

E-One Moli Energy (Canada) Limited	Document Name	E013RJ Product Electric Specification Model Name: ME202CJ			
	Document No.	EME33-E013	Ver.	1.1	Page 1/6

1 Scope

This specification is applied to E013RJ type Lithium Ion rechargeable battery packs with SMBus 1.1 interface.

2 Applicable product and Customer model name

2.1 Applicable product

E013RJ (3S3P) rechargeable lithium ion battery pack for Notebook Computer.

2.2 Customer model name

ME202CJ

3 Composition

Rechargeable lithium ion cells (3 series 3 parallel) and control circuit.

Cell (R2400mAh): Manufactured by E-ONE Moli Energy (Canada) Limited.

4 Product specification

No.	Item	Rated performance	Remark
1	Typical capacity	7100mAh	Rated discharge ¹ capacity after rated charge ² .
2	Minimum capacity	6745mAh	Rated discharge capacity after rated charge.
3	Nominal voltage	11.1V	Mean operation voltage during rated discharge after rated charge.
4	Voltage at end of discharge	9.0V	Stops discharge when the pack voltage reaches 9.0V.
5	Charge voltage	12.6V	
6	Maximum charge voltage	12.7V	
7	Maximum continuous charge current	4.0A	At 25 ± 2°C.
8	Maximum continuous discharge current	6.0A	Maximum discharge 54 W at 25 ± 2°C, stops discharge when the pack voltage reaches 9.0V.
9	Operating temperature Range	Charge 0~50°C	Rated discharge and rated charge.
		Discharge 0~50°C	Rated discharge and rated charge.
10	Storage temperature range	-20~60°C	Max. 1 month
11	Humidity	10% ~ 90% RH	Operation
		5% ~ 95% RH	Storage
12	Pack weight	Below 520g	

¹ Rated discharge; Constant current discharge (0.2CA) till the discharge end V (9.0V) at 25 ± 2°C.

² Rated charge; 12.6 ± 0.05V constant voltage and 0.5CA current limited charge, for 3.0 hours at 25 ± 2°C.

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5 Performance and test condition³

No.	Item	Standards	Test conditions (Note 3)						
1	Outside appearance	No prominent stain, deformation or damage.	Visual check						
2	Outside dimension	According to drawing.	Use a caliper (0.5mm a division).						
3	Initial Internal resistance	Below 300mΩ	Measured by the alternate current method (1kHz) within one hour after the rated charge. (25 ±2°C)						
4	Open circuit voltage	Above 12.0 V	Measured within twenty-four hours after the rated charge. (25 ±2°C)						
5	Cycle life	Above 240 minutes	Carry out 300 cycles at rated charges and rated discharges. (25 ±2°C) Then measured rated discharge time after the rated charge. (at 301st cycle)						
		Above 180 minutes	Carry out 500 cycles at rated charges and rated discharges. (25 ±2°C) Then measured rated discharge time after the rated charge. (at 501st cycle)						
6	Temperature shock cycle	No outside abnormality Above 200 minutes	5 times of cycles test under the following environment are made to the cell after the rated charge. Then measure the rated discharge time and check outside appearance immediately after the rated charge. 60°C, 2 hours ↔ -10°C, 8 hours						
7	Long time storage performance	Above 250 minutes	Storage the cell at 50% capacity condition. Cell shall be rate discharge and rate charge. Then measure the rated discharge time. This test can be carried out up to three times if discharge time is below specified time						
		<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Storage temperatures</th> <th>Storage periods</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">60°C</td> <td style="text-align: center;">1 month</td> </tr> <tr> <td style="text-align: center;">45°C</td> <td style="text-align: center;">3 months</td> </tr> </tbody> </table>		Storage temperatures	Storage periods	60°C	1 month	45°C	3 months
Storage temperatures	Storage periods								
60°C	1 month								
45°C	3 months								
8	Charge retention performance	Above 200 minutes	Leave 30 days at 25 ±2°C after rated charge. Then measure elapsed time at rated discharge.						

³ Test will be carried out using new cells within one month after delivery.

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No.	Item	Standards	Test conditions (Note 3)
9	Overcharge performance	No leakage or prominent breakage	Charge the sample after discharge till end voltage at constant current and constant voltage (0.5CA/13.5±0.05V) for 24 hours at 25 ±2°C. Then measure the rated discharge time and check outside appearance immediately after the rated charge.
10	Over discharge performance	No leakage or prominent breakage	Discharge the sample for 24 hours by connecting to 15.0Ω resistor at 25 ±2°C after rated charge. Then measure the rated discharge time and check outside appearance immediately after the rated charge.
11	Short between terminal (Safety test)	No rupture, fire, smoke or leakage.	Leave a pack shorted between terminals for 8 hour after the rated charge at 25 ±2°C.
12	Reverse charge (Safety test)	No rupture, fire, smoke or leakage.	Connect to a power supply at a reverse polarity condition (0.5C/12.6 ±0.05V) at 25 ±2°C and leave it for 8 hours.
13	Heat Test	No outside abnormality Normal function	Leave rated charged at 50% capacity test sample at 70° ±2°C for 10 hours, then leave for more than 5 hours at 25° ±2°C. Then measure the rated discharge time and check the outside appearance immediately after rated charge.

