LC25ET 2.5 Gb/s Buried Het Tunable Laser

Features

2.5 Gb/s Operation

Tunable over four separate channels at 100 GHz channel spacing

Integrated wavelength locking optics

Entire C band ITU wavelengths available (1528 to 1563 nm)

Narrow spectral line-width

Hermetically sealed 14 pin butterfly package with optical isolator

Internal TEC with precision NTC thermistor

Extended reach performance up to 360 km with low dispersion penalty

Applications

Cost effective metropolitan or long haul networks

Stock inventory / Spares reduction

Network protection

Low-speed routing / Networks reconfiguration

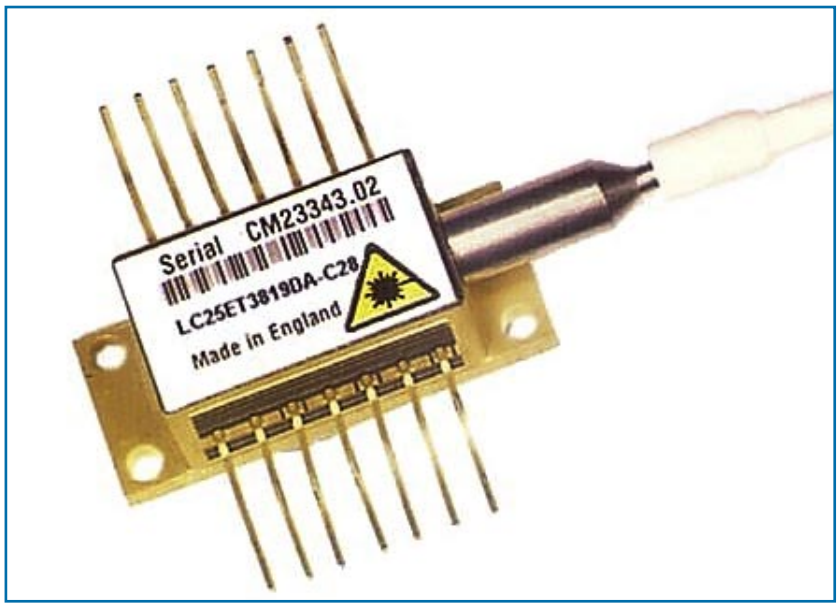
Description

This laser module employs the Nortel Networks gain coupled SLMQW buried heterostructure DFB laser chip, and has been designed specifically for use in wavelength Division Multiplexed (WDM) 2.5 Gb/s long distance optical fiber trunk systems.

The device is packaged in a hermetically sealed 14 pin-butterfly package incorporating an isolator and locking optics to lock and stabilize wavelength and power of the laser over life.

The module is tunable by means of the internal thermo-electric cooler over four adjacent 100 GHz ITU WDM channels.

The device is available with a number of power options and wavelength schemes which are customizable to individual customer specification.



