Think GAIA
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2008-7

SANYO

Lithium ion

Sanyo Lithium ion Rechargeable Batteries

URL http://www.sanyo.co.jp/energy/

Lithium-ion Battery Handling Precautions

⚠ Danger

1 Do not disassemble or modify the battery pack. The battery pack is equipped with built-in safety/protection features. Should these features be disabled, the battery pack can leak acid, overheat, emit smoke, burst and/or ignite.

2 Do not connect the positive (+) and negative (–) terminals with a metal object such as wire. Do not transport or store the battery pack together with metal objects such as necklaces, hair pins, etc. Otherwise, short-circuiting will occur, overcurrent will flow, causing the battery pack to leak acid, overheat, emit smoke, burst and/or ignite, or the metal object such as wire, necklace or hair pin can generate heat.

3 Do not discard the battery pack into fire or heat it. Otherwise, its insulation can melt down, its gas release vent or safety features will be damaged and/or its electrolyte can ignite, possibly leading to acid leakage, overheating, smoke emission, bursting and/or ignition on it.

4 Do not use or leave the battery pack near a heat source such as a fire or a heater (80°C or higher). If the resin separator should be damaged owing to overheating, internal short-circuiting may occur to the battery pack, possibly leading to acid leakage, overheating, smoke emission, bursting and/or ignition of the battery pack.

5 Do not immerse the battery pack in water or seawater or juice, and do not allow it to get wet. Otherwise, the protective features in it can be damaged, it can be charged with extremely high current and voltage, abnormal chemical reactions may occur in it, possibly leading to acid leakage, overheating, smoke emission, bursting and/or ignition.

6 Do not recharge the battery pack near fire or in extremely hot weather. Otherwise, hot temperatures can trigger its built-in protective features, inhibiting recharging, or can damage the built-in protective features, causing it to be charged with an extremely high current and voltage, and, as a result, abnormal chemical reactions can occur in it, possibly leading to acid leakage, overheating, smoke emission, bursting and/or ignition.

7 To recharge the battery pack, use the battery charger specifically designed for the purpose and observe the recharging conditions specified by SANYO. A recharging operation under non-conforming recharging conditions (higher temperature and larger voltage/current than specified, modified battery charger, etc.) can cause the battery pack to be overcharged, or charged with extremely high current, abnormal chemical reaction can occur in it, possibly leading to acid leakage, overheating, smoke emission, bursting and/or ignition.

8 Do not pierce the battery pack with a nail or other sharp objects, strike it with a hammer, or step on it. Otherwise, the battery pack will become damaged and deformed, internal short-circuiting can occur, possibly leading to acid leakage, overheating, smoke emission, bursting and/or ignition.

9 Do not strike or throw the battery pack. The impact might cause leakage, overheating, smoke emission, bursting and/or ignition. Also, if the protective feature in it becomes damaged, it could become charged with an extremely high current and voltage, abnormal chemical reactions can occur, which can lead acid leakage, overheating, smoke emission, bursting and/or ignition.

10 Do not use an apparently damaged or deformed battery pack. Otherwise, acid leakage, overheating, smoke emission, bursting and/or ignition of the battery pack may occur.

11 Do not directly solder the battery pack. Otherwise, heat can melt down its insulation, damage its gas release vent or safety features possibly leading to acid leakage, overheating, smoke emission, bursting and/or ignition.

12 Do not reverse the positive (+) and negative (–) terminals. Otherwise, during recharging, the battery pack will be reverse-charged, abnormal chemical reactions then may occur, or excessively high current can flow during discharging possibly leading to acid leakage, overheating, smoke emission, bursting and/or ignition.

13 The positive (+) and negative (–) terminals are arranged in a particular orientation. Do not force the connection if you cannot easily connect the battery pack terminals to the battery pack charger or other equipment. Confirm that the terminals are correctly oriented. Reversing the terminals will result in reverse-charging, possibly leading to acid leakage, overheating, smoke emission, bursting and/or ignition of the battery pack.

