

Cabo-LG-MH1-1S1P 电池规格书

Cabo-LG-MH1-1S1P Battery Specification

产品型号 Product Model:	MC-1474914A-B
产品料号 Product No:	RH5G13010034/RH5G13010035

编制 : _____
Created

日期: _____
Date

标准化 : _____
Standardized

日期: _____
Date

审核 : _____
Checked

日期: _____
Date

项目经理 : _____
Project manager

日期: _____
Date

批准 : _____
Approved

日期: _____
Date

客户 Customer	确认 Confirm	批准 Approved



Revision History

Rev.	Date	Item	Author
V1.0	2025-02-13	First release	Liu Liu

Contents

1 Scope	4
2 Certification	4
3 Electrical specification	4
4 Pack Cycle Life	5
5 Pack Storage Life	5
6 Protection specification	5
7 Circuit Diagram	7
8 Stack-up	7
9 PCBA part list	7
10 Layout	8
11 Pack connector definition	9
12 Safety and reliability test	11
13 Dimension	12
14 Label drawing	12
15 Others	12
16 Warning and notice	13
17 Appendix	14

1 Scope

The specification describes the requirements for MC-1474914A-B Rechargeable Li-ion Battery pack .Battery supplied by Fujian SCUD Power Technology Co., Ltd.

2 Certification

2.1 Safety regulation: UN38.3

2.2 Environment: RoHS, REACH, HF.

3 Electrical specification

No.	Item		Specification	Remark
3.1	Capacity	Rat	2940mAh	Charge:0.5C to 4.15V,cut off 0.05C; Discharge:0.2C to 3.0V; at 23±2℃,rest 10 min.
		Typ	3034mAh	
3.2	Energy	Rat	10.878Wh	-
		Typ	11.22Wh	
3.3	Normal voltage		3.7V	-
3.4	End of charge voltage		4.15V	CC/CV mode
3.5	Discharge cut off voltage		3.0V	-
3.6	Pack shipping OCV		3.5~3.6V	To FATP <30%SOC
			3.5~3.6V	Shipment <30%SOC
3.7	Charge current	Standard Charge	588mA max to 4.15V,cut off 0.02C	0°~20℃
			1470mA max to 4.15V,cut off 0.05C	20~45℃
3.8	Discharge current	Standard	588mA	Cut off 3.0V
		Maximum Continuous	1550mA	Cut off 3.0V
3.9	Battery impedance(ACIR)		TBD	@AC 1kHz,as shipping OCV
	Battery impedance(DCIR)		TBD	@Shipping OCV 1. Discharge at 0.2C for 2.5s and record the V1 and I1 values. 2. Discharge at 1C for 1s and record V2 and I2 values. DCIR=(V1-V2)/(I2-I1)
3.10	0V battery charge function		Inhibition	-
3.11	Operating temperature	Charge	0~45℃	Humidity: less than 85%RH
		Discharge	-20~60℃	
3.12	Storage temperature	1 month	-20~60℃	20℃ is recommended storage temperature
		3 month	-20~45℃	
3.13	Weight		48.4g	-

3. 14	Cell Model	LG: INR18650 MH1	Cell Internal Impedance: $\leq 40\text{m}\Omega$ (At AC 1kHz)
3. 15	Series and Parallel type	1S1P	-

4 Pack Cycle Life

No.	Item	Condition	Remark
4. 1. 1	Pack cycle life	The capacity on discharge shall be measured after following cycle condition. Charge 4.15V/0.5C/0.05C cutoff/rest 10min. Discharge 0.5C/3.0V cutoff/rest 10min. Temperature $24 \pm 2^\circ\text{C}$	500 cycles $\geq 70\%$

5 Pack Storage Life

No.	Item	Condition	Remark
5. 1. 1	High Temperature Storage	The capacity on standard charge and then storage at 60°C for 7 days. After storage, the capacity shall be on standard discharge and cycled per standard charge and standard discharge for 3cycles to obtain recovery capacity .	$\geq 80\%$ (Recovery capacity)
5. 1. 2	Thermal shock	The capacity on standard charge and then at 65°C (8h) $\leftarrow$ 3hrs $\rightarrow$ -20°C (8h) for 8cycles. After storage, the capacity shall be on standard discharge and cycled per standard charge and standard discharge for 3cycles to obtain recovery capacity .	$\geq 80\%$ (Recovery capacity)

6 Protection specification

No.	Item	Unit	Min.	Typ.	Max
Primary Protection(@-20 to 60°C)					
6. 1	Overcharge protection voltage(Hardware)	V	4.31	4.35	4.39
6. 2	Overcharge protection delay time(Hardware)	s	0.746	1.024	1.331
6. 3	Overcharge protection voltage(Software)	V	4.18	4.19	4.2
6. 4	Overcharge protection delay time(Software)	s	1	2.8	3.5
6. 5	Overcharge released	-	Discharge Release		
6. 6	Over discharge protection voltage(Hardware)	V	2.46	2.5	2.54
6. 7	Over discharge protection delay time(Hardware)	ms	89	127	177
6. 8	Over discharge released	-	Charge Release		
6. 9	Charge over current protection(Hardware)	A	4.6	5.2	5.8

6. 10	Charge over current protection delay time(Hardware)	ms	8	15.9	25
6. 11	Charge over current protection(Software)	A	1.7	1.8	1.9
6. 12	Charge over current protection delay time(Software)	s	1	2.8	3.5
6. 13	Discharge over current protection(Hardware)	A	5.4	6	6.6
6. 14	Discharge over current protection delay time(Hardware)	ms	1	7.8	15
6. 15	Discharge over current protection(Software)	A	1.7	1.8	1.9
6. 16	Discharge over current protection delay time(Software)	ms	1	2.8	3.5
6. 17	Short circuit protection(Hardware)	A	8.6	9.2	9.8
6. 18	Short circuit protection delay time(Hardware)	μ s	100	244	500
6. 19	1st Charge under temperature test(Software)	℃	-6	-3	0
6. 20	1st Charge under temperature test delay time(Software)	s	1	2.8	3.5
6. 21	1st Discharge under temperature test(Software)	℃	-26	-23	-20
6. 22	1st Discharge under temperature test delay time(Software)	s	1	2.8	3.5
6. 23	1st Charge over temperature test(Software)	℃	45	48	51
6. 24	1st Charge over temperature test delay time(Software)	s	1	2.8	3.5
6. 25	1st Discharge over temperature test(Software)	℃	60	63	66
6. 26	1st Discharge over temperature test delay time(Software)	s	1	2.8	3.5
6. 27	0 V charging	-	Enable		
2 nd Protection(@-20 to 60℃)					
6. 28	Overcharge protection voltage	V	4.22	4.24	4.252
6. 29	Overcharge protection delay time	s	0.787	1.024	1.293
6. 30	Overcharge released	-	Discharge Release		
6. 31	Over discharge protection voltage	V	2.36	2.4	2.44
6. 32	Over discharge protection delay time	ms	98.8	128	163.2
6. 33	Over discharge released	-	Charge Release		
6. 34	Charge over current protection	A	5.2	5.6	6
6. 35	Charge over current protection delay time	ms	6.175	8	10.2
6. 36	Discharge over current protection	A	5.2	5.6	6
6. 37	Discharge over current protection delay time	ms	197.6	256	325.6
6. 38	Short circuit protection	A	12.8	14	15.3
6. 39	Short circuit protection delay time	μs	205	280	374
6. 40	2 nd Over Temperature protection	℃	67	70	73
6. 41	2 nd Over Temperature protection delay time	ms	787	1024	1292
6. 42	0V charging	-	disable		

6. 43	0V Charge Voltage	V	1.54	1.6	1.66	
Others(@25℃)						
6. 44	Current consumption	Normal Mode VBAT > 2.4V, IBAT > 15mA	μA	-	-	100
		Sleep Mode VBAT > 2.4V, IBAT < 15mA		-	23.5	38
		Ship Mode VBAT < 2.8V, Time > 10s		-	13.5	21
		Shelf Mode VBAT < 2.7V, Time > 10s		-	8.5	16
		Shutdown Mode VBAT < 2.4V, Time > 10s		-	0.7	0.75
6. 45	PCM IR (Without wire connector)	-	mΩ	-	TBD	-

7 Circuit Diagram

See the appendix for details

8 Stack-up

2		Estimate thk(um)		公差	材料及供应商
Rigid		Rigid 基材	Rigid 成品		
Surface Finish	OSP	0.20-0.40um			
	S/M	25	25	+/- 15	炎里SR-500 MKE(哑黑色)
L1	Cap plating	12	12	≥ 50	
	Plating	25	25		
	Copper	15	15		
	core	670	670	+/- 67	生益 S1150G 0.67mm H/Hoz
L2	Copper	15	15	≥ 50	
	Plating	25	25		
	Cap plating	12	12		
		25	25	+/- 15	炎里SR-500 MKE(哑黑色)
Surface Finish	OSP	0.20-0.40um			

Total	824	824
Spec	800	
Tol.(+)	100	
Tol.(-)	100	

过孔塞孔 (树脂: 3F-H)
油墨厚度测量铜面位置
在保证总板厚的前提下, 层间介厚只控下限, 不控上限

备注:

- 1、无使用相关材料, 对应厚度数据填0, 对应材料型号空白;
- 2、POFV工艺需要填写Cap plating厚度; 如无此工艺, 对应厚度填0。
- 3、各项内容可改材料/数值/描述, 但所在表格位置不可更改。
- 4、sheet页命名"2层硬板"不可更改

VG

Layer	Material	Typical layer thickness (um)	
		Nominal	Tolerance
OSP		0.2~0.5um	
Silkscreen	永胜泰 M-211 ZW (白色)	20	10 (min)
Soldermask	永胜泰 R-500 MKS (哑黑色)	30	+/-15
L1	1oz + Plating	60	50 (min)
Core	华正H150HF (Tg>150c)	610	+/-50
L2	1oz + Plating	60	50 (min)
Soldermask	永胜泰 R-500 MKS (哑黑色)	30	+/-15
Silkscreen	永胜泰 M-211 ZW (白色)	20	10 (min)
OSP		0.2~0.5um	
Control overall board thickness (um)		800	+/-100

