



Specification Approval Sheet

Name: Protection Circuit Board

Model: 32137

SPEC: 7S, Max. 15A

Approved By	Checkup	Make

Customer Confirmation	Signature	Date
	Company Name :	
	Stamp :	

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

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**1: Modified Record****Product Modified Record List**

Revision	Modified Content	Principle	Date	Mark	Note
A.0	Design	Guo Jian	2012-5-29		

2: Product description**2.1: Introduction**

32137 is for 5S-7S Battery packs. Apply for Li-ion, li-polymer Pack.

The PCBA current can reach up to 15A(the maximum).

2.2: Characters

A. Protection for 7S battery cells in series

B. With the functions of overcharge, overdischarge, overcurrent, and short-circuit and so on.

C. With charging balancing function for the cells, and the balancing current is adjustable.

D. The quiescent dissipation almost can ignore.



Tenergy Corporation

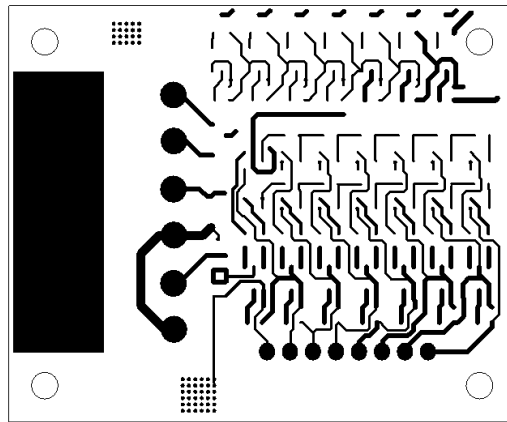
436 Kato Terrace

Fremont, CA 94539

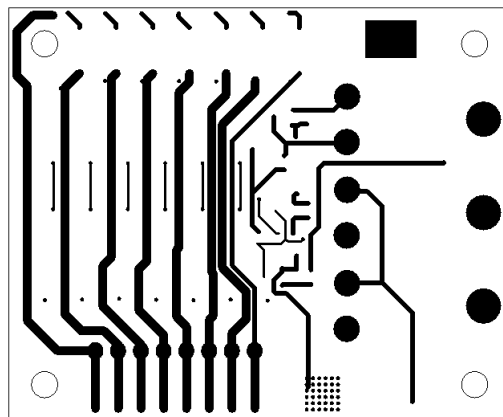
Tel: 510.687.0388 Fax: 510.687.0328

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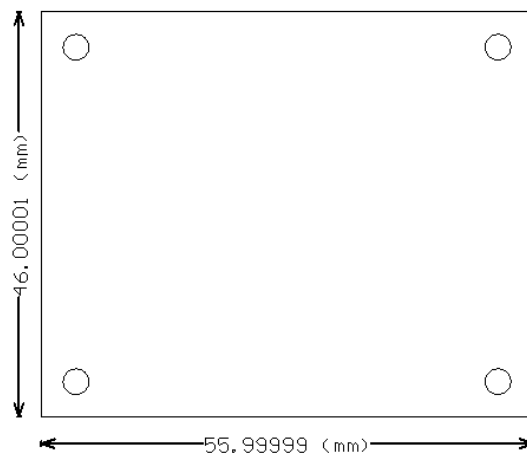
3: PCB Layout



Top PCB Layout



Bottom PCB Layout



Dimensions statement: L*W=56*46mm tolerance: $\pm 0.5\text{mm}$
T=8mm tolerance: $\pm 0.2\text{mm}$

