

# Record of Letter Ballot Review by TC Chapter for Procedural Review

Region/Locale: [Europe](#)

Global Technical Committee: [Compound Semiconductor Materials](#)

TC Chapter Cochairs: [Arnd Weber \(SiCrystal\)](#)

Standards Staff: [Laura Nguyen](#)

	Scheduled in Background Statement	Actual
Date	<a href="#">11/14/2024</a>	<a href="#">11/14/2024</a>
Location	<a href="#">ICM, Munich, Germany</a>	<a href="#">ICM, Munich, Germany</a>
Reason for Change of Date and/or Location (if changed)		

Note: See [Regulations ¶ 9.5](#) Exceptions for allowable reason to change.

## I. Document Number and Title

Document Number	Document Title
<a href="#">7225</a>	<a href="#">New Standard: Specification for Silicon Carbide Engineered Substrates</a>

## II. Tally

Standards staff to fill in.

Voting Tally: [As-cast tally after close of voting period](#)

Note: A minimum of 60% of the Voting Interests that have TC Members within the global technical committee that issued the Letter Ballot must return Votes. ([Regulations ¶ 9.6.2.1.1](#))

Voting Tally:

Voting Interest:	Returned Votes	Distribution	Return Rate	
Letter Ballot	<a href="#">62</a>	÷ <a href="#">100</a>	= <a href="#">62.0%</a>	≥60%
Intercommittee Ballot	<a href="#">24</a>			
Voting Interest Reject(s)	<a href="#">0</a>	Total Voters with Rejects		<a href="#">0</a>
Voting Interest Accept(s)	<a href="#">57</a>			

Note: See [Regulations § 3.2.1](#) for definition of Voting Interest.

### III. Rejects None

### IV. Other Technical Issues

Note: TC Chapter may choose to address a technical issue that is not part of a Negative received on a Letter Ballot (i.e., a Comment or a reason not addressed by a Vote response) by handling it as a Negative and finding it related and technically persuasive. The TC Chapter may then fail the Document or address such technical issue by using the procedure defined in *Regulations* § 9.6.1.4.3 to make a technical change to the Document. (*Regulations* ¶ 9.6.1.4.2.5)

Technical Issue	Origin	*TF/TC Chapter to choose <b>Committer 4 (Toshimasa Yamamoto/DENSO CORPORATION)</b>				
	Referenced Section/ Paragraph	*TF/TC Chapter to fill in including text in the ballot as appropriate. After section 6.3.3.2.3				
	Reason	*Original Comment text, if applicable, and problem statement, including justification and suggestion, should be copied. To address the voter's request. Although the "thickness of the surface SiC layer" is "required ordering information," it is transferred from the donor wafer and should be sufficiently thin compared to the engineering substrates wafer thickness (350±25um), but there is no description for that point, so it is desirable to describe the upper limit thickness, etc.				
Handle technical issue identified above as a Negative.						
Relate	Motion and Reason (check one)	<input checked="" type="checkbox"/>	'Related' is mutually agreed upon. (Needs no motion.)	GO TO "Persuasive" subsection		
	Motion and Reason (check one)	<input checked="" type="checkbox"/>	Negative is related and persuasive. (Needs >1/3 votes to pass.)			
Persuasive	Motion by/ 2 <sup>nd</sup> by	By: Peter Wagner / Peter Wagner Second: Tom Barbieri / Wolfspeed, Inc.				
	Discussion	None				
	Result of Vote (check one)	9 Y 0 N; Motion passed				
		<input checked="" type="checkbox"/>	[Negative is related and persuasive.] > 1/3	Is a technical change recommended? (check one)	<input checked="" type="checkbox"/>	Y
	<input type="checkbox"/>	[Negative is related and not persuasive.] < 2/3			N	GO TO "Final" subsection → (E)
Address by Technical Change Option	<b>Technical Change Recommendations</b> Original section/paragraph number and at least one full sentence are required in "FROM" and "TO" fields.					
	Technical Changes	1	FROM: Section/Paragraph <b>New</b>			
			TO: Section/Paragraph <b>xxx</b>			
			6.3.4 <i>Surface SiC Layer Thickness</i> — Thickness of the layer transferred from the donor material, small compared to the overall substrate thickness (generally < 1 μm).			
	Justification (if necessary) Definition is needed and reasonable					

