Test Report issued under the responsibility of:

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. ..... :	BATT-4788366853-A-1
Date of issue ..... :	2018-06-19
Total number of pages ..... :	23
Name of Testing Laboratory preparing the Report ..... :	UL-CCIC Company Limited Guangzhou Branch Electronic Building, Parage Electronic Industrial Park, No. 8 Nanyun Er Road, Guangzhou Science Park, Guangzhou, 510663 China
Applicant's name ..... :	GLOBTEK (HONG KONG) LTD
Address ..... :	UNIT 1402, BENSON TOWER 74 HUNG TO RD KWUN TONG KOWLOON, HONG KONG
Test specification:	
Standard ..... :	IEC 62133-2:2017
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC62133_2A
Test Report Form(s) Originator .... :	DEKRA
Master TRF ..... :	Dated 2017-08-10

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.

General disclaimer:

The test results presented in this report relate only to the object tested.
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Test item description.....:	Lithium-Ion Battery Pack
Trade Mark.....:	GlobTek, Inc.®
Manufacturer .....:	Same as applicant
Model/Type reference.....:	BL2600C18650H3S1PGQG
Ratings.....:	11.1V, 2600mAh, 28.86Wh

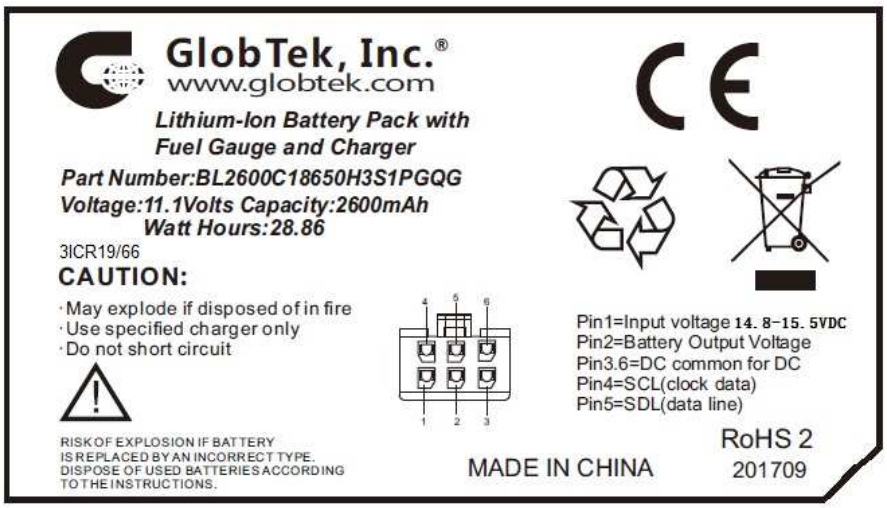
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):

☒	**CB Testing Laboratory:**	UL-CCIC Company Limited Guangzhou Branch	
Testing location/ address.....:		Electronic Building, Parage Electronic Industrial Park, No. 8 Nanyun Er Road, Guangzhou Science Park, Guangzhou, 510663 China	
Tested by (name, function, signature).....:		Robust Ma /Project Handler	
Approved by (name, function, signature)...:		Simon Chen /Project Reviewer	
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address.....:			
Tested by (name, function, signature).....:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address.....:			
Tested by (name + signature).....:			
Witnessed by (name, function, signature) .:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		
Testing location/ address.....:			
Tested by (name, function, signature).....:			
Witnessed by (name, function, signature) .:			
Approved by (name, function, signature)...:			
Supervised by (name, function, signature) :			

List of Attachments (including a total number of pages in each attachment): National Differences (0 page) Enclosures (10 pages)	
Summary of testing: Batteries were considered and tested complies with the requirement of IEC 62133-2: 2017.	
Tests performed (name of test and test clause): **For Pack (Model: BL2600C18650H3S1PGQG)** 7.2.2 Case stress at high ambient temperature (battery) 7.3.2 External short-circuit (battery) 7.3.3 Free fall 7.3.6 Over-charging of battery 7.3.8 Mechanical tests (batteries) - 7.3.8.1 Vibration - 7.3.8.2 Mechanical shock 8.2 DETERMINE OF SMALL CELL OR BATTERY	**Testing location:** UL-CCIC Company Limited Guangzhou Branch Electronic Building, Parage Electronic Industrial Park, No. 8 Nanyun Er Road, Guangzhou Science Park, Guangzhou, 510663 China
Summary of compliance with National Differences (List of countries addressed):N/A ☒ **The product fulfils the requirements of EN 62133-2: 2017**	

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.



Test item particulars.....:	--
Classification of installation and use.....:	Build-in application
Supply Connection.....:	N/A
Recommend charging method declared by the manufacturer.....:	CC/CV
Discharge current (0,2 It A).....:	520mA
Specified final voltage.....:	6.9V
Upper limit charging voltage per cell.....:	4.2V
Maximum charging current.....:	1.0A
Charging temperature upper limit.....:	60°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 .....:	2018-05-03
Date (s) of performance of tests.....:	2018-05-03 to 2018-05-17

General remarks:

"(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.

