

## WORLDWIDE HEADQUARTERS

**GPI International Limited**  
 Gold Peak Building, 8/F., 30 Kwai Wing Road, Kwai Chung, N.T., Hong Kong  
 Tel: (852) 2484 3333 Fax: (852) 2480 6912  
 E-mail address: gpil@goldpeak.com Website: http://www.gpbatteries.com

## SALES AND MARKETING BRANCH OFFICES

<b>ASEAN</b>	<b>GP BATTERY MARKETING (SINGAPORE) PTE. LIMITED</b> 97 Pioneer Road, Singapore 639579 Tel: (65) 6559 9760 Fax: (65) 6559 9761
<b>MALAYSIA</b>	<b>GP BATTERY MARKETING (MALAYSIA) SDN. BHD.</b> Lot 8, Jalan Pemberita U1/49, Temasya Industrial Park, 40150 Shah Alam, Selangor Darul Ehsan, Malaysia Tel: (60) 3 5569 3499 Fax: (60) 3 5569 3498
<b>THAILAND</b>	<b>GP BATTERY MARKETING (THAILAND) CO., LIMITED</b> 102 Soi Sukhumvit 26, Sukhumvit Road, Klongton, Klongtoey, Bangkok 10110 Thailand Tel: (66) 2 661 3688 Fax: (66) 2 661 3602
<b>TAIWAN</b>	<b>GOLD PEAK INDUSTRIES (TAIWAN) LIMITED - TAIPEI OFFICE</b> 8/F, No.205, Sec. 1, Fu Xing South Road, Taipei 10666, Taiwan R.O.C. Tel: (886) 2 2772 9998 Fax: (886) 2 2731 4868/ 2741 0192
<b>CHINA</b>	<b>HUIZHOU CHAO BA BATTERIES COMPANY LTD</b> No.29, 6th Gaoxin Road, Zhongkai Gaoxin Industrial Zone, Huizhou City, Guangdong, China (Postal Code: 516006) Tel: (86) 752 2638 698 Fax: (86) 752 2638 666
<b>HONG KONG</b>	<b>GP BATTERY MARKETING (H.K.) LIMITED</b> Unit D & E, 1/F, Kam Bun Industrial Building, No.13-19 Kwai Wing Road, Kwai Chung, N.T., Hong Kong Tel: (852) 2420 0281 Fax: (852) 2494 9349
<b>KOREA</b>	<b>GP BATTERY MARKETING (KOREA) LIMITED</b> 5/F, WhaDeok Bldg, 319-11, Yangjae-dong, Seochu-gu, Seoul, South Korea Tel: (822) 549 7188/9 Fax: (822) 514 0623
<b>U.S.A.</b>	<b>GOLD PEAK INDUSTRIES (NORTH AMERICA) INC.</b> 11235 West Bernardo Court, San Diego, CA 92127-1638, U.S.A. Tel: (1) 858 674 6099 Fax: (1) 858 674 6496/ 674 5883
<b>CANADA</b>	<b>GP BATTERY MARKETING INC.</b> Unit 7, 7780 Woodbine Avenue, Markham, Ontario, Canada L3R 2N7 Tel: (1) 905 474 9507 Fax: (1) 905 474 9452
<b>LATIN AMERICA</b>	<b>GP BATTERY MARKETING (LATIN AMERICA) INC.</b> 8370 NW, 66TH Street, Miami, Florida 33166, U.S.A. Tel: (1) 305 471 7717 Fax: (1) 305 471 7718
<b>EUROPE</b>	<b>GP BATTERIES EUROPE B.V.</b> Kortijzer 4, 5721 VE Asten, Netherlands Tel: (31) 493 681030 Fax: (31) 493 681039
<b>FRANCE</b>	<b>GP BATTERY MARKETING FRANCE - GPBMF</b> ZAE du Trou Grillon - BP49, 91280 Saint Pierre du Perray - France Tel: (33) 1 6989 6200 Fax: (33) 1 6989 6210
<b>GERMANY</b>	<b>GP BATTERY MARKETING (GERMANY) GMBH</b> Schiesstrasse 68, D-40549 Düsseldorf, Germany Tel: 49 (0) 211 522 9540 Fax: 49 (0) 211 522 954 54
<b>POLAND</b>	<b>GP BATTERY (POLAND) SP. ZO.O.</b> Al. Jerozolimskie 162, 02-342 Warsaw, Poland Tel: (48) 22 500 9500 Fax: (48) 22 846 7535
<b>UK</b>	<b>GP BATTERIES (U.K.) LIMITED</b> Monument View, Chelston Business Park, Wellington, Somerset, TA21 9ND, United Kingdom Tel: (44) 1 823 660 044 Fax: (44) 1 823 665 595
<b>ITALY</b>	<b>GP BATTERY MARKETING ITALY S.R.L.</b> Via. Alessandro Volta 3, 20094 Assago (Mi), Italy Tel: (39) 02 488 2512 Fax: (39) 02 488 2865
<b>SCANDINAVIA</b>	<b>GPBM NORDIC AB</b> Grimboåsen 5, SE-417 49, Goteborg, Sweden Tel: (46) 31 799 1600 Fax: (46) 31 799 1613
<b>RUSSIA</b>	<b>AZ COMPANY</b> Building 4, 2-D Zaborje Str. Mic. Dist. Vostryakovo, Domodedovo, 142072 Moscow Area, Russia Tel: (7) 495 926 5050 Fax: (7) 495 926 50 50 ext. 201
<b>MIDDLE EAST</b>	<b>GP MIDDLE EAST FZC</b> P.O.Box 7989, Suite No. L1-18, Saif Zone, Sharjah, United Arab Emirates Tel: (971) 6 5578787 Fax: (971) 6 5578777

