

FILE NAME: SPECIFICATIONS OF  
SEALED NICKEL CADMIUM  
BATTERIES(FOR HIGH  
TEMP)

MODEL: KRMT 26/50 C2500mAh

Specification No.: S/RONDA0161-1

EDITION: A2

DATE: 2013-10-6

EDITION	AMENDMENT		DATE OF ISSUE
A	A0 Initial Publish		2008-10-7
	A1 1. Editing the parameter of the weight 2. Editing the base data		2012-8-30
	A2 Editing the parameters of IR and the weight		2013-10-6
Drawn	Checked	Reviewed	Approved

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### 1. SCOPE

The specifications governs the performance of the following **RONDA** Nickel-Cadmium Cylindrical cell and its battery pack.. (Refer to the attached figure 1 )

Rated capacity: **2500mAh**

Designation: KRMT 26/50 C (D:  $25.8^{0}_{-1.0}$ mm H:  $50.0^{0}_{-2.0}$ mm )

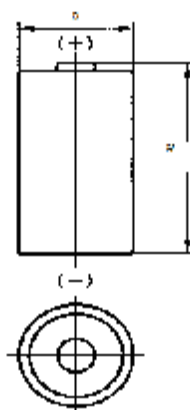


Figure 1- Jacketed cylindrical cells

### 2. DATA OF BATTERY PACK

The data of battery pack, including voltage and weight, is almost equivalent to the multiple numbers of the relevant single cells.

Example: Battery pack consisting three single cells

Nominal voltage of single cell = 1.2V

Nominal voltage of battery pack =  $1.2V \times 3 = 3.6V$

### 3. RATINGS

Table 1 - Ratings of the cells

Description	Unit	Specification	Conditions
Nominal Voltage	V/Cell	1.2	Single cell
Rated Capacity	mAh	<b>2500</b>	Standard Charge/Discharge

### 4. PERFORMANCE

Unless otherwise stated, tests should be done within one month of delivery under the following conditions:

Ambient Temperature:  $20 \pm 5^{\circ}\text{C}$

Relative Humidity:  $65 \pm 20\%$

Standard Charge/Discharge Conditions:

Preparative: Prior to charging, the cell shall be discharged by **500mA**( $0.2I_A$ ) to 1.0V

Charge: **250mA**( $0.1I_A$ )  $\times$  16hours

Stand in charged condition:1~4h

Discharge: 500mA(0.2I<sub>A</sub>) to 1.0V/Cell 1

**Table 2 – Performance and test methods**

Test Item		Unit	Specification	Test Conditions	Remarks
Discharge performance	20℃ <sup>a</sup>	h	≥ 5	Standard Charge/Discharge	/
		min	≥ 48	After Standard Charge, stored for 1~4h, then discharged by 2500mA (1.0I <sub>A</sub> ) to 0.9V.	/
	-18℃	h	≥ 2	After Standard Charge, stored for 16~24h in -18±2℃, then discharged by 500mA (0.2I <sub>A</sub> ) to 1.0V in -18±2℃.	/
Charge (capacity) retention		h/min	≥ 3h15min	After Standard Charge, stored on open circuit for a period of 28days, then discharged by 500mA (0.2I <sub>A</sub> ) to 1.0V.	/
Endurance in cycles		cycle	≥ 50	Appendix-table 3	/
Permanent charge endurance		A: ≥ 3h45min B: ≥ 42min 2 <sup>nd</sup>		Appendix-table 4	/
		A: ≥ 3h45min B: ≥ 42min 3 <sup>rd</sup>			
		A: ≥ 2h30min B: ≥ 24min 8 <sup>th</sup>			
		A: ≥ 2h30min B: ≥ 24min 9 <sup>th</sup>			
Over charge	Discharge A	h/min	≥ 4h15min	Appendix-table 5	/
	Discharge B	min	≥ 36		
Safety device operation		Not disrupt or burst		Undergo a forced discharge at constant current 500mA(0.2I <sub>A</sub> ) to 0V. Then discharged by 2500mA (1.0I <sub>A</sub> ) for 60min.	/
Storage <sup>b</sup>		hour	≥ 5	Stored on open circuit for 12 months. Then standard charge/discharge.	/
Charge acceptance		/	/	IEC 61951-1 2006 7.9	Reference
Internal resistance		mΩ	≤ 18	Within 1~4h after standard Charge (1000Hz)	
Weight		g	65(approx)	/	Reference
Vibration		No leakage, no fire, no explosion		IEC 62133 2002 4.2.2	/
Free fall		No fire, no explosion		IEC 62133 2002 4.3.3	/

a) Five cycles is permitted b) Unless otherwise stated, the cell shall be discharged by 500mA(0.2I<sub>A</sub>) to 1.0V before test.

