

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

The NX7300BA-CC and NX7300CH-CC are 1 310 nm Multiple Quantum Well (MQW) structured Fabry-Perot (FP) laser diode coaxial modules with single mode fiber.

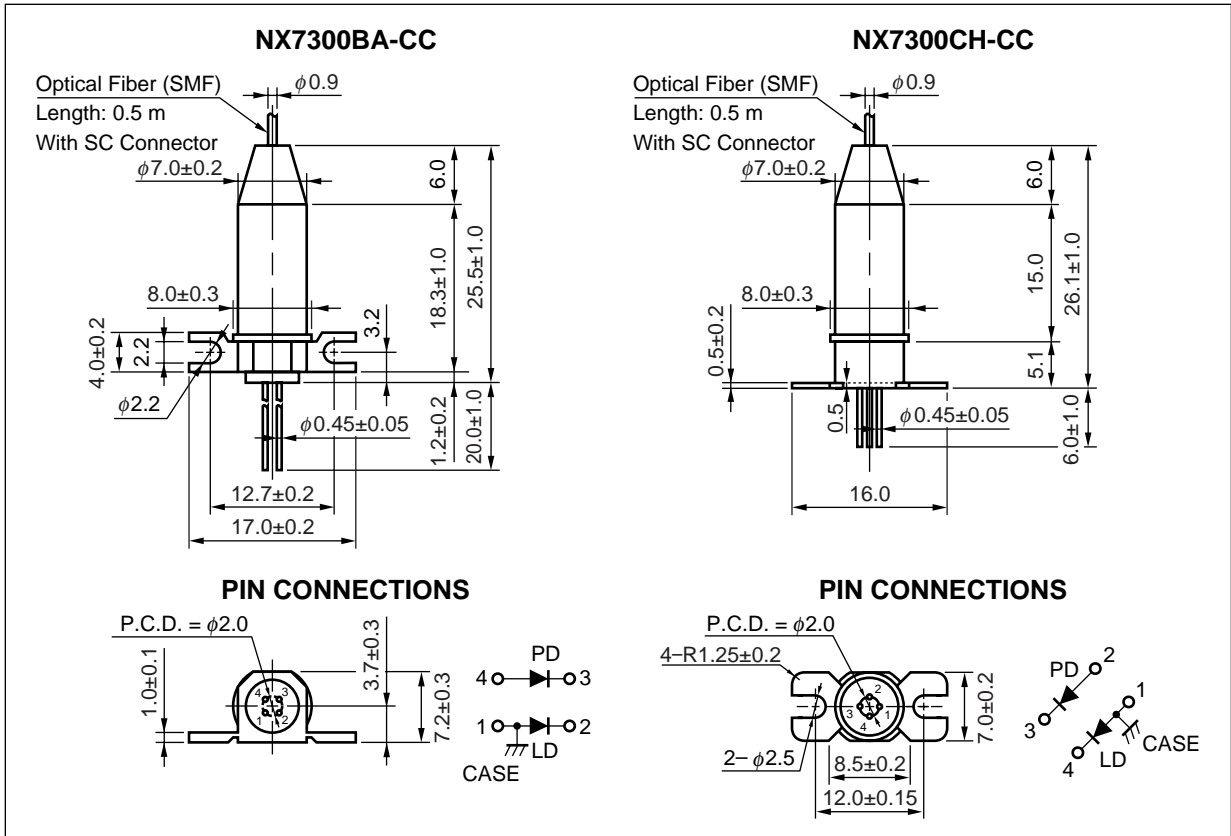
These modules are ideal as a light source for Synchronous Digital Hierarchy (SDH) system, STM-16 and intraoffice I-16 ITU-T recommendations.

