

This product is a consumer product which is used in a hermetically sealed state. So, it is not an object of the SDS system. This document is provided to customers as reference information for the safe handling of the product. The information and recommendations set forth are made in good faith and are believed to be accurate at the date of preparation. Panasonic Corporation makes no warranty expressed or implied.

PRODUCT SAFETY DATA SHEET

1 Product and Company Identification

Name of Product : Manganese dioxide lithium battery
Name of Company : Panasonic Corporation, Automotive & Industrial Systems Company
Address : 1-1 Matsushita-cho, Moriguchi City, Osaka, 570-8511, Japan
Division : Energy Device Division
Department : Engineering Department
Telephone number : +81-6-6994-4537

2 Hazards Identification

GHS Classification : Not applicable

Hazard : Electrolyte and lithium metal are inflammable.
Risk of explosion by fire if batteries are disposed in fire or heated above 100 degrees C.
Stacking or jumbling batteries may cause external short circuits, heat generation, fire or explosion.

Toxicity : Vapor generated from burning batteries, may irritate eyes, skin and throat.

3 Composition/Information of Ingredients

Component	Material	CAS No.	Content
Positive electrode	Manganese dioxide	1313-13-9	12~50wt%
Negative electrode	Lithium metal	7439-93-2	0.5~6wt%
Electrolyte	1,2-dimethoxyethane	110-71-4	1.5~3.5wt%
	Lithium Perchlorate	7791-03-9	0.2~0.7wt%
	Organic electrolyte	-	2.5~ 7wt%
Others (Steel or Plastic parts)	Steel	7439-89-6, 7440-47-3	30~85wt%
	Polypropylene	9003-07-0	0.5~10wt%

Lithium content per cell

Model Number	Lithium content(g)	Model Number	Lithium content(g)	Model Number	Lithium content(g)	Model Number	Lithium content(g)
CR1025	0.008	CR1620	0.02	CR2330	0.08	CR2412	0.03
CR1216	0.008	CR1632	0.04	CR2354	0.17	CR2430	0.09
CR1220	0.01	CR2012	0.02			CR2450	0.18
CR1612	0.01	CR2016	0.03			CR2450A	0.17
CR1616	0.02	CR2025	0.05			CR2477	0.29
		CR2032	0.07			CR3032	0.15
		CR2050B	0.10				

4 First Aid Measures

The product contains organic electrolyte. In case of electrolyte leakage from the battery, actions described below are required.

- | | |
|--------------|--|
| Eye contact | : Flush the eyes with plenty of clean water for at least 15 minutes immediately, without rubbing. Get immediate medical treatment. If appropriate procedures are not taken, this may cause eye injury. |
| Skin contact | : Wash the contact areas off immediately with plenty of water and soap. If appropriate procedures are not taken, this may cause sores on the skin. |
| Inhalation | : Remove to fresh air immediately. Get medical treatment immediately. |

5 Fire Fighting Measures

Extinguishing method : Since vapor, generated from burning batteries may make eyes, nose and throat irritates, be sure to extinguish the fire on the windward side. Wear the respiratory protection equipment in some cases.

Fire extinguishing agent : Alcohol-resistant foam and dry sand are effective.

6 Accidental Release Measures (in case of electrolyte leakage from the battery)

- Take up with absorbent cloth, treat cloth as inflammable.
- Move the battery away from the fire.

7 Handling and Storage

- When packing the batteries, do not allow battery terminals to contact each other, or contact with other metals. Be sure to pack batteries by providing partitions in the packaging box, or in a separate plastic bag so that the single batteries are not mixed together.
- Use strong material for packaging boxes so that they will not be damaged by vibration, impact, dropping and stacking during their transportation.
- Do not recharge batteries. Do not deform batteries.
- Do not mix different type of batteries.
- Do not solder directly onto batteries.
- Do not let water penetrate into packaging boxes during their storage and transportation.
- Do not store the battery in places of the high temperature or under direct sunlight.
- Please also avoid the places of high humidity. Be sure not to expose the battery to condensation, rain or frozen condition.

14 Transport Information

During the transportation of a large amount of batteries by ship, trailer or railway, do not leave them in the places of high temperatures and do not allow them to be exposed to condensation.

During the transportation do not allow packages to be dropped or damaged.

Proper shipping name : Lithium metal batteries

UN Number, UN Class : UN3090, Class9 (for the Air transport by PI968 Section IA or IB)

: Exemption (for the Marine transport and the Air transport by Section II of PI 968, 969 or 970)

Even though the cells are classified as lithium metal batteries (UN3090 or 3091), they are not subject to some requirements of Dangerous Goods Regulations because they meet the following:

1. for cells, the lithium content is not more than 0.3g;
2. each cell is of the type proven to meet the requirements of each test in the UN Manual of Tests and Criteria, Part III, sub-section 38.3.
3. each cell is manufactured in ISO9001 certified factory.

Please refer to the following reference information about concrete ways of transportation. Actual content of packaging label and shipping documents varies by shipping companies. Make sure to confirm in advance with your shipping company.

Information of reference

	Reference	Packing Instruction(PI)/ Special provision(SP)	Note
Air transport	IATA (2)(5)	PI 968 Section I A	Cells, Cargo Aircraft only; Net quantity per package Max. 35kg
		PI 968 Section I B	Cells, Cargo Aircraft only; net quantity per package Max. 2.5kg
		PI 968 Section II	Cells, Cargo Aircraft only, not more than one package in any single consignment; net quantity per package Max. 2.5kg
		PI 969 Section II	Cells packed with equipment
		PI 970 Section II	Cells contained in equipment, button cell batteries
Marine transport	IMDG (3)	SP 188	

15 Regulatory Information

IATA Dangerous Goods Regulations

IMO International Maritime Dangerous Goods Code

16 Other Information

This PSDS is provided to customers as reference information in order to handle batteries safely.

It is necessary for the customer to take appropriate measures depending on the actual situation such as the individual handling, based on this information.

In California only, packages that contain CR lithium coin cells and the Owners/Operating Instructions of products that contain CR lithium coin cells must include the following statement: "Perchlorate Material - special handling may apply, See www.dtsc.ca.gov/hazardouswaste/perchlorate".

The effective date for this Perchlorate label is July 1, 2006 for non-consumer products and January 1, 2007 for consumer products.

