

Panasonic

OEM Batteries Short Form Catalog & CD ROM



A leading supplier of primary and secondary batteries, Panasonic satisfies the many needs of the market with one of the broadest lines of battery products in the industry. Panasonic OEM Batteries is part of Panasonic Corporation of North America (PNA) and is the distribution arm of both Panasonic Battery Corporation of America (PBA), which oversees all North American battery manufacturing operations, and Matsushita Battery Industrial Company, Ltd. (MBI) of Japan.

Panasonic is one of the world's leading full-range battery research and manufacturing companies with 25 factories in 16 countries, including four in North America.

Consistent research and development activities, state-of-the-art production technology, and very strict

quality control provides a complete technological base for Panasonic. Batteries play an increasingly important role in many different applications—by ensuring exceptional quality through every step of the production process, Panasonic helps guarantee customers satisfaction with battery performance in those applications.

This Short Form catalog is designed to give you a quick overview of the battery products we offer to the North American market. Please refer to the Technical Handbook (available in PDF on CD-ROM) on each chemistry for complete technical specifications, precautions and usage guidelines or download the latest information from our web site.

www.panasonic.com/batteries

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For more detailed information or technical assistance, contact us via one of the following methods:

TOLL FREE: 1-877-726-2228 (1-877-PANABAT)

E-MAIL: oembatteries@us.panasonic.com INTERNET: www.panasonic.com/batteries

Lithium Ion Batteries

GENERAL DESCRIPTION

Panasonic rechargeable lithium ion batteries feature high energy density, high capacity, light weight and high power in both cylindrical and prismatic styles.

Panasonic lithium ion batteries provide up to 3.6V per cell, so fewer batteries are required to power an application compared to conventional nickel cadmium and nickel metal hydride batteries.

Notice to readers: In order to ensure the use of properly designed safety circuits with Lithium ion battery packs, Panasonic lithium ion cells are not sold as "off the shelf" products and can only be assembled into packs by authorized pack assembly centers that have been approved for Lithium ion pack design and assembly.

All Panasonic Lithium Ion batteries are covered by the Rechargeable Battery Recycling Corporation's (RBRC) recycling program. *Charge up to recycle!* www.rbrc.org

FEATURES

- High energy density
- High capacity
- Light weight
- Over 500 cycles

APPLICATIONS

- Digital cameras
- Cellular phones
- Notebook PC's
- Portable devices



CYLINDRICAL TYPE

Model Number*	Nominal Voltage (V)	Typical ¹ Capacity (mAh)	Dimensions		Weight oz. (g)
			Diameter inch (mm)	Height inch (mm)	
CGR17360	3.6	730	0.67 ^{+0.03} (16.9 ^{+0.7})	1.42 ^{+0.04} (36.0 ^{+1.0})	0.69 (19.5)
CGR17500	3.6	830	0.67 ^{+0.03} (16.9 ^{+0.7})	1.95 ^{+0.04} (49.6 ^{+1.0})	0.88 (25)
CGR18500	3.6	1500	0.73 ^{+0.03} (18.6 ^{+0.7})	1.97 ^{+0.04} (50.0 ^{+1.0})	1.16 (33)
CGR18650AF	3.6	2050	0.73 ^{+0.03} (18.6 ^{+0.7})	2.57 ^{+0.04} (65.2 ^{+1.0})	1.57 (44.5)
CGR18650C	3.6	2150	0.73 ^{+0.03} (18.6 ^{+0.7})	2.57 ^{+0.04} (65.2 ^{+1.0})	1.57 (44.5)
CGR18650CF	3.6	2250	0.73 ^{+0.03} (18.6 ^{+0.7})	2.57 ^{+0.04} (65.2 ^{+1.0})	1.59 (45)
CGR18650D	3.6	2350	0.73 ^{+0.03} (18.6 ^{+0.7})	2.57 ^{+0.04} (65.2 ^{+1.0})	1.59 (45)

PRISMATIC TYPE - ALUMINUM CASE

Model Number*	Nominal Voltage (V)	Typical ¹ Capacity (mAh)	Dimensions			Weight oz. (g)
			Width inch (mm)	Height inch (mm)	Thickness ² inch (mm)	
CGA523436B ³	3.6	760	1.34 ^{+0.02} (34.0 ^{+0.6})	1.42 ^{+0.04} (36.0 ^{+1.0})	0.20 ^{+0.02} (5.2 ^{+0.6})	0.53 (15)
CGA523450C ³	3.6	1030	1.34 ^{+0.2} (34.0 ^{+0.6})	1.97 ^{+0.04} (50.0 ^{+1.0})	0.21 ^{+0.02} (5.25 ^{+0.6})	0.71 (20)
CGA633450B	3.6	1200	1.34 ^{+0.02} (34.0 ^{+0.6})	1.97 ^{+0.04} (50.0 ^{+1.0})	0.25 ^{+0.02} (6.35 ^{+0.6})	0.85 (24)
CGA103450A	3.6	1950	1.34 ^{+0.02} (34.0 ^{+0.6})	1.97 ^{+0.04} (50.0 ^{+1.0})	0.41 ^{+0.02} (10.5 ^{+0.6})	1.38 (39)

1. 4.2V charge.

2. Thickness at time of shipment.

3. CGA523436B, CGA523450C are not intended for use in multi-cell packs. For use in single cell packs only.

*Model numbers may change due to capacity upgrades. Check website for most recent information and specifications on Lithium Ion cells.

Nickel Metal Hydride Batteries



GENERAL DESCRIPTION

Panasonic Nickel-Metal Hydride batteries were developed to meet the requirement for increasingly higher levels of energy demanded by today's electronic products. Our Nickel-Metal Hydride batteries can offer up to three times the capacity of the same size standard Nickel Cadmium batteries. Due to their increased capacity and energy density features, users can expect a longer time between charges and longer running time.

