

Panasonic

OEM BATTERIES SHORT FORM CATALOG



LITHIUM ION
NICKEL METAL HYDRIDE
VALVE REGULATED LEAD ACID
LITHIUM RECHARGEABLE COIN
LITHIUM PRIMARY COIN
LITHIUM PRIMARY CYLINDRICAL
ALKALINE

Panasonic
ideas for life

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 sales and marketing arm of both Panasonic Energy Corporation of America, which oversees all North American battery manufacturing operations, and Panasonic Energy Company, a division of Panasonic Corporation of Japan.

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

Please refer to the Panasonic OEM battery website at www.panasonic.com/batteries to download the latest information or send an e-mail request to oembatteries@us.panasonic.com.



TABLE OF CONTENTS

LITHIUM ION ■ 1

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

NICKEL METAL HYDRIDE ■ 2

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.

VALVE REGULATED LEAD ACID ■ 3-4

Panasonic's tough valve regulated lead acid (VRLA) rechargeable batteries are designed to provide outstanding performance in withstanding overcharge, overdischarge, and resisting vibration and shock.

LITHIUM RECHARGEABLE COIN ■ 5-6

Small, component size rechargeable coin cell batteries for memory backup applications and main power sources in small electronic devices. Available in four product variations.

LITHIUM PRIMARY COIN ■ 7-9

3V Poly-carbonmonfluoride (BR) and Manganese Dioxide (CR) batteries for a variety of applications. Special versions of the BR series are also available with wider operating temperatures than the standard product.

LITHIUM PRIMARY CYLINDRICAL ■ 10-11

Poly-carbonmonfluoride (BR) and Manganese Dioxide (CR) cylindrical batteries and userreplaceable photo batteries.

ALKALINE ■ 12

Our popular alkaline batteries are designed to support industrial strength applications and are packaged for volume purchases.

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 (RBR) recycling program. *Charge up to recycle!* www.rbr.org

FEATURES

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

APPLICATIONS

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



CYLINDRICAL TYPE

Model Number*	Nominal Voltage (V)	Typical ¹ Capacity (mAh)	Dimensions		Weight oz. (g)
			Diameter inch (mm)	Height inch (mm)	
CGR18650CG	3.6	2250	0.73 ^{+0.03} _{-0.03} (18.6 ^{+0.7} _{-0.7})	2.57 ^{+0.04} _{-0.04} (65.2 ^{+1.0} _{-1.0})	1.55 (44)
CGR18650DA	3.6	2450	0.73 ^{+0.03} _{-0.03} (18.6 ^{+0.7} _{-0.7})	2.57 ^{+0.04} _{-0.04} (65.2 ^{+1.0} _{-1.0})	1.59 (45)
CGR18650EA	3.6	2550	0.73 ^{+0.03} _{-0.03} (18.6 ^{+0.7} _{-0.7})	2.57 ^{+0.04} _{-0.04} (65.2 ^{+1.0} _{-1.0})	1.64 (46.5)
NCR18650	3.6	2900	0.73 ^{+0.03} _{-0.03} (18.6 ^{+0.7} _{-0.7})	2.57 ^{+0.04} _{-0.04} (65.2 ^{+1.0} _{-1.0})	
NCR18500	3.6	2000	0.73 ^{+0.03} _{-0.03} (18.6 ^{+0.7} _{-0.7})	1.97 ^{+0.04} _{-0.04} (50.0 ^{+1.0} _{-1.0})	

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)	
CGA633450B ³	3.7	1200	1.34 ^{+0.02} _{-0.02} (34.0 ^{+0.6} _{-0.6})	1.97 ^{+0.04} _{-0.04} (50.0 ^{+1.0} _{-1.0})	0.25 ^{+0.02} _{-0.02} (6.35 ^{+0.6} _{-0.6})	0.85 (24)
CGA103446 ³	3.6	1800	1.34 ^{+0.02} _{-0.02} (34.0 ^{+0.6} _{-0.6})	1.81 ^{+0.04} _{-0.04} (46.0 ^{+1.0} _{-1.0})	0.41 ^{+0.02} _{-0.02} (10.5 ^{+0.6} _{-0.6})	1.26 (35.5)
CGA103450A	3.7	1950	1.34 ^{+0.02} _{-0.02} (34.0 ^{+0.6} _{-0.6})	1.97 ^{+0.04} _{-0.04} (50.0 ^{+1.0} _{-1.0})	0.41 ^{+0.02} _{-0.02} (10.5 ^{+0.6} _{-0.6})	1.38 (39)

