

Control  
Number

2005-11E-013

Digi-Key Corporation

SPECIFICATION

LITHIUM BATTERY

Ordering Code BR-1/2AAE2PE

Model Code BR-1/2AAE2P

Approved by

Division/Department

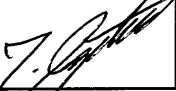
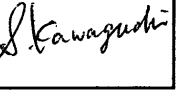
Name

Title

Signature/Date



Issued; Nov. 1<sup>st</sup>. 2005  
Lithium & Micro Battery Business Unit  
Primary Battery Company  
Matsushita Battery Industrial Co., Ltd.

| Approved                                                                            | Checked                                                                              | Checked                                                                               | Drafted                                                                               |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |  |  |

2005-11E-013

### Change Description

[illegible]

## 1. Application Range

This specification applies to poly-carbonmonofluoride lithium batteries those are delivered from Matsushita Battery Industrial Co., Ltd. (MBI).

## 2. Nominal Specification

|                                          |                                                                                                                                         |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| 2-1 Model Number                         | BR-1/2AAE2PE (Bare cell: BR-1/2AA)                                                                                                      |
| 2-2 Nominal Voltage                      | 3V                                                                                                                                      |
| 2-3 Nominal Capacity                     | 1,000mAh<br>(Nominal capacity is based on the standard discharge current and cut-off voltage 1.8V at 20°C.)                             |
| 2-4 Standard Discharge Current           | 2.5mA                                                                                                                                   |
| 2-5 Maximum Continuous Discharge Current | 50mA at 20°C                                                                                                                            |
| 2-6 Dimensions                           | The attached drawing                                                                                                                    |
| 2-7 Mass                                 | Approximately 8g                                                                                                                        |
| 2-8 Appearance                           | There shall be no noticeable deformation.                                                                                               |
| 2-9 Temperature                          | Operation -40 to +100°C<br>Storage -20 to +60°C<br>(Consult Panasonic in case continuous high-temperature over +60°C usage conditions.) |

## 3. Characteristics

|                                |                                                                                                                                    |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| 3-1 Open Circuit Voltage       |                                                                                                                                    |
| 3-1-1 Initial                  | Between 3.0 and 3.5V                                                                                                               |
| 3-1-2 After 1 year (at 25±5°C) | Between 3.0 and 3.5V                                                                                                               |
|                                | (The measuring method described item 5-4-1.)<br>(Humidity during storage shall be less than 70%RH.)                                |
| 3-2 Impedance                  |                                                                                                                                    |
| 3-2-1 Initial                  | Between 0.1 and 1.5Ω                                                                                                               |
| 3-1-2 After 1 year (at 25±5°C) | Between 0.1 and 1.5Ω                                                                                                               |
|                                | (The measuring method described item 5-4-2.)<br>(Humidity during storage shall be less than 70%RH.)                                |
| 3-3 Duration                   |                                                                                                                                    |
| 3-3-1 Initial                  | 300h MIN. (20±3°C)                                                                                                                 |
| 3-3-2 After 1 year (at 25±5°C) | 300h MIN. (20±3°C)                                                                                                                 |
|                                | (The measuring method described item 5-4-3.)<br>(Humidity during storage shall be less than 70%RH.)                                |
| 3-4 Vibration Resistance       | Deterioration of performance (3-1) shall not occur after the test described in item 4-4-4.                                         |
| 3-5 Leakage Resistance         | The battery shall not show leakage or salting which harms the performance (2-1) after the heat cycle test described in item 4-4-5. |
| 3-6 High Temperature Storage   | The battery shall not show leakage or salting after the high temperature storage described in item 4-4-6.                          |

