



Approval Sheet

Title: Approval sheet for GPRHCH53D004

Revision: 0

To: Brands Group

Fr: GPI INTERNATIONAL LTD.

GP Part Number	Description	Customer P/N
GPRHCH53D004	GP55AAAHCR2BMX-2U1+9058	

	Initiator	Checked by	Approved by		
			PM	BU	GPII
Name	XY Li	Sunny Yeung	Vivian fong	Daniel Tong	
Date	2017-08-31	2017-08-31	2017-08-31	2017-08-31	

Attachment:

Item	Revision	Prepared by	Checked by	Approved by
Data Sheet	06	XH Ye	Ling Guan	Vivian Fong
Battery drawing	2	XuYang Li	XuYang Li	Sunny Yeung
Connector spec	/	/	/	/
Product Specification	01	JW Zhu	WL Zhong	Vivian Fong

Approved by Customer		
Name		
Date		

GP Batteries

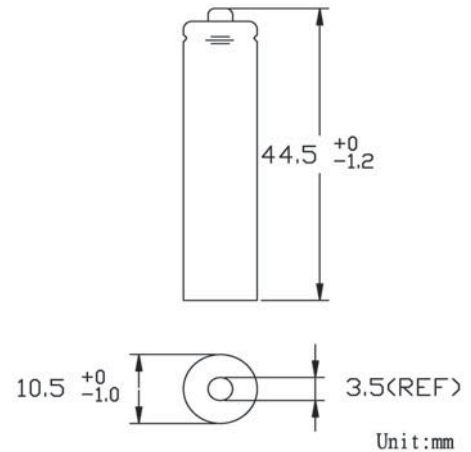
Modification History:

Rev.	Description	Initiator	Checked by	Date
0	First issue	XuYang Li	Sunny Yeung	2017-08-31

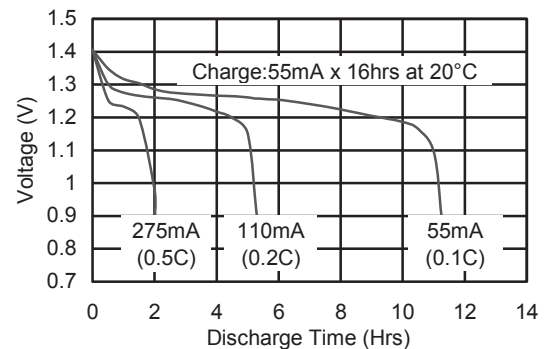
The drawing link to the document drawing no. TPD9058.

Model No.: GP55AAAHCR

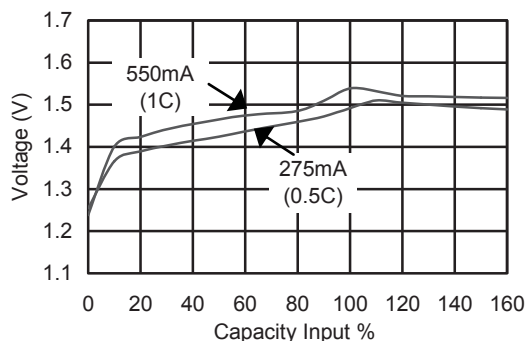
Type	: Rechargeable Nickel Metal Hydride Cylindrical Cell
Nominal Dimension (with Sleeve)	: $\Phi = 10.5\text{mm}$ H = 44.5mm
Applications	: Recommended discharge current 55 to 1650mA
Nominal Voltage	: 1.2V
Capacity	: Rated: 550mAh Typical: 570mAh When discharged at 110mA to 1.0V at 20°C
Charging Condition	: 55mA for 16 hrs at 20°C
Charging Retention	: 80% of rated capacity after cell storage at 20°C for 12 months, When discharged at 110mA to 1.0V at 20°C
Fast Charge	: 275mA to 550mA (0.5 to 1C) charge termination control recommended control parameters: - ΔV : 0-5mV DT/dt : 0.8°C/min (0.5 to 0.9C) 0.8 - 1°C/min (1C) TCO : 45 - 50°C Timer : 105% nominal input (for ref. only)
Service Life	: > 1000 cycles (IEC standard)
Continuous Overcharge	: 55mA maximum current for 1 year. No conspicuous deformation and/or leakage
Weight	: 13.2g
Internal Resistance	: Average 35m Ω upon fully charged (Max. 40m Ω) at 1000Hz
Max. Charging Voltage	: 1.5V at 55mA charging
Ambient Temperature Range	: Standard Charge : 0 to 45°C Fast Charging : 10 to 45°C Discharge : -20 to 50°C Storage : -20 to 35°C



