

	合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd		编 号 NO.																		
			Q/GX 017-2023																		
标题 : Title	IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable Cell		Page 1																		
			Total pages 28																		
IFP20100140A-27Ah 锂离子电池 产品规格书 Product Specification of IFP20100140A-27Ah Lithium-ion Rechargeable Cell																					
<table><tr><td colspan="2">制 定 Formulated by</td><td colspan="2">审 核 Checked by</td><td colspan="2">批 准 Approved by</td></tr><tr><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr><tr><td>标准化 Standardized by</td><td></td><td colspan="2">会 签 Counter Signed by</td><td colspan="2"></td></tr></table>				制 定 Formulated by		审 核 Checked by		批 准 Approved by								标准化 Standardized by		会 签 Counter Signed by			
制 定 Formulated by		审 核 Checked by		批 准 Approved by																	
标准化 Standardized by		会 签 Counter Signed by																			
发布日期 Published date				实施日期 Implementation date																	

		合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd		编 号 NO. Q/GX 017-2023	
标题: Title		IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable		Page 2	
				Total pages 28	
目 录 前 言 PREFACE3 修订记录4 1 范围 SCOPE 5 2 规范性引用文件 NORMATIVE REFERENCES 5 3 术语和定义 TERMS AND DEFINITIONS6 4 基本性能 BASIC PERFORMANCE 8 5 电性能 ELECTRICAL PROPERTY 10 6 安全性能 SAFETY PERFORMANCE 15 7 测试方法 TEST METHOD 15 8 运输 TRANSPORT 22 9 贮存 STORE 22 10 电芯使用条件 BATTERY USE CONDITIONS23 附录 A APPENDIX A25 附录 B APPENDIX B27 IFP20100140A-27AH 锂离子电池产品环保声明 ENVIRONMENTAL DECLARATION OF IFP20100140A-27AH LITHIUM BATTERY PRODUCT28					

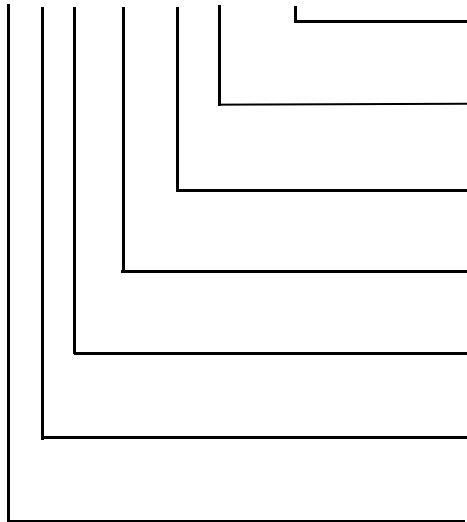
 国轩高科 GUOXUAN HIGH-TECH		合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd		编 号 NO. Q/GX 017-2023
标题: Title	IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable			Page 3
				Total pages 28
前 言 Preface 本标准为公司统一执行的企业标准。 The specification is the enterprise standard uniformly implemented by the company. 本标准的编写格式符合 GB/T 1.1—2009《标准化工作导则 第 1 部分：标准的结构和编写》的规定。 The format of this specification is in accordance with the provisions of GB/T 1.1-2009, standardization work guideline Part 1 : Standards Structure and Compilation. 本标准在参照 GB/T 31484-2015《电动汽车用动力蓄电池循环寿命要求及试验方法》、GB/T 31485-2015《电动汽车用动力蓄电池安全要求及试验方法》、GB/T 31486-2015《电动汽车用动力蓄电池电性能要求及试验方法》、Q/GX 60013—2019《电动汽车用锂离子动力电池单体电性能测试方法》的基础上，结合我公司产品实际和试验条件，特制定 PD000018057《IFP20100140A-27Ah 锂离子电池产品规格书》标准，并对试验方法、判定标准内容进行了修订和补充，以指导 IFP20100140A-27Ah 锂离子电池产品的制造和验收。 On the basis of the references of GB/T 31484-2015 Cycle Life Requirements and Test Methods for Power Cell for Electric Vehicles, GB/T 31485-2015 Safety Requirements and Test Methods for Power Cell for Electrical Vehicles, GB/T 31486-2015 Electrical Performance Requirements and Test Methods for Power Cell for Electric Vehicles, Q/GX 60013—2019 Technical Specification for Lithium Ion Power Cell for Electrical Vehicles, and with the combination of the actual and test conditions of our company, it is specially formulated the standard of PD000018057 Product Specification for IFP20100140A-27Ah Lithium Ion Rechargeable Cell. The test method and criteria is revised and supplemented to guide the manufacturing and approval of IFP20100140A-27Ah Lithium ion Cell.				

 国轩高科 GUOXUAN HIGH-TECH		合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd		编 号 NO. Q/GX 017-2023
标题 : Title	IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable Cell			Page 4
				Total pages 28
修订记录				
版本号	变更内容		修订日期	修订者
Q/GX 017-2017	首次发布 1 st Edition		2017.4.1	熊辉 Hui Xiong
Q/GX 017-2020	新版本切换 New Version Updates		2020.10.15	丁怀东 Huaidong Ding
Q/GX 017-2023	修订：4.2 尺寸 增加南京二期电芯尺寸 Revision: 4.2 Dimension Add Battery Dimension (Nanjing Phase II)		2023.06.02	倪卓炎 Zhuoyan Ni
	修订：图 A.1 电池尺寸图 增加南京二期电芯尺寸图 Revision: Figure A.1 The size of the cell Add Battery size diagram (Nanjing Phase II)		2023.06.02	倪卓炎 Zhuoyan Ni
注：具体变更内容见正文。				

		合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd	编 号 NO.
			Q/GX 017-2023
标题 : Title	IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable Cell	Page 5	
		Total pages 28	
1 范围 Scope			
本标准规定了 IFP20100140A-27Ah 型锂离子电池的性能要求、试验方法、检验规则、标志、包装、运输和贮存要求。 This Standard sets out the performance requirements, test methods, inspection rules, marking, packaging, transportation and storage requirements for IFP20100140A-27AH lithium ion rechargeable cell. 本标准适用于公司生产的 IFP20100140A-27Ah 型锂离子电池。 This standard is applicable to IFP20100140A-27AH lithium ion rechargeable cell manufactured by the company.			
2 规范性引用文件 Normative references			
下列文件对于本文件的应用是必不可少的。凡是注日期的引用文件，仅注日期的版本适用于本文件。凡是不注日期的引用文件，其最新版本（包括所有的修改单）适用于本文件。 The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. GB/T 31484-2015 电动汽车用动力蓄电池循环寿命要求及试验方法 GB/T 31484-2015: Cycle life requirements and test methods for traction batteries of electric vehicle GB/T 31485-2015 电动汽车用动力蓄电池安全要求及试验方法 GB/T 31485-2015: Safety requirements and test methods for traction batteries of electric vehicle GB/T 31486-2015 电动汽车用动力蓄电池电性能要求及试验方法 GB/T 31486-2015: Electric performance requirements and test methods for traction batteries of electric vehicle NJGX-TS-QMD-06 IFP20100140A-27Ah 电芯外观标准 NJGX-TS-QMD-06: IFP20100140A-27Ah cell appearance standard Q/GX 60013—2019 电动汽车用锂离子动力电池单体电性能测试方法 Q/GX 60013—2019: Test Method for the electrical properties of lithium ion rechargeable cell used in electric vehicles			

	合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd	编 号 NO. Q/GX 017-2023
标题: Title	IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable	Page 6 Total pages 28
IEC 62133-2 碱性及非酸性电解质的二次电池和蓄电池—便携式密封二次锂电池及其电池制造的安全要求和便携式应用 第 2 部分：锂系统 IEC 62133-2 Secondary batteries and batteries with alkaline and non-acid electrolytes - Safety requirements for portable sealed secondary lithium batteries and their manufacture and portable applications -Part 2: Lithium systems IEC 62619 碱性及非酸性电解质的二次电池和蓄电池—工业用二次锂电池和蓄电池的安全要求 IEC 62619: Secondary batteries and batteries with alkaline and non-acid electrolytes - Safety requirements for secondary lithium batteries and batteries for industrial use JIS C 8714 锂电池 PSE 认证之测试标准 JIS C 8714 Standards for lithium battery PSE Certification UL 1642 锂电池安全标准 UL 1642: Safety standard for lithium batteries UL 1973 用于固定式，车辆辅助电源和轻型电动轨道（LER）的电池应用标准 UL 1973: Standard for battery applications for stationary, vehicle auxiliary power, and light Electric Track (LER) UN 38.3 联合国关于危险品运输的建议书试验和标准手册 第 3 部分 38.3 条款 UN 38.3: United Nations Recommendations on the transport of dangerous Goods, Part 3, Manual of Tests and Standards, article 38.3		
3 术语和定义 Terms and definitions 3.1 单体电池：直接将化学能转化为电能的基本单元装置，包括电极，隔膜，电解质，外壳和端子，并设计成可充电。 3.1 Cell: Basic unit device that converts chemical energy directly into electrical energy, including electrodes, membranes, electrolytes, housing and terminals, and is designed to be rechargeable. 3.2 倍率电流：缩写符号 C，1C 表示单体电池以 26 A 的电流进行充放电，0.5C 表示单体电池以 13 A 的电流进行充放电。		

