Test Report issued under the responsibility of:

SGS Fimko Ltd.

TEST REPORT
IEC 62133
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. .....:	SZES140900251301
Date of issue .....:	2014-10-28
Total number of pages.....	20 Pages
Applicant's name.....:	DUBILIER
Address .....:	Deltron Emcon House Hargreaves Way Sawcliffe Industrial Park Scunthorpe, North Lincolnshire DN15 8RF UK
Test specification:	
Standard .....:	IEC 62133: 2012 (Second Edition)
Test procedure .....:	CB Scheme
Non-standard test method.....:	N/A
Test Report Form No.....:	IEC62133B
Test Report Form(s) Originator ....:	UL(Demko)
Master TRF.....:	Dated 2013-03

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

Test item description .....:	Lithium Polymer Battery
Trade Mark .....:	--
Manufacturer.....:	Shenzhen BAK Technology Co., Ltd. A1706 Tianan Cyber Times Town, Tianan Cyber Park, Chegongmiao, Futian, Shenzhen, Guangdong, China
Model/Type reference .....:	LP-402025-1S-3
Ratings .....:	Rated Voltage: 3,7 Vd.c.; Rated Capacity: 155 mAh (0,57 Wh)

Testing procedure and testing location:			
☒	**CB Testing Laboratory:**	SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch E&E Lab	
Testing location/ address .....:		No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China 518057	
☐	**Associated CB Testing Laboratory:**	N/A	
Testing location/ address .....:			
	Tested by (name + signature) .....:	Simon Chen	
	Approved by (name + signature).....:	Rocky Wang	
☐	**Testing procedure: TMP**	N/A	
Testing location/ address .....:			
	Tested by (name + signature) .....:		
	Approved by (name + signature).....:		
☐	**Testing procedure: WMT**	N/A	
Testing location/ address .....:			
	Tested by (name + signature) .....:		
	Witnessed by (name + signature)....:		
	Approved by (name + signature).....:		
☐	**Testing procedure: SMT**	N/A	
Testing location/ address .....:			
	Tested by (name + signature) .....:		
	Approved by (name + signature).....:		
	Supervised by (name + signature) ..:		

List of Attachments:

Attachment 1: 3 pages of Photos;

Attachment 2: 2 pages of Information for safety;

Attachment 3: 1 page of Packaging;

Attachment 4: 3 pages of Product specification;

Attachment 5: 1 page of ISO 9001 certificate.

Summary of testing:

The sample(s) tested complies with the requirements of IEC 62133: 2012.

These tests fulfil the requirements of standard ISO/IEC 17025.

When determining the test conclusion, the Measurement Uncertainty of test has been considered.

Remark:

1. Both batteries and cells were subjected to full tests as far as applicable;
2. Clause 8.3.8 transport test was considered in this report and the test was certified according to UN38.3 by CVC (Test report: RZUN2014-1298).

Tests performed (name of test and test clause):	**Testing location:**
Specific requirements and tests (lithium systems)	--
☒5.2 Insulation resistance	
☒8.2.1 Continuous charging at constant voltage (cells)	
☐8.2.2 Moulded case stress at high ambient temperature (battery)	
☒8.3.1 External short circuit (cell)	
☒8.3.2 External short circuit (battery)	
☒8.3.3 Free fall	
☒8.3.4 Thermal abuse (cells)	
☒8.3.5 Crush (cells)	
☒8.3.6 Over-charging of battery	
☒8.3.7 Forced discharge (cells)	
☒8.3.8 Transport tests	
☐8.3.9 Design evaluation – Forced internal short circuit (cells)	

Summary of compliance with National Differences

List of countries addressed:

☒ The product fulfils the requirements of EN 62133: 2013.

Copy of marking plate

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

LP-402025-1S-3
Lithium Polymer Battery
3.7V 155mAh 0.57Wh
Designation: 1ICP4/20/25

Manufacturer:
Shenzhen Bak
Technology Co., Ltd.
Caution:
Do not Short-circuit;
Do not expose cells or
batteries to heat or fire.
Date code: 201409

Remark: Battery packs with keyed external which prevents reverse polarity connections.

Test item particulars	--
Classification of installation and use	--
Supply connection	--
Recommend charging method declaired by the manufacturer	CC/CV
Discharge current (0,2 I_t A)	0,031 A
Specified final voltage	2,75 V
Chemistry	☐ nickel systems..... ☒ lithium systems
Recommend of charging limit for lithium system	
Upper limit charging voltage per cell	4,2 V
Maximum charging current	0,155 A
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 (Not applicable)
- test object does meet the requirement	P (Pass)
- test object does not meet the requirement	F (Fail)
Testing	
Date of receipt of test item	2014-09-24
Date (s) of performance of tests	2014-09-24 to 2014-10-24

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.
"(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.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided..... :

☐ **Yes**
☒ **Not applicable**

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) ..... : Shenzhen BAK Battery Co., Ltd.
BAK Industrial Park, Kuichong, Longgang, Shenzhen, Guangdong, China

General product information:

Product description……:	Lithium Polymer Battery
Model of pack……:	LP-402025-1S-3
Designation of pack……:	1ICP4/20/25
Rated voltage……:	3,7 V d.c.
Rated capacity……..:	155 mAh
Maximum charge current……..:	155 mA
Maximum discharge current……:	155 mA
Number of cells in battery pack:	One cell
Model of cell:	402025P
Designation of cell:	ICP4/20/25
Rated voltage of single cell:	3,7 V d.c.
Rated capacity of single cell:	155 mAh
Maximum charge current of single cell:	155 mA
Maximum discharge current of single cell:	155 mA

Remark: Red wire (+) & Black wire (-) and Yellow wire (connected to R3 for protection) were used.
See Attachment 4 product specification for more detailed.

