

Model No. : NTA3460-4

Product Description : 1S1P Rechargeable Lithium Ion Battery Pack

Approved by

(with company chop)

Date:

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Presented by  
GPI International Ltd.

Date:

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### Note of Revision

Rev	Page	Date	Description	Initiator	Authority
0		3Jun2015	New issue	JW Liu	E Fok
1	5	3Jun2015	Watermark removed from product drawing	JW Liu	E Fok
2	5 13	8Jul2015	Updated product design and connector pin-out Added protection circuit diagram Added protection circuit bill of materials	JW Liu	E Fok
3	4 6 12 13	29Oct2015	Added material compliance Added application Changed cycle life performance conditions Updated protection circuit bill of materials Updated protection circuit parameters	JW Liu	E Fok
4	5	24Dec2015	Change cable length of from 70mm to 85mm	JW Liu	E Fok

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### Statement of Confidentiality

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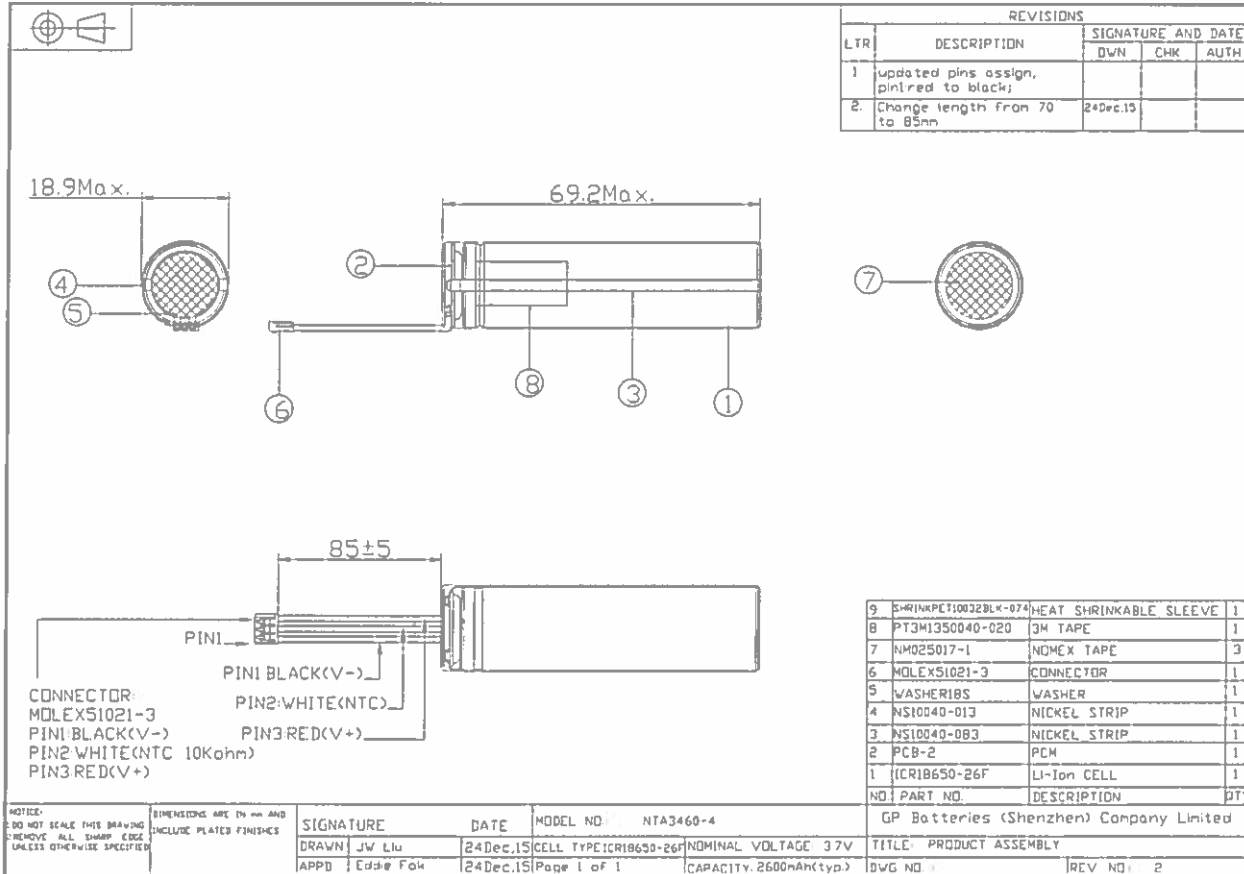
## 1. Scope

This specification describes the physical, functional and electrical characteristics of a rechargeable Lithium Ion battery pack supplied by GP Batteries International Ltd. Battery packs produced will meet this specification. However, the information is descriptive only. No representation, guarantee or warranty of merchantability or fitness for purpose is made or implied. Specifications are subject to change without any prior notice.

