


## 2.5 Gb/s CWDM Buried Het Laser 80Km reach LC25WC

This laser module provides a fast route to CWDM by providing a drop in replacement on existing TDM or WDM circuit packs with minimum redesign and verification work. The product employs the Bookham strained layer MQW Buried Heterostructure DFB laser chip, and has been designed specifically for use in Coarse Wavelength Division Multiplexed (CWDM) 2.5 Gb/s optical fibre trunk systems. The device is packaged in a hermetic 14-pin butterfly package incorporating an isolator and monitor photodiode for control of the power of the laser over life and all operating conditions.

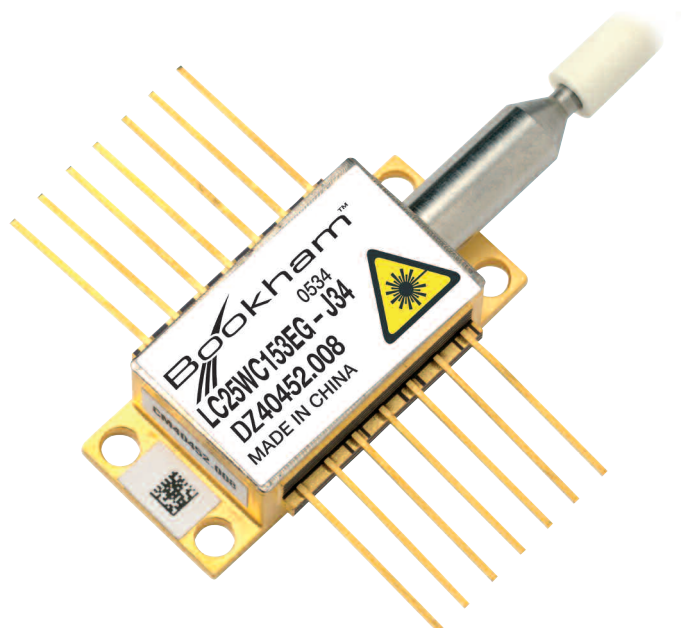
The device is available with a number of power options depending on application and link span requirements.

### Features:

- Drop in replacement onto TDM and WDM card
- 2.5 Gb/s operation
- Up to 10mW optical output power available
- Narrow spectral line-width
- Internal TEC with precision NTC thermistor for temperature control
- 1470nm to 1610nm at 20nm compliant to ITU G.694.2
- Code reduction with single product for reaches up to 80km
- GaInAsP SLMQW DFB single frequency laser chip
- InGaAs monitor photodiode
- Hermetically sealed 14-pin butterfly package with optical isolator
- RoHS compliant 

### Applications:

- CWDM metro



## Parameters

Parameter	Conditions	Min	Typ	Max	Unit
Threshold current ( $I_{th}$ )			10	22	mA
Slope efficiency by product	2 mW 3 mW 4 mW 10 mW	0.04 0.06 0.08 0.143		0.09 0.13 0.17 0.43	mW/mA
RF input reflection coef ( $S_{11}$ )	[1]			-10	dB
Forward voltage			1.3	1.8	V
Channel wavelengths available	ITU G.694.2	1470		1610	nm
Peak wavelength for channel	[2]	$\lambda_p - 4\text{nm}$	$\lambda_p$	$\lambda_p + 4\text{nm}$	nm
Dispersion penalty at 80 km	[3]			2	dB
Time averaged spectral linewidth	-20 dB		0.1	0.6	nm
Side-mode suppression		30	40		dB
Optical rise/fall time	[4]			125	ps
Monitor photo current		50	250	1200	$\mu\text{A}$
Monitor dark current				100	nA
Thermistor resistance			10		k $\Omega$
Heatpump current	70°C case temperature	250	600	900	mA
Heatpump voltage	70°C case temperature		1.0	2.4	V
Change of $\lambda_p$ with laser temp.	20 to 35		0.09		nm/°C

[1] 50  $\Omega$  measurement system,  $f = \text{dc} - 3 \text{ GHz}$ .

[2] Submount temperature between 20°C & 35°C start of life to achieve required  $\lambda_p$ .

[3] Standard product dispersion penalty will be compliant to the specified link length of 80 km using an extinction ratio of 10 dB. Fibre dispersion characteristics are derived from the following equation

$$D(\lambda) = \frac{S_0}{4} \left( \lambda - \frac{\lambda_0^4}{\lambda^3} \right) \text{ps}/(\text{nm.km})$$

Where  $S_0 = 0.092 \text{ ps}/(\text{nm}^2.\text{km})$  and  $\lambda = 1302 \text{ nm}$ .

[4] Measurements determined from 20 - 80% pk - pk.

## Absolute Maximum Ratings

Parameter	Min	Max	Unit
Case operating temperature	0	70	°C
Laser submount operating temperature	20	35	°C
Storage temperature	-40	85	°C
Laser current above $I_{th}$		100	mA
Laser reverse voltage		1.0	V
Laser reverse current		10	$\mu\text{A}$
Monitor diode bias		-10	V
Heatpump voltage		2.4	V
Fiber bend radius	30		mm

## Reliability/Quality

Meets Qualification requirements of Telcordia / Bellcore GR468-Core for central office environment.

Operating reliability <math>< 500 \text{ FITs}^1</math> in 15 years. Reliability figures for other life conditions available upon request.

1- Assumes laser die submount held at <math>< 35^\circ\text{C}</math> by internal thermoelectric cooler, mean forward current of 35 mA, and end of life limits based on 10 mA increase in I<sub>th</sub> and 25 % change in laser efficiency.