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
4	**Parameter measurement tolerances**		P
	Parameter measurement tolerances		P
5	**General safety considerations**		P
5.1	General		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 exposed metal surface. External material: Aluminum foil composite membrane	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 creepage and clearance distances between conductors		P
	Mechanical integrity of internal connections accommodates reasonably foreseeable misuse	Positive & Negative terminals of the cell are connected to PWB with soldering; Positive & Negative wires are connected to PWB with soldering; Terminals, wires and PWB are reliably wrapped by insulating tape	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	Seal the seam around the aluminium foil as the venting mechanism	P
	Encapsulation used to support cells within an outer casing does not cause the battery to overheat during normal operation nor inhibit pressure relief	Ditto	P
5.4	Temperature/voltage/current management		P
	Batteries are designed such that abnormal temperature rise conditions are prevented	Protection circuit was used.	P
	Batteries are designed to be within temperature, voltage and current limits specified by the cell manufacturer	Ditto	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	See Attachment 4 for details	P
5.5	Terminal contacts		P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	Terminals have a clear polarity marking on the external surface of the battery	Battery packs with keyed external which prevents reverse polarity connections.	P
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current		P
	External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance		P
	Terminal contacts are arranged to minimize the risk of short circuits		P
5.6	Assembly of cells into batteries		N/A
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 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 systems 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		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

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	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	Single cell in the battery	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
	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	Single cell in the battery	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 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	ISO 9001 certificate was submitted. See attachment 5 for detail.	P
6	**Type test conditions**		P
	Tests were made with the number of cells or batteries specified in Table 1 for nickel-cadmium and nickel-metal hydride systems and Table 2 for lithium systems, using cells or batteries that are not more than six months old	Tests are performed according to specified in table 2 of the standard The cell samples are not more than 6 months old (all of them were produced at 2014-08). See marking plate.	P
	Unless noted otherwise in the test methods, testing was conducted in an ambient of 20°C ± 5°C.	The tests are conducted in an ambient of 20°C ± 5°C.	P
7	**Specific requirements and tests (nickel systems)**		N/A
7.1	Charging procedure for test purposes	Lithium systems	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

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
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
	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 ± 1 kN 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

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
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
8	**Specific requirements and tests (lithium systems)**		P
8.1	Charging procedures for test purposes		P
8.1.1	First procedure: This charging procedure applied to tests other than those specified in 8.1.2		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	The upper charging temperature is 45 °C and the lower charging temperature is 0 °C in specification.	P
	A valid rationale was provided to ensure the safety of the cell (see Figure A.1) ..... :	See the test result.	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 systems The upper limit charging voltage of cell is 4,25 V during test.	N/A
	A valid rationale was provided to ensure the safety of the cell (see Figure A.1) ..... :	--	N/A
8.2	Intended use		P
8.2.1	Continuous charging at constant voltage (cells)		P
	Results: No fire. No explosion..... :	See Table 8.2.1	P
8.2.2	Moulded case stress at high ambient temperature (battery)	No moulded case.	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)		P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	The cells 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		P
	Results: No fire. No explosion..... :	See Table 8.3.1	P
8.3.2	External short circuit (battery)		P
	The cells were tested until one of the following occurred: - 24 hours elapsed; or	Protection circuit were used.	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 remained on test for an additional one hour after the current reached a low end steady state condition		P
	Results: No fire. No explosion..... :	See Table 8.3.2	P
8.3.3	Free fall		P
	Results: No fire. No explosion.		P
8.3.4	Thermal abuse (cells)		P
	The cells were held at 130°C ± 2°C for: - 10 minutes; or		P
	- 30 minutes for large cells (gross mass of more than 500 g as defined in IEC 62281)		N/A
	Oven temperature (°C)..... :	130 °C	—
	Gross mass of cell (g) ..... :	7,17 g	—
	Results: No fire. No explosion.		P
8.3.5	Crush (cells)		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	No voltage drop was noticed	N/A
	- 10% of deformation has occurred compared to the initial dimension	No deformation was noticed	N/A
	Results: No fire. No explosion..... :	See Table 8.3.5	P
8.3.6	Over-charging of battery		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		P
	- Returned to ambient		N/A

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	Results: No fire. No explosion..... :	See Table 8.3.6	P
8.3.7	Forced discharge (cells)		P
	Results: No fire. No explosion..... :	See Table 8.3.7	P
8.3.8	Transport tests		P
	Manufacturer's documentation provided to show compliance with UN Recommendations on Transport of Dangerous Goods	UN38.3 test report was submitted. Report No.: RZUN2014-1298 was issued by CVC	P
8.3.9	Design evaluation – Forced internal short circuit (cells)	Li-ion Polymer cell	N/A
	The cells complied with national requirement for .....:	--	—
	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

9	**Information for safety**		P
	The manufacturer of secondary cells ensures that information is provided about current, voltage and temperature limits of their products.	See Attachment 4 for detail.	P
	The manufacturer of batteries ensures that equipment manufacturers and, in the case of direct sales, end-users are provided with information to minimize and mitigate hazards.		N/A
	Systems analyses performed by device manufacturers to ensure that a particular battery design prevents hazards from occurring during use of a product		N/A
	As appropriate, information relating to hazard avoidance resulting from a system analysis is provided to the end user ..... :	Not for end-users.	N/A

10	**Marking**		P
10.1	Cell marking		N/A
	Cells marked as specified in the applicable cell standards: IEC 61951-1, IEC 61951-2 or IEC 61960.	Only battery will be marked	N/A
10.2	Battery marking		P
	Batteries marked in accordance with the requirements for the cells from which they are assembled.	See marking plate.	P
	Batteries marked with an appropriate caution statement.		P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
10.3	Other information		P
	Storage and disposal instructions marked on or supplied with the battery.	See Attachment 2 for detail.	P
	Recommended charging instructions marked on or supplied with the battery.	See Attachment 4 for detail.	P
11	**Packaging**		P
	The materials and packaging design are chosen so as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of environmental contaminants.	See Attachment 3 for detail.	P
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		P
A.3	Consideration on charging voltage		P
A.3.1	General		P
A.3.2	Upper limit charging voltage		P
A.3.2.1	General		P
A.3.2.2	Explanation of safety viewpoint		P
A.3.2.3	Safety requirements, when different upper limit charging voltage is applied	Lithium cobalt oxide systems The upper limit charging voltage of cell is 4,25 V during test.	N/A
A.4	Consideration of temperature and charging current		P
A.4.1	General		P
A.4.2	Recommended temperature range		P
A.4.2.1	General		P
A.4.2.2	Safety consideration when a different recommended temperature range is applied	The recommended temperature range: 0 °C to 45 °C.	P
A.4.3	High temperature range	The upper charging temperature is 45 °C	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	The lower charging temperature is 0 °C	P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
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		N/A
A.4.4.4	Safety considerations when specifying a new lower limit in the low temperature range	The cell charged at -5 °C by the methods specified in 8.2 to 8.3.	P
A.4.5	Scope of the application of charging current		P
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