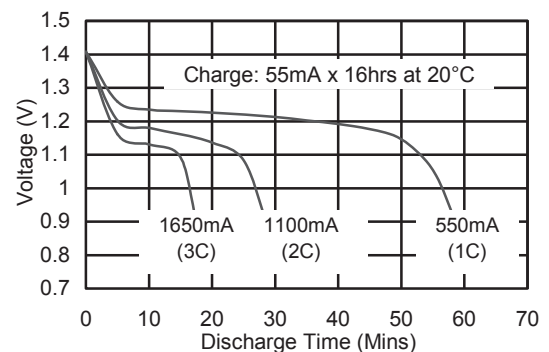
Low Rate Discharge



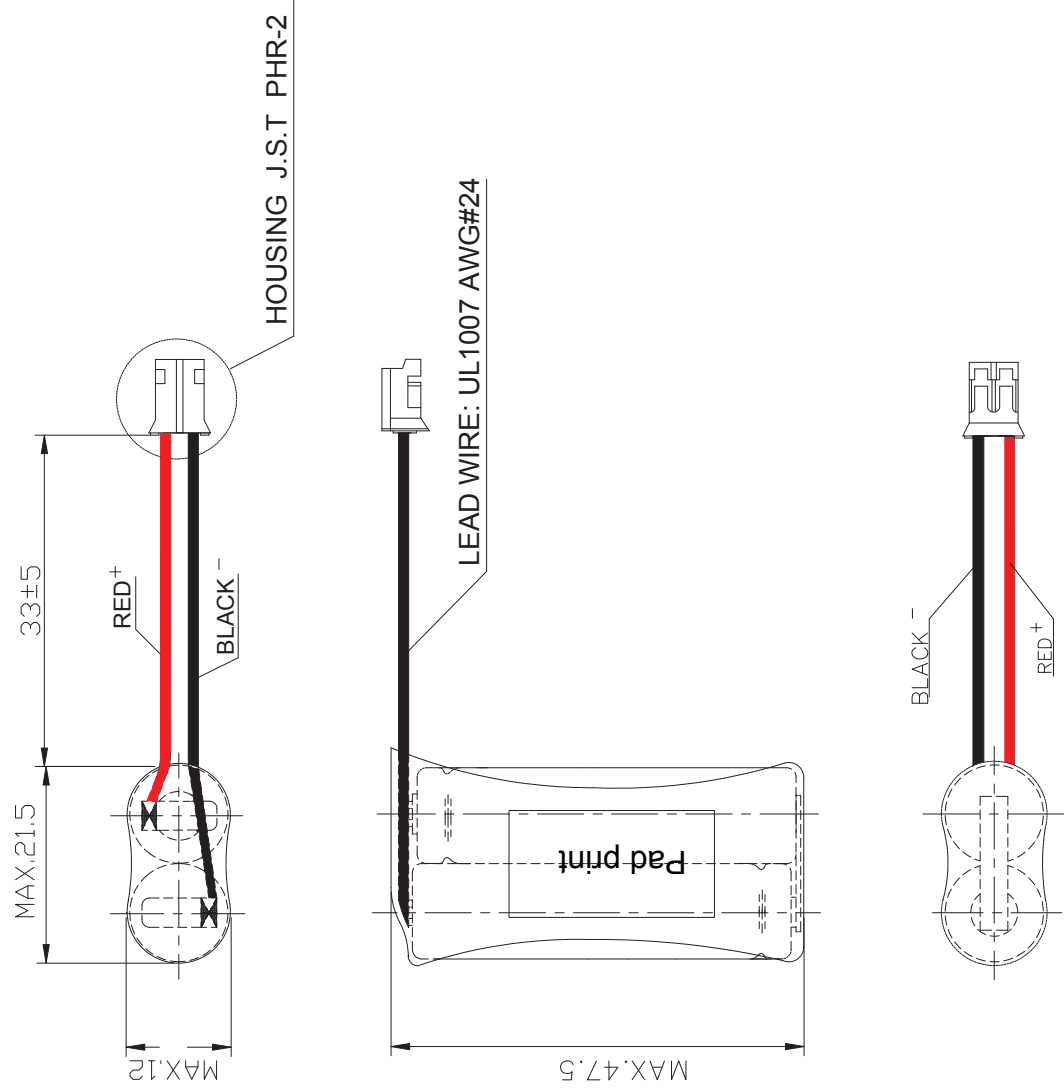
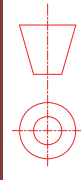
Fast Charge (Charge Control Required)