<b>Final</b>	<b>Motion</b>		Negative is addressed by the technical change(s).		
	<b>Motion by/2<sup>nd</sup> by</b>		By: Christian Kranert / Fraunhofer IISB Second: Ulrich Kretzer / Freiberger Compound Materials GmbH		
	<b>Discussion</b>		None		
	<b>Result of Vote (check one)</b>		8 Y 0 N; Motion passed.		
			<input checked="" type="checkbox"/>	2/3 ≤ [Negative is addressed by the technical change(s).]	GO TO "Incorporation of the Technical Change" subsection
	<b>Incorporation of the Technical Change</b>	<b>Motion</b>		To incorporate the technical change(s).	
		<b>Motion by/2<sup>nd</sup> by</b>		By: Peter Wagner / Peter Wagner Second: Tom Barbieri / Wolfspeed, Inc.	
		<b>Discussion</b>		None	
		<b>Result of Vote (check one)</b>		9 Y 0 N; Motion passed.	
			<input checked="" type="checkbox"/>	90% ≤ [Agree to incorporate.]	GO TO "Final" subsection → (F)
<b>(check one)</b>		<input type="checkbox"/>	(B)	Not related	DOCUMENT FAILS
		<input type="checkbox"/>	(C)	Related and not persuasive	
		<input type="checkbox"/>	(E)	Related and persuasive and not addressed by technical change	
		<input checked="" type="checkbox"/>	(F)	Addressed by technical change	
<b>(check if applicable)</b>		<input type="checkbox"/>	Comment generated. See Section V-(ii) Comment # X.		

## V. Comments

### V- (i) Voters' Comments

#### Commenter 1 (Frank Hitzel/DoubleFox) - Comment 1

<b>Comment</b>	I don't have enough knowledge about such kind of wafer specs.			
	<b>Action</b>	The TC Chapter agreed to do one of the following actions.		
*No motion is required in this step.				
<input checked="" type="checkbox"/>		No further action was taken by the TC Chapter.		

*This table is needed for each Comment accompanied a Vote*

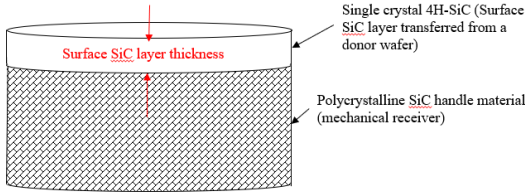
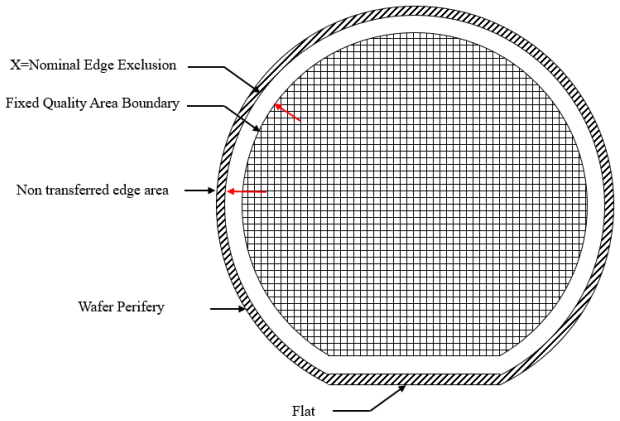
#### Commenter 2 (Guoqiao Tao/Enkris Semiconductor) - Comment 1