Danionics (Shenzhen) Ltd.  
 A1 Building, Hai Xiang Industrial Park, Lan Zhu Road  
 Export Processing Zone, Shenzhen Grand Industrial Zone,  
 Guangdong, China  
 Tel: (86) 755 8463 7788  
 Fax: (86) 755 8643 7588  
 Website: www.danionics.com  
 Post: 518118

## Lithium Polymer Rechargeable Batteries



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# INTRODUCTION

Across the world, today's consumer electronics market is moving towards the development of portable miniature digital devices such as bluetooth wireless headsets, MP3 players and other mobile electronic items. To meet the ever growing demands of lighter, thinner and higher energy density batteries for hi-tech portable devices and to promote new product development for the future, Danionics is providing a host of solutions as one of the world's top manufacturers in the LiP (lithium ion polymer, or more commonly called - lithium polymer) battery industry.

Established in 1994, Danionics provides world class LiP battery solutions that optimize thickness, length as well as width, and supplies the highest possible energy density batteries to meet customized needs. With years of experience in developing high quality power solutions for international brands, Danionics excels at creating innovative designs and manufacturing LiP batteries for different applications.

Due to their safe, lightweight characteristics and flexible form factor, LiP batteries are seen as the new wave in advanced battery solutions. To better serve the growing markets in Asia, Danionics joined forces with GP Batteries to build a production plant in Shenzhen in 2004. With GP Batteries' 40 years of manufacturing experience coupled with her cutting-edge technology and extensive marketing as well as distribution network, this powerful new corporate synergy will give both groups a stronger market presence and a better position to better serve customers' needs.

Danionics...We're leading the way forward with the next wave of power innovation around the globe.



