PRODUCT SPECIFICATION

Rechargeable Lithium Ion Cell Model : HTG26650 4307mAh

R&D Lead	QA Lead	Approved	Final Analysis
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HOHMTECH
Product of Bofuneng Battery Co., LTD
associated Indonesia & U.S. research

https://www.hohmtech.com

Revision History

Revision	Date	Originator	Description
0	2015-11-20	Jackie Li	- Original release of BBCHT 26650 ABC HTG
1	2015-11-25	Andy Chow	- Foundation guided by IC Chem Policies
2	2015-11-29	Huang Yeoh	- 0.20% Ni replaces 0.15% Mn & 0.05% Mn inert
3	2015-12-04	Sammo Chen	- 0.14% Co, 0.31% Ni replaces -0.45% Mn
4	2015-12-21	Huang Yeoh	- 0.05% Co replaces 0.05% Ni
5	2016-01-03	Zhang Wen	- 0.40% Co, 1.0% Ni replaces -1.40% Mn raw
6	2016-01-16	Joe Jinping	- BBC PTC updated to Enhanced PTC (EPTC)
7	2016-02-13	Xinci Lama	- Cathode developed to IC & HT spec v.7.2A -0.3mm
8	2016-03-02	Tony Yong II	- BBC poly seal replaced with IC & HT bitumen poly
9	2016-03-26	Klariza Han	- Cathode material updated to UHPAI
10	2016-03-29	Andy Chow	- 4.1.3 & 4.3.2 item modified in alliance to IC PS
11	2016-04-04	Huang Yeoh	- Testing process updated to IC PS
12	2018-02-27	Update	- Section 1.2 Application to Product Classification

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1. General Information

1.1 Scope: This product specification defines the requirements of the rechargeable lithium ion battery set forth and supplied to end consumer by Hohm Tech.

1.2 Product classification: Cylindrical rechargeable lithium ion cell

1.3 Model name: HTG 26650

2. Nominal Specification

Item	Condition / Note	Specification
2.1 Capacity	Std. charge / discharge	Nominal 4307 mAh (C_{nom}) Minimum 4155 mAh (C_{min})
2.2 Nominal Voltage	Average for Std. discharge	3.60V
2.3.1 Standard Charge (Refer to 4.1.1)	Constant current Constant voltage End condition (Cut off)	1075mA (1.075A - [0.25C_5A]) 4.2V 86mA (.086A)
2.3.2 Fast charge (Refer to 4.1.3)	Constant current Constant voltage End condition (Cut off)	4000mA (4A) 4.2V 100mA (0.1A)
2.4 Max. Charge Voltage	-	4.2V
2.5 Max. Charge Current	-	4300mA (4.3A - [1C_5A])
2.6.1 Standard Discharge (Refer to 4.1.2)	Constant current End voltage (Cut off)	1075mA (1.075A - [0.25C_5A]) 2.90V
2.6.2 Fast Discharge (Refer to 4.1.3)	Constant current End voltage (Cut off)	15000mA (15A), 30000mA (30A) 2.90V
2.7 Max. Discharge Current	For continuous discharge	32300mA (CC); 51600mA (pulse)
2.8 Weight	Max.	88.5 ±2.5 g
2.9 Operating Temperature (Cell Surface Temperature)	Charge Discharge	0 ~ 45℃ -20 ~ 75℃
2.10 Storage Temperature (for shipping state*)	1 month 3 month 1 year	-10 ~ 40℃ -10 ~ 30℃ -10 ~ 25℃

*Shipping Capacity : 490 random sample method - 45-48% of fully charged state. ** 2.7 Max. Discharge Current until ≤75℃.

3. Appearance and Dimension

3.1 Appearance

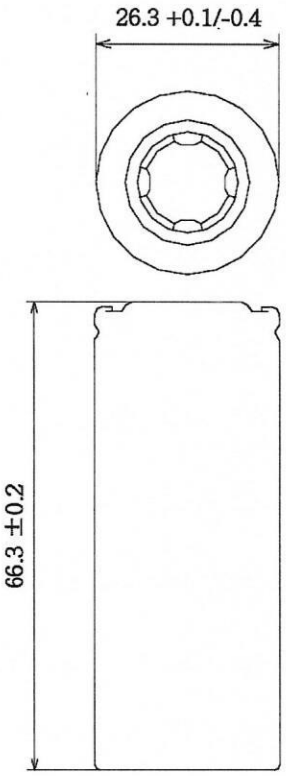
There shall be no such defects as a single deep scratch, crack, rust, discoloration or leakage, which may affect the commercial value of the cell.

