AA Portable Power Corp：

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Polymer Lithium Ion Battery

Specifications

Model: PL-75/48/168

(JUST FOR REFERENCE)

Approval	Checked	Draft

History of revisions

No.	Date	Description
0	2005/04/04	First issue----------

Contents

Specifications for PL-75/48/168

1 Scope

This specification is applied to TCL POLION Lithium Ion Battery manufactured by TCL Hyperpower Batteries Inc.

2 Product and Model Name

2.1 Product：Polymer Lithium Ion Battery

2.2 Model Name：PL-75/48/168

3 Ratings

Item			Rating	Note
3.1	Capacity	Typical	6150mAh	Discharge:0.2CmA (1200mA) cut off Voltage:3.0V for cell
		Minimum	6000mAh	
3.2	Nominal Voltage		Average 3.7V	Discharge:0.2CmA (1200mA) cut off Voltage:3.0V for cell
3.3	AC Impedance Resistance		≤20mΩ	
3.4	Discharge Cut-off Voltage		3.0V	
3.5	Charge Current		3000mA	Standard Charge
3.6	Charge Voltage		4.2V	
3.7	Max. Charge Voltage		4.23V	
3.8	Charge Time		Approx 3.5h	Charge: 0.5CmA(3000mA)
3.9	Max. Charge Current		6000mA	1.0CmA
3.10	Max. Discharge Current		6000mA	1.0CmA
3.11	Weight		Approx 122.0g	
3.12	Operating Temperature	Charge	0~+45℃	
		Discharge	-20~+60℃	
3.13	Storage Temperature	less than 1 month	-20~+45℃	Recommended storage temperature: 20℃,at the shipment state
		less than 6 months	-20~+35℃	

4 Outline Dimensions and Appearance

4.1 Outline Dimensions

See attached drawing for PL-75/48/168(Fig.1).

Thickness：7.50mm max.（Measured with weighting 300gf at 25±2℃）

Width：48.0mm max.（Measured with weighting 300gf at 25±2℃）

Length：168.0mm max.（not including tabs）

This thickness will be swelling when high temperature storage or operation in high temperature.

4.2 Appearance

There shall be no such defect as scratch, flaw, crack, rust, leakage, which may adversely affect commercial value of battery.

5 Performance

5.1 Standard Test Conditions

Test should be conducted with new batteries within one month after shipment from our factory and the cells shall not be cycled more than five times before the test. Unless otherwise defined, test and measurement shall be done under temperature of 25±2℃ and relative humidity of 45~85%. If it is judged that the test results are not affected by such conditions, the tests may be conducted at temperature 15~30℃ and humidity 25~85%RH.

5.2 Measuring Instrument or Apparatus

5.2.1 Dimension Measuring Instrument

The dimension measurement shall be implemented by instruments with equal or more precision scale of 0.01mm.

5.2.2 Voltmeter

Standard class specified in the national standard or more sensitive class having inner impedance more than 10 MΩ

5.2.3 Ammeter

Standard class specified in the national standard or more sensitive class. Total external resistance including ammeter and wire is less than 0.01Ω.

5.2.4 Impedance Meter

Impedance shall be measured by a sinusoidal alternating current method(1kHz LCR meter).

5.3 Standard Charge

Test procedure and its criteria are referred as follows:

0.5CmA=3000mA

Full charge condition: Constant current 0.5CmA,Constant voltage 4.2V for 3.5hours in all at 25±2℃.

5.4 Rest Period

Unless otherwise defined, 30min,rest period after charge,30min,rest period after discharge.

5.5 Initial Performance Test

Item	Measuring Procedure	Requirements
(1) Open-Circuit Voltage	The open-circuit voltage shall be measured within 24 hours after standard charge.	≥4.13V
(2) AC Impedance Resistance	The Impedance shall be measured in an alternating current method (1kHz LCR meter) after standard charge at 25±2℃.	≤20mΩ
(3) Minimum Capacity	The capacity on 0.2CmA(1200mA)discharge shall be measured after standard charge at 25±2℃.	Discharge Capacity ≥6000mAh

5.6 Electrical Performance

5.6.1 Temperature Dependence of Capacity (Discharge)

Cells shall meet the discharge capacity requirements listed in the below table under respective discharge temperatures. The capacities are to be measured with constant discharge current 0.2CmA (2.75V cut-off) after standard charge at 25±2℃.

