Production Line Control in Semiconductor High-Volume Manufacturing

JMP Discovery Summit - Munich 2020

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Agenda

1. SOITEC who we are
2. Problem statement
3. Data & Methodology
4. JMP demo
5. Conclusion

1 SOITEC who we are

Soitec at a glance

1992
Soitec foundation

1999
Bernin I Fab 100/200-mm

2002
Bernin II Fab 300-mm

2007

2008
Singapore Fab 300-mm

2011

2014
Manufacturing Partner in China 200-mm

2015-16
Reinforce core semiconductor business
Return to profitability

2016

2017
FD-SOI pilot line in Singapore

2018
First 300-mm wafers being shipped to RF-SOI/ FD-SOI customers from Singapore

2019
Acquisition of EpiGaN for 5G RF, power electronics, and sensor applications

2020

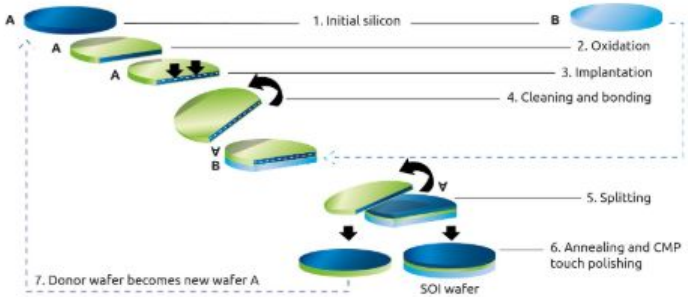
jmp 7.0 ~10 users

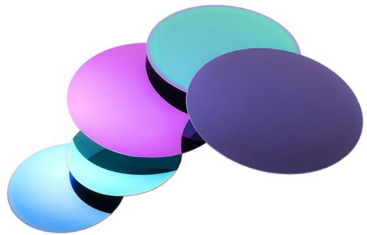
jmp 9.0 ~100 users

jmp 12 ~200 users

jmp 15 ~300 users

Smart Cut™





Soitec – Today

DESIGNER & MANUFACTURER OF INNOVATIVE SEMICONDUCTOR MATERIALS

1 | **Largest manufacturer of engineered substrates**
LEADER

2 | **Unique technologies**
SMART CUT™, SMART STACKING

4 | **High-growth markets**
SMARTPHONES, AUTOMOTIVE, CLOUD & INFRASTRUCTURE, IOT

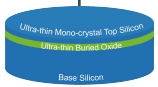
6 | **Wafer fabs (150, 200 & 300 mm)**
FRANCE, BELGIUM, SINGAPORE, CHINA*
* Partnership with Shanghai Simgui Technology Co. Ltd. (Simgui)

