CEL

NEC's DIRECTLY MODULATED InGaAsP MQW-DFB LASER DIODE MODULE FOR 2.5 GB/s, 110 KM AND 240 KM REACH DWDM METRO AND CATV APPLICATIONS

NX8563LA Series

FEATURES

- **PEAK OUTPUT POWER**
  P_f = 10 mW MIN.
- **INTERNAL THERMO-ELECTRIC COOLER AND ISOLATOR**
- **HERMETICALLY SEALED 14-PIN BUTTERFLY PACKAGE**
- **SINGLE MODE FIBER PIGTAIL**
- **WIDE OPERATION TEMPERATURE RANGE**
- **AVAILABLE FOR DWDM WAVELENGTHS BASED ON ITU-T RECOMMENDATIONS**

DESCRIPTION

NEC's NX8563LA Series is a 1 550 nm Multiple Quantum Well (MQW) structured Distributed Feed-Back (DFB) laser diode module with Single Mode Fiber.

It is designed as directly modulation light source and ideal for optical transmission systems. The device is available for Dense Wavelength Division Multiplexing (DWDM) wavelengths based on ITU-T recommendations, enabling a wide range of applications.

ELECTRO-OPTICAL CHARACTERISTICS (T_{LD} = T_{SET}, T_C = -20 + 85°C)

SYMBOL	PARAMETER AND CONDITIONS	UNIT	MIN	TYP	MAX
T_{set}	Laser Set Temperature	°C	30		45
V_F	Forward Voltage, P_f = 10 mW	V	0.9		2.0
I_{th}	Threshold Current	mA		20	40
P_f	Optical Output Power from Fiber, I_F = I_{op}, T_{LD} = T_{set}	mW	10		
I_{op}	Operation Current	mA			125
P_{th}	Threshold Output Power, I_F = I_{th}	μW			100
η	Quantum Efficiency, CW	W/A	0.142	0.17	
λ_p	Peak Emission Wavelength, P_f = 10 mW, CW, T_{LD} = T_{set}	nm	1 530	ITU-T *1	1 562
Δν	Spectral Line Width, P_f = 10 mW, CW, 3 dB down	MHz		1	5
SMSR	Side Mode Suppression Ratio, P_f = 10 mW, under modulation	dB	30	35	
ZIN	Input Impedance	Ω		25	
RIN	Relative Intensity Noise, P_f = 10 mW, 20 MHz to 3 GHz	dB/Hz			–140
t_r /t_f	Rise and Fall Time, 20-80%/80-20%, T_c = 25°C	ps			120
S_{11}	Input Return Loss, f = 50 MHz to 3 GHz	dB	6		
	f = 3 GHz to 6 GHz		3		
BW	Band Width, –3 dB, P_f = 10 mW	GHz	2.5		
DP	Dispersion Penalty, T_c = 25°C*2	dB			2.0

Notes:

***1** Available for DWDM wavelengths based on ITU-T recommendation. Please refer to the **ORDERING INFORMATION**.

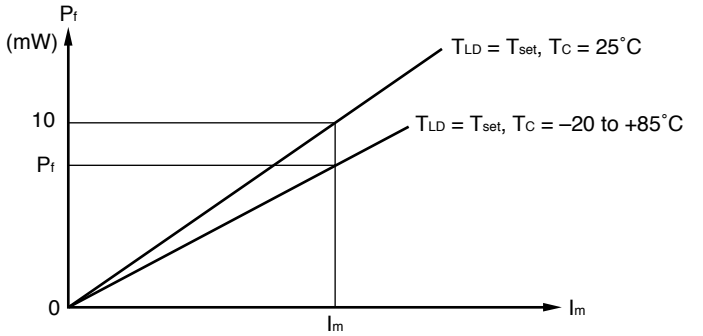
***2** 2.48832 Gb/s, PRBS 2^{23}–1, duty cycle, Extinction Ratio ≥ 8.5 dB, BER = 10^{-10}, NX8563LAS: 1 800 ps/nm(100 km), NX8563LA: 4 320 ps/nm(240 km)

ELECTRO-OPTICAL CHARACTERISTICS (Applicable to Monitor PD: $T_{LD} = T_{SET}$, T_C = -20 to +85°C)

SYMBOL	PARAMETER AND CONDITIONS	UNIT	MIN	TYP	MAX
I_m	Monitor Current, P_f = 10 mW, V_R = 5 V	μA	100		2 000
I_D	Dark Current, V_R = 5 V	nA			10
γ *1	Tracking Error, I_m = const.	dB			0.6