	TABLE: Critical components information				P
Object/part no.	**Manufacturer / trademark**	**Type/model**	**Technical data**	**Standard**	**Mark(s) of conformity [1)]**
Cell	Shenzhen BAK Technology Co., Ltd	402025P	Rated Voltage: 3,7 Vd.c., Rated Capacity: 155 mAh	IEC 62133: 2012 EN 62133: 2013	Tested with appliance
- Electrolyte	JinNiu	3000-B	EC/EMC/DEC	--	--
- Separator	Entek	LP16	16 um	--	--
- Cathode	ZhongXing	3000-B	143 mAh/g	--	--
- Anode	Shanshan	FSN-4	340 mAh/g	--	--
PWB	Shen Zhen Jiruida Circuit Technology Co., Ltd.	JRD-S	130°C, V-0	--	UL(E340032)
Protect IC (U1)	Ricoh	R5402N204KD	Input voltage between VDD and VSS: 1,5~5 V Overcharge Voltage: 4,20 ± 0,025 V Overdischarge Voltage: 2,50 ± 0,062 V Overcurrent Detection Voltage: 0,2 ± 0,015 V	--	--
MOSFET	Sino-mos	SMS8205	Drain-Source Voltage: 20 V Gate-Source Voltage: ±12 V Gate-Source Threshold Voltage: Min0,6 V Drain-Source On-State Resistancea (VGS=4,5 V): 35 mΩ MAX	--	--
Lead wire(red, black&yellow)	Dongguan Wenchang Electronic Co., Ltd.	1061	300 V, 80°C, VW-1, 28AWG	--	UL (E214500)
NTC(R3)	Joinset	0402	25°C 10K±1%	--	--
Insulating tape	Shenzhen Meixin Electronic Co., Ltd.	PI film & Acrylic	Any mm * L 33 m * T 0,06 mm	--	UL(E304309)

Supplementary information:

[1)] Provided evidence ensures the agreed level of compliance. See OD-CB2039.

7.2.1	TABLE: Continuous low rate charge (cells)	N/A
7.2.2	TABLE: Vibration	N/A
7.3.1	TABLE: Incorrect installation (cells)	N/A
7.3.2	TABLE: External short circuit	N/A
7.3.6	TABLE: Crush	N/A
7.3.8	TABLE: Overcharge	N/A
7.3.9	TABLE: Forced discharge (cells)	N/A

8.2.1	TABLE: Continuous charging at constant voltage (cells)			P
Model	**Recommended charging voltage V_c, (Vdc)**	**Recommended charging current I_{rec}, (A)**	**OCV at start of test, (Vdc)**	**Results**
Cell: 402025P (#1)	4,2	0,155	4,189	Pass
Cell: 402025P (#2)	4,2	0,155	4,187	Pass
Cell: 402025P (#3)	4,2	0,155	4,191	Pass
Cell: 402025P (#4)	4,2	0,155	4,191	Pass
Cell: 402025P (#5)	4,2	0,155	4,187	Pass

Supplementary information:

- No fire or explosion
- No leakage

8.3.1	TABLE: External short circuit (cell)				P
Model	**Ambient, (°C)**	**OCV at start of test, (Vdc)**	**Resistance of circuit, (Ω)**	**Maximum case temperature rise ΔT, (°C)**	**Results**
Samples charged at charging temperature upper limit[1)]					
Cell: 402025P (#6)	20,8	4,229	0,083	79,1	Pass
Cell: 402025P (#7)	20,6	4,228	0,083	81,2	Pass
Cell: 402025P (#8)	21,1	4,227	0,083	80,6	Pass
Cell: 402025P (#9)	21,0	4,228	0,083	77,8	Pass
Cell: 402025P (#10)	20,9	4,228	0,083	77,4	Pass
Samples charged at charging temperature lower limit[2)]					
Cell: 402025P (#11)	20,3	4,194	0,083	81,1	Pass
Cell: 402025P (#12)	20,8	4,197	0,083	81,6	Pass
Cell: 402025P (#13)	20,8	4,204	0,083	81,4	Pass
Cell: 402025P (#14)	20,8	4,207	0,083	76,0	Pass
Cell: 402025P (#15)	21,0	4,201	0,083	84,3	Pass

Supplementary information:

- No fire or explosion

1) Batteries charged at 45°C by using 4,25 V and 155 mA until the charging current reduced to 7,75 mA;

2) Batteries charged at -5°C by using 4,25 V and 155 mA until the charging current reduced to 7,75 mA.

8.3.2	TABLE: External short circuit (battery)				P
Model	**Ambient, (°C)**	**OCV at start of test, (Vdc)**	**Resistance of circuit, (Ω)**	**Maximum case temperature rise ΔT, (°C)**	**Results**
Samples charged at charging temperature upper limit[1)]					
Pack: LP-402025-1S-3(#46)	55,0	4,230	0,083	Shut down	Pass

Pack: LP-402025-1S-3(#47)	55,0	4,227	0,083	immediately and test for 24 hours. No max. temperature was noted	Pass
Pack: LP-402025-1S-3(#48)	55,0	4,226	0,083		Pass
Pack: LP-402025-1S-3(#49)	55,0	4,227	0,083		Pass
Pack: LP-402025-1S-3(#50)	55,0	4,224	0,083		Pass
Samples charged at charging temperature lower limit[2)]					
Pack: LP-402025-1S-3(#51)	54,8	4,192	0,083	Shut down immediately and test for 24 hours. No max. temperature was noted	Pass
Pack: LP-402025-1S-3(#52)	54,8	4,202	0,083		Pass
Pack: LP-402025-1S-3(#53)	54,8	4,193	0,083		Pass
Pack: LP-402025-1S-3(#54)	54,8	4,197	0,083		Pass
Pack: LP-402025-1S-3(#55)	54,8	4,204	0,083		Pass

Supplementary information:

- No fire or explosion
- Due to Protection circuit were used in battery, no maximum case temperature occur.

1) Batteries charged at 45°C by using 4,25 V and 155 mA until the charging current reduced to 7,75 mA;
2) Batteries charged at -5°C by using 4,25 V and 155 mA until the charging current reduced to 7,75 mA.

8.3.5	**TABLE: Crush**				P
Model	**OCV at start of test, (Vdc)**	**OCV at removal of crushing force, (Vdc)**	**Width/ diameter of cell before crush, (mm)**	**Required deformation for crush, (mm)**	**Results**
Samples charged at charging temperature upper limit[1)]					
Cell: 402025P (#26)	4,226	4,220	--	--	Pass
Cell: 402025P (#27)	4,230	4,223	--	--	Pass
Cell: 402025P (#28)	4,229	4,221	--	--	Pass
Cell: 402025P (#29)	4,226	4,214	--	--	Pass
Cell: 402025P (#30)	4,227	4,219	--	--	Pass
Samples charged at charging temperature lower limit[2)]					
Cell: 402025P (#31)	4,204	4,200	--	--	Pass
Cell: 402025P (#32)	4,197	4,192	--	--	Pass
Cell: 402025P (#33)	4,192	4,182	--	--	Pass
Cell: 402025P (#34)	4,198	4,192	--	--	Pass
Cell: 402025P (#35)	4,201	4,193	--	--	Pass

Supplementary information:

- No fire or explosion
- Once the maximum force (13KN±1KN) occurs, the force will be released.
- No voltage drop and deformation were noticed.