 国轩高科 GUOXUAN HIGH-TECH		合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd	编 号 NO. Q/GX 017-2023
标题: Title	IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable		Page 7
			Total pages 28
3.2 Multiplier Current: abbreviation C, 1C means the cell is charged and discharged with A current of 27A, 0.5C means the cell is charged and discharged with A current of 13.5 A. 3.3 额定容量：测试方法见 7.3。 3.3 Nominal capacity: test method see 7.3. 3.4 直流内阻：单体电池在室温 25 °C±2 °C、50%SOC 条件下，以最大脉冲电流放电 10 s，计算放电前后的电压和电流变化，然后将电压变化的差值除以电流变化的差值，即为直流内阻。 3.4 DCIR (direct-current internal resistance): under the condition of 25 °C ±2 °C and 50% SOC at room temperature, a cell is discharged with the maximum pulse current for 10 s to calculate the voltage and current changes before and after discharge. Then, the difference value of voltage change is divided by the difference value of current change, which is DCIR. 3.5 最大持续充电电流：单体电池在指定温度下，保证单体电池正常工作所允许进行持续充电的最大电流。 3.5 Maximum continuous charging current: The maximum current allowed for continuous charging of a cell at a specified temperature to ensure the normal operation of the cell. 3.6 最大持续放电电流：单体电池在指定温度下，保证单体电池正常工作所允许进行持续放电的最大电流。 3.6 Maximum continuous discharge current: The maximum current allowed for continuous discharge of a cell at a specified temperature to ensure the normal operation of a cell. 3.7 恒流充电容量比例：单体电池在室温、0%SOC 条件下，以某一倍率下恒流充电至 3.65 V 截止的充电容量与标准充电方法下的充电容量的比值。 3.7 Ratio of constant-current charging capacity: the ratio between the charging capacity of a cell charged to 3.65V at a certain ratio under the condition of 0% SOC at room temperature and the charging capacity under the standard charging method.			

		合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd		编 号 NO. Q/GX 017-2023										
标题: Title	IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable			Page 8										
				Total pages 28										
3.8 冷启动功率：在-20℃、50%SOC 条件下，单体电池的 2 s 脉冲最大放电功率。 3.8 Cold start power: the maximum discharge power of 2s pulse of a cell at -20℃ and 50%SOC. 3.9 电芯温度：由接入电池的温度传感器测量电芯顶盖的温度，在电池系统中的温度为测量模组 busbar 的温度。 3.9 Cell temperature: The temperature of the cell top cover is measured by the temperature sensor connected to the battery, and the temperature in the battery system is the temperature of the busbar module. 3.10 产品型号含义：Meaning of product model: <u>IF</u> <u>P</u> <u>20</u> <u>100</u> <u>140</u> <u>A</u> – <u>27Ah</u>  代表单体电池额定容量 Nominal capacity of cell 代表单体电池壳体材质为铝 The cell case is made of aluminum 代表单体电池高度尺寸（不含极柱） Height dimensions of cell (excluding pole column) 代表单体电池宽度尺寸 The cell width dimensions 代表单体电池厚度尺寸 The cell thickness dimension 代表单体电池形状为方形 The cell is square in shape 代表单体电池正极材料为磷酸铁锂 The cathode material of the cell is lithium iron phosphate 4 基本性能 Basic performance 表 1 基本性能 Table 1 basic performance <table><tr><th>项目 Items</th><th>规格 Specification</th><th>条件/注释 Condition/Notes</th></tr><tr><td>4.1 外观 Appearance</td><td>参考 NJGX-TS-QMD-06 Refer to NJGX-TS-QMD-06</td><td></td></tr><tr><td>4.2 尺寸 （厚度×宽度×高度） Dimension (Thickness×Width×Height)</td><td>南京一期（Nanjing Phase I） 厚度：21.3±0.9 mm（到货 1 个月以内） 21.7±0.9 mm（到货 1~4 个月） Thickness: 21.3±0.9 mm (The goods will arrive within one month) 21.7±0.9 mm (Arrival of goods within 1 ~ 4 months)</td><td>包括蓝膜厚度，束缚力：10 kgf， 存储环境温度<35℃，详见附录 A.1, (17%±2%)SOC Including the thickness of the blue film, force binding: 10 kgf, Storage ambient temperature <35℃, See Appendix A.1, (17%±2%) SOC</td></tr></table>						项目 Items	规格 Specification	条件/注释 Condition/Notes	4.1 外观 Appearance	参考 NJGX-TS-QMD-06 Refer to NJGX-TS-QMD-06		4.2 尺寸 （厚度×宽度×高度） Dimension (Thickness×Width×Height)	南京一期（Nanjing Phase I） 厚度：21.3±0.9 mm（到货 1 个月以内） 21.7±0.9 mm（到货 1~4 个月） Thickness: 21.3±0.9 mm (The goods will arrive within one month) 21.7±0.9 mm (Arrival of goods within 1 ~ 4 months)	包括蓝膜厚度，束缚力：10 kgf， 存储环境温度<35℃，详见附录 A.1, (17%±2%)SOC Including the thickness of the blue film, force binding: 10 kgf, Storage ambient temperature <35℃, See Appendix A.1, (17%±2%) SOC
项目 Items	规格 Specification	条件/注释 Condition/Notes												
4.1 外观 Appearance	参考 NJGX-TS-QMD-06 Refer to NJGX-TS-QMD-06													
4.2 尺寸 （厚度×宽度×高度） Dimension (Thickness×Width×Height)	南京一期（Nanjing Phase I） 厚度：21.3±0.9 mm（到货 1 个月以内） 21.7±0.9 mm（到货 1~4 个月） Thickness: 21.3±0.9 mm (The goods will arrive within one month) 21.7±0.9 mm (Arrival of goods within 1 ~ 4 months)	包括蓝膜厚度，束缚力：10 kgf， 存储环境温度<35℃，详见附录 A.1, (17%±2%)SOC Including the thickness of the blue film, force binding: 10 kgf, Storage ambient temperature <35℃, See Appendix A.1, (17%±2%) SOC												

		合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd	编 号 NO. Q/GX 017-2023
标题: Title	IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable		Page 9
			Total pages 28
		宽度: 100.75 ± 0.5 mm Width: 100.75 ± 0.5 mm 高度: 141.88 ± 0.5 mm (不含极柱, 含外包膜和顶盖贴片) 144.88 ± 0.5 mm (含极柱, 含外包膜和顶盖贴片) Height: 141.88 ± 0.5 mm (including outer film thickness and excluding terminals) 144.88 ± 0.5 mm (including outer film thickness and terminals)	
		南京二期 (Nanjing Phase II) 厚度: 21.3 ± 0.9 mm (到货 1 个月以内) 21.7 ± 0.9 mm (到货 1 ~ 4 个月) Thickness: 21.3 ± 0.9 mm (The goods will arrive within one month) 21.7 ± 0.9 mm (Arrival of goods within 1 ~ 4 months) 宽度: 100.75 ± 0.5 mm Width: 100.75 ± 0.5 mm 高度: $141.5^{+0.45}_{-0.5}$ mm (不含极柱, 含外包膜和顶盖贴片) $144.5^{+0.5}_{-0.35}$ mm (含极柱, 含外包膜和顶盖贴片) Height: $141.5^{+0.45}_{-0.5}$ mm (including outer film thickness and excluding terminals) $144.5^{+0.5}_{-0.35}$ mm (including outer film thickness and terminals)	包括蓝膜厚度, 束缚力: 10 kgf, 存储环境温度 < 35 °C, (17% $\pm$ 2%)SOC Including the thickness of the blue film, force binding: 10 kgf, Storage ambient temperature < 35 °C, (17% $\pm$ 2%) SOC
4.3	重量 Weight	$605 \text{ g} \pm 18 \text{ g}$	
4.4	标称电压 Nominal Voltage	3.2 V	
4.5	交流内阻 ACR	$0.9 \text{ m}\Omega \pm 0.3 \text{ m}\Omega$	1 kHz, 出货状态 1 kHz, Shipment status
4.6	直流内阻 DCR	$\leq 3.0 \text{ m}\Omega$	50%SOC(5C/10 s, 25 °C)
4.7	额定容量 Nominal Capacity	26.0 Ah	1C 标准充放电, 25 °C, 测试方法见 7.3 1C standard charge and discharge, 25 °C, See 7.3 for the test method
4.8	工作电压 Operating Voltage	2.0 V ~ 3.65 V	

