

SEMI M23.3-0600 (Withdrawn 0811) SPECIFICATION FOR RECTANGULAR POLISHED MONOCRYSTALLINE INDIUM PHOSPHIDE WAFERS

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NOTICE: This Document was balloted and approved for withdrawal in 2011.

NOTE 1: The complete specification for this product includes all general requirements of SEMI M23.

Table 1 Dimension and Tolerance Requirements

<i>Property</i>	<i>Dimension</i>	<i>Tolerance</i>	<i>Units^{#1}</i>
IA-1			
LONGITUDINAL SIDE LENGTH	32.6	±0.3	mm
LATERAL SIDE LENGTH	23.1	±0.3	mm
THICKNESS, CENTER POINT	350	±25	μm
IA-2			
LONGITUDINAL SIDE LENGTH	23.1	±0.3	mm
LATERAL SIDE LENGTH	16.3	±0.3	mm
THICKNESS, CENTER POINT	350	±25	μm
IB-1			
LONGITUDINAL SIDE LENGTH	53.0	±0.3	mm
LATERAL SIDE LENGTH	37.5	±0.3	mm
THICKNESS, CENTER POINT	600	±25	μm
IB-2			
LONGITUDINAL SIDE LENGTH	37.5	±0.3	mm
LATERAL SIDE LENGTH	26.5	±0.3	mm
THICKNESS, CENTER POINT	600	±25	μm

#1 For reference purposes, the metric (SI) units apply.

Table 2 Orientation and Flat Location Requirements

<i>Property</i>	<i>Requirement</i>
LONGITUDINAL SIDE ORIENTATION	$\overline{(011)} \pm 0.5^\circ$, under a phosphorus facet.
LATERAL SIDE ORIENTATION	$\overline{(011)} \pm 0.5^\circ$, under an indium facet.
SURFACE ORIENTATION	$\{100\} \pm 0.5^\circ$
FRONT SURFACE FINISH	Polished
BACK SURFACE FINISH	Lapped and etched
WAFER EDGE PROFILE	Cleaved face

APPENDIX 1

NOTICE: The material in this Appendix is an official part of SEMI M23.3 and was approved by full letter ballot procedures on April 21, 2000.

A1-1 Discussion

A1-1.1 InP is a promising material for photonic devices such as LDs, LEDs, and photodetectors for fiber communications. The consumption of InP wafers is increasing year by year due to the fiber communication systems such as LAN, ISDN, and others.

A1-1.2 In order to fabricate these devices, many rectangular wafers with more than 30 different sizes are industrially used but most of the sizes are not reasonably determined. From the viewpoint of material yield as explained below, the standardization of rectangular InP wafers is useful not only for InP wafer manufacturers, but also for device manufacturers.

A1-1.3 Figure A1-1 shows the effective area (A) as a function of ratio of longitudinal length (a) and of lateral length (b). It is a fact that the largest area can be obtained when the shape is square. However, it is difficult to distinguish V-Groove and Dove-Tail Groove orientations when the shape is square. It is, therefore, necessary to make the shape rectangular in a way that one can distinguish the orientations. It is, however, noted that if the length ratio becomes too large, the effective area is dramatically decreased as seen in Figure A1-1. For instance, rectangular wafers at the point P have very little area, and most of wafer is cut off in vain. It is, therefore, very reasonable to select the length ratio at which the effective area is not largely decreased. When the length ratio (a/b ratio) is $\sqrt{2}$, the area decrease is only 5.7% as seen in Table A1-1 and Figure A1-1. It is also interesting to note that if the length ratio is determined as $\sqrt{2}$, each half of the rectangular wafer again gives a similar shape with the same ratio. In fact, this length ratio is used for paper standardization as A3/A4 or B3/B4. Rectangular wafers are therefore determined SEMI M23.3.

A1-1.4 Since there are already standardized 50 and 75 mm round wafers, the standardization is made in a way that large rectangular wafers can be obtained from these standardized wafers by removing 5 mm from the periphery as seen in Figure A1-2. Removing of 5 mm is due to EPD measurement specifications in which 5 mm periphery is excluded from the measurement.

A1-1.5 As explained above, it is highly recommended to use the standardized rectangular wafers because this standardization is very important in preventing proliferation of various sizes of rectangular wafers in the future.

Table A1-1

a/b Ratio	A (mm ²)	A/square
1.000	800.0	100%
1.414	754.2	94.3%
2.000	640.0	80.0%

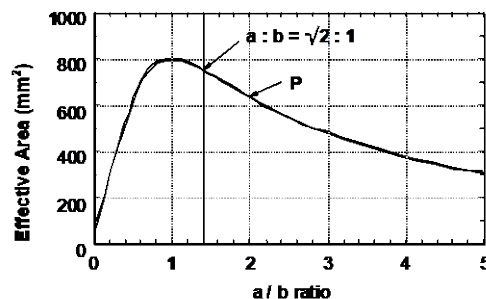


Figure A1-1
Effective Area as a Function of a/b Ratio