

TEST REPORT

IEC 62133: 2012

**Secondary cells and batteries containing alkaline or other non-acid electrolytes
Safety requirements for portable sealed secondary cells, and for batteries made
from them, for use in portable applications**

Report Number.....: TCT161107B005

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Address: 1F, Building 1, Yibaolai Industrial Park, Qiaotou Village,
Fuyong Town, Bao'an District, Shenzhen, Guangdong,
China.

Testing location: As above

Applicant's name:

Address:

Manufacturer's name:

Address:

Test specification :

Standard: IEC 62133: 2012

Test procedure: Type approved

Test result: Pass

Non-standard test method: N/A

**This test report is specially limited to the above client company and product model only, It may not
be duplicated without prior written consent of Shenzhen TCT Testing Technology Co., Ltd.**

Test item description: Li-ion Battery

Trade Mark: N/A

Model/type reference: 053035

Ratings: 3.7V, 300mAh, 1.11Wh

| | |
|---|--|
| Test Item Particulars | |
| Chemistry | <input checked="" type="checkbox"/> Li-ion systems <input type="checkbox"/> Nickel systems |
| Recommend charging method declared by the manufacture | Charging the battery with 0.2C (60mA) constant current until 4.2V, then constant voltage until charging current reduces to 0.02C (6mA) at ambient 20°C ± 5°C |
| Discharge current | 60mA |
| Specified final voltage | 3.0V |
| Recommend of charging limit for lithium system | |
| Upper limit charging voltage per cell | 4.2V |
| Maximum charging current | 300mA |
| Charging temperature upper limit | 45°C |
| Charging temperature lower limit | 0°C |
| Size (T×W×L) | 5.0×33.5×40.5 (mm) |
| Weight | 14.8 (g) |
| Possible test case verdicts: | |
| - test case does not apply to the test object....: N/A | |
| - test object does meet the requirement, P(Pass) | |
| - test object does not meet the requirement....: F(Fail) | |
| Testing: | |
| Date of receipt of test item | 2016-11-07 |
| Date(s) of performance of test | 2016-11-07 to 2016-11-18 |
| General remarks: | |
| <p>The test results presented in this report relate only to the object tested, This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory, “(C#XX)” refers to sample number of cells, “X” is 0~9; “(B#XX)” refers to sample number of batteries, “X” is 0~9; “(see below table)” refers to a table appended to the report. Throughout this report a point is used as the decimal separator.</p> | |

General product information:

This battery is constructed with one lithium-ion cell, and has overcharge, over-discharge, over current and short-circuits proof circuit.

Details information of the cell and battery as below (clause 8.1.1 and clause 8.1.2):

| Product | Cell | Battery |
|----------------------------|--------|---------|
| Model No. | 053035 | 053035 |
| Nominal Voltage | 3.7V | 3.7V |
| Rated Capacity | 300mAh | 300mAh |
| Nominal Charge Current | 60mA | 60mA |
| Nominal Discharge Current | 60mA | 60mA |
| Max. Charging Current | 300mA | 300mA |
| Max. Discharging Current | 300mA | 300mA |
| Max. Charging Voltage | 4.2V | 4.2V |
| Cut-off Voltage | 3.0V | 3.0V |
| Upper limit Charge Voltage | 4.25V | 4.25V |
| Taper-off Current | 6mA | 6mA |
| Lower Charge Temperature | 0°C | 0°C |
| Upper Charge Temperature | 45°C | 45°C |

List of Attachments:

Attachment 1: Critical components information (page 19)

Attachment 2: Photo documentation (page 20-23)

Summary of testing:

Tests Performed (name of test and test clause):

cl.5.6.2 Design recommendation (Lithium System);
cl.8.1 Charging procedures for test purposes (for Cells and Pack);
cl.8.2.1 Continuous charging at constant voltage (Cells)
cl.8.3.1 External short circuit (Cells);
cl.8.3.2 External short circuit (Battery);
cl.8.3.3 Free fall (for Cells and Pack);
cl.8.3.4 Thermal abuse (Cells);
cl.8.3.5 Crush (Cells);
cl.8.3.6 Over-charging of battery;
cl.8.3.7 Forced discharge (Cells);
cl.8.3.8 Transport test (Cells);

The electrolyte type of this cell doesn't belong to polymer, and the applicant declares that this cells isn't to be sold in France, Japan, Republic of Korea and Switzerland.

Tests are made with the number of cells and batteries specified in IEC 62133:2012 Table 2.

Testing Location:

Shenzhen TCT Testing Technology Co.,Ltd.

1F, Building 1, Yibaolai Industrial Park,
Qiaotou Village, Fuyong Town, Bao'an District,
Shenzhen, Guangdong, China.

Summary of compliance with National Differences:

BE, BY, CN, DE, DK, FI, GB, HU, NL, NO, SA, SE, SG, SI, US.

BE=Belgium, BY=Belarus, CN=China, DE=Germany, DK=Denmark, FI=Finland, GB=United Kingdom, HU=Hungary, NL=The Netherlands, NO=Norway, SA= Saudi Arabia, SE=Sweden, SG=Singapore, SI= Slovenia, US= United States of America.

The product fulfils the requirements of EN 62133: 2013

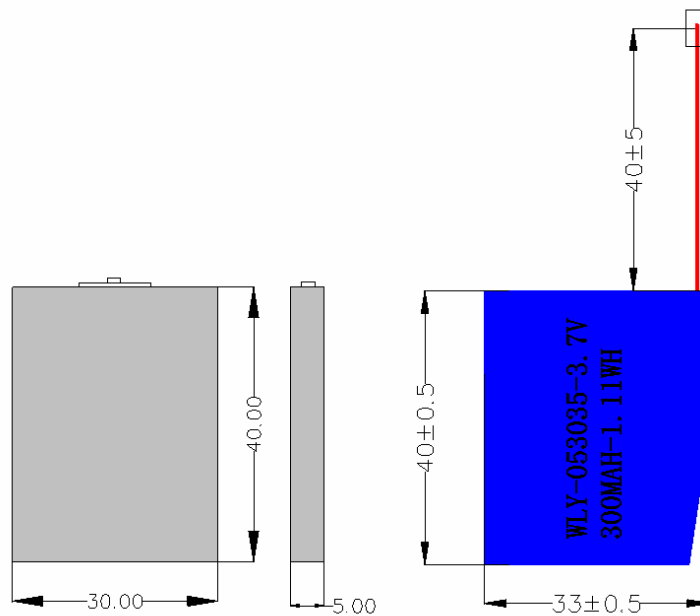
Copy of marking plate:

The artwork below may be only a draft.

