

SEMI 3D11-1214

TERMINOLOGY FOR THROUGH GLASS VIA AND BLIND VIA IN GLASS GEOMETRICAL METROLOGY

This Standard was technically approved by the 3DS-IC Global Technical Committee. This edition was approved for publication by the global Audits and Reviews Subcommittee on August 25, 2014. Available at www.semiviews.org and www.semi.org in December 2014.

1 Purpose

1.1 The purpose of this Document is to provide clear and commonly accepted definitions of through glass vias (TGV) and to provide a consistent terminology for the understanding and discussion of metrology issues important them.

2 Scope

2.1 This Document attempts to describe measurands and geometrical features of through and blind vias in glass.

2.2 The focus of this Document is on geometry-related metrology and measurands important for definition and control of fabrication and inspection operations on structures that include openings for TGV.

2.3 This Document is intended for through glass vias and blind vias in glass.

2.4 This Document can be applied to all through and blind vias as they occur in any flat surfaces made of glass, for instance wafers or sheets.

2.5 This Document adopts and adapts structure and wording from SEMI 3D1, Terminology for Through Silicon Via Metrology.

NOTICE: SEMI Standards and Safety Guidelines do not purport to address all safety issues associated with their use. It is the responsibility of the users of the Documents to establish appropriate safety and health practices, and determine the applicability of regulatory or other limitations prior to use.

3 Limitations

3.1 This Document does not include terminology for vias in silicon or other materials.

3.2 This Document does not describe measurement procedures and test methods.

3.3 This Document does not discuss statistical considerations.

4 Referenced Standards and Documents

4.1 SEMI Standards and Safety Guidelines

SEMI 3D1 — Terminology for Through Silicon Via Geometrical Metrology

SEMI E89 — Guide for Measurement System Analysis (MSA)

SEMI P35 — Terminology for Microlithography Metrology

4.2 NIST Documents¹

NIST Documents NBSIR 79-1758 — The Calibration of a Roundness Standard

4.3 Other Documents

International Technology Roadmap for Semiconductors, 2009 Edition, Chapter on Interconnect

NOTICE: Unless otherwise indicated, all documents cited shall be the latest published versions.

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5 Abbreviations and Acronyms

- 5.1 *BV* — blind via
- 5.2 *CD* — critical dimension
- 5.3 *SR* — surface roughness
- 5.4 *TGV* — through glass via

6 Definitions

- 6.1 *glass substrate* — any flat surface made of glass, for instance wafers or sheets.
- 6.2 *through glass via opening (TGV)* — a hole or recess in a glass substrate that begins at the top surface and extends fully through the substrate from one surface to the other. It may be empty, contain a conductor or contain additional layers such as an insulator between the conductor and the glass, a diffusion barrier on the glass surface within the hole, or others. See Figure 1.

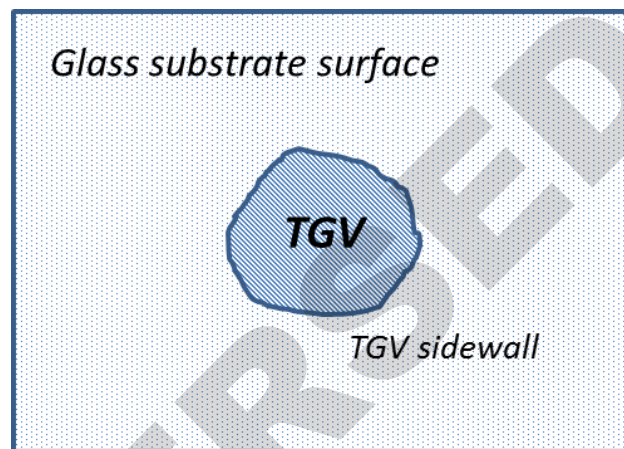


Figure 1
TGV with Sidewall at Top Glass Surface

- 6.3 *blind via opening BV* — a hole or recess in a glass substrate that begins at the top surface and does not extend fully through the substrate from one surface or to the other. It may contain a conductor or additional layers. Figure 2 shows blind via versus through via.
- 6.4 *top surface* — the substrate surface where the TGV opening is initially created and where the excavation of the TGV begins. This surface is defined to be horizontal; its perpendicular is defined to be vertical. Figure 1 shows a sketch of a TGV at the top surface.
- 6.5 *bottom surface* — the substrate surface opposite the top surface.
- 6.6 *edge* — the rim or edge of via at the top surface.
- 6.7 *area* — geometrical area of the TGV opening in a particular horizontal plane. In Figure 1, the area of the TGV opening is the area covered by the light upward diagonal line pattern.
- 6.7.1 *top area* — area of the TGV opening at the top surface of the substrate.
- 6.8 *depth* — the distance, measured from the top surface vertically toward the bottom surface, between the top surface and the deepest point of the TGV opening.