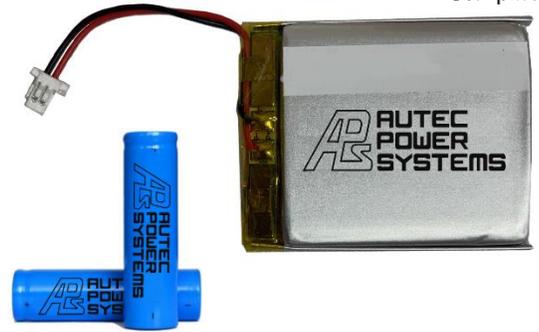


2.3Ah, 11.1V Rechargeable Lithium-ion(Li-ion) Battery

RoHS Compliant

■ Features

- Rechargeable Lithium-Ion(Li-ion)
- Nominal capacity 2.3Ah
- Nominal voltage: 11.1V
- Standard Charge 8 hours
- Rapid Charge 4 hours
- Charge Temp. 5°C to 45°C
- Discharge Temp. -10°C to 60°C
- Over Charge/Discharge Protection
- Short Circuit Protection
- Dimensions: $\phi 18.4 \times 64.8$ mm(cell)
- 5-year Warranty



*Product images are for illustrative purposes only and may vary from actual design.

■ Applications

- Small portable electronics

■ Model List*(See part number scheme for model number details)

Model Number	Nominal Capacity	Nominal Voltage	Standard Charge Time	Discharge cut-off voltage
APS28-LIR18650-2.3Ah	2.3Ah	11.1V	4 hours	9V

■ Charging Table

C-rate	Time
1C ₁	1h
0.5C ₁ or C/2	2h
0.2C ₁ or C/5	5h
0.1C ₁ or C/10	10h
0.05C ₁ or C/20	20h

Table 1: C-rate and service times when charging and discharging batteries of 1Ah (1,000mAh)

■ Technical Data

Nominal Capacity	2300mAh, Discharge:0.2CmA
Minimum Capacity	2300mAh, Discharge:0.2CmA
Energy	25.53Wh
Nominal Voltage	11.1V
Shipped Voltage	≥11.1V
AC Impedance Resistance	≤80mΩ cell, ≤250mΩ pack
Charging Current(nom.)	460mA 0.2CmA
Charging Current(max.)	2300mA 1CmA
Charging Voltage	12.6V
Discharging Current (nom.)	460mA 0.2CmA
Discharging Current (max.)	2300mA 1CmA
Discharge Cut-off Voltage	9V
Weight	Approx180.0g
Operating Temperature	Charge: 5°C~+40°C, Discharge: -10°C~+60°C

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2.3Ah, 11.1V Rechargeable Lithium-ion(Li-ion) Battery

■ **Technical Data(cont.)**

Storage Temperature	Less than a month: 5°C~+40°C, less than 6 months: -10°C~+35°C
Appearance	There shall be no scratches, burs, or other mechanical scratches, and the connector should have no rust or dirt. The structure and dimensions according to the attached drawing of the battery
Voltmeter	The standard class specified in the national standard or more sensitive class, impedance not less than 10KΩ/V
Ammeter	The standard class is specified in the national standard or more sensitive class. Total external resistance including ammeter and wire is less than 0.01Ω
Charge Mode (Full charge) Standard Charge	Standard charge mode: 23±2°C, 0.2C (CC) charge the battery until its voltage reaches 12.6V, then changed at 12.6V (CV) while tapering the charge current to 0.02C. Charging time is 8 hours in all
Charge Mode (Full charge) Rapid charge	Faster charge mode: 23±2°C, 1.0C (CC) charged the battery until its voltage reaches 12.6V, then changed at 12.6V(CV) while tapering the charge current to 0.02C. Charging time is 4 hours in all.
Discharge Performance	Within 30min after full charge, discharge at 0.2C continuously downto9.00VThe discharge capacity is required ≥2200mAh Within 30min after full charge, discharge at 1.0C continuously downto9.00VThe discharge time is required ≥54min
Cycle Performance	30min rest period after standard charge, 0.2C discharge to a cut-off voltage of 9.00V, 30min rest period; the test shall be terminated when dischargingcapacity≤80% of the minimum capacity in three consecutive cycles. Standard charge and discharge at 23±2°C
Charged Storage Characteristics	Within 28 days at 20±5°C after standard charge, at 23±2°C, then discharge at 0.2Cto 9.00V. The discharge time is required ≥4.25h
Crush Test	After the standard charge, a cell is crushed between two flat surfaces. The force for crushing is applied by a hydraulic ram exerting a force of 13KN±1KN. once the maximum force has been applied, the force is released. A cylindrical or prismatic cell is crushed with its longitudinal axis parallel to the flat surfaces of the crushing apparatus. Each cell is to be subjected to a crushing force in only one direction, separate cells are to be used for each test
Drop Test	After the standard charge, drop the cell from 1m height onto the cement floor, prismatic cell drops from each direction, total 6 times, cylindrical cell drop from longitudinal direction two times and positive and negative direction each time
Impact Test	The battery is to be fully charged with standard charging condition and put a rod with a diameter=15.8mm on the cell, and then a heavy block (weight=9.1Kg) crash on the cell from a certain height (height=61.0cm)
Short-Circuit Test	After the standard charge, the cell is to be short-circuited by connecting the positive and negative terminals with a total external resistance of 80±20mΩ. The cells remain on test for 24h or until the case temperature declines by 20% of the maximum temperature rise, whichever is sooner
Over Charging Test	After the standard charge, the cell is subjected to a charging current by connecting it to a dc-power supply. The beginning current is 3.0C, which is to be obtained by connecting a resistor of specified size and rating in series with the cell; the voltage of the dc-power supply is 4.6V. The test time is 7 hours

