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R1210A Battery Module

Datasheet

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Revision History

Rev.	Date	ECN No.	Content	Initiated by
1.0	Nov 10, 2008		First edition	Fiona SHI
1.1	Dec 29, 2008		Charge/discharge limitation and discharge data of different temperature added	Fiona SHI
1.2	Feb 11,2009		Update module pictures / discharge cut-off voltage and add the maintenance of interface definition	Cres Wang
1.3	Mar 10,2009		Add the data of inch/°F and update curve/module picture	Cres Wang
1.4	Jun 2,2009		Update denomination/tolerance/discharge cut-off voltage/DB9 definition/max discharge current	Cres Wang



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1 Purpose

The end user of R1210A battery module could notice the basic electrical and mechanical characteristics of the battery by reading this datasheet.

2 Scope

This datasheet describes the requirements for the Fe rechargeable battery module, R1210A battery module, supplied by BYD COMPANY LIMITED.

The words “battery” “pack” “battery pack” in the following text of the datasheet means the R1210A battery module.

3 Basic Characteristics

Weight:	1.4±0.2 KG
Dimension:	115 mm*89 mm*108.5 mm/4.53 inch*3.50 inch*4.27 inch
Initial capacity:	10Ah (0.2C)
Nominal voltage:	12V (0.2C)
Charge method	CC / CV (constant current / constant voltage)
Charge voltage	14.6±0.1V
Charge current	2A×7hrs (standard)
Discharge cut-off voltage	10V
Max discharge current	30A (continuous)
Operating temperature:	Charge: +10~+50°C/+50~+122°F
	Discharge: -20~+60°C/-4~+140°F
Storage temperature	-40 ~ +60°C/-40~+140°F
Storage temperature	-20 ~ +60°C/-4~+140°F: Storage for less than 1 month
	-20 ~ +45°C/-4~+113°F: Storage for less than 3 months
	-20 ~ +25°C/-4~+77°F: Storage for less than 1 year
Storage relative humidity	5% ~ 95%
Maintenance:	The maximum recharge period of the battery in storage is 12 months under room temperature.

