IEC 63068-4

Edition 1.0 2022-07

INTERNATIONAL STANDARD

Semiconductor devices – Non-destructive recognition criteria of defects in silicon carbide homoepitaxial wafer for power devices – Part 4: Procedure for identifying and evaluating defects using a combined method of optical inspection and photoluminescence

IEC 63068-4:2022-07(en)

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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 31.080.99

ISBN 978-2-8322-4307-7

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SEMICONDUCTOR DEVICES – NON-DESTRUCTIVE RECOGNITION CRITERIA OF DEFECTS IN SILICON CARBIDE HOMOEPITAXIAL WAFER FOR POWER DEVICES –

Part 4: Procedure for identifying and evaluating defects using a combined method of optical inspection and photoluminescence

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The text of this International Standard is based on the following documents:

Draft	Report on voting
47/2751/CDV	47/2768/RVC

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 63068 series, published under the general title *Semiconductor devices – Non-destructive recognition criteria of defects in silicon carbide homoepitaxial wafer for power devices*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

Results of evaluating defects on silicon carbide homoepitaxial wafer by a single test method using optical inspection or photoluminescence often depends on examined wafer conditions such as surface morphology and spatial variation of impurity concentration, and thus need human visual confirmation of the results after inspection using equipment. The procedure described in this part of IEC 63068 uses a combined method of optical inspection and photoluminescence and can yield more accurate and reproducible results of defect recognition compared to when a single test method is used.

SEMICONDUCTOR DEVICES – NON-DESTRUCTIVE RECOGNITION CRITERIA OF DEFECTS IN SILICON CARBIDE HOMOEPITAXIAL WAFER FOR POWER DEVICES –

Part 4: Procedure for identifying and evaluating defects using a combined method of optical inspection and photoluminescence

1 Scope

This part of IEC 63068 provides a procedure for identifying and evaluating defects in as-grown 4H-SiC (Silicon Carbide) homoepitaxial wafer by systematically combining two test methods of optical inspection and photoluminescence (PL). Additionally, this document exemplifies optical inspection and PL images to enable the detection and categorization of defects in SiC homoepitaxial wafers.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 63068-1, *Semiconductor devices – Non-destructive recognition criteria of defects in silicon carbide homoepitaxial wafer for power devices – Part 1: Classification of defects*

IEC 63068-2, *Semiconductor devices – Non-destructive recognition criteria of defects in silicon carbide homoepitaxial wafer for power devices – Part 2: Test method for defects using optical inspection*

IEC 63068-3, *Semiconductor devices – Non-destructive recognition criteria of defects in silicon carbide homoepitaxial wafer for power devices – Part 3: Test method for defects using photoluminescence*

3 Terms and definitions

No terms and definitions are listed in this document.

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- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

4 Principle

Defects can be more accurately and reproducibly identified by systematically combining two test methods of optical inspection and PL.