Cell Specification Approval Sheet
电池芯规格书

Model/型号：G0C1356-01

Prepared by CPD 准备-产品设计部	Approved by PM 审核-项目管理部	Approved by QA 审核-品质部
DW Zhu/朱登伟	Sunny Sun/孙晓玲	Mark Li/李鑫泉

Customer **Approval** **审核-客户**	**Signature 签名**	**Date 日期**
	Company Name: **公司名称**	
	Company Stamp ： **公司盖章**	

AMENDMENT RECORDS

修改记录

Revision /版本	Description/ 描述	Date/ 日期	Prepared/ 准备	Approval/审核
A0	New Release/新版发行	2023/9/20	DW Zhu/朱登伟	Sunny Sun/孙晓玲
A1	1. Adjust the up-charging voltage to 3.25V./调整充电上线电压至 3.25V 2. The minimum capacity of the adjusted cell is 37.0Ah, and the average capacity is 39.0Ah./调整电芯最小容量为 37.0Ah，平均容量 39.0Ah 3. Add shipment voltage./增加出货电压范围 4. Modify the recommended Charge Specification. /调整建议充电规格 5. Modify the grouping conditions./修改分组条件 6. Add coding rules./增加喷码规则	2023/11/16	DW Zhu/朱登伟	Sunny Sun/孙晓玲
A2	1. Modify fast charging method and maximum charging current/增加快速充电模式和最大充电电流 2. Modify the maximum continuous discharge current and maximum pulse discharge current/调整最大连续放电电流和脉冲放电电流 3. Modify the recommended Charge Specification/调整建议充电规格 4. Add protection Limit Specification/增加保护限制 5. Add the discharge capacity of 5.0C rate/增加 5.0C 倍率放电容量 6. Modify the discharge cut-off voltage to 1.5V in RT cycle life/修改循环性能中放电截止电压至 1.5V 7. Modify the format of the Safety Specification /修改安全特性格式	2023/12/18	DW Zhu/朱登伟	Sunny Sun/孙晓玲

CONTENTS/内容

1. General Information/基本信息

1.1. Scope/范围

This document describes the Product Specification of the Rechargeable Sodium-ion Battery G0C1356-01 supplied by Li-Fun (Li-Fun Technology Co., Ltd).

本产品规格书描述的是由湖南立方新能源科技有限责任公司供应的型号为 G0C135-01 之钠离子二次电池单体。

1.2. Model/型号: *G0C1356-01*

1.3. Application/应用:

Rechargeable Sodium-ion Battery for ESS Application. 储能系统 用钠离子二次电池单体。

2. Specification/规格

2.1. Normal Specification/基本规格

No.	Items/项目	Specification/规格	
1	Charge voltage (V)/充电截至电压	3.25	
2	Nominal voltage (V)/标称电压	2.85	
3	Minimal capacity(Ah@0.5C Discharge) 最小容量(C_m)	37.0	
4	Typical capacity(Ah@0.5C Discharge) 标称容量(C_t)	39.0	
5	Standard charging method(@25±2°C) 标准充电方法	0.2C CC Charge to 3.25V, then CV to 0.05C cut off	
6	Fast charging method(@25±2°C) 快速充电方法	1.0C CC Charge to 3.25V, then CV to 0.05C cut off	
7	Max continuous charging current (C) 最大连续充电电流(C)	3.0（≥25℃，≤70%SOC）	
8	Max. continuous discharge current (C) 最大连续放电电流	5.0	
9	Max. pulse discharge current (C) 最大脉冲放电电流	15.0（10 s，≥50% SOC @ RT）	
10	Discharge Cut-off Voltage (V)/ 放电截至电压	1.5	
11	Operating temperature (°C)/ 充放电温度窗口	Charging temperature: -10 ~ 60 Discharging temperature: -40 ~ 60	
12	Storage environment (°C)/ 存储环境	-20 to 45	1month recovery capacity≧90%
		-20 to 35	3month recovery capacity≧90%
		-20 to 25	12month recovery capacity≧90%
		After ~40% charged Cell are stored at 35°C for 1months or RT for 3months or 45°C for 14 days, measure the recovered capacity with Standard charge/discharge method @ RT environment ≥90% of initial capacity.	
13	ACIR@RT, 50%-SOC (mohm) / 交流阻抗	≤ 1（Ref.）	
14	Cell Weight Approx.(kg)/电芯重量	~1.1（Ref.）	
15	Shipment Voltage(V)/出货电压(V)	2.9-3.0	

