



Specification Approval Sheet

Name: Li-ion Battery

Model: 30207

SPEC: LiFePO₄-8081238 3.2V 10Ah

Approved By	Checkup	Make
Huanchun Li	Shaopeng Yi	Cong Huang
2012-3-17	2012-3-17	2012-3-16

Customer Confirmation	Signature	Date
	Company Name :	
	Stamp :	

436 Kato Terrace, Fremont, CA 94539 U.S.A.

Tel: 510.687.0388 Fax: 510.687.0328

www.TenergyBattery.com

**Tenergy Corporation**

436 Kato Terrace

Fremont, CA 94539

Tel: 510.687.0388

Fax: 510.687.0328

www.TenergyBattery.com

email: sales@tenergybattery.com

Amendment Records

Revision	Description	Issued Date	Approved By
A0	New release	2012-3-16	



1 Scope

This document describes the performance characteristics and testing methods for LiFePO₄ battery produced by Tenergy Corporation.

2 Product type and model number

2.1 Product type

Lithium-ion Battery

2.2 Model number

LiFePO₄-8081238 3.2V 10Ah

3 Rated performance

Form 1: Battery rated performance

No	Item	Rated performance	Remark
1	Rated capacity	Nominal $\geq 10\text{Ah}$	Standard discharge after standard charge
2	Nominal voltage	3.2V	Mean operation voltage during standard discharge after standard charge
3	Voltage at end of discharge	2.0V	Discharge cut-off voltage
4	Charging voltage	3.65V	
5	Impedance	$<6.0\text{m}\Omega$	
6	Standard charge	Constant current $0.2C_5\text{A}$ Constant voltage 3.65V Cut-off current $\leq 0.02C_5\text{A}$	
7	Standard discharge	Constant current $0.2C_5\text{A}$ End voltage 2.0V	
8	Fast charge	Constant current $0.5C_5\text{A}$ Constant voltage 3.65V Cut-off current $\leq 0.02C_5\text{A}$	
9	Fast discharge	Constant current $0.5C_5\text{A}$ End voltage 2.0V	
10	Maximum charge current	$1C_5\text{A}$	
11	Maximum continuous discharge current	$2C_5\text{A}$	
12	Maximum pulse discharge current	$3C_5\text{A}$	
13	Operation temperature range	Charge: $0\sim 45^\circ\text{C}$ Discharge: $-20\sim 60^\circ\text{C}$	$60\pm 25\%\text{R.H}$
14	Cycle life	$>1500\text{cycles}$	Charging/discharging in the below condition: Charge: standard charge Discharge: $0.2C_5\text{A}$ to 2.0V Rest time between charge/discharge: 30min Until the discharge capacity $<80\%$ of NC
15	Storage temperature	$\leq 1\text{ month: } -10\sim 45^\circ\text{C}$ $\leq 3\text{ months: } 0\sim 40^\circ\text{C}$ $\leq 1\text{ year: } 10\sim 25^\circ\text{C}$	$60\pm 25\%\text{R.H}$, Best $10\sim 25^\circ\text{C}$ for long-time storage



16	Weight	Approx: 280g	
17	Dimension(mm)	Thickness*Width*Length (Max)	8.2*82.0*240.0

4 Electrical performances

Form 2: Battery electrical performances

No	Items	Test procedure	Requirements
1	Nominal voltage	The average value of the working voltage during the whole discharge process.	3.2V
2	Discharge performance	The discharge capacity of the battery, measured with 0.2C ₅ A down to 2.0V within 1 hour after a standard charge	Discharge ≥ Minimum capacity
3	Capacity retention	After 28 days storage at 25±5℃, after having been standard charged and discharged at 0.2C ₅ A to 2.0V (the residual capacity is above 95% of nominal capacity)	Discharge time ≥ 4.75h
4	Cycle life	Charging/discharging in the below condition: Charge: standard charge Discharge: 0.2C ₅ A to 2.0V Rest time between charge/discharge: 30min Until the discharge capacity < 80% of NC	> 1500 cycles
5	Storage	Standard charge and then rest for 1h, then discharge for 2h at 0.2C ₅ A; store for 90 days at 20℃ After standard charge, discharge at 0.2C ₅ A, (Charge/discharge cycle can be repeated for 5 times before meeting the Standards (the same below)	recoverable capacity ≥ nominal capacity * 95%

