Product Specification

Item Name	Nickel-cadmium Battery
Battery Model	KST-CDD4500H-4500mAh-1.2V
Document Number	KST-CD15
Document Revision	A/0

Make by	Checked by	Approved
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2016-10-15	2016-10-16	2016-10-16

Customer Confirmation	Company Chop	Signature & Date
	Company Name:	

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1. Scope

This product specification describes the product performance indicators of Ni-Cd battery produced by Kinstar Electronics Technology Co., Ltd.

2. Product type and model number

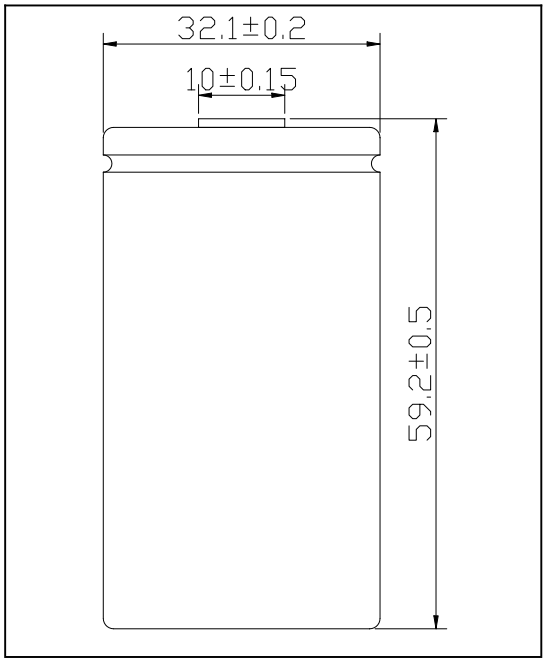
2.1 Product type

Ni-Cd Battery (Nickel-cadmium)