2.2. Recommended Charge Specification/建议充电规格

温度/℃	0%≤SOC＜10%	10%≤SOC＜20%	20%≤SOC＜30%	30%≤SOC＜40%	40%≤SOC＜50%	50%≤SOC＜60%	60%≤SOC＜70%	70%≤SOC＜80%	80%≤SOC＜90%	90%≤SOC＜100%
≤-10	0	0	0	0	0	0	0	0	0	0
-10<T≤0	0.1	0.1	0.1	0	0	0	0	0	0	0
0<T≤5	0.2	0.2	0.2	0.1	0	0	0	0	0	0
5<T≤10	0.2	0.2	0.2	0.2	0.05	0	0	0	0	0
10<T≤15	0.2	0.2	0.2	0.2	0.05	0	0	0	0	0
15<T≤20	0.5	0.5	0.5	0.5	0.5	0.2	0.1	0	0	0
20<T≤25	1.0	1.0	1.0	1.0	0.5	0.5	0.5	0.1	0.1	0
25<T≤30	3.0	3.0	3.0	3.0	3.0	3.0	2.0	1.0	1.0	1.0
30<T≤35	3.0	3.0	3.0	3.0	3.0	3.0	2.0	1.0	1.0	1.0
35<T≤40	3.0	3.0	3.0	3.0	3.0	2.0	1.0	1.0	1.0	1.0
40<T≤45	2.0	2.0	2.0	2.0	2.0	1.0	1.0	1.0	1.0	1.0
45<T≤50	2.0	2.0	2.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0
50<T≤55	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.5
55<T≤60	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0

2.3. Protection Limit Specification/保护限制

No	Item	Specification
1	1st Over Voltage Limit/一级过充电压保护	≤3.28V
2	2nd Over Voltage Limit/二级过充电压保护	≤3.32V
3	1st Under Voltage Limit/一级过放电压保护	≥1.5V
4	2nd Under Voltage Limit/二级过放电压保护	≥1.0V

3. Performance Specification/性能规格

3.1. Durability Specification/寿命

No.	Item	Specification	Condition
1	*Initial capacity *初始容量	≥37.0Ah	At 25 ± 2 ℃， the cell is charged to 3.25V at 0.2C constant current and constant voltage, and the cut-off current is 0.05 C, and then discharged at 0.5 C to 1.5V, recording the average of the three cycles 电芯进行 0.2 C 恒流充电至 3.25V，恒压至 0.05 C，然后 0.5 C 放电至 1.5V，记录三次循环的平均值
2	*5.0 C Rate discharge capacity *5.0 C 倍率放电容量	≥92%*Cm	At 25 ± 2 ℃， the cell is charged to 3.25V at 0.2 C constant current and constant voltage, and the cut-off current is 0.05 C, and then discharged at 5.0C to 1.5V， recording the discharge capacity 电芯进行 0.2 C 恒流充电至 3.25V，恒压至 0.05 C，然后 5.0 C 放电至 1.5V，记录放电容量
3	*RT Cycle Life *常温循环寿命	6000 cycles Capacity retention≥80%， 6000周容量保持率≥80%	At 25±2℃，charge the cell with 0.5C current to 3.25 V，CV until charge current to 0.05C。 Discharge the cell with 1.0C current until 1.5V. Cells shall be left for 10 minutes after both charge and discharge. Repeat the charging and discharging and record remained capacity after 6000th cycles. 在25±3℃下，0.5C充电至3.25 V，恒压至0.05C电流；1.0C标准放电至1.5V；充放电之间需间隔10min； 连续充放电循环6000周，在第6000周结束后进行充放电容量测试。

