

PRELIMINARY DATA SHEET

NEC

**LASER DIODE
NX8330RA**

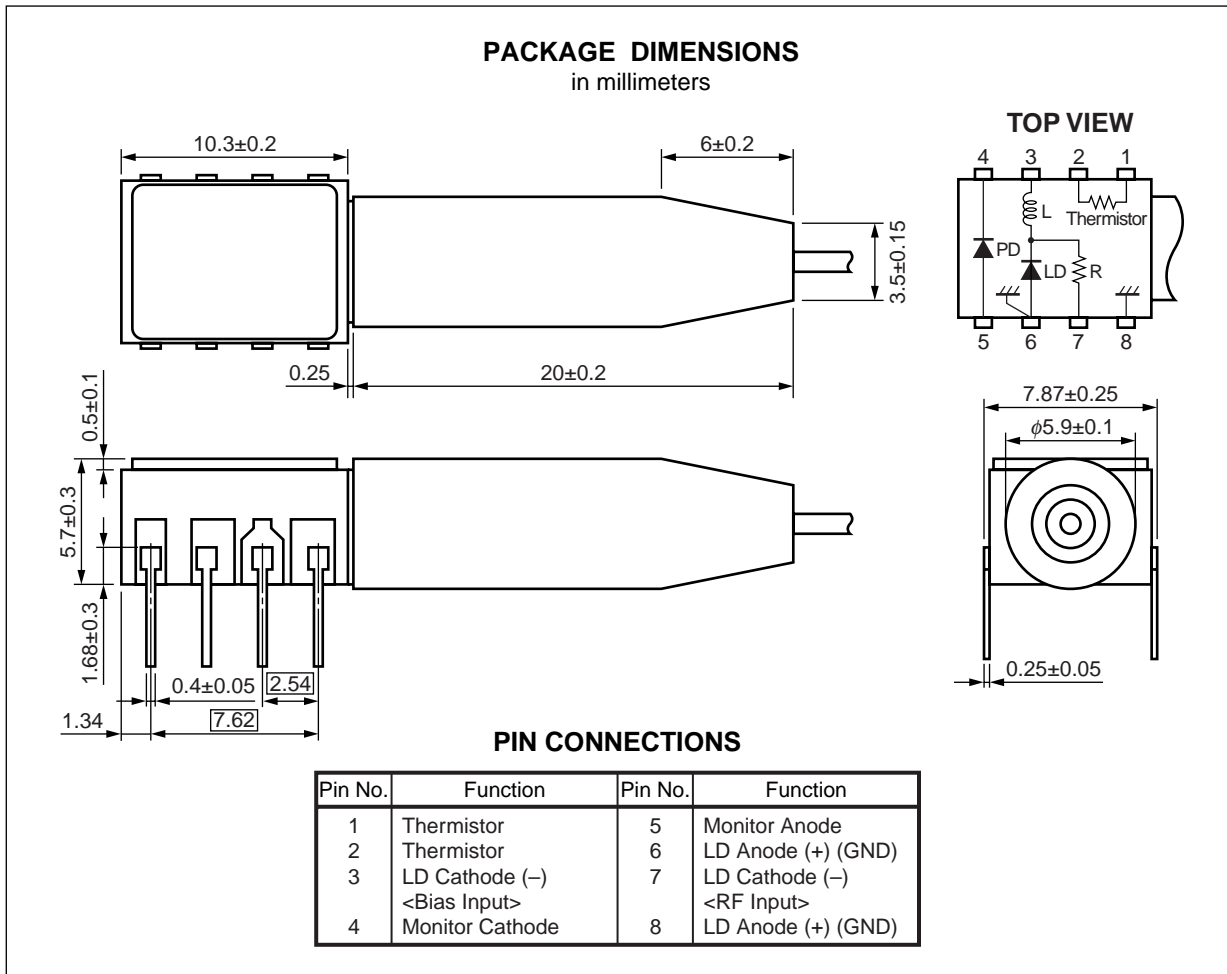
**1 310 nm OPTICAL FIBER COMMUNICATIONS
InGaAsP STRAINED MQW-DFB LASER DIODE
MINI-DIL PIGTAILED MODULE FOR 2.5 Gb/s**

DESCRIPTION

The NX8330RA is a 1 310 nm $\lambda/4$ -phase-shifted DFB (Distributed Feed-Back) laser diode mini dual in-line (DIL) pigtailed module with internal optical isolator. Newly developed strained Multiple Quantum Well (st-MQW) structure is adopted to achieve stable dynamic single longitudinal mode operation over wide temperature range of 0 to +70 °C. It is designed for STM-16 applications.

