

Product Specification

Customer's Name :

受领公司名称: 矽递科技

Spec.No :

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TCL HYPER-POWER BATTERIES INC

TCL 金能电池有限公司

Specification For Approval  
客户承认书

**Customer Model: PR-474446**

**TCL Model: \_\_\_\_\_**

**Cell Model:PR-474446**

**Type: Li-ion polymer**

**类型: 聚合物锂离子**

Approval	Checked	Draft
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Customer Approval		

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# Product Specification

## History of specification

### 规格书修订记录

修改次数 Revised Sequence	文件版本 Doc. Version	修改内容 Changed Content	修改原因 Reason	修改日期 Issued Date	修改人 Revised by	批准人 Approved by	备注 Remark
1	A/0						
2	A/1	Add connector.		2014.10.8	Tianxy	Gaosq	

# Product Specification

## Contents 目录

1. Scope 适用范围.....	4
2. Specification of cell 电芯主要技术参数.....	4
3. Battery configuration 电池组成.....	5
4. Battery Performance Criteria 电池性能检查及测试.....	5
4.1 Appearance 外观.....	5
4.2 Measurement Apparatus 测试设备要求.....	5
4.3 standard Test Condition 标准的测试条件.....	5
4.4 Standard Charge 标准充电.....	5
4.5 Electrical Performance 电性能测试.....	6
4.5.1 Temperature Dependence of Capacity (Discharge) 放电温度特性.....	6
4.5.2 Cycle Life 循环性能.....	6
4.5.3 Shelf Life 荷电保持能力.....	6
4.6 Mechanical Performance 机械性能.....	7
4.7 Safety Performance 安全性能.....	7
4.8 Rest Period 搁置时间.....	8
5. Storage and Others 贮存及其它事项.....	8
5.1 Long Time Storage 长期贮存.....	8
5.2 Others 其它事项.....	8
6. Protection Circuit 保护电路.....	8
6.1 Circuit Diagram 电路原理图.....	8
6.2 PCB Layout.....	9
6.3 PCM BOM.....	10
6.4 PCM parameter PCM 参数.....	10
7. Assembly Drawing 装配图纸.....	11
8. Battery assy.....	12
Appendix 附录	
1 Charging 充电.....	13
1.1 Charging current 充电电流.....	13
1.2 Charging voltage 充电电压.....	13
1.3 Charging temperature 充电温度.....	14
1.4 Prohibition of reverse charging 禁止反向充电.....	14
2 Discharging 放电.....	14
2.1 Discharging current 放电电流.....	14
2.2 Discharging temperature 放电温度.....	14
2.3 Over-discharging 过放电.....	14
3. Protection Circuit Module 保护电路模块.....	14
3.1 overcharging prohibition: 过充保护电压.....	15
3.2 over-discharging prohibition: 过放电保护.....	15
4. Storage 贮存.....	15
5. Handling Instructions 电池的注意事项.....	15
6. Amendment of this Specification 产品规格书的修订.....	17

## Product Specification

### 1. Scope 适用范围

The specification shall be applied to Li-ion polymer rechargeable battery pack of PR-474446 which is manufactured by TCL HYPER-POWER BATTERIES.

本规格书适用于 TCL 金能电池有限公司生产的 PR-474446 聚合物锂离子可充电电池。

### 2. Specification of cell 电芯主要技术参数

NO	Items	Criteria	Remarks
2.1	Typical Capacity 典型容量	1100mAh	Discharge:0.2CmA cut-off voltage:3.0V 0.2C 放电至 3.0V 截止
	Minimum Capacity 最小容量	1050mAh	
2.2	Nominal Voltage 标称电压	3.7V	
2.3	Internal Impedance 内阻	Cell: $\leq 80\text{m}\Omega$	AC 1KHz test after standard charge 标准充电后 AC 1KHz 测试
		Battery: $\leq 260\text{m}\Omega$	
2.4	Charge Voltage 充电电压 (V)	4.2V	
2.5	Standard charge current 标准充电电流	525mA	
2.6	Max. charge current 最大充电电流	1050mA	
2.7	Standard discharge current 标准放电电流	525mA	
2.8	Max. discharge current 最大放电电流	1050mA	
2.9	Discharge cut-off voltage 放电截止电压	3.0V	
2.10	Operating Temperature 工作温度	0~+45°C	Charging 充电
		-10°C~+60°C	Discharging 放电
2.11	Storage Temperature 贮存温度	-20°C~+45°C	Less than 1 month 小于一个月
		-20°C~+35°C	Less than 6months 小于六个月
		-20°C~+25°C	Less than 12months 小于 12 个月