References

- (1) UN Recommendations on the Transportation of Dangerous Goods, Model Regulations
- (2) IATA Dangerous Goods Regulations 57th Edition (2016)
- (3) IMO International Maritime Dangerous Goods Code 2014 Edition
- (4) UN Recommendations on the Transportation of Dangerous Goods, Manual of Tests and Criteria
- (5) IATA Dangerous Goods Regulations 57th edition Effective 1 January 2016
ADDENDUM

(END)

授权书 兼 联络书

致 上海化工研究院检测中心

首先感谢贵院一直以来对我公司的大力支持！
当前我公司因下记客户的要求给予发行授权书；
日后，该客户到贵院申请『运输条件化工鉴定证书』的事项时请求给予受理此
申请业务，再次拜托。

パナソニック株式会社
Panasonic Corporation
オートモーティブ&インダストリアルシステムズ社
Automotive & Industrial Systems Company
エナジーデバイス事業部
Energy Device Business Division
技術部
Engineering Department

長谷 洋志

2016-11-08

授权书

致 上海化工研究院检测中心

兹有我公司提供的如下表所示型号的电池 UN38.3 检验报告，
及 1.2 米落下试验报告，现授权 松下産業科技股份有限公司 使用。
特此证明。

型号	文书名称	文书编号
CR-2032L/BN	UN38.3 检验报告	CP0008-10
CR-2032L/BN	1.2 米落下试验报告	CPC160028-1

松下电器产业株式会社 检验报告

パナソニック株式会社
オートモーティブ&インダストリアルシステムズ社
エナジーデバイス事業部

Panasonic Corporation

No. CP0008-10

共9页第1页

样品名称 Name of Sample	中文 Chinese	锂电池 CR2032 (3.0V 225mAh)					
	英文 English	Lithium Battery CR2032 (3.0V 225mAh)					
送检单位 Consignor	松下电器产业株式会社/ Panasonic Corporation						
生产单位 Manufacturer	松下电器产业株式会社/ PT. Panasonic Gobel Energy Indonesia						
检验方法 Test Method	联合国《关于危险货物运输的建议书》 UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS"						
判定标准 Criterion	联合国《关于危险货物运输的建议书》 UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS"						
样品外观 Appearance	硬币形 Coin type						
检测起迄日期 Test Date	2008/4/1-2008/8/5	样品编号 Sample No	/				
检测项目 Test Items	高度模拟试检; 热测试; 振动试检; 冲击试检; 外短路试检; 冲撞试检; 强制放电试检 Altitude simulation, Thermal test, Vibration test, Shock, External short circuit, Impact, Forced discharge						
检验结论 Conclusion	受检样品通过 UN38.3检测, 检测合格。 The sample has passed the test items of UN38.3. 日期(date): 2008年(y) 08月(m) 5日(d)						
备注 Remark	/						
受检单位地址 Consignor Address	日本: 大阪府守口市松下町1番1号 1-1 Matsushita-cho, Moriguchi City Osaka, Japan		邮政编码 Post Code	570-8511			

批准人职务(the title of approver):

☒ 质量保证部长(Director of Quality Assurance)

☐ 质量保证科长(Manager of Quality Assurance)

☐ 质量保证主任工程师(Chief Engineer of QA)

批准 Approver: J. Chamoto

审核 Checker: T. Shimizu

主检 Appraiser: Y. Hattori

松下电器产业株式会社 检验报告

Panasonic Corporation

No. CP0008-10

共9页第2页

序号 No	检测项目 Name of Test Items	标准要求或标准款号 Standard Requirement or the Clause Number of Standard	检验结果 Test Result	本项结论 Test Conclusion	备注 Remark
1	高度模拟试检 Altitude simulation	试检和标准手册38.3(4 th) 38.3 Test T-1 UN Manual of Tests and Criteria Section (4 th) 38.3 Test T-1	见附表1 See Appendix 1	合格 Passed	/
2	热测试检 Thermal test	试检和标准手册38.3(4 th) 38.3 Test T-2 UN Manual of Tests and Criteria Section (4 th) 38.3 Test T-2	见附表2 See Appendix 2	合格 Passed	/
3	振动试检 Vibration test	试检和标准手册38.3(4 th) 38.3 Test T-3 UN Manual of Tests and Criteria Section (4 th) 38.3 Test T-3	见附表3 See Appendix 3	合格 Passed	/
4	冲击试检 Shock	试检和标准手册38.3(4 th) 38.3 Test T-4 UN Manual of Tests and Criteria Section (4 th) 38.3 Test T-4	见附表4 See Appendix 4	合格 Passed	/
5	外短路试检 External short circuit	试检和标准手册38.3(4 th) 38.3 Test T-5 UN Manual of Tests and Criteria Section (4 th) 38.3 Test T-5	见附表5 See Appendix 5	合格 Passed	/
6	冲撞试检 Impact	试检和标准手册38.3(4 th) 38.3 Test T-6 UN Manual of Tests and Criteria Section (4 th) 38.3 Test T-6	见附表6 See Appendix 6	合格 Passed	/
7	强制放电试检 Forced discharge	试检和标准手册38.3(4 th) 38.3 Test T-8 UN Manual of Tests and Criteria Section (4 th) 38.3 Test T-8	见附表7 See Appendix 7	合格 Passed	/
检验环境条件 / Test Environment Condition		环境温度: 15-25°C / Ambient Temperature: 15-25°C			
分包检验状况 Subcontracted Test Condition	检测项目 Test Items	/			
	分包实验室 Subcontracted Laboratory	名称 Name	/	邮编 Post Code	/
		地址 Address	/	电话 Tel	/

松下电器产业株式会社 检验报告

-----附表1

Panasonic Corporation

No. CP0008-10

Appendix 1

共9页第3页

序号 No.	T-1	检测项目名称 Name of Test Items		高度模拟试检 Altitude simulation				
样品 号码 Sample No.	样品状态 Sample State	试检前 Before		试检后 After		质量 Mass Loss (%)	剩余电压 Residual OCV (%)	其他 现象 Other Event
		质量 Mass (g)	开路电压 OCV (V)	质量 Mass (g)	开路电压 OCV (V)			
1	未放电 Undischarged	2.866	3.203	2.866	3.204	0.00	100.0	0
2	未放电 Undischarged	2.869	3.203	2.869	3.205	0.00	100.1	0
3	未放电 Undischarged	2.896	3.206	2.896	3.207	0.00	100.0	0
4	未放电 Undischarged	2.866	3.206	2.865	3.207	0.03	100.0	0
5	未放电 Undischarged	2.890	3.205	2.890	3.206	0.00	100.0	0
6	未放电 Undischarged	2.870	3.206	2.869	3.207	0.03	100.0	0
7	未放电 Undischarged	2.873	3.203	2.873	3.205	0.00	100.1	0
8	未放电 Undischarged	2.871	3.204	2.870	3.206	0.03	100.1	0
9	未放电 Undischarged	2.878	3.206	2.877	3.208	0.03	100.1	0
10	未放电 Undischarged	2.868	3.205	2.868	3.206	0.00	100.0	0
11	完全放电 Fully Discharged	2.869	—	2.868	—	0.03	—	0
12	完全放电 Fully Discharged	2.845	—	2.844	—	0.04	—	0
13	完全放电 Fully Discharged	2.899	—	2.899	—	0.00	—	0
14	完全放电 Fully Discharged	2.838	—	2.838	—	0.00	—	0
15	完全放电 Fully Discharged	2.900	—	2.899	—	0.03	—	0
16	完全放电 Fully Discharged	2.878	—	2.878	—	0.00	—	0
17	完全放电 Fully Discharged	2.842	—	2.842	—	0.00	—	0
18	完全放电 Fully Discharged	2.863	—	2.863	—	0.00	—	0
19	完全放电 Fully Discharged	2.880	—	2.881	—	0.00	—	0
20	完全放电 Fully Discharged	2.892	—	2.892	—	0.00	—	0

备注: L-漏液, V-漏气, D-解体, R-破裂, F-起火, 0-无漏液, 无漏气, 无解体, 无破裂, 无起火
Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, 0-No leakage, no venting, no disassembly, no rupture & no fire.

