

**1 310 nm InGaAsP MQW-DFB LASER DIODE  
COAXIAL MODULE FOR 2.5 Gb/s****DESCRIPTION**

The NX8300BE-CC and NX8300CE-CC are 1 310 nm Distributed Feed-Back (DFB) laser diode coaxial modules with an internal optical isolator. Multiple Quantum Well (MQW) structure is adopted to achieve stable dynamic single longitudinal mode operation over a wide temperature range of 0 to +75 °C.

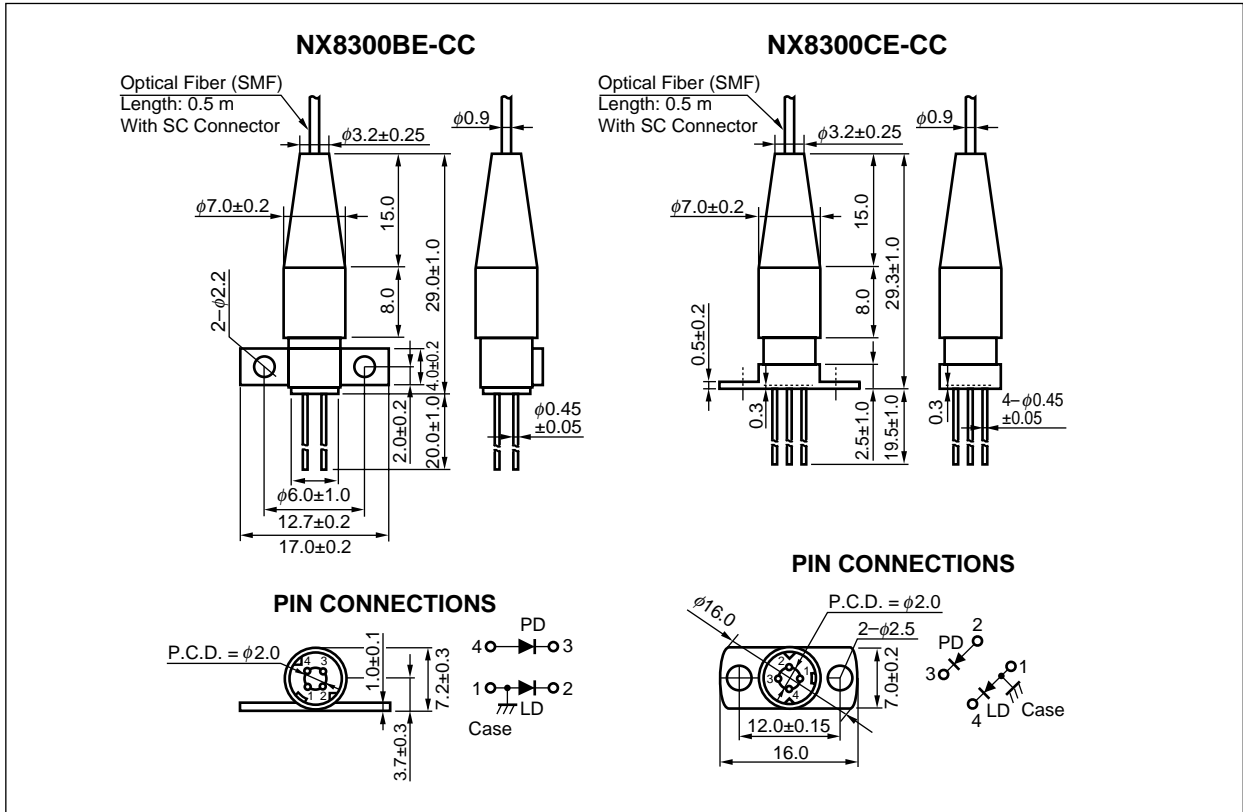
These modules are ideal as a light source for Synchronous Digital Hierarchy (SDH) system, STM-16, short-haul S-16.1 and long-haul L-16.1 ITU-T recommendations.

