TEST REPORT
测试报告

Report No.(报告编号): ANT2302170010-010 Page（页码） 1 of 6

Applicant **申请商**	: :
Address **地址**	: :
Manufacturer's name **制造商**	: :
Address **地址**	: :

Report on the submitted samples said to be:
委托检测的样品及申请者对样品的说明如下 ：

Sample Name 样品名称	: :	Li-ion Battery 锂离子电池
Trade Mark 商标	: :	N/A
Tested Style No. 测试型号	: :	602040
Series models 系列型号	: :	N/A
Sample reception time 接收时间	: :	February 22, 2023 2023 年 02 月 22 日
Testing Period 测试周期	: :	February 22, 2023 ~ February 27, 2023 2023 年 02 月 22 日 ~ 2023 年 02 月 27 日
Test request 测试要求	: :	With reference to EU Directive 2006/66/EC and amending directive 2013/56/EU 参考欧盟指令 2006/66/EC 及其修订指令 2013/56/EU。
Test method 测试方法	: :	Please refer to next page(s). 参见后续页。
Results 测试结果	: :	Please refer to next page(s). 参见后续页。

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Redact By 编 制	Yetta	Reviewed By 审 核	Sophia
Issued By 签 发	Yinon	Date of issue 签 发 日 期	February 27, 2023 2023 年 02 月 27 日

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CONCLUSION
结论

A. According to the customer's request, based on the performed tests on submitted sample, the result of total Lead (Pb), Cadmium (Cd), Mercury (Hg) content comply with the limit as set of EU Directive 2006/66/EC and amending directive 2013/56/EU.
根据客户要求，对提交样品进行的测试，总铅（Pb）、镉（Cd）、汞（Hg）含量的结果符合欧盟指令 2006/66/EC 和修订指令 2013/56/EU 的限制。

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TEST REPORT
测试报告

A. The results of total Lead(Pb), Cadmium(Cd), Mercury(Hg) content according to EU Directive 2006/66/EC and amending directive 2013/56/EU.
依据欧盟指令 2006/66/EC 及其修订指令 2013/56/EU 铅(Pb)，镉(Cd)，汞(Hg)含量的结果.

Test method: With reference to IEC 62321-5:2013 & IEC 62321-4:2013+AMD1:2017 CSV. Analysis was performed by inductively coupled plasma atomic emission spectrometer (ICP-OES)
测试方法: 参考 IEC 62321-5:2013&IEC 62321-4:2013+AMD1:2017 CSV 测试方法,样品用酸消解，然后用电感耦合等离子体发射光谱仪（ICP-OES）进行检测

Item 项目	Unit 单位	MDL 最低检出限	Results 结果	Limit 限值
Mercury (Hg)汞	mg/kg	2	N.D.	5
Cadmium (Cd)镉	mg/kg	2	N.D.	20
Lead (Pb)铅	mg/kg	2	N.D.	40

Remark
备注:

According to EU Directive 2013/56/EU:
根据欧盟指令 2013/56/EU:

※1 = The prohibition not apply to portable batteries and accumulators intended for use in:
(a) emergency and alarm systems, including emergency lighting;
(b) medical equipment;
(c) cordless power tools.

※1 = 该禁令不适用于以下我们用来使用的便携电池或蓄电池:
(a) 紧急或警报系统,包括紧急照明;
(b) 医疗设备;
(c) 无绳电动工具.

※2 =All batteries, accumulators and battery packs shall be marked with forked pulley dustbin
※2=所有的电池、蓄电池和电池组应带有划叉的带轮垃圾箱标志。

※3 = If batteries, accumulators and button cells containing more than 5 mg/kg Mercury, or more than 20 mg/kg Cadmium, or more than 40 mg/kg Lead, the chemical conformity of metal that should exceed the limit under the marking of forked pulley dustbin is Hg, Cd and Pb, and the chemical conformity occupies at least one fourth of the area of the marking of forked pulley dustbin.
※3 =如果电池、蓄电池和纽扣电池中汞(Hg)含量超过 5mg/kg 或者镉(Cd)含量超过 20 mg/kg 或者铅(Pb)含量超过 20 mg/kg，则划叉的带轮垃圾箱标志下应加超过限量的金属的化学符合：Hg、Cd、Pb，并且化学符合所占的面积至少为划叉的带轮垃圾箱标志的四分之一。

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※4 = If batteries or accumulators contain more than one of the above metals, the corresponding chemical conformity should be added separately.

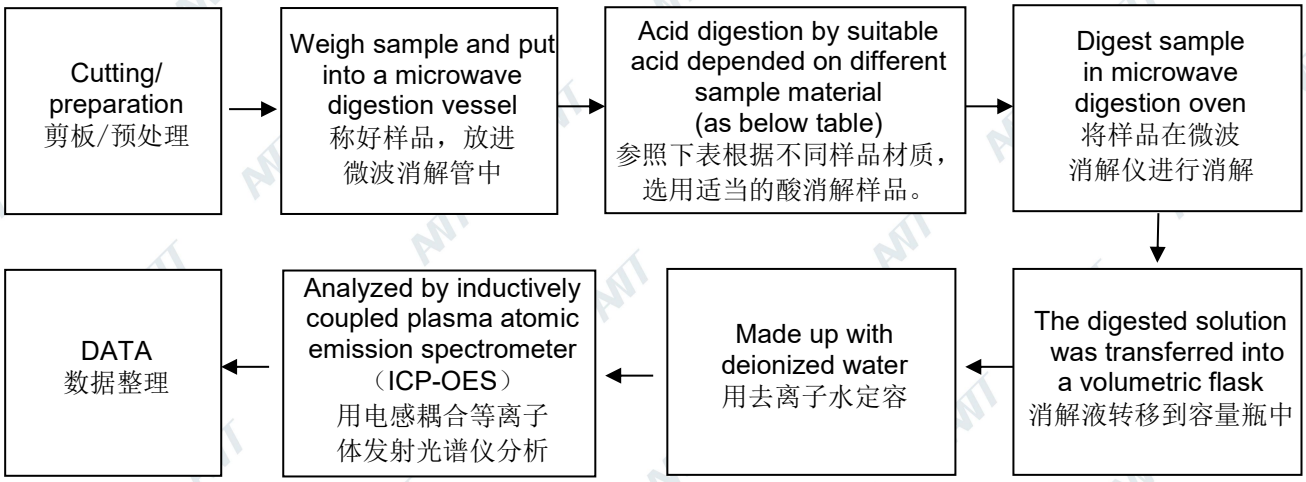
※4 =如果电池或蓄电池含有超过一种以上的上述金属，则需要分别附加相应的化学符合。

Remark
备注:

- mg/kg = ppm
- N.D. = Not detected or less than MDL
  未检出或低于方法检出限
  MDL = Method Detection Limit
  方法检出限
- Results shown are of total weight of the battery sample.
  结果显示的是整个电池样品的重量
- Flow chart appendix is included.
  测试流程图见附录
- Photo appendix is included.
  图片见附录