		合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd		编 号 NO.		
				Q/GX 017-2023		
标题: Title	IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable			Page 10		
				Total pages 28		
4.9 能量密度 Energy Density		≥140 Wh/kg	按照 0.33C 放电能量标定 According to 0.33C discharge energy calibration			
4.10 海拔高度 Altitude		≤5000 m				
备注：（17%±2%）SOC,存储环境温度<35 ℃，可满足单体电池到货后存储 4 个月内不补电。 Remark: (17%±2%) SOC, Storage ambient temperature <35 ℃, It can meet the cell storage within 4 months after the arrival of the power supply.						
5 电性能 Electrical property						
5.1 充电性能 Charging performance						
表 2 充电性能 Table 2 Charging performance						
项目 Items		规格 Specification	备注 Notes			
5.1.1 最大持续充电电流 Maximum continuous charging current		0.02C	[-10 ℃~0 ℃)，0%SOC~100%SOC			
		0.1C	[0 ℃~5 ℃)，0%SOC~100%SOC			
		0.2C	[5 ℃~10 ℃)，0%SOC~100%SOC			
		0.5C	[10 ℃~15 ℃)，0%SOC~100%SOC			
		1.0C	[15 ℃~60 ℃)，0%SOC~100%SOC，单体电池的最高温度≤60 ℃ [15 ℃~60 ℃)，0%SOC~100%SOC, The maximum temperature of cell ≤60℃			
		2.0C	[15 ℃~35 ℃)，0%SOC~90%SOC			
5.1.2 最大允许充电电压 Maximum allowable charging voltage		3.9 V	一级保护电压 3.9 V，二级保护电压 4.0 V First protection voltage 3.9V, second protection voltage 4.0V			
5.1.3 最大允许充电温度范围 Maximum permissible charging		-10 ℃~60 ℃				
5.1.4 最佳充电温度范围 Optimum charging temperature range		10 ℃~35 ℃				
5.1.5 恒流充电容量比例 Constant current charging capacity ratio		≥90%	2C			
5.2 放电性能 Discharge performance						
表 3 放电性能 Table 3 Discharge performance						
项目 Items		规格 Specification	备注 Notes			

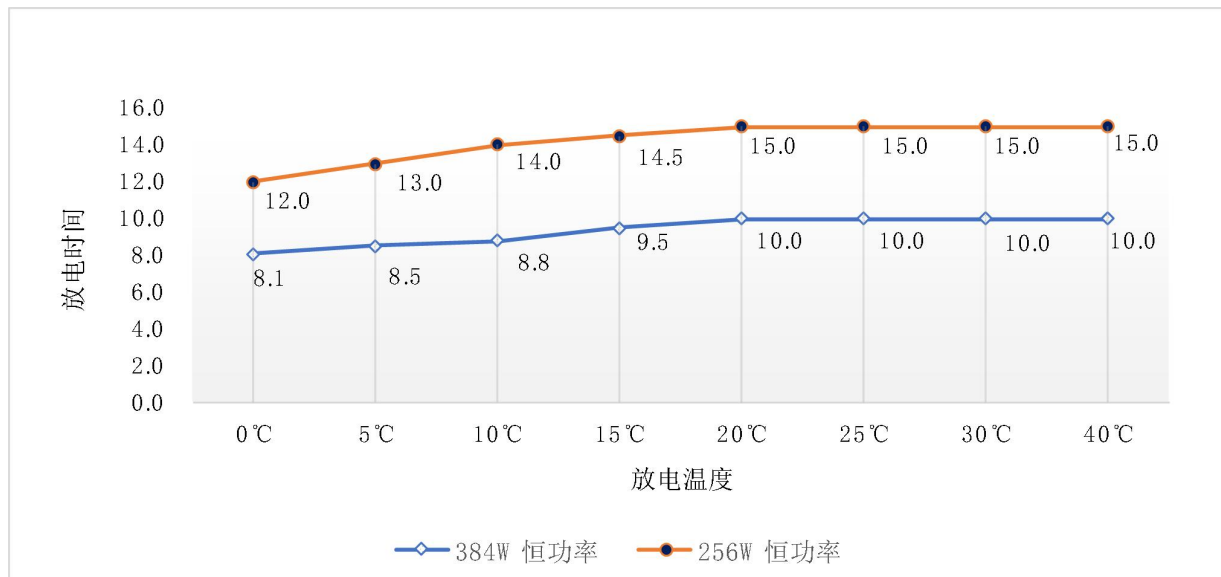
		合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd		编 号 NO. Q/GX 017-2023	
标题: Title		IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable			Page 11
					Total pages 28
5.2.1 最大持续放电电流 Maximum continuous discharge current		6C	15℃~40℃条件下，单体电池 1C 恒流恒压充满，搁置 1 h，以 6C 放电至终止电压 2.0 V，且单体电池温升<30℃ Under the condition of 15℃~ 40℃, charge at 1C to 3.65V followed by constant voltage charging until current drops down to 0.05C, standing for 1h. discharge at 6C to 2.0V, and the temperature rise of the cell was < 30℃		
5.2.2 最大脉冲放电电流 Maximum pulse discharge current		8C~10 s 10C~5 s 12C~2 s	20℃~35℃		
5.2.3 最低允许放电电压 Minimum permissible discharge voltage		2.0 V	>0℃放电下限电压 >0℃ discharge limit voltage		
		1.8 V	≤0℃放电下限电压 ≤0℃ discharge limit voltage		
5.2.4 最大允许放电温度范围 Maximum permissible discharge temperature range		-30℃~65℃			
5.2.5 最佳放电温度范围 Optimal discharge temperature range		10℃~35℃			
5.2.6 室温放电容量 Room temperature discharge capacity		≥26 Ah	25℃，测试方法见 7.3 25℃, See 7.3 for the test method		
5.2.7 高温放电容量/能量保持率 High temperature discharge capacity/energy retention rate		≥100%/≥100%	55℃，1C，测试方法见 7.5 55℃, 1C, See 7.5 for the test method		
5.2.8 低温放电容量/能量保持率 Low temperature discharge capacity/energy retention rate		≥90%/≥75%	0℃，测试方法见 7.6 0℃, See 7.6 for the test method		
		≥80%/≥60%	-10℃，测试方法见 7.6 -10℃, See 7.6 for the test method		
		≥60%/≥50%	-20℃，测试方法见 7.6 -20℃, See 7.6 for the test method		
5.2.9 倍率放电容量/能量保持率 Discharge capacity/ energy ratio		≥96%/≥92%	25℃，1C/6C，测试方法见 7.7 25℃, 1C/6C, See 7.7 for the test method		
5.2.10 充放电能量效率 Charge and discharge energy efficiency		≥91%	25℃，1C/1C，测试方法见 7.8 25℃, 1C/1C, See 7.8 for the test method		
		≥93%	25℃，0.5C/0.5C，测试方法见 7.8 25℃, 0.5C/0.5C, See 7.8 for the test method		

5.3 功率性能 Power performance

表 4 功率性能

Table 4 Power performance

项目 Items	规格 Specification	备注 Notes
5.3.1 质量功率密度 Mass power density	≥ 1300 W/kg	50%SOC, 25 °C
5.3.2 体积功率密度 Volume power density	≥ 2600 W/L	50%SOC, 25 °C
5.3.3 最大放电功率 Maximum discharge power	800 W	50%SOC, 25 °C, 测试方法见 7.11 50% SOC, 25°C, See 7.11 for the test method
5.3.4 冷启动功率 Cold start power	40 W	50%SOC, -20 °C, 测试方法见 7.15 50%SOC, -20 °C, See 7.15 for the test method
5.3.5 持续放电功率 Continuous discharge power	384 W/10 min	测试方法见 7.12 (20 °C~40 °C), 现象数据见下图 See 7.12 for the test method (20 °C ~ 40 °C), See the below figure
	256 W/15 min	测试方法见 7.12 (20 °C~40 °C), 现象数据见下图 See 7.12 for the test method (20 °C ~ 40 °C), See the below figure



注: 未标注温度点的恒功率放电时间可依据线性原则采用内插方法近似求值。

Note: The constant power discharge time without marked temperature points can be approximated using the interpolation method based on the linear principle.

