

SEMI T24-1222

SPECIFICATION FOR ID MARKING FOR GLASS CARRIER CHARACTERISTICS OF PANEL LEVEL PACKAGING (PLP) APPLICATIONS

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NOTICE: Paragraphs entitled ‘NOTE:’ are not an official part of this Standard or Safety Guideline and are not intended to modify or supersede the official Standard or Safety Guideline. These have been supplied by the global technical committee to enhance the usage of the Standard or Safety Guideline.

1 Purpose

1.1 This Specification is intended to provide a marking symbology that can be used to mark glass carrier characteristics for panel level packaging (PLP).

2 Scope

2.1 This Specification defines the geometric shape, size and content of a rectangular two-dimensional (2D) code symbol for back surface marking of the glass carrier for use in PLP applications.

2.2 Although this Specification does not specify the marking techniques that may be employed when complying with its requirements, it is assumed that the symbol is laser marked with individual dots.

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 Specification applies only to PLP glass carriers.

4 Referenced Standards and Documents

4.1 SEMI Standards and Safety Guidelines

SEMI 3D23 — Specification for Glass Characteristics for Panel Level Packaging (PLP) Applications

4.2 ISO^{®1}/IEC^{®2} Standards

ISO/IEC 16022 — International Symbology Specification – Data Matrix

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

5 Terminology

5.1 Definitions

5.1.1 *alignment bar, of a data matrix code symbol* — a solid line of contiguous filled cells abutting a line of alternately filled and empty cells. [ISO/IEC 16022]

5.1.2 *binary values* — a dot in the wafer surface indicates the binary value 1. The absence of a dot, or a smooth surface surrounding a cell center point indicates the binary value 0.

¹ International Organization for Standardization, ISO Central Secretariat, Chemin de Blandonnet 8, CP 401-1214 Vernier, Geneva, Switzerland; Telephone: +41.22.749.01.11, Fax: +41.22.733.34.30, <http://www.iso.org>. ISO trademark is owned by International Organization for Standardization.

² International Electrotechnical Commission, 3 rue de Varembe, Case Postale 131, CH-1211 Geneva 20, Switzerland; Telephone: +41.22.919.02.11, <http://www.iec.ch>. IEC trademark is owned by International Electrotechnical Commission.

- 5.1.3 *border column* — the outermost column of a data matrix code symbol. This column is a portion of the finder pattern.
- 5.1.4 *border row* — the outermost row of a data matrix code symbol. This row is a portion of the finder pattern.
- 5.1.5 *cell, of a data matrix code symbol* — the area within which a dot may be placed to indicate a binary value.
- 5.1.6 *cell center point, of an array* — the point at which the centerline of a row intersects the centerline of a column.
- 5.1.7 *cell spacing, of an array* — the (equal) vertical or horizontal distance between the cell center points of contiguous cells.
- 5.1.8 *center line, of a row or column* — the line positioned parallel to, and spaced equally between, the boundary lines of the row or column.
- 5.1.9 *central area, of a cell* — the area enclosed by a circle centered at the cell center point; used by code readers to sense the binary value of the cell.
- 5.1.10 *data matrix code symbol* — a two-dimensional array of square cells arranged in contiguous rows and columns. In certain ECC200 symbols, data regions are separated by alignment patterns. The data region is surrounded by a finder pattern. [ISO/IEC 16022]
- 5.1.11 *dot* — a localized region with a reflectance which differs from that of the surrounding surface.
- 5.1.12 *dot misalignment, within a cell* — the distance between the physical center point of a dot and the cell center point.
- 5.1.13 *finder pattern, of a data matrix code symbol* — a perimeter to the data region. Two adjacent sides contain dots in every cell; these are used primarily to define physical size, orientation and symbol distortion. The two opposite sides are made up of cells containing dots in alternate cells. [ISO/IEC 16022]
- 5.1.14 *quiet zone* — a region outside the finder pattern that contains no discontinuities in surface characteristics.
- 5.1.15 *reference point, of a data matrix code symbol* — the physical center point of a corner cell common to the primary border row and the solid line of the alignment bar, used to identify the physical location of the symbol on the object being marked with the symbol. The reference point is at a fixed location on the object. Different cells may be chosen as the reference point depending on the desired orientation of the symbol on the object and the size variability of the symbol. The particular cell to be used as the reference point should be specified for each application.

6 Requirements

6.1 Shape and Size of the Data Matrix Code Symbol (refer to Figures 1 and 2)

6.1.1 Data Matrix Code Symbol Dimensions

6.1.1.1 Each rectangular matrix code symbol shall be composed of an array of 8 rows and 32 columns with an alignment bar as defined in ISO/IEC 16022.

6.1.1.2 Cell spacing shall be 125 μm , center to center.

6.1.2 *Dot Size* — The nominal shape of the dot produced in the matrix may be circular or square. Its diameter or edge length shall be 100 μm + 10 μm – 30 μm .

6.1.3 Border Rows and Columns

6.1.3.1 One border row and one border column shall contain a dot in each cell. These are identified as the primary border row and the primary border column. These are used by the code reader to determine the orientation of the matrix.

6.1.3.2 The opposing (secondary) border row and column shall contain dots in alternating cells.

6.1.3.3 The quiet zone shall constitute a region at least the size of a cell immediately outside the border rows and columns.

6.1.3.4 For these rectangular matrix code symbols, the reference point of the symbol shall be the physical center point of the cell common to the primary border row and the center alignment bar.