Appendix
附录

1. Test Flowchart for Pb / Cd /Hg contents
   铅/镉/汞测试流程图



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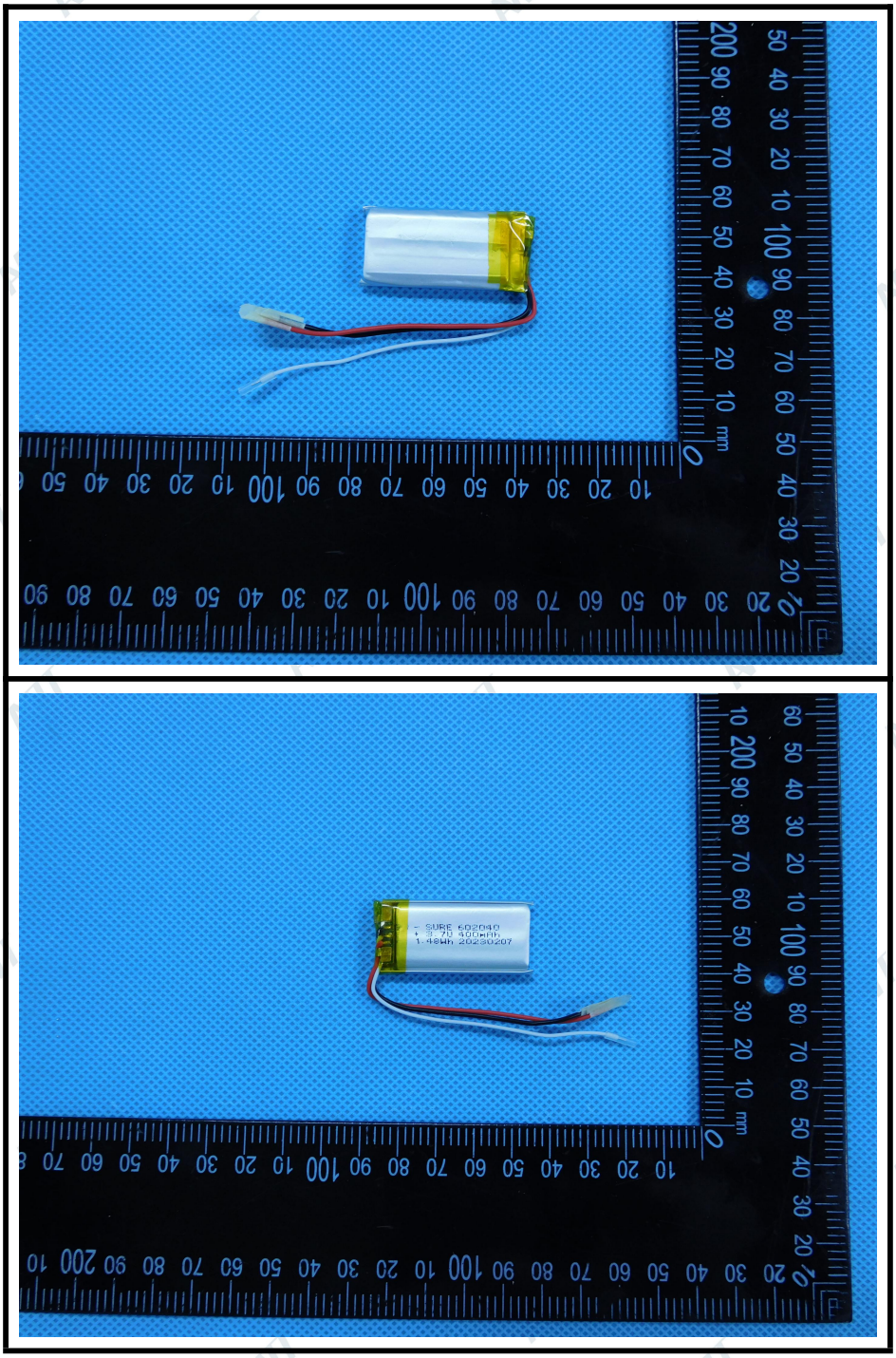
The photo of the sample

样品图片



ANT authenticate the photo on original report only

此图片仅限于随 ANT 正本报告使用

TEST REPORT
测试报告

Statement (声明):

1. The test report is considered invalidated without approval signature, special seal on the perforation.
   检测报告无批准人签字、加盖公司报告专用章无效。
2. The result(s) shown in this report refer only to the sample(s) tested.
   本报告检测结果仅对受测样品负责。
3. Without written approval of ANT, this report can't be reproduced except in full.
   未经 ANT 书面同意，不得部分复制本报告。
4. The sample(s) and sample information was/were provided by the client who should be responsible for the authenticity which ANT hasn't verified.
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5. In case of any discrepancy between the English version and Chinese version of the testing reports(if generated), the Chinese version shall prevail.
   如果英文版本和中文版本的测试报告有任何差异（如产生），则以中文版本为准。

*** End of Report ***

*** 报告结束 ***

CMC TESTING 众检检验

ilac-MRA CNAS 中国认可 国际互认 检测 TESTING CNAS L13807

TEST REPORT
IEC 62133-2
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 – Part 2: Lithium systems

Report Number. :	CMC220701008
Date of issue :	2022-07-21
Total number of pages :	27pages
Tested by (name, signature). :	Yuki Wang
Reviewed by (name, signature) :	Carol Xiong
Approved by (name, signature) :	Barry He
Name of Testing Laboratory preparing the Report :	**CMC Testing International (Shenzhen) Co., Ltd.**
Address :	101, Building B, Kaihuimao Industrial Park, Liyuan Road, Heping Community, Fuhai Street, Baoan District, Shenzhen, Guangdong, China
Applicant's name :	
Address :	
Manufacturer's name :	
Address :	
Test specification:	
Standard :	IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021
Test procedure :	Type approved
Non-standard test method :	N/A
Test result :	Pass
Test item description :	Li-ion Battery
Trade Mark :	N/A
Model/Type reference :	602040
Ratings :	3.7V, 400mAh, 1.48Wh

General disclaimer:

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 CMC. The authenticity of this Test Report and its contents can be verified by contacting the CMC, responsible for this Test Report.

List of Attachments (including a total number of pages in each attachment):

Attachment 1: Photo documentation (on pages 23-26).

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
cl.5.6.2 Design recommendation; cl.7.1 Charging procedure for test purposes (for Cells and Batteries); cl.7.2.1 Continuous charging at constant voltage (Cells); cl.7.2.2 Case stress at high ambient temperature (Batteries); cl.7.3.1 External short circuit (Cells); cl.7.3.2 External short circuit (Batteries); cl.7.3.3 Free fall (Cells and Batteries); cl.7.3.4 Thermal abuse (Cells); cl.7.3.5 Crush (Cells); cl.7.3.6 Over-charging of battery; cl.7.3.7 Forced discharge (Cells); cl.7.3.8 Mechanical tests (Batteries); cl.7.3.9 Design evaluation – Forced internal short circuit (Cells). Tests are made with the number of cells and batteries specified in IEC 62133-2:2017+A1 Table 1.	**CMC Testing International (Shenzhen) Co., Ltd.** 101, Building B, Kaihuimao Industrial Park, Liyuan Road, Heping Community, Fuhai Street, Baoan District, Shenzhen, Guangdong, China

Use of uncertainty of measurement for decisions on conformity (decision rule) :

☒ No decision rule is specified by the IEC standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty ("simple acceptance" decision rule, previously known as "accuracy method").

☐ Other: N/A (to be specified, for example when required by the standard or client, or if national accreditation requirements apply)

Information on uncertainty of measurement:

The uncertainties of measurement are calculated by the laboratory based on application of criteria given by OD-5014 for test equipment and application of test methods, decision sheets and operational procedures of IECEE.

IEC Guide 115 provides guidance on the application of measurement uncertainty principles and applying the decision rule when reporting test results within IECEE scheme, noting that the reporting of the measurement uncertainty for measurements is not necessary unless required by the test standard or customer.

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

Copy of marking plate:

-(Black) Li-ion Battery
602040 1ICP7/20/42
3.7V 400mAh 1.48Wh
+(Red)
Date: YYYYMMDD Made in China
WARNING: Risk of Fire and Burns. Do Not Open, Crush, Heat Above 60°C/140°F or Incinerate. Do not short circuit. If bulges severely, discontinue use. Follow Manufacturer's Instructions.

Date Code: YYYYMMDD

YYYY=year, MM=month, DD=day

Information for safety mentioned on equipment's package:

Warning language

1.Keep small cells and batteries which are considered swallowable out of the reach of children.

2.Swallowing may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2h of ingestion.

3.In case of ingestion of a cell or battery, seek medical assistance promptly.

Test item particulars.....:	
Classification of installation and use .....:	To be defined in final product
Supply Connection.....:	Lead wire
Recommend charging method declared by the manufacturer.....:	Charging the battery with 200mA constant current and 4.2V constant voltage until the current reduces to 8mA at ambient 20°C±5°C.
Discharge current (0,2 It A) .....:	80mA
Specified final voltage.....:	2.75V
Upper limit charging voltage per cell.....:	4.2V
Maximum charging current.....:	400mA
Charging temperature upper limit.....:	45°C
Charging temperature lower limit .....:	0°C
Polymer cell electrolyte type.....:	☐ gel polymer ☐ solid polymer ☒ N/A
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.....:	2022-07-01
Date (s) of performance of tests.....:	2022-07-05 to 2022-07-13
Test Environment Condition .....:	Ambient temperature: 22.7ºC to 23.2ºC
Sample identification.....:	SN220701008C001~ SN220701008C053 SN220701008B001~ SN220701008B022
General remarks: 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. “(CXXX)” refers to sample number of cells, “X” is 0~9; “(BXXX)” refers to sample number of batteries, “X” is 0~9; "(See Enclosure)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. **Throughout this report a ☐ comma / ☒ point is used as the decimal separator.**	
Name and address of factory (ies) .....:	Same as applicant.