High Rate Discharge

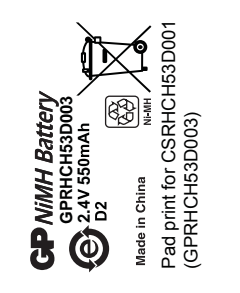
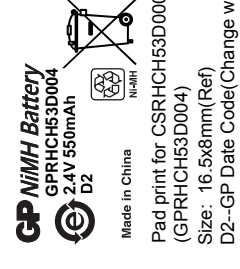
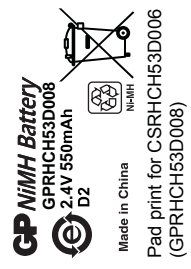


The information (subject to change without prior notice) contained in this document is for reference only and should not be used as a basis for product guarantee or warranty. For applications other than those described here, please consult your nearest GP Sales and Marketing Office or Distributors.



REVISIONS

L/TR	DESCRIPTION	SIGNATURE AND DATE		
		DWN	CHK	AUTH
1	55AAAHCRCR replace 55AAAHCRCR, revise model no. and title	2011-09-27		
2	Add pad print	2013-04-06		
3	Revise pad print	2013-05-14		
4	Add CS P/N	2014-11-10		



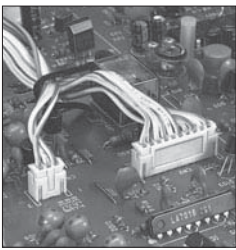
PD0539

REMARKS:
1.) BATTERY TO BE COVERED BY SHRINKAGE SLEEVE

NOTICE:	SIGNATURE		MODEL NO:	GP 55AAAHCRCR STACK UP BATTERY	
DIMENSIONS ARE IN mm AND INCLUDE PLATED FINISHES * TOLERANCE REQUEST: NO DEC.PT. ±0.50 1 DEC.PT. ± 0.10 2 DEC.PT. ± 0.05	DRAWN	BX Xiao	DATE	2014-11-10	NOMINAL VOLTAGE: 2.4V
	CHK'D	XuYang Li		2014-11-10	CAPACITY: 550mAh
	APP'D	GB Zhan		2014-11-10	SCALE: none
DIMENSIONS ARE IN mm AND INCLUDE PLATED FINISHES * TOLERANCE REQUEST: NO DEC.PT. ±0.50 1 DEC.PT. ± 0.10 2 DEC.PT. ± 0.05		SIGNATURE BX Xiao XuYang Li GB Zhan		MODEL NO: GP55AAAHCRCR2BMX Division : RBD CELL TYPE: NiMH Page 1 of 1	REV. NO.: 4 DWG NO. : TPD9058