3.2 Dimension

Diameter : 26.3 + 0.1/-0.4 mm (Max. 26.4 mm)

Diameter is defined as the largest data value measured on the "A" area of a cylindrical cell.

Height : 66.3 ± 0.2 mm (Max. 66.5 mm)



4. Performance Specification

4.1 Standard test condition

4.1.1 Standard Charge

Unless otherwise specified, "Standard Charge" shall consist of charging at constant current of 1075mA. The cell shall then be charged at constant voltage of 4.2V while tapering the charge current. Charging shall be terminated when the charging current has tapered to 86mA. For test purposes, charging shall be

performed at 23°C ± 2°C.

4.1.2 Standard Discharge

"Standard Discharge" shall consist of discharging at a constant current of 1075mA to 2.90V. Discharging is to be performed at 23 °C ± 2 °C unless otherwise noted (such as capacity versus temperature).

4.1.3 Fast Charge / Discharge condition

Cells shall be charged at constant current of 4000mA to 4.2V with end current of 100mA. Cells shall be discharged at constant current of 15000mA and 30000mA to 2.90V. Cells are to rest 10 minutes after charge and 30 minutes after discharge.

4.2 Electrical Specification

Item	Condition	Specification
4.2.1 Initial AC Impedance	Cell shall be measured at 1kHz after charge per 4.1.1.	≤ 15 mΩ, without EPTC
4.2.2 Initial Capacity	Cell shall be charged per 4.1.1 and discharged per 4.1.2 within 1h after full charge.	4307 mAh (C_{nom})
4.2.3 Cycle Life	Cells shall be charged and discharged per 4.1.3, 300 cycles(15A) and 200 cycles(30A). A cycle is defined as one charge and one discharge. 301st (15A) and 201st (30A) discharge capacity shall be measured per 4.1.1 and 4.1.2	≥ 80 % (of C_{nom} in 2.1)

4.3 Environmental specification.

Item	Condition	Specification
4.3.1 Storage Characteristics	Cells shall be charged per 4.1.1 and stored in a temperature-controlled environment at 20°C ± 5°C for 28 days. After storage, cells shall be discharged per 4.1.2 to obtain the remaining capacity*.	Capacity recovery rate ≥ 80% (of C_{nom} in 2.1)
4.3.2 High Temperature Storage Test	Cells shall be charged per 4.1.1 and stored in a temperature-controlled environment at 60°C for 4 hours. After storage, cells shall be discharged per 4.1.2 and cycled per 4.1.1 and 4.1.2 for 3 cycles to obtain recovered capacity*.	No leakage, Capacity recovery rate ≥ 85% (of C_{nom} in 2.1)

* Remaining Capacity : After storage, cells shall be discharged with standard condition(4.1.2) to measure the remaining capacity.

** Recovery Capacity : After storage, cells shall be discharged with standard discharge condition (4.1.2), and then cells shall be charged with standard charge condition (4.1.1), and then discharged with standard discharge condition (4.1.2). This charge / discharge cycle shall be repeated three times to measure recovery capacity.

<table>
<tr><td>4.3.3
Thermal Shock Test</td><td colspan="2">130°C oven (1h) ← 3h → -20°C (1h) for 8 cycles with cells charged per 4.1.1 After test, cells are discharged per 4.1.2 and cycled per 4.1.1 and 4.1.2 for 3 cycles to obtain recovered capacity.</td><td>No leakage
Capacity recovery rate
≥ 75% (of C_{nom} in 2.1)</td></tr>
<tr><td rowspan="3">4.3.4
Temperature Dependency of Capacity</td><td colspan="2">Cells shall be charged per 4.1.1 at 23°C ± 2°C and discharged per 4.1.2 at the following temperatures.</td><td></td></tr>
<tr><td>Charge</td><td>Discharge</td><td>Capacity</td></tr>
<tr><td>23℃</td><td>-10℃
0℃
23℃
60℃</td><td>60% (of C_{nom} in 2.1)
75% (of C_{nom} in 2.1)
100% (of C_{nom} in 2.1)
90% (of C_{nom} in 2.1)</td></tr>
</table>