1) Batteries charged at 45°C by using 4,25 V and 155 mA until the charging current reduced to 7,75 mA;
2) Batteries charged at -5°C by using 4,25 V and 155 mA until the charging current reduced to 7,75 mA.

8.3.6	TABLE: Over-charging of battery				P
Constant charging current (A) ..... :		0,31			—
Supply voltage (Vdc) ..... :		5,0			—
Model	**OCV before charging, (Vdc)**	**Resistance of circuit, (Ω)**	**Maximum outer casing temperature, (°C)**	**Results**	
Pack: LP-402025-1S-3(#56)	2,982	--	25,3	Pass	
Pack: LP-402025-1S-3(#57)	3,121	--	24,7	Pass	
Pack: LP-402025-1S-3(#58)	3,057	--	25,1	Pass	
Pack: LP-402025-1S-3(#59)	2,993	--	25,0	Pass	
Pack: LP-402025-1S-3(#60)	3,074	--	25,6	Pass	
Supplementary information: - No fire or explosion - Ambient temperature: 21,2°C					

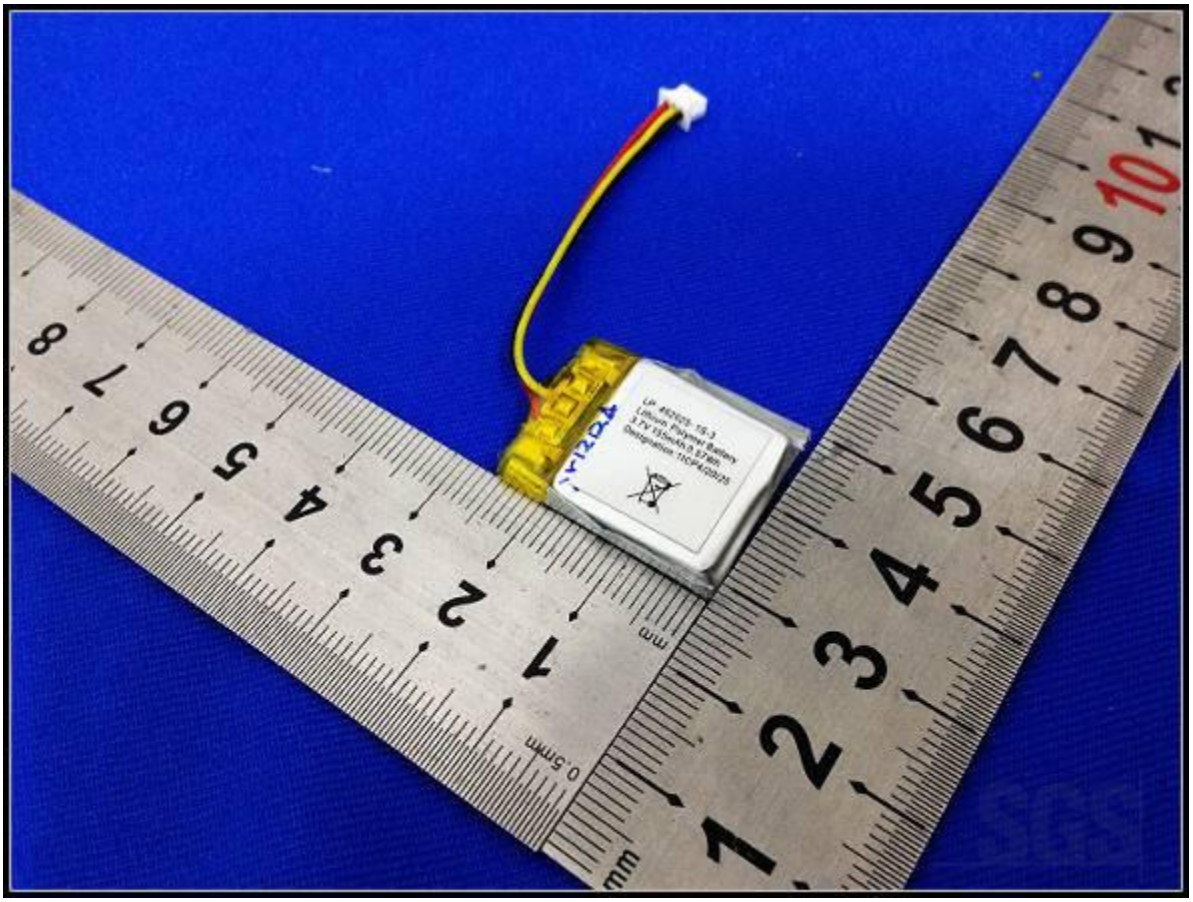
8.3.7	TABLE: Forced discharge (cells)			P
Model	**OCV before application of reverse charge, (Vdc)**	**Measured Reverse charge I_t, (A)**	**Time for reversed charge, (minutes)**	**Results**
Cell: 402025P (#36)	3,123	0,155	90	Pass
Cell: 402025P (#37)	2,994	0,155	90	Pass
Cell: 402025P (#38)	3,058	0,155	90	Pass
Cell: 402025P (#39)	3,086	0,155	90	Pass
Cell: 402025P (#40)	3,113	0,155	90	Pass
Supplementary information: - No fire or explosion				

