

Rechargeable Lithium Coin Batteries

Reflowable Manganese Lithium Rechargeable Batteries (ML-RH series)



Features

These super compact lithium rechargeable batteries feature a manganese compound oxide for the positive electrode, a lithium/aluminum alloy for the negative electrode and a special non-aqueous solvent for the electrolyte. Special gasket materials and electrolyte with a high boiling point have been utilized to help the battery withstand the reflow solder process.¹

Applications

- Memory backup power supplies for mobile phones, memory cards, pagers and other compact communications equipment, data terminals and office automation equipment



General Specifications

Model	Electrical Characteristics (20°C)			Dimensions (mm)		Weight (g)	JIS	IEC
	Nominal Voltage (V)	Nominal Capacity (mAh)	Continuous Drain (mA)	Diameter	Height			
ML414RH	3	1.0*	0.005	4.8	1.4	0.1	-	-

*Nominal capacity shown above is based on standard drain and cut off voltage down to 2.0V at 20°C.

¹ Reflow Soldering for ML-R Cells with Terminals

- The surface temperature, of the anode (-) part of the cell, should not exceed the following conditions:

Above 150°C (302°F), max. 180 seconds

Above 200°C (392°F), max. 65 seconds

Above 230°C (428°F), max. 45 seconds

Reflow peak temperature, 260°C within 3 seconds

- The storage environment should be 10°C - 30°C and 60% humidity.
- The number of times the cell can be reflowed is 2 times or less. If the reflow peak temperature exceeds 260°C (446°F) or the number of repeated reflow soldering exceeds 2 times, the performance of the battery may be drastically reduced and the battery may rupture or leak electrolyte. Please consult Panasonic if you plan to reflow solder in excess of these conditions.

Reflowable Manganese Lithium Rechargeable Batteries (ML-RH series)

Charging

■ Charging circuits

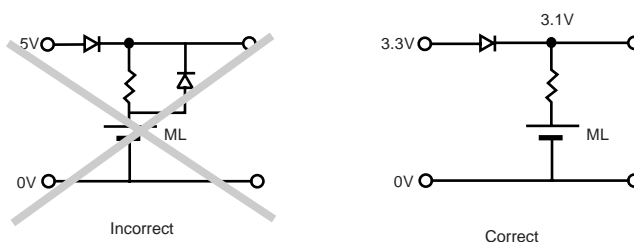
Charging/discharging cycle	Approx. 350 times at 10% discharge depth to nominal capacity
Charging system*	Constant-voltage charging. (Please strictly adhere to the specified charge voltage)
Operating temperature	-20°C ~ + 60°C

* Consult with Panasonic concerning constant-current charging systems.

The charging circuit is crucial in terms of ensuring that full justice will be done to the battery characteristics. Consider it carefully as the wrong charging circuit can cause trouble.

■ Precautions regarding the charge voltage setting

Under no circumstances should trickle charging, which is used for nickel-cadmium batteries, be used. Ignoring this precaution will cause the battery voltage to rise to about 5V, resulting in a deterioration of performance.



■ Charge voltage range

If a fixed-charging method is applied, please adhere to the specified charging voltage.

Guaranteed voltage is 2.8V ~ 3.2V at the temperature of -20°C~60°C.

* If the charging voltage exceeds the specifications, the internal resistance of the battery will rise and may cause battery deterioration. Also, with a charge voltage around 4V, corrosion of the (+)terminal (case) may occur, causing leakage.

* It is not possible for the battery capacity to recover completely when the charging voltage is below the specification.

■ Recommended charging circuits

- Basic conditions
 - Fixed-voltage charge
 - Charge voltage: 2.8~3.2V (Standard voltage: 3.1V)
 - Charge current: For a battery voltage of 2.5V
 - ML414RH Approx. 0.06 mA or below

■ Mixed usage of batteries

Do not use these batteries and lithium primary batteries or other rechargeable batteries together, and do not use new batteries and old batteries together even if they are of the same type.

