DATA SHEET

NEC

LASER DIODE

NX8311UD

1 310 nm FOR LONG HAUL 2.5 Gb/s InGaAsP MQW-DFB LASER DIODE TOSA

DESCRIPTION

The NX8311UD is a 1 310 nm Multiple Quantum Well (MQW) structured Distributed Feed-Back (DFB) laser diode TOSA (transmitter optical sub-assembly) with InGaAs monitor PIN-PD in a receptacle type package designed for SFF/SFP transceiver with LC duplex receptacle.

FEATURES

★	• Applications	STM-16 (L-16.1), SONET OC-48 (LR)
	• Internal optical isolator	
	• Optical output power	P_f = 2.0 mW
	• Low threshold current	I_{th} = 10 mA TYP. @ T_C = 25°C
	• Wide operating temperature range	T_C = –20 to +85°C
	• InGaAs monitor PIN-PD	
★	• Small package	ϕ 3.8 mm TOSA (Total length 12.0 mm MAX.)

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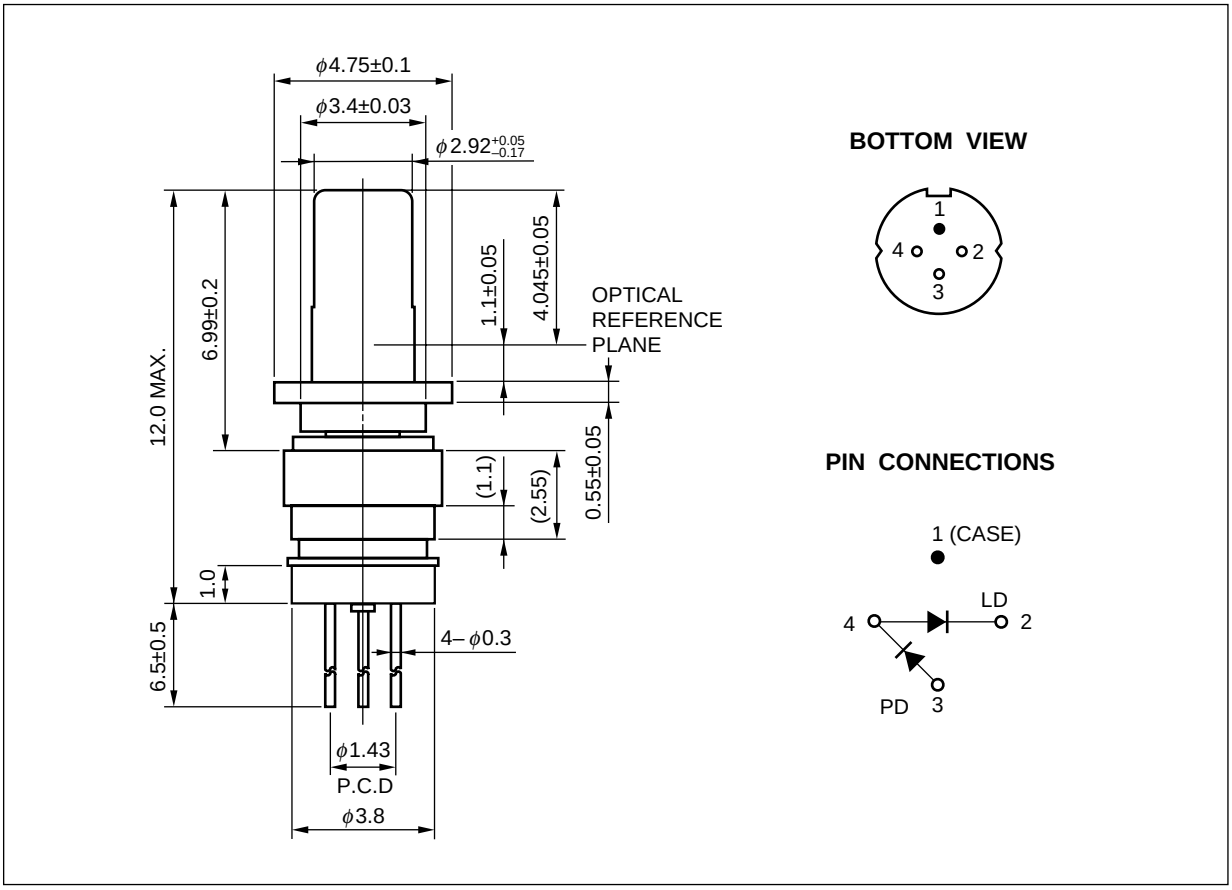
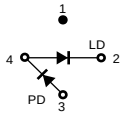
The mark ★ shows major revised points.