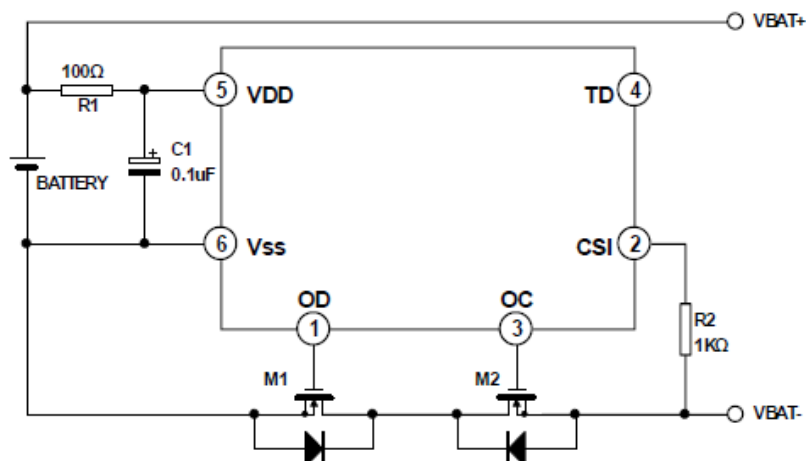
+ Li-ion Battery
Model:053035 1ICR5/30/40
3.7V 300mAh 1.11Wh

- Date: 2016. 11 Made in China

Construction:



Circuit diagram:



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| Clause | Requirement – Test | Result - Remark | Verdict |
|----------|--|--|----------|
| 5 | General safety considerations | | P |
| 5.1 | General | | P |
| 5.2 | Insulation and wiring | | P |
| | The insulation Resistance between an accessible metal case (excluding electrical contacts) and positive terminals $\geq 5M\Omega$. | No metal surface exists; | N/A |
| | Insulation resistance ($M\Omega$) : | | — |
| | Internal wiring and insulation are sufficient to withstand maximum anticipated current, voltage and temperature requirements | | P |
| | Orientation of wiring maintains adequate creepage and clearance distances between conductors. | | P |
| | Mechanical integrity of internal connections is sufficient to accommodate conditions of reasonably foreseeable misuse | | P |
| 5.3 | Venting | | P |
| | Battery cases and cells incorporate a pressure relief mechanism or are constructed so that they relieve excessive internal pressure at a value and rate that will preclude rupture, explosion and self-ignition. | Venting mechanism exists on the narrow side of pouch cell. | P |
| | Encapsulation used to support cells within an outer casing does not cause the battery to overheat during normal operation no inhibit pressure relief. | | N/A |
| 5.4 | Temperature/voltage/current management | | P |
| | Batteries are designed such that abnormal temperature rise conditions are prevented. | Overcharge, over discharge, over current and short-circuit proof circuit used in this battery. See tests of clause 8 | P |
| | Batteries are designed to be within temperature, voltage and current limits specified by the cell manufacturer. | See above. | P |
| | Batteries are provided with specifications and charging instructions for equipment manufacturers so that associated chargers are designed to maintain charging within the temperature, voltage and current limits specified; | The charging limits specified in the manufacturer's specifications | P |
| 5.5 | Terminal contacts | | P |
| | Terminals have a clear polarity marking on the external surface of the battery | The "Red +" and "Black -" polarity explicitly marked on surface of the battery. | P |
| | The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current. | Complied | P |

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| Clause | Requirement – Test | Result - Remark | Verdict |
|--------|--|---|---------|
| | External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance. | Complied | P |
| | Terminal contacts are arranged to minimize the risk of short circuits. | Complied | P |
| 5.6 | Assembly of cells into batteries | | P |
| 5.6.1 | If there is more than one battery housed in a single battery case, cells used in the assembly of each battery have closely matched capacities, be of the same design, be of the same chemistry and be from the same manufacturer | Single cell in the battery | N/A |
| | Each battery has an independent control and protection | | N/A |
| | Manufacturers of cells make recommendations about current, voltage and temperature limits so that the battery manufacturer/designer may ensure proper design and assembly | | N/A |
| | Batteries that are designed for the selective discharge of a portion of their series connected cells incorporate separate circuitry to prevent the cell reversal caused by uneven discharges | | N/A |
| | Protective circuit components are added as appropriate and consideration given to the end-device application | | N/A |
| | When testing a battery, the manufacturer of the battery provides a test report confirming the compliance according to this standard | | N/A |
| 5.6.2 | Design recommendation for lithium system only | | P |
| | For the battery consisting of a single cell or a single cellblock: - Charging voltage of the cell does not exceed the upper limit of the charging voltage specified in Clause 8.1.2, Table 4; or | Charging voltage: 4.2V, not exceed 4.25V specified in Clause 8.1.2, Table 4 | P |
| | - Charging voltage of the cell does not exceed the different upper limit of the charging voltage determined through Clause 8.1.2, NOTE 1. | | N/A |
| | For the battery consisting of series-connected plural single cells or series-connected plural cellblocks: - The voltages of any one of the single cells or single cellblocks does not exceed the upper limit of the charging voltage, specified in Clause 8.1.2, Table 4, by monitoring the voltage of every single cell or the single cellblocks; or | | N/A |
| | - The voltages of any one of the single cells or single cellblocks does not exceed the different upper limit of the charging voltage, determined through Clause 8.1.2, NOTE 1, by monitoring the voltage of every single cell or the single cellblocks | | N/A |

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| Clause | Requirement – Test | Result - Remark | Verdict |
|----------|--|--------------------------------------|------------|
| | For the battery consisting of series-connected plural single cells or series-connected plural cellblocks: - Charging is stopped when the upper limit of the charging voltage, specified in Clause 8.1.2, Table 4, is exceeded for any one of the single cells or single cellblocks by measuring the voltage of every single cell or the single cellblocks; or | | N/A |
| | - Charging is stopped when the upper limit of the different charging voltage, determined through Clause 8.1.2, NOTE 1, is exceeded for any one of the single cells or single cellblocks by measuring the voltage of every single cell or the single cellblocks | | N/A |
| 5.7 | Quality plan | | P |
| | The manufacturer has prepared a quality plan defining the procedures for the inspection of materials, components, cells and batteries and which covers the process of producing each type of cell and battery. | Complied. Quality plan provided. | P |
| 6 | Type test conditions | | P |
| | Test were made with the number of cells or batteries specified in Table 1 for nickel-cadmium and nickel-metal hydride system and Table 2 for lithium system, used cells or batteries that are not more than six months old. | Complied. Lithium system. | P |
| | Unless noted otherwise in the test methods, testing was conducted in an ambient of 20°C ± 5°C. | Tests are carried out at 20°C ± 5°C. | P |
| 7 | Specific requirements and tests (nickel systems) | | N/A |
| 7.1 | Charging procedure for test purposes | Lithium system | N/A |
| 7.2 | Intended use | | N/A |
| 7.2.1 | Continuous low-rate charging (cells) | | N/A |
| | Results: No fire. No explosion | | N/A |
| 7.2.2 | Vibration | | N/A |
| | Results: No fire. No explosion. No leakage | | N/A |
| 7.2.3 | Moulded case stress at high ambient temperature | | N/A |
| | Oven temperature (°C) | | — |
| | Results: no physical distortion of the battery casing resulting in exposure if internal components. | | N/A |
| 7.2.4 | Temperature cycling | | N/A |
| | Results: No fire. No explosion. No leakage | | N/A |
| 7.3 | Reasonably foreseeable misuse | | N/A |
| 7.3.1 | Incorrect installation cell | | N/A |

