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SPECIFICATIONS

Tunable Single-Frequency Laser Box

DL-BF12-CLSwwwB-Sxxxx-yy-zz

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

A. PRODUCT DESCRIPTION

The DenseLight DL-BF12-CLSwwwB-Sxxxx-yy-zz is a series of tunable single frequency laser designed for applications in optical metrology & instrumentation and optical gas & chemical sensing, requiring narrow spectral linewidth, excellent SMSR, power stability, and a very highly wavelength stable laser output. The DL-BF12-CLSwwwB-Sxxxx-yy-zz is complete with a DenseLight 14-pin BTF package laser, integrated laser driver & temperature controller, and 10-Turn dial controlled electronics for picometer precision wavelength tuning over the selected tuning range. The built-in current driver is capable for CW driving, digital or analog modulation input, which can be customized with various options to meet your specific needs. DenseLight DL-BF12-CLSwwwB-Sxxxx-yy-zz is available over a wide wavelength range across the O, E, S, C and L bands.

For responsive prototyping enquiries please email: info@denselight.com

B. FEATURES

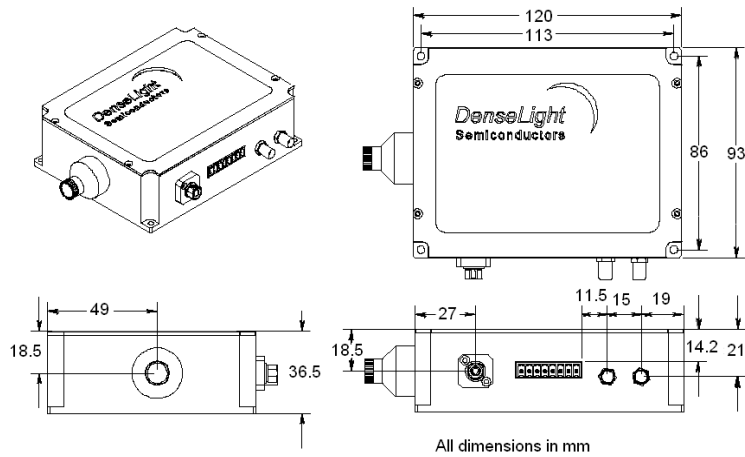
- CW optical power of 3 to 20mW and pulsed power 5 to 50mW
- Typical linewidth of 5kHz
- SMSR >35dB
- Wavelength stability better than +/-1pm
- Wavelength tuning range of 300pm
- Wavelength availability 1260 to 1670nm
- Integrated optical isolator (Optional)
- FC receptacle
- Built-in current driver and temperature controller
- Single +5V power supply (optional power adapter)
- Over temperature protection and internal PCB temperature monitor
- Optional analog intensity modulation upto 20MHz (transconductance amplifier performance)
- Optional pulse or digital modulation upto 200MHz
- Compact size
- RoHS compliance

C. APPLICATIONS

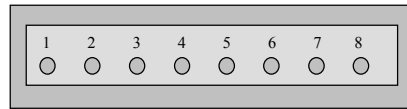
- OTDR
- Optical measuring instrumentation
- Optical gas and chemical sensor

D. PHYSICAL DIMENSIONS AND MECHANICAL SPECIFICATION

Dimension: L120 x W93 x H36.5 mm
 Enclosure: Metal Case
 Optical output: FC receptacle
 Cooling: Air-cooled.
 Electronic interface: 8-pin terminal block



E. PIN ASSIGNMENT AND FUNCTION



8-pin terminal block (Pin 8 near to SMA1)

Pin No.	Symbol	Power/Control /Monitor	Analog /Digital	Input /Output	Description
1	P _{GND}	P			Power Supply Ground
2	V _S	P			+5V d.c.
3	OVRT	M	D	O	To report PCB over temperature and internal self-protection shutdown in operation (Active high)
4	T _{MON}	M	A	O	To monitor the temperature of PCB
5	N/C				
6	N/C				
7	LO_EN	C	D	I	To enable Light output (active low or no connection to enable laser driver)
8	A _{GND}				Signal Ground for Control and Monitor Signals

F. ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Condition	Min	Max	Unit
Operating temperature (chassis)	T_{op}	I_{op}	0	60	°C
Operating Relative Humidity	RH	I_{op}		85	%
Storage temperature	T_{stg}	Unbiased	-40	85	°C
Input current	I_s			6	A
Input Power Supply	V_s			6	V

G. ELECTRICAL SPECIFICATIONS ¹

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Input Power Supply	V_s		4.75	5	5.5	V
Input Current ²	I_s				2.5	A
Total Power consumption ²	P_s				12.5	W
Over Temperature	OVRT	Open-drain digital output with internal 1K pull-up to 3V for VH and 8mA current sink for VL				
	V_{OL}	Normal	0		0.45	V
	V_{OH}	Over-temp	2.0		3.0	V
Internal PCB Temperature Monitor	T_{MON}	Analog voltage: $T_{MON} = 395mV + (6.2mV/°C \times T)$, T = PCB temperature in °C				mV
Voltage	V_{OUT}	$R_x = \text{infinite}$	0		2.5	V
Output Impedance	R_{OUT}			150		Ω
Source Current	$ I_{OUT} $	$V_{OUT} = 2.5V$			4	mA
Light Output Enable	LO-EN	Digital input with internal 10K pull-down for light output enable at logic low or no connection				
	V_{IL}	Normal	0		1	Normal
	V_{IH}	Disable light output	2.5		3.3	Disable light output