General product information and other remarks:

- Electronic components mounted on PWB soldered with 3S/1P IEC 62133-2: 2017 cell US18650VTC5A.

- The internal cell (Model US18650VTC5A) was approved by IEC62133-2: 2017, CB test report No. E236872-4788219989-1-Original issued on 2018-01-03 by Underwriters Laboratories Taiwan Co., Ltd.; CB Certification No. DK-69691-UL, certified on 2018-01-05 and DK-69691-A1-UL, certified on 2018-01-08, certified by UL (Demko), Borupvang 5A DK-2750 Ballerup, DENMARK.

- Type reference 3ICR19/66 is IEC 62133 requirement and is identical to Model BL2600C18650H3S1PGQG except for model designation.

Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: Charge: 0~60 °C (T2~T3), discharge: -20~60 °C;

- Maximum charge current/voltage: 12.6V, 1.0A (Full charge condition);

- Maximum discharge condition: 6000mA (Continuous), end of discharge voltage is 6.9V;

The following are available from the Applicant upon request: Installation (Safety) Instructions / Manual.

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	Battery does not contain any exposed metal surfaces.	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		P
	Encapsulation used to support cells within an outer casing does not cause the battery to overheat during normal operation nor inhibit pressure relief	No Encapsulation	N/A
5.4	**Temperature, voltage and current management**	Related information provided. See Enclosure ID 02.	P
	Batteries are designed such that abnormal temperature rise conditions are prevented		P
	Batteries are designed to be within temperature, voltage and current limits specified by the cell manufacturer		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		P
5.5	**Terminal contacts**		P
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current	Related information provided. See marking plate, Page 5.	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		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	Integrated Protection Circuit, MOSFET designed.	P
	This protection may be provided external to the battery such as within the charger or the end devices	Protection circuit within the battery	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		N/A
	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	Battery Configuration: 3S1P	N/A
	Protective circuit components added as appropriate and consideration given to the end-device application		N/A
	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		P
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		N/A

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	Refer to battery specification	P
	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	Refer to battery specification	P
	For batteries consisting of series-connected cells or cell blocks, nominal charge voltage not be counted as an overcharge protection		P
	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		P
	It is recommended that the cells and cell blocks not discharged beyond the cell manufacturer's specified final voltage	Battery Configuration: 3S1P	N/A
	For batteries consisting of series-connected cells or cell blocks, cell balancing circuitry incorporated into the battery management system	Battery Configuration: 3S1P	P
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		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	This shall be considered in 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	This shall be considered in end product.	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	This shall be considered in end product.	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		P
5.8	**Battery safety components**		P
	According annex F	See TABLE: Critical components information for detail.	P
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		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		N/A
	This charging procedure applies only to 7.3.1, 7.3.4, 7.3.5, and 7.3.9		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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		N/A
7.2	**Intended use**		P
7.2.1	Continuous charging at constant voltage (cells)	Considered in approved cell.	N/A
	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		N/A
	Results: No fire. No explosion. No leakage.....:	--	N/A
7.2.2	Case stress at high ambient temperature (battery)		P
	Oven temperature (°C).....:	70°C	—
	Results: 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)	Considered in approved cell.	N/A
	The cells were tested until one of the following occurred:		N/A
	- 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
7.3.2	External short-circuit (battery)		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		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
	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		P
	A single fault applies to protective component parts such as MOSFET, fuse, thermostat or positive temperature coefficient (PTC) thermistor	Single fault for MOSFET	P
	Results: No fire. No explosion.....:	(See appended table 7.3.2)	P

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Clause	Requirement + Test	Result - Remark	Verdict
7.3.3	Free fall		P
	Results: No fire. No explosion		P
7.3.4	Thermal abuse (cells)	Considered in approved cell.	N/A
	Oven temperature (°C) ..... :	--	—
	Results: No fire. No explosion		N/A
7.3.5	Crush (cells)	Considered in approved cell.	N/A
	The crushing force was released upon:		N/A
	- The maximum force of 13 kN ± 0,78 kN has been applied; or		N/A
	- An abrupt voltage drop of one-third of the original voltage has been obtained		N/A
	Results: No fire. No explosion..... :	--	N/A
7.3.6	Over-charging of battery		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		N/A
	- 1,2 times the upper limit charging voltage resented in Table A.1 per cell for series connected multi-cell batteries, and		P
	- 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)	Considered in approved cell.	N/A
	If 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
	If 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		N/A
	Results: No fire. No explosion..... :	--	N/A
7.3.8	Mechanical tests (batteries)		P
7.3.8.1	Vibration		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		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)	Considered in approved cell.	N/A
	The cells complied with national requirement for .....:	--	—
	The pressing was stopped upon:		N/A
	- 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

