NEC

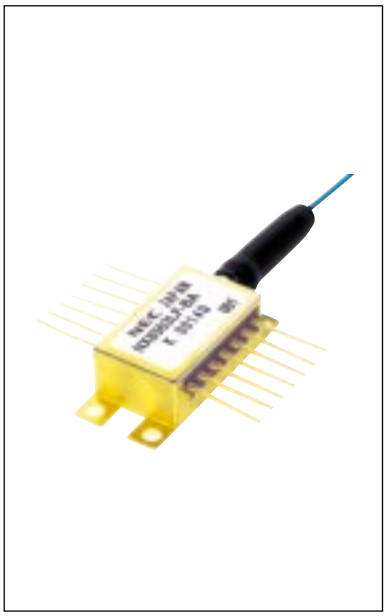
LASER DIODE
NX8563 Series

1 550 nm InGaAsP MQW-DFB LASER DIODE MODULE
CW LIGHT SOURCE FOR DWDM APPLICATIONS

DESCRIPTION

The NX8563 Series is a 1 550 nm Multiple Quantum Well (MQW) structured Distributed Feed-Back (DFB) laser diode module with Polarization Maintain Fiber (PMF).

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



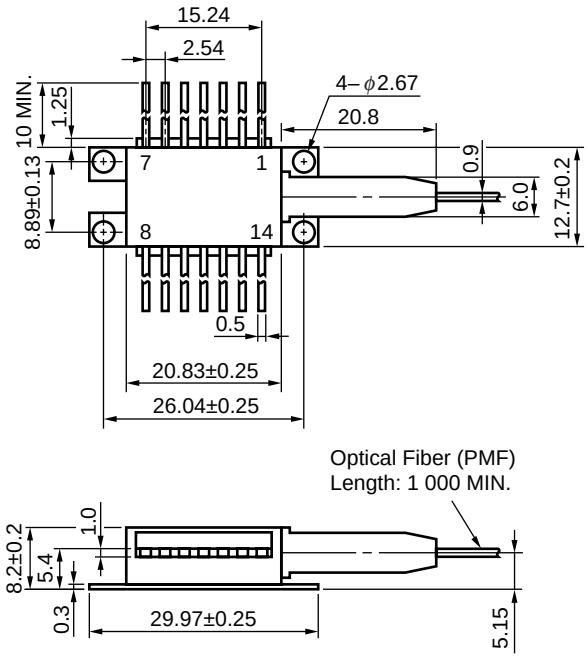
FEATURES

- 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
- Polarization maintain fiber pigtail

Document No. PL10215EJ01V0DS (1st edition)
(Previous No. P13642EJ5V0DS00)
Date Published February 2003 CP(K)
Printed in Japan

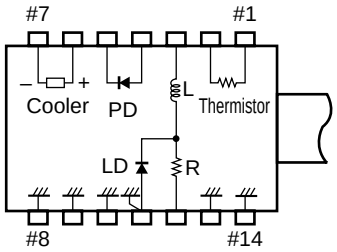
The mark ★ shows major revised points.

★ **PACKAGE DIMENSIONS (UNIT: mm)**



NX8563LB

TOP VIEW

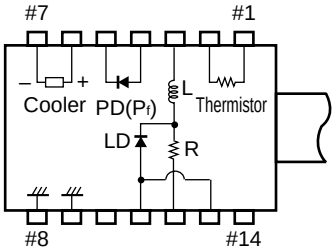


PIN CONNECTIONS

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

NX8563LF

TOP VIEW

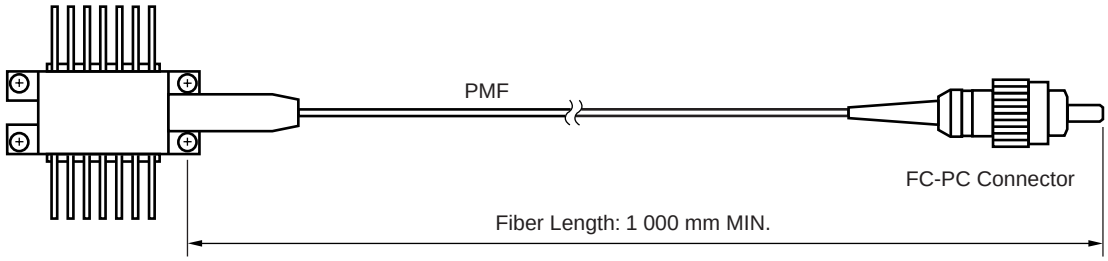


PIN CONNECTIONS

Pin No.	Function	Pin No.	Function
1	Thermistor	8	GND
2	Thermistor	9	GND
3	LD Cathode	10	PD (λ_P) Anode
4	PD (P_f) Anode	11	LD Anode
5	PD Cathode	12	LD Cathode
6	Cooler Anode	13	LD Anode
7	Cooler Cathode	14	NC