HIGH RATE CYLINDRICAL TYPE

Model Number*	Nominal Voltage (V)	Typical ¹ Capacity (mAh)	Dimensions		Weight oz. (g)
			Diameter inch (mm)	Height inch (mm)	
CGR26650A	3.7	2650	1.04 ^{+0.03} _{-0.03} (26.5 ^{+0.7} _{-0.7})	2.57 ^{+0.04} _{-0.04} (65.2 ^{+1.0} _{-1.0})	3.2 (90)
CGR26650B	3.7	3300	1.04 ^{+0.03} _{-0.03} (26.5 ^{+0.7} _{-0.7})	2.57 ^{+0.04} _{-0.04} (65.2 ^{+1.0} _{-1.0})	3.2 (90)

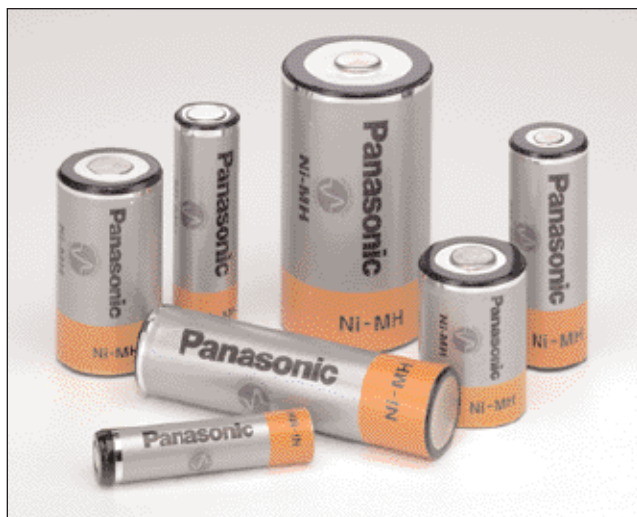
1. 4.2V charge.