8	**INFORMATION FOR SAFETY**		P
8.1	**General**		P
	Manufacturers of secondary cells ensure that information is provided about current, voltage and temperature limits of their products	Specification provided. See Enclosure ID 05.	P
	Manufacturers of batteries ensure that equipment manufacturers and, in the case of direct sales, end-users are provided with information to minimize and mitigate hazards		P
	Systems analyses performed by device manufacturers to ensure that a particular battery design prevents hazards from occurring during use of a product		P
	As appropriate, any information relating to hazard avoidance resulting from a system analysis provided to the end user		P
	Do not allow children to replace batteries without adult supervision	Related information provided. See Enclosure ID 05.	P
8.2	**Small cell and battery safety information**	Not small battery.	N/A
	The following warning language is to be provided with the information packaged with the small cells and batteries or equipment using them:		N/A
	- Keep small cells and batteries which are considered swallowable out of the reach of children		N/A
	- Swallowing may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2 h of ingestion		N/A
	- In case of ingestion of a cell or battery, seek medical assistance promptly		N/A

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
9	**MARKING**		P
9.1	**Cell marking**	Considered in approved cell.	N/A
	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 marked as specified in IEC 61960, except for coin batteries	IEC Designation: 3ICR19/66	P
	Coin batteries whose external surface area is too small to accommodate the markings on the batteries show the designation and polarity. Batteries also marked with an appropriate caution statement		N/A
	Terminals have clear polarity marking on the external surface of the battery	See marking plate	P
	Batteries with keyed external connectors designed for connection to specific end products need 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		N/A
	When small cells and batteries are intended for direct sale in consumer-replaceable applications, caution for ingestion given on the immediate package		N/A
9.4	**Other information**		P
	Storage and disposal instructions	Related information provided. See Enclosure ID 05.	P
	Recommended charging instructions	Related information provided. See Enclosure ID 02.	P

10	**PACKAGING AND TRANSPORT**		P
	Packaging for coin cells not small enough to fit within the limits of the ingestion gauge of Figure 3		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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	Packaging information provided. See Enclosure ID 04. Package also comply with PI965IB	P
ANNEX A	**CHARGING AND DISCHARGING RANGE OF SECONDARY LITHIUM ION CELLS FOR SAFE USE**		N/A
A.1	**General**	Considered in approved cell.	N/A
A.2	**Safety of lithium ion secondary battery**		N/A
A.3	**Consideration on charging voltage**		N/A
A.3.1	General		N/A
A.3.2	Upper limit charging voltage		N/A
A.3.2.1	General		N/A
A.3.2.2	Explanation of safety viewpoint		N/A
A.3.2.3	Safety requirements, when different upper limit charging voltage is applied		N/A
A.4	**Consideration of temperature and charging current**		N/A
A.4.1	General		N/A
A.4.2	Recommended temperature range		N/A
A.4.2.1	General		N/A
A.4.2.2	Safety consideration when a different recommended temperature range is applied		N/A
A.4.3	High temperature range		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		N/A
A.4.4.1	General		N/A
A.4.4.2	Explanation of safety viewpoint		N/A
A.4.4.3	Safety considerations, when specifying charging conditions in the low temperature range		N/A
A.4.4.4	Safety considerations when specifying a new lower limit in the low temperature range		N/A
A.4.5	Scope of the application of charging current		N/A
A.4.6	Consideration of discharge		N/A
A.4.6.1	General		N/A

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
A.4.6.2	Final discharge voltage and explanation of safety viewpoint		N/A
A.4.6.3	Discharge current and temperature range		N/A
A.4.6.4	Scope of application of the discharging current		N/A
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
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 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		N/A
A.6	**Experimental procedure of the forced internal short-circuit test**		N/A
A.6.1	Material and tools for preparation of nickel particle		N/A
A.6.2	Example of a nickel particle preparation procedure		N/A
A.6.3	Positioning (or placement) of a nickel particle		N/A
A.6.4	Damaged separator precaution		N/A
A.6.5	Caution for rewinding separator and electrode		N/A
A.6.6	Insulation film for preventing short-circuit		N/A
A.6.7	Caution when disassembling a cell		N/A
A.6.8	Protective equipment for safety		N/A
A.6.9	Caution in the case of fire during disassembling		N/A
A.6.10	Caution for the disassembling process and pressing the electrode core		N/A
A.6.11	Recommended specifications for the pressing device		N/A
ANNEX B	**RECOMMENDATIONS TO EQUIPMENT MANUFACTURERS AND BATTERY ASSEMBLERS**		P
ANNEX C	**RECOMMENDATIONS TO THE END-USERS**		P
ANNEX D	**MEASUREMENT OF THE INTERNAL AC RESISTANCE FOR COIN CELLS**		N/A
D.1	**General**		N/A
D.2	**Method**		N/A