★ 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



★ ORDERING INFORMATION

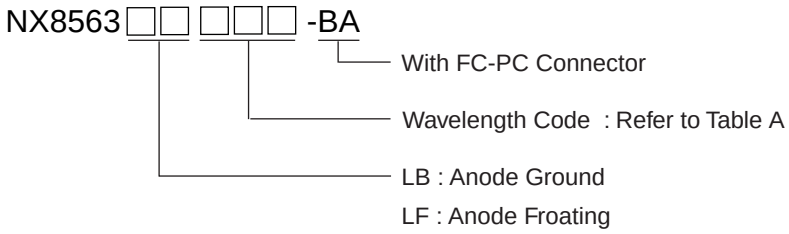


Table A: DWDM wavelength based on ITU-T recommendations (@T_{LD} = T_{set}) (1/2)

Wavelength Code	ITU-T Wavelength*1 (nm)	Frequency (THz)	Wavelength Code	ITU-T Wavelength*1 (nm)	Frequency (THz)
279	1527.99	196.20	485	1548.51	193.60
287	1528.77	196.10	493	1549.31	193.50
295	1529.55	196.00	501	1550.11	193.40
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	622	1562.23	191.90
421	1542.14	194.40	630	1563.04	191.80
429	1542.93	194.30	638	1563.86	191.70
437	1543.73	194.20	646	1564.67	191.60
445	1544.52	194.10	654	1565.49	191.50
453	1545.32	194.00	663	1566.31	191.40
461	1546.11	193.90	671	1567.13	191.30
469	1546.91	193.80	679	1567.95	191.20
477	1547.71	193.70	687	1568.77	191.10

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

Table A: DWDM wavelength based on ITU-T recommendations (@T_{LD} = T_{set}) (2/2)

Wavelength Code	ITU-T Wavelength*1 (nm)	Frequency (THz)	Wavelength Code	ITU-T Wavelength*1 (nm)	Frequency (THz)
695	1569.59	191.00	912	1591.25	188.40
704	1570.41	190.90	921	1592.10	188.30
712	1571.23	190.80	929	1592.94	188.20
720	1572.06	190.70	937	1593.79	188.10
728	1572.88	190.60	946	1594.64	188.00
737	1573.71	190.50	954	1595.48	187.90
745	1574.54	190.40	963	1596.33	187.80
753	1575.36	190.30	971	1597.18	187.70
761	1576.19	190.20	980	1598.04	187.60
770	1577.02	190.10	988	1598.89	187.50
778	1577.85	190.00	997	1599.74	187.40
786	1578.68	189.90	6006	1600.60	187.30
795	1579.51	189.80	6014	1601.45	187.20
803	1580.35	189.70	6023	1602.31	187.10
811	1581.18	189.60	6031	1603.16	187.00
820	1582.01	189.50	6040	1604.02	186.90
828	1582.85	189.40	6048	1604.88	186.80
836	1583.69	189.30	6057	1605.74	186.70
845	1584.52	189.20	6066	1606.60	186.60
853	1585.36	189.10	6074	1607.46	186.50
862	1586.20	189.00	6083	1608.32	186.40
870	1587.04	188.90	6091	1609.19	186.30
878	1587.88	188.80	6100	1610.05	186.20
887	1588.72	188.70	6109	1610.92	186.10
895	1589.56	188.60	6117	1611.78	186.00
904	1590.41	188.50			

***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 +70	°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 +70°C)

	Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
	Laser Set Temperature	T_{set}		20		35	°C
★	Forward Voltage	V_F	P_f = 10 mW		1.2	2.5	V
★	Forward Current	I_F	P_f = 10 mW		70	125	mA
	Threshold Current	I_{th}			20	40	mA
★	Optical Output Power from Fiber	P_f	I_F = 125 mA, $T_{LD} = T_{set}$	10			mW
★	Peak Emission Wavelength	λ_p	P_f = 10 mW, CW, $T_{LD} = T_{set}$	1527.99	ITU-T*1	1611.78	nm
	Spectral Line Width	$\Delta\nu$	P_f = 10 mW, CW, 3 dB down		1	2	MHz
★	Side Mode Suppression Ratio	SMSR	P_f = 10 mW, CW	33	45		dB
	Relative Intensity Noise	RIN	P_f = 10 mW, 20 MHz to 3 GHz			−150	dB/Hz
★	Polarization Extinction Ratio*2	ext	P_f = 10 mW, CW	20			dB