**Notice:** Test conditions is drawn according to IEC 61951-1 2006; Please refer to the related description of the standard.

## 5. CONFIGURATION, DIMENSIONS AND MARKINGS

Please refer to the attached drawing.

## 6. EXTERNAL APPEARANCE

The cell/battery shall be free from cracks, scars, breakage, rust, discoloration, leakage nor deformation.

## 7. CAUTION

- (1) Reverse charging is not acceptable.
- (2) Charge before use. The cells/batteries are delivered in an uncharged state.
- (3) Do not charge/discharge with more than our specified current.

- (4) Prevent short circuit, do not incinerate or disassemble the cell/battery.
- (5) Do not solder directly to the cell/battery for a long time.
- (6) The life expectancy may be reduced if the cell/battery is subjected adverse conditions like: extreme temperature, deep cycling, excessive overcharge/ over-discharge.
- (7) Store the cell/battery in a cool and dry place. Always discharge batteries before assemble or solder.
- (8) Always discharge batteries before bulk storage or shipment.
- (9) Do not mix batteries of different types and capacities.

### Appendix

#### A) Endurance in cycles

Prior to the endurance on cycle test ,the cell shall be discharged at 500mA(0.2I<sub>r</sub>) to 1.0V. The following test shall be carried out in accordance with the conditions specified in Table 3.

**Table 3 Endurance in cycles**

Cycle number	Charge	Stand in charged condition	Discharge
1	0.1I <sub>r</sub> for 16h	none	0.25I <sub>r</sub> for 2h20min
2~48	0.25I <sub>r</sub> for 3h10min	none	0.25I <sub>r</sub> for 2h20min
49	0.25I <sub>r</sub> for 3h10min	none	0.25I <sub>r</sub> to 1.0V
50	0.1I <sub>r</sub> for 16h	1h~4h	0.20I <sub>r</sub> to 1.0V <sup>a</sup>

a) Cycles 1 to 50 shall be repeated until the discharge duration on any 50th Cycle becomes less than 3h or the cell voltage drops below 1.0V during 1~48<sup>th</sup> cycle.

#### B) Permanent charge endurance

The permanent charge endurance test shall be performed in three steps according to the conditions specified in table 4.

It consists of:

- I A charge acceptance test at +40°C;
- I An ageing period of six months at +70°C;
- I A final charge acceptance test to check the cell' s performance after ageing.

NOTE: The six months ageing period and the temperature of +70 ° C have been selected to simulate four years of permanent charge operation at +40 ° C.

Table 4 Permanent charge endurance

Cycle number	Ambient temperature	Charge	Discharge A or B <sup>a</sup>	Minimum discharge duration
1	40°C ± 2°C	0.05I <sub>r</sub> A for 48h	A: 0.2I <sub>r</sub> A to 1.0V or B: 1.0I <sub>r</sub> A to 1.0V	No requirement
2		0.05I <sub>r</sub> A for 24h	A: 0.2I <sub>r</sub> A to 1.0V or B: 1.0I <sub>r</sub> A to 1.0V	3h45min 42min
3		0.05I <sub>r</sub> A for 24h	A: 0.2I <sub>r</sub> A to 1.0V or B: 1.0I <sub>r</sub> A to 1.0V	3h45min 42min
4	70°C ± 2°C	0.05I <sub>r</sub> A for 60d	A: 0.2I <sub>r</sub> A to 1.0V or B: 1.0I <sub>r</sub> A to 1.0V	No requirement
5		0.05I <sub>r</sub> A for 60d	A: 0.2I <sub>r</sub> A to 1.0V or B: 1.0I <sub>r</sub> A to 1.0V	
6		0.05I <sub>r</sub> A for 60d	A: 0.2I <sub>r</sub> A to 1.0V or B: 1.0I <sub>r</sub> A to 1.0V	
7	40°C ± 2°C	0.05I <sub>r</sub> A for 48h	A: 0.2I <sub>r</sub> A to 1.0V or B: 1.0I <sub>r</sub> A to 1.0V	No requirement
8		0.05I <sub>r</sub> A for 24h	A: 0.2I <sub>r</sub> A to 1.0V or B: 1.0I <sub>r</sub> A to 1.0V	2h30min 24min
9		0.05I <sub>r</sub> A for 24h	A: 0.2I <sub>r</sub> A to 1.0V or B: 1.0I <sub>r</sub> A to 1.0V	2h30min 24min