## MAJOR FEATURES

- Ultra thin compared with cylindrical type of batteries
- High flexibility design
- High energy density
- High uniformity and reliability
- Good cycling characteristics (min. 500 cycles)
- Wide operation temperature range (Charging: 0 to 45°C Discharging: -10 to 60°C)
- Low self discharge
- Low internal resistance
- Good storage performance
- ISO 9001 accreditation

# LITHIUM POLYMER RECHARGEABLE BATTERIES

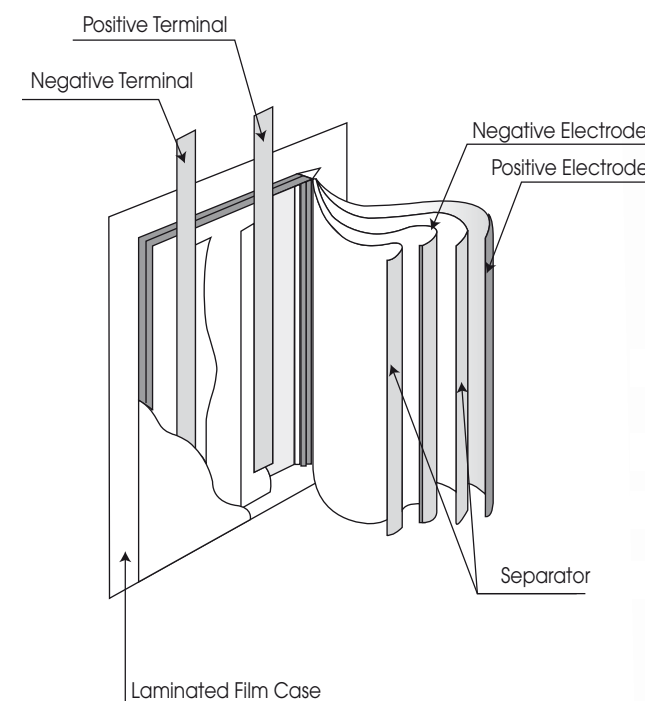


## MAJOR APPLICATIONS

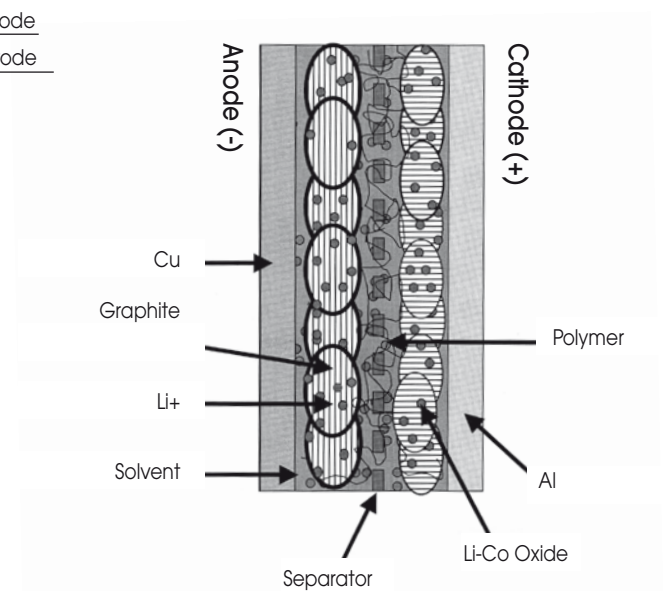
- Bluetooth Devices (e.g. Headsets)
- Wireless Stereo Headsets
- MP3 / MPEG4 / PMP
- PDAs
- Pocket PCs
- Tablet PCs
- Smart Display
- Mobile Phones
- Remote Control
- Other Portable Electronics