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| Clause | Requirement – Test | Result - Remark | Verdict |
|--------|--|-----------------|---------|
| | The test was carried out using: Four fully charged cells of the same brand, type, size and age connected in series, with one of them reversed; or | | N/A |
| | - A stabilized dc power supply | | N/A |
| | Results: No fire. No explosion | | N/A |
| 7.3.2 | External short circuit | | N/A |
| | The cells or batteries were tested until one of the following occurred: -24 hours elapsed; or | | N/A |
| | - The case temperature declined by 20% of the maximum temperature rise. | | N/A |
| | Results: No fire. No explosion | | N/A |
| 7.3.3 | Free fall | | N/A |
| | Results: No fire. No explosion | | N/A |
| 7.3.4 | Mechanical shock (crash hazard) | | N/A |
| | Results: No fire. No explosion. No leakage. | | N/A |
| 7.3.5 | Thermal abuse | | N/A |
| | Oven temperature (°C) | | — |
| | Results: No fire. No explosion. | | N/A |
| 7.3.6 | Crushing of cells | | N/A |
| | The crushing force was released upon: - The maximum force of 13 KN± 1KN has been applied; or | | N/A |
| | - An abrupt voltage drop of one-third of the original voltage has been obtained | | N/A |
| | The cell is prismatic type and a second set of samples was tested, rotated 90° around longitudinal axis compared to the first set | | N/A |
| | Results: No fire. No explosion | | N/A |
| 7.3.7 | Low pressure | | N/A |
| | Chamber pressure (KPa) | | — |
| | Results: No fire. No explosion. No leakage. | | N/A |
| 7.3.8 | Overcharge | | N/A |
| | Results: No fire. No explosion. | | N/A |
| 7.3.9 | Forced discharge | | N/A |
| | Results: No fire. No explosion. | | N/A |

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| Clause | Requirement – Test | | | Result - Remark | Verdict |
|---|---|--|------------------------------------|---|----------|
| 8 | Specific requirements and tests (lithium systems) | | | | P |
| 8.1 | Charging procedure for test purposes | | | | P |
| 8.1.1 | First procedure | | | | P |
| | Test is carried out at 20°C±5°C. Charging method declared by the manufacturer. | | | | P |
| | Prior to charging, the cell shall have been discharged at 20 °C ± 5 °C at a constant current of 0,2 It A down to a specified final voltage. | | | | P |
| 8.1.2 | Second procedure This charging procedure applied to the tests of 8.3.1, 8.3.2, 8.3.4, 8.3.5, and 8.3.9 | | | | P |
| | If a cell's specified upper and/or lower charging temperature exceeds values for the upper and/or lower limit test temperatures of Table 4, the cells were charged at the specified values plus 5 °C for the upper limit and minus 5 °C for the lower limit | | | Charge temperature 0-45°C declared. 45 °C used for upper limit test; -5 °C used for lower limit test; | P |
| | A valid rationale was provided to ensure the safety of the cell (see Figure A.1) | | | | P |
| | For a different upper limit charging voltage (i.e. other than for lithium cobalt oxide systems at 4,25 V), the applied upper limit charging voltage and upper limit charging temperatures were adjusted accordingly | | | Lithium cobalt oxide system only. | N/A |
| | A valid rationale was provided to ensure the safety of the cell (see Figure A.1) | | | 4.25V applied. | N/A |
| 8.2 | Intended use | | | | P |
| 8.2.1 | Continuous charging at constant voltage (cells) | | | Tested and complied | P |
| | Fully charged cells are subjected for 7 days to a charge as specified by the manufacturer. | | | | P |
| | Results: No fire, No explosion, No leakage | | | See below table | P |
| Sample No. | Recommended Charging Voltage Vc, (Vdc) | Recommended Charging Current Irec, (mA) | OCV at Start of Test, (Vdc) | Results | P |
| C#01 | 4.20 | 60 | 4.18 | NF,NE,NL | P |
| C#02 | 4.20 | 60 | 4.17 | NF,NE,NL | P |
| C#03 | 4.20 | 60 | 4.17 | NF,NE,NL | P |
| C#04 | 4.20 | 60 | 4.16 | NF,NE,NL | P |
| C#05 | 4.20 | 60 | 4.19 | NF,NE,NL | P |
| Supplementary Information: - NF: No Fire - NE: No Explosion - NL: No Leakage | | | | | |

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| Clause | Requirement – Test | Result - Remark | Verdict |
|--------|--------------------|-----------------|---------|
|--------|--------------------|-----------------|---------|

| | | | |
|-------|---|------------------------|-----|
| 8.2.2 | Moulded case stress at high ambient temperature (battery) | No moulded case exists | N/A |
| | Oven temperature (°C) | | — |
| | Results: No physical distortion of the battery casing resulting in exposure if internal components. | | N/A |
| 8.3 | Reasonably foreseeable misuse | | P |
| 8.3.1 | External short circuit (cell) | Tested and complied | P |
| | Fully charged each cell according to the second procedure in 8.1.2; | | P |
| | Fully charged cells were subjected to a short circuit test at 20°C ± 5°C. | | P |
| | The external resistance of 80 ± 20 mΩ. | Complied | P |
| | The cells were tested until one of the following occurred: - 24 hour elapsed; or | | N/A |
| | - The case temperature declined by 20% of the maximum temperature rise. | | P |
| | Results: No fire, No explosion | See below table | P |

Samples charged at charging temperature upper limit (45°C)

| Sample No. | Ambient, (At 20°C ± 5°C) | OCV at start of test (Vdc) | Resistance of Circuit (mΩ) | Max. External Temperature (°C) | Results | P |
|------------|--------------------------|----------------------------|----------------------------|--------------------------------|---------|---|
| C#06 | 25.0 | 4.21 | 78 | 102.8 | NF,NE | P |
| C#07 | 25.0 | 4.21 | 77 | 111.5 | NF,NE | P |
| C#08 | 25.0 | 4.22 | 80 | 114.2 | NF,NE | P |
| C#09 | 25.0 | 4.20 | 78 | 110.6 | NF,NE | P |
| C#10 | 25.0 | 4.20 | 79 | 109.5 | NF,NE | P |

Samples charged at charging temperature lower limit (-5°C)

| Sample No. | Ambient, (At 20°C ± 5°C) | OCV at start of test (Vdc) | Resistance of Circuit (mΩ) | Max. External Temperature (°C) | Results | P |
|------------|--------------------------|----------------------------|----------------------------|--------------------------------|---------|---|
| C#11 | 25.0 | 4.18 | 77 | 101.3 | NF,NE | P |
| C#12 | 25.0 | 4.16 | 77 | 105.9 | NF,NE | P |
| C#13 | 25.0 | 4.16 | 78 | 112.8 | NF,NE | P |
| C#14 | 25.0 | 4.17 | 80 | 108.7 | NF,NE | P |
| C#15 | 25.0 | 4.17 | 80 | 110.5 | NF,NE | P |

Supplementary Information:

- NF: No Fire
- NE: No Explosion

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| Clause | Requirement – Test | Result - Remark | Verdict | | | |
|---|--|----------------------------|----------------------------|--------------------------------|---------|---|
| 8.3.2 | External short circuit (battery) | Tested and complied | P | | | |
| | Fully charged each battery according to the second procedure in 8.1.2; | | P | | | |
| | Fully charged batteries were subjected to a short circuit test at 55°C ± 5°C. | | P | | | |
| | The external resistance of 80 ± 20 mΩ. | Complied | P | | | |
| | The batteries were tested until one of the following occurred: - 24 hour elapsed; or | | P | | | |
| | - The case temperature declined by 20% of the maximum temperature rise. | | N/A | | | |
| | In case of rapid decline in short circuit current, the battery pack should remain on test for an additional one hour after the current reached a low end steady state condition. | | N/A | | | |
| | Results: No fire, No explosion. | See below table | P | | | |
| Samples charged at charging temperature upper limit (45°C) | | | | | | |
| Sample No. | Ambient (At 55°C ± 5°C) | OCV at start of test (Vdc) | Resistance of Circuit (mΩ) | Max. External Temperature (°C) | Results | P |
| B#01 | 55.0 | 4.21 | 77 | 55.3 | NF,NE | P |
| B#02 | 55.0 | 4.21 | 78 | 55.6 | NF,NE | P |
| B#03 | 55.0 | 4.22 | 79 | 55.4 | NF,NE | P |
| B#04 | 55.0 | 4.22 | 79 | 55.3 | NF,NE | P |
| B#05 | 55.0 | 4.21 | 80 | 55.5 | NF,NE | P |
| Samples charged at charging temperature lower limit (-5°C) | | | | | | |
| Sample No. | Ambient (At 55°C ± 5°C) | OCV at start of test (Vdc) | Resistance of Circuit (mΩ) | Max. External Temperature (°C) | Results | P |
| B#06 | 55.0 | 4.18 | 77 | 55.3 | NF,NE | P |
| B#07 | 55.0 | 4.16 | 78 | 55.3 | NF,NE | P |
| B#08 | 55.0 | 4.17 | 79 | 55.4 | NF,NE | P |
| B#09 | 55.0 | 4.17 | 80 | 55.2 | NF,NE | P |
| B#10 | 55.0 | 4.16 | 80 | 55.4 | NF,NE | P |
| Supplementary Information: | | | | | | |
| - NF: No Fire | | | | | | |
| - NE: No Explosion | | | | | | |

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| IEC 62133: 2012 | | | | | |
|---|---|--------|--------|---------------------|---------|
| Clause | Requirement – Test | | | Result - Remark | Verdict |
| 8.3.3 | Free fall | | | | P |
| | Ambient temperature of 20±5°C | | | | P |
| | Fully charged cells or batteries were dropped 3 times from a height of 1.0 m onto a concrete floor. | | | Tested and complied | P |
| | After the test, the cell or battery shall be put on rest for a minimum of one hour and then a visual inspection shall be performed. | | | | P |
| | Results: No fire, No explosion | | | See below table | P |
| Sample No. | C#16 | C#17 | C#18 | | |
| Results | NF, NE | NF, NE | NF, NE | | |
| Sample No. | B#11 | B#12 | B#13 | | |
| Results | NF, NE | NF, NE | NF, NE | | |
| Supplementary Information: - NF: No Fire - NE: No Explosion | | | | | |
| 8.3.4 | Thermal abuse (cells) | | | | P |
| | The cells were held at 130°C±2°C for: - 10 minutes; or | | | Tested complied | P |
| | - 30 minutes for large cells (gross mass of more than 500 g as defined in IEC 62281) | | | <500g, small cell. | N/A |
| | Oven temperature (°C) : | | | 130°C | — |
| | Gross mass of cell (g) : | | | <500g, small cell. | — |
| | Results: No fire, No explosion | | | See below table | P |
| Samples charged at charging temperature upper limit(45°C) | | | | | |
| Sample No. | C#19 | C#20 | C#21 | C#22 | C#23 |
| Status | NF, NE | NF, NE | NF, NE | NF, NE | NF, NE |
| Samples charged at charging temperature lower limit(-5°C) | | | | | |
| Sample No. | C#24 | C#25 | C#26 | C#27 | C#28 |
| Status | NF, NE | NF, NE | NF, NE | NF, NE | NF, NE |
| Supplementary Information: - NF: No Fire - NE: No Explosion | | | | | |
| 8.3.5 | Crush (cells) | | | | P |
| | Each fully charged cell, charged according to the second procedure at the upper limit charging temperature in clause 8.1.2, is immediately transferred and crushed between two flat surfaces in an ambient temperature. | | | | P |

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| Clause | Requirement – Test | | | Result - Remark | Verdict |
|---|--|--------------------------------------|----------------------|---------------------------------------|---------|
| | Fully charged cells were crushed between two flat surfaces with a hydraulic ram exerting a force of 13 kN ± 1 kN. | | | Tested and complied | P |
| | The crushing force was released upon: - The maximum force of 13 kN ± 1 kN has been applied;or | | | | P |
| | - An abrupt voltage drop of one-third of the original voltage has been obtained; or | | | | N/A |
| | - 10 % of deformation has occurred compared to the initial dimension. | | | | N/A |
| | A cylindrical or prismatic cell was crushed with its longitudinal axis parallel to the flat surfaces of the crushing apparatus. Test only the wide side of prismatic cells. | | | | P |
| | Results: No fire, No explosion | | | See below table | P |
| Samples charged at charging temperature upper limit (45°C) | | | | | |
| Sample No. | C#29 | C#30 | C#31 | C#32 | C#33 |
| Status | NF, NE | NF, NE | NF, NE | NF, NE | NF, NE |
| Supplementary Information: - NF: No Fire - NE: No Explosion | | | | | |
| 8.3.6 | Over-charging of battery | | | Tested and complied | P |
| | The test shall be carried out in an ambient temperature of +20 ° C ± 5 ° C. | | | | P |
| | Each test battery shall be discharged at a constant current of 0,2 It A, to a final discharge voltage specified by the manufacturer. | | | | P |
| | A discharged battery was charged from a power supply of 5.0V per cell or not to exceed the maximum voltage supplied by the recommended charger, at a charging current of 2.0 It A. | | | | P |
| | Test was continued until the temperature of the outer casing: - Reached steady state conditions (less than 10°C change in 30-minute period); or | | | | N/A |
| | - Returned to ambient | | | | P |
| | Results: No fire, No explosion. | | | See below table | P |
| Sample no. | OCV before charging, (Vdc) | Constant Charging Current (2.0 It A) | Supply voltage (Vdc) | Maximum outer casing temperature (°C) | Results |
| B#14 | 3.31 | 0.6 | 5.0 | 30.8 | NF,NE |
| B#15 | 3.42 | 0.6 | 5.0 | 31.7 | NF,NE |
| B#16 | 3.39 | 0.6 | 5.0 | 29.6 | NF,NE |
| B#17 | 3.38 | 0.6 | 5.0 | 32.5 | NF,NE |
| B#18 | 3.37 | 0.6 | 5.0 | 33.4 | NF,NE |

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| Clause | Requirement – Test | Result - Remark | Verdict |
|--------|--------------------|-----------------|---------|
|--------|--------------------|-----------------|---------|

Supplementary Information:

- NF: No Fire
- NE: No Explosion

| 8.3.7 | Forced discharge (cells) | | | P |
|------------|--|---|--------------------------------|---------|
| | A discharged cell is subjected to a reverse charge at 1 It A for 90 min. | | Tested and complied | P |
| | Results: No fire, No explosion | | See below table | P |
| Sample No. | OCV before application of reverse charge (Vdc) | Measured Reverse Charge I _r (mA) | Time for reversed Charge (Min) | Results |
| C#34 | 3.40 | 300 | 90 | NF,NE |
| C#35 | 3.38 | 300 | 90 | NF,NE |
| C#36 | 3.43 | 300 | 90 | NF,NE |
| C#37 | 3.39 | 300 | 90 | NF,NE |
| C#38 | 3.41 | 300 | 90 | NF,NE |

Supplementary Information:

- NF: No Fire
- NE: No Explosion

| | | | |
|-------|--|------------------|-----|
| 8.3.8 | Transport test | Tested complied. | P |
| | Manufacturer's documentation provided to show compliance with UN Recommendations on Transport of Dangerous Goods | Tested complied. | P |
| | Transportation tests are given in IEC 62281, test details as below: | Tested complied. | P |
| | - Test T-1: Altitude | | |
| | - Test T-2: Thermal cycling | Tested complied. | P |
| | - Test T-3: Vibration | Tested complied. | P |
| | - Test T-4: Shock | Tested complied. | P |
| | - Test T-5: External short-circuit | Tested complied. | P |
| | - Test T-6: Impact/crush | Tested complied. | P |
| | - Test T-8: Forced discharge | Tested complied. | P |
| 8.3.9 | Design evaluation – Forced internal short circuit (cells) | | N/A |
| | The force internal short circuit test is performed in a chamber at +10 °C and +45 °C(ambient internal chamber temperature) according to the following procedure: | | N/A |
| | 1) Number of samples | | N/A |
| | This test shall be carried out on five secondary (rechargeable) lithium-ion cells. | | N/A |
| | 2) Charging procedure | | N/A |
| | i) Conditioning charge and discharge | | N/A |
| | ii) Storage procedure | | N/A |

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| Clause | Requirement – Test | Result - Remark | Verdict |
|--------|--------------------|-----------------|---------|
|--------|--------------------|-----------------|---------|

| | | | |
|--|--|---------------------------------------|-----|
| | iii) Ambient temperature | | N/A |
| | iv) Charging procedure for forced internal short test | | N/A |
| | 3) Pressing the winding core with nickel particle | | N/A |
| | The cells complied with national requirement for.....: | France, Japan, Korea and Switzerland; | — |
| | The pressing was stopped upon: - A voltage drop of 50 mV has been detected; or | | N/A |
| | -The pressing force of 800 N (cylindrical cells) or 400 N (prismatic cells) has been reached | | N/A |
| | Results: No fire. | | N/A |

| Sample No. | Chamber ambient, (°C) | OCV at start of test, (Vdc) | Particle location ¹⁾ | Maximum applied pressure, (N) | Voltage drop, (mV) | Results |
|------------|-----------------------|-----------------------------|---------------------------------|-------------------------------|--------------------|---------|
| | | | | | | |
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Supplementary Information:

¹⁾ Identify one of the following:

1: Nickel particle inserted between positive and negative (active material) coated area.

2: Nickel particle inserted between positive aluminium foil and negative active material coated area.

-No fire

| | | | |
|----------|--|--|----------|
| 9 | Information for safety | | P |
| | The manufacture of secondary cells ensures that information is provided about current, voltage and temperature limits of their product. | Information for safety mentioned in manufacturer's specifications. | P |
| | The manufacture of batteries ensures that equipment manufactures and, in the case of direct sales, end-users are provided with information to minimize and mitigate hazards. | | N/A |
| | System analyses performed by device manufacture to ensure that a particular battery design prevent hazards from occurring during use of a product | | N/A |

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| Clause | Requirement – Test | Result - Remark | Verdict |
|--------|--------------------|-----------------|---------|
|--------|--------------------|-----------------|---------|

| | | | |
|--|--|--|-----|
| | As appropriate, information relating to hazard avoidance resulting from a system analysis is provide to the end user | | N/A |
|--|--|--|-----|

| | | | |
|-----------|---|---|----------|
| 10 | Marking | | P |
| 10.1 | Cell marking | | N/A |
| | Cells marked as specified in the applicable cell standards: IEC 61951-1, IEC 62951-2 or IEC 61960 | The final product is battery. | N/A |
| 10.2 | Battery marking | | P |
| | Batteries marked in accordance with the requirements for the cells from which they are assembled. | The battery is marked in accordance with IEC 61960, also see page 4. | P |
| | Batteries marked with an appropriate caution statement. | | N/A |
| 10.3 | Other information | | P |
| | Storage and disposal instructions marked on or supplied with the battery. | Information for storage instructions mentioned in manufacturer's specifications. | P |
| | Recommended charging instructions marked on or supplied with the battery. | Information for recommended charging instructions mentioned in manufacturer's specifications. | P |

| | | | |
|-----------|---|--|----------|
| 11 | Packaging | | P |
| | The materials and packaging design are chosen so as to prevent the development of unintentional electrical conduction, corrosion of the terminal and ingress of environmental contaminants. | | P |

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| Clause | Requirement – Test | Result - Remark | Verdict |
|----------------|--|--|----------|
| Annex A | Charging range of secondary lithium ion cells for safe use | | P |
| A.1 | General | | P |
| A.2 | Safety of lithium-ion secondary battery | Complied. | P |
| A.3 | Consideration on charging voltage | Complied. | P |
| A.3.1 | General | | P |
| A.3.2 | Upper limit charging voltage | 4.25V applied. | P |
| A.3.2.1 | General | | P |
| A.3.2.2 | Explanation of safety viewpoint | Max. charging voltage is 4.2V | N/A |
| A.3.2.3 | Safety requirements, when different upper limit charging voltage is applied | 4.25V applied. | N/A |
| A.4 | Consideration of temperature and charging current | | P |
| A.4.1 | General | | P |
| A.4.2 | Recommended temperature range | See A.4.2.2. | P |
| A.4.2.1 | General | | P |
| A.4.2.2 | Safety consideration when a different recommended temperature range is applied | Charging temperature range declared by client is: 0-45°C | P |
| A.4.3 | High temperature range | Not higher than the temperature specific in this standard. | N/A |
| A.4.3.1 | General | | N/A |
| A.4.3.2 | Explanation of safety viewpoint | | N/A |
| A.4.3.3 | Safety considerations when specifying charging conditions in high temperature range | | N/A |
| A.4.3.4 | Safety consideration when specifying new upper limit in high temperature range | | N/A |
| A.4.4 | Low temperature range | Charging low temperature declared by client is: 0°C. | P |
| A.4.4.1 | General | | P |
| A.4.4.2 | Explanation of safety viewpoint | | P |
| A.4.4.3 | Safety considerations, when specifying charging conditions in low temperature range | | P |
| A.4.4.4 | Safety considerations when specifying a new lower limit in the low temperature range | -5°C applied. | P |
| A.4.5 | Scope of the application of charging current | | P |