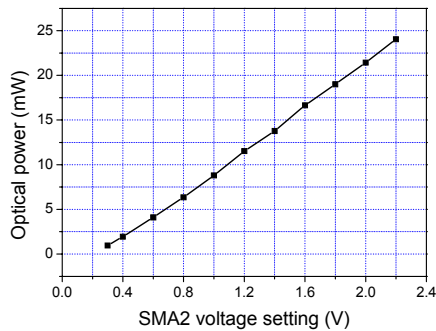
¹⁾ Unless otherwise specified, tests are performed at $T_{op} = 25°C$

²⁾ Depending on product selection

Operating mode ³	Operation Setting	
	SMA1 connector (50Ω)	SMA2 connector (50Ω)
CW	Logic High, $2V \leq V_{IH} \leq 5V$	DC Voltage (User to set optical peak power through DC voltage to SMA2)
Digital modulation ⁴	External Trigger Input (CMOS/TTL compatible), $0 \leq V_{IL} \leq 0.8V$ and $2V \leq V_{IH} \leq 5V$	DC Voltage (User to set optical peak power through DC voltage to SMA2)
Analog modulation ⁴	Logic High, $2V \leq V_{IH} \leq 5V$	Transconductance amplifier operating on positive polarity analog input signal

³⁾ There will be no optical output power if SMA1 or SMA2 is left unconnected.

⁴⁾ Pre-bias setting on laser can be factory preset. Please specify the amount of pre-set bias (in terms of X% of optical power). Note: Factory default setting is zero.



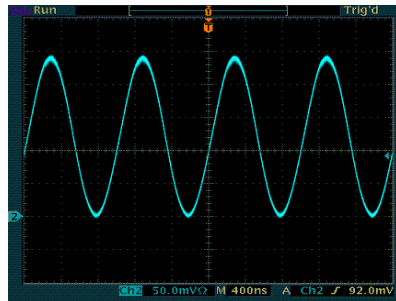
Optical power vs SMA2 voltage setting

Digital modulation:



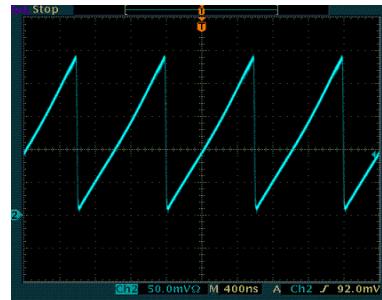
SMA1: Pulse waveform
 Frequency= 100kHz
 Amplitude= 2V
 SMA2: DC voltage 2V

Analog modulation



SMA1: Logic high ($V_{IH} = 2V$)
 SMA2: Sine wave
 Frequency: 1MHz
 Amplitude= 0.3 to 2.3V

Analog modulation



SMA1: Logic high ($V_{IH} = 2V$)
 SMA2: Ramp wave
 Frequency: 1MHz
 Amplitude= 0.3 to 2.3V

H. OPTICAL SPECIFICATIONS

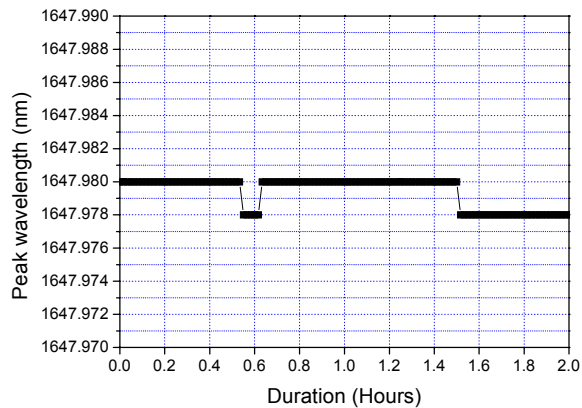
Parameter	Symbol	Min	Typ	Max	Unit
Power stability ⁵ 1 hour	P _{Stb}			± 0.03	dB
8 hour				± 0.05	dB
Wavelength stability ⁵	$\lambda_{\text{stability}}$			± 1	pm

⁵⁾ After one hour of warm-up for CW operation

14-Pin Butterfly package CLSwwwB-Sxxxx	Min Power (mW)	Peak wavelength (nm)	Side Mode Suppression Ratio (dB)	Linewidth (kHz)
CLS051B-S1260	5	1260±2	>35dB	<50
CLS051B-S1383	5	1383±2	>35dB	<50
CLS101B-S1550	10	1550±2	>35dB	<50
CLS051B-S1648	5	1648±2	>35dB	<50
CLS051B-S1665	5	1665±2	>35dB	<50

The full optical performance of the DL-BF12-CLSwwwB-Sxxxx-yy-zz can be found in DenseLight standard 14-pin Butterfly package CLSwwwB-Sxxxx series individual specification. Please contact DenseLight Semiconductor Pte Ltd for further information.

I. TYPICAL WAVELENGTH STABILITY



*Wavelength stability <+/-1pm, limited by resolution of optical spectrum analyzer

J. ORDERING INFORMATION

Please use the following part code system to order products.

DL-BF12-CLSwwwB-Sxxxx-yy-zz

Part code:

1) CLSwwwB-Sxxxx refers to DenseLight standard 14-pin Butterfly package. Refer to the summary in section H for the code number.

2) Sxxxx-yy denotes peak wavelength selection

xxxx.yy = 1260.01 to 1670.00

2) zz denotes the factory laser optical power pre-bias setting:

00= Zero bias (factory default)

zz= Pre-bias 01 to zz% (eg. 05 denotes 5% optical power pre-bias)

K. REVISION CONTROL

Authorized Personnel	Rev	Description of Change	Date
OTK	A	Initial: Prelim Production Release	12 June 2007