarrow 200Hz Directions: X, Y, Z Duration: 15 minutes, 12 times (each direction) |
| 5-4-5 High Temperature Storage | The battery shall be stored at 60°C for 1 month. After the storage, the battery shall be kept in dry place at $25 \pm 5^{\circ}\text{C}$ during 4hours, then leakage and appearance shall be checked by visual observation method. |

6. Indication

6.1 Below items are indicated on the battery or its package.
(Design of indication can be changed without notice.)

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| Model code | CR2 |
| Nominal voltage | 3V |
| Manufacture or its brand | Panasonic |
| Production | Indonesia |

6.2 Date Code System



6.3 UL Standard

This battery is certificated by UL and listed on the file number MH12210.

6.4 Production Site

PT. Panasonic Gobel Energy Indonesia
JI.Teuku Umar Km. 44, Cikarang Barat Bekasi, Jawa Barat Indonesia

7. Operations and Modification of This Specification

Modification must be carried out under mutual agreement.

Any Accidents caused by non-described items in this specification must be discussed and solved mutually.

8. Important Notes (Warranty)

1) The batteries are warranted to conform to the description contained in this Specification for a period of twelve [12] months from the ex-factory date and any claim by you (customer) must be made within such period.

During that warranty period, if the Batteries are proved to become defective, non-defective and conforming Batteries will be supplied in due course at sole expense of Panasonic upon Panasonic's own determination that this is apparently caused by negligence of Panasonic.

Any further claims based on the delivery of defective Batteries shall be excluded. Such exclusion shall not affect the liability of Panasonic based on product liability for grossly negligence or intentional behavior of Panasonic.

2) Confirmation of the matching and reliability of Batteries into your actual sets or units is your own responsibility.

3) Panasonic shall not warrant or be responsible in any case where your fails to carry out proper handling, operating, installation, testing, service and checkout of the batteries and/or to follow the instructions, cautions, warnings, notes provided in this Specifications, or other Panasonic's reasonable instructions or advice.

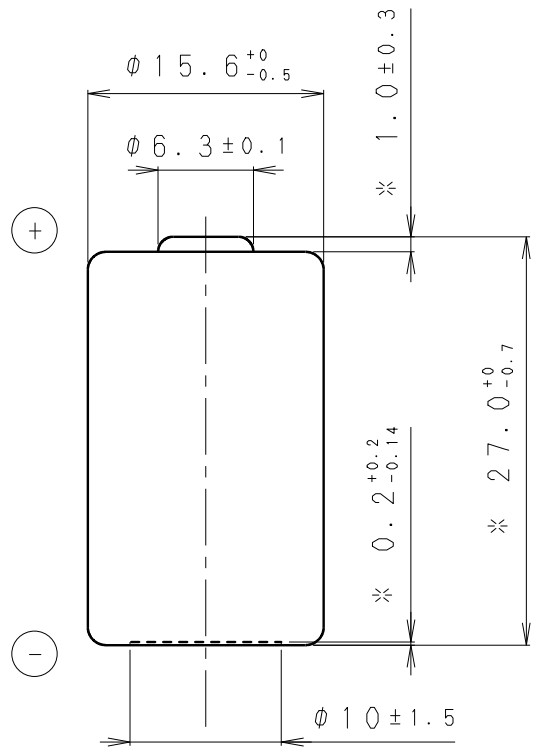
4) Panasonic will not be held responsible for any issues caused by modifications to the battery taken place after that the battery is delivered to the customer end.
The battery shall not be resoled to any other parties.

9. Others

- 1) CR2 is developed for Camera use only , and requested to replace within two years if its used for another usage ,out of Camera use.
- 2) This product specification will be validated assuming that it is accepted when it is not returned within six months from the date of issue.
- 3) The weight of lithium metal content in this battery is within the limit of dangerous goods in regulations of transportation such as IATA, IMO, or DOT.
This battery is certificated UN Recommendation on the Transport of Dangerous Goods.
- 4) This battery does not contain any toxic materials, such as mercury, cadmium or lead.

10. Precautions for use

- 1) The battery shall not be stored at temperatures in excess of 45°C.
Storage at less than 35°C is recommended. Storage at less than -20°C can deform the plastic parts and may cause a leakage. To prevent self-discharge caused by corrosion or decrease of insulation, humidity during storage shall be less than 70%RH.
- 2) The battery has an explosion resistant construction. But the following cautions should be taken, because combustible materials such as lithium metal and organic electrolyte are contained in the battery.
 - * Do not use except in applicable model or equipment.
 - * Do not connect more than two cells in series.
 - * Do not mix new (fresh) and old (end of life) batteries.
 - * Do not force-discharge.
 - * Do not mix different types (chemistries) of batteries.
 - * Do not short circuit.
 - * Do not dispose in fire.
 - * Do not charge.
 - * Do not disassemble.
 - * Do not heat up more than 100°C.
 - * Do not solder directly onto batteries.
 - * Do not soak in water.
 - * Do not deform.
 - * Do not inadequacy modify and remodel for installation.
 - * Insert the batteries in correct polarity position.
- 3) Keep away from heat source or flame.
- 4) The battery shall not be washed by ultrasonic wave washer.
- 5) Keep away from children and infants to prevent the possibility of swallowing by mistake.



NOTE [注記]

1. *: DIMENSIONS DO NOT INCLUDE DOUBLE SEAMS OF OUTER FILM LABEL.
 [* : ラベルの合わせ目は除く寸法]
2. THE FOLLOWING ITEMS ARE INDICATED ON BATTERIES. [電池に下記の表記を行う]
 BATTERY NAME, BATTERY PN, NOMINAL VOLTAGE, CAUTIONS AND etc.
 [電池名称・素電池品番・公称電圧及び注意事項等]

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| MODEL NO. | CR2 | | SCALE |
| | | | 2 : 1 |
| DRAWING NO. | P_CR2 | REV. | |
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