PRELIMINARY DATA SHEET

NEC

LASER DIODE

NX8508 Series

1 470 TO 1 610 nm InGaAsP MQW-DFB LASER DIODE COAXIAL MODULE FOR 2.5 Gb/s, CWDM

DESCRIPTION

The NX8508 Series is a 1 470 to 1 610 nm Multiple Quantum Well (MQW) structured Distributed Feed-Back (DFB) laser diode coaxial module with an internal optical isolator.

These devices are ideal for 2.5 Gb/s CWDM application.

FEATURES

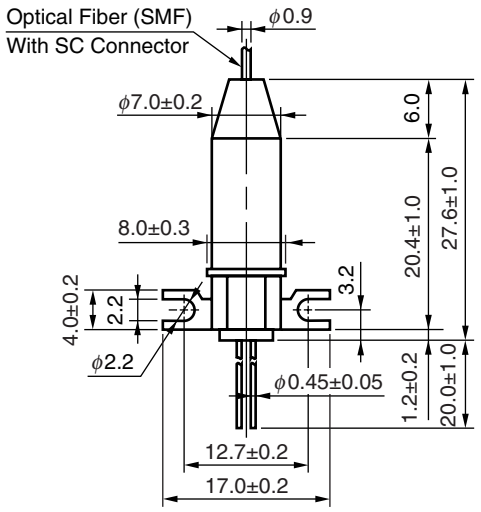
- Internal optical isolator
- Peak emission wavelength λ_p = 1 470 to 1 610 nm (Based on CWDM)
- Optical output power P_f = 2.0 mW
- ★ Operating case temperature range T_C = –20 to +85°C
- Side mode suppression ratio SMSR = 40 dB
- InGaAs monitor PIN-PD
- With SC-UPC connector
- Based on Telcordia reliability

Document No. PL10433EJ03V0DS (3rd edition)
Date Published March 2004 CP(K)
Printed in Japan

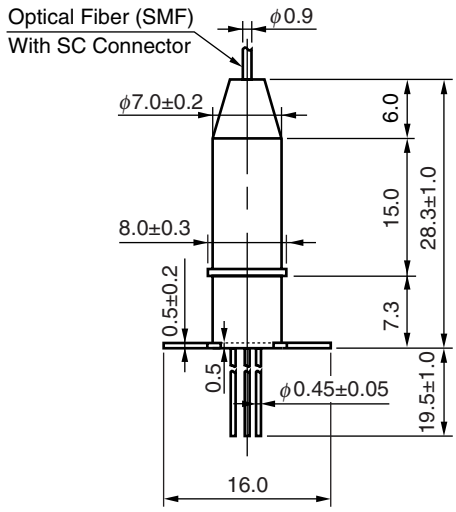
The mark ★ shows major revised points.