**FEATURES**

- Internal optical isolator
- High-speed response  $t_r = 40 \text{ ps}$ ,  $t_f = 100 \text{ ps}$
- Peak emission wavelength  $\lambda_p = 1\,310 \text{ nm}$
- Optical output power  $P_r = 2.0 \text{ mW}$
- Wide operating temperature range  $T_c = 0 \text{ to } +75 \text{ }^\circ\text{C}$
- InGaAs monitor PIN-PD
- With SC-UPC connector
- Based on Telcordia reliability

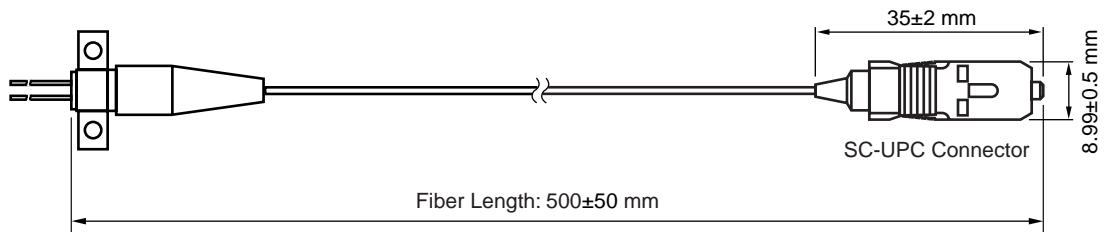
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PACKAGE DIMENSIONS (UNIT : mm)



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	500±50	mm
Flammability	UL1581 VW-1	



**ORDERING INFORMATION**

Part Number	Available Connector	Flange Type
NX8300BE-CC	With SC-UPC Connector	Flat Mount Flange
NX8300CE-CC		Vertical Mount Flange

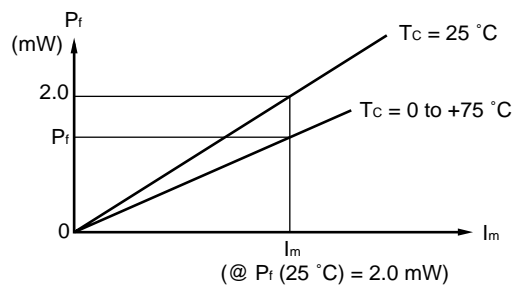
**ABSOLUTE MAXIMUM RATINGS**

Parameter	Symbol	Ratings	Unit
Optical Output Power from Fiber	$P_i$	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	$T_c$	0 to +75	°C
Storage Temperature	$T_{stg}$	-40 to +85	°C
Lead Soldering Temperature	$T_{sld}$	260 (10 sec.)	°C
Relative Humidity (noncondensing)	RH	85	%

ELECTRO-OPTICAL CHARACTERISTICS (T<sub>c</sub> = 0 to +75 °C, unless otherwise specified)