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

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: Critical components information				P
Object / part No.	**Manufacturer / trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
1. Cell	Tohoku Murata Manufacturing Co., Ltd.	US18650VTC 5A	3.7V, Nominal Capacity: 2600 mAh, Rated Capacity: 2500 mAh	IEC 62133-2: 2017	CB Certification No. DK-69691-UL, and DK-69691-A1-UL, certified by UL (Demko)
2. PCB	SHENZHEN XUANSHENG TECHNOLOGY CO LTD	XS-1, XS-2	Min. thickness: 0.1mm, V-0, 130°C	UL 796	UL (E366014)
Alt. PCB	Interchangeable	Interchangeable	Min. V-1, 105°C	UL 796	UL
3. MOSFET(Q2/Q3)	AOS	AO4430A	--	--	--
4. Protect IC(U1)	TI	BQ40Z50-R2	TSSOP-30	--	--
5. Lead wire (Red, Black, Yellow)	Interchangeable	Interchangeable	Min.22AWG, 80°C, 30Vac	UL 758	UL
6. Connector	Interchangeable	Interchangeable	Min. V-2, 80°C	UL 1977	UL
7. Fuse	LITTELFUSE INC	LF 10A(451 series)	10A, 125V	UL 248	UL (E10480)

Supplementary information:

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

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict

7.2.1	TABLE: Continuous charging at constant voltage (cells)			N/A
Sample no.	**Recommended charging voltage Vc (Vdc)**	**Recommended charging current I_{rec} (A)**	**OCV before test (Vdc)**	**Results**
--	--	--	--	--

Supplementary information:

A - No fire or explosion
B - No leakage

7.3.1	TABLE: External short-circuit (cell)				N/A
Sample no.	**Ambient T (°C)**	**OCV before test (Vdc)**	**Resistance of circuit (mΩ)**	**Maximum case temperature rise ΔT (K)**	**Results**
Samples charged at charging temperature upper limit					
--	--	--	--	--	--
Samples charged at charging temperature lower limit					
--	--	--	--	--	--

Supplementary information:

A - No fire or explosion

B - The test was completed after the cell casing cooled to 20% of the maximum temperature rise.

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 (K)**	**Component single fault condition**	**Results**
1576956-6	22.4	12.287	84	24.0	short Q2 pin S to D	A, C
1576956-7	22.5	12.261	90	24.6	Short Q2 pin S to D	A, C
1576956-8	22.5	12.271	83	22.9	short RS1	A, C
1576956-9	22.5	12.190	78	22.9	short RS1	A, C
1576956-10	22.5	12.187	91	22.9	Normal	A, C

Supplementary information:

A - No fire or explosion
B - The test was completed after the cell casing cooled to 20% of the maximum temperature rise.
C - 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. There is no obvious temperature rise.

7.3.5	TABLE: Crush (cells)				N/A
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				
--	--	--	--	--
Samples charged at charging temperature lower limit				
--	--	--	--	--

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information:

A - No fire or explosion

B - Force released after maximum level reached

7.3.6	TABLE: Over-charging of battery				P
Constant charging current (A) ..... :		5.2			—
Supply voltage (Vdc) ..... :		15.12			—
Sample no.	**OCV before charging (Vdc)**	**Total charging time (hour)**	**Maximum outer case temperature (°C)**	**Results**	
1576956-11	7.301	5	37.5	A	
1576956-12	7.311	5	37.9	A	
1576956-13	7.324	5	39.0	A	
1576956-14	7.365	5	36.7	A	
1576956-15	7.290	5	38.8	A	

Supplementary information:

A - No fire or explosion

7.3.7	TABLE: Forced discharge (cells)			N/A
Sample no.	**OCV before application of reverse charge (Vdc)**	**Measured reverse charge I_t (A)**	**Lower limit discharge voltage (Vdc)**	**Results**
--	--	--	--	--

Supplementary information:

A - No fire or explosion

B - The voltage did not reach negative value of upper limit charging voltage.

C - The voltage reached negative value of upper limit charging voltage within 90 min.

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**
1576956-1	12.041	11.976	174.55	174.55	A
1576956-2	11.869	11.817	174.30	174.33	A
1576956-3	12.101	11.140	174.56	174.57	A

Supplementary information:

A - No fire. No explosion. No leakage. No venting. No rupture.
B - Others (please explain)

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**
1576956-1	12.103	12.091	174.55	174.55	A
1576956-2	12.087	12.056	174.33	174.33	A
1576956-3	12.017	12.010	174.57	174.55	A

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information:

A - No fire. No explosion. No leakage. No venting. No rupture.
B - Others (please explain)

7.3.9	TABLE: Forced internal short circuit (cells)				N/A
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					
--	--	--	--	--	--
Samples charged at charging temperature lower limit					
--	--	--	--	--	--

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.

A - No fire
B - Test concluded when ~~800~~/400 N pressure was reached and 50 mV voltage drop was not achieved

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

List of test equipment used:

A completed list of used test equipment shall be provided in the Test Reports when a Customer's Testing Facility according to CTF stage 1 or CTF stage 2 procedure has been used.
Note: This page may be removed when CTF stage 1 or CTF stage 2 are not used. See also clause 4.8 in OD 2020 for more details.

