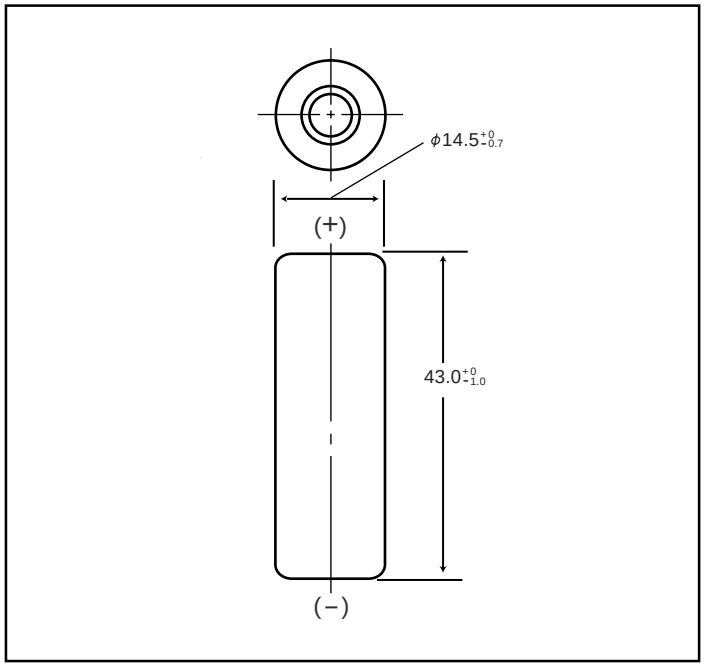
HHR120AA Cylindrical 4/5AA size (HR 15/43)

Dimensions (with Tube) (mm)



Specifications

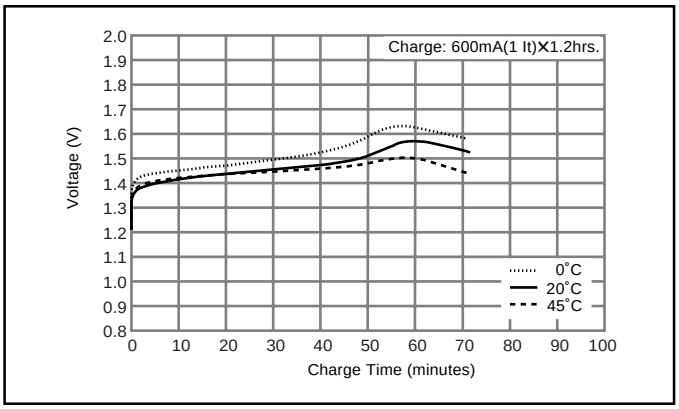
	mm	inch
Diameter	14.5+0/-0.7	0.57+0/-0.03
Height	43.0+0/-1.0	1.69+0/-0.04
Approximate Weight	Grams	Ounces
	23	0.81

Nominal Voltage			1.2V	
Discharge Capacity*		Average**	1220 mAh	
		Rated (Min.)	1150 mAh	
Approx. Internal impedance at 1000Hz at charged state.			19mΩ	
Charge		Standard	120mA (0.1It) x 16hrs.	
		Rapid	1200mA (1It) x 1.2 hrs.	
Ambient Temperature	Charge	Standard	°C	°F
			0˚C to 45˚C	32˚F to 113˚F
		Rapid	0˚C to 40˚C	32˚F to 104˚F
	Discharge		-10˚C to 65˚C	14˚F to 149˚F
	Storage	< 1 year	-20˚C to 35˚C	-4˚F to 95˚F
		< 3 months	-20˚C to 45˚C	-4˚F to 113˚F
		< 1 month	-20˚C to 55˚C	-4˚F to 131˚F

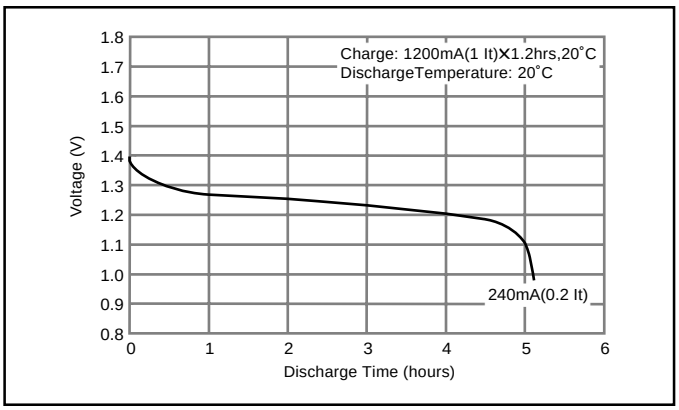
* After charging at 0.1It for 16 hours, discharging at 0.2It.
** For reference only.
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

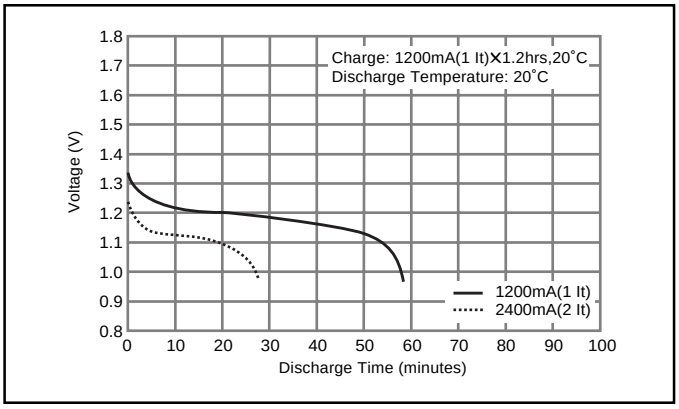
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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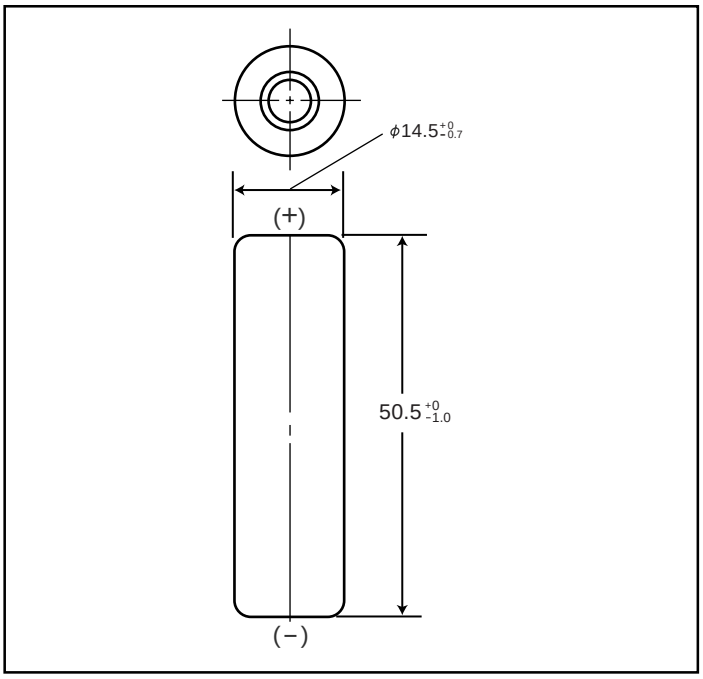
HHR150AA Cylindrical AA size (HR 15/51)

Dimensions (with Tube) (mm)



Specifications

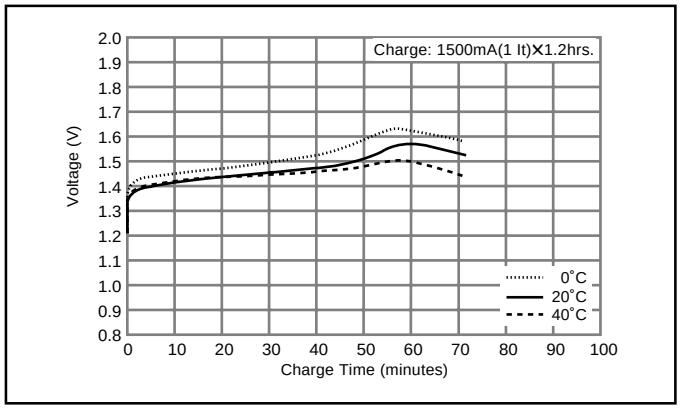
	mm	inch
Diameter	14.5+0/-0.7	0.57+0/-0.03
Height	50.0+0/-1.0	1.97+0/-0.06
Approximate Weight	**Grams**	**Ounces**
	26	0.92

Nominal Voltage			1.2V	
Discharge Capacity*		**Average****	1580 mAh	
		Rated (Min.)	1500 mAh	
Approx. Internal impedance at 1000Hz at charged state.			20mΩ	
Charge		**Standard**	150mA (0.1It) x 16hrs.	
		Rapid	1500mA (1It) x 1.2 hrs.	
Ambient Temperature			**°C**	**°F**
	Charge	**Standard**	0°C to 45°C	32°F to 113°F
		Rapid	0°C to 40°C	32°F to 104°F
	Discharge		-10°C to 65°C	14°F to 149°F
	Storage	**< 1 year**	-20°C to 35°C	-4°F to 95°F
		< 3 months	-20°C to 45°C	-4°F to 113°F
		< 1 month	-20°C to 55°C	-4°F to 131°F

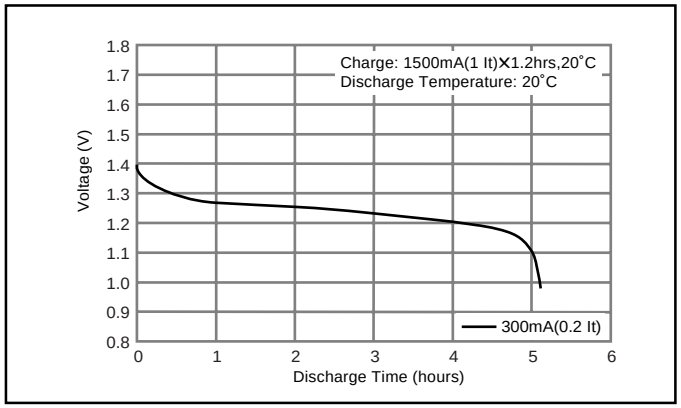
* After charging at 0.1It for 16 hours, discharging at 0.2It.
** For reference only.
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

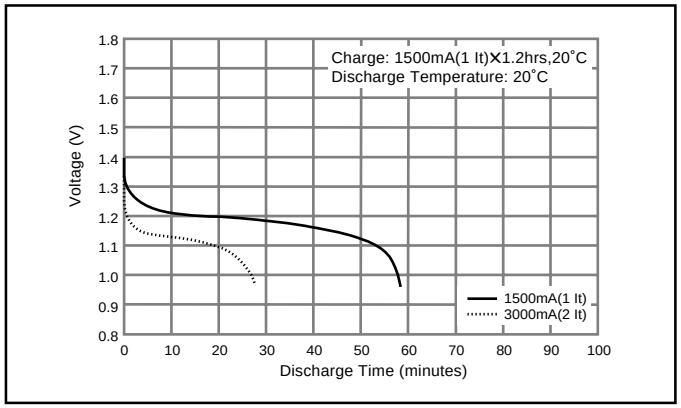
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours.
  n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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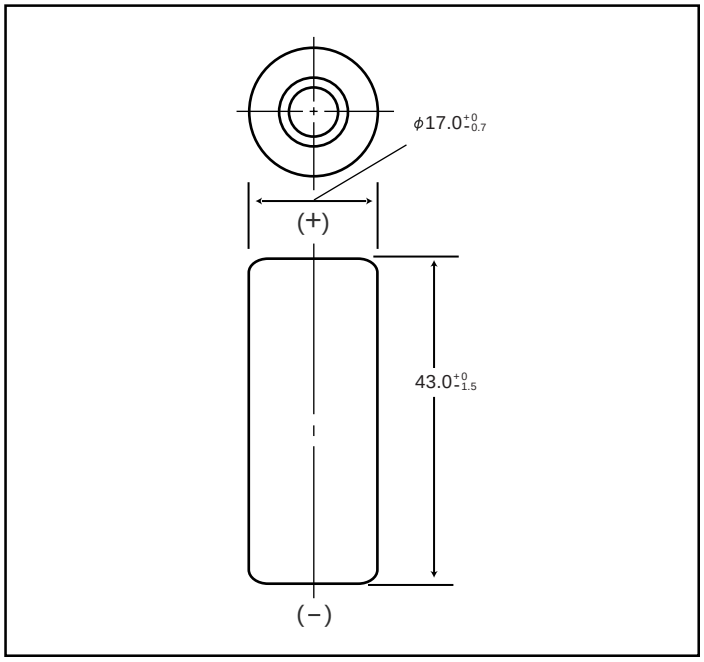
HHR200A Cylindrical 4/5A size (HR 17/43)

Dimensions (with Tube) (mm)



Specifications

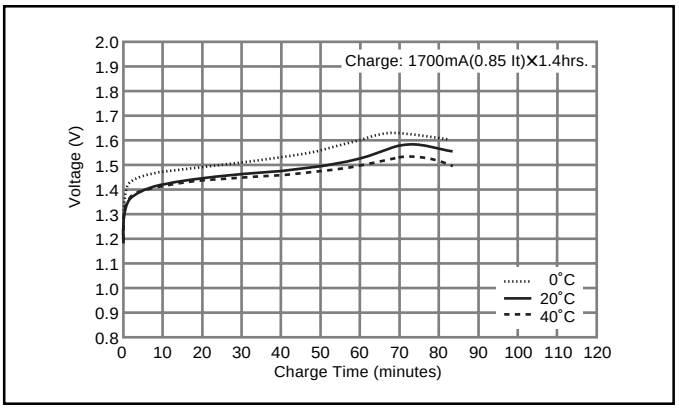
	mm	inch
Diameter	17.0+0/-0.7	0.67+0/-0.03
Height	43.0+0/-1.5	1.69+0/-0.06
Approximate Weight	Grams	Ounces
	32	1.13

Nominal Voltage			1.2V	
Discharge Capacity*		Average**	2040 mAh	
		Rated (Min.)	2000 mAh	
Approx. Internal impedance at 1000Hz at charged state.			20mΩ	
Charge		Standard	200mA (0.1It) x 16hrs.	
		Rapid	2000mA (1It) x 1.2 hrs.	
Ambient Temperature	Charge	Standard	°C	°F
			0°C to 45°C	32°F to 113°F
		Rapid	0°C to 40°C	32°F to 104°F
	Discharge		-10°C to 65°C	14°F to 149°F
	Storage	< 1 year	-20°C to 35°C	-4°F to 95°F
		< 3 months	-20°C to 45°C	-4°F to 113°F
		< 1 month	-20°C to 55°C	-4°F to 131°F

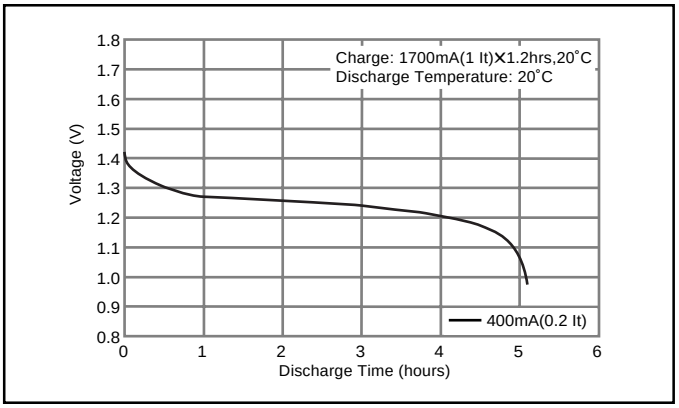
* After charging at 0.1It for 16 hours, discharging at 0.2It.
** For reference only.
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

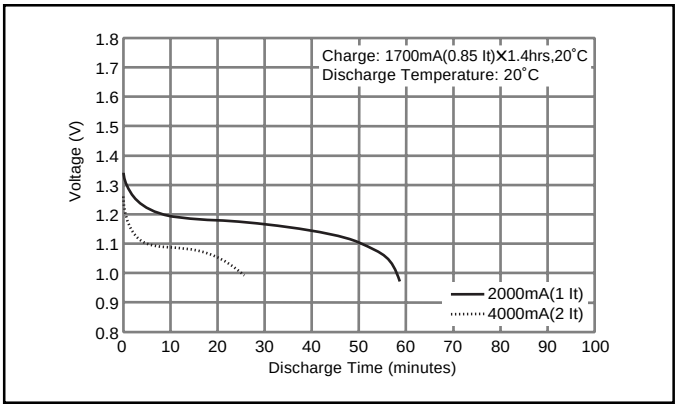
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours.
  n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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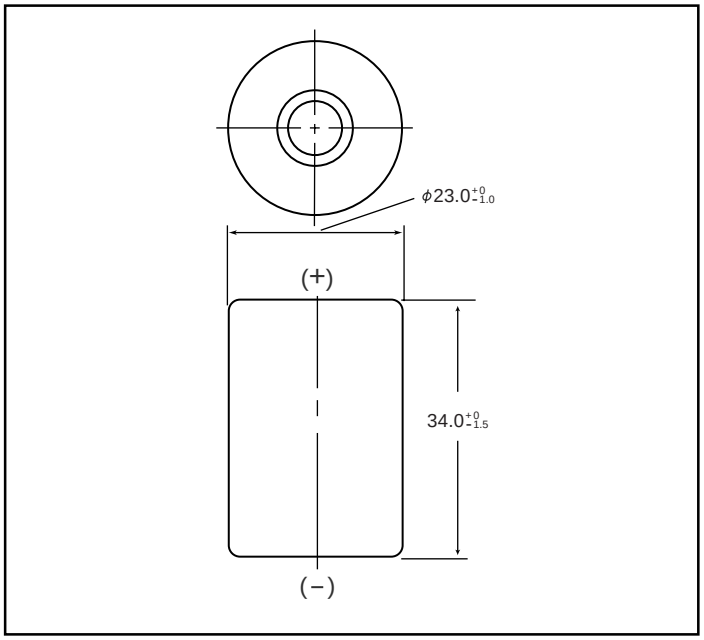
HHR200SCP Cylindrical 4/5SC size (HR 23/34)

Dimensions (with Tube) (mm)



Specifications

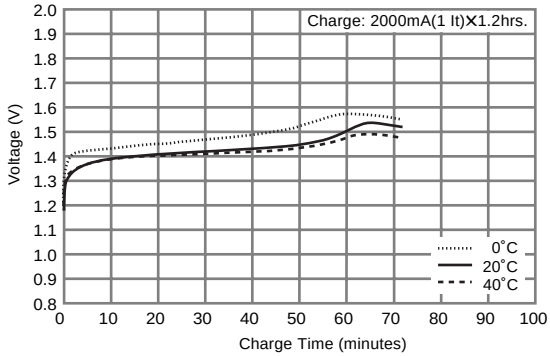
	mm	inch
Diameter	23.0+0/-0.1	0.91+0/-0.04
Height	34.0+0/-1.5	1.34+0/-0.06
Approximate Weight	Grams	Ounces
	42	1.48

Nominal Voltage			1.2V	
Discharge Capacity*		Average**	2100 mAh	
		Rated (Min.)	1900 mAh	
Approx. Internal impedance at 1000Hz at charged state.			5mΩ	
Charge		Standard	200mA (0.1It) x 16hrs.	
		Rapid	2000mA (1It) x 1.2 hrs.	
Ambient Temperature	Charge	Standard	°C	°F
			0˚C to 45˚C	32˚F to 113˚F
		Rapid	0˚C to 40˚C	32˚F to 104˚F
	Discharge		-10˚C to 65˚C	14˚F to 149˚F
	Storage	< 2 years	-20˚C to 35˚C	-4˚F to 95˚F
		< 6 months	-20˚C to 45˚C	-4˚F to 113˚F

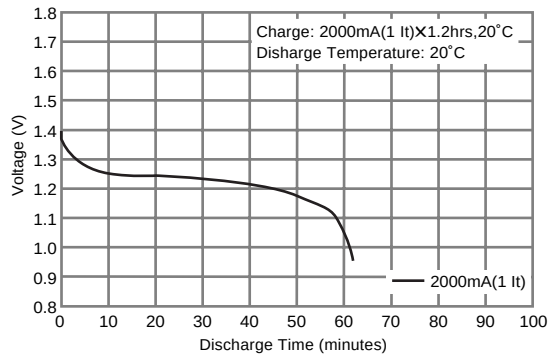
* After charging at 0.1It for 16 hours, discharging at 0.2It.
** For reference only.
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

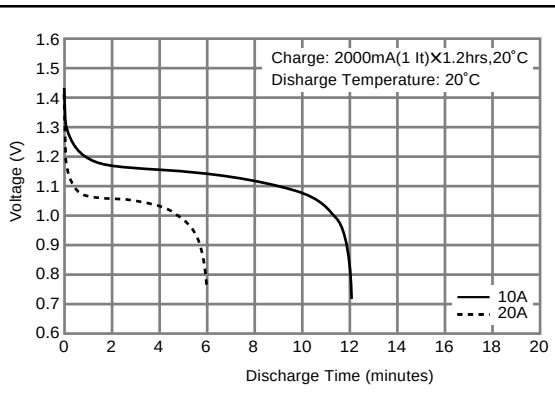
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours.
  n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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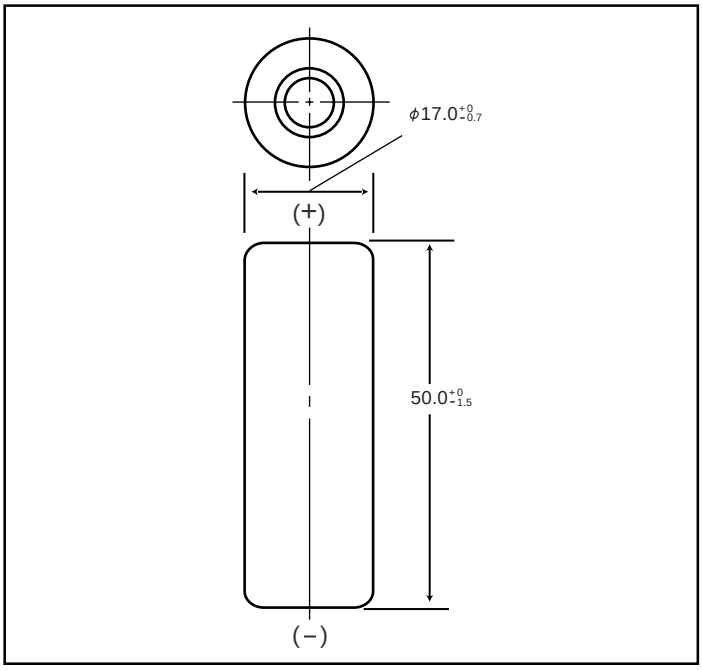
HHR210A Cylindrical A size (HR 17/50)

Dimensions (with Tube) (mm)



Specifications

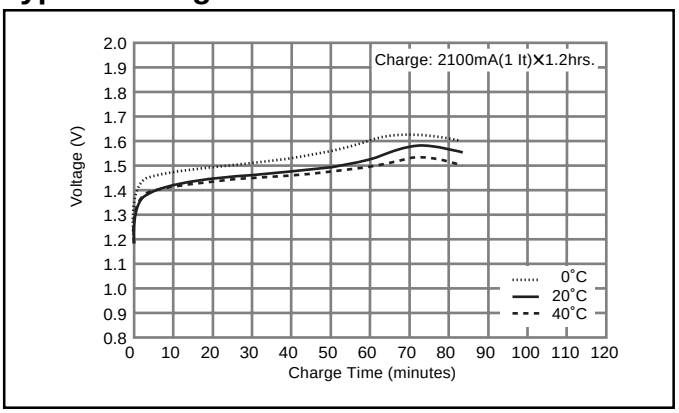
	mm	inch
Diameter	17.0+0/-0.7	0.67+0/-0.03
Height	50.0+0/-1.5	1.97+0/-0.06
Approximate Weight	Grams	Ounces
	38	1.34

Nominal Voltage			1.2V	
Discharge Capacity*		Average**	2200 mAh	
		Rated (Min.)	2100 mAh	
Approx. Internal impedance at 1000Hz at charged state.			20mΩ	
Charge		Standard	210mA (0.1It) x 16hrs.	
		Rapid	2100mA (1It) x 1.2 hrs.	
Ambient Temperature	Charge	Standard	°C	°F
			0˚C to 45˚C	32˚F to 113˚F
		Rapid	0˚C to 40˚C	32˚F to 104˚F
	Discharge		-10˚C to 65˚C	14˚F to 149˚F
	Storage	< 1 year	-20˚C to 35˚C	-4˚F to 95˚F
		< 3 months	-20˚C to 45˚C	-4˚F to 113˚F
		< 1 month	-20˚C to 55˚C	-4˚F to 131˚F