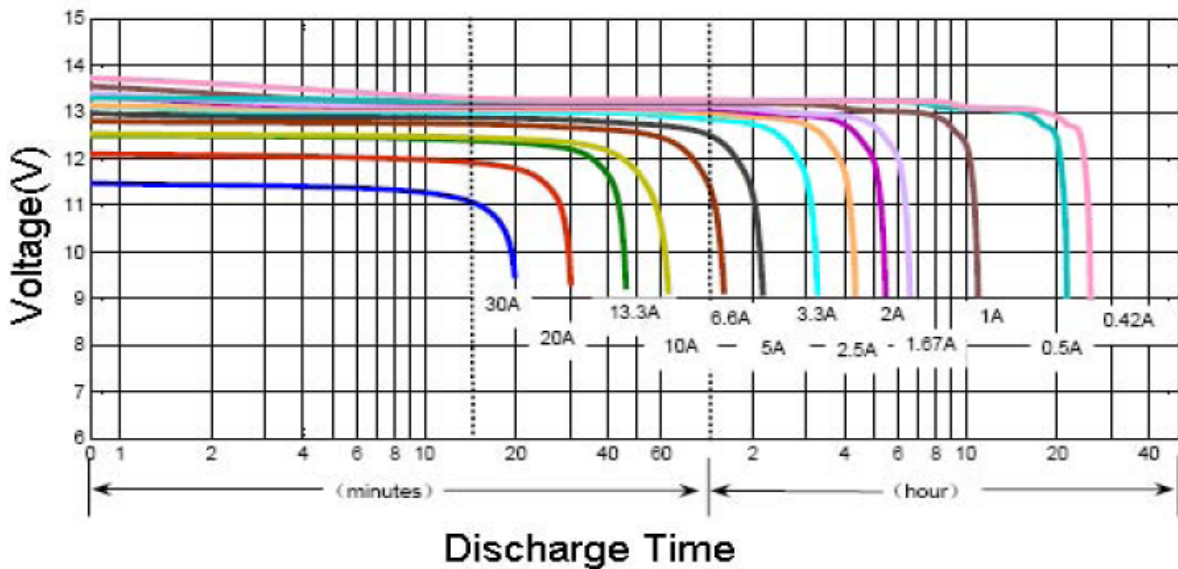


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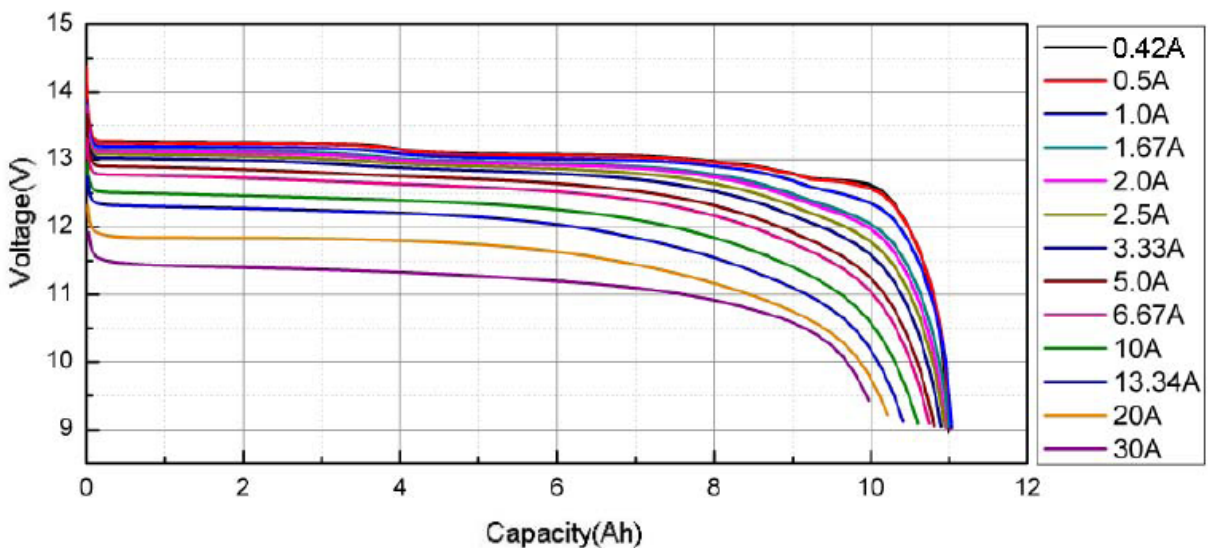
4 Charge and Discharge Curve Reference

4.1 Discharge curve of constant current (25°C) (unit: min)

Discharge Rate	3C	2C	4/3C	1C	2/3C	1/2C	1/3C	1/4C	1/5C	1/6C	1/10C	1/20C	1/24C
Current/A	30A	20A	13.34A	10A	6.67A	5A	3.33A	2.5A	2A	1.67A	1A	0.5A	0.42A
End voltage 9.6V	19.70	30.10	45.70	62.55	95.40	128.1	194.2	259.8	325.4	391.4	655.5	1287.0	1537.9
End voltage 9.9V	19.40	29.85	45.40	61.95	94.60	127.2	193.1	258.5	324.0	389.8	653.7	1284.3	1534.9
End voltage 10.2V	19.00	29.55	45.05	61.15	93.70	126.1	191.8	256.9	322.4	387.9	651.3	1280.9	1531.3
End voltage 10.5V	18.20	29.15	44.65	60.15	92.60	124.8	190.2	255.1	320.4	385.5	648.3	1276.5	1526.4
End voltage 10.8V	16.75	28.55	44.05	58.80	91.20	123.2	188.3	252.9	317.9	382.7	644.6	1270.6	1519.9