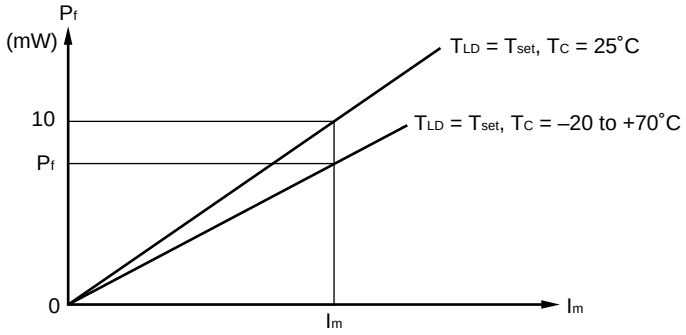
***1** Available for DWDM wavelengths based on ITU-T recommendation.
Please refer to the ORDERING INFORMATION.

***2** Polarization state of LD is aligned parallel to the slow axis.

ELECTRO-OPTICAL CHARACTERISTICS
(Applicable to Monitor PD: $T_{LD} = T_{set}$, T_C = –20 to +70°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.			0.5	dB

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



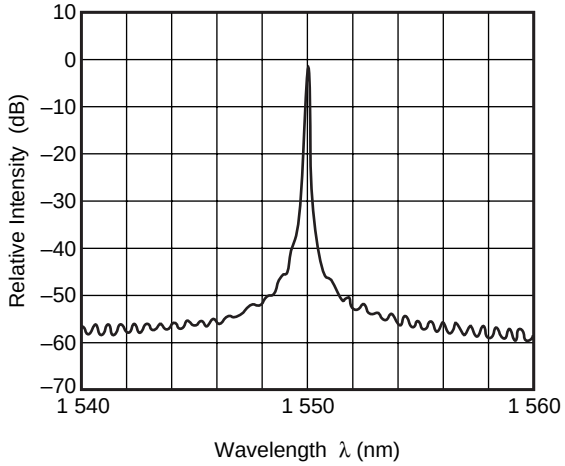
(@ P_f (25˚C) = 10 mW)

ELECTRO-OPTICAL CHARACTERISTICS
(Applicable to Thermistor and TEC: $T_{LD} = T_{set}$, T_C = –20 to +70°C)

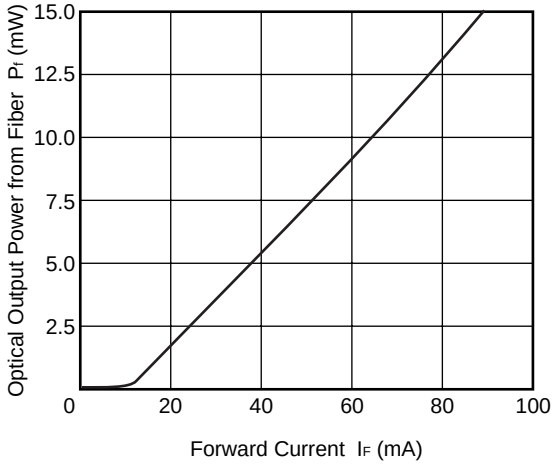
	Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
	Thermistor Resistance	R	T_{LD} = 25°C	9.5	10.0	10.5	kΩ
	B Constant	B		3 350	3 450	3 550	K
★	Cooler Current	I_C	$\Delta T = 70 - T_{set}$, P_f = 10 mW			1.0	A
★	Cooler Voltage	V_C	$\Delta T = 70 - T_{set}$, P_f = 10 mW			2.0	V

TYPICAL CHARACTERISTICS (T_{LD} = T_{set}, unless otherwise specified)

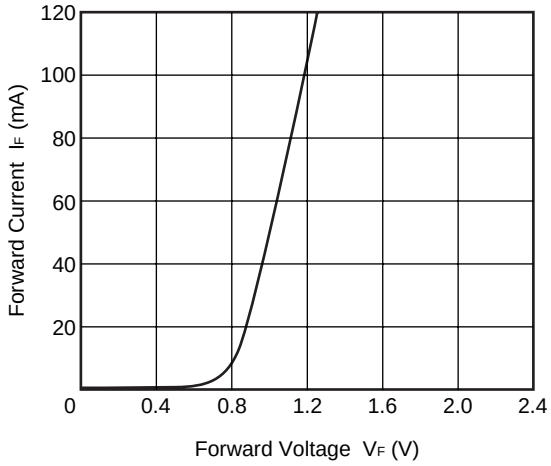
SPECTRUM



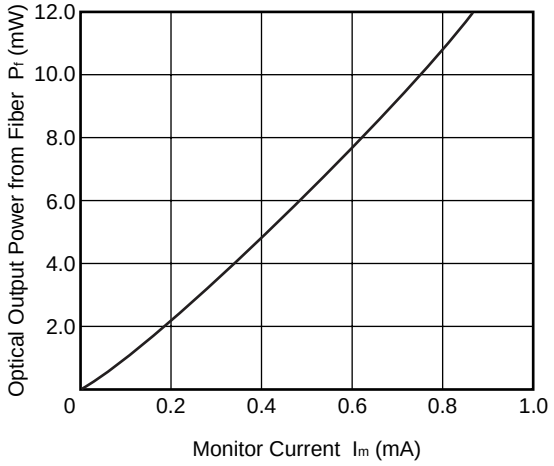
OPTICAL OUTPUT POWER FROM ★ FIBER vs. FORWARD CURRENT