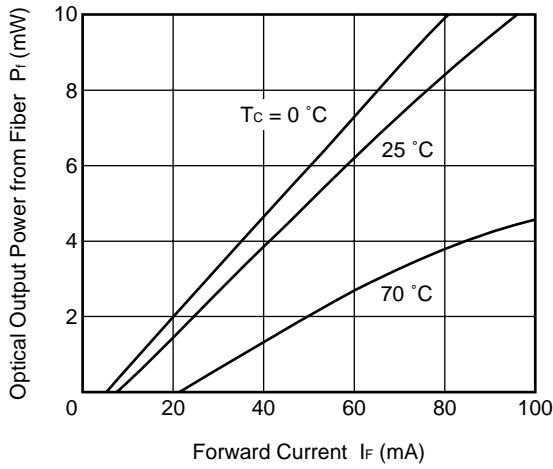
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Optical Output Power from Fiber	P <sub>f</sub>	CW		2.0		mW
Operating Voltage	V <sub>op</sub>	P <sub>f</sub> = 2.0 mW		1.2	1.6	V
Threshold Current	I <sub>th</sub>	T <sub>c</sub> = 25 °C		15	25	mA
					45	
Threshold Output Power	P <sub>th</sub>	I <sub>f</sub> = I <sub>th</sub>			50	μW
Modulation Current	I <sub>mod</sub>	P <sub>f</sub> = 2.0 mW, T <sub>c</sub> = 25 °C	11	20	35	mA
		P <sub>f</sub> = 2.0 mW	10		40	
Differential Efficiency	η <sub>d</sub>	P <sub>f</sub> = 2.0 mW, T <sub>c</sub> = 25 °C	0.060	0.100	0.150	W/A
		P <sub>f</sub> = 2.0 mW	0.050		0.200	
Temperature Dependence of Differential Efficiency	Δη <sub>d</sub>	$\Delta\eta_d = 10 \log \frac{\eta_d (@ T_c \text{ } ^\circ\text{C})}{\eta_d (@ 25 \text{ } ^\circ\text{C})}$	-3	-1.6		dB
Kink	kink	P <sub>f</sub> = Up to 2.4 mW			±20	%
Peak Emission Wavelength	λ <sub>p</sub>	P <sub>f</sub> = 2.0 mW	1 285	1 310	1 330	nm
Temperature Dependence of Peak Emission Wavelength	Δλ/ΔT			0.09	0.1	nm/°C
Spectral Width	Δλ	P <sub>f</sub> = 2.0 mW, -20 dB down width		0.1	1.0	nm
Side Mode Suppression Ratio	SMSR	P <sub>f</sub> = 2.0 mW	30	40		dB
Relaxation Oscillation Frequency	f <sub>r</sub>	P <sub>f</sub> = 2.0 mW		8.0		GHz
Rise Time	t <sub>r</sub>	10-90 %, P <sub>pk</sub> = 2.0 mW, I <sub>f</sub> = I <sub>th</sub>		40	125	ps
Fall Time	t <sub>f</sub>	90-10 %, P <sub>pk</sub> = 2.0 mW, I <sub>f</sub> = I <sub>th</sub>		100	200	ps
Monitor Current	I <sub>m</sub>	V <sub>R</sub> = 5 V, P <sub>f</sub> = 2.0 mW	100	500	1 000	μA
Monitor Dark Current	I <sub>D</sub>	V <sub>R</sub> = 5 V, T <sub>c</sub> = 25 °C		0.1	50	nA
		V <sub>R</sub> = 5 V		10	500	
Monitor PD Terminal Capacitance	C <sub>t</sub>	V <sub>R</sub> = 5 V, f = 1 MHz		1.0	20	pF
Linearity	LIN <sub>m</sub>	V <sub>R</sub> = 5 V, P <sub>f</sub> = 0.2 to 2.0 mW			10	%
Tracking Error	γ <sup>-1</sup>	I <sub>m</sub> = const.		0.5	1.0	dB

\*1  $\gamma = \left| 10 \log \frac{P_f}{2.0 \text{ mW}} \right|$

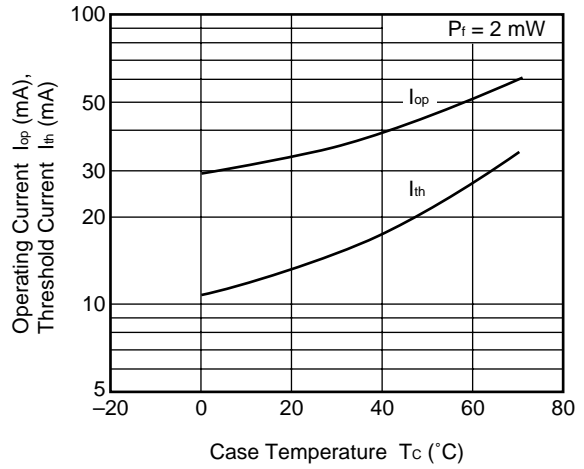


TYPICAL CHARACTERISTICS ( $T_c = 25\text{ }^\circ\text{C}$ , unless otherwise specified)

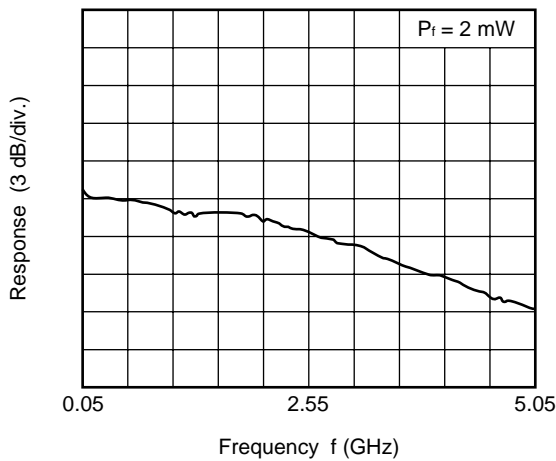
OPTICAL OUTPUT POWER FROM FIBER vs. FORWARD CURRENT