Olympic

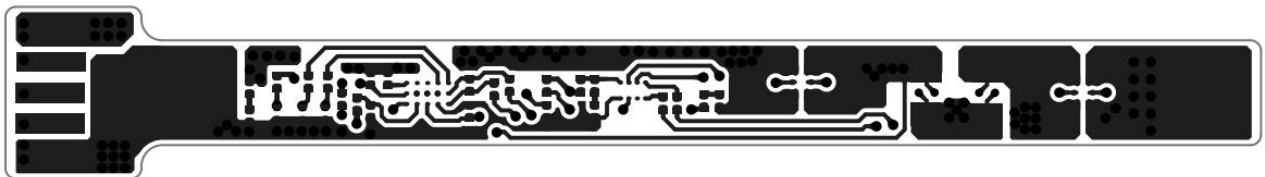
9 PCBA part list

Type	Symbol	MPN	Description	Qty	Vendor	Pkg
Prot IC	U1	Bq27z758	Gas gauge,Primary protection IC	1	TI	DABGA
	U2	NB7120ZA604FZ	Secondary protection IC	1	Ricoh	WLCSP8
MOS	Q1,Q2	AOCA32106E	12V, 9A, 3.9mΩ	2	AOS	CSP
		KFCAB21830L	12V, 15A, 4.3mΩ		Nuvoton	CSP
Res	R6	RC0201FR-0710ML	10MΩ ,±1%,1/20W	1	Yageo	0201
	R3, R5, R7, R12, R13	PFR03S-101-FNH	1/20W, 100 Ω±1%	5	Cyntec	0201
		RC0201FR-07100RL			Yageo	
	R4	RC0201FR-0710RL	1/20W, 10 Ω ±1%	1	Yageo	0201
	R1	RC0201JR-07330RL	330Ω , +/-5%,1/20W	1	Yageo	0201
	R2, R8, R9	RC0201FR-071KL	1kΩ , +/-1%,1/20W	3	Yageo	0201
	R14	RC0201FR-075K1L	5.1kΩ , ±1%, 1/20W	1	Yageo	0201
		PFR03S-512-FNH			Cyntec	
Cap	C3, C4, C6, C8, C9	GRM033R61A104KE15D	100nF, +/-10%,10V	5	Murata	0201

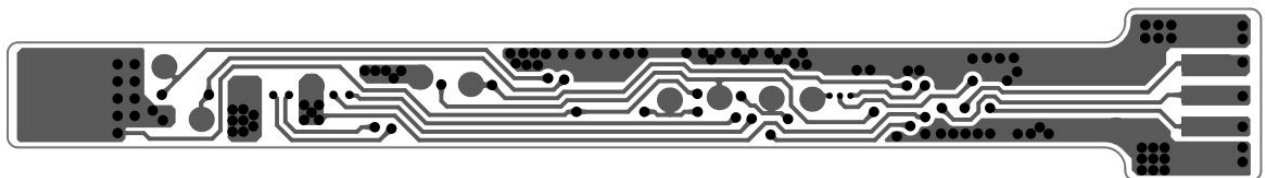
	C5	GRM033R60J105MEA2D	1 μ F, 6.3V, $\pm$ 20%	1	Murata	0201
	C7	GRM033R61A103KA01D	0.01 μ F, 10V, $\pm$ 10%	1	Murata	0201
	C1, C2	GRM033R61A224KE90D	220nF,+/-10%,10V	2	Murata	0201
TVS	D1, D2, D3	PESD5V0L1BSF	+/-30kV IEC, +/-5V VRWM, +/-10V VBR	3	Nexperia	0201
		AOZ8S503BDS-05			AOS	
NTC	RT1	NCP03XH103F05RL	10k Ω , +/-1%,3435K	1	Murata	0201
		ERTJZEG103FA			Panasonic	
	RT2	NCP03WF474F05RL	470k Ω ,1%,Beta(25/50) =4250	1	Murata	0201
Res	RS1, RS2	PA0805FRE470R005L	5m Ω , +/-1%, 1/2W	2	Yageo	0805
		LRE0805-2CR005F5			Ralec	

10 Layout

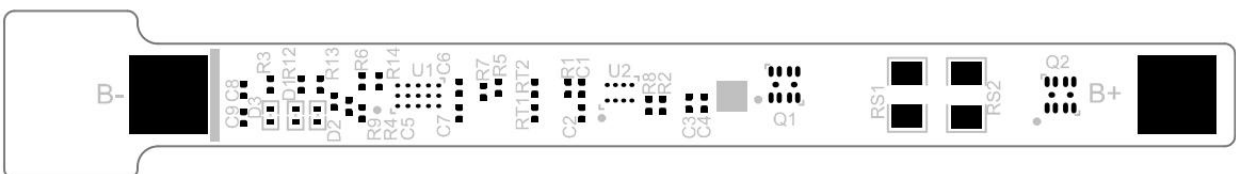
Top layer :



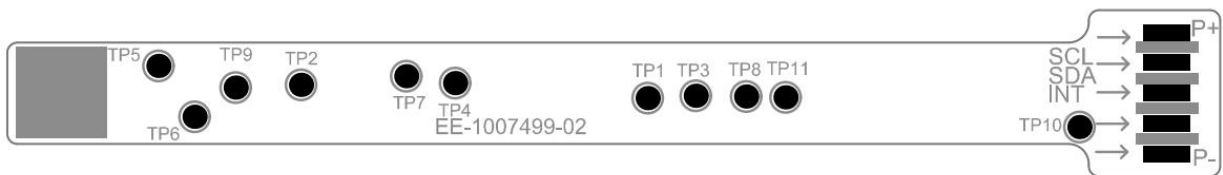
Bottom layer:



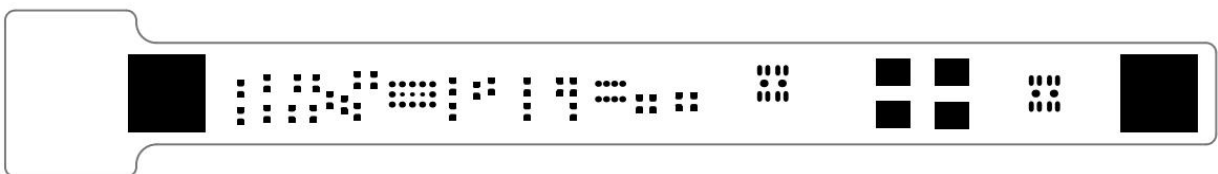
Top Overlay&Paste :



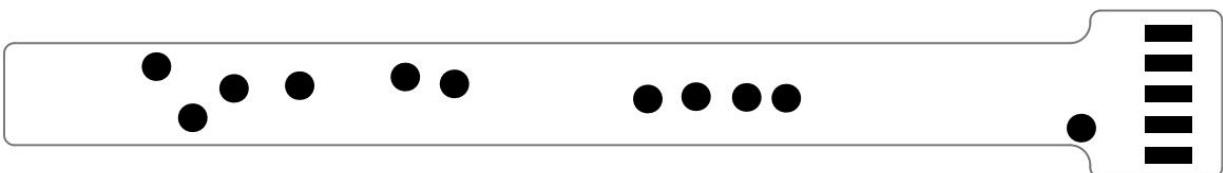
Bottom Overlay&Paste:



Top Solder :



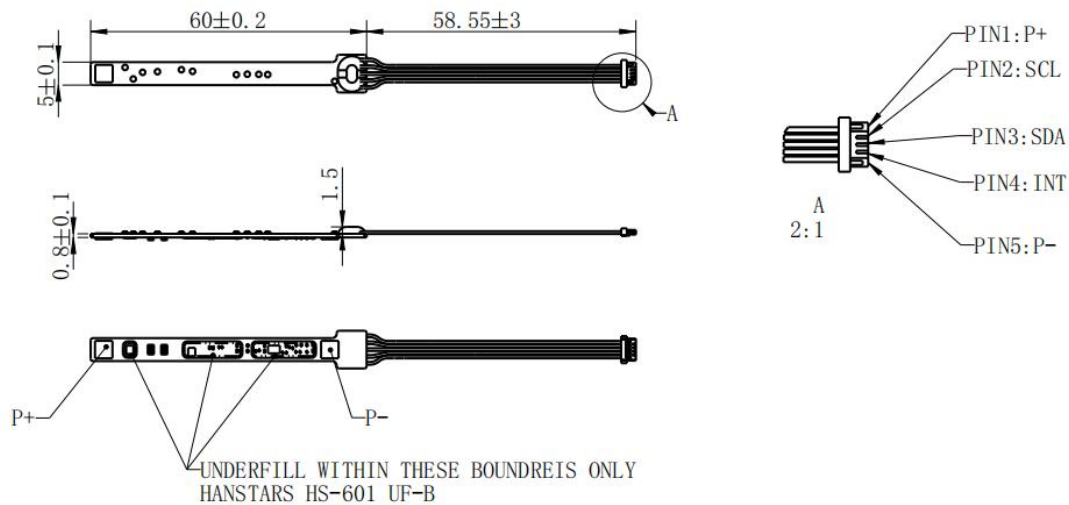
Bottom Solder :



Keep-Out Layer :



11 Pack connector definition



Function Definition	Model	Wire Length	Color	UL File No.
P+	28AWG	58.85 ± 1 mm	Red	UL3302
SCL			White	
SDA			Yellow	
INT			Blue	
P-			Black	

12 Safety and reliability test

1. UN38.3 with 1.2 meter drop test and stack test, include Meta Template Test Summary Report (required at each NPI build)
2. PI965 (CSTCG Shanghai + Beijing; Both Air and Ground at each NPI stage; Require Air, Sea, and Ground at MP stage; CSTCG/DGM SDS at MP stage)
3. UL 2054 PACK level - UL 1642 CELL level; Limited Power Source (LPS) measurement data required
4. UL 62368-1
5. CB IEC62133-2:2017
6. CB IEC62368-1:2018 (Annex M and PS1 measurements required)
7. Great Britain UKCA
8. EU Battery Directive (CE-EMC)
9. Australia/New Zealand RCM
10. Japan JIS62133
11. Korea KC62133
12. Taiwan BSMI CNS15364
13. India BIS IS16046
14. WERCs Registration
15. Certificate of Compliance (CoC) Requirements
 - a. Full Material Declaration (FMD)
 - b. EU RoHS

- c. EU REACH (SVHC)
- d. EU REACH (AnnexXVII)
- e. CA Prop-65
- f. Halogen-Free (Low-Halogen)
- g. Persistent Organic Pollutants (POPs) Regulation
- h. China Volatile Organic Compound(VOC)Regulation
- i. EPA Regulated Substances (TSCA)
 - i. Isopropylated phosphate (3:1) (PIP (3:1)) - CAS No. 68937-41-7
 - ii. DecaBDE - CAS No. 1163-19-5
 - iii. Pentachlorothiophenol (PCTP) - CAS No. 133-49-3
 - iv. Hexachlorobutadiene (HCBd) - CAS No. 87-68-3
 - v. 2,4,6-Tris(tert-butyl)phenol (2,4,6-TTBP) - CAS No. 732-26-3
- 16. China GB31241
- 17. Israel SI62133

13 Dimension

The mechanical structure parameters table

Item	Parameters		Note
Dimensions (mm)	Upper Wide	21.73~22.73	See the appendix for details
	Lower Wide	20.15~20.95	
	Diameter	18.80 MAX	
	High	66.20 MAX	
Pack Weight (g)	48.4		For Reference Only

14 Label drawing

See the appendix for details.

