



PRODUCT SPECIFICATION

DOC NO. : PS-GB-902738-01
 REV. : A
 SHEET : 1 of 13
 ECN NO. : _____

Battery Specification Confirmation Sheet

of
Amperex Technology Limited (“ATL”)

ATL Product Part Number: GB-S10-902738-010H

Prepared by SL	Approved by SLS	Approved by R&D	Approved by QA
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	Authorized Signatory		Date
	Signature	Print Name	
Customer Confirmation	Company Name Of Customer:		
	Company Stamp Of Customer:		

Confidential : () Level 3 Private confidential () Level 2 High confidential (V) Level 1 Low confidential



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AMENDMENT RECORDS

Revision	Description	Originator	Date
A	New release	SF Gan	05/21/2015



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1 Scope:

The purpose of this document is to specify the specifications of the Lithium-ion Polymer (“LIP”) rechargeable battery with ATL Part Number _GB-S10-902738-010H_ (“Product” or “Pack”) to be supplied by ATL to Customer under Customer’s purchase order and ATL’s confirmation relevant to the Product. For the avoidance of doubt, the specifications specified herein do not apply to any Host Device, apparatus, instrument, equipment or hardware device containing Product or Cell (“Host Device”).

2 Model Name: 902738.

3 Standard Environmental Test Conditions:

1): Unless otherwise specified, all tests stated in this Product Specification are conducted at below conditions:

Temperature: 25 ± 3 °C (“Temperature Condition”)

Humidity: $65 \pm 20\%$ RH (“Humidity Condition”)

2): Throughout this specification, numeric criteria annotated by “*” means such criteria are only applicable to fresh unused Product within 30 days from manufacture by ATL. Products either have been used or stored for a period longer than 30 days by Customer and/or its customer may exhibit an inferior numeric parameter than such criteria. Customer agrees that such occurrence does not constitute nonconformance of specification.

4 Detailed Specifications:

The specifications listed in this Section 4 shall be the detailed specifications for the Product (“**Detailed Specifications**”).

No.	Items	Specifications	Remark
4.1	*Minimal Capacity (C_{min})	900 mAh	Standard capacity measure method: 0.2C _{min} CC (constant current) charge to 4.2V, then CV (constant voltage 4.2V) charge till charge current decline to 0.02C _{min} , then with 0.2C _{min} discharge to 3.0V cut-off
4.2	Typical Capacity	920 mAh	
4.3	*Typical Voltage	3.7 V	
4.4	Charge Cutoff Voltage	4.2 V	
4.5	Voltage at end discharge	3.0 V	Stop discharge when one cell reaches 3.0V
4.6	Charge/Discharge	Cell Surface Temperature	Charge Current and Voltage
	Charge	0°C-15°C	0.3C _{min} CC to 4.2V, then CV to 0.05C _{min}
		15°C-25°C	0.5C _{min} CC to 4.2V, then CV to 0.05C _{min}
		25°C-45°C	1.0C _{min} CC to 4.2V, then CV to 0.05C _{min}
Discharge	-10 °C to 60 °C	1.0 C _{min} Max to 3.0 V	
4.7	Storage Temperature	25 ± 3 °C Storage over 3 months	The cell voltage for a long time (Over 3 months) storage shall be 3.6V to 3.9 V range



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4.8	*Initial resistance	$\cong 300 \text{ m}\Omega$	Internal resistance measured at AC 1KHz after 50% charge
4.9	Allowable Humidity Range	10% ~ 90%	Operational
4.10	Pack Voltage (V)	3.6 ~ 3.9	As of shipment
4.11	*RT Cycle life (25 °C ± 3 °C)	0.5 C _{min} Max Charge to 4.2V, then 0.5C _{min} discharge to 3.0V, repeat to 500 cycles, record the remained capacity	> 80% of C _{min}