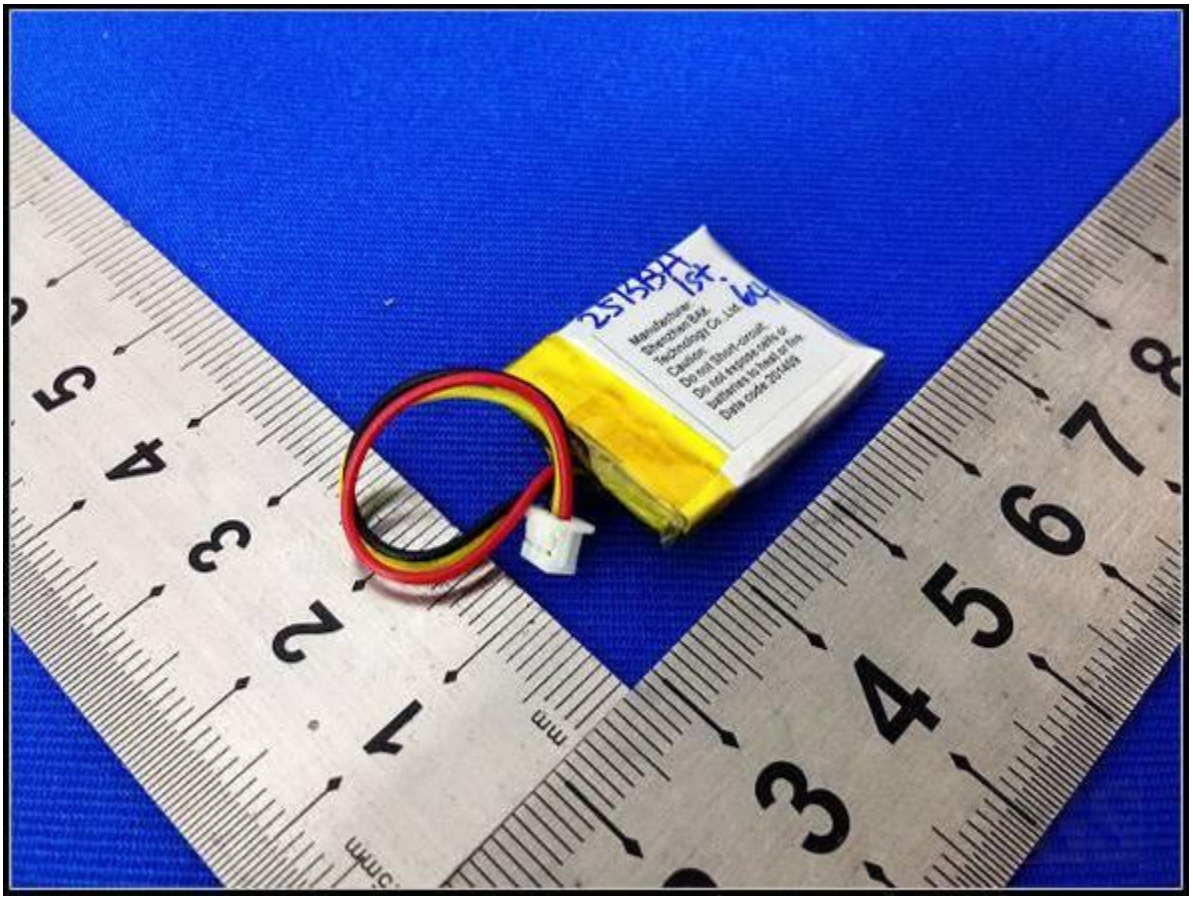
8.3.9	TABLE: Forced internal short circuit (cells)				N/A
Model	**Chamber ambient, (°C)**	**OCV at start of test, (Vdc)**	**Particle location [1)]**	**Maximum applied pressure, (N)**	**Results**
--	--	--	--	--	--
Supplementary information: --					