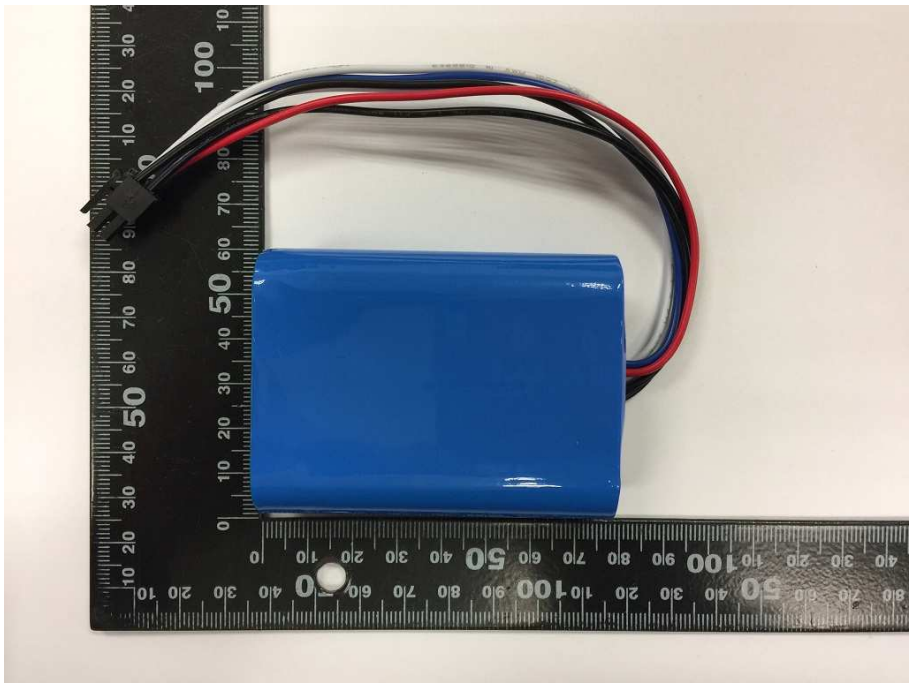
Clause	Measurement / testing	Testing / measuring equipment / material used, (Equipment ID)	Range used	Last Calibration date	Calibration due date
N/A					

Enclosure

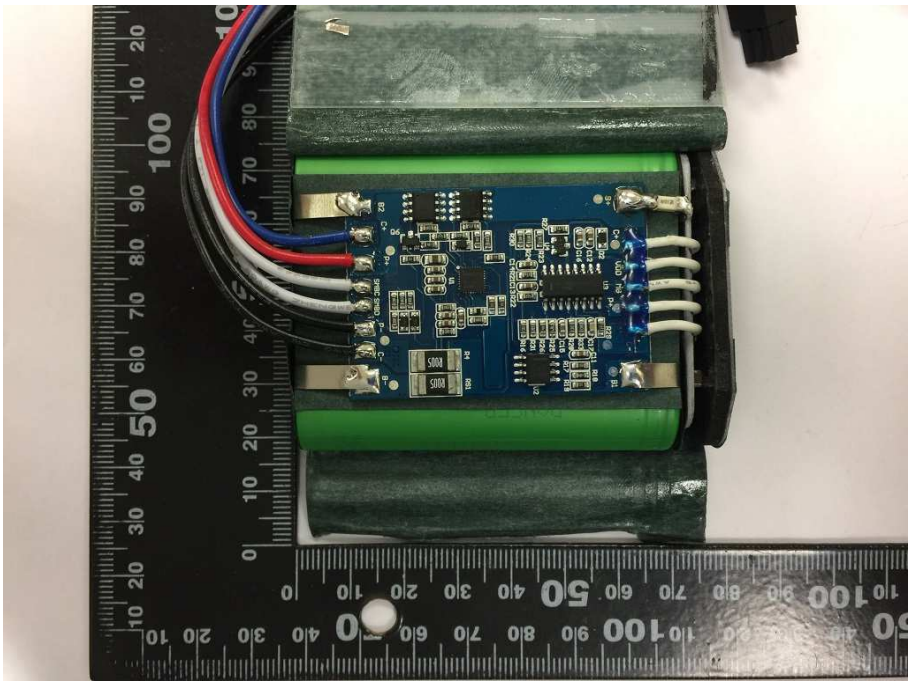
Supplement ID	Description
01	Overview of Lithium-Ion Battery Pack, Model BL2600C18650H3S1PGQG, 11.1V, 2600mAh, 28,86Wh
02	Specification for Lithium-Ion Battery Pack, Model BL2600C18650H3S1PGQG, 11.1V, 2600mAh, 28,86Wh
03	Dimensional drawing of Lithium-Ion Battery Pack, Model BL2600C18650H3S1PGQG, 11.1V, 2600mAh, 28,86Wh
04	Package of Lithium-Ion Battery Pack, Model BL2600C18650H3S1PGQG, 11.1V, 2600mAh, 28,86Wh
05	Safety information and instruction