【Voltage-discharge time at different discharge current】



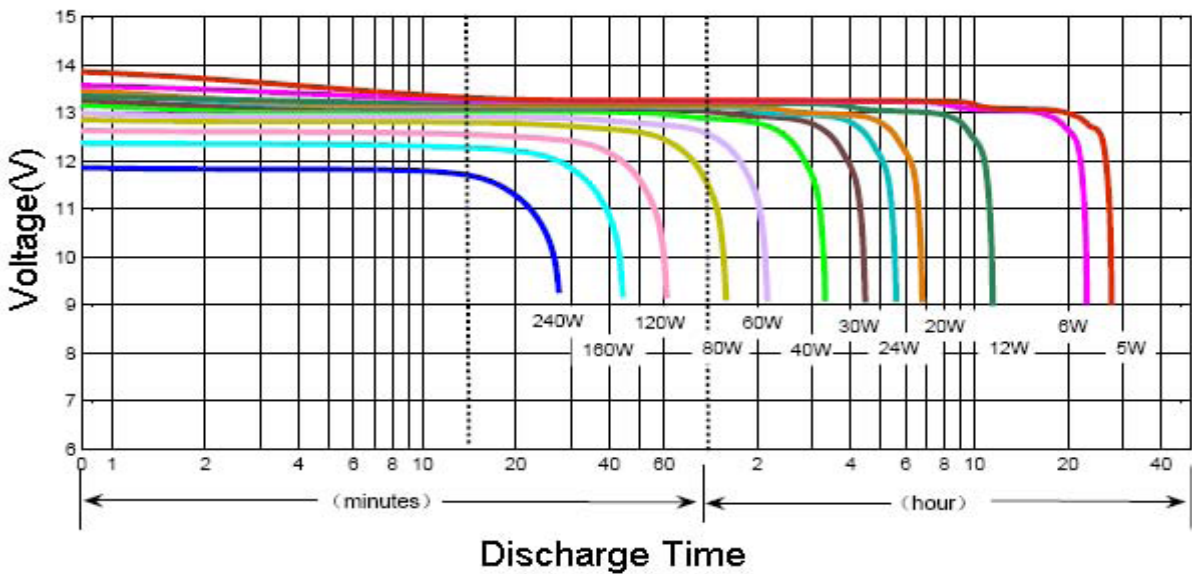
【Voltage-capacity at different discharge current】



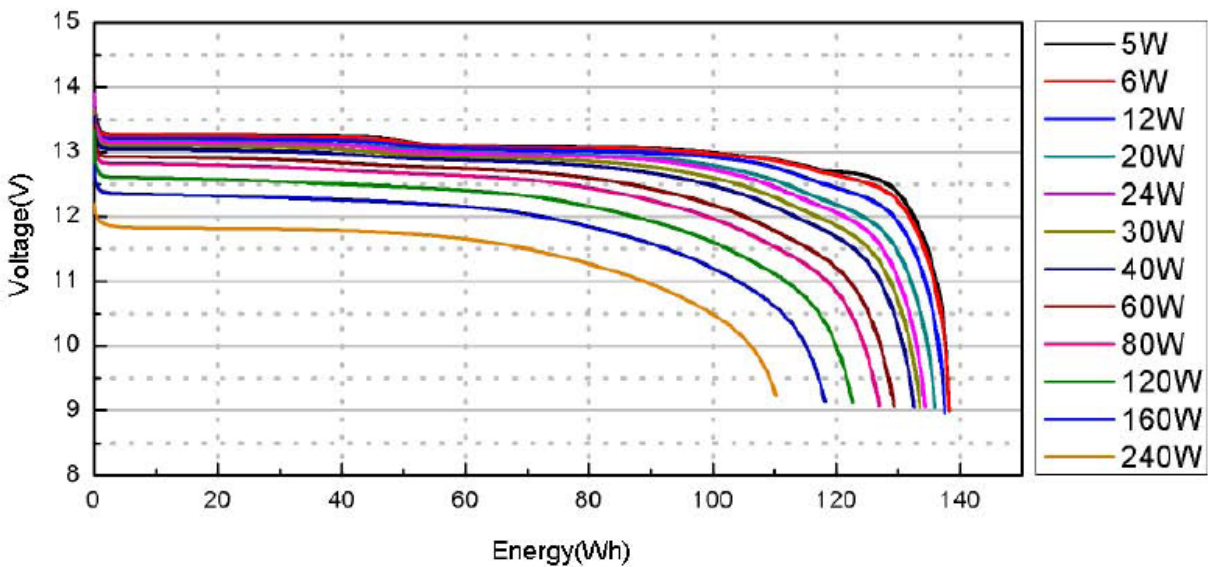
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4.2 Discharge curve of constant power (25°C) (unit: min)

