

Cell Specification

INR 18650 11P

Powerful for you.
Fast for everyone.



E-Mobility



Industrial



Medical



Power- and
Gardentools



Drive
System



Energy Storage
Systems

INR 18650 11P2

Cylindrical Lithium Ion Cell

1. Characteristics

1.1	Weight	39,5g
1.2	Dimension	Length: 65.2±0.3 mm Diameter: 18.5±0.15 mm
1.3	Nominal Capacity	1100mAh (at 0.5C Discharge)
1.4	Nominal Voltage	3.2V
1.5	Internal Resistance	≤18mΩ(AC,1 kHz,30% SOC)
1.6	Charge Cut-Off Voltage	3.65V±0,5V (end at current density of 0.05C)
1.7	Discharge Cut-Off Voltage	32.5V
1.8	Max. Charge Current	0~10°C: 5C 10~35°C: 10C 35~55°C: 10C
1.9	Max. Discharge Current	-20~-10°C: max 20C, discharge rate 80%, can't promise cycle life -10 ~ 10°C: max 25C, discharge rate 80%, can't promise cycle life 10 ~ 35 °C: max 30C, discharge rate 92%, can't promise cycle life 35 ~ 60°C: max 30C, can't promise cycle life
1.10	Product Certification	UN38.3 UL1642 IEC62133-2:2017 BIS16046

1. Cell Performance Criteria

2.1 Cell Testing Conditions

Unless specified, all tests stated according to the following conditions:

Temperature: 25±2°C
Humidity: ≤85%RH
Use standard charge and standard discharge method

2.2 Requirement of the Testing Equipment

Voltage meter
Temperature meter
Current meter requirements
Dimensional measuring apparatus

The voltage tester internal resistance is ≥ 10 K/V
The precision is ≤0.5°C
Accuracy should not be less than 0.5 mA
Accuracy grade is not less than 0.01 mm

INR 18650 11P2

Cylindrical Lithium Ion Cell

2.3 Electronic Performance

No.	Item	Test Method and Condition	Standard		
1	1C Rated Cap. 10C Rated Cap. 20C Rated Cap.	Discharging at current of 1C to 2.0V after standard charge. Discharging at current of 10C to 2.0V after standard charge. Discharging at current of 20C to 2.0V after standard charge.	≥ 95% initial capacity ≥ 90% initial capacity ≥ 90% initial capacity		
2	Cycle life at room temperature	Test condition: Temperature: 25±2°C Charge: 1C CC to 3.65V, and then CV(3.65V) to 0.05C Discharge: 10C CC to 2.5V ≥80% of initial discharge capacity	≥ 500		
3	Storage at room temperature	For storage at room temperature, following the guideline from attached specification to keep voltage range between 3.3V and 3.4V and proper condition, what will be the recoverable capacity after following storage time:			
			1 Month	3 Month	6 Month
		Recoverable capacity	97,4%	95%	94%

2.4 Safety Characteristics

Overcharge

Normal batteries are charged at 1C constant current until the charging termination voltage is 1.5 times or after charging time reaches 1h, then stop charging and the appearance changes of the batteries are observed for 1h.

Criteria: No Fire, No Explosion

Overdischarge

After normal charge, test the batteries' initial state. When the batteries are normal, discharge to 0V at 0.5C. Observe cell's variation of appearance.

Criteria: No Fire, No Explosion, No Leakage

External Short Circuit Test (25°C)

After standard charging of normal batteries, direct short circuit positive and negative poles for 10 minutes, external line resistance should be less than 5 mΩ. When the temperature of batteries drops to 10°C, the test is completed and the appearance changes of batteries are observed for 1 hour.

Criteria: No Fire, No Explosion

INR 18650 11P2

Cylindrical Lithium Ion Cell

Thermal Abuse

The initial state of the normal battery was measured. After standard charging, the battery was placed in the oven. The temperature was increased to $130\pm 2^{\circ}\text{C}$ at a rate of $(5\pm 2^{\circ}\text{C})/\text{min}$ and kept for 30 minutes. Then the appearance of the battery was observed for one hour.

Criteria: No Fire, No Explosion

2.5 Reliability Characteristics

Drop Test

After standard charging of normal batteries, the initial state of the batteries was measured, and the test batteries were freely dropped from 1.5m height to flat cement ground, once in each direction.

