DATA SHEET

NEC

LASER DIODE

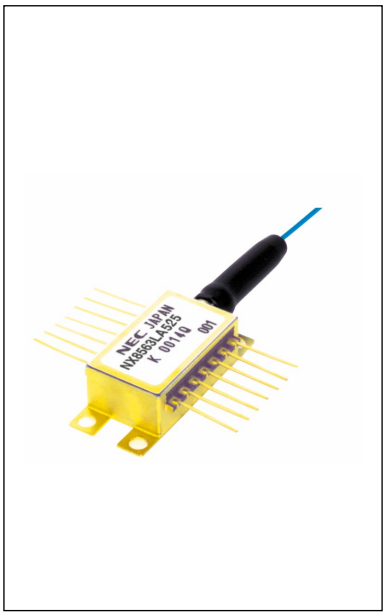
NX8563LA Series

1 550 nm InGaAsP MQW-DFB LASER DIODE MODULE
2.5 Gb/s DIRECTLY MODULATION LIGHT SOURCE FOR DWDM APPLICATIONS

DESCRIPTION

The 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.



FEATURES

- Peak output power P_f = 10 mW MIN.
- Available for DWDM wavelengths based on ITU-T recommendations (100 GHz grid, refer to the **ORDERING INFORMATION**)
- Internal thermo-electric cooler and isolator
- Hermetically sealed 14-pin butterfly package
- Single mode fiber pigtail
- Wide operation temperature range

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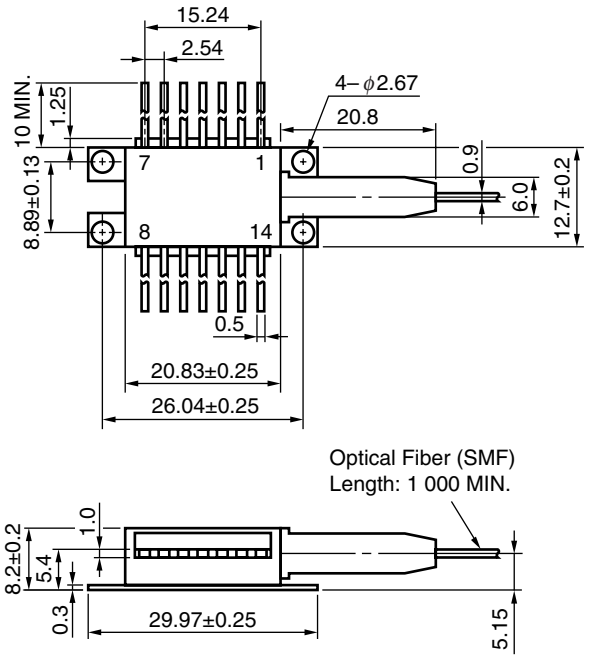
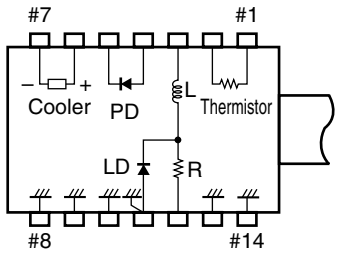
PACKAGE DIMENSIONS (UNIT: mm)



TOP VIEW

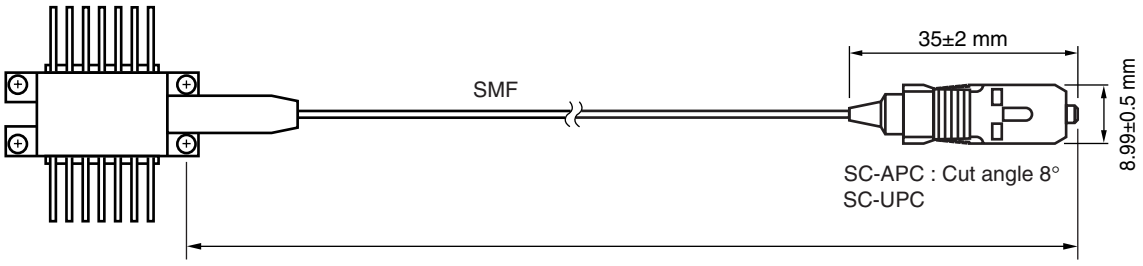


PIN CONNECTIONS

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	Specification	Unit
Outer Diameter	0.9±0.1	mm
Minimum Fiber Bending Radius	30	mm
Fiber Length	1 000 MIN.	mm



Fiber Length: 1 000 mm MIN.

ORDERING INFORMATION

NX8563LA □ □□□ - □□

- CD : SC-APC
  CC : SC-UPC
- Wavelength Code : Refer to Table A
- Without : 240 km (4 320 ps/nm)
  S : 100 km (1 800 ps/nm)

Table A: DWDM wavelength based 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			

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

ABSOLUTE MAXIMUM RATINGS

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

ELECTRO-OPTICAL CHARACTERISTICS ($T_{LD} = T_{set}$, T_C = –20 to +85°C)

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

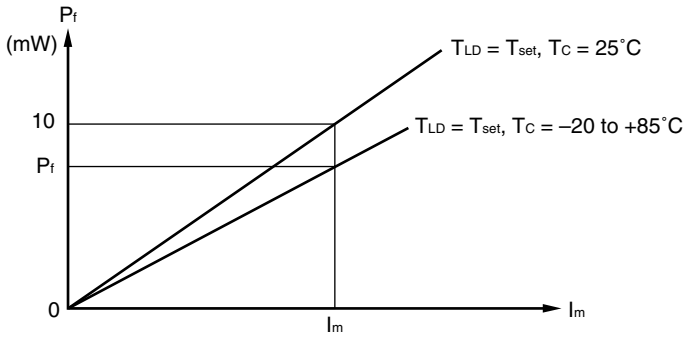
***1** Available for DWDM wavelengths based on ITU-T recommendation.
Please refer to the **ORDERING INFORMATION**.

