

Lenovo - Sony Technical Meeting

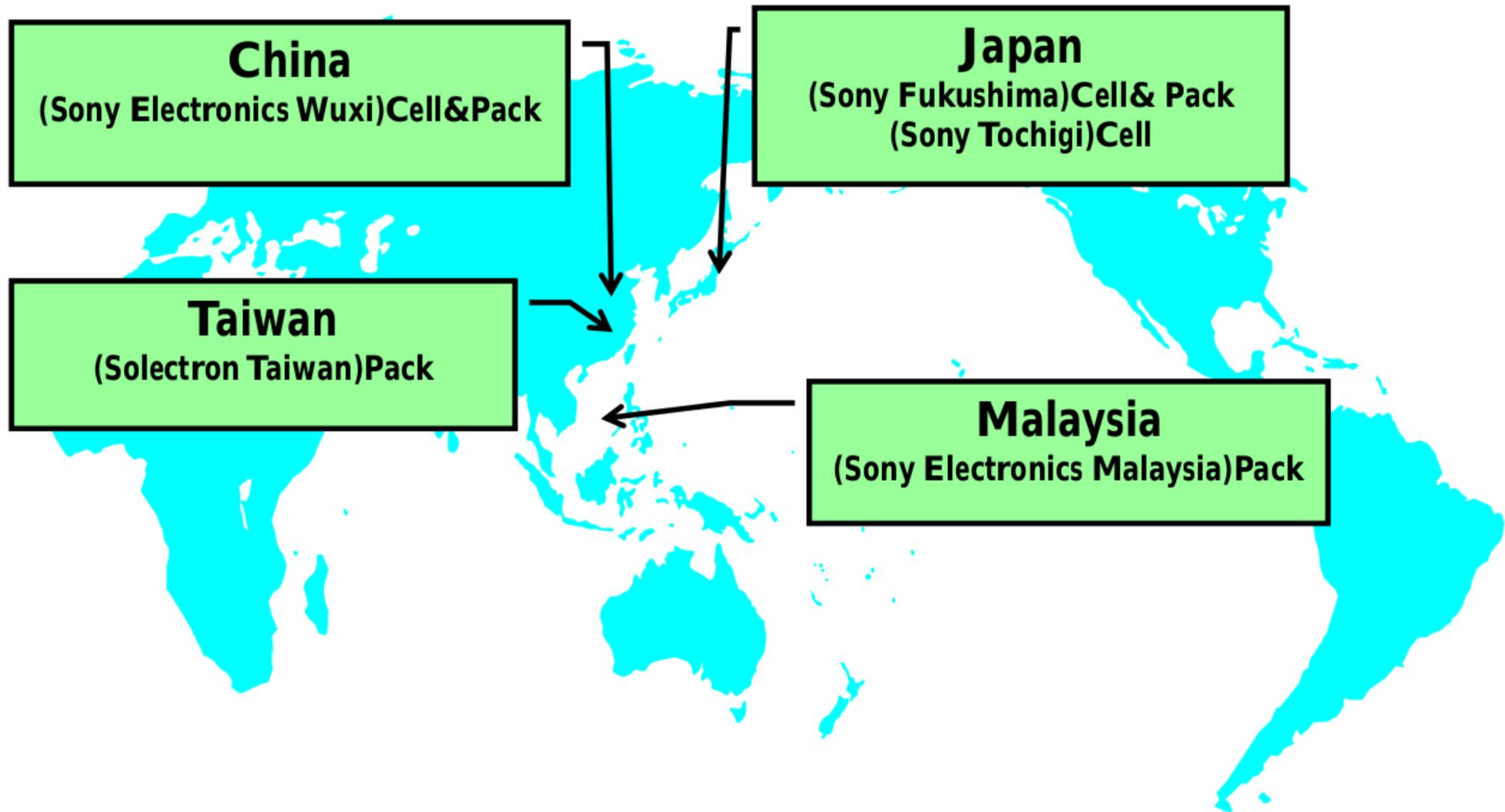
August 27, 2003

Sony Corp.