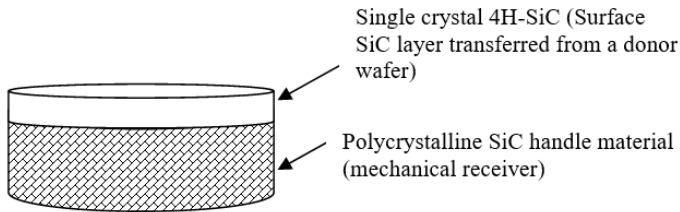
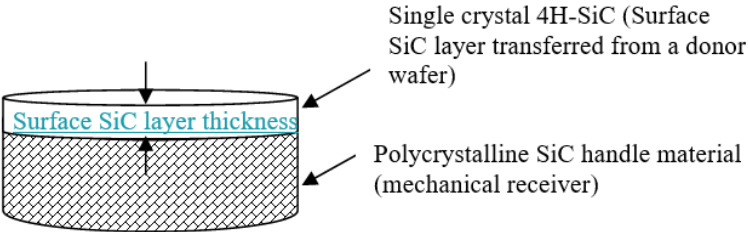
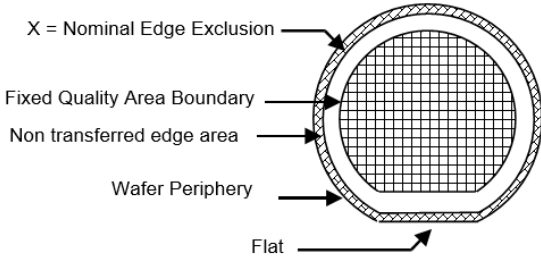
<b>Comment</b>	My comment is editorial: I suggest to include the term "polytype 4H" in the title of the document. (in case other polytypes are used in the future, a separate document would be needed)			
	<b>Action</b>	The TC Chapter agreed to do one of the following actions.		
*No motion is required in this step.				
<input checked="" type="checkbox"/>		No further action was taken by the TC Chapter.		

**Commenter 3 (Peter Wagner/Peter Wagner Consulting) - Comment 1**

<b>Comment</b>	I could not check the entire document. Therefore I have only two short remarks: §2.3: this statement is unnecessary. SEMI standards are required to use SI units according to Regulations. Definitions: definitions shall not contain discussions.
<b>Action</b>	The TC Chapter agreed to do one of the following actions.
	*No motion is required in this step.
<b>X</b>	No further action was taken by the TC Chapter.

**Commenter 4 (Toshimasa Yamamoto/DENSO CORPORATION) - Comment 1**

<b>Comment</b>	<p>*TF/TC Chapter to fill in section/paragraph #, if necessary.</p> <p>The idea of our counterproposal is,</p> <p>The “thickness of the surface SiC layer ” in Table A1-9 is shown in Figure A2-1, but is unclear because only one side of the arrow is shown. We therefore think that it should be clearly marked with arrows on both sides.</p> <p>“X =Nominal Edge Exclusion ” and“ Non transferred edge area ” in Table A1-4 and Figure A2-2 are indicated by arrows in the figures because the regions shown in the same manner are unclear. See Figure A2-1 and Figure A2-2 in the attached file.</p> <p>Also, although the "thickness of the surface SiC layer" is "required ordering information," it is transferred from the donor wafer and should be sufficiently thin compared to the engineering substrates wafer thickness (350±25um), but there is no description for that point, so we think it is desirable to describe the upper limit thickness, etc.</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p><b>Figure A2-1</b> <b>SiC Engineered Substrate Structure</b></p> </div> <div style="text-align: center;">  <p><b>Figure A2-2</b> <b>Fixed Quality Area and Non-Transferred Edge Area</b></p> </div> </div>
<b>Action</b>	The TC Chapter agreed to do one of the following actions.
	*No motion is required in this step.
<b>X</b>	Editorial Change