14 Do not connect the battery pack to an electrical outlet, vehicle cigarette lighter, etc. When subjected to large voltage, overcurrent can flow on the battery pack, possibly leading to acid leakage, overheating, smoke emission, bursting and/or ignition.

15 Do not use the battery pack for a purpose other than those specified. Otherwise, its guaranteed performance will be lost and/or its service life will be shortened. Depending on the equipment in which the battery pack is used, excessively high current can flow through battery pack, possibly damaging it and leading to acid leakage, overheating, smoke emission, bursting and/or ignition.

16 If the battery pack leaks, and the electrolyte gets into the eyes, do not rub them. Instead, rinse the eyes with clean running water and immediately seek medical attention. Otherwise, eye injury may result.

⚠ Warning

1 Do not use the battery pack in combination with primary battery packs (such as dry-cell battery packs) or battery packs of different capacities or brands. Otherwise, the battery pack can be overdischarged during use or overcharged during recharging, abnormal chemical reactions may occur, possibly leading to acid leakage, overheating, smoke emission, bursting and/or ignition.

2 If recharging operation fails to complete even when a specified recharging time has elapsed, immediately stop further recharging. Otherwise, acid leakage, overheating, smoke emission, bursting and/or ignition can occur.

3 Do not put the battery pack into a microwave oven or pressurized container. Rapid heating or disrupted sealing can lead to acid leakage, overheating, smoke emission, bursting and/or ignition.

4 If the battery pack leaks or gives off a bad odor, remove it from any exposed flame. Otherwise, the leaking electrolyte may catch fire, and the battery pack may emit smoke, burst or ignite.

5 If the battery pack gives off an odor, generates heat, becomes discolored or deformed, or in any way appears abnormal during use, recharging or storage, immediately remove it from the equipment or battery pack charger and stop using it. Otherwise, the problematic battery pack can develop acid leakage, overheating, smoke emission, bursting and/or ignition.

⚠ Caution

1 Do not use or subject the battery pack to intense sunlight or hot temperatures such as in a car in hot weather. Otherwise, acid leakage, overheating and/or smoke emission can occur. Also, its guaranteed performance will be lost and/or its service life will be shortened.

2 The battery pack incorporates built-in safety devices. Do not use it in a location where static electricity (greater than the manufacturer's guarantee) may be present. Otherwise, the safety devices can be damaged, possibly leading to acid leakage, overheating, smoke emission, bursting and/or ignition.

3 The guaranteed recharging temperature range is 0 to 40°C. A recharging operation outside this temperature range can lead to acid leakage and/or overheating of the battery pack, and may cause damage to it.

4 If acid leaking from the battery pack contacts your skin or clothing, immediately wash it away with running water. Otherwise, skin inflammation can occur.

5 Store the battery pack in a location where children cannot reach it. Also, make sure that a child does not take out the battery pack from the battery pack charger or equipment.

6 Before use, carefully study the Operation Manual and Precautions. For further information, contact a nearest SANYO distributor or representative. Safekeep the manual for future reference.

7 For recharging procedures, refer to the Operation Manual of your battery pack charger.

8 If you find rust, a bad odor, overheating and/or other irregularities when using the battery pack for the first time, return it to your supplier or vendor.

Lithium ion

Smaller, lighter, more powerful
Meeting today's needs for a compact, portable, and robust source of energy.

Devices designed to make our lives easier are being developed at an increasingly rapid pace. With the multimedia age dawning, the market is becoming more diversified with such innovations as lightweight, compact video equipment, personal computers, and data-processing equipments. Such devices have created a need for high-quality, reliable power sources that provide excellent functionality.

Sanyo now introduces a series of lithium-ion batteries offering a higher energy density and three times the voltage of Nickel-Cadmium (Ni-Cd) and Nickel-Metal-Hydride (Ni-MH) batteries. What's more, lithium-ion batteries are composed of materials that are both safer and less damaging to the environment.

Smaller, lighter, and more powerful. Sanyo introduces the new generation battery for the forth-coming multimedia age.