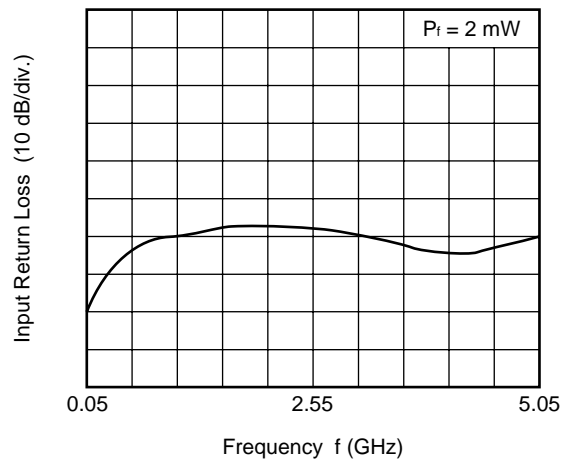
OPERATING CURRENT AND THRESHOLD CURRENT vs. CASE TEMPERATURE



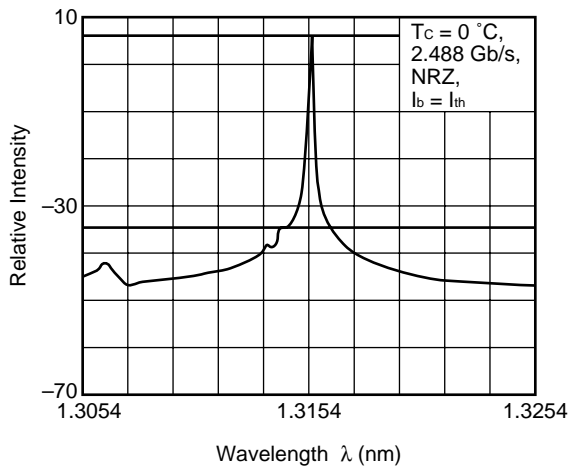
FREQUENCY RESPONSE ( $S_{21}$ )



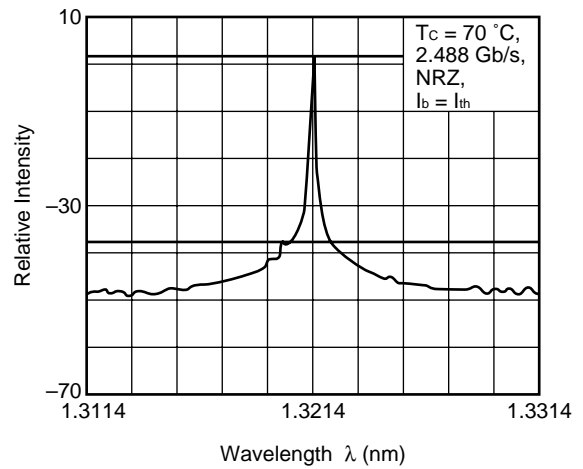
INPUT RETURN LOSS CHARACTERISTICS ( $S_{11}$ )



