



STANDARDS NEW ACTIVITY REPORT FORM (SNARF)

Date Prepared: 2021-01-18 Revised (if Applicable): _____

SNARF for: New Standard: Test Method for quantifying TSDs in 4H-SiC crystals

Originating Global Technical Committee: Global Compound Semiconductor Materials Committee

Originating TC Chapter: European Compound Semiconductor TC

Task Force (TF) in which work is to be carried out: _____

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Refer to *Procedure Manual* § 2.2.4 for more information on properly filling out the SNARF.

1. Rationale:

a: Describe the need or problem addressed by this activity.

(Indicate the customer, what benefits they will receive, and if possible, quantify the impact on the return on investment [ROI] if the Document is implemented.)

Threading screw dislocations (TSDs) are detrimental to the yield and the performance of several types of 4H-SiC-based devices. Thus, there is a need to specify the TSD density of a substrate material (or an epi-layer) sold to a customer using these for device fabrication, based on a non-destructive measurement technique.

By using a standardized and reliable method for specification, the appropriate quality of the substrate material can be chosen, which either may reduce costs if the requirements regarding TSD density is low, or may increase the yield if the supplied substrates (or epi-layers) are of sufficiently high quality.

X-ray topography is the method of choice for this problem, but different approaches or measurement parameters may yield varying results. Thus, the measurement and evaluation parameters need to be defined to obtain comparable results.

b: Estimate effect on industry. Check one of the following:

☐ 1: Major effect on entire industry or on multiple important industry sectors

- identify the relevant sectors: _____

☒ 2: Major effect on an industry sector

- identify the relevant sector: SiC-based electronics

☐ 3: Major effect on a few companies

- identify the relevant companies: _____

☐ 4: Slight effect or effect not determinable

c: Estimate technical difficulty of the activity. Check one of the following:

☐ I: No Difficulty – Proven concepts and techniques exist or quick agreement is anticipated

☒ II: Some Difficulty – Disagreements on known requirements exist, but developing consensus is possible

☐ III: Difficult – Limited expertise and resources exist and/or achieving consensus is difficult

☐ IV: Extremely Difficult – Expertise and resources are scarce and/or achieving consensus is very difficult



2. Scope:

a: Describe the technical areas to be covered or addressed by this Document development activity.

(For Subordinate Standards, list common concepts or criteria that the Subordinate Standard inherits from the Primary Standard, as well as differences from the Primary Standard.)

This document will specify the method for detection and quantification of TSDs in 4H-SiC materials by X-ray topography. It shall define the measurement procedure, the requirements to the measurement data and the procedure for analyzing the data to obtain a TSD quantification.

b: Expected result of activity

- | | |
|--|---|
| <input checked="" type="checkbox"/> New Standard or Safety Guideline (including replacement of an existing Standard or Safety Guideline) | <input type="checkbox"/> Line-item revision to two or more existing Standards or Safety Guidelines |
| <input type="checkbox"/> New Subordinate Standard to an existing Standard or to a new Primary Standard to be developed concurrently with this new Subordinate Standard | <input type="checkbox"/> Reapproval of a Standard or Safety Guideline |
| <input type="checkbox"/> New Preliminary Standard | <input type="checkbox"/> Removal of a Standard or Safety Guideline |
| <input type="checkbox"/> Major revision to an existing Standard or Safety Guideline | <input type="checkbox"/> Withdrawal of a Standard or Safety Guideline |
| <input type="checkbox"/> Line-item revision to an existing Standard or Safety Guideline | <input type="checkbox"/> Reinstatement of a Standard or Safety Guideline |
| | <input type="checkbox"/> Publication of an existing Standard or Safety Guideline as an American National Standard |
| | <input type="checkbox"/> New Auxiliary Information |
| | <input type="checkbox"/> Modification of existing Auxiliary Information |

For a new Subordinate Standard, identify the Primary Standard here: _____

For revision of existing Standard(s) or Safety Guideline(s), identify the Standard(s) or Safety Guideline(s) that are to be revised here: _____, and identify which parts of the Standard(s) or Safety Guideline(s) that are to be revised. (Check all that apply.)

