

PRODUCT DATASHEET

1653.7nm, 7mW DFB Laser Diode Chip

DL-DFB65407D

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DenseLight reserves the right to make product design or specifications changes without notice.

A. PRODUCT DESCRIPTION

Denselight DL-DFB65407D laser diode operates at 1653.7nm with high precision and thus specifically optimized for sensitive detection of methane gas. Denselight's advanced technology enables mode-hop free tuning, high power, and excellent SMSR performance. The laser diode chip is designed for hermetic packaging.

B. FEATURES

- Minimum output power of 7mW at 25°C @45mA
- Lasing wavelength of 1653.7nm with accuracy of ± 2 nm wavelength
- Minimum SMSR of 35dB
- Mode-hop free

C. APPLICATIONS

- Test & Measurement (OTDR)
- Methane Sensing
- Biomedical Sensing

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D. ABSOLUTE MAXIMUM RATINGS

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

Parameter	Symbol	Test Conditions	Min	Max	Unit
Reverse voltage	V_R	CW	–	2	V
Forward Current	I_F	CW	–	120	mA
Operating Temperature	T_{op}	CW	0	70	°C
Storage temperature	T_{stg}	Unbiased	-40	85	°C
Storage Humidity	RH	Unbiased	No Dew Condensation		
Electro static discharge (ESD)	V_{ESD}	Human body model	–	500	V
Soldering Temperature	S_{temp}	–	–	300	°C
Soldering Time	S_{time}	–	–	10	s

E. ELECTRICAL AND OPTICAL CHARACTERISTICS

Performance is based on laser diode chip mounted onto heat-dissipating submount at $T_{chip}=25^{\circ}\text{C}$ and CW, unless stated otherwise

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Peak wavelength	λ_p	$I_{op}=45\text{mA}$	1651.7	1653.7	1655.7	nm
Optical output power	P_o	–	7	–	–	mW
Threshold current	I_{th}	–	–	12	20	mA
Operating current	I_{op}	$P_o = 7\text{mW}$	–	45	–	mA
Forward voltage	V_{op}	$P_o = 7\text{mW}$	–	1.2	1.6	V
Slope efficiency	η_s	$P_o = 7\text{mW}$	0.2	0.3	–	mW/mA
Side mode suppression ratio	SMSR	CW	35	40	–	dB
Wavelength temperature tuning coefficient	$\Delta\lambda/\Delta T$	CW	–	0.1	–	nm/°C
Wavelength current tuning coefficient	$\Delta\lambda/\Delta I$	CW	–	0.012	–	nm/mA
Beam divergence angle (parallel)	θ_H	CW	–	30	–	deg
Beam divergence angle (perpendicular)	θ_V	CW	–	38	–	deg

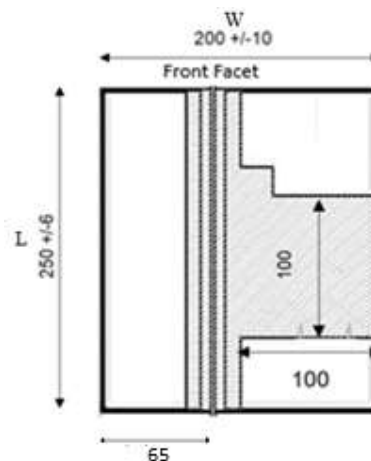
Note: T_{chip} is measured by a thermistor soldered on the submount