3	High temperature storage performance 高温存储性能	Retention capacity ≥ 90% *C_m 保持容量 ≥ 90%*C_m Recovery capacity ≥ 92%*C_m 恢复容量 ≥ 92%*C_m Thickness swelling ≤ 8%（vs initial thickness） 厚度膨胀 ≤8% （对比初始厚度）	The cell is charged to 3.25V at 0.2C constant current and constant voltage, and the cut-off current is 0.05C at room temperature, the thickness of the cell is recorded as the initial thickness; the cell is stored at 55±3 °C for 7D, the cell is transferred to room temperature for storage for 2h and the cell thickness is recorded, the cell is discharged to 1.5V at 0.5C as the retention capacity, the cell is charged to to 3.25V at 0.2C constant current and constant voltage, and the cut-off current is 0.05C, the cell is discharged at 0.5C to 1.5V, and the discharge capacity is marked as the recovery capacity. 电芯在室温下0.2C恒流充电至3.25V，截止电流0.05C，记录电芯厚度为初始厚度；电芯存放在55±3℃℃下存放7D后，电芯转移至常温存放2h后记录电芯厚度，电芯以0.5C放电至1.5V的容量为残余容量，电芯以0.2C恒流充电至3.25V，恒压至0.05C，再0.5C放电至1.5V的容量为恢复容量。

3.2. Safety Specification/安全特性

No	Item项目	Specification规格	Standard标准
1	Free Drop Test/ 自由跌落测试	No Explode, No Fire 不爆炸，不起火	Reference GB/T 36276-2018 参考GB/T 36276-2018
2	Heating Test/ 热冲击测试	No Explode, No Fire 不爆炸，不起火	
3	Low Pressure/ 低压测试	No Explode, No Fire，No leakage 不爆炸，不起火，不漏液	
4	Over-discharge Test/ 过放电测试	No Explode, No Fire 不爆炸，不起火	
5	External Short-Circuiting Test/ 外短路测试	No Explode, No Fire 不爆炸，不起火	
6	Crush Test/ 挤压测试	No Explode, No Fire 不爆炸，不起火	
7	Overcharge Test/ 过充测试	No Explode, No Fire 不爆炸，不起火	
8	Thermo runaway Test/ 热失控测试	No Explode, No Fire 不爆炸，不起火	

3.3. Standard environmental test condition/标准测试环境条件

Unless otherwise specified, all tests stated in this Product Specification are conducted at below conditions:
除特殊注明外，本规格指定的所有测试应在以下环境中进行。
Temperature /温度: 25 ± 3 °C
Humidity/相对湿度: 65 ± 20% RH

3.4. Shipment/出货

Configuration parameters (refer to series-parallel configuration, configuration parameters, can be adjusted) :

(1) group capacity range ≤ 1.5%*Caverage

(2) group internal resistance range ≤ 0.5 mΩ;

(3) group voltage range ≤5mV;

配组参数（参照串并联配置，配组参数，可进行调整）：

（1）配组容量极差≤ 1.5%*Cavg；

（2）配组内阻极差≤ 0.5 mΩ；(Ref)

（3）配组压差≤ 5mV

4. Caution and Prohibition in Handing/操作提示和禁止事项

Below is warning for using the Sodium ion rechargeable battery. Mishandling of the battery may cause heat, fire and deterioration in performance. Be sure to observe the following. /以下为钠离子二次电池的操作提示及禁止事项。

