Kokam
Engineering Co.,Ltd.

CONFIDENTIAL

Superior Lithium Polymer Battery

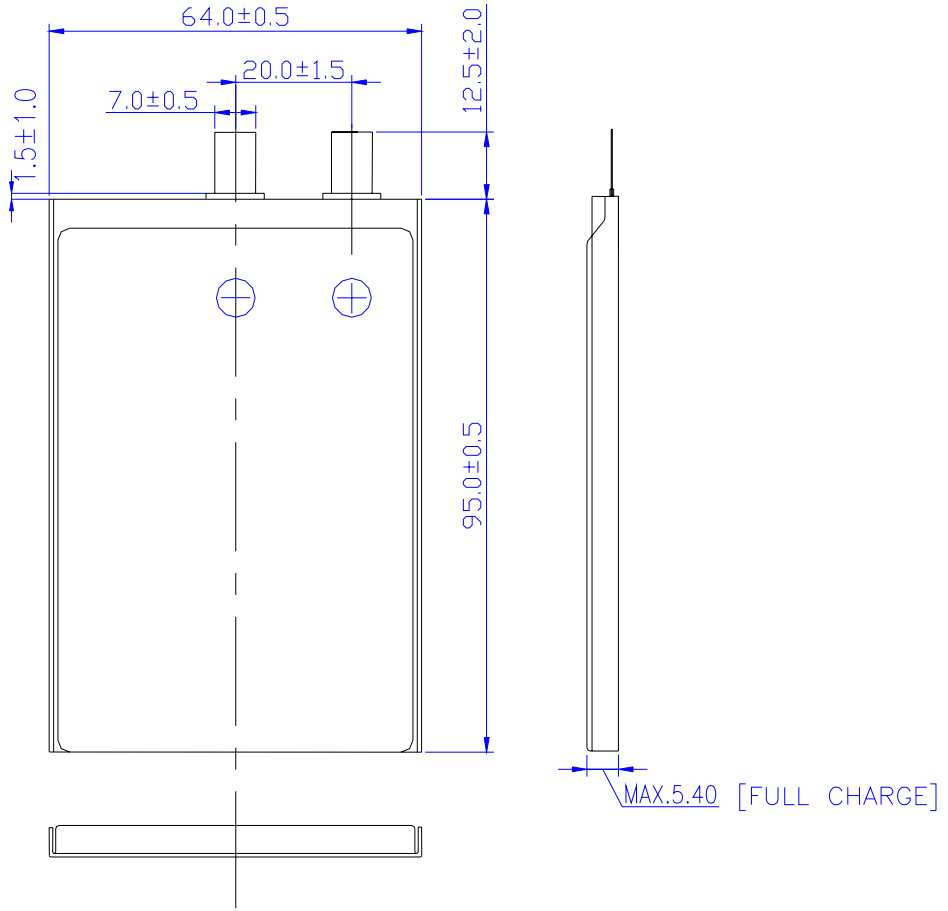
SLPB 526495

April 22, 2003

KOKAM ENGINEERING CO., LTD

Kokam
Engineering Co.,Ltd.

Dimension Specifications



Kokam
Engineering Co.,Ltd.