General product information and other remarks:

This battery is constructed with a single lithium-ion cell (1S1P), and has overcharge, over-discharge, over current and short-circuits proof circuit.

The main features of the battery are shown as below (clause 7.1.1):

Model (Battery)	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Final Voltage
602040	400mAh	3.7V	200mA	200mA	400mA	400mA	4.2V	2.75V

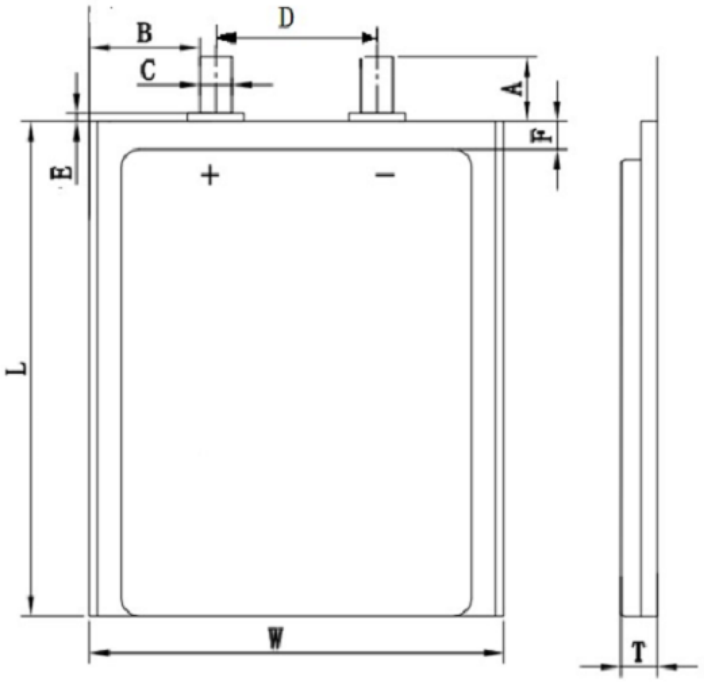
The main features of the cell in the battery are shown as below (clause 7.1.1):

Model (Cell)	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Final Voltage
602040	400mAh	3.7V	200mA	200mA	400mA	400mA	4.2V	2.75V

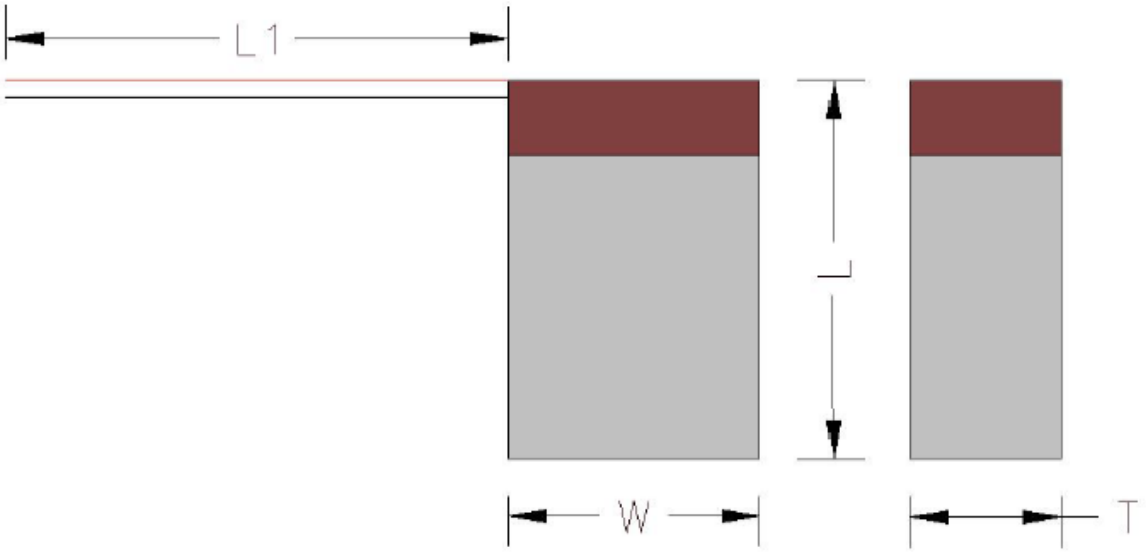
The main features of the cell in the battery are shown as below (clause 7.1.2):

Model (Cell)	Upper limit charge voltage	Taper-off current	Lower charge temperature	Upper charge temperature
602040	4.2V	20mA	0°C	45°C

Construction

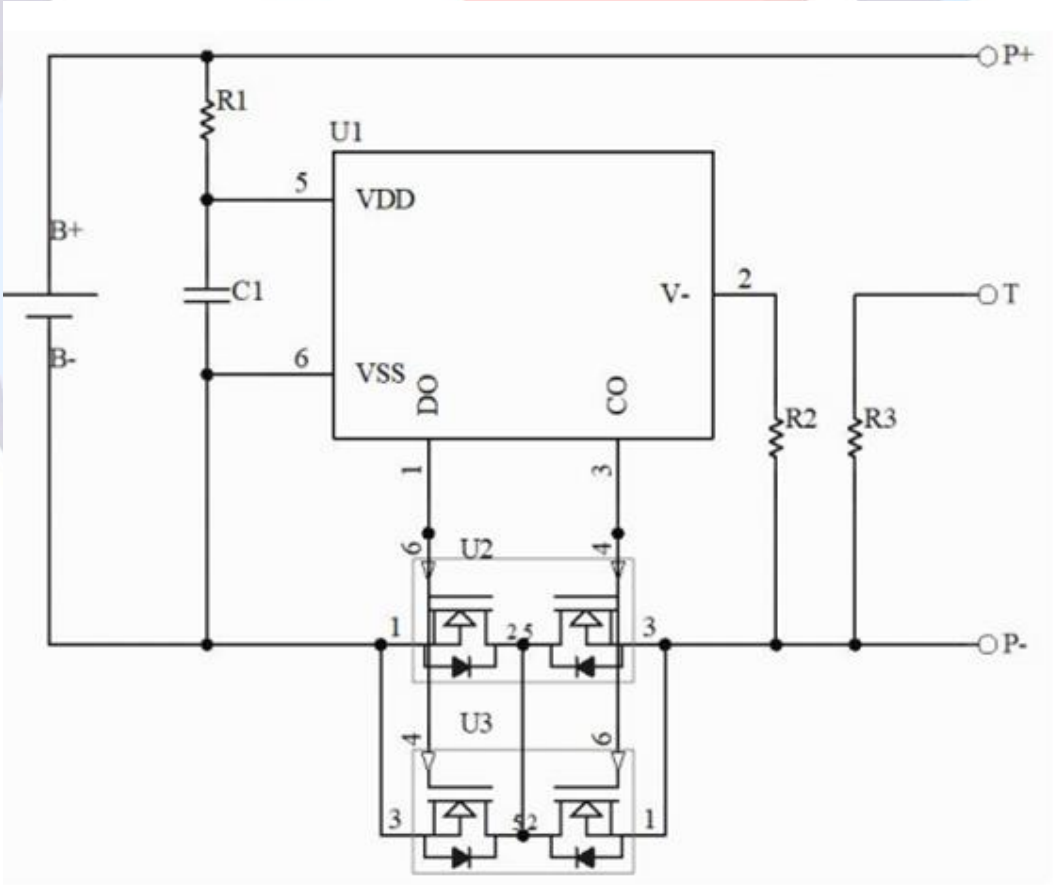


T: 6.2max W: 20.0max L: 41.8max
Cell (Unit: mm)



T:6.5max W: 22.5max H: 44.0max
Battery (Unit: mm)

Circuit diagram:



IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
4	**PARAMETER MEASUREMENT TOLERANCES**		P
	Parameter measurement tolerances		P
5	**GENERAL SAFETY CONSIDERATIONS**		P
5.1	**General**		P
	Cells and batteries so designed and constructed that they are safe under conditions of both intended use and reasonably foreseeable misuse		P
5.2	**Insulation and wiring**		P
	The insulation resistance between the positive terminal and externally exposed metal surfaces of the battery (excluding electrical contact surfaces) is not less than 5 MΩ	No metal surface exists.	N/A
	Insulation resistance (MΩ) ..... :		—
	Internal wiring and insulation are sufficient to withstand maximum anticipated current, voltage and temperature requirements		P
	Orientation of wiring maintains adequate clearance and creepage distances between conductors		P
	Mechanical integrity of internal connections accommodates 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 nor inhibit pressure relief		N/A
5.4	**Temperature, voltage and 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 7.	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 specified chargers are designed to maintain charging within the temperature, voltage and current limits specified	The charging limits specified in the manufacturer's specification.	P
5.5	**Terminal contacts**		P
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current	Lead wire contacts complied with the requirements.	P

IEC 62133-2			
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-circuit		P
5.6	**Assembly of cells into batteries**		P
5.6.1	General		P
	Each battery have an independent control and protection for current, voltage, temperature and any other parameter required for safety and to maintain the cells within their operating region	Single cell battery.	N/A
	This protection may be provided external to the battery such as within the charger or the end devices		N/A
	If protection is external to the battery, the manufacturer of the battery provide this safety relevant information to the external device manufacturer for implementation		N/A
	If there is more than one battery housed in a single battery case, each battery have protective circuitry that can maintain the cells within their operating regions		N/A
	Manufacturers of cells specify current, voltage and temperature limits so that the battery manufacturer/designer may ensure proper design and assembly	Current, voltage and temperature limits specified by cell manufacturer.	P
	Batteries that are designed for the selective discharge of a portion of their series connected cells incorporate circuitry to prevent operation of cells outside the limits specified by the cell manufacturer		N/A
	Protective circuit components added as appropriate and consideration given to the end-device application		P
	The manufacturer of the battery provide a safety analysis of the battery safety circuitry with a test report including a fault analysis of the protection circuit under both charging and discharging conditions confirming the compliance		N/A
5.6.2	Design recommendation		P
	For the battery consisting of a single cell or a single cellblock, it is recommended that the charging voltage of the cell does not exceed the upper limit of the charging voltage specified in Table 2	Single cell battery, Max. charging voltage: 4.2V, not exceed 4.2V specified in Table 2.	P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	For the battery consisting of series-connected plural single cells or series-connected plural cellblocks, it is recommended that the voltages of any one of the single cells or single cellblocks does not exceed the upper limit of the charging voltage, specified in Table 2, by monitoring the voltage of every single cell or the single cellblocks		N/A
	For the battery consisting of series-connected plural single cells or series-connected plural cellblocks, it is recommended that charging is stopped when the upper limit of the charging voltage 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
	For batteries consisting of series-connected cells or cell blocks, nominal charge voltage not be counted as an overcharge protection		N/A
	For batteries consisting of series-connected cells or cell blocks, cells have closely matched capacities, be of the same design, be of the same chemistry and be from the same manufacturer		N/A
	It is recommended that the cells and cell blocks not discharged beyond the cell manufacturer's specified final voltage	Final voltage of battery: 2.75V, not exceed the final voltage specified by cell manufacturer.	P
	For batteries consisting of series-connected cells or cell blocks, cell balancing circuitry incorporated into the battery management system		N/A
5.6.3	Mechanical protection for cells and components of batteries		P
	Mechanical protection for cells, cell connections and control circuits within the battery provided to prevent damage as a result of intended use and reasonably foreseeable misuse	Mechanical protection for cell connections and control circuits provided.	P
	The mechanical protection can be provided by the battery case or it can be provided by the end product enclosure for those batteries intended for building into an end product	Built-in batteries, mechanical protection for cells should be provided by end product.	N/A
	The battery case and compartments housing cells designed to accommodate cell dimensional tolerances during charging and discharging as recommended by the cell manufacturer	To be evaluated in final system.	N/A
	For batteries intended for building into a portable end product, testing with the battery installed within the end product considered when conducting mechanical tests		N/A
5.7	**Quality plan**		P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	The manufacturer prepares and implements a quality plan that defines procedures for the inspection of materials, components, cells and batteries and which covers the whole process of producing each type of cell or battery	Complied. Quality plan provided.	P
5.8	**Battery safety components**	See TABLE: Critical components information	N/A
6	**TYPE TEST AND SAMPLE SIZE**		P
	Tests are made with the number of cells or batteries specified in Table 1 using cells or batteries that are not more than six months old		P
	Coin cells with resistance ≤ 3 Ω (measured according annex D) are tested according table 1	Not coin cells	N/A
	Unless otherwise specified, tests are carried out in an ambient temperature of 20 °C ± 5 °C		P
	The safety analysis of 5.6.1 identify those components of the protection circuit that are critical for short-circuit, overcharge and overdischarge protection		P
	When conducting the short-circuit test, consideration given to the simulation of any single fault condition that is likely to occur in the protecting circuit that would affect the short-circuit test	See clause 7.3.2.	P
7	**SPECIFIC REQUIREMENTS AND TESTS**		P
7.1	**Charging procedure for test purposes**		P
7.1.1	First procedure		P
	This charging procedure applies to subclauses other than those specified in 7.1.2		P
	Unless otherwise stated in this document, the charging procedure for test purposes is carried out in an ambient temperature of 20 °C ± 5 °C, using the method declared by the manufacturer		P
	Prior to charging, the battery have been discharged at 20 °C ± 5 °C at a constant current of 0,2 It A down to a specified final voltage		P
7.1.2	Second procedure		P
	This charging procedure applies only to 7.3.1, 7.3.4, 7.3.5, and 7.3.9		P
	After stabilization for 1 h and 4 h, respectively, at ambient temperature of highest test temperature and lowest test temperature, as specified in Table 2, cells are charged by using the upper limit charging voltage and maximum charging current, until the charging current is reduced to 0,05 It A, using a constant voltage charging method	Charge temperature specified by manufacturer: 0-45°C. -5°C used for lower limit tests. 45°C used for upper limit tests.	P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
7.2	**Intended use**		P
7.2.1	Continuous charging at constant voltage (cells)	Tested complied.	P
	Fully charged cells are subjected for 7 days to a charge using the charging method for current and standard voltage specified by the cell manufacturer	Charging for 7 days with 200mA.	P
	Results: No fire. No explosion. No leakage.....:	(See appended table 7.2.1)	P
7.2.2	Case stress at high ambient temperature (battery)	Test as request by client	P
	Oven temperature (°C).....:	70°C	—
	Results: No physical distortion of the battery case resulting in exposure of internal protective components and cells	No physical distortion of the battery case resulting in exposure of internal protective components and cells	P
7.3	**Reasonably foreseeable misuse**		P
7.3.1	External short-circuit (cell)	Tested complied.	P
	The cells were tested until one of the following occurred:		P
	- 24 hours elapsed; or		N/A
	- The case temperature declined by 20 % of the maximum temperature rise		P
	Results: No fire. No explosion.....:	(See appended table 7.3.1)	P
7.3.2	External short-circuit (battery)	Tested complied.	P
	The batteries were tested until one of the following occurred:		P
	- 24 hours elapsed; or		N/A
	- The case temperature declined by 20 % of the maximum temperature rise		P
	In case of rapid decline in short circuit current, the battery pack remained on test for an additional one hour after the current reached a low end steady state condition		P
	A single fault in the discharge protection circuit conducted on one to four (depending upon the protection circuit) of the five samples before conducting the short-circuit test	Single fault conducted on three samples.	P
	A single fault applies to protective component parts such as MOSFET, fuse, thermostat or positive temperature coefficient (PTC) thermistor	Single fault applies on MOSFET (U3) pin1~pin3	P
	Results: No fire. No explosion.....:	(See appended table 7.3.2)	P
7.3.3	Free fall	Tested complied.	P
	Results: No fire. No explosion	No fire. No explosion.	P
7.3.4	Thermal abuse (cells)	Tested complied.	P
	Oven temperature (°C).....:	130°C	—