All Panasonic Nickel Metal Hydride batteries are covered by the Rechargeable Battery Recycling Corporation's (RBRC) recycling program. *Charge up to recycle! www.rbrc.org*



FEATURES

- High energy density
- Rapid charge
- Excellent cycle life
- Excellent discharge characteristics

APPLICATIONS

- Cellular mobile telecom products
 - PDAs
 - Portable audio players
 - Power tools
 - R/C hobby
 - Digital cameras
- Applications where high-energy and small size are critical*

CYLINDRICAL TYPE

Model Number	Size	Nominal Voltage (V)	Discharge Capacity ⁵		Rapid Charge		Dimensions		Approximate Weight oz.(g)
			Average ⁴ (mAh)	Minimum (mAh)	Current (mA)	Hours (h)	Diameter inch (mm)	Height inch (mm)	
HHR60AAA ¹	AAA	1.2	550	500	250	2.4	0.41 ^{+0.03} (10.5 ^{+0.7})	1.75 ^{+0.04} (44.5 ^{+1.0})	0.42 (12)
HHR70AAA ¹	AAA	1.2	720	700	650	1.2	0.41 ^{+0.03} (10.5 ^{+0.7})	1.75 ^{+0.04} (44.5 ^{+1.0})	0.46 (13)
HHR75AAA/B	AAA	1.2	730	700	450	1.7	0.41 ^{+0.03} (10.5 ^{+0.7})	1.75 ^{+0.04} (44.5 ^{+1.0})	0.42 (12)
HHR120AA	4/5AA	1.2	1220	1150	1200	1.2	0.57 ^{+0.03} (14.5 ^{+0.7})	1.69 ^{+0.04} (43.0 ^{+1.0})	0.81 (23)
HHR150AA	AA	1.2	1580	1500	1500	1.2	0.57 ^{+0.03} (14.5 ^{+0.7})	1.97 ^{+0.04} (50.0 ^{+1.5})	0.92 (26)
HHR210AA/B	AA	1.2	2080	2000	1200	2.0	0.57 ^{+0.03} (14.5 ^{+0.7})	1.99 ^{+0.05} (50.5 ^{+1.0})	1.02 (29)
HHR200A	4/5A	1.2	2040	2000	2000	1.2	0.67 ^{+0.03} (17.0 ^{+0.7})	1.69 ^{+0.06} (43.0 ^{+1.5})	1.13 (32)
HHR210A	A	1.2	2200	2100	2100	1.2	0.67 ^{+0.03} (17.0 ^{+0.7})	1.97 ^{+0.06} (50.0 ^{+1.5})	1.34 (38)
HHR210AH ¹	A	1.2	2050	1900	---	---	0.67 ^{+0.03} (17.0 ^{+0.7})	1.97 ^{+0.06} (50.0 ^{+1.5})	1.34 (38)
HHR380A ²	L-A	1.2	3800	3700	2000	2.3	0.67 ^{+0.03} (17.0 ^{+0.7})	2.64 ^{+0.06} (67.0 ^{+1.5})	1.87 (53)
HHR330APH	18670 (L-Fat-A)	1.2	3300	3200	1650	2.4	0.72 ^{+0.03} (18.2 ^{+0.7})	2.64 ^{+0.06} (67.0 ^{+1.5})	2.12 (60)
HHR370AH ¹	18670 (L-Fat-A)	1.2	3700	3500	---	---	0.72 ^{+0.03} (18.2 ^{+0.7})	2.64 ^{+0.06} (67.0 ^{+1.5})	2.12 (60)
HHR450A ²	18670 (L-Fat-A)	1.2	4500	4200	2000	2.7	0.72 ^{+0.03} (18.2 ^{+0.7})	2.64 ^{+0.06} (67.0 ^{+1.5})	2.12 (60)
HHR200SCP ³	4/5SC	1.2	2100	1900	2000	1.2	0.91 ^{+0.04} (23.0 ^{+1.0})	1.34 ^{+0.06} (34.0 ^{+1.5})	1.50 (42)
HHR250SCH ¹	SC	1.2	2650	2500	1250	2.4	0.91 ^{+0.04} (23.0 ^{+1.0})	1.69 ^{+0.06} (43.0 ^{+1.5})	1.94 (55)
HHR260SCP ³	SC	1.2	2600	2450	2600	1.2	0.91 ^{+0.04} (23.0 ^{+1.0})	1.69 ^{+0.06} (43.0 ^{+1.5})	1.94 (55)
HHR300SCP ³	SC	1.2	3050	2800	3000	1.2	0.91 ^{+0.04} (23.0 ^{+1.0})	1.69 ^{+0.06} (43.0 ^{+1.5})	2.01 (57)
HHR300CH ¹	C	1.2	3300	3100	1500	2.4	1.02 ^{+0.04} (25.8 ^{+1.0})	1.97 ^{+0.06} (50.0 ^{+1.5})	2.82 (80)
HHR650D ³	D	1.2	6800	6500	6500	1.2	1.30 ^{+0.04} (33.0 ^{+1.0})	2.40 ^{+0.08} (61.0 ^{+1.5})	6.0 (170)
HHR900D	D	1.2	9000	8250	4500	2.4	1.30 ^{+0.04} (33.0 ^{+1.0})	2.40 ^{+0.08} (61.0 ^{+1.5})	6.0 (170)

1. H Type: Improved low rate charge characteristics at higher temperatures. Ideal for back-up applications (with appropriate charge control circuitry).

2. Mainly for PC applications.

3. Mainly for high drain applications such as power tools.

4. For reference only.

5. After charging at 0.1It for 16 hours, discharging at 0.2It

Note: /B=extended positive terminal (button top).

Nickel Cadmium Batteries

GENERAL DESCRIPTION

Panasonic rechargeable nickel-cadmium batteries feature the performance, high power, and reliability needed for today's high technology equipment. This ranges from audio visual and communications equipment to motorized devices and hobby equipment. These advanced cells make an important contribution to the practicality of designing small, multi-functional products.

All Panasonic Nickel Cadmium batteries are covered by the Rechargeable Battery Recycling Corporation's (RBRC) recycling program. *Charge Up to Recycle!* www.rbrc.org



APPLICATIONS

- Power tools
- Data collection terminals
- R/C hobby
- 2-way radios
- Cordless phones
- Portable printers
- Portable TVs, CD and tape players
- Shavers
- Cordless vacuum cleaners
- Emergency lights & exit signs

TYPES AND FEATURES

- **High Capacity "S" Type:**
Increased capacity to meet the needs of today's high-tech devices.
- **Rapid charge "R" Type:**
Can be charged at a current of 1CmA making rapid charge in 1 hour possible.
- **High Rate Discharge and Rapid Charge "P" Type:**
Combined with "R" Type rapid charge characteristics and advances in the electrode plate technologies to improve the 10-CmA discharge characteristics.

