Silicon Wafer Japan TC Chapter

Meeting Summary and Minutes

SEMICON Japan Meetings 2024
Thursday, December 12, 2024 9:00 AM – 12:00 PM JST
Tokyo Big Sight, Tokyo, Japan / Official Virtual TC Chapter Meeting (Hybrid)

TC Chapter Announcements

Next TC Chapter Meeting

Friday, April 18, 2025 2:00 PM – 4:00 PM JST

SEMI Japan Office, Tokyo, Japan/ Official Virtual TC Chapter Meeting (Hybrid)

Table 1 Meeting Attendees

Italic indicates virtual participants

Co-Chairs: Tetsuya Nakai (SUMCO), Ryuji Takeda (GlobalWafers Japan)
SEMI Staff: Kevin Nguyen (SEMI HQ)

Company	*Last*	*First*	*Company*	*Last*	*First*
NAURA	Cao	Clark	Meiji University	Ogura	Atsushi
KLA	*Haller*	*Kurt*	GlobalWafers Japan	Okano	Hirofumi
Advanced Silicon Technology Co.	Hu	Hao	GlobalWafers Japan	Takeda	Ryuji
SELF	Kawai	Naoyuki	Shin-Etsu Handotai Co., Ltd.	Tsunoda	Hitoshi
SUMCO	Nakai	Tetsuya			
OPTIMA	Akiyama	Satoshi	SEMI HQ	Nguyen	Kevin

Table 2 Leadership Changes

WG/TF/SC/TC Name	*Previous Leader*	*New Leader*
None		

Table 3 TC Chapter Structure Changes

Previous WG/TF/SC Name	*New WG/TF/SC Name or Status Change*
None	

Table 4 Ballot Results

Document #	*Document Title*	*Committee Action*
7265	Reapproval of SEMI MF391-0310E, Test Method for Minority Carrier Diffusion Length in Extrinsic Semiconductors by Measurement of Steady-State Surface Photovoltage	Passed as balloted
7266	Reapproval of SEMI M71-0120, Specification for Silicon-on-Insulator (SOI) Wafers for CMOS LSI	Passed as balloted
7291	Revision to SEMI M62-0317, Specification For Silicon Epitaxial Wafers	Passed as balloted

#1 **Passed** ballots and line items will be submitted to the ISC Audit & Review Subcommittee for procedural review.

#2 **Failed** ballots and line items were returned to the originating task forces for re-work and re-balloting or abandoning.

Table 5 Ratification Ballot Results

Document #	*Document Title*	*ISC A&R Action*	*A&R Forms*
None			

Note 1: **Passed** Ratification ballots will be submitted to SEMI publication for final processing.

Note 2: **Failed** Ratification ballots were returned to the originating task forces for re-work and re-balloting or abandoning.

Table 6 Activities Approved by the GCS between meetings of the TC Chapter

#	*Type*	*SC/TF/WG*	*Details*
None			

Table 7 Authorized Activities

Listing of all revised or new SNARF(s) approved by the Originating TC Chapter.

#	*Type*	*SC/TF/WG*	*Details*
7318	SNARF	Int'l Test Methods TF	New Standard: Test Method for Net Carrier Density and Resistivity Of Silicon Epitaxial Layer By Capacitance-Voltage Measurements With An Evaporated Metal Schottky Diode
7319	SNARF	Int'l Test Methods TF	Line-item revision to SEMI M88-0119, Practice for Sample Preparation Methods for Measuring Minority Carrier Diffusion Length in Silicon Wafers by Surface Photovoltage Methods
7320	SNARF	Int'l Polished Wafer TF	Revision to SEMI M1-0924, Specification for Polished Single Crystal Silicon Wafers