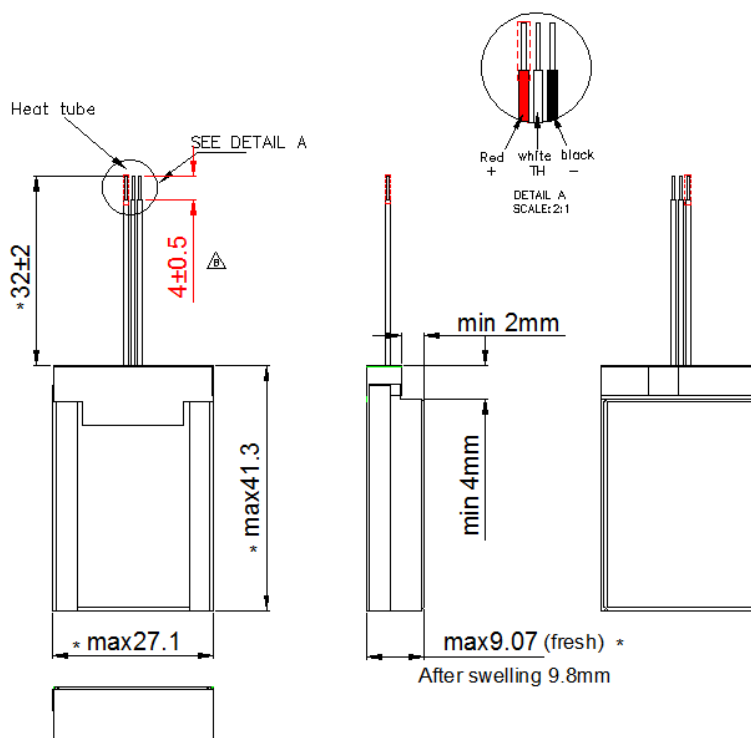
5 PCM Parameter

No	Item	Unit	Typ.	Min.	Max.	
1	Over charge protection voltage	V	4.280	4.260	4.300	
2	Delay time for over charge protection	S	1.0	0.7	1.3	
3	Over discharge protection voltage	V	2.800	2.765	2.835	
4	Delay time for over discharge protection	mS	20	14	26	
5	Over current protection testing values	A	3.2	2.69	3.72	
6	Delay time for over current protection	mS	12	8	16	
7	Delay time for short circuit protection	uS	250	180	425	
8	Power consumption of protection circuit	Dynamic	uA	-	4.0	8.7
		Static	uA	-	-	0.12
9	NTC thermistor value	KΩ	10	9.9	10.1	
10	Thermal protector	YES				

6 Warranty period

The warranty period of Battery is 12months after the manufacture date.

7 Assembly Drawing (all unit is mm, not in scale)





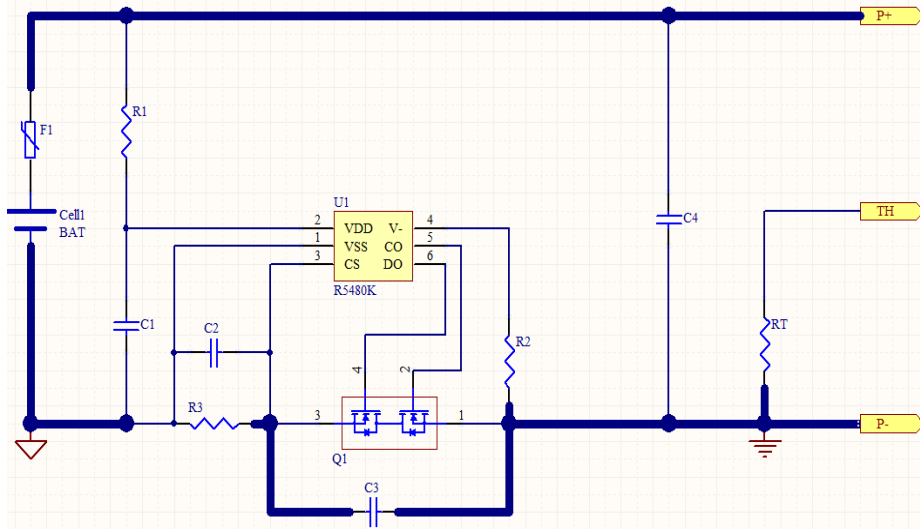
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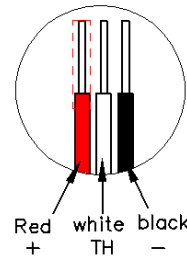
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8 Circuit Diagram