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| Clause | Requirement – Test | Result - Remark | Verdict |
|---------|---|-----------------|---------|
| A.5 | Sample preparation | | N/A |
| A.5.1 | General | | N/A |
| A.5.2 | Insertion procedure for nickel particle to generate internal short | | N/A |
| | The insertion procedure carried out at 20°C±5°C and under -25 °C of dew point | | N/A |
| A.5.3 | Disassembly of charged cell | | N/A |
| A.5.4 | Shape of nickel particle | | N/A |
| A.5.5 | Insertion of nickel particle to cylindrical cell | | N/A |
| A.5.5.1 | Insertion of nickel particle to winding core | | N/A |
| A.5.5.2 | Mark the position of nickel particle on the both end of winding core of the separator | | N/A |
| A.5.6 | Insertion of nickel particle to prismatic cell | | N/A |

Attachment 1

Critical Components Information

Product: Li-ion Battery

Type Designation: 053035

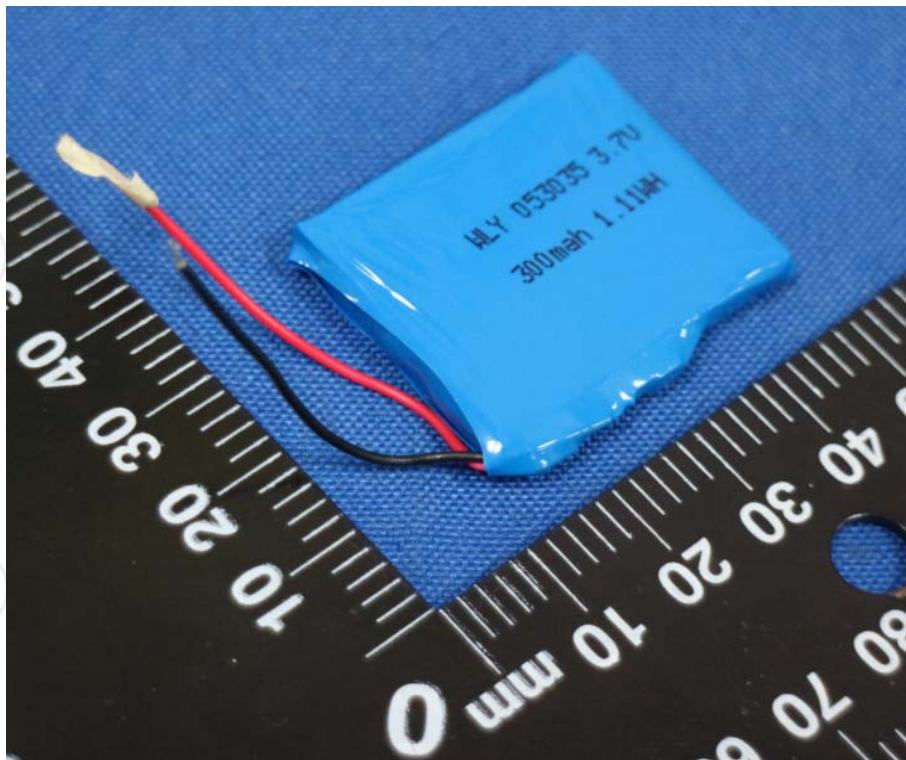
| Object/part No. | Manufacturer/trademark | Type/model | Technical data | Standard | Mark(s) of conformity |
|---------------------|---|-----------------|--|-----------------|-----------------------|
| Cell | Shenzhen City honest and beautiful Technology Co., Ltd. | 503035 | 3.7V 300mAh | IEC 62133: 2012 | Tested with appliance |
| -Electrolyte | Luoyang Da Sheng | LM011-HD | LiCoO ₂ | -- | -- |
| -Positive Electrode | Qingdao Hua Guan new energy | H5 | Graphite, CMC, SBR, Distilled Water, Conductive | -- | -- |
| -Negative Electrode | Jiangxi Dasheng Metallurgical Materials Co. Ltd. | SWHM-A003 | Graphite | -- | -- |
| -Separator | Interchangeable | JH-25um | Shut down temperature: 135°C | -- | -- |
| Wire | Interchangeable | Interchangeable | 30AWG, 80°C, 30V | UL 758 | UL approved |
| PCB | Interchangeable | Interchangeable | V-0, 130°C | UL 796 | UL approved |
| Protective IC (U1) | Guangdaxinye | DW01 | Overcharge: 4.25V-4.35V Overdischarge: 2.3V-2.5V | -- | Tested with appliance |
| MOSFET (U2) | Huahong | 8205 | V _{DS} =20V, V _{GS} =±12V, I _D =6.5A | -- | Tested with appliance |
| Tape | Interchangeable | Interchangeable | 130°C | UL 510 | UL approved |