FEATURES

- High-speed response $t_r = 40 \text{ ps}, t_r = 100 \text{ ps}$
- Peak emission wavelength $\lambda_p = 1 \text{ 310 nm}$
- Wide operating temperature range $T_c = 0 \text{ to } +70 \text{ }^\circ\text{C}$
- Input impedance 25Ω
- Internal optical isolator
- $\lambda/4$ -phase-shifted DFB
- InGaAs monitor PIN-PD



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ORDERING INFORMATION

Part Number	Available Connector
NX8330RA	Without Connector
NX8330RA-BA	With FC-PC Connector
NX8330RA-CA	With SC-PC Connector

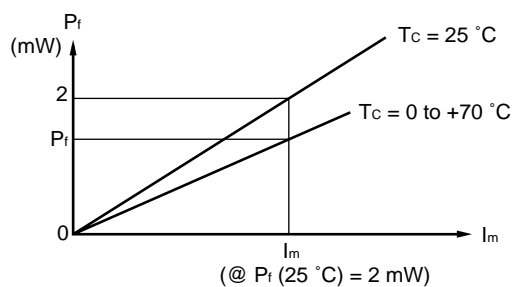
ABSOLUTE MAXIMUM RATINGS (T_c = 0 to +70 °C, unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Forward Current of LD	I _F	150	mA
Optical Output Power from Fiber	P _f	5.0	mW
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	0 to +70	°C
Storage Temperature	T _{stg}	-40 to +85	°C
Lead Soldering Temperature (10 s)	T _{slid}	260	°C

★ ELECTRO-OPTICAL CHARACTERISTICS (T_c = 0 to +70 °C, unless otherwise specified)

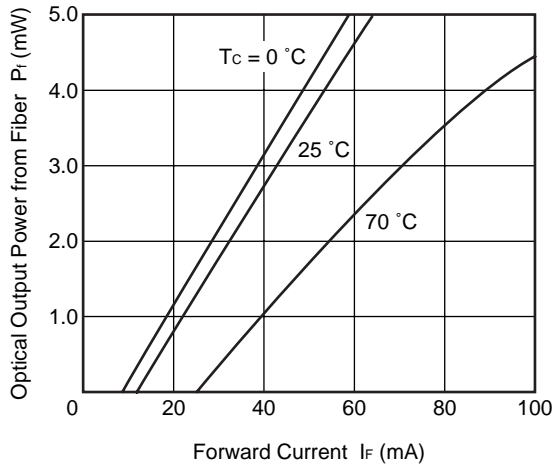
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Operating Voltage	V _{op}	P _f = 2 mW, T _c = 25 °C	0.9	1.1	1.4	V
Optical Output Power from Fiber	P _f	I _f = I _{th} + 40 mA	2.0			mW
Threshold Current	I _{th}	T _c = 25 °C		15	25	mA
					45	
Differential Efficiency from Fiber	η _d	P _f = 2 mW, T _c = 25 °C	0.07	0.10		W/A
		P _f = 2 mW	0.03			
Temperature Dependence of Differential Efficiency from Fiber	Δη _d	$\Delta\eta_d = 10 \log \frac{\eta_d(T_c = 70\text{ }^\circ\text{C})}{\eta_d(T_c = 25\text{ }^\circ\text{C})}$	-3.5	-2.5		dB
Peak Emission Wavelength	λ _p	P _f = 1 mW, I _b = I _{th} , T _c = 25 °C	1 292	1 310	1 326	nm
		P _f = 1 mW, I _b = I _{th}	1 290		1 330	
Side Mode Suppression Ratio	SMSR	2.5 Gb/s-NRZ, PN 1/2	30	40		dB
Rise Time	t _r	10-90 %, I _b = 0.9 × I _{th}		40	125	ps
Fall Time	t _f	90-10 %, I _b = 0.9 × I _{th}		100	200	ps
Monitor Current	I _m	V _R = 5 V, P _f = 2 mW	50		2 000	μA
Monitor Dark Current	I _d	V _R = 5 V, T _c = 25 °C		0.1	5.0	nA
Monitor PD Terminal Capacitance	C _t	V _R = 5 V		1.0	1.5	pF
Tracking Error	γ ⁻¹	I _m = const.			1.0	dB
Thermistor Resistance	R	T _c = 25 °C	9.5	10.0	10.5	kΩ
B Constant	B		3 300	3 400	3 500	K