6 Protection function

6.1 Cell

Built-in safety valve. (Prevent the build-up of internal pressure)

6.2 Built-in control circuit

Built-in control circuit with overcharge prevention function, over-discharge prevention function, over-current prevention function, and high temperature prevention function.

7 Control circuit

7.1 Performance

No.	Item	Rated performance	Remarks
1	Maximum input voltage	13.5V	
2	Circuit current consumption (During storage)	Below 200uA	Measure the current consumption when the cell voltage is 3.5V

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7.2 Protection function

No.	Functional item	Control function and operation	Condition for reset
1	Overcharge First Protection Function	Shut down the circuitry and stop the charging process if the cell voltage becomes above $4.275 \pm 0.050V$ lasting for a few seconds (Possible to discharge)	Discharge the cell voltage below $4.150 \pm 0.050V$.
2	Overcharge Second Protection Function	Shut down the circuitry and stop the charging / discharge process if the cell voltage becomes above $4.450 \pm 0.050V$ lasting for a few seconds.	Not recoverable. (Impossible to charge or discharge)
3	Over Discharge Protection Function	Shut down the circuitry and stop the discharge if the cell voltage becomes less than $2.750 \pm 0.050V$. (Possible to charge).	Recover the cell voltage above $3.380 \pm 0.050V$ by pre-charging.
4	Over Current Discharge Protection Function	Stop the discharge if the discharge current is over $6.3A \sim 8.7A$ lasting for few seconds	Remove discharge load for few minutes.
5	Over Current Charge Protection Function	Stop the charge if the charge current is over $4.3A \sim 6.7A$ lasting for few seconds.	Remove charger for few minutes.
6	Over Temperature Protection Function	Stop the discharge and charge if the temperature inside the battery packs raises over $85 \pm 3^{\circ}C$.	Recover when the temperature inside the battery pack falls to $25^{\circ}C$ from active temperature.
7	Protection For High Temperature	Thermal fuse melts if the temperature inside the battery packs raises over $91^{\circ}C$	Not recoverable. (Impossible to charge or discharge).

7.3 Available Specifications

Smart Battery Data Specification Rev1.1

System Management Bus Specification Rev1.1

7.4 Power gauge description

7.4.1 Description

This battery pack contains an SMBus/SBS 1.1 compliant Fuel Gauge.

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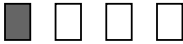



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8. I/O Terminal specifications

Name	Function	I/O	Remark
P+	Terminal for charge and discharge	I/O	
SMC	Terminal for SMBus clock	I/O	Inside 5.6V zener connected between the C and GND
SMD	Terminal for SMBus data	I/O	Inside 5.6V zener connected between the D and GND
ID	Terminal for Resistor output	O	Inside 300Ω fix resistor connected between the ID and GND
P-	GND	I/O	

9. LED light

When the switch is pushed, the LED lamp is lighted as follows according to Relative State of Charge.

RSOC	LED LAMPS
0~24%	
25~49%	
50~74%	
75~100%	

10. Charge state of battery pack before shipment

- Use specified charge/discharge conditions
- Capacity at shipping point: > 40%
- Specified product use only
- Do not short terminals
- Do not immerse in water

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- Do not heat or throw in fire
- Do not leave in conditions of over than 60°C or in a heated car.
- Do not attempt to crush or drop
- Do not attempt to modify
- Do no solder
- Store in cool and dry location
- Do not put it in a microwave oven or pressure container
- If charging time is longer than specified, stop charge
- If the battery voltage is less than the specified discharge voltage, pre-charge the pack at a very low current less than 0.03C. Do not use the battery if it does not recover during the conditioning above
- During assembly, charging, normal use and storage of battery pack, if unusual phenomena such as smell, change of color, mechanical abuse are detected, do not use
- In case of leakage or smells resulting from thermal conditions, wash off the leaked liquid with clean natural water.
- In case of solvent in your eyes, wash off with clean natural water and consult your doctor

11. Others

If any doubt or inconvenience resulting from the specification, both parties shall solve the problem through a mutual discussion.

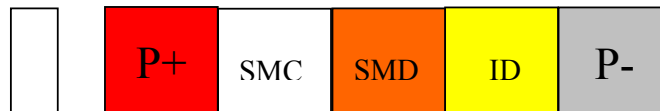
11.1 Warranty Period

12 months from the date of manufacture of pack.

12. Modified History

REV	DATE EFFECTIVE	DESCRIPTION OF REVISION
0.1	March 17, 2004	Preliminary release
0.2	August 23, 2004	First release
1.0	September 15, 2004	Pack configuration: C6 change to C2
1.1	September 16, 2004	ME202AJ Change to ME202CJ

13. Pin Assignment



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