



CONTROLLED DOCUMENT APPROVAL SHEET

Product Type: Blue InGaN/ GaN LED QGP5 (45X45) Chips

Part No: B4545ECI0

Doc ID: MK-QA-043

Rev: B.

Date : Jun 22, 2010

Created By:

Oscar Chan

Approved By:

Jason Lin



REVISION HISTORY

Rev.	Date	Charged	Approval	Revision Summary
A	2010/06/09		Jason Lin	First issue.
B	2010/06/22	Oscar Chan	Jason Lin	Revise Iv range (-34)

1. Scope :

This specification applies to Blue InGaN/GaN LED chips, QGP5(45X45) of Genesis Photonics Inc. ◦ And Includes the inspection of electro-optical characteristics ◦

2. Materials :

2.1 P-contact : ITO ◦

2.2 P-pad : Au ◦

2.3 N-pad : Au ◦

3. Mechanical specifications :

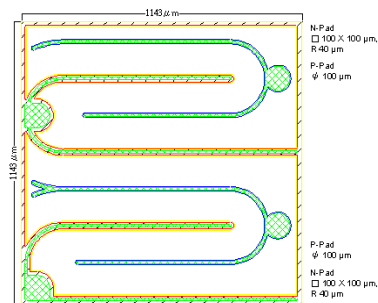
3.1 Chip size : 1143x1143 μ m (\pm 10 μ m) ◦

3.2 P-pad : \varnothing 100 μ m (\pm 10 μ m) ◦

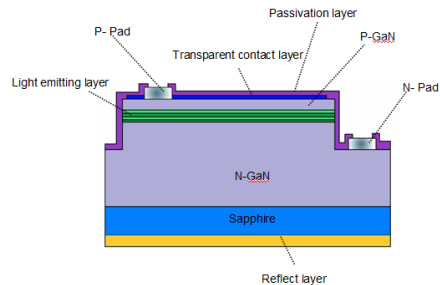
3.3 N-pad : \varnothing 100 μ m (\pm 10 μ m) ◦

3.4 Chip thickness : 150 μ m (\pm 10 μ m) ◦

3.5 Chip diagram



Top view



Cross section

4. Electro-optical characteristics and specification :

4.1 Test condition :

Parameter	Symbol	Condition	Unit
Dominant wavelength	Wd	If = 350 mA	nm
Luminous intensity	Iv	If = 350 mA	mW
Forward voltage	Vf	If = 350 mA	V
Reverse current	Ir	Vr = - 5 V	μ A



Genesis Photonics Inc.

BLUE InGaN/GaN LED Chip QGP5 (45X45) Product Specification

V.990609B

4.2 Characteristics:

Maximum Ratings at T _a =25°C	Symbol	Conditions	Ratings
DC Forward Current	I _F	T _j =125°C	700mA
Junction Temperature	T _j		150°C
Reverse Voltage	V _r	T _a =25°C	-5V
Reverse Current	I _r	V _r =-5V	<2μA
Assembly Process Temp.			325°C (<5sec)

Notes :

- Maximum ratings were measured in an integrating sphere using Au plated TO-39 headers without an encapsulate, and may differ with different package types..

4.3 Model No :

Part No :

Bin : -

Exp :

Part No: B4545ECI0

Bin : V33 P45A-29

4.3.1 Code :

Product code: <input type="text" value="ABCDEFGHI"/>
Product code

4.3.2 Code :

V _f range (V): <input type="text" value="123"/>					
V31	3.1~3.2	V33	3.3~3.4	V35	3.5~3.6
V32	3.2~3.3	V34	3.4~3.5		

4.3.3 Code :

Electrical spec: <input type="text" value="4"/>	
P	V _f <3.6 ; I _r <2μA



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BLUE InGaN/GaN LED Chip QGP5 (45X45) Product Specification

V.990609B

4.3.4 Code 5 6 7 :

Wd range (nm): 5 6 7					
44B	442.5~445.0	45A	450.0~452.5	45D	457.5~460.0
44C	445.0~447.5	45B	452.5~455.0	46A	460.0~462.5
44D	447.5~450.0	45C	455.0~457.5	46B	462.5~465.0

4.3.5 Code 8 9 :

Iv range (mW): 8 9	
29	240~260
30	260~280
31	280~300
32	300~320
33	320~340
34	340~370

Lot No :

L/N : A B C D E - F G H I J - K L M

Exp : **L/N : 61621-18183-001**

5. Bin description :

Below is a table which defines the specific part numbers or “bins” which are within the B4545ECI0 kit. Each tape will contain chips from only one bin, and a customer order for kit B4545ECI0 will be fulfilled with a shipment of production devices which may contain any combination of tapes consisting of any or all bins in the table.