1,450 | **Employees Worldwide**
GLOBAL PRESENCE

A broad product portfolio of engineered substrates

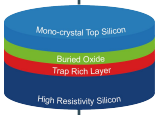
PROCESSOR & CONNECTIVITY SOC

FD-SOI
For power-efficient integration of digital/ analog/RF



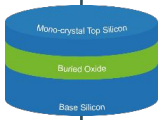
RF FRONT-END MODULE

RF-SOI
For highly efficient mobile communication



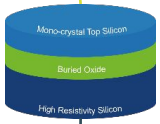
POWER

Power-SOI
For high voltage device integration



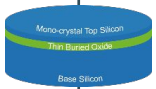
PHOTONICS

Photonics-SOI
For high perf. photonics device integration into silicon



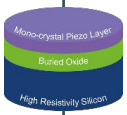
IMAGERS

Imager-SOI
For improved imager performance in NIR



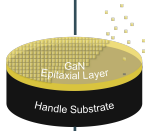
PIEZO-ON-INSULATOR

POI
For high performance 5G filters



GaN

GaN
For radio frequency (RF) 5G and power systems



Silicon-On-Insulator products

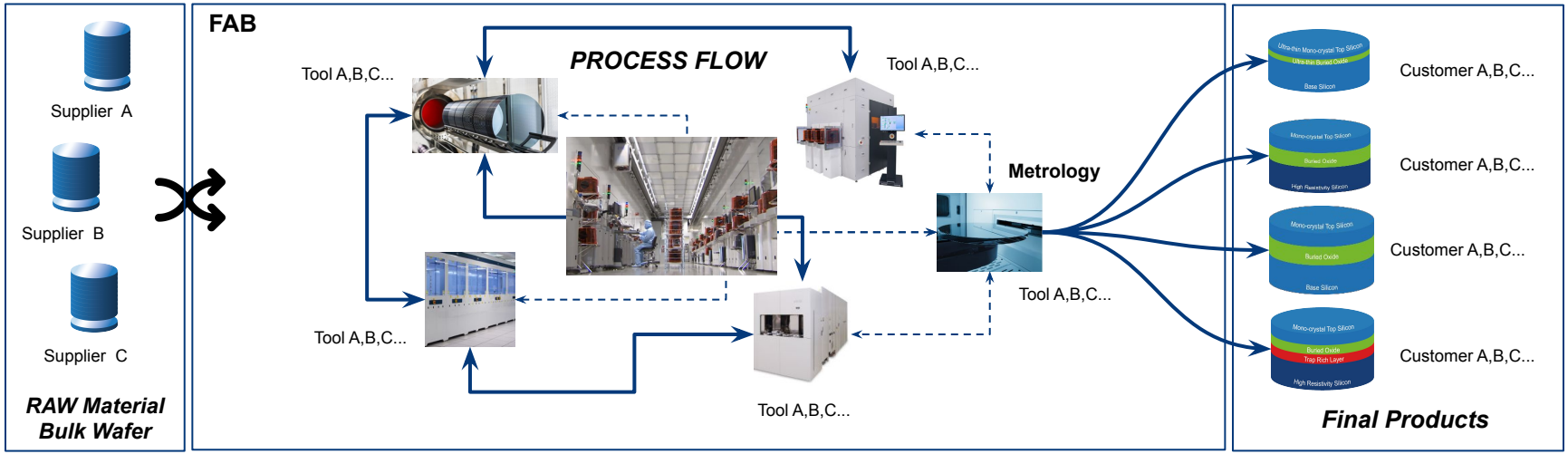
Piezo & compound products

A global multi-site industrial footprint

2 Problem statement

Yield drift detection in a full fab environnement

Data quality and real time analysis are key to minimize scrap, reduce wafer cost and quality impacts



- Multiple Raw Materials suppliers
- Same tools can be used at different process stages
- New tools, new stages, new processes
- Multiple products and customers specifications
- Several Yield engineers & JSL scripts
- Data everywhere (incoming, in line, end of line)

Common interface for all Yield engineers
Data uploaded automatically real time
Trends, Analysis by Products

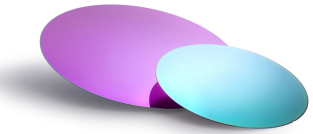
3 DATA & METHODOLOGY

Some… data

- Database size **: 3.7TB**
- **Each day,** lot of data are collected into different databases systems
  - **> 2 000 000** wafer measurements
  - **> 1 000 000** equipment measurements

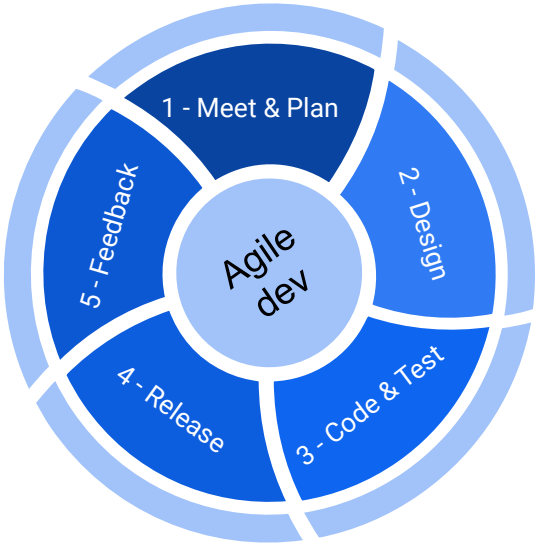
- To analyze all these data, Eng. need to have a quick and easy access to them

  - **SOLUTION : publish “Ready To Use” data tables**



Methodology

- **“Ready To Use” tables can help to**
  - Prevent drift detection
  - find root-cause issue
  - root causes could be due to materials, equipment…



- **Agile approach**
  - Combined work with Yield team to define relevant data
  - and **iterative approach**
    - Equipment historical data (eqpt name / in-out date…)
    - Process parameters (product measurement)
    - Tests parameters
    - Material parameters
  - Add more or different data and data sources at each sprint

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4 JMP demo

5 Conclusion

Conclusion

- Data are “Ready To Use” and easy to access
- Data available automatically for new products / process / tools
- Standardization << All data tables have same format
- Yield engineers backup periods, training easier
- Soitec JMP users data analysis sharing improved

- JMP facilitates database access : easy to request Data Lake or multiple db sources
- JMP can handle lot of data and users can visualize all of them
- JMP is a part of Soitec Industrie 4.0 program

Thank you

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