

FILE NAME: SPECIFICATIONS OF
SEALED NICKEL-METAL
HYDRIDE BATTERI (FOR
HIGH TEMP)

MODEL: **HRMT 26/50 C4000mAh**

Specification No.: S/RONDA**0364-1**

EDITION: A1

DATE: **2012-07-18**

EDITION	AMENDMENT		DATE OF ISSUE
A	A0 Initial Publish		2009-08-24
	A1 1. Editing the parameters of IR and the weight 2. Editing the base data		2012-07-18
Drawn	Checked	Reviewed	Approved

Ronda Group Co.,Ltd.

Add /Block C & D,Shachongwei Industrial
Zone,Huangzhuang,Jianshe Third
Road,Jiangmen,Guangdong,China
Tel /86-750-3287188 3287189
Fax /86-750-3287198 3287199 P.C. /529000
[http:// www.ronda-battery.com](http://www.ronda-battery.com)
E-mail/ ronda@ronda-battery.com

Notice: If the document wasn't signed and stamped, the information (subject to change without prior notice) contained in this document is for reference only and should not be used as a criterion for product guarantee or warranty.

1. SCOPE

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

Rated capacity: 4000mAh

Designation: HRMT 26/50 C (D: 26.0⁰_{-1.0}mm H: 50.0⁰_{-2.0}mm)

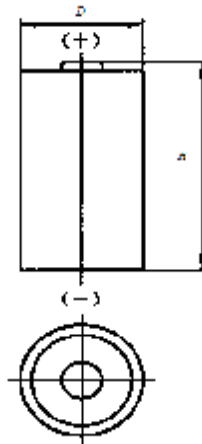


Figure 1- Jacketed cylindrical cells

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 × 3 = 3.6V

3. RATINGS

Table 1 - Ratings of the cells

Description	Unit	Specification	Conditions
Nominal Voltage	V/Cell	1.2	Single cell
Nominal Capacity	mAh	4000	Standard Charge/Discharge

4. PERFORMANCE

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

Ambient Temperature: 20 ± 5°C

Relative Humidity: 65 ± 20%

Standard Charge/Discharge Conditions:

Preparative: Prior to charging, the cell shall be discharged by 800mA(0.2I_rA) to 1.0V

Charge: 400mA(0.1I_rA) × 16hours

Stand in charged condition:1~4h

 Discharge: 800mA(0.2I_A) to 1.0V/Cell

Table 2 – Performance and test methods

Test Item	Unit	Specification	Test Conditions	Remarks	
Discharge performance	20 °C ^a	h	≥ 5	Standard Charge/Discharge	/
	0°C	h	≥ 2	After Standard Charge, stored for 16~24h in 0±2°C, then discharged by 800mA (0.2I _A) to 1.0V in 0±2°C.	/
Charge (capacity) retention	h	≥ 3h	After Standard Charge, stored on open circuit for a period of 28days, then discharged by 800mA (0.2I _A) to 1.0V.	/	
Endurance in cycles	cycle	≥ 50	Appendix-table 3	/	
Permanent charge endurance	A: ≥ 3h45min B: ≥ 42min 2 nd		Appendix-table 4	/	
	A: ≥ 3h45min B: ≥ 42min 3 rd				
	A: ≥ 2h30min B: ≥ 24min 8 th				
	A: ≥ 2h30min B: ≥ 24min 9 th				
Over charge	Discharge A	h	≥ 2	Appendix-table 5	/
	Discharge B	min	/		/
Safety device operation	Not disrupt or burst		Undergo a forced discharge at constant current 800mA(0.2I _A) to 0V. Then discharged by 4000mA (1.0I _A) for 60min.	/	
Storage ^b	hour	≥ 4	Stored on open circuit for 12 months. Then standard charge/discharge.	/	
Charge acceptance	/	/	IEC 61951-1 2003 7.9	Reference	
Internal resistance	mΩ	≤ 10	Within 1~4h after standard Charge (1000Hz)		
Weight	g	83.5(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 800mA(0.2I_A) to 1.0V before test.