“Aries” Project Members

Marketing Mgr	Akira SHIRAISHI
China Local Biz Support	Edward WU/Robert GAO
China Local Tech Support	Yukihiro NISHIMURA
Planning Promoter	Kazuhiko YOSHIUCHI
Electrical Mgr	Takanori MARUICHI
Mechanical Mgr	Hiromasa IGUCHI
Software Engr	(Isao SUZUKI)
Safety Engr	Kyusuke KUWAHARA

Factories & Manufacturing Capabilities



Cell Information

- Cylindrical(US18650) & Polymer

Cell Line Up for PC Battery

CELL	CY2003	CY2004	CY2005
Cylindrical Cell Nominal Capacity	US18650G5	2150mAh/8.1Wh	
	US18650G7	2400mAh/9.1Wh	
PC Polymer Cell Nominal Capacity	UP5541100	K2: 2200mAh/8.3Wh	K3: 2400mAh/9.1Wh

US18650G7, Cell Safety Requirement

- Max Charge Voltage; 4.25V/cell (Open Circuit Voltage)
- Cell Temperature;
Charge ; 0 to 60 deg. C
Discharge; -20 to 70 deg. C
- Charging Current ; less than 0.7C
If capacity is 2400mAh, 0.7C means;
 $2.4A \times 0.7 = 1.68A$
- Discharging Current; less than 1.0C
If capacity is 2400mAh, 1C means;
 $2.4A \times 1 = 2.4A$

US18650G7, Electrical Info.

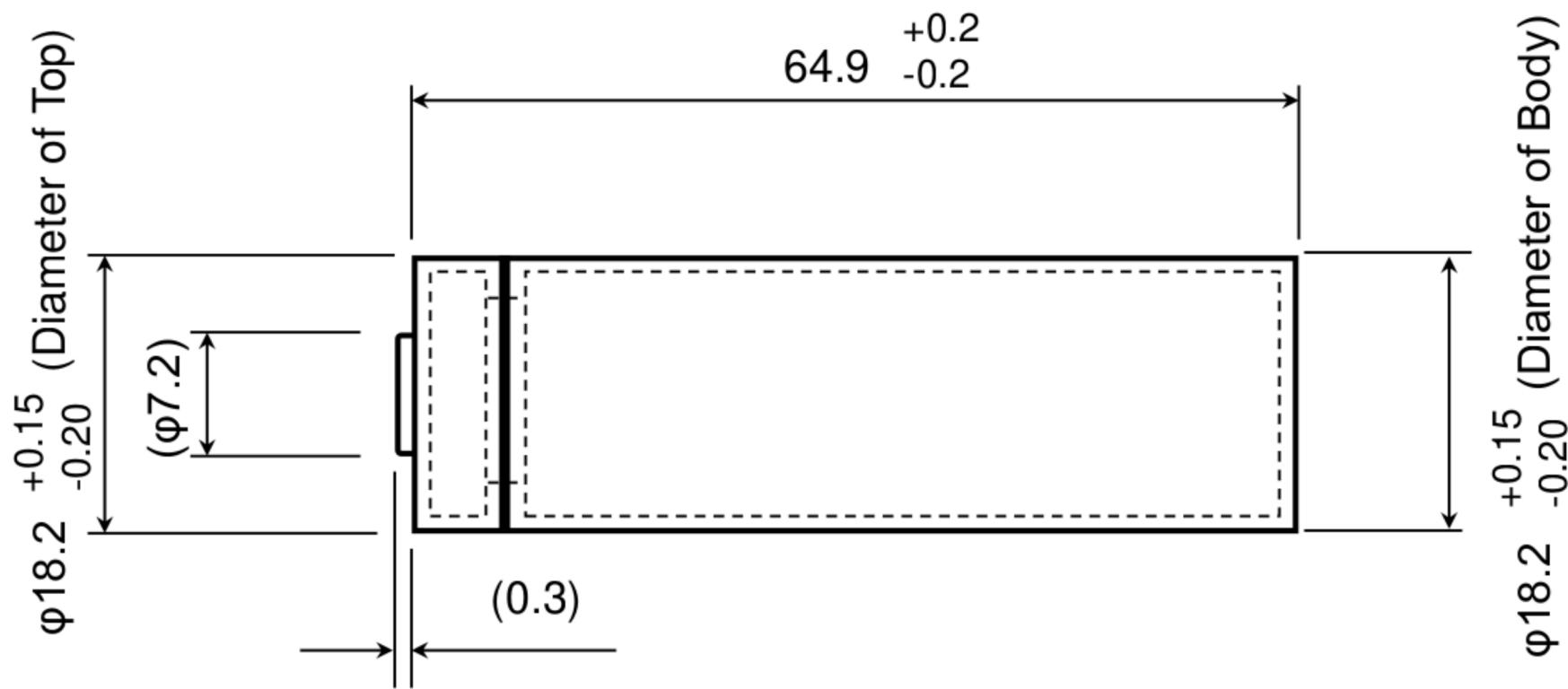
* Standard Charge Condition

Charge Method	: constant current constant voltage	
Charge Up Voltage	: $4.2 \pm 0.05V$	
Charge Current	: 1.0A	
Charge Time	: 5.0 hours charge	
Ambiance Temperature	: $23^{\circ}C$	at room temperature, 3.0V cut off

Nominal Capacity (0.2C discharge)	2400mAh 9.0Wh	average capacity 3.75V (average discharge voltage)
Rated Capacity (0.2C discharge)	2250mAh 8.4Wh	minimum capacity
Capacity at 0.5C	2350mAh (8.6Wh)	average capacity
Capacity at 1C	2300mAh (8.2Wh)	average capacity
Nominal Voltage	3.7V	
Internal Impedance	55mΩ	measured by AC1kHz
Cycle Performance	80 % of Initial capacity at 300 cycles	0.7A discharge

US18650G7, Mechanical Info.