*1 $\gamma = \left| 10 \log \frac{P_f}{2 \text{ mW}} \right|$

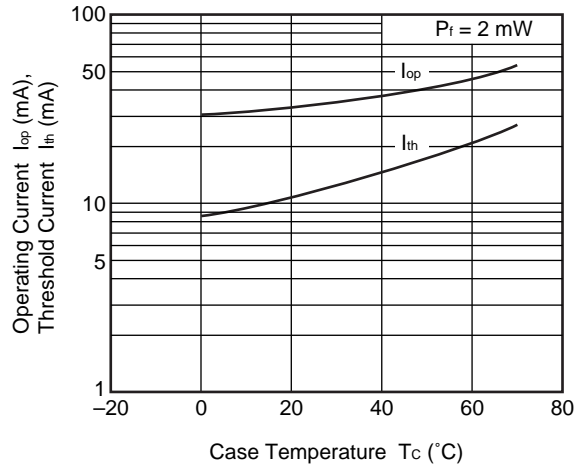


★ TYPICAL CHARACTERISTICS ($T_c = 25\text{ }^\circ\text{C}$, unless otherwise specified)

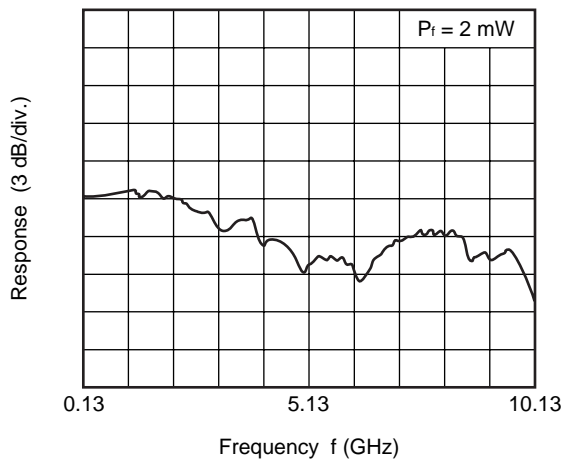
OPTICAL OUTPUT POWER FROM FIBER vs. FORWARD CURRENT



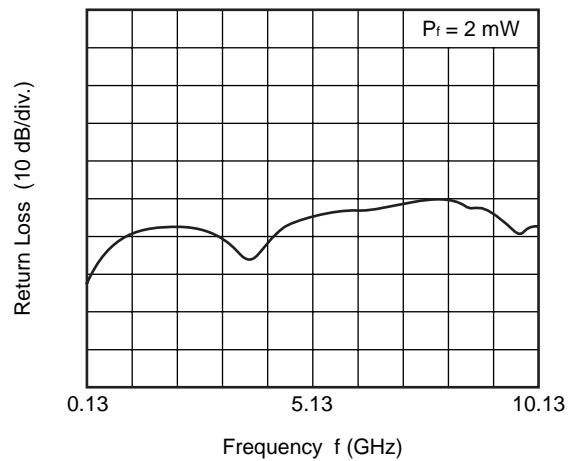
OPERATING CURRENT AND THRESHOLD CURRENT vs. CASE TEMPERATURE



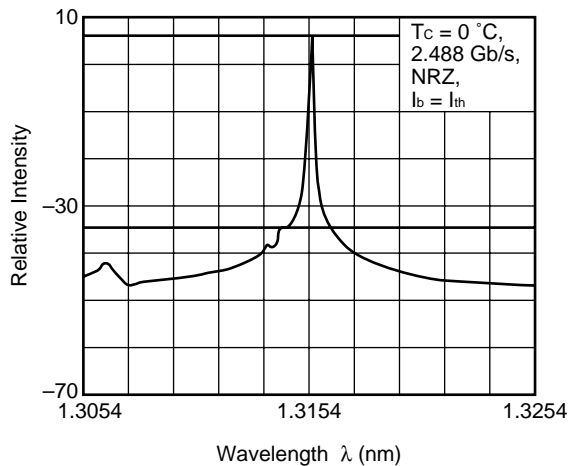
FREQUENCY RESPONSE (S21)



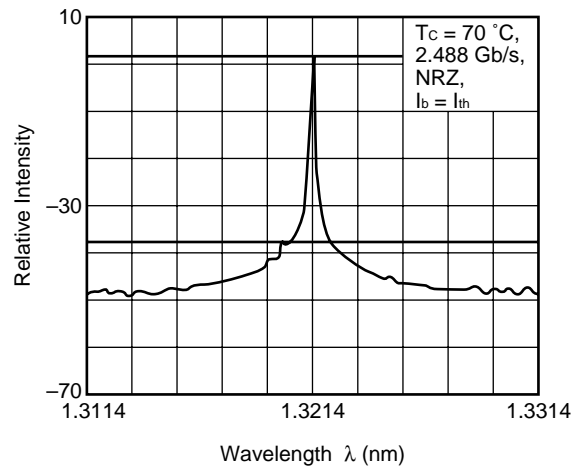
RETURN LOSS CHARACTERISTICS (S11)