Discharge Temperature	-20℃	25℃	60℃
Discharge Capacity	50%	100%	90%

5.6.2 Cycle Life

30min, rest period after standard charge, 0.5CmA discharge to a cut-off voltage of 3.0V, 30min rest period, the capacity shall be measured after 300 cycles of standard charge and discharge at 25±2℃.

Capacity ≥4800mAh

5.6.3 Shelf Life

Item		Measuring Procedure	Requirements
Storage Characteristics 1	1	The capacity on 0.2CmA discharge shall be measured after standard charge and then storage at 25±2℃ for 30 days.	Remaining Capacity ≥85% C_5
	2	After above measured Remaining capacity, the capacity on standard discharge shall be measured after standard charge.	Recovery capacity ≥90% C_5
Storage Characteristics 2	1	The capacity on 0.2CmA discharge shall be measured after standard charge and then storage at 25±2℃ for 30 days.	Remaining Capacity ≥60% C_5
	2	After above measured Remaining capacity, the capacity on standard discharge shall be measured after standard charge.	Recovery capacity ≥80% C_5

5.6.4 Long Time Storage Characteristics

After about half charge and then storage at 25±2℃ for one year(365 days). The remaining available capacity is ≥85% C_5. The capacity is determined with the capacity of the by the most of preceding three cycles.

5.7 Mechanical Performance

Item	Measuring Procedure	Requirements
Vibration test	After standard charge, the battery is to be tested as following conditions: Amplitude:0.8mm Frequency:10~55Hz(sweep:1Hz/min) Direction: X/Y/Z axis for 90~100min. The battery is to be tested in three mutually perpendicular to each axis.	No fire, no explosion, no smoking is obtained. Recovery Capacity $\geqslant$ 70%C_5

5.8 Safety Performance

Item	Measuring Procedure	Requirements
Short-Circuit Test	After standard charge, the battery is to be short-circuited by connecting the positive and negative terminals of the battery with copper wire having a maximum resistance load of 0.1Ω.	No explosion, fire. The temperature of the exterior cell casing shall not exceed 150℃.
Heating Test	A battery is to be heated in a gravity convection or circulating air oven. The temperature of the oven is to be raised at a rate of 5±2℃/min to a temperature of 130±2℃ at which temperature the oven is to remain for 30 minutes before the test is discontinued.	No explosion, fire.
Abnormal Charging Test	After standard charge, the battery is subjected to a charging current by connecting it to a dc-power supply. The beginning current is 0.3C,witch is to be obtained by connecting a resistor of specified size and rating in series with the battery, the voltage of the dc-power supply is 4.8V. The test time is 2.5 hours. This does not require that the initial I_c be maintained for 2.5 hours.	No explosion, fire.

6 Handling Instructions

Read and observe the following warnings and precautions to ensure correct and safe use of Li-ion batteries.

Danger!

Failure to observe the following precautions may result in battery leakage, overheating, explosion and/ or fire.

— Do not immerse the battery in water or allow it to get wet.
— Do not use or storage the battery near sources of heat such as a fire or heater.
— Do not use any chargers others than those recommended by TCL.
— Do not reverse the positive(+) and negative(-) terminals.
— Do not connect the battery directly to wall outlets or car cigarette-lighter sockets.
— Do not put the battery into a fire or apply direct heat to it.
— Do not shot-circuit the battery by connecting wires or other metal objects to the positive(+) and negative(-) terminals. Do not carry or storage the battery with necklaces, hairpins or other metal objects.
— Do not strike, throw or subject the battery to sever physical shock.
— Do not pierce the battery casing with a nail or other sharp object, break it open with a hammer, or step on it.
— Do not directly solder the battery terminals.
— Do not attempt to disassemble or modify the battery in any way.
— Do not recharge the battery near a fire or in extremely hot conditions.

Warning!

Failure to observe the following precautions may result in battery leakage, overheating, explosion and/ or fire.