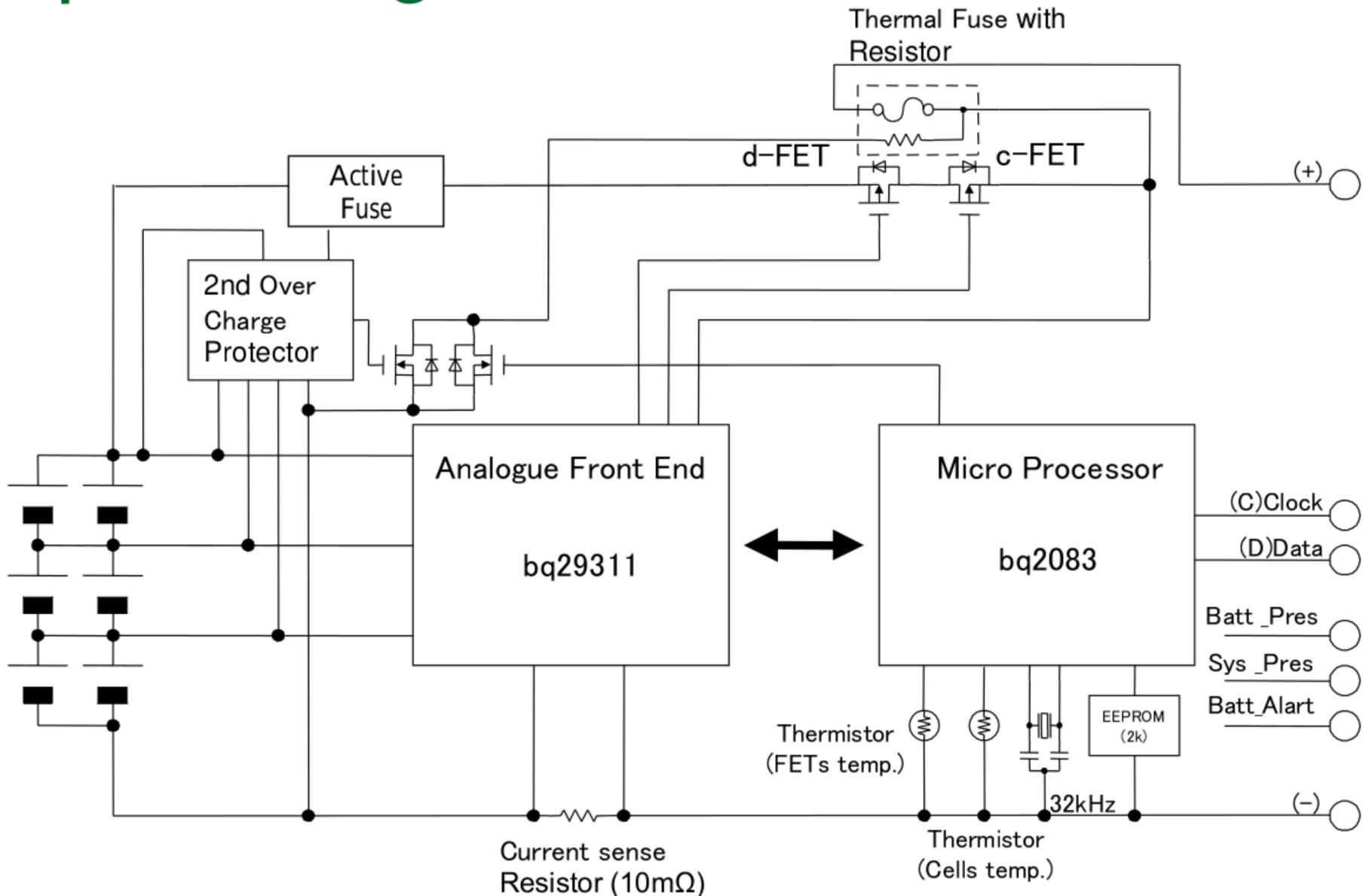
Cell Size (with plastic tube)



