

Technical Information of 18650HE4 (2.5Ah)

Oct. 23 , 2014

High Power Cell Development Team

Summary of HE4 (2.5Ah)

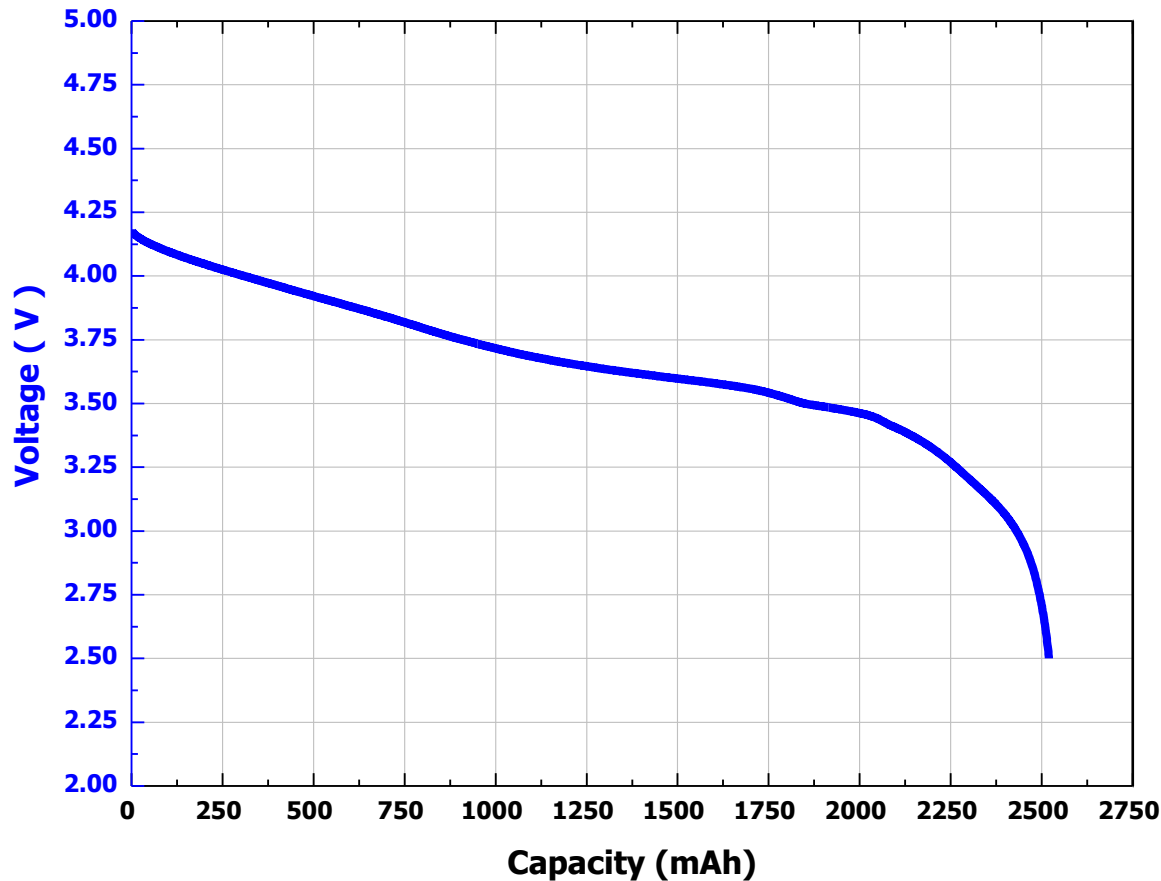
Type		Spec	Actual
Chemistry		Cathode: Conventional NMC (not Ni rich) / Anode: Graphite + SiO	
Dimensions (mm)	Diameter	18.3 +0.2/-0.3 mm	
	Height	65.0 ± 0.2 mm	
Weight (g)		Max. 47	45~46
Initial IR (mΩ AC 1kHz)		Max. 20	13~15
Initial IR (mΩ DC)		Max. 30	23~25
Nominal Voltage (V)		3.6V	
Charge Method		Nominal : 1.25A 4.2V, 50mA End-current (CC-CV)	
		Fast : 4A 4.2V, 100mA End-current (CC-CV)	
Charge Time	Nominal (min)	154	
	Fast (min)	85	
Charge Current	Nominal Current (A)	1.25A	
	Max. Current (A)	4A	
Discharge	End Voltage (V)	2.5V	
	Max. Current (A)	20A (Continued discharge current)	
0.2C Capacity	Nominal (Ah)	2.5	
Energy Density	Nominal (Wh/kg)	196	