松下电器产业株式会社 检验报告

-----附表2

Panasonic Corporation

No. CP0008-10

Appendix 2

共9页第4页

序号 No.	T-2	检测项目名称 Name of Test Items		热测试检 Thermal test				
样品 号码 Sample No.	样品状态 Sample State	试检前 Before		试检后 After		质量 Mass Loss (%)	剩余电压 Residual OCV (%)	其他 现象 Other Event
		质量 Mass (g)	开路电压 OCV (V)	质量 Mass (g)	开路电压 OCV (V)			
1	未放电 Undischarged	2.866	3.204	2.866	3.233	0.00	100.9	0
2	未放电 Undischarged	2.869	3.205	2.869	3.232	0.00	100.8	0
3	未放电 Undischarged	2.896	3.207	2.895	3.233	0.03	100.8	0
4	未放电 Undischarged	2.865	3.207	2.865	3.234	0.00	100.8	0
5	未放电 Undischarged	2.890	3.206	2.890	3.234	0.00	100.9	0
6	未放电 Undischarged	2.869	3.207	2.869	3.235	0.00	100.9	0
7	未放电 Undischarged	2.873	3.205	2.873	3.234	0.00	100.9	0
8	未放电 Undischarged	2.870	3.206	2.870	3.234	0.00	100.9	0
9	未放电 Undischarged	2.877	3.208	2.877	3.236	0.00	100.9	0
10	未放电 Undischarged	2.868	3.206	2.867	3.235	0.03	100.9	0
11	完全放电 Fully Discharged	2.868	—	2.868	—	0.00	—	0
12	完全放电 Fully Discharged	2.844	—	2.845	—	0.00	—	0
13	完全放电 Fully Discharged	2.899	—	2.899	—	0.00	—	0
14	完全放电 Fully Discharged	2.838	—	2.839	—	0.00	—	0
15	完全放电 Fully Discharged	2.899	—	2.899	—	0.00	—	0
16	完全放电 Fully Discharged	2.878	—	2.878	—	0.00	—	0
17	完全放电 Fully Discharged	2.842	—	2.843	—	0.00	—	0
18	完全放电 Fully Discharged	2.863	—	2.863	—	0.00	—	0
19	完全放电 Fully Discharged	2.881	—	2.880	—	0.03	—	0
20	完全放电 Fully Discharged	2.892	—	2.891	—	0.03	—	0
备注: L-漏液, V-漏气, D-解体, R-破裂, F-起火, 0-无漏液, 无漏气, 无解体, 无破裂, 无起火 Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, 0-No leakage, no venting, no disassembly, no rupture & no fire.								

松下电器产业株式会社 检验报告

-----附表3

Panasonic Corporation

No. CP0008-10

Appendix 3

共9页第5页

序号 No.	T-3	检测项目名称 Name of Test Items		振动试检 Vibration Test				
样品 号码 Sample No.	样品状态 Sample State	试检前 Before		试检后 After		质量 Mass Loss (%)	剩余电压 Residual OCV (%)	其他 现象 Other Event
		质量 Mass (g)	开路电压 OCV (V)	质量 Mass (g)	开路电压 OCV (V)			
1	未放电 Undischarged	2.866	3.233	2.865	3.245	0.03	100.4	0
2	未放电 Undischarged	2.869	3.232	2.868	3.244	0.03	100.4	0
3	未放电 Undischarged	2.895	3.233	2.895	3.243	0.00	100.3	0
4	未放电 Undischarged	2.865	3.234	2.865	3.248	0.00	100.4	0
5	未放电 Undischarged	2.890	3.234	2.890	3.246	0.00	100.4	0
6	未放电 Undischarged	2.869	3.235	2.869	3.245	0.00	100.3	0
7	未放电 Undischarged	2.873	3.234	2.872	3.245	0.03	100.3	0
8	未放电 Undischarged	2.870	3.234	2.870	3.245	0.00	100.3	0
9	未放电 Undischarged	2.877	3.236	2.877	3.250	0.00	100.4	0
10	未放电 Undischarged	2.867	3.235	2.867	3.246	0.00	100.3	0
11	完全放电 Fully Discharged	2.868	—	2.868	—	0.00	—	0
12	完全放电 Fully Discharged	2.845	—	2.845	—	0.00	—	0
13	完全放电 Fully Discharged	2.899	—	2.899	—	0.00	—	0
14	完全放电 Fully Discharged	2.839	—	2.839	—	0.00	—	0
15	完全放电 Fully Discharged	2.899	—	2.899	—	0.00	—	0
16	完全放电 Fully Discharged	2.878	—	2.878	—	0.00	—	0
17	完全放电 Fully Discharged	2.843	—	2.843	—	0.00	—	0
18	完全放电 Fully Discharged	2.863	—	2.863	—	0.00	—	0
19	完全放电 Fully Discharged	2.880	—	2.880	—	0.00	—	0
20	完全放电 Fully Discharged	2.891	—	2.891	—	0.00	—	0

备注: L-漏液, V-漏气, D-解体, R-破裂, F-起火, 0-无漏液, 无漏气, 无解体, 无破裂, 无起火
Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, 0-No leakage, no venting, no disassembly, no rupture & no fire.

松下电器产业株式会社 检验报告

-----附表4

Panasonic Corporation

No. CP0008-10

Appendix 4

共9页第6页

序号 No.	T-4	检测项目名称 Name of Test Items		冲击试检 Shock Test				
样品 号码 Sample No.	样品状态 Sample State	试检前 Before		试检后 After		质量 Mass Loss (%)	剩余电压 Residual OCV (%)	其他 现象 Other Event
		质量 Mass (g)	开路电压 OCV (V)	质量 Mass (g)	开路电压 OCV (V)			
1	未放电 Undischarged	2.865	3.245	2.865	3.254	0.00	100.3	0
2	未放电 Undischarged	2.868	3.244	2.868	3.250	0.00	100.2	0
3	未放电 Undischarged	2.895	3.243	2.895	3.251	0.00	100.2	0
4	未放电 Undischarged	2.865	3.248	2.865	3.257	0.00	100.3	0
5	未放电 Undischarged	2.890	3.246	2.890	3.253	0.00	100.2	0
6	未放电 Undischarged	2.869	3.245	2.869	3.251	0.00	100.2	0
7	未放电 Undischarged	2.872	3.245	2.872	3.253	0.00	100.2	0
8	未放电 Undischarged	2.870	3.245	2.870	3.254	0.00	100.3	0
9	未放电 Undischarged	2.877	3.250	2.877	3.259	0.00	100.3	0
10	未放电 Undischarged	2.867	3.246	2.868	3.254	0.00	100.2	0
11	完全放电 Fully Discharged	2.868	—	2.868	—	0.00	—	0
12	完全放电 Fully Discharged	2.845	—	2.845	—	0.00	—	0
13	完全放电 Fully Discharged	2.899	—	2.899	—	0.00	—	0
14	完全放电 Fully Discharged	2.839	—	2.838	—	0.04	—	0
15	完全放电 Fully Discharged	2.899	—	2.899	—	0.00	—	0
16	完全放电 Fully Discharged	2.878	—	2.877	—	0.03	—	0
17	完全放电 Fully Discharged	2.843	—	2.844	—	0.00	—	0
18	完全放电 Fully Discharged	2.863	—	2.863	—	0.00	—	0
19	完全放电 Fully Discharged	2.880	—	2.879	—	0.03	—	0
20	完全放电 Fully Discharged	2.891	—	2.891	—	0.00	—	0

备注: L-漏液, V-漏气, D-解体, R-破裂, F-起火, 0-无漏液, 无漏气, 无解体, 无破裂, 无起火
Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, 0-No leakage, no venting, no disassembly, no rupture & no fire.