Wd Grade	Iv Grade				
45A	-30	-31	-32	-33	
45B	-30	-31	-32	-33	
45C	-30	-31	-32	-33	
45D	-30	-31	-32	-33	
46A	-30	-31	-32	-33	
46B	-30	-31	-32	-33	
46C	-30	-31	-32	-33	
46D	-30	-31	-32	-33	

6. Packing specification :

6.1 LED chips are placed on the blue adhesive tape with the bonding pads facing up (i.e. sapphire is adhered to the tape) and covered with a glossy paper (See Figure 6-1)

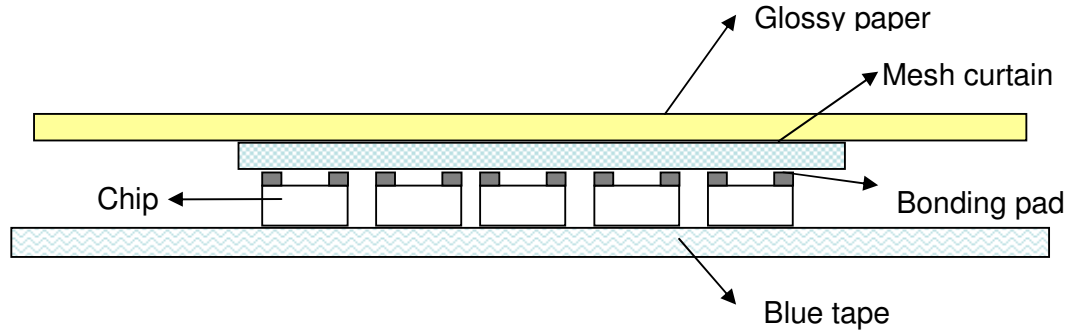


Fig 6-1 Chip on tape

6.2 Chip array must be placed within the center of the blue adhesive tape and the bar code label is located on the back of the blue tape at the left lower corner (See Figure. 6-2).



Fig 6-2 Location of label

6.3 Label specification :

	MIN	AVG	MAX	STD
Vf (V)	--	actual	spec	actual
Iv (mW)	spec	actual	spec	actual
Wd (nm)	spec	actual	spec	actual

6.4 Packaging dimensions (See table 6-1)

Item	Dimension
Blue adhesive tape	200 mm × 200 mm (±10mm)
Mesh curtain	70 mm × 70 mm (±10mm)
Backing glossy paper	200 mm × 210 mm (±10mm)
Label location on blue tape	Lower left corner; 10 ± 2 mm

Table 6-1 Package dimensions

6.5 Packaging for shipment

6.5.1 The sheet (blue adhesion tape + mesh curtain+ glossy paper) must be packed in an anti-electrostatic bag and paper box for shipment(See Fig 6-3)

6.5.2 The max numbers of blue tapes in a bag is 20 pieces

6.5.3 The ESD attention label is stamped on bag

6.5.4 Each box and each sheet should be labeled with information describing its content.

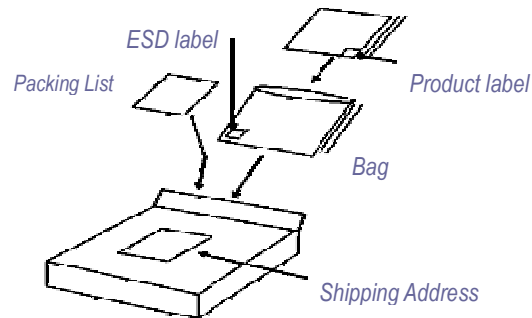


Fig 6-3 Package list

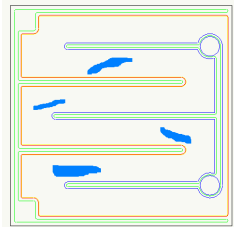
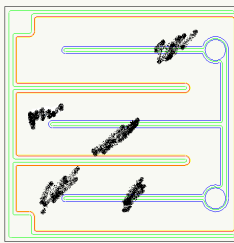
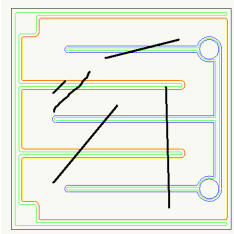
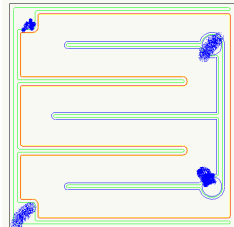
Criteria of Defective Chip