图 1 不同温度下的恒功率放电时间

Fig. 1 Constant power discharge time at different temperatures

		合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd		编 号 NO. Q/GX 017-2023	
标题: Title		IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable			Page 13
					Total pages 28
5.4 电池寿命 Battery life					
表 5 电池寿命 Table 5 Battery Life					
项目 Items		规格 Specifications		备注 Notes	
5.4.1 常温循环寿命 Room Temperature Cycle Life		≥2500 次 ≥2500 times		25 °C, 1C/1C, (~150) kgf 夹具力, 测试方法见 7.13.1, 80%EOL 25 °C, 1C/1C, (~150) kgf Clamp force, See 7.13.1 for the test method, 80% EOL	
		≥1000 次 ≥1000 times		25 °C, 1C/4C, (~150) kgf 夹具力, 测试方法见 7.13.1, 80%EOL 25 °C, 1C/4C, (~150) kgf Clamp force, See 7.13.1 for the test method, 80% EOL	
		≥350 次 ≥350 times		25 °C, 1C/6C, (~150) kgf 夹具力, 测试方法见 7.13.1, 80%EOL 25 °C, 1C/6C, (~150) kgf Clamp force, See 7.13.1 for the test method, 80% EOL	
5.4.2 高温循环寿命 High Temperature Cycle Life		≥1400 次 ≥1400 times		45 °C, 1C/1C, (~150) kgf 夹具力, 测试方法见 7.13.2 45 °C, 1C/1C, (~150) kgf Clamp force, See 7.13.2 for the test method	
		≥800 次 ≥800 times		55 °C, 1C/1C, (~150) kgf 夹具力, 测试方法见 7.13.3 55 °C, 1C/1C, (~150) kgf Clamp force, See 7.13.3 for the test method	
5.4.3 低温循环寿命 Low Temperature Cycle Life		≥200 次 ≥200 times		-10 °C, 0.1C/0.5C, (~150) kgf 夹具力, 测试方法见 7.13.4 -10 °C, 0.1C/0.5C, (~150) kgf Clamp force, See 7.13.4 for the test method	
5.4.4 日历寿命 Calendar Life		≥10 年 ≥10 years		30%SOC, 25 °C, 测试方法见 7.14 30% SOC, 25 °C, Clamp force, See 7.14 for the test method	
5.4.5 典型工况寿命 Typical Working Condition Life		≥15 年, 寿命截止为 70%容量保持率 ≥15 years, Life end is 70% capacity retention rate		(25±5) °C, 1C/1C, 每年放电不超过 10 次 (25±5) °C, 1C/1C, No more than 10 discharges per year	

 国轩高科 GUOXUAN HIGH-TECH		合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd	编 号 NO. Q/GX 017-2023
标题: Title	IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable		Page 14
			Total pages 28
5.5 存储性能 Endurance performance			
表 6 存储性能 Table 6 Endurance performance			
项目 Items		规格 Specifications	备注 Notes
5.5.1 存储温度范围 Storage Temperature Range		-40 °C~60 °C	单体电池不爆炸，不起火，允许高温存放时容量衰减 The cell does not explode, does not fire, and the capacity decreases when stored at high temperature
5.5.2 最佳存储温度范围 Optimal Storage Temperature Range		-10 °C~35 °C	
5.5.3 存储容量恢复率 Storage Capacity Recovery Rate		≥97%	50%SOC, 25 °C, 90 d
5.5.4 室温荷电保持率/容量恢复率 Room Temperature SOC Retention Rate/ capacity recovery rate		≥95%/ ≥96%	25 °C, 100%SOC, 28 d, 测试方法见 7.9 25 °C, 100%SOC, 28 d, See 7.9 for the test method
5.5.5 高温荷电保持率/容量恢复率 High Temperature SOC Retention Rate/ capacity recovery rate		≥94%/ ≥95%	55 °C, 100%SOC, 7 d, 测试方法见 7.9 55 °C, 100%SOC, 7 d, See 7.9 for the test method
5.5.6 储存容量恢复率 Storage Capacity Recovery Rate		≥95%	45 °C, 50%SOC, 28 d, 测试方法见 7.10 45 °C, 50%SOC, 28 d, See 7.10 for the test method
		≥93%	45 °C, 100%SOC, 28 d, 测试方法见 7.10 45 °C, 100%SOC, 28 d, See 7.10 for the test method
5.5.7 储存容量恢复率 Storage Capacity Recovery Rate		≥96%	35 °C, 50%SOC, 28 d, 测试方法见 7.10 35 °C, 50%SOC, 28 d, See 7.10 for the test method
		≥94%	35 °C, 100%SOC, 28 d, 测试方法见 7.10 35 °C, 100%SOC, 28 d, See 7.10 for the test method

	合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd	编 号 NO. Q/GX 017-2023
标题: Title	IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable	Page 15 Total pages 28
6 安全性能 Safety performance 具备通过 GB/T 31485-2015, IEC62619, IEC62133, JIS C 8714, UL1642, UL1973, UN38.3 认证标准的能力, 同时可提供 IEC62619、UL1642、UN38.3 证书。 It has the ability to pass GB/T 31485-2015, IEC62619, IEC62133, JIS C 8714, UL1642, UL1973, UN38.3 certification standards, and can provide IEC62619, UL1642, UN38.3 certificates. 7 测试方法 Test Method 7.1 测试环境 Test environment 除另有备注说明外, 电池测试环境条件为: 温度 25 °C±2 °C, 相对湿度为(25%~85%)RH, 大气压力 86 kPa~106 kPa; 电池充电采用 7.2 方式; 电池放电采用 7.3 方式; 本标准中所提到的室温, 是指 25 °C±2 °C。 Unless otherwise noted, the cell test environment conditions are: temperature 25 °C ± 2 °C, relative humidity (25% ~ 85%) RH, atmospheric pressure 86 kPa ~ 106 kPa; battery charging method is 7.2; cell discharge is 7.3 Method: The room temperature mentioned in this standard refers to 25 °C ± 2 °C. 7.2 标准充电 Standard charging 室温下, 单体蓄电池以 1C 电流放电至电压为 2.0 V, 静置 1 h, 然后在以 1C 电流充电至电压为 3.65 V 时转恒压充电, 至充电电流降至 0.05C 时停止充电, 充电后静置 1 h。 At room temperature, the cell is discharged with a current of 1C to a voltage of 2.0 V and left to stand for 1 h. Then, when the battery is charged with a current of 1C to a voltage of 3.65 V, it is switched to constant voltage charging. When the charging current drops to 0.05C, the charging is stopped. Then let it stand for 1 h. 7.3 标准放电 Standard discharging 先按照 7.2 充满电, 室温下, 单体电池以 1C 电流放电至电压为 2.0 V 截止, 计量放电容量 (Ah) 和放电能量 (Wh)。 Fully charge according to 7.2. At room temperature, the cell is discharged with a current of 1C to a voltage of 2.0 V and the discharge capacity (Ah) and discharge energy (Wh) are measured. 7.4 直流内阻 DC internal resistance		