15 Others

15.1 Odor

The battery should not produce foul smell or harmful odor.

15.2 Protection for Environment

The material used for packing should meet the criterion to protect environment.

16 Warning and notice

WARNING

1. Do not put the battery into a fire, or heat the battery.
2. Do not store the battery in high temperature environment.
3. Do not connect the battery reversed in positive (VBAT) and negative (GND) terminals in the charger or equipment.
4. Do not let the battery terminals (VBAT and GND) contact a wire or any metal (like a metal necklace or a hairpin) with which it carried or stored together, may cause short-circuit.
5. Do not drive a nail in, hit with a hammer, or stamp on the battery, do not strike the battery in other ways.
6. Do not disassemble or alter the batteries' outside structure.
7. Do not submerge the battery in water, do not wet the battery when store the battery.

NOTICE

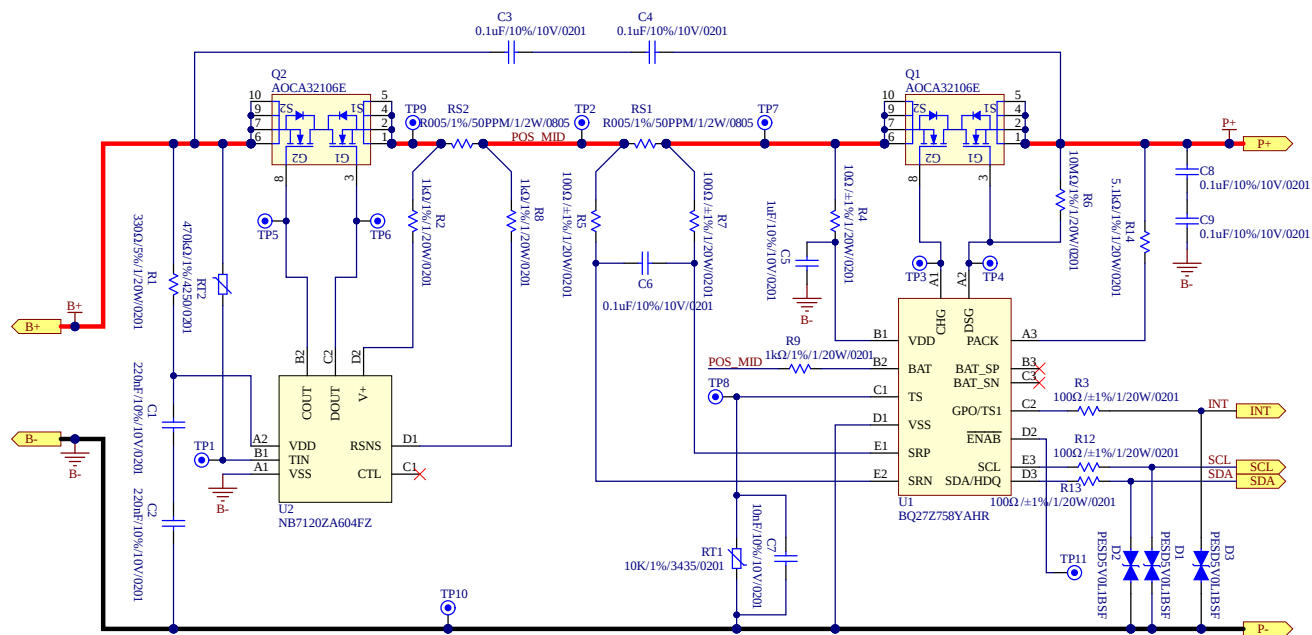
1. Battery should be charged and discharged with proper charger, in compliance with correct operation contents
2. Do not use the battery with other maker's batteries, different types and /or models of batteries such as dry batteries, nickel-metal hydride batteries, or nickel-cadmium batteries, or new and old lithium batteries together.
3. Do not leave the battery in a charger or equipment if it generates an older and/or heat, changes color and/or shape, leaks electrolyte, or cause any other abnormality.
4. Do not discharge the battery continuously when it is not charged.

Caution

1. Complete instructions as to how to replace the battery including the following or equivalent statement: Dispose of used battery promptly. Keep away from children.
2. Caution – The battery used in this device may present a risk of fire or chemical burn if mistreated. Do no disassemble, heat above (manufacturer's maximum temperature limit), or incinerate. Replace battery with (battery manufacturer's name or end product manufacturer's name and part number) only. Use of another battery may present a risk of fire or explosion."
3. For long-term storage, please charge at Standard Charge for about one hour in advance.
4. Do not use the battery in other than the following conditions; otherwise, the battery might cause heat generation, damage, or deterioration of its performance.
 - 1) Do not put the battery into a fire, or heat the battery.

- 2) Do not store the battery in high temperature environment.
- 3) Do not connect the battery reversed in positive (VBAT) and negative (GND) terminals in the charger or equipment.
- 4) Do not let the battery terminals (VBAT and GND) contact a wire or any metal (like a metal necklace or a hairpin) with which it carried or stored together, may cause short-circuit.
- 5) Do not drive a nail in, hit with a hammer, or stamp on the battery, do not strike the battery in other ways.
- 6) Do not disassemble or alter the batteries' outside structure.
- 7) Do not submerge the battery in water, do not wet the battery when store the battery.

17 Appendix



V1.0.4	2024/11/08	Sovi Chen	RS1、RS2 position exchanged
V1.0.3	2024/11/04	Sovi Chen	Add TP9-TP11
V1.0.2	2024/08/08	Sovi Chen	Change C1 connection
V1.0.1	2024/07/19	Sovi Chen	Add TP3,TP4,TP5 and TP6.
V1.0.0	2024/07/16	Sovi Chen	First Edition
Version	Date	Reviser	Description

Schematic (Li-ion Cabo Battery)		PN:	RH3824*****
Designer:	陈少为/Sovi Chen	Name:	Cabo
Standard by:	揭亚旺/Yawang Jie	Config:	1S1P
Checked by:	吴清浪/Qinglang Wu	Page:	Page 1, Total 1
Approved by:	陈阿文/Awen.Chen	SCUD Power Technology Co., Ltd.	



PRODUCT SPECIFICATION

DOC NO.: PS-FRLWMS7-01
REV. : C1
Page: 1 of 22
ECN NO. :

Battery Specification Confirmation Sheet

Of

Dongguan NVT Technology Co.,Ltd (“NVT”)

电池产品规格书

Model: MC-1514044A-B

NVT Product Part Number/NVT产品料号: 31910MS70001/31910MS70002

Pack Configuration/电池结构: 1Series 1 Parallel (1S1P)

Prepared by TPM	Approved by TPM	Approved by CPD	Approved by QA

Customer Confirmation	Authorized Signatory		Date
	Signature	Print Name	
	Company Name Of Customer: META		
	Company Stamp Of Customer:		

Confidential : () Level 3 Private confidential () Level 2 High confidential (V) Level 1 Low confidential

AMENDMENT RECORDS/变更记录

Revision/版本	Description/描述	Originator/制作者	Date/日期
A	New Release	Sunny Liang	2024/11/08
B	1. Updated 4.8; Completed pack ACR . 2. Updated 7; Terminal specification . 3. Updated 8.1; Circuit diagram . 4. Updated 8.2; FPC layout. 5. Updated 8.3; FPC stack up. 6. Updated 8.4; PCM Part list . 7. Updated 8.5; 1 st UVP and UVP delay of PCM parameter	Leefu	2024/12/09
B1	1.Updated content 2.Updated 2.2; META Model Name 3.Updated 6.1; Battery drawing. 4.Updated 6.2; Battery artwork . 5.Updated 6.3; Battery photos. 6.Updated 6.4; disassembly drawing	ZJ	2024/12/13
B2	1. Updated 8.2; FPC layout. 2. Updated 8.3; FPC stack up. 3. Updated 8.4; PCM Part list . 4. Updated9.1 Pack Packing method	Leefu	2025/03/01
C0	1. MP for certification.	Leefu / Wizz	2025/06/06
C1	1. Updated 6.2 Battery Barcode Drawing	Wizz	2025/06/24

Content/目录	
SECTION/部分	Page/页码
1 Scope/适用范围:	4
2 Model Name/型号:	4
3 Standard Environmental Test Conditions/标准环境测试条件:	4
4 Detailed Specifications/详细规格:	4
5 Warranty period/保质期:	6
6 Assembly Drawing (all unit is mm, not in scale) /电池图纸 (单位: mm)	7
7 Terminal Specification/引脚定义	10
8 PCM Specifications/保护板规格	11
9 Battery Packing requirement/电池包装要求:	17
10 Appendix Handling Precautions and Guidelines for LIP Rechargeable Batteries:	18
附录聚合物锂离子充电电池操作指示及注意事项	18
11. Disclaimer/免责声明	20
12. Miscellaneous/其他	22

	PRODUCT SPECIFICATION	DOC NO.: <u>PS-FRLWMS7-01</u> REV. : <u>C1</u> Page: 4 of 22
--	------------------------------	--

1 Scope/适用范围:

The purpose of this Document (“Document”) is to specify the specifications of the Lithium-ion Polymer (“LIP”) rechargeable battery with NVT Part Number 31910MS70001/31910MS70002 (“Product” or “Pack”) to be supplied by NVT to Customer under Customer’s purchase order and NVT’s confirmation relevant to the Product. For the avoidance of doubt, the specifications specified herein do not apply to any Host Device, apparatus, instrument, equipment or hardware device containing Product or Cell (“Host Device”).

本产品规格书描述了 NVT 依据客户采购订单生产的可充电聚合物锂离子(“LIP”)电池的产品性能指标, NVT 产品代码号 31910MS70001/31910MS70002 (“产品”或“电池”)。为避免疑问, 本产品规格书不适用于任何包含该产品或电芯的主机设备、仪器、仪表、器件、硬件设备等 (“主机”)。

2 Model Name/型号: MC-1514044A-B

2.1 NVT Project:FRLWMS7

2.2 META Model Name: MC-1514044A-B

3 Standard Environmental Test Conditions/标准环境测试条件:

3.1 Unless otherwise specified, all tests stated in this Product Specification are conducted at below conditions:

除非特别指定, 本产品规格书所有的测试遵循如下条件:

Temperature/温度: $25 \pm 3^{\circ}\text{C}$ (“Temperature Condition” /温度条件)

Humidity/湿度: $65 \pm 20\% \text{ RH}$ (“Humidity Condition” /湿度条件)

3.2 Throughout this Document, numeric criteria annotated by “*” means such criteria are only applicable to fresh unused Product within 30 days from manufacture by NVT. Products either have been used or stored for a period longer than 30 days by Customer and/or its customer may exhibit an inferior numeric parameter than such criteria. Customer agrees that such occurrence does not constitute nonconformance of specification.