— Do not place the battery in a microwave oven or pressurized container.
— Do not use the battery in combination with primary batteries(such as dry-cell batteries) or batteries of different capacity, type or brand.
— Do not use the battery if it gives off an odor, generates heat, becomes discolored or deformed, or appears abnormal in any way. If the battery is in use or being recharged, remove it from the device or charger immediately and discontinue use.
— Keep the batteries out of the reach of children. If a child somehow swallows a battery , seek medical attention immediately.
— If the battery leaks or emits an odor, immediately remote it from the proximity of any exposed flame. The leaking electrolyte can ignite and cause a fire or explosion.
— If the battery leaks and electrolyte gets in your eyes, do not rub them. Instead, rinse them with clean running water and immediately seek medical attention. If left as is, electrolyte can cause eye injury.

Caution!

Do not use store the battery where a exposed to extremely heat, such as in direct sunlight or in a car on a hot day. Otherwise, the battery can overheat and possibly ignite. This can also reduce performance and/or shorten service life.

Use the battery only under the following environmental conditions. Failure to do so can result in reduced performance or a shorten service life. Recharging the battery outside of these temperatures can cause the battery to overheat, explode or catch fire.

Operating environment:
When charging the battery: 0℃～45℃
When discharging the battery: -20℃～60℃
When stored up to 30 days: -20℃～45℃
When stored up to 90 days: -20℃～35℃

In cases where children use the battery, instruct them on the contents of the user's guide and keep an eye on them to ensure that the battery is being used correctly.
If the battery leaks and electrolyte gets your skin or clothing, immediately rinse the affected area with clean running water. If left as is, skin inflammation can occur.
For directions on battery installation and removal, read the instruction manual that accompanies the equipment in which the battery will be used.
If a device is not used for an extended period, the battery should be removed and stored in a cool, dry place. Otherwise, resting or reduced performance may occur.
If the terminals of the battery are dirty, wipe them clean with dry cloth before use. Otherwise, solid electrical contact may not be charged with the equipment, and this can cause power outages or charging to fail.

7 Period of Warranty

The period of warranty is one year from the date of shipment. TCL guarantees to give a replacement in case of cells with defects proven due to manufacturing process instead of the customers abuse and misuse.

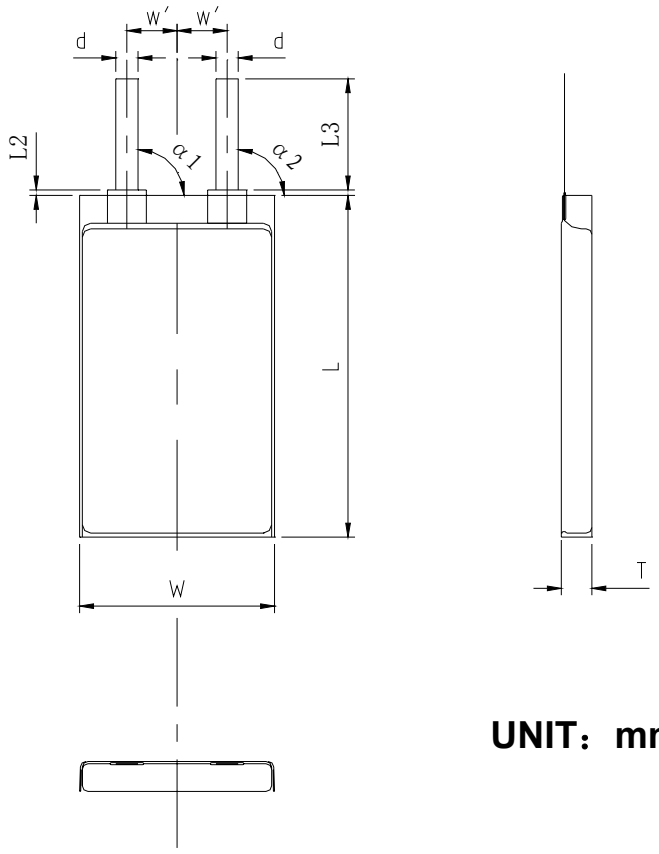
8 Shipment

Partial charged condition.

9 Amendment of this Specification

This specification is subject to change with prior notice.

Fig.1 Dimensional Drawing of PL-75/48/168



UNIT：mm

Testing Term	Specs	
T	**7.50mm max.**	
W	**48.0 mm max.**	
L	**168.0 mm max.**	
L2	**1.0+1.0/-0.5 mm**	
L3	**10.0±1.0 mm**	
w'	**11.0±1.0mm**	
d	**5.0±0.2mm**	
α 1	**90±5 °**	
α 2	**90±5 °**	
Draft	Checked	Approval