Specifications

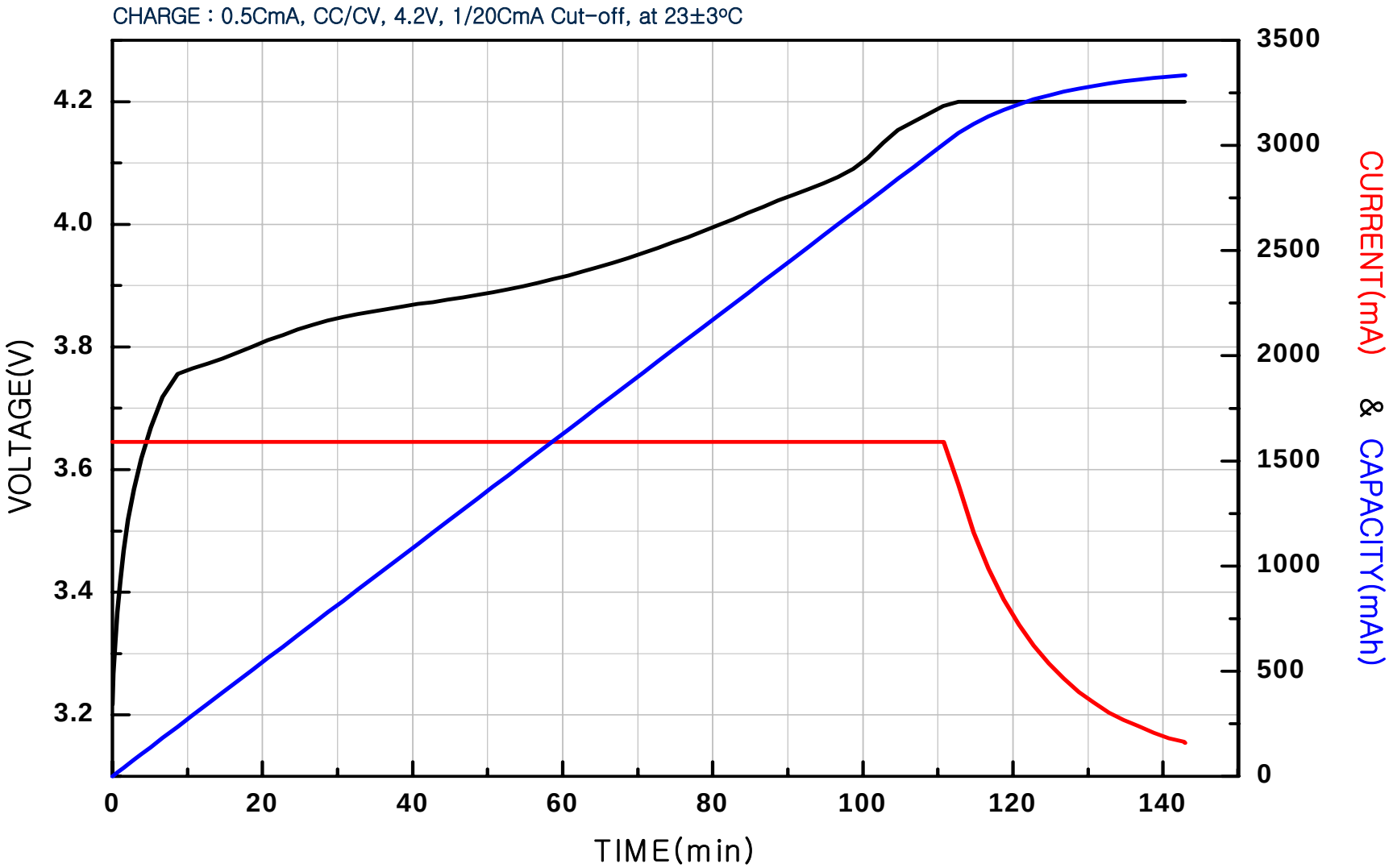
NO	ITEM		SPECIFICATIONS	REMARKS
1	Rated Capacity*1		Typ. 3300mAh Min. 3180mAh	
2	Nominal Voltage		3.7 V	
3	Charge Condition	Max. Current	1.0CmA(3180mA)	
		Voltage	4.2 ± 0.03V	
4	Discharge Condition	Max. Current	2.0CmA	
		Cut-off Voltage	3.0 V	
5	AC Impedance (mOHM)		TYP. 12 MAX. 18	AT 1KHz
6	Operating Temperature	Charge	0°C ~ 45°C	
		Discharge	-20°C ~ 60°C	
7	Weight(Approx.g)		64.0	
8	Energy Density	Volumetric	386 Wh/ l	
		Gravimetric	190Wh/kg	

