



## 3D Packaging & Integration North America TC Chapter

### Meeting Summary and Minutes

NA Standards Fall 2018 Meetings  
Thursday, November 8, 14:00 – 16:00  
SEMI Global Headquarters, Milpitas, California

#### TC Chapter Announcements

*Next TC Chapter Meeting*

NA Standards Spring 2019 Meetings

Thursday, April 4, 14:00 – 16:00

SEMI Global Headquarters, Milpitas, California

#### Table 1 Meeting Attendees

*Italics indicate virtual participants*

**Co-Chairs:** Richard Allen (NIST), Chris Moore (Covalent Metrology), Sesh Ramaswami (Applied Materials)

**SEMI Staff:** Laura Nguyen

<i>Company</i>	<i>Last</i>	<i>First</i>	<i>Company</i>	<i>Last</i>	<i>First</i>
DNP Corporation USA	Shoji	Yusuke	<i>NIST</i>	<i>Allen</i>	<i>Richard</i>
BW & Associates	Wu	Bevan	Nordson SONOSCAN	Martell	Steve
Corning	Schmidt	Ilona			
Nanometrics Inc.	Valley	John	SEMI	Nguyen	Laura

#### Table 2 Leadership Changes

None

#### Table 3 Committee Structure Changes

None

#### Table 4 Ballot Results

<i>Document #</i>	<i>Document Title</i>	<i>Committee Action</i>
6075	New Standard, Guide for Describing Glass-Based Material for Use in 3DS-IC Process	<b>Failed</b>
6175	New Standard, Guide on Measurements of Openings and Vias in Glass	<b>Failed</b>
6332	New Standard, Specification for Panel Substrate Characteristics for Fan-Out Panel Level Packaging (FO-PLP) Applications	<b>Failed</b>
6412	Line Item Revision to SEMI 3D1-0912(Reapproved 0417), Terminology for Through Silicon via Geometrical Metrology	<b>Passed</b> , 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 Activities Approved by the GCS between meetings of the TC Chapter**

None

**Table 6 Authorized Activities**

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

#	Type	SC/TF/WG	Details
6075	SNARF	Bonded Wafer Stacks TF	New Standard, Guide for Describing Glass-Based Material for Use in 3DS-IC Process – <i>Revision to SNARF title and scope. TC Member Review took place between 06/20/2018 and 07/03/2018.</i>
TBD	SNARF	Inspection and Metrology TF	Line Item Revision to SEMI 3D1-0912(Reapproved 0417), Terminology for Through Silicon via Geometrical Metrology

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

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

**Table 7 Authorized Ballots**

#	When	TF	Details
6075A	Cycle 1 or 2-2019	Bonded Wafer Stacks TF	New Standard, Guide for Describing Glass-Based Material for Use in 3DS-IC Process
6175A	Cycle 1 or 2-2019	Inspection and Metrology TF	New Standard, Guide on Measurements of Openings and Vias in Glass
6332A	Cycle 1 or 2-2019	FO-PLP Panel TF	New Standard, Specification for Panel Substrate Characteristics for Fan-Out Panel Level Packaging (FO-PLP) Applications

**Table 8 SNARF(s) Granted a One-Year Extension**

None

**Table 9 SNARF(s) Abolished**

#	TF	Title
5976	3DP&I Inspection & Metrology	New Standard: Terminology for 3DS-IC Technology <i>-New activity for COT to be updated to include terminology from all volumes. This SNARF is no longer needed. Motion was made to abandon SNARF.</i>
6076	3DP&I Bonded Wafer Stacks	New Standard: Specification for Identification and Marking on Wafers and Wafer Stacks for 3DS-IC Applications <i>-No activity on NA side. NA requested JA to take over activity. No industry push. Motion was made to abandon SNARF.</i>

**Table 10 Standard(s) to receive Inactive Status**

None

**Table 11 New Action Items**

None

**Table 12 Previous Meeting Action Items**

None



## 1 Welcome, Reminders, and Introductions

Rich Allen (NIST) called the meeting to order at 14:04. The meeting reminders on antitrust issues, intellectual property issues and holding meetings with international attendance were reviewed. Attendees introduced themselves.

**Attachment:** SEMI Standards Required Meetings Elements

## 2 Review of Previous Meeting Minutes

The TC Chapter reviewed the minutes of the previous meeting.