## 2. Specification

Model No	:	NTA3460-4
Application	:	Video Monitor
Battery Type	:	Lithium Ion
Battery Configuration	:	1S1P
Nominal Voltage	:	3.7 V
Maximum Charge Voltage	:	4.2 V
Discharge Cut-off Voltage	:	2.75 V
Typical Capacity	:	2600 mAh
Standard Charging Current	:	1300 mA
Standard Discharging Current	:	520 mA
Maximum Charging Current	:	2000 mA
Maximum Discharging Current	:	2000 mA (Continuous)
Operating Temperature	:	5°C to 45°C (Charging) -20°C to 50°C (Discharging)
Storage Temperature	:	-20°C to 45°C (1 month) -20°C to 40°C (6 months) -20°C to 35°C (12 months)
Safety Device	:	Each pack is equipped with a protection circuit against over-voltage, over-discharge and over-current.
Material Compliance	:	BFR/PVC-free

### 3. Product Drawing



#### 4. Test Conditions

Unless otherwise specified, all tests should be conducted within 1 month of delivery under the following conditions:

Ambient Temperature :  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$   
Relative Humidity :  $65 \pm 20\%$

#### 5. Performance

Item	Criteria	Test Conditions
Capacity	$\geq 2550 \text{ mAh}$	Standard charge and standard discharge
Internal Impedance	TBD	Measure AC impedance at 1kHz within 1 hour after standard charge
Leakage	No leakage nor deformation	Store the battery at the temperature under $43 \pm 5^{\circ}\text{C}$ and $65 \pm 5\% \text{RH}$ for 2 weeks after quick charge.
Cycle Life	TBD	Measure discharge capacity after conducting 400 cycles of standard charge and 0.2C discharge with cut-off voltage of 3.3V.
Charge Retention	$\geq 80\%$	Measure discharge capacity of cells after standard charge and stored at $23 \pm 5^{\circ}\text{C}$ for 28 days
Drop test	No fire No explosion No leakage	Drop cells after standard charged onto a concrete floor from a height of 1 m for 3 times.
Vibration test	No fire No explosion No leakage	Vibrate cell in 0.8mm amplitude and frequency varied at 1Hz/min between 10 to 55Hz and return in within 90 to 100 minutes.
Battery weight	TBD	Measured by balance
Appearance	No crack No leakage No deformation	Visual Inspection

#### 6. Charge state of battery shipment

Battery is charged to 30-50% before shipment.

#### 7. Liability

Customer is kindly requested to use the battery delivered from GP Batteries in strict accordance with the

specification in this document. Improper usage of the battery may cause fire or even explosion. GP Batteries will not guarantee against any accidents occurring due to use outside those written in this specification. GP Batteries shall not responsible against any accident caused by matters which is not written in this specification.

### **8. Limited Warranty**

GP Batteries will be responsible for replacing the battery pack against defects in workmanship and materials for a period of 12 months from manufacture code that GP Batteries can confirm such defects are coming from manufacturing abnormality. Any other problem is not under this limited warranty.

GP Batteries makes no warranties against any accidents occurring due to use outside scope and application written in this document.

GP Batteries makes no warranties against any losses or lost earnings incurred by the customer or third parties arising from any usage of the battery.

GP Batteries makes no other warranties expressed or implied except as provided in this limited warranty.

### **9. Precautions**

#### **9.1. Handling & Usage**

Never short-circuit the battery.

Never immerse in water.

Never expose to, or dispose of the battery in fire.

Avoid excessive physical shock or vibration.

Keep out of reach of children

Never use a battery that appears to have suffered abuse

#### **9.2. Charging**

Battery must be charged with an appropriate charger only.

Never use a modified or damaged charger.

Never connect the battery directly to an electric outlet or cigarette heater socket in a car.

Never charge the battery near fire or in a car under the blazing sun.

Never use a battery in a potentially hazardous environment.

Discontinue charging after specified charging time even if the charging is not completed.

### 9.3. Discharging

Specified product use only. Never use the battery with any equipment other than specified.

Never use a battery in a potentially hazardous environment.

Never use the battery in a place near fire, heaters, or high temperature sources.

### 9.4. Storage

Never store the battery in hot and/or humid environment.

Never store the battery in a potentially hazardous environment.

Never store the battery as fully charge state.

Never store the battery as a load is connected.

Never put the battery in a microwave oven or a pressure cooker.

Store in a cool, dry and well-ventilated area.

### 9.5. Disposal

Regulations vary for different countries. Dispose of in accordance with local regulations.