### 3. Battery configuration 电池组成

NO	Item	Criteria	Remarks
3.1	Semi-manufactured cell	PR-474446	TCL
3.2	PCM	BS41	TCL
3.3	Connector	JST PHR-2	/
3.4	Wire	Wire:UL3302 30AWG	/

### 4. Battery Performance Criteria 电池性能标准

#### 4.1 Appearance 外观

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

电池外表面清洁，无电解液泄漏，无明显的划痕及机械损伤，无变形，无影响电池价值的其它外观缺陷。

#### 4.2 Measurement Apparatus 测试设备要求

##### (1) Dimension Measuring Instrument 尺寸测量设备

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

测量尺寸的仪器的精度应不小于 0.01mm

##### (2) Voltmeter 电压表

Standard class specified in the national standard or more sensitive class having inner impedance not less than 10 KΩ/V.

国家标准或更灵敏等级,内阻不小于 10 KΩ/V.

##### (3) Ammeter 电流表

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

国家标准或更灵敏等级，外部总体内阻包括电流表和导线应小于 0.01Ω.

##### (4) Impedance Meter 内阻测试仪

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

内阻测试仪测试方法为交流阻抗法(AC 1kHz LCR).

#### 4.3 standard Test Condition 标准的测试条件

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°C and relative humidity of 45~85%.

测试电池必须是本公司出厂时间不超过一个月的新电池，且电池未进行过五次以上充放电循环。除非其它特殊要求，本产品规格书规定的测试的环境条件为：温度 25±2°C，相对湿度 45%~85%。

#### 4.4 Standard Charge 标准充电

0.5CmA=525mA

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

0.5CmA (525mA) 4.2V(CC-CV) 总充电时间不超过 3.5 小时，其中在 25±2°C 环境下充电；

## 4.5 Electrical Performance 电性能

### 4.5.1 Temperature Dependence of Capacity (Discharge) 放电温度特性

Battery shall meet the discharge capacity requirements at different discharge temperature as showed in the follow table. The capacities are to be measured with constant discharge current on 0.2CmA 210mA (3.0V cut-off) after standard charge at  $25 \pm 2^\circ\text{C}$ .

电池在  $25 \pm 2^\circ\text{C}$  标准充电, 然后在 30 分钟内冷却或加热到测试温度。放电前电池在此温度下保持 1 小时, 放电电流为 0.2CmA (210mA) (3.0V 关断), 做完一个温度实验后, 电池在室温下放置 2h 然后进行充电 ( $25 \pm 2^\circ\text{C}$ ), 要求如下:

Discharge Temperature 放电温度	-10 $^\circ\text{C}$	25 $^\circ\text{C}$	60 $^\circ\text{C}$
Discharge Capacity 放电容量	50%	100%	95%

### 4.5.2 Cycle Life 循环性能

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 400cycles of standard charge and discharge at  $25 \pm 2^\circ\text{C}$ .

Capacity  $\geq 80\%$

标准充电后, 搁置 30min, 0.5CmA 放电至 3.0V, 搁置 30min, , 重复上述步骤进行循环, 直至电池循环 400 次 测试温度  $25 \pm 2^\circ\text{C}$  (影响电池循性能的重要参数), 要求如下:

容量  $\geq 80\%$

### 4.5.3 Shelf Life 荷电保持能力

Item 项目	Measuring Procedure 测试方法	Requirements 要求
Storage Characteristics 1 常温贮存	1 The capacity on 0.2CmA discharge shall be measured after standard charge and then to be stored at $25 \pm 2^\circ\text{C}$ for 30 days. 标准充电后电池在 $25 \pm 2^\circ\text{C}$ 的环境中贮存 30 天, 测试 0.2CmA 放电容量 (保持容量)	Retention Capacity $\geq 85\%$ 容量保持 $\geq 85\%$
	2 To measure the Retention Capacity (the highest discharge capacity in three cycles) after the battery to be cycled on 0.2CmA for three times. 0.2CmA 循环 3 次, 测试恢复容量 (3 周循环的最大放电容量)	Recovery capacity $\geq 90\%$ 容量恢复 $\geq 90\%$
Storage Characteristics 2 高温贮存	1 The discharge capacity on 0.2CmA shall be measured after standard charge and then to be stored at $60 \pm 2^\circ\text{C}$ for 7 days. 标准充电后电池在 $60 \pm 2^\circ\text{C}$ 的环境中贮存 7 天, 测试 0.2CmA 放电容量 (保持容量)	Remaining Capacity $\geq 85\%C5$ 容量保持 $\geq 85\%C5$
	2 To measure the Retention Capacity (the highest discharge capacity in three cycles) after the battery to be cycled on 0.2CmA for three times. 0.2CmA 循环 3 次, 测试恢复容量 (3 周循环的最大放电容量)	Recovery capacity $\geq 80\%$ 容量恢复 $\geq 80\%$

