

Challenges of Kyushu for Reproduction of Silicon Island

-Silicon Sea-Belt 2.0-

July 8, 2024

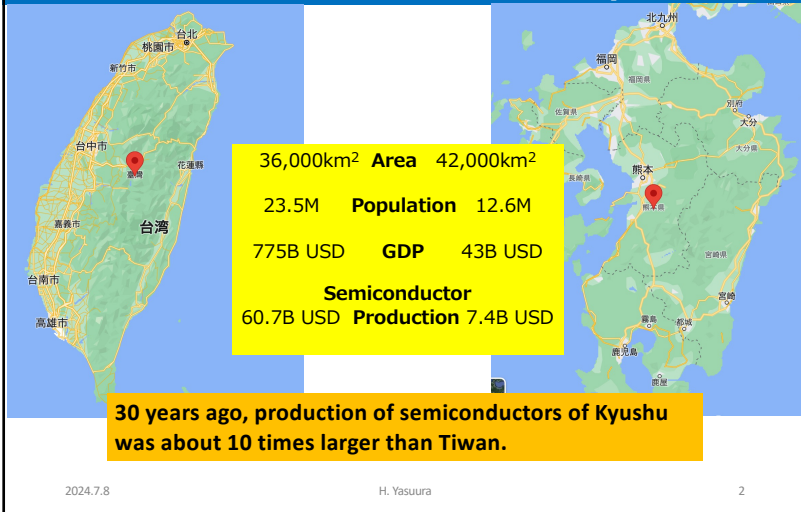
Kyushu Semiconductor Human Resource
Development Consortium WG Chair

Hiroto Yasuura

Vice Director-General of National Institute of Infomatics

1

Silicon Islands: Taiwan and Kyushu

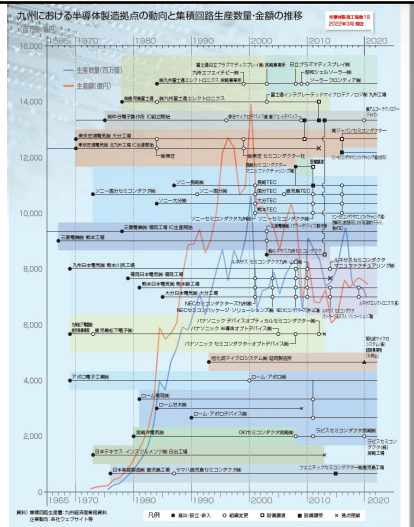


2

Kyushu was the Silicon Island in 80's to 90's

1970-2000
Semiconductor Production Center of Japan
Memories (SRAM and DRAM)
Logic

After 2000
CMOS Image sensors
Power Semiconductor
Manufacturing Equipment
Materials
1,000 related companies



出典:九州経済産業局

2024.7.8

H. Yasuura

3

3

JASM (Japan Advanced Semiconductor Manufacturing)

- Established on Dec. 10, 2021
- Location: Kikuyou, Kumamoto Pref.
- Shareholders : TSMC, Sony semiconductor, Denso etc.
- 1st Plant: 23.1ha, 22/28nm and 12/16nm Process 55,000wafer/month
The first lot (4Q of 2024)
- A plan of 2nd Plant has been already announced



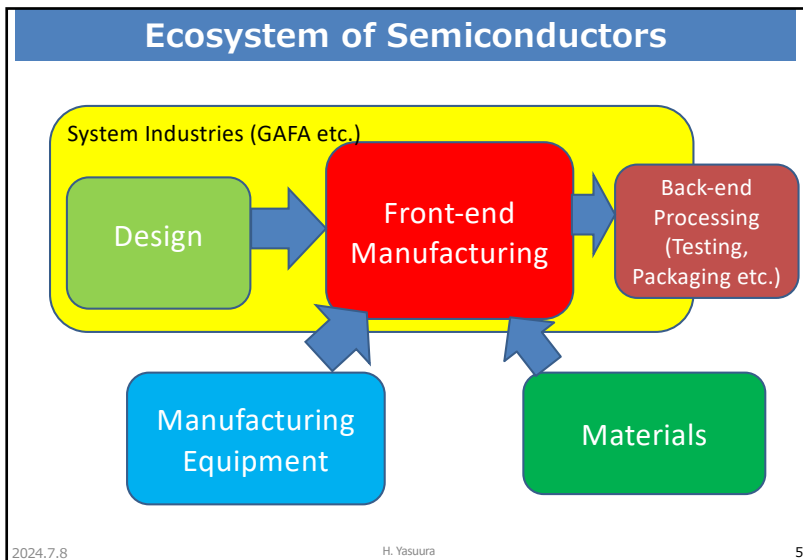
2022				2023				2024			
1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
	工場棟 (FAB棟) 建設										
							製造設備 搬入		継続		
								立上げ~認定		生産	出荷開始