Notice: Test conditions is drawn according to IEC 61951-2 2003; 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 **800mA**($0.2I_t$) 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	$0.1I_t$ for 16h	none	$0.25I_t$ for 2h20min
2~48	$0.25I_t$ for 3h10min	none	$0.25I_t$ for 2h20min
49	$0.25I_t$ for 3h10min	none	$0.25I_t$ to 1.0V
50	$0.1I_t$ for 16h	1h~4h	$0.20I_t$ to 1.0V ^a

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 1~48th 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 ^a	Minimum discharge duration
1	40°C ± 2°C	0.05I _r A for 48h	A: 0.2I _r A to 1.0V or B: 1.0I _r A to 1.0V	No requirement
2		0.05I _r A for 24h	A: 0.2I _r A to 1.0V or B: 1.0I _r A to 1.0V	3h45min 42min
3		0.05I _r A for 24h	A: 0.2I _r A to 1.0V or B: 1.0I _r A to 1.0V	3h45min 42min
4	70°C ± 2°C	0.05I _r A for 60d	A: 0.2I _r A to 1.0V or B: 1.0I _r A to 1.0V	No requirement
5		0.05I _r A for 60d	A: 0.2I _r A to 1.0V or B: 1.0I _r A to 1.0V	
6		0.05I _r A for 60d	A: 0.2I _r A to 1.0V or B: 1.0I _r A to 1.0V	
7	40°C ± 2°C	0.05I _r A for 48h	A: 0.2I _r A to 1.0V or B: 1.0I _r A to 1.0V	No requirement
8		0.05I _r A for 24h	A: 0.2I _r A to 1.0V or B: 1.0I _r A to 1.0V	2h30min 24min
9		0.05I _r A for 24h	A: 0.2I _r A to 1.0V or B: 1.0I _r 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.

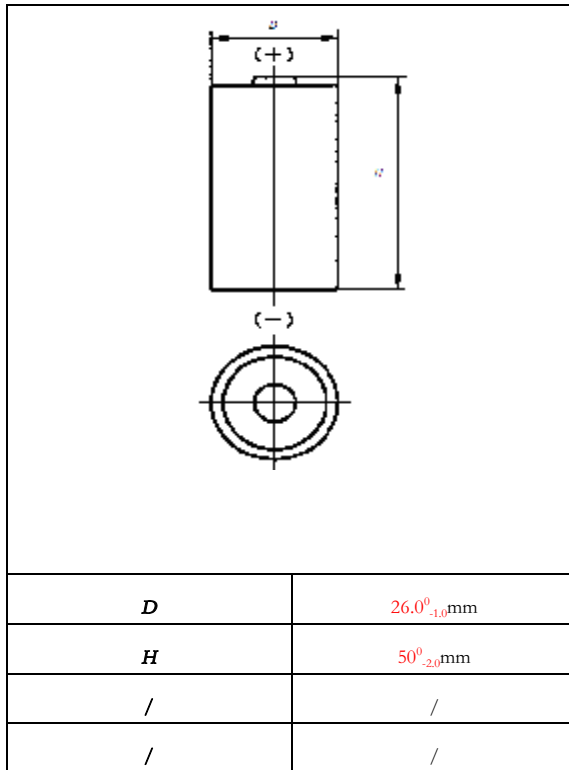
The test shall be carried out according to the specified in table 5.

Table 5 Overcharge at 0°C

Charge	Discharge A ^a	Discharge B ^a
	LT、MT、HT cells	MT、HT cells
0.05 I _r A for 28d	0.2I _r A to 1.0V	1.0I _r A to 0.9V

