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Control  
number

2006- 2E-003

DIGI-KEY CORPORATION

<b>SPECIFICATION</b>	
<b>LITHIUM BATTERY</b>	
Ordering Code :	BR-1/2AAE5P
Model Code :	BR-1/2AA

Approved by
Division/Department
Name
Title
Signature/date



Issued : Feb,7th,2006  
Lithium and Micro Battery Business Unit  
Primary Battery Company  
Matsushita Battery Industrial Co., Ltd.

Approved	Checked	Checked	Drafted



## 1. Application Range

This specification is applied to poly-carbonmonofluoride lithium batteries manufactured by Matsushita Battery Industrial Co., Ltd (MBI).

## 2. Nominal Specification

2-1 Model Number	BR-1/2AAE5P (Bare cell: BR-1/2AA)
2-2 Nominal Voltage	3V
2-3 Nominal Capacity	1,000mAh (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	See attached drawing
2-7 Mass	Approximately 8g
2-8 Appearance	No noticeable deformation
2-9 Temperature	-40°C to +100°C (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
2-10 Battery Composition	Lithium primary battery composed of cathode from poly-carbonmonofluoride, anode from lithium, and electrolyte from organic solvent and lithium salt.

## 3. Characteristics

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 (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 1.5Ω (The measuring method described in item 5-4-2.)
3-2-2 After 1 year (at 25±5°C)	Between 0.1 and 1.5Ω (The measuring method described in item 5-4-2.)
3-3 Duration	
3-3-1 Initial	300h MIN. (20±3°C) (The measuring method described in item 5-4-3.)
3-3-2 After 1 year (at 25±5°C)	300h 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 5-4-6.

#### 4. Test Condition

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	Accuracy : $\leq 0.5\%$ Sine-wave AC method (1kHz, 0.1mA) (As a general, 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

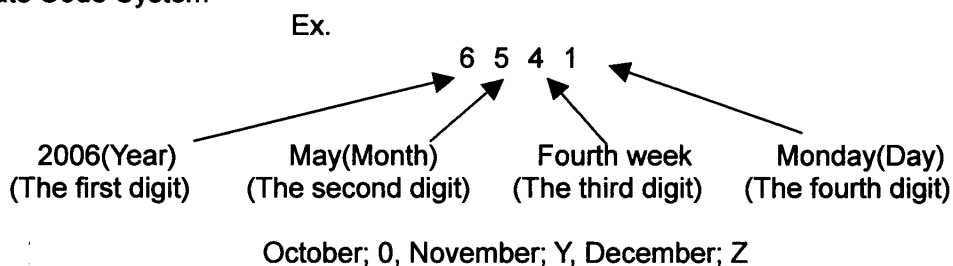
5-1 Dimensions	This shall be measured with the caliper described in item 4-3-3.
5-2 Mass	This shall be measured with the balance described in item 4-3-4.
5-3 Appearance	Deformation or tarnish shall be visually checked.
5-4 Characteristics	
5-4-1 Open Circuit Voltage	This shall be measured with the voltage 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. Test temperature : $23 \pm 3^{\circ}\text{C}$ Load resistance : $1,000 \Omega$ 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, Part III, sub-section 38.3.4.5, Amplitude: 0.8mm Frequency: $7 \leftrightarrow 200 \text{Hz}$ Directions: X, Y, Z Duration: 15 minutes, 12 times (each direction)
5-4-5 High Temperature Storage	The battery shall be stored at $60^{\circ}\text{C}$ for 1 month. 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. Indication

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

Model code	BR-1/2AA
Nominal voltage	3V
Manufacture or its brand	Panasonic
Production	Japan

## 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

Matsushita Battery Industrial Co.  
1-1 Matsushita-cho, Moriguchi-city, Osaka, 570-8511, Japan

