

SEMI M9.6-0813 (Withdrawn 0822) SPECIFICATION FOR ROUND 125 mm DIAMETER POLISHED MONOCRYSTALLINE GALLIUM ARSENIDE WAFERS

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NOTICE: This Document was balloted and approved for withdrawal in 2022.

1 Purpose

1.1 This Specification defines properties of 125 mm monocrystalline GaAs wafers, in agreement with presently established industry practice. It uniquely defines those mechanical parameters that do not need, for technical reasons, a choice of different values.

2 Scope

2.1 The parameters defined include the values and tolerances of wafer diameter, thickness and surface orientation. The position and length of primary and secondary flats are also specified.

2.2 The complete Specification of this product includes the requirements of SEMI M9, excluding those that are not relevant to this Specification.

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 Referenced Standards and Documents

3.1 SEMI Standards and Safety Guidelines

SEMI M9 — Specification for Polished Monocrystalline Gallium Arsenide Wafers

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

4 Physical Requirements

Table 1 Dimension and Tolerance Requirements

<i>Property</i>	<i>Dimension</i>	<i>Tolerance</i>	<i>Units</i>
DIAMETER	125	±0.3	mm
THICKNESS, CENTER POINT	625	±25	μm
PRIMARY ORIENTATION FLAT DIAMETER ^{#1}	121	±0.3	mm
SECONDARY FLAT DIAMETER ^{#2}	123.5	±0.3	mm

#1 Actual Primary Orientation Flat Length depends on allowed variation in the wafer diameter and the orientation flat diameter. Variation in Primary Orientation Flat Length is calculated assuming that the end points of Primary Orientation Flat will have curvature of a circle of radius $R = 0$ or $R = 3$ mm; this circle will be tangent to the orientation flat and also tangent to the wafer circumference. Calculated nominal linear length of Primary Orientation Flat (the straight part of the flat) are 44 mm in a case of $R = 0$ mm and 42.90 respectively on a case of $R = 3$ mm.

#2 Actual Secondary Flat Length also depends on allowed variation in the wafer diameter and the Secondary Flat Diameter. Variation in Secondary Flat Length is calculated. Calculated nominal linear lengths of the Secondary Flat (the straight part of the flat) are 27.22 mm in the case of $R = 0$ mm, and 26.25 mm, respectively, in the case of $R = 3$ mm.

Table 2 Orientation and Flat-Location Requirements

<i>Property</i>	<i>Requirement</i>
PRIMARY FLAT ORIENTATION	$(01\bar{1}) \pm 1.0^\circ$, under an Arsenic facet. The primary flat shall be perpendicular to the 'V' etch figure. ^{#3}
SECONDARY FLAT ORIENTATION	$90^\circ \pm 5^\circ$ counterclockwise from the primary flat.
SURFACE ORIENTATION	
A.	$(100) \pm 0.5^\circ$ (Refer to Figure 1 in M9.)
B.	(100) off $2^\circ \pm 0.5^\circ$ towards the (110) plane, which is between the primary and secondary flats. (Refer to Figure 3 in M9.)
ORTHOGONAL MISORIENTATION	$\pm 5^\circ$ (Refer to Figure 5 in M9.)

#1 The frame of reference is the (100) plane of the crystal. It is the wafer normal that is tilted towards the (110) plane of the crystal.

#2 Refer to Table 1.

#3 Using A-B, bromine-methanol, ammonium hydroxide: hydrogen peroxide etch. Refer to Figures 1 through 4. Figure 1 also shows the orientation of the V-groove figure relative to the KOH etch pits.

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