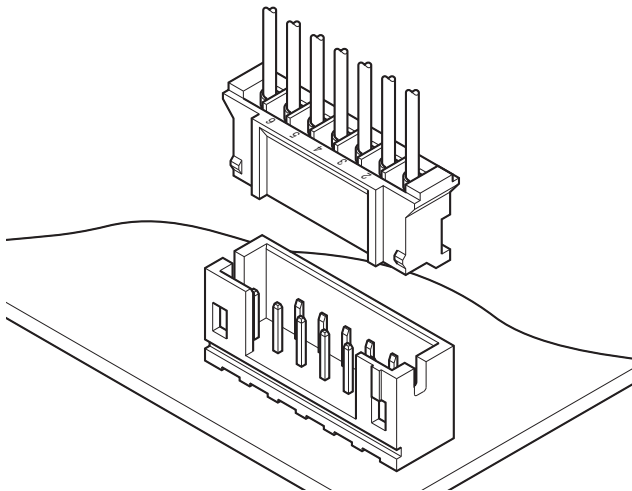
Manufacturer reserves the right to alter or amend the design, model and specification without prior notice.

(GEF 0010)



PH CONNECTOR

2.0mm pitch/Disconnectable Crimp style connectors



This is a thin, low-profile 2.0mm pitch connector 8.0mm in height after mounting and 4.5mm in width. It is designed to meet the demand for high-density connection of internal wires to printed circuit boards. It is compact, highly reliable and low in cost.

- **Reliable contact**
- **Fully shrouded header**
- **Printed circuit board retention mechanism**
- **Surface mount model (SMT)**

Specifications

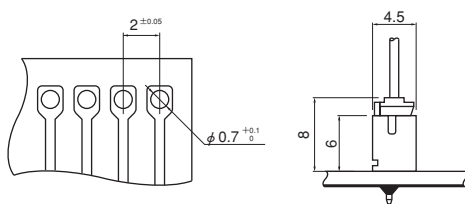
- Current rating: 2A AC, DC (AWG #24)
 - Voltage rating: 100V AC, DC
 - Temperature range: -25°C to +85°C
(including temperature rise in applying electrical current)
 - Contact resistance: Initial value/ 10m Ω max.
After environmental testing/ 20m Ω max.
 - Insulation resistance: 1,000M Ω min.
 - Withstanding voltage: 800V AC/ minute
 - Applicable wire: AWG #32 to #24
 - Applicable PC board thickness: 0.8 to 1.6mm
- * Compliant with RoHS.
* Refer to "General Instruction and Notice when using Terminals and Connectors" at the end of this catalog.
* Contact JST for details.

Standards

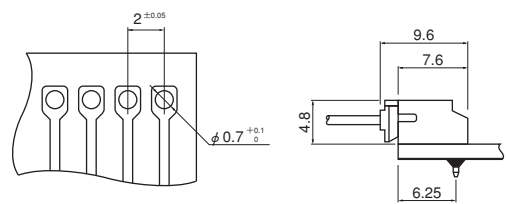
- Ⓜ Recognized E60389
- Ⓢ Certified LR20812
- Ⓡ R75087

〈Through-hole type (viewed from soldering side)〉

Top entry type



Side entry type

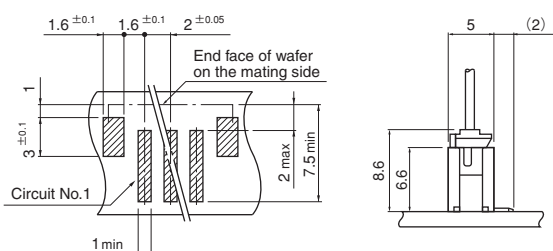


Note: 1. Tolerances are non-cumulative: ±0.05mm for all centers.