Higher energy density

Lithium-ion batteries provide a higher energy density per unit volume and unit weight than nickel-cadmium and nickel-metal-hydride batteries. In addition, their higher voltage and lighten weight contribute significantly to the downsizing, weight reduction, and simplified operation of electronic devices.

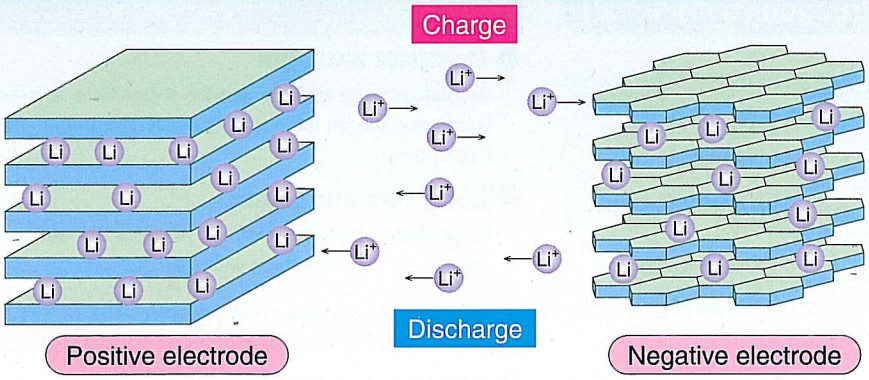
Built for safety

With certifications such as UL 1642 (safety standard for lithium batteries), Sanyo Lithium-ion batteries ensure safety in operation.

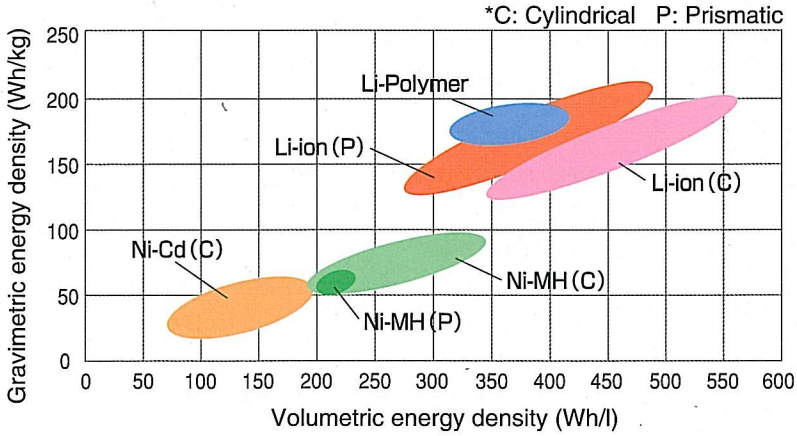
Higher Voltage

Our lithium-ion batteries are capable of generating an amazing 3.7V per cell — so only one-third the number of batteries is required compared to conventional nickel-cadmium and nickel-metal-hydride batteries.

Structure and operation principle



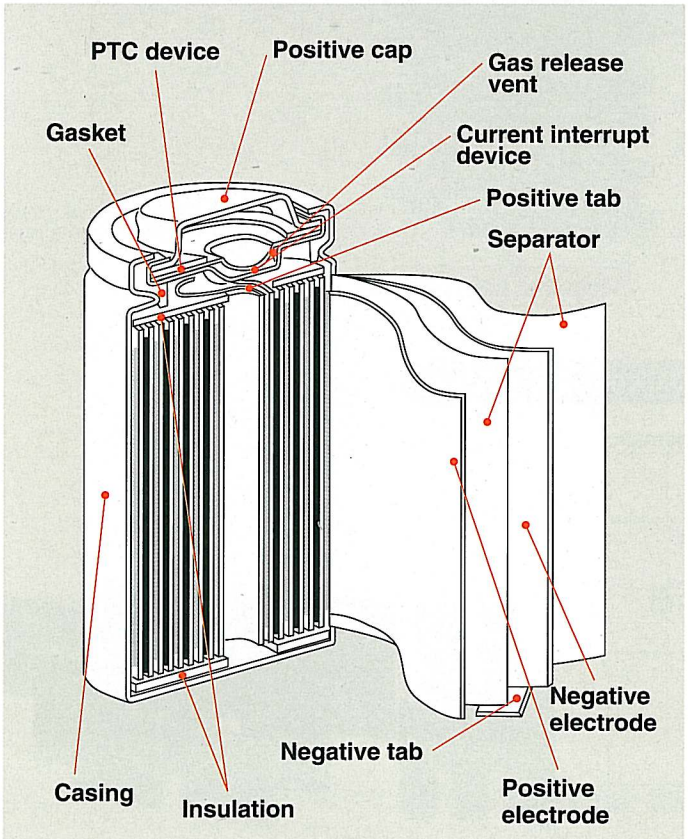
Energy density of lithium-ion batteries vs. other rechargeable batteries (Sanyo Battery Comparison)