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Results: No fire. No explosion	No fire. No explosion.	P
7.3.5	Crush (cells)	Tested complied.	P
	The crushing force was released upon:		P
	- The maximum force of 13 kN ± 0,78 kN has been applied; or		P
	- An abrupt voltage drop of one-third of the original voltage has been obtained		N/A
	Results: No fire. No explosion..... :	(See appended table 7.3.5)	P
7.3.6	Over-charging of battery	Tested complied.	P
	The supply voltage which is:		P
	- 1,4 times the upper limit charging voltage presented in Table A.1 (but not to exceed 6,0 V) for single cell/cell block batteries or	5.88V applied.	P
	- 1,2 times the upper limit charging voltage resented in Table A.1 per cell for series connected multi-cell batteries, and		N/A
	- Sufficient to maintain a current of 2,0 It A throughout the duration of the test or until the supply voltage is reached		P
	Test was continued until the temperature of the outer casing:		P
	- 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 appended table 7.3.6)	P
7.3.7	Forced discharge (cells)	Tested complied.	P
	Discharge a single cell to the lower limit discharge voltage specified by the cell manufacturer		P
	The discharged cell is then subjected to a forced discharge at 1 It A to the negative value of the upper limit charging voltage		P
	- The discharge voltage reaches the negative value of upper limit charging voltage within the testing duration. The voltage is maintained at the negative value of the upper limit charging voltage by reducing the current for the remainder of the testing duration		N/A
	- The discharge voltage does not reach the negative value of upper limit charging voltage within the testing duration. The test is terminated at the end of the testing duration		P
	Results: No fire. No explosion..... :	(See appended table 7.3.7)	P
7.3.8	Mechanical tests (batteries)		P
7.3.8.1	Vibration	Tested complied.	P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Results: No fire, no explosion, no rupture, no leakage or venting. ..... :	(See appended table 7.3.8.1)	P
7.3.8.2	Mechanical shock	Tested complied.	P
	Results: No leakage, no venting, no rupture, no explosion and no fire ..... :	(See appended table 7.3.8.2)	P
7.3.9	Design evaluation – Forced internal short-circuit (cells)	Tested complied.	P
	The cells complied with national requirement for .....:	France, Japan, Republic of Korea and Switzerland.	—
	The pressing was stopped upon:		P
	- 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	400N for prismatic cell.	P
	Results: No fire ..... :	(See appended table 7.3.9)	P
8	**INFORMATION FOR SAFETY**		P
8.1	**General**		P
	Manufacturers of secondary cells provides information about current, voltage and temperature limits of their products	Information for safety mentioned in manufacturer's specifications.	P
	Manufacturers of batteries provides information regarding how to minimize and mitigate hazards to equipment manufacturers or end-users	Information for safety mentioned in manufacturer's specifications.	P
	Systems analyses are performed by device manufacturers to ensure that a particular battery design prevents hazards from occurring during use of a product		N/A
	As appropriate, any information relating to hazard avoidance resulting from a system analysis is provided to the end user		N/A
8.2	**Small cell and battery safety information**	Small cell and battery	P
	The following warning language is to be provided with the information packaged with the small cells and batteries or equipment using them:	Information for safety mentioned in manufacturer's specifications.	P
	- Keep small cells and batteries which are considered swallowable out of the reach of children		P
	- Swallowing may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2 h of ingestion		P
	- In case of ingestion of a cell or battery, seek medical assistance promptly		P
9	**MARKING**		P
9.1	**Cell marking**	The final product is battery	N/A

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Cells marked as specified in IEC 61960, except coin cells		N/A
	Coin cells whose external surface area is too small to accommodate the markings on the cells show the designation and polarity		N/A
	By agreement between the cell manufacturer and the battery and/or end product manufacturer, component cells used in the manufacture of a battery need not be marked		N/A
9.2	**Battery marking**		P
	Batteries are marked as specified in IEC 61960, except for coin batteries	See marking plate.	P
	Coin batteries whose external surface area is too small to accommodate the markings on the batteries show the designation and polarity	Not coin batteries.	N/A
	Batteries are marked with an appropriate caution statement	Batteries marked with an appropriate caution statement.	P
	- Terminals have clear polarity marking on the external surface of the battery, or	The “+(Red)” and “-(Black)” polarity explicitly marked on surface of the battery.	P
	- Not be marked with polarity markings if the design of the external connector prevents reverse polarity connections		N/A
9.3	**Caution for ingestion of small cells and batteries**		N/A
	Coin cells and batteries identified as small batteries according to 8.2 include a caution statement regarding the hazards of ingestion in accordance with 8.2	Not coin cells and batteries.	N/A
	Small cells and batteries are intended for direct sale in consumer-replaceable applications, caution for ingestion is given on the immediate package	Not intended for direct sale.	N/A
9.4	**Other information**		P
	The following information are marked on or supplied with the battery:	Information for storage and disposal instructions mentioned in manufacturer’s specifications.	P
	- Storage and disposal instructions		P
	- Recommended charging instructions		P
10	**PACKAGING AND TRANSPORT**		N/A
	Packaging for coin cells are not be small enough to fit within the limits of the ingestion gauge of Figure 3	Not coin cells.	N/A

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
ANNEX A	**CHARGING AND DISCHARGING 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	4.2V applied.	P
A.3.2.1	General		P
A.3.2.2	Explanation of safety viewpoint		N/A
A.3.2.3	Safety requirements, when different upper limit charging voltage is applied	4.2V 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 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 the high temperature range		N/A
A.4.3.4	Safety considerations when specifying a new upper limit in the 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 the low temperature range		P
A.4.4.4	Safety considerations when specifying a new lower limit in the low temperature range	No documents provided by manufacturer explaining the lower limit exceed 10°C, -5°C applied for testing in this report for safety considerations.	P
A.4.5	Scope of the application of charging current		P
A.4.6	Consideration of discharge		P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
A.4.6.1	General		P
A.4.6.2	Final discharge voltage and explanation of safety viewpoint	Cell specified final voltage 2.75V, not exceed 2.75V specified by cell manufacturer.	P
A.4.6.3	Discharge current and temperature range		P
A.4.6.4	Scope of application of the discharging current		P
A.5	**Sample preparation**		P
A.5.1	General		P
A.5.2	Insertion procedure for nickel particle to generate internal short		P
A.5.3	Disassembly of charged cell		P
A.5.4	Shape of nickel particle		P
A.5.5	Insertion of nickel particle in cylindrical cell		N/A
A.5.5.1	Insertion of nickel particle in winding core		N/A
A.5.5.2	Marking the position of the nickel particle on both ends of the winding core of the separator		N/A
A.5.6	Insertion of nickel particle in prismatic cell		P
A.6	**Experimental procedure of the forced internal short-circuit test**		P
A.6.1	Material and tools for preparation of nickel particle		P
A.6.2	Example of a nickel particle preparation procedure		P
A.6.3	Positioning (or placement) of a nickel particle		P
A.6.4	Damaged separator precaution		P
A.6.5	Caution for rewinding separator and electrode		P
A.6.6	Insulation film for preventing short-circuit		P
A.6.7	Caution when disassembling a cell		P
A.6.8	Protective equipment for safety		P
A.6.9	Caution in the case of fire during disassembling		P
A.6.10	Caution for the disassembling process and pressing the electrode core		P
A.6.11	Recommended specifications for the pressing device		P
ANNEX B	**RECOMMENDATIONS TO EQUIPMENT MANUFACTURERS AND BATTERY ASSEMBLERS**		N/A
ANNEX C	**RECOMMENDATIONS TO THE END-USERS**		N/A
ANNEX D	**MEASUREMENT OF THE INTERNAL AC RESISTANCE FOR COIN CELLS**		N/A
D.1	**General**	Not coin cells.	N/A

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
D.2	**Method**		N/A
	A sample size of three coin cells is required for this measurement		N/A
	Coin cells with an internal resistance greater than 3 Ω require no further testing .....:	(See appended table D.2)	N/A
	Coin cells with an internal resistance less than or equal to 3 Ω are subjected to the testing according to Clause 6 and Table 1		N/A
ANNEX E	**PACKAGING AND TRANSPORT**		N/A
ANNEX F	**COMPONENT STANDARDS REFERENCES**		N/A

