Technical Specification of 48V50AH Telecom Battery

Model : BTESF48V50-R(E)

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Contents

1. Scope

This specification describes the external dimensions, characteristics, technical requirements and matters needing attention of telecom lithium ion battery. This specification is applicable to BTESF48V50-R(E) lithium iron phosphate battery produced by Shenzhen BAK power battery Co., LTD.

2. Mechanical Design and Battery Cell

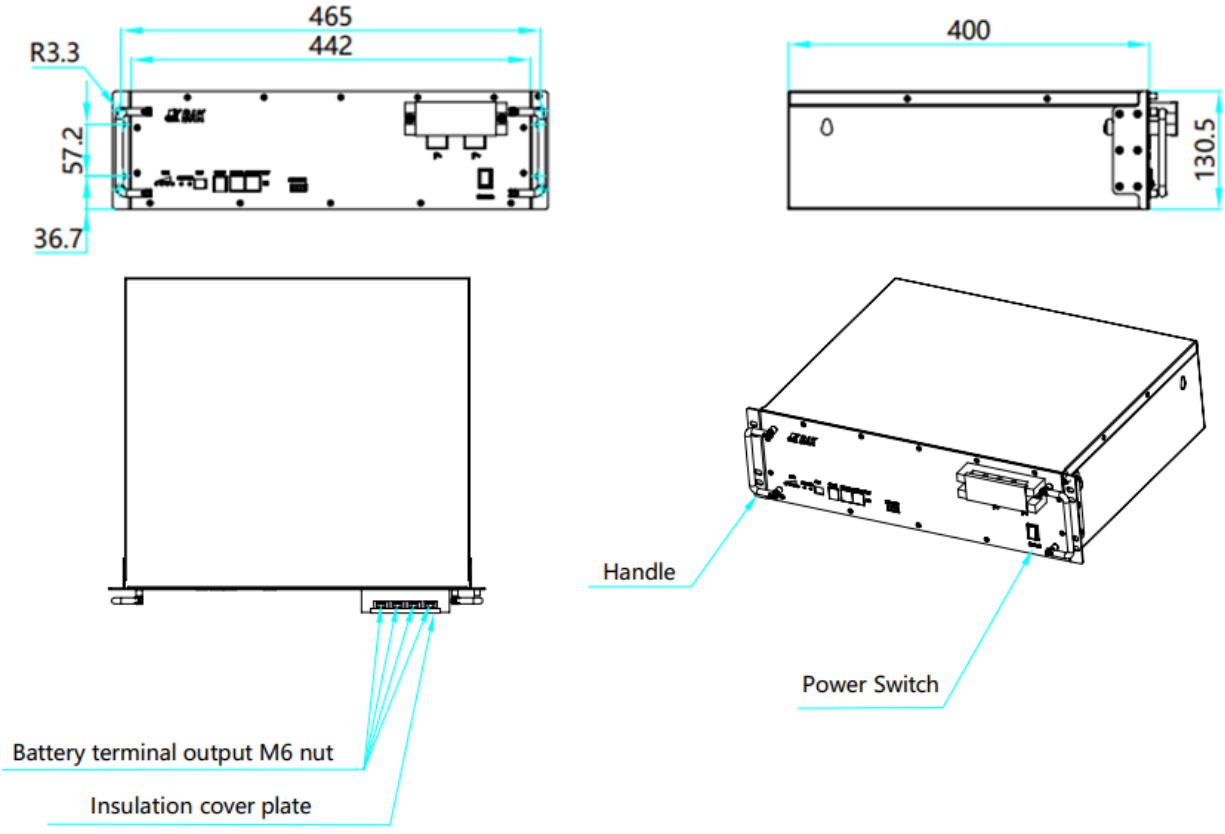
2.1 Battery specification：48V50AH

2.1.1 Combination Method：15S

2.1.2 Finished product:

+ Battery dimension 442*400*130.5mm

Finished product outline drawing

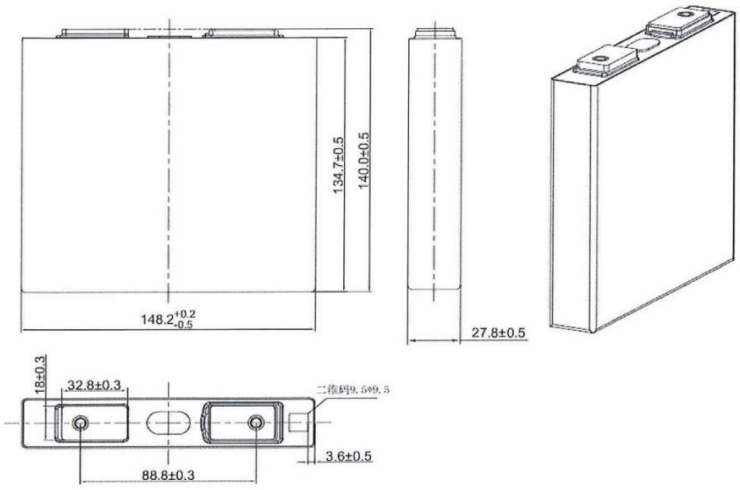


+ Installation Dimensions is suitable for 19" rack mounting
+ Battery container: make by steel & powder coated, prevent corrosion
+ Structure of sensors: All sensor locations must be fixed, solid, safe (cell, environment, chipset)
+ Power cord and signal wire: Must be fixed, firm, neat, with code on each wire in the tank

2.2 Cell model:

Model: LFP 3.2V50AH (27148130)

Cell physical dimension listed in following figure (unit: mm)



+ Cell structure: rectangular box with the thickness ≥0.60 mm metal cell coverage

+ The connection between the terminals of the battery cells by metal terminals using laser welding

+ Uniformity between battery cells in 1 battery Cells must be identical in structure, similar in size and weight

+ At the time the battery is fully charged, the voltage difference between the cell with the highest and lowest voltage is not more than 0.05V

+ The difference in capacity value between the cell with the largest and smallest capacity and the average capacity does not exceed 1%

3. Battery Pack Basic Performance

No.	Item	Parameter	Remark
1	Rated Capacity	50AH	23℃±5℃，0.2C Constant current discharging ,42V cut off