Cylindrical

※The tube design in the photo is for visual purpose.

Lithium ion Battery Construction (Cylindrical)



Features

● Compact and slim

Its high energy density makes it possible to smaller design and lighter equipment such as notebook computers which can consume large power.

● Long operating time

Its graphite negative electrode enables the battery pack to operate equipment for a long time with stable discharge voltage.

Applications

- **Notebook computer**
- **Handy terminal**
- **Digital camera**
- **Camcorder**
- **DVD**
- **Other portable equipment**

Abundant variety of models meet wide variety of uses (UR18650 series)

F :High capacity with steady operatig voltage model.

E :High current model for power applications.

Y , A:Cost performance and improved standard model by optimization of material.

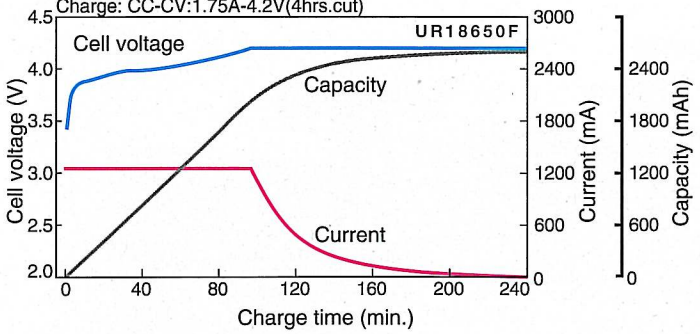
L :Cost performance and robust model by optimization of material.

SA,W:Excellent power model for power tools by optimization of material and structure.

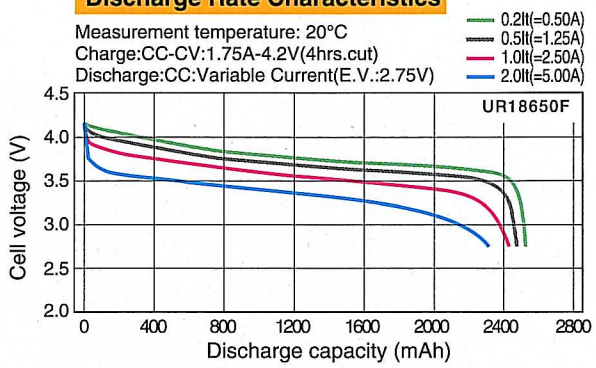
U :Long storage life and high current model.