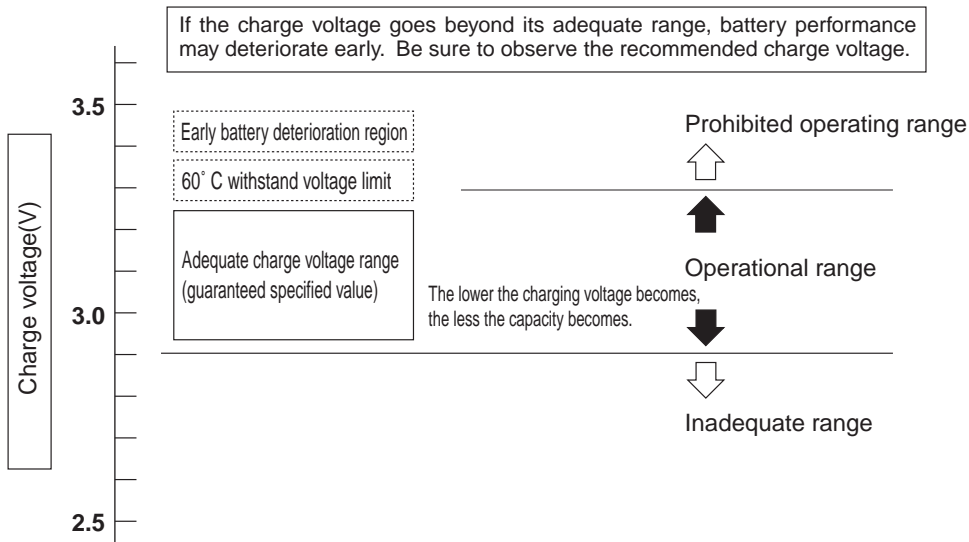
Reflowable Manganese Lithium Rechargeable Batteries (ML-R series)

Charging

● Reference: Examples of 5-V charging circuits

<p>①</p>	<table border="1"> <thead> <tr> <th colspan="3">ML414RH</th> </tr> <tr> <th>REG</th> <th>D</th> <th>R</th> </tr> </thead> <tbody> <tr> <td>3.2V</td> <td>MA2J728</td> <td>7.5K Ω</td> </tr> <tr> <td>3.1V</td> <td>MA2J728</td> <td>5.8K Ω</td> </tr> </tbody> </table>	ML414RH			REG	D	R	3.2V	MA2J728	7.5K Ω	3.1V	MA2J728	5.8K Ω
ML414RH													
REG	D	R											
3.2V	MA2J728	7.5K Ω											
3.1V	MA2J728	5.8K Ω											
<p>②</p>	<p>Standard circuits</p> <p>For D2, select a diode of small inverse current D1, D2 : MA716(Diode type code) ($I_R=1\mu A/5V$) D3 : MA704, MA700</p> <table border="1"> <thead> <tr> <th></th> <th>R1</th> <th>R2</th> </tr> </thead> <tbody> <tr> <td>ML414RH</td> <td>12k Ω</td> <td>21k Ω</td> </tr> </tbody> </table>		R1	R2	ML414RH	12k Ω	21k Ω						
	R1	R2											
ML414RH	12k Ω	21k Ω											
<p>③</p> <p>Pat No. JP284170</p>	<p>Simple economical circuits D: MA700: Very small inverse current</p> <table border="1"> <thead> <tr> <th>Load</th> <th colspan="2">10μ A below</th> </tr> <tr> <th>D, Vf</th> <th colspan="2">0~0.2V</th> </tr> <tr> <th></th> <th>R1</th> <th>R2</th> </tr> </thead> <tbody> <tr> <td>ML414RH</td> <td>21k Ω</td> <td>12k Ω</td> </tr> </tbody> </table> <p>Vf of D will be different from the value given above if a current in excess of 10μ A flows to the load during operation. Compensation must be provided by the resistors in such cases.</p>	Load	10 μ A below		D, Vf	0~0.2V			R1	R2	ML414RH	21k Ω	12k Ω
Load	10 μ A below												
D, Vf	0~0.2V												
	R1	R2											
ML414RH	21k Ω	12k Ω											

● Influence of charge voltage on ML batteries



○ UL recognition conditions

When a protective component is shorted or opened, the maximum charge current is regulated to the following Value : ML414RH, 300mA