## 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 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.

## 9. Others

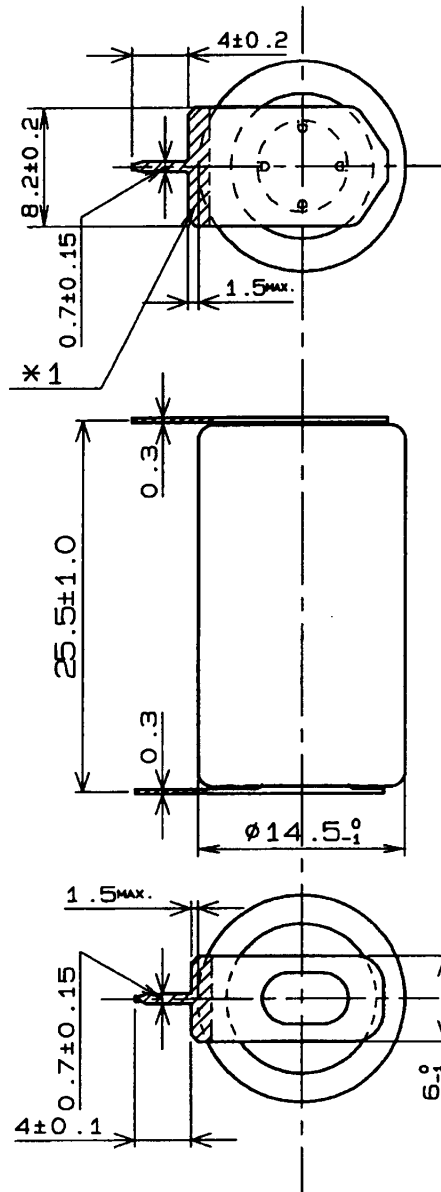
- 1) This product specification will be validated assuming that it is accepted when it is not returned within six months from the date of issue.
- 2) The weight of lithium metal content in this battery is within the limit of dangerous goods in regulations of transportation such as IATA, IMO, or DOT.  
This battery is certificated UN Recommendation on the Transport of Dangerous Goods.
- 3) 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.  
Do not expose batteries to direct sunlight or moisture in order to prevent deterioration of performance.
- 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) Do not wash by ultrasonic wave washer.
- 5) Keep away from children and infants to prevent the possibility of swallowing by mistake.



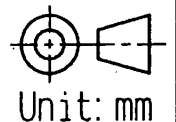
Symbol	Date	Revision	Signed	Checked
△				



Note: \*1 Material of tabs:

Stainless steel+Nickel plating+partial Tin plating.

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



Lithium & Micro Battery Dimension Standard (for Products)	Nominal Size	Tolerance		Product No.	BR-1/2AAE5P		
	≤6	±0.2					
	6<~≤30	±0.5		Name	Product Drawing		
	30<~≤120	±0.8					
Scale	Designed	Drawn	Checked	Checked	Approved		
2:1	S.N	S.N	<i>T. Yamaguchi</i>	<i>N. Ueno</i>	<i>[Signature]</i>	Drawing No.	PC-B12AA0214E
	JUN. 15. 2004	JUL. 23. 2004	Aug. 31. 2004	Aug. 31. 2004			



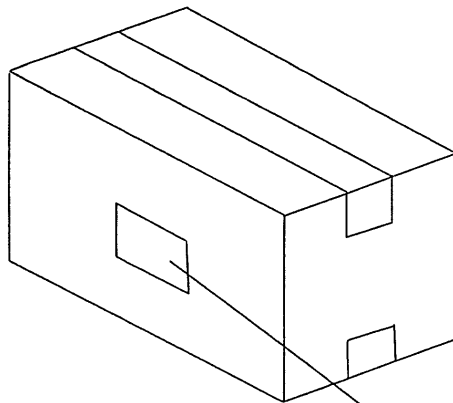
品 番 / Model Number _____ 包 装 仕 様 書	分類番号	232-円筒-CR/BR-共通
	制 定	2002.12.20
	実 施	2003.01月切以降

## VTCP 対応の梱包箱表示

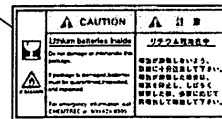
VTCP marking and labeling for air transportation of lithium cells and batteries.

\* 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〕

  IF DAMAGED	<b>CAUTION</b> <b>Lithium batteries inside</b> Do not damage or mishandle this package. If package is damaged, batteries must be quarantined, inspected, and repacked. For emergency information, call CHEMTREC at 800-424-9300. Outside the United States Call 703-527-3887 Collect calls accepted.	<b>注意</b> <b>リチウム電池在中</b> 梱包が損傷しないよう、取扱に十分注意して下さい。 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。

1/1

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.

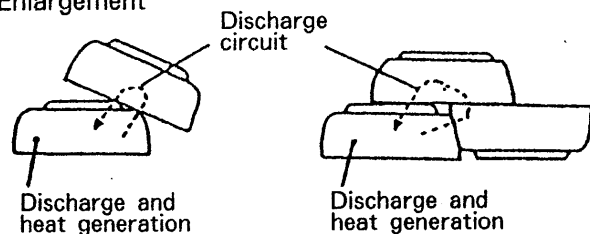
#### 2. Do not dispose of batteries in fire

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.