2	Rated Voltage	48V	Battery module rate voltage
3	Standard Charge Current	10A（0.2C）	0℃~45℃，, 0.2C CC charge to 54.75V, then CV charge Cur off when charging current ≤0.05C
4	Max. Charge Current	50A（1C）	0℃~45℃，less than 1C
5	Charge Cut Off Voltage	54.75V	
6	Max Continuous discharge Current	50A（1C）	25℃±3℃，continuous 50A discharge
7	Discharge Cut Off Voltage	42V	
8	Max Pulse Discharge Current	65A	25℃±3℃；≤1S
9	Working Temperature(charge)	0℃~55℃	During charge, battery and ambient temperature should not exceed 55℃
10	Working Temperature(discharge)	-20℃~60℃	Battery can work at specified temperature range with capacity loss in tolerance
11	Weight	25±2kg	

12	Impendence	≤25mΩ	AC 1kHz impendence with half electricity
13	Capacity self-discharge factor	3%/month	
14	Discharge/charge energy efficiency (Wh/Wh)	≥95% 0.2 Crt(Ah)	
15	Operating Humidity (charge and discharge)	5%-95%	
16	Standard of protection against dust	IP20	

4. Main Performance

4.1 Battery pack main performance parameter

NO.	Item		Standard	Test Method
1	Discharge Rate Character	0.2C	100%	Test Temperature：25℃±3℃；Charge：0.2C CC charge to 54.75V，transfer to constant voltage, Cut off when current ≤0.05C Discharge: 0.2C/0.5C/1C constant current discharge cut off @42V
		0.5C	≥98%	
		1C	≥97%	
2	Capacity & Temperature Character	55℃	≥95%	Charge：0.2C CC charge to 54.75V，transfer to CV, cut off when current ≤0.05c; Discharge: 0.5C CC discharge cut off at 42V, 2 hours interval for the temperature.
		45℃	≥95%	
		25℃	100%	
		0℃	≥65%	
		-10℃	≥50%	
3	Life Cycle Character		≥2000	After finish the standard charging, lay aside for 30 min, in 25℃±5,0.2C CC discharge to 100% DOD, then go for next cycle.
			≥4000	After finish the standard charging, lay aside for 30 min, in 25℃±5,0.2C CC discharge to 80% DOD, then go for next cycle.
4	Storage Character	25℃ 6months	≥95%	Charge battery with 60%~75% capacity for storage
		45℃ 3months	≥90%	
		60℃ 1month	≥90%	

