
Spec.No.	IFR26650-36	Version No.	0.0
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SPECIFICATION OF PRODUCT

for Lithium-ion Rechargeable Cell

Model: [IFR26650-36](#)

November, 2018

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1.Scope

This product specification has been prepared to specify the rechargeable lithium-ion cell.

2. Description and Model

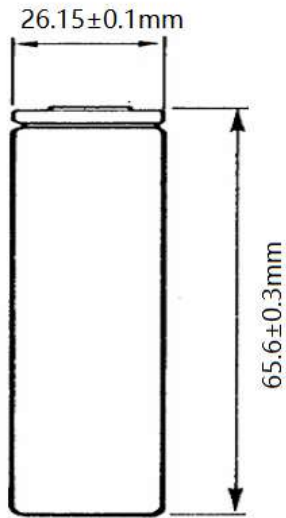
2.1 Description Cell (Lithium-ion rechargeable cell)

2.2 Model [IFR26650-36](#)

3. Nominal Specifications

Item	Specification
3.1 Nominal Capacity	3600mAh (0.2C, 2.50V discharge)
3.2 Minimum Capacity	3500mAh (0.2C, 2.50V discharge)
3.3 Charging Voltage	3.65 ± 0.05 V
3.4 Nominal Voltage	3.2V
3.5 Charging Method	CC-CV (Constant voltage with limited current)
3.6 Charging Current	Standard charge:720mA
3.7 Charging Cut-off Current	36mA (0.01C)
3.8 Max. Charge Current	3600mA(ambient temperature 25°C)
3.9 Max. Discharge Current	10000mA(ambient temperature 25°C)
3.10 Discharge Cut-off Voltage	2.50V
3.11 Cell Weight	85.0g max
3.12 Cell Dimension	Height: 65.90mm max Diameter: 26.30mm max
3.13 Operating Temperature	Charge : 0 to 45°C Discharge: -20 to 60°C
3.14 Storage Temperature	1 year : -20~25°C 3 months : -20~45°C 1 month : -20~55°C

4. Outline Dimensions



5. Appearance

There shall be no such defects as scratch, rust, discoloration, leakage which may adversely affect commercial value of the cell.

6. Standard Test Conditions

6.1 Environmental Conditions

Unless otherwise specified, all tests stated in this specification are conducted at temperature $25 \pm 2^\circ\text{C}$ and humidity $65 \pm 20\%$.

6.2 Measuring Equipment

(1) Ammeter and Voltmeter

The ammeter and voltmeter should have an accuracy of the grade 0.5 or higher.

(2) Slide caliper

The slide caliper should have 0.01 mm scale.

(3) Impedance meter

The impedance meter with AC 1kHz should be used.

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7. Characteristics

7.1 Standard Charge

This "Standard Charge" means charging the cell with charge current 1000mA and constant voltage 3.65V at 25°C with cut-off at 36mA.

7.2 Standard Discharge Capacity

The standard discharge capacity is the initial discharge capacity of the cell, which is measured with discharge current of 720mA with 2.50V cut-off at 25°C within 1 hour after the standard charge.

Standard Discharge Capacity $\geq$ 3500mAh

7.3 Initial internal impedance

Initial internal impedance measured at AC 1kHz after rated charge.

Initial internal impedance $\leq$ 30m Ω

7.4 Temperature Capabilities

Capacity comparison at each temperature, measured with discharge constant current 720mA and 2.50V cut-off after the standard charge is as follows.

Charge Temperature	Discharge temperature			
25°C	-10°C	0°C	25°C	40°C
Relative Capacity	60%	80%	100%	90%

7.5 Cycle Life

Each cycle is an interval between the charge (charge current 1800mA) with 36mA cut-off and the discharge (discharge current 3600mA) with 2.5 V cut-off.

Capacity after 2000cycles, measured under the same condition in 7.2

Capacity $\geq$ 2800mAh(80% of the capacity at 25°C)

7.6 Status of the cell as of ex-factory

The cell should be shipped in 30% charged state. In this case, OCV is from 3.20V to 3.35V.

8. Mechanical Characteristics

8.1 Drop Test

Test method: Drop height of 1.0 meters. Drop each cell three times on bottom onto a plastic plate then Drop each cell once on side onto concrete surface, and Drop each cell three times on header onto a plastic plate.

Criteria: No leakage, No explode, No fire.

8.2 Vibration Test

As to the UN transportation regulation (UN38.3), for each axis (X and Y axis with cylindrical cells) 7Hz→200Hz→7Hz for 15min, repetition 12 times totally 3hours, the acceleration 1g during 7 to 18Hz and 8g (amplitude 1.6mm) up to 200Hz.

Criteria: No leakage, with less than 10mV of OCV drop.

Vibration test shall be performed with the UN38.3 standard.

9. Safety

9.1 Overcharge Test

Test method: After normal charge, test the batteries' initial state and capacity. Charge to 10.0V at 3C, then charge at CV mode to 0.01C. Observe cell's variation of appearance.

Criteria: No fire, and no explosion.