**Motion:** To accept the previous meeting minutes as written.

**By / 2<sup>nd</sup>:** Steve Martell (Nordson SONOSCAN) / Bevan Wu (BW & Associates)

**Discussion:** None.

**Vote:** 4-0 in favor. Motion passed.

**Attachment:** [2018West] 3DP&I NA Minutes FINAL

## 3 Liaison Reports

### 3.1 3D Packaging & Integration Japan TC Chapter

Laura Nguyen (SEMI) reported for the Japan TC Chapter. Of note:

#### Meeting Information

- Last meeting
  - Monday, October 15, 2018 at Japan Fall 2018 Meetings; SEMI Japan office, Tokyo
- Next meeting
  - February 22, 2019 at the Japan Winter 2019 Meetings; SEMI Japan office, Tokyo

#### Announcements

The TC Chapter expose its activity at SEMICON Japan 2018 as follows.

- Exhibition at "SEMI Standards" Booth
  - FO-PLP used materials such as encapsulants, PLP FOUP and PLP panels are exhibited in the booth. SEMI related documents and PLP technical documents are displayed in the booth.
- Workshop at TechSPOT
  - Date and Time: Thursday, December 13, 10:20-11:10
  - Session Title: How Industry Standards are helped to accelerate the PLP wider adoption in the market?
  - Abstract: With introduction of current SEMI Standard activities, key Fan-out PLP materials and equipment providers will discuss the FO- PLP technology readiness to market-in. The roadblock for wider adoption of PLP technology to more application will be discussed and how the industry standard can help for the FO-PLP to penetrate into the wider markets.
- Further information will be posted at SEMICON Japan 2018 website.

#### Leadership

- Committee Co-Chairs
  - Kazunori Kato – AiT
    - 1st GCS voting member; 1st 3D Packaging & Integration representative to the JRSC
  - Masahiro Tsuruya – iNEMI
    - 2nd GCS voting member; 3rd 3D Packaging & Integration representative to the JRSC
  - Haruo Shimamoto – AIST
    - 2nd 3D Packaging & Integration representative to the JRSC

Current Organization Chart of Japan TC Chapter {See attachment for Org Chart}



Ballot Results /See attachment for full details}

Activities Approved via GCS between Meetings /See attachment for full details}

#### Task Force Highlights

##### Thin Chip Handling Task Force

- #6424: New Standard: Test method for Adhesive Strength for Adhesive Tray Used for Thin Chip Handling
  - SNARF approved on July 20 by GCS
  - Ballot submitted for Cycle 6-18 with receiving one comment
  - Ballot reviewed and passed with editorial change at the TC Chapter meeting on October 15

##### 3D Packaging & Integration 5 Year Review Task Force

- #6424: Revision to SEMI G83-0912 “Specification for Bar Code Marking of Product Packages” and Withdrawal of SEMI G83.1-0912 “Specification for Bar Code Marking of Product Packages”
  - SNARF approved on July 20 by GCS
  - Submitted for Cycle 6-18 with receiving one comment
  - Reviewed and passed with editorial change at the TC Chapter meeting on October 15

#### Five-Year Review

Designation	Standard Title	Action By	Assigned to
SEMI G63-95 (Reapproved 0811)	Test Method for Measurement of Die Shear Strength	Past due	3D Packaging & Integration 5 Year Review TF
SEMI G95-0314	*Mechanical Interface Specification for 450 mm Load Port for Tape Frame Cassettes in the Backend Process	Spring 2019	JA 450mm Assembly and Test Die Preparation TF
SEMI G96-1014	Test Method for Measurement of Chip (Die) Strength by Mean of Cantilever Bending	Fall 2019	3D Packaging & Integration 5 Year Review TF

Staff Contact: Chie Yanagisawa; cyanagiswa@semi.org

**Attachment:** 20181030\_3DP&I-Japan\_Liaison\_v1.0

### 3.2 3D Packaging & Integration Taiwan TC Chapter

Laura Nguyen (SEMI) reported for the 3D Packaging & Integration Taiwan TC Chapter. Of note:

#### Meeting Information

- Previous meeting:
  - Tuesday, September 25, 2018 at the Taiwan Fall 2018 Meetings; SEMI Taiwan office, Hsinchu
- Next meeting:
  - Tuesday, December 18, 2018 at the Taiwan Winter 2018 Meetings; SEMI Taiwan office, Hsinchu

#### Leadership

- Committee Co-Chairs:
  - Wendy Chen (King Yuan Electronics)
  - Roger Hwang (ASE)
  - Chien-Chung Lin (ITRI)

Organization Chart /See attachment for Org Chart}

Ballot Results /See attachment for full details}

Task Force Highlights /See attachment for embedded file}



Staff Contact:

Dean Chang, E-mail: dchang@semi.org

Tiffany Huang, E-mail: thuang@semi.org

**Attachment:** 3D P&I TW Liaison Report\_20180925

*3.3 SEMI Staff Report*

Laura Nguyen (SEMI) gave the SEMI Staff Report. Of note:

SEMI Global 2018 Calendar of Events

- SEMICON Europa (November 13-16; Munich, Germany)
- SEMICON Japan (December 12-14; Tokyo, Japan)

SEMI Global 2019 Calendar of Events

- SEMICON Korea (January 23-25; Seoul, Korea)
- MSTC Conference (February 19-20; Monterey, California)
- SEMICON China (March 20-22, Shanghai, China)
- SEMICON SEA (May 7-9, Kuala Lumpur, Malaysia)
- SEMICON West (July 9-11, San Francisco, California)

Upcoming North America Standards Meetings

- NA Standards Spring 2019 Meetings (April 1-4, 2019, SEMI HQ in Milpitas, California)
- SEMICON West 2018 (July 8-11, 2019, San Francisco, California)
- NA Standards Fall 2019 Meetings (November 4-7 [tentative], 2019, SEMI HQ in Milpitas, California)

Letter Ballot Critical Dates for 2018 & 2019

- Cycle 8-2018: ballot submission due: Oct 12/Voting Period: Oct 26 – Nov 26
- Cycle 9-2018: ballot submission due: Nov 14/Voting Period: Nov 28 – Dec 28
- Cycle 1-2019: ballot submission due: Jan 3/Voting Period: Jan 16 – Feb 15
- Cycle 2-2019: ballot submission due: Feb 1/Voting Period: Feb 15 – Mar 18
- Cycle 3-2019: ballot submission due: Mar 12/Voting Period: Mar 26 – April 25

Critical Dates: <http://www.semi.org/en/Standards/Ballots>

Standards Publications Report

<i>Cycle</i>	<i>New</i>	<i>Revised</i>	<i>Reapproved</i>	<i>Withdrawn</i>
July 2018	0	3	21	0
August 2018	2	11	4	0
September 2018	0	8	1	0
October 2018	7	8	12	0

Total in portfolio – 996 (includes 252 Inactive Standards)

New Standards

<i>Cycle</i>	<i>Designation</i>	<i>Title</i>	<i>Committee</i>	<i>Region</i>
August 2018	SEMI HB9	Test Method and Acceptance Criteria for Visual Inspection of Surface Defects of GaN Epitaxial Wafers Used for Manufacturing HB-LED	HB-LED	CH

August 2018	SEMI PV84	Test Method for Polymer Foil Dependent Discoloration of Silver Fingers on Photovoltaic Modules	Photovoltaic	TA
October 2018	SEMI 3D18	Guide for Wafer Edge Trimming for 3DS-IC Process	3D-IC	TA
October 2018	SEMI D78	Test Method of Water Vapor Barrier Property for Plastic Films with High Barrier for Electronic Devices	FPD - Materials & Components	JA
October 2018	SEMI HB10	Specification for Single Crystal Sapphire Intended for Use for Manufacturing HB-LED Wafers	HB-LED	CH
October 2018	SEMI PV85	Practice for Metal Wrap Through (MWT) Back Contact Photovoltaic (PV) Module Assembly	Photovoltaic	CH
October 2018	SEMI PV86	Specification for Crystalline Silicon Photovoltaic Module Dimensions	Photovoltaic	CH
October 2018	SEMI PV87	Test Method for Peeling Force Between Electrode and Ribbon/Back Sheet	Photovoltaic	CH
October 2018	SEMI PV88	Test Method for Determination of Hydrogen in Photovoltaic (PV) Polysilicon by Inert Gas Fusion Infrared Absorption Method	Photovoltaic	CH

#### Inactive Standards

<i>Committee</i>	<i>Number of Inactive Standards</i>
Assembly & Packaging	35
Automated Test Equipment	2
Compound Semiconductor Materials	4
Environmental Health & Safety	8
Facilities	13
FPD – Equipment	5
FPD – Factory Automation	14
FPD – Materials & Components	12
FPD – Substrate	1
Gases	18
Information & Control	37
Liquid Chemicals	23
MEMS	3
Metrics	9
Micropatterning	29
Photovoltaic	1
Physical Interfaces & Carriers	19
Silicon Wafer	11
Traceability	8

#### New Forms, Regulations & Procedure Manual

- New version of Regulations (June 8, 2018)
- New version of Procedure Manual (June 8, 2018)
- New TFOF & SNARF forms
- New Ballot Review Templates



- [www.semi.org/standards](http://www.semi.org/standards)
  - Bottom left, under **Resources**

#### Rules for Handling of Trademark (Regulations § 16.4)

- Sections 16.4.1 and 16.4.4 of the recently revised of the Regulations contain requirements for the use of trademarks in published Documents.
- Existing Documents have been found that contain trademarks for items such as materials, software protocols, and equipment.
- All TC Chapters should review their Documents at the time a revision or reapproval ballot is planned to determine if a trademark is used and, if so, whether its use is justified, properly represented, and that a footnote references the trademark owner.
- Failure to do so could jeopardize ballot approval.

