

POWER-XTRA

1. Basic Details

| Technical Drawing | | Image | |
|--|-----------------------|---|--|
| <p style="text-align: right;">Unit: mm</p> | | | |
| Diameter, D | 18.3mm | +0.15 | |
| | | -0.15 | |
| Height, H | 48.5mm | +0.15 | |
| | | -0.15 | |
| Cap Diameter, W | 10.5mm | +0.15 | |
| | | -0.15 | |
| Characteristics | Parameters | Conditions | |
| 1.1. Nominal Capacity | 150mAh | Standard Discharging, 0.2C ₅ A | |
| 1.2. Nominal Voltage | 3.7V | - | |
| 1.3. Discharge Cut-off Voltage | 2.75V | Standard Discharging, 0.2C ₅ A | |
| 1.4. Charging Voltage | 4.2±0.03V | 0°C ~ 45°C | |
| 1.5. Standard Charging Current | 0.2C ₅ A | 0°C ~ 45°C | |
| 1.6. Standard Discharging Current | 0.2C ₅ A | -10°C ~ +60°C | |
| 1.7. Fast Charging Current | 0.5C ₅ A | 0°C ~ 45°C | |
| 1.8. Fast Discharging Current | 0.5C ₅ A | -10°C ~ +60°C | |
| 1.9. Max Discharging Current | 1C ₅ A | Cut-off Voltage @2.75V | |
| 1.10. Internal Impedance | ≤ 80mΩ | @AC 1 KHz | |
| 1.11. Weight | 34g | ±1g | |
| 1.12. Threshold Storage Temperature | ≤ 1 month, -20 ~ 45°C | Ex-factory Voltage @3.85 ~ 4.10V | |
| | ≤ 3 month, 0 ~ 30°C | | |
| | ≤ 12 month, +20±5°C | | |

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2. General Test & Performance

| Test | Conditions & Procedures | Result & Performance |
|---------------------------|--|---|
| 2.1. Full Charging | <ul style="list-style-type: none"> a. Charge the battery at constant current 0.2C₅A b. Change to constant voltage charging at 4.2V when reaches that voltage c. Stop charging when current gradually decreases to 0.01C₅A d. Pre-set charging time for 8 hrs | Measured Capacity ≥ Nominal Capacity |
| 2.2. Cycle Life | <ul style="list-style-type: none"> a. Charge and discharge the battery with standard cycle life test b. Stop charging after 300 cycles and discharge at 0.2C₅A to cut-off voltage 2.75V c. Measure the discharged capacity | Measured capacity ≥ 80% of Nominal Capacity |
| 2.3. Retention at Storage | <ul style="list-style-type: none"> a. Charge the battery at standard charging condition b. Store for 28 days at 20°C c. Discharge at 0.2C₅A, cut-off at 2.75V | Retention Rate = Measured capacity / Nominal Capacity ≥ 85% |
| 2.4. Discharging | a. Full-charge the battery at standard charging condition, discharge at 0.2C ₅ A within 1 hr, cut-off at 3.0V | Capacity ≥ 100% of Nominal Capacity |
| | b. Full-charge the battery at standard charging condition, discharge at 0.5C ₅ A within 1 hr, cut-off at 3.0V | 0.5C/0.2C=90% |
| | c. Full-charge the battery at standard charging condition, discharge at 1C ₅ A within 1 hr, cut-off at 3.0V | 1C/0.2C=85% |
| | d. Full-charge the battery at standard charging condition, discharge at 2C ₅ A within 1 hr, cut-off at 3.0V | 2C/0.2C=80% |

3. Environmental Test & Performance

| Test | Conditions & Procedures | Result & Performance |
|--------------------------------------|--|--|
| 3.1. Temperature | <ul style="list-style-type: none"> a. Charge the battery at standard charging condition at 20°C b. Discharge at different temp of, | Discharged capacity compared with nominal capacity -10°C ≥ 55% 0°C ≥ 75% 10°C ≥ 80% 20°C ≥ 90% 60°C ≥ 95% |
| 3.2. Constant Temperature & Humidity | <ul style="list-style-type: none"> a. Charge the battery at standard charging condition at 20°C b. Put in a chamber at 40°C & R.H. 90% for 48 hrs c. Discharge at 1C₅A, cut-off at 2.75V | No obvious deformation No smoke No explosion Discharging time not less than 36 min. |

4. Safety Test & Performance

| Test | Conditions & Procedures | Result & Performance |
|-----------------------|--|---|
| 4.1. Short Circuit | a. Fully charge the battery at standard charging condition b. Connect with a thermocouple c. Put in test chamber with poles connected, total circuitry resistance $\leq 100\text{m}\Omega$ d. Observe & measure temperature change e. Stop while temperature drops to 10°C from peak | No fire No explosion Battery's surface temperature $\leq 150^\circ\text{C}$ |
| 4.2. Over Charging | a. Fully charge the battery at standard charging condition b. Continue to charge at $3C_5\text{A}$, constant 4.8V for 8 hrs | No fire No explosion Battery's surface temperature $\leq 150^\circ\text{C}$ |
| 4.3. Over Discharging | a. Fully charge the battery at standard charging condition b. Discharge at $0.2C_5\text{A}$, $20\pm 5^\circ\text{C}$ to cut-off voltage 2.75V c. Continue to discharge with a load of 30Ω connected for 24 hrs | No fire No explosion |
| 4.4. Thermal Shock | a. Fully charge the battery at standard charging condition b. Put in hot chamber with temperature increasing at $5\pm 2^\circ\text{C}/\text{min}$ until $130\pm 2^\circ\text{C}$ & then stay for 30 min | No fire No explosion |