★ **PACKAGE DIMENSIONS (UNIT : mm)**

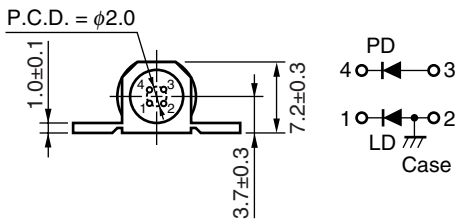
NX8508BMxx*1 -CC



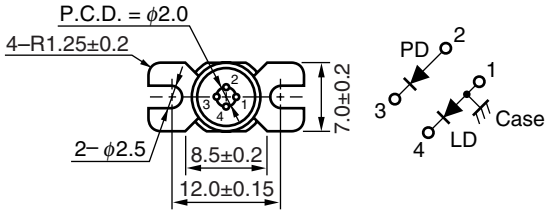
NX8508CGxx*1 -CC



PIN CONNECTIONS



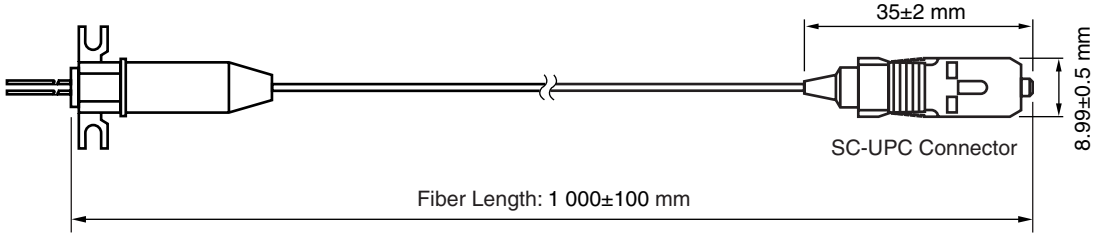
PIN CONNECTIONS



***1** Please refer to **ORDERING INFORMATION**.

OPTICAL FIBER CHARACTERISTICS

Parameter	Specification	Unit
Mode Field Diameter	9.5±1	μm
Cladding Diameter	125±2	μm
Maximum Cladding Noncircularity	2	%
Maximum Core/Cladding Concentricity	1.6	%
Outer Diameter	0.9±0.1	mm
Cut-off Wavelength	1 100 to 1 270	nm
Minimum Fiber Bending Radius	30	mm
Fiber Length	1 000±100	mm
Flammability	UL1581 VW-1	



ORDERING INFORMATION

Part Number	Flange Type	Available Connector
NX8508BMxx-CC	Flat Mount Flange	With SC-UPC Connector
★ NX8508CGxx-CC	Vertical Mount Flange	

NX8508□□xx-CC

- Connector code : With SC-UPC connector
- Wavelength code : Refer to **Table A**
- Package code : Refer to **PACKAGE DIMENSIONS**

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit
Optical Output Power from Fiber	P_f	5	mW
Forward Current of LD	I_F	150	mA
Reverse Voltage of LD	V_R	2.0	V
Forward Current of PD	I_F	2.0	mA
Reverse Voltage of PD	V_R	15	V
★ Operating Case Temperature	T_C	–20 to +85	°C
Storage Temperature	T_{stg}	–40 to +85	°C
Lead Soldering Temperature	T_{sld}	350 (3 sec.)	°C
Relative Humidity (noncondensing)	RH	85	%

★ ELECTRO-OPTICAL CHARACTERISTICS (T_C = –20 to +85°C, unless otherwise specified)

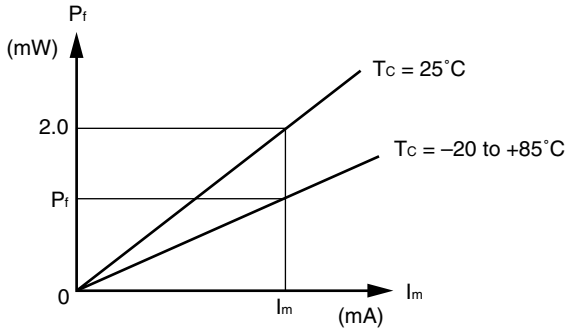
	Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
	Optical Output Power from Fiber	P_f	CW, T_C = 25°C, I_F = I_{th} + 20 mA		2.0		mW
	Operating Voltage	V_{op}	CW, P_f = 2.0 mW		1.1	1.6	V
	Threshold Current	I_{th}	T_C = 25°C		10	20	mA
★						50	
	Differential Efficiency	η_d	P_f = 2.0 mW, T_C = 25°C	0.07	0.1		W/A
			P_f = 2.0 mW	0.04			
★	Peak Emission Wavelength	λ_p	CW, P_f = 2.0 mW, T_C = 35°C	λ_p–2	λ_p [*1]	λ_p+2	nm
	Temperature Dependence of Peak Emission Wavelength	$\Delta\lambda/\Delta T$	CW	0.08	0.10	0.12	nm/°C
	Side Mode Suppression Ratio	SMSR	P_f = 2.0 mW	30	40		dB
	Rise Time	t_r	20-80%, P_f = 2.0 mW			100	ps
	Fall Time	t_f	80-20%, P_f = 2.0 mW			150	ps
	Monitor Current	I_m	V_R = 1.5 V, P_f = 1.0 mW	100	500	1 000	μA
★	Monitor Dark Current	I_D	V_R = 1.5 V, T_C = 25°C		0.1	10	nA
★			V_R = 1.5 V		10	100	
	Tracking Error [*2]	γ	I_m = const.	–1.0		1.0	dB

***1** Available Available for CWDM Wavelengths based on ITU-T recommendations
λ_p = 1 470, 1 490, 1 510, 1 530, 1 550, 1 570, 1 590, 1 610 nm
Please refer to **Table A**.