NORTEL NETWORKS™

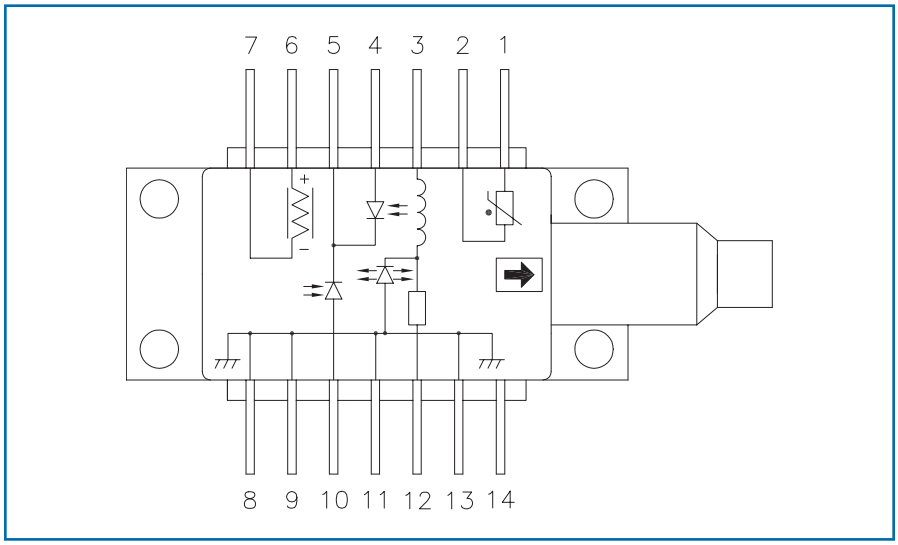


Figure 1: Schematic diagram

Parameters

Parameter	Conditions	Min	Typ	Max	Unit
Threshold current (Ith)			10	22	mA
Slope efficiency	3 mW High power (1)	0.07 0.143			mW/mA mW/mA
RF input reflection coef (S11)	(2)			-10	dB
Forward voltage			1.3	1.8	V
Peak wavelength (λp)	(3)	1527		1563	nm
Dispersion penalty	(4)			2	dB
Time averaged spectral linewidth	-20dB		0.4	0.6	nm
Side-mode suppression		34	40		dB
Optical rise/fall time	(5)			125	ps
Monitor photo currents		75	250	360	μA
Monitor dark current				50	nA
Thermistor resistance		5.6		29.95	kΩ
Heatpump current	ΔT = 70°C	250	600	1500	mA
Heatpump voltage	ΔT = 70°C		3.0	3.5	V
Change of λ with temp.	0 to 40°C		0.1		nm/°C

(1) The high power version provides 10 mW peak output power for 175 km applications and 7 mW peak ouput power for 360 km applications.
(2) 50 Ω measurement system, f = dc - 3 GHz.
(3) Submount temperature between 0°C & 40°C start of life to achieve required λp.
(4) Dispersion penalty is compliant to a link length of 175 km or 360 km. Fiber dispersion characteristics are derived from the following equation:

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

where So =0.092 ps/(nm^2 km) and λ_0 = 1302 nm.
(5) Measurements determined from 20 - 80% Pk - Pk

Absolute Maximum Ratings

Parameter	Min	Max	Unit
Case operating temperature	-5	70	°C
Laser submount operating temperature	0	40	°C
Storage temperature	-40	70	°C
Laser current above Ith		100	mA
Laser reverse voltage		1.0	V
Laser reverse current		10	µA
Monitor diode bias		-10	V
Heat Pump Current		2	A
Heatpump voltage		4	V
Fiber bend radius	30		mm

Reliability/Quality

Meets Qualification requirements of Telcordia / Bellcore GR468-Core for central office environment.
Operating reliability <500 FITs[1] in 15 years.

1 - Assumes laser die submount held at <40°C by internal thermoelectric cooler, mean forward current of 35 mA, and end of life limits based on 10 mA increase in Ith and 25 % change in laser efficiency.

