CEL

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

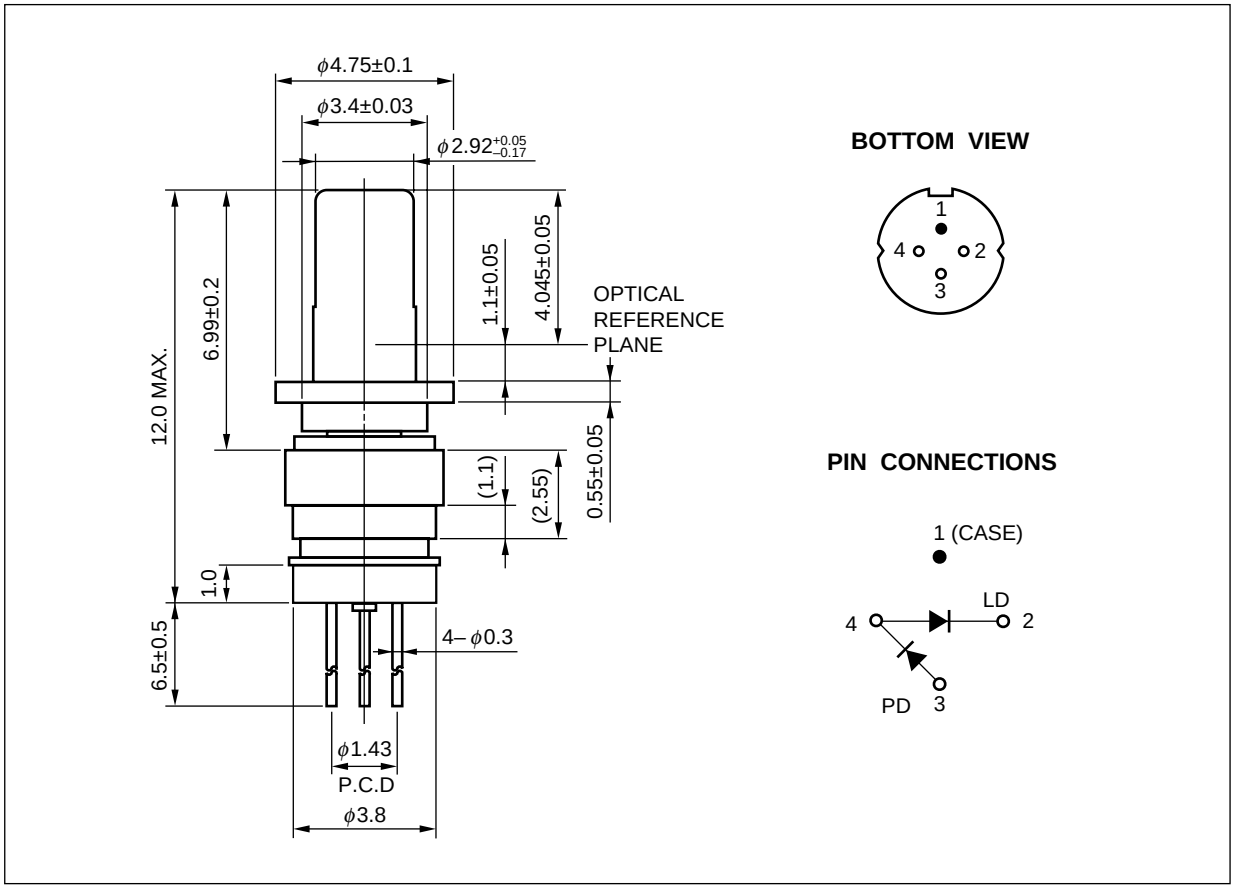
★ • Applications — STM-16 (L-16.1), SONET OC-48 (LR)
- Internal optical isolator
- Optical output power — P_f = 2.0 mW
- Low threshold current — I_{th} = 10 mA TYP. @ T_C = 25°C
- Wide operating temperature range — T_C = –20 to +85°C
- InGaAs monitor PIN-PD

★ • Small package — ϕ3.8 mm TOSA (Total length 12.0 mm MAX.)

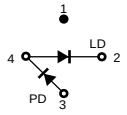
Document No. PL10181EJ02V0DS (2nd edition)
Date Published July 2003 CP (K)

The mark ★ shows major revised points.

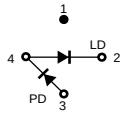
★ **PACKAGE DIMENSIONS (UNIT: mm)**



ORDERING INFORMATION (Solder Contains Lead)

Part Number	Package	Pin Connections
NX8311UD	ϕ 3.8 mm TOSA	

ORDERING INFORMATION (Pb-Free)

Part Number	Package	Pin Connections
NX8311UD-AZ*	ϕ 3.8 mm TOSA	

***NOTE:**

Please refer to the last page of this data sheet, “Compliance with EU Directives” for PB-Free RoHS Compliance Information.