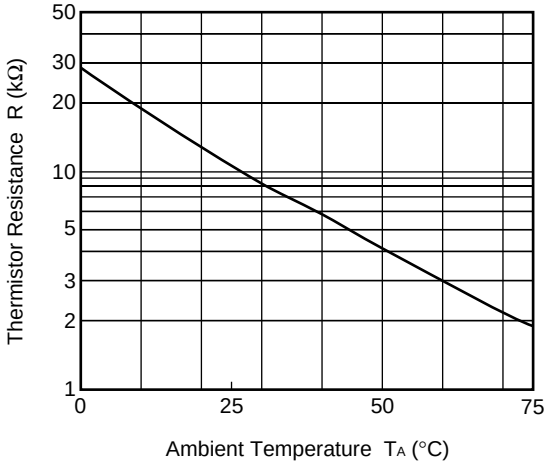
FORWARD CURRENT vs. FORWARD VOLTAGE



OPTICAL OUTPUT POWER FROM FIBER vs. MONITOR CURRENT



THERMISTOR RESISTANCE vs. AMBIENT TEMPERATURE



Remark The graphs indicate nominal characteristics.

★ 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) 622 Mb/s: STM-4 (L-4.2, L-4.3)	Coaxial
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
NX8562 Series	−20 to +70	−40 to +85	20	20	1 550 *2	CW Light Source for external modulator	BFY
NX8563 Series	−20 to +70	−40 to +85	20	10	1 550 *2	CW Light Source for external modulator	BFY
NX8570 Series	−20 to +70	−40 to +85	20	20	1 550 *2	CW Light Source with λ monitoring PD	BFY
NX8571 Series	−20 to +70	−40 to +85	20	10	1 550 *2	CW Light Source with λ monitoring PD	BFY

***1** TYP.

***2** Available for DWDM Wavelengths based on ITU-T recommendations

REFERENCE

Document Name	Document No.
Optical semiconducrtor devices for fiberoptic communications Selection Guide	PX10161E
Opto-Electronics Devices Pamphlet	PX10160E
NEC semiconductor device reliability/quality control system *1	C11159E
Quality grades on NEC semiconductor devices *1	C11531E
SEMICONDUCTOR SELECTION GUIDE –Products and Packages– *1	X13769X

***1** Published by NEC Corporation

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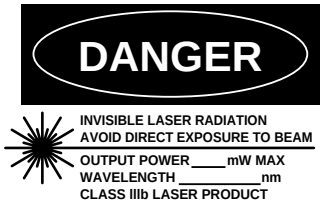
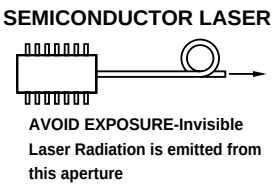
M8E 00.4-0110

SAFETY INFORMATION ON THIS PRODUCT





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	The product contains gallium arsenide, GaAs. GaAs vapor and powder are hazardous to human health if inhaled or ingested. • Do not destroy or burn the product. • Do not cut or cleave off any part of the product. • Do not crush or chemically dissolve the product. • Do not put the product in the mouth. Follow related laws and ordinances for disposal. The product should be excluded from general industrial waste or household garbage.
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.

►**For further information, please contact**

NEC Compound Semiconductor Devices, Ltd.
5th Sales Group, Sales Division TEL: +81-44-435-1588 FAX: +81-44-435-1579 E-mail: salesinfo@csd-nec.com

NEC Compound Semiconductor Devices Hong Kong Limited
Hong Kong Head Office TEL: +852-3107-7303 FAX: +852-3107-7309 E-mail: ncsd-hk@elhk.nec.com.hk
Taipei Branch Office TEL: +886-2-8712-0478 FAX: +886-2-2545-3859
Korea Branch Office TEL: +82-2-558-2120 FAX: +82-2-558-5209

NEC Electronics (Europe) GmbH http://www.ee.nec.de/
TEL: +49-211-6503-01 FAX: +49-211-6503-487

California Eastern Laboratories, Inc. http://www.cel.com/
TEL: +1-408-988-3500 FAX: +1-408-988-0279