Cautions/注意事项

- When using the application equipped with the battery, refer to the user's manual before usage. Please read the specific charger manual before charging. /使用设备前请参照用户手册.给电池充电前请阅读专用充电器操作手册。
- When the cell is not charged after long exposure to the charger, discontinue charging. /长时间置于充电器上而不充电，请切断充电。
- Please check the positive (+) and negative (-) direction before packing. /进行成组前，请检查电池的正负极性。
- When a lead plate or wire is connected to the cell for packing, check out insulation not to short-circuit. /当使用导柱或线材进行电池包组装时，做好绝缘防护，避免短路。
- Battery must be stored separately. /电池必须隔离存放。
- Battery must be stored in a dry area with low temperature (≤25°C) for long-term storage. /电池如需长期存储，应存储在干燥和低温(≤25°C)环境下。
- Do not place the battery in direct sunlight or heat.不要将电池放在阳关直射处或热源附件。
- Do not use the battery in high static energy environment where the protection device can be damaged. /不要将电池放置在可能损害电池保护装置的高能态环境下。
- When rust or smell is detected on first use, please return the product to the seller immediately. /在第一次使用电池时，如发现有生锈或有味道，请立即退回厂商。
- The battery must be away from children or pets. /电池必须远离儿童或宠物。
- When cell life span shortens after long usage, please exchange to new cells. /当电池长期使用后至寿命终止后，请更换新电池。
- Do not wear metallic objects (ex. ring, watch, accessory, etc.) while handling battery cells. /不要穿戴金属物品（例如：戒指、手表等配饰）操作电池。
- When use cells for an assembly of module or pack, the "first-in, first-out" (FIFO) principle should be applied. /当用电芯组装模组或电池组时，适用"先入先出的原则"。
- Charge time should not be longer than specified in the manual. /充电时间不应超出手册中规格。
- Do not expose the battery to the outside of the operating temperature range specified in this document. /不要超出规定的温度范围操作电池。
- Do not charge and discharge with the maximum current for uninterrupted cycle. /规格书中的最大充电或放电电流不适用于不间断循环。
- It should be noted that during the long period when the cell is not used, it may be in a certain over-discharge state due to its self-discharge characteristics. To prevent the occurrence of over-discharge, the cell should be charged

regularly and its voltage should be maintained between 2.5 and 3.0V

- 需要注意，在电芯长期未使用期间，它可能会因其它自放电特性而处于某种过放电状态。为防止过放电的发生，电芯应定期充电，将其电压维持在 2.5～3.0V 之间。
- If manual soldering is used, please pay attention to the following to ensure the function of the electric cell: a) the temperature control of the soldering iron can prevent static electricity; b) the temperature of the soldering iron shall not exceed 350℃; c) the soldering time shall not exceed 3s; d) no more than 5 times of soldering; e) secondary welding must be carried out after the polar ear is cooled; f) direct heating of the cell is prohibited. Above 100℃ will cause cell damage. /如使用手工锡焊，须注意以下事项，以保证电芯的功能：a) 烙铁的温度可控能防静电；b) 烙铁温度不能超过 350℃；c) 锡焊时间不能超过 3s；d) 锡焊次数不能超过 5 次；e) 必须在极耳冷却后再进行二次焊接；f) 禁止直接加热电芯，高于 100℃会导致电芯损坏

Prohibitions/禁止

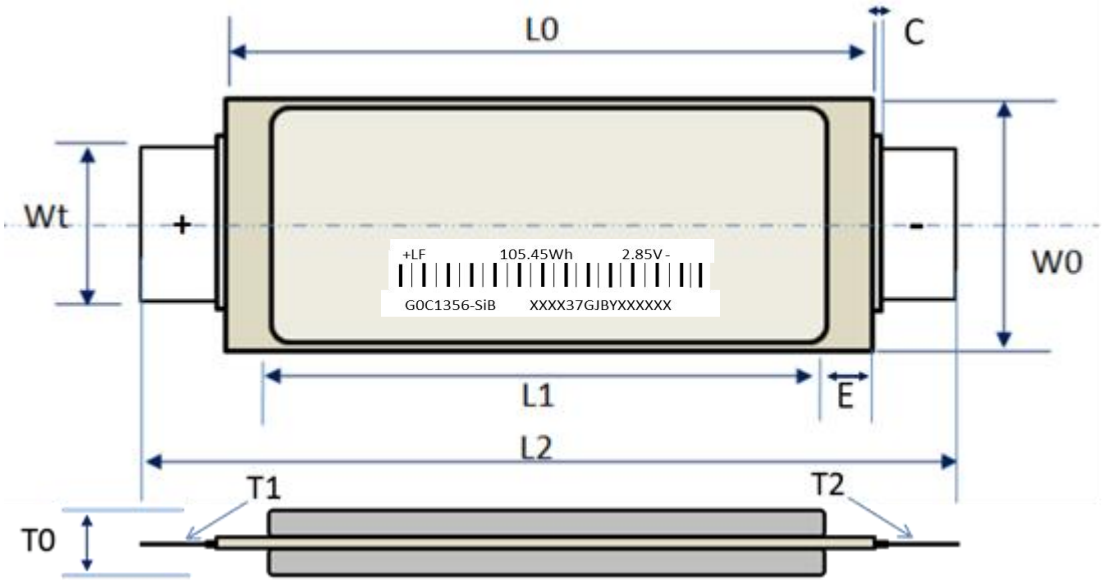
- Do not use different charger. /禁止使用非标配充电器。
- Do not charge with more than maximum charge rate. /禁止超出最大充电倍率充电。
- Do not disassemble or reconstruct the battery. 禁止拆解和重组电池。
- Do not throw or cause impact.禁止丢抛电池或其他可能引起撞击的动作。
- Do not pierce a hole in the battery with sharp things. (such as nail, knife, pencil, drill) /禁止尖锐物插入电池
- Do not use with other batteries or cells. /禁止和其他电池混用。
- Do not solder on battery directly. /禁止直接在电池上面上锡。
- Do not press the battery with overload in manufacturing process. /禁止在制程中过度挤压。
- Do not use old and new cells together for packing. /禁止新老电芯在同一个电池模组内混搭使用。
- Do not expose the battery to high heat. (such as fire) /禁止将电池暴露在高温或过热处,例如火中。
- Do not put the battery into a microwave or high-pressure container. /禁止将电池放入微波或高压容器内。
- Do not use the battery reversed. /禁止反转。
- Do not connect positive (+) and negative (-) with conductive materials (such as metal, wire). /禁止正负极直接短接（如使用金属、电线等）
- Do not allow the battery to be immersed in or wet with water or sea-water. /不允许将电池浸入水中和被水淋。
- Do not deform the battery cell (e.g. bending the terrace area or the pouch sealing area) without written agreement with the battery manufacturer. /在没有征得制造商书面同意前，禁止将电池弄变形(例如弯折易于形变的台阶或封装区域)。

