



## Specification Approval Sheet

Name: LFP Cylindrical Battery

Model: 30193-0/1

SPEC: ICR17335 3.2V 400mAh

Approved By	Checkup	Make

Customer Confirmation	Signature	Date
	Company Name :	
	Stamp :	

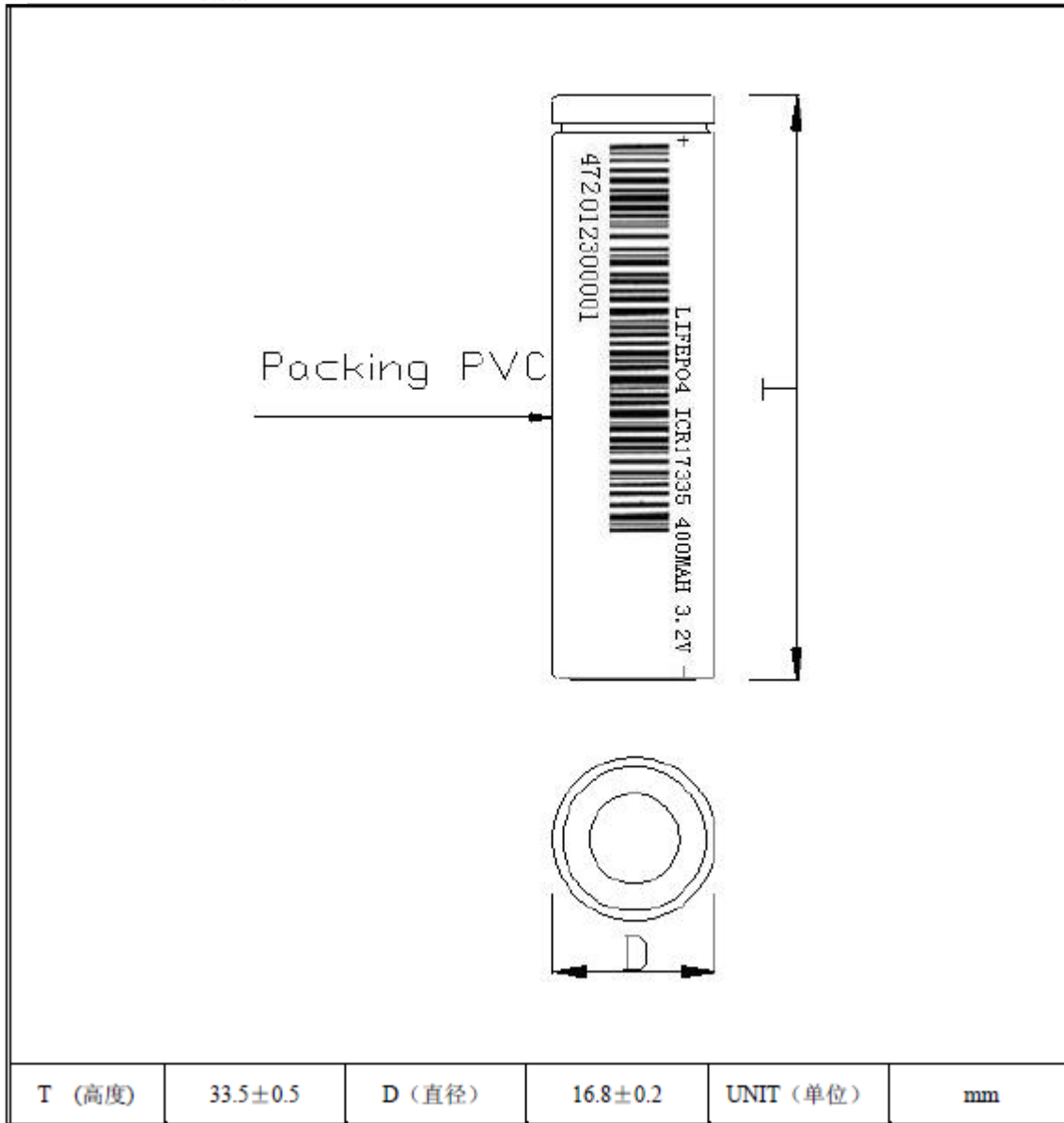
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[www.TenergyBattery.com](http://www.TenergyBattery.com)



1 Initial dimension 初始尺寸





2 Specification 产品规格

NO. 序号	Item 项目	Specifications 规格要求	
4.1	Nominal capacity 标称容量	400mAh 0.2C Discharge (0.2C 放电)	
4.2	Nominal voltage 标称电压	3.2 V	
	Fully charge voltage(FC) 满充电压 FC	3.8 V Defined in this DOC: FC = 3.8 V	
	Fully discharge voltage(FD) 满放电电压 FD	2.0 V Defined in this DOC: FD = 2.0 V	
4.3	Standard charge current 标准充电电流	0.5C	
4.4	Standard charging method 标准充电方法	0.5C CC (constant current) charge to FC, then CV(constant voltage FC)charge till charge current decline to $\leq 0.01C$ 0.5C CC (恒流) 充电至 FC, 再 CV (恒压 FC) 充电直至充电电流 $\leq 0.01C$	
4.5	Charging time 充电时间	Standard Charge (标准充电) Approx 3 hours 大约 3 小时	
4.6	Max.charge current 最大充电电流	Constant current 1C constant Voltage FC 0.01 C cut-off 持续电流: 1C, 持续电压: FC, 截止电流: 0.01 C	
4.7	Max.discharge current 最大放电电流	Constant current 5C end voltage FD 持续电流: 5C, 截止电压: FD	
4.8	Standard discharge current 标准放电电流	Constant current 1 C end voltage FD 持续电流: 1C, 截止电压: FD	
4.9	Discharge lower limit voltage 放电电压下限	FD	
4.10	Charge upper limit voltage 充电电压上限	FC	
4.11	Initial Impedance 初始内阻	$\leq 90m\Omega$	
4.12	Weight 重量	Approx(约): 20g	
4.13	Storage temperature 储存温度	0°C~60°C $\leq 1$ month	Percentage of recoverable capacity no less than 80% of the initial capacities 恢复容量不低于初始容量的 80%
		0°C~45°C $\leq 3$ month	
		0°C~20°C $\leq 1$ year	
4.14	Recoverable capacity 恢复容量	Constant current 0.5C charge to FC then constant voltage charge to current declines to 0.01C, rest for 10min, constant current 0.5C discharge to FD, rest for 10min.Repeat above steps 3 times, recording the maximum capacity 先用 0.5 C 恒流充电至 FC, 再恒压 FC 充电直至充电电流 $\leq 0.01C$ , 搁置 10 分钟, 再用 0.5C 电流放电至 FD; 又搁置 10 分钟, 重复以上步骤 3 次, 记录容量最大值	