5 Environment Performance

Form 3: Environment requirements and test methods

No	Item	Requirements and Test methods
1	Rate Discharge Performance	a). Standard charge at 0.2C ₅ A under the condition of normal atmospheric pressure, the environmental temperature 20±5℃ and relative humidity 45%~80%, then discharge at 0.2 C ₅ /1.5 C ₅ A to 2.0V or other cut-off voltage which is specified in the technical document of the company. b) Charge/discharge cycle can be repeated for 3 times before meeting the Standards, the same below. Discharge \Capacity/Nominal capacity×100% 0.3 C ₅ ≥100% 1.5 C ₅ A ≥95%.
2	High-low Temperature Discharge performance	a). After Standard charging, store it at the constant temperature of 55±2℃ for 20±2 hours, then discharge at 0.2 C ₅ A to 2.0V or other cut-off voltage which is specified in the technical document of the company. Discharge Capacity/Nominal capacity×100% A) 55℃ ≥95% B) 20℃ ≥90% C) -20℃ ≥80% D) -40℃ ≥50%
3	Normal Storage/ High Temperature Storage	Store for 28 days (Store for 7 days at the constant temperature of 55±2℃ after standard charge, then measure final status and residual capacity at 0.2 C ₅ A to 2.0V or other cut-off voltage which is specified in the technical document of the company; After charge/discharge (0.2C ₅ A/0.2C ₅ A) cycle recoverable capacity will be tested. Charge/discharge cycle can be repeated for 3 times before meeting the Standards. Residual Capacity ≥ Nominal capacity * 95% Recoverable capacity ≥ Nominal capacity * 98%

6 Safety

Test conditions: The following tests must be measured at flowing air and safety protection conditions. All batteries must standard charge and lay 24h.

Form 4: Safety requirements and test methods

N o	Item	Test Methods	Requirements
1	Over charge	After standard charging, Charge at 3 C ₅ A to 10.0V	No explosion or fire
2	Over discharge	After standard charging, Discharge at 0.2C ₅ A to 0V at 20±5 °C	No explosion or fire
3	Short-circuit	After standard charging, Put the battery into a ventilation explosion-proof cabinet and short-circuit the positive and negative terminals directly (general resistance shall be less than or equal to 5mΩ) for 10 minutes.	No explosion or fire
4	Crush	After standard charging, put the battery on the bracket, 1. Extrusion direction: Perpendicular with the direction of the battery plates. 2. Extrusion contact area ≥ 20cm ² . 3. Extrusion degree: Until the battery shell ruptured or internal short circuit (battery voltage becomes 0V)	No fire, no explosion
5	Thermal Shock	After standard charging, keep the battery in the oven with a constant temperature of 85 ± 2 °C for 2 hours.	No fire, no explosion
6	Needle puncture	After standard charging, put the battery on the bracket ,penetrate through it with a 3mm ~ 8mmdiameter nail near the center of its biggest surface at the	No fire, no explosion
7	Drop	After standard charging, let itself fall off from a height of 1.5m (the lowest height) to a rigid wooden board with a thickness of 20mm. The drop is implemented one time for every face. speed of 10mm/s-40mm/s.	No fire, no explosion., No leakage

7 Standard test conditions

Test should be conducted with new batteries within one week after shipment from our factory and the batteries shall not be cycled more than five times before the test. Unless otherwise defined, test and measurement shall be done under temperature of 20±5 °C and 85%RH. If it is judged that the test results are not affected by such conditions, the tests may be conducted at temperature 15~30 °C and humidity 25~85%RH.

8 Cautions in use

To ensure proper use of the battery please read the manual carefully before using it.

8.1 Handling

Do not expose to, dispose of the battery in fire.

Do not put the battery in a charger or equipment with wrong terminals connected.

Avoid shorting the battery.

Avoid excessive physical shock or vibration.

Do not disassemble or deform the battery.

Do not immerse in water.

Do not use the battery mixed with other different make, type, or model batteries.

Keep out of the reach of children.

8.2 Charge and discharge



Battery must be charged in appropriate charger only.

Never use a modified or damaged charger.

Do not leave battery in charge over 24 hours.

8.3 Storage

Store the battery in a cool, dry and well-ventilated area.

8.4 Disposal

Regulations vary for different countries, Dispose of in accordance with local regulations.

9 Battery operation instruction

9.1 Charging

Charging current: Cannot surpass the biggest charging current which in this specification book stipulated.