a) A: for LT、MT、HT cells; B: for MT、HT cells only.

### C) Over charge

The ability of the cell to withstand an overcharge shall be determined by the following test at 0°C ± 2°C in circulating air.

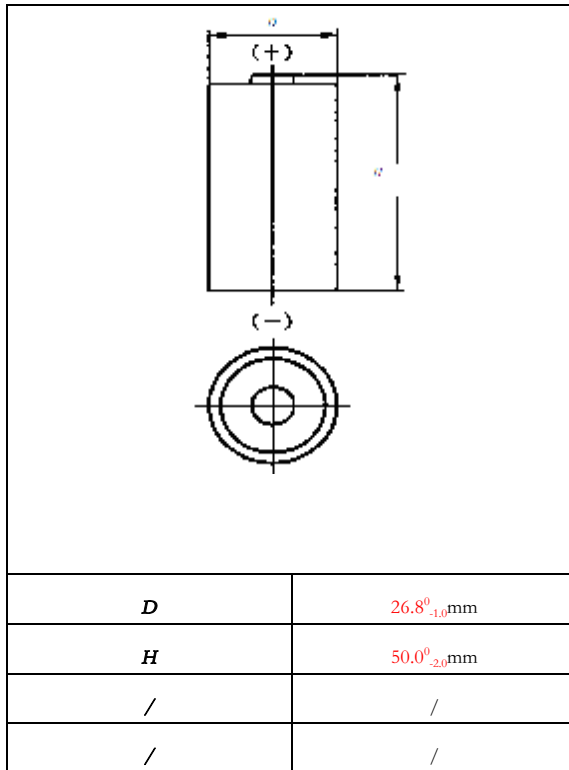
The test shall be carried out according to the specified in table 5.

Table 5 Overcharge at 0°C

Charge	Discharge A <sup>a</sup>	Discharge B <sup>a</sup>
	LT、MT、HT cells	MT、HT cells
0.05 I <sub>r</sub> A for 28d	0.2I <sub>r</sub> A to 1.0V	1.0I <sub>r</sub> A to 1.0V