Characteristics

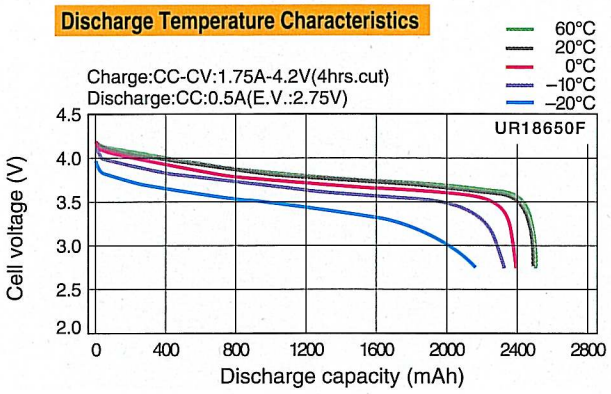
Charge Characteristics



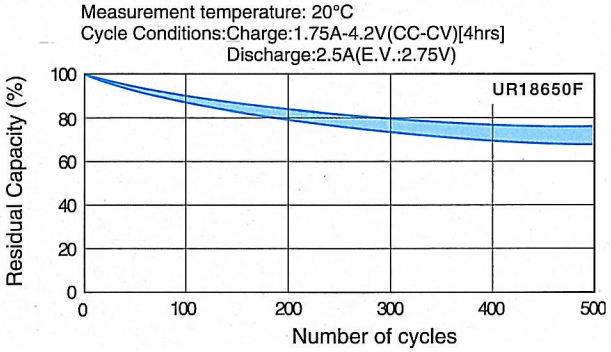
Discharge Rate Characteristics



Discharge Temperature Characteristics



Charge/Discharge Cycle Characteristics



Lithium ion Battery Ratings (Cylindrical)

Product Number	Nominal Voltage (V)	Nominal Capacity (min./typ.) ※1 (mAh)	Standard Charge System	External Dimensions (mm) ※2		Weight (Max.g)
				Diameter	Height	
UR18650F	3.7	2500/2600	0.5It-4.2V (4.0hrs.)	18.1	64.8	47.0
UR18650A NEW	3.6	2150/2250	0.7It-4.2V Constant Current-Constant Voltage (3.0hrs.)	18.1	64.8	43.0
UR18650E NEW	3.6	2050/2150		18.1	64.8	44.5
UR18650Y	3.7	1900/2000		18.1	64.8	43.3
UR18650W	3.7	1500/1600		18.1	64.8	45.4
UR18650SA	3.7	1200/1300		18.1	64.8	43.9
UR18650U NEW	3.6	1100/1200 (4.0V Charge)		18.1	64.8	41.5
UR18500F	3.7	1620/1700		18.1	49.3	33.5
UR18500H	3.7	1450/1520		18.1	49.3	33.5
UR18500L	3.7	1200/1260		18.1	49.3	33.7
UR14650P	3.7	940/980		13.9	64.7	26.0
UR14500P	3.7	800/840		13.9	49.2	20.0
UR14500L	3.7	680/710		13.9	49.2	19.7
UR14430P	3.7	660/700		13.9	42.9	17.5
UR14430Y	3.7	500/530		13.9	42.9	16.4

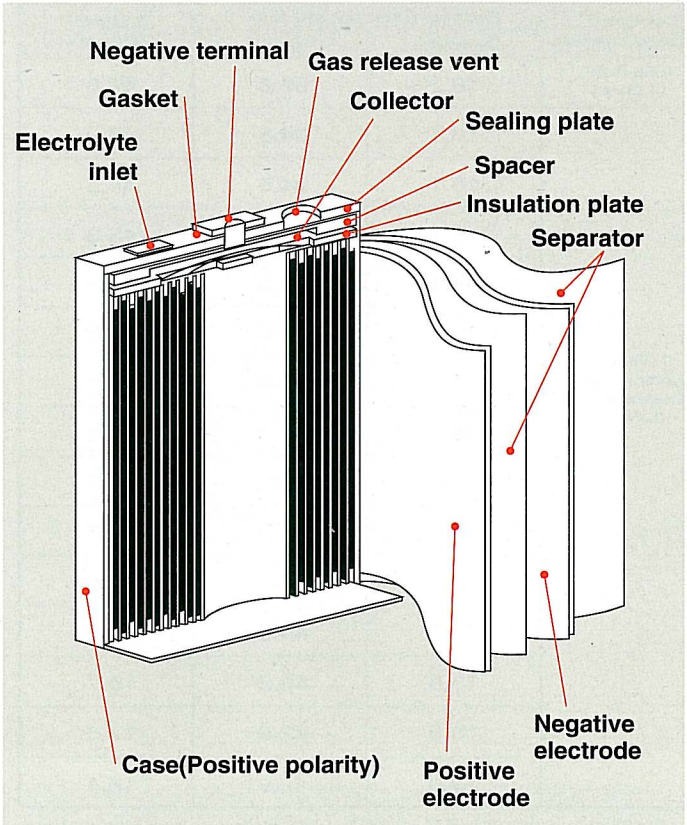
※1:Discharge:0.2ItA(E.V.=2.75V) ※2:Maximum size without tube.