		合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd		编 号 NO.
				Q/GX 017-2023
标题: Title	IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable			Page 16
				Total pages 28
按 7.2 方法充电，在室温下以 1C 电流放电 30 min 后，静置 1 h，以 5C 电流放电 10 s，计算放电前后的电压和电流变化，然后将电压变化的差值除以电流变化的差值。 Charge according to method 7.2. After discharging at 1C current for 30 min at room temperature, let it stand for 1 h, discharge at 5C current for 10 s, calculate the voltage and current changes before and after the discharge, and then divide the difference in voltage change by the difference in current change value.				
7.5 高温放电容量/能量保持率 High temperature discharge capacity/energy retention rate 先按照 7.2 方法充电；在指定温度下 55 °C±2 °C 下存储 5 h；再在该指定温度下以 1C 电流放电，放电至 2.0 V，计量放电容量(Ah)和放电能量(Wh)，两者与室温下的放电容量和放电能量（按照 7.3）的比值，即为高温下的容量/能量保持率，按此方法测试高温下的放电能力。 First charge according to 7.2 method; store at 55 °C± 2 °C for 5 h at the specified temperature; then discharge at the specified temperature with 1C current, discharge to 2.0 V, measure the discharge capacity (Ah) and discharge energy (Wh), The ratio of that to the discharge capacity and discharge energy (according to 7.3) at room temperature is the capacity/energy retention rate at high temperature. According to this method, the discharge capacity at high temperature is tested.				
7.6 低温放电容量/能量保持率 Low temperature discharge capacity/energy retention rate 先按照 7.2 方法充电；在 5.2.7 指定温度下（-20/-10/ 0 °C±2 °C）下存储 20 h 或者单体电池表面温度达到目标环境温度；再在该指定温度下以 1C 电流放电，放电至 1.8 V，计量放电容量(Ah)和放电能量(Wh)，两者与室温下的放电容量和放电能量（按照 7.3）的比值，即为高温下的容量/能量保持率，按此方法测试低温下的放电能力。 First charge according to 7.2 method; Store for 20 h at the specified temperature in 5.2.7 (-20/ -10/ 0 °C±2 °C) or the surface temperature of the cell reaches the target ambient temperature; Then discharge at 1C at the specified temperature, discharge to 1.8 V, measure the discharge capacity (Ah) and discharge energy (Wh). The ratio of the two to the discharge capacity and discharge energy (according to 7.3) at room temperature is the capacity/ energy retention rate at high temperature. This method tests the discharge capacity at low temperatures.				
7.7 室温倍率充放电容量 Room temperature rate charge and discharge capacity				

		合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd		编 号 NO.		
				Q/GX 017-2023		
标题: Title	IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable			Page 17		
				Total pages 28		
室温下，单体电池以 7.3 方法放电，分别以规定倍率进行恒流充电至 3.65 V，得到不同倍率下的充电容量（Ah）和充电能量（Wh）。室温下，单体电池以 7.2 方法充电，以规定倍率进行放电至 2.0 V，得到不同倍率下的放电容量（Ah）和放电能量（Wh），其中放电容量与初始容量的比值即为倍率放电容量保持率，放电能量与初始能量的比值即为倍率放能量保持率。 At room temperature, the cell is discharged by the method 7.3, and the constant current is charged to 3.65 V at the specified rate respectively to obtain the charging capacity (Ah) and charging energy (Wh) at different rates. At room temperature, the cell is charged in the 7.2 method and discharged to 2.0 V at the specified rate to obtain the discharge capacity (Ah) and discharge energy (Wh) at different rates. The ratio of the discharge capacity to the initial capacity is the rate discharge capacity retention rate, the ratio of discharge energy to initial energy is the rate discharge energy retention rate. 7.8 充放电能量效率 Charge and discharge energy efficiency 室温下，单体电池以 1C 电流放电至电压为 2.0 V，静置 1 h，然后再以 0.5C 电流充电至电压为 3.65 V 时转恒压充电，至充电电流降至 0.05C 时停止充电，计量充电容量(Ah)和恒流阶段充电能量 E1(Wh)，充电后静置 1 h; 单体电池再以 0.5C 电流放电至电压为 2.0 V 截止，计量放电容量(Ah)和放电能量 E2(Wh)，充放电能量效率按照 E2/E1×100%来计算。 At room temperature, the cell is discharged at a current of 1C to a voltage of 2.0 V, left to stand for 1 h, and then charged at a current of 0.5C to a voltage of 3.65 V, and then switched to constant voltage charging. When the charging current drops to 0.05C, the charging stops. Measure the charge capacity (Ah) and the charge energy E1 (Wh) in the constant current stage, and let stand for 1 h after charging; the cell is discharged at a current of 0.5C until the voltage is 2.0 V cut-off, and the discharge capacity (Ah) and discharge energy E2 are measured (Wh), charge and discharge energy efficiency is calculated according to E2/E1×100%. 室温下，单体电池按照 7.2 方法充电，计量充电容量(Ah)和恒流阶段充电能量 E1(Wh)；单体电池再以 1C 电流放电至电压为 2.0 V 截止，计量放电容量(Ah)和放电能量 E2(Wh)，1C 标准充放电能量效率按照 E2/E1×100%来计算。 At room temperature, the cell is charged according to the method 7.2, and the charging capacity (Ah) and the constant current stage charging energy E1 (Wh) are measured; the cell is then discharged with a current of 1C until the voltage is 2.0 V cut-off, and the discharge capacity (Ah) and discharge energy E2 (Wh), 1C standard charge and discharge energy efficiency is calculated according to E2/E1×100%						

		合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd	编 号 NO.			
			Q/GX 017-2023			
标题: Title	IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable	Page 18				
		Total pages 28				
7.9 荷电保持率、自放电率与容量恢复率 Charge retention rate, self-discharge rate and capacity recovery rate 先按照 7.2 方法充电，在室温下存储 28 d 或在 55 °C±2 °C 下存储 7 d，或者在 60 °C±2 °C 下存储 7 d 后，以 1C 电流放电至 2.0 V，得到放电容量，其与初始容量的比值即为荷电保持率；再按照 7.2 方法充电和 7.3 方法放电，得到恢复容量，其与初始容量的比值即为容量恢复率；室温容量恢复率与室温荷电保持率的差值，即为电池自放电率。 First charge according to 7.2 method, store at room temperature for 28 d, or store at 55 °C±2 °C for 7 d, or store at 60 °C±2 °C for 7 d, then discharge to 2.0 V with 1C current to obtain the discharge capacity. The ratio to the initial capacity is the charge retention rate; then charge and discharge according to the 7.2 method to obtain the recovery capacity, and the ratio to the initial capacity is the capacity recovery rate; the difference between the room temperature capacity recovery rate and the room temperature charge retention rate is the battery self-discharge rate.						
7.10 存储容量恢复率 Storage capacity recovery rate 先按照 7.2 方法充电，在室温下以 1C 电流放电 30 min，再在 35 °C±2 °C 和 45 °C±2 °C 下存储 28 d；再按照 7.2 方法充电，在室温下以 1C 电流放电至 2.0 V，得到放电容量，其与初始容量的比值即为 50%SOC 存储容量恢复率。 First charge according to 7.2 method, discharge at room temperature with 1C current for 30 minutes, then store at 35 °C±2 °C and 45 °C±2 °C for 28 d; then charge according to 7.2 method, discharge at room temperature with 1C current to 2.0 V , get the discharge capacity, its ratio to the initial capacity is the 50% SOC storage capacity recovery rate. 先按照 7.2 方法充电，再在 35 °C±2 °C 和 45 °C±2 °C 下存储 28 d；再按照 7.2 方法充电，在室温下以 1C 电流放电至 2.0 V，得到放电容量，其与初始容量的比值即为 100%SOC 存储容量恢复率。 First charge according to 7.2 method, then store at 35 °C±2 °C and 45 °C±2 °C for 28 d; then charge according to 7.2 method and discharge to 2.0 V at room temperature with 1C current to obtain the discharge capacity, which is the ratio of the initial capacity The ratio is the 100% SOC storage capacity recovery rate.						
7.11 最大放电功率和最大反馈功率 Maximum discharge power and maximum feedback power 按 7.3、7.5 和 7.6 方法得出不同温度下的放电容量，并以此作为不同温度下的 SOC 计算标准；按 7.2 方法充电后于待测环境温度下搁置相应时间后（>0 °C，5 h；≤0 °C，20 h），以 1C 电流放电调整						

 国轩高科 GUOXUAN HIGH-TECH	合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd	编 号 NO. Q/GX 017-2023
标题: Title	IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable	Page 19 Total pages 28

SOC 为 90%，静置 1 h 后，以当前温度最大脉冲 6C 电流放电 10 s，搁置 40 s，依次以 1C 电流将 SOC 调整为 80%，70%，...10%，测试不同 SOC 下脉冲充放电能力，记录过程数据，按照 HPPC 测试方法中直流内阻和脉冲功率的计算公式，计算出不同温度和 SOC 下的最大放电功率。

Calculate the discharge capacity at different temperatures according to methods 7.3, 7.5 and 7.6, and use this as the standard for calculating SOC at different temperatures; after charging according to method 7.2, leave it for a corresponding time at the ambient temperature to be tested ($> 0\text{ }^{\circ}\text{C}$, 5 h ; $\leq 0\text{ }^{\circ}\text{C}$, 20 h), adjust the SOC to 90% with 1C current discharge, after 1 h of standing, discharge with the current temperature maximum pulse current of 6C for 10 s, leave it for 40 s, and adjust the SOC to 80% with 1C current in turn , 70%,... 10%, test the pulse charge and discharge capacity at different SOC, record the process data, and calculate the maximum discharge power at different temperatures and SOC according to the calculation formula of DC internal resistance and pulse power in the HPPC test method.