uP and AFE Information

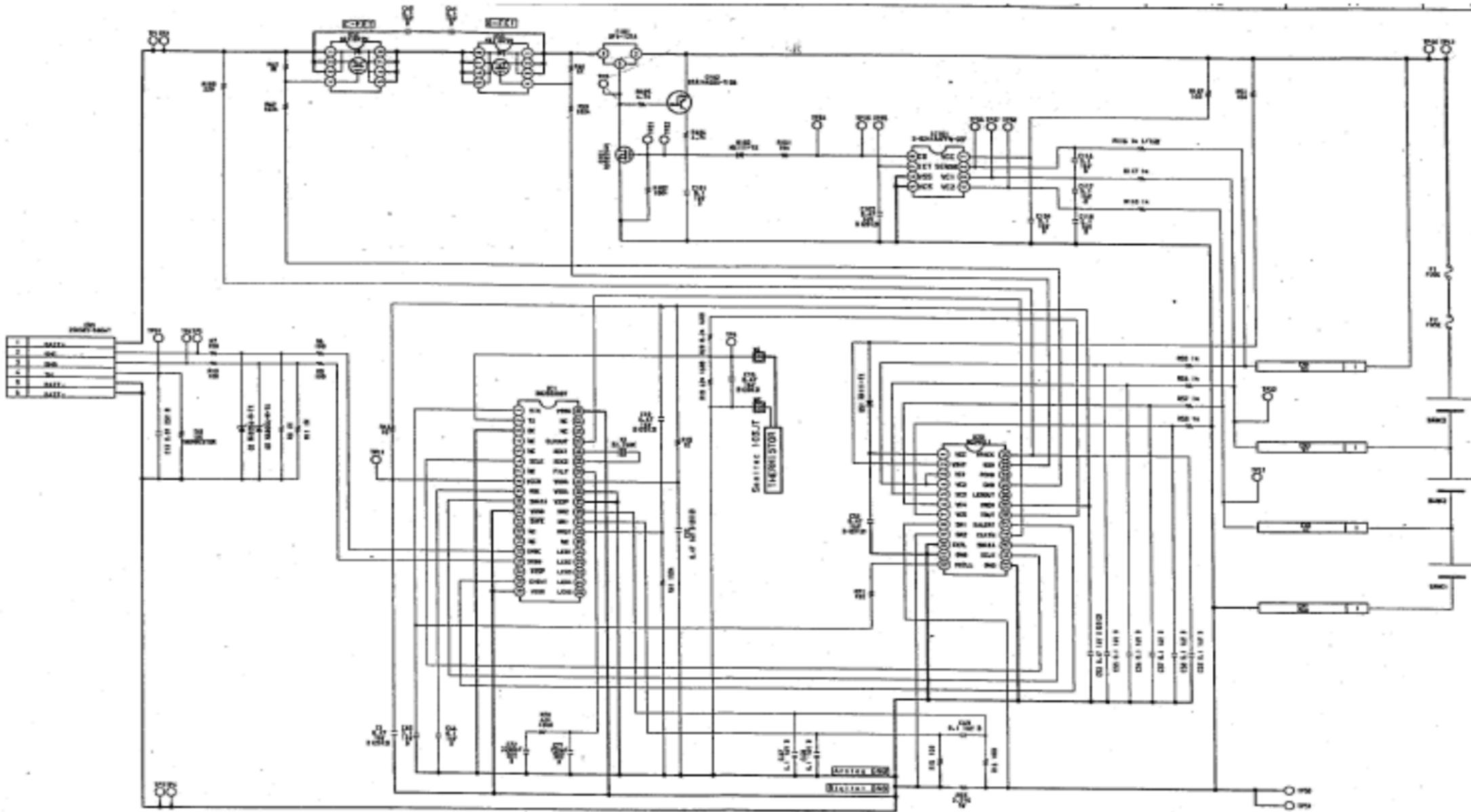
- Micro Processor---bq2083
- Analogue Front End---bq29311

