REVISION HISTORY					
Rev	**Revision Date**	**Originator**	**Affected**		**Description of change**
			Page	**Clause**	
Prelim	06-Nov-2015	Abdullah Rasmita	All	All	Initial: Prelim Production Release
Prelim 1	09-Dec-2015	Abdullah Rasmita	3	F	Prelim revision: change optical output power requirement
Prelim 2	28-Mar-2016	Hafiziarto	All	A,B,F,G, H	Updated specified values, added specs at 85C test conditions. Added burn-in specifications
Rev A	22-Aug-2016	Choo Lay Cheng	2,3	A,F	Update specifications & Insert H to J

Originator	Choo Lay Cheng		

Approval	Name	Signature	Date
Product Engineering	Hafiziarto J. Mukhtar		
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SPECIFICATIONS

1310 nm DFB Laser Diode Chip

DL-DFB310055B-025A

A. PRODUCT DESCRIPTION

DenseLight DL-DFB310055B-025A is an uncooled DFB laser diode operating with an output power of 5mW at 25°C at the 1310nm wavelength and engineered for transmission up to 2.5Gbps. It operates over a wide temperature range from -10°C to 85°C without any need for a Peltier cooler and temperature controller.

B. FEATURES

- Uncooled operation from -10 to 85°C
- Output power of 10mW at 25°C, I_{th}+20mA (typical)
- Lasing wavelength of 1310nm
- Typical SMSR ≥ 35dB
- Designed for 2.5Gbps high speed transmission

C. PACKAGING

- DFB Laser diode die (chip) with coated facets

D. APPLICATIONS

- Uncooled PON Applications
- FTTx Networks

E. ABSOLUTE MAXIMUM RATINGS

Operation beyond the absolute maximum ratings can cause degradation in device performance leading to permanent damage to the device.

Parameter	Symbol	Condition	Min	Max	Unit
Reverse voltage	V_R	-	-	1	V
Forward current	I_F	-	-	120	mA
Operating temperature	T_{op}	-	-10	85	°C
Storage temperature	T_{stg}	Unbiased	-40	90	°C
Electro static discharge (ESD)	V_{ESD}	Human body model	-	500	V

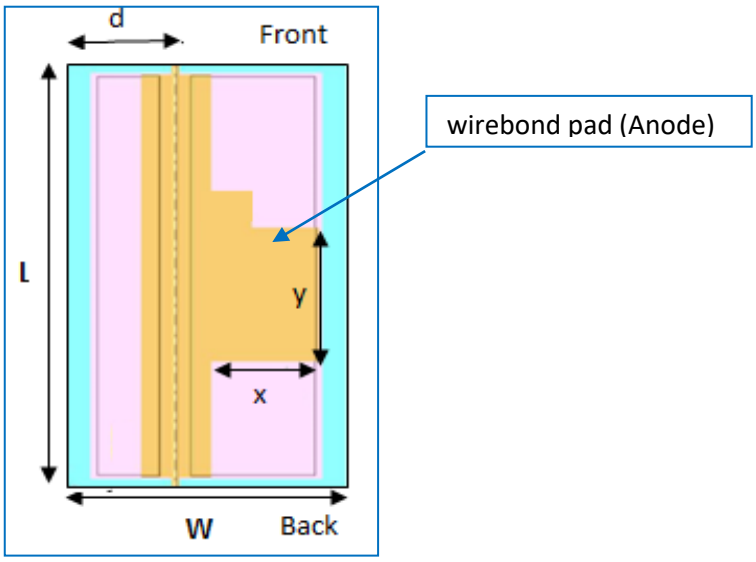
F. ELECTRO-OPTICAL CHARACTERISTICS

Performance is based on laser diode die singulated from bar and mounted onto heat-dissipating submount.

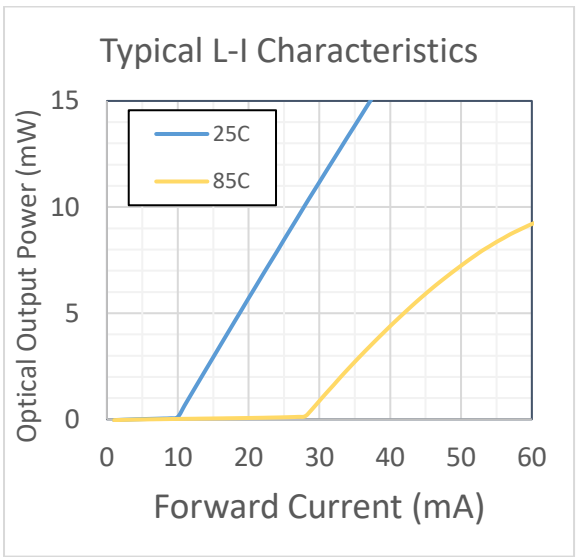
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Optical output power	P_o	T_{op} = 25°C, I_F = I_{th}+20mA	10.5	11	-	mW
		T_{op} = 85°C, I_F = I_{th}+20mA	-	10	-	
Forward voltage	V_F	T_{op} = 25°C, I_F = I_{th}+20mA	-	1.3	1.5	V
Threshold current	I_{th}	T_{op} = 25°C	-	9	10	mA
		T_{op} = 85°C	-	22	-	
Slope efficiency	η_s	T_{op} = 25°C, I_F = I_{th} +20mA	-	0.55	-	W/A
		T_{op} = 85°C, I_F = I_{th} +20mA	-	0.45	-	
Rear Power	P_R	T_{op} = 25°C, I_F = I_{th} +20mA	250	-	-	μW
Center wavelength	λ_c	T_{op} = 25°C, I_F = I_{th}+20mA	1290	1310	1330	nm
Side Mode Suppression Ratio	SMSR	T_{op} = 25°C, I_F = I_{th} +20mA	35	45	-	dB
Temperature dependence of center wavelength	$\Delta\lambda/\Delta T$	CW	-	0.1	-	nm/^{0}C
Beam divergence angle (parallel)	θ_H	T_{op} = 25°C, I_F = I_{th}+20mA, FWHM	-	25	-	degree
Beam divergence angle (perpendicular)	θ_V	T_{op} = 25°C, I_F = I_{th}+20mA, FWHM	-	35	-	degree
Modulation bandwidth	BW_{mod}	T_{op} = 25°C, I_F = I_{th}+20mA	5	-	-	GHz