Charging voltage: Does not have to surpass the highest amount which in this specification book stipulated to decide the voltage.

Charge temperature: The battery must carry on the charge in the ambient temperature scope which this specification book stipulated. Uses the constant electric current and the constant voltage way charge, the prohibition reverse charges. If the battery positive electrode and the cathode meet instead, can damage the battery.

9.2 Discharging current

The discharging current does not have to surpass this specification book stipulation the biggest discharging current, the oversized electric current electric discharge can cause the battery capacity play to reduce and to cause the battery heat.

9.3 Electric discharge temperature

The battery discharge must carry on in the ambient temperature scope which this specification book stipulated.

9.4 Over-discharges

After the short time excessively discharges charges immediately cannot affect the use, but the long time excessively discharges can cause the battery the performance, battery function losing. The battery long-term has not used, has the possibility to be able to be at because of its automatic flashover characteristic certain excessively discharges the condition, or prevented excessively discharges the occurrence, the battery should maintain the certain electric quantity.

9.5 Storing the batteries

The battery should store in the product specification book stipulation temperature range. If has surpasses above for six months the long time storage, suggested you should carry on additional charge to the battery.

10 Period of warranty

The period of warranty is one year from the date of shipment. Tenergy guarantees to give a replacement in case of batteries with defects proven due to manufacturing process instead of the customer's abuse and misuse.

11 Other the chemical reaction

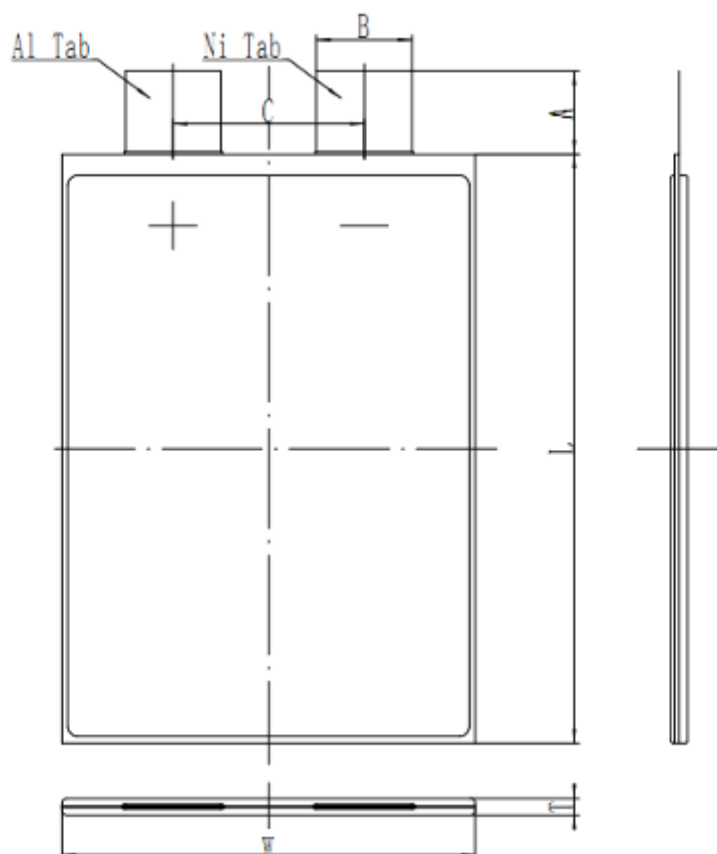
Because batteries utilize a chemical reaction, battery performance will deteriorate over time even if stored for a long period of time without being used. In addition, if the various usage conditions such as charge, discharge, ambient temperature, etc. are not maintained within the specified ranges the life expectancy of the battery may be shortened or the device in which the battery is used may be damaged by electrolyte leakage. If

the batteries cannot maintain a charge for long periods of time, even when they are charged correctly, this may indicate it is time to change the battery.

12 Note

Any other items which are not covered in this specification shall be agreed by both parties.

13 Appendix



Item	Description	Dimensions
T	Thickness	8.2 mm max
W	Width	82.0 mm max
L	Length	240.0 mm max
A	Tab Length	Positive: 21 ± 3.0 mm
		Negative: 20 ± 3.0 mm
B	Tab width	20.0 ± 0.5 mm
C	The center width of Tab	40 ± 3 mm
The thickness of Tab: 0.2 ± 0.02 mm		