★ **PACKAGE DIMENSIONS (UNIT : mm)**



ORDERING INFORMATION

Part Number	Package	Pin Connections
NX8311UD	ϕ 3.8 mm TOSA	

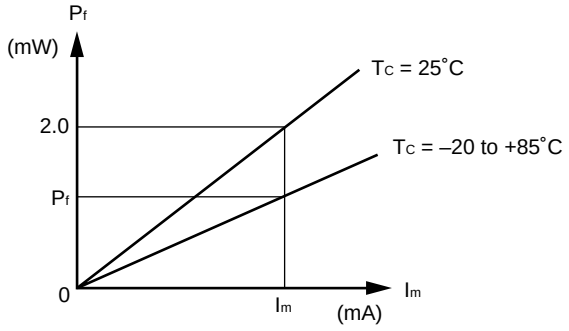
ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit
Optical Output Power from Fiber	P_f	5.0	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

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

	Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
	Operating Voltage	V_{op}	CW, P_f = 2.0 mW		1.2	1.6	V
	Threshold Current	I_{th}	CW,	2		50	mA
			CW, T_C = 25°C	4	10	20	
	Optical Output Power from Fiber	P_f	CW		2.0		mW
	Modulation Current	I_{mod}	CW, P_f = 2.0 mW	7		50	mA
★			CW, P_f = 2.0 mW, T_C = 25°C	9	20	30	
★	Differential Efficiency	η_d	CW, P_f = 2.0 mW	0.04		0.29	W/A
★			CW, P_f = 2.0 mW, T_C = 25°C	0.07	0.10	0.20	
	Peak Emission Wavelength	λ_p	CW, P_f = 2.0 mW, RMS (–20 dB)	1 280		1 335	nm
	Side Mode Suppression Ratio	SMSR	CW, P_f = 2.0 mW	30			dB
	Rise Time	t_r	$I_b = I_{th}$, 10-90%			200	ps
	Fall Time	t_f	$I_b = I_{th}$, 90-10%			200	ps
	Monitor Current	I_m	CW, V_R = 1.5 V, P_f = 1.0 mW	100		2 000	μA
	Monitor Dark Current	I_D	V_R = 1.5 V			500	nA
			V_R = 1.5 V, T_C = 25°C			50	
★	Tracking Error*1	γ	CW, I_m = const. (@ P_f = 2.0 mW)	–1.0		1.0	dB
	Connector Repeatability	–	With master pigtail	–1.0		1.0	dB
★	Optical Isolation	I_s	CW, P_f = 2.0 mW	20			dB

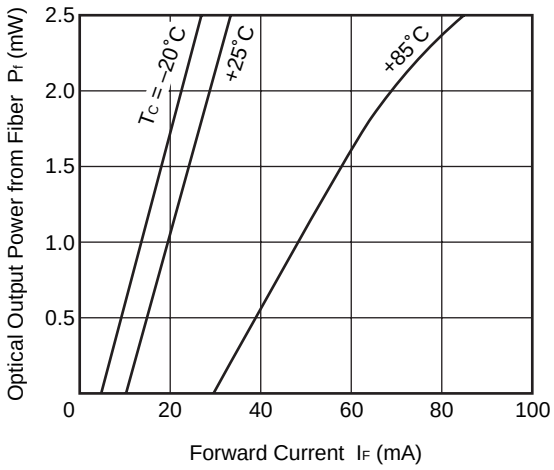
***1** Tracking Error: γ



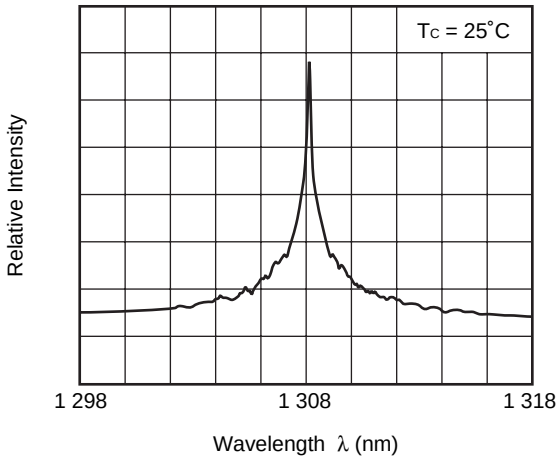
$$\gamma = \left| 10 \log \frac{P_f}{2.0} \right| \text{[dB]}$$