2.3Ah, 11.1V Rechargeable Lithium-ion(Li-ion) Battery

■ **Technical Data(cont.)**

Constant Humidity and
Temperature
Characteristics

Under the temperature of $23\pm 2^{\circ}\text{C}$, after charging the cell with 0.2C, then put the cell into the constant temperature and humidity oven with $55\pm 2^{\circ}\text{C}$ and 90~95% for 48h, the cell should be no obvious deformation, leakage, rust, smoking, and explosion. After testing take out the cell then rest for 2h under the temperature of $20\pm 5^{\circ}\text{C}$, discharge with 0.2C to 3.0V

Notes:

1. Nominal capacity is measured by the discharge at 0.2C to 9.0V end voltage after fully charged according to specification at $23\pm 2^{\circ}\text{C}$.
2. Discharged at a high rate and high temperature ($>45^{\circ}\text{C}$) frequently, battery life will be shortened
3. The test should be conducted with new batteries within one month after shipment from our factory and the cells shall not be cycled more than five times before the test. Unless otherwise defined, test and measurement shall be done under the temperature of $23\pm 2^{\circ}\text{C}$ (capacity test), $20\pm 5^{\circ}\text{C}$ (other tests) and relative humidity of 75% or less.

■ **PCM List**

Designator	LibRef	Comment	Description	Footprint	Quantity
U1	IC	BQ40Z50-R1		QFN32-0.4	1
Q5	MOSFET	2N702		SOT-23	1
Q2, Q1	MOSFET	MT8386M5(N-type)		DFN5*6-8	2
D2, D3	Zener diode	5V6		SOD523	2
D1	diode	1N4148		SOD523	1
RT1, T1	NTC	10KNTC	B=3435 1%	0402	2
R2, R3, R4, R5, R6, R8, R9, R14	Chip Resistors	100R 5%		R0402	8
R10, R11	Chip Resistors	200R 5%		R0402	2
R1	Chip Resistors	47K 5%		R0402	1
R13	Chip Resistors	5.1K 1%		R0603	1
R16	Chip Resistors	5.1K 1%		R0402	1
R7	Chip Resistors	20K 1%		R0402	1
R12, R17	Alloy Resistors	10M 5%		R0603	2
R18	Chip Resistors	10K 5%		R0603	1
R19	Chip Resistors	10K 5%		R0402	1
RS1	Metal Film Resistors	5mR 2W		2512	1
C1, C9	Chip Capacitors	1uF/50V		C0603	2
C2	Chip Capacitors	2.2uF/50V		C0805	1
C3, C4, C5, C6, C7, C8, C12, C13	Chip Capacitors	0.1uF/50V		C0402	8
C11 C10	Chip Capacitors	0.1UF/50V		0603	2
J1	connector	50278-00901-001			1
PCB		TX3S1P-46/FR4, black oil/tin plate			

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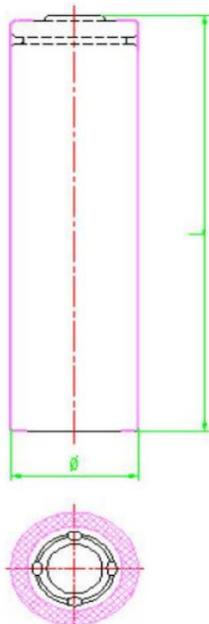
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■ PCM Parameter

No.	Item	Condition	Specification
1	input Voltage	input Voltage B+ to B-	-0.3~+30V
2	Overcharge	Detection voltage	4.44±0.01V
3		Release voltage	4.35±0.01V
4		Detection delay time	1~3S
5	Over-discharge	Detection voltage	2.8±0.05V
6		Release voltage	2.9±0.1V
7		Detection delay time	1~3S
8	Over discharge current	Over current	9~13A
9		delay time	1~3S
10	Short Circuit Protection	Short detection delay time	100-500uS
11		Release Conditions	Cut-off load
12	Normal current consumption	Normal current consumption of PCM	Max 6uA
13	OV charger	allowed OV change	NO
14	Suggest working conditions	Max continuous charge/discharge current	2A
15		suggest working temperature	5°C~40°C
16	Thermistor	25°C NTC resistance	10KΩ, ±5%, B=3435
17	IR resistance	IR of PCM	≤65mΩ
18	The size of final PCM	The length of final PCM	46.2±0.15mm
19		The width of final PCM	12.3±0.1mm
20		The thickness of final PCM	Max 2.4mm