0.2C Capacity (IEC61960)

- Test Conditions

- Charge : 1.25A(0.5C) charge to 4.2V,50mA Cut-off at RT

- Discharge : 0.5A(0.2C), 2.5V cut off

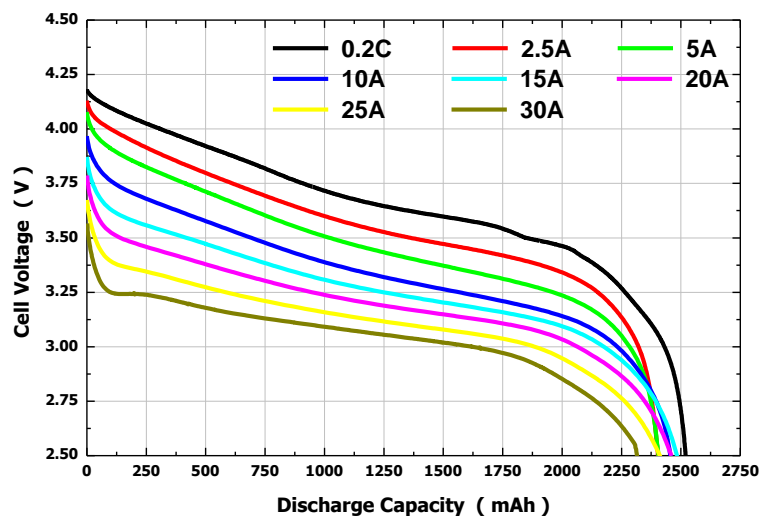


Cell Resistance (AC/DCIR)

No.	Requirement [mΩ]	DC IR [mΩ]	Requirement [mΩ]	AC IR [mΩ]
		1 st		
1	≤ 30	23.8	≤ 20	14.0
2		23.9		13.9
3		24.0		13.8
4		24.0		14.0
5		24.1		14.1
6		24.2		13.9

Rate Performance

Discharge Characteristics



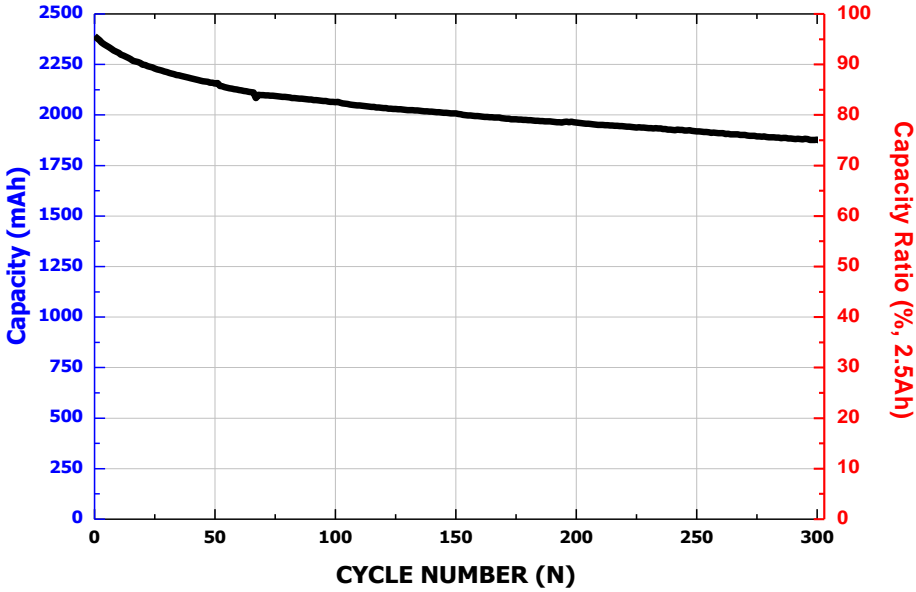
	0.2C	2.5A	5A	10A	15A	20A	25A	30A
Capacity [mAh]	2520	2404	2406	2457	2485	2460	2415	2315
% C _N	101%	96%	96%	98%	99%	98%	97%	93%
Energy [Wh]	9.6	8.5	8.3	8.2	8.1	7.8	7.5	7.1
% W _N	107%	94%	92%	91%	90%	87%	83%	79%