本产品规格书中, 所有标有“*”的项目是指仅适用于 “未使用的且从NVT制造日起30天内的产品”。如果产品已被客户使用或存储时间超过30天, 可能表现出低于标准规格, 客户同意并接受产品不构成不符合规格。

4 Detailed Specifications/详细规格:

The specifications listed in this Section 4 shall be the detailed specifications for the Product (“Detailed Specifications”). 列在第 4 部分的规格作为产品的详细规格。

No.	Items/项目	Specifications/规格	Remark/备注
4.1	*Minimum Capacity ($C_{\min}$) / Rated Capacity 额定容量/额定能量	122mAh/0.475Wh	Standard capacity measure method: 1.5Cmin Max to 4.25V, 0.7Cmin Max to 4.48V, then CV to 0.05 Cmin , then with 0.2Cmin discharge to 3.0V cut-off 标准容量测试方法: 先用 1.5Cmin 恒流充电至 4.25V, 0.7Cmin 恒流充电至 4.48V, 再恒压充电直至充电电流 0.05Cmin, 然后用 0.2Cmin 放电至 3.0V
4.2	Nominal Capacity/ 典型容量/典型容量	126mAh	
4.3	* Nominal Voltage/ 标称电压	3.89V	
4.4	Limited Charging Voltage/ 充电限制电压	4.48V	
4.5	End of Discharge Voltage /放电终止电压	3.0V	
4.6	Charge/Discharge 充电/放电	Cell Surface Temperature 电芯表面温度	Charge Current and Voltage 充电电流和电压

	Charge/充电	0°C ~10°C	0.5Cmin Max to 4.25V, 0.2Cmin Max to 4.48V ,then CV to 0.05Cmin / 0.5Cmin Max 充电到4.25V, 0.2Cmin Max 充电到4.48V, 然后CV到0.05Cmin
		10°C ~20°C	1.0Cmin Max to 4.25V, 0.5Cmin Max to 4.48V ,then CV to 0.05Cmin / 1.0Cmin Max 充电到4.25V, 0.5Cmin Max 充电到4.48V, 然后CV到0.05Cmin
		20°C ~45°C	1.5Cmin Max to 4.25V, 0.7Cmin Max to 4.48V ,then CV to 0.05Cmin / 1.5Cmin Max 充电到 4.25V, 0.7Cmin Max 充电到 4.48V, 然后 CV 到 0.05Cmin
	Discharge/放电	-20°C ~0°C	0.5Cmin Max to 3.0 V Discharge current sustained for time ≥ 10 seconds 0.5Cmin Max 放电到3.0 V 放电电流持续时间 ≥ 10 秒
		0°C ~60°C	2.0Cmin Max to 3.0 V Discharge current sustained for time ≥ 10 seconds 2.0 Cmin Max 放电到3.0 V 放电电流持续时间 ≥ 10 秒
4.7	Storage Condition/ 存贮条件	Temperature/温度: within 3 months/3个月内 -20°C ~ + 45°C; over three months/超过3个月 25 $\pm$ 3°C; Humidity/湿度: $\leq 75\%$ RH	The battery voltage should be kept in the range of 3.6V to 3.95V by charging batteries if batteries are stored more than 3 months/电池存储超过 3 个月需要给电池充电维持电压在 3.6V to 3.95V
4.8	*Initial resistance 初始内阻	380 m Ω Max	Internal resistance measured at AC 1KHz after charge to shipment voltage. 充电到出货电压后, 测量其 AC 1KHz 下的交流阻抗
4.9	*Pack Voltage(as of shipment) 电池电压 (出货状态)		
		3.65~3.80 V	Air transport (IATA require shipping SOC $\leq 30\%$)/空运 (IATA 要求出货 SOC $\leq 30\%$)

4.10	Cycle Life	Charge: 1.5Cmin to 4.25 V, 0.7Cmin to Vmax, CV to 0.05Cmin Discharge: 0.5Cmin to Vmin Repeat to 500 cycles, record remained capacity of 500th cycle. . Test temperature: 25°C±2°C .	≥80Cinitial, ≤10%swelling
		Charge: 1.5Cmin to 4.25 V, 0.7Cmin to Vmax, CV to 0.05Cmin Discharge: 0.5Cmin to Vmin Repeat to 400 cycles, record remained capacity of 400th cycle.. Test temperature: 45°C±2°C .	≥80Cinitial, ≤10%swelling
		Charge: 1Cmin to 4.25V, 0.5Cmin to Vmax, CV at Vmax to 0.05Cmin Discharge: 0.5Cmin to Vmin Repeat to 150 cycles, record remained capacity of 150th cycle... Test temperature: 10°C±2°C .	≥80Cinitial, ≤10%swelling
		Charge: 0.5Cmin to 4.25V, 0.2Cmin to Vmax, CV at Vmax to 0.05Cmin Discharge: 0.5Cmin to Vmin Repeat to 150 cycles, record remained capacity of 150th cycle... Test temperature: 0°C±2°C .	≥80Cinitial, ≤10%swelling
4.11	Pack Weight/电池重量	2.81g	Only for reference/仅供参考

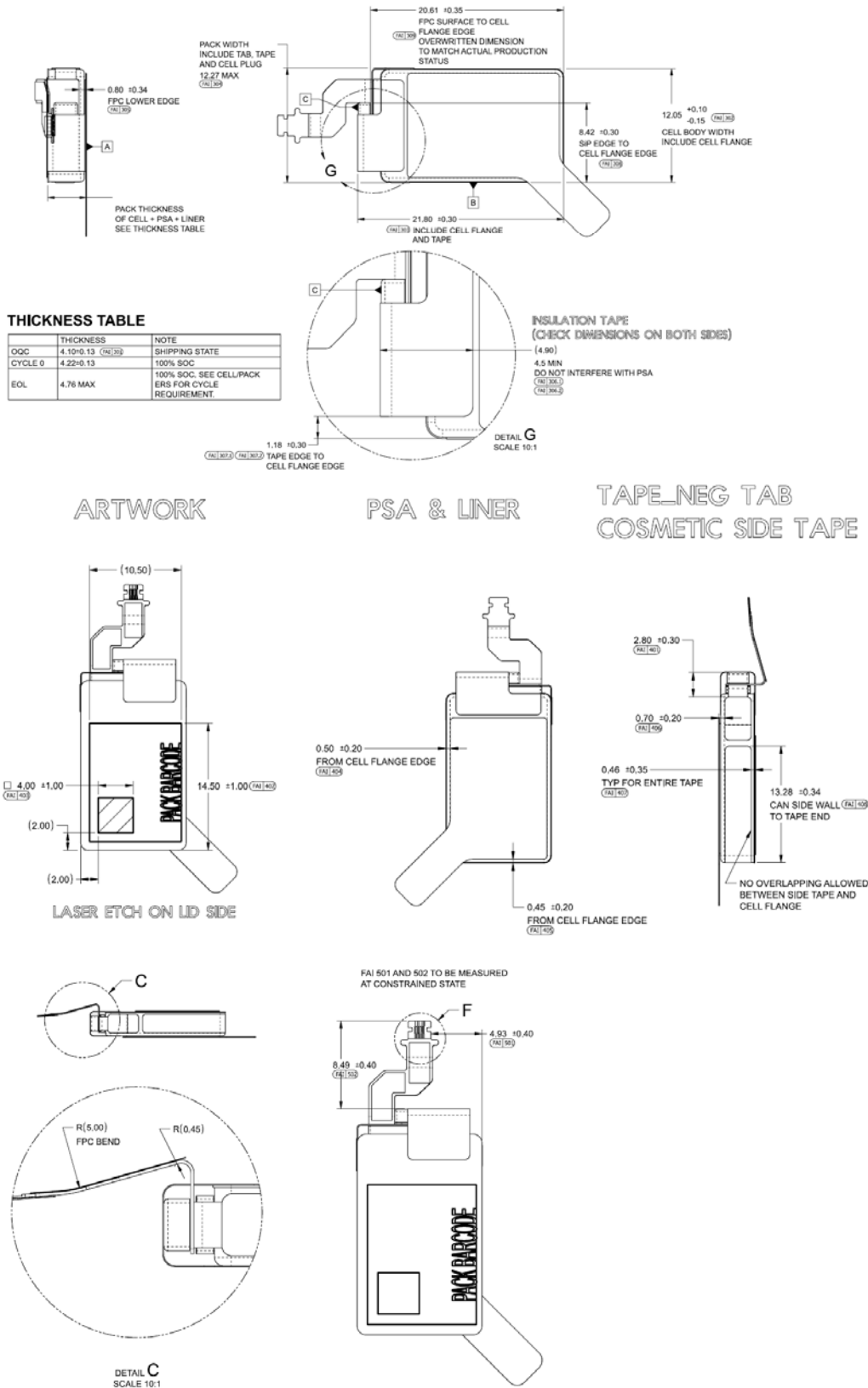
5 Warranty period/保质期:

The warranty period of Battery is 12Monthsafterthe manufacture date.

电池保质期为从生产日期算起12个月。

6 Assembly Drawing (all unit is mm, not in scale) / 电池图纸 (单位: mm)

6.1 Battery Drawing/电池图纸



6.2 Battery Barcode Drawing/电池喷码图纸

Print renderings(2:1)
印刷效果图

- 标称（或典型）电压：3.89V
- 充电限制电压：4.48V
- 电池最小（或额定）容量：122mAh/0.475Wh
- 电池标称（或典型）容量：126mAh/0.490Wh

Two-dimension code definition

二维码大小：L4.0±1.0*W4.0±1.0mm;类型：Data Matrix

Barcode dimension size: L4.0±1.0*W4.0±1.0mm ; Barcode type:Data Matrix.