9.2 External Short-circuit Test

Test method: After normal charge, test the batteries initial state, Keep the cell into explosion protection cover, short-circuit the positive and negative terminals directly (general resistance shall be less than or equal to 50mΩ). Stop the

test when the temperature falls to 10°C lower than the peak value. Observe the variation of the batteries' appearance and temperature.

Criteria: No fire, and no explosion.

9.3 Over discharge Test

Test method: 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 leakage, and no explosion.

9.4 Heating Test

Test method: Test the batteries' initial state and capacity. Standard charge. Put cell into oven, increase the temperature to 130±2°C at rate of (5±2°C) /min, and keep it for 30min. Observe the variation of batteries' appearance.

Criteria: No fire, and no explosion.

10. Warranty

Manufacturer will be responsible for replacing the cell against defects or poor workmanship for 15 months from the date of shipping. Any other problems caused by malfunction of the equipment or unsuitable use of the cell are not under this warranty.

The warranty set forth in proper use, handling conditions described above, and excludes in the case of a defect which is not related to manufacturing of the cell.

11. Others

11.1 Storage for a long time

If the cell is kept for a long time (3months or more), It is strongly recommended that the cell is preserved at dry and low-temperature.

11.2 Other

Any matters that specification does not have, should be conferred with between the both parties.

12. Packing

To be confirmed

Proper Use and Handling of Lithium Ion Cells

See before using lithium-ion cell

This document has been prepared to describe the appropriate cautions and prohibitions, which the customer should take or employ when the customer uses and handles the lithium ion cell to be manufactured in order to obtain optimum performance and safety.

1. Charging

1.1 Charging current

Charging current should be less than maximum charge current specified in the product specification.

1.2 Charging voltage

Charging should be done by voltage less than that specified in the product specification.

1.3 Charging time

Continuous charging under specified voltage does not cause any loss of performance characteristics. However, the charge timer is recommended to be installed from a safety consideration, which shuts off further charging at time specified in the product specification.

1.4 Charging temperature

The cell should be charged within a range of specified temperatures in the specification.

1.5 Reverse charging

The cell should be connected, confirming that its poles are correctly aligned. Inverse charging should be strictly prohibited. If the cell is connected improperly, it may be damaged.

2. Discharging

2.1 Discharging

The cell shall be discharged continuously at less than maximum discharge current specified in the product specification. In case of the higher discharge current should be set, it shall be discussed together with manufacturer.

2.2 Discharging temperature

2.2.1 The cell should be discharged within a range of temperatures specified in the product specification.

2.2.2 Otherwise, it may cause loss of characteristics.

2.3 Over-discharging

2.3.1 The system should be equipped with a device to prevent further discharging exceeding discharging cut-off voltage specified in the product specification.

2.3.2 Over-discharging may cause loss of performance, characteristics of battery function.

2.3.3 Over-discharging may occur by self-discharge if the battery is left for a very long time without any use.

2.3.4 The charger should be equipped with a device to detect cell voltage and to determine recharging procedures.

3. Storage

3.1 Storage conditions

3.1.1 The cell should be stored within a range of temperatures specified in the product specification.

3.1.2 Otherwise, it may cause loss of performance characteristics, leakage and/or rust.

3.2 Long-term storage

3.2.1 The cell should be used within a short period after charging because long-term storage may cause loss of capacity by self-discharging.

3.2.2 If long-term storage is necessary, the cell should be stored at lower voltage within a range specified in the product specification, because storage with higher voltage may cause more loss of performance characteristics.

3.2.3 Store the battery at 0 ~ 23°C, low humidity (below 65%), no dust and no corrosive gas atmosphere.

4. Cycle life

4.1 Cycle life performance

4.1.1 The cell can be charged/discharged repeatedly up to times specified in the produce specification with a certain level of capacity also specified in the product specification.

4.1.2 Cycle life may be determined by conditions of charging, discharging, operating temperature and/or storage.

5. Battery Pack Assembly

5.1 Prohibition of usage of damaged cell

5.1.1 The cell should be inspected visually before battery assembly.

5.1.2 The cell should not be used if sleeve-damage, can-distortion and/or electrolyte-smell is detected.

5.2 Terminals handling

5.2.1 Excessive force on the negative terminal should be avoided when external strip terminal is welded.

5.3 Transportation

5.3.1 If the cell is necessary to be transported to such as the battery manufacturer, careful precautions should be taken to avoid damage of cell.

6. Others

6.1 Disassembly

6.1.1 The cell should not be dismantled from the battery pack.

6.1.2 Internal short-circuit caused by disassembly may lead to heat generation and/or venting.

6.1.3 When the electrolyte is coming in contact with the skin or eyes, wash immediately with fresh water and seek medical advice.

6.2 Short-circuiting

6.2.1 Short-circuit results in very high current which leads to heat generation.

6.2.2 An appropriate circuitry should be employed to protect accidental short-circuiting.

6.3 Incineration

6.3.1 Incinerating and disposing of the cell in fire are strictly prohibited, because it may cause rupture and explosion.

6.4 Immersion

6.4.1 Soaking the cell in water is strictly prohibited, because it may cause corrosion and leakage of components to be damaged to functions.

