Datasheet

Product Specification

AlGaAs VCSEL Epitaxial wafer

940nm VCSEL Epitaxial wafer

• Application

- 3D sensing / Proximity sensing / Auto Focus / LiDAR(ToF) / etc
- This specification is suitable for 4inch VCSEL epitaxial wafer

• Epitaxial material and structure

- P-Type Layer : p-AlGaAs
- Active Layer : MQW
- N-Type Layer : n-AlGaAs
- # of Active Junction : 1 / 2 / 3 & 5 /7 (Under development)
- Substrate : n-GaAs

• Epitaxial Wafer dimension

[Wafer Size : 4inch]

Parameter	Min.	Typ.	Max.	Unit
Diameter	99.7	-	100.3	[mm]
Flat length	29	-	31	[mm]
Thickness	605	-	645	[μm]

• Optical Characteristics

[Wafer Size : 4inch]

Parameter	Symbol	Min.	Typ.	Max.	Unit
Active Wavelength	WACT AVG	910	-	930	[nm]
WACT std.	WACT std	-	-	1.5	[nm]
Stop Band Center Wavelength	SBCx	930	-	950	[nm]
SBCx std.	SBCx std	-	-	3	[nm]
Dip Wavelength	Dipx	930	-	950	[nm]
Dipx std.	Dipx std	-	-	3	[nm]

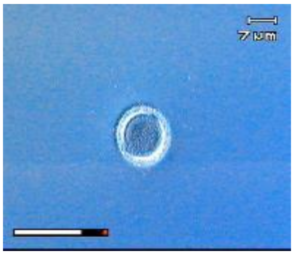
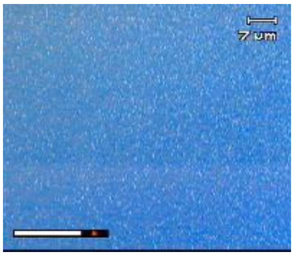
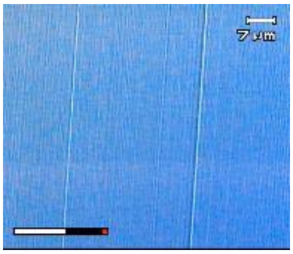
• Appearance Data

Item No.	Rejected Item	Inspection Method	Standard
1	Defect	Surface Scanner	N ≤ 2000
2	Hatch Pattern	Visual inspection	Not allowed
3	Diffuse Reflection	Visual inspection	Not allowed
4	Scratches	Visual inspection	Not allowed

Note : standard code definition

- N ： The sum of bright spots, pit spots, white spots, particles, and small circles. (Particle size ≥ Size 50㎛)

Appearance Definition

Abnormality	Example	Description
Defect		The abnormality caused by the fall of foreign objects during the extended growth process is measured by the number of particles on the surface.
Diffuse Reflection		During epitaxial layer growth, mismatches occur, resulting in atoms that cannot form covalent bonds among the atoms at the interface.
Hatch Pattern		The hatch-pattern is initiated from the nonuniform lateral growth induced by the impurity concentration near the dislocation sites.

• Raw Material

1. Substrate

1) Suppliers : Sumitomo Electric Industries, Ltd. , Dowa Holdings Co., Ltd. ,
Freiberger Compound Materials GmbH

2) Specification

Parameter	Specification
Crystal	Prime Grade GaAs
Purity	>99.998%
Diameter	100±0.3 mm
Thickness	625±20 μm
Pattern Height	1.5~2.0 mm
EPD	0~99 cm^{-2}

• Environmental

1. Cleanliness :

1) Workshop dust particles maximum number of allowed /ft^3<1000(Particle size ≥ 0.5um)

2) Special area cleanliness standards

Cleanliness standards	Max
MOCVD LoadLock	500
Test Room	1000
Corridor	1000

3) Temperature : 22±2℃

4) Relative humidity : 50±5%

• Testing equipment

Equipment	**Test Parameter**	**Symbol**
Photoluminescence Tester	Active Wavelength WACT std.	WACT AVG WACT std
	Stop Band Center Wavelength SBCx std.	SBCx SBCx std
	Dip Wavelength Dipx std.	Dipx Dipx std
ECV	Doping levels	-
Surface Scanner	Particle Counts	-

• Production monitoring

Parameter	**Symbol**	**Min.**	**Typ.**	**Max.**	**Unit**
Stop Band Center Wavelength	SBCx	930	-	950	[nm]
SBCx std.	SBCx std	-	-	3	[nm]
Dip Wavelength	Dipx	930	-	950	[nm]
Dipx std.	Dipx std	-	-	3	[nm]