2. Thickness at time of shipment.

3. CGA103446 and CGA633450B 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 ^H	AAA	1.2	550	500	250	2.4	0.41 ^{+0.03} _{-0.03} (10.5 ^{+0.7} _{-0.7})	1.75 ^{+0.04} _{-0.04} (44.5 ^{+0.9} _{-0.9})	0.42 (12)
HHR70AAA ^J	AAA	1.2	720	700	650	1.2	0.41 ^{+0.03} _{-0.03} (10.5 ^{+0.7} _{-0.7})	1.75 ^{+0.04} _{-0.04} (44.5 ^{+0.9} _{-0.9})	0.46 (13)
HHR75AAA ^B	AAA	1.2	730	700	450	1.7	0.41 ^{+0.03} _{-0.03} (10.5 ^{+0.07} _{-0.07})	1.75 ^{+0.04} _{-0.04} (44.5 ^{+0.9} _{-0.9})	0.42 (12)
HHR120AA	4/5AA	1.2	1220	1150	1200	1.2	0.57 ^{+0.03} _{-0.03} (14.5 ^{+0.7} _{-0.7})	1.69 ^{+0.04} _{-0.04} (43.0 ^{+0.9} _{-0.9})	0.81 (23)
HHR150AA	AA	1.2	1580	1500	1500	1.2	0.57 ^{+0.03} _{-0.03} (14.5 ^{+0.7} _{-0.7})	1.97 ^{+0.04} _{-0.04} (50.0 ^{+1.5} _{-1.5})	0.92 (26)
HHR210AA ^B	AA	1.2	2080	2000	1200	2.0	0.57 ^{+0.03} _{-0.03} (14.5 ^{+0.7} _{-0.7})	1.99 ^{+0.05} _{-0.05} (50.5 ^{+0.9} _{-0.9})	1.02 (29)
HHR200A	4/5A	1.2	2040	2000	2000	1.2	0.67 ^{+0.03} _{-0.03} (17.0 ^{+0.7} _{-0.7})	1.69 ^{+0.06} _{-0.06} (43.0 ^{+1.5} _{-1.5})	1.13 (32)
HHR210A	A	1.2	2200	2100	2100	1.2	0.67 ^{+0.03} _{-0.03} (17.0 ^{+0.7} _{-0.7})	1.97 ^{+0.06} _{-0.06} (50.0 ^{+1.5} _{-1.5})	1.34 (38)
HHR210AH ¹	A	1.2	2050	1900	—	—	0.67 ^{+0.03} _{-0.03} (17.0 ^{+0.7} _{-0.7})	1.97 ^{+0.06} _{-0.06} (50.0 ^{+1.5} _{-1.5})	1.34 (38)
HHR380A ²	L-A	1.2	3800	3700	2000	2.3	0.67 ^{+0.03} _{-0.03} (17.0 ^{+0.7} _{-0.7})	2.64 ^{+0.06} _{-0.06} (67.0 ^{+1.5} _{-1.5})	1.87 (53)
HHR330APH	18670(L-Fat-A)	1.2	3300	3200	1650	2.4	0.72 ^{+0.03} _{-0.03} (18.2 ^{+0.7} _{-0.7})	2.64 ^{+0.06} _{-0.06} (67.0 ^{+1.5} _{-1.5})	2.12 (60)
HHR370AH ¹	18670(L-Fat-A)	1.2	3700	3500	—	—	0.72 ^{+0.03} _{-0.03} (18.2 ^{+0.7} _{-0.7})	2.64 ^{+0.06} _{-0.06} (67.0 ^{+1.5} _{-1.5})	2.12 (60)
HHR450A ²	18670(L-Fat-A)	1.2	4500	4200	2000	2.7	0.72 ^{+0.03} _{-0.03} (18.2 ^{+0.7} _{-0.7})	2.64 ^{+0.06} _{-0.06} (67.0 ^{+1.5} _{-1.5})	2.12 (60)
HHR200SCP ³	4/5SC	1.2	2100	1900	2000	1.2	0.91 ^{+0.04} _{-0.04} (23.0 ^{+0.9} _{-0.9})	1.34 ^{+0.06} _{-0.06} (34.0 ^{+1.5} _{-1.5})	1.50 (42)
HHR250SCH ¹	SC	1.2	2650	2500	1250	2.4	0.91 ^{+0.04} _{-0.04} (23.0 ^{+0.9} _{-0.9})	1.69 ^{+0.06} _{-0.06} (43.0 ^{+1.5} _{-1.5})	1.94 (55)
HHR260SCP ³	SC	1.2	2600	2450	2600	1.2	0.91 ^{+0.04} _{-0.04} (23.0 ^{+0.9} _{-0.9})	1.69 ^{+0.06} _{-0.06} (43.0 ^{+1.5} _{-1.5})	1.94 (55)
HHR300SCP ³	SC	1.2	3050	2800	3000	1.2	0.91 ^{+0.04} _{-0.04} (23.0 ^{+0.9} _{-0.9})	1.69 ^{+0.06} _{-0.06} (43.0 ^{+1.5} _{-1.5})	2.01 (57)
HHR300CH ¹	C	1.2	3300	3100	1500	2.4	1.02 ^{+0.04} _{-0.04} (25.8 ^{+0.9} _{-0.9})	1.97 ^{+0.06} _{-0.06} (50.0 ^{+1.5} _{-1.5})	2.82 (80)
HHR650D ³	D	1.2	6800	6500	6500	1.2	1.30 ^{+0.04} _{-0.04} (33.0 ^{+0.9} _{-0.9})	2.40 ^{+0.06} _{-0.06} (61.0 ^{+1.5} _{-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.

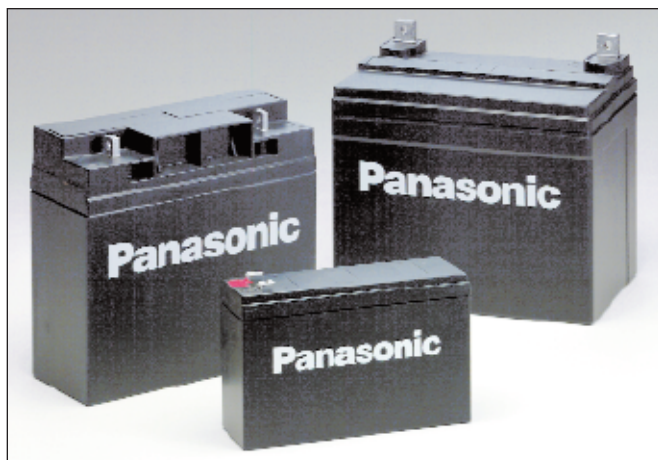
3. Mainly for high drain applications such as power tools.