Others/其他

Any matters that this specification does not cover should be conferred between the customer and Li-Fun. /本规格书中之未尽事宜需客户与敝司共同确认。

5. Drawing /图纸

(all unit in mm, not in scale/单位为毫米，未按比例绘制)



X	1位	年份	第一个X:年份,按实际喷,参照喷码对照表
X	1位	月份	第二个X:月份,按实际喷,参照喷码对照表
XX	2位	日期	第三、四个X:日期,按实际喷,参照喷码对照表
37	2位	容量	固定
G	1位	型号代码	固定
J	1位	正极主材代码	当前体系喷J
B	1位	负极主材代码	当前体系喷B
Y	1位	隔膜代码	"20PP"喷Y
X	1位	班次码	半自动线：白班"1",晚班"2",白班返喷"3",晚班返喷"4" 全自动线：白班喷″5″, 晚班喷″6″
XXXXX	5位	流水码	按实际喷

年份	字符	月份	字符	日期	字符
18	F	1	1	1	01
19	G	2	2	2	02
20	H	3	3	3	03
21	I	4	4	4	04
22	J	5	5	5	05
23	K	6	6	6	06
24	L	7	7	7	07
25	M	8	8	8	08
26	N	9	9	9	09
27	O	10	A	…	…
28	P	11	B	30	30
29	Q	12	C	31	31

Items	Description	Dimension
T0	Thickness for shipping with mylar and side tape(mm), measure with caliper (圆盘卡尺)	15.5±0.5
W0	Width(mm)	121.0±2.0
L0	Length(mm)-Cell body	≤356
L2	Length(mm)-with Tab Lead	417.0±5.0
L1	Length without top sealing(mm)	325.0±2.0
Wt	Tab width(mm)	45.0±0.2
T1	Cathode tab thickness(mm)	0.40±0.03
T2	Anode tab thickness(mm)	0.40±0.03
E	Top sealing width (mm)	14.0±2.0
C	Sealant outside length(mm)	1.0~3.0

Customer Inquiry/客户调查

Model/型号: **G0C1356-01**

The customer is requested to write down your information and contact Li-Fun in advance, When the customer needs applications or operating conditions other than those described in this document. Li-Fun could design and build such products according to your special request.

尊敬的客户，如您需要在此规格书描述之外的范围内应用产品，可将需求信息反馈给敝司。立方将根据您的特殊要求设计和制造相关产品。

No.	Special Request /要求	Criteria /条件
1		
2		
3		
4		
5		

Company Name：_____ Signature：_____ Date：_____