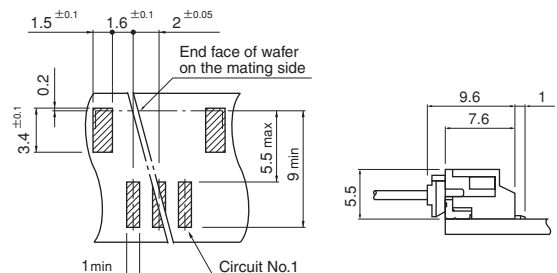
2. Hole dimensions differ according to the kind of PC board and piercing method. If PC boards made of hard material are used, the hole dimensions should be larger. The dimensions above should serve as a guideline. Contact JST for details.

〈SMT type (viewed from component side)〉

SM4 type Top entry type



SM4 type Side entry type

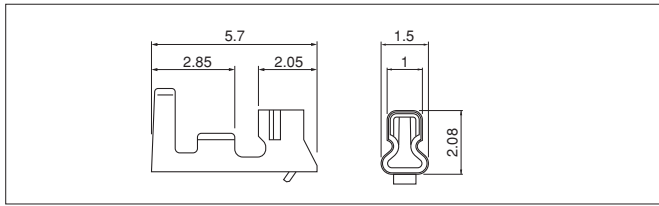


Note: 1. Tolerances are non-cumulative: ±0.05mm for all centers.

2. The dimensions above should serve as a guideline. Contact JST for details.

PH CONNECTOR

Contact



Contact	Crimping machine	Applicator		
		Crimp applicator	Dies	Crimp applicator with dies
SPH-002T-P0.5S	AP-K2N	MKS-L	MK/SPH-002-05S	APLMK SPH002-05S
		*MKS-SC	SC/SPH-002-05S	APLSC SPH002-05S
SPH-002T-P0.5L		MKS-L	MK/SPH-002-05L	APLMK SPH002-05L
		*MKS-SC	SC/SPH-002-05L	APLSC SPH002-05L
SPH-004T-P0.5S		MKS-L-10	MK/SPH-004-05S	APLMK SPH004-05S
		*MKS-SC-10	SC/SPH-004-05S	APLSC SPH004-05S

Note: *Strip-crimp applicator

Model No.	Applicable wire			Q'ty / reel
	mm ²	AWG #	Insulation O.D. (mm)	
SPH-002T-P0.5S	0.05 ~ 0.22	30~24	0.9~1.5	8,000
SPH-002T-P0.5L	0.08 ~ 0.22	28~24	0.8~1.5	
SPH-004T-P0.5S	0.032~0.08	32~28	0.5~0.9	10,000

Material and Finish

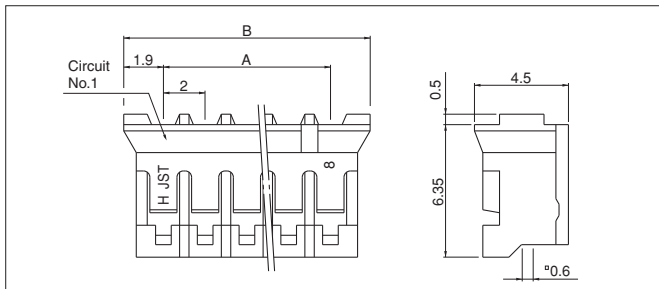
Phosphor bronze, tin-plated (reflow treatment)

RoHS compliance

Note:

- Contact JST for gold-plated products.
- SPH-002T-P0.5L is low-insertion force type contact, for easier insertion/withdrawal, which would be less resistant to the vibration. The crimp height is different from the standard.
- Contact JST for details.

