

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
Ingotting method	CZ				
Crystallinity	Monocrystalline	-	-	-	
Conductivity type	N-type	-	-	-	SEMI MF 42-02
Dopant	Phosphorous	-	-	-	
Oxygen concentration [O _i]	-	at/cm ³	-	1E+18	ASTM F 121-83
Carbon concentration [C _s]	-	at/cm ³	-	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	0.5	3.5	SEMI MF 43-99
Other dopants' concentration	-	ppba	-	45 (no umg-Si)	
Lifetime	-	μs	100	-	SEMI MF 1535-1104

3. Geometry

Property	Target	Unit	Lower Limit	Upper Limit	Standard
Geometry	pseudo square	-	-	-	
Side length	156.0	mm	- 0.5	+ 0.5	
Angle between adjacent sides	90	°	- 0.2	+ 0.2	
Bevel edge shape	195	mm	- 0.5	+ 0.5	
Bevel cathetus	round	-	-	-	
Bevel edge angle		mm	-	0.2	
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	μm	- 5	+ 5	
TTV (Total thickness variation)	-	μm	-	50	SEMI MF 533-02a

4. Surface properties

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

5. Packaging

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