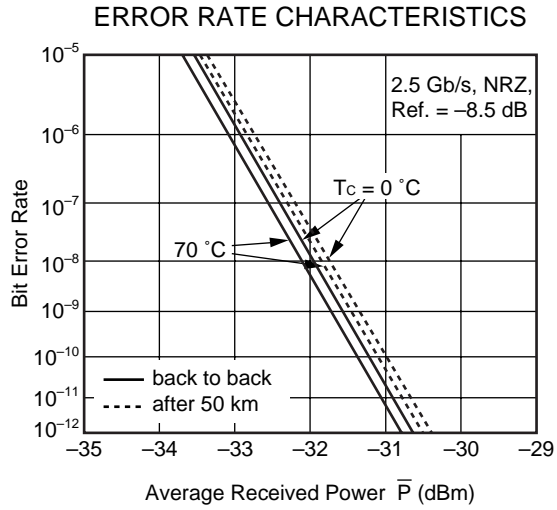


LONGITUDINAL MODE



LONGITUDINAL MODE





Remark The graphs indicate nominal characteristics.

★ DFB-LD FAMILY FOR TELECOM

Part Number	Absolute Maximum Ratings		Typical Characteristics			SDH Application	Package
	T _c (°C)	T _{stg} (°C)	I _{th} (mA)	P _r (mW)	λ _p (nm)		
			TYP.	MIN.	TYP.		
NDL7603P Series	-40 to +85	-40 to +85	15	2	1 310	≤ STM-4 : 622 Mb/s	Coaxial
NDL7620P Series	0 to +70	-40 to +85	45 (MAX.)	2	1 310	≤ STM-16: 2.5 Gb/s	Coaxial
NX8330RA	0 to +70	-40 to +85	45 (MAX.)	2	1 310	≤ STM-16: 2.5 Gb/s	Mini-DIL
NX8501 Series	0 to +65	-40 to +85	20	2	1 510	Telemetry	Coaxial
NX8561JD	0 to +65	-40 to +85	20	3	1 510	Telemetry	DIP
NDL7701P Series	-20 to +85	-40 to +85	15	2	1 550	≤ STM-4 : 622 Mb/s	Coaxial
NDL7705P Series	-40 to +85	-40 to +85	15	2	1 550	≤ STM-4 : 622 Mb/s	Coaxial
NX8562LB	-20 to +65	-40 to +85	20	20	1 550 ^{*1}	CW Light Source for external modulator	BFY
NX8563LB	-20 to +65	-40 to +85	20	10	ITU-T ^{*2}	CW Light Source for external modulator	BFY
NDL7910P	-20 to +70	-40 to +85	7	0.5	ITU-T ^{*2}	≤ STM-16: 2.5 Gb/s EA modulator integrated DFB-LD	BFY
NX7660JC	-20 to +70	-40 to +85	30 (MAX.)	5	1 625	Telemetry	DIP

*1 Wavelength selectable for ITU-T standards upon request and based on D-WDM standards

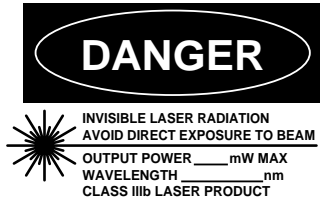
*2 Wavelength selectable for ITU-T and D-WDM standards

REFERENCE

Document Name	Document No.
NEC semiconductor device reliability/quality control system	C11159E
Quality grades on NEC semiconductor devices	C11531E
Semiconductor device mounting technology manual	C10535E
★ SEMICONDUCTORS SELECTION GUIDE Products & Packages (CD-ROM)	X13769X

CAUTION

Within this device there exists GaAs (Gallium Arsenide) material which is a harmful substance if ingested. Please do not under any circumstances break the hermetic seal.

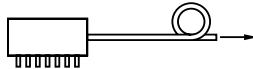


DANGER

INVISIBLE LASER RADIATION
AVOID DIRECT EXPOSURE TO BEAM

OUTPUT POWER _____mW MAX
WAVELENGTH _____nm
CLASS IIIb LASER PRODUCT

SEMICONDUCTOR LASER



AVOID EXPOSURE-Invisible
Laser Radiation is emitted from
this aperture

NEC Corporation
NEC Building, 7-1, Shiba 5-chome,
Minato-ku, Tokyo 108-01, Japan

Type number: _____
Manufactured: _____
Serial Number: _____

This product conforms to FDA
regulations as applicable
to standards 21 CFR Chapter 1.
Subchapter J.

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