4.15	Storage humidity	储存湿度	≤75% RH
4.16	Appearance	外观	Without scratch, distortion, contamination and leakage 无划痕、变形、污迹、电解液泄露
4.17	Standard testing condition	标准测试环境	Temperature(温度) : 23±5℃ Humidity (湿度) : 45-75%RH Atmospheric Pressure (大气压) : 86-106 Kpa

Remark: 1.From 4.1 to 4.12, the testing condition is following 4.18(standard testing condition)

从 4.1 至 4.12 项目, 测试环境遵从 4.18 (标准测试环境)

2.Operating temperature (使用温度): charging(充电) 0℃~45℃; Discharging (放电): -10℃~60℃

If the working condition is out of 4.18, the performance will be some shift.

如果工作环境超出 4.17 范围, 性能将会有一些偏移。

3 General performance 常规性能

No.	Item 项目	Test methods and condition 测试方法和条件	Criteria 标准
5.1	0.2C Capacity 0.2C 容量	After standard charging, rest for 10min, then discharging at 0.2C to voltage FD, recording the discharging time. 标准充电后, 搁置 10 分钟, 然后用 0.2C 电流放电至 FD, 记录放电时间	≥300min
5.2	1C Capacity 1C 容量	After standard charging, rest for 10min, then discharging at 1C to voltage FD, recording the discharging time. 标准充电后, 搁置 10 分钟, 然后用 1C 电流放电至 FD, 记录放电时间	≥54min
5.3	Cycle life 循环寿命	At standard testing condition, constant current 1.0C charge to FC, then constant voltage charge to current declines to 0.01C, rest 10min, constant current 1.0C discharge to FD, rest 10min. Repeat above steps till continuously discharging capacity Higher than 90% of the Initial Capacities of the Cells 在标准测试环境下, 先用 1.0 C 恒流充电至 FC, 再恒压 FC 充电直至充电电流≤0.01C, 搁置 10 分钟, 再用 1.0C 电流放电至 FD; 又搁置 10 分钟, 重复以上步骤, 直到放电容量是初始容量的 90%	≥1000 times(次)
5.4	Capability of keeping electricity 荷电保持能力	At standard testing condition, after standard charging, no outer loading circuit, rest the cell 28days, discharging at 0.2C to voltage FD, recording the discharging time. 在标准测试环境下, 标准充电后, 无外接负载线路, 电池搁置 28 天, 然后用 0.2C 放电至 FD, 记录放电时间.	≥240min



4 Environment Performance 环境性能

No.	Item 项目	Test methods and condition 测试方法和条件	Criteria 标准
6.1	Discharge at high temperature 高温放电	After standard charging, rest for 4h at 60±2℃, then discharging at 1C to voltage FD at the same time, recording the discharging time. 标准充电后,在 60±2℃条件下贮存 4h,然后用 1C 放电至 FD,记录放电时间.	≥54min
6.2	Thermal shock 热冲击	Put the battery in the oven. the temperature of the oven is to be raised at 5±2℃ per minute to a temperature of 130±2℃ and remains 30 minutes. 将电池放进烘箱内,以 5±2℃/min 速度升高烘箱内温度至 130±2℃后,恒温 30min.	No fire, no smoke 不起火,不冒烟

5 Safe characteristic 安全性能

No.	Item 项目	Test methods and condition 测试方法和条件	Criteria 标准
7.1	Over charge testing 过充测试	At 23±5℃, charging cells with constant current 3C to voltage 5V, then with constant voltage 5V till current decline to 0A, charging time no less than 8h. 在 23±5℃状态下,电池用 3C 电流充电至 5V,然后恒压 5V 让电流下降接近为 0A,充电时间不小于 8h.	No smoke or fire 不起火,不冒烟
7.2	Over discharge testing 过放测试	At 23±5℃, According to the requirements of standard charge, the cells will be discharge to cut-off voltage, then connect with external load of 30 ohm for 24 hours. 在 23±5℃状态下,按标准放电的要求放电至终止电压后,外接 30Ω 负载放电 24 小时.	No fire, no smoke, no leakage. 无起火,无冒烟, 无泄液
7.3	Short-circuit testing 短路测试	At 23±5℃, After standard charging, connect cells anode and cathode by wire which impedance less than 50mΩ, keep 6h. 在 23±5℃状态下,标准充电后,将电池的正负极用一根小于 50mΩ 的导线连接,放置 6 小时.	No smoke or fire 不起火,不冒烟

※ Above testing of safe characteristic must be with protective equipment.(安全性能测试应在有保护措施下进行)