松下电器产业株式会社 检验报告

-----附表5

Panasonic Corporation

No. CP0008-10

Appendix 5

共9页第7页

序号 No.	T-5	检测项目名称 Name of Test Items	外短路试检 External short circuit
样品号码 Sample No.	样品状态 Sample State	样品表面最高温度 Max. External Temperature(°C)	其他现象 Other Event
1	未放电 Undischarged	62.6	0
2	未放电 Undischarged	60.8	0
3	未放电 Undischarged	60.4	0
4	未放电 Undischarged	61.6	0
5	未放电 Undischarged	63.2	0
6	未放电 Undischarged	63.3	0
7	未放电 Undischarged	60.8	0
8	未放电 Undischarged	61.4	0
9	未放电 Undischarged	61.6	0
10	未放电 Undischarged	60.1	0
11	完全放电 Fully Discharged	57.2	0
12	完全放电 Fully Discharged	56.9	0
13	完全放电 Fully Discharged	57.5	0
14	完全放电 Fully Discharged	56.8	0
15	完全放电 Fully Discharged	56.7	0
16	完全放电 Fully Discharged	57.3	0
17	完全放电 Fully Discharged	57.9	0
18	完全放电 Fully Discharged	56.5	0
19	完全放电 Fully Discharged	56.3	0
20	完全放电 Fully Discharged	56.8	0
备注: D-解体, R-破裂, F-起火, 0-无解体, 无破裂, 无起火 Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, 0-No leakage, no venting, no disassembly, no rupture & no fire.			

松下电器产业株式会社
检验报告

-----附表6

Panasonic Corporation

No. CP0008-10

Appendix 6

共9页第8页

[illegible]

松下电器产业株式会社 检验报告

-----附表7

Panasonic Corporation

No. CP0008-10

Appendix 7

共9页第9页

序号 No.	T-8	检测项目名称 Name of Test Items	强制放电试检 Forced Discharge
样品号码 Sample No.	样品状态 Sample State	试检现象 Event	
31	完全放电 Fully Discharged	0	
32	完全放电 Fully Discharged	0	
33	完全放电 Fully Discharged	0	
34	完全放电 Fully Discharged	0	
35	完全放电 Fully Discharged	0	
36	完全放电 Fully Discharged	0	
37	完全放电 Fully Discharged	0	
38	完全放电 Fully Discharged	0	
39	完全放电 Fully Discharged	0	
40	完全放电 Fully Discharged	0	
		</	

松下电器产业株式会社 检验报告

パナソニック株式会社
オートモーティブ & インダストリアルシステムズ株式会社
エナジーデバイス事業部

Panasonic Corporation - Test Report

No .CPC160028-1

共2页第1页

样品名称 Name of Sample	中文 Chinese	锂电池 CR-2032L/BN			
	英文 English	Lithium Battery CR-2032L/BN			
送检单位 Consignor	松下电器产业株式会社 / Panasonic Corporation				
生产单位 Manufacturer	松下电器产业株式会社 / PT. Panasonic Gobel Energy Indonesia				
检验方法 Test Method	联合国《关于危险货物运输的建议书》 UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS"				
判定标准 Criterion	联合国《关于危险货物运输的建议书》 UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS"				
样品外观 Appearance	淡茶颜色直方形纸箱 Cardboard Box of Rectangular Solid of Light Brown				
检测起迄日期 Test Date	2014/11/27	样品编号 Sample No	/		
检测项目 Test Items	1.2米跌落试验、包装件毛重测试 1.2m Drop Test、Gross Weight Measure				
检验结论 Conclusion	受检样品通过所有项目检测，检测结果合格。 The sample has passed all of the testing items. 签发日期(date):2014年(y)11月(m) 28日(d)				
备注 Remark	/				
受检单位地址 Consignor Address	日本:大阪府守口市松下町1番1号 1-1 Matsushita-cho, Moriguchi City Osaka, Japan		邮政编码 Post Code 570-8511		

批准人职务(the title of approver):

- ☒ 质量保证部长(Director of Quality Assurance)
☐ 质量保证科长(Manager of Quality Assurance)
☐ 质量保证主任工程师(Chief Engineer of QA)

批准 Approver:

J. Chame to

审核 Checker:

Signature

主检 Appraiser:

S. Arita

28. Nov. 2014 No.1

Panasonic Confidential

松下电器产业株式会社

检验报告

Panasonic Corporation - Test Report

No .CPC160028-1

共2页第2页

序号 No	检验项目名称 name of test items	标准要求或标准条款号 standard requirement or the clause number of standard	检测结果 test result		本项结论 test conclusion	备注 remark
1	1.2米 跌落试验 1.2m Drop Test	联合国《关于危险货物运输的建议书规章范本》(15th) (以下简称: 规章范本) (15th) 3.3章188条款 Recommendations on the TRANSPORT OF DANGEROUS GOODS Model Regulations(15th) (for short: UN Model Regulations) SPECIAL PROVISION 188	面跌落	包装未破裂, 内装物完好。 The package is not cracked, and the contents are not damaged and not shifted.	合格 Passed	/
			棱跌落	包装未破裂, 内装物完好。 The package is not cracked, and the contents are not damaged and not shifted.		
			角跌落	包装未破裂, 内装物完好。 The package is not cracked, and the contents are not damaged and not shifted.		
2	包装件 毛重测试 Gross Weight Measure	规章范本 (15th) 3.3章188条款 UN Model Regulations(15th) SPECIAL PROVISION 188	Weight of lbox : 1.5kg(Gross)		合格 Passed	/
检验环境条件 test environment condition		环境温度: 25deg-C Ambient temperature: 25deg-C				
分包检验情况 Subcontracted test condition		检验项目 test item	/			
		分 包 实验室 Subcontracted Laboratory	名称 name	/	邮编 post code	/
			地址 address	/	电话 tel	/

28. Nov. 2014 No.2

Panasonic Confidential

Control
number

02014-4E-007

SPECIFICATION	
LITHIUM BATTERY	
Ordering Code :	CR-2032L/BE
Model Code :	CR2032

Approved by

Division/Department

Name

Title

Signature/date

ISSUED

Apr,4,2014

PT. Panasonic Gobel Energy Indonesia

Date of Issued : Apr,4,2014

PT. Panasonic Gobel Energy Indonesia

Approved	Checked	Drafted
		

Revision history		
No.	Date	Revision
1	Apr,4,2014	Issued
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		

1. Applicable range

This specification applies to manganese dioxide lithium batteries which are delivered from PT. Panasonic Gobel Energy Indonesia

2. Nominal specification

- 2.1. Model code (bare cell) CR2032
- 2.2. Nominal voltage 3V
- 2.3. Nominal capacity 225 mAh
- 2.4. Operation temperature From -30 to 60 °C
(Please consult Panasonic in case continuous high-temperature usage conditions)
- 2.5. Storage Condition Temperature : 5°C to 35°C, Humidity : 45~85%RH
(Recommendable)
- 2.6. Mass Refer to drawing 1
- 2.7. Dimension Refer to drawing 1
- 2.8. Battery composition Lithium primary battery composed of cathode from manganese dioxide anode from lithium and electrolyte from organic solvent and lithium salt. Both cathode and anode outer shells are made of Stainless Steel with Ni plating on surface