**FEATURES**

- Center wavelength  $\lambda_c = 1\,310\text{ nm}$
- Optical output power  $P_r = 0.7\text{ mW}$
- Low threshold current  $I_{th} = 9\text{ mA}$
- Wide operating temperature range  $T_c = -40\text{ to }+85\text{ }^\circ\text{C}$
- InGaAs monitor PIN-PD
- With SC-UPC connector
- Based on Telcordia reliability

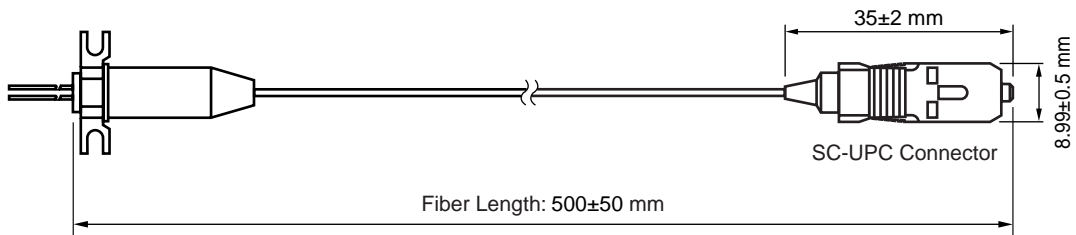
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★ PACKAGE DIMENSIONS (UNIT: mm)



OPTICAL FIBER CHARACTERISTICS

Parameter	Specification	Unit
Mode Field Diameter	9.5 $\pm$ 1	$\mu$ m
Cladding Diameter	125 $\pm$ 2	$\mu$ m
Maximum Cladding Noncircularity	2	%
Maximum Core/Cladding Concentricity	1.6	%
Outer Diameter	0.9 $\pm$ 0.1	mm
Cut-off Wavelength	1 100 to 1 270	nm
Minimum Fiber Bending Radius	30	mm
Fiber Length	500 $\pm$ 50	mm
Flammability	UL1581 VW-1	



★ ORDERING INFORMATION

Part Number	Flange Type	Available Connector
NX7300BA-CC	Flat Mount Flange	With SC-UPC Connector
NX7300CH-CC	Vertical Mount Flange	

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit
Optical Output Power from Fiber	P <sub>f</sub>	2.0	mW
Forward Current of LD	I <sub>F</sub>	150	mA
Reverse Voltage of LD	V <sub>R</sub>	2.0	V
Forward Current of PD	I <sub>F</sub>	10	mA
Reverse Voltage of PD	V <sub>R</sub>	20	V
Operating Case Temperature	T <sub>C</sub>	-40 to +85	°C
Storage Temperature	T <sub>stg</sub>	-40 to +85	°C
Lead Soldering Temperature	T <sub>slid</sub>	260 (10 sec.)	°C
Relative Humidity (noncondensing)	RH	85	%

ELECTRO-OPTICAL CHARACTERISTICS (T<sub>C</sub> = -40 to +85 °C, unless otherwise specified)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Optical Output Power from Fiber	P <sub>f</sub>			0.7		mW
Operating Voltage	V <sub>op</sub>	P <sub>f</sub> = 0.7 mW		1.2	1.5	V
Threshold Current	I <sub>th</sub>	T <sub>C</sub> = 25 °C	4	9	20	mA
			2		50	
Threshold Output Power	P <sub>th</sub>	I <sub>F</sub> = I <sub>th</sub>			75	μW
Modulation Current	I <sub>mod</sub>	P <sub>f</sub> = 0.7 mW, T <sub>C</sub> = 25 °C	14	20	35	mA
			10		60	
★ Differential Efficiency	η <sub>d</sub>	P <sub>f</sub> = 0.7 mW, T <sub>C</sub> = 25 °C	0.020	0.035	0.040	W/A
			0.012		0.070	
Temperature Dependence of Differential Efficiency	Δη <sub>d</sub>	$\Delta\eta_d = 10 \log \frac{\eta_d (@ T_c \text{ °C})}{\eta_d (@ 25 \text{ °C})}$	-3	-2		dB
Kink (Refer to <b>DEFINITIONS</b> )	kink	P <sub>f</sub> = Up to 0.84 mW			±20	%
★ Center Wavelength	λ <sub>C</sub>	P <sub>f</sub> = 0.7 mW, RMS (-20 dB)	1 266	1 310	1 360	nm
Temperature Dependence of Center Wavelength	Δλ/ΔT			0.4	0.5	nm/°C
Spectral Width	σ	P <sub>f</sub> = 0.7 mW, RMS (-20 dB)		1.3	4.0	nm
Relaxation Frequency	f <sub>r</sub>	P <sub>f</sub> = 0.7 mW		7.0		GHz
★ Rise Time	t <sub>r</sub>	10-90 %, P <sub>pk</sub> = 0.7 mW, I <sub>F</sub> = I <sub>th</sub>		0.100	0.150	ns
★ Fall Time	t <sub>f</sub>	90-10 %, P <sub>pk</sub> = 0.7 mW, I <sub>F</sub> = I <sub>th</sub>		0.125	0.200	ns