NICKEL CADMIUM BATTERIES

Model Number	Type	Nominal Voltage (V)	Discharge Capacity ¹		Dimensions (with tube)		Approximate weight oz (g)	Size
			Average ² Capacity (mAh)	Minimum Capacity (mAh)	Diameter inch (mm)	Height inch (mm)		
P-100AASJ/B	S	1.2	1080	1000	0.57 ^{-0.03} (14.5 ^{-0.7})	1.97 ^{-0.04} (50.0 ^{-1.0})	0.81(23)	AA
P-100AASJ/FT	S	1.2	1080	1000	0.57 ^{-0.03} (14.5 ^{-0.7})	1.97 ^{-0.04} (50.0 ^{-1.0})	0.81(23)	AA
P-120AS	S	1.2	1280	1200	0.67 ^{-0.03} (17.0 ^{-0.7})	1.69 ^{-0.06} (43.0 ^{-1.5})	0.92(26)	4/5A
P-120SCJS	R	1.2	1300	1200	0.91 ^{-0.04} (23.0 ^{-1.0})	1.34 ^{-0.06} (34.0 ^{-1.5})	1.31(37)	4/5SC
P-130SCS	R	1.2	1450	1300	0.91 ^{-0.04} (23.0 ^{-1.0})	1.69 ^{-0.06} (43.0 ^{-1.5})	1.55(44)	SC
P-140AS	S	1.2	1530	1400	0.67 ^{-0.03} (17.0 ^{-0.7})	1.97 ^{-0.06} (50.0 ^{-1.5})	1.13(32)	A
P-150SCS	R	1.2	1600	1500	0.91 ^{-0.04} (23.0 ^{-1.0})	1.69 ^{-0.06} (43.0 ^{-1.5})	1.55(44)	SC
P-170SCS	P	1.2	1800	1700	0.91 ^{-0.04} (23.0 ^{-1.0})	1.69 ^{-0.06} (43.0 ^{-1.5})	1.69(48)	SC
P-200SCS	P	1.2	2100	2000	0.91 ^{-0.04} (23.0 ^{-1.0})	1.69 ^{-0.06} (43.0 ^{-1.5})	1.80(51)	SC

1. 0.2It discharge capacity after charging at 0.1It for 16 hours.

2. For reference only.

Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = (Ah)/1h.

• [It] is the reference test current in amperes.

• [Cn] is the rated capacity of the cell or battery in Ampere-hours.

n = the time base [hours] for which the rated capacity is declared.

Note: /B=extended positive terminal (button top).

Valve Regulated Lead Acid Batteries*



FEATURES

- High quality and reliability
- Exceptional deep discharge recovery
- No corrosive gas generation
- Long service life
- Quick chargeability
- High power density
- Maintenance-free operation

APPLICATIONS

- UPS (uninterruptible power supplies)
- Emergency lighting
- Wheelchairs
- Telecom back-up power supplies
- Lawn and garden tools
- Engine starters

GENERAL DESCRIPTION

Panasonic's tough valve regulated lead acid (VRLA) rechargeable batteries are designed to provide outstanding performance in withstanding over-charge, overdischarge, and resisting vibration and shock. Compact, these batteries save installation space while providing full and reliable power. The use of special sealing epoxies, tongue and groove case construction, long-sealing paths for posts and connectors assures that the battery will offer exceptional leak resistance.

Panasonic VRLA batteries utilize pasted lead-calcium plates with the electrolyte in the battery held captive in an Absorbent Glass Mat (AGM) separator located between the plates that immobilizes the electrolyte in the cell. AGM separator material is a highly porous, absorbent micro fiberglass-mat mixed with polymer fibers that immobilizes the electrolyte and creates a situation where a spill of electrolyte is highly unlikely.

Panasonic Valve Regulated Lead Acid batteries (weighing less than 2 lbs) are covered by the Rechargeable Battery Recycling Corporation's (RBRC) recycling program. *Charge up to recycle!* www.rbrc.org. For larger batteries call 1-800-SAV-LEAD.



*Previously referred to as "Sealed Lead Acid" batteries.

BACK-UP AND MAIN POWER SUPPLIES (CYCLE AND TRICKLE USE)										
Model Number*	Nominal Voltage (V)	Rated capacity 20 hours rate (Ah)	Outline dimensions inch (mm)				Wt. (Approx.) lbs (kg)	Terminal Types	Battery-case resin	
			Length	Width	Height	Total height			UL94HB	UL94V-0
LC-R061R3P (LC-R6V1.3P)	6	1.3	3.82 (97)	0.95 (24)	1.97 (50)	2.17 (55)	0.66 (0.30)	B	○	
LC-R063R4P	6	3.4	5.28 (134)	1.34 (34)	2.36 (60)	2.6 (66)	1.37 (0.62)	B	○	
LC-R064R5P	6	4.5	2.76 (70)	1.89 (48)	4.02 (102)	4.26 (108)	1.72 (0.78)	B	○	
LC-R067R2P(a) (LC-R6V7.2P)	6	7.2	5.95 (151)	1.34 (34)	3.70 (94)	3.94 (100)	2.78 (1.26)	B/C	○	
LC-R0612P(a) (LC-R6V12P)	6	12.0	5.95 (151)	1.97 (50)	3.70 (94)	3.94 (100)	4.30 (1.95)	B/C	○	
LC-R121R3P (LC-R12V1.3P)	12	1.3	3.82 (97)	1.87 (48)	1.97 (50)	2.17 (55)	1.30 (0.59)	B	○	
LC-R122R2P	12	2.2	6.97 (177)	1.34 (34)	2.36 (60)	2.6 (66)	1.76 (0.80)	B	○	
LC-R123R4P	12	3.4	5.28 (134)	2.64 (67)	2.36 (60)	2.6 (66)	2.65 (1.20)	B	○	
LC-R127R2P(a) (LC-R12V7.2P)	12	7.2	5.95 (151)	2.54 (64.5)	3.70 (94)	3.94 (100)	5.45 (2.47)	B/C	○	
LC-RA1212P(a) (LC-R1212P)	12	12.0	5.95 (151)	3.86 (98)	3.70 (94)	3.94 (100)	8.36 (3.80)	B/C	○	
LC-RD1217P (LC-R12V17P)	12	17.0	7.13 (181)	2.99 (76)	6.58 (167)	6.58 (167)	14.34 (6.50)	D	○	
LC-R1233P (LC-LA1233)	12	33.0	7.70 (195.6)	5.12 (130)	6.10 (155)	7.09 (180)	26.50 (12.0)	E	○	●

* Previous model number is given in parentheses

(a) Add applicable codes for terminal type: P = faston 187, P1 = faston 250, P2 = 187/250

Note: Battery cases marked with a (○) are the normal product using the standard resin.