★ **TYPICAL CHARACTERISTICS (T_C = 25°C, unless otherwise specified)**

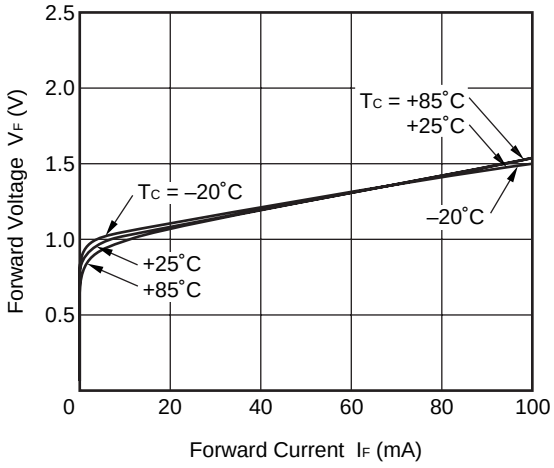
OPTICAL OUTPUT POWER FROM FIBER vs. FORWARD CURRENT



SPECTRUM

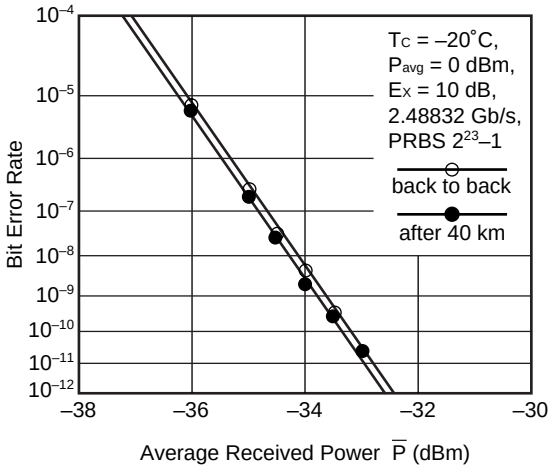


FORWARD VOLTAGE vs. FORWARD CURRENT

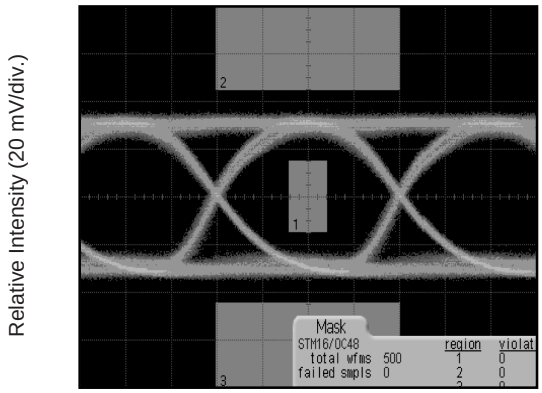


Remark The graphs indicate nominal characteristics.

ERROR RATE CHARACTERISTICS

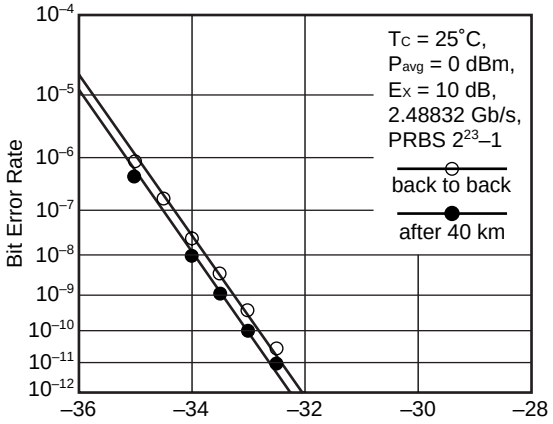


EYE DIAGRAM

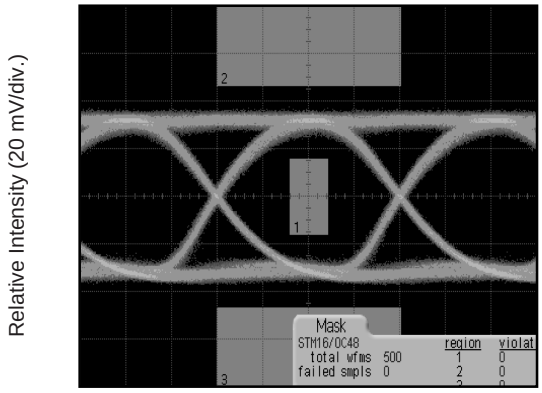


Back to Back (100 ps/div.)