4. For reference only.

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

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

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 overcharge, 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.

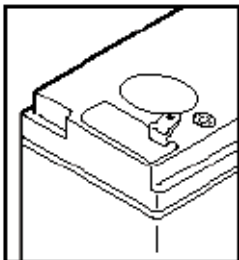
Those marked with a solid circle (●) indicate specifications as per special order.

*Expected trickle life approximately 6 years

BACK-UP POWER (HIGH POWER SERIES)

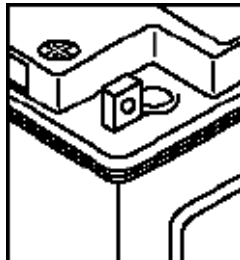
Model Number	Nominal Voltage (V)	Rated capacity Watts/Cell at 10 Minute Rate	Outline dimensions inch (mm)				Wt. (Approx.) lbs (kg)	Terminal Types	Battery-case resin	
			Length	Width	Height	Total height			UL94HB	UL94V-0
UP-RW1220P1	12	20	5.51 (140)	1.52 (38.5)	3.70 (94)	4.00 (101.5)	2.98 (1.35)	C	○	●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



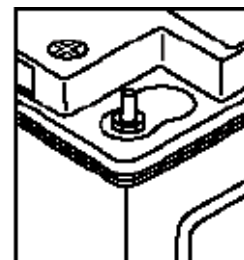
(B) Faston type 187
(C) Faston type 250

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	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(2.7)
VL2330	3.0	50.0	0.10	0.91(23.0)	0.12(3.0)	0.12(3.5)
VL3032	3.0	100.0	0.20	1.18(30.0)	0.13(3.2)	0.22(6.2)

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

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	Dimensions (Max.)		
	Nominal Voltage (V)	*Nominal Capacity (mAh)		Diameter inch (mm)	Height inch (mm)	Weight oz. (g)
ML414	3.0	1.2	0.005	0.19(4.8)	0.06(1.4)	0.003(0.09)
ML421	3.0	2.3	0.005	0.19(4.8)	0.08(2.1)	0.004(0.11)
ML614	3.0	3.4	0.01	0.27(6.8)	0.06(1.4)	0.006(0.16)
ML621	3.0	5.0	0.01	0.27(6.8)	0.08(2.1)	0.008(0.23)
ML920	3.0	11.0	0.03	0.37(9.5)	0.08(2.0)	0.014(0.40)
ML1220	3.0	17.0	0.03	0.49(12.5)	0.08(2.0)	0.03(0.80)
ML2020	3.0	45.0	0.12	0.79(20.0)	0.08(2.0)	0.078(2.2)

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

GENERAL DESCRIPTION

The ML-RM 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 lead free reflow solder process.¹

REFLOW SOLDERABLE MANGANESE LITHIUM RECHARGEABLE (ML-RM)						
Model Number	Electrical Characteristics 20°C (68°F)		Recommended Drain	Dimensions (Max.)		
	Nominal Voltage (V)	*Nominal Capacity (mAh)		Diameter inch (mm)	Height inch (mm)	Weight oz. (g)
ML414RM	3.0	1.0*	0.005	0.19(4.8)	0.06(1.4)	0.003(0.07)

* 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-RM cells with terminals.

NIOBIUM LITHIUM RECHARGEABLE (NBL)						
Model Number	Electrical Characteristics 20°C (68°F)		Recommended Drain	Dimensions (Max.)		
	Nominal Voltage (V)	*Nominal Capacity (mAh)		Diameter inch (mm)	Height inch (mm)	Weight oz. (g)
NBL414	2.0	1.0	0.008	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

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

APPLICATIONS

Power source for backing up memory data in:

- Mobile telephones
- Memory cards
- Other small-size communications devices

APPLICATIONS

Power source for backing up memory data in:

- Mobile telephones
- Memory cards
- Other small-size communications devices
- Data terminals
- Office automation equipment