## Product Specification

### 4.6 Mechanical Performance 机械性能

Item	Measuring Procedure	Requirements
Vibration test 振动测试	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. 标准充电后, 电池在以下条件下测试: 振幅: 0.8mm 振动频率: 10~55Hz(扫频:1Hz/min) 方向: X、Y、Z 三个互相垂直方向往复振动 90~100min.	No fire, no explosion, no smoking is obtained. 电池不起火,不爆炸,不冒烟
Drop Test 跌落测试	Drop the battery in the shipment condition(full- charge) from 1m height onto 5cm or thicker concrete with p-tile on it 1 times each of X, Y, and Z directions at 25±2°C 在出货条件下将电池由高度为 1m 的位置自由跌落到置于 5cm 水泥地面,X,Y,Z 方向上各 1 次.	No fire, no explosion, no smoking is obtained. 电池不起火,不爆炸,不冒烟

### 4.7 Safety Performance 安全性能

Item	Condition	Criteria
Overcharge Test 过充电测试	After standard charge (Section 4.4), the battery shall be charged at 3C(3150mA)/4.6V for 8.0hrs. 标准充电后, 电池用 3C(3150mA)/4.6V 恒流恒压充电 8 小时	No fire, no explosion, no smoking is obtained. 电池不起火,不爆炸,不冒烟
Short circuiting Test 短路测试	After standard charge (Section 4.4), the battery shall be subjected to a short-circuit condition with a wire of resistance less than 100mΩ for 1 hour. 标准充电后, 将接有热电偶的的电池置于通风橱中, 短路其正、负极, 线路总电阻不大于 100mΩ, 测试 1 小时	No fire, no explosion, no smoking is obtained. 电池不起火,不爆炸,不冒烟
Over discharge Test 过放电测试	After discharged to the cut-off voltage, the battery shall be subjected to a short-circuit condition with a load of resistance less than 30Ω for 24hour. 放电至截止电压后, 外接小于 30Ω 的负载电阻放电 24 小时	No fire, no explosion, no smoking is obtained. 电池不起火,不爆炸,不冒烟
Heating Test 热冲击	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°C/min to a temperature of 130±2°C at which temperature the oven is to remain for 30 minutes before the test is discontinued. 电池放于热箱中, 温度以 (5±2°C) /min 的速率升至 130±2°C 并保温 30min.	No explosion, no fire. 电池不起火,不爆炸

#### 4.8 Rest Period 搁置时间

Unless otherwise defined, 30min, rest period after charge, 30min, rest period after discharge.  
如无特殊要求，电池充放电间隔为 30min。

### 5. Storage and Others 贮存及其它事项

#### 5.1 Long Time Storage 长期贮存

If stored for a long time(exceed three months), the cell should be stored in drying and cooling place.  
The cell is to be stored in a condition as following.

长期贮存的电池（超过 3 个月）须置于干燥、凉爽处。且贮存要求如下。

The environmental condition should be:

Temperature:  $25 \pm 2^{\circ}\text{C}$ , Humidity:  $65 \pm 20\% \text{RH}$

须置于温度为  $25 \pm 2^{\circ}\text{C}$ 、湿度为  $65 \pm 20\% \text{RH}$  的环境中。

No use for long time, Please keep the battery capacity at 50%, it means: not full charge and not full discharge, and re-charge it after 2-3 months (voltage is 3.7-3.9v), and use the 50% of capacity, in this way, it can avoid the battery damage for long time.

长期不使用时，要让电池处于半电（一半容量）状态，并在 2-3 个月时间后重新充电（3.7-3.9v），并使用一半容量，这样可以长期有效的保证电池不受损坏。

#### 5.2 Others 其它事项

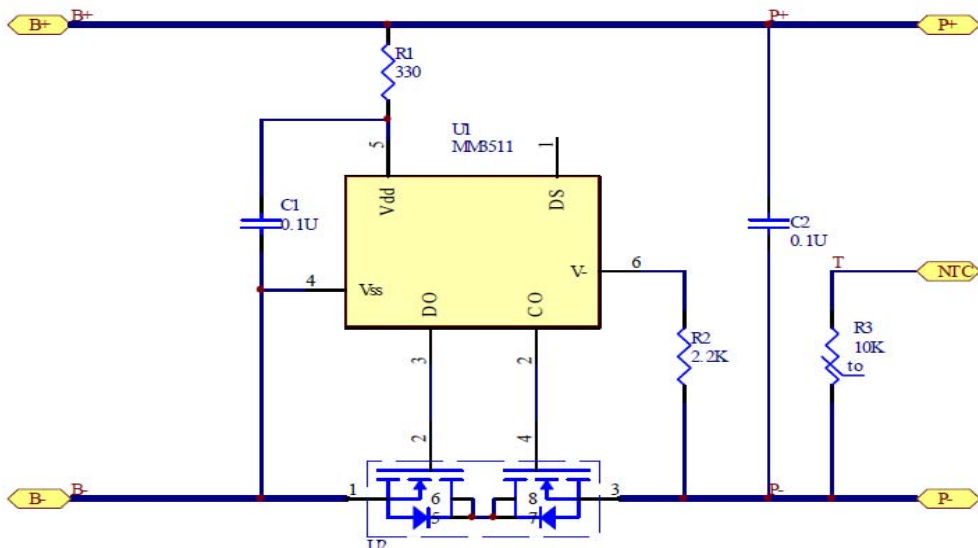
Any matters that this specification does not cover should be conferred between the customer and TCL.

