

Multicrystalline Silicon Wafer

P-type 156 mm 160/180/200 μm

1. Crystal- and material properties

Property	Target	Unit	Lower Limit	Upper Limit	Standard
Crystallinity	Multicrystalline	–	–	–	
Conductivity type	p-type	–	–	–	SEMI MF 42-02
Dopant	Boron	–	–	–	
Oxygen concentration [Oi]	–	at/cm ³	–	5E+17	ASTM F 121-83
Carbon concentration [Cs]	–	at/cm ³	–	4E+17	ASTM F 123-86
Surface fraction with etch pit density >4E+5 cm ⁻²	–	%	–	–	

2. Electrical properties

Property	Target	Unit	Lower Limit	Upper Limit	Standard
Resistivity 1	–	Ωcm	1	3	SEMI MF 673-02
Resistivity 2	–	Ωcm	0.5	2	SEMI MF 673-02
Other dopants' concentration	–	ppba	–	45 (no umg-Si)	
Lifetime	–	μs	2	–	SEMI MF 1535-1104

3. Geometry

Property	Target	Unit	Lower Limit	Upper Limit	Standard
Geometry	Full 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)	160/180/200 (= “nominal thickness”)	μm	– 30	+ 30	SEMI MF 533-02a
Thickness mean (over the delivery)	160/180/200 (= “nominal thickness”)	%	– 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	No allowed (Detection equipment: Hennecke system)				

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, Amount of wafers from the specified block, Thickness, Furnace Run, Furnace No., Position of block and ingot in furnace, 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	–	–	–	