bq-uP Diagram

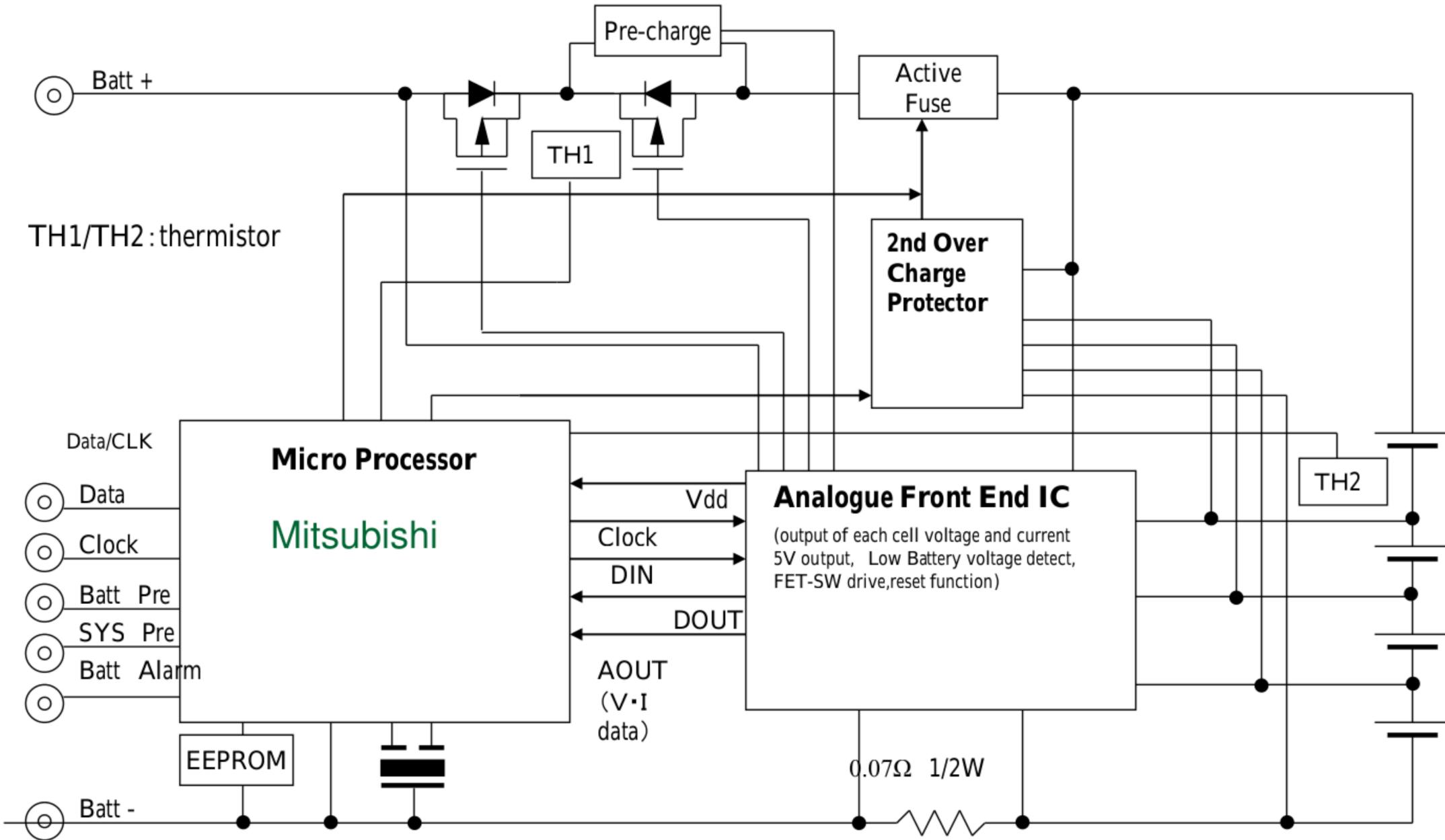


*Battery_pres and Sys_pres are not necessary.

bq-uP Schematic (for example)