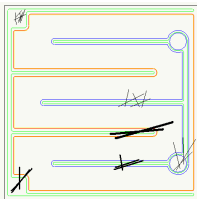
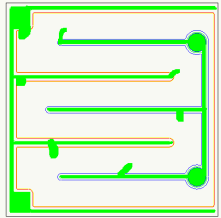
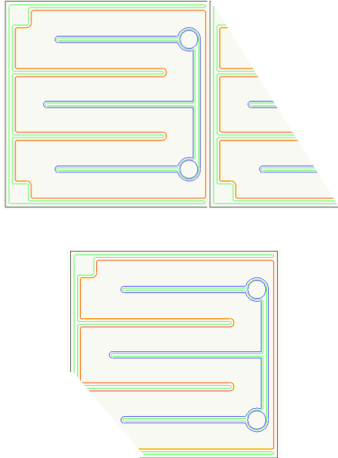
1. Inspection Equipment and Method

Inspecting Chip by Microscope

Magnification: 30X

2. Figure of Example

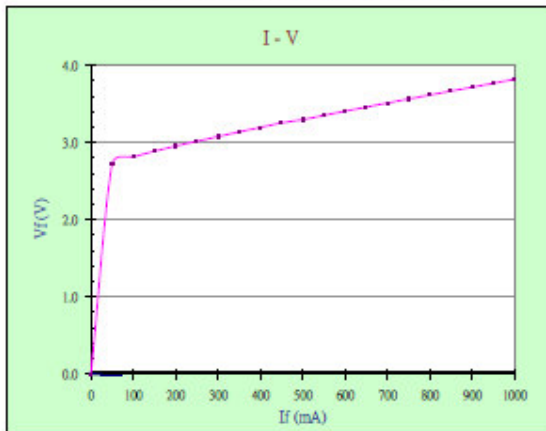
Item	Defective item	Criteria of Defect Chip	Example
1	Active Area Broken	Rejected	
2	Active Area Dirty (1)	Dirty Area ≥ 10% of Active Area	
3	Active Layer Breakage and Scratched	1. Breakage and scratch must not cross active layer 2. Breakage and Scratch ≥ 10% of Active Layer	
4	Pad Dirty	Dirty Area ≥ 10% of Pad Area	

Item	Defective item	Criteria of Defect Chip	Example
5	Pad Scratched	<ol style="list-style-type: none"> 1. Scratched Area $\geq 20\%$ of Pad Area 2. Scratched Length $\geq 1/3$ of Pad Diameter 3. Exposed Sub-tract 	
6	Remnant Metal	<ol style="list-style-type: none"> 1. Remnant Area $\geq 10\%$ of Active Area 2. Remnant metal ≥ 3 Spots and Spot Length $\geq 20 \mu\text{m}$ 3. Remnant metal over active area 	
7	Defective Scribe	<ol style="list-style-type: none"> 1. Double Chips 2. Scribed on active area or N-pad 3. Racked or Chipped Area $\geq 10\%$ of the Original Area 4. Un-scribed Area $\geq 110\%$ of the Original Area 	
9	Wrong Label	Rejected	--
10	Inverse Protective Paper	Rejected	--
11	The Amount of Chips	Amount per Blue Tape ≥ 50 pcs	--

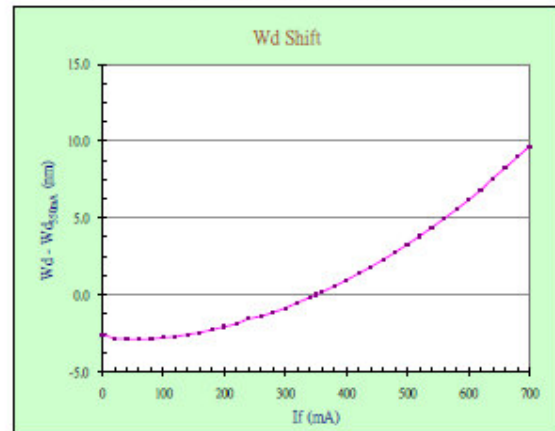
Typical Characteristic*

1. Sampling Mode
The sampling mode is based on GPI standard sampling Plan.
2. Characteristic Test
 - 2.1 Test Condition
Package form: Chip on chuck
Operating temperature @ RT (Room Temperature)
 - 2.2 Contain Items
 - (1) Forward Voltage vs. Forward Current (I-V Curve)
 - (2) Emission Intensity vs. Forward Current (I-L Curve)
 - (3) Dominant Wavelength Shift vs. Forward Current (Wd Shift)
 - (4) Relative Intensity vs. Wavelength (Spectrum)