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 (AB2O4) 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	0.04	0.23 (5.8)	0.06(1.6)	0.005(0.15)
MT616	1.5	1.05	0.04	0.27(6.8)	0.06(1.6)	0.007(0.2)
MT621	1.5	2.5	0.04	0.27(6.8)	0.08(2.1)	0.01(0.25)
MT920	1.5	5.0	0.04	0.37(9.5)	0.08(2.0)	0.02(0.45)

COIN CELL TAB CONFIGURATIONS

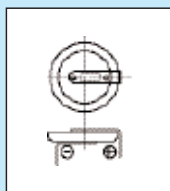
Model Number	Tab Type		Configuration Type
	With Insulation Wrap	Without Insulation Wrap	
VL TYPE			
VL621		/DN	F
VL1220	/HFN		H
VL1220	/VCN		V
VL1220	/FCN		F
VL2020	/VCN		V
VL2020	/HFN		H
VL2320	/VCN		V
VL2320	/HFN		H
VL2320	/F2N		F
VL2330	/VCN		V
VL2330	/VCN		H
VL2330	/F3N		F
VL3032		/GUFN	G
VL3032	/F2N		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.

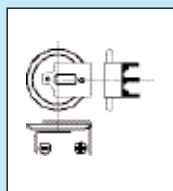
Please contact Panasonic for requests on custom tab configurations. Minimum order requirements may apply.

Model Number	Tab Type		Configuration Type
	With Insulation Wrap	Without Insulation Wrap	
ML TYPE			
ML414		ML-414S/DN	F
ML421	Contact Panasonic for details on available tab configurations.		
ML614		ML-614S/FN	F
ML621	ML-621S/FDDN	ML-621S/DN	F
ML920		ML-920S/DN	F
ML1220	/F1AN		F
ML1220	/V1AN		V
ML1220			F
ML2020	/G1AN		G
ML2020	/H1CN		H
ML2020	/V1AN		V
ML-R TYPE			
ML414RM	/AN		F
ML414RM	/CN		F
MT TYPE			
ALL Tabs not available for this series.			
NBL TYPE			
NBL414		/DN	F
NBL621		/DN	F

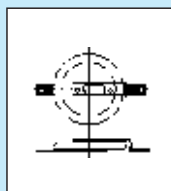
TYPICAL TAB CONFIGURATIONS



H Type



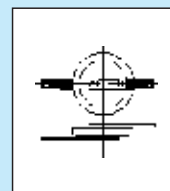
G Type



F Type



V Type



T 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-carbon-monofluoride 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.

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

COIN TYPE



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

Model Number	Electrical Characteristics (20°C)				Recommended Drain (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
	With Insulation Wrap	Without Insulation Wrap	
BR1220	/HFN		H
BR1220	/VCN		V
BR1225	/HCN	/HBN	H
BR1225	/VCN		V
BR1632	/HFN		H
BR2032		/HGN	G
BR2032	/GUFN	/GUN	G
BR2032	/HFN	/HEN	H
BR2032		/VBN	V
BR2032	/GVFN	/GVN	V
BR2032	/F2N		F

Model Number	Tab Type		Configuration Type
	With Insulation Wrap	Without Insulation Wrap	
BR2325	/HCN	/HBN	H
BR2325	/VCN		V
BR2325		/HGN	H
BR2325	/2HCN		H
BR2325		/VGN	V
BR2330	/HFN	/HEN	G
BR2330	/GUFN	/GUN	G
BR2330	/VCN	/VBN	V
BR2330	/GVFN	/GVN	V
BR2330	/F3N		F
BR3032	/VCN		V
BR3032	/F2N		F

Lithium Primary Coin Batteries

MnO₂/Li: MANGANESE DIOXIDE (CR)