Those marked with a solid circle (●) indicate specifications as per special order.

Valve Regulated Lead Acid Batteries

MAIN POWER SUPPLIES (CYCLE USE)

Model Number	Nominal Voltage (V)	Rated capacity 20 hours rate (Ah)	Outline dimensions inch (mm)				Wt. (Approx.) lbs (kg)	Terminal Types	Battery-case resin	
			Length	Width	Height	Total height			UL94HB	UL94V-0
LC-XC1228AP	12	28.0	6.50 (165)	4.92 (125)	6.89 (175)	7.07 (179.5)	24.34 (11)	G	○	

Note: Battery cases marked with a (○) are the normal product using the standard resin. Those marked with a solid circle (●) indicate specifications as per special order.

BACK-UP POWER SUPPLIES (LONG LIFE TRICKLE USE*)

Model Number	Nominal Voltage (V)	Rated capacity 20 hours rate (Ah)	Outline dimensions inch (mm)				Wt. (Approx.) lbs (kg)	Terminal Types	Battery-case resin	
			Length	Width	Height	Total height			UL94HB	UL94V-0
LC-P067R2P(a)	6	7.2	5.95 (151)	1.34 (34)	3.70 (94)	3.94 (100)	2.87 (1.3)	B/C		○
LC-P0612P(a)	6	12.0	5.95 (151)	1.97 (50)	3.70 (94)	3.94 (100)	4.41 (2.0)	B/C		○
LC-P127R2P(a)	12	7.2	5.95 (151)	2.54 (64.5)	3.70 (94)	3.94 (100)	5.52 (2.5)	B/C		○
LC-PD1217P	12	17.0	7.13 (181)	2.99 (76)	6.58 (167)	6.58 (167)	14.34 (6.5)	D	●	○
LC-X1220P	12	20.0	7.13 (181)	2.99 (76)	6.58 (167)	6.58 (167)	14.6 (6.6)	D	○	
LC-X1220AP	12	20.0	7.13 (181)	2.99 (76)	6.58 (167)	6.58 (167)	14.6 (6.6)	G	●	
LC-X1228P	12	28.0	6.50 (165)	4.92 (125)	6.89 (175)	7.07 (179.5)	24.3 (11)	D	○	●
LC-X1228AP	12	28.0	6.50 (165)	4.92 (125)	6.89 (175)	6.89 (175)	24.3 (11)	G	○	●

(a) Add applicable codes for terminal type: P = faston 187, P1 = faston 250, P2 = 187/250

Note: Battery cases marked with a (○) are the normal product using the standard resin.

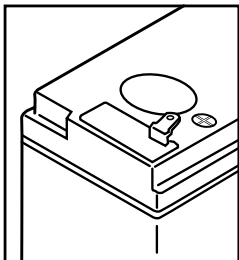
Those marked with a solid circle (●) indicate specifications as per special order.

*Expected trickle life approximately 6 years

BACK-UP POWER (HIGH POWER SERIES)

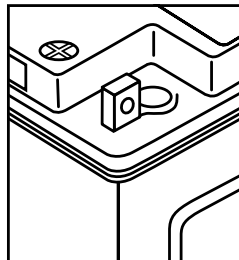
Model Number	Nominal Voltage (V)	Rated capacity Watts/Cell at 10 Minute Rate	Outline dimensions inch (mm)				Wt. (Approx.) lbs (kg)	Terminal Types	Battery-case resin	
			Length	Width	Height	Total height			UL94HB	UL94V-0
UP-RW1220P1	12	20	5.51 (140)	1.52 (38.5)	3.70 (94)	4.00 (101.5)	2.98 (1.35)	C	○	●
UP-RW1245P1	12	45	5.95 (151)	2.54 (64.5)	3.70 (94)	4.00 (101.5)	5.74 (2.6)	C	○	●

TERMINAL TYPES:



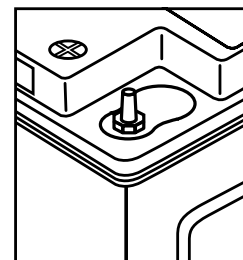
(B) Faston type 187
(C) Faston type 250

Indicated by model # suffix:
P=187
P1=250
P2=250(+)/187(-)



(D) M5 bolt and nut type
(E) M6 bolt and nut type

Indicated by model # suffix: P



(G) M5 threaded post type
(H) M6 threaded post type

Indicated by model # suffix: AP

Lithium Rechargeable Coin Batteries

GENERAL DESCRIPTION

Panasonic vanadium pentoxide rechargeable lithium batteries are compact, high energy secondary batteries that have nearly twice the energy of conventional button-shaped Ni-Cd batteries.

FEATURES

- One high-voltage battery can serve your back-up needs.
- Months of continuous use as a back-up.
- Superior reliability; withstands overcharging and overdischarging.



VANADIUM PENTOXIDE RECHARGEABLE (VL)

Model Number	Electrical Characteristics 20°C (68°F)		Recommended Drain Standard (mA)	Dimensions (Max.)		
	Nominal Voltage (V)	*Nominal Capacity (mAh)		Diameter inch (mm)	Height inch (mm)	Weight oz. (g)
VL621	3.0	1.5	0.01	0.27(6.8)	0.08(2.1)	0.01(0.3)
VL1220	3.0	7.0	0.03	0.49(12.5)	0.08(2.0)	0.03(0.8)
VL2020	3.0	20.0	0.07	0.79(20.0)	0.08(2.0)	0.07(2.2)
VL2320	3.0	30.0	0.10	0.91(23.0)	0.08(2.0)	0.09(2.8)
VL2330	3.0	50.0	0.10	0.91(23.0)	0.12(3.0)	0.12(3.7)
VL3032	3.0	100.0	0.20	1.18(30.0)	0.13(3.2)	0.20(6.3)

* Nominal capacity is based on a standard drain and cut off voltage down to 2.5V at 20°C (68°F).

APPLICATIONS

- Memory backup in facsimiles
- Memory cards
- Personal computers
- Sequencers
- Telephones
- Tuners
- Video cameras
- VTRs

GENERAL DESCRIPTION

These super compact lithium secondary batteries feature a new configuration in which a manganese compound oxide is used for the positive electrode, and a lithium/aluminum alloy for the electrode.