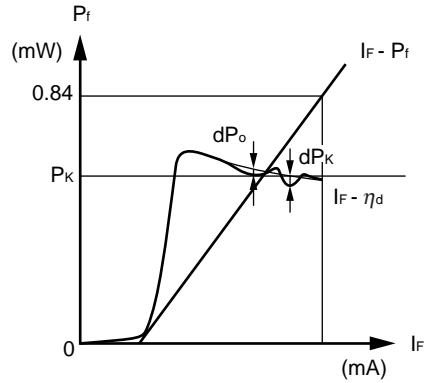
**ELECTRO-OPTICAL CHARACTERISTICS**

**(Applicable to Monitor PD: T<sub>c</sub> = -40 to +85 °C, unless otherwise specified)**

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Monitor Current	I <sub>m</sub>	V <sub>R</sub> = 5 V, P <sub>f</sub> = 0.7 mW	100	700	1 200	μA
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	
Terminal Capacitance	C <sub>t</sub>	V <sub>R</sub> = 5 V, f = 1 MHz			20	pF
Linearity (Refer to <b>DEFINITIONS</b> )	LIN <sub>m</sub>	V <sub>R</sub> = 5 V, P <sub>f</sub> = 0.07 to 0.7 mW			±10	%
Tracking Error (Refer to <b>DEFINITIONS</b> )	γ	I <sub>m</sub> = const.		0.5	1.0	dB