	TABLE: Critical components information				P
Object / part No.	**Manufacturer / trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Cell		602040	3.7V, 400mAh	IEC 62133-2:2017+A1:2021	Tested with appliance
-Positive electrode	Soundon New Energy Technology Co., Ltd	01A	$LiCoO_2$, NMP, PVDF, Conductive Additive	--	--
-Negative electrode	Huizhou New Carbon Battery Materials Co., Ltd	01B	Graphite, CMC, SBR, Distilled Water, Conductive Additive	--	--
-Electrolyte	Dongguan Shanshan Battery Material Co., Ltd	LD-134BJ	$LiPF_6$ dissolved in organic solvent (EC+DMC)	--	--
-Separator	Shenzhen Juhuicheng Technology Co., LTD	12+4μm	PE+ ceramic/ PVDF, shutdown temperature: 125 ~ 130°C	--	--
PCB	Interchangeable	Interchangeable	V-0, 130°C	UL 796 UL 94	UL approved
Protective IC (U1)	Shenzhen Xinfeihong Electronics Co., Ltd	DW01	V_{CU}= 4.300V±50mV V_{DL}=2.500V±75mV	--	Tested with appliance
MOSFET (U2 U3)	Shenzhen Xinfeihong Electronics Co., Ltd	8205A	V_{DS}= 20V V_{GS}= ±12V I_D=5A	--	Tested with appliance
Lead wire	Interchangeable	Interchangeable	24AWG, 80°C, 300Vac	UL 758	UL approved
Tape	Interchangeable	Interchangeable	130°C	UL 510	UL approved

Supplementary information:

[1)] Provided evidence ensures the agreed level of compliance.

7.2.1	TABLE: Continuous charging at constant voltage (cells)	P

Sample no.	Recommended charging voltage Vc (Vdc)	Recommended charging current I_{rec} (A)	OCV before test (Vdc)	Results
SN220701008C001	4.20	0.2	4.20	P
SN220701008C002	4.20	0.2	4.20	P
SN220701008C003	4.20	0.2	4.20	P
SN220701008C004	4.20	0.2	4.20	P
SN220701008C005	4.20	0.2	4.20	P

Supplementary information:

- No fire or explosion
- No leakage

7.3.1	TABLE: External short-circuit (cell)	P

Sample no.	Ambient T (°C)	OCV before test (Vdc)	Resistance of circuit (mΩ)	Maximum case temperature ~~rise ΔT~~, °C	Results
Samples charged at charging temperature upper limit (45°C)					
SN220701008C006	55.6	4.18	81	100.2	P
SN220701008C007	55.6	4.18	80	103.2	P
SN220701008C008	55.6	4.17	82	100.9	P
SN220701008C009	55.6	4.18	81	101.5	P
SN220701008C010	55.6	4.18	82	102.4	P
Samples charged at charging temperature lower limit (-5°C)					
SN220701008C011	55.6	4.15	82	109.5	P
SN220701008C012	55.6	4.15	81	104.2	P
SN220701008C013	55.6	4.14	83	102.6	P
SN220701008C014	55.6	4.15	82	103.8	P
SN220701008C015	55.6	4.14	81	102.9	P

Supplementary information:

- fire or explosion

7.3.2	TABLE: External short-circuit (battery)	P

Sample no.	Ambient T (°C)	OCV before test (Vdc)	Resistance of circuit (mΩ)	Maximum case temperature ~~rise ΔT~~, °C	Component single fault condition	Results
SN220701008B004	22.8	4.19	80	102.3	Short circuit MOSFET (U2) pin1~pin3	P
SN220701008B005	22.8	4.18	82	104.8	Short circuit MOSFET (U2) pin2~pin7	P
SN220701008B006	22.8	4.18	81	106.4	Short circuit MOSFET (U2) pin1~pin3	P
SN220701008B007	22.8	4.19	83	23.3	--	P
SN220701008B008	22.8	4.18	82	23.5	--	P

Supplementary information:

- No fire or explosion

7.3.5	TABLE: Crush (cells)	P

Sample no.	OCV before test (Vdc)	OCV at removal of crushing force (Vdc)	Maximum force applied to the cell during crush (kN)	Results
Samples charged at charging temperature upper limit (45°C)				
SN220701008C029	4.18	4.18	13.02	P
SN220701008C030	4.17	4.17	13.00	P
SN220701008C031	4.17	4.17	13.03	P
SN220701008C032	4.18	4.18	13.00	P
SN220701008C033	4.17	4.17	13.05	P
Samples charged at charging temperature lower limit (-5°C)				
SN220701008C034	4.15	4.15	13.04	P
SN220701008C035	4.14	4.14	13.04	P
SN220701008C036	4.15	4.15	13.00	P
SN220701008C037	4.15	4.15	13.05	P
SN220701008C038	4.14	4.14	13.06	P

Note: A 13kN force applied at the wide side of prismatic cells.

Supplementary information:

- No fire or explosion

7.3.6	TABLE: Over-charging of battery				P
Constant charging current (A) .....:		0.8			—
Supply voltage (Vdc) .....:		5.88			—
Sample no.	**OCV before charging (Vdc)**	**Total charging time (minute)**	**Maximum outer case temperature (°C)**	**Results**	
SN220701008B012	3.00	90	36.2	P	
SN220701008B013	3.02	90	36.0	P	
SN220701008B014	3.03	90	36.4	P	
SN220701008B015	3.00	90	36.8	P	
SN220701008B016	3.01	90	35.9	P	
Supplementary information: - No fire or explosion					

7.3.7	TABLE: Forced discharge (cells)			P
Sample no.	**OCV before application of reverse charge (Vdc)**	**Measured reverse charge I_t (A)**	**Lower limit discharge voltage (Vdc)**	**Results**
SN220701008C039	3.02	0.4	2.75	P
SN220701008C040	3.00	0.4	2.75	P
SN220701008C041	3.03	0.4	2.75	P
SN220701008C042	3.00	0.4	2.75	P
SN220701008C043	3.01	0.4	2.75	P
Supplementary information: - No fire or explosion				

7.3.8.1	TABLE: Vibration				P
Sample no.	**OCV before test (Vdc)**	**OCV after test (Vdc)**	**Mass before test (g)**	**Mass after test (g)**	**Results**
SN220701008B017	4.19	4.19	9.855	9.848	P
SN220701008B018	4.18	4.18	9.841	9.835	P
SN220701008B019	4.18	4.18	9.851	9.845	P
Supplementary information: - No fire or explosion - No rupture - No leakage - No venting					

7.3.8.2	TABLE: Mechanical shock				P
Sample no.	**OCV before test (Vdc)**	**OCV after test (Vdc)**	**Mass before test (g)**	**Mass after test (g)**	**Results**
SN220701008B020	4.19	4.19	9.833	9.830	P
SN220701008B021	4.18	4.18	9.845	9.842	P
SN220701008B022	4.19	4.19	9.839	9.837	P

Supplementary information:

- No fire or explosion
- No rupture
- No leakage
- No venting

7.3.9	TABLE: Forced internal short circuit (cells)				P
Sample no.	**Chamber ambient T (°C)**	**OCV before test (Vdc)**	**Particle location [1)]**	**Maximum applied pressure (N)**	**Results**
Samples charged at charging temperature upper limit (45°C)					
SN220701008C044	45	4.18	1	400	P
SN220701008C045	45	4.18	1	400	P
SN220701008C046	45	4.17	1	400	P
SN220701008C047	45	4.18	1	400	P
SN220701008C048	45	4.18	1	400	P
Samples charged at charging temperature lower limit (-5°C)					
SN220701008C049	-5	4.15	1	400	P
SN220701008C050	-5	4.14	1	400	P
SN220701008C051	-5	4.15	1	400	P
SN220701008C052	-5	4.15	1	400	P
SN220701008C053	-5	4.14	1	400	P

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.