7.12 持续放电功率 Continuous discharge power

按 7.2 方法充电，然后以 256 W、384 W 等恒功率放电终止电压 2.5 V，放电时间及温度满足 5.3.5 中要求。

Charge according to 7.2 method, and then discharge at a constant power of 256 W, 384 W, etc. The final voltage is 2.5 V, and the discharge time and temperature meet the requirements in 5.3.5.

7.13 循环寿命 Cycle life

7.13.1 标准循环寿命 Standard cycle life

单体电池在 $25\text{ }^{\circ}\text{C}\pm 2\text{ }^{\circ}\text{C}$ 环境下，以 1C 恒定电流充电至 3.65 V 转恒压充电，直到电流降至 0.05C 截止，静置 10 min，然后以 1C 电流放电至 2.0 V，静置 10 min；重复 2500 次时放电容量不低于额定容量的 80%。

The cell is charged at a constant current of 1C to 3.65 V at a constant voltage of $25\text{ }^{\circ}\text{C}\pm 2\text{ }^{\circ}\text{C}$, until the current drops to 0.05C to cut off, stand for 10 minutes, then discharge to 2.0 V with a current of 1C, and stand for 10 min; When repeated 2500 times, the discharge capacity is not less than 80% of the rated capacity.

单体电池在 $25\text{ }^{\circ}\text{C}\pm 2\text{ }^{\circ}\text{C}$ 环境下，以 1C 恒定电流充电至 3.65 V 转恒压充电，直到电流降至 0.05C 截止，静置 1 h，然后以 4C 电流放电至 2.0 V，静置 2 h；重复 1000 次时放电容量不低于额定容量的 80%。

		合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd	编 号 NO.
			Q/GX 017-2023
标题: Title	IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable	Page 20	
		Total pages 28	
The cell is charged at a constant current of 1C to 3.65 V at a temperature of 25 °C ± 2 °C, and then charged at a constant voltage until the current drops to 0.05C and cut off. Let it stand for 1 h, then discharge to 2.0 V at a current of 4C, and let it stand for 2 h; The discharge capacity shall not be less than 80% of the rated capacity when repeated 1000 times. 单体电池在 25 °C±2 °C环境下，以 1C 恒定电流充电至 3.65 V 转恒压充电，直到电流降至 0.05C 截止，静置 1 h，然后以 6C 电流放电至 2.0 V，静置 2 h；重复 350 次时放电容量不低于额定容量的 80%。 The cell is charged at a constant current of 1C to 3.65 V and then charged at a constant voltage at 25 °C±2°C, until the current drops to 0.05C and cut off, let it stand for 1 h, then discharge to 2.0 V at a current of 6C, and let it stand for 2 h; The discharge capacity shall not be less than 80% of the rated capacity when repeated 350 times. 7.13.2 45 °C循环寿命 45 °C cycle life 单体电池在 45 °C±2 °C环境下，以 1C 恒定电流充电至 3.65 V 转恒压充电，直到电流降至 0.05C 截止，静置 10 min，然后以 1C 电流放电至 2.0 V，静置 10 min；重复 1400 次时放电容量不低于额定容量的 80%。 The cell is charged at a constant current of 1C to 3.65 V at a temperature of 45 °C ± 2°C, and then charged at a constant voltage until the current drops to 0.05C. Let it stand for 10 min, then discharge to 2.0 V at a current of 1C, and stand for 10 min; The discharge capacity is not less than 80% of the rated capacity when repeated 1400 times 7.13.3 55 °C循环寿命 55 °C cycle life 单体电池在 55 °C±2 °C环境下，以 1C 恒定电流充电至 3.65 V 转恒压充电，直到电流降至 0.05C 截止，静置 10min，然后以 1C 电流放电至 2.0 V，静置 10 min；重复 800 次时放电容量不低于额定容量的 80%。 The cell is charged at a constant current of 1C to 3.65 V at a temperature of 55 °C±2 °C, and then charged at a constant voltage until the current drops to 0.05C and cut off. Let it stand for 10 minutes, then discharge it to 2.0 V with a current of 1C, and let it stand for 10 minutes ; The discharge capacity is not less than 80% of the rated capacity when repeated 800 times. 7.13.4 低温循环寿命 Low temperature cycle life			

		合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd	编 号 NO.
			Q/GX 017-2023
标题: Title	IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable	Page 21	
		Total pages 28	
单体电池在-10 °C±2 °C环境下，以 0.1C 恒定电流充电至 3.65 V 转恒压充电，直到电流降至 0.05C 截止，静置 30min，然后以 0.5C 电流放电至 2.0 V，静置 10 min；重复 200 次时放电容量不低于该温度下初始容量的 80%。 The cell is charged at a constant current of 0.1C to 3.65 V at a constant voltage of -10 °C±2 °C, until the current drops to 0.05C and cut off, let it stand for 30 minutes, and then discharge to 2.0 V at a current of 0.5C. Leave it for 10 min; the discharge capacity after 200 repetitions is not less than 80% of the initial capacity at this temperature. 7.14 日历寿命 Calendar life 测试方法如下： The test method is as follows: a) 在 25 °C±2 °C环境下，将单体电池以 1C 恒流放电至 2.0 V，静置 30 min；以 1C 恒定电流充电至 3.65 V 转恒压充电，直到电流降至 0.05C 截止，静置 30 min；再以 1C 恒流放电至 2.0 V，循环 3 周，记录此 3 周放电容量的均值为初始容量； a) Under an environment of 25 °C±2 °C, discharge the cell to 2.0 V at a constant current of 1C, and let it stand for 30 minutes; charge at a constant current of 1C to 3.65 V and then charge at a constant voltage until the current drops to 0.05C. Let it stand for 30 min; then discharge to 2.0 V at a constant current of 1C, cycle for 3 weeks, and record the average value of the discharge capacity for the 3 weeks as the initial capacity; b) 搁置：以 1C 恒定电流充电至 3.65 V 转恒压充电，直到电流降至 0.05C 截止，静置 30 min；再以 1C 恒流放电，调节 SOC 为 30%，然后在 25 °C±2 °C环境下搁置 1 个月； b) Shelving: Charge with 1C constant current to 3.65 V and switch to constant voltage charging, until the current drops to 0.05C and stop for 30 minutes; then discharge with 1C constant current, adjust SOC to 30%, and then at 25 °C±2 °C Shelve for 1 month under the environment; c) 容量测试：一个月后，在 25 °C±2 °C环境下将单体电池以 1C 恒流放电至 2.0 V，静置 30 min，再以 1C 恒定电流充电至 3.65 V 转恒压充电，直到电流降至 0.05C 截止，最后以 1C 恒流放电至 2.0 V，循环 1 周，计量放电容量(Ah)，计算容量保持率； c) Capacity test: After one month, discharge the cell at a constant current of 1C to 2.0 V under an environment of 25 °C±2 °C, let it stand for 30 minutes, and then charge at a constant current of 1C to 3.65 V and then charge at a constant voltage until Cut the current down to 0.05C, and finally discharge to 2.0 V at a constant current of 1C, cycle for 1 week, measure the discharge capacity (Ah), and calculate the capacity retention rate;			

 国轩高科 GUOXUAN HIGH-TECH	合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd	编 号 NO. Q/GX 017-2023
标题: Title	IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable	Page 22 Total pages 28

d) 重复步骤 b)~c), 以后每一个月以此循环, 直到容量保持率<80%, 单体电池寿命终止。

d) Repeat steps b) ~ c), and repeat this cycle every month until the capacity retention rate is less than 80%, and the life of the cell is terminated.

7.15 冷启动测试 Cold start test

按 7.2 方法充电, 在室温下以 1C 电流放电至 50%SOC, 将单体电池放置到-20 °C环境下搁置 20 h, 然后在-20 °C环境下以 5 kW 功率放电 2 s, 然后静置 10 s, 重复 3 次。

Charge according to 7.2 method, discharge to 50% SOC at room temperature with 1C current, put the cell in -20 °C environment for 20 h, then discharge at -20 °C at 5 kW power for 2 s, then stand still 10 s, repeat 3 times.