- ☐ **Modification of an existing part of Standard(s) or Safety Guideline(s) including Appendices, Complementary Files, and Supplementary Materials**
- ☐ **Addition of one or more Appendices or Complementary Files to an existing Standard or Safety Guideline**
- ☐ **Addition of one or more Related Information sections or Various Materials to an existing Standard or Safety Guideline**
- ☐ **Revision or addition of one or more Subordinate Standards to an existing Primary Standard**



For Standards, identify the Standard Subtype below:

☐ Classification

☐ Practice

☒ Test Method

☐ Miscellaneous (describe:)

☐ Guide

☐ Specification

☐ Terminology

3. Projected Timetable for Completion:

a: General Milestones

a. Activity Start: 2021-01-28

b. 1st Draft by: 2021-08-31

c. (Optional) Informational Ballot by: e: TC

d. Letter Ballot by: 2021-11-1

Chapter Approval By: 2022-1-28

4. Liaisons:

a: List SEMI Global Technical Committees, TC Chapters, Subcommittees, or Task Forces in your or other Regions/Locales that should be kept informed regarding the progress of this activity.

(Refer to SEMI Standards organization charts and global technical committee charters as needed.)

[Metrics](#)

b: List any planned Type I Liaisons with external nonprofit organizations (e.g., SDO) that should receive Draft Documents from Standards staff for feedback during this activity and be notified when the Letter Ballot is issued (see Procedure Manual § 7).

c: Intercommittee Ballots (check one):

☐ will be issued – **identify the recipient global technical committee(s):**

☐ will not be issued

5. Safety Considerations:

The resulting Document is expected (Check one):

☐ to be a Safety Guideline

☒ NOT to be a Safety Guideline

NOTE FOR 'to be a Safety Guideline': When all safety-related information is removed from the Document, the Document is NOT technically sound and complete – Refer to § 15.1 of the *Regulations* for special procedures to be followed.

NOTE FOR 'NOT to be a Safety Guideline': When all safety-related information is removed from the Document, the Document is still technically sound and complete.

6. Intellectual Property Considerations:

a: For a new Standard or Safety Guideline and for any part to be modified or added in a Revision of published Standards and Safety Guidelines (Check one):

☒ the use of patented technology is NOT required.

☐ patented technology is intended to be included in the proposed Standard(s) or Safety Guideline(s).

(If the second box is checked, check one):



- ☐ Letter of Intent received
- ☐ Letter of Intent not received

b: For Revision, Reapproval, Reinstatement, or Withdrawal of existing Standard(s) and Safety Guideline(s) (Check one):

- ☐ there is no known material patented technology necessary to use or implement the Standard(s) and Safety Guideline(s)
- ☐ there is previously known material patented technology necessary to use or implement the Standard(s) and Safety Guideline(s)

c: The body of the Document and any Appendices, Complementary Files, Related Information sections, or Various Materials that may or may not be a part of the Document by reference (Check one):

- ☐ will incorporate Copyrighted Item
- ☒ the incorporation of Copyrighted Item will NOT be required

NOTE FOR 'the use of patented technology or the incorporation of Copyrighted Item(s) is NOT required': If in the course of developing the Document, it is determined that the use of patented technology or Copyrighted Item(s) is necessary for the Document, the provisions of *Regulations* § 16 must be followed.

NOTE FOR 'will incorporate Copyrighted Item': A copyright release letter must be obtained from the copyright owner prior to publication.

7. Comments, Special Circumstances:

8. TC Member Review (Check one):

- ☐ took place between (put dates here: MM/DD/YYYY and MM/DD/YYYY) before approval at the TC Chapter Meeting, or
- ☐ took place between (put dates here: MM/DD/YYYY and MM/DD/YYYY) before approval by the GCS, or
- ☐ is not required for this SNARF.

NOTE FOR 'TC Member Review': A TC Member Review is required by the *Regulations* for a period of at least two weeks before approval of a new, or a major revision of an existing, Standard or Safety Guideline. (See *Regulations* ¶ 8.2.1)

9. Approval Dates:

TC Chapter or GCS: _____

Recorded in TC Chapter Minutes: _____