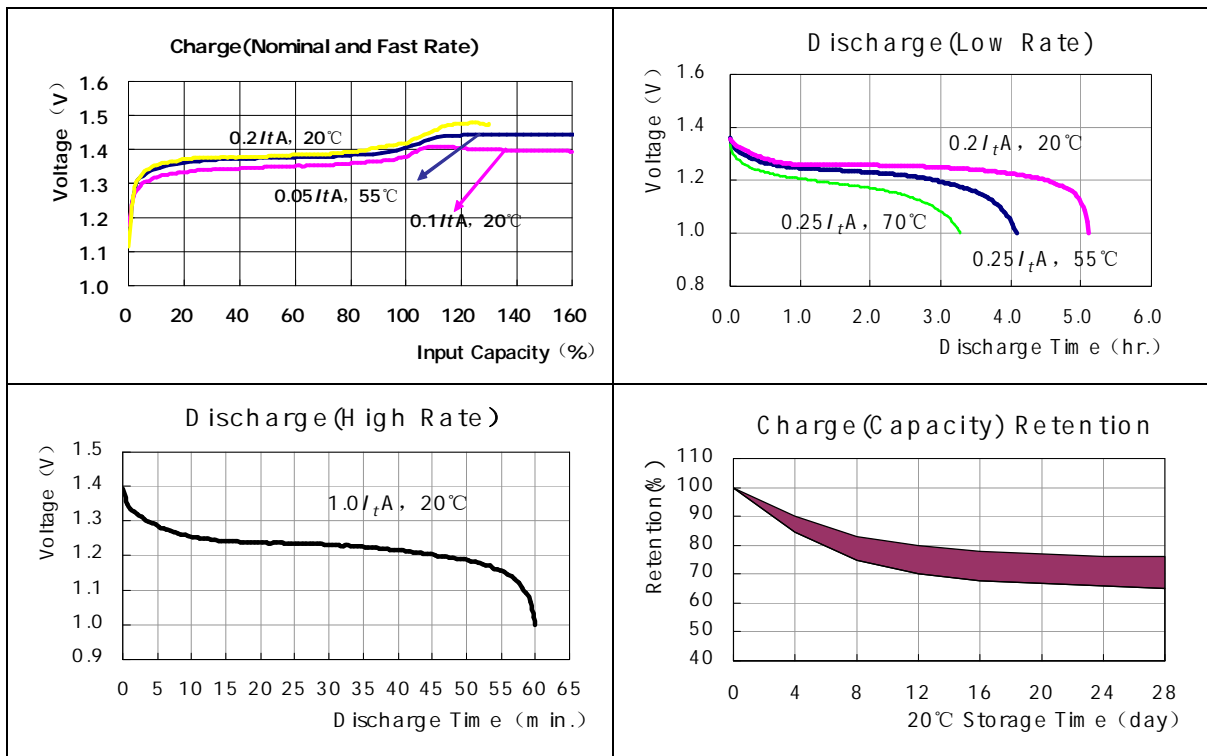
a) The discharge is carried out immediately on the charging

Base Data:



Nominal voltage		1.2V
Capacity comparison(mAh)	0.2I _t A	4000
	1.0I _t A	3200
Weight(g)		83.5
Internal Impedance at 1000Hz (After Charge;mΩ)		≤ 10
Charge current	Trickle	200mA
	Standard	400mA
	Rapid	800mA
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:



NOTICE: Manufacturer reserves the right to alter or amend the design, model and specification without prior to notice.

The information (subject to change without prior to notice) contained in this document is for reference only and should not be used as a criterion for product guarantee or warranty.

文件名称: 圆柱型密封可充镍氢高温电池规格书
 型 号: HRMT 26/50 C4000 毫安时
 编 号: S/RONDA0364-1
 版 次: A1
 日 期: 2012年07月18日

版 次	修 改 内 容		生 效 日 期
A	A0 初版发行		2009-08-24
	A1 1. 修订电池内阻参数和重量 2. 修订基础数据		2012-07-18
草 拟	审 核	复 核	批 准

江门市朗达集团有限公司

地址 / 广东省江门市建设三路篁庄沙冲围工业区C、D栋

电话 / 86-750-3287188 3287189

传真 / 86-750-3287198 3287199

邮编 / 529000

http:// www.ronda-battery.com

E-mail / ronda@ronda-battery.com

如果文件没有签名并盖章,本文件中包含的信息仅供参考,不应被用来作为产品提供保证或担保的基准。(如有变更,恕不另行通知)

1. 范围

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

额定容量: 4000mAh

电池型号: HRMT 26/50 C (D: $26.0^{0}_{-1.0}$ mm H: $50.0^{0}_{-2.0}$ mm)

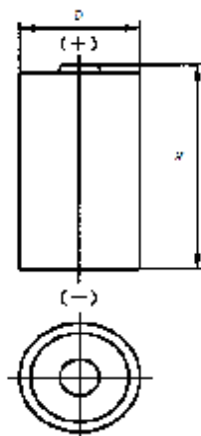


图 1 带防护外套的圆柱密封镍氢可充单体电池

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	4000	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： 400mA ($0.1I_A$)充 16 小时；