9 Terminal Specification

Wire color	Pin Name	Function	I/O
Black	P-	Battery negative terminal for charge & discharge	I/O
Red	P+	Battery positive terminal for charge & discharge	I/O
white	TH	NTC sensor port ,10K Ω \pm 1% @ 25°C ,B=3435K,	Connecting to P-



10 Major Component

No.	Items	Specifications	Manufacturer	Remark
1	Protection IC	Ricoh,R5480K240CGL-TR,DFN(PLP)1414-6,one-cell Li-ion battery protection IC,RoHS+HF	RICOH	U1
2	MOSFET	YOSONIC,QM2530M7,DFN3*3,N-ch,RoHS+HF	YOSONIC	Q1
3	SMD Capacitor	0402 inch, 0.1uF/16V 10% X7R-RoHS+HF	Walsin/TDK/YA GEO	C1, C2, C3, C4,
4	SMD Resistor	0402 inch, 330 Ω \pm 5%-RoHS+HF	Walsin/TDK/YA GEO	R1
5	SMD Resistor	0402 inch, 1K Ω \pm 5%-RoHS+HF	Walsin/TDK/YA GEO	R2
6	PTC	TE,nanoSMD200LR-2,2.0A,6.0V,RoHS+HF	TE	F1
7	NTC	Mitsubishi,0402,TH05-3I103FR,10K Ω \pm 1%,B3435 \pm 1%,RoHS+HF	Mitsubishi	RT
8	L-type Ni sheet	3*5*0.127mm-RoHS+HF	XXY	B+,B-,
9	Rsensor	0805,10m Ω \pm 1%,0.75W,Mu-Cu alloy,RoHS+HF	CurrentElectronic	R3
10	PCB	FR4,LGO0475-1,REV.01,24*5*0.8mm, 2-Layers,OSP,RoHS+HF		



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11 Appendix Handling Precautions and Guidelines for LIP Rechargeable Batteries:

Foreword

These *Handling Precautions and Guidelines for LIP Rechargeable Batteries* shall apply to the Product.

Statement (1):

Customer is requested to contact ATL in advance, if and when the customer needs other applications or operating conditions than those described in this document. Additional experimentation may be required to verify performance and safety under such conditions.

Statement (2):

ATL will take no responsibility for any accident when the Product is used under other conditions than those described in this Document.