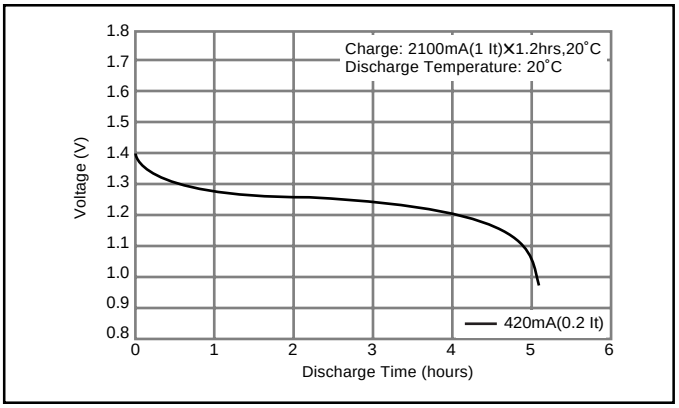
* After charging at 0.1It for 16 hours, discharging at 0.2It.
** For reference only.
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

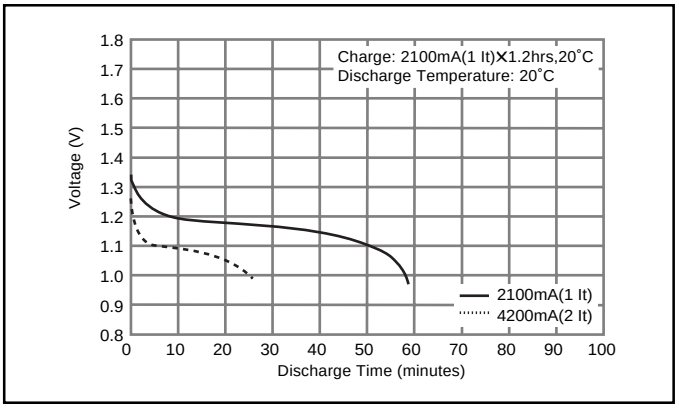
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours.
  n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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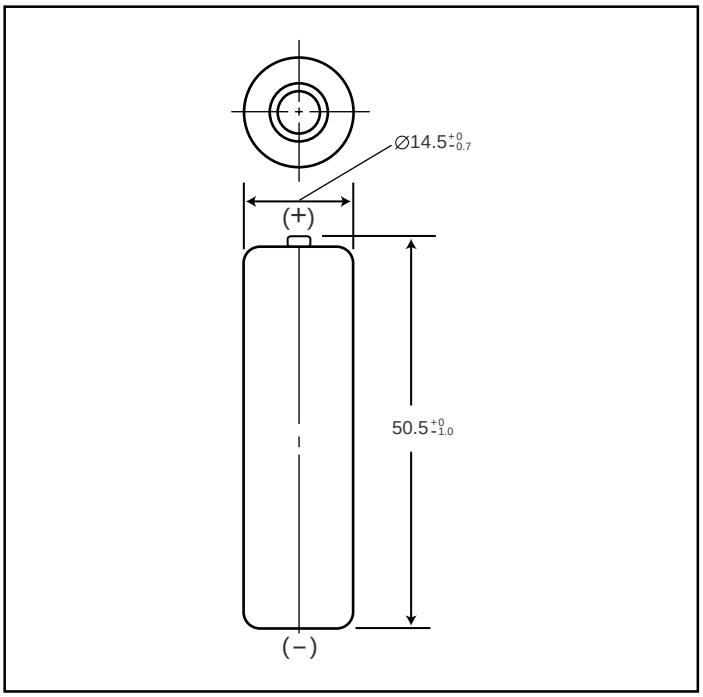
HHR210AA/B Cylindrical AA size (HR 15/51)

Dimensions (with Tube) (mm)



Specifications

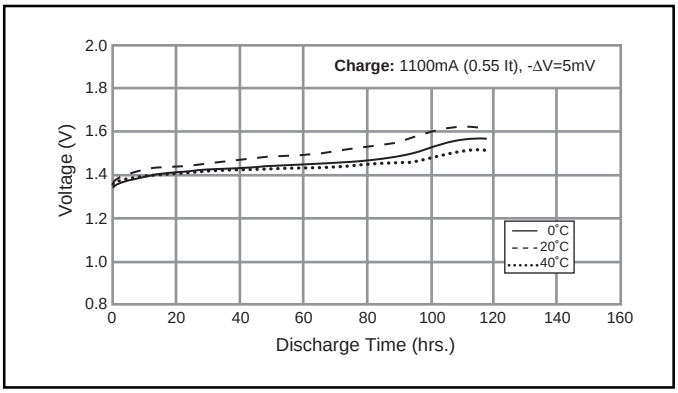
	mm	inch
Diameter	14.5 +0/-0.7	0.57 +0/-0.3
Height	50.5 +0/-1.0	1.99 +0/-0.5
Approximate Weight	Grams	Ounces
	29	1.02

Nominal Voltage			1.2V	
Discharge Capacity*		Average**	2080mAh	
		Rated (Min.)	2000mAh	
Approx. internal Impedance at 1000Hz at charged state.			25mΩ	
Charge		Standard	200mA (0.1It) x 16 hrs.	
		Rapid	1200mA (1It) x 2 hrs.	
Ambient Temperature	Charge	Standard	°C	°F
			0°C to 45°C	32°F to 113°F
		Rapid	0°C to 40°C	32°F to 113°F
	Discharge		-10°C to 65°C	14°F to 149°F
	Storage	< 1 year	-20°C to 35°C	-4°F to 95°F
		< 3 months	-20°C to 45°C	-4°F to 113°F
		< 1 month	-20°C to 55°C	-4°F to 131°F

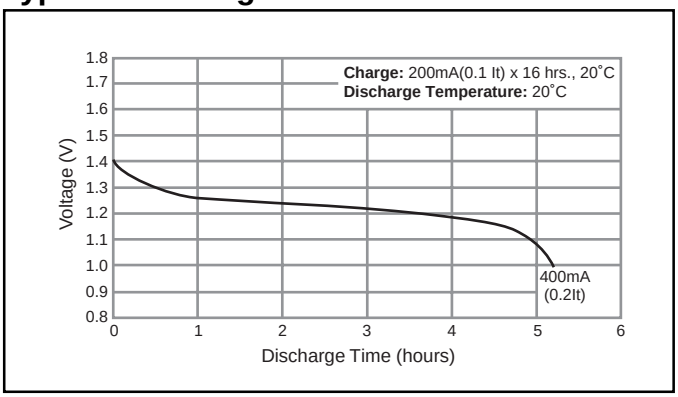
* After charging at 0.1It for 16 hours, discharging at 0.2It.
** For reference only.
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

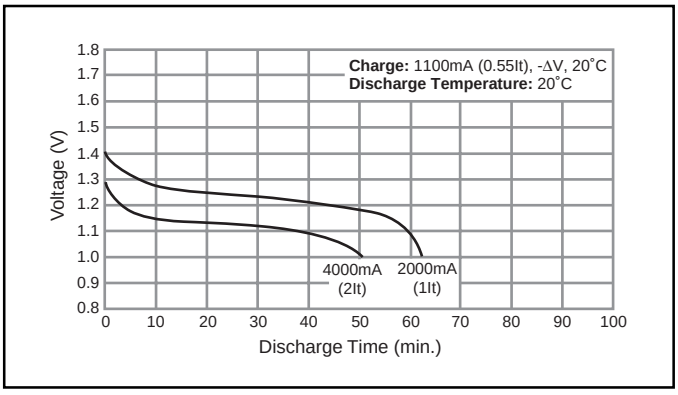
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h
* [It] is the reference test current in ampres
* [Cn] is the rated capacity of the cell or battery in Ampere-hours.
n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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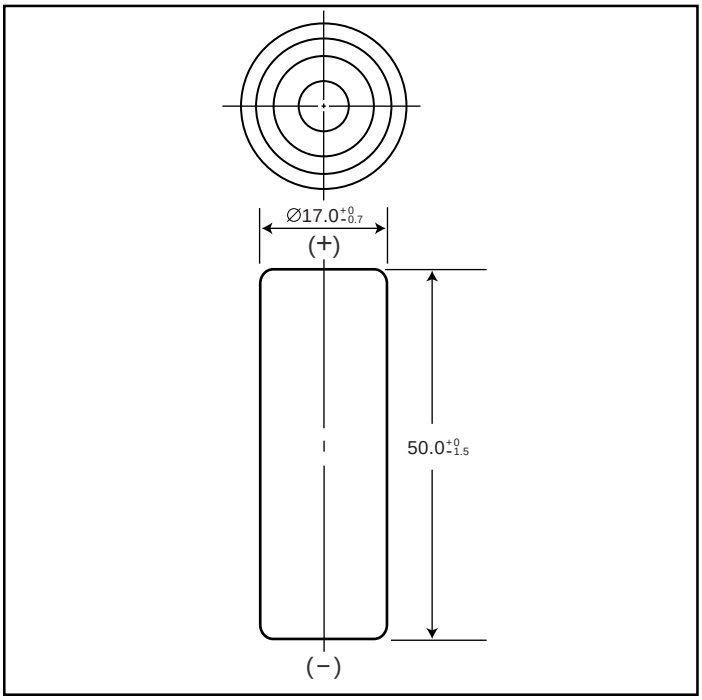
HHR210AH Cylindrical A size (HR 17/50)

Dimensions (with Tube) (mm)



Specifications

	mm	inch
Diameter	17.0+0/-0.7	0.67+0/-0.03
Height	50.0+0/-1.5	1.97+0/-0.06
Approximate Weight	**Grams**	**Ounces**
	38	1.34

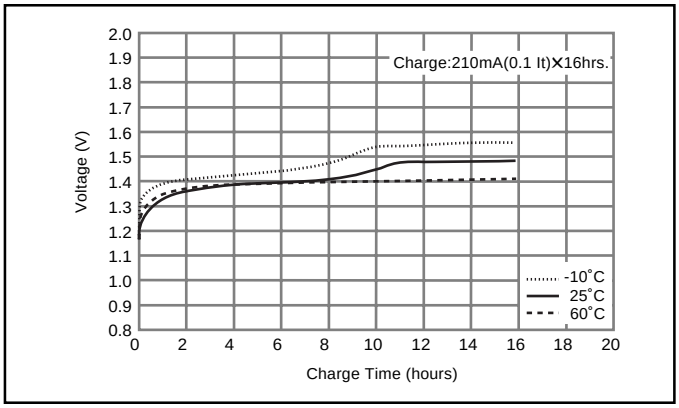
Nominal Voltage			1.2V	
Discharge Capacity[1]		**Average**[2]	2050mAh	
		Rated (Min.)	1900mAh	
Approx. internal Impedance at 1000Hz at charged state.			20mΩ	
Charge		**Standard**	210mA (0.1It) x 16 hrs.	
		Rapid	-	
Ambient Temperature	**Charge**	**Standard**	**˚C**	**˚F**
			-10˚C to 60˚C	14˚F to 140˚F
		Rapid	-	-
	Discharge		-10˚C to 60˚C	14˚F to 140˚F
	Storage	**< 1 year**	-20˚C to 35˚C	-4˚F to 95˚F
		< 3 months	-20˚C to 45˚C	-4˚F to 113˚F
		< 1 month	-20˚C to 55˚C	-4˚F to 131˚F
		< 1 week	-20˚C to 60˚C	-4˚F to 140˚F

[1] After charging at 0.1It for 16 hours, discharging at 0.2It.
[2] For reference only.

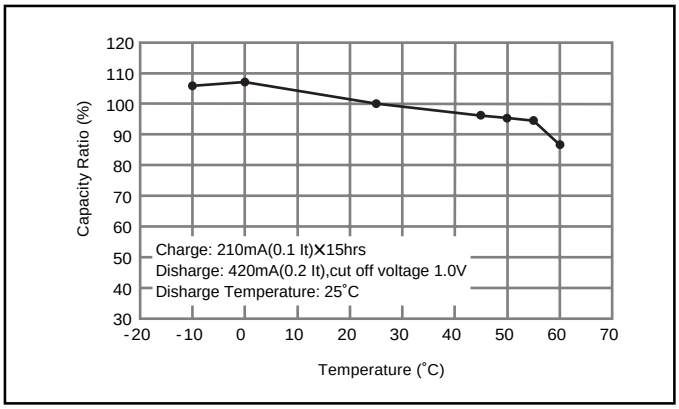
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

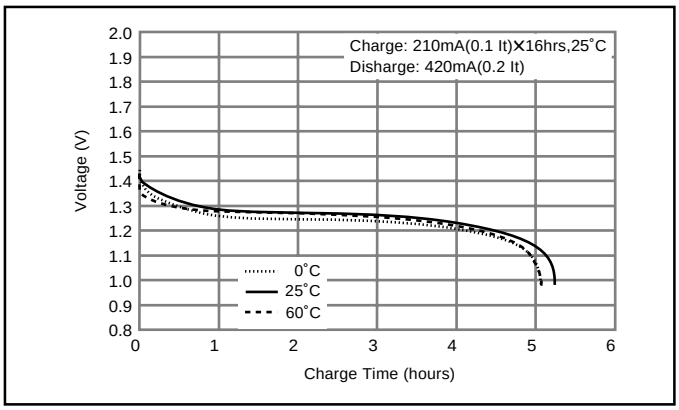
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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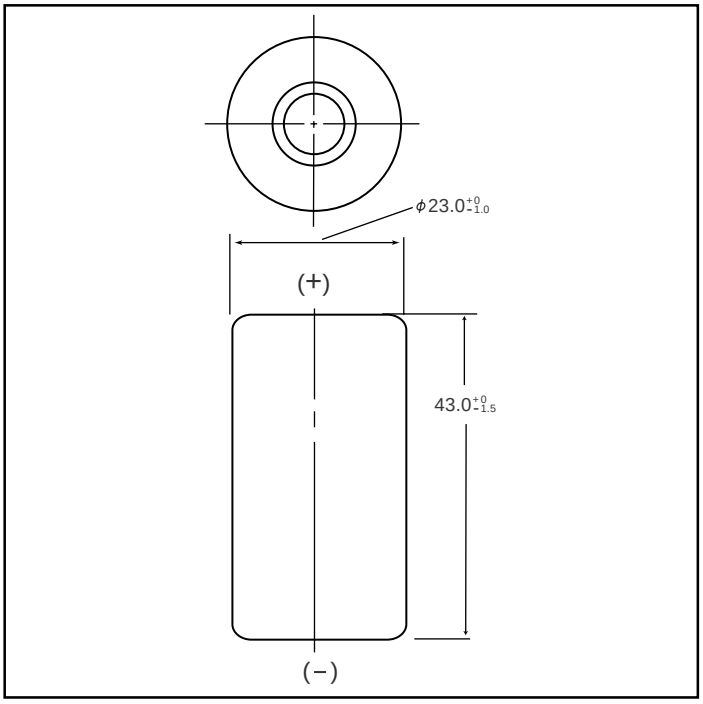
HHR250SCH Cylindrical SC size (HR 23/43)

Dimensions (with Tube) (mm)



Specifications

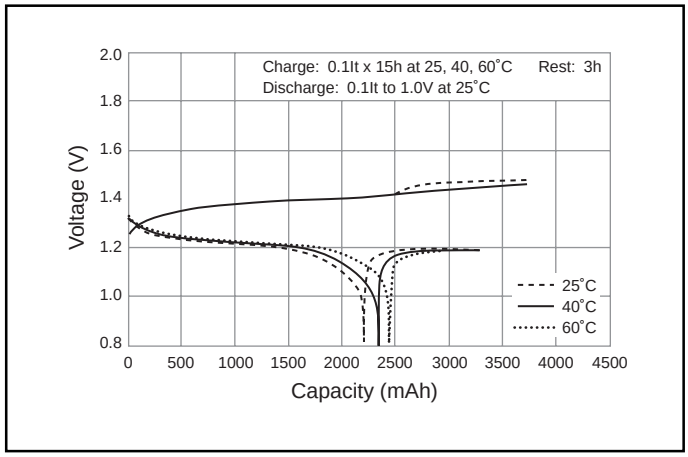
	mm	inch
Diameter	23.0+0/-1.0	0.91+0/-0.04
Height	43.0+0/-1.5	1.69+0/-0.06
Approximate Weight	Grams	Ounces
	55	1.94

Nominal Voltage			1.2V	
Discharge Capacity[1]		Average[2]	2650 mAh	
		Rated (Min.)	2500 mAh	
Approx. Internal impedance at 1000Hz at charged state.			5mΩ	
Charge		Standard	250mA x 16hrs.	
		Rapid[3]	1250mA x 2.4 hrs.[4]	
		Low Rate	125mA x 32 hrs. 83mA x 48 hrs.	
Ambient Temperature	Charge	Standard	°C	°F
			-10˚C to 60˚C	14˚F to 140˚F
		Rapid	-10˚C to 45˚C	14˚F to 113˚F
	Discharge		-10˚C to 60˚C	14˚F to 140˚F
	Storage	< 1 year	-20˚C to 35˚C	-4˚F to 95˚F
		< 6 months	-20˚C to 45˚C	-4˚F to 113˚F
		< 1 month	-20˚C to 55˚C	-4˚F to 131˚F
		< 1 week	-20˚C to 65˚C	-4˚F to 149˚F

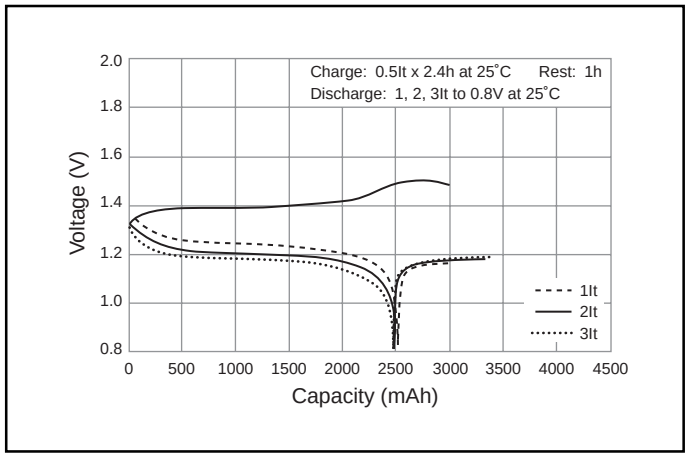
[1] After charging at 0.1It for 16 hours, discharging at 0.2It.
[2] For reference only.
[3] Need specially designed control system
Control System:
dT/dt cut-off; 1 to 2°C/min
-△V cut-off; -△V per cell = 5 to 10 mV
T-control; T=65°C
Rapid charger timer; 2.4h (at 1.25a)
Trickle timer; within 2h
[4] With control system

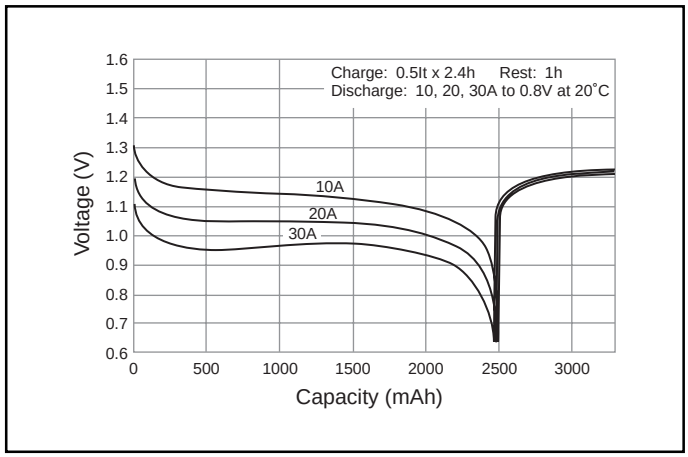
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

Typical Charge Characteristics



Typical Discharge Characteristics





Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h
* [It] is the reference test current in ampres
* [Cn] is the rated capacity of the cell or battery in Ampere-hours.
n = the time base [hours] for which the rated capacity is declared

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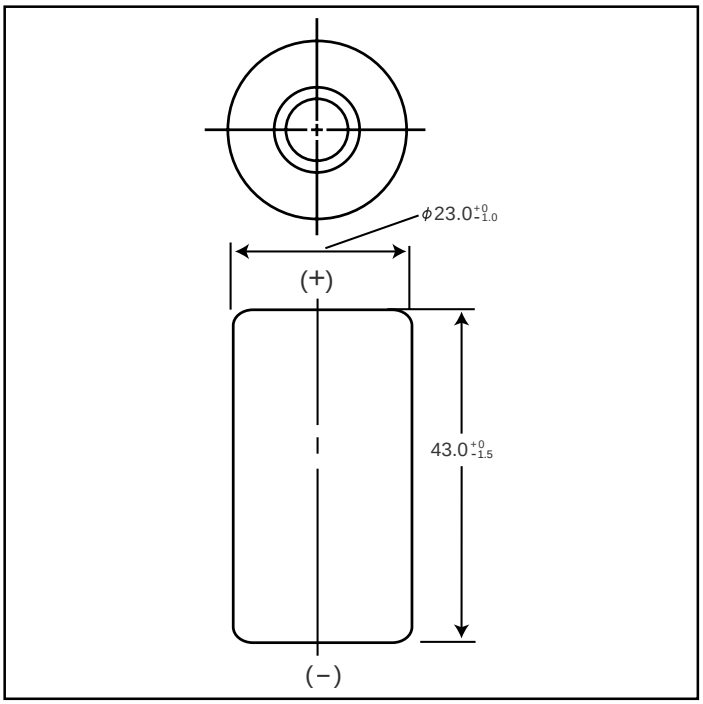
HHR260SCP Cylindrical SC size (HR 23/43)

Dimensions (with Tube) (mm)



Specifications

	mm	inch
Diameter	23.0+0/-1.0	0.91+0/-0.04
Height	43.0+0/-1.5	1.69+0/-0.06
Approximate Weight	**Grams**	**Ounces**
	55	1.94

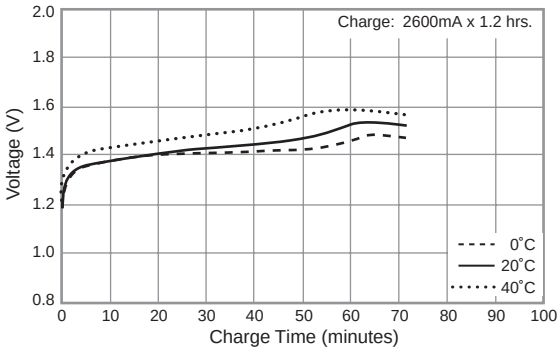
Nominal Voltage			1.2V	
Discharge Capacity[1]		**Average**[2]	2600 mAh	
		Rated (Min.)	2450 mAh	
Approx. Internal impedance at 1000Hz at charged state.			5mΩ	
Charge		**Standard**	260mA x 16hrs.	
		Rapid	2600mA x 1.2 hrs.	
Ambient Temperature	**Charge**	**Standard**	**°C**	**°F**
			0°C to 45°C	32°F to 113°F
		Rapid	10°C to 40°C	50°F to 104°F
	Discharge		-10°C to 65°C	14°F to 149°F
	Storage	**< 1 year**	-20°C to 35°C	-4°F to 95°F
		< 3 months	-20°C to 45°C	-4°F to 113°F
		< 1 month	-20°C to 55°C	-4°F to 131°F

[1] After charging at 0.1It for 16 hours, discharging at 0.2It.
[2] For reference only.