ID 01-01

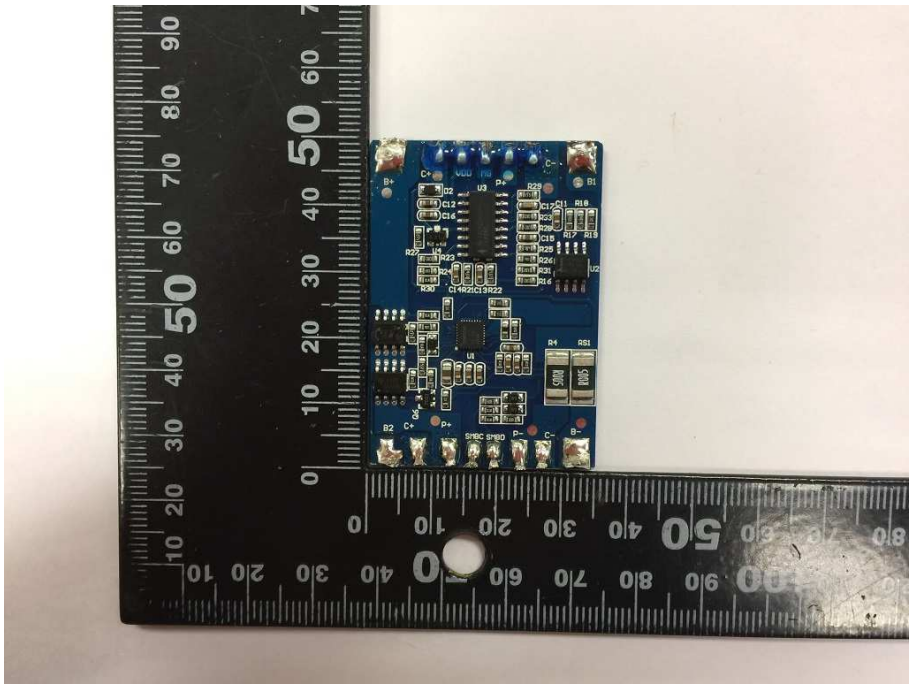

GlobTek, Inc.®
www.globtek.com
Lithium-Ion Battery Pack with
Fuel Gauge and Charger
CAUTION:
MADE IN CHINA
RoHS 2
201709