---End report ---

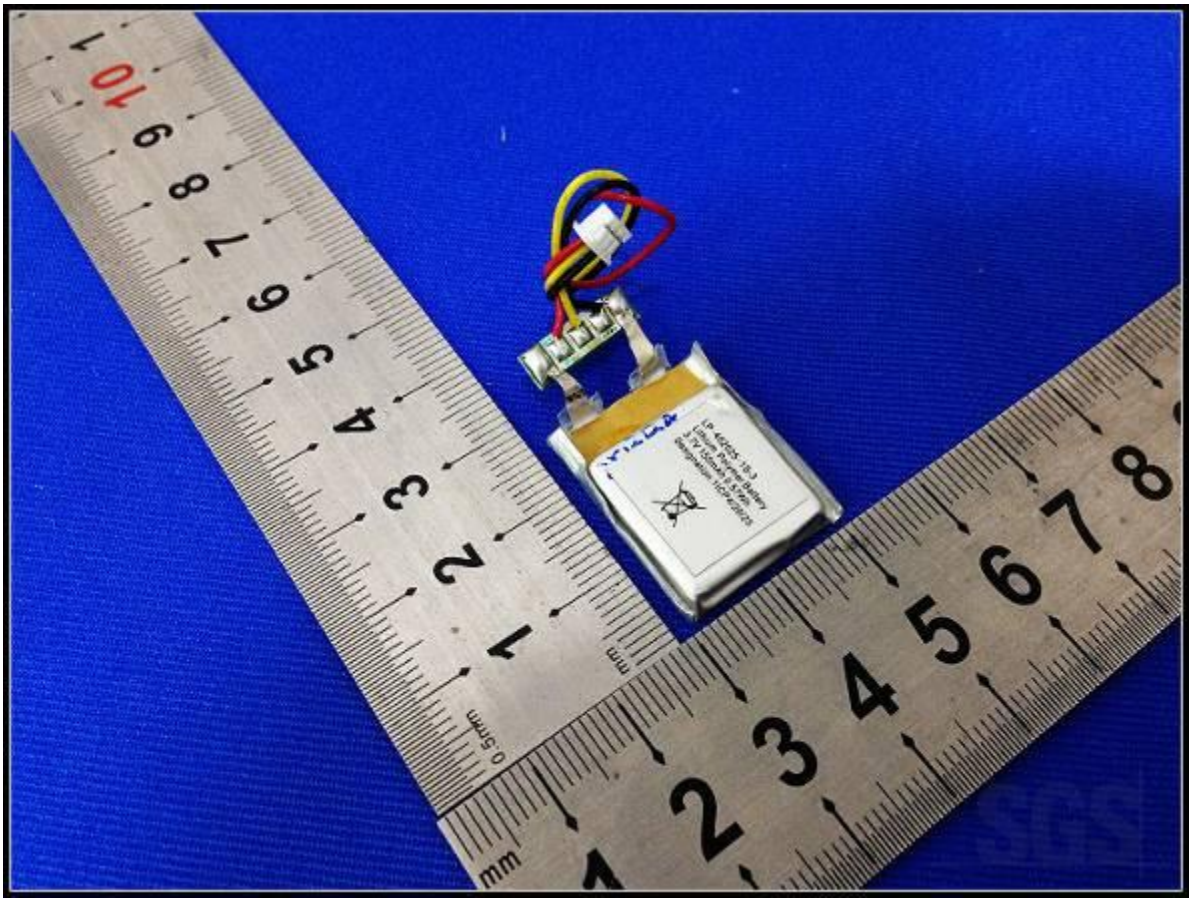
Attachment 1 Photo documentation

Whole unit

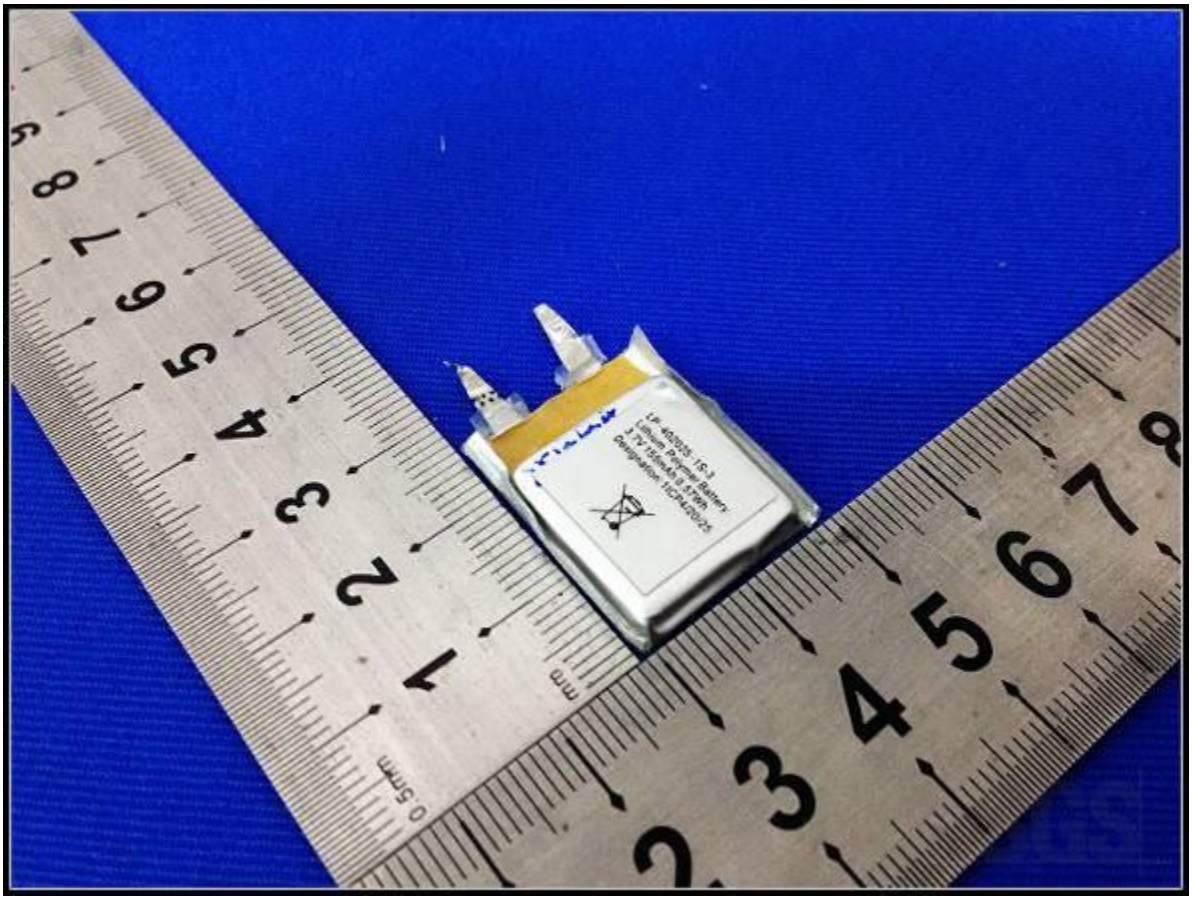




Attachment 1 Photo documentation

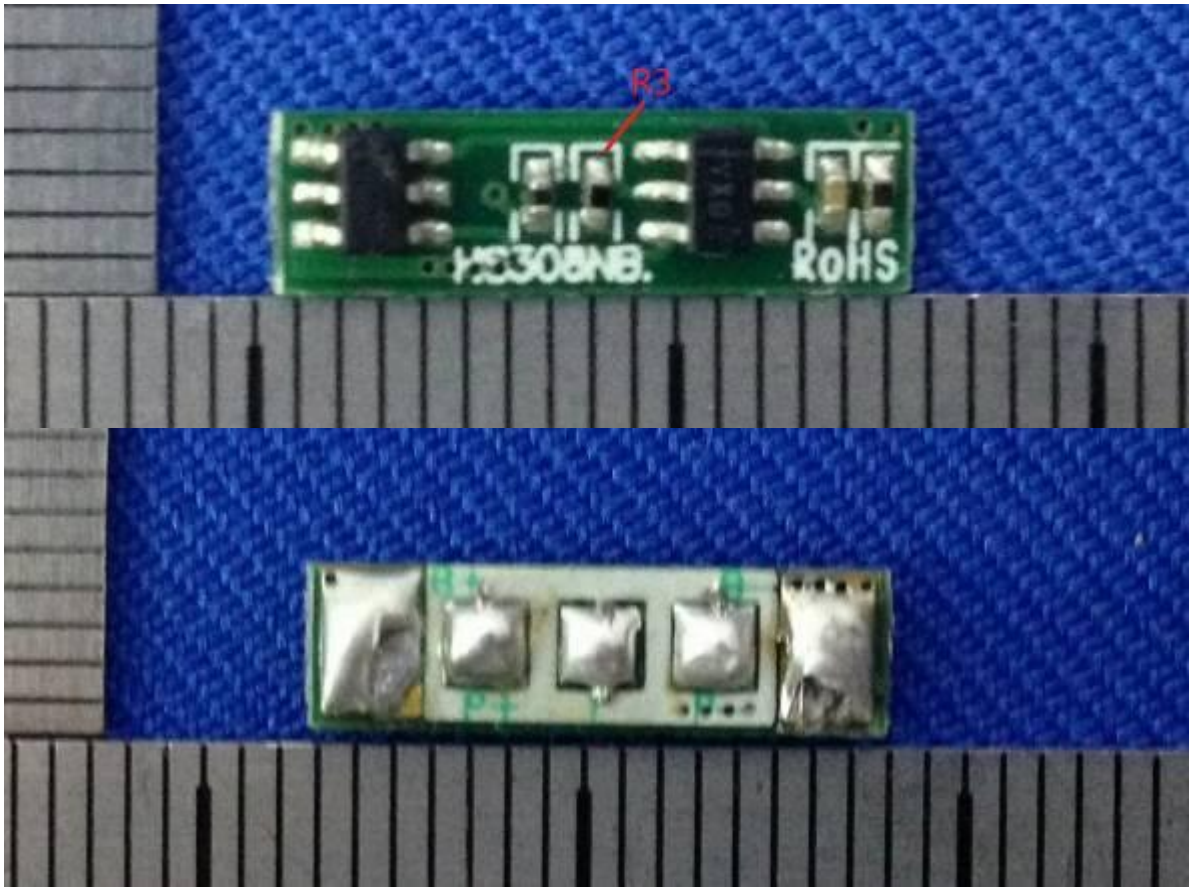


Cell



Attachment 1 Photo documentation

PWB



- - - End of Attachment 1 - - -

Attachment 2 Information for safety

6. Lithium Ion Polymer Battery Handling Guideline

6.1 In case of contacting the materials from a damaged or ruptured cell or battery:

Eye contact: Washing immediately with plenty of water and soap or for at least 15 minutes. Get medical attention.