### Safety Information

Laser safety classifications:-  
IEC60825-1: Edition 1.2 Class 1M  
21CFR1040.10 Class IIIB

Electrostatic discharge:-  
ESD threshold >500V

**TA-TSY-000870 class 3.**

## Outline Drawing and Pinout Information

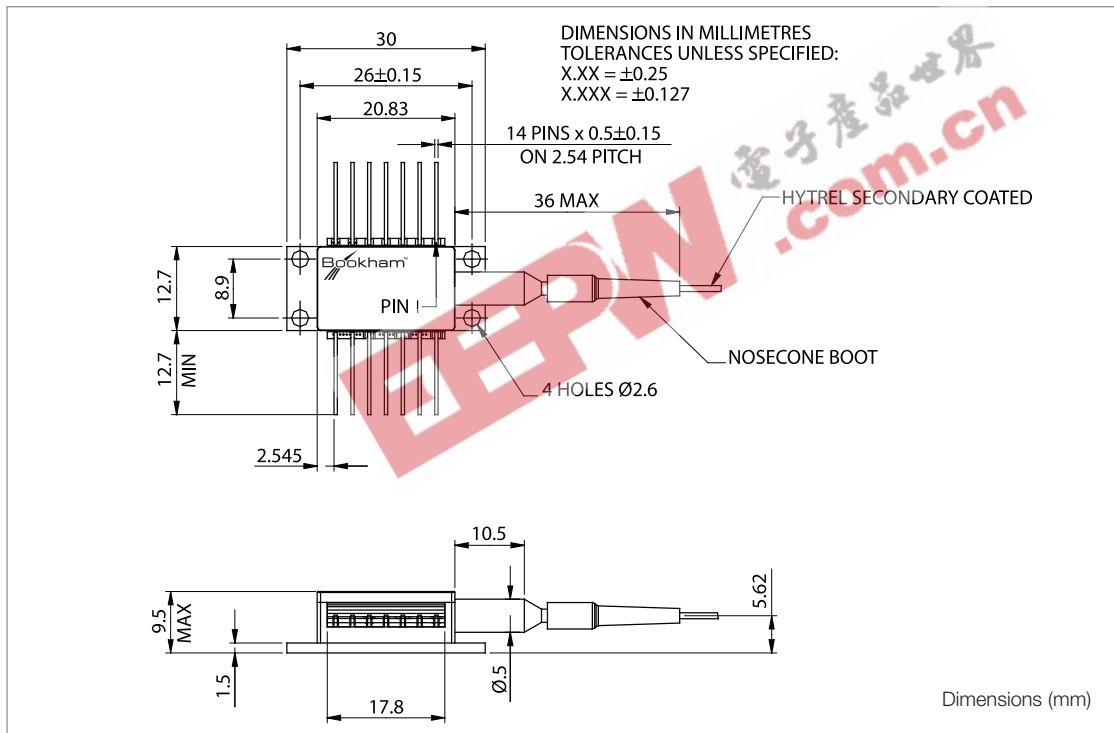


Figure 1: Outline Drawing and Pinout Information.

## Instructions for Use – LC25WC

### Pin 1 and Pin 2 Thermistor

The thermistor is used in a control loop in conjunction with the thermo-electric cooler to maintain the laser submount temperature at the required value for wavelength. Operating current should be less than 100  $\mu$ A to prevent self-heating errors.

### Pin 3 Laser DC bias (-)

Laser bias current (negative with respect to package ground) is applied via this pin which forms one side of the bias-T connection to the laser cathode.

### Pin 4 Monitor anode, Pin 5 Monitor cathode

The back facet monitor provides a mean power reference for the laser and is normally operated with a 5 V reverse bias.

### Pin 6 TEC (+), Pin 7 TEC (-)

Applying a positive voltage on pin 6 with respect to pin 7 will cause the internal submount to be cooled relative to the case temperature. Reversing the polarity will raise the submount temperature relative to the case. The TEC supply should be capable of delivering up to 0.9 A at 2.4 V.

### Pin 8, 9, 11, 13 Case ground

These pins must be grounded in all applications.

### Pin 10

This pin is not connected. It should be grounded if possible.

### Pin 12 Laser modulation (-)

The data input (modulation current) is applied via this pin which is a nominal 25 Ohm impedance coplanar line. For 10mW applications the end of life modulation current is 90mA. For all other applications 60mA maximum modulation current should be provisioned.

### Pin 14 N/C

This pin is not connected. It should be grounded if possible.

## Connections

Pin #	Function	Pin #	Function
1	Thermistor	8	Case Ground
2	Thermistor	9	Case Ground
3	Laser DC bias (-)	10	Not Connected
4	Monitor Anode (-)	11	Case Ground
5	Monitor Cathode (+)	12	Laser Modulation (-)
6	TEC (+)	13	Case Ground
7	TEC (-)	14	Not Connected

## RoHS Compliance



Bookham is fully committed to environment protection and sustainable development and has set in place a comprehensive program for removing polluting and hazardous substances from all of its products. The relevant evidence of RoHS compliance is held as part of our controlled documentation for each of our compliant products. RoHS compliance parts are available to order, please refer to the ordering information section for further details.

### Ordering Information:

LC25WC	[Wavelength]	[Power Option]	[Reach]	[Connector]
	***	E = 2 mWpk C = 3 mWpk A = 4 mWpk B = 10 mWpk	G = 80 km	J28 = SC/PC J34 = FC/PC J57 = LC J59 = MU

\*\*\* = First three digits of wavelength value E.g. for  $\lambda_p = 1530 \text{ nm}$  \*\*\* = 153  
Fibre length 1130 to 1190 mm.

Other connector types are available on request.

E.g. LC25WC153AG-J28 is a 4 mW 1530nm device with an SC connector for use in an 80 km application.

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