## CELL CONSTRUCTION



Cell Laminate



# SPECIFICATIONS

Series	Model	Nominal Voltage(V)	Capacity (mAh)		Watt hour	Thickness after 500 Cycles* Max. (mm)	Width # Max. (mm)	Length # Max. (mm)	Weight <sup>▲</sup> (g)	Maximum Discharge Current	Maximum Charging Voltage	Maximum Charging Current
			Typical	Minimum								
XX1225	381225 †	3.7	80	75	0.30	3.8	12.2	25.5	2.0	160	4.2	80
XX1230	391230 †	3.7	105	95	0.39	3.9	12.2	30.5	2.4	210	4.2	105
XX1422	481422	3.7	105	95	0.39	4.8	14.2	22.5	2.1	210	4.2	105
XX1429	371429 †	3.7	105	95	0.37	3.7	14.2	29.5	2.3	200	4.2	100
XX1538	491538 †	3.7	230	220	0.85	4.9	15.2	38.5	2.2	460	4.2	230
XX1730	461730 †	3.7	180	170	0.67	4.6	17.2	30.5	4.1	360	4.2	180
XX2023	412023	3.7	130	120	0.48	4.1	20.2	23.5	2.8	260	4.2	130
XX2950	902950A80	3.2	800	770	2.96	9.0	29.2	50.5	22.6	1600	3.65	800
XX3040	513040 †	3.7	560	550	2.07	5.1	30.2	40.5	11.0	1120	4.2	560
XX3239	413239 †	3.7	465	450	1.72	4.1	30.2	39.5	9.2	930	4.2	465
XX3450	983450 †	3.7	1850	1810	6.85	9.8	34.2	50.5	32.0	3700	4.2	1850
XX3759	493759	3.7	1110	1050	4.11	4.9	37.2	59.5	27.5	2200	4.2	1110
	543759 †	3.7	1290	1260	4.77	5.4	37.2	59.5	20.9	2580	4.2	1290
	663759	3.7	1500	1450	5.55	6.6	37.2	59.5	27.5	3000	4.2	1500
XX4050	604050	3.7	1140	1100	4.22	6.0	40.2	50.5	21.5	2280	4.2	1140
XX4255	364255	3.7	700	650	2.59	3.6	42.2	55.5	15.3	1400	4.2	700
XX45101	7745101	3.6	3800	3700	14.06	7.7	45.2	101.5	83.0	7600	4.2	3800
XX99130	2999130	3.6	3600	3500	13.32	2.9	99.2	130.5	75.0	7200	4.2	3600

\*At 100% State of Charge

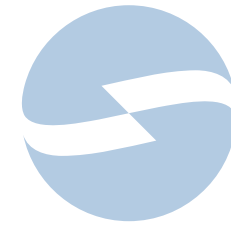
# Dimensional tolerances of individual model will be referred to corresponding product specification sheet.

▲ Dependent on individual model, tolerance of cell weight is ranging from 4% to 8% around the average value.

† With UL1642 Approval (file no. MH27857)