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)
CR1025	CR1025	CR1025	3	30	0.10	0.39 (10.0)	0.10 (2.5)	0.02 (0.7)
CR1216	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	40	0.10	0.63 (16.0)	0.05 (1.2)	0.03 (0.8)
CR1616	CR1616	CR1616	3	55	0.10	0.63 (16.0)	0.06 (1.6)	0.04 (1.2)
CR1620	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)	0.08 (2.3)
CR2032	CR2032	CR2032	3	225	0.20	0.79 (20.0)	0.13 (3.2)	0.10 (2.9)
CR2330	CR2330	CR2330	3	265	0.20	0.91 (23.0)	0.12 (3.0)	0.13 (3.8)
CR2354	CR2354	CR2354	3	560	0.20	0.91 (23.0)	0.21 (5.4)	0.20 (5.8)
CR2412	—	—	3	100	0.20	0.96 (24.5)	0.05 (1.2)	0.07 (2.0)
CR2450	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	CR3032	CR3032	3	500	0.20	1.18 (30.0)	0.13 (3.2)	0.24 (6.8)

*Nominal capacity shown is based on standard drain

CR COIN CELL TAB CONFIGURATIONS

See page 7 for diagrams

Model Number	Tab Type		Configuration Type
	With Insulation Wrap	Without Insulation Wrap	
CR1220	/HFN		H
CR1220	/VCN		V
CR1616		/F2N	F
CR1632	/HFN		H
CR2016	/F2N		F
CR2032		/HU3N	H
CR2032		/HGN	G
CR2032	/HSN		H
CR2032	/GUFN	/GUN	G
CR2032	/HFN	/HEN	H
CR2032	/GVFN	/GVN	V
CR2032	/F4N		F
CR2032	/F2N		F

Model Number	Tab Type		Configuration Type
	With Insulation Wrap	Without Insulation Wrap	
CR2330	/GUFN	/GUN	G
CR2330	/HFN		H
CR2330	/GVFN	/GVN	V
CR2330	/F3N		F
CR2354	/HFN	/HEN	H
CR2354	/GUFN	/GUN	G
CR2354	/VCN		V
CR2450	/H1AN		H
CR2450		/G1AN	G
CR2477	/VCN		V
CR2477	/HFN		H
CR3032	/VCN		V
CR3032	/F2N		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

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	/FAN		F
BR1225A	/HBN	/HAN	H
BR1632A	/FAN		F
BR1632A		/GAN	G
BR1632A	/HAN	/HBN	H
BR1632A	/VAN		V
BR2330A	/FAN		F
BR2330A		/GAN	G
BR2330A	/HDN		H
BR2330A	/VAN		V
BR2450A ¹	/FAN		F
BR2450A ¹	/GAN		G
BR2477A	/FBN		F
BR2477A	/GAN		G
BR2477A	/HBN	/HCN	H
BR2477A	/VAN		V

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 MONOFLUORIDE



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
- Strong leakage resistance
- Excellent durability