#1 SNARFs and TFOFs are available for review on the SEMI Web site at:

http://downloads.semi.org/web/wstdsbal.nsf/TFOFSNARF

Table 8 Authorized Ballots

#	*When*	*TF*	*Details*
6570B	Cycle 1, 2, or 3 of 2025	Int'l Test Methods TF	New Standard: Guide for Measuring Bulk Micro Defect Density and Denuded Zone Width in Annealed Silicon Wafers by a Laser-Scattering Tomography Technique
7318	Cycle 1 or 2 of 2025	Int'l Test Methods TF	New Standard: Test Method for Net Carrier Density and Resistivity Of Silicon Epitaxial Layer By Capacitance-Voltage Measurements With An Evaporated Metal Schottky Diode
7319	Cycle 1, 2, or 3 of 2025	Int'l Test Methods TF	Line-item revision to SEMI M88-0119, Practice for Sample Preparation Methods for Measuring Minority Carrier Diffusion Length in Silicon Wafers by Surface Photovoltage Methods
7320	Cycle 1, 2, or 3 of 2025	Int'l Polished Wafer TF	Revision to SEMI M1-0924, Specification for Polished Single Crystal Silicon Wafers

Table 9 SNARF(s) Granted a One-Year Extension

#	*TF*	*Title*	*Expiration Date*
6570	Int'l Test Methods TF	New Standard: Guide for Measuring Bulk Micro Defect Density and Denuded Zone Width in Annealed Silicon Wafers by a Laser-Scattering Tomography Technique	04/19/2026
6687	Int'l Test Methods TF	Revision of M51, Test Method for Characterizing Silicon Wafer by Gate Oxide Integrity	10/02/2025
6702	Japan Test Methods TF	Revision of M60, Test Method for Time Dependent Dielectric Breakdown Characteristics of Amorphous SiO2 Films for Silicon Wafer Evaluation	01/15/2026

Table 10 SNARF(s) Abolished

#	TF	Title
None		

Table 11 Standard(s) to receive Inactive Status

Standard Designation	Title
None	

Table 12 New Action Items

Item #	Assigned to	Details
SW20241212-01	SEMI Staff	To seek approval from Silicon Wafer GCS members for authorizing Doc. 7318 New Standard: Test Method for Net Carrier Density And Resistivity Of Silicon Epitaxial Layer By Capacitance-Voltage Measurements With An Evaporated Metal Schottky Diode for ballot adjudication at Japan Meeting in April 2025.

Table 13 Previous Meeting Action Items

Item #	Assigned to	Details
SW20240829-01	SEMI Staff	To have a training session of Connect@SEMI for TF leaders. →Open
SW20240829-02	Hitoshi Tsunoda (Shin-Etsu Handotai)	To submit SEMI M62 Revision Ballot (Doc.#7291) for Cycle 8. →Closed
SW20240829-03	Tetsuya Nakai (SUMCO)	To confirm the EU AWG TF leader whether the draft of SEMI M73 Revision ballot (Doc.#7192) was distributed to all the TF members for their inputs at least one week before submission to SEMI staff. →Closed

1 Welcome, Reminders, and Introductions

Tetsuya Nakai (SUMCO), called the meeting to order at 9:00 AM JST. The meeting reminders on antitrust issues, intellectual property issues and holding meetings with international attendance were reviewed. Attendees introduced themselves.

Attachment: 1_Required Meeting Elements March 2024_J

2 Review of Previous Meeting Minutes

The TC Chapter reviewed the minutes of the previous meeting.

Motion: Approve the minutes as written.

By / 2nd: Ryuji Takeda / GlobalWafers Japan co.,ltd./ Naoyuki Kawai (Self)

Discussion: None.

Vote: Result: 7-Y 0-N. **Motion Passed.**

Attachment: 2_SW JA TC Minutes_20240829_R1

3 Liaison Report

3.1 *Japan Regional Standards Committee (JRSC)*

Tetsuya Nakai (SUMCO) reported no critical update from the JRSC.

3.2 *Global Coordinating Subcommittee (GCS)*

Tetsuya Nakai (SUMCO) reported there was no meeting for the GCS.

