



IQE Number: PHTD01-1-15
Customer Part Number: Design A: 1310NMAB RevA
EPIQ Reference: N/A

Materials Specifications for 1.3-1.6um AlGaInAs FPLD - 2" 2600

Layer	Material	Group	Repeat	Mole Fraction (x)		Mole Fraction (y)	Strain (%)	PL (nm)	Thickness (µm)	CV Level (cm-3)		Type	Dopant
				Start	Finish					Start	Finish		
14	GaIn(x)As			0.53					0.19	>1E19		P	Zinc
13	InP								1.3	=1E18		P	Zinc
12	GaIn(x)As(y)P			0.85		0.33		1100 ± 50nm	0.01	=1E18		P	Zinc
11	InP								0.12	=5E17		P	Zinc
10	(AlxGa)In(y)As			0.96	0.86				0.01	=5E17		P	Zinc
9	Al(x)InAs			0.48					0.011	=5E17		P	Zinc
8	(AlxGa)In(y)As			0.54	0.96	0.52	-0.1		0.15	=5E16 ± 50%		P	Zinc
7	(AlxGa)In(y)As			0.57		0.71	1.2	1300	0.005			U/D	None
6	(AlxGa)In(y)As	1	4	0.54		0.52	-0.1	1080 ± 20nm	0.01			U/D	None
5	(AlxGa)In(y)As	1	4	0.57		0.71	1.2	1300	0.005			U/D	None
4	(AlxGa)In(y)As			0.96	0.54	0.52	-0.1		0.15	=5E16 ± 50%		N	Sulphur
3	Al(x)InAs			0.48					0.011	=5E17		N	Sulphur
2	(AlxGa)In(y)As			0.86	0.96				0.01	>1E18		N	Sulphur
1	InP								1.25	=1E18		N	Sulphur
0	InP-Sulphur 50mm 350um								See Substrate Specifications Table				

Additional Specifications

None

Additional Comments



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Substrate Specifications

IQE Part Number:	1101-0020		
Material Type	InP	Carrier Conc cm-3	1-8 e18
Size	50 +/- 0.3mm	EPD cm-2	<1E3
Orientation	(100) +/- 0.5	Finish & Flats	P/P EJ

Tolerance and Uniformity Specification (Target and tolerance data applies to wafer centre only)

These guarantees do not apply for material within the exclusion zone. The exclusion zone extends 5mm from the wafer edge.

Thickness tolerance	Within $\pm 10\%$	Mole-fraction (x) Uniformity	N/A
Thickness Uniformity	$\leq 6\%$	Target Peak PL Wavelength	1300nm
Doping Level Tolerance	Within $\pm 30\%$	PL wavelength tolerance	$\pm 10\text{nm}$
Doping Level Uniformity	$\leq 20\%$	PL wavelength uniformity	$\leq 8\text{ nm}$
Target Relaxed Cubic Lattice Mismatch	-300 ppm	Percentage Area to lie within PL specification	N/A
Relaxed Cubic Lattice Mismatch Tolerance	Within $\pm 1000\text{ ppm}$	Defect Density	$< 10\text{cm}^{-2}$
Relaxed cubic lattice mismatch Uniformity	$\leq 600\text{ ppm}$	Minimum Defect Size	N/A
Mole-fraction (x) tolerance	N/A	Maximum Defect Size	N/A

Additional Tolerance and Uniformity Specifications (Target and tolerance data applies to wafer centre only)

These guarantees do not apply for material within the exclusion zone. The exclusion zone extends 5mm from the wafer edge.

Target Etalon - PL offset	N/A	Target DBR Centre wavelength	N/A
Etalon tolerance	N/A	DBR tolerance	N/A
CSB - Etalon tolerance	N/A	DBR uniformity	N/A
Percentage area to lie within Etalon specification	N/A		



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Wafer Characterisation Sheet

Epilayer structures will be grown on 2" diameter substrates and fully characterised using the following techniques:

Non destructive tests on deliverables, where appropriate.

Surface	Nomarski optical microscopy study over the full wafer, with representative photographs.
Surface	Surfscan Defect Density measurement .
Structural	Double crystal X-ray rocking curve measurement performed at the centre point of the wafer, detailing lattice mismatch and/or thickness of the appropriate layers.

Destructive analysis on representative test samples placed adjacent to 2" wafer during growth run, where appropriate.

Electrical	Polaron carrier concentration depth profile through structure using capacitance-voltage measurements and electrolytic etching.
Optical	Photoluminescence spectrum measured at room temperature, on the centre of a test-piece wafer, with absorbing layers removed, detailing near band edge characteristics and optical quality of epilayers (intensity and FWHM).
Structural	Thickness measurements to be performed using either a selective etch and Alpha step; a ball and stain; or a cleave & stain technique .

All test data from the above measurements will be supplied with wafers, together with all calibration data if requested. Substrates used will be quality assured. Supplementary analysis of layers e.g. DLTS, SIMS, Auger, and TEM can be carried out if requested.

IQE (Europe) Limited operates a quality assurance system that covers all processes carried out at it production facility at St.Mellons Cardiff. The company is registered to ISO 9002:1994. (Certificate No: FM 14512).



Prices And Delivery
Quotation Number: 39562

Customer Name:	Dr Taha Masood	Fax:	001 214 768 1616
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Line Item:	Quantity	IQE Number	Structure	Unit Price (US\$)	Extended Price (US\$)
1	7	PHTD01-1-15	1.3-1.6um AlGaInAs FPLD - 2" 2600	2950	20650

Price Comments

Line Item:	Comment:
1	



Prices And Delivery

Quotation Number: 39562

Dispatch

Expected Dispatch: 4 wks from Receipt Date of order. Delivery will be confirmed at time of order via Order Acknowledgement

Terms & Conditions

As per the IQE (Europe) Limited standard terms and conditions of sale, our payment terms are 30 days from date of dispatch of goods subject to credit approval.

To IQE's knowledge this quotation is an accurate description of the specification requested. The customer is responsible for ensuring its accuracy prior to order placement whereupon IQE (Europe) Limited will be responsible for manufacturing according to the enclosed specification.

All quotes are based on the current substrate pricing. IQE reserves the right to re-quote should the substrate price vary by >10%

Any requests for modifications to the material specification must be submitted to IQE (Europe) Limited in writing.

Terms of Delivery

Incoterms "Ex-works" (exclusive of sales tax and /or similar taxes)

Validity

This quotation is valid for 30 days.

Important

Please reference the Quotation Number and IQE number when placing a purchase order

Tim Bettles