## 4. Test Condition

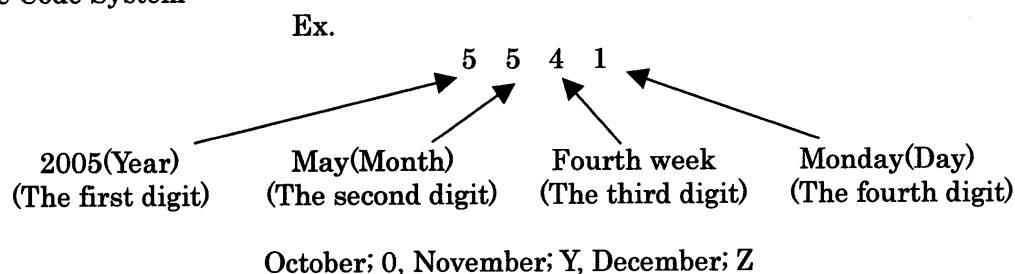
|                               |                                                                                                                                                |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| 4-1 Test Condition            | Unless otherwise specified the test shall be carried out at,<br>Temperature : $25 \pm 5^{\circ}\text{C}$<br>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 | Accuracy : $\leq 0.5\%$<br>Sine-wave AC method (1kHz, 0.1mA)<br>(Agilent Technologies LCR Meter[4263B] is recommended)                         |
| 4-3-3 Caliper                 | Accuracy : $\leq 1\%$ by JIS                                                                                                                   |
| 4-3-4 Balance                 | Sensitivity : $\leq 100\text{mg}$                                                                                                              |

## 5. Measuring Method

|                            |                                                                                                                                                                                                                                                                                                                                   |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 visually checked.                                                                                                                                                                                                                                                                                 |
| 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             | This shall be measured by constant resistance discharge method.<br>The condition is<br>Test temperature : $20 \pm 3^{\circ}\text{C}$<br>Load resistance : $1,000\Omega$<br>End voltage: 1.8V                                                                                                                                      |
| 5-4-4 Vibration Test       | This test shall be carried out by the following condition according to UN Manual of Test and Criteria, PartIII, sub-section 38.3.4.5,<br>Amplitude: 0.8mm<br>Frequency: 10 to 55Hz<br>Sweep speed: 1Hz/min<br>Directions: X, Y, Z<br>Duration: 90 minutes                                                                         |
| 5-4-5 Heat Cycle Test      | The test shall be carried out by the following condition.<br>Temperature range : $60^{\circ}\text{C} 1\text{h} \Leftrightarrow -20^{\circ}\text{C} 1\text{h}$ / cycle<br>Duration: 9 cycles<br>Then leakage and appearance shall be checked by naked eyes after 24hours kept at Room Temperature.<br>Dimensions shall be checked. |

|                                |                                                                                                                                                                                                                    |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5-4-6 High Temperature Storage | The battery shall be stored at 60°C for 28 days. After the storage, the battery shall be kept in dry place at $25 \pm 5^\circ\text{C}$ during 4 hours, then leakage and appearance shall be checked by naked eyes. |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 6. Date Code System



## 7. UL Standard

BR-1/2AA is complied by UL1642 (File No.MH12210).

## 8. 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.

## 9. 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 Matsushita Battery Industrial Co., Ltd. (MBI) upon MBI's own determination that this is apparently caused by negligence of MBI.

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

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

3) MBI 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 MBI's reasonable instructions or advice.

4) This product specification will be validated assuming that it is accepted when it is not returned within six months from the date of issue.

#### 10. Precautions for use

1) The battery shall not be stored at temperatures in excess of 45°C.

Storage at less than 30°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.

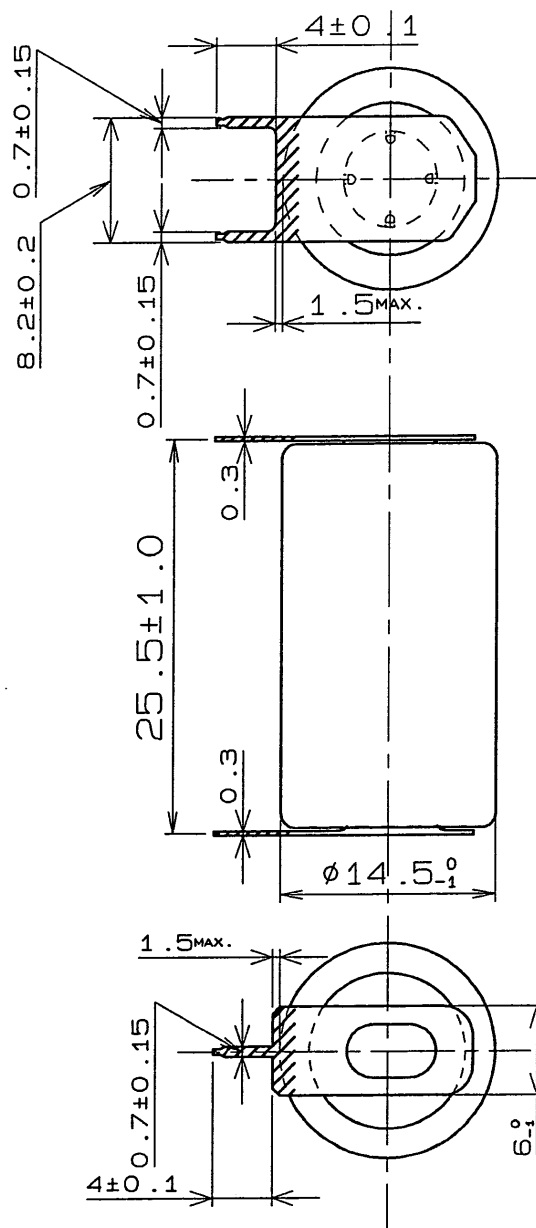
- \* Do not use except in applicable model or equipment.
- \* Do not connect more than two cells in series.
- \* Do not mix different types (chemistries) of batteries.
- \* Do not short circuit.
- \* Do not dispose in fire.
- \* Do not charge.
- \* Do not disassemble.