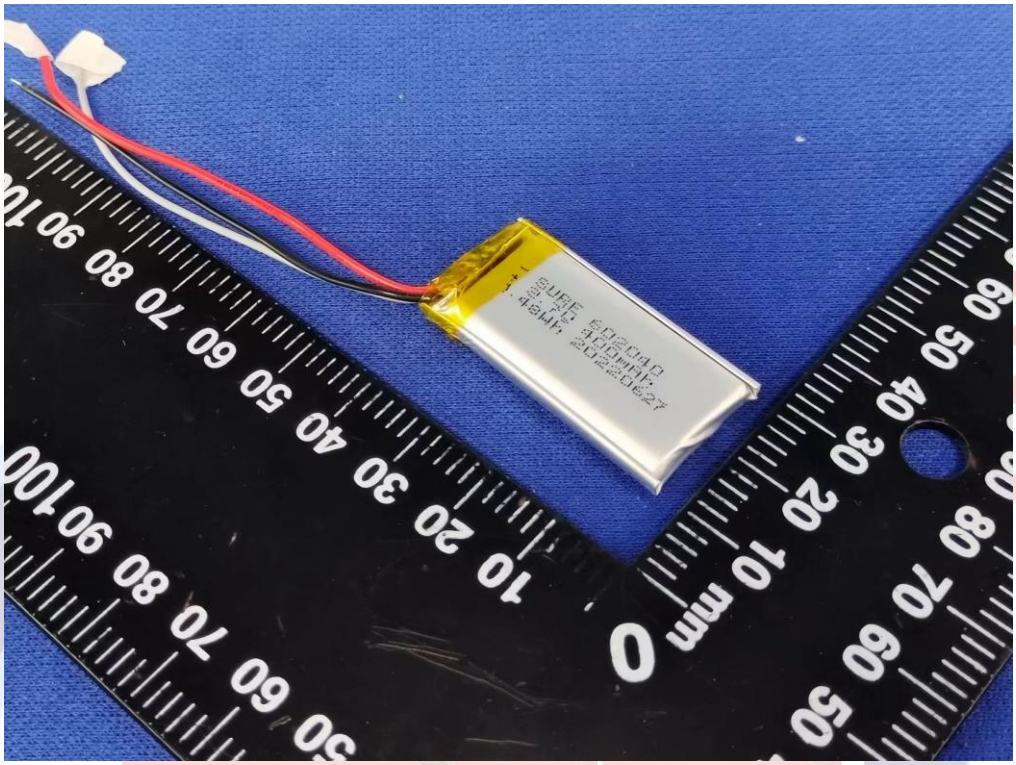
- No fire or explosion

D.2	TABLE: Internal AC resistance for coin cells			N/A
Sample no.	**Ambient T (°C)**	**Store time (h)**	**Resistance Rac (Ω)**	**Results [1)]**

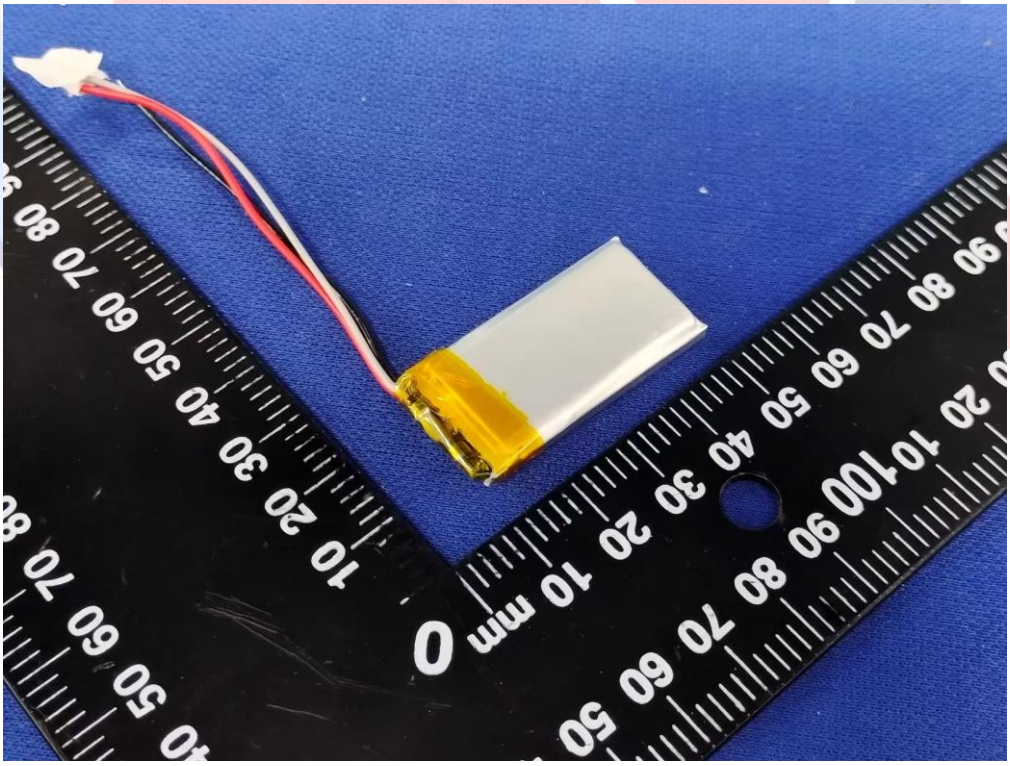
Supplementary information:

[1)] Coin cells with internal resistance less than or equal to 3 Ω, see test result on corresponding tables