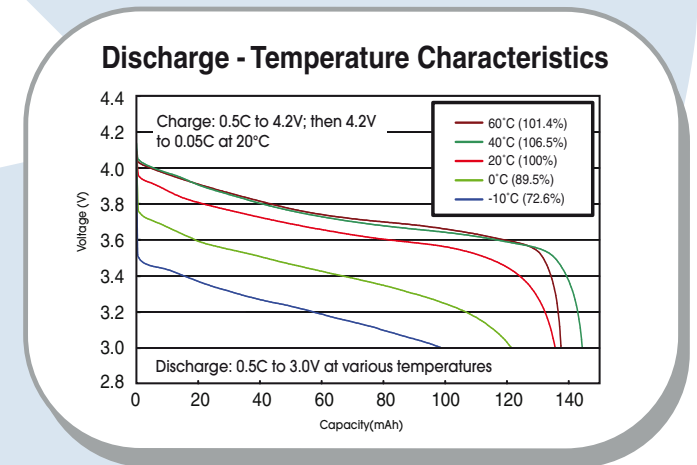
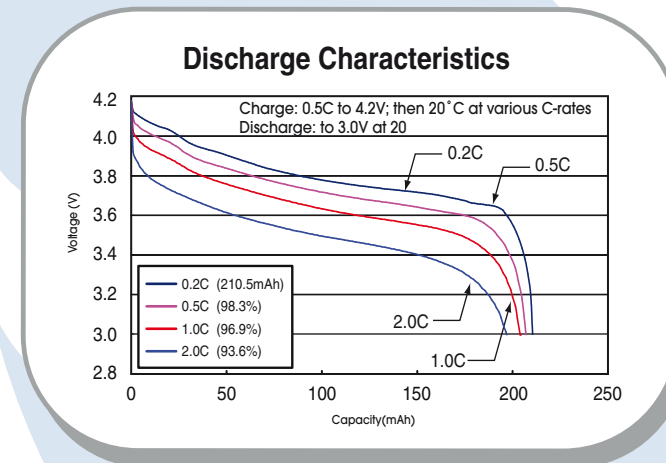
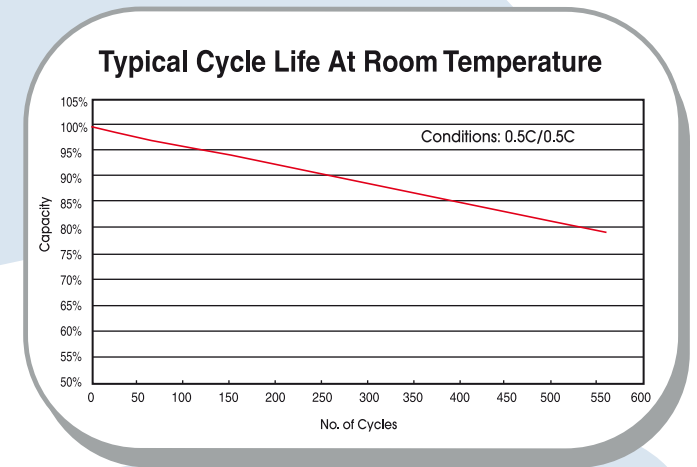
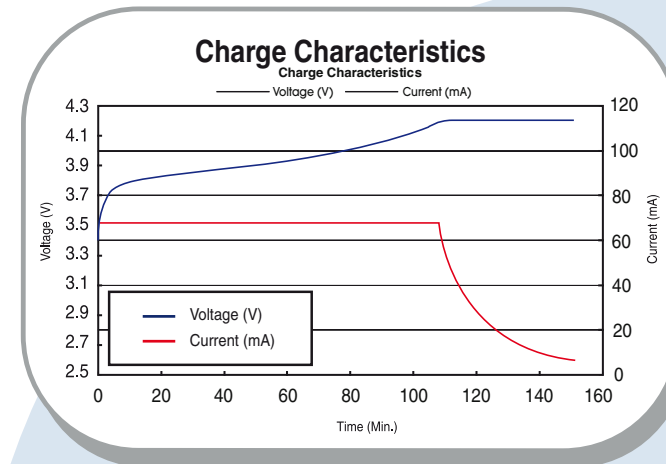
Nickel tabs will be welded to both +ve and -ve terminals for bare cells at delivery unless otherwise specified.

Due to continuous development of the products, we reserve the rights to change the data without prior notice. Figures shown above should not be regarded as specifications.



# PERFORMANCE

# CHARACTERISTICS



# PROTECTION

## CIRCUIT MODULE

A Protection Circuit Module (PCM) for Lithium Polymer battery provides at least the following functions:

### OVERCHARGE PROTECTION

Charging is stopped when the applied voltage exceeds the specified maximum value. This prevents the battery from overheating or exploding due to overcharging.

### OVERDISCHARGE PROTECTION

Discharging is stopped when the battery voltage falls below the specified minimum value usually not less than 2.4V. This prevents degradation of the battery due to overdischarging.

### OVER-CURRENT PROTECTION DURING CHARGING AND DISCHARGING

Charging or discharging stops when an abnormal current (several amps more) flows are detected due to a fault in the host device.

### SHORT-CIRCUIT PROTECTION

Discharging is stopped promptly when a large current of several tens of amps flow due to external shorting of the battery pack.