Rated discharge time/h		30min	45min	1h	1.5h	2h	3h	4h	5h	6h	10h	20h	24h
Power/w		240W	160W	120W	80W	60W	40W	30W	24W	20W	12W	6W	5W
End voltage	9.6V	27.15	43.8	60.7	94.25	128.2	197.45	265.45	334.05	405.95	684.8	1378.6	1654.85
End voltage	9.9V	26.7	43.35	60.15	93.6	127.4	196.5	264.3	332.8	404.55	683.1	1376.1	1652.95
End voltage	10.2V	25.95	42.7	59.5	92.8	126.4	195.3	262.9	332.3	402.85	680.85	1372.6	1649.5
End voltage	10.5V	24.9	41.7	58.6	91.75	125.2	193.85	261.15	329.4	400.7	678	1368.1	1644.75
End voltage	10.8V	23.45	40.25	57.2	90.25	123.55	192.05	259	327.05	398.1	674.45	1362.2	1638.45



【Voltage-discharge time at different discharge power】



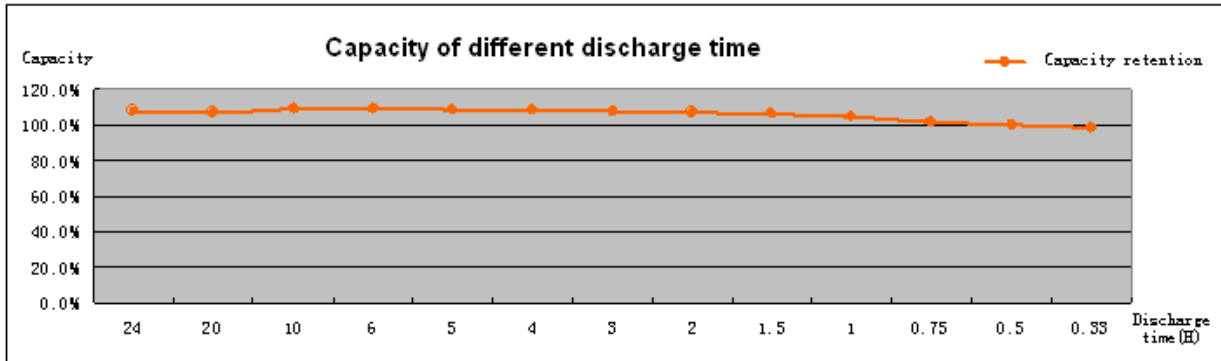
【Voltage-energy at different discharge power】



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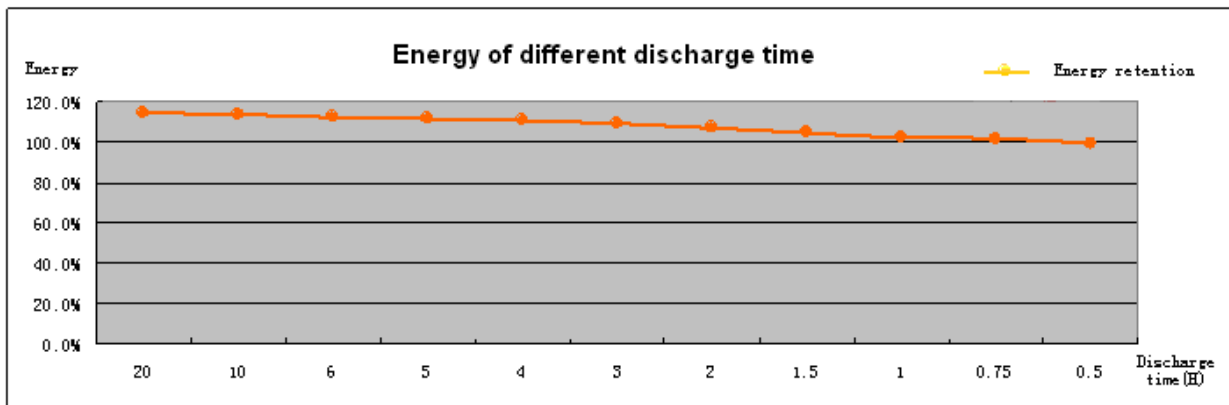
4.3 Capacity of different discharge time (unit: Ah)

