TENTA	TIVE	Date 7/Nov./'0
	SANYO LITI BATTERY SPE	
BATTERY C	LASSIFICATION	LITHIUM ION BATTERY
BATTERY T	YPE	UF553450Z
APPLICATIO	N	Dynapack
[ACCEPT	ANCE]	
Acce	epted by:	
Nam	e in block letters:	
Date):	

SANYO Electric Co., Ltd.

Mobile Energy Company Battery System Development Management Department MC Technical Service Department MC Business Development Section No.2

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Арр	

Т	ïtle	Sp	Specifications of Lithium Ion battery (Prismatic Type) page 1/12							
á	 Extent of the application This specification is applied to the SANYO Lithium Ion Battery of the above mentioned type for a Smart phone of Dynapack. 									
2. B	2. Battery Classification and Type2.1 Battery ClassificationSANYO Lithium Ion Battery2.2 Battery TypeUF553450Z									
3. N	omina	al Speci	fications				1			
			Item		Spe	ecification		Remark	(
	3.1	Nomina	Capaci	.y	11	I50mAh	0.20	CA disch	narge	
	3.2	Nomina	l Voltage			3.70V				
	3.3	End Vo	ltage			2.75V				
	3.4	Chargin	g Currer	it (Std.)	1C	(=1.15)A	C) ~ +45	°C	
	3.5	Chargin	g Voltag	e	4.2	0±0.03V				
	3.6	Chargin	g Time	(Std.)		Bhours				
	3.7	Dischar	ging Cur	rent (Std.)		1.15 A	-2	0 ~ +60	O°C	
	3.8	Dischar	ging Curr	ent (Max.)		2.30A	C) ~ +40°	С О	
	3.9	Internal	Resistar	nce	less t	than 80m Ω	AC Im	npedanc	e 1kHz	
	3.10	Weight			less	than 22.3g				
	3.11 \$	Surround	ings	less than 1month	-20	~ +60°C	Percei	ntage of		
	Те	mperatur	re range	less than 3months	-20	~ +40°C		erable ca	apacity	
	for	⁻ shipped	battery	less than 1year	-20	~ +20°C		80%		
	 Percentage of recoverable capacity (discharging time after storage/Initial discharging time) × 100 Discharging time is measured by the discharge at 0.2CA to 2.75V end voltage after fully charged according to specification at approximately 25°C. 									
No		Date		Remark	No.	Date		Rema	rk	
	7/Nov./'07 Issue(Tentative) (b)									
(a)	(a) (c)									
File	File No. UF553450-292 Battery System Development Management Department									

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4. Electrio	cal Charac	cteristic	s		
lte	em		Test Method	Cr	iterion
4.1 Charge		until l change	harger supply 1.0C(=1.15)A constant current battery voltage reaches 4.20V, then be ed at constant voltage of 4.20V while ig the charge current. Charging time is 3.0		
4.2 Capac	ity		=0.23)A continuously down to 2.75V end	More th	an 300min.
			=1.15)A continuously down to 2.75V end	More th	an 54min.
(1.1 to 2		charge (1.15A to 2.75 time is	attery unit shall be repeated 500 /discharge cycles, charged at CC-CV -4.20V) for 3.0hours, discharged at 1.15A V end voltage. After 500cycles, discharging measured as specified in paragraph 4.2	More th	an 32min.
4.4 Tempe	erature	batte meas	n 1hour after fully charged at 20 °C, a ry unit is stored at 0°C. Discharge time is ured by discharging at 1.0C(=1.15)A nuously down to 2.75V end voltage.	More th	ian 35min.
		unit meas	n 1hour after fully charged at 20°C,a battery is stored at 60 °C. Discharge time is ured by discharging at 1.0C(=1.15)A nuously down to 2.75V end voltage.	More th	an 50min.
State Storage a [1		and Disch	rested at room temperature for 1hour. arge time is measured by discharging at =1.15)A continuously down to 2.75V end	More th	an 35min.
			next discharge time is measured as fied in paragraph 4.2 ②.	More th	an 45min.
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		②After fully charged, stored for 20days at 60°C and rested at room temperature for 1hour. Discharge time is measured by discharging at 1.0C(=1.15)A continuously down to 2.75V end voltage.	more th	nan 30min.
		Then next discharge time is measured as specified in paragraph 4.2 ②.	more th	nan 40min.
	•	After fully charged and discharged as specified in paragraph 4.2 ②, then store for 20days at 60°C and rest at room temperature for 1hour. Discharging time is measured as specified in paragraph 4.2 ②.	more th	nan 50min.
4.7 Drop		The cell is freely dropped 6 times from a height of 1m onto a flat surface of hard wood.	No elec	trical change
STANDARI	D TEST (CONDITIONS:		