• Data output

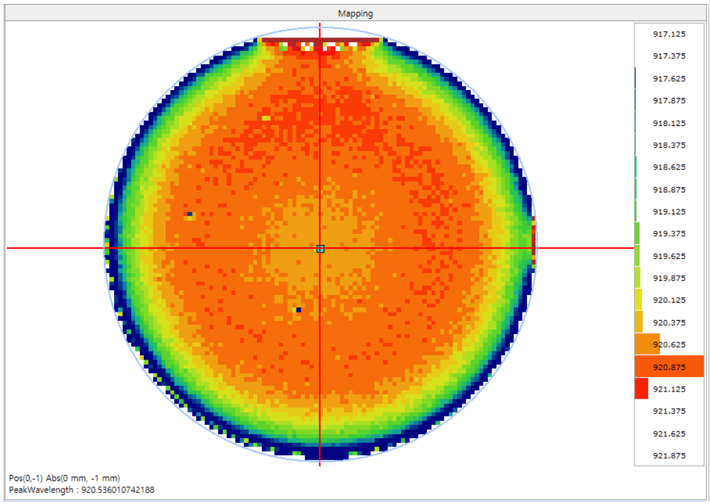
- Shipment data is transmitted in the form of electronic document, specific parameters are as follows, the data form - defined :

COMPONENT ID	**SBCx**	**SBCx std**	**Dipx**	**Dipx std**

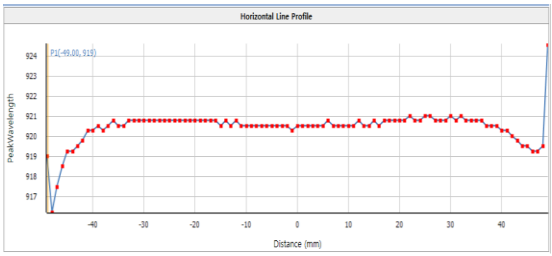
940nm VCSEL Epitaxial wafer

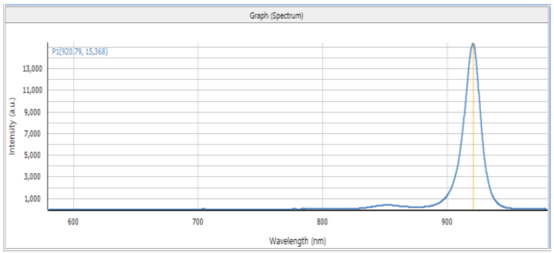
• Analysis Data

1. PL Mapping - Active Layer

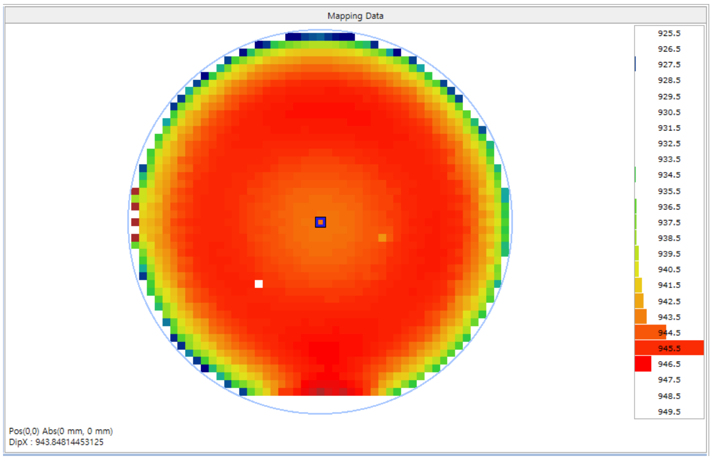


Pos(0,-1) Abs(0 mm, -1 mm)
PeakWavelength : 920.536010742188

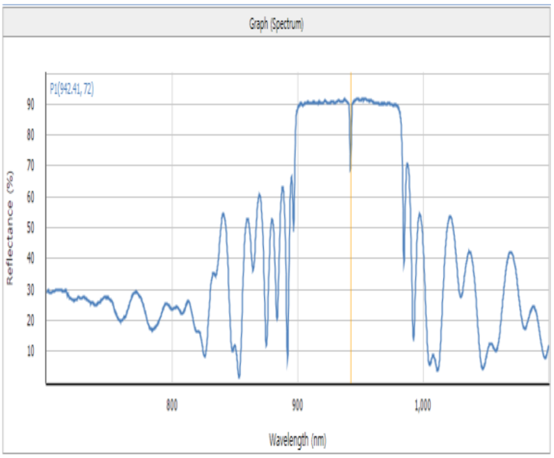




2. Reflectance Mapping – Dipx



Pos(0,0) Abs(0 mm, 0 mm)
DipX : 943.84814453125



• Shipment Package

1. Single box package

1) Each wafer is individually packaged in a coin-style wafer shipper. The coin-style wafer shipper contains a spider frame for fixation.

2) Coin-style wafer shippers individually sealed in two outer bags in inert atmosphere.