8 运输 Transport

在运输过程中应严禁暴力装卸, 防止剧烈振动、冲击或挤压, 防止日晒雨淋。

Violent loading and unloading shall be strictly prohibited during transportation to prevent severe vibration, impact or extrusion, and prevent sun and rain.

9 贮存 Store

不打开包装的产品应贮存在环境温度为-40 °C~60 °C(保证单体电池不出现安全事故, 允许高温存放时容量衰减), 相对湿度≤75%的清洁、干燥、通风的库房内, 库房内不应含有腐蚀性气体; 产品应远离火源和热源。

Products without opening the package should be stored in a clean, dry, and ventilated warehouse with an ambient temperature of -40 °C~60 °C (to ensure that there is no safety accident for the cell, and the capacity attenuation when stored at high temperature is allowed), and the relative humidity is ≤75%. The warehouse should not contain corrosive gas; the product should be kept away from fire and heat sources.

单体电池出货在-10 °C~30 °C存储及≥50%SOC 条件下, 可满足 2 年不补电以及在 30 °C~40 °C存储及≥50%SOC 条件下可满足 1.5 年不补电。

Cell shipments can meet 2 years of non-recharge when stored at -10 °C~30 °C and ≥50% SOC, and can meet 1.5 years of non-charge when stored at 30 °C~40 °C and ≥50% SOC.

		合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd		编 号 NO. Q/GX 017-2023	
标题: Title	IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable			Page 23	
				Total pages 28	
10 电芯使用条件 Battery use conditions					
10.1 充放电 Charge and discharge					
使用条件如下:					
The conditions of use are as follows:					
a) 充电时间、电流、电压、温度按照本规格书（5.1 条款）的要求;					
a) The charging time, current, voltage and temperature are in accordance with the requirements of this specification (clause 5.1);					
b) 放电时间、电流、电压、温度按照本规格书（5.2 条款）的要求。					
b) The discharge time, current, voltage, and temperature are in accordance with the requirements of this specification (clause 5.2).					
10.2 束缚力要求 Binding force requirement					
建议 Pack 采用单体电池厚度 20.95 mm 设计，公差建议按照±0.2 mm 设计，单体电池组装成模组后垂直于大面方向初始束缚力要求为 100 N~1500 N（（17%±2%）SOC），在此条件下满足寿命指标（5.4 条款、5.5 条款）。					
It is recommended that the pack adopt a cell thickness of 20.95 mm, and the tolerance is recommended to be designed as ±0.2 mm. After the cell is assembled into a module, the initial binding force perpendicular to the general direction is required to be 100 N~1500 N（（17% ±2%）SOC），under these conditions, meet the life index (clause 5.4, clause 5.5).					
10.3 电池放置方向 Battery placement direction					
单体电池组装成模组后在使用状态下，极柱不能朝下。					
After the cell is assembled into a module, the pole should not face down when in use.					
10.4 电池成组 Batteries					
使用条件如下:					
The conditions of use are as follows:					
a) 同一电池组中使用的单体电池批次最多不超过 4 批次(建议 3 个批次), 电池生产时间差异不超过					

	合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd	编 号 NO. Q/GX 017-2023
标题: Title	IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable	Page 24 Total pages 28
30 d, 不得使用不同类型的电池混合成组, 不得将新旧单体电池一起混合使用; a) The batteries used in the same cell should not exceed 4 batches at most (3 batches are recommended), and the difference in cell production time should not exceed 30 d. Different types of batteries should not be mixed into groups, and new and old should not Mixed use of batteries; b) 单体电池组成电池组的过程中, 确保焊接产生的焊渣或其他金属异物不能掉落到单体电池表面或单体电池与单体电池之间; b) In the process of forming batteries from a cell, ensure that welding slag or other metal foreign objects produced by welding cannot fall on the surface of the single cell or between the cell and the cell; c) 单体电池与电池组箱体之间要做绝缘, 以免造成电气短路; c) The cell and the batteries box should be insulated to avoid electrical short circuit; d) 电池组应具备不容易造成短路的功能, 电池组不要在可能损坏保护装置的高静电环境中使用。 d) The batteries should have a function that is not easy to cause a short circuit. The batteries should not be used in a high electrostatic environment that may damage the protection device.		
10.5 电池管理系统 Battery management system 保护电路应能满足电池在规定的温度、电压、电流下使用, 应具备异常情况(过温度、过电压、过电流)的警告系统。 The protection circuit should be able to meet the requirements of the battery to be used under the specified temperature, voltage and current, and should have a warning system for abnormal conditions (over temperature, over voltage, over current)		

附录 A Appendix A

(规范性附录) (Normative appendix)

单体电池尺寸/实物图 Cell size/physical picture

A.1 单体电池尺寸见图 A.1(单位: mm)。

A.1 The size of the cell is shown in Figure A.1 (unit: mm).

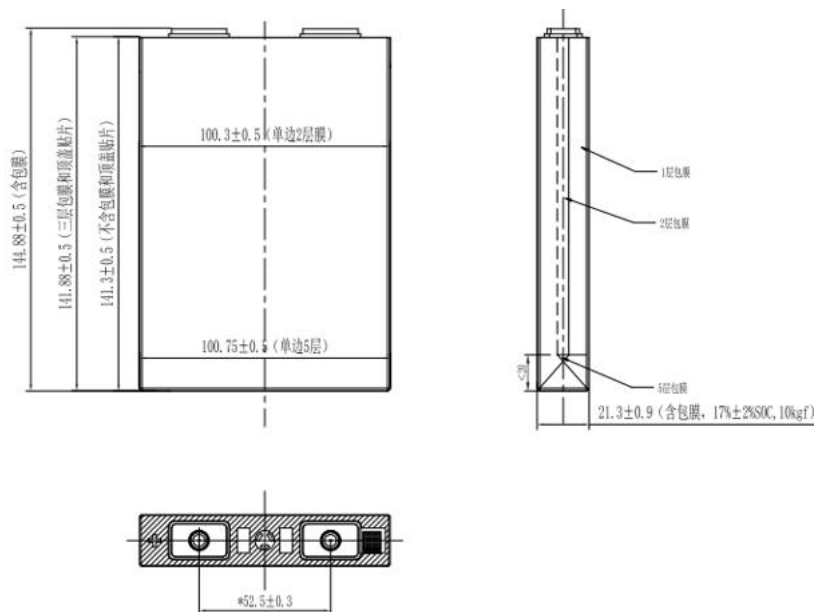


图 A.1.1 电池尺寸图 (南京一期)

Figure A.1.1 Battery size diagram (Nanjing Phase I)

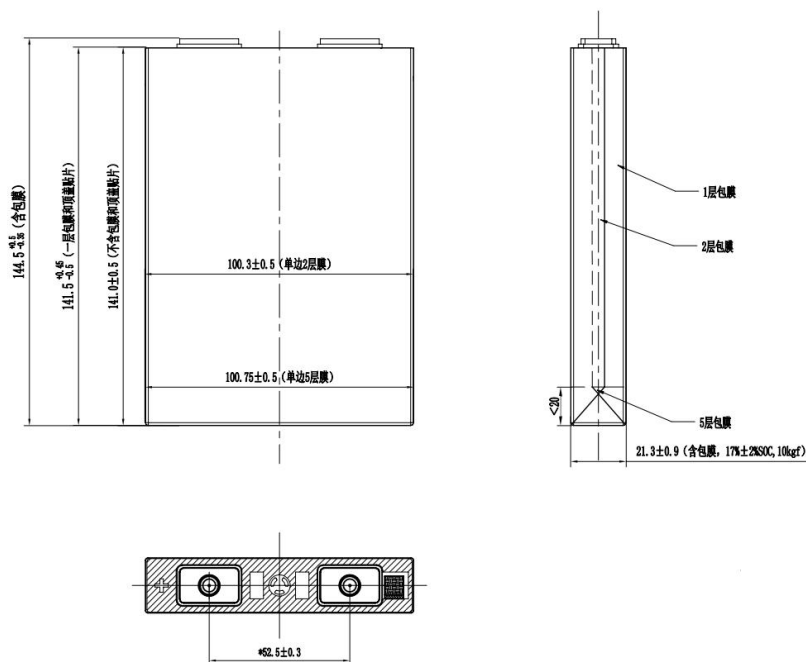


图 A.1.2 电池尺寸图 (南京二期)

Figure A.1.2 Battery size diagram (Nanjing Phase II)

	合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd	编 号 NO.
		Q/GX 017-2023
标题: Title	IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable	Page 26
		Total pages 28

注：电池底部至上 20mm 高度，因蓝膜包覆层数为单边 5 层，宽度规格为 100.75±0.5mm。

Note: The height of the cell from the bottom to the top is 20mm, because the blue film coating layer is 5 layers on one side, and the width specification is 100.75±0.5mm.