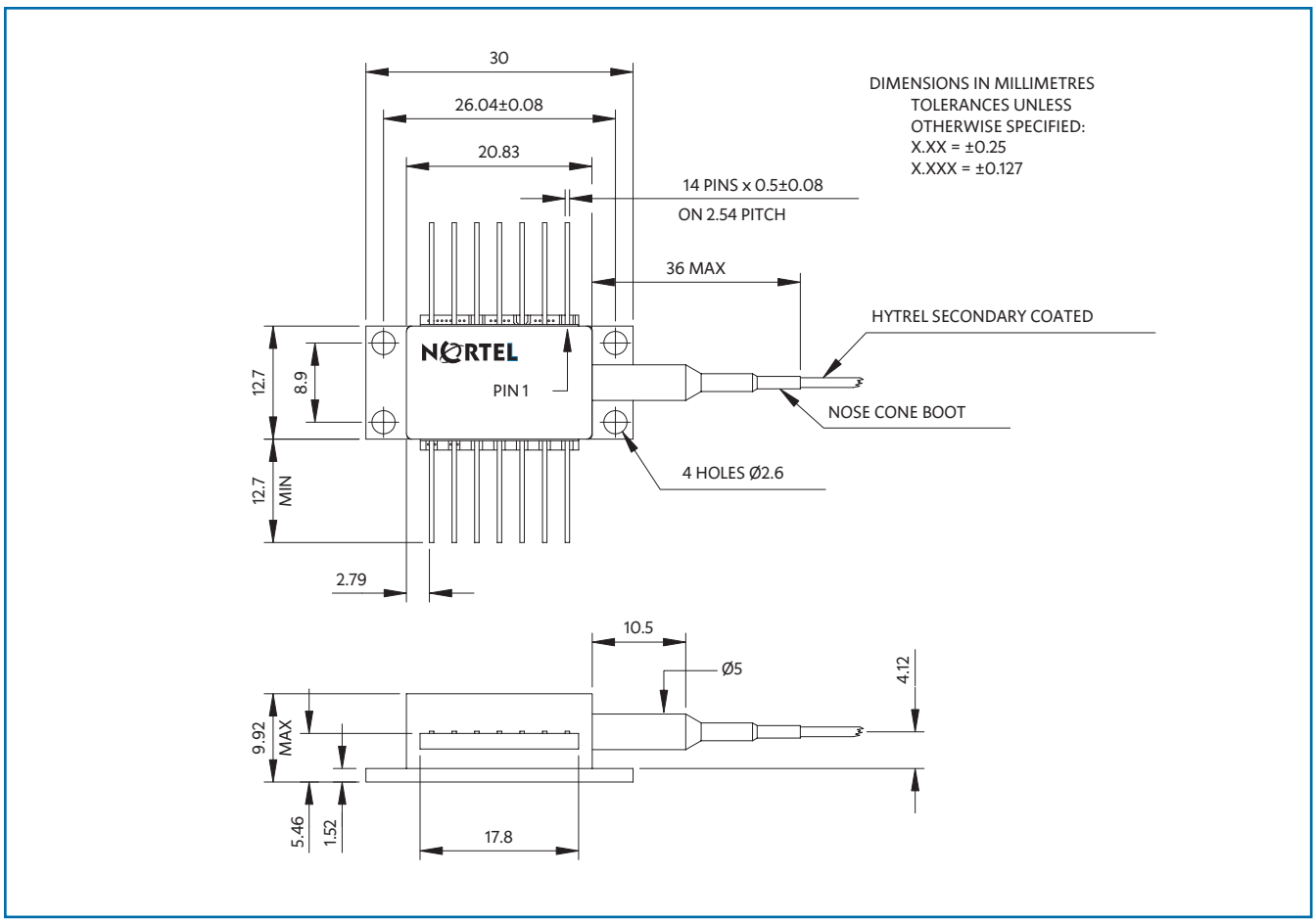


Figure 2: Outline Drawing and Pinout Information

Connections

Pin #	Function	Pin #	Function
1	Thermistor	8	Case ground
2	Thermistor	9	Case ground
3	Laser DC bias (-)	10	Pin Long anode
4	Monitor anode (-)	11	Laser case ground
5	Monitor cathode (+)	12	Laser modulation (-)
6	TEC (+)	13	Laser case ground
7	TEC(-)	14	N/C

Instructions for use – LC25ET

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. Operating current should be less than 100 µA 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 + 10 Monitor anodes, Pin 5 Common Monitor cathode

Monitor diodes are arranged in the package such that they give an equal monitor current when the laser wavelength is matched to the ITU grid. A reverse bias must be applied equally across each of the monitors, this is commonly achieved by applying 10 V to Pin 5.

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

Applying a positive voltage on pin 6 with respect to pin 7 causes the internal submount to be cooled relative to the case temperature. Reversing the polarity raises the submount temperature relative to the case. The TEC supply is capable of delivering up to 1.5 A at 3.8 V.

Pin 8, 9, 11, 13 Case ground

These pins must be grounded in all applications.

Pin 12 Laser modulation (-)

The data input (modulation current) is applied via this pin which is a nominal 25 Ohm impedance coplanar line.

Pin 14 N/C

This pin is not connected. Ground it, if possible.

Device Ordering Information

LC25ET [Wavelength]	[Power Option]	[Reach]	[Connector]
****	**C** = 3 mWpk	**A** = 175 km	**C28** = SC/PC
	B = High power	**B** = 360 km	**C34** = FC/PC
			C57 = LC
			C59 = MU

Fiber Length 1130 to 1190 mm.
Other connector types are available on request.

**** = Last four digits of first channel / shortest wavelength
E.g. **LC25ET4532CA-C28** has the following for channels:
1545.32 nm
1546.12 nm
1546.92 nm
1547.72 nm

The high power option provides 10 mW peak power at 175 km or 7 mW peak power over 360 km

E.g. **LC25ET4532BA-C28** is a 10 mW 1545.32 nm device with an SC connector for use in a 175 km application.

E.g. **LC25ET4532BB-C28** is a 7 mW 1545.32 nm device with an SC connector for use in a 360 km application.

REFERENCE IEC 60825–1: Edition 1.2

THIS PRODUCT COMPLIES WITH 21 CFR 1040.10

Certificate No. FM 15040

Certificate No. EMS 35100

NORTEL NETWORKS™

Nortel Networks
Optical Components
185 Corkstown Road
Ottawa, Ontario
Canada K2H 8V4

www.nortelnetworks.com/opticalcomponents

For more information, please contact your local Nortel Networks representative.
Tel: 800.4.NORTEL/800.466.7835
or outside North America 506.674.5471
Email:
sales-opticalcomponents@nortelnetworks.com

Publication # 84106.02/05-02, Issue 2 Dated 05/01/02