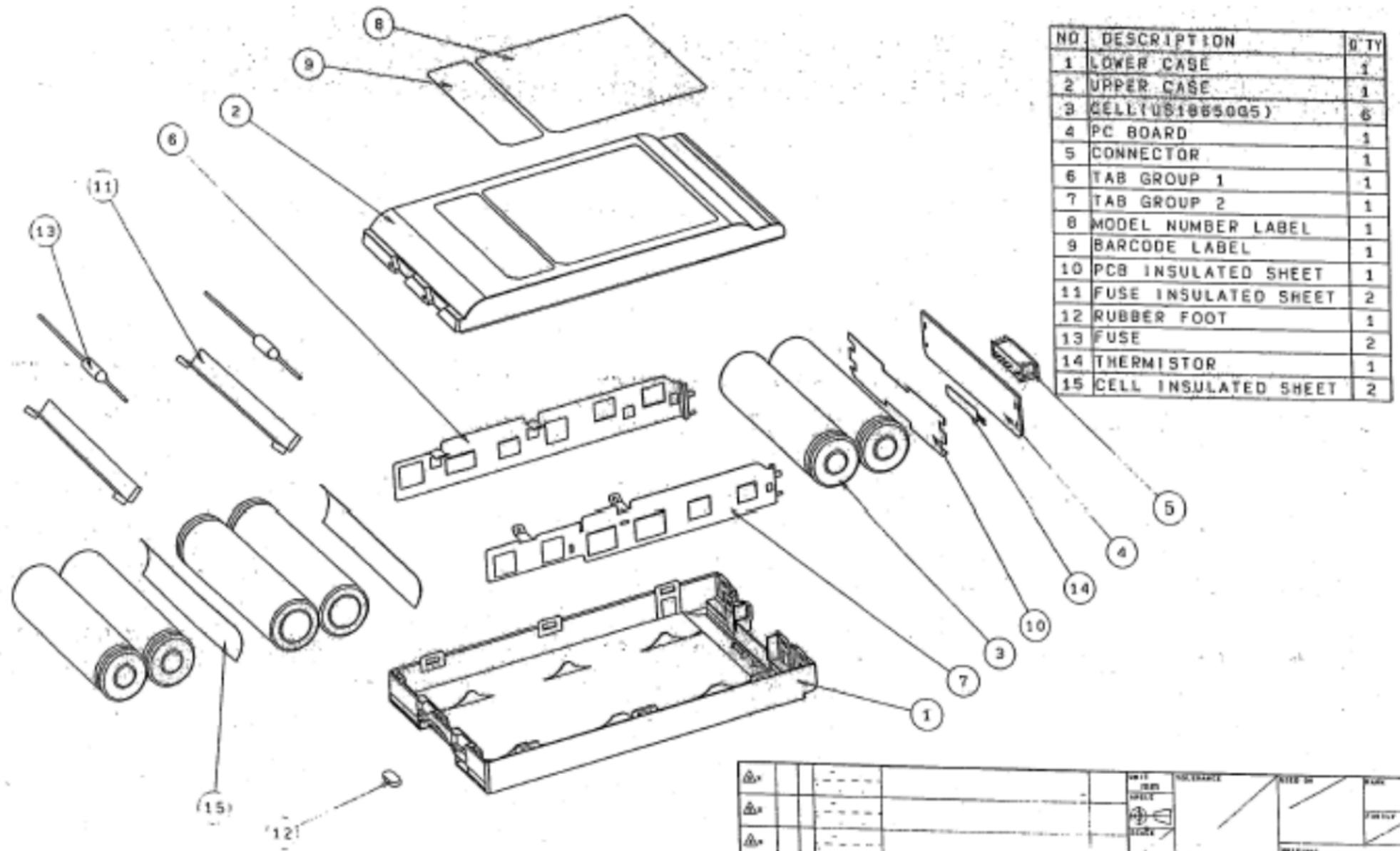
Mitsubishi-uP Diagram (for example)



Mechanical Information

- UL requires UL flammability “V-1” for enclosure.
- Min thickness; 0.8 mm---PC
1.2 to 1.6 mm---PC+ABS

Pack Structure (for example)



* Connection tab and thermal fuses are replaceable to other components.

Development Schedule

Fiscal year	'03/3Q 10 11 12	4Q 1 2 3	'04/1Q 4 5 6	2Q 7 8 9	3Q 10 11 12	4Q
EVT (Hand Made Case)		Design		*EVT sample 2 pcs.		
DVT (Hard Tooling Case)			Hard Tooling (Min. 2 months)		*DVT sample 20 pcs.	
Safety Application				(Min. 1.5 months)		
PVT					Design Approval	
MP					*PVT sample 50 pcs.	Mass Production

WELCOME TO
SONY ELECTRONICS WUXI(SEW)
索尼電子(無錫)有限公司



Wuxi Summary



- **Location:** East longitude $119^{\circ}31'$, North latitude $31^{\circ} 7'$, East of China, the center of Changjiang delta area, 103Km from Shanghai, 147Km from Nanjing
- **Area:** $4,650\text{km}^2$ DT: 517.7km^2
- **Population:** 5 million DT 1.2 million
- **Industry lines:** Mechanism, Electronics, Light-industries, Textile, Chemical, Pharmaceutical
- **GDP** 120.1billion in 2000 , one of the first ten in the country : GDP RMB28,000/person, the 4th in the country
- **Traffic:** Express way to SHA & Nanjing, 312 National Road, Railway to SHA & Nanjing
- **Education:** Jiangnan University

New District Industrial Zone Summary

- **Location:** At the east-south of Wuxi city, 6Km from downtown.
- **Character :** National Hi-tech Industrial Development, No. 1 of the best 50 national hi-tech industrial development
- **Favorable policy:** Income tax rate 15% (Normal area 30%, littoral area 24%)
2 years' income tax-free, 3 years' income tax half-paid
Hi-tech enterprise , - 5 free 5 half