Barcode content: AABBBCCCYMDEEEE 条码内容共14位

AA=3Z (Project code reference battery pack ERS,Fixed /项目代码参考PACK ERS,2位固定值)

BB=8G (Vendor code Meta assigned, /供应商代码,Meta指定, 2位具体需咨询PM)

CCC=DCB/DCB, DCB=PN: 31910MS70001

DDB=PN: 31910MS70002

Variable value confirm with PM/组件方案, 参考Pack ERS和 Build Matrix,具体需咨询PM,3位变量)

Y=Year/年(Details ref as below/具体规则参考如下, 1位变量)

M=Month /月(Details ref as below/具体规则参考如下, 1位变量)

D=Day/日(Details ref as below/具体规则参考如下, 1位变量)

EEEE= Unique Identifier (Base-31 value 0001 to ZZZZ with the exception of alpha characters A, E, I, O and U used for unique identifier allows up to 923520 unique serial numbers within a single day of production/allocation /流水码, 31进制从0001到ZZZZ字母A E I O U 除外, 单日生产或分配最大值为923520)

NYMD

电池明码, 共4位:

1位: N, 代表生产厂, N代表东莞新能德科技有限公司;

2位: Y, 生产年份, 与暗码规则一致, 具体规则参考图表;

3位: M, 生产月份, 与暗码规则一致, 具体规则参考图表;

4位: D, 生产日期, 与暗码规则一致, 具体规则参考图表;

Battery code, a total of 4 digits:

1 digits: N, represents the manufacturer, N represents Dongguan Xinnengde Technology Co., LTD.

2 digits: Y, production year, Consistent with barcode rules Details ref as table;

3 digits: M, Production months, Consistent with barcode rules Details ref as table;

4 digits: D, Production date, Consistent with barcode rules Details ref as table;



PRODUCT SPECIFICATION

DOC NO.: PS-FRLWMS7-01

REV. : C1

Page: 9 of 22

6.3 Battery Photos/电池图片

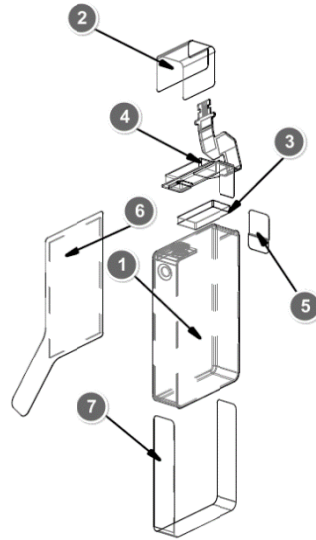
Year	Year Code
2020	B
2021	C
2022	D
2023	F
2024	G
2025	H
2026	J
2027	K
2028	L
2029	M
2030	N
2031	P
2032	Q
2033	R
2034	S
2035	T
2036	V
2037	W
2038	X
2039	Y
2040	Z
2041	0
2042	1
2043	2
2044	3
2045	4
2046	5
2047	6
2048	7
2049	8
2050	9

Month	Month Code
1月 January	0
2月 February	1
3月 March	2
4月 April	3
5月 May	4
6月 June	5
7月 July	6
8月 August	7
9月 September	8
10月 October	9
11月 November	B
12月 December	C

Day of Month	Day Code
1	0
2	1
3	2
4	3
5	4
6	5
7	6
8	7
9	8
10	9
11	B
12	C
13	D
14	F
15	G
16	H
17	J
18	K
19	L
20	M
21	N
22	P
23	Q
24	R
25	S
26	T
27	V
28	W
29	X
30	Y
31	Z

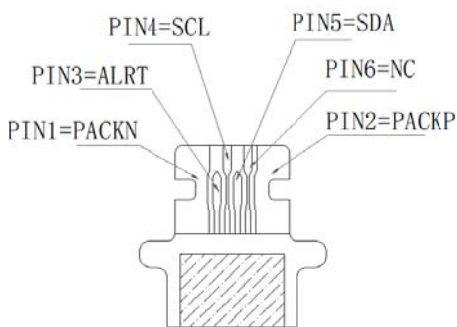
Encoded Character	Base-31 Value
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
B	10
C	11
D	12
F	13
G	14
H	15
J	16
K	17
L	18
M	19
N	20
P	21
Q	22
R	23
S	24
T	25
V	26
W	27
X	28
Y	29
Z	30

6.4 Disassembly Drawing for Pack/电池拆分图



Item/项目	Specification/规格	Qty/数量	Remark/备注
Cell/电芯	ATL, GC-NSC-401220-100H, 122mAh min	1pcs	1
Tape/胶带	T=0.05mm	1pcs	2
Foam/泡棉	T=0.9mm	1pcs	3
PCM/保护版	FPC+SIP	1pcs	4
Tape/胶带	T=0.05mm	1pcs	5
PSA/压敏胶	TESA75415 T=0.15mm	1pcs	6
Tape/胶带	T=0.03mm	1pcs	7

7 Terminal Specification/引脚定义

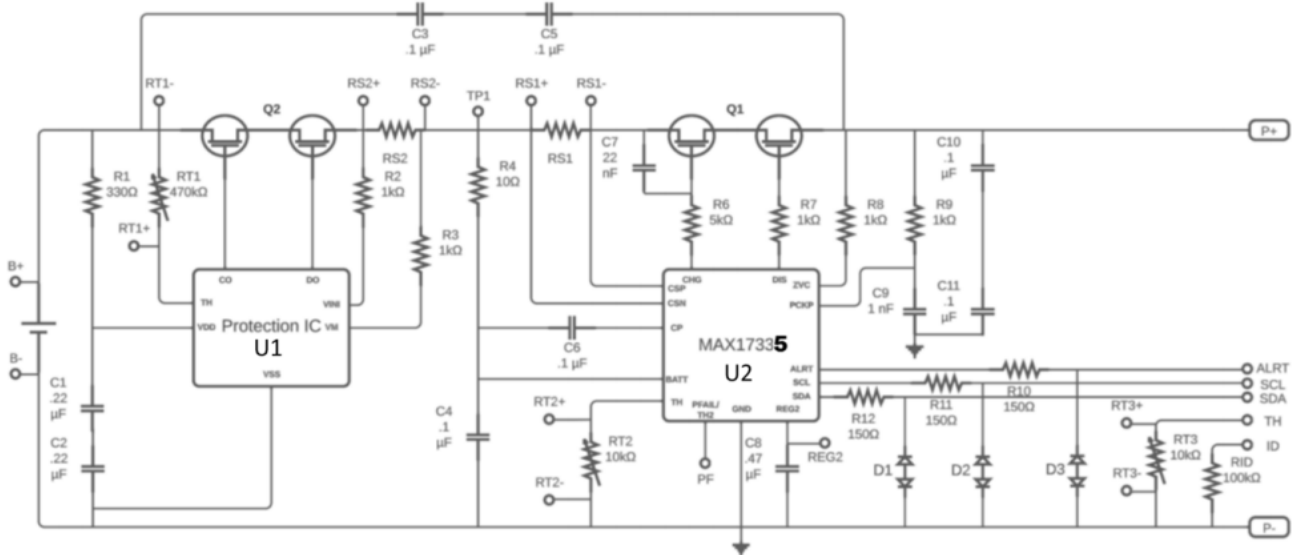


Pin Number	Signal
1	PACKN
2	PACKP
3	ALRT
4	SCL
5	SDA
6	NC

Name/名称	Pin No./引脚编号	Function/功能	Remark/备注
PACKN	PIN 1	Battery negative terminal for charge & discharge/电池负端用于充电和放电	-
PACKP	PIN 2	Battery positive terminal for charge & discharge/电池正端用于充电和放电	-
ALRT	PIN 3	Alert Output /报警输出	-
SCL	PIN 4	Serial Clock Input for I2C Communication/I2C通信模式时钟输入	-
SDA	PIN 5	Serial Data Input/Output for I2C Communication Modes /I2C通信模式数据输入/输出	-
NC	PIN 6	No connection/不连接	-

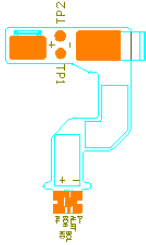
8 PCM Specifications/保护板规格

8.1 Circuit diagram/电路图



8.2 PCM and FPC Layout/保护板和FPC布局

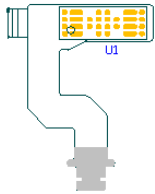
Top overlayer



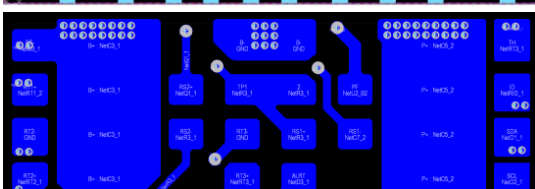
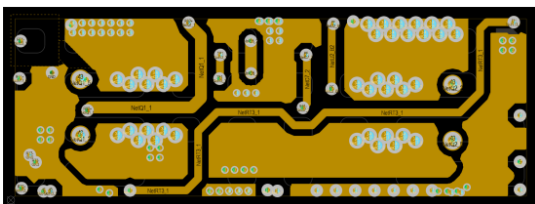
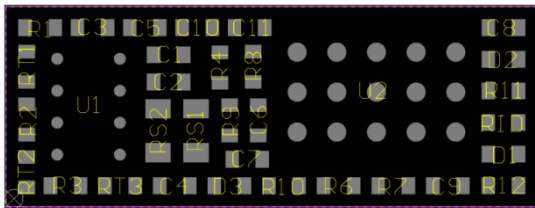
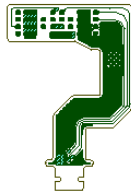
Top layer



Bottom overlayer
(已左右镜像)



Bottom layer
(已左右镜像)



	PRODUCT SPECIFICATION	DOC NO.: <u>PS-FRLWMS7-01</u> REV. : <u>C1</u> Page: 13 of 22
--	--------------------------------	---

8.3 PCB and FPC Stack up/PCB和FPC叠层图

Stack up 1:

Structure and Materials Chart														
Description	SIP (A)		BARS FPC (B)		PULL TAB FPC+PI (C)		FPC+PI (D)		ZIF (E)		FPC+PI (F)		TOL (um)	
	Nominal	Est. Laminat	Nominal	Est. Laminat	Nominal	Est. Laminat	Nominal	Est. Laminat	Nominal	Est. Laminat	Nominal	Est. Laminat		
Stiffener					PI stiffener	25	25	PI stiffener	25	25			±15	
Adhesive					Adhesive	25	22	Adhesive	25	22	PI stiffener	25	25	±15
Coverlay (black)	PI	PI Coverlay	12.5	12.5	PI Coverlay	12.5	12.5	PI Coverlay	12.5	12.5	PI Coverlay	12.5	12.5	±6
SF315C 0525BT	AD	Adhesive	25	22	Adhesive	25	22	Adhesive	25	22	ENIG 金厚0.02~0.03um, Ni3-Bum	Adhesive	25	22
Cu plating		CU plating	25	18	CU plating	25	18	CU plating	25	18	CU plating	25	18	±5
FCCL (ED)	CU	Copper	18	18	Copper	18	18	Copper	18	18	Copper	18	18	±5
SF202 1018DTN	PI	PI Base	25	±1	PI Base	25	±1	PI Base	25	±1	PI Base	25	±1	±3
	CU	Copper	18	5	Copper	18	5	Copper	18	5	Copper	18	18	±5
Cu plating		CU plating	25	18	CU plating	25	18	CU plating	25	18	CU plating	25	18	±5
Coverlay (black)	AD	Adhesive	25	22	Adhesive	25	22	Adhesive	25	22	Adhesive	25	22	±6
SF315C 0525BT	PI	PI Coverlay	12.5	12.5	PI Coverlay	12.5	12.5	PI Coverlay	12.5	12.5	PI Coverlay	12.5	12.5	±6
Solder mask (black)		Solder mask	25	25									±15	
PSR-9000 FLX505EM (黑色阻光)													±15	
Adhesive							Adhesive	25	22	Adhesive	25	22		
P25-250A1(A)							PI stiffener	50	50	PI stiffener	50	50		
Stiffener														
DTX200LX1(A)														
Thicknesses		174	153		186	162	211	191	311	283	181	166	236	211