FEATURES

- Charge at voltage levels even under 3V
- Large capacity for hour-after-hour back-up
- Excellent withstand voltage, overcharge and overdischarge withstanding characteristics



MANGANESE LITHIUM RECHARGEABLE (ML)

Model Number	Electrical Characteristics 20°C (68°F)		Recommended Drain Standard (mA)	Dimensions (Max.)		
	Nominal Voltage (V)	*Nominal Capacity (mAh)		Diameter inch (mm)	Height inch (mm)	Weight oz. (g)
ML414S	3.0	1.2	0.005	0.19(4.8)	0.06(1.4)	0.003(0.08)
ML421S	3.0	2.3	0.003	0.19(4.8)	0.08(2.1)	0.004(0.11)
ML614S	3.0	3.4	0.01	0.27(6.8)	0.06(1.4)	0.006(0.16)
ML621S	3.0	5.0	0.01	0.27(6.8)	0.08(2.1)	0.008(0.30)
ML920S	3.0	11.0	0.03	0.37(9.5)	0.08(2.0)	0.02(0.50)
ML1220	3.0	17.0	0.03	0.49(12.5)	0.08(2.0)	0.03(0.80)
ML2020	3.0	45.0	0.10	0.79(20.0)	0.08(2.0)	0.07(2.2)

* Nominal capacity shown is based on standard drain and cut off voltage down to 2.0V at 20°C (68°F)

APPLICATIONS

- Power source for backing up memory data in:
- Mobile telephones
 - Memory cards
 - Other small-size communications devices

GENERAL DESCRIPTION

The ML-RH series has all of the features of the regular Manganese Lithium series with an added benefit. Special gasket materials and electrolyte with a high boiling point have been utilized to help the battery withstand the reflow solder process.¹

REFLOW SOLDERABLE MANGANESE LITHIUM RECHARGEABLE (ML-RH)

Model Number	Electrical Characteristics 20°C (68°F)		Recommended Drain Standard (mA)	Dimensions (Max.)		
	Nominal Voltage (V)	*Nominal Capacity (mAh)		Diameter inch (mm)	Height inch (mm)	Weight oz. (g)
ML414RH	3.0	1.0*	0.005	0.19(4.8)	0.06(1.4)	0.004(0.1)

* Nominal capacity shown is based on standard drain and cut off voltage down to 1.0V at 20°C (68°F)

¹ Note: Please refer to the Panasonic Lithium Battery Technical Handbook for information about reflow soldering for ML-RH cells with terminals.

APPLICATIONS

- Power source for backing up memory data in:
- Mobile telephones
 - Memory cards
 - Other small-size communications devices
 - Data terminals
 - Office automation equipment

NIOBIUM LITHIUM RECHARGEABLE (NBL)

Model Number	Electrical Characteristics 20°C (68°F)		Recommended Drain Standard (mA)	Dimensions (Max.)		
	Nominal Voltage (V)	*Nominal Capacity (mAh)		Diameter inch (mm)	Height inch (mm)	Weight oz. (g)
NBL414	2.0	1.0	0.005	0.19(4.8)	0.06(1.5)	0.003(0.08)
NBL621	2.0	4.0	0.01	0.27(6.8)	0.09(2.2)	0.01(0.25)

* Nominal capacity shown is based on standard drain and cut off voltage down to 1.0V at 20°C (68°F)

APPLICATIONS

- Power source for backing up memory data in:
- Mobile telephones
 - Memory cards
 - Other small-size communications devices

Lithium Rechargeable Coin Batteries

GENERAL DESCRIPTION

Manganese titanium lithium rechargeable batteries are compact rechargeable batteries that employ a lithium-manganese complex oxide as the cathode, and lithium-titanium oxide (AB204) as the anode.

FEATURES

- Large capacity in a miniature size comparable to chip components
- Superior charge characteristics
- Charging/discharging over a long period is possible
- Excellent voltage and overdischarge withstanding characteristics



APPLICATIONS

- Main power supply of compact products such as kinetic or solar watches
- Memory backup power supplies for pagers and timers

MANGANESE TITANIUM LITHIUM RECHARGEABLE (MT)						
Model Number	Electrical Characteristics 20°C (68°F)		Recommended Drain (mA)	Dimensions (Max.)		
	Nominal Voltage (V)	*Nominal Capacity (mAh)		Diameter inch (mm)	Height inch (mm)	Weight oz. (g)
MT516	1.5	1.15	0.05	0.23 (5.8)	0.06(1.6)	0.005(0.15)
MT616	1.5	1.05	0.05	0.27(6.8)	0.06(1.6)	0.007(0.2)
MT621	1.5	2.5	0.05	0.27(6.8)	0.08(2.1)	0.01(0.25)
MT920	1.5	5.0	0.1	0.37(9.5)	0.08(2.0)	0.02(0.45)

COIN CELL TAB CONFIGURATIONS

Model Number	Tab Type		Configuration Type
	With Insulation Wrap	Without Insulation Wrap	
VL TYPE			
VL621		/F9D	F
VL1220	/1HF		H
VL1220	/1VC		V
VL1220	/1FC	/1F5U	F
VL2020	/1VC		V
VL2020	/1GU7		G
VL2020	/1HF		H
VL2320	/1VC		V
VL2320	/1HF		H
VL2320	/1F2		F
VL2330	/1VC		V
VL2330	/1HF		H
VL2330	/1F3		F
VL3032		/1GUF	G
VL3032	/1F2		F

Model Number	Tab Type		Configuration Type
	With Insulation Wrap	Without Insulation Wrap	
ML TYPE			
ML414S		/F9D	F
ML421S	Contact Panasonic for details on available tab configurations.		
ML614S		/F9F	F
ML621S	/FDD	/F9D	F
ML920S		/F9D	F
ML1220	/F1A		F
ML1220	/V1A		V
ML1220	/F1B		F
ML2020	/G1A		G
ML2020	/H1C		H
ML2020	/V1A		V
ML-R TYPE			
ML414RH	/F9A		F
ML414RH	/F9C		F
MT TYPE			
ALL Tabs not available for this series.			
NBL TYPE			
NBL414		/F9D	F
NBL621		/F9D	F

Note: Please refer to the Panasonic Lithium Battery Technical Handbook for exact tab dimensions. Not all configuration types are available for each model number.

Please contact Panasonic for requests on custom tab configurations. Minimum order requirements may apply.

TYPICAL TAB CONFIGURATIONS

H Type

G Type

F Type

V Type

T Type

S Type

Lithium Primary Coin Batteries

GENERAL DESCRIPTION

Panasonic coin type lithium batteries are high energy, high reliability batteries for a variety of applications. The full 3 volts in these high energy batteries is about twice that of conventional dry batteries. Panasonic coin type lithium batteries are available in two types: poly-carbonmonofluoride lithium batteries (BR Series) for users requiring extended reliability and safety, and manganese dioxide lithium batteries (CR Series) for users requiring high voltage and strong load pulse characteristics.