4.4 Mechanical Specification

Item	Condition	Specification
Drop Test	Cells charged per 4.1.1 are dropped onto an oak board from 1 meter height for 1 cycle, 2 drops from each cell terminal and 1 drop from side of cell. (Total number of drops =3).	No leakage No temperature rising
4.4.2 Vibration Test	Cells charged per 4.1.1 are vibrated for 90 minutes per each of the three mutually perpendicular axes (x, y, z) with total excursion of 0.8mm, frequency of 10Hz to 55Hz and sweep of 1Hz change per minute.	No leakage

4.5 Safety Specification

Item	Condition	Specification
4.5.1 Overcharge Test	Cells are discharged per 4.1.2, then charged at a constant current of 8.6A [2C] till 10°C lower than max temperature. Charging is continued for 7 hours (Per UL1642).	No explosion, No fire
4.5.2 External Short - Circuiting Test	Cells are charged per 4.1.1, and the positive and negative terminal is connected by a 100 mΩ-wire for 1 hour (Per UL1642).	No explosion, No fire

4,5.3 Overdischarge Test	Cells are discharged at constant current of 0.2C to 250% of the minimum capacity.	No explosion, No fire
4.5.4 Heating Test	Cells are charged per 4.1.1 and heated in a circulating air oven at a rate of 5°C per minute to 130°C. At 130°C, oven is to remain for 10 minutes before test is discontinued (Per UL1642).	No explosion, No fire
4.5.5 Impact Test	Cells charged per 4.1.1 are impacted with their longitudinal axis parallel to the flat surface and perpendicular to the longitudinal axis of the 15.8mm diameter bar (Per UL1642).	No explosion, No fire
4.5.6 Crush Test	Cells charged per 4.1.1 are crushed with their longitudinal axis parallel to the flat surface of the crushing apparatus (Per UL1642).	No explosion, No fire

5. Caution and Prohibition in Handling

Warning for using the lithium ion rechargeable battery. Mishandling of the battery may cause heat, fire and deterioration in performance. Be sure to observe the following.

Caution

- When using the application equipped with the cell, refer to the user's manual before usage.
- Please read the specific charger manual before charging.
- If cell is not charged with long exposure to the charger, discontinue charging.
- Cell must be charged at operating temperature range 0 ~ 50 ℃.
- Cell must be discharged at operating temperature(cell surface temperature) range -20 ~ 75 ℃.
- Please check the positive(+) and negative(-) direction before packing.
- When a lead plate or wire is connected to the cell for packing, check out insulation not to short-circuit.
- Cell must be stored separately.
- Cell must be stored in a dry area with low temperature for long-term storage.
- Do not place the cell in direct sunlight or heat.
- Do not use the cell in high static energy environment where the protection device can be damaged.
- If rust or smell is detected on first use, please return the product to the seller immediately.
- The cell must be kept away from children and pets.
- When cell life span shortens after repeated use, replace with new cells.

Prohibitions

- Do not use charger that is not specifically for lithium ion batteries.
- Do not use cigarette jacks (in cars) for charging.
- Do not charge with constant current more than maximum charge current.
- Do not disassemble or reconstruct the battery.
- Do not throw or cause impact.
- Do not pierce a hole in the cell with sharp things. (such as nail, knife, pencil or drill, etc.)
- Do not use with other model, brand, or size of battery .
- Do not solder on cell directly.
- Do not press the cell with overload in manufacturing process, especially ultrasonic welding.
- Do not use old and new cells together for packing.
- Do not expose the battery to high heat. (such as fire)
- Do not put the cell into a microwave or high pressure container.
- Do not use the cell reversed.
- Do not connect positive(+) and negative(-) with conductive materials. (such as metal, wire)
- Do not allow the battery to be immerged in or wetted with water or sea-water.
- Do not short circuit.
- Do not use if wrap covering battery has any tears or punctures.
- Do not use in applications that are not equipped with a battery management system (BMS).
- Do not build or use the battery pack which these batteries are intended for without consulting a certified battery pack assembler.

ANY QUESTIONS REGARDING USE OF, HANDLING OF, OR RECYCLING OF LITHIUM ION BATTERIES, VISIT THE FOLLOWING RESOURCES:

http://batteryuniversity.com/

https://www.call2recycle.org/locator/