任何本说明书中未提及的事项，须经双方协商确定。

### 6. Protection Circuit 保护电路

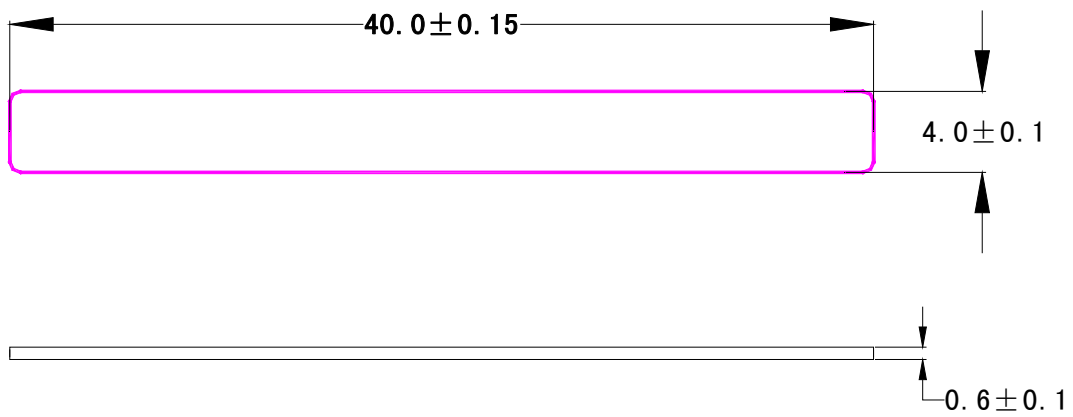
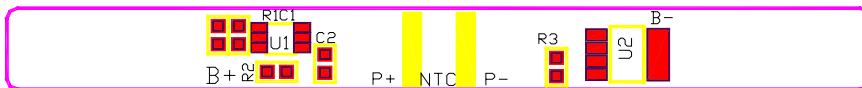
#### 6.1 Circuit Diagram 电路原理图

#### 6.2 PCB Layout





# Product Specification



### 6.3 PCM BOM

Item	Reference	Description	Type	Qty	Mftr
1	U1	Protection IC	MM3511A66Y	1	Mitsumi
2	U2	Power Mosfet	MTMC8E2A0LBF	1	Panasonic
3	R1	Resistor	330Ω±5%	1	SKYWELL Or YAGEO
4	R2	Resistor	2.2KΩ±5%	1	SKYWELL Or YAGEO
5	T	NTC	10KΩ±5% B=3435	1	SENSICOM
6	C1、C2	Capacitor	0.1uF±20%	2	SKYWELL Or YAGEO
7		PCB		1	