C O I N



FEATURES

- High voltage of 3 volts — twice that of conventional batteries
- Extremely small self-discharge for long service and shelf life
- Compact and lightweight, with extremely high energy density per unit weight
- Extremely safe (poly-carbon monofluoride lithium batteries)
- Extremely strong load pulse characteristics (manganese dioxide lithium)

APPLICATIONS

- Calculators
- Cameras
- Compact, low power consuming cordless appliances
- Electronic watches (digital and analog)
- Memory backup in all type of devices (with tab terminals)

Operating Temperature CR Type: -30°C ~ 60°C
 Operating Temperature BR Type: -30°C ~ 80°C

(CF)n/Li: POLYCARBON MONOFLUORIDE (BR)

Model Number	Electrical Characteristics (20°C)				Recommended Drain Continuous (mA)	Dimensions (Max.)		
	JIS	IEC	Nominal Voltage (V)	Nominal Capacity (mAh)		Diameter inch (mm)	Height inch (mm)	Weight oz. (g)
BR1220	-	-	3	35	0.03	0.49 (12.5)	0.08 (2.00)	0.02 (0.7)
BR1225	-	BR1225	3	48	0.03	0.49 (12.5)	0.10 (2.50)	0.03 (0.8)
BR1632	-	-	3	120	0.03	0.63 (16.0)	0.13 (3.20)	0.05 (1.5)
BR2032	-	-	3	190	0.03	0.79 (20.0)	0.13 (3.20)	0.09 (2.5)
BR2325	-	BR2325	3	165	0.03	0.91 (23.0)	0.10 (2.50)	0.11 (3.2)
BR2330	-	-	3	255	0.03	0.91 (23.0)	0.12 (3.00)	0.11 (3.2)
BR3032	-	BR3032	3	500	0.03	1.18 (30.0)	0.13 (3.20)	0.19 (5.5)

*Nominal capacity shown is based on standard drain

BR COIN CELL TAB CONFIGURATIONS

See page 7 for diagrams

Model Number	Tab Type		Configuration Type	Model Number	Tab Type		Configuration Type
	With Insulation Wrap	Without Insulation Wrap			With Insulation Wrap	Without Insulation Wrap	
BR1220	/1HF	/1HE	H	BR2325	/1HC	/1HB	H
BR1220	/1VC	/1VB	V	BR2325	/1VC		V
BR1225	/1HC	/1HB	H	BR2325		/1HG	H
BR1225	/1VC		V	BR2325	/2HC		H
BR2032	/1HF1	/1HE1	H	BR2325		/1VG	V
BR2032	/1HM		H	BR2330	/1HF	/1HE	G
BR2032		/1HG	G	BR2330	/1GUF	/1GU	G
BR2032	/1HS	/1HSE	H	BR2330	/1VC	/1VB	V
BR2032	/1GUF	/1GU	G	BR2330	/1GVF	/1GV	V
BR2032	/1HF	/1HE	H	BR2330	/1F3		F
BR2032		/1VB	V	BR2330	/1F4C		F
BR2032	/1GVF	/1GV	V	BR3032	/1VC		V
BR2032	/1F4		F	BR3032	/1F2		F
BR2032	/1F2		F				

Lithium Primary Coin Batteries

MnO₂/Li: MANGANESE DIOXIDE (CR)

Model Number	Electrical Characteristics (20°C)				Recommended Drain	Dimensions (Max.)		
	JIS	IEC	Nominal Voltage (V)	Nominal Capacity (mAh)	Continuous (mA)	Diameter inch (mm)	Height inch (mm)	Weight oz (g)
CR1025	CR1025	-	3	30	0.10	0.39 (10.0)	0.10 (2.5)	0.02 (0.7)
CR1216	CR1216	-	3	25	0.10	0.49 (12.5)	0.06 (1.6)	0.02 (0.7)
CR1220	CR1220	CR1220	3	35	0.10	0.49 (12.5)	0.08 (2.0)	0.04 (1.2)
CR1612	-	-	3	41	0.10	0.63 (16.0)	0.05 (1.2)	0.03 (0.8)
CR1616	CR1616	-	3	55	0.10	0.63 (16.0)	0.06 (1.6)	0.04 (1.2)
CR1620	-	CR1620	3	75	0.10	0.63 (16.0)	0.08 (2.0)	0.05 (1.3)
CR1632	-	-	3	140	0.10	0.63 (16.0)	0.13 (3.2)	0.06 (1.8)
CR2012	CR2012	-	3	55	0.10	0.79 (20.0)	0.05 (1.2)	0.05 (1.4)
CR2016	CR2016	CR2016	3	90	0.10	0.79 (20.0)	0.06 (1.6)	0.06 (1.6)
CR2025	CR2025	CR2025	3	165	0.20	0.79 (20.0)	0.10 (2.5)	0.09 (2.5)
CR2032	CR2032	CR2032	3	220	0.20	0.79 (20.0)	0.13 (3.2)	0.11 (3.1)
CR2330	CR2330	-	3	265	0.20	0.91 (23.0)	0.12 (3.0)	0.14 (4.0)
CR2354	-	-	3	560	0.20	0.91 (23.0)	0.21 (5.4)	0.21 (5.9)
CR2412	-	-	3	100	0.20	0.96 (24.5)	0.05 (1.2)	0.07 (2.0)
CR2450	-	CR2450	3	620	0.20	0.96 (24.5)	0.2 (5.0)	0.20 (6.3)
CR2477	-	-	3	1000	0.20	0.96 (24.5)	0.30 (7.7)	0.37 (10.5)
CR3032	-	-	3	500	0.20	1.18 (30.0)	0.13 (3.2)	0.25 (7.1)