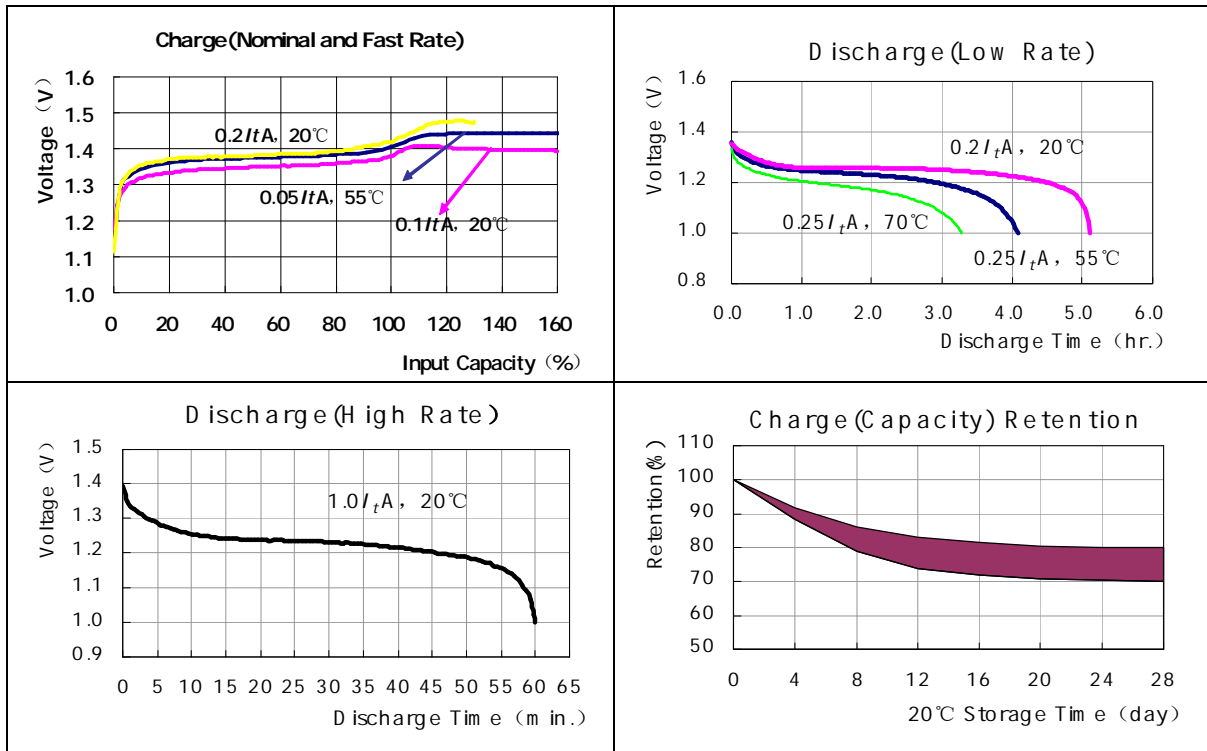
a) The discharge is carried out immediately on the charging

### Base Data:



Nominal voltage		1.2V
Capacity comparison(mAh)	0.2I <sub>t</sub> A	2500
	1.0I <sub>t</sub> A	2250
Weight(g)		65
Internal Impedance at 1000Hz (After Charge;mΩ)		≤ 18
Charge current	Trickle	125mA
	Standard	250mA
	Rapid	500mA
Charge time	Trickle	48h
	Standard	16h
	Rapid	6.5h
Temperature Ambient	charge	0~+70°C
	Discharge	-20~+70°C
	Storage	-30~+70°C
Max. Test Temperature		70°C

### Electrical Performance:



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文件名称： 圆柱型密封可充镍镉高温型电池规格书  
 型 号： KRMT 26/50 C2500 毫安时  
 编 号： S/RONDA0161-1  
 版 次： A2  
 日 期： 2013年10月6日

版 次	修 改 内 容		生 效 日 期
A	A0 初版发行		2008-10-7
	A1 1. 修订电池重量参数 2. 修订基础数据		2012-8-30
	A2 修订电池内阻和重量参数		2013-10-6
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#### 1. 范围

本规格书适用于下述的朗达牌 Ni-Cd 圆柱型电池单体及电池组的全部性能指标。

额定容量: 2500mAh

电池型号: KRMT 26/50 C (D:  $26.8^{0}_{-1.0}$ mm H:  $50.0^{0}_{-2.0}$ mm)