Attachment 2

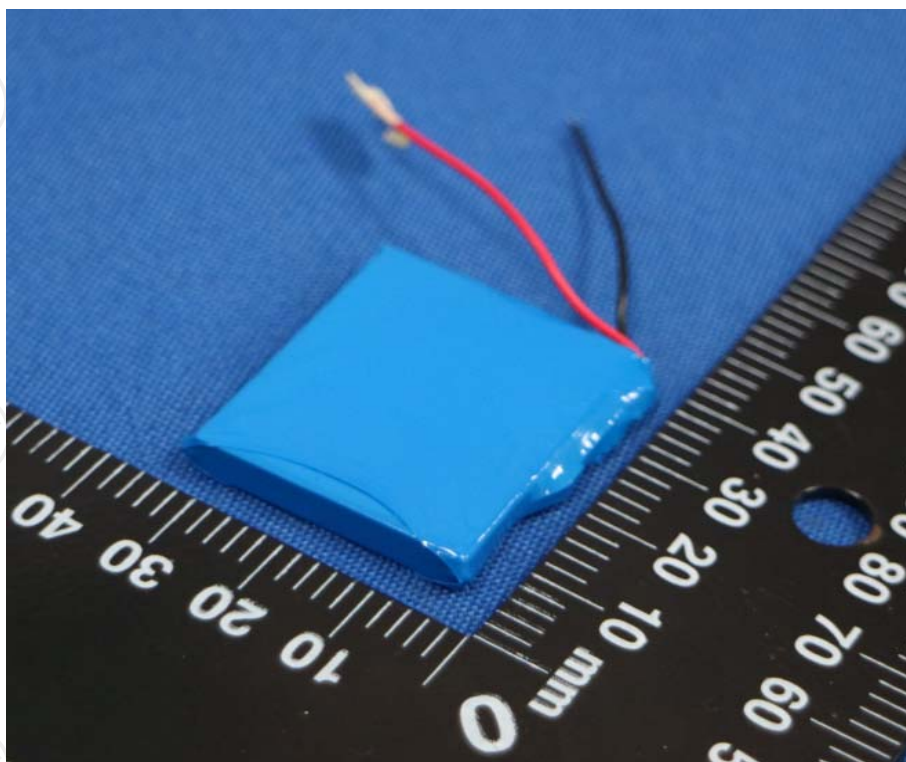
Photo Documentation

Product: Li-ion Battery

Type Designation: 053035



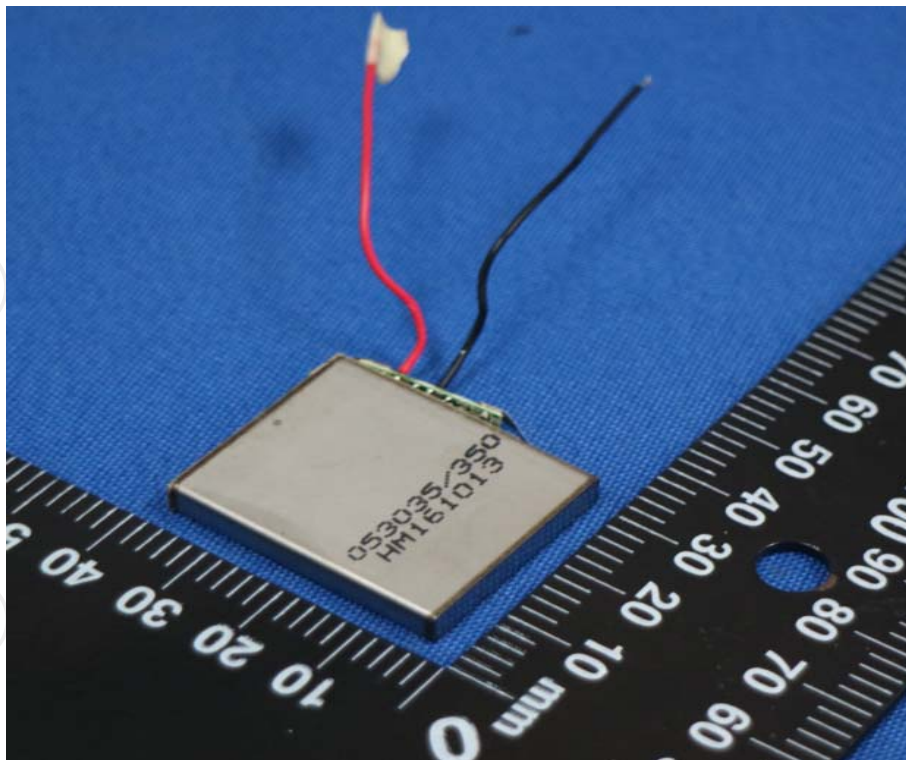
Picture 1. Battery view-1



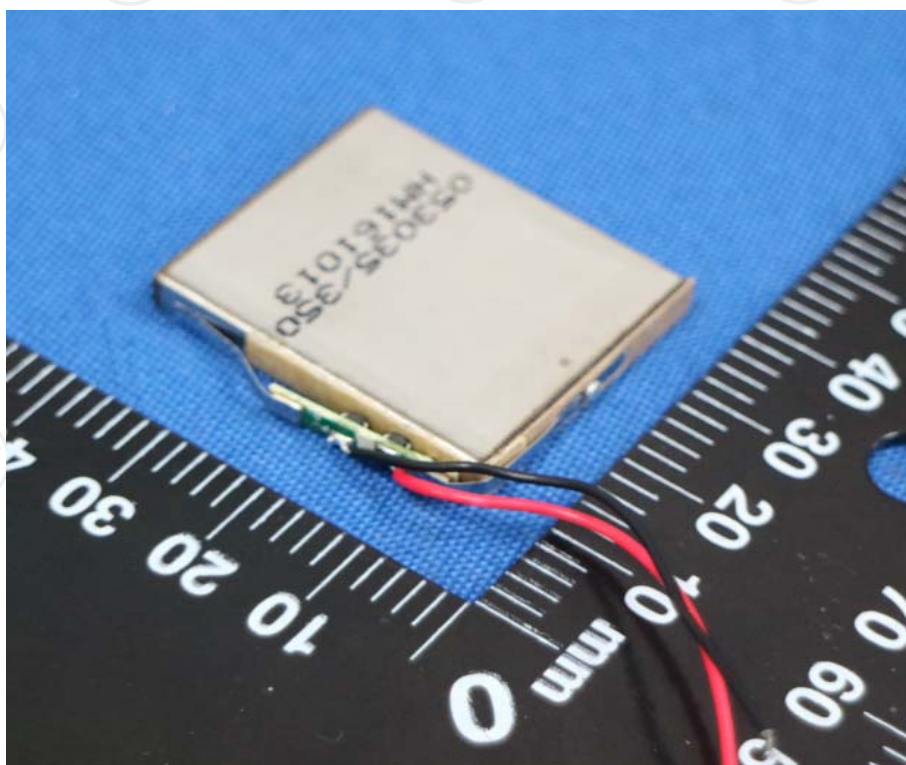
Picture 2. Battery view-2

Attachment 2

Photo Documentation



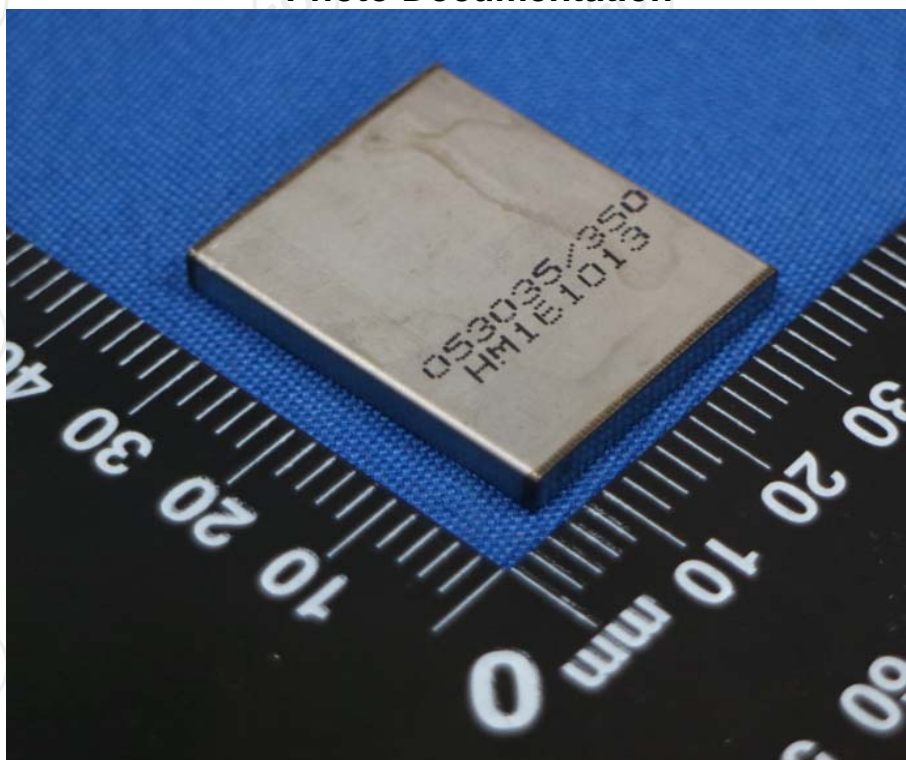
Picture 3. Battery view-3