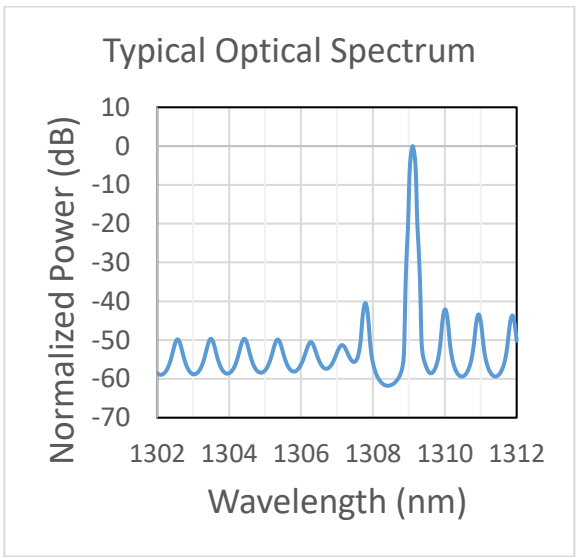
G. PHYSICAL CHARACTERISTICS

Parameter	Symbol	Typical	Unit
Chip dimensions	LxWxH	250 x 200 x 100	µm
Emission spot from chip edge	d	65	µm
Wirebond pad	x x y	100x100	µm



H. TYPICAL PERFORMANCE





I. BURN-IN AND TEST

The laser diode chips have not undergone burn-in screening. The user is expected to perform burn-in screening after assembly of the laser diode chip onto a submount or into a TO-can package. The recommended burn-in screening conditions are as follows:

Temperature	: 85°C
Operating mode	: ACC
Drive current	: 90mA
Duration	: 48 hours

DenseLight will perform the necessary wafer/cell buyoff using chips mounted on DenseLight standard submounts, based on statistical sampling plan for AQL of 0.4%, Special Inspection Levels S-2 as per ANSI/ASQ Z1.4. Only those associated chips that have passed the criteria described in the "Wafer Acceptance Test" will their corresponding cells, and/or bars, be accepted for use.

Since the product is in chip form, its eventual electro-optical performance will depend not only on chip performance but also on its assembly process. If the chip is assembled in a proper way, the performance described in specifications table can be expected.

J. VISUAL INSPECTION

Refer to document "DFB Chip Inspection Criteria", which will represent the visual mechanical criteria upon which acceptance of product has been made. The acceptance criteria represented in this specification does not impede the functions of the DFB chip in its electro-optical characteristics.

K. OTHER NOTIFICATIONS

1. Quality Assurance
   After any processing of the laser diode chip into a package product (TO-Can/BTF/DIL), the performance, yield and reliability of the product, in which the chip is applied, are subject to change due to the customer's handling, assembly, testing and processing. All assembly and handling related matters that are out of the control of DenseLight are at the customer's responsibility. DenseLight does not have any responsibility for field failures attributed to a customer process.

2. Reliability
   DenseLight will endeavor to continue to improve the quality and reliability of its laser diode chips, and it should be recognized that laser diode chips can fail due to their own intrinsic characteristics. It is thus required that the customers' products and processes of manufacture are designed with full regard to error avoidance and prevention, and high capability for assembly level reliability.

3. Specification
   The information provided by DenseLight, including but not limited to technical specification, customer recommendations, application notes related to the laser diode chip, are believed to be reliable and accurate, and is subject to change as and when required.

4. Functional Samples
   Functional samples have a prefix of -F to the product number, and is a sample that is designed according to DenseLight specification and/or customer request. The purpose of the functional sample is to check and confirm the product usability and feasibility. Thus, the sample may be used as for R&D or prototype. It will be the discretion of DenseLight to determine if the sample is to be manufactured in qualified production lines.

5. Working Samples
   Working samples are those parts that have a suffix of -W to the product number, and is a sample to evaluate, confirm and qualify the product specifications. Basically, DenseLight guarantees the performance at the BOL (Beginning of Life), but not all qualifications may be completed. This product may not be manufactured in qualified production lines, until DenseLight releases the product for general sales. DenseLight reserves the right to change prices, features, functions, specification, capabilities and release schedules as per notifications to the customer.