***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)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Monitor Current	I_m	P_f = 10 mW, V_R = 5 V	100		2 000	μA
Dark Current	I_D	V_R = 5 V			10	nA
Tracking Error	γ *1	I_m = const.			0.6	dB

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



(@ P_f (25˚C) = 10 mW)

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

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

DFB-LD FAMILY

Part Number	Absolute Maximum Ratings		Electro-Optical Characteristics (T_C = 25°C)			Application	Package
	T_C (°C)	T_{stg} (°C)	I_{th} (mA)	P_f (mW)	λ_p (nm)		
			TYP.	MIN.	TYP.		
NX8300BE-CC NX8300CE-CC	0 to +75	−40 to +85	15	2 *1	1 310	2.5 Gb/s: STM-16 (S-16.1, L-16.1)	Coaxial
NX8303BG-CC NX8303CG-CC	−10 to +85	−40 to +85	15	2 *1	1 310	622 Mb/s: STM-4 (L-4.1)	Coaxial
NX8304BE-CC NX8304CE-CC	−40 to +85	−40 to +85	15	2 *1	1 310	For fiberoptic communications	Coaxial
NX8503BG-CC NX8503CG-CC	−10 to +85	−40 to +85	15	2 *1	1 550	156 Mb/s: STM-1 (L-1.2, L-1.3)	Coaxial
						622 Mb/s: STM-4 (L-4.2, L-4.3)	
NX8504BE-CC NX8504CE-CC	−10 to +85	−40 to +85	15	2 *1	1 550	622 Mb/s: STM-4 (L-4.2, L-4.3)	Coaxial
NX8508 Series	0 to +70	−40 to +85	10	2 *1	λ *2	2.5 Gb/s: CWDM	Coaxial
NX8562 Series	−20 to +70	−40 to +85	20	20	1 550 *3	CW Light Source for external modulator	BFY
NX8563 Series	−20 to +70	−40 to +85	20	10	1 550 *3	CW Light Source for external modulator	BFY
NX8563LA Series	−20 to +85	−40 to +85	20	10	1 550 *3	2.5 Gb/s: DWDM	BFY
NX8570SA/SCxxx-BA	−20 to +70	−40 to +85	20	20	1 550 *3	CW Light Source with λ monitoring PD single channel wavelength, 50 GHz-spacing	BFY
NX8570SA/SCxxxD-BA	−20 to +70	−40 to +85	20	20	1 550 *3	CW Light Source with λ monitoring PD 4 channel wavelength tunable capability for 50 GHz-spacing	BFY
NX8570SCxxxQ-BA	−20 to +70	−40 to +85	20	20	1 550 *3	CW Light Source with λ monitoring PD 8 channel wavelength tunable capability for 50 GHz-spacing	BFY
NX8571SA/SCxxx-BA	−20 to +70	−40 to +85	20	10	1 550 *3	CW Light Source with λ monitoring PD single channel wavelength, 50 GHz-spacing	BFY
NX8571SA/SCxxxD-BA	−20 to +70	−40 to +85	20	10	1 550 *3	CW Light Source with λ monitoring PD 4 channel wavelength tunable capability for 50 GHz-spacing	BFY
NX8571SCxxxQ-BA	−20 to +70	−40 to +85	20	10	1 550 *3	CW Light Source with λ monitoring PD 8 channel wavelength tunable capability for 50 GHz-spacing	BFY

***1** TYP.

***2** Available for CWDM Wavelengths based on ITU-T recommendations
λ = 1 470, 1 490, 1 510, 1 530, 1 550, 1 570, 1 590, 1 610 nm

***3** Available for DWDM Wavelengths based on ITU-T recommendations also

REFERENCE

Document Name	Document No.
Optical semiconducrtor devices for fiberoptic communications Selection Guide	PL10161E
Opto-Electronics Devices Pamphlet	PX10160E

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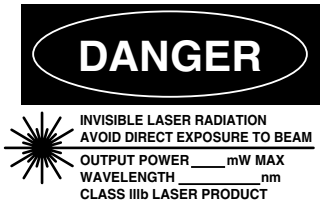

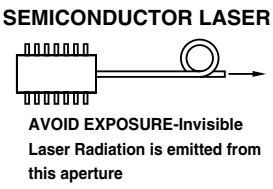

Warning Laser Beam	A laser beam is emitted from this diode during operation. The laser beam, visible or invisible, directly or indirectly, may cause injury to the eye or loss of eyesight. • Do not look directly into the laser beam. • Avoid exposure to the laser beam, any reflected or collimated beam.
Caution GaAs Products	This product uses gallium arsenide (GaAs). GaAs vapor and powder are hazardous to human health if inhaled or ingested, so please observe the following points. • Follow related laws and ordinances when disposing of the product. If there are no applicable laws and/or ordinances, dispose of the product as recommended below. 1. Commission a disposal company able to (with a license to) collect, transport and dispose of materials that contain arsenic and other such industrial waste materials. 2. Exclude the product from general industrial waste and household garbage, and ensure that the product is controlled (as industrial waste subject to special control) up until final disposal. • Do not burn, destroy, cut, crush, or chemically dissolve the product. • Do not lick the product or in any way allow it to enter the mouth.
Caution Optical Fiber	A glass-fiber is attached on the product. Handle with care. • When the fiber is broken or damaged, handle carefully to avoid injury from the damaged part or fragments.

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