[It] is a standard shall be expressed as : $It(A) = C_5(Ah)/1(h)$ C_5 is the rated capacity of the cell or battery, in ampere-hours.

Prismatic

※The tube design in the photo is for visual purpose.

Lithium ion Battery Construction (Prismatic)



Features

● Compact and slim

Smaller space requirement allows designing of smaller and thinner equipment.

● Light weight

Its aluminum alloy casing contributes to a much lighter battery pack, as compared to a stainless steel casing.

Applications

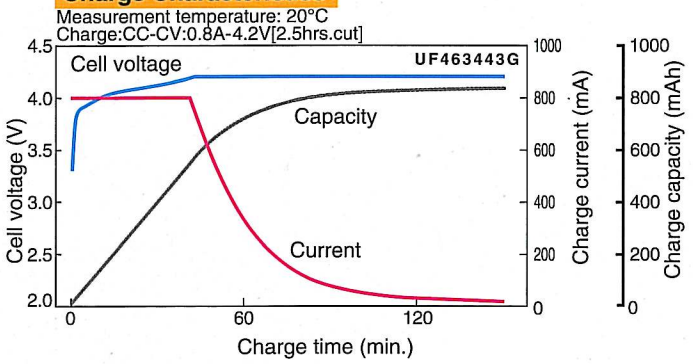
- **Cellular phone**
- **Digital camera**
- **Camcorder**
- **Handy terminal**
- **Portable audio**
- **Other portable equipment**

High capacity model employing neo-hybrid positive electrode (T series)

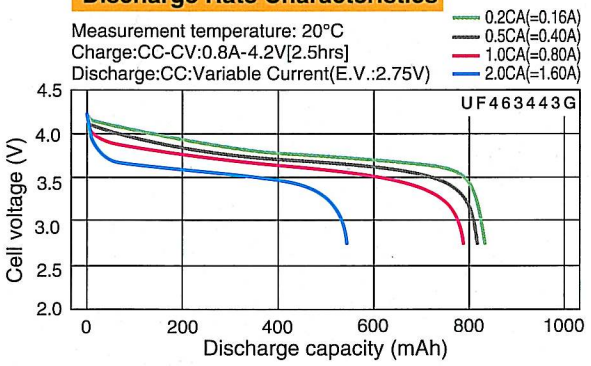
- Neo hybrid positive electrode enables higher charging voltage, which realizes further high capacity.
- Safety is secured same as existing lithium ion battery.
- Included cobalt amount can be decreased compared to conventional lithium ion battery.