3) Keep away from heat source or flame.

4) The battery shall not be washed by ultrasonic wave washer.

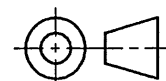
| Symbol | Date | Revision | Signed | Checked |
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| △      |      |          |        |         |

2005-11E-013



Note: \*1 Material of tabs:

Stainless steel+Nickel plating+partial Tin plating.



Unit: mm

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN TOLERANCES  
ON "Lithium & Micro Battery Dimension Standard"

|                                                                 |               |               |                                                                                     |              |                                                                                     |                |                 |
|-----------------------------------------------------------------|---------------|---------------|-------------------------------------------------------------------------------------|--------------|-------------------------------------------------------------------------------------|----------------|-----------------|
| Lithium & Micro Battery<br>Dimension Standard<br>(for Products) |               | Nominal Size  |                                                                                     | Tolerance    |                                                                                     | Product<br>No. | BR-1/2AAE2PE    |
|                                                                 |               | ≤6            |                                                                                     | ±0.2         |                                                                                     |                |                 |
|                                                                 |               | 6<~≤30        |                                                                                     | ±0.5         |                                                                                     | Name           | Product Drawing |
|                                                                 |               | 30<~≤120      |                                                                                     | ±0.8         |                                                                                     |                |                 |
|                                                                 |               | Angle         |                                                                                     | ±5°          |                                                                                     |                |                 |
| Scale                                                           | Designed      | Drawn         | Checked                                                                             | Checked      | Approved                                                                            |                |                 |
| 2: 1                                                            | S.N           | S.N           |  | N. Veno      |  | Drawing<br>No. | PC-B12AA0254E   |
|                                                                 | JUN. 15. 2004 | JUL. 23. 2004 | Nov. 1. 2005                                                                        | Nov. 2. 2005 |                                                                                     |                |                 |

|                          |           |      |                 |
|--------------------------|-----------|------|-----------------|
| 品 番 / Model Number _____ | 包 装 仕 様 書 | 分類番号 | 232-円筒-CR/BR-共通 |
|                          |           | 制 定  | 2002.12.20      |
|                          |           | 実 施  | 2003.01月切以降     |

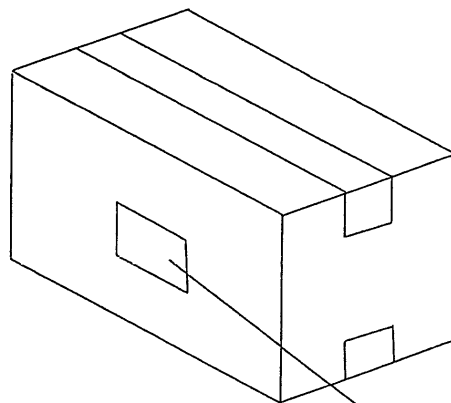
## V T C P 対応の梱包箱表示

VTCP marking and labeling for air transportation of lithium cells and batteries.

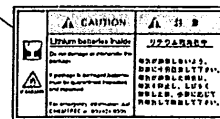
\* 円筒形リチウム電池（品番:BR-,CR-）の場合.

Cylindrical type lithium cell and Batteries. (BR-,CR-)

\* 外装段ボール箱<Corrugated board case.>



「VTCP mark」



シール貼り又は印刷.  
marking or labeling.