- Use specified charge/discharge conditions.
- Specified product use only.
- Do not immerse in water pour.
- Do not heat or throw in fire.
- Do not attempt to crush or drop.
- Do not attempt to modify.
- Leave in cool places.
- Do not put it in microwave oven, oven or pressure container.
- Do not use battery if not recover during conditions above.
- During assembly, charging, normal use and storage of battery pack, such as change of color, mechanical are detected do not use.
- In case of leakage or smells remove from thermal conditions, Also wash off with clean water.
- Do not place or leave the battery and equipment in the reach of infants so that they are not able to swallow or mistreat the battery by mistake. In case of ingestion, consult with a doctor immediately.
- Do not let leaked electrolyte come into contact with eyes or skin. In such a case, immediately wash the area of contact with clean water and seek help from a doctor. If not treated soon, prolonged contact may cause serious injury.
- Do not put the battery into a fire. Do not use it or leave it in a place near fire, heaters, or high temperature sources. In such a case, the insulator in the battery may be melted, the safety vent and structure may be damaged, or the electrolyte may catch fire, all of which may cause heat generation, explosion, or fire.
- Do not submerge the battery in water, or wet the battery. If the protecting device assembled in the battery is damaged, the battery may be charged with an abnormal current and voltage and may cause a chemical reaction within the battery, which may result in the cause of heat generation, explosion, or fire of the battery.
- Do not use any battery charger not specified. Incorrect charging method and charging equipment, the battery will be damaged, which may cause firing, or other problems.
- Do not use, charge, or leave the battery near fire or in a car under the blazing sun. Such a high temperature may cause damage of the protecting device in the battery, which may result in an abnormal reaction, and then heat generation, explosion, or fire.
- Do not connect the battery reversed in positive (+) and negative (-) terminals in the charger or equipment. In the case the battery is connected in reverse, it is charged reversibly and may cause heat generation, explosion, or fire due to an abnormal chemical reaction.
- Do not short terminals. 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. In such a case, the battery is shorted and causes an excessive current, which may result in heat generation, explosion, or fire.
- Do not connect the battery directly to an electric outlet or cigarette heater socket in car. With a high voltage applied, the battery may overheat, explode, or cause fire.



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- Do not throw or drop the battery. Strong impact may damage the protecting device, which may cause an abnormal chemical reaction during its charge and result in heat generation, explosion, or fire of the battery.
- Do not drive a nail in, hit with a hammer, or stamp on the battery. In such a case, the battery may be deformed and shorted, which may cause heat generation, explosion, or fire of the battery.
- Do not solder the battery directly. Heat applied during soldering may damage the insulator of the safety vent and mechanism, which may result in heat generation, explosion, or fire of the battery.
- Do not disassemble or alter the battery. The battery employs a safety mechanism and a protecting device in order to avoid any danger. If these are damaged, heat, explosion or fire may be caused.
- Do not put the battery in a microwave oven or a pressure cooker. Sudden heat may damage the seal of the battery and may cause heat generation, explosion, or fire of the battery.
- Do not leave the battery in a charger or equipment if it generates an odor and / or heat, changes color and / or shape, leaks electrolyte, or causes any other abnormality. In such a case, immediately take the battery out of the charge or equipment and keep it away from fire, otherwise, the battery might overheat, explode, or cause fire.
- Discontinue charging after specified charging time even if the charge is not complete, otherwise, the battery might cause heat generation, explosion, or fire.
- Do not use the battery in the place where the static electricity (more than the limit of the manufacturer's guarantee) occurs. Otherwise, the protecting device in the battery might be damaged and cause heat generation, explosion, or fire.
- Do not use the battery in other than the conditions specified; otherwise, the battery might cause heat generation, damage, or deterioration of its performance.
- Read the instructions of your equipment regarding the battery installation and removal from the equipment so as not to mishandle and waste the battery.
- 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.
- The battery was manufactured and inspected carefully before shipment to conform with the specification. However, in the case any abnormality of bad smell or heat, etc. arises after purchase, bring the battery back to the retail shop where you bought it.
- The battery was charged a little before shipment for temporary use by an end user. In case your equipment does not operate with the battery or in the case of a long use, charge the battery with a specified charger once.
- Do not charge the battery over the specified time described in the instructions, otherwise, the battery performance might deteriorate.
- Turn off your equipment power switch after use, otherwise, the performance of the battery might deteriorate.
- When the battery is expected not to be used for a long time, take the battery out of the equipment and store it in a less humid area, otherwise, rust might occur and deteriorate the battery performance.
- The battery after long storage might not be sufficiently charged for use.
- In the case the battery terminals are dirty, clean the terminals with a dry cloth before use, otherwise, the contact with equipment might cause insufficiency, and power failure or charge failure.
- Despite being rechargeable, the battery has a limited life span, Replace when usage time between charges becomes short.
- Keep the handling instructions and your equipment instructions in a suitable place for future reference.