## 10. Air-sea-road transport

The stated battery is complied with UN manual tests of Criteria ST/SG/AC.10/11/Rev.5, Part III, Section 38.3, where the published “Model Regulations” and “Manual of Tests and Criteria” are the basis for most updated versions of international shipping regulations. These include:

IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
DOT	US Dept of Transportation

## 11. Green Policy

The stated battery supplied to your company contains the hazard substances that are all below the threshold concentration levels mentioned in Battery Directive 2013/56/EU.



### 12. Cell Specification

# GP Batteries

Product Specification

Model No. : **GP ICR18650-26F**

Document Number: PS-RD-P02-02-GPICR18650-26F

Revision: R0

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## 1. APPLICABILITY

The specification is applicable to GP lithium ion rechargeable Batteries.

GP Model : GP ICR18650-26F  
Cell Size : Diameter = 18.3 mm Max and Height = 65.4mm Max

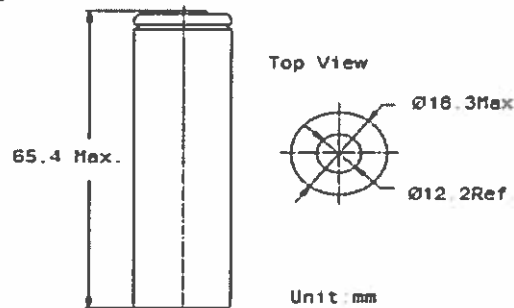
## 2. RATINGS

2.1	Rated voltage	:	3.7 V
2.2	Capacity #	:	2600 mAh (typical) 2550 mAh (minimum)
2.3	Standard charge @ 23 ± 5°C	:	Constant current at 1300 mA with max voltage of 4.20V ,cut-off current at 26mA
2.4	Standard discharge @ 23 ± 5°C	:	520 mA to 2.75V
2.5	Maximum charge current	:	2000 mA
2.6	Maximum discharge current	:	5200 mA
2.7	Internal impedance	:	≤ 60 mohm
2.8	Cell weight	:	≤ 48 g
2.9	Operating temperature	:	5°C – 45°C (charge) -20°C – 50°C (discharge)
2.10	Storage temperature	:	-20°C – 45°C (1 month) -20°C – 40°C (6 months) -20°C – 35°C (12 months)

# Based on standard charge/discharge

## 3. CONFIGURATION AND DIMENSIONS

Please refer to the drawing.



# GP Batteries

Product Specification

Model No. : *GP ICR18650-26F*

Document Number: PS-RD-P02-02-GPICR18650-26F  
STANDARD TEST CONDITIONS

Revision: R0

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Unless otherwise specified, all tests should be conducted within one month of delivery under the following conditions:

Ambient Temperature :  $23 \pm 5^{\circ}\text{C}$   
Relative Humidity :  $65 \pm 20\%$

### TYPICAL CHARACTERISTICS

#### 4. TYPICAL CHARACTERISTICS

Item	Criteria		Test Conditions
Capacity	$\geq 2550 \text{ mAh}$		Standard charge and standard discharge described at section 2.3 and 2.4, respectively
Internal Impedance	$\leq 60 \text{ mohm}$		Measure AC impedance at 1kHz within 1 hour after standard charge as described at section 2.3
Typical discharge capacity at different temperatures	-10°C	60%	Standard charge cell as described at section 2.3. Place cell in the temperature to be tested for 2 hours and then discharge cell using standard discharge as described at section 2.4 and at specified temperature.
	0°C	80%	
	25°C	100%	
	45°C	90%	
Cycle Life	$\geq 70\%$		Measure discharged capacity after conducting 350 cycles of charge/discharge at 0.5C/0.5C with cut-off voltage at 3.0V.
Charge Retention	$\geq 80\%$ (retention) $\geq 90\%$ (recovery)		Measure standard discharge capacity of cells after standard charge to 100% SOC and stored at $23 \pm 5^{\circ}\text{C}$ for 28 days.

#### 5. WARRANTY

One year limited warranty against workmanship and material defects. For application use on this cell please contact your nearest GP Sales and Marketing office or Distributors.

# GP Batteries

Product Specification

Model No. : *GP ICR18650-26F*

Document Number: PS-RD-P02-02-GPICR18650-26F

Revision: R0

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## 6. CHARGE STATE OF CELL BEFORE SHIPMENT

30% to 50% SOC prior to delivery.

## 7. SAFETY PRECAUTION

Please follow the safety precaution carefully as improper handling of lithium ion batteries may result in injury or damage from electrolyte leakage, heating ignition or explosion. To ensure safety, consult with GP regarding the charge and discharge specifications, equipment structure, warning labels and other important details when designing equipment to use GP rechargeable lithium ion batteries.