### 6.4 PCM parameter PCM 参数

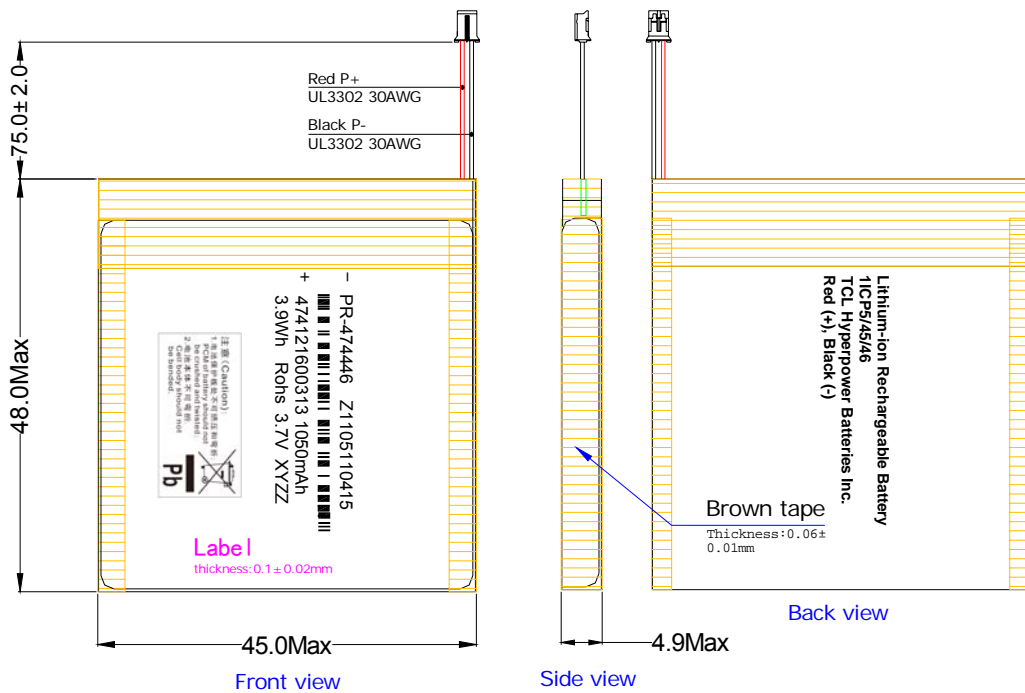
NO	Item	Criteria
1	Over-charge Protection Voltage 过充电保护电压	4.280±0.020V
2	Over-discharge protection Voltage 过放保护电压	3.0±0.035V
3	Over-current detection Voltage 过流检测电压	0.075±0.01V
4	Current consumption at normal operation 静态时消耗电流	10uA Max
5	Current consumption at power-down 休眠时消耗电流	2uA Max

# Product Specification

## 7. Assembly Drawing 装配图纸

Rev.	Revision note	Date	Signature	Checked
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Connector: JST PHR-2  
Pitch=2.0mm  
Wire: UL3302 30AWG



manufacturing date: X Y ZZ

X=1,2,...,9;

"A" represent "2010year", "B" represent "2011 year" "C" represent "2012 year", ... "J" represent "2019 year"

Y=A,B...L:

"A" represent January, "B" represent February, "C" represent March, "D" represent April, "E" represent May,

"F" represent June, "G" represent July, "H" represent August, "I" represent September, "J" represent October,

"K" represent November, "L" represent December

ZZ=01,02...31:

the day in month: "01" is the first day in month, "02" is the second day in month---- "31" is the 31th day in the month

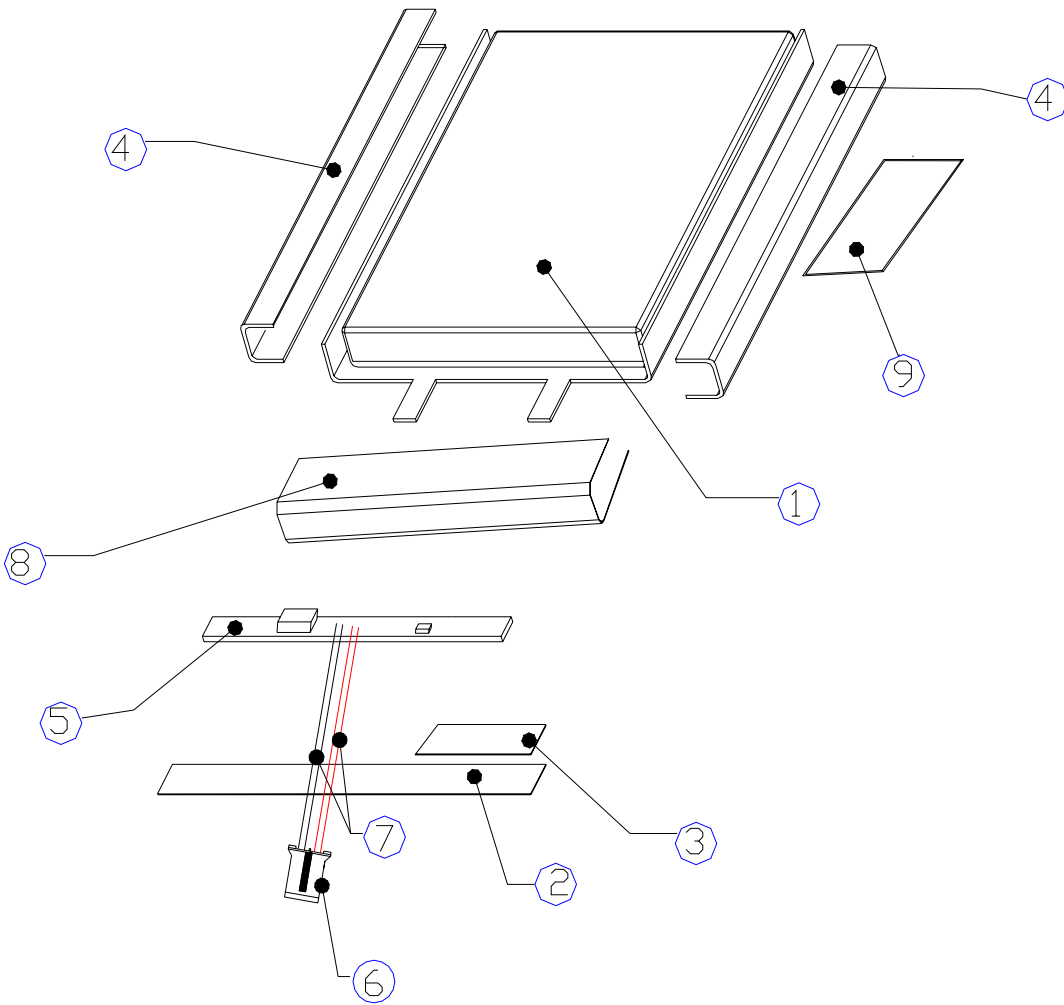
## TCL HYPERPOWER BATTERIES INC.