3. Battery characteristics

Table 1. CR2032 characteristics

	Items	Test method	Temperature		initial	After 1 year in room temperature
1	Open circuit voltage	Voltage between terminals (Min)	20 +/- 2°C		3.1V	3.1V
2	Internal resistance	1kHz sine wave method (Max.)	20 +/- 2°C		20 Ω	-
3	Discharge duration	Continuous discharge (Std.)	20 +/- 2°C	Load : 15k Ω cut off V : 2.0V	1183h	1133h
		Continuous discharge (Min.)			1041h	1019h

4. Indication

4.1. Below items are indicated on battery or its package

- Model code CR2032
- Nominal voltage 3V
- Plus polarity +
- Manufacturer or its brand : Panasonic
- Production country and Classification Made in Indonesia

(Design of indication can be changed without notice)

4.2. Production date

- Stated on minus side of battery
- First digit: End digit of dominical year; Second digit: Month (October=O, November=Y, December=Z)
- Example : 3Z (December/2013)

4.3. UL

This battery is certificate by UL and listed on file number MH12210

4.4. Production Site

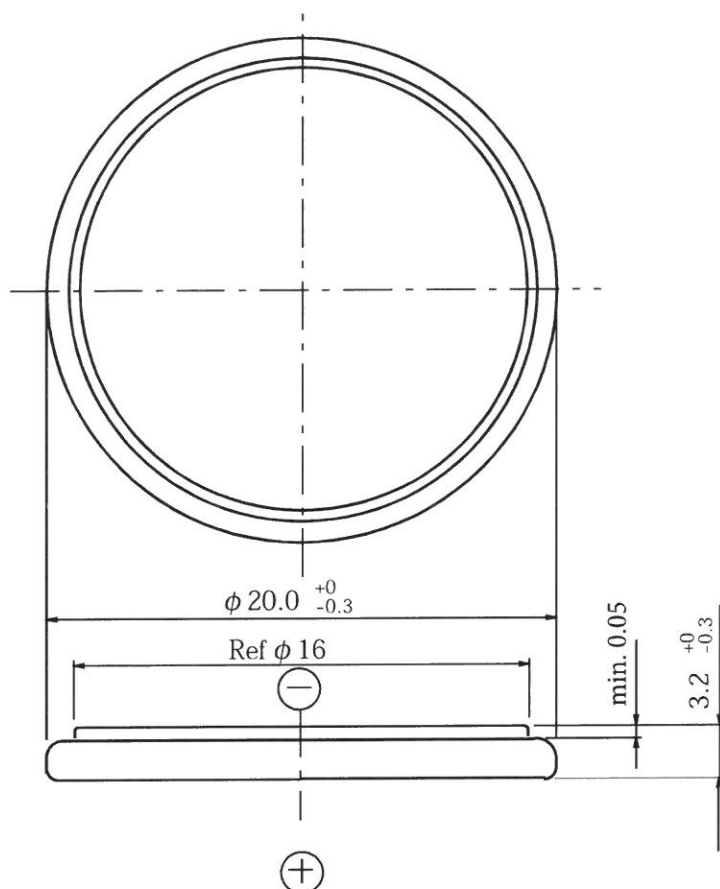
PT. Panasonic Gobel Energy Indonesia, Jl. Teuku Umar Km. 44, Cikarang Barat Bekasi, Jawa Barat Indonesia

4.5. RoHS comply

The battery herein complies with EU battery directive (2006/66/EC). Since the batteries shall comply with EU battery directive (2006/66/EC), RoHS directive does not cover batteries. However, this battery does not use the Six substances restricted by RoHS directive. Therefore, each content of Six restricted substances is less than the maximum amount regulated by RoHS.

Drawing 1. Dimensions

Ordering code : CR2032



Terminal : Plus terminal material : Nickel plated stainless steel
Minus terminal material : Nickel plated stainless steel

Mass : Approx. 2.9 g

5. Test condition and performance

5.1. External dimensions

Measure the battery dimensions with caliper described in item 6.3.(1) herein without making short-circuit.
Dimensions shall be confirmed with drawing 1 herein.

5.2. Open circuit voltage

Measure the open circuit voltage with the voltage meter described in item 6.3.(2) herein after keeping the battery for 2 hours at least in measurement environment. Open circuit voltage shall conform to table 1 herein.

5.3 Internal resistance

Measure the interenal resistance with the resistance meter described in item 6.3.(3) herein after keeping the battery for 2 hours at least in measurement environment. Internal resistance shall conform to table 1 herein.

5.4. Discharge duration

Discharge the battery with the load resistance specified in table 1 herein after keeping the battery in measurement environment for 8 hours at least. The discharge duration is determined as an operation time that the operation voltage reaches to the cut off voltage specified in the table 1 herein.

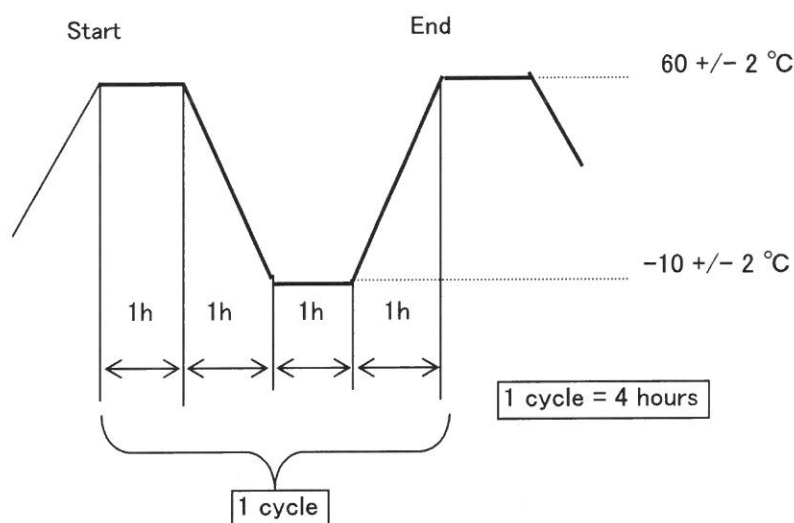
Discharge duration shall conform to table 1 herein.

5.5. Anti-leakage

Appearance check after 42 cycles of thermal cycle by the condition showing below. Battery shall not have deformation or leakage.

* This test shall be started from high temperature (60°C) position.

* No humidifying to ambient temperature and humidity.



5.6. Storage characteristics

(1) Open circuit voltage

After storage term described on table 1 herein, keep the battery for 4 hours at least in measurement environment, then measure the open circuit voltage with the voltage meter described in item 6.3.(2) herein.
Open circuit voltage shall conform to table 1 herein.

(2) Internal resistance

After storage term described on table 1 herein, keep the battery for 4 hours at least in measurement environment, then measure the internal resistance with the resistance meter described in item 6.3.(3) herein. Internal resistance shall conform to table 1

(3) Discharge duration

After storage term described on table 1 herein, keep the battery for 8 hours at least in measurement environment, then discharge the battery with the load resistance specified in table 1 herein. The discharge duration is determined as an operation time that the operation voltage reaches to the cut off voltage specified in the table 1 herein.
Discharge duration shall conform to values described in table 1 herein.