Note:

*1 $\gamma = \left| 10 \log \frac{P_f}{10\ mW} \right|$



(@ P_f (25˚C) = 10 mW)

ELECTRO-OPTICAL CHARACTERISTICS (Applicable to Thermistor and TEC: $T_{LD} = T_{SET}$, T_C = -20 to +85°C)

SYMBOL	PARAMETER AND CONDITIONS	UNIT	MIN.	TYP.	MAX.
R	Thermistor Resistance, T_{LD} = 25°C	kΩ	9.5	10.0	10.5
B	B Constant	K	3 350	3 450	3 550
I_C	Cooler Current, $\Delta T = 85 - T_{set}$, P_f = 10 mW	A			1.2
V_C	Cooler Voltage, $\Delta T = 85 - T_{set}$, P_f = 10 mW	V			2.4

ABSOLUTE MAXIMUM RATINGS[1]

(T_C = 25°C, unless otherwise specified)

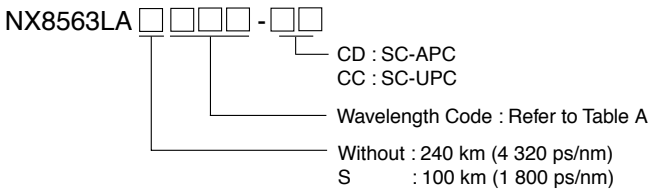
SYMBOL	PARAMETER	UNIT	RATINGS
I_F	Forward Current of LD	mA	300
V_R	Reverse Voltage of LD	V	2.0
I_F	Forward Current of PD	mA	10
V_R	Reverse Voltage of PD	V	20
T_C	Operating Case Temperature	°C	–20 to +85
T_{stg}	Storage Temperature	°C	–40 to +85
T_{sld}	Lead Soldering Temperature	°C	260 (10 sec.)

Note:

1. Operation in excess of any one of these parameters may result in permanent damage.

ORDERING INFORMATION

PART NUMBER	PACKAGE
NX8563LA-AZ*	Hermetically sealed 14-pin butterfly package



***NOTE:**
Please refer to the last page of this data sheet, “Compliance with EU Directives” for Pb-Free RoHS Compliance Infomation.

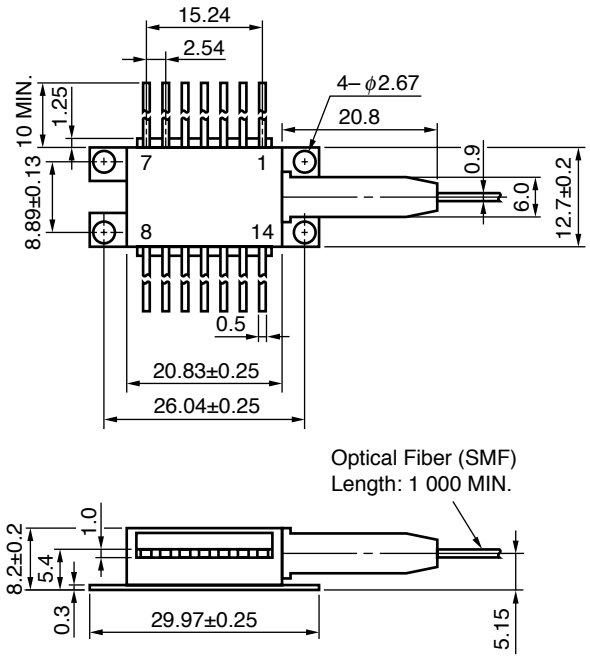
Table A: DWDM wavelength base on ITU-T recommendations (@ $T_{LD} = T_{set}$)

Wavelength Code	ITU-T Wavelength*1 (nm)	Frequency (THz)	Wavelength Code	ITU-T Wavelength*1 (nm)	Frequency (THz)
303	1530.33	195.90	509	1550.91	193.30
311	1531.11	195.80	517	1551.72	193.20
318	1531.89	195.70	525	1552.52	193.10
326	1532.68	195.60	533	1553.32	193.00
334	1533.46	195.50	541	1554.13	192.90
342	1534.25	195.40	549	1554.94	192.80
350	1535.03	195.30	557	1555.74	192.70
358	1535.82	195.20	565	1556.55	192.60
366	1536.60	195.10	573	1557.36	192.50
373	1537.39	195.00	581	1558.17	192.40
381	1538.18	194.90	589	1558.98	192.30
389	1538.97	194.80	597	1559.79	192.20
397	1539.76	194.70	606	1560.60	192.10
405	1540.55	194.60	614	1561.41	192.00
413	1541.34	194.50			
421	1542.14	194.40			
429	1542.93	194.30			
437	1543.73	194.20			
445	1544.52	194.10			
453	1545.32	194.00			
461	1546.11	193.90			
469	1546.91	193.80			
477	1547.71	193.70			
485	1548.51	193.60			
493	1549.31	193.50			
501	1550.11	193.40			