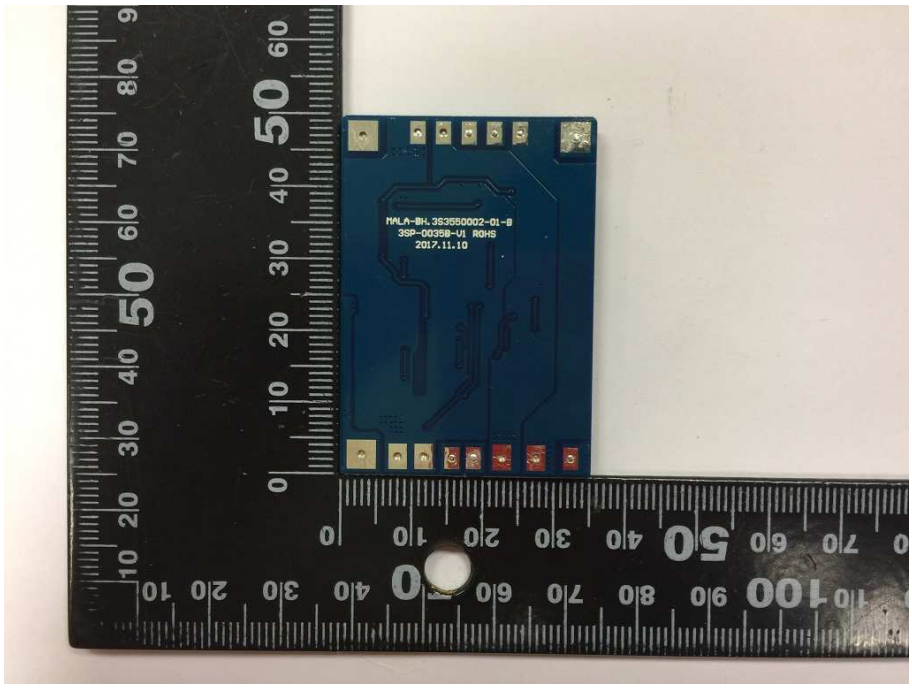


ID 01-02



ID 01-03





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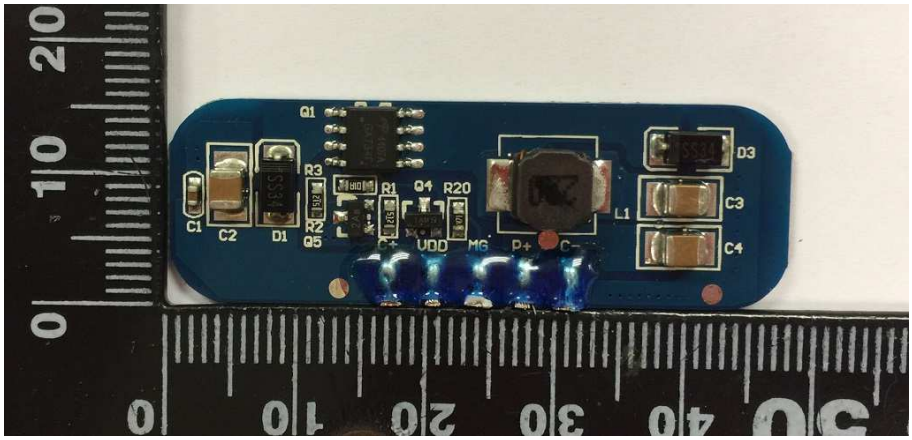
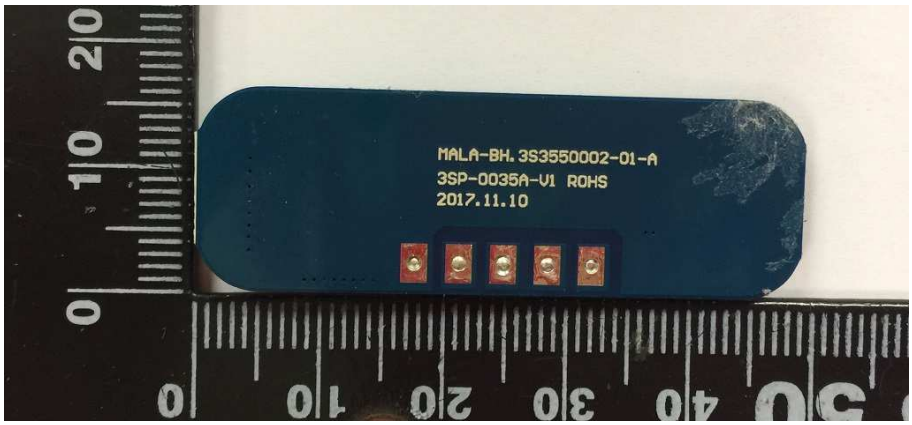

Q1
R3
R1
Q4
R20
C1
C2
D1
R2
Q5
VDD
MG
P+
C-
L1
D3
C3
C4


MALA-BH.3S3550002-01-A
3SP-0035A-V1 ROHS
2017.11.10

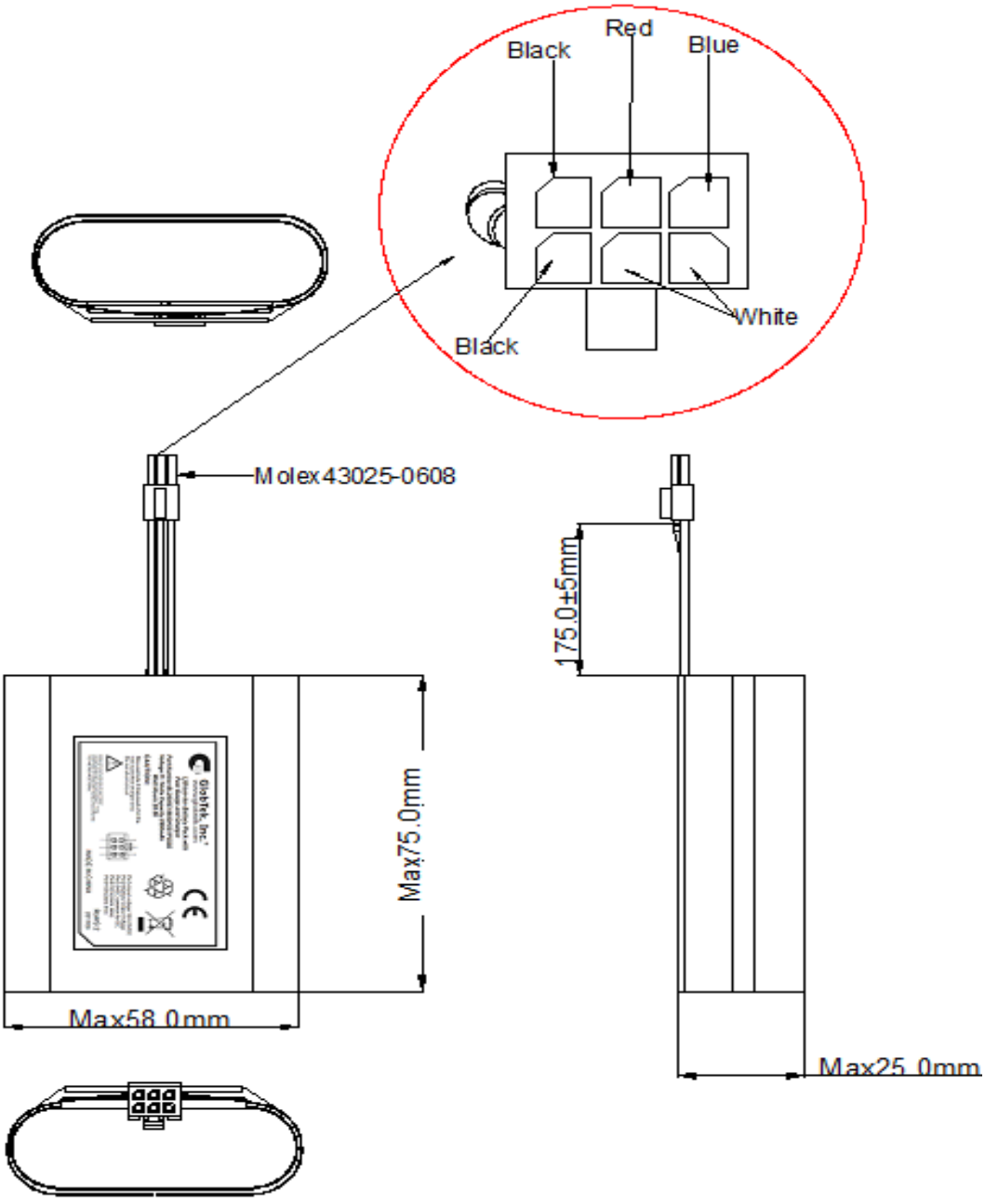
ID 02
Battery Pack basic characteristics