Discharge time(H)	24	20	10	6	5	4	3	2	1.5	1	0.75	0.5	0.33
Capacity(%)	107.7%	107.3%	109.2%	108.9%	108.5%	108.2%	107.8%	106.7%	106.1%	104.3%	101.6%	100.3%	98.5%



4.4 Energy of different discharge time (unit: Wh)

Discharge time (h)	20	10	6	5	4	3	2	1.5	1	0.75	0.5
Energy(%)	114.9%	114.1%	112.8%	111.4%	110.6%	109.7%	106.8%	104.7%	102.8%	101.8%	99.2%



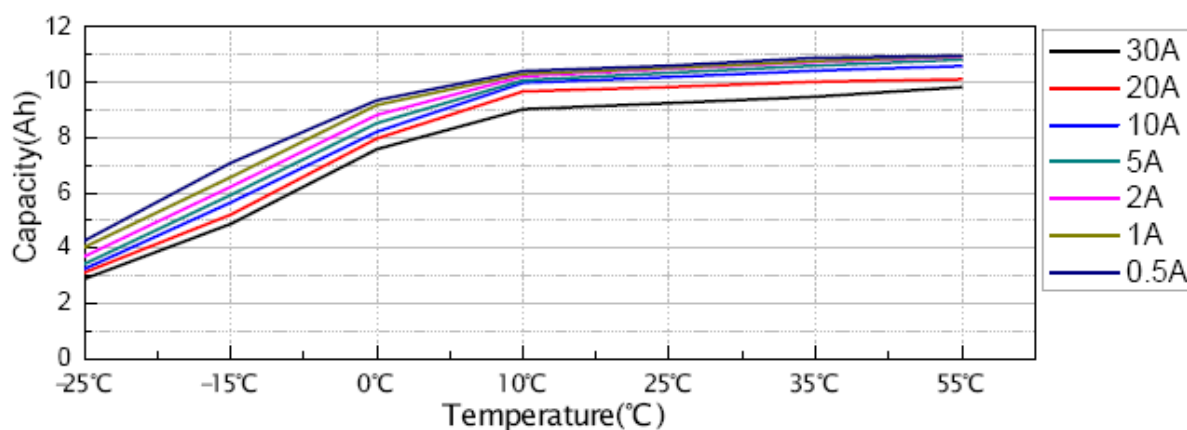
4.5 Discharge curve of constant current at different temperature (unit: Ah)

Discharge time		3C	2C	1C	0.5C	0.2C	0.1C	0.05C
		30A	20A	10A	5A	2A	1A	0.5A
55°C	Capacity(Ah)	9.83	10.12	10.59	10.82	10.93	10.96	10.97
35°C	Capacity(Ah)	9.48	10.03	10.42	10.61	10.73	10.77	10.69



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25℃	Capacity(Ah)	9.25	9.83	10.19	10.35	10.49	10.53	10.61
10℃	Capacity(Ah)	9.03	9.67	9.98	10.07	10.22	10.31	10.41
0℃	Capacity(Ah)	8.38	8.87	9.01	8.93	9.02	9.18	9.35
-15℃	Capacity(Ah)		8.62	7.66	6.53	6.12	6.58	7.09
-25℃	Capacity(Ah)		6.28	5.08	5.42	4.50	5.04	5.28