■ Mechanical Diagram(cell)



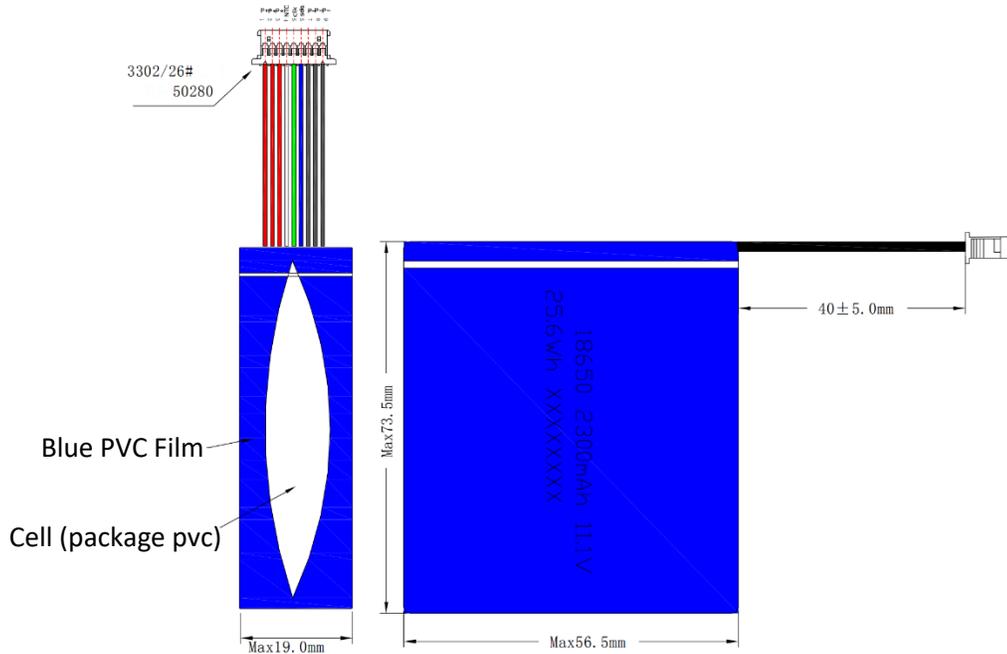
Item	Specifications
Φ	18.4mm max
L	64.8±0.5mm

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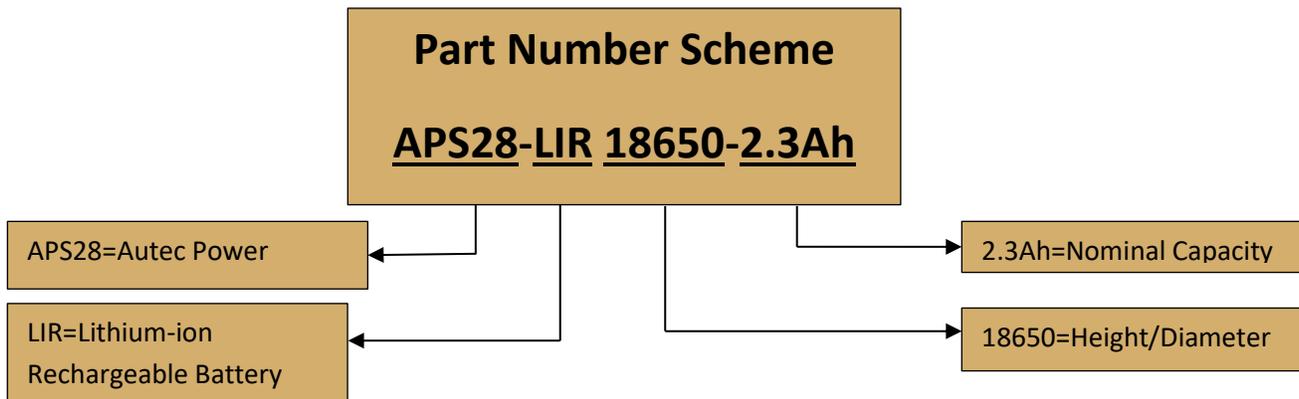
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■ Mechanical Diagram(PCM)



■ Warnings

1. Install batteries correctly.
2. Ensure the contact points are clean and conducive.
3. Do not mix different types or brands of batteries in any application.
4. Do not expose the batteries to heat or fire.
5. Keep away from small children.
6. Please check the manufacturing date code.



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*Specifications are subject to change without notice. Autec is not responsible for issues arising from errors or omissions.

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