DRAW:Tianxy	DATE: 2014-10-08	SCALE:	TITLE <b>PR-474446</b>		
CHECK:	MATERIAL:	VER:A/0			
APPROVAL:	FINISHED:		unit:mm	doc. number:	

# Product Specification

## 8. Battery assy

Rev.	Revision note	Date	Signature	Checked
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NO.	Component	Material Name	Description	Qty	Unit	Remark
9	Label			1	Pcs	
8	Insulation tape	Brown Tape		1	Pcs	
7	Wire		UL3302 30AWG Black UL3302 30AWG Red	1	Pcs	
6	connector	JST PHR-2		1	Pcs	
5	Pcm	BS41		1	Pcs	
4	Insulation tape	Brown Tape		2	Pcs	
3	DOUBLE COATE TISSUE TAPE	3M9448		1	Pcs	
2	Insulation tape	Brown Tape		1	Pcs	
1	Cell	PR-374860		1	Pcs	

**TCL HYPERPOWER BATTERIES INC.**

DRAW:tianxy	DATE: 2014-10.08	SCALE:	TITLE
CHECK:	MATERIAL:	VER:A/1	<b>Battery assy</b>
APPROVAL:	FINISHED:		unit:mm doc. number:

## Appendix 附录

### Handling Precautions and Guideline For LIP (Lithium-Ion Polymer) Rechargeable Batteries 聚合物锂离子充电电池操作指示及注意事项

#### Preface 前言

This document of 'Handling Precautions and Guideline LIP Rechargeable Batteries' shall be applied to the battery cells manufactured by TCL Hyperpower Batteries Inc.

本档“聚合物锂离子充电电芯操作指示及注意事项”仅适用于 TCL 金能电池有限公司生产电芯。

#### Note (1) : 声明一

The customer is requested to contact TCL Hyperpower Batteries Inc. 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.

客户若需要将电芯用于超出本规格书规定以外的设备, 或在本规格书规定以外的使用条件下使用电芯, 应事先联系 TCL 金能电池有限公司, 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。

#### Note (2) : 声明二

TCL Hyper-power Batteries Inc. will take no responsibility for any accident when the cell is used under other conditions than those described in this Document.

对于在超出本规格书规定以外的条件下使用电芯而造成的任何意外事故, TCL 金能电池有限公司概不负责。

#### Note (3): 声明三

TCL Hyper-power Batteries Inc. will inform, in a written form, the customer of improvement(s) regarding proper use and handling of the cell, if it is deemed necessary.

如有必要, TCL 金能电池有限公司会以书面形式告知客户有关正确操作使用电芯的改进措施。

## 1 Charging 充电

### 1.1 Charging current 充电电流

Charging current should be less than maximum charge current specified in the Product Specification. Charging with higher current than recommended value may cause damage to cell electrical, mechanical, and safety performance and could lead to heat generation or leakage.

充电电流不得超过本规格书中规定的最大充电电流。使用高于推荐值电流充电将可能引起电芯的充放电性能、机械性能和安全性能的问题, 并可能会导致发热或泄漏。

### 1.2 Charging voltage 充电电压

Charging shall be done by voltage less than that specified in the Product Specification (4.2V/cell). Charging beyond 4.30V, which is the absolute maximum voltage, must be strictly prohibited. The charger shall be designed to comply with this condition.

充电电压不得超过本规格书规定的额定电压 (4.2V/电芯)。4.30V 为充电电压最高极限, 充电器的设计应满足此条件。

It is very dangerous that charging with higher voltage than maximum voltage may cause damage to the cell electrical, mechanical safety performance and could lead to heat generation or leakage.