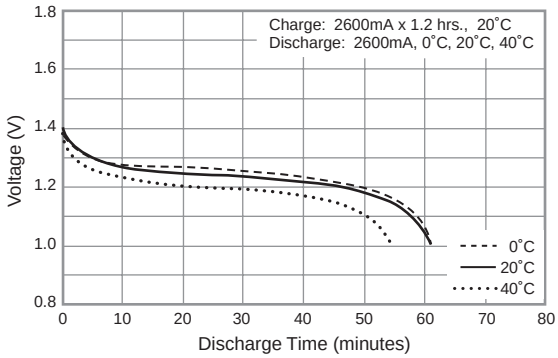
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

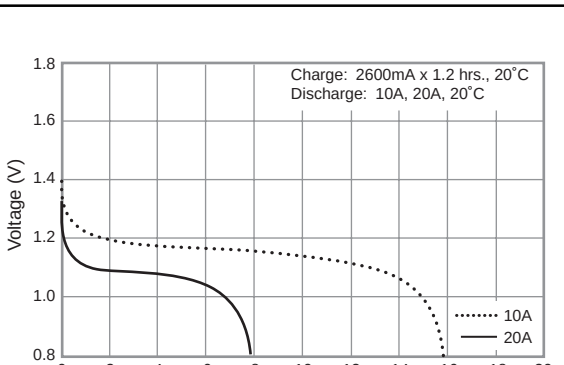
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h
* [It] is the reference test current in ampres
* [Cn] is the rated capacity of the cell or battery in Ampere-hours.
n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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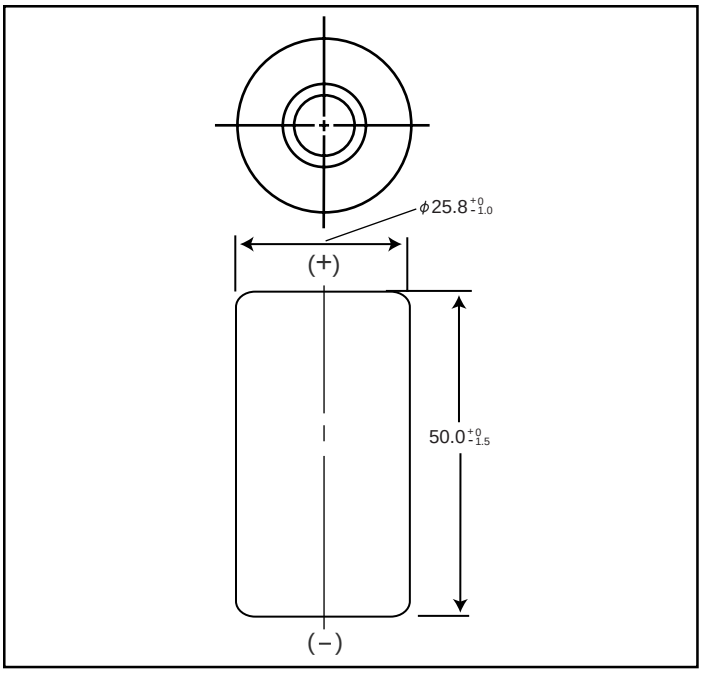
HHR300CH Cylindrical C size (HR 26/50) for backup use

Dimensions (with Tube) (mm)



Specifications

	mm	inch
Diameter	25.8+0/-1.0	1.02+0/-0.04
Height	50.0+0/-1.5	1.97+0/-0.06
Approximate Weight	**Grams**	**Ounces**
	80	2.82

Nominal Voltage			1.2V	
Discharge Capacity[1]		**Average[2]**	3300 mAh	
		Rated (Min.)	3100 mAh	
Approx. Internal impedance at 1000Hz at charged state.			5mΩ	
Charge		**Standard**	300mA (0.1It) x 16hrs.	
		Rapid[3]	1500mA (1It) x 2.4 hrs.[4]	
		Low Rate	155mA x 32 hrs. 100mA x 48 hrs.	
Ambient Temperature			**°C**	**°F**
	Charge	**Standard**	0°C to 45°C	32°F to 113°F
		Rapid	10°C to 40°C	32°F to 104°F
		Low Rate	-10°C to 45°C	14°F to 149°F
	Discharge		-10°C to 65°C	14°F to 113°F
	Storage	**< 1 year**	-20°C to 35°C	-4°F to 95°F
		< 3 months	-20°C to 35°C	-4°F to 95°F
		< 1 month	-20°C to 55°C	-4°F to 131°F

[1] After charging at 0.1It for 16 hours, discharging at 0.2It.

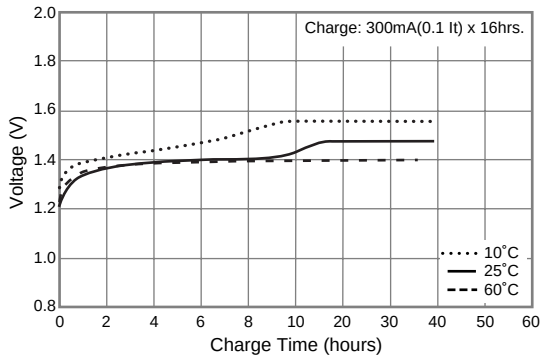
[2] For reference only.

[3] Need specially designed control system
Control System:
dT/dt cut-off; 1 to 2°C/min
-△V cut-off; -△V per cell = 5 to 10 mV
T-control; T=65°C
Rapid charger timer; 2.4h (at 1.25a)
Trickle timer; within 2h

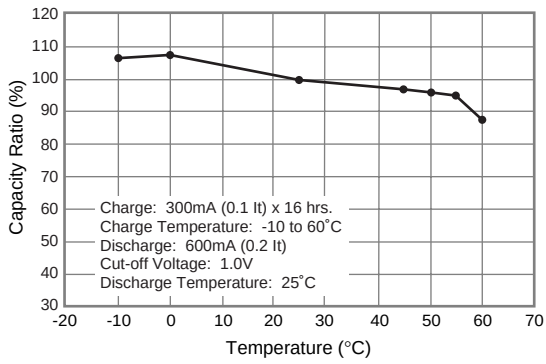
[4] With control system

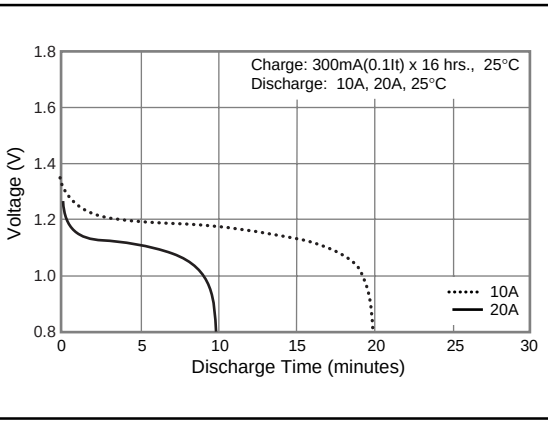
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

Typical Charge Characteristics



Typical Discharge Characteristics





Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

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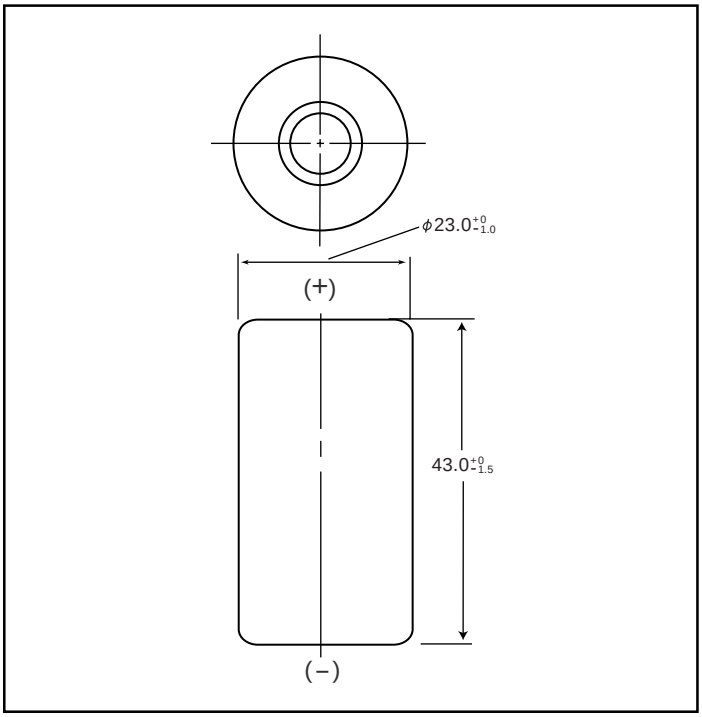
HHR300SCP Cylindrical SC size (HR 23/43)

Dimensions (with Tube) (mm)



Specifications

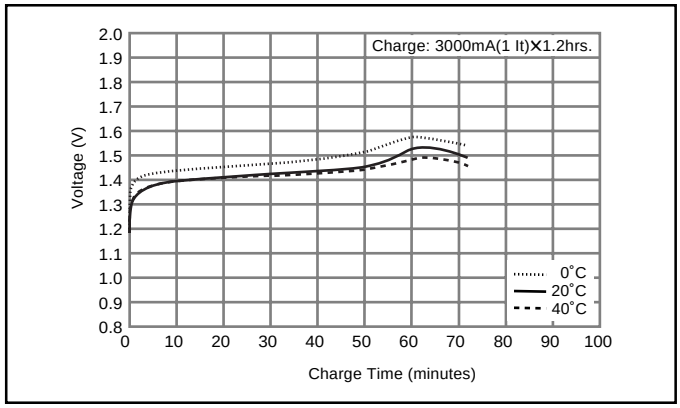
	mm	inch
Diameter	23.0+0/-0.1	0.91+0/-0.04
Height	43.0+0/-1.5	1.69+0/-0.06
Approximate Weight	**Grams**	**Ounces**
	57	2.01

Nominal Voltage			1.2V	
Discharge Capacity*		**Average****	3050 mAh	
		Rated (Min.)	2800 mAh	
Approx. Internal impedance at 1000Hz at charged state.			4mΩ	
Charge		**Standard**	300mA (0.1It) x 16hrs.	
		Rapid	3000mA (1It) x 1.2 hrs.	
Ambient Temperature	**Charge**	**Standard**	**°C**	**°F**
			0˚C to 45˚C	32˚F to 113˚F
		Rapid	0˚C to 40˚C	32˚F to 104˚F
	Discharge		-10˚C to 65˚C	14˚F to 149˚F
	Storage	**< 2 years**	-20˚C to 35˚C	-4˚F to 95˚F
		< 6 months	-20˚C to 45˚C	-4˚F to 113˚F

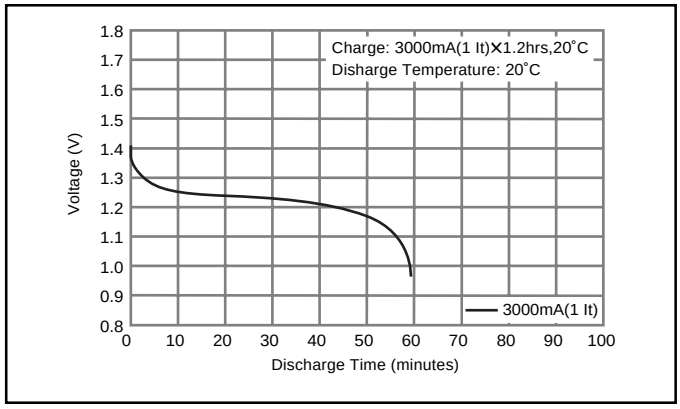
* After charging at 0.1It for 16 hours, discharging at 0.2It.
** For reference only.
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

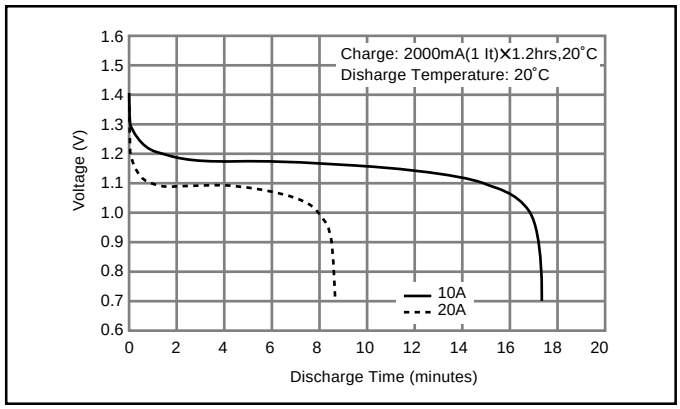
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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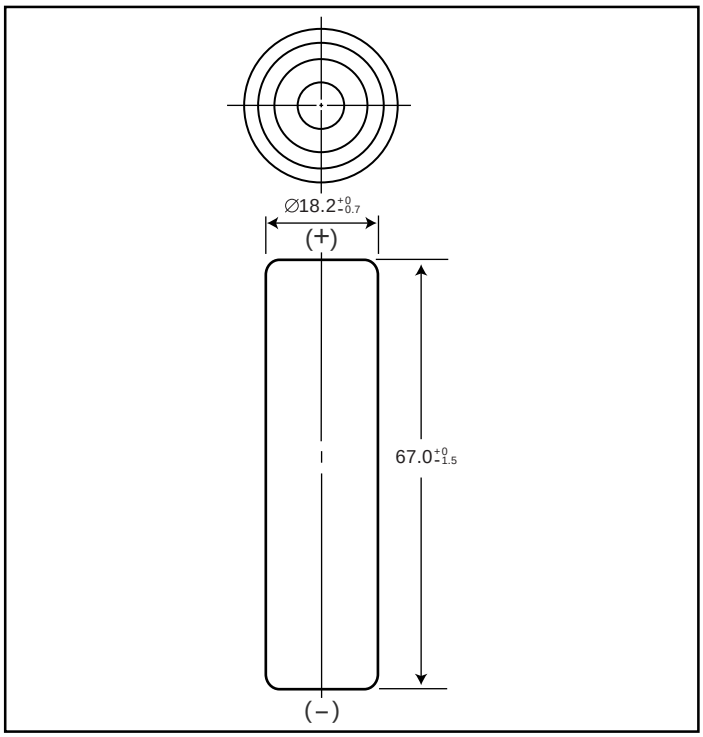
HHR330APH Cylindrical L-Fat A size (HR 18/67)

Dimensions (with Tube) (mm)



Specifications

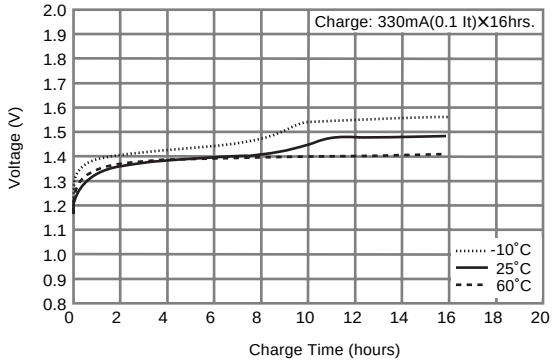
	mm	inch
Diameter	18.2+0/-0.7	0.72+0/-0.03
Height	67.0+0/-1.5	2.64+0/-0.06
Approximate Weight	**Grams**	**Ounces**
	60	2.12

Nominal Voltage			1.2V	
Discharge Capacity[1]		**Average**[2]	3300 mAh	
		Rated (Min.)	3200 mAh	
Approx. Internal impedance at 1000Hz at charged state.			5.5mΩ	
Charge		**Standard**	330mA x 16hrs.	
		Rapid[3]	1650mA x 2.4 hrs.[4]	
		Low Rate	165mA x 32 hrs. 110mA x 48 hrs.	
Ambient Temperature			**°C**	**°F**
	Charge	**Standard**	-10°C to 60°C	14°F to 140°F
		Rapid	-10°C to 45°C	14°F to 113°F
	Discharge		-10°C to 60°C	14°F to 140°F
	Storage	**< 1 year**	-20°C to 35°C	-4°F to 95°F
		< 6 months	-20°C to 45°C	-4°F to 113°F
		< 1 month	-20°C to 55°C	-4°F to 131°F
		< 1 week	-20°C to 65°C	-4°F to 149°F

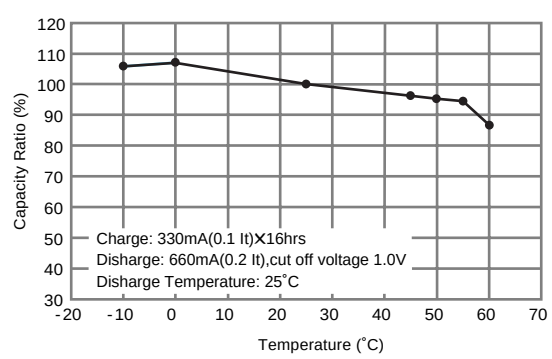
1 After charging at 0.1It for 16 hours, discharging at 0.2It.
2 For reference only.
3 Need specially designed control system
Control System:
dT/dt cut-off; 1 to 2°C/min
-△V cut-off; -△V per cell = 5 to 10 mV
T-control; T=65°C
Rapid charger timer; 2.4h (at 1.25a)
Trickle timer; within 2h
4 With control system

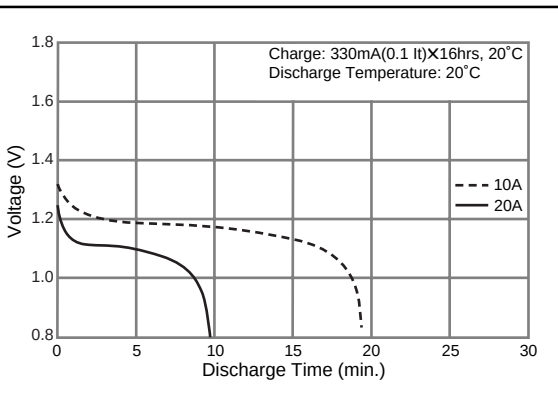
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

Typical Charge Characteristics



Typical Discharge Characteristics





Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

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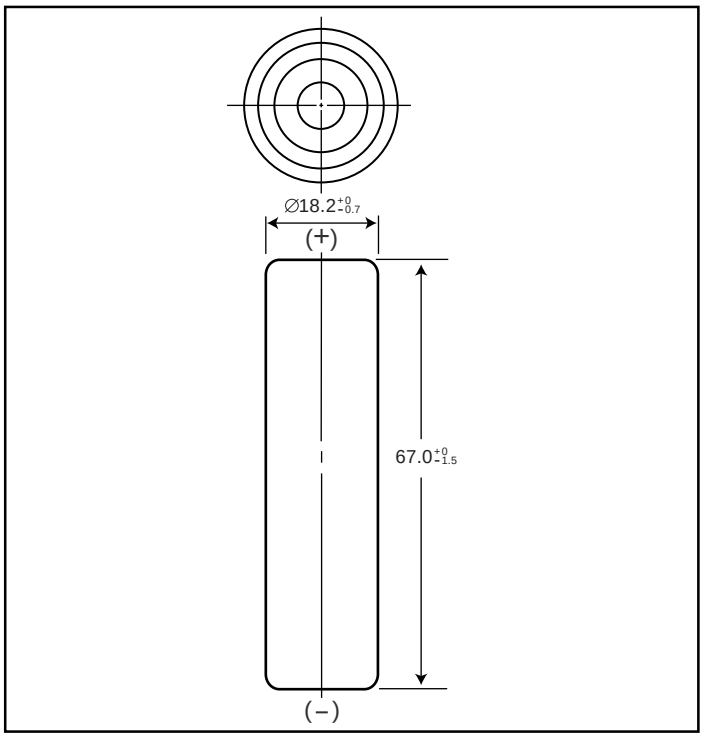
HHR370AH Cylindrical L-Fat A size (HR 18/67)

Dimensions (with Tube) (mm)



Specifications

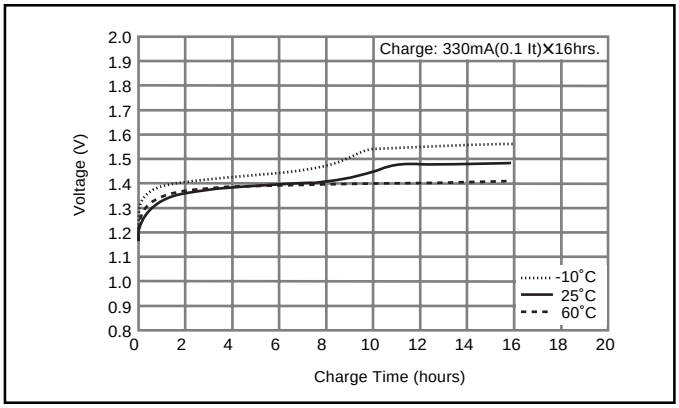
	mm	inch
Diameter	18.2+0/-0.7	0.72+0/-0.03
Height	67.0+0/-1.5	2.64+0/-0.06
Approximate Weight	**Grams**	**Ounces**
	60	2.12

Nominal Voltage			1.2V	
Discharge Capacity[1]		**Average**[2]	3700 mAh	
		Rated (Min.)	3500 mAh	
Approx. Internal impedance at 1000Hz at charged state.			20mΩ	
Charge		**Standard**	370mA x 16hrs.	
		Rapid[3]	1750mA x 2.4 hrs.[4]	
		Low Rate	185mA x 32 hrs. 123mA x 48 hrs.	
Ambient Temperature			**°C**	**°F**
	Charge	**Standard**	-10˚C to 60˚C	14˚F to 140˚F
		Rapid	-10˚C to 45˚C	14˚F to 113˚F
	Discharge		-10˚C to 60˚C	14˚F to 140˚F
	Storage	**< 1 year**	-20˚C to 35˚C	-4˚F to 95˚F
		< 6 months	-20˚C to 45˚C	-4˚F to 113˚F
		< 1 month	-20˚C to 55˚C	-4˚F to 131˚F
		< 1 week	-20˚C to 65˚C	-4˚F to 149˚F

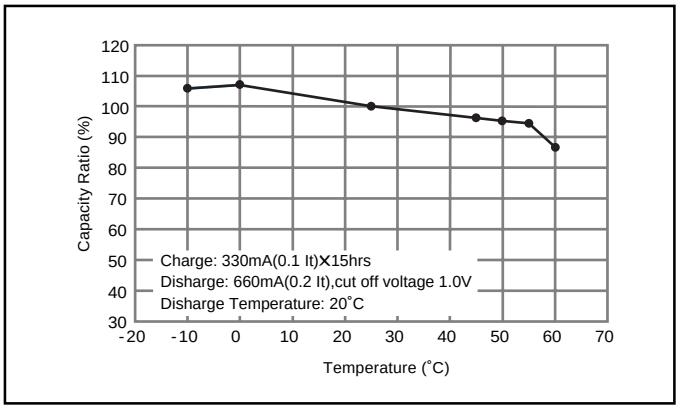
1 After charging at 0.1It for 16 hours, discharging at 0.2It.
2 For reference only.
3 Need specially designed control system
Control System:
dT/dt cut-off; 1 to 2°C/min
-△V cut-off; -△V per cell = 5 to 10 mV
T-control; T=65°C
Rapid charger timer; 2.4h (at 1.25a)
Trickle timer; within 2h
4 With control system

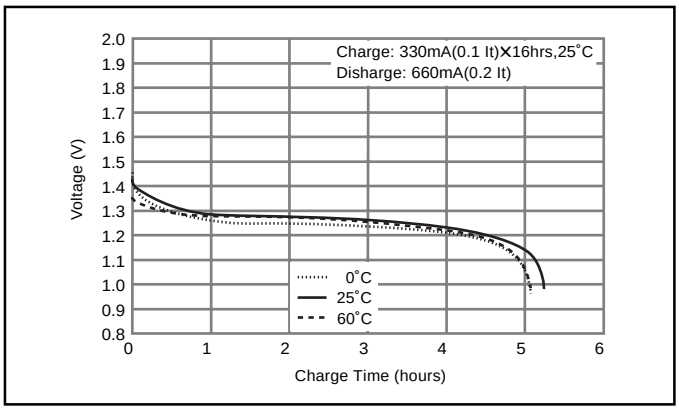
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

Typical Charge Characteristics



Typical Discharge Characteristics





Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

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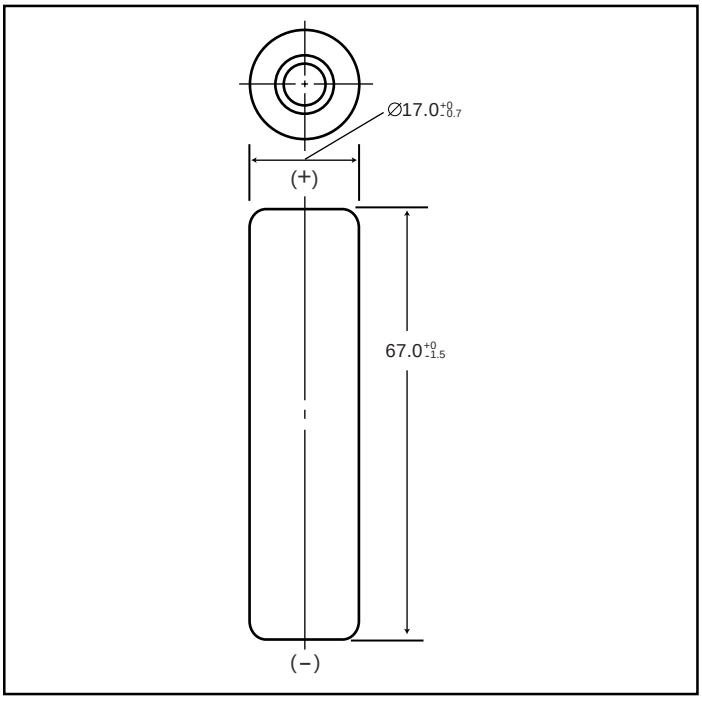
HHR380A Cylindrical L-A size (HR 17/67)

Dimensions (with Tube) (mm)



Specifications

	mm	inch
Diameter	17.0+0/-0.7	0.67+0/-0.03
Height	67.0+0/-1.5	2.64+0/-0.06
Approximate Weight	Grams	Ounces
	53	1.87

Nominal Voltage			1.2V	
Discharge Capacity*		Average**	3800 mAh	
		Rated (Min.)	3700 mAh	
Approx. Internal impedance at 1000Hz at charged state.			25mΩ	
Charge		Standard	370mA (0.1It) x 16hrs.	
		Rapid***	2000mA dT/dt	
Ambient Temperature	Charge	Standard	°C	°F
			0°C to 45°C	32°F to 113°F
		Rapid	0°C to 40°C	32°F to 104°F
	Discharge		-10°C to 65°C	14°F to 149°F
	Storage	< 1 year	-20°C to 35°C	-4°F to 95°F
		< 3 months	-20°C to 45°C	-4°F to 113°F
		< 1 month	-20°C to 55°C	-4°F to 131°F

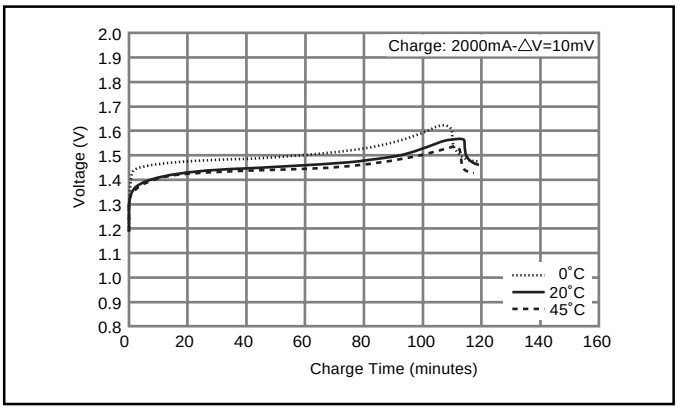
* After charging at 0.1It for 16 hours, discharging at 0.2It.
** For reference only.
*** For rapid charge: use dT/dt charge termination method. Refer to the Nickel Metal Hydride "Charge Methods" section for further details.

Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

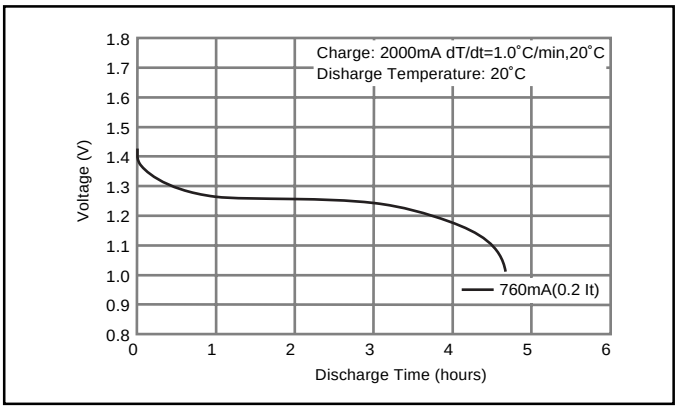
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.

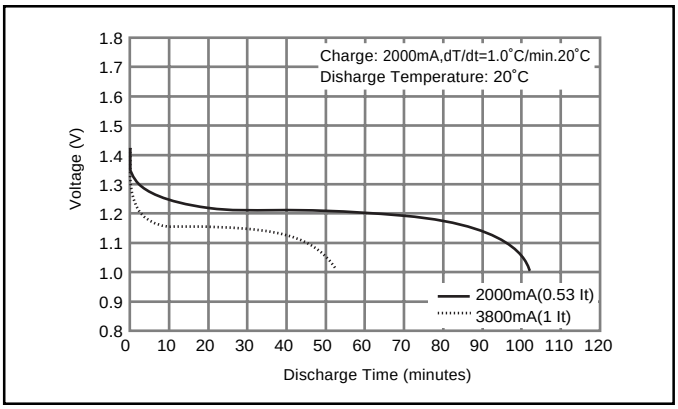
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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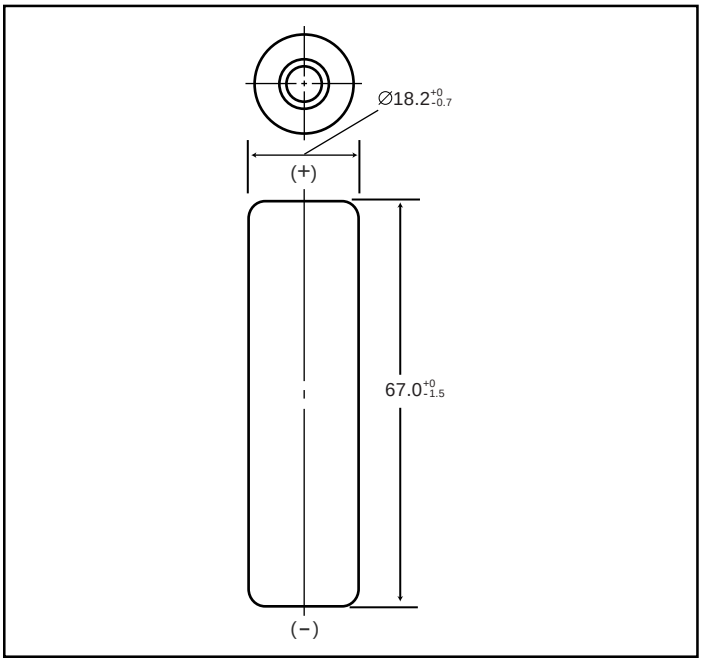
HHR450A Cylindrical L-fat A size (HR 18/67)

Dimensions (with Tube) (mm)



Specifications

	mm	inch
Diameter	18.2+0/-0.7	0.72+0/-0.03
Height	67.0+0/-1.5	2.64+0/-0.06
Approximate Weight	Grams	Ounces
	60	2.12

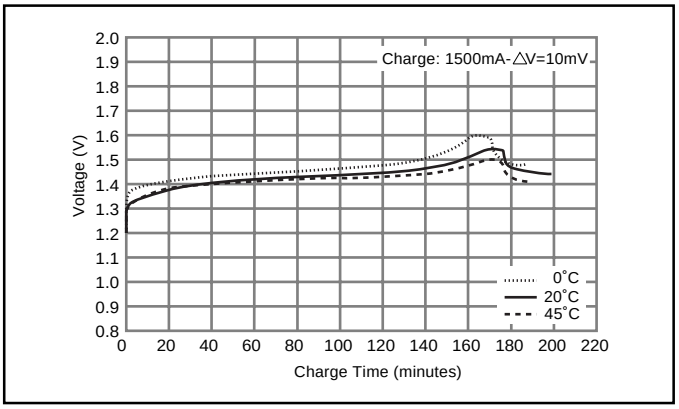
Nominal Voltage			1.2V	
Discharge Capacity*		Average**	4500 mAh	
		Rated (Min.)	4200 mAh	
Approx. Internal impedance at 1000Hz at charged state.			25mΩ	
Charge		Standard	420mA (0.1It) x 16hrs.	
		Rapid***	2000mA dT/dt	
Ambient Temperature	Charge	Standard	°C	°F
			0°C to 45°C	32°F to 113°F
		Rapid	0°C to 40°C	32°F to 104°F
	Discharge		-10°C to 65°C	14°F to 149°F
	Storage	< 1 year	-20°C to 35°C	-4°F to 95°F
		< 3 months	-20°C to 45°C	-4°F to 113°F
		< 1 month	-20°C to 55°C	-4°F to 131°F

* After charging at 0.1It for 16 hours, discharging at 0.2It.
** For reference only.
*** For rapid charge: use dT/dt charge termination method. Refer to the Nickel Metal Hydride "Charge Methods" section for further details.

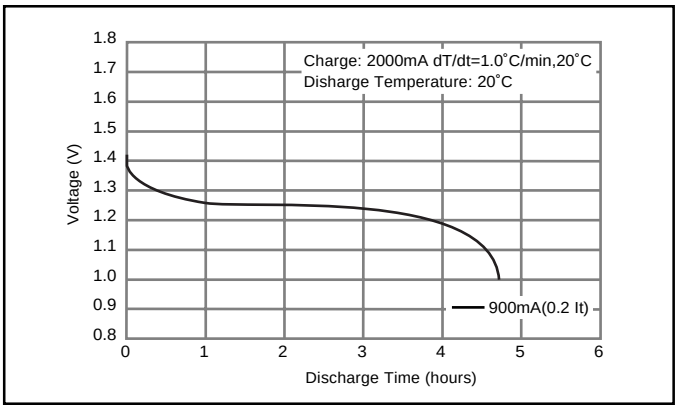
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

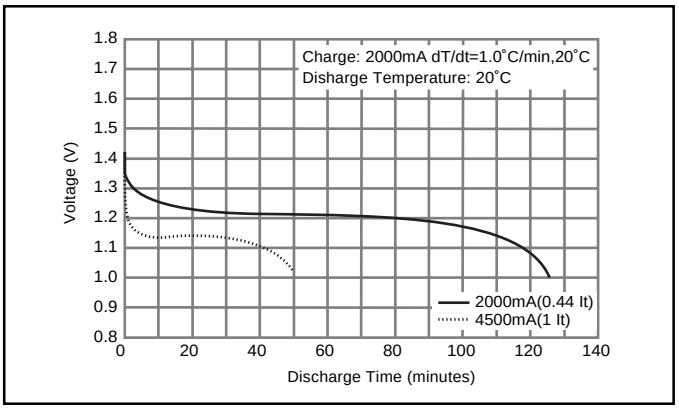
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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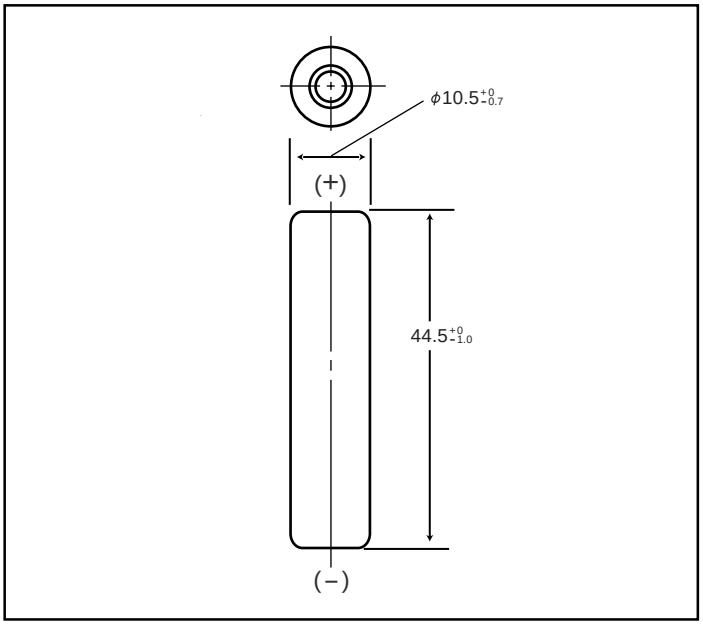
HHR60AAAH Cylindrical AAA size (HR 11/45)

Dimensions (with Tube) (mm)



Specifications

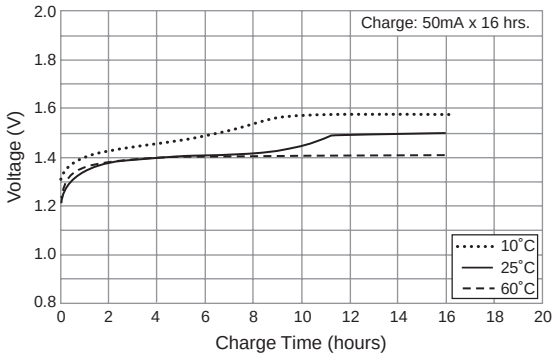
	mm	inch
Diameter	10.5 +0/-0.7	0.41 +0/-0.03
Height	44.5 +0/-1.0	1.75 +0/-0.04
Approximate Weight	**Grams**	**Ounces**
	13	0.46

Nominal Voltage			1.2V	
Discharge Capacity[1]		**Average**[2]	550 mAh	
		Rated (Min.)	500 mAh	
Approx. Internal impedance at 1000Hz at charged state.			35mΩ	
Charge		**Standard**	50mA x 16hrs.	
		Rapid[3]	250mA x 2.4 hrs.[4]	
		Low Rate	25mA x 32 hrs. 17mA x 48 hrs.	
Ambient Temperature			**°C**	**°F**
	Charge	**Standard**	-10°C to 60°C	14°F to 140°F
		Rapid	-10°C to 45°C	14°F to 113°F
	Discharge		-10°C to 60°C	14°F to 140°F
	Storage	**< 1 year**	-20°C to 35°C	-4°F to 95°F
		< 6 months	-20°C to 45°C	-4°F to 113°F
		< 1 month	-20°C to 55°C	-4°F to 131°F
		< 1 week	-20°C to 65°C	-4°F to 149°F

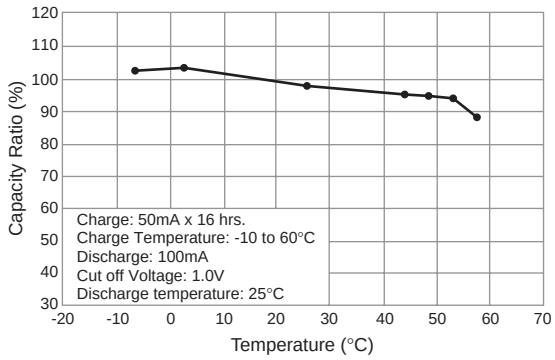
1 After charging at 0.1It for 16 hours, discharging at 0.2It.
2 For reference only.
3 Need specially designed control system
Control System:
dT/dt cut-off; 1 to 2°C/min
-△V cut-off; -△V per cell = 5 to 10 mV
T-control; T=65°C
Rapid charger timer; 2.4h (at 1.25a)
Trickle timer; within 2h
4 With control system

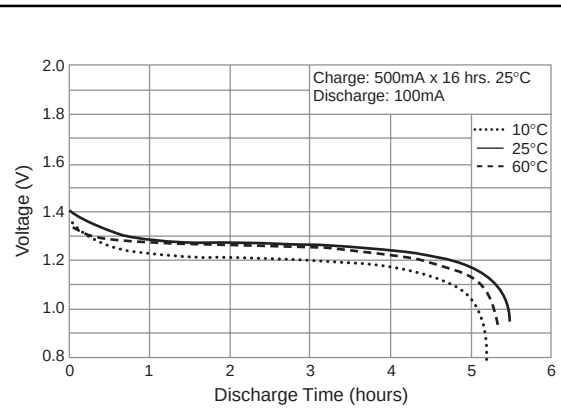
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

Typical Charge Characteristics



Typical Discharge Characteristics





Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h
* [It] is the reference test current in ampres
* [Cn] is the rated capacity of the cell or battery in Ampere-hours.
n = the time base [hours] for which the rated capacity is declared

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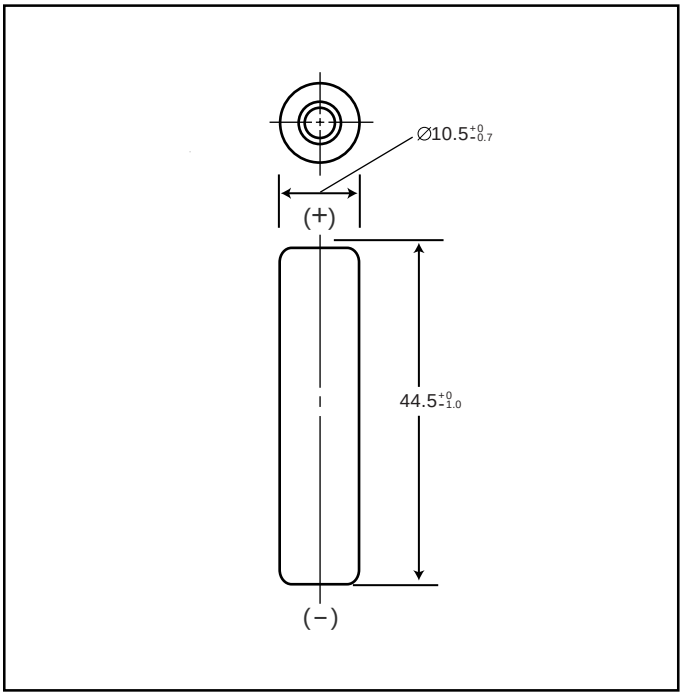
HHR70AAAJ Cylindrical HR AAA size (HR 11/45)

Dimensions (with Tube) (mm)



Specifications

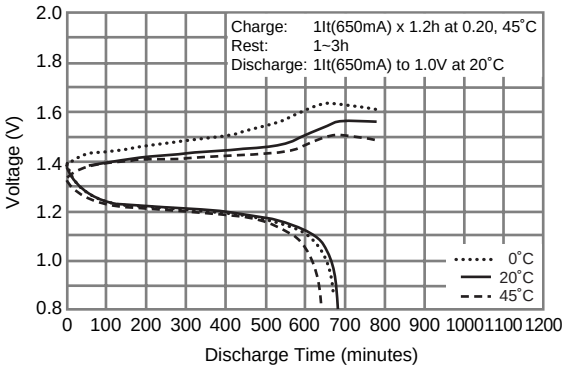
	mm	inch
Diameter	10.5+0/-0.7	0.41+0/-0.03
Height	44.5+0/-1.0	1.75+0/-0.04
Approximate Weight	Grams	Ounces
	13	0.46

Nominal Voltage			1.2V	
Discharge Capacity*		Average**	720 mAh	
		Rated (Min.)	700 mAh	
Approx. Internal impedance at 1000Hz at charged state.			30mΩ	
Charge		Standard	70mA (0.1It) x 16hrs.	
		Rapid	650mA (1It) x 1.2 hrs.	
Ambient Temperature	Charge	Standard	°C	°F
			0°C to 45°C	32°F to 113°F
		Rapid	0°C to 40°C	32°F to 104°F
	Discharge		-10°C to 65°C	14°F to 149°F
	Storage	< 1 year	-20°C to 35°C	-4°F to 95°F
		< 3 months	-20°C to 45°C	-4°F to 113°F
		< 1 month	-20°C to 55°C	-4°F to 131°F

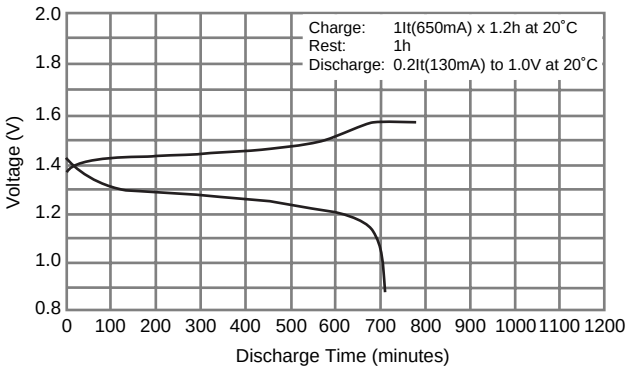
* After charging at 0.1It for 16 hours, discharging at 0.2It.
** For reference only.
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

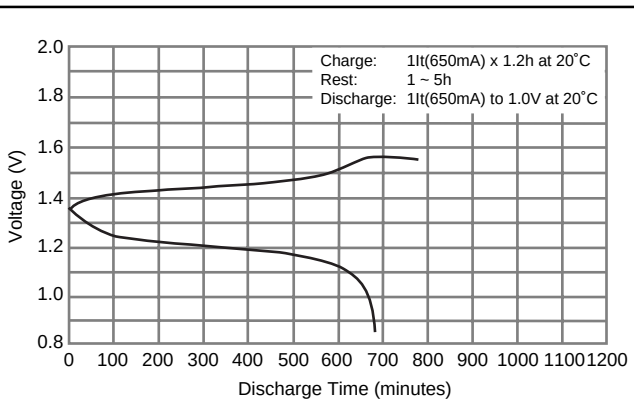
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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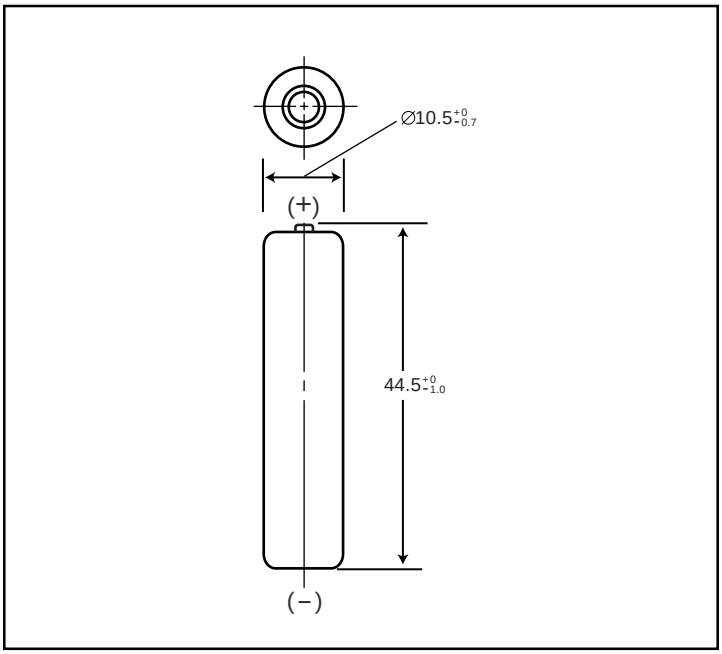
HHR75AAA/B Cylindrical AAA size (HR 11/45)

Dimensions (with Tube) (mm)



Specifications

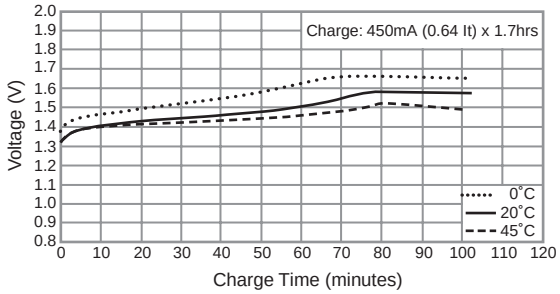
	mm	inch
Diameter	10.5+0/-0.7	0.41+0/-0.03
Height	44.5+0/-1.0	1.75+0/-0.04
Approximate Weight	Grams	Ounces
	12	0.42

Nominal Voltage			1.2V	
Discharge Capacity*		Average**	730 mAh	
		Rated (Min.)	700 mAh	
Approx. Internal impedance at 1000Hz at charged state.			35mΩ	
Charge		Standard	70mA x 16hrs.	
		Rapid	450mA x 1.7 hrs.	
Ambient Temperature	Charge	Standard	°C	°F
			0˚C to 45˚C	32˚F to 113˚F
		Rapid	0˚C to 40˚C	32˚F to 104˚F
	Discharge		-10˚C to 65˚C	14˚F to 149˚F
	Storage	< 1 year	-20˚C to 35˚C	-4˚F to 95˚F
		< 3 months	-20˚C to 45˚C	-4˚F to 113˚F
		< 1 month	-20˚C to 55˚C	-4˚F to 131˚F

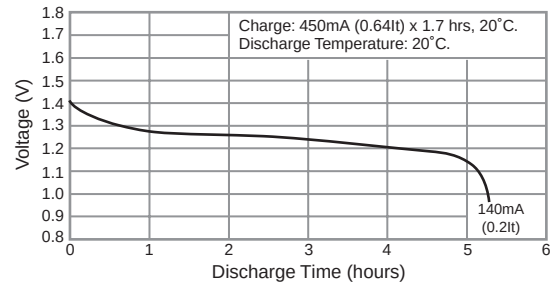
* After charging at 0.1It for 16 hours, discharging at 0.2It.
** For reference only.
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