5.7. Appearance

No deformation, bruise and stain which cause practical interference.

6. Test conditions

- 6.1. Initial test Initial test must be started within 2 months from delivery.
- 6.2. Temperature and humidity Unless otherwise specified, test should be carried out in room temperature (20 $\pm$ 15 $^{\circ}$ C) and room humidity (65 $\pm$ 20%RH).

6.3. Measuring equipment's

(1) Dimension

Micrometer defined by JIS B7502 or equivalent or more accurate one must be used for dimension measurement.

For one digit decimals tolerance, caliper with 0.05mm accuracy which is defined JIS B7507 or higher accuracy equipment must be used.

(2) Voltage

Voltage meter defined by JIS C1102 class 0.2 or higher, and more than 10Mohm impedance must be used.

(3) Internal resistance

It should be measured by sinusoidal current method (1kHz). Measurement should be finished within 5 seconds.

(As a general rule, Agilent Technologies LCRmeter 4263B or equivalent should be used.)

(4) Load resistance includes all resistance of discharge circuit, and its tolerance shall be less than 0.5%.

(5) Appearance check is observed by visual evaluation.

7. Revision and modification of this specification

Revision and modification must be carried out after the prior mutual agreement.

All accidents or issues caused by any events that are neither defined nor described in this specification, mutual discussion shall take place for the resolution.

8. Important Notes (Warranty)

- 1) The batteries are warranted to conform to the description contained in this specifications for a period of twelve [12] months from the ex-factory date and any claim by customer (apparatus manufacturer or distributor) 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.
- 2) Confirm and assure the matching and reliability of batteries on actual set or unit application with customer's responsibility.
- 3) Panasonic shall not warrant or be responsible in any case where customer fails to carry out proper handling, operating, installation, testing, service and checkout of the batteries and/or to follow the instruction, cautions, warnings, notes provided in this specifications, or other Panasonic's reasonable instructions or advise.
- 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.
- 5) This product specification will be validated assuming that it is accepted when it is not returned within six months from the date of issue.

9. Precautions for use

9.1 Cautions for storage

- Store the battery at a constant temperature of 35 degree C or less in order to prevent deteriorations from heat.
- Keep the battery away from high humidity such as 85% RH or higher in order to prevent dew condensations on the battery that may cause to electrical leakage,
- Keep the battery away from heat sources i.e., boiler, radiator and etc., and from direct sunlight.

9.2 Warning for safety

Following cautions should be taken into consideration in order to use this battery in safe, since the battery contains combustible materials such as Lithium metal and organic electrolyte.

- Do not use except in applicable model or equipment.
- Do not mix fresh and used batteries.
- Do not mix different types (chemistries) of batteries.
- Do not short circuit.
- Do not charge.
- If multiple batteries are kept in contact with each other. The (+) and (-) terminals may short-circuit, and/or the charging possibly happen by other adjacent batteries, which may cause of shorten service life, significant damages and catching fire.
- Do not dispose into fire.
- Do not heat up higher than 100°C.
- Do not solder direct to battery.
- Do not disassemble.
- Do not soak in water.
- Do not deform.
- Do not apply inadequacy modifications or remodeling on the batteries.
- Insert the batteries in the correct polarity position.

Warning for prevention of ingestion accident

- Small-sized batteries can easily be swallowed. They must be kept out of the reach of small children.
- Also, in the design of equipment using batteries, the care should be taken to ensure that batteries are NOT easy removable for children.

9.3 Caution for better usage

- Use gold-plated or nickel-plated steel or stainless steel strips for terminals in order to keep good conductivity with the battery surface. Terminals made of gold-plated phosphor bronze will ensure stable conductivity.
- Apply and keep the contact pressure more than 2N for stable conductivity.
- Before inserting batteries, check the terminal contact surfaces on both the equipment and the batteries are clean, and also check that they are not deformed. If the contact surfaces are dirty, clean up and dry them thoroughly before inserting batteries.
- Even if batteries of the same size or same shape, they may differ in type or grade. When replacing batteries, confirm that they are correct type by checking the identification symbol (designated by I.E.C. standards) which is marked on the battery and its packages.
- Lithium primary batteries continuously indicate high voltage even toward the end of their service life. As such, they may be mistakenly judged as yet being strong. In case of multiple batteries are used in an application or equipment, all batteries should be replaced at the same time when the one of those batteries shows it has totally consumed even other batteries seems still operating, since the remaining capacity in other batteries must be also quite little at the time.
- When multiple batteries are used in series in applications or equipments, it may occur that the one battery has a polarity inversion at the end of operation life. That behavior happen when the battery had consumed its capacity earlier than other batteries. Therefore, that is not failure of battery.
- When the Lithium battery has short-circuit, even slightly. A certain amount of time is required for recovering its voltage completely. If the electrical characteristics of the battery are

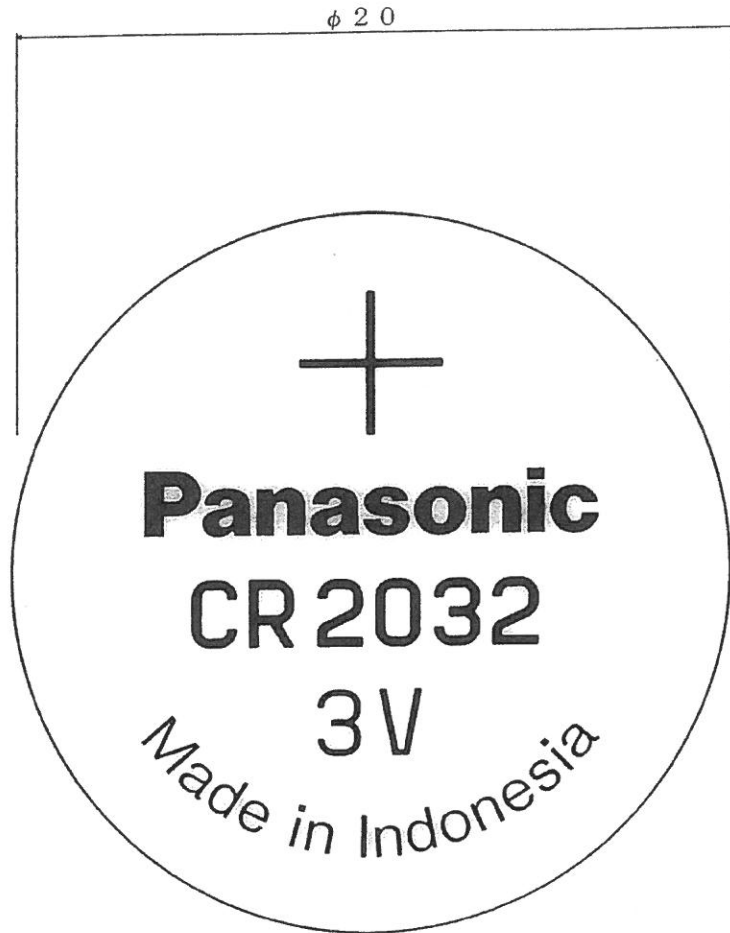
measured at a time before a sufficient time has passed, it may indicate unstable values due to the battery was in recovering mode.