2024.7.8

H. Yasuura

4

4



5

Problems of Human Resource

Problems in Japan especially in Kyushu

- Lack of talents who understand the overall picture of the semiconductor industry.
- Negative images of the semiconductor industry
 - Few young people see the value in dedicating their lives to the semiconductor industry.
 - People cannot take pride in the semiconductor industry.
- Few educational programs for researchers, specialists, and engineers in the semiconductor industry
 - Graduate schools, universities, and technical colleges
 - Primary and secondary education (Basic knowledge)
 - Reskilling education for working people

2024.7.8 H. Yasuura

6

Towards Human resource development

Kyushu Semiconductor Human Resource Development Consortium

- Collaboration of Industries, Academia, and Local Governments
- Clarifying Kyushu's role in the global semiconductor industry structure and demand
- A semiconductor industry strategy that young people can bet their lives
- The provision of continuous learning opportunities for students through to working people
- Continuous investment in human and economic capital by building semiconductor eco-system

2024.7.8

H. Yasuura

7

7

Actions

1. Teachers and Professors Training Seminars
 - Teachers in Elementary, Junior-High and High Schools
 - Professors in technical Colleges and Universities
 - Learning of overview and factories of semiconductor Industry
2. Semiconductor Curriculum in Technical Colleges
3. Top Engineer Education Programs in Grad. Schools
 - Collaboration with Taiwan top Universities
 - Kyushu Univ., Kumamoto Univ., Kyushu Inst. of Tech etc.
4. Reskilling Programs for Active Engineers
 - Fukuoka Semiconductor Reskilling Center
 - Center for Microelectronics Systems in Kyushu Inst. Tech.

2024.7.8


H. Yasuura

8

8

Center for Microelectronics Systems in Kyushu Inst. Tech.

4 days course for CMOS Processing

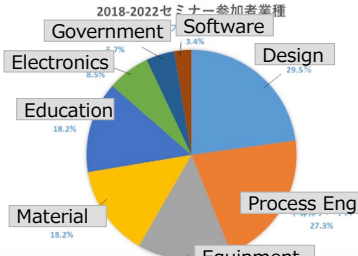


九州工業大学
マイクロ化総合技術センター
CMS 公開講座のご案内
2023年度

- 1 Course in every month
- On-Site 14 (¥149,800)
- Online 50 (¥83,200)
- Special Program over 50
- <https://www.cms.kyutech.ac.jp>
- More than 1,000 Trainee in 2023


Overall experience using old technology

- 4 inch Wefar
- 1- μ m Polysilicon Gate 1 layer metal process



2018-2022 Seminar Participants by Category

Category	Percentage
Design	29.5%
Process Eng.	27.3%
Equipment	18.2%
Material	18.2%
Education	10.2%
Electronics	5.5%
Software	3.4%
Government	1.7%



Processing Flow:

- エッチング
- 熱酸化
- イオン注入(ニパッタ)
- 成膜
- リソ工程
- レジスト塗布
- 光学露光
- 現像
- 光学顕微鏡
- マニュアル測定
- 完成ウエハ

- 4日間でCMOS ICを自ら試作
- 最終日に測定実施
- ダイシングしたチップを呈呈

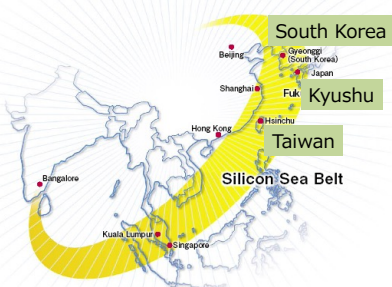
H. Yasuura 九州工業大学 中村教授

Silicon Sea Belt Project 1.0

Silicon Sea Belt Project

2002—2011

Concentrate semiconductor-related technologies, especially design technologies, in Kyushu and create a global supply chain for the utilization, design, and manufacture of semiconductors, collaborated with Korea, Kyushu, Taiwan, coastal areas of China, Singapore, South Asian Countries and India.



The map shows the Silicon Sea Belt region, a crescent-shaped area connecting South Korea, Kyushu (Japan), Taiwan, and Singapore. Key cities marked include Beijing, Shanghai, Hong Kong, Seoul, Gwangju (South Korea), Fukuoka, Hsinchu, Bangalore, and Kuala Lumpur.

2024.7.8

H. Yasuura

10

Kyushu is starting Silicon Sea-Belt 2.0 to reproduce Silicon Island again!



2024.7.8

H. Yasuura

11