Criteria: No Fire, No Explosion

Impact Test

A diameter of 15.8 mm steel rod is placed in the middle of the fully charged cell, then the weight of 10kg hammer from 1.0m height free falls to the cell upper.

Criteria: No Fire, No Explosion

Crush Test

After standard charging of normal batteries, pressure is applied perpendicular to the electrode plate or the longitudinal axis of batteries. The area of extrusion head is not less than 20 cm^2 , and the pressure gradually increases to 13 kN or the deformation reaches 30%.

Criteria: No Fire, No Explosion

Vibration Test

Standard charge. Equip it to the vibration platform, prepare the test equipment according to following vibration frequency and relevant swing, doing frequency sweeping from X, Y, Z three directions, each from 10Hz to 55Hz for 30 minutes of recycling, rating of which is $1\text{oct}/\text{min}:0.38\text{mm}$

- a) vibration frequency:10Hz ~ 30Hz Displacement breadth (single swing): 0.38mm
- b) vibration frequency:30Hz ~ 55Hz Displacement breadth (single swing): 0.19mm.

Observe the final state after scanning.

Criteria: Residual Capacity $\geq 90\%$ Rated Capacity
Voltage Decrease Rate $\leq 0.5\%$ No obvious outside damage, No leakage, No smoke, No explosion

INR 18650 11P2

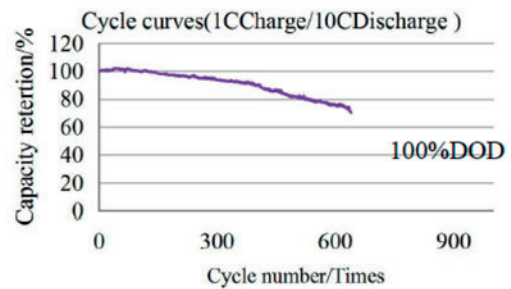
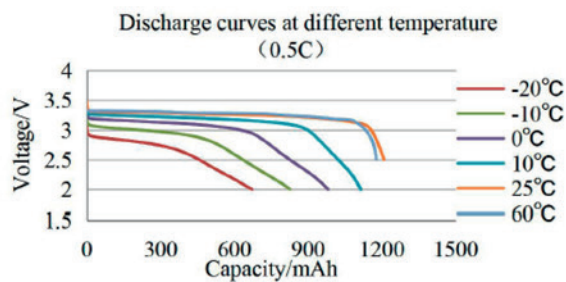
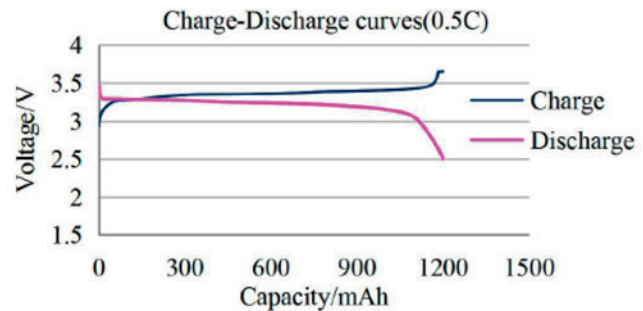
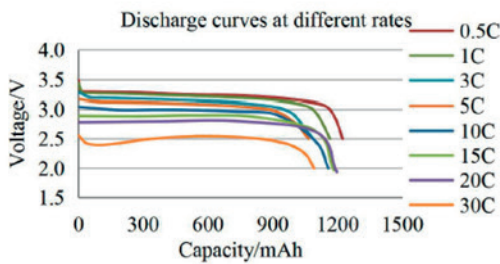
Cylindrical Lithium Ion Cell

Prick Test

Use $\Phi 3\sim 5$ mm high temperature resistant steel needle, to 10 mm/s \sim 40 mm/s of speed, from the perpendicular to the direction of the cell plate. (The steel needle stays in battery for more than 5 minutes).

Criteria: No Fire, No Explosion, No Leakage

3. Charge/Discharge Performance



INR 18650 11P2

Cylindrical Lithium Ion Cell

4. Appearance



5. Notification

5.1 Charging

- Charging voltage must be set 3.65V/cell. Concerning charge voltage tolerance of charger, charging limited voltage must be set below 3.65V/cell. Cell life will be shortened by charging voltage above 3.65V.
- Charge the cell at a constant current of 0.5C until 3.65V is attained.
- Maintain charge voltage at 3.65V for 2.0 hours (recommended for maximum capacity).
- No reverse charging
- In case of cell voltage is below 2.5V, cell should be charged with pre-charge that current is below 0.34A (0.1C). Then cell voltage reach over 2.5V, standard charge starts. And if cell voltage never reaches to 2.5V in specified period (timer), charger will stop charging.
- By timer, current detection and open circuit voltage detection, charger detects full charge. When charger detect cell is full charged, charger stop charging.