搁置：1~4 小时；

放电： 800mA ($0.2I_A$)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 ¹⁾	h	≥5	标准充放	/
	0°C	h	≥2	标准充电后在 0°C ± 2°C 搁置 16~24 小时, 以 800mA(0.2I _A)放电至 1.0V。	/
荷电保持率		h/min	≥3h	标准充电后, 开路搁置 28 天(20°C ± 2°C), 随后标准放电(0.2I _A)至 1.0V。	/
循环寿命		Cycle	≥50	见附录 表 3	见附录
耐充电寿命		A: ≥ 3h45min B: ≥ 42min 2 nd		见附录 表 4	见附录
		A: ≥ 3h45min B: ≥ 42min 3 rd			
		A: ≥ 2h30min B: ≥ 24min 8 th			
		A: ≥ 2h30min B: ≥ 24min 9 th			
过充测试	放电 A	h	≥2	见附录 表 5	见附录
	放电 B	min	/		
安全装置操作		/	无爆炸、无破裂	以 800mA(0.2I _A) 放电至 0V 后再以 4000mA(1.0 I _A)强制放电 60 分钟。	/
贮存 ¹⁾		h	≥4	以 800mA(0.2I _A)放电至 1.0V 后搁置 12 个月, 再进行标准充放。	/
内阻		mΩ	≤10	电池应以 0.2I _A 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	83.5(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_A 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 61951-2 2003 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 ^{b)}

循环至任何第 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°C 下六个月的老化周期；
- 注： 70°C 的试验是模拟 40°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 ^a	最少放电时间
1	40°C ± 2°C	0.05I _A 48h	A: 0.2I _A 放电至 1.0V 或 B: 1.0I _A 放电至 1.0V	无要求
2		0.05I _A 24h	A: 0.2I _A 放电至 1.0V 或 B: 1.0I _A 放电至 1.0V	3h45min 42min
3		0.05I _A 24h	A: 0.2I _A 放电至 1.0V 或 B: 1.0I _A 放电至 1.0V	3h45min 42min
4	70°C ± 2°C	0.05I _A 60d	A: 0.2I _A 放电至 1.0V 或 B: 1.0I _A 放电至 1.0V	无要求
5		0.05I _A 60d	A: 0.2I _A 放电至 1.0V 或 B: 1.0I _A 放电至 1.0V	
6		0.05I _A 60d	A: 0.2I _A 放电至 1.0V 或 B: 1.0I _A 放电至 1.0V	
7	40°C ± 2°C	0.05I _A 48h	A: 0.2I _A 放电至 1.0V 或 B: 1.0I _A 放电至 1.0V	无要求
8		0.05I _A 24h	A: 0.2I _A 放电至 1.0V 或 B: 1.0I _A 放电至 1.0V	2h30min 24min
9		0.05I _A 24h	A: 0.2I _A 放电至 1.0V 或 B: 1.0I _A 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

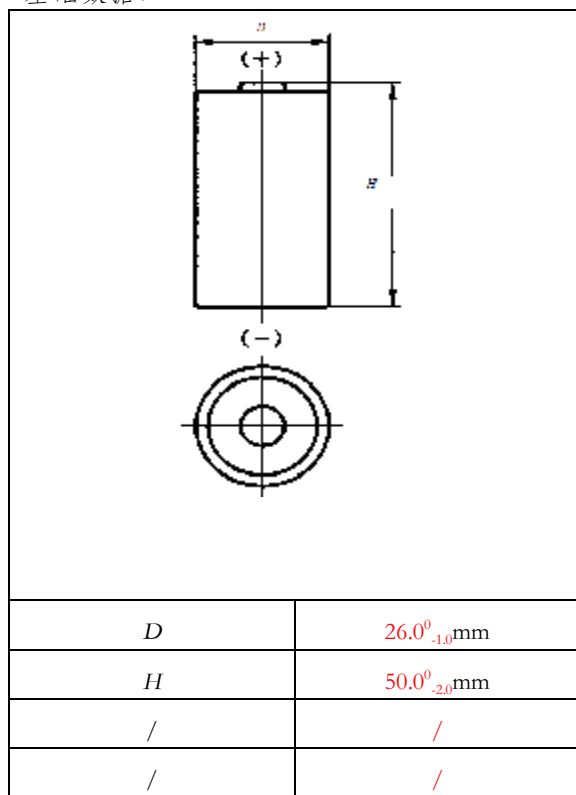
试验前, 电池应在 20°C ± 5°C 下以 0.2I_A 放电至终止电压 1.0V, 并在 0°C ± 2°C 下搁置 16h~24h。在 0°C ± 2°C 循环空气中, 电池的耐过充电能力应由下面试验来决定, 测试条件见表