Housing



<For reference> As the color identification, the following alphabet shall be put in the underlined part. For availability, delivery and minimum order quantity, contact JST.

ex. **PHR-2-oo**

(blank)...natural (white)

BK...black R...red TR...tomato red BL...blue Y...yellow

L...lemon yellow M...green D...orange N...brown

P...purple PK...pink H...gray LE...light blue

FY...vivid yellow DPK...dark pink

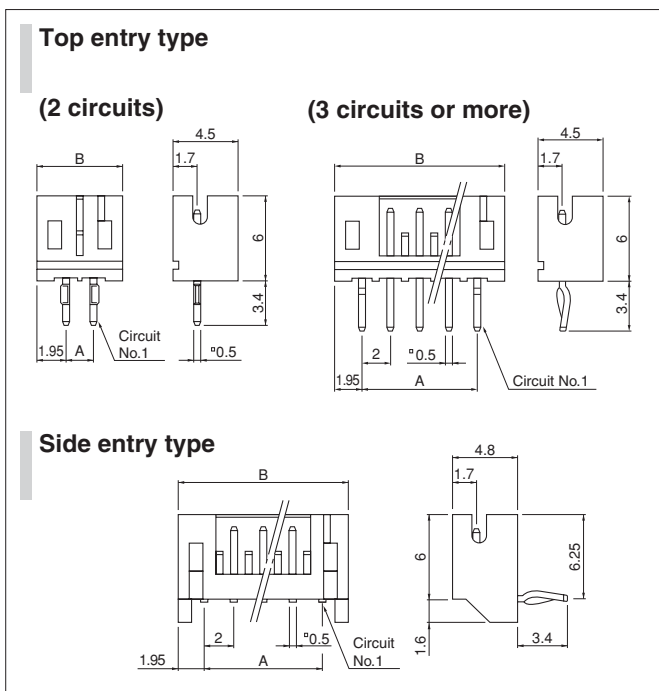
Circuits	Model No.	Dimensions (mm)		Q'ty / box
		A	B	
2	PHR-2	2.0	5.8	1,000
3	PHR-3	4.0	7.8	1,000
4	PHR-4	6.0	9.8	1,000
5	PHR-5	8.0	11.8	1,000
6	PHR-6	10.0	13.8	1,000
7	PHR-7	12.0	15.8	1,000
8	PHR-8	14.0	17.8	1,000
9	PHR-9	16.0	19.8	1,000
10	PHR-10	18.0	21.8	1,000
11	PHR-11	20.0	23.8	1,000
12	PHR-12	22.0	25.8	1,000
13	PHR-13	24.0	27.8	1,000
14	PHR-14	26.0	29.8	1,000
15	PHR-15	28.0	31.8	1,000
16	PHR-16	30.0	33.8	1,000

Material

PA 66, UL94V-0, natural (white)

RoHS compliance

Through-hole type shrouded header



Circuits	Model No.		Dimensions (mm)		Q'ty / box	
	Top entry type	Side entry type	A	B	Top entry type	Side entry type
2	B2B-PH-K-S	S2B-PH-K-S	2.0	5.9	1,000	1,000
3	B3B-PH-K-S	S3B-PH-K-S	4.0	7.9	1,000	1,000
4	B4B-PH-K-S	S4B-PH-K-S	6.0	9.9	1,000	500
5	B5B-PH-K-S	S5B-PH-K-S	8.0	11.9	1,000	500
6	B6B-PH-K-S	S6B-PH-K-S	10.0	13.9	1,000	500
7	B7B-PH-K-S	S7B-PH-K-S	12.0	15.9	500	500
8	B8B-PH-K-S	S8B-PH-K-S	14.0	17.9	500	250
9	B9B-PH-K-S	S9B-PH-K-S	16.0	19.9	500	250
10	B10B-PH-K-S	S10B-PH-K-S	18.0	21.9	500	250
11	B11B-PH-K-S	S11B-PH-K-S	20.0	23.9	500	250
12	B12B-PH-K-S	S12B-PH-K-S	22.0	25.9	400	250
13	B13B-PH-K-S	S13B-PH-K-S	24.0	27.9	250	250
14	B14B-PH-K-S	S14B-PH-K-S	26.0	29.9	250	250
15	B15B-PH-K-S	S15B-PH-K-S	28.0	31.9	250	200
16	B16B-PH-K-S	S16B-PH-K-S	30.0	33.9	250	200