3.3 *Silicon Wafer Europe TC Chapter*

Kevin Nguyen reported. Of notes,

- Last meeting
    - Thursday, November 14, 2024
    - SEMICON Europa at the ICM in Munich, Germany
- Next meeting
    - SEMICON Europa 2025, November 18-21
    - ICM, Munich, Germany
- Ballot Results
    - All ballots passed
        - Doc. 7192, Revision of SEMI M73-1013E (Reapproved 1019), Test Method for Extracting Relevant Characteristics from Measured Wafer Edge Profiles
        - Doc. 7261, Reapproval of SEMI M53-0220, Practice for Calibrating Scanning Surface Inspection Systems Using Certified Depositions of Monodisperse Reference Spheres on Unpatterned Semiconductor Wafer Surfaces
        - Doc. 7262, Reapproval Of SEMI M58-1109 (Reapproved 0320) Test Method For Evaluating DMA Based Particle Deposition Systems And Processes
        - Doc. 7263, Line-Item Revision of SEMI M35-1114 (Reapproved 1019) Guide For Developing Specifications For Silicon Wafer Surface Features Detected By Automated Inspection
        - Doc. 7264, Line-Item Revision of SEMI M52-0923 Guide for Specifying Scanning Surface Inspection Systems for Silicon Wafers for the 130 nm to 5 nm Technology Generations
- Int‘l Advanced Wafer Geometry TF
    - Ballot Development
        - Doc 6983: Revision of SEMI M49-0918 with title change to: Guide for Specifying Geometry Measurement Systems for Silicon Wafers for the 130 nm to 3 nm Technology Generations
- Int‘l Automated Advanced Surface Inspection TF
    - Status of AFM Roughness Working Group Activities
        - Estimate to complete the Round Robin by End of Q1/2025
        - Focus is on the data evaluation and a concept of data presentation as basis for the development of a new standard.
- Int‘l Test Methods TF

- SEMI Working Group – Phase Out of Mercury
    - Drafting doc. 7162, New Standard: Test Method for epi-resistivity determination in Si wafers by Surface Charge Profiling – Target draft middle of 2025

- Int'l Polished Wafer TF
    - Ballot Development
        - Proposal to issue a new SNARF for SEMI M1 to remove 450mm wafers references
        - SNARF to be submitted during the SEMICON Japan 2024 in December

Attachment: 3_EU SiW Liaison Report November 2024

3.4 *Silicon Wafer North America TC Chapter*

Kevin Nguyen reported for the Silicon Wafer North America TC Chapter. Of notes:

- The voting result of Doc.#7024, Line-Item Revision to SEMI M1-0918, Specification for Polished Single Crystal Silicon Wafers (Re: 300mm wafer diameter tolerance reduction from ± 200um to ±100um) was reviewed at SEMICON West and it passed as balloted and published as SEMI M1-0924.
- Under the Int'l Automated Advance Surface Inspection TF, the AFM Working Group has started AFM and Haze measurement RRT.

Attachment: 03_NA Si Wafer TC Chapter Liaison Report August 2024

4 SEMI Staff Report

Kevin Nguyen gave the SEMI Staff Report. Of notes:

- SEMICON West 2024 will be held in Phoenix, Arizona in October. The venue of SEMICON West will alternate between Phoenix and San Francisco every October thereafter.
- Global Standards Summit 2024 - Innovating Tomorrow: Standards for Future Factories
    - Thursday, December 12 | 10:30 AM to 4:30 PM
    - Tokyo Big Sight, Conference Tower, Room 606. Everyone is invited.
    - Session Topics
        - Smart Manufacturing for Future Factories
        - Packaging Architectures & Materials
        - Environmental Sustainability
- SEMI Standards Friendship Party & Award Ceremony
    - Thursday, December 12: 5:00 PM – 7:00 PM
    - Room 102, Int'l Conference Tower, Tokyo Big Sight
    - All are invited.
- TFs have until 02/20/24 to implement use of Connect@SEMI (https://connect.semi.org) for TF management and document development depository. Once TFs have implemented use of Connect@SEMI, they shall use it to: maintain the TF member roster up to date, share the working drafts in PDF, and distribute the Draft Document at least one week before ballot submission to SEMI. Training materials for TF leaders and members (users) are available on the SEMI website.

Attachment: 04_ Staff Report November 2024 v4_ay

5 Ballot Review

5.1 Doc.#7265, Reapproval of SEMI MF391-0310E, Test Method for Minority Carrier Diffusion Length in Extrinsic Semiconductors by Measurement of Steady-State Surface Photovoltage.

- This document passed as balloted. Refer attachment for more details.