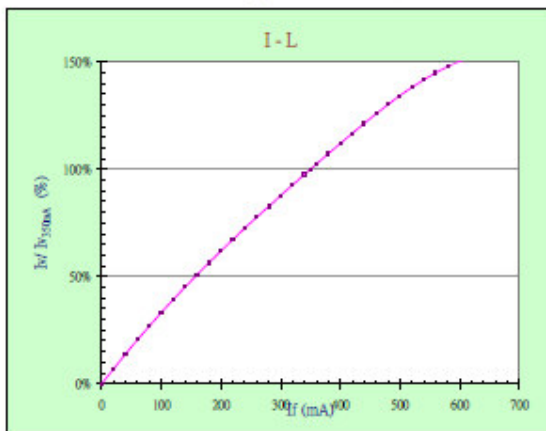
Forward Voltage vs. Forward Current



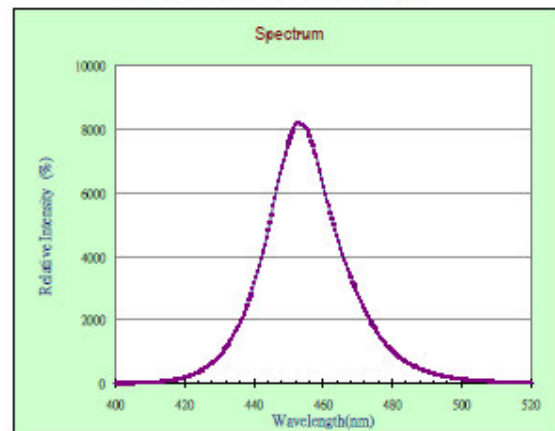
Dominant Wavelength Shift vs. Forward Current



