

1 Crystal, chemical and material properties

Property	Specification	Control frequency	Measuring Methodes	References
Crystal Growing method	CZ	-	-	-
Crystal Structure	Mono-crystalline	-	-	-
Crystal Orientation	$\langle 100 \rangle \pm 3^\circ$	-	-	-
Conductivity Type	P-type	Each block	-	-
Dopant	Boron and phosphorus, adjusted with Gallium	-	-	-
Oxygen Concentration ¹	$\leq 9,0 \times 10^{17}$ atoms/cm ³ [≤ 18 ppma]	Each mother ingot - center value, seed and tail	FTIR	(new) ASTM F121 - 83
Carbon Concentration ²	$\leq 5,0 \times 10^{17}$ atoms/cm ³ [≤ 10 ppma]	Each mother ingot - center value, seed and tail	FTIR	ASTM F1391-93a

2 Electrical and Chemical properties

Property	Specification	Control frequency	Measuring Methodes	References
Specific Resistivity ³	1.0 - 2.5 Ohmcm	Each mother ingot - center value, seed and tail	4-point probe	ASTM F84
Bulk Lifetime ⁴	$\geq 100 \mu\text{s}$	Each mother ingot - surface value, seed and tail	Sinton	QSS
Defects ⁵	No slip lines	Each mother ingot - seed and tail	Visual and PL-camera	-

3 Geometry

Property	Specification	Control frequency	Measuring Methodes	References
Wafer Shape	Pseudo square	-	-	-
Wafer Size - flat to flat	210 mm \pm 0.25 mm	Continuous	Vision system	-
Wafer Diameter	156.75 mm \pm 0.25 mm	Continuous	Vision system	-
Corner edge length	8.5 mm \pm 0.5 mm	Continuous	Vision system	-
Right Angel (Φ)	$90^\circ \pm 0.2^\circ$	Continuous	Vision system	-
Thickness	180/190 μm \pm 20 μm / -20 μm	Continuous	Vision system	-
Bow	$\leq 50 \mu\text{m}$	Continuous	Vision system	-
Warp	$\leq 70 \mu\text{m}$	Continuous	Vision system	-
TTV	$< 30 \mu\text{m}$	Continuous	Vision system	-

4 Surface Properties

Property	Specification	Control frequency	Measuring Methodes	References
Wafer Slicing	Water Based Diamond Wafering	-	-	-
Wafer Cleaning	Water + Detergent	-	-	-
Wafer Surface	As cut - No stains exp. A) Water stains B) Stains from Si dust	Continuous	-	-

5 Apperance

Property	Specification	Control frequency	Measuring Methodes	References
Edge Defect	Length $\leq 0,5$ mm, Width $\leq 0,3$ mm, max 1	100% - Stacks of 100 pieces	Visual	-
Saw Marks	Depth $\leq 15 \mu\text{m}$	Continuous	Vision system	-
V chip	Not allowed	Continuous	Vision system	-
Crack and Pin Holes	No cracks. No Pin Holes	Continuous	IR - Camera	-

6 Packaging

Property	Specification
Packaging Method	EPS boxes packed in cardboard cartons and wooden pallet
Information on each EPS box	Product name, thickness, ingot lot, quantity, packaging date and inspector
Information on each pallet	Pallet number
Statistical quality criteria	AQL 1.0 - Inspection level II. AQL items are thickness, sawmarks, dimension and visual surface defects/Appearance

7 Illustration