#### Nonconforming Titles (See PM Appendix 4) {None}

#### Five-Year Review

- SEMI 3D8-0514, Guide for Describing Silicon Wafers for Use as 300 mm Carrier Wafers in a 3DS-IC Temporary Bond-Debond (TBDB) Process
- SEMI 3D10-0814, Guide to Describing Materials Properties for Intermediate Wafers for Use in a 300 mm 3DS-IC Wafer Stack

#### SNARF 3 Year Status, TC Chapter may grant a one-year extension

- 5976: New Standard, Terminology for 3DS-IC Technology
  - SNARF expires Fall 2018

#### In-progress/Needs Action

- 6076, New Standard: Specification for Identification and Marking on Wafers and Wafer Stacks for 3DS-IC Applications
  - Request Japan to take over this SNARF
  - Reached out to Japan Chapter
    - Japan does not want to take over
    - Abandon SNARF?

#### Request for Testimonials

- Please email: [Nguyen@semi.org](mailto:Nguyen@semi.org)
  - Name of contact and company, Email address, How has Standards affected you: business, life, etc.
- James Amano or SEMI Global Marketing will reach out to you personally.

**Attachment:** [2018Fall] Staff Report 3DP&I

## **4 Ballot Review**

NOTE 1: TC Chapter adjudication on ballots reviewed is detailed in the Audits & Review (A&R) Subcommittee Forms for procedural review. The A&R forms are available as attachments to these minutes. The attachment number for each balloted document is provided under each ballot review section below.

#### 4.1 Document # 6075, New Standard: Guide for Describing Glass-Based Material for Use in 3DS-IC Process

- The committee found the negatives related and technically persuasive. The ballot failed and returned to the task force for re-work and re-ballot in the next cycle if ready.

**Motion:** To find negative #1 from Supika Mashiro (TEL) related and technically persuasive and to fail Doc 6075 based on this negative.

**By / 2<sup>nd</sup>:** Ilona Schmidt (Corning) / Bevan Wu (BW & Associates)

**Discussion:** None.

**Vote:** 4-0 in favor. Motion passed.

**Motion:** To authorize Doc 6075A to ballot in voting Cycle 1 or 2-2019.

**By / 2<sup>nd</sup>:** Ilona Schmidt (Corning) / Steve Martell (Nordson SONOSCAN)

**Discussion:** None.

**Vote:** 4-0 in favor. Motion passed.

**Attachment:** [Ballot Results] Cycle 07-2018 3DP&I BWS

#### 4.2 Document # 6175, New Standard: Guide on Measurements of Openings and Vias in Glass

- The committee found the Accept Comment related and technically persuasive. The ballot failed and returned to the task force for re-work and re-ballot in the next cycle if ready.

**Motion:** To find the Accept Comment related and technically persuasive from Wendy Chen (KYECC) and to fail Doc 6175 based on this comment.

**By / 2<sup>nd</sup>:** Ilona Schmidt (Corning) / Bevan Wu (BW & Associates)

**Discussion:** None.

**Vote:** 4-0 in favor. Motion passed.

**Motion:** To authorize Doc 6175A to ballot in voting Cycle 1 or 2-2019.

**By / 2<sup>nd</sup>:** Ilona Schmidt (Corning) / Shoji Yusuke (DNP Corp)

**Discussion:** None.

**Vote:** 4-0 in favor. Motion passed.

**Attachment:** [Ballot Results] Cycle 07-2018 3DP&I I&M

#### 4.3 Document # 6332, New Standard: Specification for Panel Substrate Characteristics for Fan-Out Panel Level Packaging (FO-PLP) Applications

- The committee found the negatives related and technically persuasive. The ballot failed and returned to the task force for re-work and re-ballot in the next cycle if ready.

**Motion:** To find negative #3 from Stefan Radloff (Intel) related and technically persuasive and to fail Doc 6332 based on this negative.