6.5 Mixing use

6.5.1 Different types of cell, or same types but different cell manufacturer's shall not be used, which may lead to cell imbalance, cell rupture or damage to system due to the different characteristics of cell.

6.5.2 Do not mix use the cells from different batches/ranks even they are the same cell types from the same manufacturer.

6.6 Battery disposal

6.6.1 Although the cell contains no environmentally hazardous component, such as lead or cadmium. the battery should be disposed according to the local regulations when it is disposed.

6.6.2 The cell should be disposed with a discharged state to avoid heat generation by an inadvertent short-circuit.

6.7 Caution

6.7.1 The Battery used in this device may present a risk of fire or chemical burn if mistreated.

6.7.2 Do not disassemble, expose to heat above 100°C or incinerate it.

6.7.3 Replace battery.

6.7.4 Use of another battery may present a risk of fire or explosion.

6.7.5 Dispose of used battery promptly.

6.7.6 Keep away from children.

6.7.7 Do not disassemble and do not dispose of in fire.

Handling precaution and prohibitions of lithium rechargeable cells and batteries

Inaccurate handling of lithium ion and lithium ion batteries rechargeable battery may cause leakage, heat, smoke, an explosion, or fire.

This could cause deterioration of performance or failure. Please be sure to follow instructions carefully.

1. Safety precaution and prohibitions

To assure product safety, describe the following precautions in the instruction manual of the application.

2. Danger

2.1 Electrical misuseage

2.1.1 Use dedicated charger.

2.1.2 Use or charge the battery only in the dedicated application.

2.1.3 Don't charge the battery by an electric outlet directly or a cigarette lighter charger.

2.1.4 Don't charge the battery reversely.

2.2 Environmental misuseage

2.2.1 Don't leave the battery near the fire or a heated source.

2.2.2 Don't throw the battery into the fire.

2.2.3 Don't leave, charge or use the battery in a car or similar place where inside of temperature may be over 60°C.

2.2.4 Don't immerse, throw, wet the battery in water / seawater.

2.3 Others

2.3.1 Don't fold the battery cased with laminated film such as pouch and Polymer.

2.3.2 Don't store the battery in a pocket or a bag together with metallic objects such as keys, necklaces, hairpins, coins, or screws.

2.3.3 Don't short circuit (+) and (-) terminals with metallic object intentionally.

2.3.4 Don't pierce the battery with a sharp object such as a needle, screw drivers.

2.3.5 Don't heat partial area of the battery with heated objects such as soldering iron.

2.3.6 Don't hit with heavy objects such as a hammer, weight.

2.3.7 Don't step on the battery and throw or drop the battery on the hard floor to avoid mechanical hock.

2.3.8 Don't disassemble the battery or modify the battery design including electric circuit.

2.3.9 Don't solder on the battery directly.

2.3.10 Don't use seriously scared or deformed battery.

2.3.11 Don't put the battery into a microwave oven, dryer ,or high-pressure container.

2.3.12 Don't use or assemble the battery with other makers' batteries, different types and/or models of batteries such as dry batteries, nickel-metal hydride batteries, or nickel-cadmium batteries.

2.3.13 Don't use or assemble old and new batteries together.

3. Warning

3.1 Stop using the battery if the battery becomes abnormally hot, order, discoloration, deformation, or abnormal conditions is detected during use, charge, or storage.

3.2 Keep away from fire immediately when leakage or foul odors are detected. If liquid leaks onto your skin or cloths, wash well with fresh water immediately.

3.3 If liquid leaking from the battery gets into your eyes, don't rub your eyes and wash them with clean water and go to see a doctor immediately.

3.4 If the terminals of the battery become dirty, wipe with a dry cloth before using the battery.

3.5 Cover terminals with proper insulating tape before disposal.

4. Caution

4.1 Electrical misuseage

Battery must be charge with constant current-constant voltage (CC/CV).

4.2 Others

4.2.1 Keep the battery away from babies and children to avoid any accidents such as swallow.

4.2.2 If younger children use the battery, their guardians should explain the proper handling method and precaution before using.

4.2.3 Before using the battery, be sure to read the user's manual and precaution of its handling.

4.2.4 Before using charger, be sure to read the user's manual of the charger.

4.2.5 Before installing and removing the battery from application, be sure to read user's manual of the application.

4.2.6 Replace the battery when using time of battery becomes much shorter than usual.

4.2.7 Cover terminals with insulating tape before proper disposal.

4.2.8 If the battery is needed to be stored for an long period, battery should be removed from the application and stored in a place where humidity and temperature are low.

4.2.9 While the battery is charged, used and stored, keep it away from object materials with static electric chargers.

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5. Safety Handling Procedure for the Transporter

5.1 Quarantine

Packages that are crushed, punctured or torn open to reveal contents should not be transported. Such packages should be isolated until the shipper has been consulted, provided instructions and, if appropriate, arranged to have the product inspected and repacked.

5.2 Spilled Product

In the event that damage to packaging results in the release of cells or batteries, the spilled products should be promptly collected and segregated, and the shipper should be contacted for instructions.