表 5 0°C 过充电

充电	放电 ^a	
	LT、MT、HT 电池	MT、HT 电池
0.05I _A 充 28d	0.2I _A 放电至 1.0V	1.0I _A 放电至 0.9V
a) 充电结束后立即放电		

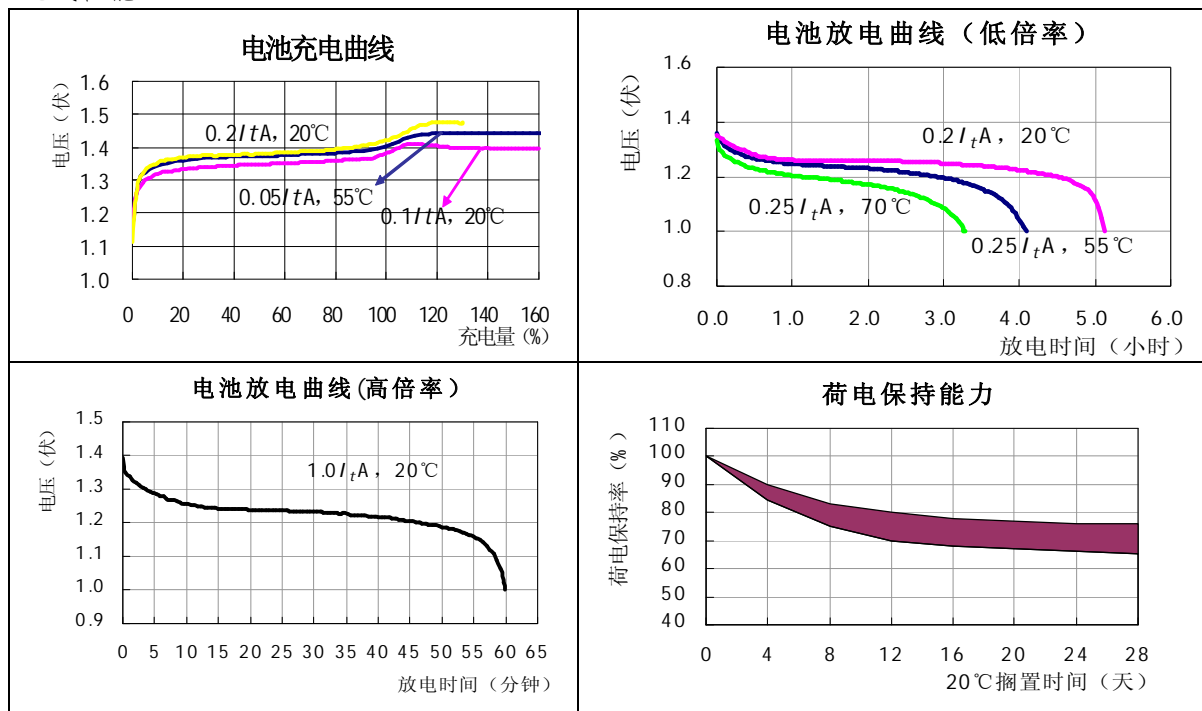
HRMT 26/50 C4000 毫安时

基础数据:



标称电压		1.2V
容量对比(mAh)	0.2I _t A	1.0I _t A
	4000	3200
重量 (g)		83.5
内阻 (在 1000Hz 下) (充电后; mΩ)		≤10
充电电流	涓流	200mA
	标准	400mA
	快速	800mA
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:



注: 本公司保留该规格书的修订权。(如有变更, 恕不另行通知。)

本文件中包含的信息仅供参考, 不应被用来作为产品提供保证或担保的基准。