▪ Test Conditions

- Charge : 4A charge to 4.2V, 0.1A Cut-off
- Discharge : 0.2C-1C-5A-10A-15A-20A-25A-30A, 2.5V Cut-off

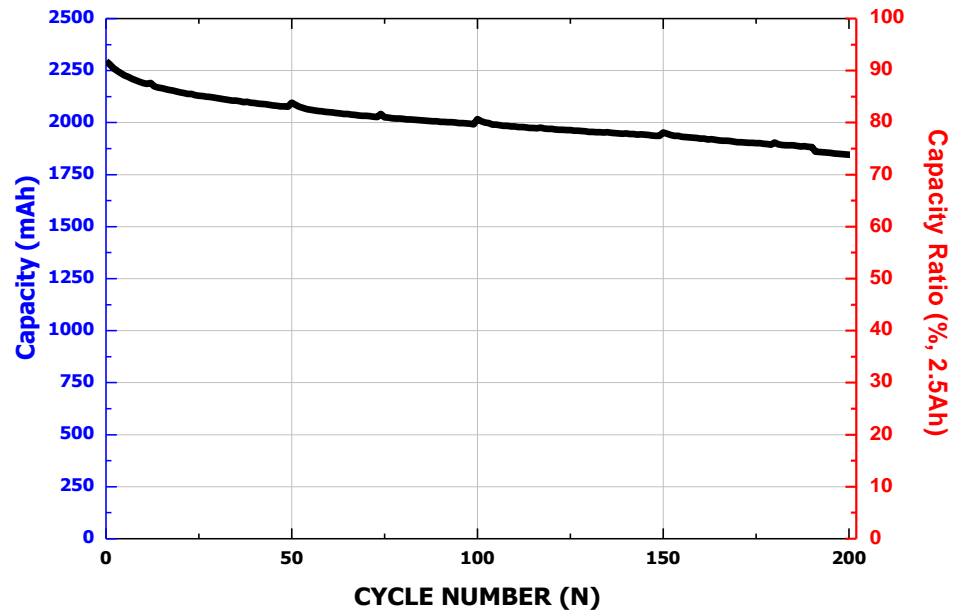
Cycle Life (Continuous, 22A & 30A CYCLE)

[22A cycle]



- Test Conditions
 - Charge : 4A charge to 4.2V, 0.1A Cut-off
 - Discharge : 20A, 2.5V Cut-off, 75°C Cut off, 50°C re discharge

[30A cycle]



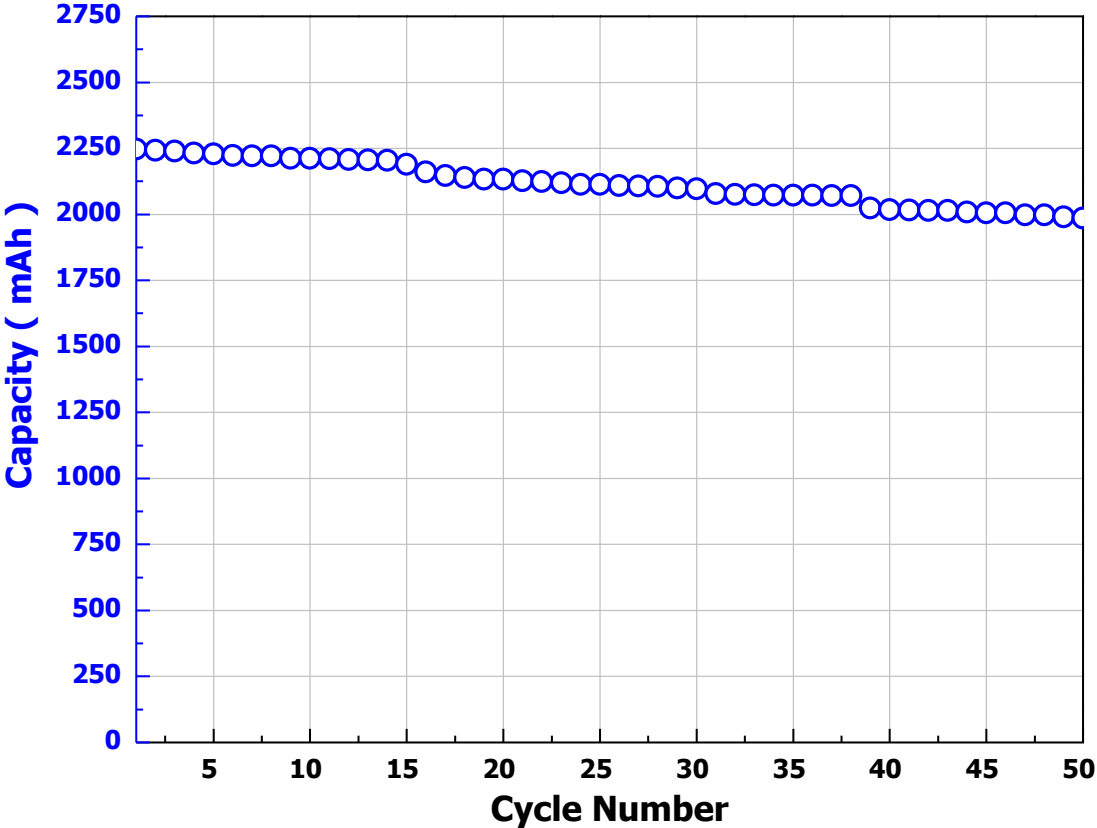
- Test Conditions
 - Charge : 4A charge to 4.2V, 0.1A Cut-off
 - Discharge : 30A, 2.5V Cut-off, 75°C Cut off, 50°C re discharge