*Nominal capacity shown is based on standard drain

CR COIN CELL TAB CONFIGURATIONS

See page 7 for diagrams

Model Number	Tab Type		Configuration Type	Model Number	Tab Type		Configuration Type
	With Insulation Wrap	Without Insulation Wrap			With Insulation Wrap	Without Insulation Wrap	
CR1220	/1HF	/1HE	H	CR2330	/1GUF	/1GU	G
CR1220	/1VC	/1VB	V	CR2330	/1HF	/1HE	H
CR1616		/1F2	F	CR2330	/1VF1	/1VB	V
CR1632	/1HF		H	CR2330	/1GVF	/1GV	V
CR2016	/1F2		F	CR2330	/1F3		F
CR2032		/1HU3	H	CR2330	/1F4C		F
CR2032	/1VS1		V	CR2330		/1GU7	G
CR2032		/1HG	G	CR2354	/1HF	/1HE	H
CR2032	/1HS	/1HSE	H	CR2354	/1GUF	/1GU	G
CR2032	/1GUF	/1GU	G	CR2354	/1VC	/1VB	V
CR2032	/1HF	/1HE	H	CR2450	/H1A		H
CR2032		/1VB	V	CR2450		/G1A	G
CR2032	/1VC3		V	CR2477	/1VC	/1VB	V
CR2032	/1GVF	/1GV	V	CR2477	/1HF	/1HE	H
CR2032	/1F4		F	CR3032	/1VC		V
CR2032	/1F2		F	CR3032	/1F2		F

Lithium Primary Coin Batteries

GENERAL DESCRIPTION

Panasonic's coin type high temperature batteries are high energy, high reliability batteries for applications that require a wider operating temperature range. The full 3 volts in these high energy batteries is about twice that of conventional dry batteries.

FEATURES

- Wide operational temperature range
- Good storage stability
- Constant operating voltage
- Available with Tab terminals for PCB mounting

APPLICATIONS

- Automotive electronic systems
- Tollway transponders
- RFID



HIGH TEMPERATURE COIN CELL

Model Number	Nominal Voltage (V)	Nominal Capacity (mAh)	Dimensions (max)		Weight oz (g)	Temp. Range °C
			Diameter inch (mm)	Height inch (mm)		
BR1225A	3	48	0.49 (12.5)	0.10 (2.5)	0.03 (0.8)	-40° C~125° C
BR1632A	3	120	0.63 (16.0)	0.13 (3.2)	0.05 (1.5)	-40° C~125° C
BR2330A	3	255	0.91 (23.0)	0.12 (3.0)	0.11 (3.2)	-40° C~125° C
BR2450A ¹	3	550	0.96 (24.5)	0.20 (5.0)	0.21 (5.0)	-40° C~125° C
BR2477A	3	1000	0.96 (24.5)	0.30 (7.7)	0.28 (8.0)	-40° C~125° C
BR2777A ¹	3	1000	1.08 (27.5)	0.30 (7.7)	0.28 (8.0)	-40° C~125° C

¹Contact Panasonic for the latest information on these models

BR "A" COIN CELL TAB CONFIGURATIONS

See page 7 for diagrams

Model Number	Tab Type		Configuration Type
	With Insulation Wrap	Without Insulation Wrap	
BR1225A	/FA		F
BR1225A	/HB	/HA	H
BR1632A	/FA		F
BR1632A		/GA	G
BR1632A	/HA	/HB	H
BR2330A	/FA		F
BR2330A		/GA	G
BR2330A	/HD		H
BR2330A	/VA		V
BR2450A ¹	/FA		F
BR2450A ¹	/GA		G
BR2477A	/FB		F
BR2477A	/GA		G
BR2477A	/HB	/HC	H
BR2477A	/VA		V
BR2777A ¹	Contact Panasonic for details on available tab configurations		

Note: Please refer to the Panasonic Lithium Battery Technical Handbook for exact tab dimensions. Not all configuration types are available for each model number.

Please contact Panasonic for requests on custom tab configurations. Minimum order requirements may apply.

¹ Contact Panasonic for the latest information on these models.

Lithium Primary Cylindrical Batteries

(CF)n/ Li POLY-CARBON MONO-



GENERAL DESCRIPTION

Panasonic cylindrical lithium batteries are known for their high voltage, energy density, durability, and stable operation.

FEATURES

- High energy density
- Long shelf life
- Stable operation
- High rate discharge
- Operating temperature (-40°C~85°C)
- Strong leakage resistance
- Excellent durability

APPLICATIONS

- Cameras
- Memory back-up
- Utility meters
- Emergency signal light
- Electric locks
- Electronic measurement equipment

CYLINDRICAL TYPE

Model Number	Electrical Characteristics				Dimensions		Weight oz. (g)
	Nominal Voltage (V)	**Nominal Capacity (mAh)	Standard Drain (mA)	Continuous Drain (mA)	Diameter inch (mm)	Approximate Height inch (mm)	
BR-C	3	5,000	150.0	150.0	1.02 (26.0)	1.99 (50.5)	1.48 (42.0)
BR-A	3	1,800	2.5	2.5	0.67 (17.0)	1.79 (45.5)	0.63 (18.0)
BR-AG*	3	2,200	2.5	2.5	0.67 (17.0)	1.79 (45.5)	0.63 (18.0)
BR-2/3A	3	1,200	2.5	2.5	0.67 (17.0)	1.32 (33.5)	0.48 (13.5)
BR-2/3AG*	3	1,450	2.5	2.5	0.67 (17.0)	1.32 (33.5)	0.48 (13.5)

Note: * G Versions are higher capacity. ** Nominal capacity is based on standard drain.



GENERAL DESCRIPTION

Developed by Panasonic, packaged user replaceable lithium batteries offer high voltage and high energy density. Ideal for designs requiring batteries with retail availability to allow for convenient end user replacement.

FEATURES

- High safety and reliability
- High current pulse discharge capability
- Rapid discharge for strobes is possible at 6V
- Superior shelf life/minimal self-discharge
- Operating temperature (-40°C~70°C)
- High energy density

USER REPLACEABLE TYPE

Model Number	Voltage (V)	Nominal Capacity (mAh)	Dimensions inch (mm)	Weight oz. (g)
CR123A	3	1,550*	0.67 x 1.36 (17.0 x 34.5)	0.60 (17)
CR2	3	850*	0.61 x 1.56 (15.6 x 27.0)	0.39 (11)
2CR5	6	1,400**	0.67 x 1.34 x 1.79 (17 x 34 x 45)	1.34 (38)
CR-P2	6	1,400**	0.77 x 1.38 x 1.42 (19.5 x 35 x 36)	1.31 (37)
CR-V3P	3	3,300*	1.03 x 0.51 x 1.84 (29 x 14.5 x 52)	1.38 (39)

* Based on standard drain and cut off voltage down to 2.0 V at 20°C

** Based on standard drain and cut off voltage down to 4.0 V at 20°C

APPLICATIONS

- Cameras
- Memory back-up over a wide range of applications
- Other applications where ease of replacement is required

GENERAL DESCRIPTION

Panasonic carbon monofluoride pin type lithium batteries are slim and lightweight through the use of an aluminum case. This unique design, developed first by Panasonic, combines the best of battery technologies.