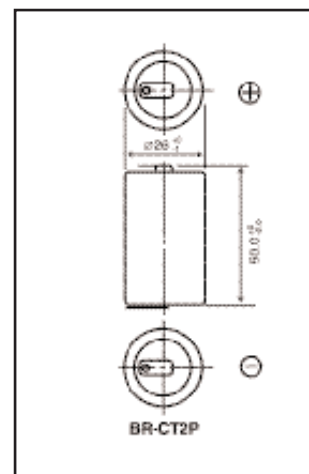
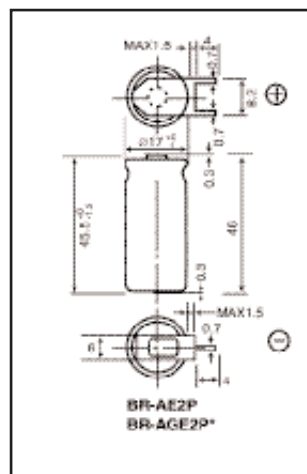
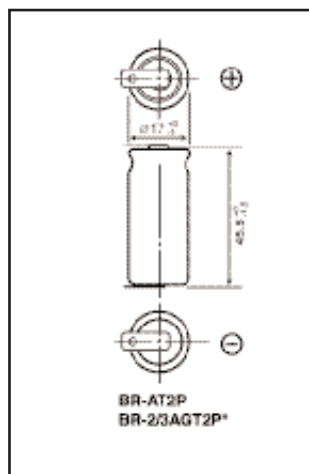
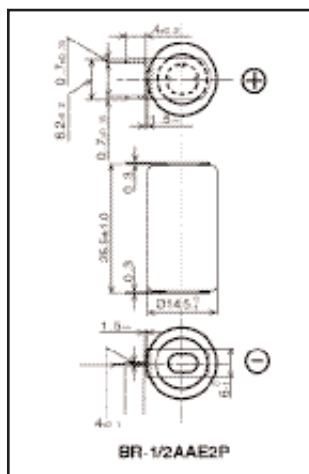
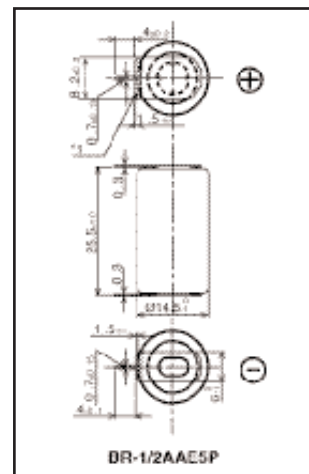
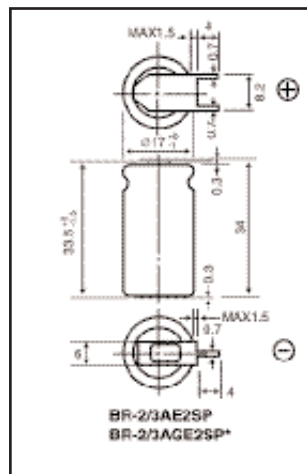
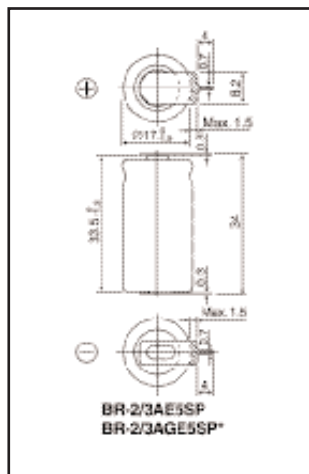
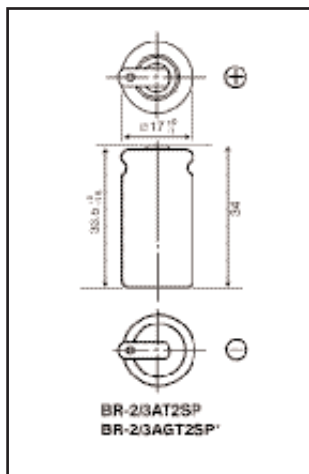
APPLICATIONS

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

CYLINDRICAL TYPE

Model Number	Electrical Characteristics			Dimensions		Approximate Weight oz. (g)	Operating Temperature (°C)
	Nominal Voltage (V)	**Nominal Capacity (mAh)	Standard Drain (mA)	Diameter inch (mm)	Height inch (mm)		
BR-C	3	5,000	5.0	1.02 (26.0)	1.99 (50.5)	1.48 (42.0)	- 40 to +85
BR-A	3	1,800	2.5	0.67 (17.0)	1.79 (45.5)	0.63 (18.0)	- 40 to +85
BR-AG*	3	2,200	2.5	0.67 (17.0)	1.79 (45.5)	0.63 (18.0)	- 40 to +85
BR-2/3A	3	1,200	2.5	0.67 (17.0)	1.32 (33.5)	0.48 (13.5)	- 40 to +85
BR-2/3AG*	3	1,450	2.5	0.67 (17.0)	1.32 (33.5)	0.48 (13.5)	- 40 to +85
BR-1/2AA	3	1,000	2.5	0.57 (14.5)	1.00 (25.5)	0.28 (8.0)	- 40 to +100

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



Lithium Primary Cylindrical Batteries



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

MANGANESE DIOXIDE (CR)

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

POLY-CARBON MONOFLUORIDE (BR)



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.

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
- EU compliant



APPLICATIONS

- Portable stereos
- Radio-cassette recorders
- Stroboscopes
- 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)
LR20XWA	D	1.5	1.312 (33.3)	2.407 (60.5)	4.97 (141.0)
LR14XWA	C	1.5	1.004 (25.5)	1.969 (49.5)	2.47 (70.0)
LR6XWA	AA	1.5	.571 (14.50)	1.988 (50.0)	0.80 (23.0)
LR03XWA	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)
6LR61XWA (9V)	9	1.0 (47.5)	1.0 (25.50)	0.649 (17.50)	1.60 (45)

Panasonic ideas for life

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 Panasonic Corporation. 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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