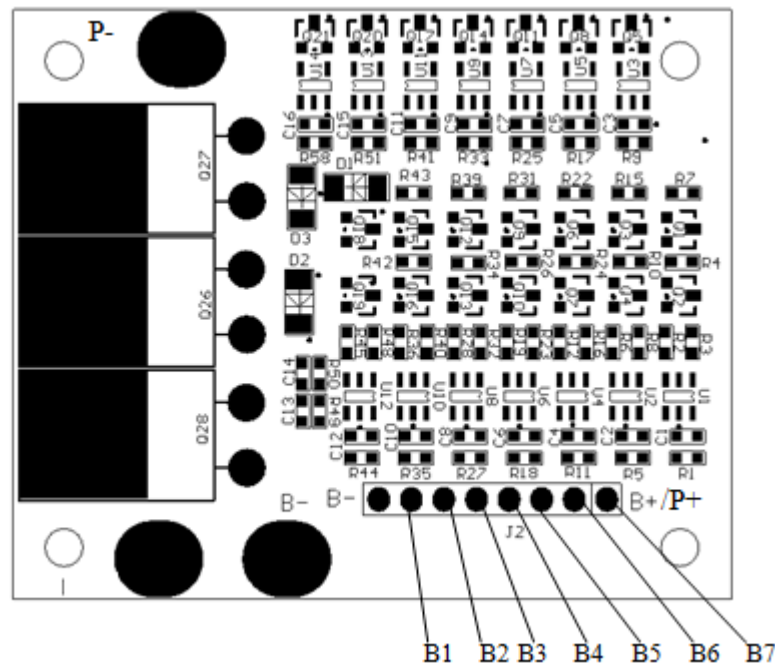


4: 4.1 parameter List (Li cells) (Ta=25℃.)

Details	Min.	Typ.	Max	Error	Unit
Battery					
Battery Gas	Li-ion cells				
Battery Links	7S				
Absolute Maximum Rating					
Input Charging Voltage		30		±1%	V
Input Charging Current			6		A
Output Discharging Voltage		25.9			V
Output Discharging Current			6		A
Continuous Output Discharging Current (Continuous working Current)	≤6				A
Ambient Condition					
Operating Temperature	- 10		65		℃
Humidity(No Water-Drop)	0%				RH
Storage					
Temperature	- 40		85		℃
Humidity(No Water-Drop)	0%				RH
Protection Parameters(for Individual Cell).					
Over-Charge Voltage Protection(OVP)		4.280		±30mV	V
Over-Charge Voltage Protection Release(OVPR)		4.080		±50mV	V
Over-Discharge Voltage Protection(UVP)		2.80		±80mV	V
Over-Discharge Voltage Protection Release(UVPR)		2.80		±100mV	V
Over-Current Charge Protection(OCCP)		—			A
Over-Current Discharge Protection(OCCP1)	13	15	17		A
Over-Current Protection Delay Time(OCPDT1)		9			mS
Over-Discharge Discharge Protection Release	Remove the load				
Short circuit current protection		Yes			A
Short circuit current protection delay time		320			uS
Short circuit protection Release					
Discharge Temperature Protection		75			℃
Discharge Temperature Protection Release		75			℃
Cell balance					
Bleed Start Point		4.2			V
Bleed Current	40	50	60		mA
Balance Mode	Idle				
Current Consumption		40	200		uA