The battery used for the test mentioned above should be new one delivered a month before at most. The test shall be performed at $20\pm2^{\circ}C$ (Standard temperature of fifth grade adopted in *JIS Z 8703*(Standard Test Conditions)), $65\pm5\%$ (Standard humidity of twentieth grade adopted in *JIS Z 8703*(Standard Test Conditions)). It is allowed however to test at $15\sim25^{\circ}C$, $45\sim85\%$ humidity, as long as there is no big difference in test results. The battery used for the test without residual capacity indicator. The grade of voltmeter and ammeter used in the test shall be higher than class 0.5 adopted in *JIS C 1102*(Electric Indicator).

5. Design, Construction

A battery unit shall be of the design, construction and physical dimensions shown in the attached drawing. (Drawing No. NUF553450Z-29601-0A)

6. Appearance

There shall be no practical damage such as conspicuous liquid electrolyte leakage, flaw electrolyte leakage, flaw, rust, dirt, and deformation. The battery must have marketability.

7. Shipment

The battery shall be shipped in 50% charged state. The battery shall be charged in 50% ($1.15A \times 30minutes = 575mAh$) at SANYO. It is not specified more than 50% capacity remain at Dynapack, because of self discharge.

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Title	Specificatior	ns of Lithium Ion battery (Prismatic Type)	page	4/12
 8-1. Pred 1 Charge A bare In care Charge Charge Charge Charge Have In care A.35 Have A.35 Have In care A.35 Have In care A.35 Have Batte Do re Batte Do re Batte Do re Smate Do re Charge Charge Charge Charge Charge Charge Charge Charge Disc Disc Disc Disc Disc Charge Do re A batte To are A batte To are A batte Charge <l< td=""><td>cautions on Designations on Designations on Designations on Designations of UF553450Z, rige voltage must be cerning charge must be cerning charge with the charge voltage must be cerning charge system ase of a battery volt current is below 0.1 is. And if a battery volt current is below 0.1 is. And if a battery is charging. If the charge of a battery volt current is below 0.1 is. And if a battery is charging. If a battery is charging. If a battery is charging of the current must harge current must harge temperature harge end voltage restructions on Batter of the context on the shape of the shape of the shape of the shape and charge temperature harge end voltage restructions on Batter of the shape of</td><td>and the constant of the consta</td><td>uld not ged with V, stand iod (time harger of charger. re of cha ipment e function rse to ec ind wate functior</td><th>be above pre-charge ard charge er), charger detects full t the place arger. exclusive of ect such as to prevent puipment. er easy go</th></l<>	cautions on Designations on Designations on Designations on Designations of UF553450Z, rige voltage must be cerning charge must be cerning charge with the charge voltage must be cerning charge system ase of a battery volt current is below 0.1 is. And if a battery volt current is below 0.1 is. And if a battery is charging. If the charge of a battery volt current is below 0.1 is. And if a battery is charging. If a battery is charging. If a battery is charging of the current must harge current must harge temperature harge end voltage restructions on Batter of the context on the shape of the shape of the shape of the shape and charge temperature harge end voltage restructions on Batter of the shape of	and the constant of the consta	uld not ged with V, stand iod (time harger of charger. re of cha ipment e function rse to ec ind wate functior	be above pre-charge ard charge er), charger detects full t the place arger. exclusive of ect such as to prevent puipment. er easy go
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 sealin In ca poss SAN weld ultra proce Add for fe devic accur Prote Add for fe devic accur Prote Add for fe devic accur Free Virite No c Storage atmos 	ng part) by rib or shase of the battery piblity to cause leak YO requests to use ing of cases, SAN' sonic welding, SAP ess of ultra sonic welding, SAP ess of ultra sonic we the protection devi- ear the trouble of the ear the trou	function which is described below inside batt e of misuse. tion 4.25~4.31V/cell by charge, overcharge protect all be shut down. Dtection 0~2.40V/cell, over discharge protection should shall be shut down and consumption current is rrent Protection t exceed about 3.00A, over discharge current ge current shall be shut down. during storage, design the low consumption rcuit, fuel gauge, etc) inside battery pack. ttery in order to avoid a damage on the battery plate onto battery, and solder lead wire or lead rade mark, maker's nation, model number a on chapter 14. anual based on chapter 14. battery.	e batter a sonic lefects. ality afte) e(e.g.TS ent. The device n ery pac ction sh l work. below t protec curren d plate. nd prec	y pack has is used for (In case of er using the 1N, TS2N) protection hay get the k, to insure hould work. 1μΑ. tion should t electronic
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Title	Specificatior	ns of Lithium Ion battery (Prismatic Type)	page	6/12			
 9-2 Long Period Storage In case of long period storage (more than 3 months), storage the battery at temperature range -20~+20°C, low humidity, no corrosive gas atmosphere. And in this case, charge condition of the battery is SANYO shipment charge state or discharge state. No condensation on the battery. 							
In term of handling Dynapao 10-1 Preo When voltag * Lot n 10-2 Preo Do no By ove circuit 10-3 Insp · About circuit 10-4 Pac · When avoid SANY Even SANY 10-5 Abn · Do no else, a 11. Exemp · SANY in this · SANY	of shipping and ase SANYO lithium io ck. This battery pac cautions on serie the cells are conne difference. Sumber (= shipping Cautions on term t over-stress or rotater-stress, it has po- bection Before S all battery pack, before shipment. king and shippin cells are re-shipped stress by shipping. O recommends the if after open pack O for re-packing. O will not be respo specification. O will not be respo phone and charger	ate at positive terminal plate and negative cap. ssibility to remove the welding point and caus hipment of The Battery pack inspect voltage, internal impedance and fun ing cells ed to assembling factory, make enough atten e same package shipped from SANYO when re age, when re-shipping, use the same parts a l which has damages by shipping stress, drop, electrolyte odor. tee insible for trouble occurred by handling outside onsible for trouble occurred by matching elector	's batter d use w se leaka ction of tion the e-shippir and mat short or e of the p ctric circ	y packs by within 20mV ge or short protection packing to ng. erials from something precautions cuit, battery			
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12. Other Remarks

