

## LONGi P-Type Monocrystalline Wafer Specification

### 隆基 P 型单晶硅片规格书

#### 1、Material properties 材料性能

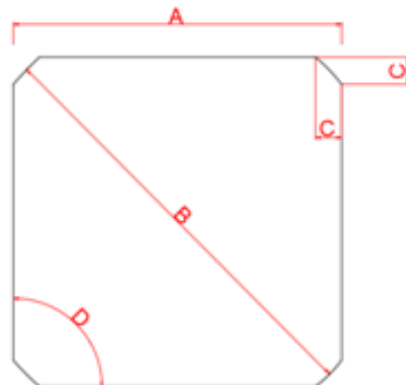
Property 项目	Specification 规格	Inspection Method 检测方法
Growth method 生长方式	CZ 直拉法	--
Crystallinity 结晶性	Monocrystalline 单晶	Preferential Etch Techniques (ASTM F47-88) 择优化学腐蚀法
Conductivity type 导电类型	P-type P 型	Napson EC-80TPN P/N 型测试仪
Dopant 掺杂元素	Boron 硼	--
Oxygen concentration [O <sub>i</sub> ] 间隙氧含量	≤9E + 17 at/cm <sup>3</sup>	FTIR (ASTM F121-83) 傅里叶变换红外光谱仪
Carbon Concentration [C <sub>s</sub> ] 替位碳含量	≤ 5E + 16 at/ cm <sup>3</sup>	FTIR (ASTM F123-91) 傅里叶变换红外光谱仪
Etch pit density (dislocation density) 位错密度	≤ 500 cm <sup>-2</sup>	Preferential Etch Techniques (ASTM F47-88) 择优化学腐蚀法
Surface orientation 表面晶向	<100> ±3°	X-ray Diffraction Method (ASTM F26-1987) X 射线衍射仪
Orientation of pseudo square sides 侧面晶向	<010>, <001> ±3°	X-ray Diffraction Method (ASTM F26-1987) X 射线衍射仪

## 2、Electrical properties 电性能

Property 项目	Specification 规格	Inspection Method 检测方法
Resistivity 电阻率	<input type="checkbox"/> 0.5-1.5 $\Omega$ .cm <input type="checkbox"/> 0.8-2.6 $\Omega$ .cm <input type="checkbox"/> Other _____	wafer inspection system 硅片自动检测设备
MCLT (Minority carrier lifetime) 少数寿命	$\geq 20\mu\text{s}$	Sinton BCT-400 QSSPC 准稳态光电导衰减法 /Transient 瞬态光电导衰减法 (with injection level: $1E15 \text{ cm}^{-3}$ )

## 3、Geometry 几何尺寸

Property 项目	Specification 规格	Inspection Method 检测方法
Geometry 几何外形	pseudo square 准方	--
Bevel edge shape 倒角边形状	Round 圆弧	--
Wafer Side length 硅片边距	$156.75 \pm 0.25 \text{ mm}$	wafer inspection system 硅片自动检测设备
Wafer Diameter 硅片直径	$210 \pm 0.25 \text{ mm}$	wafer inspection system 硅片自动检测设备
Angle between adjacent sides 垂直度	$90^\circ \pm 0.2^\circ$	wafer inspection system 硅片自动检测设备
Thickness 厚度	<input type="checkbox"/> $190 + 20 / - 10 \mu\text{m}$ <input type="checkbox"/> $180 + 20 / - 10 \mu\text{m}$ <input type="checkbox"/> Other _____	wafer inspection system 硅片自动检测设备
TTV (Total thickness variation) 总厚度变化	$\leq 30 \mu\text{m}$	wafer inspection system 硅片自动检测设备



**M2**

**A: 156.75 ± 0.25mm**

**B: 210.00 ± 0.25mm**

**C: 8.5 ± 0.5mm**

**D: 90 ± 0.2°**

#### 4、Surface properties 表面性能

Property 项目	Specification 规格	Inspection Method 检测方法
Cutting method 切割方式	DW 金刚线切割	--
Surface quality 表面质量	as cut and cleaned, no visible contamination, (oil or grease, finger prints, spot stains, epoxy/glue residue are not allowed) 表面洁净, 无可见污染 (不允许有油污, 指印, 花斑, 砂浆残留, 胶残留)	wafer inspection system 硅片自动检测设备
Saw marks 线痕	≤ 15μm	wafer inspection system 硅片自动检测设备
Bow 弯曲度	≤ 50 μm	wafer inspection system 硅片自动检测设备
Warp 翘曲度	≤ 50 μm	wafer inspection system 硅片自动检测设备
Chip 崩边	depth ≤ 0.3mm and length ≤ 0.5mm Max 2/pcs; no V-chip 深度 ≤ 0.3mm 且 长度 ≤ 0.5mm; 每片不能超过 2 个; 无 V 型崩边	Naked eyes or wafer inspection system 人工检验或硅片自动检测设备
Micro cracks / holes 隐裂/气孔	Not allowed 不允许	wafer inspection system 硅片自动检测设备