电池电压高于额定电压值时, 将可能引起电芯的充放电性能、机械性能和安全性能的问题, 可能会导致发热或泄漏。

### 1.3 Charging temperature 充电温度

The cell shall be charged within range in the Product Specification.

电池必须在本规格书规定的环境温度范围内进行充电。

### 1.4 Prohibition of reverse charging 禁止反向充电

Reverse charging is prohibited. The cell shall be connected correctly. The polarity has to be confirmed before wiring. In case of the cell is connected improperly, the cell cannot be charged. Simultaneously, the reverse charging may cause damaging to the cell which may lead to degradation of cell performance and damage the cell safety, and could cause heat generation or leakage.

正确连接电池的正负极，严禁反向充电。若电池正负极接反，将无法对电芯进行充电。同时，反向充电会降低电芯的充放电性能、安全性，并会导致发热、泄漏。

## 2 Discharging 放电

### 2.1 Discharging current 放电电流

The cell shall be discharged at less than the maximum discharge current specified in the Product Specification. High discharging current may reduce the discharging capacity significantly or cause over-heat.

放电电流不得超过本规格书规定的最大放电电流，大电流放电会导致电芯容量剧减并导致过热。

### 2.2 Discharging temperature 放电温度

The cell shall be discharged within range specified in the Product Specification.

电池必须在本规格书规定的环境温度范围内进行放电。

### 2.3 Over-discharging 过放电

It should be noted that the cell would be at an over-discharged state by its self-discharge characteristics in case the cell is not used for long time. In order to prevent over-discharging, the cell shall be charged periodically to maintain between 3.7V and 3.9V.

需要注意的是，在电池长期未使用期间，它可能会用其自放电特性而处于某种过放电状态。为防止过放电的发生，电池应定期充电，将其电压维持在 3.7V 至 3.9V 之间。

Over-discharging may causes loss of cell performance, characteristics, or battery functions.

过放电会导致电芯性能、电池功能的丧失。

The charger shall be equipped with a device to prevent further discharging exceeding a cut-off voltage specified in the Product Specification. Also the charger shall be equipped with a device to control the recharging

充电器应有装置来防止电池放电至低于本规格书规定的截止电压。此外，充电器还应有装置以防止重复充电，

## 3. Protection Circuit Module 保护电路模块

The cell/battery pack shall be with a PCM that can protect cell/battery pack properly. PCM shall have functions of (1) overcharging prevention, (2) over-discharging prevention, (3) over current prevention to maintain safety and Prevent significant deterioration of cell performance. The over current can occur by external short circuit

电芯/电池包装应配有 PCM 以正确保护电芯/电池。PCM 应具有以下功能以保证安全并防止损坏电池性能：  
(1) 过充保护功能；(2) 过放保护功能；(3) 过流保护

### 3.1 overcharging prohibition: 过充保护电压

Overcharging prohibition function shall stop charging if any one of the cells of the battery pack reaches  $4.280\pm 0.020V$

当电池中任一电芯的电压达到  $4.280\pm 0.020V$  时，过充电保护功能应立即启动并停止充电。

### 3.2 over-discharging prohibition: 过放电保护

Over-discharging prevention function shall work to avoid further drop in cell voltage of  $3.0\pm 0.035V$  Or less per cell in any cell of the battery pack. It is recommended that the dissipation current of PCM Shall be minimized to  $0.5\mu A$  or less with the over-discharging prevention..

The protection function shall monitor each bank of the battery pack and control the current all the time

当电池中任一电芯的电压降至  $3.0\pm 0.035V$  以下时，过放保护功能应起保护作用以避免电芯的深度放电。推荐 PCM 的静态电流小于  $0.5\mu A$ ，并具有过放保护功能。该保护功能应实时监控所有电池

## 4. Storage 贮存

The cell shall be stored within range environmental condition of specification

电芯贮存必须是在本规格书规定的环境条件范围内贮存。

## 5. Handling Instructions 电池的注意事项

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

认真阅读下面的注意事项，确保正确使用聚合物锂离子电池。TCL 对违反下述注意事项而产生的任何问题不予负责。

**Danger!**  
**危 险!**

- Do not immerse the battery in water or allow it to get wet.
- 勿将电池投入水中或将其弄湿!
- Do not use or store the battery near sources of heat such as a fire or heater.
- 禁止在火源或极热条件下给电池充电! 勿在热源(如火或加热器)附近使用或贮存电池! 如果电池泄漏或发出异味, 应立即将其从接近明火处移开;
- Do not use any chargers other than those recommended by TCL.
- 请使用专用充电器!
- Do not reverse the positive(+) and negative(-) terminals.
- 勿将正负极接反!
- Do not connect the battery directly to wall outlets or car cigarette-lighter sockets.
- 勿将电池直接连接到墙上插座或车载点烟式插座上!
- Do not put the battery into a fire or apply direct heat to it.