**By / 2<sup>nd</sup>:** Steve Martell (Nordson SONOSCAN) / Ilona Schmidt (Corning)

**Discussion:** None.

**Vote:** 4-0 in favor. Motion passed.

**Motion:** To authorize Doc 6332A to ballot in voting Cycle 1 or 2-2019.

**By / 2<sup>nd</sup>:** Steve Martell (Nordson SONOSCAN) / Bevan Wu (BW & Associates)

**Discussion:** None.

**Vote:** 4-0 in favor. Motion passed.

**Attachment:** [Ballot Results] Cycle 07-2018 3DP&I FO-PLP Panel



4.4 Document 6412, Line Item Revision to SEMI 3D1-0912(Reapproved 0417), Terminology for Through Silicon via Geometrical Metrology

4.4.1 Line Item #1: Remove Wikipedia Reference.

- The ballot passed TC Chapter review as balloted. See attachment for ballot adjudication.

**Attachment:** 6412\_ProceduralReview

## 5 Subcommittee and Task Force Reports

### 5.1 *Fan-Out Panel Level Packaging (FO-PLP) Panel Task Force*

This TF did not meet. Notification was sent out prior to the TC Chapter that this TF would be cancelled and a TF meeting will meet a few weeks after the F2F meeting. Tentatively scheduled for November 26.

### 5.2 *3DP&I Inspection & Metrology and Bonded Wafer Stacks Task Force*

Task Force Leaders reported for both the 3DP&I Inspection & Metrology and 3DP&I Bonded Wafer Stacks Task Forces.

Of note, during the task force meeting, the task force reviewed the ballot results that can be found in Section 4 of these minutes.

## 6 Old Business

### 6.1 *SNARF(s) Approaching Three-Year Document Development Project Period*

The committee decide to abandon the following SNARFs approaching three-year document development period:

**Motion:** To abandon SNARFs 5976 and 6076.

**By / 2<sup>nd</sup>:** Steve Martell (Nordson SONOSCAN) / Ilona Schmidt (Corning)

**Discussion:** None.

**Vote:** 4-0 in favor. Motion passed.

6.2 Previous action items have been completed and closed. There is no further old business.

## 7 New Business

### 7.1 *Leadership Changes*

Rich Allen (NIST) addressed the committee on this topic.

- Rich Allen is intending to step down from co-chair position of the 3DP&I.
  - Looking for replacement/notify other chairs if they intend to take over (Chris/Sesh)
- Victor Vartanian – stepped down from I&M TF.

### 7.2 *FO-PLP Panel FOUP TF to update FO-PLP Panel TF at Nov 26 teleconference*

- Steve Martell will give a brief update of the Panel FOUP TF at the next Panel TF teleconference.



## 8 Next Meeting and Adjournment

The next meeting is scheduled for Thursday, April 4<sup>th</sup>, at the NA Standards Spring 2019 Meetings located at SEMI Global Headquarters in Milpitas, California. See <http://www.semi.org/standards-events> for the current list of events.

Tentative Schedule:

Thursday, April 4

10:30-12:00 Joint 3DP&I Bonded Wafer Stacks (TF) and 3DP&I Inspection and Metrology (TF)

12:30-14:00 Fan-Out Panel Level Packaging (FO-PLP) Panel (TF)

14:00-16:00 3DP&I (C)

Adjournment: 14:50.

Respectfully submitted by:

Laura Nguyen

Sr. Coordinator, International Standards

SEMI Headquarters

Phone: 1.408.943.7019

Email: [lnghuyen@semi.org](mailto:lnghuyen@semi.org)

Minutes tentatively approved by: **3DP&I NA TC Chapter on April 4, 2019**

Richard Allen (NIST), Co-chair	<Date approved>
Sesh Ramaswami (Applied Materials), Co-chair	<Date approved>
Chris Moore (Covalent Metrology), Co-chair	<Date approved>

**Table 13 Index of Available Attachments<sup>#1</sup>**

<i>Title</i>	<i>Title</i>
SEMI Standards Required Elements	[Ballot Results] Cycle 07-2018 3DP&I BWS
[2018West] 3DP&I NA Minutes FINAL	[Ballot Results] Cycle 07-2018 3DP&I I&M
20181030_3DP&I-Japan_Liaison_v1.0	[Ballot Results] Cycle 07-2018 3DP&I FO-PLP Panel
3D P&I TW Liaison Report_20180925	6412_ProceduralReview
Staff Report Nov 2018_3DP&I	

<sup>#1</sup> 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](http://www.semi.org). For additional information or to obtain individual attachments, please contact Laura Nguyen at the contact information above.