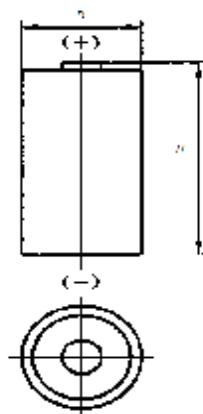


图 1 带防护外套的圆柱型密封镍镉可充单体电池

#### 2. 组合电池的指标

组合电池的电压、重量等数据，近似等于单体电池数与对应值之乘积。

例如：组合电池包括三个单体电池

单体电池的额定电压=1.2V

则电池组的额定电压=1.2V×3=3.6V

#### 3. 额定性能

表 1 电池的额定性能

项目	单位	指标	备注
标称电压	V	1.2	单体
额定容量	mAh	2500	标准充放

#### 4. 电池性能与测试方法

除非另有说明，测试须在发货后一个月内在下述条件下进行：

环境温度:  $20 \pm 5^\circ\text{C}$

相对湿度:  $65 \pm 20\%$

标准充放条件：

准备：充电前电池要以  $0.2I_A$  恒流放电至终点电压 1.0V；

充电： $250\text{mA}$ ( $0.1I_A$ )充 16 小时；

搁置：1~4 小时；

放电： $500\text{mA}$ ( $0.2I_A$ )至 1.0V。

电池性能和测试方法见表 2



表 2 电池性能及测试方法

测试项目		单位	标准	测试方法	备注
放电性能	20°C <sup>1)</sup>	h	≥5	标准充放	/
		min	≥48	标准充电后搁置 1~4 小时，以 2500mA(1.0I <sub>A</sub> )放电至 0.9V。	/
	-18°C	h	≥2	标准充电后在 -18°C ± 2°C 搁置 16~24 小时，以 500mA(0.2I <sub>A</sub> )放电至 1.0V。	/
荷电保持率		h/min	≥3h15min	标准充电后，开路搁置 28 天(20°C ± 2°C)，随后标准放电(0.2I <sub>A</sub> )至 1.0V。	/
循环寿命		Cycle	≥50	见附录 表 3	/
耐充电寿命		A: ≥ 3h45min B: ≥ 42min 2 <sup>nd</sup>		见附录 表 4	/
		A: ≥ 3h45min B: ≥ 42min 3 <sup>rd</sup>			
		A: ≥ 2h30min B: ≥ 24min 8 <sup>th</sup>			
		A: ≥ 2h30min B: ≥ 24min 9 <sup>th</sup>			
过充测试	放电 A	h/min	≥4h15min	见附录 表 5	/
	放电 B	min	≥36		
安全装置操作		/	无爆炸、无破裂	以 500mA(0.2I <sub>A</sub> ) 放电至 0V 后再以 2500mA(1.0 I <sub>A</sub> )强制放电 60 分钟。	/
贮存 <sup>1)</sup>		h	≥5	以 500mA(0.2I <sub>A</sub> )放电至 1.0V 后搁置 12 个月，再进行标准充放。	/
内阻		mΩ	≤18	电池应以 0.2I <sub>A</sub> 放电至 1.0V，然后标准充电，搁置 1~4 小时；在频率为 1.0kHz ± 0.1kHz 的交流电流下测电池内阻。	/
重量		g	65(大约)	/	参考
碰撞试验		不漏液、不着火、不爆炸		IEC 62133 2002 4.2.2	/
自由落体		不着火、不爆炸		IEC 62133 2002 4.3.3	/

 1) 允许最多测试五次 2) 如未特别说明电池在测试前必须以 0.2I<sub>A</sub> 恒流放电至终点电压 1.0V

**注：**本规格书中的测试方法根据 IEC 61951-1 2006 制订，详细测试方法请参考该标准的相关条款。

## 5. 电池外观尺寸

参见附图

## 6. 外观

无裂缝、疤痕、破裂、锈蚀、脏污、漏液、变形

## 7. 使用注意事项

- 1) 勿将电池反极充电；
- 2) 如电池已带电，初次使用前先放电后再充电；
- 3) 避免以高于指定的电流充放电；

- 4) 防止电池短路，不要拆解或焚烧电池；
- 5) 勿在电池上直接锡焊焊接；
- 6) 如极端高温、大于规定的过充、过放电，电池的使用寿命可能会下降；
- 7) 电池应存放于凉爽阴凉处，电池在组装或焊接前应将电池放电；
- 8) 建议在运输或散装贮存时将电池放电；
- 9) 不要将不同类型或不同容量的电池组合使用。

**附录**
**1) 循环寿命测试**

循环寿命试验前，电池应以  $0.2I_A$  放电至终止电压 1.0V，然后，在环境温度  $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$  下作循环寿命测试；测试循环见表 3。

**表 3 循环寿命**

循环次数	充电	充电态搁置	放电
1	$0.1I_A$ 16h	无	$0.25I_A$ 2h20min
2~48	$0.25I_A$ 3h10min	无	$0.25I_A$ 2h20min
49	$0.25I_A$ 3h10min	无	$0.25I_A$ 放电至 1.0V
50	$0.1I_A$ 16h	1h~4h	$0.20I_A$ 放电至 1.0V <sup>b)</sup>