	Options for editorial change (check one)		<b>Case 1: No vote in this section:</b>
			To be included and voted on as a group in § VI. <i>Editorial Changes Other than Those Voted on in § V.</i>
		X	<b>Case 2: Voted in this section:</b>
			Original section number and at least one full sentence are required in “FROM” and “TO” fields.
Editorial Changes	1	<b>FROM: Section/Paragraph Fig A2-1</b>	
		 <p>Single crystal 4H-SiC (Surface SiC layer transferred from a donor wafer)</p> <p>Polycrystalline SiC handle material (mechanical receiver)</p>	
		<b>TO: Section/Paragraph Fig A2-1</b>	
		 <p>Single crystal 4H-SiC (Surface SiC layer transferred from a donor wafer)</p> <p>Surface SiC layer thickness</p> <p>Polycrystalline SiC handle material (mechanical receiver)</p>	
		<p><b>Justification (If necessary)</b></p> <p>The “thickness of the surface SiC layer” in Table A1-9 is shown in Figure A2-1, but is unclear because only one side of the arrow is shown. It should be clearly marked with arrows on both sides.</p>	
	2	<b>FROM: Section/Paragraph Fig A2-2</b>	
		 <p>X = Nominal Edge Exclusion</p> <p>Fixed Quality Area Boundary</p> <p>Non transferred edge area</p> <p>Wafer Periphery</p> <p>Flat</p>	



## VII. – (ii) Approval Level (check one)

Note: See *Regulations* § 9.6.2 for further information.

- Globally Approved (No Ratification Ballot needed):**  
The Letter Ballot meets the Letter Ballot approval conditions for the global technical committee.
- Need a Ratification Ballot:**  
The Letter Ballot meets the Letter Ballot approval conditions for the TC Chapter and a Ratification Ballot will be issued to validate technical changes.

## VIII. Safety Check

Note: See *Regulations* § 15 for further information.

Motion	<input checked="" type="checkbox"/>	<b>This is not a Safety Document</b> , when all safety-related information is removed, the Document is still technically sound and complete. ( <i>Regulations</i> ¶ 8.7.1)
	<input type="checkbox"/>	<b>This is a Safety Document</b> , when all safety-related information is removed, the Document is not technically sound and complete. ( <i>Regulations</i> ¶ 8.7.2)
	<input type="checkbox"/>	Safety Checklist ( <i>Regulations</i> ¶ 15.3) is complete and has been included with the Document throughout the balloting process. ( <i>Regulations</i> ¶ 15.1.2)
Motion by/2 <sup>nd</sup> by		By: Christian Kranert / Fraunhofer IISB Second: Tom Barbieri / Wolfspeed, Inc.
Discussion		None
Vote		7 Y 0 N; Motion <b>passed</b> .

## IX. Intellectual Property (IP) Check

Note: This Letter Ballot may cover all or part of a Standard or Safety Guideline. Regardless of the coverage, this IP check applies to the entire Standard or Safety Guideline\*. See *Regulations* § 16 for further information.

<input checked="" type="checkbox"/>	The TC Chapter meeting chair asked those participating, if they were aware of any patented technology that might be relevant (see <i>Regulations</i> ¶ 16.3.1.1) to the Standard or Safety Guideline; or, any copyrighted items or trademarks that are used/reproduced (see <i>Regulations</i> ¶ 16.4.1.2) in the Standard or Safety Guideline. (Also see, <i>Regulations</i> § 8.8)	
<input checked="" type="checkbox"/>	The question is NOT answered in affirmative (No potentially material patented technology or use/reproduction of copyrighted items/trademarks is known.)	<b>GO TO SECTION X.</b>

## X. Action for This Document

<b>Motion</b>	<input checked="" type="checkbox"/>	This Document passed TC Chapter review with technical changes and with or without editorial changes and will be forwarded to the ISC A&R SC for procedural review. A Ratification Ballot will be issued to verify the technical changes.
<b>Motion by/ 2<sup>nd</sup> by</b>	By: Shailaja Rao / Wolfspeed Second: Peter Wagner / Peter Wagner	
<b>Discussion</b>	None	
<b>Vote</b>	9 Y 0 N	
<b>Final Action</b>	<input checked="" type="checkbox"/>	Motion passed
	<input type="checkbox"/>	Motion failed

**Note: If the use of PMPT or copyrighted item is justified by the TC Chapter, LOA or release form must be received before publication can proceed.**