5.2 Discharging

- Discharge temperature range should be -20 °C ~ +60°C.

5.3 Environmental using Conditions

- When the cell is charged: 0°C~55°C
- When the cell is discharged: -20°C ~ +60°C
- Charge or discharge out of recommended range might cause the generating heat or serious damage of cell. And also, it might cause the deterioration of cell's characteristics and cycle life.

INR 18650 11P2

Cylindrical Lithium Ion Cell

5.4 Storage

It should be stored in dry and cool place if the cell is stored for a long time (more than three months), Storage ambient temperature is required to be $25\pm 5^{\circ}\text{C}$, humidity is required to be less than 85% RH. And in order to ensure that the environmental control under this condition cannot make the surface of the cell appear condensate droplets, while the surface of the storage cell cannot appear moisture phenomenon. The batteries' storage voltage should be 3.3~3.4V.

5.5 Precautions on Handling Lithium Ion Cells

- a) Inspect voltage and internal impedance before using.
- b) Do not use abnormal cell which has damages by shipping stress, drop, short or something else, and which gives off electrolyte odor.
- c) Do not use or leave the cell under the blazing sun (or in heated car by sunshine). The cell may generate heat, , it might cause the deterioration of cell's characteristics or cycle life.
- d) Do not use cell nearby the place where generates static electricity (more than 100V).
- e) Please read the manual before using the cell and please reread if necessary.
- f) Please read the manual of specified charger about charging method.
- g) When the cell has rust, bad smell or something abnormal at first-time-using, do not use the equipment and go to bring the cell to the place which it was bought.

5.6 Cell Position in Equipment and Charger

To avoid degradation of cell performance by heat, a cell should set the place apart from heat generating electronic parts inside equipment and charger.

6. Precautions and Safety Instructions

- 6.1 The cell includes the flammable objects such as the organic solvent. If the handling is missed there will be possibility that the cell rupture flames or hot, or it will cause the damage to the cell and/or personal injury. Please observe the following prohibitive matters. And also, add the protection device the equipment for fear that the trouble would affect the cell by the abnormality of equipment. Please read and observe the standard cell precautions below before using utilization.
- 6.2 Don't use or expose the cell to extreme heat, flame, disposed in fire or water or get it wet. Don't modify or disassemble the cell. It will be dangerous, and may cause ignition, heating, leakage or explosion.

INR 18650 11P2

Cylindrical Lithium Ion Cell

- 6.3** Don't short-circuit cell positive(+) and negative(-) terminals. Keep away from metal or other conductive materials. Jumbling the cells of direct contact with positive(+) and negative(-) terminals or other conductive materials may cause short-circuit. Don't reverse the positive (+) and negative (-) terminals for any reason.
- 6.4** Don't use the unspecified charger and breach charging requirement. Cell charged with unspecified condition maybe lead cell to be overcharged or abnormal chemical reaction. It causes the generating heat, smoke,rupture.
- 6.5** Don't overcharge, over-discharge, drive nail into the cell, strike it by hammer or tread it.
- 6.6** Don't give cell impact or drop, and not use the cell with conspicuous damage or deformation.
- 6.7** Don't connect cell to the plug socket or car-cigarette-plug. Don't use lithium-ion cell in mixture of different batch or use cell for other equipment.
- 6.8** Do not use or leave the cell under the blazing sun (or in heated car by sunshine), and keep cell away from little children in order to avoid troubles by Swallowing.
- 6.9** If the cell gives off an odor, generates heat, becomes discolored, or in any way appears abnormal during use, recharging or storage, immediately remove (Don't touch a abnormal cell directly) it from the device or cell charger and stop using it.

Any questions?

Contact us, we will be pleased to advise you.

A full load of advantages

Customized cells tailored to your individual requirements with the best choice in Li-Ion technology for the coming development.



One-Stop Shop



Customized



High Quality



More Power



High Energy

Headquarter Germany

TerraE GmbH
Zeche Gustav 1
63791 Karlstein am Main

+49(0) 6188-9956-0
info@terrae.com
www.terrae.com

Power – the result of a better battery