Danionics supplies both PCBA type and state of the art Chips-On-Board (COB) type protection circuit module as standard accessory. Both types encompass all the above features. For best performance, we always recommend our standard PCM to protect Danionics Lithium Polymer batteries.



# LITHIUM POLYMER RECHARGEABLE BATTERIES



## BATTERY HANDLING PRECAUTION

### CHARGE

Charge Voltage	Charge to 4.20V per cell, each being monitored.
Charge Current	Do not exceed 1C charging rate.
Charge Temperature	Charge in the range of 0 to 45°C.

### DISCHARGE

Discharge Current	Do not exceed 2C discharging rate.
Discharge Temperature	Discharge in the range of -10 to 60°C.
Discharge Termination Voltage	Device should be designed to stop discharge at above 3.0V/cell. Take care to ensure that there is no leakage current after discharge cutoff to avoid overdischarging the cell with prolonged small current discharge.

### STORAGE

Storage Temperature	Store at -20 to 45°C for less than 3 months. For longer period of storage up to 1 year, -20 to 35°C is recommended. Significant permanent loss can occur when storing at 60°C for prolonged period. Keep the battery away from fire.
Long Term Storage	Deterioration of cell capacity is slower at low state of charge. Store at below 50% state of charge or about 3.7V. For extended storage period, we recommend recharge to 3.7V about once a year to prevent overdischarge.

### EQUIPMENT DESIGN

Reverse Polarity Prevention	Provide mechanical stop so that the battery cannot be inserted in a reverse manner. The electrical contacts should be designed so as to avoid inadvertent short-circuit.
Battery Location	Elements like solid state safety circuit should be mounted so that the battery is not subject to high temperatures from the device it is powering or being charged by.
Damage Prevention Due to Drop	Provide sufficient support to the battery so that it would not be subjected to movement or short-circuit due to drop.

### TRANSPORTATION

All Lithium Polymer cells comply to the necessary requirements under the UN Transport of Dangerous Goods, manual of Test and Criteria.

### SAFETY

Don't Dismantle	Do not disassemble or modify the battery in any way such as bending or deforming it. The battery pack is equipped with built-in safety/ protection features. If these features are disabled, the battery pack may leak, emit corrosive liquid, or it would overheat, burst or ignite.
Don't Short Circuit	Do not carry or store the battery together with metal objects such as necklaces, hair pins, etc. Otherwise, short-circuiting will occur, or overcurrent will flow, causing the battery pack to leak electrolyte, become overheated, emit smoke, burst and/or ignite. Metal objects such as wire, necklaces or hair pins generate heat.
Don't Put Into Fire	Do not put the battery into fire or apply direct heat to it. Otherwise, its insulation can melt down. Safety features will be damaged and/or its electrolyte can ignite, possibly leading to leakage, overheating, smoke emission, bursting and/or ignition on it.
Don't Put Into Water	Do not immerse the battery pack in water or allow it to get wet. Otherwise, the protective features in it can be damaged. It should not be charged with high current or voltage, abnormal chemical reactions may occur, possibly leading to leakage, overheating, smoke emission, bursting and/or ignition.
Don't Pierce	Do not pierce the battery with nails or other sharp objects, strike it with a hammer, or step on it. Otherwise, the battery will become damaged and deformed, internal short-circuiting can occur, possibly leading to leakage, overheating, smoke emission, bursting and/or ignition.
Don't Strike Or Throw	Do not strike, throw or subject the battery to severe physical shock. Otherwise, the protective feature in it may become damaged. It can result in extremely high current and voltage, so abnormal chemical reactions can occur, possibly leading to leakage, overheating, smoke emission, bursting and/or ignition.
Don't Direct Connect with AC or DC Outlets	Do not connect the battery directly to wall outlets or car cigarette-lighter sockets.
Don't Recharge with Unspecified Charger	Do not use any chargers other than those recommended by Danionics. Do not recharge the battery near fire or under extremely hot condition.