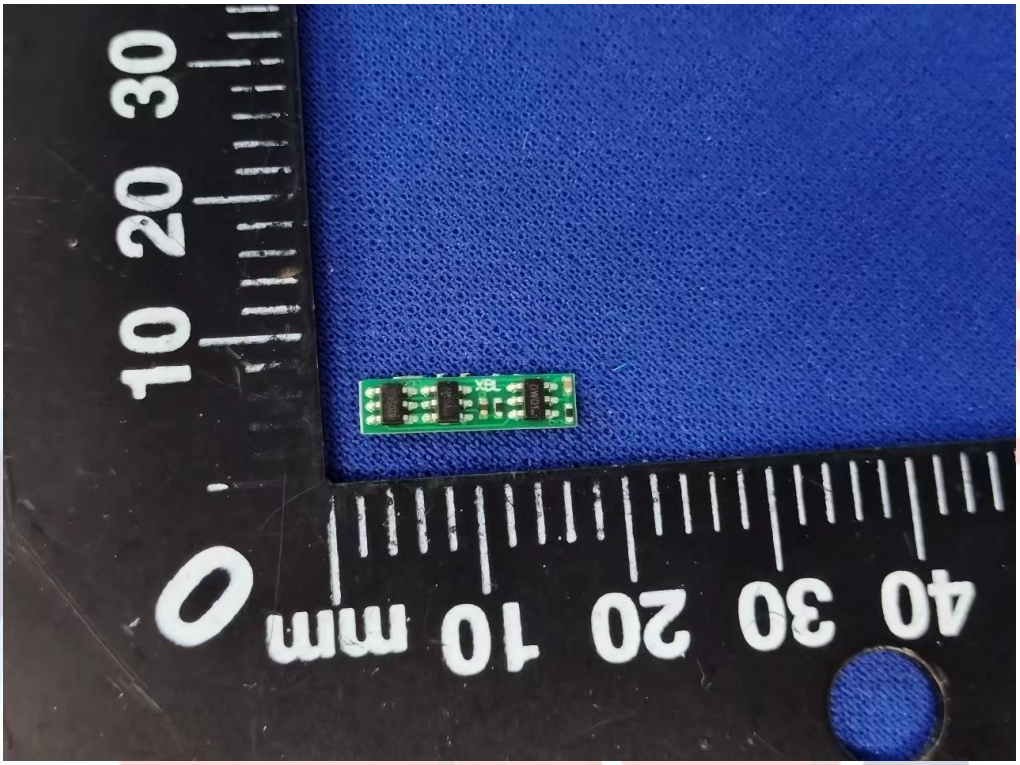
Attachment 1: Photo documentation



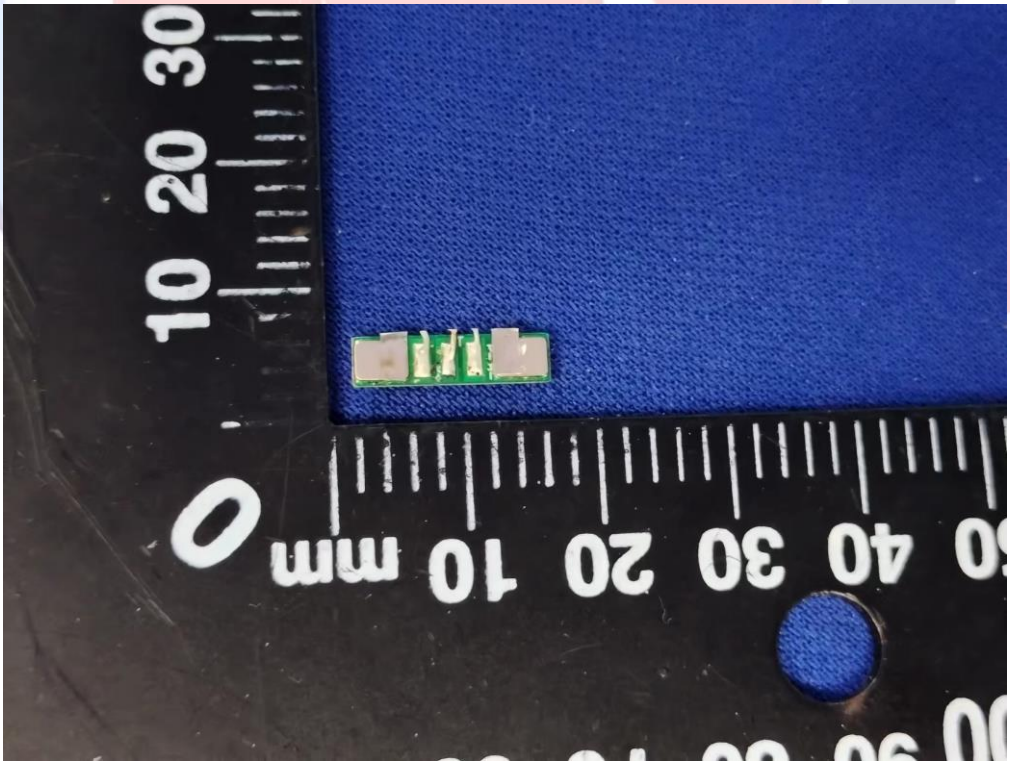
Picture 1. Front view of battery



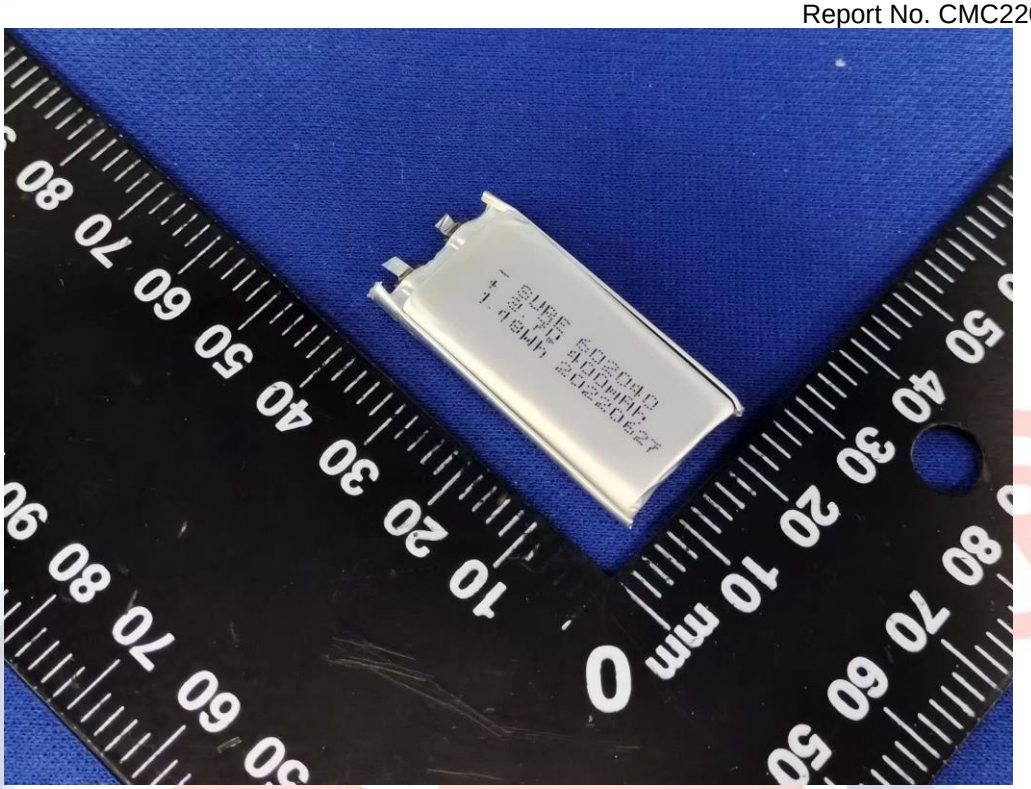
Picture 2. Back view of battery



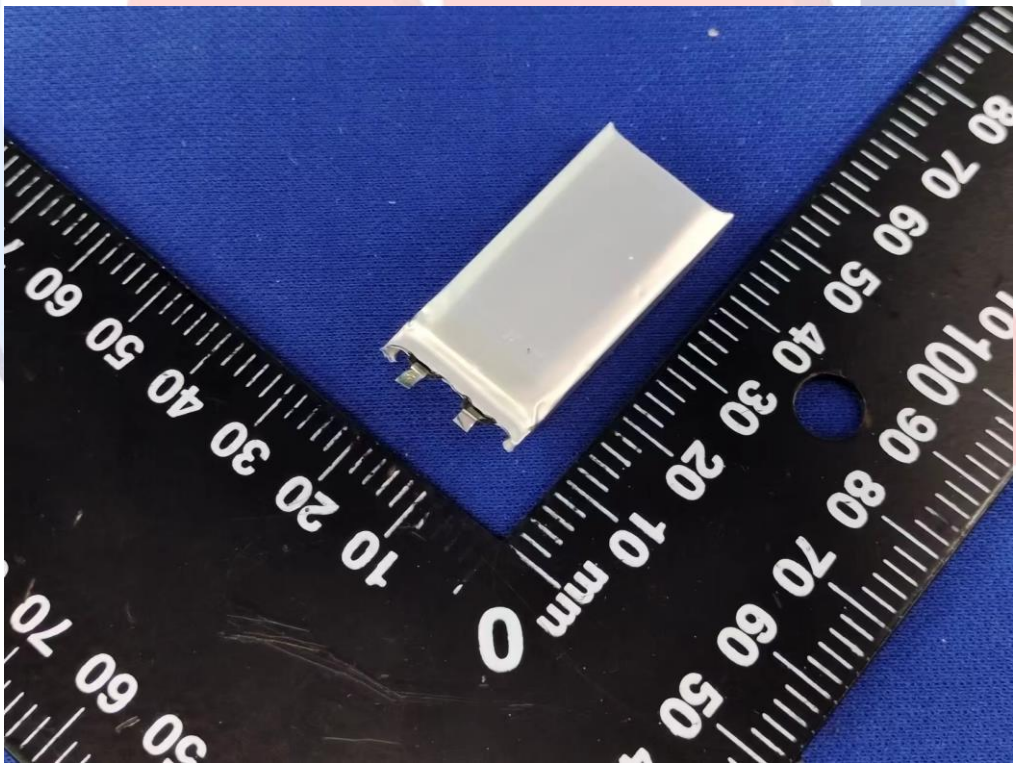
Picture 3. Component view of protection board



Picture 4. Back view of protection board



Picture 5. Front view of cell



Picture 6. Back view of cell

Important

1. The test report is invalid if it is not affixed the official seal of the laboratory to it.
2. Copies of the test report without the official seal of the laboratory are invalid.
3. It is forbidden to copy the test report partially without the written approval of the laboratory.
4. The test report is invalid without the signatures of Approver, Reviewer and Testing engineer.
5. The test report is invalid if it is blotted out.
6. Objections to the test report must be submitted to CMC within 15 days.
7. The test report is valid for the tested samples only.
8. As for the Verdict, “--” means “no need for judgement”, “P” means “pass” ,“F” means “fail” and “N/A” means “not applicable”.

Testing laboratory: CMC Testing International (Shenzhen) Co., Ltd.
Address: 101, Building B, Kaihuimao Industrial Park, Liyuan Road, Heping Community, Fuhai Street, Baoan District, Shenzhen, Guangdong, China
Tel: 400-1668-320
E-mail: info@cmczj-lab.com
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-- End of Report --