- If there are problems in this specification, SANYO can consider to change specification after discussion.
- · About the things not covered by this specification, SANYO will have discussion.
- · Do not use this cell for other models or equipment.

13. Standard Charging Method

- (1) The battery voltage fall to about 0V by storage. If the battery is rapidly charged at this state, FET of a protection circuit may generate heat. The charger must have the pre-charge system.
- (2) Pre-charge current of charger should be approximately 0.1C(=0.115)A. When the battery voltage becomes 3.00V, standard charge should be started. When the battery voltage is less than 3.00V even after the set period of timer, charging should be stopped.
- (3) Rapid charge is 1.15A-4.20V (Constant current-constant voltage). Charging should be suspended when the time, OCV or current is certain value.
- (4) The maximum current of the battery pack is 2.00A. Charge current of charger must not exceed 2.00A.
- (5) The battery may be swelled by continuous charge or charging long period under high temperature atmosphere. Please consult SANYO regarding the detail for charging method.

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Title	Specifications of Lithium Ion battery (Prismatic Type)	page	8/1

14. Safety Instruction

Prohibition Points on Handle

The battery pack includes the flammable objects such as the organic solvent. If the handling is missed there will be possibility that the battery rupture flames or hot, or it will cause the deterioration or damage of battery. Please observe the following prohibitive matters. And also, add the protection device the equipment for fear that the trouble would affect the battery by the abnormality of equipment. In addition, mention the following matters as "Prohibition Points on Handle" in the instruction manual of the equipment.

! Danger

1. Disassemble and Reconstruction

"Do not disassemble or reconstruct battery"

The battery pack has safety function and protection circuit to avoid the danger. If they have serious damage, it will cause the generating heat, smoke, rupture or flame.

2. Short-circuit

"Do not short-circuit battery"

Do not connect the + and - terminals with metals (such as wire). Do not carry or store the battery with metal objects (such as wire, necklace or hairpins). If the battery is short-circuited, excessive large current will flow and then the generating heat, smoke, rupture or flame will occur. And also, it causes generating heat at metals.