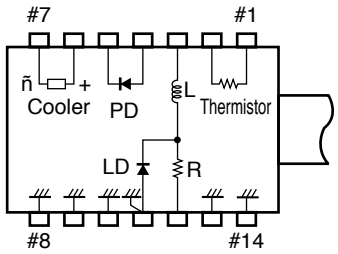
Note:

***1** The value which omitted and computed the 3rd place below the decimal point

PACKAGE DIMENSIONS (Units in mm)



TOP VIEW

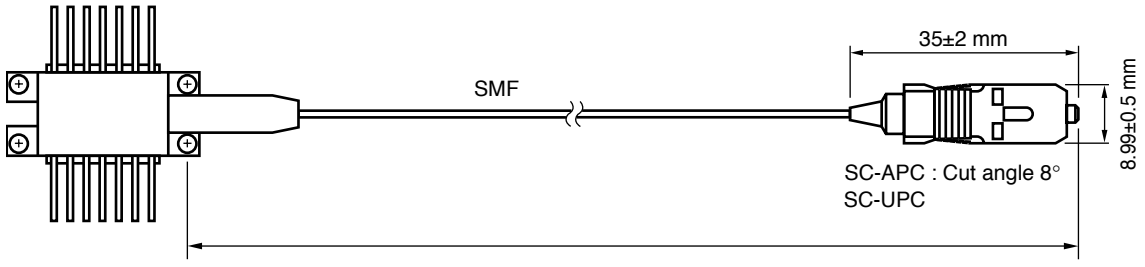


PIN CONNECTIONS

Pin No.	Function	Pin No.	Function
1	Thermistor	8	GND
2	Thermistor	9	GND
3	Bias	10	GND
4	PD Anode	11	GND, LD Anode
5	PD Cathode	12	Signal Input
6	Cooler Anode	13	GND
7	Cooler Cathode	14	GND

OPTICAL FIBER DIMENSIONS (UNIT: mm)

PARAMETER	UNIT	SPECIFICATION
Outer Diameter	mm	0.9±0.1
Minimum Fiber Bending Radius	mm	30
Fiber Length	mm	1 000 MIN.



Fiber Length: 1 000 mm MIN.

Life Support Applications
These NEC products are not intended for use in life support devices, appliances, or systems where the malfunction of these products can reasonably be expected to result in personal injury. The customers of CEL using or selling these products for use in such applications do so at their own risk and agree to fully indemnify CEL for all damages resulting from such improper use or sale.

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Subject: Compliance with EU Directives

CEL certifies, to its knowledge, that semiconductor and laser products detailed below are compliant with the requirements of European Union (EU) Directive 2002/95/EC Restriction on Use of Hazardous Substances in electrical and electronic equipment (RoHS) and the requirements of EU Directive 2003/11/EC Restriction on Penta and Octa BDE.

CEL Pb-free products have the same base part number with a suffix added. The suffix –A indicates that the device is Pb-free. The –AZ suffix is used to designate devices containing Pb which are exempted from the requirement of RoHS directive (*). In all cases the devices have Pb-free terminals. All devices with these suffixes meet the requirements of the RoHS directive.

This status is based on CEL's understanding of the EU Directives and knowledge of the materials that go into its products as of the date of disclosure of this information.

Restricted Substance per RoHS	Concentration Limit per RoHS (values are not yet fixed)	Concentration contained in CEL devices	
Lead (Pb)	< 1000 PPM	-A	-AZ
		Not Detected	(*)
Mercury	< 1000 PPM	Not Detected	
Cadmium	< 100 PPM	Not Detected	
Hexavalent Chromium	< 1000 PPM	Not Detected	
PBB	< 1000 PPM	Not Detected	
PBDE	< 1000 PPM	Not Detected	

If you should have any additional questions regarding our devices and compliance to environmental standards, please do not hesitate to contact your local representative.