Characteristics

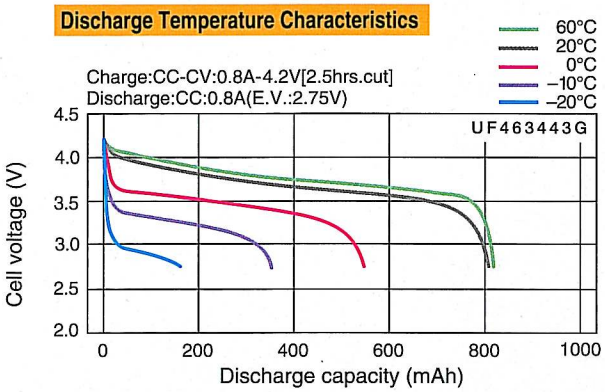
Charge Characteristics



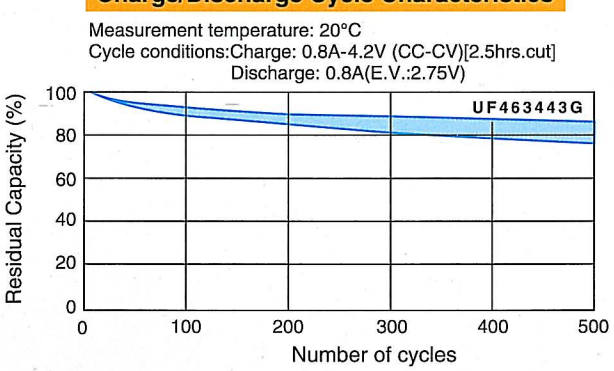
Discharge Rate Characteristics



Discharge Temperature Characteristics



Charge/Discharge Cycle Characteristics



Lithium ion Battery Ratings (Prismatic)

Product Number	Nominal Voltage (V)	Nominal Capacity (min./typ.) ※1 (mAh)	Standard Charge System	External Dimensions (mm) ※2			Weight (Max. g)
				Thickness ※3	Width	Height	
UF383543F NEW	3.7	650/680	1It-4.2V Constant Current-Constant Voltage (2.5hrs.)	3.80	34.95	42.6	13.6
UF383551F	3.7	790/830		3.80	34.95	50.6	16.3
UF423643F	3.7	700/730		4.10	35.95	42.4	14.8
UF463443G NEW	3.7	800/830		4.55	33.85	42.6	15.8
UF463446S	3.7	840/870		4.45	33.86	45.8	17.2
UF463450F	3.7	920/960		4.45	33.85	49.6	18.5
UF503436F NEW	3.7	670/700		4.90	33.95	35.8	13.8
UF503445S	3.7	900/930		4.90	33.80	44.8	17.4
UF534042F	3.7	950/990		5.00	39.85	41.7	19.7
UF553436G NEW	3.7	800/830		5.50	33.85	35.6	15.6
UF553443Z	3.7	930/970		5.40	33.91	42.8	18.5
UF553446Z	3.7	1030/1080		5.35	33.86	45.8	20.4
UF553450Z	3.7	1150/1200		5.40	33.85	49.8	21.8
UF583136R	3.7	700/740		5.60	31.15	36.3	14.2
UF603443S	3.7	1030/1080		5.90	33.80	42.8	20.5
UF613756F	3.7	1400/1450		5.80	36.65	55.4	28.6
UF634042F NEW	3.7	1230/1270		6.20	39.85	41.7	24.6
UF653436S NEW	3.7	880/920		6.30	33.85	35.7	17.6
UF653450S	3.7	1200/1250		6.30	33.85	49.8	24.8
UF752836F	3.7	850/890		7.50	27.95	35.8	17.3
UF103450P	3.7	1880/2000		10.50	33.80	48.8	38.5

※1:Discharge:0.2ItA(E.V.=2.75V) ※2:Maximum size without tube. ※3:The maximum thickness of the standard shipment charging condition.

Product Number	Nominal Voltage (V)	Nominal Capacity (min./typ.) ※1 (mAh)	Standard Charge System	External Dimensions (mm) ※2			Weight (Max. g)
				Thickness ※3	Width	Height	
UF553436T	3.7	810/850	0.5It-4.33V Constant Current-Constant Voltage (4hrs.)	5.45	33.85	35.8	14.8
UF463443T	3.7	810/850		4.60	33.85	42.8	15.0

※1:Discharge:0.2ItA(E.V.=3.00V) ※2:Maximum size without tube. ※3:The maximum thickness of the standard shipment charging condition.

[It] is a standard shall be expressed as : $It(A) = C_5(Ah)/1(h)$ C_5 is the rated capacity of the cell or battery, in ampere-hours.

Certified by ISO 9000S

SANYO Electric Co., Ltd. Mobile Energy Company, as a part of the SANYO Electric Group, has received Environmental Management System ISO14001 certification.

●Approval Certificate NO: EC00J0303
●Registration Date: 19/Mar/2001

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