Thickness requirement	SIP (A)		BARE FPC (B)		PULL TAB FPC+PI (C)		FPC+PI (D)		ZIF (E)		FPC+PI (F)		
	Thickness(mm)	0.15	Thickness(mm)	0.16	Thickness(mm)	0.19	Thickness(mm)	0.28	Thickness(mm)	0.16	Thickness(mm)	0.21	
	TOL(±mm)	0.05	TOL(±mm)	0.03	TOL(±mm)	0.05	TOL(±mm)	0.05	TOL(±mm)	0.03	TOL(±mm)	0.05	

Stack up 2:

Structure and Materials Chart																		
Description	SIP (A)		BARE FPC (B)		PULL TAB FPC+PI (C)		FPC+PI (D)		ZIF (E)		PULL TAB FPC+PI (F)		FPC+PI (G)		TOL (um)			
	Nominal	Est. Laminat	Nominal	Est. Laminat	Nominal	Est. Laminat	Nominal	Est. Laminat	Nominal	Est. Laminat	Nominal	Est. Laminat	Nominal	Est.				
SILK					PI stiffener 25	25	PI stiffener 25	25	25			PI stiffener 25	25	PI stiff 25	25			
Solder mask (black)					Adhesive 25	0	Adhesive 25	25	25			Adhesive 25	25	0	Adhesi 25	25	±15	
Coverlay (black)	PI	PI Coverlay 12.5	12.5	PI Coverlay 12.5	12.5	12.5	PI Coverlay 12.5	12.5	12.5			PI Coverlay 12.5	12.5	12.5	PI Cove 12.5	12.5		
阻光IP--	AD	Adhesive 25	22	Adhesive 25	22	Adhesive 25	22	Adhesive 25	22	ENIG金厚0.02~0.03um, Ni3-Bum		Adhesive 25	22	Adhesi 25	25	25	±6	
Cu plating		CU plating 18	18	CU plating 18	18	16	CU plating 18	18	16	CU plating 18	18	16	CU plating 18	18	16	CU plat 18	18	
FCCL (ED)	CU	Copper 18	18	Copper 18	18	18	Copper 18	18	18	Copper 18	18	18	Copper 18	18	18	Copper 18	18	±5
阻光IP--	PI	PI Base 25	25	PI Base 25	25	25	PI Base 25	25	25	PI Base 25	25	25	PI Base 25	25	25	PI Base 25	25	±3
2L02518C01	CU	Copper 18	18	Copper 18	18	18	Copper 18	18	18	Copper 18	18	18	Copper 18	18	18	Copper 18	18	±5
Cu plating		CU plating 18	18	CU plating 18	18	16	CU plating 18	18	16	CU plating 18	18	16	CU plating 18	18	16	CU plat 18	18	±5
Coverlay (black)	AD	Adhesive 25	22	Adhesive 25	22	Adhesive 25	22	Adhesive 25	22	Adhesive 25	25	22	Adhesive 25	25	22	Adhesi 25	25	±6
阻光IP--	PI	PI Coverlay 12.5	12.5	PI Coverlay 12.5	12.5	12.5	PI Coverlay 12.5	12.5	12.5	PI Coverlay 12.5	12.5	12.5	PI Coverlay 12.5	12.5	12.5	PI Cove 12.5	12.5	
Solder mask (black)		Solder mask 25	25															±15
FSR-9000 FLX505EM (黑色阻光)																		
Adhesive							Adhesive 25	22	Adhesive 25	25	25							±15
Stiffener							PI stiffener 50	50	PI stiffener 50	50	50							±10
Thicknesses	160	153	172	162	222	187	247	281		174	169	222	187	222	209			
Thickness requirement	SIP (A)		BARE FPC (B)		PULL TAB FPC+PI (C)		FPC+PI (D)		ZIF (E)		PULL TAB FPC+PI (F)							
	Thickness (mm)	0.15	Thickness (mm)	0.16	Thickness (mm)	0.19	Thickness (mm)	0.28	Thickness (mm)	0.16	Thickness (mm)	0.19	Thickness (mm)	0.21				
	TOL (±mm)	0.05	TOL (±mm)	0.03	TOL (±mm)	0.05	TOL (±mm)	0.05	TOL (±mm)	0.03	TOL (±mm)	0.05	TOL (±mm)	0.05				

8.4 PCM Part list/保护板清单

SN.	Discription	Specification	Number	Unit	Symbol	Vendor	Remark
1	SIP module	BUB010101-1C6 ; MAX17335X22+,S-PI14BBG-H8T2S7	1	PCS	U1		
		BUB010101-1CD ; MAX17335X22+,R5449Z606NE-E2-T					
2	Nickel	B+ Nickel ,L-shape ,H=0.1mm	1	PCS	B+		
3	Nickel	B- Nickel ,L-shape ,H=0.1mm	1	PCS	B-		
4	FPC	9.7x14.35x0.16mm ,ENIG ,Black solder mask ,HF	1	PCS	/	Redboard	
		9.7x14.35x0.16mm ,ENIG ,Black solder mask ,HF				AKM	
5	Glue	UV glue	0.01	g	TP1,TP2 test point		
6	Glue	UF3820	0.01	g	SIP and flex gap		

	PRODUCT SPECIFICATION	DOC NO.: <u>PS-FRLWMS7-01</u> REV. : <u>C1</u> Page: 14 of 22
--	------------------------------	---

8.5 PCM Parameter/保护板参数

PCM Primary Protector Thresholds(-20℃~60℃)/PCM主保护参数(-20℃~60℃)

No.	Item/项目	Unit/单位	Min./最小值	Typ./典型值	Max./最大值
1	Over charge protection voltage 过充保护电压	V	4.520	4.530	4.540
2	Delay time for over charge protection 过充保护延迟时间	S	0.7	1.0	1.75
3	Over discharge protection voltage 过放保护电压	V	2.49	2.5	2.51
4	Delay time for over discharge protection 过放保护延迟时间	mS	175	525	1579
5	Discharge over current protection(Fast) 放电过流保护(快)	A	1.77	1.94	2.11
6	Delay time for over current protection(Fast) 过流保护延迟时间(快)	mS	7	7.89	9
7	Discharge over current protection(slow) 放电过流保护(慢)	A	0.975	1	1.025
8	Delay time for over current protection(slow) 过流保护延迟时间(慢)	mS	175	525	1579
9	Charge over Current Protection Current(slow)/ 充电过流保护电流(慢)	mA	240	250	260
10	Charge Over Current Protection Delay Time(slow)/ 充电过流保护延迟时间(慢)	mS	175	525	1579
11	Short circuit protection/ 短路保护	A	2.85	3.07	3.31
12	Delay time for short circuit protection/ 短路保护延迟时间	uS	240	253	260
13	Over Temperature Protection 过温保护	℃	65	70	75
14	0V Charging 0V 充电	Enabled			

PCM Secondary Protector Thresholds(-20℃~60℃)/ PCM次保护参数(-20℃~60℃)

No.	Item/项目	Unit/单位	Min./最小值	Typ./典型值	Max./最大值
1	Over charge protection voltage 过充保护电压	V	4.534	4.550	4.562
2	Delay time for over charge protection 过充保护延迟时间	S	0.788	1.024	1.292
3	Over discharge protection voltage 过放保护电压	V	2.361	2.400	2.440
4	Delay time for over discharge protection 过放保护延迟时间	mS	95.2	128	163.3
5	Discharge over current protection 放电过流保护	A	1.17	1.5	1.85



PRODUCT SPECIFICATION

DOC NO.: PS-FRLWMS7-01REV. : C1

Page: 15 of 22

6	Delay time for over current protection 过流保护延迟时间	mS	197.9	256	324.9
9	Charge over Current Protection Current/ 充电过流保护电流	A	0.84	1.2	1.52
10	Charge Over Current Protection Delay Time/ 充电过流保护延迟时间	mS	6.1	8	10.4
11	Short circuit protection/ 短路保护	A	3.51	4.0	4.47
12	Delay time for short circuit protection/ 短路保护延迟时间	uS	205	280	374
13	Over Temperature Protection 过温保护	°C	72	75	78
14	0V Charging 0V 充电	Disabled			

	PRODUCT SPECIFICATION	DOC NO.: <u>PS-FRLWMS7-01</u>
		REV. : <u>C1</u>
		Page: 16 of 22

PCM Current / Impedance/PCM 电流和内阻

No.	Item/项目	Condition/条件	Unit/单位	Min./最小值	Typ./典型值	Max./最大值
1	PCM CurrentConsumption PCM 消耗电流	Normal Mode VBAT > 3.0V	uA	-	39	60
		Ship Mode VBAT > 3.0V	uA	-	15	30
		DeepShip 1 Mode VBAT > 3.0V	uA	-	4.5	10
		Shutdown Mode VBAT < 2.4V	nA	-	-	50
2	PCM Impedance PCM 内阻	Cell+ -> PACKP to PACKN- -> Cell-	mΩ	-	-	65