## Product Specification

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- 勿将电池投入火中或给电池加热！
- Do not short-circuit the battery by connecting wires or other metal objects to the positive(+) and negative(-) terminals.
- 禁止用导线或其它金属物体将电池正负极短路，禁止将电池与项链、发夹或其它金属物体一起运输或贮存！
- Do not pierce the battery casing with a nail or other sharp object, break it open with a hammer, or step on it.
- 禁止用钉子或其它尖锐物体刺穿电池壳体，禁止锤击或脚踏电池！
- Do not strike, throw or subject the battery to physical shock.
- 禁止撞击、投掷或者使电池受到机械震动
- Do not directly solder the battery terminals.
- 禁止直接焊接电池端子！
- Do not attempt to disassemble or modify the battery in any way.
- 禁止以任何方式分解电池！
- Do not place the battery in a microwave oven or pressurized container.
- 禁止将电池置入微波炉或压力容器中！
- Do not use the battery in combination with primary batteries(such as dry-cell batteries) or batteries of different capacity, type or brand.
- 禁止与一次电池（如干电池）或不同容量、型号、品种电池组合使用！
- 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.
- 如果电池发出异味、发热、变形、变色或出现其它任何异常现象时不得使用；如果电池正在使用或充电，应立即从用电器中或充电器上取出并停止使用！

### Caution!

#### 注 意！

Do not use or store the battery where is exposed to extremely hot, such as under window of a car in direct sunlight in a hot day. Otherwise, the battery may be overheated. This can also reduce battery performance and/or shorten service life.

不要使用处于极热环境中的电池，如阳光直射或热天的车内。否则，电池会过热，可能着火（点燃），这样就会影响电池的性能、缩短电池的使用寿命。

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.

如果电池漏液后电解液进入眼睛，不要擦，应用水冲洗，立即寻求医疗救助。如不及时处理，眼睛将会受到伤害。

Use the battery only under the specification of cell. Failure to do so can result in reduced performance or a shorten service life.

只能在电芯规定的条件下使用电池，否则将会降低电池的性能或缩短电池的使用寿命。



## 6. Amendment of this Specification 产品规格书的修订

This specification is subject to change with prior notice.

本公司有权对本产品规格书进行修订，在对产品规格书修订后 TCL 金能电池有限公司将会通知客户。

### Annex

#### Warning sentences to equipment manufacturers and battery assemblers

#### Recommendations to equipment manufacturers and battery assemblers

The following represents a typical, but non-exhaustive, list of good advice to be provided by the manufacturer of secondary cells and batteries to equipment manufacturers and battery assemblers.

- a) Do not dismantle, open or shred cells. Batteries should be dismantled only by trained personnel. Multicell battery cases should be designed so that they can be opened only with the aid of a tool.
- b) Do not short-circuit a cell or battery. Do not store cells or batteries haphazardly in a box or drawer where they may short-circuit each other or be short-circuited by conductive materials.
- c) Do not remove a cell or battery from its original packaging until required for use.
- d) Do not expose cells or batteries to heat or fire. Avoid storage in direct sunlight.
- e) Do not subject cells or batteries to mechanical shock.
- f) In the event of a cell leaking, do not allow the liquid to come into contact with the skin or eyes. If contact has been made, wash the affected area with copious amounts of water and seek medical advice.
- g) Equipment should be designed to prohibit the incorrect insertion of cells or batteries and should have clear polarity marks. Always observe the polarity marks on the cell, battery and equipment and ensure correct use.
- h) Do not mix cells of different manufacture, capacity, size or type within a battery.
- i) Seek medical advice immediately if a cell or battery has been swallowed.
- j) Consult the cell/battery manufacturer on the maximum number of cells, which may be assembled in a battery and on the safest way in which cells may be connected.
- k) A dedicated charger should be provided for each equipment. Complete charging instructions should be provided for all secondary cells and batteries offered for sale.
- l) Keep cells and batteries clean and dry.
- m) Wipe the cell or battery terminals with a clean dry cloth if they become dirty.
- n) Secondary cells and batteries need to be charged before use. Always refer to the cell or battery manufacturer's instructions and use the correct charging procedure.
- o) Do not maintain secondary cells and batteries on charge when not in use.
- p) After extended periods of storage, it may be necessary to charge and discharge the cells or batteries several times to obtain maximum performance.
- q) Secondary cells and batteries give their best performance when they are operated at normal room temperature.
- r) Retain the original cell and battery literature for future reference.
- s) When disposing of secondary cells or batteries, keep cells or batteries of different electro-chemical systems separate from each other.