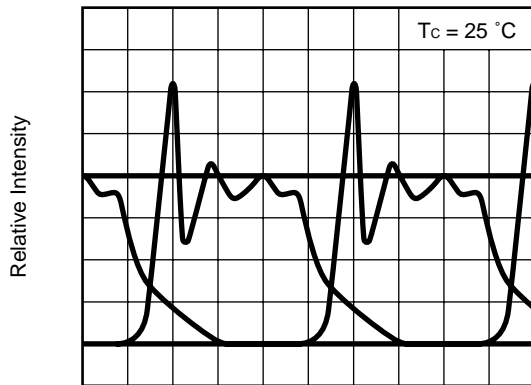
LONGITUDINAL MODE



LONGITUDINAL MODE

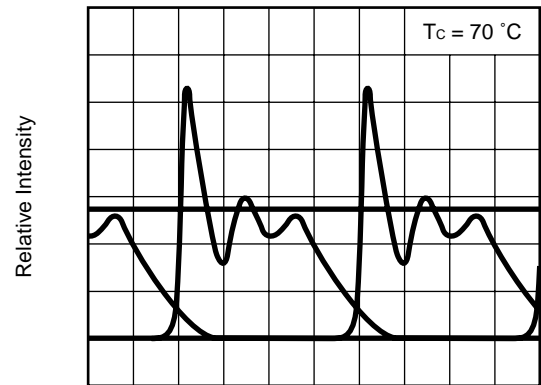


EYE DIAGRAM



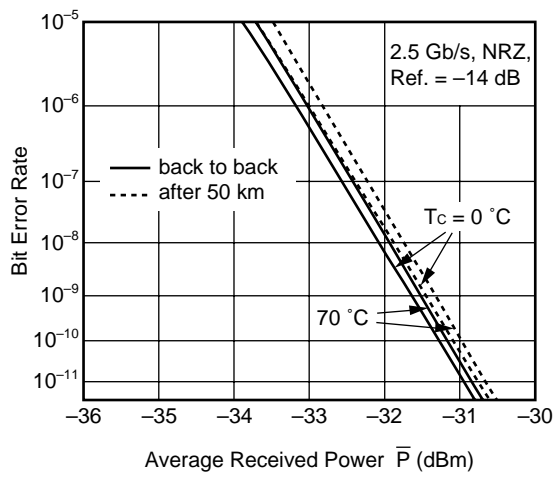
Time Base (100 ps/div.)

EYE DIAGRAM



Time Base (100 ps/div.)

ERROR RATE CHARACTERISTICS



**Remark** The graphs indicate nominal characteristics.

DFB-LD FAMILY

Part Number	Absolute Maximum Ratings		Electro-Optical Characteristics (T <sub>c</sub> = 25 °C)			Application	Package
	T <sub>c</sub> (°C)	T <sub>stg</sub> (°C)	I <sub>th</sub> (mA)	P <sub>f</sub> (mW)	λ <sub>p</sub> (nm)		
			TYP.	MIN.	TYP.		
NX8300BE-CC NX8300CE-CC	0 to +75	-40 to +85	15	2	1 310	2.5 Gb/s: STM-16 (S-16.1, L-16.1)	Coaxial
NX8303BG-CC	-10 to +85	-40 to +85	15	2 <sup>*1</sup>	1 310	622 Mb/s: STM-4 (L-4.1)	Coaxial
NX8503BG-CC	-10 to +85	-40 to +85	15	2 <sup>*1</sup>	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	1 550	622 Mb/s: STM-4 (L-4.2, L-4.3)	Coaxial
NX8560LJ-CC	-10 to +70	-40 to +85	6	-2 dBm	1 550 <sup>*2</sup>	≤ 10 Gb/s: STM-64	BFY with GPO
NX8562LB	-20 to +65	-40 to +85	20	20	1 550 <sup>*2</sup>	CW Light Source for external modulator	BFY
NX8563LB	-20 to +65	-40 to +85	20	10	1 550 <sup>*2</sup>	CW Light Source for external modulator	BFY
NX8564LE-CC	-20 to +70	-40 to +85	7	0.5	1 550 <sup>*2</sup>	2.5 Gb/s: STM-16 EA modulator integrated	BFY
NX8565LE-CC	-20 to +70	-40 to +85	7	0.5	1 550 <sup>*2</sup>	2.5 Gb/s: STM-16 EA modulator integrated	BFY
NX8570SA	-20 to +70	-40 to +85	20	20	1 550 <sup>*2</sup>	CW Light Source with λ monitoring PD	BFY

\*1 TYP.

\*2 Available for DWDM Wavelength based on ITU-T recommendation



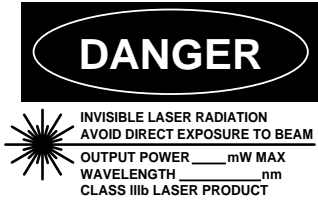
**REFERENCE**

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
SEMICONDUCTOR SELECTION GUIDE Products & Packages (CD-ROM)	X13769X

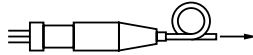
[MEMO]

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.



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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