**1. Rated Capacity : 0.2C, 3.0V cutoff Average Discharge Capacity*

Performance Data

NO	ITEM		CRETERION	REMARKS
1	C-rate Charateristics	0.2C	100%	■ Test Temperature : 23°C ■ Charge : 0.5CmA,CC/CV,4.2V ■ Discharge : Each Rate,CC,3.0V
		0.5C/0.2C	> 98%	
		1.0C/0.2C	> 95%	
		2.0C/0.2C	> 85%	
2	Temperature Dependence of Capacity	60°C	> 95%	■ Percentage of 23°C capacity is 100%. ■ On the standing setting temperature, Cell state is full-charge(4.2V) ■ Measured with discharge current 0.5CmA with 3.0V ■ Interval for temperature's change is 2Hr.
		45°C	> 95%	
		23°C	100%	
		0°C	> 90%	
		-10°C	> 70%	
3	Cycle Life Characteristics [Charge : 1.0C,CC/CV,4.2V,C/20 end Discharge : 1.0C,CC,3.0V]		500cycles	■ More than 80% of initial capacity
4	Storage Characteristics (Recovery Capacity)	6Month at 20°C	> 90%	■ On a storage, Cell state is 40%~50% charge(3.7~3.9V).
		3Month at 45°C	> 80%	
		1Month at 60°C	> 80%	

Charge Characteristics (0.5CmA)