Material and Finish

Post: Brass, copper-undercoated, tin-plated (reflow treatment)
Wafer: PA 66, UL94V-0, natural (white)

RoHS compliance

This product displays (LF)(SN) on a label. <For reference> As the color identification, the following alphabet shall be put in the underlined part. For availability, delivery and minimum order quantity, contact JST.

ex. **B2B-PH-K-oo**

S...natural (white)

K...black R...red TR...tomato red

E...blue Y...yellow L...lemon yellow M...green

O...orange N...brown P...purple PK...pink H...gray

LE...light blue FY...vivid yellow (blank)...ivory

GP Batteries

Product Specification

Model No.: GPRHCH53D004

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1. SCOPE

This specification governs the performance of the following GP Rechargeable Nickel Metal Hydride Cylindrical Cell and its stack-up batteries.

GP Model: **GP55AAAHC2BMX-2+9058**
 Cell Size: **AAA**

The data involving nominal voltage and the approximate weight of the stack-up batteries shall be equal to the value of the unit cell multiplied by the number of cells in the battery. For example, a stack-up battery consists of eight unit cells:

Nominal voltage of unit cell = 1.2 V
 Thus, nominal voltage of stack-up battery = 1.2 V × 2 = 2.4 V

2. RATINGS

Description	Unit	Specification	Conditions
Nominal Voltage	V	2.4	
Typical Capacity	mAh	560	Standard charge / discharge
Rated Capacity	mAh	550	
Standard Charge	mA	55(0.1C)	Ta = 0 ~ 45 °C (see Note 1)
	hr	16	
Fast Charge	mA	275(0.5C) ~ 550(1C)	-ΔV = 0~5mV/cell Timer cutoff=105% input capacity Temp. cutoff=45~50°C dT/dt=0.8°C/min (0.5C to 0.9C) 0.8~1°C/min (1C) ** for ref. only
	hr	1.05 approx.(1C) 2.1 approx. (0.5C)	
Trickle Charge	mA	27.5(0.05C) ~ 55 (0.1C)	Ta = 0 ~ 45 °C
Maximum Discharging Current	A	1.65 (3C)	Ta = 10 ~ 45 °C
Discharge Cut-off Voltage	V	2.0	<i>Unit cell</i>
Storage Temperature	°C	-20 ~ 35	Discharge state, open circuit
Typical Weight	g	29.0(Approx)	

3. PERFORMANCE

Before proceed the following tests, the cells should be discharged at 0.2C to 1.0V cut-off. Unless otherwise stated, tests should be done within one month of delivery under the following conditions:

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Ambient Temperature, T_a : 20 ± 5 °C
 Relative Humidity : $65 \pm 20\%$ RH
Notes: Standard Charge / Discharge Condition
 Charge: 55mA (0.1C) ×16hrs
 Discharge: 110mA (0.2C) to 2.0V

Test	Unit	Specification	Conditions	Remarks
Capacity	mAh	≥ 550	Standard Charge / discharge	Up to 3 cycles are allowed
Open Circuit Voltage (OCV)	V	≥ 2.5	Within 1hr after standard charge	
Internal Impedance (Ri)	mΩ	≤ 172	Upon fully charge At 1kHz	
High Rate Charge (0.5C)	mAh	≥ 485	Standard Charge, 1hr rest before discharge	
High Rate Discharge (1C)	mAh	≥ 440	Standard Charge, 1hr rest before discharge	
Overcharge	mAh	No conspicuous deformation and / or leakage	55mA(0.1C) maximum current charge for 1 yrs	
Charge Retention	mAh	≥ 440	Standard Charge, Storage:12months at 20°C, Standard Discharge	
IEC Cycles Test	Cycle	> 500	IEC61951-2(2011) 7.5.1.2	(see Note 3)
Leakage	N/A	No leakage	Fully charged at 550mA(1C), Stand for 14 days.	
External Short Circuit	N/A	No fire and no explosion	After standard charge, short circuit the cell at 20 ± 5 °C until the cell temperature returns to ambient temperature. (The resistance of the inter-connecting circuitry shall not exceed 0.1Ω.)	
Vibration Resistance	N/A	$\Delta V < 0.02V/\text{cell}$ ΔRi (Internal Impedance) < 5m Ω/cell	Charge at 0.1C for 16 hrs, and then leave for 24hrs,check battery before / after vibration Amplitude: 1.5mm Vibration: 3000CPM (any direction for 60mins)	Unit Cell
Impact Resistance	N/A	$\Delta V < 0.02V/\text{cell}$ ΔRi (Internal Impedance) < 5m Ω/cell	Charge at 0.1C for 16 hrs, and then leave for 24hrs,check battery before / after drop Height: 50cm Thickness of wooden board: 30mm Direction is not specified Test for 3 times	Unit Cell