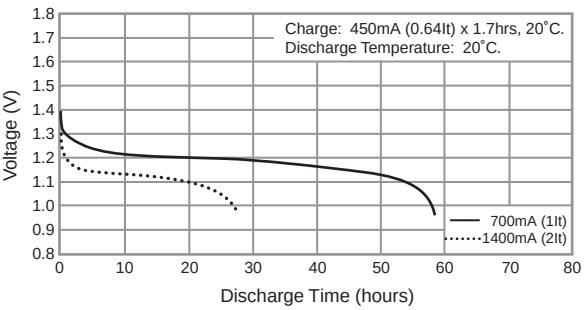
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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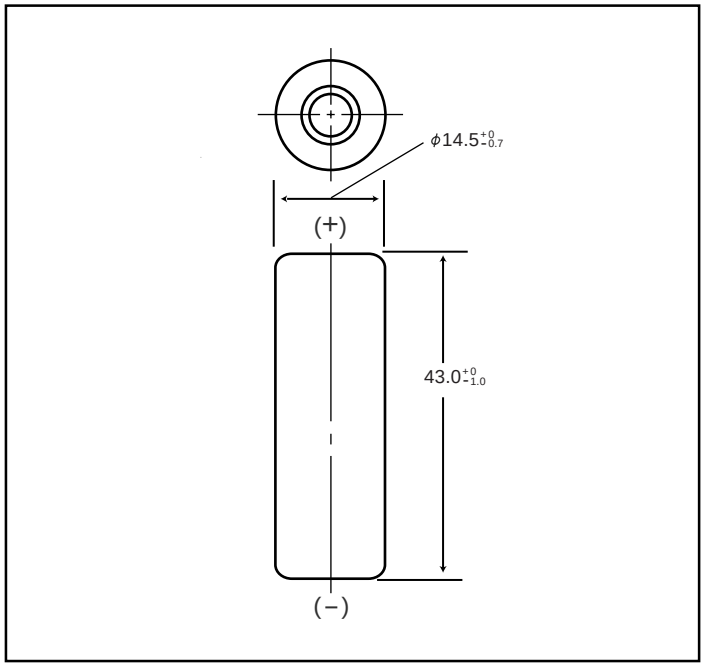
HHR120AA Cylindrical 4/5AA size (HR 15/43)

Dimensions (with Tube) (mm)



Specifications

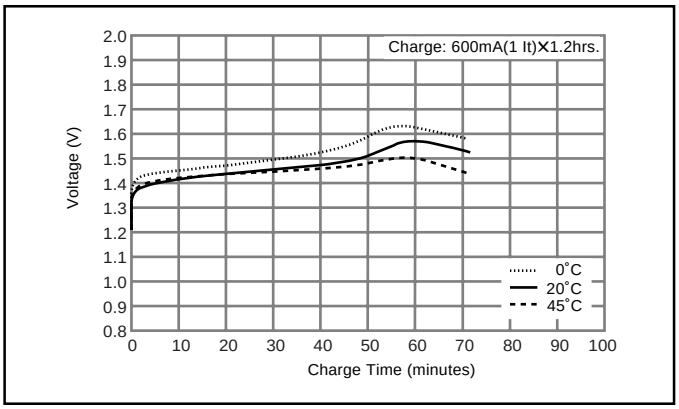
	mm	inch
Diameter	14.5+0/-0.7	0.57+0/-0.03
Height	43.0+0/-1.0	1.69+0/-0.04
Approximate Weight	Grams	Ounces
	23	0.81

Nominal Voltage			1.2V	
Discharge Capacity*		Average**	1220 mAh	
		Rated (Min.)	1150 mAh	
Approx. Internal impedance at 1000Hz at charged state.			19mΩ	
Charge		Standard	120mA (0.1It) x 16hrs.	
		Rapid	1200mA (1It) x 1.2 hrs.	
Ambient Temperature	Charge	Standard	°C	°F
			0˚C to 45˚C	32˚F to 113˚F
		Rapid	0˚C to 40˚C	32˚F to 104˚F
	Discharge		-10˚C to 65˚C	14˚F to 149˚F
	Storage	< 1 year	-20˚C to 35˚C	-4˚F to 95˚F
		< 3 months	-20˚C to 45˚C	-4˚F to 113˚F
		< 1 month	-20˚C to 55˚C	-4˚F to 131˚F

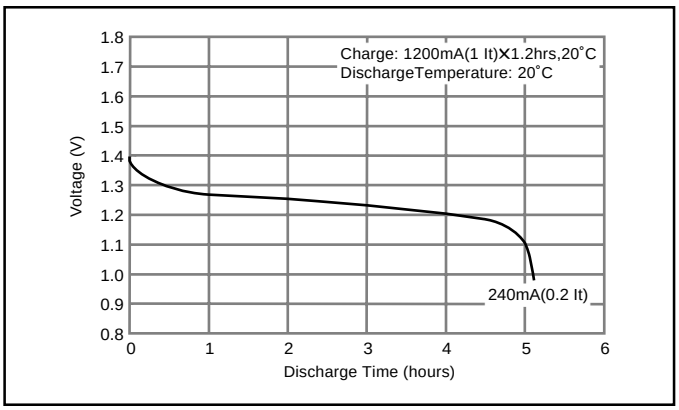
* After charging at 0.1It for 16 hours, discharging at 0.2It.
** For reference only.
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

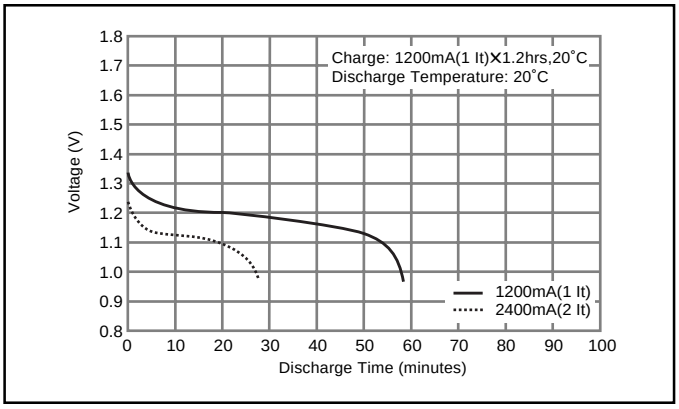
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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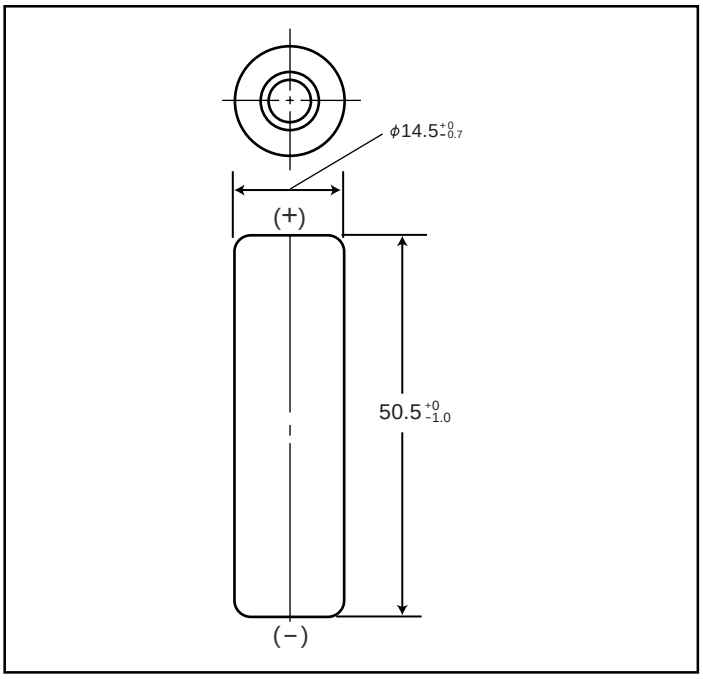
HHR150AA Cylindrical AA size (HR 15/51)

Dimensions (with Tube) (mm)



Specifications

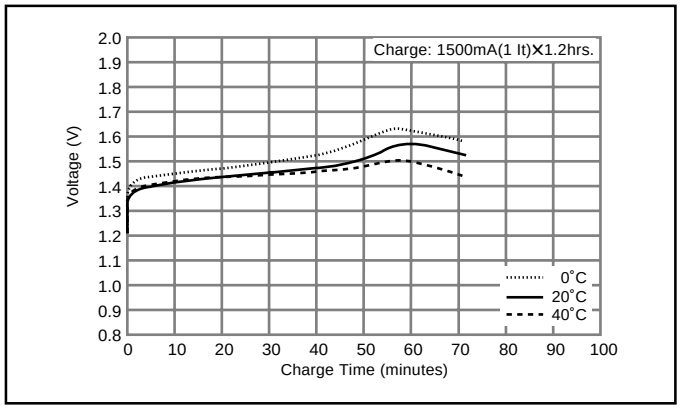
	mm	inch
Diameter	14.5+0/-0.7	0.57+0/-0.03
Height	50.0+0/-1.0	1.97+0/-0.06
Approximate Weight	**Grams**	**Ounces**
	26	0.92

Nominal Voltage			1.2V	
Discharge Capacity*		**Average****	1580 mAh	
		Rated (Min.)	1500 mAh	
Approx. Internal impedance at 1000Hz at charged state.			20mΩ	
Charge		**Standard**	150mA (0.1It) x 16hrs.	
		Rapid	1500mA (1It) x 1.2 hrs.	
Ambient Temperature			**°C**	**°F**
	Charge	**Standard**	0°C to 45°C	32°F to 113°F
		Rapid	0°C to 40°C	32°F to 104°F
	Discharge		-10°C to 65°C	14°F to 149°F
	Storage	**< 1 year**	-20°C to 35°C	-4°F to 95°F
		< 3 months	-20°C to 45°C	-4°F to 113°F
		< 1 month	-20°C to 55°C	-4°F to 131°F

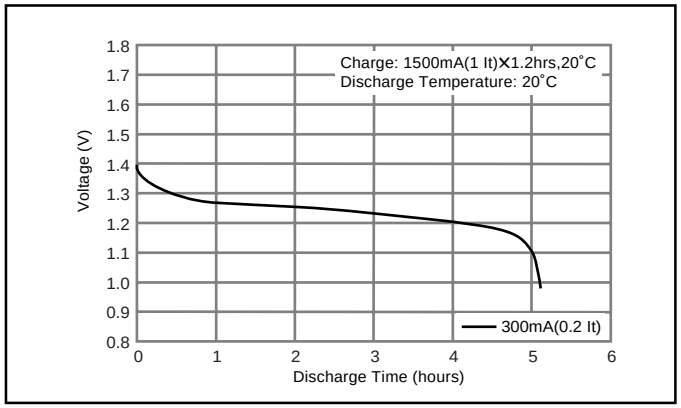
* After charging at 0.1It for 16 hours, discharging at 0.2It.
** For reference only.
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

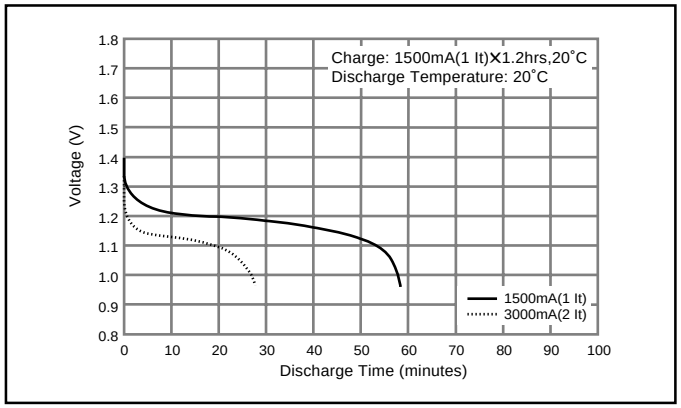
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours.
  n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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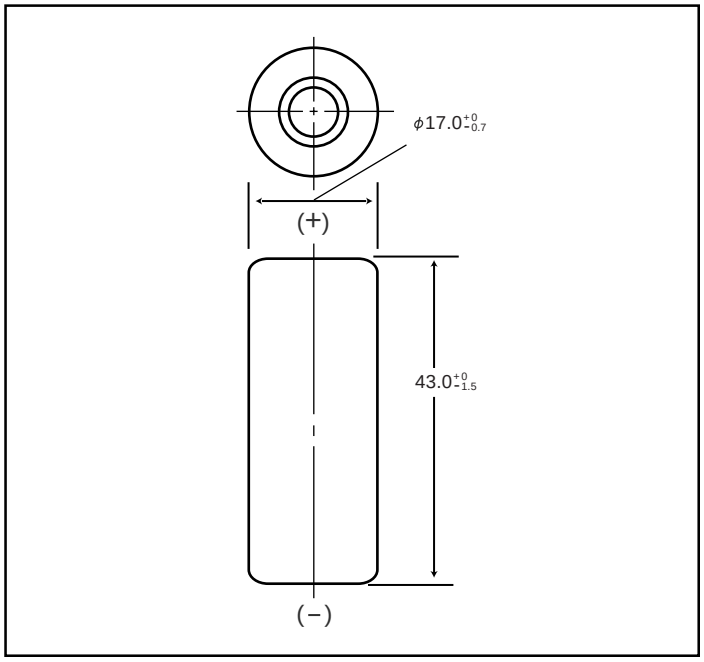
HHR200A Cylindrical 4/5A size (HR 17/43)

Dimensions (with Tube) (mm)



Specifications

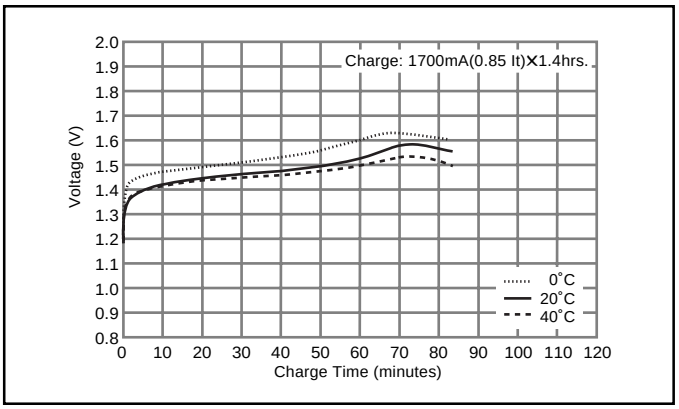
	mm	inch
Diameter	17.0+0/-0.7	0.67+0/-0.03
Height	43.0+0/-1.5	1.69+0/-0.06
Approximate Weight	Grams	Ounces
	32	1.13

Nominal Voltage			1.2V	
Discharge Capacity*		Average**	2040 mAh	
		Rated (Min.)	2000 mAh	
Approx. Internal impedance at 1000Hz at charged state.			20mΩ	
Charge		Standard	200mA (0.1It) x 16hrs.	
		Rapid	2000mA (1It) x 1.2 hrs.	
Ambient Temperature	Charge	Standard	°C	°F
			0°C to 45°C	32°F to 113°F
		Rapid	0°C to 40°C	32°F to 104°F
	Discharge		-10°C to 65°C	14°F to 149°F
	Storage	< 1 year	-20°C to 35°C	-4°F to 95°F
		< 3 months	-20°C to 45°C	-4°F to 113°F
		< 1 month	-20°C to 55°C	-4°F to 131°F

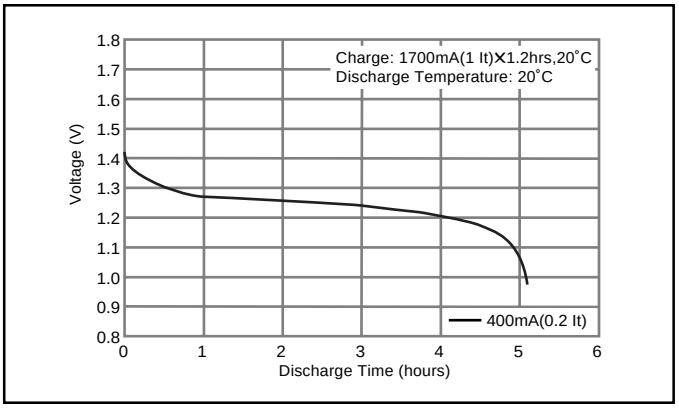
* After charging at 0.1It for 16 hours, discharging at 0.2It.
** For reference only.
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

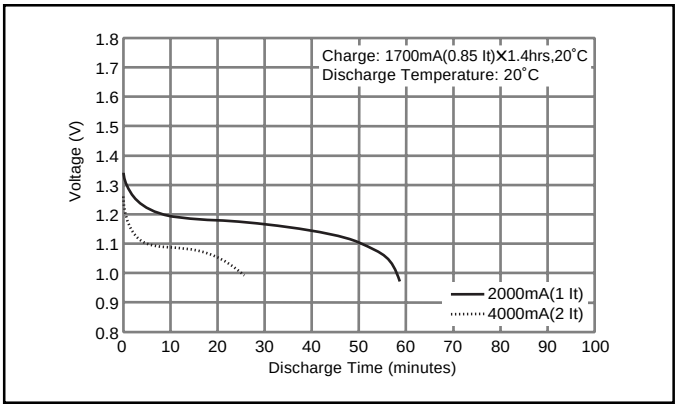
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours.
  n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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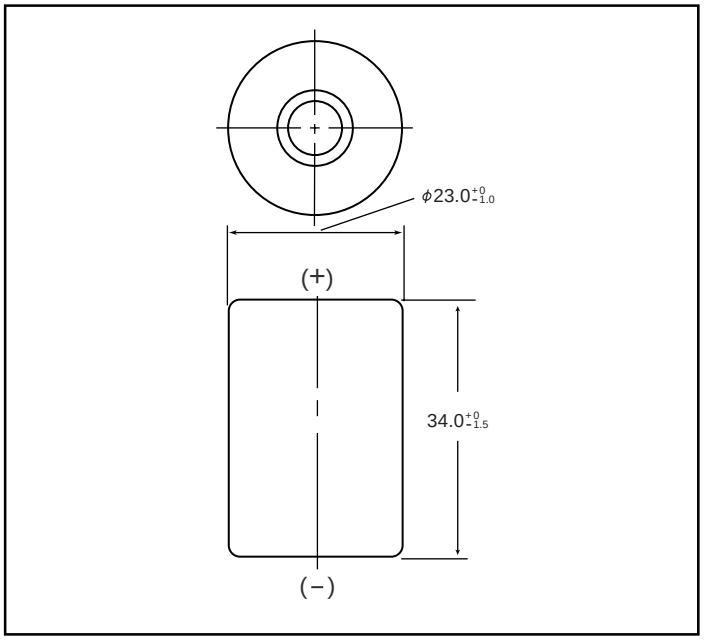
HHR200SCP Cylindrical 4/5SC size (HR 23/34)

Dimensions (with Tube) (mm)



Specifications

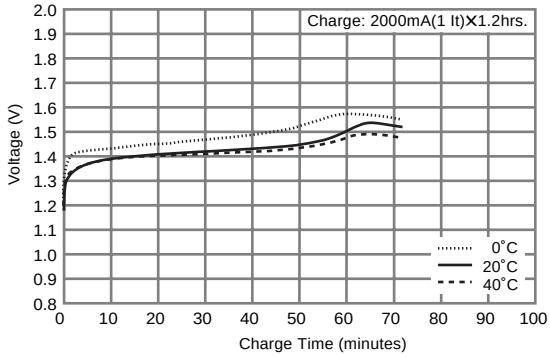
	mm	inch
Diameter	23.0+0/-0.1	0.91+0/-0.04
Height	34.0+0/-1.5	1.34+0/-0.06
Approximate Weight	Grams	Ounces
	42	1.48

Nominal Voltage			1.2V	
Discharge Capacity*		Average**	2100 mAh	
		Rated (Min.)	1900 mAh	
Approx. Internal impedance at 1000Hz at charged state.			5mΩ	
Charge		Standard	200mA (0.1It) x 16hrs.	
		Rapid	2000mA (1It) x 1.2 hrs.	
Ambient Temperature	Charge	Standard	°C	°F
			0˚C to 45˚C	32˚F to 113˚F
		Rapid	0˚C to 40˚C	32˚F to 104˚F
	Discharge		-10˚C to 65˚C	14˚F to 149˚F
	Storage	< 2 years	-20˚C to 35˚C	-4˚F to 95˚F
		< 6 months	-20˚C to 45˚C	-4˚F to 113˚F

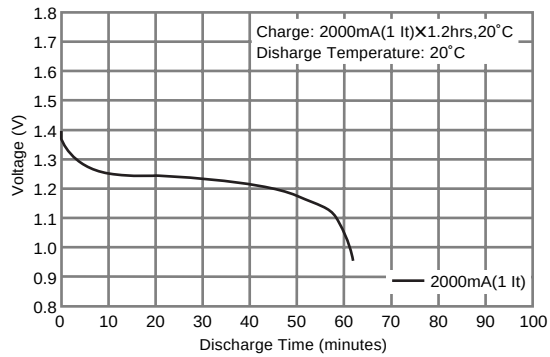
* After charging at 0.1It for 16 hours, discharging at 0.2It.
** For reference only.
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

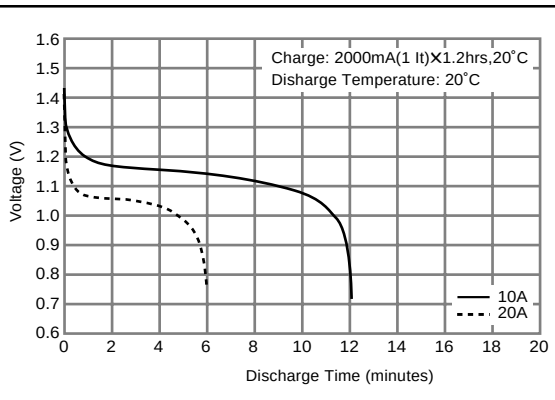
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours.
  n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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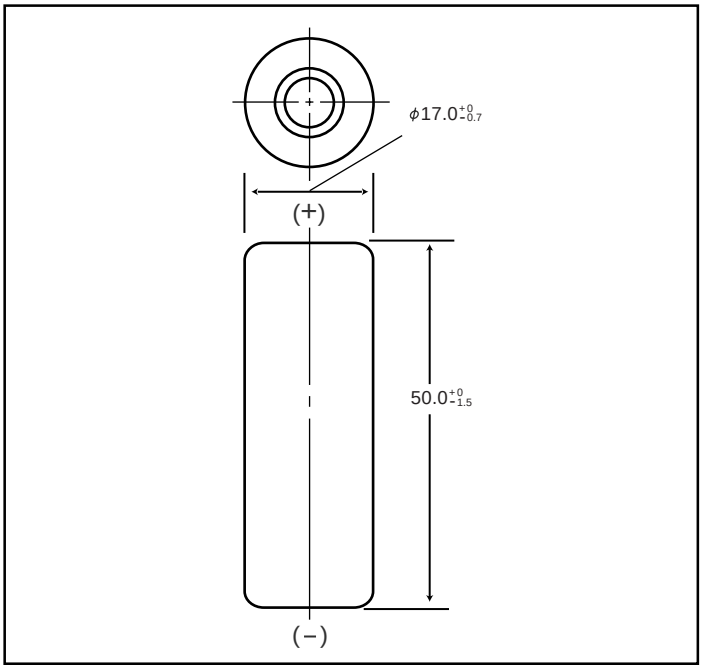
HHR210A Cylindrical A size (HR 17/50)

Dimensions (with Tube) (mm)



Specifications

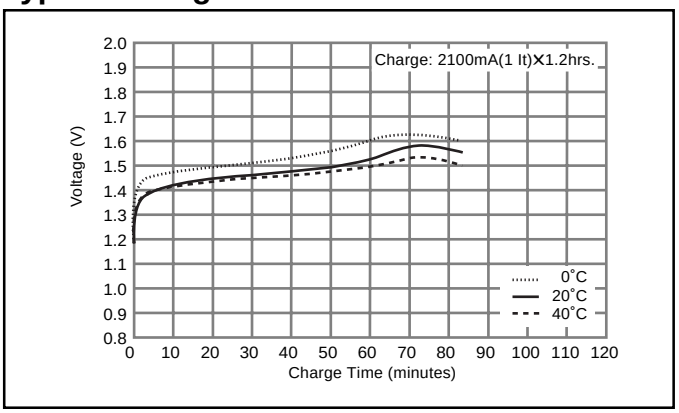
	mm	inch
Diameter	17.0+0/-0.7	0.67+0/-0.03
Height	50.0+0/-1.5	1.97+0/-0.06
Approximate Weight	Grams	Ounces
	38	1.34

Nominal Voltage			1.2V	
Discharge Capacity*		Average**	2200 mAh	
		Rated (Min.)	2100 mAh	
Approx. Internal impedance at 1000Hz at charged state.			20mΩ	
Charge		Standard	210mA (0.1It) x 16hrs.	
		Rapid	2100mA (1It) x 1.2 hrs.	
Ambient Temperature	Charge	Standard	°C	°F
			0˚C to 45˚C	32˚F to 113˚F
		Rapid	0˚C to 40˚C	32˚F to 104˚F
	Discharge		-10˚C to 65˚C	14˚F to 149˚F
	Storage	< 1 year	-20˚C to 35˚C	-4˚F to 95˚F
		< 3 months	-20˚C to 45˚C	-4˚F to 113˚F
		< 1 month	-20˚C to 55˚C	-4˚F to 131˚F