5. Standard Testing Conditions and Requirements

5.1. Temperature & Humidity

All testes should be done according to the following conditions, otherwise as of requirement.

5.1.1. Temperature range of $15 \sim 35^\circ\text{C}$

5.1.2. Relative Humidity at $45 \sim 75\%$

5.2. Measuring Instrument

5.2.1. Dimension Measuring : Caliper with range of $0 \sim 100\text{mm}$, precision at 0.01mm

5.2.2. Voltage Measuring : Voltmeter with range of $0 \sim 20\text{V}$, precision at 0.01V

5.2.3. Current Measuring : Ammeter with range of $0 \sim 10\text{A}$, precision at $\pm 0.4\%$

5.2.4. Impedance Measuring : Battery Impedance Tester, $1 \text{ KHz} \pm 10\%$

6. Appearance

The battery should be free of defects such as leakage, rust and deformation. There should be no fire, and no explosion on general performance test while shall be referred to the state and conditions when it is gone through all other testes.



7. Packaging & Transportation

7.1. Pre-shipment inspection

The battery should be checked and passed on voltage, resistance and the function of protection circuit before packing and forwarding to ship.

7.2. Packaging

The battery is recommended and should be packed as per UN38.3 instructions

7.3. Transportation

The battery shall be charged in half of State-of-Charge during ex-factory for transportation. During transportation, it should be free of severe vibration, shocking, extrusion, direct sunshine and rain. It is recommended to go through performance test prior to use of battery while is prohibited to use if damage found such as leakage, deformation, due to transportation.

8. Safety Precaution & Prohibitions

In order to prevent battery leakage, heating, fire, reduced performance or life drops, explosion and other accidents, please follow the provisions of normal use of the battery and comply with preventive matters.

8.1. Charging

8.1.1. Charging Current

Charging current should not be exceeded the maximum value specified in characteristics. Charging with higher current than recommended value may cause damage to battery's electrical, mechanical and safety performance and could lead to heat generation or leakage.

8.1.2. Charging Voltage

Charging voltage should not be exceeded the maximum value specified in the specification details and any intention for higher voltage charging must be strictly prohibited.

Any charger for the charging shall be designed to comply with this condition. It is very dangerous for charging beyond maximum voltage value, which may cause damage to the battery electrical, mechanical safety performance and could lead to heat generation, leakage or explosion.

8.1.3. Charging Temperature

The battery should be charged within range of 0 ~ 45°C as stated in characteristics.

8.2. Reverse Charging

Reverse charging is always strictly prohibited. The battery shall be always connected correctly that the polarity must be confirmed before wiring. In case of improper connection, the battery cannot be charged. Reverse charging may also damage battery which may lead to performance degradation, safety issue that may lead to unwanted heat generation, leakage or explosion.

8.3. Discharging

8.3.1. Discharging Current

The battery should be discharged at current not exceeding the maximum discharge current specified in characteristics, otherwise may reduce the discharging capacity significantly or cause it over-heated.

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8.3.2. Discharging Temperature

The battery should be discharged within 0 ~ 45°C range specified in characteristics.

8.3.3. Over-Discharging

It should be noted that the battery would be at over-discharged state by its self-discharge characteristic when it is not used for a long time. In order to prevent that state, it should be charged periodically to maintain a voltage between 3.6 ~ 3.9V. Over-discharging may cause loss of performance, characteristics, or functionalities.

Any charger for the charging shall be equipped with over-charging and over-discharging protection with respect to the cut-off voltage specified in specification details.

9. Storage

The battery must be handled safely and carefully at the point when it is produced. It is totally prohibited to use it if any unusual conditions found such as deformation, leakage or odor. It should be kept away from fire to avoid an explosion due to over-heated.

9.1. Storage Temperature and Humidity

The battery shall be stored according to the storage conditions in characteristics. It is also recommended to store at temperature range of 5 ~ 35°C, R.H. of 25 ~ 75% and in an environment of clean, dry and free of corrective substances.

9.2. Long Time Storage

The battery shall be kept at temperature range of -5 ~ 25°C if it would be stored for a long time and in an environment of clean, dry and free of corrective substances. It should also be charged and discharged in a complete cycle to retain a voltage of 3.8V for every 3 month.

10. Guarantee Period of Quality

The battery is under guarantee period of quality within one year from date code. It would only be replaced if manufacturing issue found, otherwise any claim, such as damage due to misuse or mishandling, is not accepted.