

**Monocrystalline Silicon Wafer**

**Pseudo Square N-type 156 mm 180/200/220 μm**

**1. Crystal- and material properties**

Property	Target	Unit	Lower Limit	Upper Limit	Standard
<b>Ingotting method</b>	CZ				
<b>Crystallinity</b>	Monocrystalline	-	-	-	
<b>Conductivity type</b>	N-type	-	-	-	SEMI MF 42-02
<b>Dopant</b>	Phosphorous	-	-	-	
<b>Oxygen concentration [O<sub>i</sub>]</b>	-	at/cm <sup>3</sup>	-	1E+18	ASTM F 121-83
<b>Carbon concentration [C<sub>s</sub>]</b>	-	at/cm <sup>3</sup>	-	5E+16	ASTM F 123-86
<b>Etch pit density (dislocation density)</b>	-	cm-2	-	300	SEMI MF 1725-1103
<b>Surface orientation</b>	<100>	-	- 3°	+ 3°	SEMI MF 26-0305
<b>Orientation of square sides</b>	<010> <001>	-	- 3°	+ 3°	SEMI MF 26-0305

**2. Electrical properties**

Property	Target	Unit	Lower Limit	Upper Limit	Standard
<b>Resistivity (variant 1)</b>	-	Ωcm	0.5	3.5	SEMI MF 43-99
<b>Other dopants' concentration</b>	-	ppba	-	45 (no umg-Si)	
<b>Lifetime</b>	-	μs	100	-	SEMI MF 1535-1104

**3. Geometry**

Property	Target	Unit	Lower Limit	Upper Limit	Standard
<b>Geometry</b>	pseudo square	-	-	-	
<b>Side length</b>	156.0	mm	- 0.5	+ 0.5	
<b>Angle between adjacent sides</b>	90	°	- 0.2	+ 0.2	
<b>Bevel edge shape</b>	195	mm	- 0.5	+ 0.5	
<b>Bevel cathetus</b>	round	-	-	-	
<b>Bevel edge angle</b>		mm	-	0.2	
<b>Average thickness (over 1 wafer)</b>	180/200/220 (= "nominal thickness")	μm	- 30	+ 30	SEMI MF 533-02a
<b>Thickness mean (over the delivery)</b>	180/200/220	μm	- 5	+ 5	
<b>TTV (Total thickness variation)</b>	-	μm	-	50	SEMI MF 533-02a

4. Surface properties

Property	Specification	Unit	Lower Limit	Upper Limit	
<b>Surface quality</b>	as-cut and cleaned; no visible contamination as oil or grease, finger prints, soap stains, slurry stains, epoxy/water stains, (Detection equipment: Hennecke system)	-	-	-	
<b>Saw marks / steps</b>	(Detection equipment: Hennecke system)	µm	-	20	
<b>Chippings</b>	below 1 mm from the edge are allowed				
<b>Micro cracks/ inclusions/holes</b>	prohibited				

5. Packaging

Property	Target	Unit	Lower Limit	Upper Limit	
<b>Packing method</b>	Wafer stacks in shrink foil packed in styrofoam boxes packed in cardboard cartons	-	-	-	
<b>Labelling on each styrofoam boxes</b>	Supplier, Date / Time, Ingot No., Box No., Amount of wafers, Thickness, Furnace Run, Furnace No., Supplier's internal Order No.	-	-	-	
<b>Labelling on each cardboard carton</b>	Supplier, Carton No., Wafer description (thickness, size, Crystallinity), Article No., Amount of wafers per cardboard carton, Amount of boxes, Date	-	-	-	