

SPECIFICATION

OF

Battery Type: Keppower P1634C

Approved by	Checked by	Prepared by
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1. Scope.

The specification shall be applied to Li-ion rechargeable battery pack of P1634C , which is manufactured by KEEPOWER TECHNOLOGY CO.,LTD. The product is ROHS compliant.

2. Battery Pack Datasheet:

NO	Items	Criteria	Remarks
2.1	Typical Capacity	700mAh	Discharge:140mA cut-off voltage:2.50V
	Minimum Capacity	650mAh	
2.2	Energy	2.59Wh	
2.3	Nominal Voltage	3.7V	
2.4	Open Circuit Voltage	3.5-3.8V	
2.5	Internal Impedance	Cell: $\leq 80\text{m}\Omega$	AC 1KHz after standard charge
		Battery pack: $\leq 180\text{m}\Omega$	
2.6	Charge voltage	4.2V	
2.7	Charge Time(Std.)	3 hours	
2.8	Standard charge current	350mA	25°C
2.9	Standard discharge current	140mA	25°C
2.10	Max. discharge current	1400mA	0°C ~ +45°C
2.11	Discharge cut-off voltage	2.5V	
2.12	Operating Temperature	Charge 0 ~ +45°C	
		Discharge -20 ~ +60°C	
2.13	Storage Temperature	-20°C ~ +60°C	Less than 1 month
		-20°C ~ +45°C	Less than 3 months
2.14	Weight	19.5g	
2.15	Size(mm)	Max. (D)16.6*(H)35.80	

3. Battery pack configuration

NO	Item	Criteria	Remarks
3.1	Cell	16340 /700mAh	
3.2	PCM	1SR16	
3.3	PVC	Black	
3.4	Plastic Rack of PCM	Black	
3.5	Label	Keppower	

4. Battery Performance Criteria

4.1 Appearance

There shall be no such defect as scratch, bur and other mechanical scratch, and the connector should be no rust dirt. The structure and dimensions see attached drawing of the battery.

4.2 Measurement Apparatus

(1) Dimension Measuring Instrument

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

(2) Voltmeter

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

(3) Ammeter

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

(4) Impedance Meter

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

4.3 standard Test Condition

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 $20\pm5^{\circ}\text{C}$ and relative humidity of 45~85%.

4.4 Standard Charge

4.2V /350mA Full charge condition: Constant current 350mA, Constant voltage 4.2V for 30mA end in all at $25\pm3^{\circ}\text{C}$.

4.5 Common Performance

No	Items	Testing method and determinant standard
1	Charge Performance	The battery can be charged when using the original charger. The standard charge mode :under the temperature of 25°C ,charge the battery with the current of 140mA until the voltage reaches up to 4.2V for 8 hours ,then stop charging.
2	Discharge Performance	When connecting with load, the battery can supply power. Charge the battery with standard charge mode, then rest for 1hour, then discharge with 140mA until the voltage is 2.50V at 25°C , the standard discharge capacity $\geq 650\text{mAh}$.
3	Cycle Performance	Under the temperature of 25°C ,charge the battery with 0.5C, when the voltage reaches up to 4.2V charge with constant voltage until the charge current $\leq 0.05\text{C}$, then stop charging, then rest for 1h, then discharge with 0.5C to 2.50V. Cycle with the above mode, Capacity after 499 cycles and plus 1 day, measured under the same condition in 4.5.2, Capacity $\geq 490\text{mAh}$.
4	Charged Storage Characteristics	Charge the battery with 0.2C, then shift to charge with constant voltage until the voltage reaches up to 4.2V, when the charge current $\leq 0.05\text{C}$ stop charging; rest under the temperature of 25°C for 28days then discharge with 0.2C to 2.50V. The discharge time is required $\geq 4.25\text{h}$.
5	Storage Characteristics	Charge the battery ,which is new manufactured shorter than 3 months, with 0.2C until the capacity reaches to 40~50%, after resting for 12 months under the temperature of 25°C and the humidity of 45~75%, then charge with 0.5C to 4.2V then shift to charge with constant voltage, after full-charge rest for 0.5h,then discharge with 0.2C to 2.50V. The discharge time is required $\geq 4\text{h}$.