Cycle Life (High Current Pulse)

- Test Conditions

- Charge : 4A to 4.2V, 100mA Cut-off at 23°C

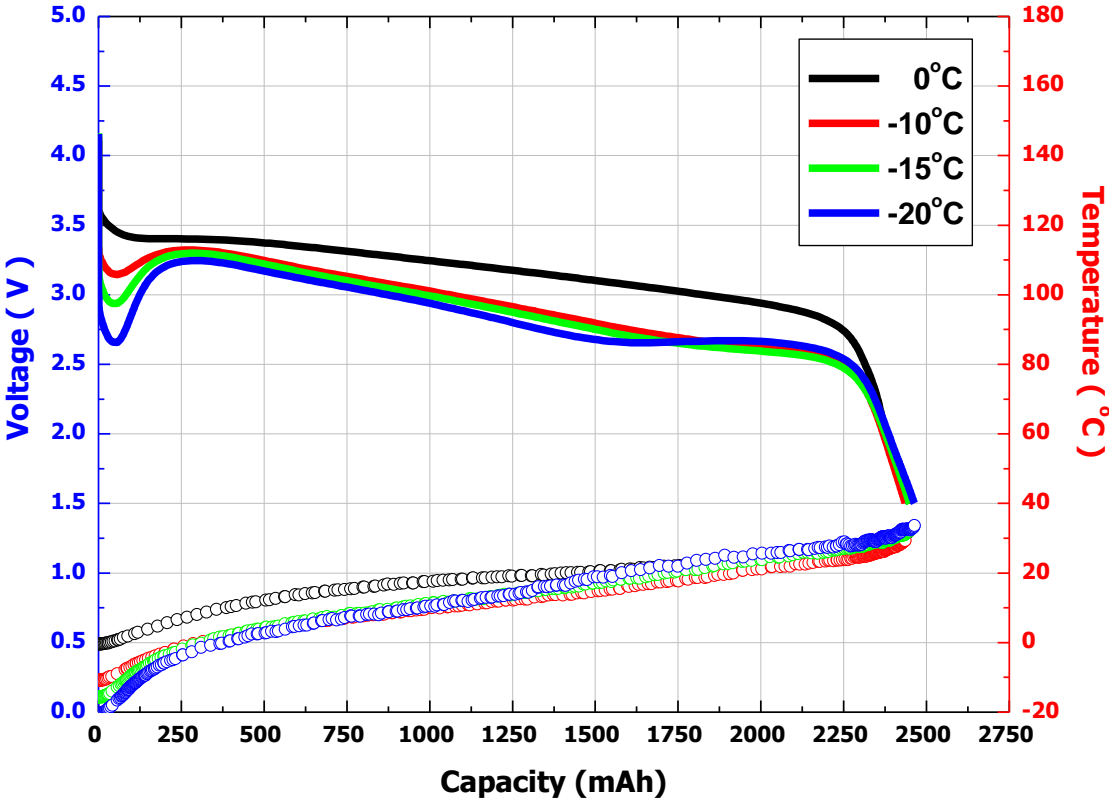
- Discharge : 95A, 0.5sec → 80A, 0.5sec → 45A, 5sec → 30A, 6sec → rest 6sec, 1.5V cut-off at 23°C