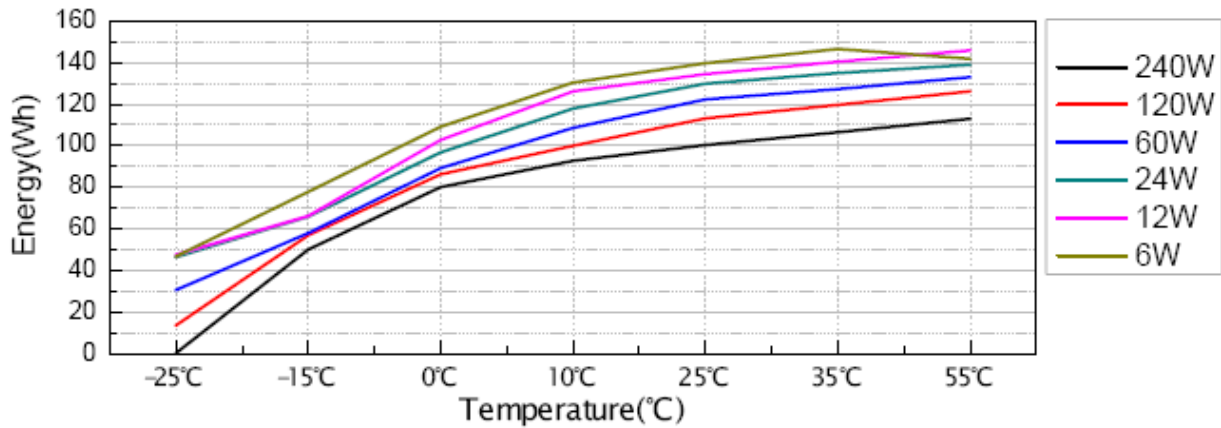
【Capacity-temperature at different discharge current】

4.6 Discharge curve of constant power at different temperature (unit: Wh)

Discharge power / Discharge parameter		UC/0.5	UC/1	UC/2	UC/5	UC/10	UC/20
		240W	120W	60W	24W	12W	6W
55℃	Energy(WH)	112.80	126	132.9	138.82	145.79	141.69
35℃	Energy(WH)	106.40	119.50	127.05	134.88	140.39	146.52
25℃	Energy(WH)	100.20	113.00	122.15	129.84	134.27	139.69
10℃	Energy(WH)	92.60	99.80	108.55	117.74	126.15	130.35
0℃	Energy(WH)	80.00	86.20	89.20	96.62	102.68	108.96
-15℃	Energy(WH)	50.00	56.80	57.80	65.84	66.14	77.65
-25℃	Energy(WH)		13.40	30.50	46.22	47.40	46.57



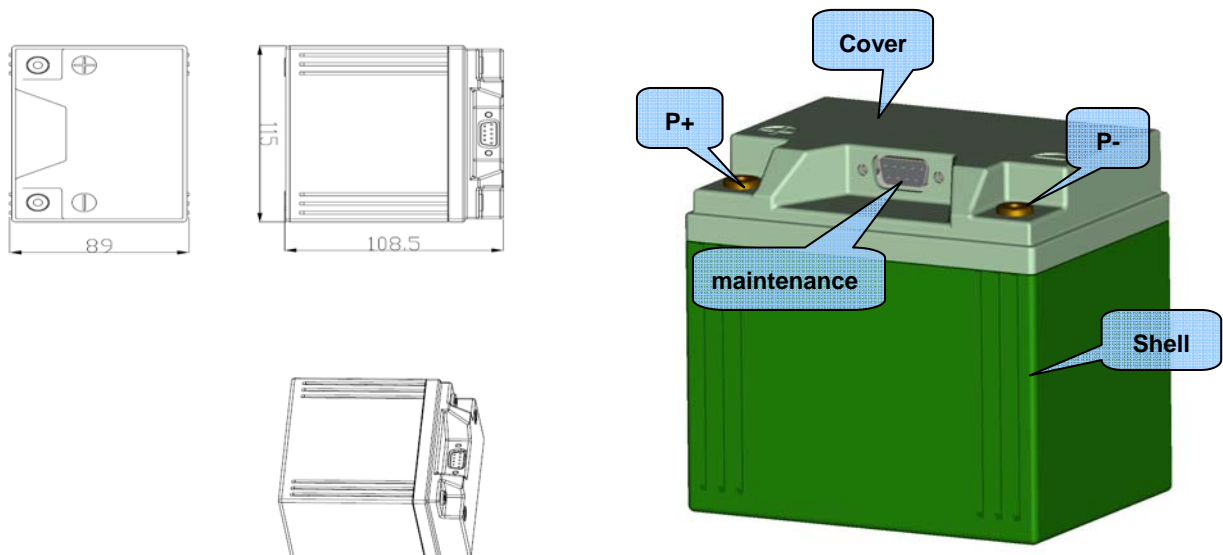
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【Energy-temperature at different discharge power】

5 Physical Dimensions

The dimension of the battery is 115mm (length)*89mm (width) *108.5mm (height). The sheathing material of the battery is ABS, two parts of the shell are connected to each other by glue. There are 3 terminals on the interface: positive terminal, negative terminal and maintenance.