ERROR RATE CHARACTERISTICS

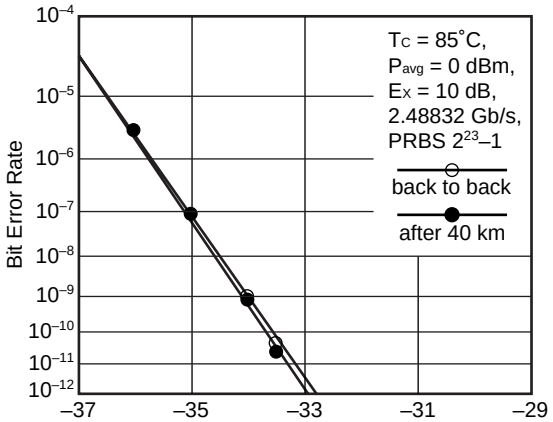


EYE DIAGRAM

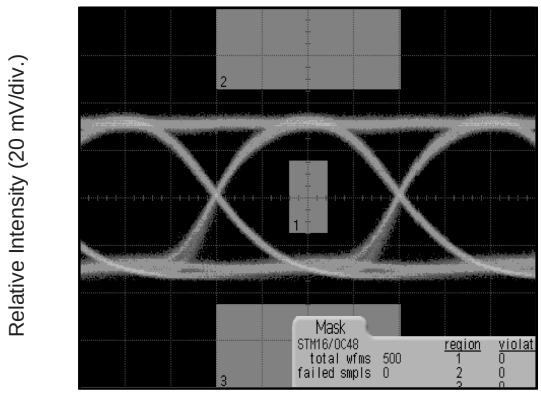


Back to Back (100 ps/div.)

ERROR RATE CHARACTERISTICS



EYE DIAGRAM



Back to Back (100 ps/div.)

Remark The graphs indicate nominal characteristics.

LD ϕ3.8 mm FP-TOSA PACKAGES FAMILY FOR OPTICAL FIBER COMMUNICATIONS

	Part Number	Absolute Maximum Ratings		Electro-Optical Characteristics				Application	Package
				@T_C = 25°C	@T_C				
		T_C (°C)	T_{stg} (°C)	I_{th} (mA)	P_f (mW)	λ_C (nm)			
				TYP.	TYP.	MIN.	MAX.		
	NX7312UA	–40 to +85	–40 to +85	8	0.2	1 274	1 356	156 Mb/s: STM-1 (S-1.1)	ϕ3.8 mm TOSA
								622 Mb/s: STM-4 (S-4.1)	
	NX7313UA	–40 to +85	–40 to +85	8	0.6	1 270	1 355	1.25 Gb/s: GbE	ϕ3.8 mm TOSA
	NX7314UA	–40 to +85	–40 to +85	8	1.0	1 263	1 360	156 Mb/s: STM-1 (L-1.1)	ϕ3.8 mm TOSA
★	NX7315UA	–40 to +85	–40 to +85	8	0.6	1 266	1 360	2.5 Gb/s: STM-16 (I-16)	ϕ3.8 mm TOSA

LD ϕ3.8 mm DFB-TOSA PACKAGES FAMILY FOR OPTICAL FIBER COMMUNICATIONS

	Part Number	Absolute Maximum Ratings		Electro-Optical Characteristics				Application	Package
				@T_C = 25°C	@T_C				
		T_C (°C)	T_{stg} (°C)	I_{th} (mA)	P_f (mW)	λ_p (nm)			
				TYP.	TYP.	MIN.	MAX.		
	NX8310UA	–40 to +85	–40 to +85	10	2.0	1 280	1 335	622 Mb/s: STM-4 (L-4.1)	ϕ3.8 mm TOSA
	NX8311UD	–20 to +85	–40 to +85	10	2.0	1 280	1 335	2.5 Gb/s: STM-16 (L-16.1)	ϕ3.8 mm TOSA
★	NX8312UA	–20 to +85	–40 to +85	10	1.0	1 280	1 335	2.5 Gb/s: STM-16 (S-16.1)	ϕ3.8 mm TOSA
	NX8312UD	–20 to +85	–40 to +85	10	1.0	1 280	1 335	2.5 Gb/s: STM-16 (S-16.1)	ϕ3.8 mm TOSA

REFERENCE

Document Name	Document No.
OPTICAL SEMICONDUCTOR DEVICES FOR FIBEROPTIC COMMUNICATIONS SELECTION GUIDE	PX10161E
Opto-Electronics Devices Pamphlet	PX10160E

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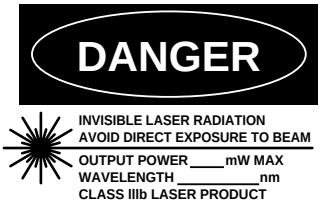
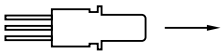
SAFETY INFORMATION ON THIS PRODUCT



SEMICONDUCTOR LASER



AVOID EXPOSURE-Invisible Laser Radiation is emitted from this aperture

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@csd-nec.com (sales and general)
techinfo@csd-nec.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: +49-211-6503-01 FAX: +49-211-6503-487

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

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