Skin Contact: Washing immediately with water and soap. Inhalation of Vented Gas: Remove to fresh air. Get medical attention. Ingestion: Get medical attention immediately.

6.2 Keep away batteries from children.

6.3 The cells/ batteries are requested to be stored within a proper temperature range specified in this specification.

6.4 Do not store batteries in a manner that allow s terminals to short circuit.

6.5 Do not place batteries near heating sources, nor exposed to direct sunlight for long periods. Elevated temperatures can result in reduced battery service life.

6.6 Charging Battery

Use only approved chargers and procedures. Improperly charging a cell or battery may cause the cell or battery to flame or damage.

Charge the battery using the "CC/CV" or constant current /constant voltage method.

Do not charge the battery with a current or voltage higher than the specified maximum value in this specification. The absolute maximum charging voltage is 4.25V per cell.

Prohibit reverse charging of the battery. The battery must be connected correctly.

6.7 Discharging Battery

Discharge battery at the max current specified in this specification. If you plan to discharge battery at a higher current than the max current, please consult us.

Avoid discharge the battery below 2.75V for each cell.

Do not over-discharge the battery. Over-discharging can damage the performance of the battery. It should be noted that the cell/battery would be at an over-discharged state by its self-discharge characteristics in case the cell is not used for long time. In order to prevent over-discharging, the cell/battery shall be charged periodically to maintain between 3.7V and 4.1V.

6.8 Operation Temperature

The battery shall be operated (stored, charged and discharged) in the temperature specified in This specification.

6.9 Cell/Battery Protection Circuit Module (PCM)

The cell/battery must be equipped with a PCM that protects the cell/battery from overcharging, over-discharging and over-current.

6.10 Battery Short Circuit

Do not short-circuit a battery. A short circuit can result in over-heating of the terminals and provide an ignition source. More than a momentary short circuit will generally reduce the cell or battery service life and can lead to ignition of surrounding materials or materials within the cell or battery if the seal integrity is damaged. Extended short-circuiting creates high temperature in the cell and at the terminals. Physical contact to high temperatures can cause skin burns. In addition, extended short-circuit may cause the cell or battery to flame.

6.11 Prohibit reversing cell polarity within a battery assembly.

6.12 The cell edge of the heat seal zone is electrically conductive. Avoid the edge cross battery terminals, PCB, or conductive surfaces.

6.13 Do not bend, fold or fall the battery or part of the battery. It may cause the battery be damaged and result in the battery swelling, leaking, explosion or ignition

6.14 Do not open or manipulate the folded cell edge.

Attachment 2 Information for safety

6.15 Do not bend or fold the sealing edge. And do not tear off the sealing film.

6.16 Battery Pack Design

The battery housing should have sufficient mechanical strength.

No sharp edge components shall be inside the battery housing. The sharp edge may destroy the cell packaging.

No cell movement is allowed in the battery housing.

The ultrasonic head shall not directly/ or indirectly pressed the cell if you need to enclose the battery housing by ultrasonic method. Please consult us for designing the ultrasonic head. Avoid designing airtight battery housing.

6.17 Battery Assembly

We recommend ultrasonic welding or spot welding to connect battery with PCM or other parts. If you employ manual solder method to connect tab with PCM, please pay attention to the followings:

Use a solder with temperature controlled and ESD.

Soldering temperature should not exceed 300℃.

Soldering time should not be longer than 3s.

Soldering times should not exceed 5 times.

Keep battery tab cold down before next time soldering.

Do not directly heat cell body. It may cause the battery be damaged by heat above 90℃

6.18 Battery Disassembly

Never disassemble a battery.

Should a battery unintentionally be crushed, thus releasing its contents, rubber gloves must be used to handle all battery components. Avoid inhalation of any vapors that may be emitted.

6.19 Do not mixed Batteries and Types. Avoid to use old and new cells or cells of different sizes, different chemistry or types in the same battery assembly.

6.20 Other Warnings

Do not heat or dispose the battery into fire, water or other liquids.

Do not put the battery into microwave, washing machine or drying machine.

Do not use a damaged battery.

6.21 Others

Shenzhen BAK Technology Co., Ltd shall make no liability for problems that occur when the above specifications are not followed.

— When disposing of secondary cells or batteries, keep cells or batteries of different electrochemical systems separate from each other.(电池处置信息)

**********End of Attachment 2**********

Attachment 3 Packaging

16 small boxes/ case 10 psc batteries/ box

**********End of Attachment 3**********

Attachment 4 Product specification

Specification of pack

3. Ratings

3.1. Nominal Capacity[at 0.2C]: 155mAh (min);
165mAh (typical)

3.2. Nominal Voltage: 3.7V (average voltage at 0.2C discharge)

3.3. Charging Voltage: 4.20 ±0.05V

3.4. Max. Charging Current: 155mA

3.5. Charging Method: constant current constant voltage

Standard Charge: 78mA (constant current) charge to 4.20V, then 4.2V (constant voltage) for 3.5hr or 3mA(0.02C) cut off

Quick Charge: 155mA(constant current) charge to 4.20V, then 4.2V (constant voltage) for 3.0hr or 3mA (0.02C) cut off