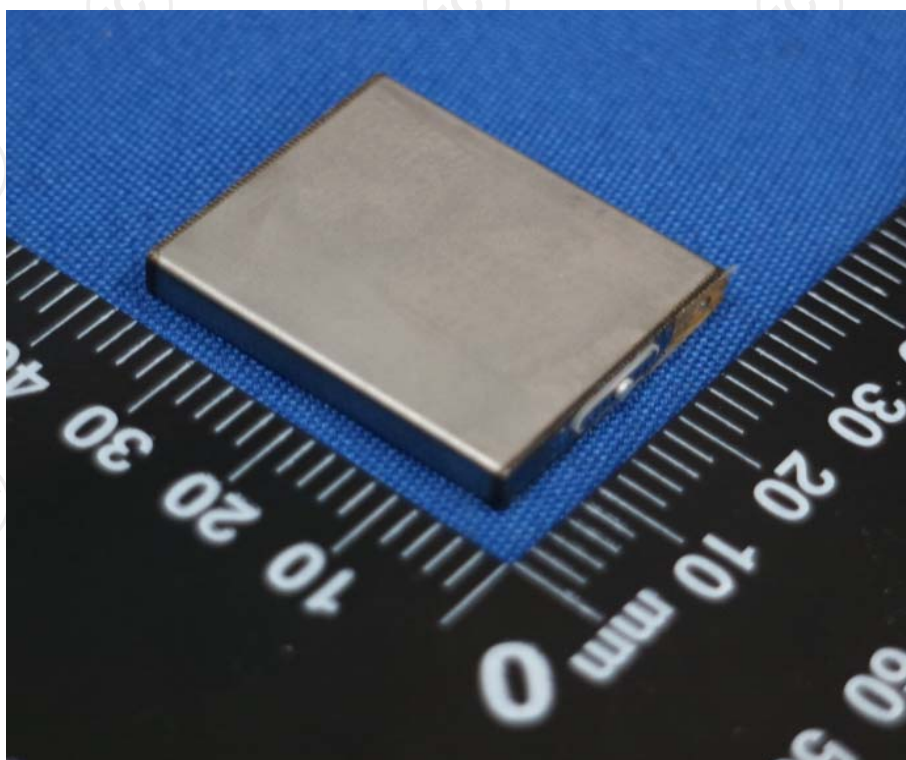
Picture 4. Battery view-4

Attachment 2

Photo Documentation

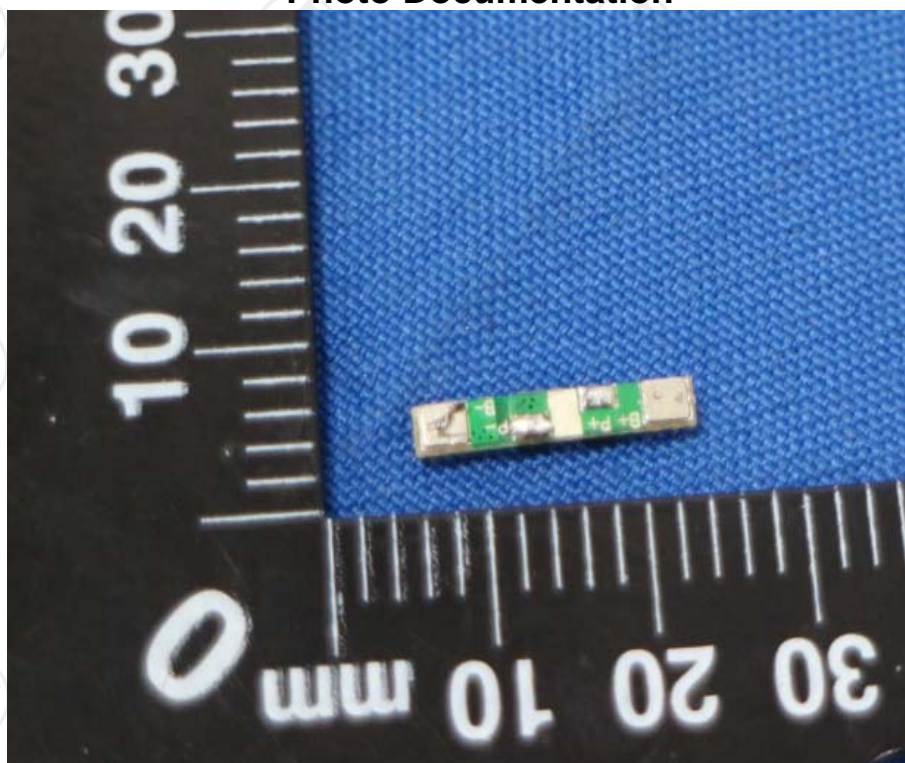


Picture 5. Cell view-1

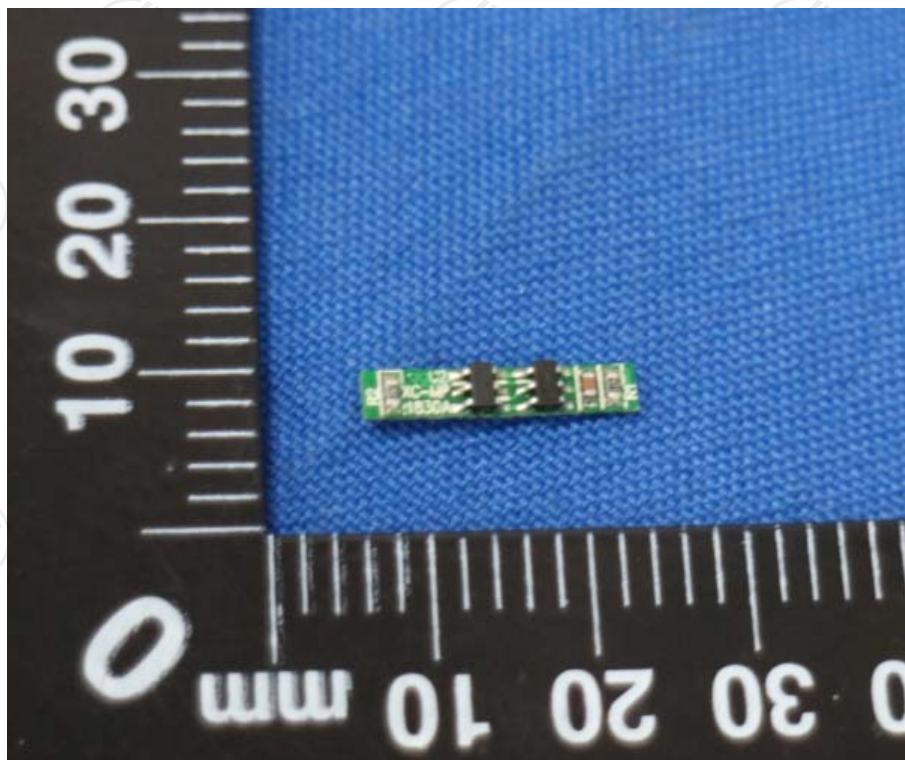


Picture 6. Cell view-2

Photo Documentation



Picture 7. Protection board view-1



Picture 8. Protection board view-2

*** End of Test Report ***