1、电池规格参数（BATTERY PACK PARAMETERS）

Secondary battery pack（测试参数表）	
Battery Manufacturer	PowerOak Innovation company
Battery Pack Model	BL2600C18650H3S1PGQG
Cell Manufacturer	Tohoku Murata Manufacturing Co., Ltd.
Cell Model	US18650VTC5A
Cell Configuration (Series, Parallel)	3S1P
Cell UL file No.	MH12566
Overcharge Voltage Protection	YES
Over-discharging Voltage Protection:	YES
PTC or other current/thermal protection	NTC
Nominal Capacity	2600mah
Nominal Voltage	11.1V
Standard Charging Current	520mA
Standard Full Charging Voltage	12.6V
End of Charging Current	26MA
Maximum Charging Current	1.0A
Maximum Charging Voltage	12.6V
Standard Discharging Current/Load	0.52A
End Point Voltage	6.9V
Maximum Discharge Current/Load	6A
Charging Temperature Range （充电温度范围，如 0～45）	0～60
Discharging Temperature Range （放电温度范围，如－20～60）	－20～60

ID 03

Battery (Unit: mm)



ID 04

ID 05-01

9. Use Attentions: 使用说明

To ensure proper use of the battery please read the manual carefully before using it.

为了确保电池的安全和正确使用，请在使用电池产品之前仔细阅读以下内容：

9.1 Handling 操作

9.1.1 Do not expose to, dispose of the battery in fire.

严禁靠近火源以及投入火中。

9.1.2 Do not put the battery in a charger or equipment with wrong terminals connected.

在充电或接入使用电器时，注意正负极不要接反。

9.1.3 Avoid shorting the battery

请勿将电池产品短路。

9.1.4 Avoid excessive physical shock or vibration.

避免敲击以及震动电池产品。

9.1.5 Do not disassemble or deform the battery.

请勿解剖电池体。

9.1.6 Do not immerse in water.

严禁电池产品浸入水中。

9.1.7 Do not use the battery mixed with other different make, type, or model batteries.

请勿不同厂家、不同类型、不同型号产品混用。

9.1.8 Keep out of the reach of children.

避免让儿童接触到。

9.2 Charge 充电

9.2.1 Battery must be charged in appropriate charger only.

电池必须使用适用的充电器充电。

9.2.2 Never use a modified or damaged charger.

不要使用经修理过的或是已损坏的充电器充电。

9.2.3 Do not leave battery in charger over 24 hours.

不要让电池充电超过 24 个小时。

9.2.4 Charging current: Can not surpass the biggest charging current which in this specification book stipulated.

充电电流：不能高于本规格书规定的充电电流上限。

ID 05-02

9.2.5 Charging voltage: Does not have to surpass the highest amount which in this specification book stipulated to decide the voltage.

充电电压：不能高于本规格书规定的充电电压上限。

9.2.6 Charge temperature: The battery must carry on the charge in the ambient temperature scope which this specification book stipulated.

充电环境温度：必须在本规格书规定的温度范围内进行充电。

9.2.7 Uses the constant electric current and the constant voltage way charge, the prohibition reverse charges. If the battery positive electrode and the cathode meet instead, can damage the battery.

先恒流后恒压充电，不可反向充电，如果电池的正负极接触将会损伤电池。

9.3 Discharge 放电

9.3.1 The discharging current does not have to surpass this specification book stipulation the biggest discharging current, the over sized electric current electric discharge can cause the battery capacity play to reduce and to cause the battery heat。

放电电流不能高于本规格书规定的放电电流上限，过高的放电电流可能导致电池容量受损，并可能导致电池体过热而造成危险。

9.3.2 Electric discharge temperature: The battery discharge must carry on in the ambient temperature scope which this specification book stipulated.

放电环境温度：必须在本规格书规定的温度范围内放电使用。

9.3.3 Over-discharges: After the short time excessively discharges charges immediately cannot affect the use, but the long time excessively discharges can cause the battery the performance, battery function losing. The battery long-term has not used, has the possibility to be able to be at because of its automatic flashover characteristic certain excessively discharges the condition, for prevented excessively discharges the occurrence, the battery should maintain the certain electric quantity.

过放：瞬间过放不影响使用，但长时间的过放会影响电池性能，如果电池长期不使用，电池性能也会降低，使用时需做几次充分的充放电后才能恢复。

9.4 Disposal: Regulations vary for different countries. Dispose of in accordance with local regulations.

处置：依据使用当地的法规处理废旧电池。