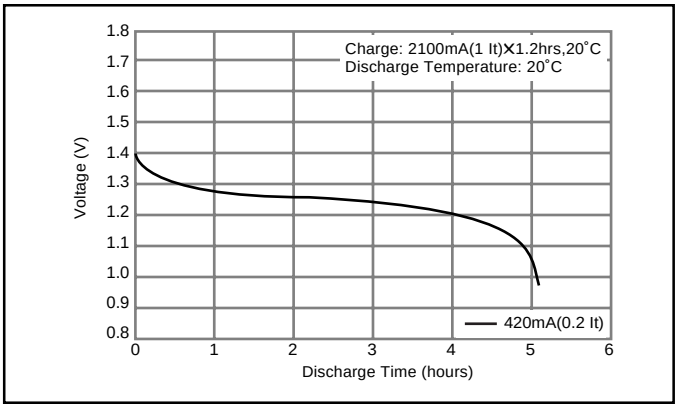
* After charging at 0.1It for 16 hours, discharging at 0.2It.
** For reference only.
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

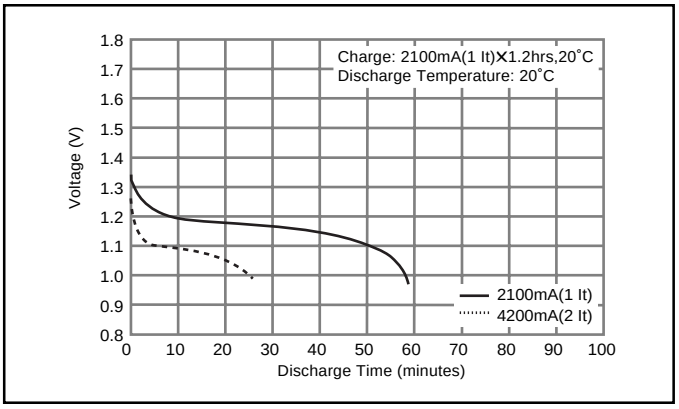
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours.
  n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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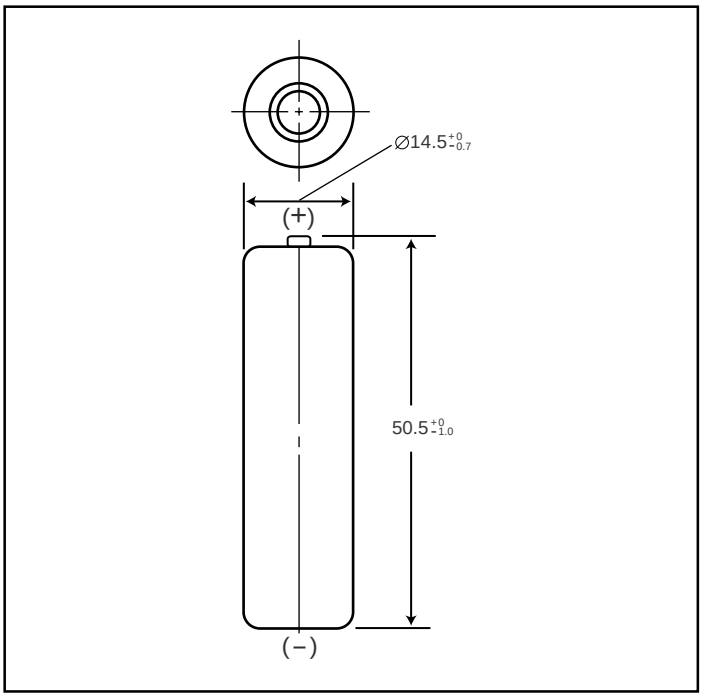
HHR210AA/B Cylindrical AA size (HR 15/51)

Dimensions (with Tube) (mm)



Specifications

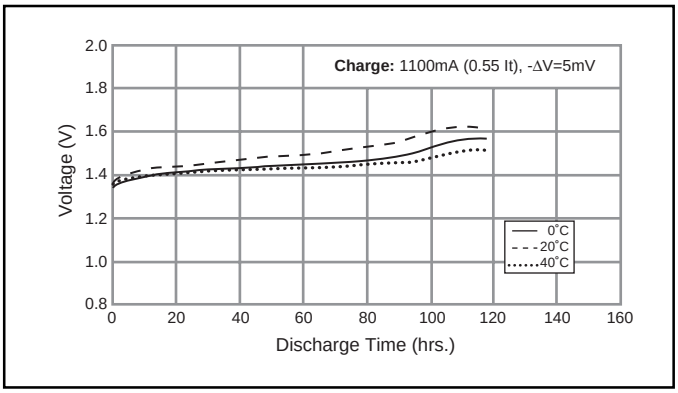
	mm	inch
Diameter	14.5 +0/-0.7	0.57 +0/-0.3
Height	50.5 +0/-1.0	1.99 +0/-0.5
Approximate Weight	Grams	Ounces
	29	1.02

Nominal Voltage			1.2V	
Discharge Capacity*		Average**	2080mAh	
		Rated (Min.)	2000mAh	
Approx. internal Impedance at 1000Hz at charged state.			25mΩ	
Charge		Standard	200mA (0.1It) x 16 hrs.	
		Rapid	1200mA (1It) x 2 hrs.	
Ambient Temperature	Charge	Standard	°C	°F
			0°C to 45°C	32°F to 113°F
		Rapid	0°C to 40°C	32°F to 113°F
	Discharge		-10°C to 65°C	14°F to 149°F
	Storage	< 1 year	-20°C to 35°C	-4°F to 95°F
		< 3 months	-20°C to 45°C	-4°F to 113°F
		< 1 month	-20°C to 55°C	-4°F to 131°F

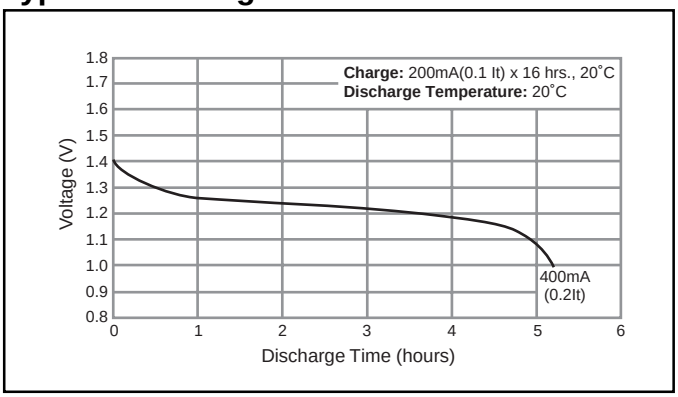
* After charging at 0.1It for 16 hours, discharging at 0.2It.
** For reference only.
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

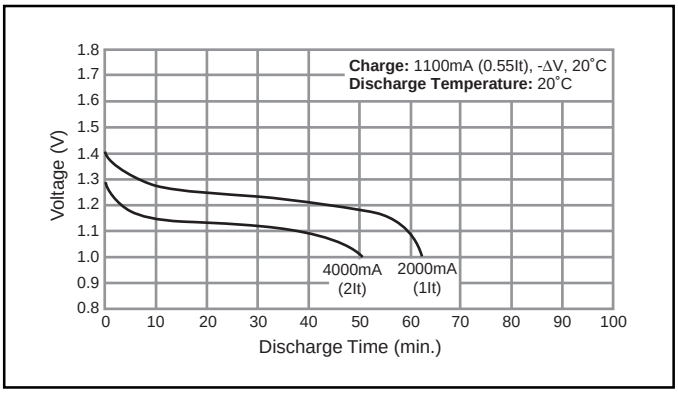
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h
* [It] is the reference test current in ampres
* [Cn] is the rated capacity of the cell or battery in Ampere-hours.
n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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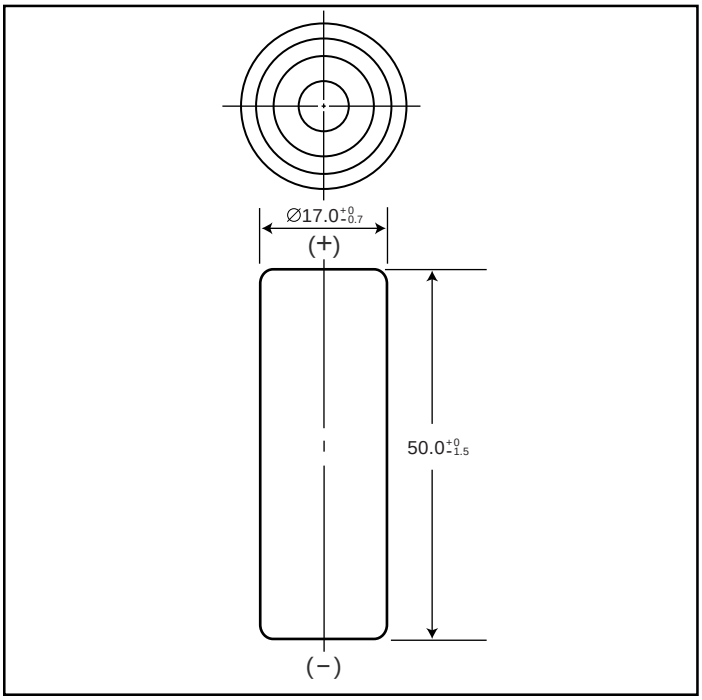
HHR210AH Cylindrical A size (HR 17/50)

Dimensions (with Tube) (mm)



Specifications

	mm	inch
Diameter	17.0+0/-0.7	0.67+0/-0.03
Height	50.0+0/-1.5	1.97+0/-0.06
Approximate Weight	**Grams**	**Ounces**
	38	1.34

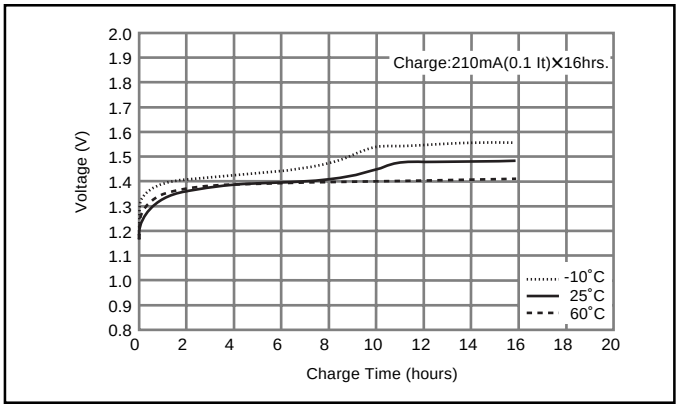
Nominal Voltage			1.2V	
Discharge Capacity[1]		**Average**[2]	2050mAh	
		Rated (Min.)	1900mAh	
Approx. internal Impedance at 1000Hz at charged state.			20mΩ	
Charge		**Standard**	210mA (0.1It) x 16 hrs.	
		Rapid	-	
Ambient Temperature	**Charge**	**Standard**	**˚C**	**˚F**
			-10˚C to 60˚C	14˚F to 140˚F
		Rapid	-	-
	Discharge		-10˚C to 60˚C	14˚F to 140˚F
	Storage	**< 1 year**	-20˚C to 35˚C	-4˚F to 95˚F
		< 3 months	-20˚C to 45˚C	-4˚F to 113˚F
		< 1 month	-20˚C to 55˚C	-4˚F to 131˚F
		< 1 week	-20˚C to 60˚C	-4˚F to 140˚F

[1] After charging at 0.1It for 16 hours, discharging at 0.2It.
[2] For reference only.

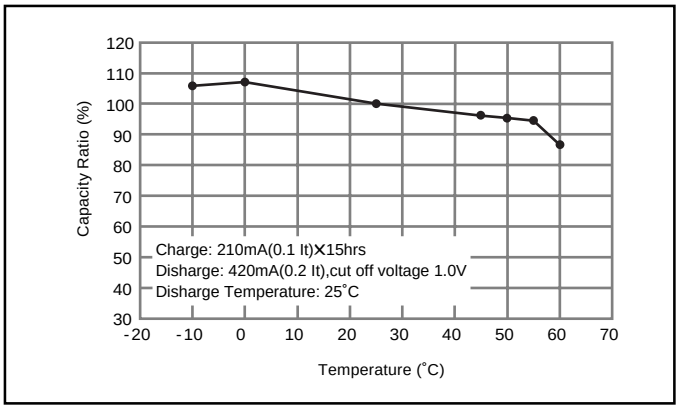
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

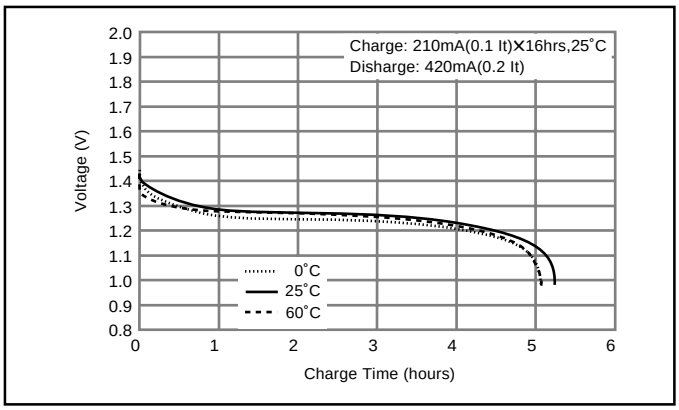
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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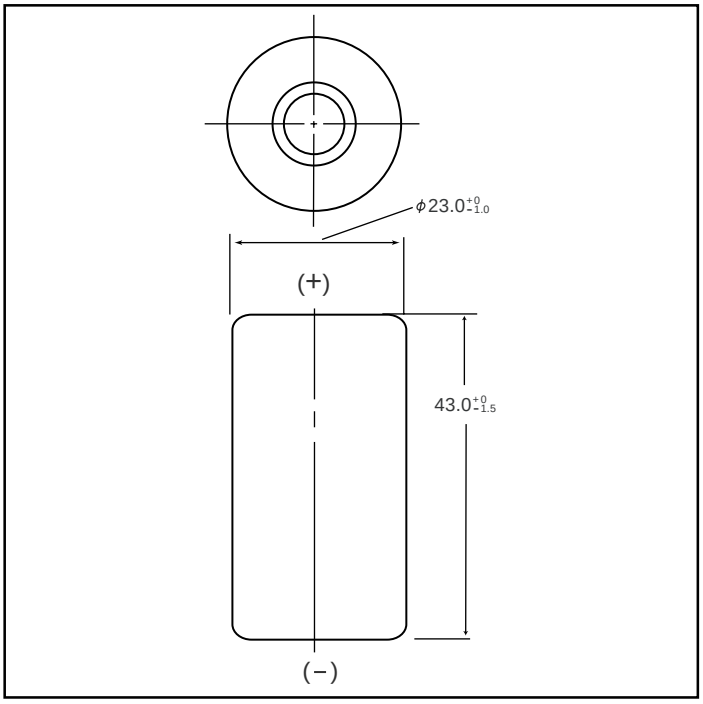
HHR250SCH Cylindrical SC size (HR 23/43)

Dimensions (with Tube) (mm)



Specifications

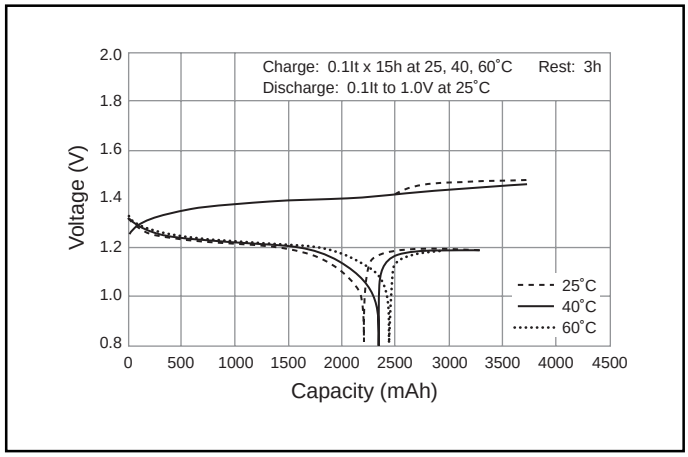
	mm	inch
Diameter	23.0+0/-1.0	0.91+0/-0.04
Height	43.0+0/-1.5	1.69+0/-0.06
Approximate Weight	Grams	Ounces
	55	1.94

Nominal Voltage			1.2V	
Discharge Capacity[1]		Average[2]	2650 mAh	
		Rated (Min.)	2500 mAh	
Approx. Internal impedance at 1000Hz at charged state.			5mΩ	
Charge		Standard	250mA x 16hrs.	
		Rapid[3]	1250mA x 2.4 hrs.[4]	
		Low Rate	125mA x 32 hrs. 83mA x 48 hrs.	
Ambient Temperature	Charge	Standard	°C	°F
			-10˚C to 60˚C	14˚F to 140˚F
		Rapid	-10˚C to 45˚C	14˚F to 113˚F
	Discharge		-10˚C to 60˚C	14˚F to 140˚F
	Storage	< 1 year	-20˚C to 35˚C	-4˚F to 95˚F
		< 6 months	-20˚C to 45˚C	-4˚F to 113˚F
		< 1 month	-20˚C to 55˚C	-4˚F to 131˚F
		< 1 week	-20˚C to 65˚C	-4˚F to 149˚F

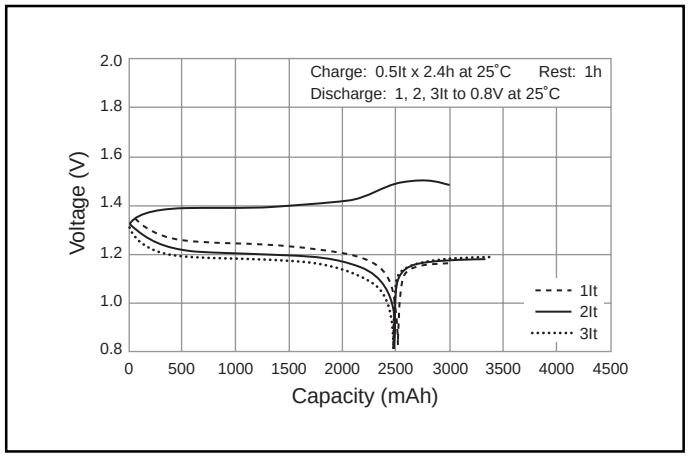
[1] After charging at 0.1It for 16 hours, discharging at 0.2It.
[2] For reference only.
[3] Need specially designed control system
Control System:
dT/dt cut-off; 1 to 2°C/min
-△V cut-off; -△V per cell = 5 to 10 mV
T-control; T=65°C
Rapid charger timer; 2.4h (at 1.25a)
Trickle timer; within 2h
[4] With control system

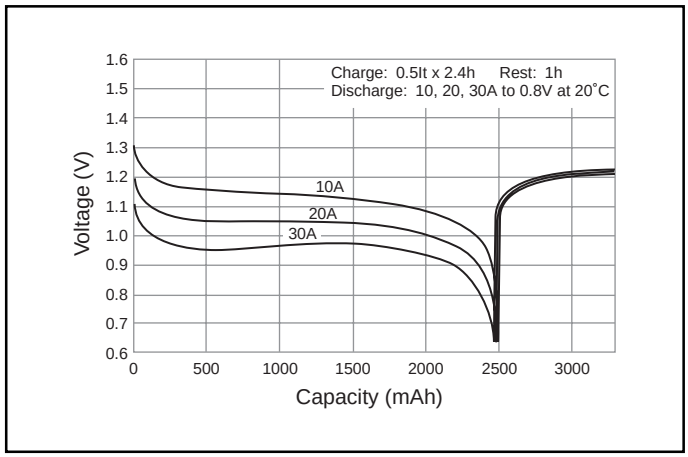
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

Typical Charge Characteristics



Typical Discharge Characteristics





Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h
* [It] is the reference test current in ampres
* [Cn] is the rated capacity of the cell or battery in Ampere-hours.
n = the time base [hours] for which the rated capacity is declared

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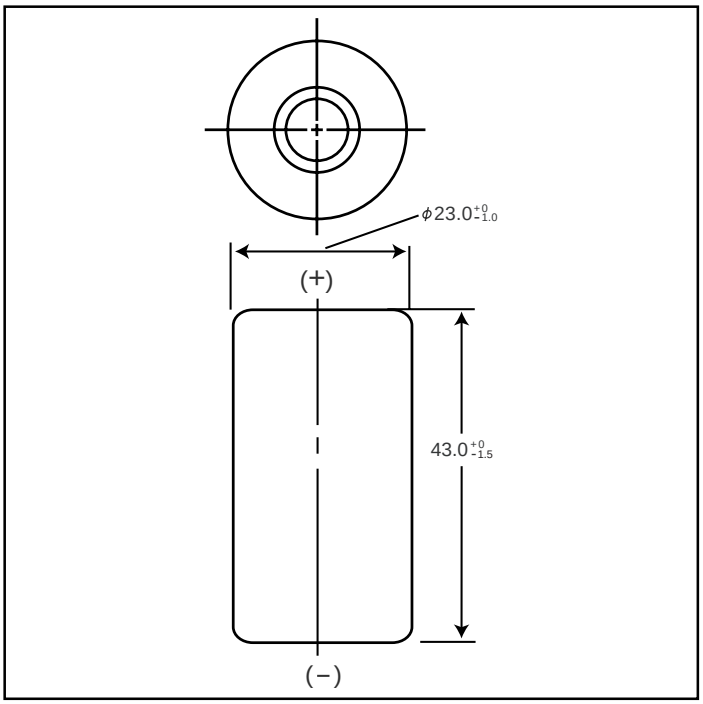
HHR260SCP Cylindrical SC size (HR 23/43)

Dimensions (with Tube) (mm)



Specifications

	mm	inch
Diameter	23.0+0/-1.0	0.91+0/-0.04
Height	43.0+0/-1.5	1.69+0/-0.06
Approximate Weight	**Grams**	**Ounces**
	55	1.94

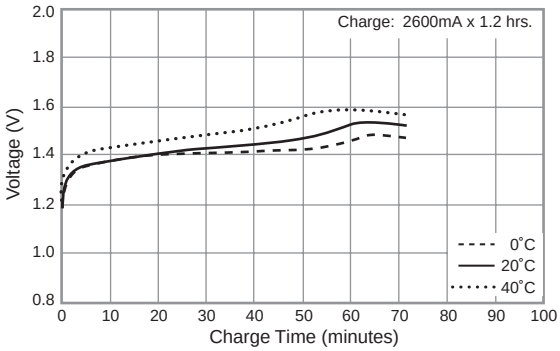
Nominal Voltage			1.2V	
Discharge Capacity[1]		**Average**[2]	2600 mAh	
		Rated (Min.)	2450 mAh	
Approx. Internal impedance at 1000Hz at charged state.			5mΩ	
Charge		**Standard**	260mA x 16hrs.	
		Rapid	2600mA x 1.2 hrs.	
Ambient Temperature	**Charge**	**Standard**	**°C**	**°F**
			0°C to 45°C	32°F to 113°F
		Rapid	10°C to 40°C	50°F to 104°F
	Discharge		-10°C to 65°C	14°F to 149°F
	Storage	**< 1 year**	-20°C to 35°C	-4°F to 95°F
		< 3 months	-20°C to 45°C	-4°F to 113°F
		< 1 month	-20°C to 55°C	-4°F to 131°F

[1] After charging at 0.1It for 16 hours, discharging at 0.2It.
[2] For reference only.

