

Flatness • Light Point Defects

Flatness

Product		Size	Surface Finish	TTV (μm)		TIR (μm)		LTV (μm)			Warp (μm)	
				Guaranteed	(Ref.) Typical	Guaranteed	(Ref.) Typical	Guaranteed	PLTV (%) Guaranteed	(Ref.) Typical	Guaranteed	(Ref.) Typical
GaAs	Semi-Insulating	4" ϕ	P/P	≤ 2	1.3	≤ 2	1.2	≤ 1 (15mm \square)	≥ 90	0.6	≤ 5	2
		6" ϕ	P/P	≤ 5	1.5	≤ 4	1.8	≤ 1.5 (20mm \square)	≥ 90	0.7	≤ 10	3
	Laser Diodes	2" ϕ	P/LE	≤ 10	7	—	—	—	—	—	≤ 10	7
		3" ϕ		≤ 10	6	—	—	—	—	—	≤ 15	8
InP	2" ϕ	P/E	≤ 15	10	12	10	—	—	—	≤ 15	10	
		P/LE	≤ 6	4	6	4	—	—	—	≤ 9	5	
		P/P	≤ 6	4	6	4	—	—	—	≤ 9	5	
	3" ϕ	P/LE	≤ 8	4	6	5	—	—	—	≤ 10	7	
		P/P	≤ 6	3	4	3	—	—	—	≤ 10	5	
		4" ϕ	P/P	≤ 5	3	5	3	—	—	—	≤ 10	5

Definitions of Flatness

TTV	Total Thickness Variation: The difference between the highest and the lowest elevation of the top surface of a clamped wafer. The back surface referenced.	
TIR	Total Indicated Reading: The difference between the highest point above and the lowest point below the front surface referenced focal plane of a clamped wafer. 3 points on the front surface generally used.	
LTV	Local Thickness Variation: The difference between the highest point and the lowest point within a site of the top surface of a clamped wafer. The back surface referenced.	
PLTV	Percent LTV: Percentage of sites on a wafer within the specified LTV value.	
Warp	The difference between the highest point above and the lowest point below the front surface referenced focal plane of an unclamped wafer. A least square fit on the front surface generally used.	

Light Point Defects

Product	Size	Defect Size	Pcs./Wafer	
			Guaranteed	(Ref.) Typical
GaAs VB (Semi-Insulating)	4" ϕ	$\geq 0.4\mu\text{m}$	≤ 40	10
	6" ϕ		≤ 100	30
InP	2" ϕ	$\geq 1.2\mu\text{m}^2$	≤ 20	7
	3" ϕ		≤ 30	10
	4" ϕ		≤ 30	10

Categories of Off-Orientation

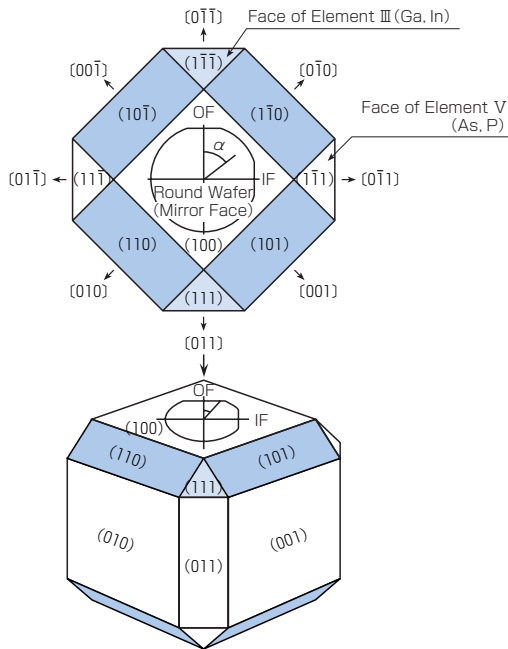
Clockwise (EJ)

Surface Orientation	Off-Orientation			
	General	Specific	α	Case
(100) χ° off toward	nearest $\langle 110 \rangle$	(1 $\bar{1}$ 0)	45°	A
		(110)	225°	B
		(101)	135°	C
		(10 $\bar{1}$)	315°	D
	nearest $\langle 111 \rangle$ A	(1 $\bar{1}\bar{1}$)	0°	E
		(0 $\bar{1}\bar{1}$)	180°	F
		(111)	90°	G
	nearest $\langle 111 \rangle$ B	(1 $\bar{1}\bar{1}$)	90°	G
		(0 $\bar{1}\bar{1}$)	270°	H
		(111)	270°	H

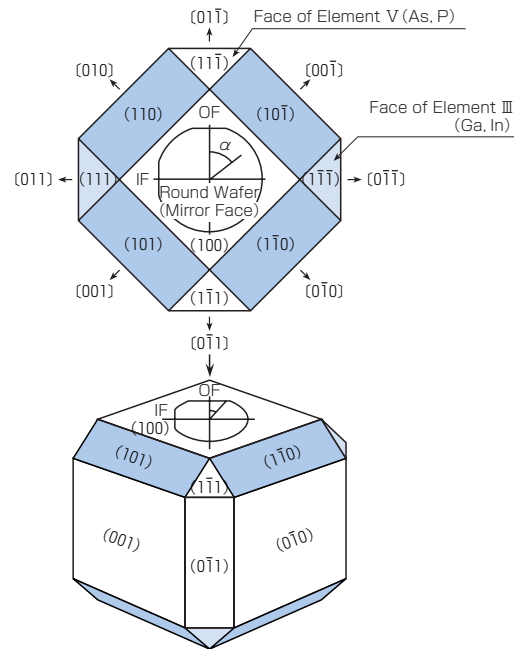
Counter Clockwise (US)

Surface Orientation	Off-Orientation			
	General	Specific	α	Case
(100) χ° off toward	nearest $\langle 110 \rangle$	(10 $\bar{1}$)	45°	I
		(101)	225°	J
		(1 $\bar{1}$ 0)	135°	K
		(110)	315°	L
	nearest $\langle 111 \rangle$ A	(1 $\bar{1}\bar{1}$)	90°	M
		(0 $\bar{1}\bar{1}$)	270°	N
		(111)	0°	O
	nearest $\langle 111 \rangle$ B	(1 $\bar{1}\bar{1}$)	0°	O
		(0 $\bar{1}\bar{1}$)	180°	P
		(111)	180°	P

Planar Representation of Cubic Form



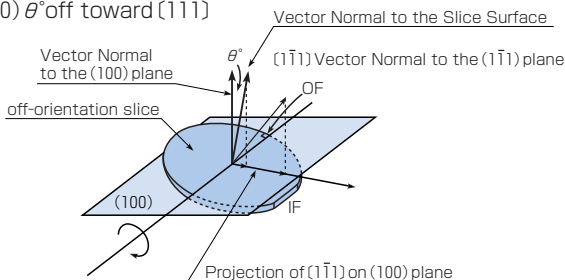
Planar Representation of Cubic Form



Example of off-orientation

Case: G

→ (100) θ° off toward (1 $\bar{1}\bar{1}$)



Example of off-orientation

Case: P

→ (100) θ° off toward (1 $\bar{1}\bar{1}$)