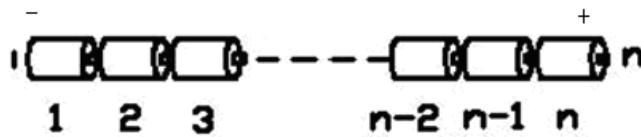
5. Cell connection way



PCM connection schematic diagram

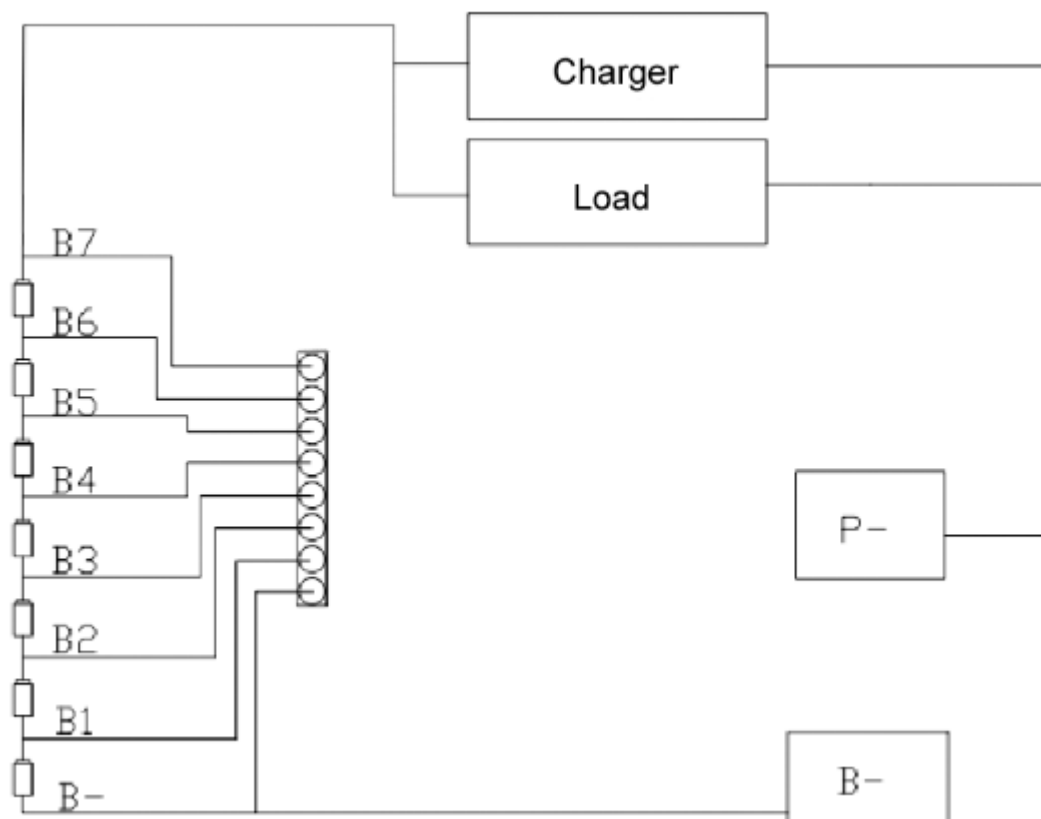
Mark		Connection ways
battery pack anode		The anode port of charge and discharge(Use large current line to connect and weld firmly)
PCBA B-		Connecting to the first cell's cathode(Use large current line to connect and weld firmly)
PCBA P-		The cathode port of charge and discharge(Use large current line to connect and weld firmly).
White Row socket on PCBA	B-	Connecting to the first cell's cathode
	B1	Connecting to the first cell's anode
	B2	Connecting to the second cell's anode
	B3	Connecting to the third cell's anode
	B4	Connecting to the fourth cell's anode
	B5	Connecting to the fifth cell's anode
	B6	Connecting to the sixth cell's anode
	B7	Connecting to the seventh cell's anode

If cells less than 13S, wires of the white row socket connect the first cell's cathode, the last wire connects to battery's anode.



Cell's connection schematic diagram

Connection chart



6. Note

6.1 Connecting Battery cells to PCBA

Warning: When connecting battery cells to PCBA or disassembly them, operation must follow the steps, or the PCBA will be destroyed, battery cells will lose the protections.

Preparation: Connecting the Voltage-Detecting cable which according the white Row socket to the battery cells, please pay attention on the order of the plugs.



A) Steps of connecting PCBA to battery cells:

Step1: Connecting Battery Pack Negative to PCBA B-

Step2: Connecting the negatives of charger and load to PCBA P-

Step3: Connecting battery pack positive to PCBA B+, connecting the positive of battery packs to the positives of charger and load.

Step4: Connecting the cable of battery pack to the white Row socket of PCBA;

B) Disassembly the PCBA from the battery pack

Step1: plug out the cable on the battery pack;

Step2: plug out the cable on the battery pack Positive B+;

Step3: plug out the cable on the P- of charger and load;

Step4: plug out the cable on the battery pack Positive B-;

Note: please pay attention on the Static electricity during operating.

6.2 Other Considerations

A) This PCBA adopts balanced current circuit and over-current detector; please pay attention on the surface of the PCBA, the temperature is rising during working. Please adopt right heat treatment on the surface of balanced-resistor and over-current copper wire if need lower down the temperature, we suggest that using Thermal insulation pad to insulate the balanced-resistor and over-current copper wire and the heat-treatment devices.

B) When testing the pack after finished the assembling, please don't use the aging test devices to test every battery cell of the pack or the battery cell and PCBA will be destroyed.

C) This PCBA doesn't have 0 voltage charging function. When the battery pack is 0 voltage, the function of the battery cells will be going worse. In order to protect battery, battery needs to be charged when out of use for a long time. After finish the discharge, should charge it in 12 hours, avoid current consume to 0V.

D) This PCB did not equipped with the charging protection function, do not make reverse connection while using, it may damage protection board and cells.