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F. PACKAGE

Parameter	Symbol	Typ	Unit
Length	L	250	μm
Width	W	200	μm
Thickness	T	100	μm



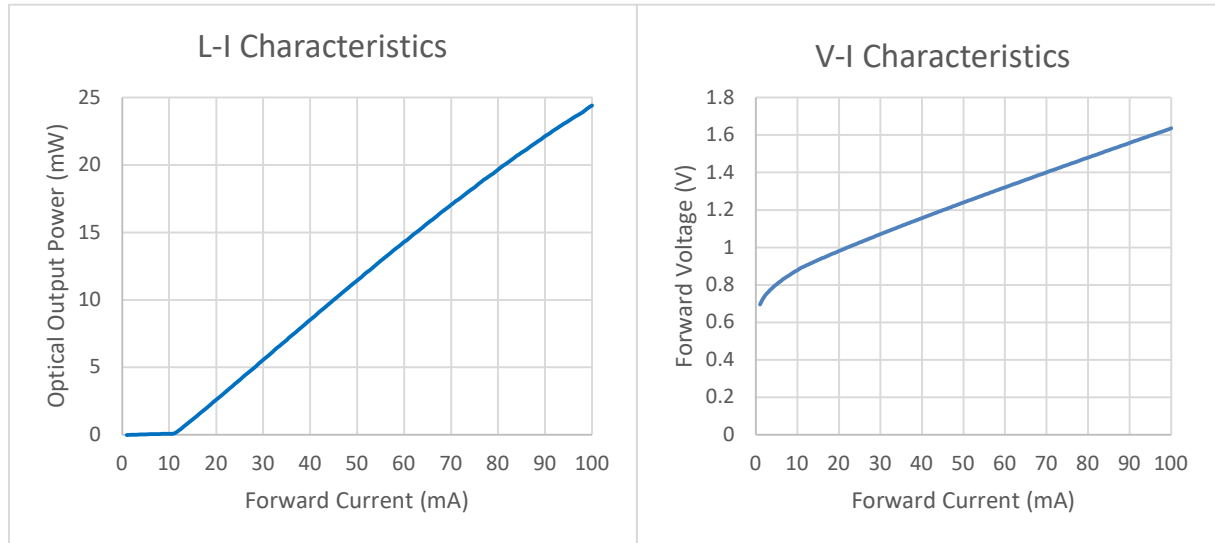
Device Handling

1. InGaAsP chips are inherently fragile & easily damaged. Special handling precautions must be taken care
2. Avoid using tweezers or any form of contact with facets and a vacuum tip with flat surface is recommended
3. This device has ESD withstand voltage of 500V. EOS may result from improper ESD handling

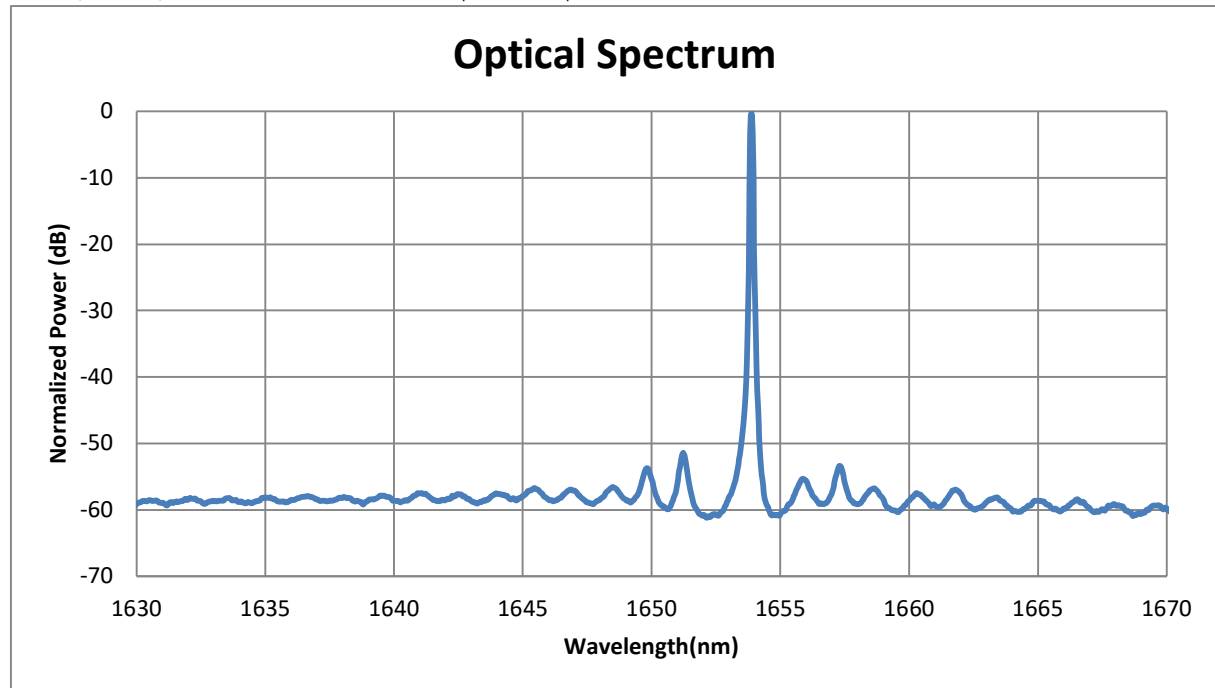
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G. TYPICAL PERFORMANCE CHARACTERISTICS

The L-I and V-I characteristics are evaluated at $T_{\text{chip}}=25^{\circ}\text{C}$ and CW



The Optical Spectrum is evaluated at $T_{\text{chip}}=25^{\circ}\text{C}$, $I_{\text{op}}=45\text{mA}$ and CW



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H. PRODUCT NAMING

DL – DFB65407D

DL: Denselight

DFB: Distributed Feedback Laser

654: Typical Peak Wavelength 1653.7nm

07: Minimum Power 7mW

D: Bare Die

I. DISCLAIMER FOR CUSTOMER SPECIFIC APPLICATIONS

Denselight product is not intended for use other than stated on the application note or as defined in the product specification. The performance of the product should always be tested in the actual application conditions. As our products are used in conditions beyond our control, we cannot assume any liability for damage caused through their use. Users of DenseLight products are solely responsible to thoroughly test and qualify their system and / or application for their intended application and have determined such at their sole discretion. DenseLight cannot assume any liability for the use of our products in conjunctions with other. Customer assumes the sole risk and liability of the product performance other than specified by the product specific data sheet or application notes without DenseLight's specific written consent.

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	: 110mA
Duration	: 48 hours

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. 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.

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