- If the battery touch with any antistatic conductive materials include packing bags, trays, mats, sheets, films and resin cases, sheets, for example, have a resistance of 10^3 to $10^6 \Omega$, it may cause of short-circuit since both the positive and the negative terminal of the battery may contact with those materials. In order to prevent short circuit, special attention may apply when handle batteries or battery attached PCB in close to those materials.

Notice for equipment design

- Keep batteries away from heat source or flame, and water.
- Please contact us in case of using multiple batteries.

Case Marking		13-323-10-03 (I)
MODLE NUMBER	LITHIUM BATTERY Panasonic Brand CR2032	
		SCALE 5 : 1



1/1

3		
2		
1	SEP-21-2005	INDONESIA ⇒ Made in Indonesia
Sym.	Date of Revision	Remarks
Date of stigation : APR - 4 - 2001		Described by 2006.3.21 <i>J. T. M. P. R. S.</i>
(Ring less type)		Checked by /
		Approved by <i>A. Amari</i>

Packaging specification

Product No. : CR-2032L/BE

Drawing No.

232-BC-86

*

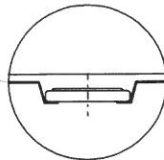
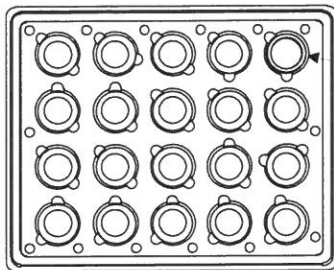
Product name : Lithium battery

SPEC : Tray for 20pcs. × Shrink Packing for 200pcs. × Outer Carton for 4000pcs.

1-Product

Refer to the product drawing

2-Tray for 20pcs.

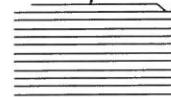


Arrange cells negative side up

× 10

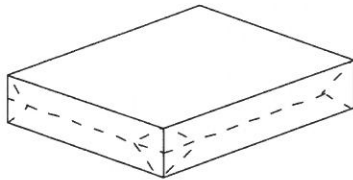


Empty tray as lid
(φ 20 type) 1pc.



10-stack piling

3-Shrink Packing for 200pcs.



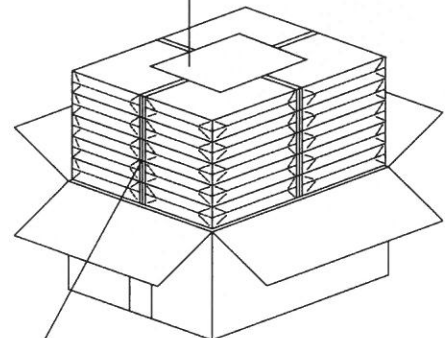
× 20



Alignment

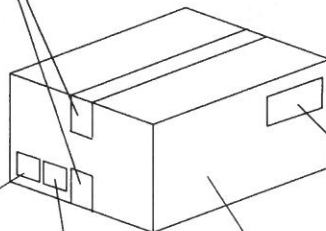
Product No.
Panasonic BRAND
200pcs. × 20
xxxx

Date of shrink packing
(4-digit)



4-Outer Carton for 4000pcs.

PP Tape (50mm)



VTCP Mark

"UL Mark"



"Dustbin Mark"



Case Mark

PT. Panasonic Gobel Energy Indonesia

Packing List

Dimension	: 295 × 360 × 237mm
M3	: 0.0251m ³
Net	: 11.6kg 2.9g/1pc.
Gross	: 13.5kg

unit: mm

Panasonic Corporation

S P E C I F I C A T I O N	
Precautions for Use	
Please pay attention to the following points in order to maintain satisfactory operating conditions. * Use nickel plated(steel or stainless steel) for power terminal contacts. * To ensure stable contact, the contact pressure for power terminals must be at 20 to 10 N * When measuring battery voltage, use a meter with an internal resistance of 1 MΩ or greater. Correct voltage measurements cannot be obtained otherwise. * Batteries are extremely sensitive to the adverse effects of humidity. Be sure to store them in a place which is dry and subject to little temperature change. * Do not place near the boiler or radiator, nor expose to the direct sunlight. * If button-type batteries are kept in contact with each other, the (+) and (-) terminals may short-circuit, greatly shortening their serviceable life. * Button-type batteries may expand slightly during use. Therefore, sufficient space must be provided for this expansion when designing equipment. * Before inserting batteries, check to confirm that the terminal contact surfaces on both the equipment and the batteries are clean and that they are not deformed. If the contact surfaces are dirty, clean and dry them thoroughly before inserting batteries. * Batteries of the same size and shape may differ in type and grade. When exchanging batteries, confirm that they are the correct type by checking the identification symbol (designated by I.E.C. standards) provided on the battery. * Lithium primary batteries continue to register high voltage even toward the end of their serviceable life. As such, they may be mistakenly judged as yet being strong. If one of several batteries being used in a set is found to be exhausted, it can be assumed that there is very little life remaining in the others even though they may continue to register high voltage. It is therefore advisable to exchange all of the batteries at the same time. * The direction of polarity in a battery may reverse as it nears the end of its serviceable life. This occurs when it is the first among several batteries being used in a set to be exhausted. It is not due to an abnormality in the battery itself. * When a lithium battery is short-circuited, even slightly, a certain amount of time is required for its voltage output to recover completely. If the electrical characteristics of the battery are measured before a sufficient amount of time has passed, the battery may appear to be malfunctioning when actually it is merely in a state of recovery. The batteries should be used correctly, otherwise the set may be damaged due to leakage trouble. Therefore, keep the following precautions in mind. * Do not charge, short-circuit, disassemble, heat or dispose the batteries in fire. * Insert the batteries in correct polarity position. * Do not directly solder to batteries. * Do not use spent batteries with new ones. Small-sized batteries can easily be swallowed. They must be kept out of the reach of small children. Also, in the design of battery powered equipment, Care should be taken to ensure that batteries cannot be easily removed by children.	
3	
2	
1	
Sym.	Date of Revision
Date of stipulation	Stipulated
May . 4. 1984	Described
	<i>H. Hattori</i>

Battery Safety Practices

Avoiding hazards in lithium battery handling



Warning

Mishandling batteries can cause battery leakage, heat generation, rupture, ignition etc., that can lead to possible fire or injury.

Both of coin type and cylinder type of lithium batteries contain flammable materials such as lithium, organic solvent and other chemical ingredients. Improper handling of lithium batteries may result in heat generation, fire or explosion, with a risk of personal injury or damage. To prevent these accidents in battery handling, be sure to observe the following precautions.

1. Do not Short circuit

Direct connection of plus(+) and minus(-) poles may result in leakage, heat generation, explosion and/or fire.

Do not store and/or carry batteries with metallic product such as necklace. (Refer fig.1)

Fig. 1 Short circuit

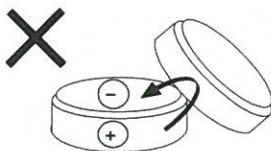


Fig. 2 stacked & jumble batteries



2. Do not stack and/or jumble batteries

Stacked and/or jumbled batteries may cause short circuit and/or forced discharge by the contact of other batteries. This may result in leakage, heat generation, explosion and/or fire.

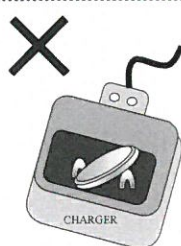
Especially, a connection with the 006P(9V) type batteries may have a high risk of leakage, heat generation, explosion and/or fire.