★ **Table A: CWDM wavelength code (@ Tc = 35°C)**

Wavelength Code	MIN. (nm)	TYP. (nm)	MAX. (nm)
47	1 468	1 470	1 472
49	1 488	1 490	1 492
51	1 508	1 510	1 512
53	1 528	1 530	1 532
55	1 548	1 550	1 552
57	1 568	1 570	1 572
59	1 588	1 590	1 592
61	1 608	1 610	1 612

★ ***2** Tracking Error: γ



$$\gamma = \left| 10 \log \frac{P_f}{2.0} \right| [dB]$$

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	−20 to +85	−40 to +85	10	2 *1	λ_p *2	2.5 Gb/s: CWDM	Coaxial
NX8509 Series	−20 to +85	−40 to +85	10	2 *1	1 550	2.5 Gb/s: STM-16 (L-16.2)	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** T_C = 35°C

Available for CWDM Wavelengths based on ITU-T recommendations

λ_p = 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

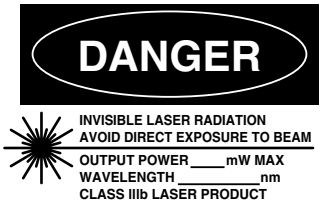
REFERENCE

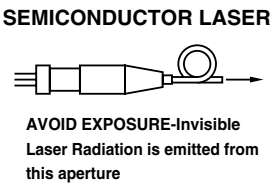
Document Name	Document No.
OPTICAL SEMICONDUCTOR DEVICES FOR FIBEROPTIC COMMUNICATIONS SELECTION GUIDE	PL10161E
Opto-Electronics Devices Pamphlet	PX10160E

- **The information in this document is current as of March, 2004. The information is subject to change without notice. For actual design-in, refer to the latest publications of NEC's data sheets or data books, etc., for the most up-to-date specifications of NEC semiconductor products. Not all products and/or types are available in every country. Please check with an NEC sales representative for availability and additional information.**
- No part of this document may be copied or reproduced in any form or by any means without prior written consent of NEC. NEC assumes no responsibility for any errors that may appear in this document.
- NEC does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from the use of NEC semiconductor products listed in this document or any other liability arising from the use of such products. No license, express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of NEC or others.
- Descriptions of circuits, software and other related information in this document are provided for illustrative purposes in semiconductor product operation and application examples. The incorporation of these circuits, software and information in the design of customer's equipment shall be done under the full responsibility of customer. NEC assumes no responsibility for any losses incurred by customers or third parties arising from the use of these circuits, software and information.
- While NEC endeavours to enhance the quality, reliability and safety of NEC semiconductor products, customers agree and acknowledge that the possibility of defects thereof cannot be eliminated entirely. To minimize risks of damage to property or injury (including death) to persons arising from defects in NEC semiconductor products, customers must incorporate sufficient safety measures in their design, such as redundancy, fire-containment, and anti-failure features.
- NEC semiconductor products are classified into the following three quality grades:
  "Standard", "Special" and "Specific". The "Specific" quality grade applies only to semiconductor products developed based on a customer-designated "quality assurance program" for a specific application. The recommended applications of a semiconductor product depend on its quality grade, as indicated below. Customers must check the quality grade of each semiconductor product before using it in a particular application.
  "Standard": Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots
  "Special": Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)
  "Specific": Aircraft, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems and medical equipment for life support, etc.
  The quality grade of NEC semiconductor products is "Standard" unless otherwise expressly specified in NEC's data sheets or data books, etc. If customers wish to use NEC semiconductor products in applications not intended by NEC, they must contact an NEC sales representative in advance to determine NEC's willingness to support a given application.
  (Note)
  (1) "NEC" as used in this statement means NEC Corporation, NEC Compound Semiconductor Devices, Ltd. and also includes its majority-owned subsidiaries.
  (2) "NEC semiconductor products" means any semiconductor product developed or manufactured by or for NEC (as defined above).

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	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.

▶**For further information, please contact**

NEC Compound Semiconductor Devices, Ltd. **http://www.ncsd.necel.com/**
E-mail: salesinfo@ml.ncsd.necel.com (sales and general)
techinfo@ml.ncsd.necel.com (technical)
5th Sales Group, Sales Division TEL: +81-44-435-1588 FAX: +81-44-435-1579

NEC Compound Semiconductor Devices Hong Kong Limited
E-mail: ncsd-hk@elhk.nec.com.hk (sales, technical and general)
Hong Kong Head Office TEL: +852-3107-7303 FAX: +852-3107-7309
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: +49-211-6503-0 FAX: +49-211-6503-1327

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

0401