4.2 Ambient Character

NO.	Item	Standard	Test Method
1	Steady damp heat test	No fire, No explosion, No leakage. Discharge capacity cannot be lower than 60% of initial capacity	After standard charge, test as below: Temp:40℃±5℃，Relative Humidity:90%~95%; Standing time:48h; take out and place for 2h at room temperature, Then discharge with 1C till cut off voltage

2	Vibration	No fire, No explosion, No leakage.	After standard charge, fix to vibration machine and vibrate 30 minutes each at XYZ direction. Frequency Sweeping Rate:1oct/min; Vibration Frequency:10Hz~30Hz; Displacement amplitude(Single):0.28mm; Vibration Frequency:30Hz~55Hz; Displacement amplitude(Single):0.19mm.
3	Low Pressure	No fire, No explosion, No leakage.	Under 25±3℃ambient temperature, put call into vacuum cabinet, and reduce internal pressure gradually to not high than 11.6kPa(Simulated altitude 15240m), keep 6 Hours
4	Drop Test	No fire, No explosion, No leakage.	Under the condition of shipment, the battery is free fall from a height of 1 m to a concrete floor of 5 cm thick repeat 3 times from X,Y,Z axis direction.

4.3 Safe Performance

NO.	Item	Standard	Test Method
1	Over Charge Test	No fire, No explosion, No leakage	After standard charge, Under 25℃ ±3℃ ambient temperature for 1h.Then under the same temperature, 0.5C constant current charge to 5V(the simple cell)
2	Over Discharge Test	No fire, No explosion, No leakage	After standard charge, Under 25℃ ±3℃ ambient temperature for 1h. Then under the same temperature, 0.2C constant current discharge to 0V(the simple cell)
3	Heat shock	No fire, No explosion, No leakage	Put battery in hot cabinet, temperature is up with 5℃
4	High Temperature Test	No fire, No explosion, No leakage	After standard charge, place battery in 85℃ for4h.
5	Short Circuit	No fire, No explosion, No leakage	After standard charge, ambient temperature for 1h. Then put the battery by external short circuit for 10min, the outside line resistance should be less than 100mΩ.

5. BMS

5.1 Protection Parameter

NO.	Item	Description	Value	Unit
1	Over Charge Parameter	Unit Overcharge Warning Voltage	3600	mV
		Unit Overcharge Protection	3650	mV
		Battery pack over charge warning voltage	53.25	V
		Battery pack over charge Protection voltage	54.75	V
2	Over Discharge Parameter	Unit Over discharge Warning Voltage	2700	mV
		Unit Over discharge Protection voltage	2500	mV

		Battery pack over discharge warning voltage		40.5	V
		Battery pack over discharge Protection voltage		37.5	V
3	Charge Over Current Parameter	Charge Over Current Warning		55	A
		Charge 1st over current		60	A
		Short circuit at charging port		YES	
4	Discharge Over Current Parameter	Discharge Over Current Warning		55	A
		Discharge 1st over current		60	A
		Discharge 2st over current		65	A
		Short circuit at discharging port		YES	
5	Temperature Protection	Charge	High temperature warning	50.0	℃
			Low temperature warning	5.0	℃
			High temperature protection	55.0	℃
			Low temperature protection	0.0	℃
		Discharge	High temperature warning	55.0	℃
			Low temperature warning	-15.0	℃
			High temperature protection	60.0	℃
			Low temperature protection	-20.0	℃
6	Software monitoring function of upper computer	Real-time display of parameters: battery capacity (SOC, SOH), charging and discharging voltage and current (each cell and battery), temperature (environment in battery, BMS circuit, cell PIN), number of operating cycles			
		Real-time display of operating status: over-threshold warning (low and high threshold) current, voltage, temperature, low capacity, battery cell failure, sensor failure			

5.2 Electrical Parameter

NO.	Item	Min	Typical	Max	Unit
1	Manage cell qty	-	15	-	个
2	Normal Working Voltage	-	48	54.0	V
3	Working temperature range	-20	25	60	℃
4	Continuous charge current	-	20	50	A
5	Continuous discharge current	-	50	50	A
6	Total Operate Power Consumption	-		35	mA
7	Total dormant Power Consumption			100	uA
8	Display precision of SOC and SOH			5%	
9	Simultaneous monitoring capabilities	≤15pcs modules			
10	Cell voltage display	1mV			
11	Battery voltage display	10mV			
12	Battery current display	10mA			
13	Temperature display	1℃			
14	Error of voltage value of cell, average displayed on software and actual measurement	< 0.5%			