3. Incineration and Heating

"Do not incinerate or heat the battery"

These occur the melting of insulator, damage of gas release vent or safety function, or ignition on electrolyte. Above mentioned matters cause the generating heat, smoke, rupture or flame.

4. Use nearby Heated Place

"Do not use or leave battery nearby fire, stove or heated place(more than 80°C)" In case that separator made of polymer is melted by high temperature, the internal short-circuit occurs in individual cells and then it causes the generating heat, smoke, rupture or flame. In addition, do not use the battery under the heated place (more than 80°C) for same reason.

5. Immersion

"Do not immerse the battery in water or sea water, or get it wet"

If the protection circuit included in the battery is broken, the battery will be charged at extreme current or voltage and the abnormal chemical reaction occurs in it. And then it causes the generating heat, smoke, rupture or flame.

Charge nearby heated place

"Do not charge battery nearby the fire or under the blazing sun"

If the protection circuit to avoid the danger works under high temperature or it is broken, the battery will be charged at abnormal current (or voltage) and abnormal chemical reaction will occur. It causes the generating heat, smoke, rupture or flame.

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<i>"Do use</i> If the baregulated charger), occur in c 8. Penetr <i>"Do not</i> As the bar generatin 9. Impact <i>"Do not</i> The impa also if the voltage o heat, smo 10. Defor <i>"Do not</i> It causes 11. Solde <i>"Do not</i> As the int causes th 12. Revei <i>"Do not</i> As the int causes th 12. Revei <i>"Do not</i> As the int causes th 13. Revei <i>"Do not</i> The batte smoothly, connected chemical 14. Conn <i>"Do not</i> Added hig the gener	attery is charged value, excessive there are cases the eells. It causes the ation drive a nail into the attery might be bro g heat, smoke, rup give battery impact ct might cause lea e protection circuit r current, and abit oke, rupture, and/or mation use the battery we the generating heat ring make the direct sulator is melted to be generating heat, rse Charge and reverse polarity (a ing, the battery is e may be case that g heat, smoke, rup resed Polarity Us reverse-charge of ery has polarity. In do not force there d to opposite po reaction will occur. ect Battery To the connect battery to gh voltage to the battery connect battery for oth ttery is used for	rger and observe charging requirement" with unspecified condition (under high term high voltage or current over regulated vanat it will be overcharged or the abnormal chargenerating heat, smoke, rupture or flame. The battery, strike it by hammer, or tread it" ken or deformed and then it will be short-circu- ture or flame. The battery is broken, the battery will be charden in the battery is broken, the battery will be charden in the battery is broken, the battery will be charden in the battery is broken, the battery will be charden in the battery is broken, the battery will be charden in the battery is broken, the battery will be charden in the battery is broken, the battery will be charden in the battery is broken, the battery will be charden in the battery is broken, the battery will be charden in the battery or flame. Soldering on battery" by heat or the gas release vent (or safety fur smoke, rupture or flame. Overdischarge and terminals)" reverse-charged and abnormal chemical reat tunexpected large current flows on discharging ture or flame. e reverse-connect" in case the battery is not connected with char in to connect and do check polarity of batter larity with charger, it will be reverse-charge It causes the generating heat, smoke, rupture the Plug of the plug socket or car-cigarette-plug" battery, the excessive current will flow in it an rupture or flame. r Other Equipment	in the b arged a ght caus action o g. These arger or ry. If the ged and or flam d then if	remodeled eaction will causes the attery. And it abnormal se leakage, s broken, it ccurs. And e cause the equipment e battery is abnormal e. t will cause
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 16. Leakage "Do not touch a leaked battery directly" In case the leaked electrolyte gets into eyes, wash them with fresh water as soon as possible without rubbing eyes. And then, see a doctor immediately. If leave damaged eyes undone, it will cause eye-trouble. 				
	! Warnin	g		
I Warning Warning				
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Title Specifications of Lithium Ion battery (Prismatic Type) 11/12 page ! Caution 1. Use under strong sunshine Do not use or leave the battery under the blazing sun(or in heated car by sunshine). The battery may generate heat, smoke or flame. And also, it might cause the deterioration of battery's characteristics or cycle life. 2. Static Electricity The battery pack has the protection circuit to avoid the danger. Do not use nearby the place where generates static electricity (more than 100V) which gives damage to the protection circuit. If the protection circuit were broken, the battery would generate smoke, rupture or flame. 3. Charging Temperature Range Charging temperature range is regulated between 0°C and 45°C. Do not charge the battery out of recommended temperature range. Charging out of recommended range might cause the generating heat or serious damage of battery. And also, it might cause the deterioration of battery's characteristics and cycle life. 4. Manual Please read the manual before using the battery and let it keep after reading. And also, please reread if neccesary. 5. Charging Method Please read the manual of specified charger about charging method. First time use When the battery has rust, bad smell or something abnormal at first-time-using, do not use the equipment and go to bring the battery to the shop which it was bought. 7. Used by children In case younger children use the battery, their parents teach how to use batteries according to the manual with care. And also, when children are using the batteries, pay attention to use it according to that or not. 8. Keep Battery away from children Keep the battery out of the reach of younger children. And also, using the battery, pay attention to be taken out it from the charger or equipment by little children. 9. Leakage If the skin or cloth is smeared with liquid from the battery, wash with fresh water. It may cause the skin inflammation. Mobile Energy Company File No UF553450-292 Battery System Development Management Department