4. CONFIGURATIONS, DIMENSIONS AND MARKING

GP Batteries

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Please refer to attached drawing

5. EXTERNAL APPEARANCE

The cell / battery shall be free from crack, scars, breakage, rust, discoloration, leakage and deformation.

6. WARRANTY

One year limited warranty against workmanship and material defects.

7. CAUTION

1. Batteries should be charged prior to use.
 2. For charging methods please referred to our technical handbook.
 3. Use the correct charger for Ni-MH batteries.
 4. Do not reverse charge batteries.
 5. Do not subject batteries to adverse condition such as extreme temperature, deep cycling and excessive over charge/over discharge.
 6. Avoid batteries being used in an airtight compartment. Ventilation should be provided inside the battery compartment; otherwise batteries may generate hydrogen gas, which could cause an explosion if exposed to an ignition source.
 7. Do not attempt to take batteries apart or subject them to pressure or impact, Heat may be generated or fire may result. The alkaline electrolyte is harmful to eyes and skin, and it may damage clothing upon contact.
 8. Keep away from children .If swallowed, contact a physician at once.
 9. Do not short circuit batteries, permanent damage to batteries may result.
 10. Do not incinerate or mutilate batteries ,may burst or release toxic material
 11. Do not solder directly to cells or batteries.
 12. Store batteries in a cool dry place.
 13. If find any noise, excessive temperature or leakage from a battery, please stop its use.
 14. When not using a battery, disconnect it from the device.
 15. When using a new battery for the first time or after long term storage, please fully charge the battery before use.
 16. Do not mix new batteries in use with semi-used batteries, over-discharge may occur.
 17. When connecting a battery pack to a charger, ensure correct polarity.
 18. When the battery is hot, please do not touch it and handle it, until it has cooled down.
 19. Do not remove the outer sleeve from a battery pack nor cut into its housing.
 20. When find battery power down during use, please switch off the device to avoid over discharge.
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21. Unplug a battery by holding the connector itself and not by pulling at its cord.
22. After use, if the battery is hot, before recharging it, allow it to cool in a well-ventilated place out of direct sunlight.
23. Never put a battery into water or seawater.
24. In order to maintain satisfactory cell / battery performance when being stored under extending period of time, cycling (i.e. charging and discharging) of the cell / battery within 6 months period is highly recommended. At least one times cycling should be conducted within one year

Notes: 1. T_a: Ambient Temperature

2. Approximate charge time from discharged state, for reference only.

3. IEC61951-2(2011) 7.5.1.2 Endurance in cycles:

Cycle No.	Charge	Rest	Discharge
1	0.1C × 16hrs	None	0.25C × 2hrs20mins
2 - 48	0.25C × 3hrs10mins	None	0.25C × 2hrs20mins
49	0.25C × 3hrs10mins	None	0.25C to 1.0V/cell
50	0.1C × 16hrs	1 - 4hr(s)	0.2C to 1.0V/cell
Cycle 1 to 50 shall be repeated until the discharge duration on any 50th cycle become less than 3hrs			