A.2 单体电池实物图见 A.2（参考）。

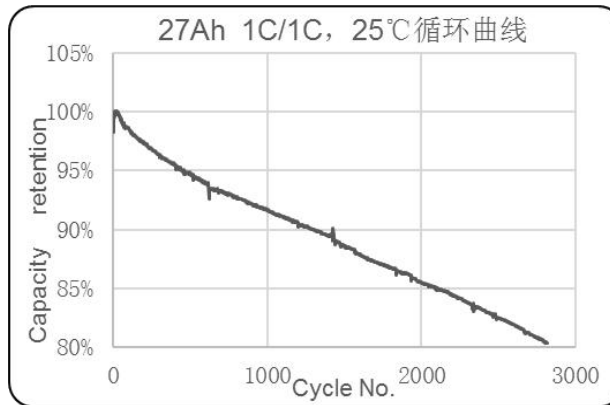
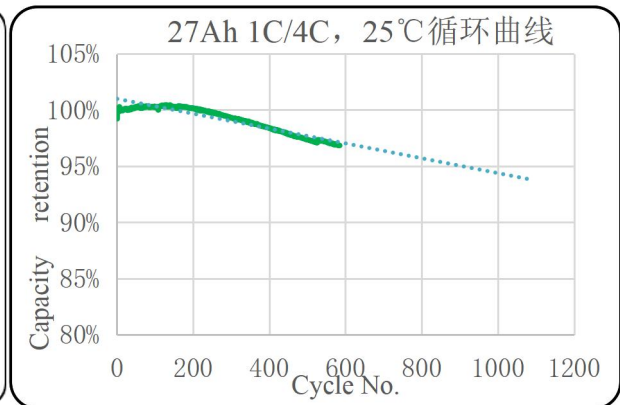
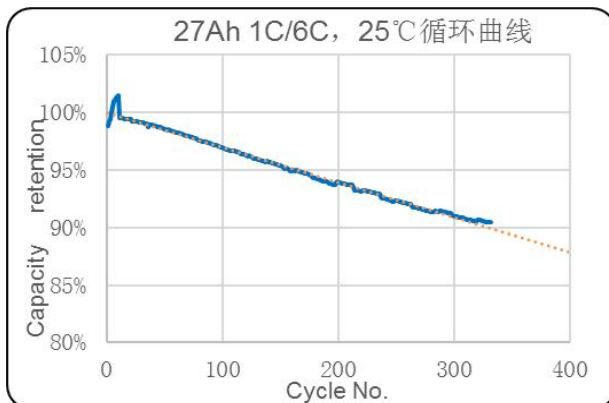
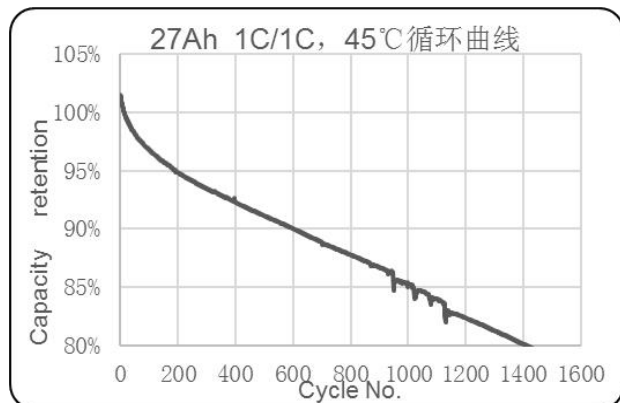
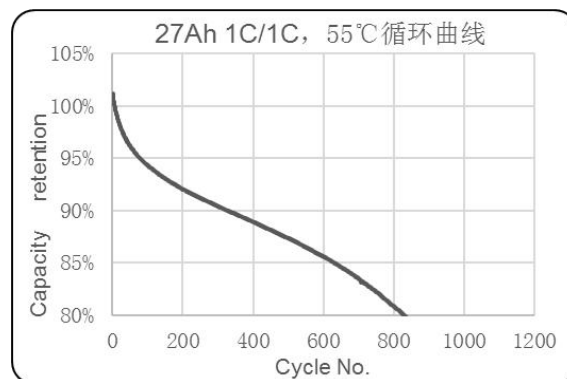
A.2 See A.2 (reference) for the physical picture of the cell.



图 A.2 单体电池实物图

Figure A.2 Physical picture of single cell

附录 B Appendix B

(规范性附录) (Normative appendix)
单体电池循环曲线图 Single cell cycle graph图 B.1 25°C 1C/1C 循环曲线
Figure B.1 25 °C 1C/1C cycle curve图 B.2 25°C 1C/4C 循环曲线
Figure B.2 25 °C 1C/4C cycle curve图 B.3 25°C 1C/6C 循环曲线
Figure B.3 25 °C 1C/6C cycle curve图 B.4 45°C 1C/1C 循环曲线
Figure B.4 45 °C 1C/1C cycle curve图 B.5 55°C 1C/1C 循环曲线
Figure B.5 55 °C 1C/1C cycle curve

 国轩高科 GUOXUAN HIGH-TECH		合肥国轩高科动力能源有限公司 HEFEI GUOXUAN HIGH-TECH POWER ENERGY Co.,Ltd	编 号 NO. Q/GX 017-2023
标题: Title	IFP20100140A-27Ah 锂离子电池产品规格书 Product Specification of IFP20100140A-27Ah Lithium Ion Rechargeable		Page 28
			Total pages 28
IFP20100140A-27Ah 锂离子电池产品环保声明 Environmental declaration of IFP20100140A-27Ah Lithium battery product			
根据欧盟(EU)2015/863 指令；2006-66-EC 电池指令要求，如下表所示 镉、铅、汞、六价铬、多溴联苯(PBB)、多溴二苯醚(PBDE)及邻苯二甲酸酯(PAEs)共计 10 种物质纳入禁用物质清单。			
In accordance with EU directive 2015/863, battery instruction requirements in 2006-66-EC, as shown in the following table, a total of 10 substances are included in the RSL, for example Cadmium、Lead 、Mercury、Hexavalent chromium、Polybrominated biphenyls (PBB) 、 Polybrominated diphenylethers (PBDE) and phthalate (PAEs).			
表 1. 十种禁用物质清单 Table A.11 List of 10 restricted substances			
RoHS 禁用物质 RoHS restricted substance		最高限值（PPM） The highest limit（PPM）	说明 Description
镉(Cd) Cadmium(Cd)		20	2006-66-EC 指令要求 2006-66-EC Directive Requirement
铅 (Pb) Lead (Pb)		40	2006-66-EC 指令要求 2006-66-EC Directive Requirement
汞 (Hg) Mercury (Hg)		5	2006-66-EC 指令要求 2006-66-EC Directive Requirement
六价铬 (Cr ⁶⁺) Hexavalent chromium (Cr ⁶⁺)		1000	RoHS 1.0 要求 RoHS 1.0 limited substance
多溴联苯 (PBB) Polybrominated biphenyls (PBB)		1000	RoHS 1.0 要求 RoHS 1.0 limited substance
多溴二苯醚 (PBDE) Polybrominated diphenyl ethers (PBDE)		1000	RoHS 1.0 要求 RoHS 1.0 limited substance
邻苯二甲酸二(2-乙基己基)酯 Diphtalate (2-ethylhexyl) ester (DEHP- Di(2-ethylhexyl)Phthalate)		1000	RoHS 2.0 新增限用物质 RoHS 1.0 limited substance
邻苯二甲酸丁苄酯 Benzyl butyl phthalate (BBP- Benzyl Butyl Phthalate)		1000	RoHS 2.0 新增限用物质 RoHS 2.0 limited substance
邻苯二甲酸二丁酯 Dibutyl phthalate (DBP-Di-n-butyl Phtalate)		1000	RoHS 2.0 新增限用物质 RoHS 2.0 limited substance
邻苯二甲酸二异丁酯 Diisobutyl phthalate (DIBP-Diiso butyl Phthalate)		1000	RoHS 2.0 新增限用物质 RoHS 2.0 limited substance
从发布日期立即实施执行。Execute immediately from release date.			