3.6. Max. Continuous Discharge Current: 155mA

3.7. Discharge Cut-off Voltage: 2.75V

3.8. Battery Dimensions (Refer to the attached drawing)

Thickness: 3.8±0. 3
（Measured with weighing 300gf at 25±2℃）

Width: 20±1
（Measured with weighing 300gf at 25±2℃）

Length: 26±1

3.9.Battery Weight: 4±0.2g

3.10. Operating Temperature

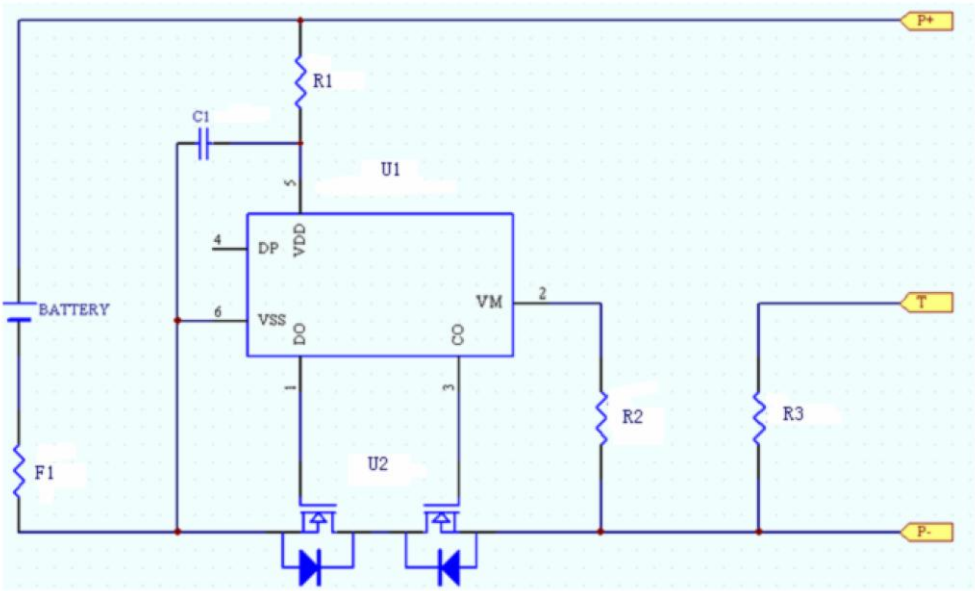
Discharge: -20℃ ~+60℃

Charging: 0℃ ~+45℃

Remark: Pack and cell have the same charge and discharge parameter

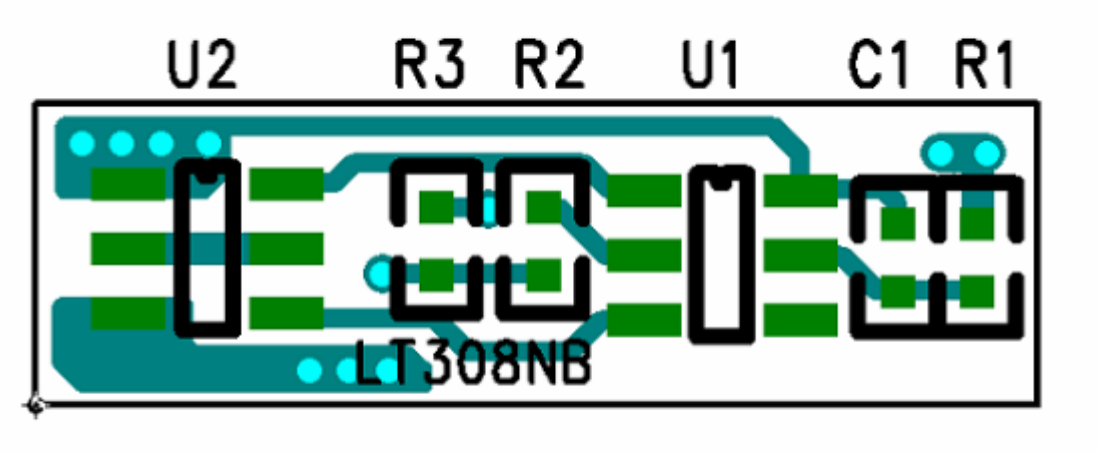
Attachment 4 Product specification

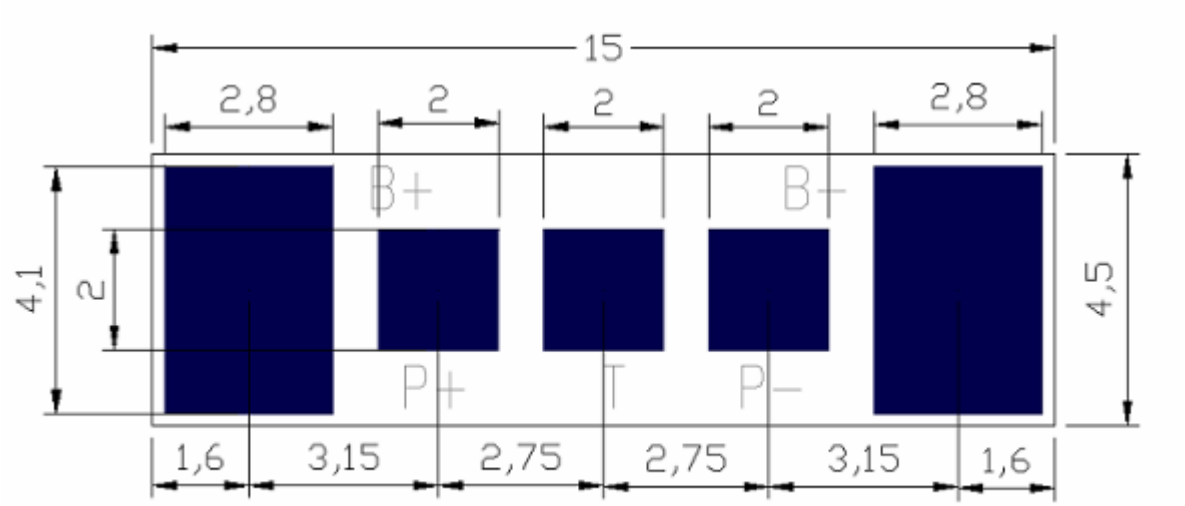
Protection Circuit Diagram



Attachment 4 Product specification

7. PCB layout(R5402N204KD OR Equivalent)PCM308NB





**********End of Attachment 4**********

Attachment 5 ISO 9001 certificate

Certificate

Standard **ISO 9001:2008**

Certificate Registr. No. 01 100 075528

TÜV Rheinland Cert GmbH certifies:

Certificate Holder: **SHENZHEN BAK BATTERY CO., LTD.**
BAK Industrial Park, Kuichong Street, Longgang District,
Shenzhen City, Guangdong Province 518119, P. R. China

Scope: Design and Manufacturing of Li-Ion Batteries & Polymer Li-Ion Batteries

An audit was performed, Report No. 075528. Proof has been furnished that the requirements according to ISO 9001:2008 are fulfilled.
The due date for all future audits is 10-08 (dd.mm).

Validity: The certificate is valid from 2012-09-25 until 2015-09-24.
First certification 2007

2012-09-07

TÜV Rheinland Cert GmbH
Am Grauen Stein · 51105 Köln

DGA-ZM-58-95-00

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Precisely Right.

**********End of Attachment 5**********