Attachment: 5_7265 A&R

5.2 Doc.#7266, Reapproval of SEMI M71-0120, Specification for Silicon-on-Insulator (SOI) Wafers for CMOS LSI

- This document passed as balloted. Refer attachment for more details.

Attachment: 5_7266 A&R

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5.3 Doc.#7291, Revision to SEMI M62-0317, Specification For Silicon Epitaxial Wafers

- This document passed as balloted. Refer attachment for more details.

Attachment: 5_7291 A&R

6 Subcommittee and Task Force Reports

6.1 *International Advanced Wafer Geometry Task Force*

Akiyama-san (Optima) reported for the International Advanced Wafer Geometry Task Force. Of notes:

- The TF is developing Doc.#6983A, Revision of SEMI M49-0918, With Title Change To: Guide for Specifying Geometry Measurement Systems for Silicon Wafers for the 130 nm to 3 nm Technology Generations.
    - The consensus of the TF is that the decision for no values or values in Table 3 of Doc 6983A should be voted on at the TF meeting at Semicon Japan in December 2024.
        - TF agreed go with “No value on Table 3” and report it to SWC.
    - Provides a final ballot-ready draft of document 6983A to NA standards meeting in February 2025

Attachment: 6_AWG TF Japan Report_20241211

6.2 *International/ Japan Test Method Task Force*

Takeda-san (GlobalWafers Japan) reported. Of notes:

- Ballot Review
    - Doc.#7265, Reapproval of SEMI MF391-0310E, Test Method for Minority Carrier Diffusion Length in Extrinsic Semiconductors by Measurement of Steady-State Surface Photovoltage
        - Passed
- Old Business (GOI WG)
    - Doc. 6687 Revision of M51, Test Method For Time Zero Dielectric Breakdown Characteristics Of Amorphous Sio2 Films For Silicon Wafer Evaluation.
        - Work in progress. Plan to go to ballot in April 2026.
    - Doc. 6702 Revision of M60, Test Method For Time Dependent Dielectric Breakdown Characteristics Of Amorphous Sio2 Films For Silicon Wafer Evaluation
        - Work in progress. Plan to go to ballot in the future.

- SEMI M85_Guide for the Measurement of Trace Metal Contamination on Silicon Wafer Surface by Inductively Coupled Plasma Mass Spectrometry.
    - Due for 5 year review. WG will provide a tentative draft in September 2025.
- New Activity
    - SEMI M88-0119, Practice for Sample Preparation Methods for Measuring Minority Carrier Diffusion Length in Silicon Wafers by Surface Photovoltage Methods
        - Due for 5 year review. Minor revision is needed. Takeda-san presented the SNARF.
        - Motion: Approve the SNARF for
          Line Item Revision to SEMI M88-0119, Practice for Sample Preparation Methods for Measuring Minority Carrier Diffusion Length in Silicon Wafers by Surface Photovoltage Methods
          By: Ryuji Takeda / GlobalWafers Japan co.,ltd.
          Second: Naoyuki Kawai / Self
          Discussion: None
          Result: 6-Y 0-N Voting Result: Pass - 100.00%. Voting Rule: Majority
        - Motion: Authorize the Line Item Revision of SEMI M88, Practice for Sample Preparation Methods for Measuring Minority Carrier Diffusion Length in Silicon Wafers by Surface Photovoltage Methods, for Letter Ballot for review at SEMICON West 2025
          By: Ryuji Takeda / GlobalWafers Japan co.,ltd.
          Second: Naoyuki Kawai / Self
          Discussion: None
          Result: 7-Y 0-N Voting Result: Pass - 100.00%. Voting Rule: Majority