- **Enterprises come in this district:**

America : Seagate, Kodak, GE

German : SIEMENS, BOSCH, Bayer, HOIST

Sweden : VOLVO, Astra

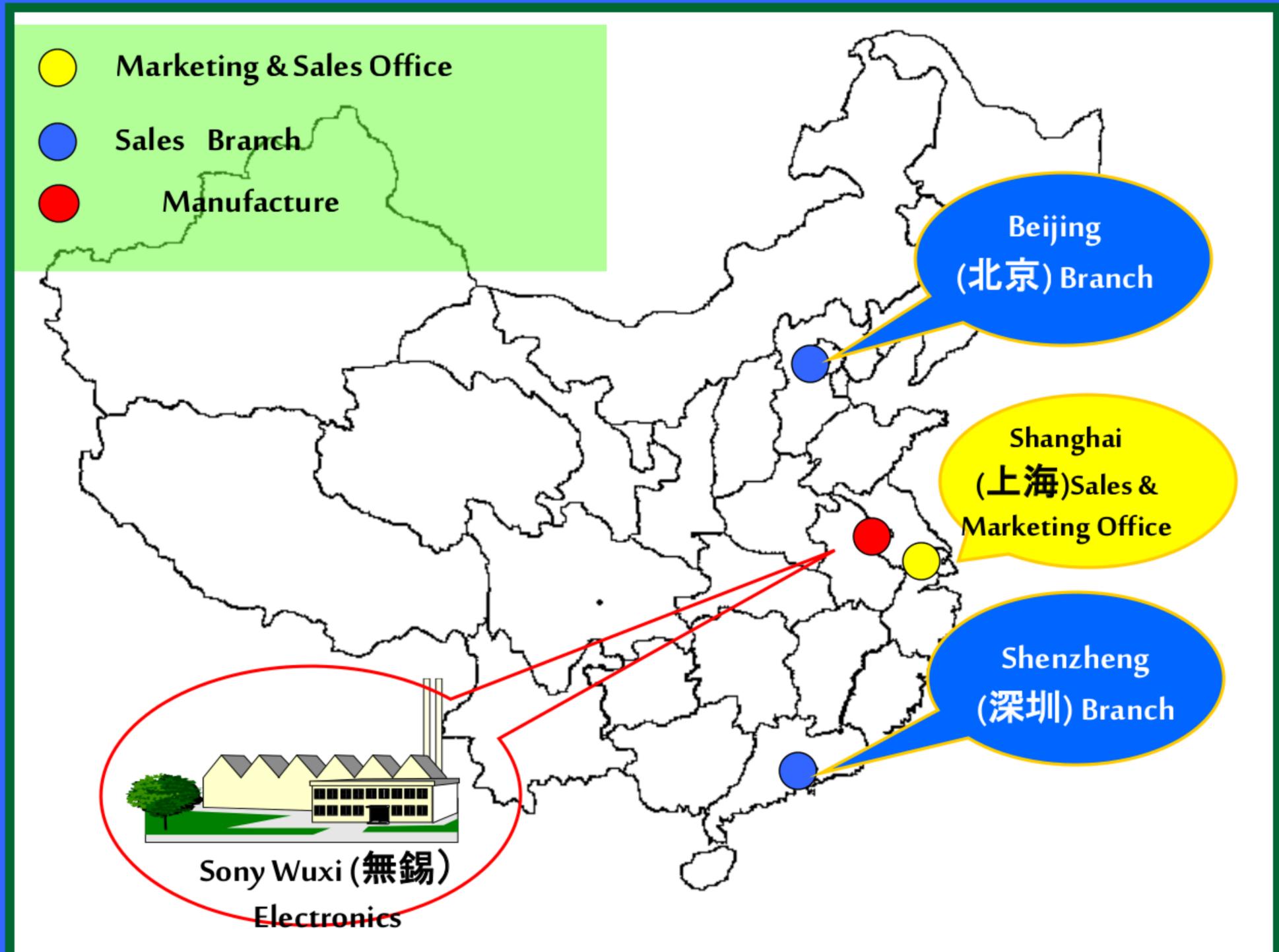
English : COMINS, Rexam

Japan : SHARP, Alps, Murata, Sumitomo, Hitachi,
National, Toshiba, Maruko, Nittobo

Company Profile

- Date of incorporation : August 22nd/2000
- Leading Company : Energy Company
- Ownership : Sony China 100%, Registered Capital : US\$29.5mil
- Board Chairman : Hiroshi Nakagawa
- Vice Board Chairman : Masaru Suzuki
- Managing Director : Taizo Suzuki
- Address : 62 Block, Wuxi National Hi-tech Industrial Development Zone.
- Main Products : Lithium-Ion Polymer Battery,
- Land Area : 110,000m², Factory-site 10,600 m²
- Rental Address : 52 Block, Wuxi National Hi-tech Industrial Development Zone.
- Main Products : Projector TV, Factory-site 3,855m²
- New Plant Address : 64 Block, - ditto - .
- Main Products : Electronics Devices.
- Land Area : 210,000m², Factory-site (Initial) : 19,100m²
- Employee As of Apr/2003 : 1,305 persons, include 11 persons of Japanese (Battery)