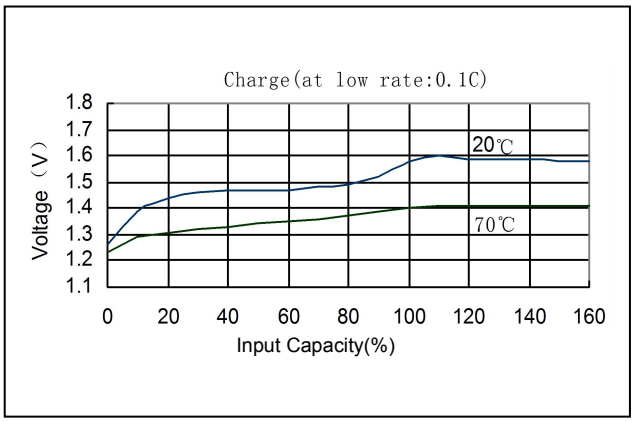
2.2 Model number

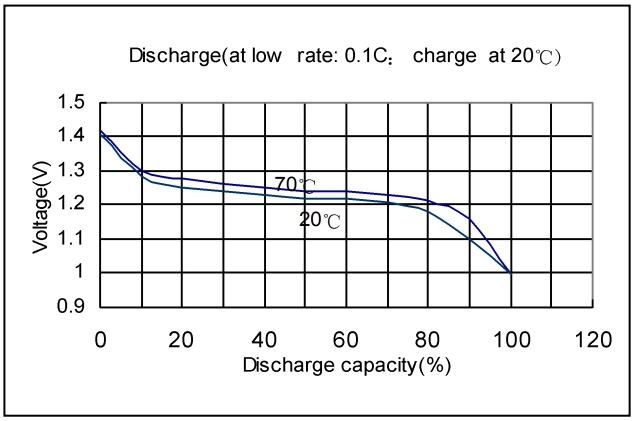
KST-CDD4500H-4500mAh-1.2V

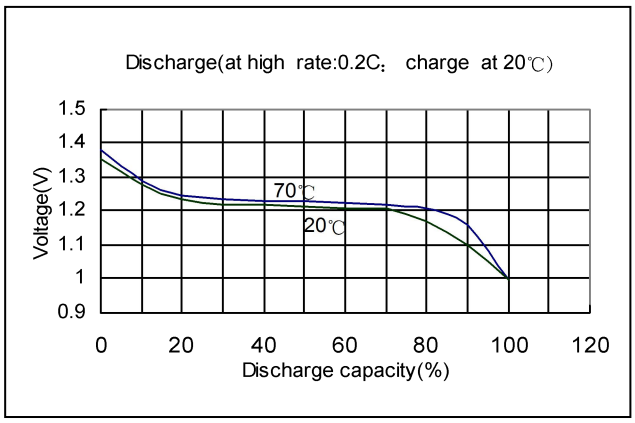
3. Specifications

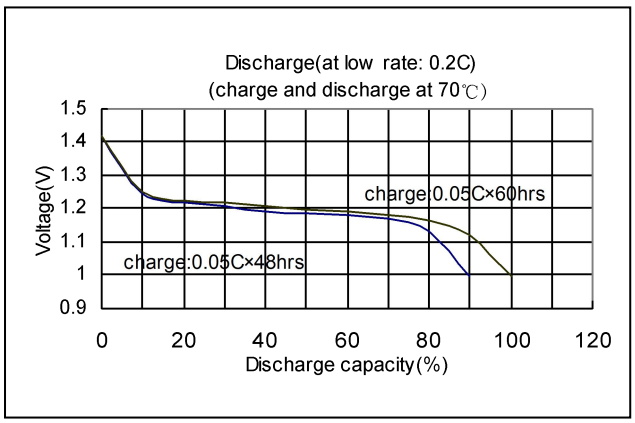


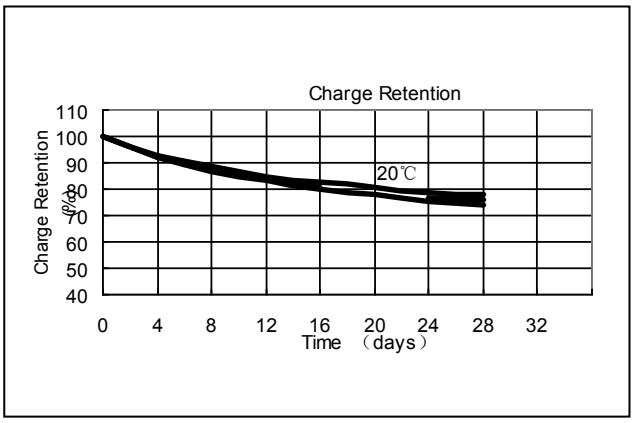
Nominal Capacity			4500 mAh
Nominal Voltage			1.2 V
Charge current		Trickle	225mA
		Standard	450mA
		Quick	900mA
Charge time		Trickle	48 Hrs
		Standard	14~16 Hrs
		Quick	6.5 Hrs
Ambient Temperature	Charge	Standard	0℃~70℃
		Quick	10℃~70℃
	Discharge		-20℃~70℃
	Storage		-20℃~70℃
Internal Impedance(mΩ) (Upon fully charge)			Max≤15
Weight			124g











4. Data of stack up batteries

All data involves voltage and weight to stack-up battery are equal to the value of unit cell times the number of unit cell which consisted in the stack-up batteries

Example: Stack-up battery consisting three unit cells

Nominal voltage of unit cell=1.2V

Nominal voltage of stack-up batteries=1.2V×3=3.6V

5. Ratings

Description	Unit	Specification	Conditions
Nominal Voltage	V/Cell	1.2	
Nominal Capacity	mAh	4500	Standard Charge/Discharge
Standard Charge	mA	450(0.1C)	T1= 0~70℃(see Note1)
	Hour	14~16	
Quick Charge	mA	900(0.2C)	-ΔV=0-5mV/Cell or Timer Cutoff=120 % nominal capacity or Temp.Cutoff=55℃ , T1= 10~70℃
	hour	6.5 approx. (see Note 2)	

Trickle Charge	mA	0.03C ~ 0.05C	T1= 0~70℃
Standard discharge	mA	900(0.2C)	T2= -20~70℃ Humidity: Max.85%
Discharge Cut-off Voltage	V/Cell	1.0	
Storage Temperature	℃	-20~70	Discharged state; Humidity; Max.85%
Typical Weight	Gram	124	unit cell

6. Performance

Unless otherwise stated, tests should be done within one month of delivery under the following conditions:

Ambient Temperature, T: 20±5℃

Relative Humidity: 65±20%

Notes: Standard Charge/Discharge Conditions：

Charge: 450mA(0.1C)×14 hours

Discharge: 900mA(0.2C) to 1.0V/Cell

Test	Unit	Specification	Conditions	Remarks
Capacity	mAh	≥4500	Standard Charge Discharge	up to 3 cycles are allowed
Open Circuit Voltage(OCV)	V/ Cell	≥1.25	Within 1 hour after standard Charge	
Internal Impedance	mΩ/ Cell	≤15	Upon fully charge(lKHz)	
High Rate Discharge(1200mA)	minute	≥205	Standard Charge, I hour rest Before discharge by 1200mA to 1.0V/cell	up to 3 cycles are allowed
Charge Retention	mAh	≥70%	Standard Charge, Storage: 28 days, Standard Discharge	
IEC Cycle Life	Cycle	≥150	IEC61951-1(2003) 7.4.1.1	(see Note 3)
IEC Permanent Charge Test		Specified at Note 4	IEC61951-1(2003)7.4.2.3	(see Note 4)
Leakage		No leakage nor deformation	Fully charged at 900mA(0.2C) For 6 hrs Stand for 14 days	
Vibration Resistance		Change of voltage should be under 0.02V/ Cell, Change of impedance should be under 5 mΩ/ Cell	Charge the cell 0.1C 14hrs,then leave for 24hrs,check Cell before/after vibration, Amplitude 1.5mm Vibration 3000 CPM Any direction for 60mins.	
Impact Resistance		Change of voltage should be under 0.02V/ Cell Change of impedance should be under 5 mΩ/ Cell	Charge the cell 0.1C 14hrs Then leave for 24hrs,check bat-before/after dropped, Height 50cm Wooden board(thickness 30mm) Direction not specified, 3 times.	

7. Configuration, Dimensions and Markings

Please refer to the attached drawing.

8. External appearance

The cell/battery shall be free from cracks, scars, breakage, rust, discoloration, leakage nor deformation.

9. Warranty

One year limited warranty against workmanship and material defects.

10. Caution

(1) Reverse charging is not acceptable.

(2) Charge before use. The cells/batteries are delivered in an uncharged state.

(3) Do not charge/discharge with more than our specified current.

(4) Do not short circuit the cell/battery Permanent damage to the cell/battery may result.

(5) Do not incinerate or mutilate the cell/battery.

(6) Do not solder directly to the cell/battery.

(7) The life expectancy may be reduced if the cell/battery is subjected adverse conditions like: extreme temperature, deep cycling, excessive overcharge/ over-discharge.

(8) Store the cell/battery uncharged in a cool dry place. Always discharge batteries before bulk storage or shipment.

11. Notes

(1) T_1: Ambient Temperature.

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

(3) IEC61951-1(2003) 7.4.1.1 Cycle Life:

Cycle No.	Charge	Rest	Discharge
1	0.1C×16h	None	0.25C×2h20min
2-48	0.25C×3h, 10min	None	0.25×2h20min
49	0.25C×3h, 10min	None	0.25C to 1.0V/ cell
50	0.1C×16h	1-4h	0.2C to 1.0V/ cell
Cycles 1 to so shall be repeated until the discharge duration on any 50th Cycle becomes less than 3h.			

(4)IEC61951-1(2003)7.4.2.3 Cycle Life:

Cycle No	Ambient temperature	Charge	Discharge	Minimum discharge duration
1	+40℃+/-2℃	0.05C for 48h	0.2C to 1.0V	No requirement
2		0.05C for 24h	0.2C to 1.0V	3h, 45min
3		0.05C for 24h	0.2C to 1.0V	3h, 45min
4	+70℃+/-2℃	0.05C for 60days	0.2C to 1.0V	No requirement
5		0.05C for 60days	0.2C to 1.0V	
6		0.05C for 60days	0.2C to 1.0V	
7	+40℃+/-2℃	0.05C for 48h	0.2C to 1.0V	No requirement
8		0.05C for 24h	0.2C to 1.0V	2h, 30min
9		0.05C for 24h	0.2C to 1.0V	2h, 30min