15	Error of current value of tank displayed on software and actual measurement	≤2% 0.5Crt (A)
16	Error value of charge/discharge current	≤2%@FS
17	Error between temperature value of cell, BMS, battery displayed on software and actual measurement	≤ 2 ℃

5.3 Function

NO.	Function	Description
1	Setup address devices	By dial switch
2	System Rest	Using reset button
3	Communicate Interface	RS485 connecter allows several devices connecting in parallel to enlarge battery capacity. RS232 interface communicates with computer
4	SOC Evaluate and Display	Can dynamic evaluate SOC for each battery pack, and display the remaining power by 4green LED.
5	Operation Status Display	Can display system operation status by 1 green LED.
6	Failure Warning Display	Cn display system failure by 1 red LED
7	Data Storage	Can record battery array's voltage , temperature, each charge and discharge power
8	Low Consumption	Very slight static consumption deviation, and low operation & standby consumption
9	SOH Evaluation	Per sampling information, can do SOH evaluation for whole battery
10	Balance Management	≥50mA Balance current function during charging, improve cell voltage consistency; When the maximum cell voltage is greater than or equal to the starting voltage of equalization (adjustable), and the difference between the maximum cell voltage and the minimum cell voltage is greater than or equal to the difference between the opening voltage (adjustable), the equalization circuit of the maximum cell voltage is opened;
11	Unit Voltage Inspection	Test cell unit's voltage, 15S Max can be inspected
12	Temperature Inspection	Battery temperature protection function , battery high& low temperature protection and component high temperature protection.
13	Charge & Discharge control	Disconnect failed module when at abnormal charge, over discharge, over-hot, over current, short circuit, separate each defective module timely and reduce defective scope.
14	Short Circuit Protection	When battery has short circuit, system will be automatically protective within 300us（adjustable）, disconnect load and recover. When the current value of the discharge circuit is too large to trigger the short-circuit protection value, BMS cuts off the discharge MOSFET, and the protection can be removed by removing the load or charging

15	Communication	Through connection between upper computer and BMS, can remote signaling. Remote control, remote adjust,
16	Battery in Parallel Connection Management	Support multiple-unit battery connection in parallel, and set up address. When the charging current is greater than or equal to the charging current limit value (adjustable), BMS starts the current limit charging function and limits the charging current to the set value (standard 10A) to charge the battery pack with the set value;
17	The event store	Store 400
18	Power switch	With ON/OFF switch（Optional）

6. Storage and Transportation Requirement

Item		Requirement
Storage Temperature	Less than 1month	-20℃~55℃
	Less than 6months	-10℃~+35℃
Humidity		＜70%RH
Storage SOC		60%~75%SOC

7. Accessories list

NO.	Product	Discrition	Quantity	Unit
1	Power Cable	Length：500mm， wire diameter: 25mm， 1 positive and 1 negative pole	1	PCS/module
2	External communication line	Length: 500mm, RJ45 port *2	1	PCS/module
3	RS485-USB Converter Cable	Length:1000mm,	1	PCS/10modules

8. Note for battery Usage

8.1Prohibition

For avoiding battery leakage, heat radiating, explosion, below prevent tips should be taken care of：

A） Prohibition of disassembly or re-assembly；

B）Prohibition of short circuit battery；

C）Prohibition to use near hot source；

D） Prohibition of dumping of battery into water, ocean or getting battery wet；

E）Prohibition of charging near fire or under sunlight；

F） Charge with specified charge according to charging requirement；

G） Prohibition of inserting nail into battery, hammering or stepping on foot；

H） Prohibition of throwing；

I） Prohibition to use with damaged or deformed battery

8.2 Attentions

A）Prohibit of using battery in sunlight, otherwise will cause over hot, firing, or function failure, life reducing；

B）Prohibit use near static place which over 64V；

C）Prohibit charge at temperature below 0℃ or above 60℃；

D）When use at first time, if has corrosion, or bad smell, or any other abnormal, please do not use；