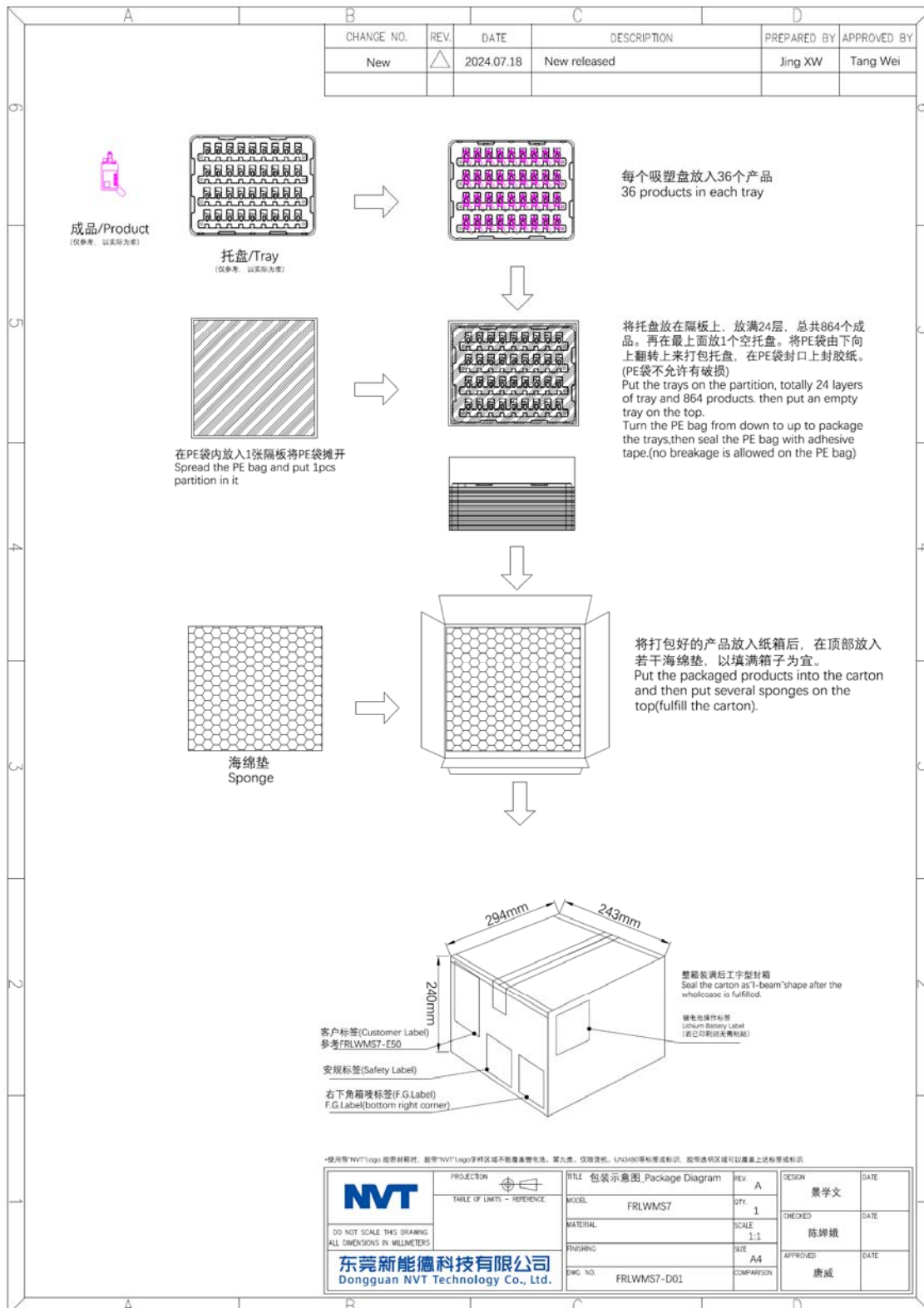
PCM Fuel Gauge Accuracy

No.	Item/项目	Condition/条件	Unit/单位	Min./最小值	Typ./典型值	Max./最大值
1	Voltage Accuracy 电压精度	-20°C < Temp <=60°C No Load	mV	-20	-	20
2	Current Accuracy 电流精度	-20°C < Temp <=60°C I > 3mA	%	-1	-	1
3	Temperature Accuracy 温度精度	-20°C < Temp <=60°C	°C	-3	-	3
4	RepSOC Accuracy 剩余容量精度	0°C < Temp <=60°C 0.2C to 3.0V Discharge	%	-5	-	5

9 Battery Packing requirement/电池包装要求:

9.1 Pack Packing method/电池包装方式

The battery are delivered in trays with 36 pcs in a tray, 864 pcs battery are packed in a bulk package then put into the carton box. Tray dimensions are 282mm (L) * 224mm (W), Carton box dimensions are 294mm(L)*243mm(W)*240mm(T)./ 每盘吸塑盒可装 36 pcs 电池, 每箱装 864 pcs 电池, 吸塑盒尺寸为 282mm(L)*224mm(W), 纸箱尺寸为 294mm(L)*243mm(W)*240mm(T), 一体化打包。



10 Appendix Handling Precautions and Guidelines for LIP Rechargeable Batteries:

附录聚合物锂离子充电电池操作指示及注意事项

Foreword/前言

These *Handling Precautions and Guidelines for LIP Rechargeable Batteries* shall apply to the Product.

本文件《聚合物锂离子充电电池操作指示及注意事项》仅适用于新能源科技有限公司生产的电池。

Statement (1):

Customer is requested to contact NVT in advance, if and when the customer needs other applications or operating conditions than those described in this document. Additional experimentation may be required to verify performance and safety under such conditions.

声明 (1) : 客户若需要将电池用于超出文件规定以外的设备, 或在文件规定以外的使用条件下使用电池应事先联系 NVT, 因为需要进行特定的实验测试以核实电芯在该使用条件下的性能及安全性。

Statement (2):

NVT will take no responsibility for any accident when the Product is used under other conditions than those described in this Document.

声明 (2) : 对于在超出文件规定以外的条件下使用电池而造成的任何意外事故, NVT 概不负责。

Statement(3):

Customer shall implement the requirements of this Document by setting up corresponding control measures and protection devices on charger, terminal Charger IC, etc. NVT will take no responsibility for any consequences arising from Customer's failure to implement the requirements of this Document.

声明 (3) : 客户应当在充电器、终端 Charger IC 等方面落实执行本产品规格书的要求, 设置相应的控制措施和保护装置。对于客户未落实执行本产品规格书要求而产生的任何后果, NVT 将不承担任何责任。

- Use specified charge/discharge conditions/使用指定的充放电条件。
- Specified product use only/仅用于指定产品。
- Do not immerse in water pour/禁止投入水中。
- Do not heat or throw in fire/禁止加热或投入火中。
- Do not attempt to crush or drop/禁止尝试挤压或跌落。
- Do not attempt to modify/禁止任何修改。
- Leave in cool places/存放在阴凉处。
- Do not put it in microwave oven, oven or pressure container/禁止放在微波炉, 炉子或压力容器里。
- Do not use battery if not recover during conditions above/假如在上述条件下电池不能恢复请不要继续使用。
- During assembly, charging, normal use and storage of battery pack, such as change of color, mechanical are detected do not use/在组装, 充电, 正常使用和存储中, 如有变色或机械损伤, 请不要继续使用。
- In case of leakage or smells remove from thermal conditions, Also wash off with clean water/万一有漏液或气味, 要从热源移除, 并且用清水清洗干净。
- Do not place or leave the battery and equipment in the reach of infants so that they are not able to swallow or mistreat the battery by mistake. In case of ingestion, consult with a doctor immediately/请将电池放在幼儿不宜触碰的地方, 以免吞食和误处理。万一发生请立即就医。
- Do not let leaked electrolyte come into contact with eyes or skin. In such a case, immediately wash the area of contact with clean water and seek help from a doctor. If not treated soon, prolonged contact may cause serious injury/漏出的电解液远离眼睛和皮肤, 万一发生立即清洗干净或就医, 假如不能立即处理, 可能引起严重伤害。
- Do not put the battery into a fire. Do not use it or leave it in a place near fire, heaters, or high temperature sources. In such a case, the insulator in the battery may be melted, the safety vent and structure may be damaged, or the electrolyte may catch fire, all of which may cause heat generation, explosion, or fire/不要将电池丢入火中。不要在离火源, 热源或高温源近的地方使用或放置。在这种情况下, 电池中的绝缘保护可能融化, 安全阀等结构可

能会被毁坏，这样可能会过热，爆炸或起火。

- Do not submerge the battery in water, or wet the battery. If the protecting device assembled in the battery is damaged, the battery may be charged with an abnormal current and voltage and may cause a chemical reaction within the battery, which may result in the cause of heat generation, explosion, or fire of the battery/禁止浸泡或弄湿电池，如果电池保护装置被损坏，电池可能会被异常电流和电压充电从而引起电池内化学变化，导致过热，爆炸或起火。
- Do not use any battery charger not specified. Incorrect charging method and charging equipment, the battery will be damaged, which may cause firing, or other problems/禁止使用非指定充电器，错误的充电方法和充电设备，可能损坏电池，导致起火或其它安全问题。
- Do not use, charge, or leave the battery near fire or in a car under the blazing sun. Such a high temperature may cause damage of the protecting device in the battery, which may result in an abnormal reaction, and then heat generation, explosion, or fire/禁止离火源很近的位置或烈日下的车中放置，使用或给电池充电，这种高温环境下可能毁坏电池中的保护机构，从而引起异常反应，发热，爆炸和起火。
- Do not connect the battery reversed in positive (+) and negative (-) terminals in the charger or equipment. In the case the battery is connected in reverse, it is charged reversibly and may cause heat generation, explosion, or fire due to an abnormal chemical reaction/禁止反接电池正负极，在这种情况下，电池被异常充电可能会导致过热，爆炸或起火。
- Do not short terminals. Do not let the battery terminals (+ and -) contact a wire or any metal (like a metal necklace or a hairpin) with which it carried or stored together. In such a case, the battery is shorted and causes an excessive current, which may result in heat generation, explosion, or fire/禁止短接，禁止直接用导线或任何金属（比如金属项链或发卡）连接电池正负极。这种情况下，电池外短路引起过电流，有可能导致过热，爆炸或起火。
- Do not connect the battery directly to an electric outlet or cigarette heater socket in car. With a high voltage applied, the battery may overheat, explode, or cause fire/车上禁止直接连接到电源插座和点烟器上，因为高压下，电池可能会过热，爆炸，或起火。
- Do not throw or drop the battery. Strong impact may damage the protecting device, which may cause an abnormal chemical reaction during its charge and result in heat generation, explosion, or fire of the battery/禁止抛扔或跌落电池，强的重力冲击可能破坏保护机构，可能引起异常化学反应导致发热，爆炸或起火。
- Do not drive a nail in, hit with a hammer, or stamp on the battery. In such a case, the battery may be deformed and shorted, which may cause heat generation, explosion, or fire of the battery/禁止针刺，砸锤或邮戳电池，这种情况下，电池可能变形和短路，从而导致过热，爆炸，起火。
- Do not solder the battery directly. Heat applied during soldering may damage the insulator of the safety vent and mechanism, which may result in heat generation, explosion, or fire of the battery/禁止锡焊电池，可能破坏安全阀，以及机构的绝缘保护措施，导致过热，爆炸，起火。
- Do not disassemble or alter the battery. The battery employs a safety mechanism and a protecting device in order to avoid any danger. If these are damaged, heat, explosion or fire may be caused/禁止拆解或更换电池，电池安置了安全机构和保护机构避免安全隐患，假如损坏，可能导致过热，爆炸或起火。
- Do not put the battery in a microwave oven or a pressure cooker. Sudden heat may damage the seal of the battery and may cause heat generation, explosion, or fire of the battery/禁止将电池放在微波炉或压力锅内，极速的热可能导致过热，爆炸或起火。
- Do not leave the battery in a charger or equipment if it generates an odor and/or heat, changes color and / or shape, leaks electrolyte, or causes any other abnormality. In such a case, immediately take the battery out of the charge or equipment and keep it away from fire, otherwise, the battery might overheat, explode, or cause fire/如果电池已经发出气味或发热，颜色和/或外形有变化，电解液露出或任何不正常的现象，请不要再将电池放到充电器或设备里。这种情况下，应立即将电池从充电器或设备中取出并远离火源，否则电池可能过热，爆炸或起火。
- Discontinue charging after specified charging time even if the charge is not complete, otherwise, the battery might cause heat generation, explosion, or fire/规定时间内不能完成充电不要继续充电，否则可能导致过热，爆炸或起火。