(Refer fig.2 & 3)

3. Do not make forced discharge batteries

Forced discharge by external power source, the battery voltage goes to negative and this cause gas generation in inside of the battery. This may result in leakage, heat generation, explosion and/or fire.

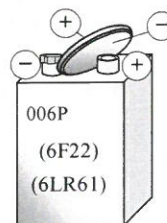
(Refer fig.3)



Connection with battery charger

DANGER!

Fig. 3
Examples of forced discharge



* In your disposal and/or storage of the batteries, please isolate plus and minus poles by adhesive tape. A connection with other metals and/or batteries may result in leakage, heat generation, explosion and/or fire.

* When using the stored battery, please remove the tape perfectly to avoid high contact resistance problem. (Refer fig.4)

4. Do not dispose of batteries in fire

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

5. Do not heat batteries

Heating batteries above 100°C (212°F) may damage the resin in crimping, separator and other parts, causing electrolyte leak, internal short circuit, fire and explosion.

6. Do not solder directly onto batteries

Direct soldering onto batteries may damage the resin in crimping, separator and other parts, causing electrolyte leak, internal short circuit, fire and explosion.

7. Do not charge batteries

Charging of primary batteries may result internal gas generation, causing electrolyte leak, battery swelling, fire and explosion.

8. Do not disassemble batteries

Disassembly batteries may cause gas generation that may irritate your throat. Lithium may also react with moisture to generate heat and fire.

9. Do not deform batteries

Applying extreme pressure to batteries may cause deformation of the crimping and internal short circuit, causing electrolyte leak, battery swelling, fire and explosion.

10. Do not mix different type batteries

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

11. Do not insert batteries with opposite polarity

For some applications, battery insertion with opposite polarity (reverse insertion of plus and minus) may result in leakage, heat generation, explosion and/or fire.

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.

Beware of Antistatic Conductive Materials

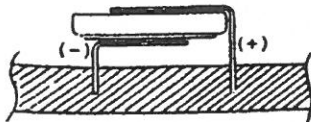
Whenever terminal-mounted backup batteries or coin-type lithium batteries contact conductive materials, they discharge. Measures to protect semiconductor parts from static damage have been implemented in plants that use such ICs and LSIs. A number of protective materials are presently being used, and all contain blends of carbon, aluminum and other metals that make them conduct.

Antistatic conductive materials include packing bags, trays, mats, sheets, film and resin cases. Sheets, for example, have a resistance of 10^3 to $10^6 \Omega$, which means that when they contact the positive and negative terminals of a battery, they will discharge the battery.

In a lithium battery, a current flow of several μA to several mA reduces its voltage and electrical capacity. We recommend constant attention when using batteries around protective materials.

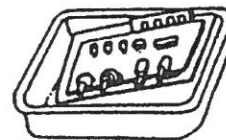
Examples

A terminal-mounted battery with its terminals inserted into a conductive mat is completely discharged after several days.



Conductive mat

A PCB-mounted battery is completely discharged by contact with the conductive resin case.

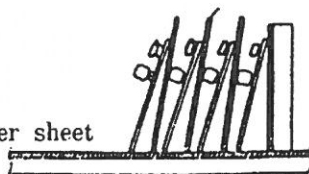


Conductive resin case

PCB-mounted batteries are discharged by contact with spacers and conductive rubber sheets.

Spacer

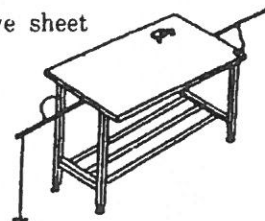
Conductive rubber sheet



Batteries left on a work bench with positive and negative terminals in direct contact with the grounded rubber sheet cover are completely discharged.

Ground wire

Conductive sheet



For more information, please make contact with your local dealer.

Preventing Accidental Memory Erasure

Coin-type Lithium batteries are widely used for memory backup purposes. However, there have been an increasing number of cases of accidental memory erasure due to inadequate battery contact.

To prevent unexpected memory erasure, consider the following tips for proper use.

<Long-term Continuous Battery Use>

- Use a battery with solderable tab terminals, so that the battery can be permanently soldered to terminal pads on the circuit board (Fig. 1).
- If the battery requires periodic replacement, use a battery holder (Fig. 2) or a battery with in-line lead connectors (Fig. 3).

The battery holder can be adjusted to suit any Panasonic lithium battery (Fig. 2).

<Batteries Requiring Short-Term Periodic Replacement --- Using batteries without solderable tab terminals or lead connectors>

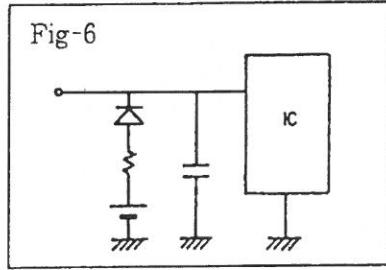
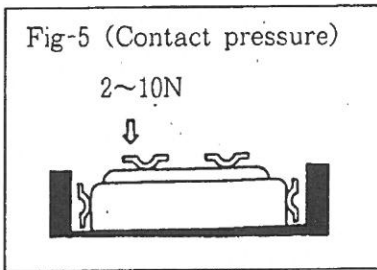
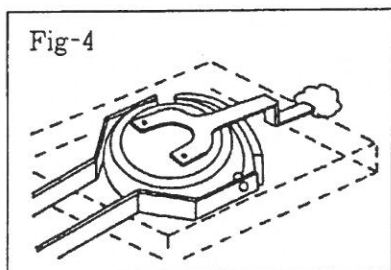
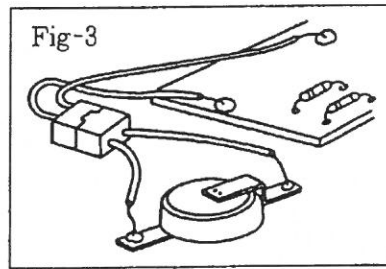
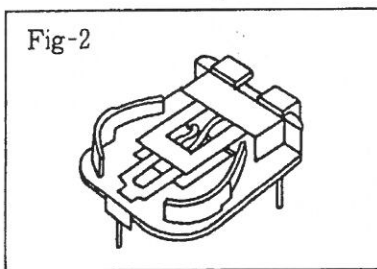
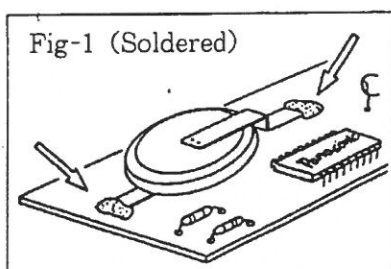
- Use gold- or nickel-plated steel or stainless-steel strips for battery terminal contacts. Terminals made of gold-plated phosphor bronze will ensure contact with long-term stability.
- Y-shaped terminals (double contacts) for both the anode and cathode offer very stable contact (Fig. 4).

Each contact on the Y-shaped terminals requires a minimum contact pressure of 2-10N {approximately 200~1000gf} (Fig. 5).

- To guard against momentary contact failures of a few milliseconds in duration, use the tantalum capacitor-diode-resistor circuit shown in Fig. 6.

* Do not touch the contact surfaces of the battery with bare hands, as this will increase the contact resistance and impair proper contact.

Figures 1 through 6 show examples of how to ensure proper battery contact.



For more information, please make contact with your local dealer.