RECHARGEABLE LITHIUM-ION BATTERY

SPECIFICATION FOR APPROVAL

Cell Model: **CSL355870**

Cell Type:**Li-ion Polymer**

Pack Model: **TLp024C1**

	Item	Prepared	Checked	Approved
BYD	Date	May 05,2016	May 05,2016	May 05,2016
	Sign	Tong Decai	Cai Xiaoli	Zhang Baosheng

BYD common seal	Effective date: _____	Customer common seal

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Issue/Revision History

Rev.	Date	Revision Content	Initiated by	Checked by	Approved by
X1	2016-03-04	First issue	Tong Decai	Cai Xiaoli	Zhang Baosheng
X2	2016-03-14	Add printing drawing and TCL PN,Update pack model	Tong Decai	Cai Xiaoli	Zhang Baosheng
X3	2016-03-22	Update PCM specification	Tong Decai	Cai Xiaoli	Zhang Baosheng
X4	2016-05-05	Add CAC C1 printing drawing, CAC C1,and DG shipment voltage, DG packaging, general packaging	Tong Decai	Cai Xiaoli	Zhang Baosheng

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Battery PN list

TCL PN	Logo	Language	Package type	MPN	Remark
CAC C1	Alcatel	Chinese-English-French	General packaging		
CAC C1	TCL	Chinese-English-French	General packaging		
CAC C1	Alcatel	Chinese-English-French	DG packaging		

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1. Scope

The specification describes the requirements for the rechargeable lithium-ion battery supplied by BYD LITHIUM BATTERY CO.,LTD. Including product specification, test method, product liability, notice and pack specification etc.

2. Product specifications

2.1	Cell model		CSL355870		
2.2	Pack model		TLp024C1		
2.3	Nominal voltage		3.85V		
2.4	Battery capacity		2400mAh (Minimum)		
			Fully charged battery is discharged with current 0.2C from 4.40V to 3.00V		
2.5	Charge	Charge method	CC - CV (Constant current - Constant voltage)		
		Operating temp.	0~10°C	10~45°C	45~60°C
		Current	0.2C(Standard) 0.5C(Max)	0.5C(Standard) 1C(Max)	0.2C(Standard) 0.5C(Max)
		Limited voltage	4.40V	4.40V	4.10V
2.6	Discharge	Current	0.2C(Standard)	1.5C(Max)	
		Cut-off voltage	3.00V		
		Operating temp.	-20～+60°C		
2.7	Storage at different temperature		Storage temp.	Storage term	Recovery capacity
			-20～+60°C	1 month	Refer to note*1
			-20～+45°C	3 months	
			-20～+20°C	1 year	
2.8	charge current at different voltage		<2.5V 0.2C		
			<3.2V 0.5C		
2.9	Initial impedance		≤150mΩ (@AC1kHz)		
2.10	Shipment voltage		3.88～3.98V		
2.11	DG shipment voltage		3.74-3.82V		
2.12	Storage relative humidity		65±20%		
Note*1:The capacity recovery rate should be more than 80% under the shipment status.					

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3. Specification and test method

3.1 Test Conditions

No.	Items	Description
3.1.1	Standard environmental	Unless otherwise specified, all tests stated in this document shall be performed at: Temperature: 23±2℃
3.1.2	Electrical characteristics	Unless otherwise specified, all electrical tests stated in this document shall be performed to no less than the following levels of precision: End of charge and end of discharge voltage: ± 0.05 V Open circuit voltage (OCV): ±0.001 V Charge and discharge current:±1mA, or at ≤0.1% Impedance: ±0.2 mΩ
3.1.3	Impedance	Measured at AC 1kHz

3.2 Test Definitions

No.	Items	Description
3.2.1	Standard charge	Charge to 4.40V with 0.5C constant current(CC) then with 4.40 V constant voltage (CV);cut off at 0.02C
3.2.2	Standard discharge	Discharge with 0.5C constant current to 3.00V
3.2.3	1C-rate current	The discharge current consumed when discharging the fully charged battery to 3.00V for 1 hour
3.2.4	Rest time	Rest time is 30minutes after every discharge Rest time is 10minures after every charge
3.2.5	Normal test	Before any new test, battery should be tested OCV and impedance
3.2.6	Explosion	When the battery contents are forcibly expelled and the battery casing is torn or split into two or more pieces
3.2.7	Venting	Release of gas at increased internal pressure from a battery, in a manner intended by design to preclude explosion.
3.2.8	Fire	The emission of flames
3.2.9	Leakage	Unplanned escape of electrolyte, gas or other material, from a battery: leakage has occurred when a battery loses more than 0.1% of its initial mass due to loss of internal components.
3.2.10	Residual capacity	The residual capacity is measured by standard discharging to the cut-off voltage before being charged
3.2.11	Recovery capacity	The recovery capacity is the 3rd discharge capacity of being fully charged and discharged for 3 times

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4. Electrical characteristics

NO.	Items	Conditions			Criterion
4.1	Complete charge	"Complete charge" means charging the battery with 0.2C of constant current and 4.40V constant voltage for 6.5 hours total.			/
4.2	Initial capacity	Fully charged battery is discharged with current 0.2C to 3.00V cut off.			≥2400mAh
4.3	Cycle life	Measure the capacity after 350cycles and 500 cycles of 1C charge followed by 0.5C discharge			After 350 cycles, Capacity≥ 85% Impedance increase ＜25mΩ
					After 500 cycles, Capacity≥80% Impedance increase＜30mΩ
4.4	Discharge at different temperature	Compare with the capacity of discharging at each temperature. The charging is completed at 23 ± 2 ℃ according with the standard charge method. At 23 ℃ and 60℃, the capacity is measured by discharging with a constant current 0.2C till the voltage reaches 3.0V, while at -10℃ the capacity is measured by discharging with a constant current 0.2C till the voltage reaches 2.75V. The cooling and warming time are both at least 3 hours. Compare the capacity to that of at 23±2℃, and get the rate as below.			
		-10℃	0℃	23℃	55℃
		70%	80%	100%	95%
4.5	Self discharge	After complete charge, stand at 23 ℃ for 28days, Then discharge at 0.2C to 3.0V cut-off			Residual Capacity: ≥85%

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