- Do not use the battery in the place where the static electricity (more than the limit of the manufacturer's guarantee) occurs. Otherwise, the protecting device in the battery might be damaged and cause heat generation, explosion, or fire/禁止将电池搁置在超出制造商定义的静电区, 否则保护机构可能损坏导致过热, 爆炸或起火。
- Do not use the battery in other than the conditions specified; otherwise, the battery might cause heat generation, damage, or deterioration of its performance/禁止在超出规定条件下使用电池, 否则可能导致过热, 损坏, 恶化电池电性能。
- Read the instructions of your equipment regarding the battery installation and removal from the equipment so as not to mishandle and waste the battery/阅读设备和电池关于安装和拆卸指导书, 避免误操作导致浪费。
- In case young children use the battery, instruct them on the contents of the instructions and ensure the battery is correctly used by them at all times/如果小孩使用电池, 务必指导他们正确操作, 确保电池正确使用。
- The battery was manufactured and inspected carefully before shipment to conform with the specification. However, in the case any abnormality of bad smell or heat, etc. arises after purchase, bring the battery back to the retail shop where you bought it/电池制造和出厂前检查是满足本规格的, 万一购买后发现像气味, 热等任何异常, 去购买处退回处理。
- The battery was charged a little before shipment for temporary use by an end user. In case your equipment does not operate with the battery or in the case of a long use, charge the battery with a specified charger once/出厂前电池充了一点电, 购买后使用不能工作或使用一段时间后, 需要规定的充电器充电。
- Do not charge the battery over the specified time described in the instructions, otherwise, the battery performance might deteriorate/禁止用超出规格书规定的充电时间, 否则可能恶化电池电性能。
- Turn off your equipment power switch after use, otherwise, the performance of the battery might deteriorate/设备使用后请关掉电源, 否则可能恶化电池电性能。
- The battery after long storage might not be sufficiently charged for use/电池长期存储不用可能导致电量不足。
- Prolonged standing or storage, PACK must be stored after removal from the host (disconnect the electrical properties of contacts); PACK need to conduct a test at least once in half of year. If necessary, the PACK needs to supplement electricity. PACK shall be kept for at least 40% capacity after a path to storage.
- 长时间搁置或储存, 电池必须从主机上拆卸下储存(断开电子器件的接触); 电池至少在半年需要进行测试一次, 如有必要, 电池需要补充电力, 保持至少 40%的容量。
- If the PACK cannot removed from the host , the PACK need to be set to the lowest power consumption mode before the storage, and arrangements the PACK supplementary charge regularly and performance testing according the Consumption rate (recommendation: supplementary charge to 60 - 70% every two months), adjustment depending on the system actual storage conditions and power consumption. With Smart-Gauge products, it is strongly recommended to set Shipping Mode of the PACK after storage.
- 如果电池无法从主机上拆卸, 电池需要被设置为最低功耗模式存储, 并安排定期充电和性能测试, 根据自耗电率(建议: 每 2 个月补充电至 60-70%), 根据系统的实际存储条件和耗电调整。带有智能电量计的产品, 强烈建议储存设置为电池出货模式。
- In the case the battery terminals are dirty, clean the terminals with a dry cloth before use, otherwise, the contact with equipment might cause insufficiency, and power failure or charge failure/万一电池金手指脏污, 请清理干净后使用, 否则连接设备后可能引起一些异常, 甚至可能导致电源或充电失效。
- Despite being rechargeable, the battery has a limited life span, Replace when usage time between charges becomes short/尽管可充电, 电池有极限使用寿命, 当满充后使用时间明显变短需要更换电池。
- Keep the handling instructions and your equipment instructions in a suitable place for future reference/确保操作指导书和设备指导书在合适的位置为进一步参考。

11. Disclaimer/免责声明

11.1 The Customer hereby agrees that it has carefully read and understand any and all terms and conditions, safety



PRODUCT SPECIFICATION

DOC NO.: PS-FRLWMS7-01

REV. : C1

Page: 21 of 22

precautions and measures set forth in this Document, furthermore, the Customer agrees to bear full responsibilities of these risks and responsible for any accidents, injury to persons, or property damage that may occur, Customer further agrees to waive claiming any liability against NVT.

客户在此确认并同意，其已认真阅读并理解本产品规格书中所阐明的条款、所有安全规范及措施，并且将完全地对可能因此产生的任何意外事故、人身伤害及财产损失等风险承担责任而不会向 NVT 主张任何责任。

11.2 The Product is produced and supplied to Customer with B2B nature, and is not for direct consumer use. Customer should verify the fitness for a particular purpose of such Product described hereof under certain application. Except as provided in the Specifications, NVT makes no representation or warranty of any kind, whether express or implied, including with respect to any warranty as to merchantability, compatibility, fitness for use or for any particular purpose. The parameters provided in this Document may vary in different applications and performance may vary from time to time. All operating parameters, including typical parameters, must be validated for each customer application by the Customer's technical experts.

本产品是基于企业对企业(B2B)的交易模式所向客户制造及供应，非供终端消费者之直接使用。客户应当验证本规格书定义的产品在客户特定终端（或应用）满足特定用途的适用性。除规格书中有明确规定的情况外，NVT 不作任何明示或暗示的陈述或保证，包括关于适销性、兼容性、适用性或任何特定目的的任何保证。本产品规格书中提供的参数在不同的应用中可能会有所不同，并且性能可能随时间而变化。客户的技术专家必须就每次应用对所有操作参数（包括典型参数）进行验证。

11.3 The parties agree that NVT shall have no liability or obligation with respect to any infringement, claim or action which is based upon:

双方同意对于下列的侵权、索赔或诉讼，NVT 无须承担任何责任：

11.3.1 NVT's incorporation or use of materials, designs, technology or intellectual property designed, designated or instructed by Customer, its affiliates, contract manufacturers, customer, or end user into the products;

NVT 在其产品上结合或使用客户、客户之关联方、分包方、客户或终端用户的设计、指定或指示的材料、设计、技术或知识产权；

11.3.2 the combination, assembly, operation, or use of the products with materials, devices, parts, or software not supplied by NVT;

客户将 NVT 的产品与非 NVT 提供的材料、设备、组件或软件进行结合、组装使用/运行；

11.3.3 modifications, disassembly, repair, and rework to the products made by Customer or any third party without the prior written consent of NVT;

未经 NVT 授权(包括甲方或其他第三人)而对 NVT 的产品进行的修改、拆解、维修或重工；

11.3.4 NVT's modification of the products in compliance with the design, specification, requirements, or instructions of Customer;

NVT 依照客户的设计、规格、要求或指示而对其产品进行的修改；

11.3.5 the claim or action arising from non-compliance with the requirements for use, storage, delivery, assembly, and disposal of the products designated by NVT;

客户或任何第三方未依据 NVT 指定的产品使用方式对 NVT 的产品进行使用或未按照 NVT 指定的标准对产品进行安置、贮存、运输、组装或处理而导致的任何侵权或索赔事项；

11.3.6 use of the products outside the scope of intended use under this Document; or

客户或任何第三方未依据本产品规格书中约定的使用范围对 NVT 的产品进行使用；或

11.3.7 any defect that may exist before NVT's product enters the market or any defect that is unable to be detected by the existing technology at the time NVT's product enters market.

NVT 未投入流通的产品或 NVT 产品在投入流通时引起损害发生的缺陷尚不存在或投入流通时的技术水平尚不能发现缺陷的存在。

11.4 NVT shall have no liability or obligation with respect to any Products which have been subjected to abuse, misuse, improper use, negligence, accident, alternation, repair or rework performed by any unauthorized persons or entities other

	PRODUCT SPECIFICATION	DOC NO.: <u>PS-FRLWMS7-01</u> REV. : <u>C1</u> Page: 22 of 22
--	------------------------------	---

than NVT.

对于任何未经授权的个人或非 NVT 实体滥用，滥用，不当使用，疏忽，意外，改动，修理或返工的产品，NVT 概不承担任何责任或义务。

11.5 Neither party shall be liable for any indirect, special, incidental, punitive or consequential damages of any kind (including lost profits), regardless of the form of action, whether in contract, tort (including negligence), strict liability or otherwise, even if informed of the possibility of such damages in advance.

即便对方已提前通知一方下述损失发生的可能性，双方同意并确认，任何一方均不对任何间接的、特别的、附带的、惩罚性的或结果性的损失（包括可得利益损失）承担赔偿责任，无论是基于任何诉讼方式、无论是基于合同或侵权之债（包含过失侵权行为）、无论是否基于严格责任。

11.6 The maximum overall liability of each party, alone or in the aggregate with respect to all claims of any kind, if any, whether in contract, tort (including negligence), strict or product liability, damages, reimburse, indemnification or otherwise, shall not exceed two times of the goods price allocable to the specific Product upon which the claim is directly based.

任一方所应承担的全部责任，无论是基于合同、侵权（包括过失）、严格责任或产品责任、损害、补偿、赔偿或其他任何原因，单次及累计金额应不超过引发该索赔的特定产品的货款的两倍。

12. Miscellaneous/其他

In the event of any conflict, ambiguity or discrepancy between the Chinese version and English version of this Document, both parties agree that the Chinese version of this Document shall prevail.

本产品规格书之中文文本与英文文本如有任何矛盾，歧义或者不一致之处，双方同意应以中文文本优先适用。