Attachment: 6_SNARF_Line Item Revision to M88_R1

- Old Business (BMD/DZ WG)
    - Doc.6570B: New Standard: Guide for Measuring Bulk Micro Defect Density and Denuded Zone Width in Annealed Silicon Wafers by a Laser Scattering Tomography Technique
        - Motion: Authorize Document 6570B, New Standard: Guide for Measuring Bulk Micro Defect Density and Denuded Zone Width in Annealed Silicon Wafers by a Laser-Scattering Tomography Technique, for Letter Ballot cycle 2 for review at SEMICON West 2025
          By: Ryuji Takeda / GlobalWafers Japan co.,ltd.
          Second: Naoyuki Kawai / Self
          Discussion: None
          Result: 7-Y 0-N Voting Result: Pass - 100.00%. Voting Rule: Majority
- New activity
    - Solid Metal Schottky Epi Wafer Resistivity (WG)
        - New Standard: Test Method For Determining Resistivity Of Silicon Epitaxial Layer By Using Evaporated Metal Schottky.
            - This standard provides the test method for resistivity by reverse bias voltage dependence of the capacitance of a Schottky junction diode (hereinafter referred to as C-V method), prepared on epitaxial layers, uniformly doped in depth-direction, grown on mirror-polished silicon substrates. Diode Capacitance-Voltage Measurements

- Motion: Approve the SNARF for: New Standard: Test Method for net carrier density and resistivity of silicon epitaxial layer by capacitance-voltage measurements with an evaporated metal Schottky diode
  By: Ryuji Takeda / GlobalWafers Japan co.,ltd.
  Second: Naoyuki Kawai / Self
  Discussion: None
  Result: 6-Y 0-N Voting Result: Pass - 100.00%. Voting Rule: Majority

- **Motion:** Authorize New Standard: Test Method for net carrier density and resistivity of silicon epitaxial layer by capacitance-voltage measurements with an evaporated metal Schottky diode for Letter Ballot in cycle 2 for review at JA Spring Meeting with a condition of GCS approval
  By: Ryuji Takeda / GlobalWafers Japan co.,ltd.
  Second: Naoyuki Kawai / Self
  Discussion: Kawai-san reported this project is time sensitive due to collaborative effort with Japanese Society of Nuclear Medicine (JSNM), which operates under a 3-year project timeline for integrating the JSNM Standard into the SEMI Standard (supported by METI, Japan). This timeline ends in March 2025.
  Kevin said the TC Chapter may also address negative (if persuasive) as technical change and the ballot will be ratified without further TC Chapter adjudication.
  Nakai-san suggested to ask GCS approval for a one time exception for reviewing at NA Spring meeting.
  Action Item – Kevin will ask GCS for approval.
  Result: 5-Y 0-N Voting Result: Pass - 100.00%. Voting Rule: Majority

Attachment: 6_SNARF_Test Method for Epi Resistivity_R1

Attachment: 6_International_Japan Test Method TF meeting December 2024_R2

6.3 *International Advanced Automated Surface Inspection Task Force*

No report provided.

6.4 *International Polished Wafers Task Force*

6.4.1 Okano-san (GlobalWafers Japan) reported there is a SNARF to revise SEMI M1. The intent is to remove all 450 mm specifications from M1. The SNARF was presented.

Motion: Approve the SNARF for Major Revision to SEMI M1
By: Hirofumi Okano / GlobalWafers Co., Ltd.
Second: Ryuji Takeda / GlobalWafers Japan co.,ltd.
Discussion: None
Result: 6-Y 0-N Voting Result: Pass - 100.00%. Voting Rule: Majority

6.4.2 Okano-san presented the draft document for revision of SEMI M1.

Motion: Authorize the Document of Revision to SEMI M1 for Letter Ballot in cycle 2 for review at SEMICON West
By: Hirofumi Okano / GlobalWafers Co., Ltd.
Second: Ryuji Takeda / GlobalWafers Japan co.,ltd.
Discussion: TF members reviewed were completed.
Result: 6-Y 0-N Voting Result: Pass - 100.00%. Voting Rule: Majority

Attachment: 6_SNARF_M1 Revision_Nov2024_R2

6.5 *International Epitaxial Wafers Task Force*

Tsunoda-san (S.E.H) reported doc. 7291, Revision to SEMI M62-0317, Specification For Silicon Epitaxial Wafers, passed superclean.

6.6 *International Annealed Wafers Task Force*

No report provided.

6.7 *International SOI Wafers Task Force*

Nakai-san (SUMCO) reported. Of notes:

- Doc. 7266, Reapproval of SEMI M71-0120, Specification for Silicon-on-Insulator (SOI) Wafers for CMOS LSI, was approved.
- The TF is drafting Doc.#6583, New Standard: Specification for SOI Wafers for RF Device Applications.