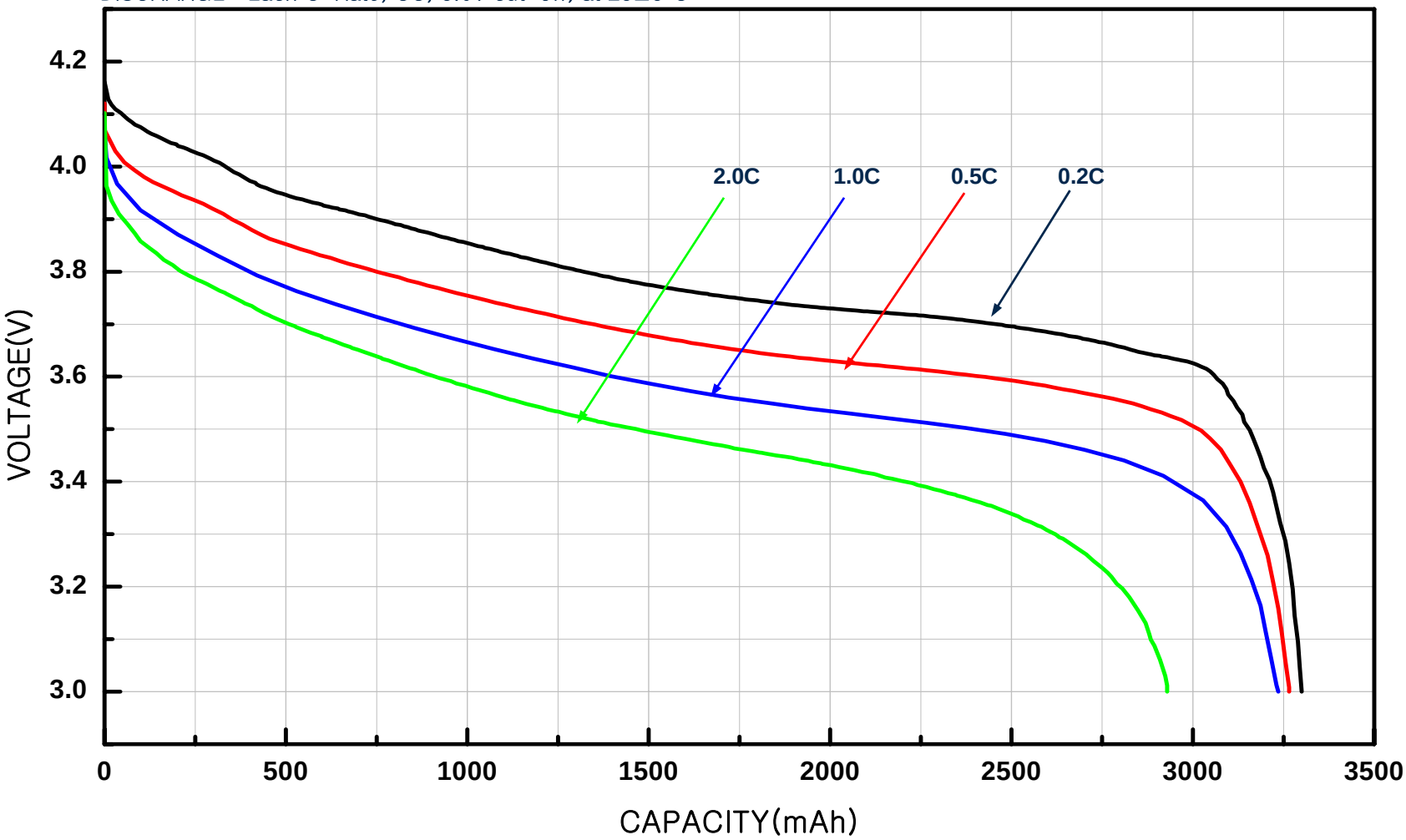


Kokam
Engineering Co.,Ltd.

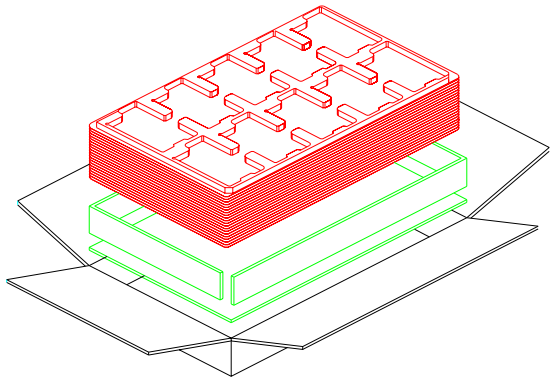
Discharge Characteristics at Various Current

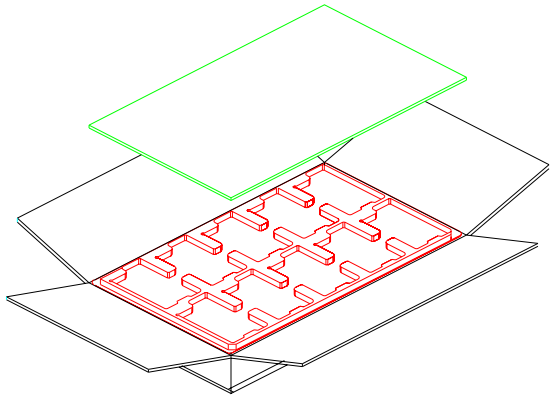
CHARGE : 0.5CmA, CC/CV, 4.2V, 1/20CmA cut-off, at 23±3ºC

DISCHARGE : Each C-Rate, CC, 3.0V cut-off, at 23±3ºC

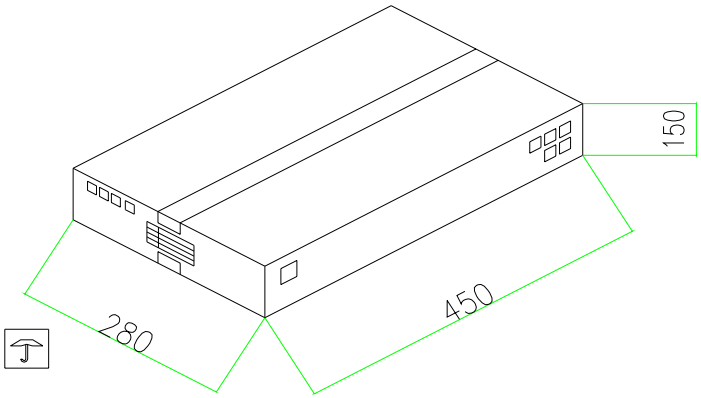


Packing Box





MODEL	SLPB 526495	
ITEM	SIZE or Q'ty	WEIGHT(kg)
BOX SIZE(L*W*H)	450*280*150	0.54
CELL	180 CELLS	11.54
TRAY	19 EA	0.82
BUFFER PAPER	UP&DOWN 2 EA	0.18
	SIDE 2 EA	0.14
TOTAL WEIGHT		13.2



Handling Precautions

For use of this battery, must follow as specified below. Other than conditions listed may cause major burst, fire, some smokes and it will cause severe performance failure and unsafe for use. Please be sure to follow instructions carefully.