Relative Intensity vs. Forward Current

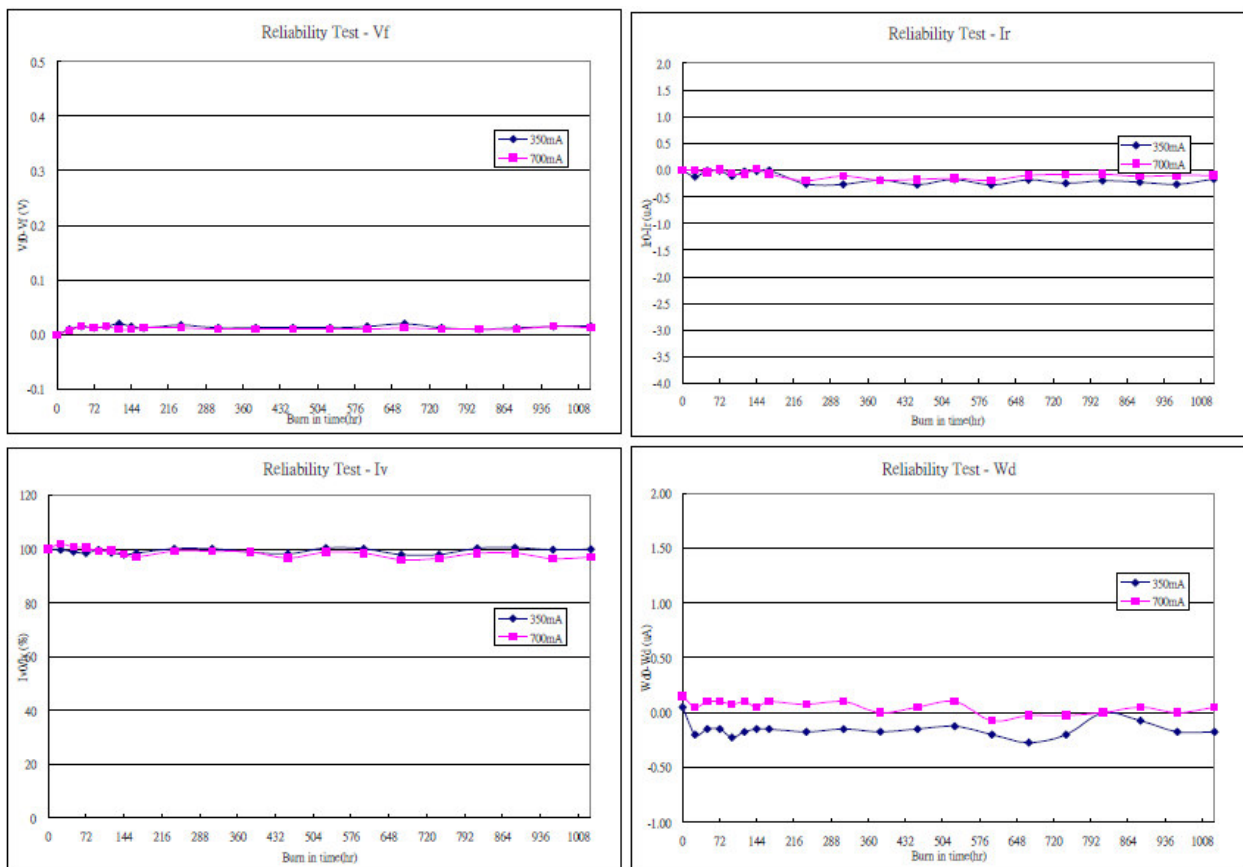


Relative Intensity vs. Wavelength



Reliability test

1. Temperature : $85\pm 3^{\circ}\text{C}$
2. OPERATE CURRENT: 350 & 700mA
3. Burn in Mode: CHIP ON MCPCB



Product ESD Test

I. Test Product:

Blue 45X45 mil (QGP5 mask) Chip

II. Test Division:

Chip Engineering Department

Test Date: 2010/06/09

III. Tester:

ETS HED-W500M ESD Tester

IV. Test Condition:

Ir=10 uA
Vr=12.0 V
ESD-Pulse=1
ESD-Mode=HBM
Test Voltage : 0~-4000V

V. Test Data:

BIN: V31 S45A-27

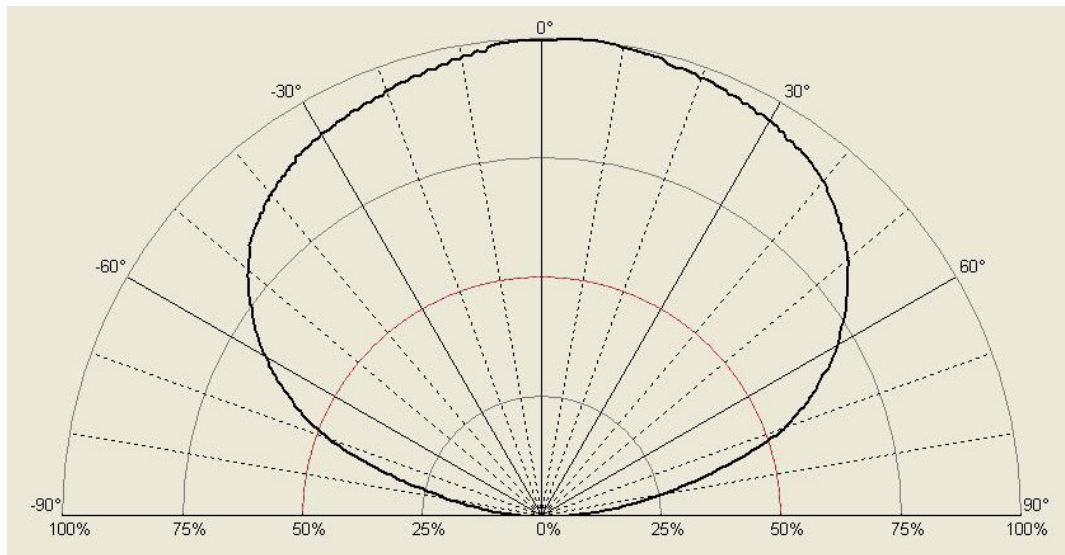
L/N: 81122-62253-001

Test Chip : 285 pcs

Test Voltage(V)	Fail NO.(pcs)	Total	Fail Yield(%)
-500	81	81	31%
-1000	30	111	41.89%
-2000	39	150	56.60%
-3000	40	190	71.70%
-4000	42	232	87.55%

Led Chip View angle Measurement

1. Package type
Chip on TO-39 Without Cap
2. Measurement Condition
Measurement Distance: 100mm
Operating Angle From -90° to 90°
3. Result
Relative Intensity vs. Off Axis Angle (View Angle)



Notes:

- The above diagram is measured with the current at 200mA using Au plated To39 headers without an encapsulate.