循环至第 50 次放电时间不足 3 小时或在 1~48 个循环中电压降至 1.0V 以下为止。

**2) 耐充电寿命**

按表 4 规定的条件，耐充电寿命试验应分三步进行，它包括：

- 充电效率试验
  - 在  $70^{\circ}\text{C}$  下六个月的老化周期；
- 注： $70^{\circ}\text{C}$  的试验是模拟  $40^{\circ}\text{C}$  时 4a 的耐充电寿命。
- 最后充电效率试验检查电池老化后的性能。

表 4 LT、MT、HT 电池的耐充电寿命

循环次数	环境温度	充电	放电 A 或 B <sup>a</sup>	最少放电时间
1	40°C ± 2°C	0.05I <sub>A</sub> 48h	A: 0.2I <sub>A</sub> 放电至 1.0V 或 B: 1.0I <sub>A</sub> 放电至 1.0V	无要求
2		0.05I <sub>A</sub> 24h	A: 0.2I <sub>A</sub> 放电至 1.0V 或 B: 1.0I <sub>A</sub> 放电至 1.0V	3h45min 42min
3		0.05I <sub>A</sub> 24h	A: 0.2I <sub>A</sub> 放电至 1.0V 或 B: 1.0I <sub>A</sub> 放电至 1.0V	3h45min 42min
4	70°C ± 2°C	0.05I <sub>A</sub> 60d	A: 0.2I <sub>A</sub> 放电至 1.0V 或 B: 1.0I <sub>A</sub> 放电至 1.0V	无要求
5		0.05I <sub>A</sub> 60d	A: 0.2I <sub>A</sub> 放电至 1.0V 或 B: 1.0I <sub>A</sub> 放电至 1.0V	
6		0.05I <sub>A</sub> 60d	A: 0.2I <sub>A</sub> 放电至 1.0V 或 B: 1.0I <sub>A</sub> 放电至 1.0V	
7	40°C ± 2°C	0.05I <sub>A</sub> 48h	A: 0.2I <sub>A</sub> 放电至 1.0V 或 B: 1.0I <sub>A</sub> 放电至 1.0V	无要求
8		0.05I <sub>A</sub> 24h	A: 0.2I <sub>A</sub> 放电至 1.0V 或 B: 1.0I <sub>A</sub> 放电至 1.0V	2h30min 24min
9		0.05I <sub>A</sub> 24h	A: 0.2I <sub>A</sub> 放电至 1.0V 或 B: 1.0I <sub>A</sub> 放电至 1.0V	2h30min 24min

a) A: 适用于 LT、MT、HT 电池; B: 仅适用于 MT、HT 电池。

## 3) 过充电测试

试验前, 电池应在 20°C ± 5°C 下以 0.2I<sub>A</sub> 放电至终止电压 1.0V, 并在 0°C ± 2°C 下搁置 16h~24h。在 0°C ± 2°C 循环空气中, 电池的耐过充电能力应由下面试验来决定, 测试条件见表