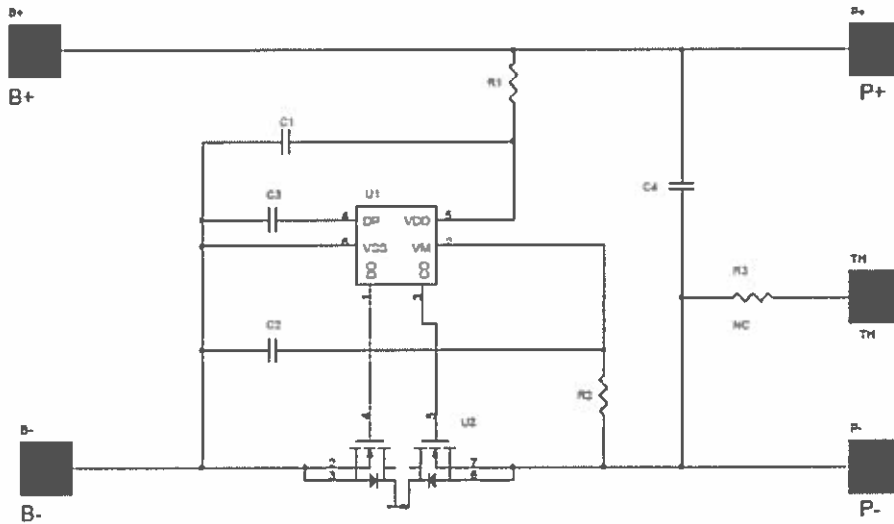
- Never charge the battery above 4.25V.
- Never reverse charge the battery.
- Never heat or incinerate the battery.
- Never pierce, crush or cause mechanical damage to the battery.
- Never charge a battery at high temperature condition, such as at or near a fire.
- Never short circuit the battery.
- Never discharge a battery to below 2.70V per cell.
- Never allow the battery to get wet or be immersed in water.
- For long period of storage, temperature should be below 25°C.
- After long period of storage, battery may require some cycling to recover capacity.
- GP Batteries will not be liable to accidents caused by improper use.

### Protection Circuit Module (PCM)

The Cell(s) / Battery Pack shall be used with a PCM which can protect Cell(s) / Battery Pack properly. The PCM shall have functions of (a) overcharging protection;(b) over-discharging protection and (c) over current protection, to maintain safety and significant deterioration of cell performance. The over current can occur by external short circuit.

- a. Overcharging protection
  - Overcharging protection function shall work if any cells or batteries reach 4.25V at which charging should be stopped.
- b. Overdischarge protection
  - Overdischarging protection function shall work if any cells or batteries reach 2.70V at which discharging should be stopped.
- c. Overcurrent protection
  - Maximum continuous discharging current is 2C at which cell should be stopped. Please contact GP if applications require discharging current above 2C.

### 13. Protection Circuit Diagram



### 14. Protection Circuit Bill of Materials

No.	Ref.	Part Name	Description	Package	Qty
1	C1	Capacitor	0.1uF Y5V	SMD0603	1
2	C2	Capacitor	NC	SMD0603	0
3	C3	Capacitor	NC	SMD0603	0
4	C4	Capacitor	0.1uF Y5V	SMD0603	1
5	R1	Resistor	170 Ohm	SMD0603	1
6	R2	Resistor	2K Ohm	SMD0603	1
7	R3	Thermistor	10K Ohm +/- 1%, B=3435	SMD0603	1
8	U1	Protection IC	S-8261AAJMD	SOT-23-6	1
9	U2	MOSFET	STG8211	TSSOP-8	1
10	B+, B-	Nickel Strip	3.0mm (L) x 2.0mm (W) x 0.3mm (T)	-	2

**15. Protection Circuit Parameters**

No.	Item	Specification	Unit
1	Over-charge detection voltage	4.325 ± 0.025	V
2	Over-charge release voltage	4.075 ± 0.05	V
3	Over-discharge detection voltage	2.50 ± 0.05	V
4	Over-discharge release voltage	2.90 ± 0.05	V
5	Discharge Over-current detection	4.6 to 9.1	A
6	Over-charge detection delay time	960 to 1400	msec
7	Over-discharge detection delay time	115 to 173	msec
8	Discharge over-current detection delay time	7.2 to 11	msec
9	Short circuit detection delay time	220 to 380	usec
10	Supply current (Normal mode)	7.0 (max)	uA
11	Supply current (Power down mode)	0.1 (max)	uA
12	Maximum continuous charge current	2	A
13	Maximum continuous discharge current	2.5	A
14	Thermistor	10 ± 0.1	kΩ

**16. Packaging Method**

TBD