4.6 Safety Performance.

No	Items	Testing method and determinant standard
1	High Temperature Characteristics	Under the temperature of 25℃, after charging the battery with 0.2C, then put the battery into the constant temperature and humidity oven with 45±2℃ for 4h, then discharge with 0.5C to 2.50V. The discharge time is required ≥51min and the battery should no deformation and smoking.
2	Low Temperature Characteristics	Under the temperature of 25℃, after charging the battery with 0.2C, then put the battery into the constant temperature and humidity oven with 0±2℃ for 4h, then discharge with 0.2C to 2.5V. The discharge time is required ≥3h and the battery should no deformation and smoking.
3	Overcharge Protection Characteristics	After full-charging the battery with 0.2C and set the constant current and voltage supplier with 2times of the nominal voltage and current, then load it to the battery for 8h. It is required the battery should be no leakage, deformation, smoking and explosion during the test processes.
4	Over-discharge Protection Characteristics	Under the temperature of 25℃, after discharging the battery with 0.2C to 2.50V, then connect the load with 30Ω then discharge for 24h. It is required the battery should be no leakage, in fire, smoking and explosion during the test processes.
5	Short-circuit Protection Characteristics	Under the temperature of 25℃, after full-charging the battery with 0.2C, then make the battery's anode and cathode short-circuit for 1h (the connecting resistance is smaller than 100mΩ), then cut the anode and cathode, After the battery momentary charge by 1C current, the voltage should come back to 3.7V, and there should be no leakage, deformation, smoking and explosion during the test processes.

6	Constant Humidity and Temperature Characteristics	Under the temperature of 25°C, after charging the battery with 0.2C, then put the battery into the constant temperature and humidity oven with 10±2°C and 90~95% for 48h, the battery should be no obvious deformation, leakage, rust, smoking and explosion. After testing take out the battery then rest for 2h under the temperature of 25°C, discharge with 1C to 2.50V. The discharge time is required ≥ 36 min.
7	Drop Test	Under the temperature of 25°C, after full-charging the battery with 0.2C, then drop it freely from 1 meter height onto the hard board which 18~20mm thick (6 times each of X,Y,Z with positive and negative directions).The battery should be no smoking and explosion, After test discharge the battery with 1C, and the discharge time is required ≥ 54 min(The battery should be cycled no more than 3 times, among them if one time is passed then stop.).

4.7 Rest Period

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

5. Storage and Others

5.1 Storage

The battery shall be storied within -20°C~ 45°C range environmental condition. If stored for a long time (exceed three months), the battery should be stored in drying and cooling place. The battery's storage voltage should be 11.1~11.85V and the battery is to be stored in condition: Temperature: 23±5°C,Humidity: 65±20%RH

5.2 Others

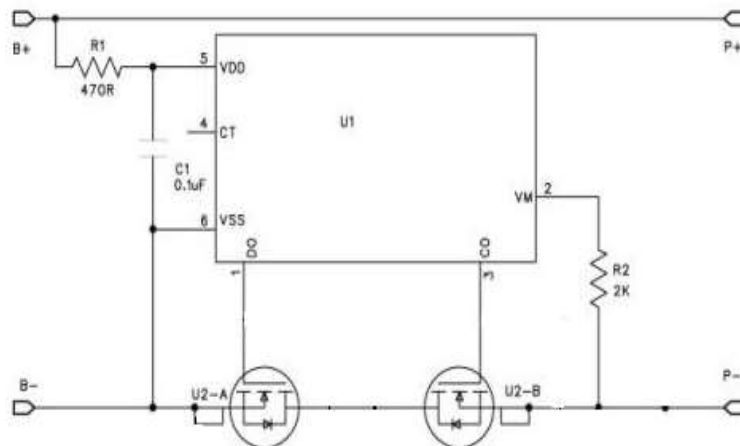
Any matters that this specification does not cover should be conferred between the customer and KEEPOWER.

6. Protection Circuit

6.1 Electrical characteristics

Item	Symbol	Content	Criterion
Over charge protection	VDET1	Over charge detection voltage	4.275±0.05 V
	tVDET1	Over charge detection delay time	1.2±0.5ms
Over discharge protection	VDET2	Over discharge detection voltage	2.50±0.1V
	tVDET2	Over discharge detection delay time	1.0±0.5ms
Over current protection	VDET3	Over current detection voltage	0.15±0.015V
	IDP	Over current detection current	5-8A
	tVDET3	Detection delay time	12±4ms
		Release condition	Cut load and charging
Short protection		Detection condition	Exterior short circuit
	TSHORT	Detection delay time	MAX.18ms
		Release condition	Cut short circuit and charging
Interior resistance	RDS	Main loop electrify resistance	RDS≤50mΩ
Current consumption	IDD	Current consume in normal operation	1.0μA Min 10.0μA Max

6.2 Circuit Diagram



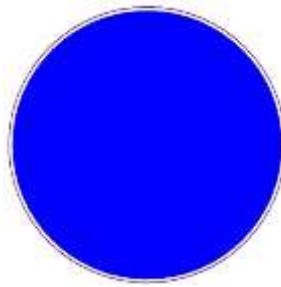
6.3 Parts list

Name	Quantity	Reference	Part
CAP	2	C1	104
RES	1	R1,	470
RES	1	R2	202
Res	1	F1	0
IC	1	IC1	S-8261-G2J
MOSFET	1	Q2	AO8814
MOSFET	1	Q4	NC

6.4 PCB Craft

Material:	FR-4
Layer	2 Layers

6.5 PCB Layout



7. Assembly Drawing