6.8 *International Terminology Task Force*

Tetsuya Nakai (SUMCO) reported that there had been no updates.

7 Old Business

7.1 *Project Period Review*

The following documents need a one year extension since they are reaching a 3 year maximum project period.

- SNARF 6570, New Standard: Guide for Measuring Bulk Micro Defect Density and Denuded Zone Width in Annealed Silicon Wafers by a Laser-Scattering Tomography Technique
- SNARF 6687, Revision of M51, Test Method for Characterizing Silicon Wafer by Gate Oxide Integrity
- SNARF 6702, Revision of M60, Test Method for Time Dependent Dielectric Breakdown Characteristics of Amorphous SiO2 Films for Silicon Wafer Evaluation

Motion: Approve a 1 year extension of the project period for the SNARF 6570, 6687, 6702
By: Ryuji Takeda / GlobalWafers Japan co.,ltd.
Second: Naoyuki Kawai / Self
Discussion:
Result: 6-Y 0-N Voting Result: Pass - 100.00%. Voting Rule: Majority

7.2 *5 Year Review Check*

- SEMI M85-0120, Guide for the Measurement of Trace Metal Contamination on Silicon Wafer Surface by Inductively Coupled Plasma Mass Spectrometry
    - It was confirmed that the Test Methods TF is drafting the document, which will be presented next year.
- SEMI M88-0119, Practice for Sample Preparation Methods for Measuring Minority Carrier Diffusion Length in Silicon Wafers by Surface Photovoltage Methods
    - The document was reviewed and it will be issued for ballot.

8 New Business

8.1 SNARF for New Standard: Test Method for Net Carrier Density and Resistivity of Silicon Epitaxial Layer by Capacitance-Voltage Measurements with an Evaporated Metal Schottky Diode

- This item was addressed in section 6.2 above. The SNARF was approved.

8.2 SNARF for Revision to SEMI M1-0924, Specification for Polished Single Crystal Silicon Wafers

- This item was addressed in section 6.4 above. The SNARF was approved.

9 Action Item Review

9.1 *Open Action Item*

Item #	*Assigned to*	*Details*
SW20240829-01	SEMI Staff	To have a training session of Connect@SEMI for TF leaders.

9.2 *New Action Item*

Item #	*Assigned to*	*Details*
SW20241212-01	SEMI Staff	To seek approval from Silicon Wafer GCS members for authorizing Doc. 7318 New Standard: Test Method for Net Carrier Density And Resistivity Of Silicon Epitaxial Layer By Capacitance-Voltage Measurements With An Evaporated Metal Schottky Diode for ballot adjudication at Japan Meeting in April 2025.

10 Next Meeting and Adjournment

The next meeting is scheduled for Thursday, April 18, 2025 2:00 PM – 4:00 PM JST at SEMI Japan office via Official Virtual TC Chapter Meeting. Refer to http://www.semi.org/standards for the current list of events.

Adjournment: 11:00 AM

Respectfully submitted by:

Kevin Nguyen

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Email: knguyen@semi.org

Minutes tentatively approved by:

Tetsuya Nakai (SUMCO), Co-chair	December 25, 2024
Ryuji Takeda (Global Wafers Japan), Co-chair	January 10, 2025

Table 14 Index of Available Attachments[#1]

Title	*Title*
01_Meeting Reminders	5_7291_A&R
2_SW JA TC Minutes_20240829_R1	6_AWG TF Japan Report_20241211
03_NA Si Wafer TC Chapter Liaison Report August 2024	6_International_Japan Test Method TF meeting December 2024_R2
3_EU SiW Liaison Report November 2024	6_SNARF_Line Item Revision to M88_R1
4_Staff Report November 2024 v4_ay	6_SNARF_Test Method for Epi Resistivity_R1
5_7265 A&R	6_SNARF_M1 Revision_Nov2024_R2
5_7266_A&R	

#1 Due to file size and delivery issues, attachments must be downloaded separately. A .zip file containing all attachments for these minutes is available at www.semi.org. For additional information or to obtain individual attachments, please contact Kevin Nguyen at the contact information above.