FEATURES

- Compact and lightweight
- 2x the voltage of conventional dry batteries
- Operating temperature (-30°C~+60°C)
- Pin terminal for easy connection

APPLICATIONS

- Fishing pole tip lights
- LED illumination
- LED night fishing floats
- Microphones



PIN TYPE

Model Number	Electrical Characteristics				Dimensions		Weight oz (g)
	Nominal Voltage	Nominal Capacity (mAh)	Recommended Drain		Diameter Inch (mm)	Height Inch (mm)	
			Pulse (mA)	Standard (mA)			
BR425	3	25	4	0.5	0.17 (4.2)	1.02 (25.9)	0.02 (0.55)
BR435	3	50	6	1.0	0.17 (4.2)	1.41 (35.9)	0.03 (0.85)

Alkaline Batteries

GENERAL DESCRIPTION

Panasonic Industrial Alkalines are designed with a power reservoir that enables them to last longer. High current and large capacity are standard, which means high performance for our customers. All Panasonic Industrial Alkaline batteries are made in the USA at our state-of-the-art manufacturing facility in Columbus, Georgia.

FEATURES

- High current and large capacity for excellent performance
- Stable Voltage and current
- Excellent storage life
- Excellent resistance to leakage
- Contains less than 0.0005 Mercury by weight



APPLICATIONS

- Portable stereos
- Radio-cassette recorders
- Strobes
- Cameras
- Electronic calculators
- Electric shavers
- High-powered flashlights
- Electric doorlocks
- Emergency lighting
- Toys and other cordless products

INDUSTRIAL ALKALINE BATTERIES

Model Number	Size	V	Diameter Inch (mm)	Height Inch (mm)	Avg. Wt. oz (g)
AM-1PI	D	1.5	1.312 (33.3)	2.407 (60.5)	4.97 (141.0)
AM-2PI	C	1.5	1.004 (25.5)	1.969 (49.5)	2.47 (70.0)
AM-3PI	AA	1.5	.571 (14.50)	1.988 (50.0)	0.80 (23.0)
AM-4PI	AAA	1.5	.413 (10.20)	1.752 (44.10)	0.38 (11.0)

Model Number	V	L Inch (mm)	W Inch (mm)	D Inch (mm)	Avg. Wt. oz (g)
6AM-6PI (9V)	9	1.0 (47.5)	1.0 (25.50)	0.649 (17.50)	1.60 (45)

MANUFACTURED IN THE U.S.A.

Carbon Zinc Batteries



APPLICATIONS

- Clocks
- Communications equipment
- Electronic calculators
- Flashlights, penlights
- Measuring instruments
- Remote controls
- Cameras and other photographic products
- Tape recorders
- Portable electronics

CARBON ZINC BATTERIES

Model Number	Size	Type*	Label Color	V	Diameter/Width Inch (mm)	Height Inch (mm)	Thickness Inch (mm)	Av. Wt. oz (g)
UM-4NPA	AAA	Super Heavy Duty	Blue	1.5	.413(10.49)	1.752 (44.50)	–	0.34 (9.70)
UM-3NPA	AA	Super Heavy Duty	Blue	1.5	.571(14.50)	1.988 (50.50)	–	0.67 (19.00)
UM-2NPA	C	Super Heavy Duty	Blue	1.5	1.031(26.19)	1.969 (50.00)	–	1.82 (51.50)
UM-1NPA	D	Super Heavy Duty	Blue	1.5	1.339 (34.01)	2.421 (61.49)	–	3.53 (100.00)
R1NW	N	Extra Heavy Duty	Black	1.5	.472(11.99)	1.189 (30.20)	–	0.23 (6.55)
6F22NW	9V	Extra Heavy Duty	Black	9	1.043 (26.49)	1.909 (48.49)	0.689 (17.50)	1.34 (38.00)

*Extra Heavy Duty and Super Heavy Duty are the same grade product. Super Heavy Duty is manufactured in Indonesia and Extra Heavy Duty is manufactured in Japan.

Setup Instructions:

- 1.) Run D:/Setup where D is the letter of your CD ROM drive.
- 2.) If you already have Acrobat Reader Version 5.0 (with search engine) installed, click on VIEW HANDBOOKS.
- 3.) If you do not have Acrobat Reader Version 5.0 (with search engine) installed, click on INSTALL ACROBAT READER. After it has been installed, click on VIEW HANDBOOKS.

Troubleshooting:

If setup fails to run on your system, you may still view the handbooks by following these instructions:

- 1.) If you already have Acrobat Reader Version 5.0 (with search engine) installed, open the file HANDBOOKS.PDF (located on the CD-ROM) from within Acrobat Reader.
- 2.) If you do not have Acrobat Reader 5.0 (with search engine) installed you will need to install it before you can view the handbooks.

To install the Acrobat Reader (with search engine), run D:/acroread/32bit/setup.exe (where D:/ is your CD ROM drive)

After the Acrobat Reader is installed, open the file D:/HANDBOOKS.PDF (where D:/ is your CD ROM drive) from within Acrobat Reader.

Battery Technical Handbooks on CD-ROM



The enclosed CD-ROM contains:

Complete Technical Handbooks in pdf format for:

- Alkaline Batteries
- Lithium Coin & Cylindrical Batteries
- Li-ion Batteries
- Nickel Cadmium Batteries
- Nickel Metal Hydride Batteries
- Valve Regulated Lead Acid Batteries

Corporate Overview of

Matsushita Battery Industrial (Panasonic OEM Batteries):

- Company overview and history
- The Panasonic Power Video
- List of global sales offices
- Overview of global production locations by product
- Global listings of locations with ISO 14001, ISO 9001, or QS9000 certification
- Environmental policy

MSDS/Product Information sheets for each chemistry:

- Transportation Guidelines
- Recycling information

Panasonic

OEM Batteries Short Form Catalog & CD ROM

Notice to Readers

It is the responsibility of each user to ensure that every battery application is adequately designed safe and compatible with all conditions encountered during use, and in conformance with existing standards and requirements.

This literature contains information concerning cells and batteries manufactured by Matsushita Battery Industrial Co., Ltd. This information is generally descriptive only and is not intended to make or imply any representation, guarantee or warranty with respect to any cells and batteries. Cell and battery designs are subject of modification without notice.

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