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15. Warranty Period of Battery

The warranty period of a battery is for one year after shipment. However, if a battery causes unusual operation within this period, SANYO will replace by a new battery for free as long as it is clear that the cause of the failure is in the battery manufacturing process and the battery has not been used in the abnormal condition.

16. Requirement for Safety Assurance

For the sake of safety assurance, please discuss the equipment design, its system and protection circuit of Lithium ion battery with SANYO in advance.

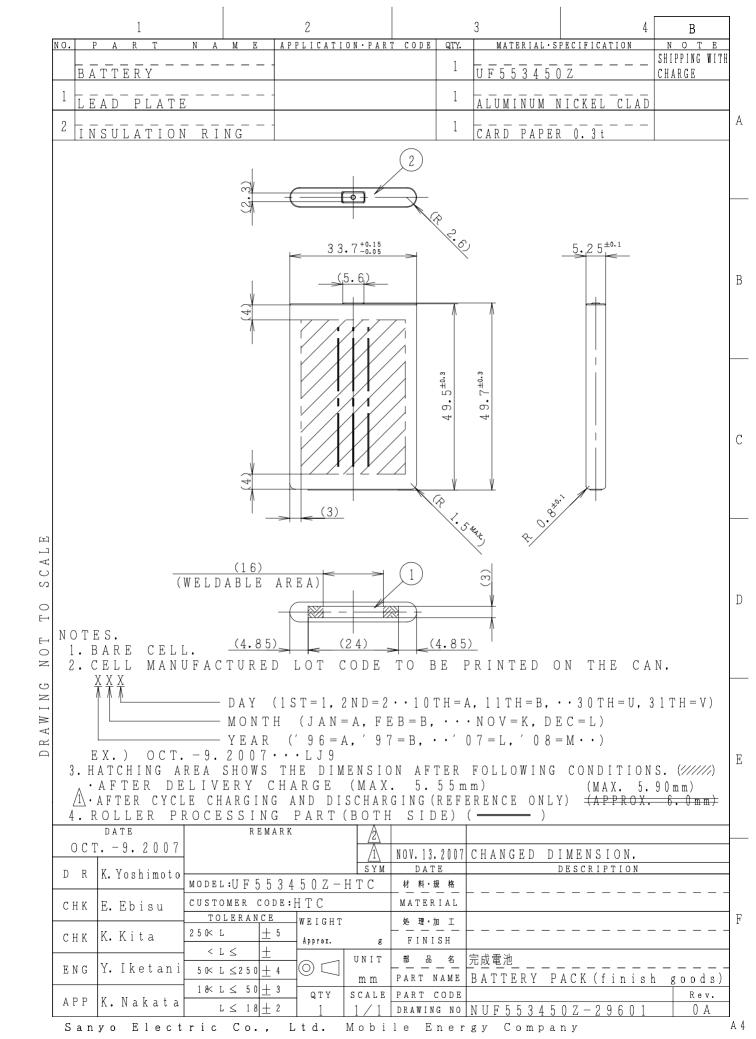
And also, consult SANYO about the high rate current, rapid charge and special application such as extreme condition and / or environment.

17. Effectiveness of This Specification

(1)This specification has effectiveness for 6 months.

- ②In case of Dynapack receives permanent specification, please abrogate or send back this specification to SANYO.
- ③The standardized figure stated in this specification is tentative value.

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