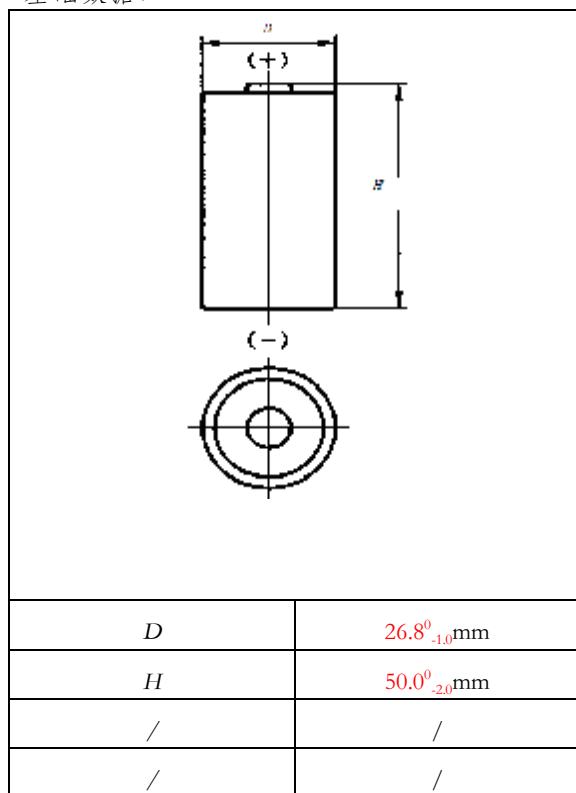
表 5 0°C 过充电

充电	放电 <sup>a</sup>	
	LT、MT、HT 电池	MT、HT 电池
0.05I <sub>A</sub> 充 28d	0.2I <sub>A</sub> 放电至 1.0V	1.0I <sub>A</sub> 放电至 1.0V

a) 充电结束后立即放电

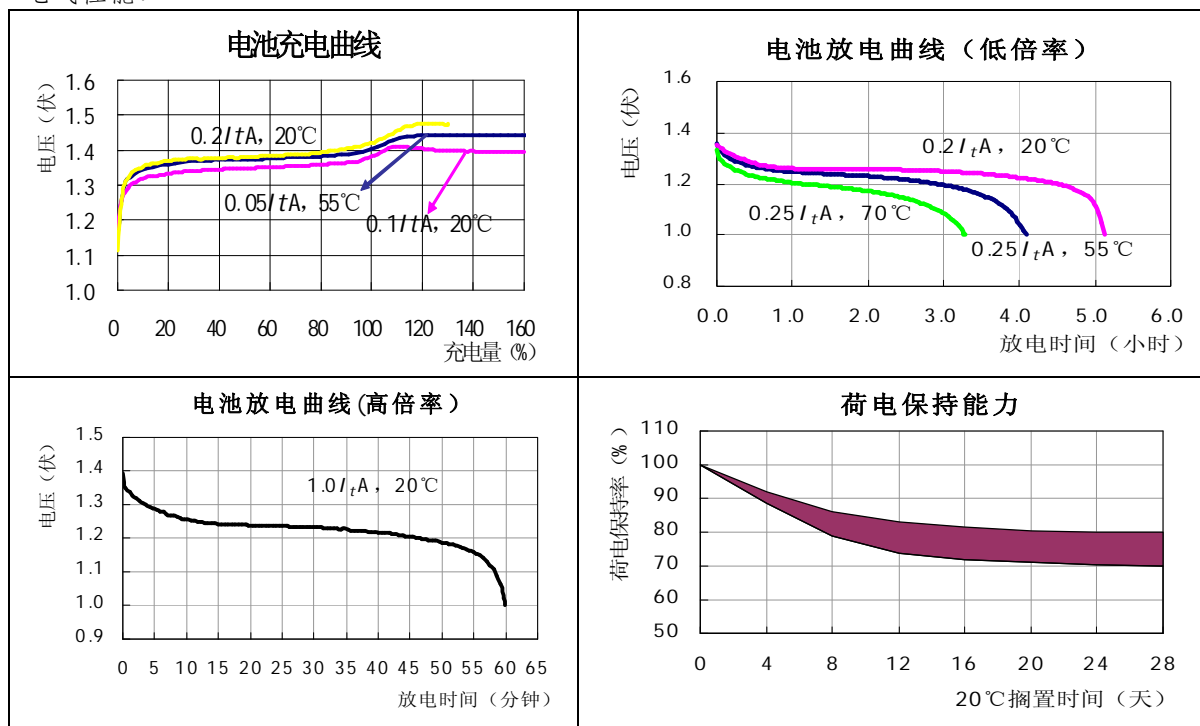
### KRMT 26/50 C2500 毫安时

基础数据:



标称电压	1.2V	
容量对比(mAh)	0.2I <sub>t</sub> A	1.0I <sub>t</sub> A
	2500	2250
重量 (g)	65	
内阻 (在 1000Hz 下) (充电后; mΩ)	≤18	
充电电流	涓流	125mA
	标准	250mA
	快速	500mA
充电时间	涓流	48 小时
	标准	16 小时
	快速	6.5 小时
使用温度	充电	0~+70°C
	放电	-20~+70°C
	贮存	-30~+70°C
最高测试温度	70°C	

电气性能:



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