1. Protection Circuit Module(PCM)

(1) The Cell(s)/Battery Pack shall be with a PCM which can protect Cell(s)/Battery Pack properly.
PCM shall have functions of (i) overcharging prevention, (ii) over-discharging prevention, and (iii) over-current prevention, to maintain safety and prevent significant deterioration of cell performance. The over current can occur by external short circuit.

(2) Overcharging Prohibition

Overcharging prevention function shall work if any one of the Cells of the battery pack reaches to 4.30V above which charging shall be stopped.

(3) Over-discharge Prohibition

Over-discharging prevention function shall work to minimize a dissipation current to avoid further drop in cell voltage of 2.70V or less per cell in either cells of the battery pack. It is recommended that the dissipation current of PCM shall be designed to be minimized such as 0.5 micro-amperes or less after the over-discharge prevention function works.

2. Consideration of strength of package film

(1) Aluminum Laminate Film

Easily damaged by sharp edge parts such as Ni-tabs, pins and needles, comparing with metal can case LIB.

(2) Film sealed part

May be damaged by heat above approximately 90^{O}C. (Seal break may cause Electrolyte leakage)

3. Prohibition short part

Never make short circuit the Cells. It makes generation of very high currents which subsidiary cause heating of the Cells, which may cause the electrolyte leakage, gassing or explosion which are very dangerous. The SLPB tabs may be easily short-circuited by putting them on conductive surface. (Such outer short circuit may lead to heat generation and damage of the cell.)
An appropriate circuitry with PCM shall be employed to protect accidental short circuit of the battery pack.

4. Mechanical Shock

SLPB cells have less mechanical endurance than metal can case LIB. **Falling, hitting, bending, etc. may cause degradation on SLPB characteristics**.

(1) Don't cut, deform, tear or drill the laminate film of battery.

(2) Don't twist or bend the battery. Keep the battery away from excessive pressure especially on the boundary between the body and the sealed part

5. Handling of tabs

The SLPB tabs are not so stubborn especially for aluminum tabs as positive terminal. **Do not put much force on SLPB tabs**. (Aluminum tab may easily be torn off by shear force.)

Kokam
Engineering Co.,Ltd.

Handling Warning

1. Cell connection

(1) Direct soldering of wire leads or devices to the Cell is strictly prohibited.
(2) Lead tabs with pre-soldered wiring shall be spot welded to the Cells.
Direct soldering may cause damage of component, such as separator and insulator, by heat generation.
(3) Don't reverse polarity (and terminal)
On charging, the battery is reverse-charged and abnormal chemical reaction occurs. And also, there may be case that unexpected large current flows on discharging. There cause the generating, smoke, rupture or flaming

2. Prohibition of Disassemble the Cells.
(1) The disassemble the Cells
The disassembling may cause a chance to generate internal short circuit in the Cell, which may cause gassing, firing, explosion or other troubles.
(2) Electrolyte is harmful
An electrolyte happens to be leaked out from the Cells is harmful to the human bodies. In case if the electrolyte is coming in contact with the skin, eyes or others, the electrolyte shall be flushed immediately with fresh water and seek medical advice by physicians.

3. Prohibition of Dumping of Cells into Fire
Never incinerate nor dispose the Cells in fire. These may cause explosion of the Cells, which is very dangerous and is prohibited.

4. Prohibition of Cells immersion into liquid such as water
The cells shall never be soaked with liquids such water, sea water, drinks such as soft drinks, juices, coffee or others.

5. Keep the battery away from babies
Keep the little battery out of the reach of babies in order to avoid troubles by swallowing. In case of swallowing the battery, see a doctor immediately.

6. Prohibition of getting into a microwave or a high pressure container
It causes the generating, smoke, rupture or flaming because of sudden heat or damage of sealing condition of battery

7. Battery Cells Replacement
The battery replacement shall be done only by either Cells supplier or device supplier and never be done by the user.

8. Prohibition of User of Damaged Cells
The Cells happens to have a chance to be damaged during shipping by any shocks.
If any abnormal features of the Cells are found such as damaged in a packaging film of the Cell, deformation of the Cell, smelling of an electrolyte, an electrolyte leakage and others, the Cells shall never be used any more.