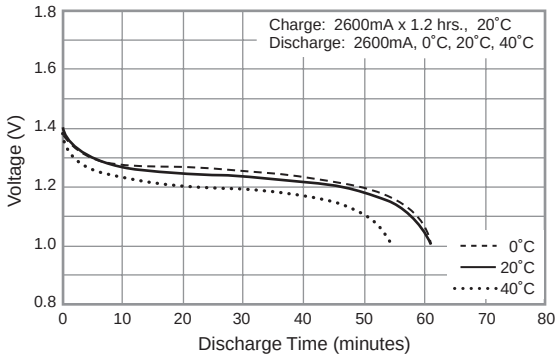
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

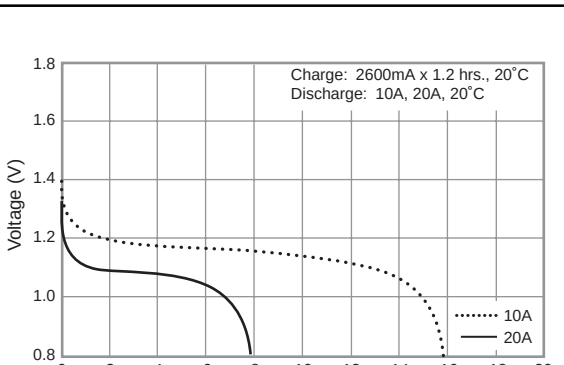
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h
* [It] is the reference test current in ampres
* [Cn] is the rated capacity of the cell or battery in Ampere-hours.
n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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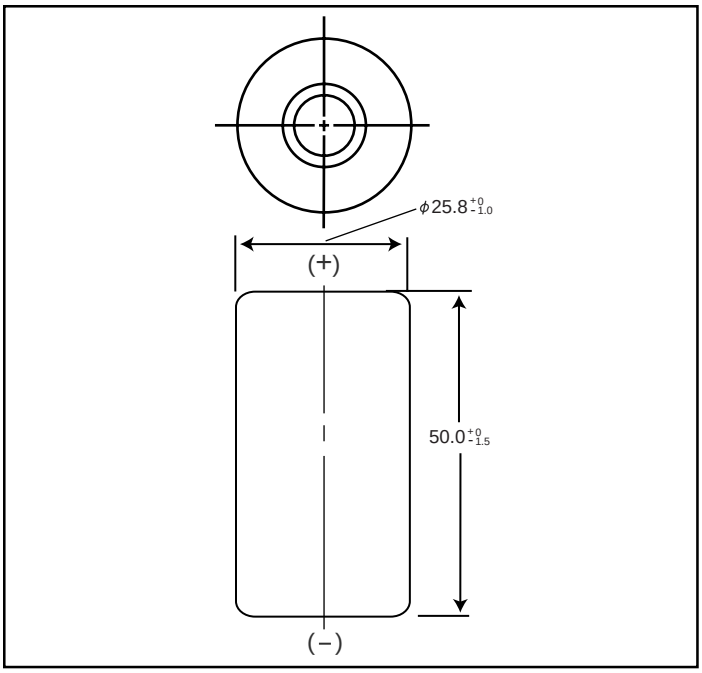
HHR300CH Cylindrical C size (HR 26/50) for backup use

Dimensions (with Tube) (mm)



Specifications

	mm	inch
Diameter	25.8+0/-1.0	1.02+0/-0.04
Height	50.0+0/-1.5	1.97+0/-0.06
Approximate Weight	**Grams**	**Ounces**
	80	2.82

Nominal Voltage			1.2V	
Discharge Capacity[1]		**Average[2]**	3300 mAh	
		Rated (Min.)	3100 mAh	
Approx. Internal impedance at 1000Hz at charged state.			5mΩ	
Charge		**Standard**	300mA (0.1It) x 16hrs.	
		Rapid[3]	1500mA (1It) x 2.4 hrs.[4]	
		Low Rate	155mA x 32 hrs. 100mA x 48 hrs.	
Ambient Temperature			**°C**	**°F**
	Charge	**Standard**	0°C to 45°C	32°F to 113°F
		Rapid	10°C to 40°C	32°F to 104°F
		Low Rate	-10°C to 45°C	14°F to 149°F
	Discharge		-10°C to 65°C	14°F to 113°F
	Storage	**< 1 year**	-20°C to 35°C	-4°F to 95°F
		< 3 months	-20°C to 35°C	-4°F to 95°F
		< 1 month	-20°C to 55°C	-4°F to 131°F

[1] After charging at 0.1It for 16 hours, discharging at 0.2It.

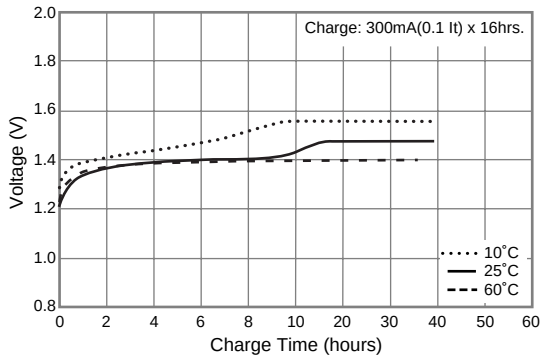
[2] For reference only.

[3] Need specially designed control system
Control System:
dT/dt cut-off; 1 to 2°C/min
-△V cut-off; -△V per cell = 5 to 10 mV
T-control; T=65°C
Rapid charger timer; 2.4h (at 1.25a)
Trickle timer; within 2h

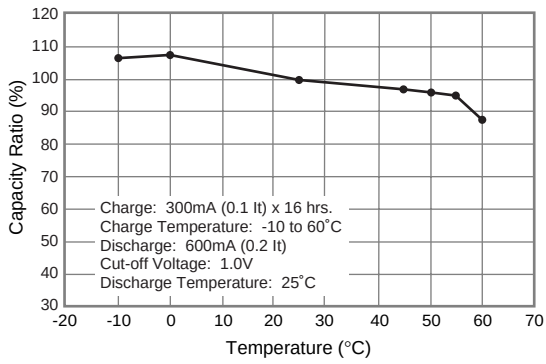
[4] With control system

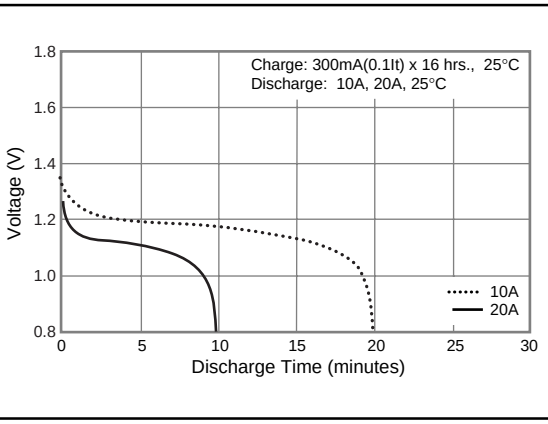
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

Typical Charge Characteristics



Typical Discharge Characteristics





Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

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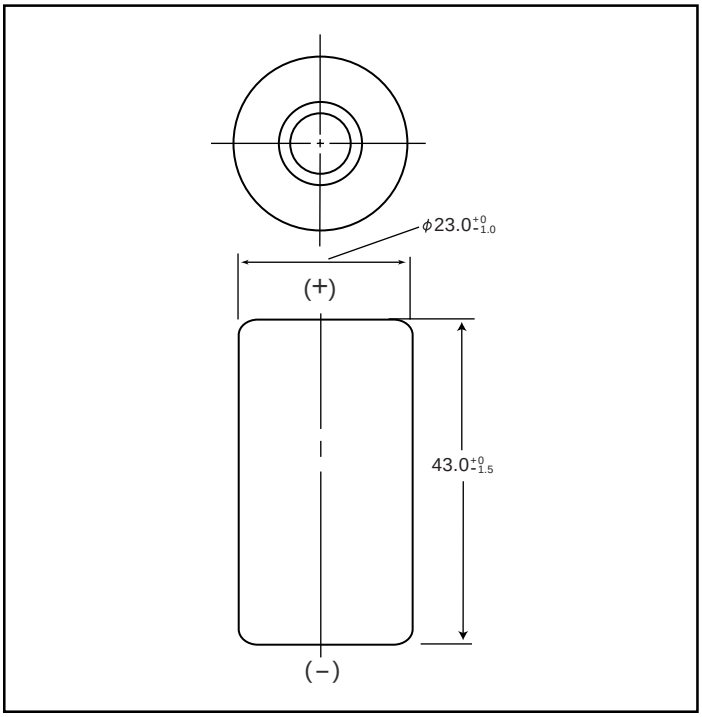
HHR300SCP Cylindrical SC size (HR 23/43)

Dimensions (with Tube) (mm)



Specifications

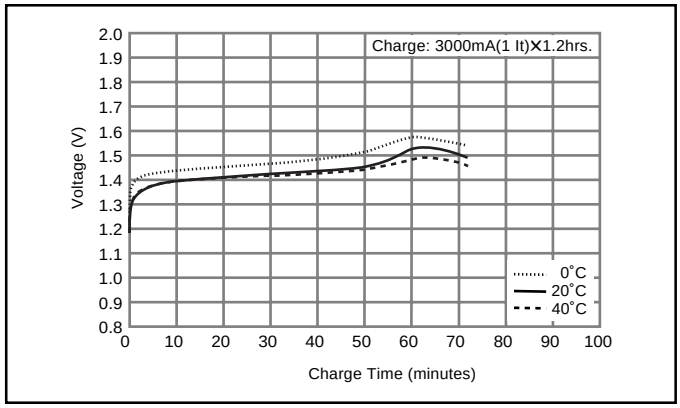
	mm	inch
Diameter	23.0+0/-0.1	0.91+0/-0.04
Height	43.0+0/-1.5	1.69+0/-0.06
Approximate Weight	**Grams**	**Ounces**
	57	2.01

Nominal Voltage			1.2V	
Discharge Capacity*		**Average****	3050 mAh	
		Rated (Min.)	2800 mAh	
Approx. Internal impedance at 1000Hz at charged state.			4mΩ	
Charge		**Standard**	300mA (0.1It) x 16hrs.	
		Rapid	3000mA (1It) x 1.2 hrs.	
Ambient Temperature	**Charge**	**Standard**	**°C**	**°F**
			0˚C to 45˚C	32˚F to 113˚F
		Rapid	0˚C to 40˚C	32˚F to 104˚F
	Discharge		-10˚C to 65˚C	14˚F to 149˚F
	Storage	**< 2 years**	-20˚C to 35˚C	-4˚F to 95˚F
		< 6 months	-20˚C to 45˚C	-4˚F to 113˚F

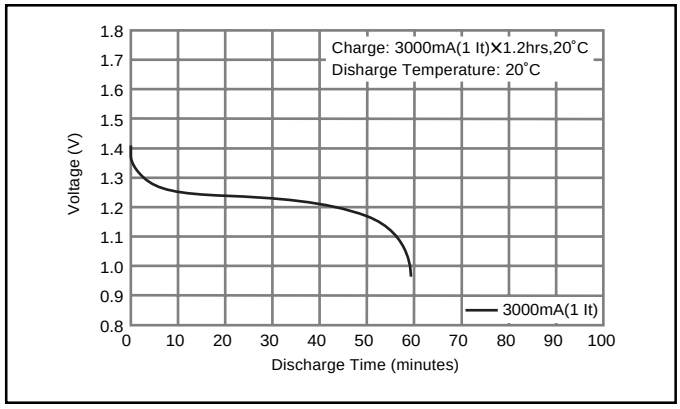
* After charging at 0.1It for 16 hours, discharging at 0.2It.
** For reference only.
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

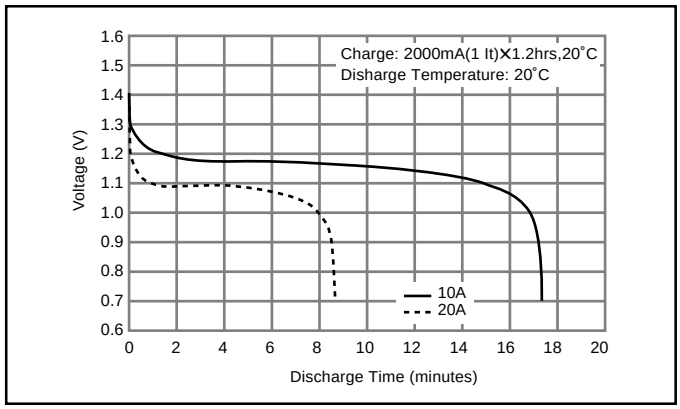
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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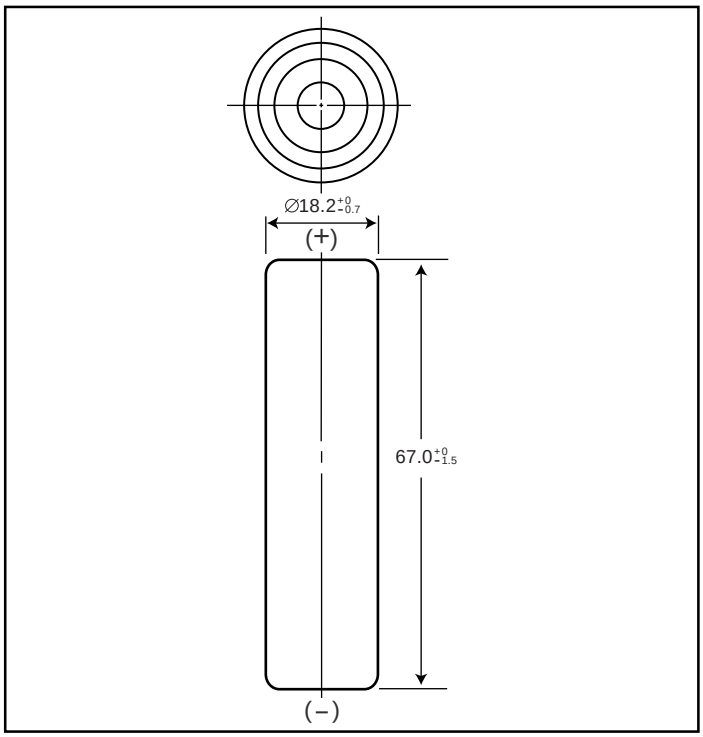
HHR330APH Cylindrical L-Fat A size (HR 18/67)

Dimensions (with Tube) (mm)



Specifications

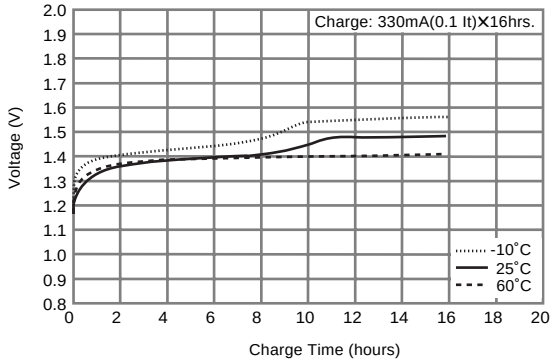
	mm	inch
Diameter	18.2+0/-0.7	0.72+0/-0.03
Height	67.0+0/-1.5	2.64+0/-0.06
Approximate Weight	**Grams**	**Ounces**
	60	2.12

Nominal Voltage			1.2V	
Discharge Capacity[1]		**Average**[2]	3300 mAh	
		Rated (Min.)	3200 mAh	
Approx. Internal impedance at 1000Hz at charged state.			5.5mΩ	
Charge		**Standard**	330mA x 16hrs.	
		Rapid[3]	1650mA x 2.4 hrs.[4]	
		Low Rate	165mA x 32 hrs. 110mA x 48 hrs.	
Ambient Temperature			**°C**	**°F**
	Charge	**Standard**	-10°C to 60°C	14°F to 140°F
		Rapid	-10°C to 45°C	14°F to 113°F
	Discharge		-10°C to 60°C	14°F to 140°F
	Storage	**< 1 year**	-20°C to 35°C	-4°F to 95°F
		< 6 months	-20°C to 45°C	-4°F to 113°F
		< 1 month	-20°C to 55°C	-4°F to 131°F
		< 1 week	-20°C to 65°C	-4°F to 149°F

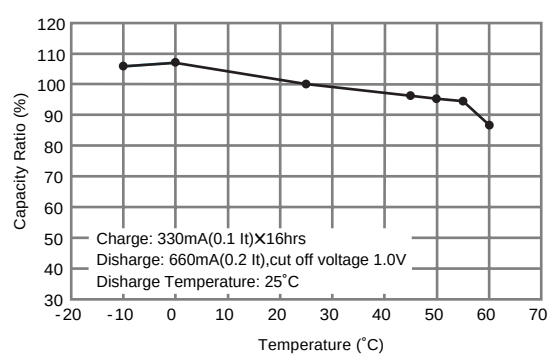
1 After charging at 0.1It for 16 hours, discharging at 0.2It.
2 For reference only.
3 Need specially designed control system
Control System:
dT/dt cut-off; 1 to 2°C/min
-△V cut-off; -△V per cell = 5 to 10 mV
T-control; T=65°C
Rapid charger timer; 2.4h (at 1.25a)
Trickle timer; within 2h
4 With control system

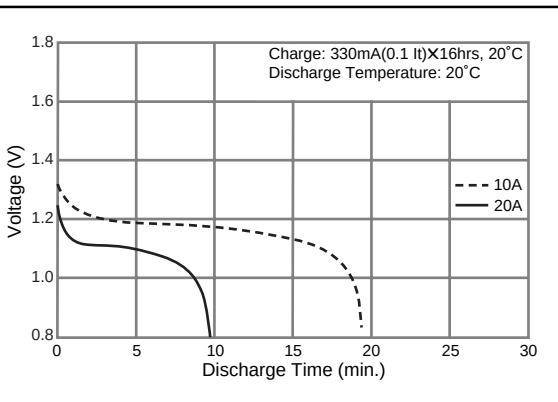
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

Typical Charge Characteristics



Typical Discharge Characteristics





Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

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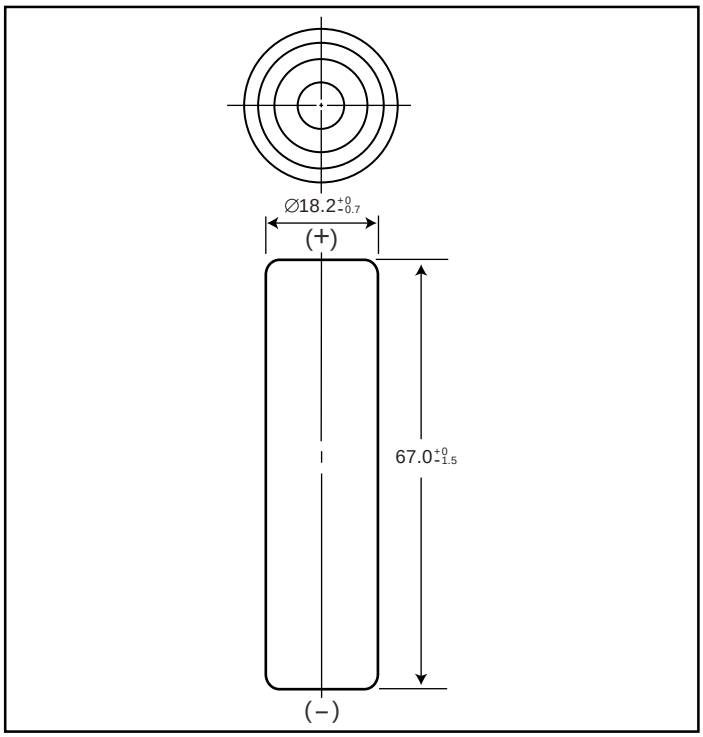
HHR370AH Cylindrical L-Fat A size (HR 18/67)

Dimensions (with Tube) (mm)



Specifications

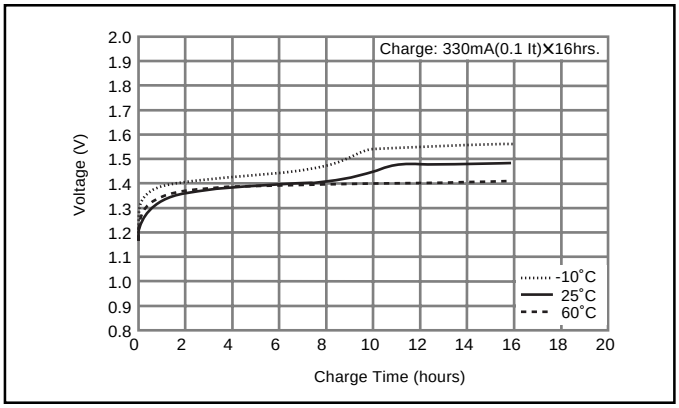
	mm	inch
Diameter	18.2+0/-0.7	0.72+0/-0.03
Height	67.0+0/-1.5	2.64+0/-0.06
Approximate Weight	**Grams**	**Ounces**
	60	2.12

Nominal Voltage			1.2V	
Discharge Capacity[1]		**Average**[2]	3700 mAh	
		Rated (Min.)	3500 mAh	
Approx. Internal impedance at 1000Hz at charged state.			20mΩ	
Charge		**Standard**	370mA x 16hrs.	
		Rapid[3]	1750mA x 2.4 hrs.[4]	
		Low Rate	185mA x 32 hrs. 123mA x 48 hrs.	
Ambient Temperature			**°C**	**°F**
	Charge	**Standard**	-10˚C to 60˚C	14˚F to 140˚F
		Rapid	-10˚C to 45˚C	14˚F to 113˚F
	Discharge		-10˚C to 60˚C	14˚F to 140˚F
	Storage	**< 1 year**	-20˚C to 35˚C	-4˚F to 95˚F
		< 6 months	-20˚C to 45˚C	-4˚F to 113˚F
		< 1 month	-20˚C to 55˚C	-4˚F to 131˚F
		< 1 week	-20˚C to 65˚C	-4˚F to 149˚F

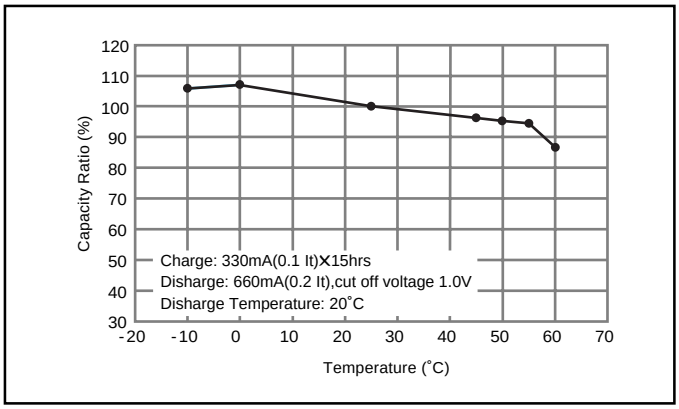
1 After charging at 0.1It for 16 hours, discharging at 0.2It.
2 For reference only.
3 Need specially designed control system
Control System:
dT/dt cut-off; 1 to 2°C/min
-△V cut-off; -△V per cell = 5 to 10 mV
T-control; T=65°C
Rapid charger timer; 2.4h (at 1.25a)
Trickle timer; within 2h
4 With control system

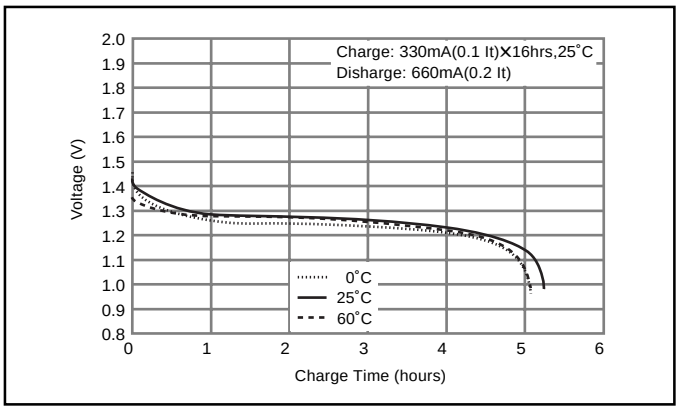
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

Typical Charge Characteristics



Typical Discharge Characteristics





Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

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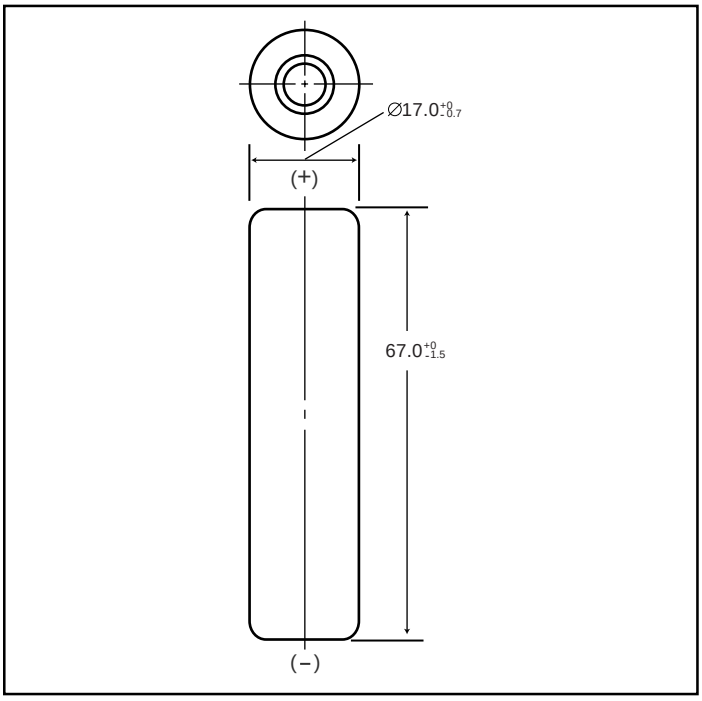
HHR380A Cylindrical L-A size (HR 17/67)

Dimensions (with Tube) (mm)



Specifications

	mm	inch
Diameter	17.0+0/-0.7	0.67+0/-0.03
Height	67.0+0/-1.5	2.64+0/-0.06
Approximate Weight	Grams	Ounces
	53	1.87

Nominal Voltage			1.2V	
Discharge Capacity*		Average**	3800 mAh	
		Rated (Min.)	3700 mAh	
Approx. Internal impedance at 1000Hz at charged state.			25mΩ	
Charge		Standard	370mA (0.1It) x 16hrs.	
		Rapid***	2000mA dT/dt	
Ambient Temperature	Charge	Standard	°C	°F
			0°C to 45°C	32°F to 113°F
		Rapid	0°C to 40°C	32°F to 104°F
	Discharge		-10°C to 65°C	14°F to 149°F
	Storage	< 1 year	-20°C to 35°C	-4°F to 95°F
		< 3 months	-20°C to 45°C	-4°F to 113°F
		< 1 month	-20°C to 55°C	-4°F to 131°F

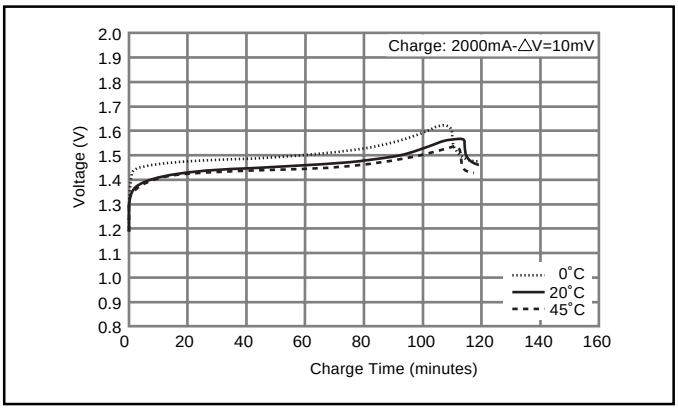
* After charging at 0.1It for 16 hours, discharging at 0.2It.
** For reference only.
*** For rapid charge: use dT/dt charge termination method. Refer to the Nickel Metal Hydride "Charge Methods" section for further details.

Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

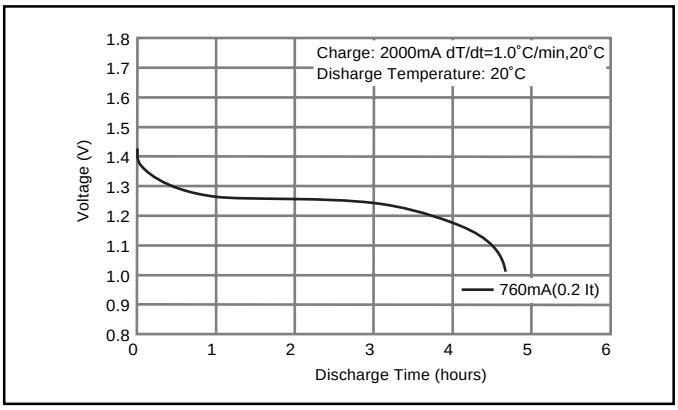
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.

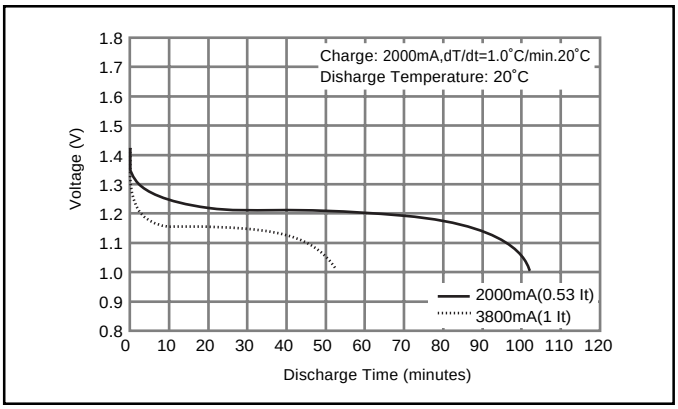
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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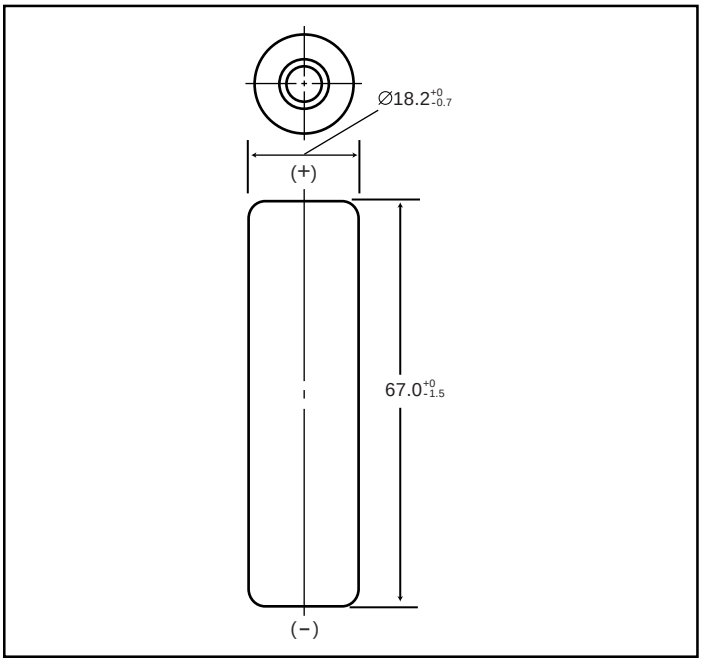
HHR450A Cylindrical L-fat A size (HR 18/67)

Dimensions (with Tube) (mm)



Specifications

	mm	inch
Diameter	18.2+0/-0.7	0.72+0/-0.03
Height	67.0+0/-1.5	2.64+0/-0.06
Approximate Weight	Grams	Ounces
	60	2.12

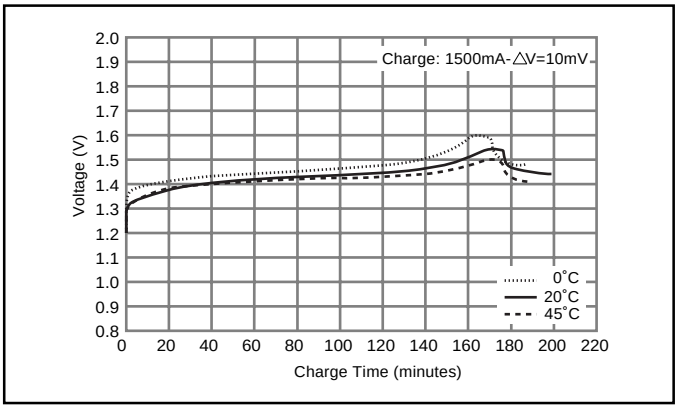
Nominal Voltage			1.2V	
Discharge Capacity*		Average**	4500 mAh	
		Rated (Min.)	4200 mAh	
Approx. Internal impedance at 1000Hz at charged state.			25mΩ	
Charge		Standard	420mA (0.1It) x 16hrs.	
		Rapid***	2000mA dT/dt	
Ambient Temperature	Charge	Standard	°C	°F
			0°C to 45°C	32°F to 113°F
		Rapid	0°C to 40°C	32°F to 104°F
	Discharge		-10°C to 65°C	14°F to 149°F
	Storage	< 1 year	-20°C to 35°C	-4°F to 95°F
		< 3 months	-20°C to 45°C	-4°F to 113°F
		< 1 month	-20°C to 55°C	-4°F to 131°F

* After charging at 0.1It for 16 hours, discharging at 0.2It.
** For reference only.
*** For rapid charge: use dT/dt charge termination method. Refer to the Nickel Metal Hydride "Charge Methods" section for further details.

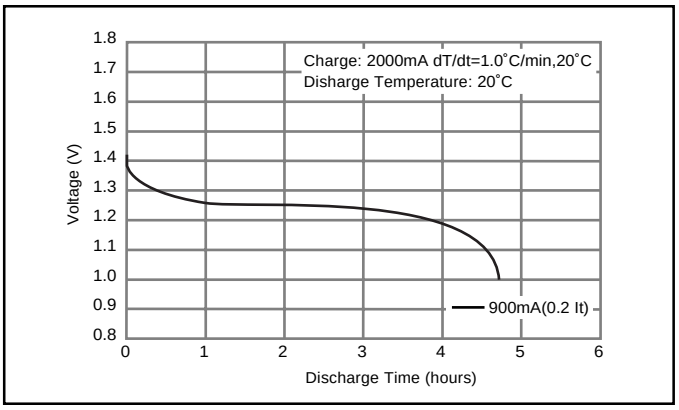
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

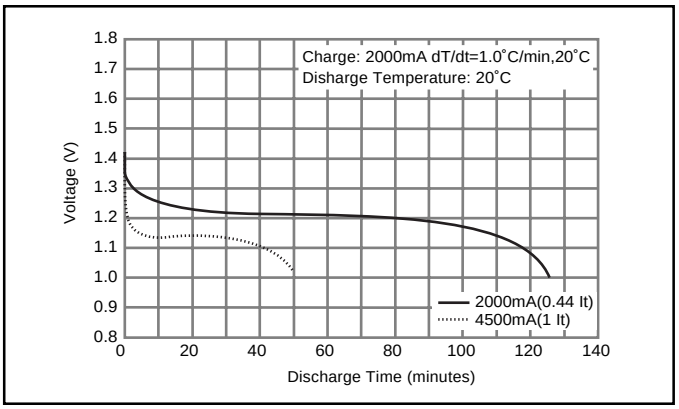
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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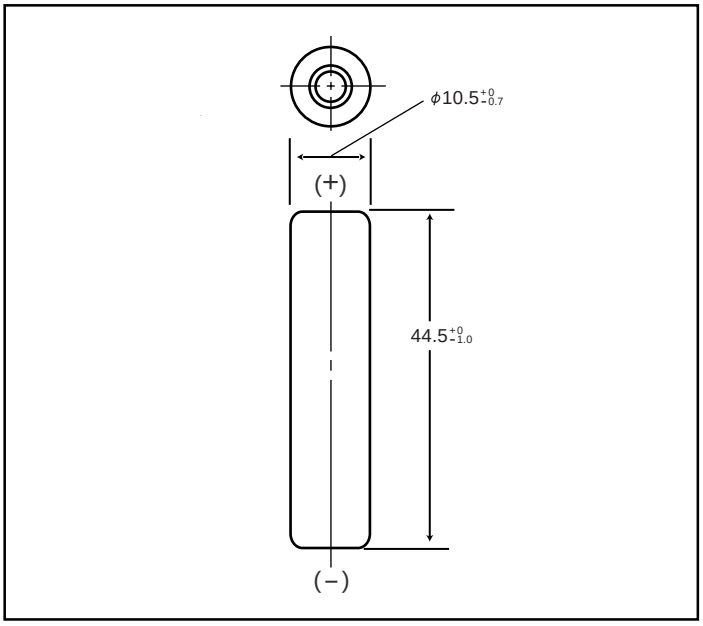
HHR60AAAH Cylindrical AAA size (HR 11/45)

Dimensions (with Tube) (mm)



Specifications

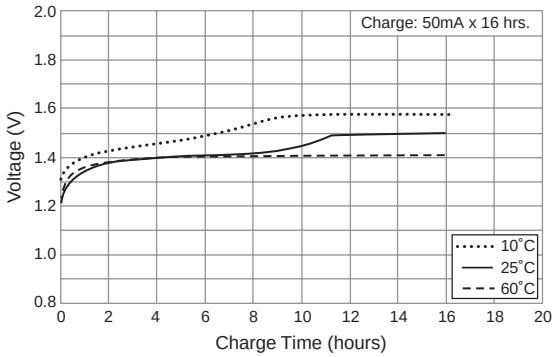
	mm	inch
Diameter	10.5 +0/-0.7	0.41 +0/-0.03
Height	44.5 +0/-1.0	1.75 +0/-0.04
Approximate Weight	**Grams**	**Ounces**
	13	0.46

Nominal Voltage			1.2V	
Discharge Capacity[1]		**Average**[2]	550 mAh	
		Rated (Min.)	500 mAh	
Approx. Internal impedance at 1000Hz at charged state.			35mΩ	
Charge		**Standard**	50mA x 16hrs.	
		Rapid[3]	250mA x 2.4 hrs.[4]	
		Low Rate	25mA x 32 hrs. 17mA x 48 hrs.	
Ambient Temperature			**°C**	**°F**
	Charge	**Standard**	-10°C to 60°C	14°F to 140°F
		Rapid	-10°C to 45°C	14°F to 113°F
	Discharge		-10°C to 60°C	14°F to 140°F
	Storage	**< 1 year**	-20°C to 35°C	-4°F to 95°F
		< 6 months	-20°C to 45°C	-4°F to 113°F
		< 1 month	-20°C to 55°C	-4°F to 131°F
		< 1 week	-20°C to 65°C	-4°F to 149°F

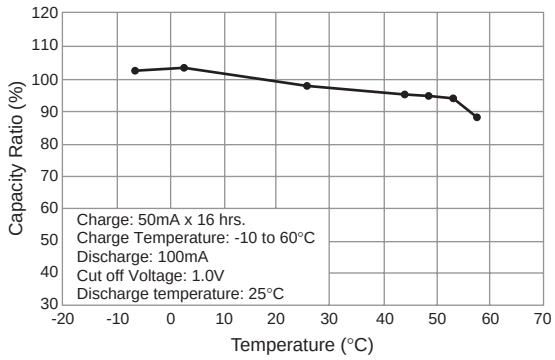
1 After charging at 0.1It for 16 hours, discharging at 0.2It.
2 For reference only.
3 Need specially designed control system
Control System:
dT/dt cut-off; 1 to 2°C/min
-△V cut-off; -△V per cell = 5 to 10 mV
T-control; T=65°C
Rapid charger timer; 2.4h (at 1.25a)
Trickle timer; within 2h
4 With control system

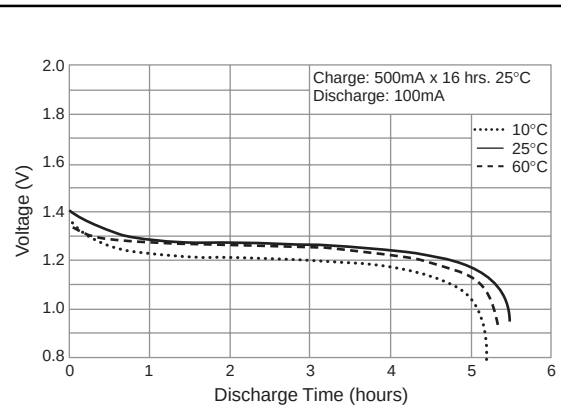
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

Typical Charge Characteristics



Typical Discharge Characteristics





Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as:
It(A) = Cn (Ah)/1h
* [It] is the reference test current in ampres
* [Cn] is the rated capacity of the cell or battery in Ampere-hours.
n = the time base [hours] for which the rated capacity is declared

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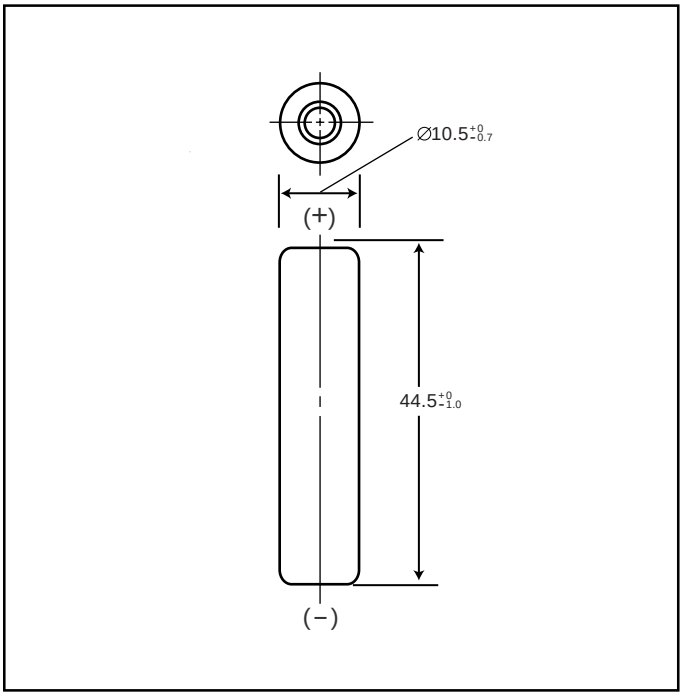
HHR70AAAJ Cylindrical HR AAA size (HR 11/45)

Dimensions (with Tube) (mm)



Specifications

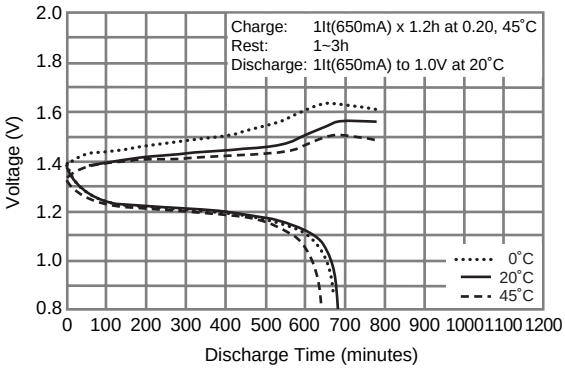
	mm	inch
Diameter	10.5+0/-0.7	0.41+0/-0.03
Height	44.5+0/-1.0	1.75+0/-0.04
Approximate Weight	Grams	Ounces
	13	0.46

Nominal Voltage			1.2V	
Discharge Capacity*		Average**	720 mAh	
		Rated (Min.)	700 mAh	
Approx. Internal impedance at 1000Hz at charged state.			30mΩ	
Charge		Standard	70mA (0.1It) x 16hrs.	
		Rapid	650mA (1It) x 1.2 hrs.	
Ambient Temperature	Charge	Standard	°C	°F
			0°C to 45°C	32°F to 113°F
		Rapid	0°C to 40°C	32°F to 104°F
	Discharge		-10°C to 65°C	14°F to 149°F
	Storage	< 1 year	-20°C to 35°C	-4°F to 95°F
		< 3 months	-20°C to 45°C	-4°F to 113°F
		< 1 month	-20°C to 55°C	-4°F to 131°F

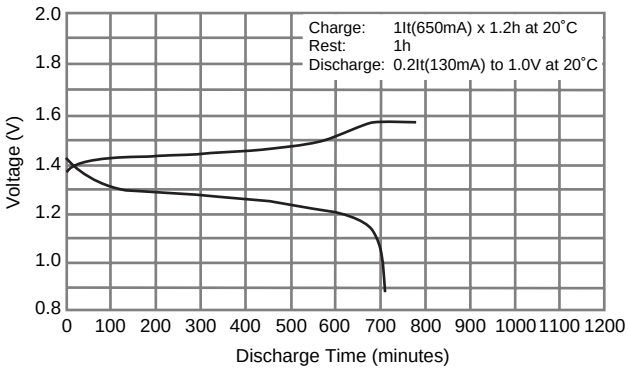
* After charging at 0.1It for 16 hours, discharging at 0.2It.
** For reference only.
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

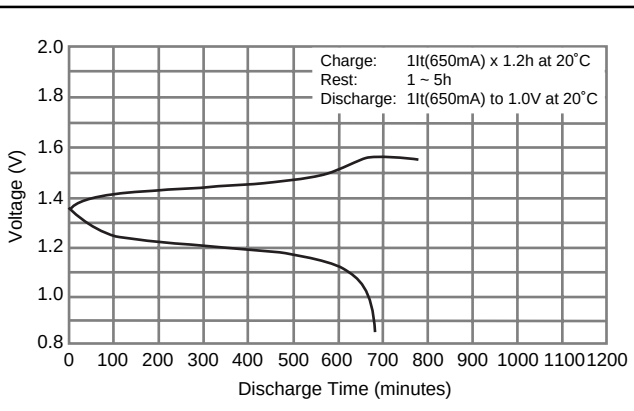
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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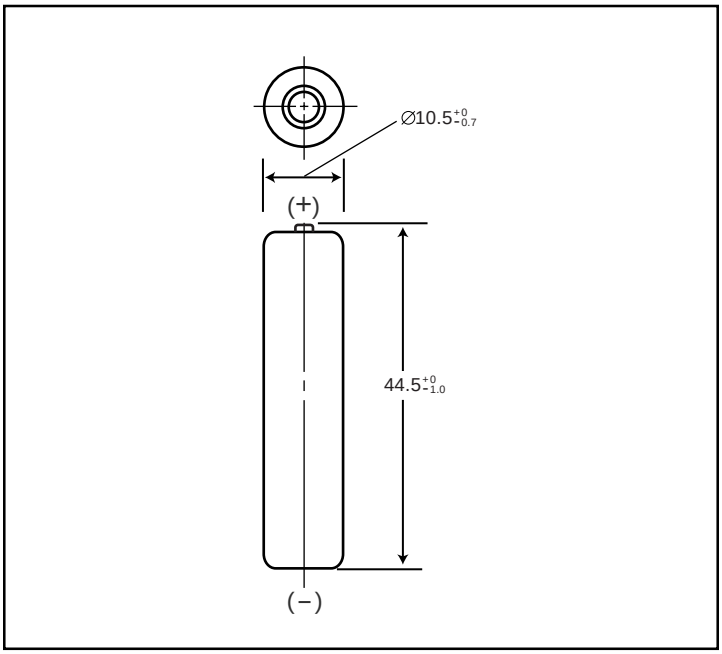
HHR75AAA/B Cylindrical AAA size (HR 11/45)

Dimensions (with Tube) (mm)



Specifications

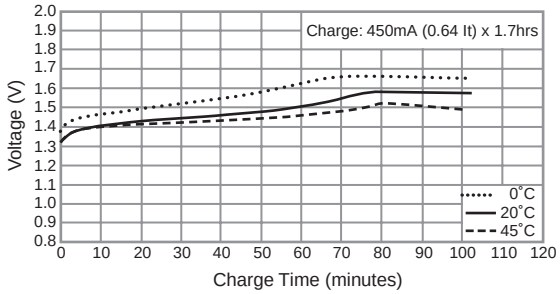
	mm	inch
Diameter	10.5+0/-0.7	0.41+0/-0.03
Height	44.5+0/-1.0	1.75+0/-0.04
Approximate Weight	Grams	Ounces
	12	0.42

Nominal Voltage			1.2V	
Discharge Capacity*		Average**	730 mAh	
		Rated (Min.)	700 mAh	
Approx. Internal impedance at 1000Hz at charged state.			35mΩ	
Charge		Standard	70mA x 16hrs.	
		Rapid	450mA x 1.7 hrs.	
Ambient Temperature	Charge	Standard	°C	°F
			0˚C to 45˚C	32˚F to 113˚F
		Rapid	0˚C to 40˚C	32˚F to 104˚F
	Discharge		-10˚C to 65˚C	14˚F to 149˚F
	Storage	< 1 year	-20˚C to 35˚C	-4˚F to 95˚F
		< 3 months	-20˚C to 45˚C	-4˚F to 113˚F
		< 1 month	-20˚C to 55˚C	-4˚F to 131˚F

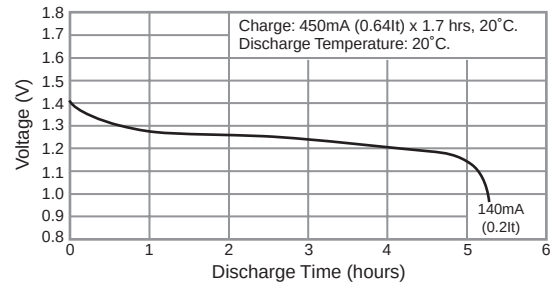
* After charging at 0.1It for 16 hours, discharging at 0.2It.
** For reference only.
Battery performance and cycle life are strongly affected by how they are used. In order to maximize battery safety, please consult Panasonic when determining charge / discharge specs, warning label contents and unit design.

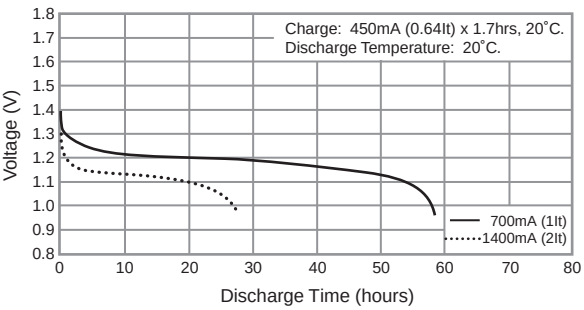
Note: [It] was previously expressed as [C]. [It] is an IEC standard expression for the amount of charge or discharge current and is expressed as: It(A) = Cn (Ah)/1h.
- [It] is the reference test current in ampres
- [Cn] is the rated capacity of the cell or battery in Ampere-hours. n = the time base [hours] for which the rated capacity is declared

Typical Charge Characteristics



Typical Discharge Characteristics





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