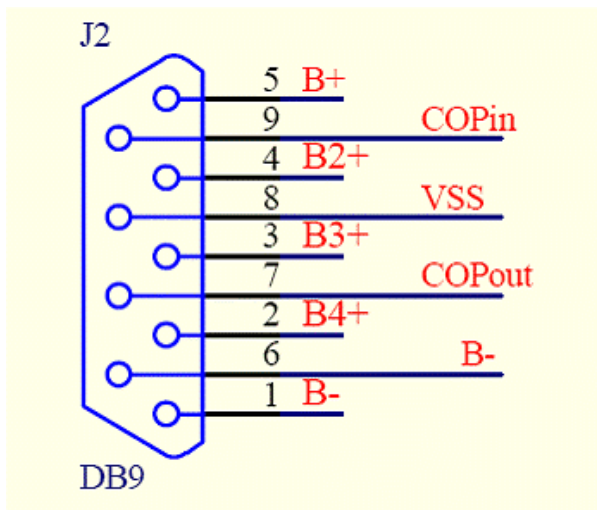
6 Expansion function

The battery could be connected to a Battery Management Unit (BMU), and BMU could monitor the performance of the battery. Further information could be found in *BMU of 12V Standard Battery Module*.

R1210A standard module maintenance of interface definition as follows:



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COPIN: Controlling signal this module received from superior module.

VSS: GND of this module's received signal from superior module.

COPOUT: Controlling signal generated by this module and transmitted to the next module.

B-: GND of this module, also the GND of its generated signal's.

7 Safety Certifications

The following safety certifications shall be met for the finally step sample of the battery:

- UL 1642 for cell;
- UL 2054 for battery pack;

8 Warranty Period

Warranty period of this product is 12 months from manufacture code, Which the battery should be used accordance with this Datasheet

9 Other Product Liability

Users are kindly requested to use the battery which is delivered from BYD COMPANY LIMITED in strict accordance with the Datasheet and remarks include at the end of the document.

Due to improper usage of the battery, an accident or a fire may occur due to the battery generating heat, catching fire or rupture, smoke.

BYD COMPANY LIMITED will not guarantee against any accidents occurring due to use outside those written in this Datasheet.

Prior Notice of Change

In case Datasheet, materials, production process, and control system for the products are changed, the notice of change in writing together with quality and reliability data is informed in advance to the buyer.



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10 .Warning, Notice and Caution

Please read and follow the handling instructions for the battery before use. Improper use of the battery may cause heat, fire, rupture, damage or capacity deterioration of the battery.

WARNING

1. Do not put the battery into fire, or heat the battery, do not store the battery in high temperature environment.
2. Do not connect the battery reversed in positive (+) and negative (-) terminals in the charger or equipment.
3. Do not let the battery terminals (+ and -) contact a wire or any metal (like a metal necklace or a hairpin) with which it carried or stored together, may cause short-circuit.
4. Do not drive a nail in, hit with a hammer, or stamp on the battery, do not strike the battery in other ways.
5. Do not disassemble or alter the batteries' outside structure.
6. Do not submerge the battery in water, do not wet the battery when store the battery.

NOTICE

1. Battery should be charged and discharged with proper charger, in compliance with correct operation contents.
2. Do not use the battery with other maker's batteries, different types and /or models of batteries such as dry batteries, nickel-metal hydride batteries, or nickel-cadmium batteries, or new and old lithium batteries together.
3. Do not leave the battery in a charger or equipment if it generates an older and/or heat, changes colour and/or shape, leaks electrolyte, or cause any other abnormality.
4. Do not discharge the battery continuously when it is not charged.

Caution

1. In case young children use the battery, instruct them on the contents of the instructions and ensure the battery is correctly used by them at all times.
2. The battery was inspected carefully by QA before shipment to confirm with the Datasheets. However, in the case any abnormality of bad smell or heat, etc, arises after purchase, bring it and communicate with us.
3. For long-term storage, please charge at 0.5C for about one hour in advance.