## 【VTCP mark】

|                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                           |                                                                                                             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <br><br>IF DAMAGED | <b>CAUTION</b><br><b>Lithium batteries inside</b><br>Do not damage or mishandle this package.<br>If package is damaged, batteries must be quarantined, inspected, and repacked.<br>For emergency information, call CHEMTREC at 800-424-9300.<br>Outside the United States<br>Call 703-527-3887<br>Collect calls accepted. | <b>注意</b><br><b>リチウム電池在中</b><br>梱包が損傷しないよう、取扱に十分注意して下さい。<br>梱包が損傷した場合は、輸送を停止し、しばらく観察した後、必要に応じて再梱包して輸送して下さい。 |
|                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                           |                                                                                                             |

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|       |                   |  |  |  |  |                                                                                       |                                                                                       |                                                                                       |
|-------|-------------------|--|--|--|--|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 符号記事  | 1) VTCP対応         |  |  |  |  | 作成                                                                                    | 検印                                                                                    | 承認                                                                                    |
| 年.月.日 | 2002.12.20        |  |  |  |  |  |  |  |
| 訂正者   | 橋本 / M. Hashimoto |  |  |  |  | M. Hashimoto                                                                          | A. Amari                                                                              | S. Oguro                                                                              |

松下電池工業株式会社 一次電池社 リチウム一次電池ビジネスユニット

MATSUSHITA BATTERY INDUSTRIAL CO.,LTD.

1-1 MATSUSHITA-CHO ,MORIGUCHI-SHI,OSAKA, 570-8511 JAPAN



## Battery Safety Practices

### Avoid danger when handling batteries

Lithium batteries contain volatile materials such as lithium, organic solvents and other chemical ingredients. Incorrect handling of lithium batteries may result in heat generation, fire or explosion, with the risk of personal injury or damage. To prevent accidents when handling batteries, be sure to observe the following precautions.

#### 1. Do not stack or jumble batteries

Avoid contact between positive (+) and negative (−) battery poles, and contact with other metal surfaces, as this can cause short circuits with intense current flows and heat. Stacking or jumbling batteries, as shown at right, may cause short circuits, heat generation, fire or explosion.

Example of stacked and jumbled batteries



\* Contact between battery poles may form a discharge circuit and lead to heat generation, fire or explosion.

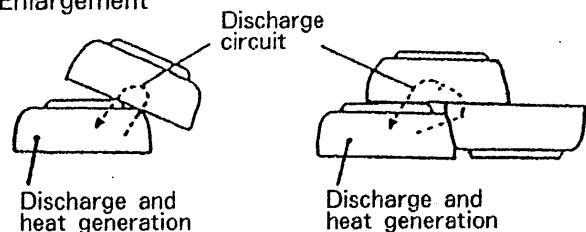
#### 2. Do not dispose of batteries in fire

Disposal of batteries in fire is extremely dangerous with a risk of explosion and violent flaring.

#### 3. Do not heat batteries

When lithium batteries are heated above 100°C (212°F), the resin used in seals, separators and other parts may be damaged, causing electrolyte leaks and internal short circuits which may lead to fire or explosion.

Enlargement



#### 4. Do not Solder directly onto batteries

Heat from soldering may damage seals, separators and other parts, causing electrolyte leaks and internal short circuits which may lead to fire or explosion.

#### 5. Do not recharge batteries

Attempting to recharge batteries may result in internal generation of gases, which may lead to swelling, fire or explosion.

#### 6. Do not disassemble batteries

Do not disassemble lithium batteries as this can generate a gas that may irritate the throat. Lithium may also react with moisture to generate heat and fire.

#### 7. Do not deform batteries

When extreme pressure is applied to batteries, seals may be deformed or damaged, causing electrolyte leaks or internal short circuits. This may lead to the risk of heat generation, fire or explosion.

#### 8. Do not mix different types of batteries

For some applications, mixing different types of batteries, or new and old batteries, can cause over discharge due to differences in voltage and electrical capacities. This may lead to the risk of swelling or explosion.

#### 9. Insert batteries correctly

Depending on the application device, incorrect insertion of batteries, with positive (+) and negative (−) poles reversed, may result in short circuits and the risk of heat generation, fire or explosion.

Please ensure the above precautions are strictly observed by related divisions including production departments, sales departments and external subcontractors. For additional details and information, please contact our sales representatives.

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Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

moschip.ru

moschip.ru\_4

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