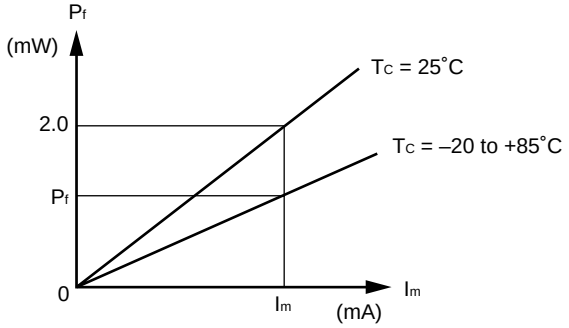
ABSOLUTE MAXIMUM RATINGS

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

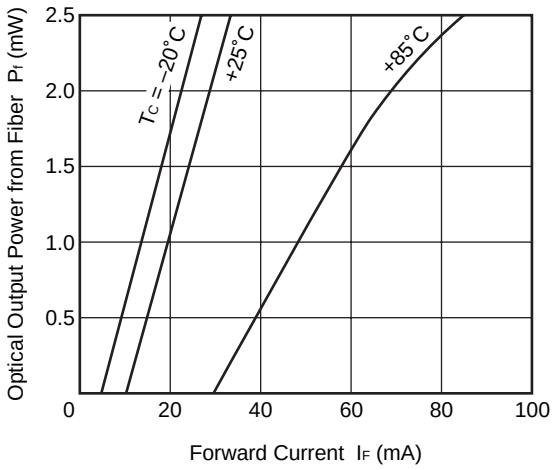
***1** Tracking Error: γ



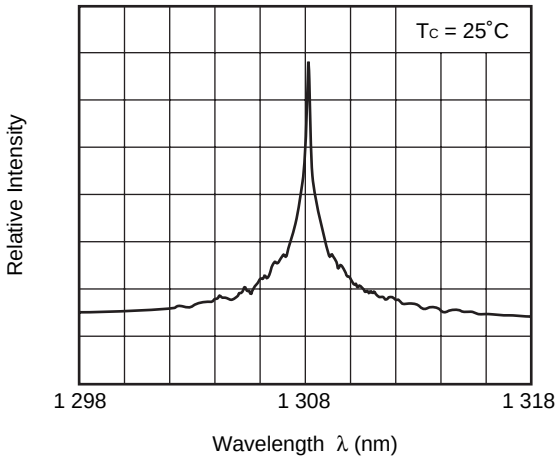
$$\gamma = \left| 10 \log \frac{P_f}{2.0} \right| [dB]$$

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

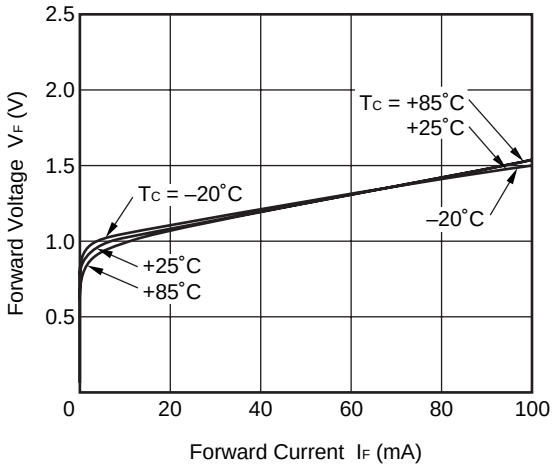
OPTICAL OUTPUT POWER FROM FIBER vs. FORWARD CURRENT



SPECTRUM

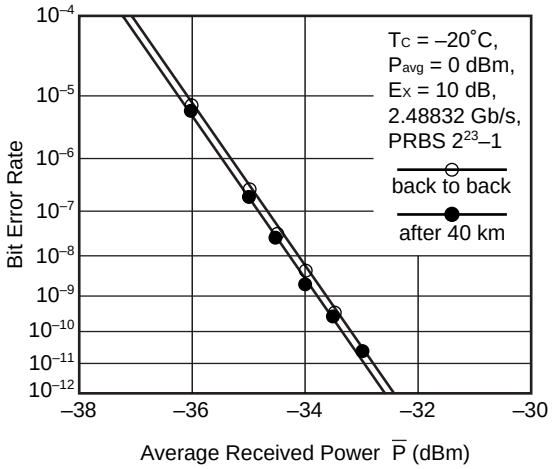


FORWARD VOLTAGE vs. FORWARD CURRENT

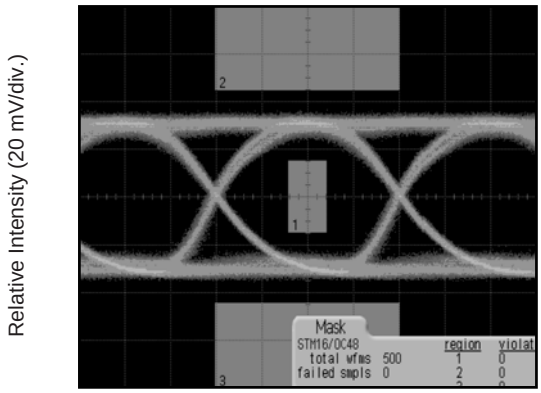


Remark The graphs indicate nominal characteristics.

