

## Monocrystalline Silicon Wafer

**Full Square P-type 156 mm 180/200/220 μm**

### 1. Crystal- and material properties

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

### 2. Electrical properties

Property	Target	Unit	Lower Limit	Upper Limit	Standard
Resistivity (variant 1)	–	Ωcm	2.5	6	SEMI MF 43-99
Other dopants' concentration	–	ppba	–	45 (no umg-Si)	
Lifetime	–	μs	10	–	SEMI MF 1535-1104

### 3. Geometry

Property	Target	Unit	Lower Limit	Upper Limit	Standard
Geometry	square with bevels	–	–	–	
Side length	156.0	mm	– 0.5	+ 0.5	
Angle between adjacent sides	90	°	– 0.2	+ 0.2	
Bevel edge shape	flat	–	–	–	
Bevel cathetus	1	mm	– 0.33	+ 0.33	
Bevel edge angle	45	°	– 10	+ 10	
Average thickness (over 1 wafer)	180/200/220 (= “nominal thickness”)	μm	– 30	+ 30	SEMI MF 533-02a
Thickness mean (over the delivery)	180/200/220 (= “nominal thickness”)	μm	–5	+5	
TTV (Total thickness variation)	–	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>	<b>No allowed</b> (Detection equipment: Hennecke system)				

## 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	–	–	–	