Low Temp. Performance (Discharge)

- Test Conditions

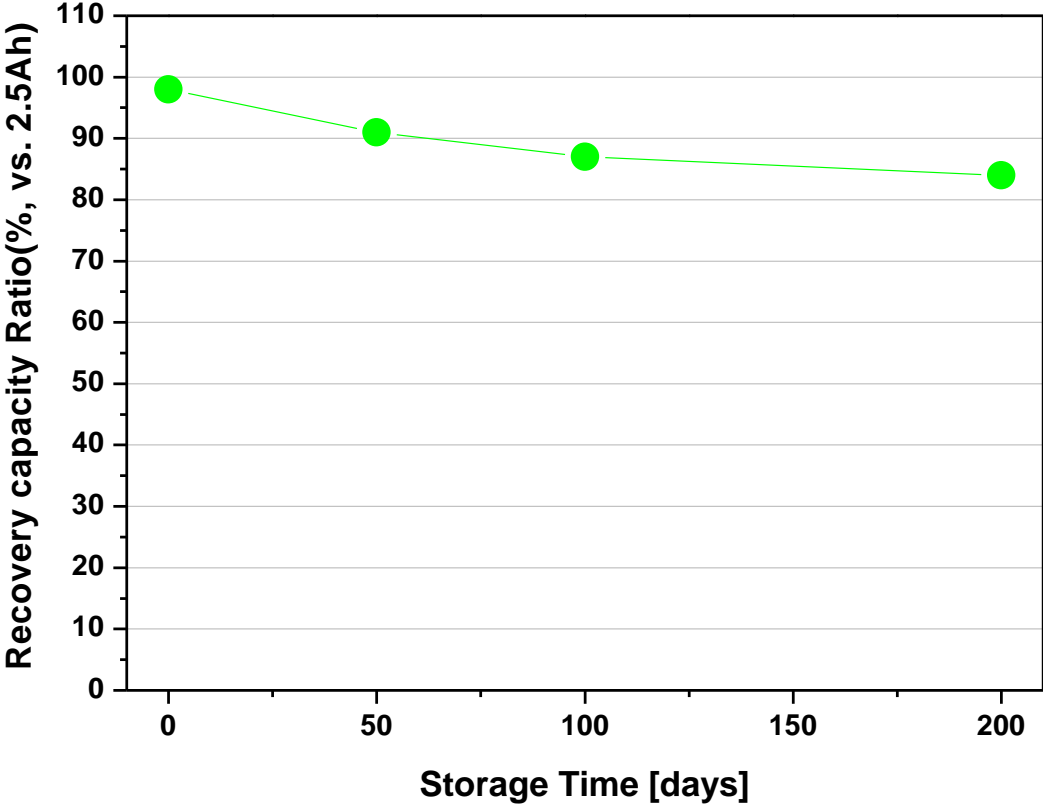
- Charge : 4A charge to 4.2V, 100mA Cut-off at RT
- Discharge : 10A, 1.5V Cut-off at -20~0°C



Storage (SOC100%, 60°C)

- Test Conditions (Capacity measurement)
 - Charge : 4A charge to 4.2V, 100mA Cut-off at RT
 - Discharge : 10A, 2.5V Cut-off at RT

[Recovery capacity]



Safety Test - International certification

Classification		Test Items	Results
International certification	UL1642	Short circuit / Abnormal charging / Crush / Impact / Heating / Projectile	Pass
	UN38.3	Altitude simulation/ Thermal test / Vibration / shock / External short / Impact / overcharge / Forced discharge	Pass
	IEC62133	Continuous Low rate charging / Vibration / Temperature cycling / External short circuit / Free fall / Mechanical shock / Thermal abuse / Crushing of cells / Low pressure / Overcharge / Forced discharge / Cell protection against a high charging rate	Pass
	PSE	Continuous Low rate charging / Vibration / Temp. cycling / External short circuit / Free fall / Mechanical shock / Thermal abuse / Crushing of cells / Low pressure / Overcharge / Forced discharge / Cell protection against a high charging rate / Forced Internal short circuit of cells	Pass

Dimension Drawing

Can material: Steel (Nickel-plated)
Tube material: Colored PET ($t=0.08 \pm 0.02$ mm)