ERROR RATE CHARACTERISTICS

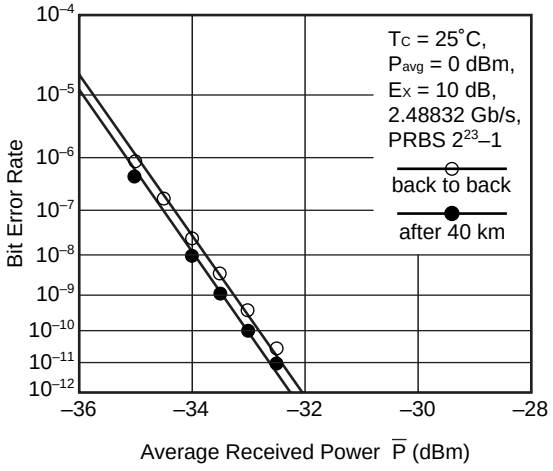


EYE DIAGRAM

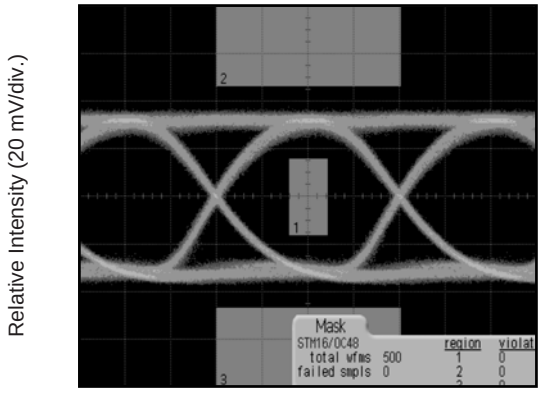


Back to Back (100 ps/div.)

ERROR RATE CHARACTERISTICS

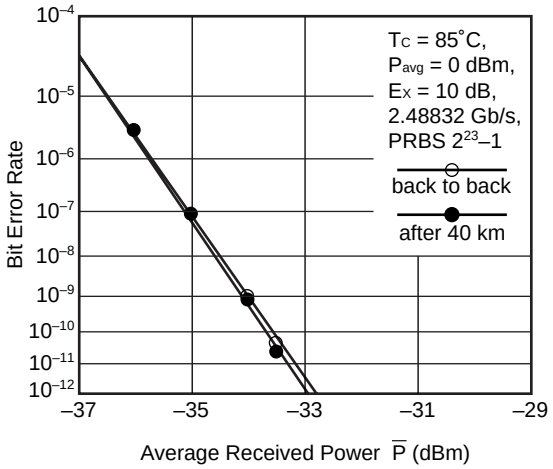


EYE DIAGRAM

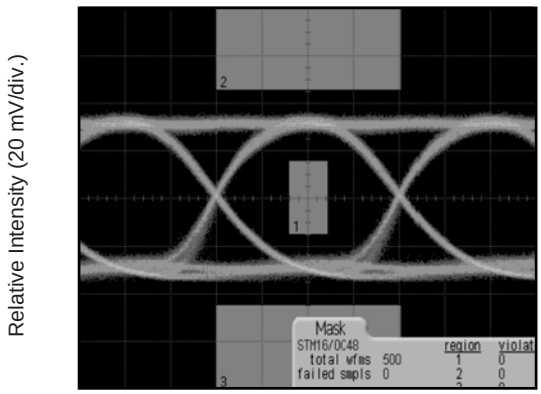


Back to Back (100 ps/div.)

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-AZ*	−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-AZ*	−40 to +85	−40 to +85	8	0.6	1 270	1 355	1.25 Gb/s: GbE	ϕ3.8 mm TOSA
NX7314UA-AZ*	−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-AZ*	−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

***NOTE:**

Please refer to the last page of this data sheet, “Compliance with EU Directives” for PB-Free RoHS Compliance Information.

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-AZ*	−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-AZ*	−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-AZ*	−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-AZ*	−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

***NOTE:**

Please refer to the last page of this data sheet, “Compliance with EU Directives” for PB-Free RoHS Compliance Information.

REFERENCE

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

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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.