Sony China Battery Div- Sales Network



Business Terms

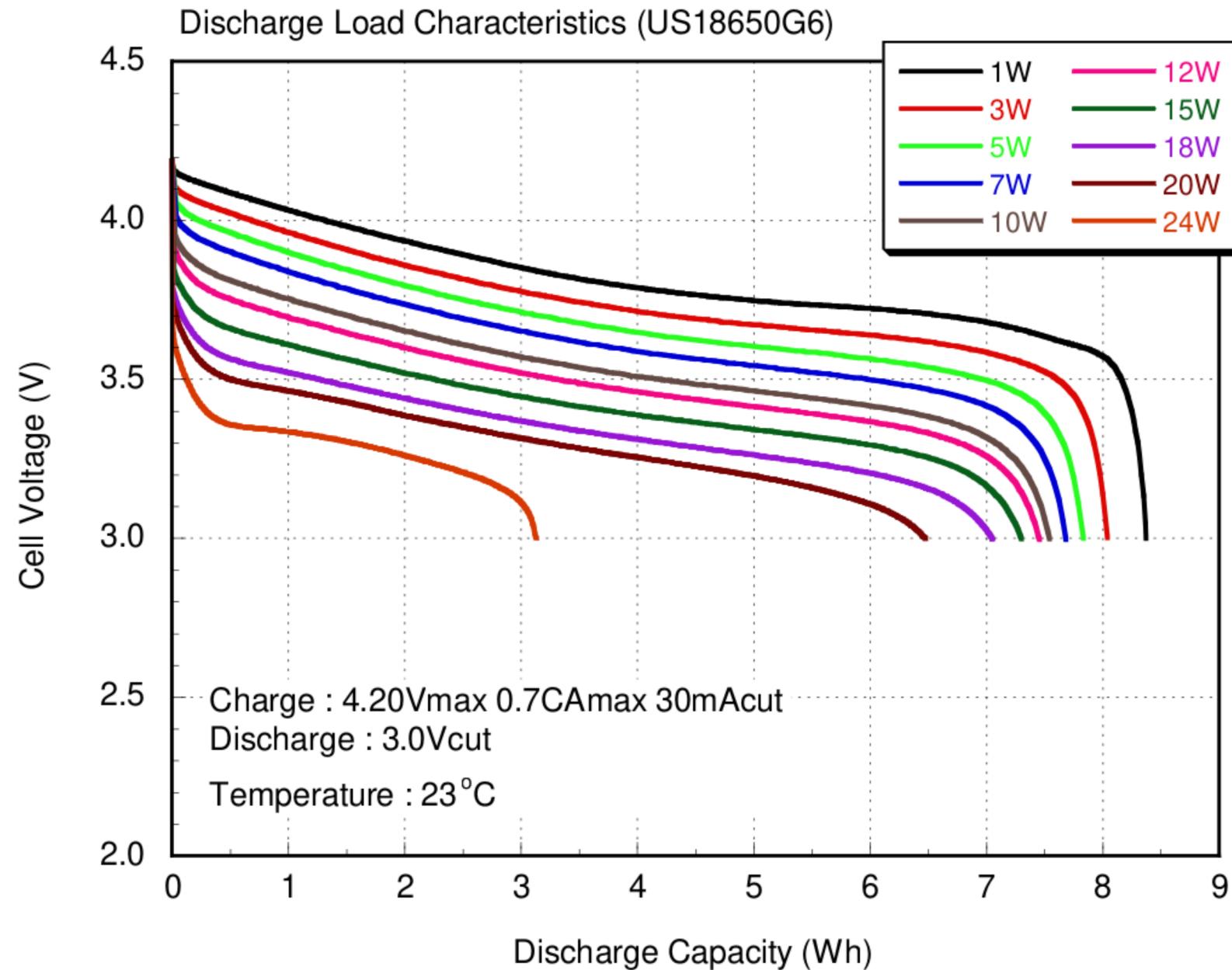
- Development Cost :
 - 1) NRE – New model development fee
 - 2) Sample Fee
 - 3) Tooling Fee
- Delivery Terms :

ex-Sony Wuxi Factory or CIF Lenovo Shanghai Factory
- Warranty : 12 months after manufacturing date

Questions

- Contact window for business matter ?
(Procurement for R&D parts and MP parts)
- Function of Beijing team and Shanghai team ?

Appendix-1; Discharge Curves of US18650G6



Appendix-2; Charge Curves of US18650G6