★ PARAMETER DEFINITIONS

**Kink : kink**

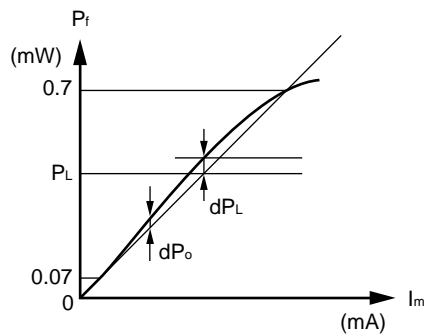


$$\text{kink} = \frac{|dP_K|}{P_K} \times 100 [\%]$$

$$dP_K = dP_o \text{ MAX.}$$

$$P_K \leq 0.84 \text{ (mW)}$$

**Linearity : LIN<sub>m</sub>**

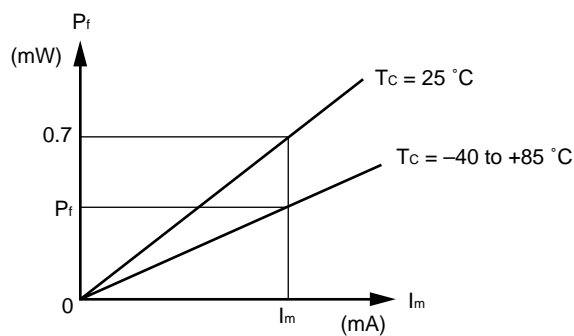


$$\text{LIN}_m = \frac{|dP_L|}{P_L} \times 100 [\%]$$

$$dP_L = dP_o \text{ MAX.}$$

$$0.07 < P_L < 0.7 \text{ (mW)}$$

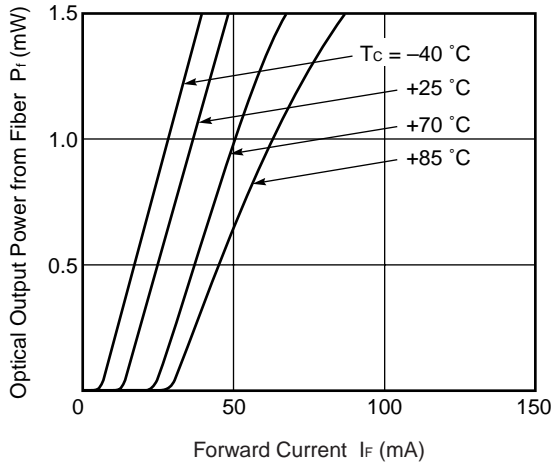
**Tracking Error :  $\gamma$**



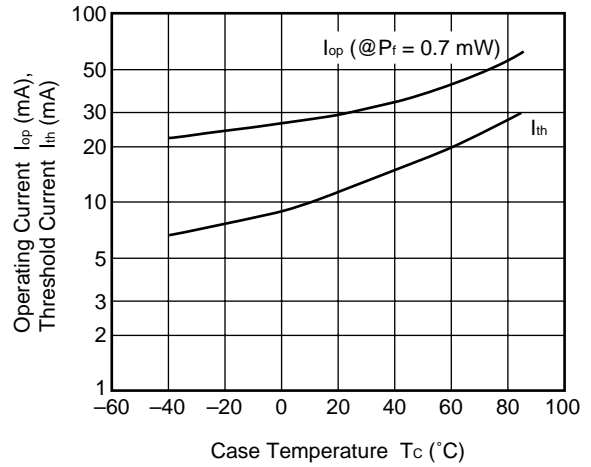
$$\gamma = \left| 10 \log \frac{P_f}{0.7} \right| [\text{dB}]$$

★ TYPICAL CHARACTERISTICS ( $T_c = -40$  to  $+85$  °C)

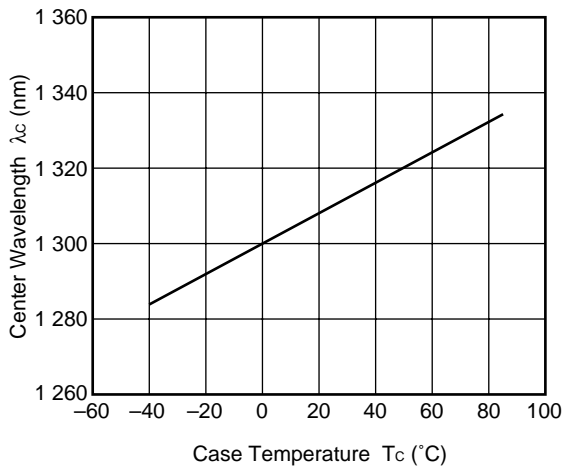
OPTICAL OUTPUT POWER FROM FIBER vs. FORWARD CURRENT



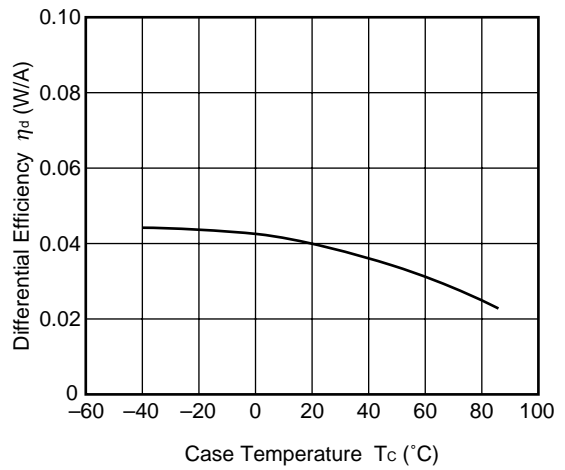
OPERATING CURRENT AND THRESHOLD CURRENT vs. CASE TEMPERATURE



TEMPERATURE DEPENDENCE OF CENTER WAVELENGTH

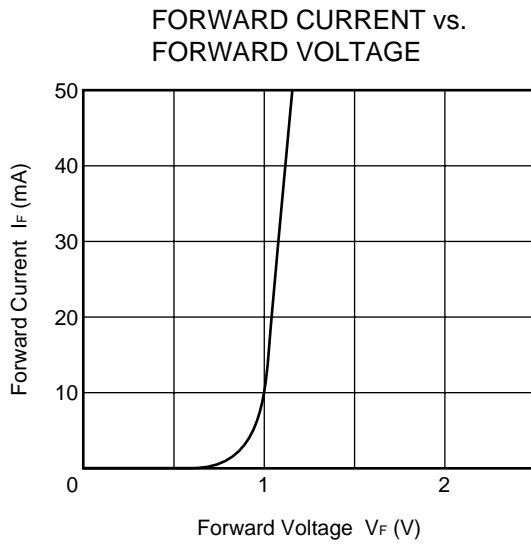
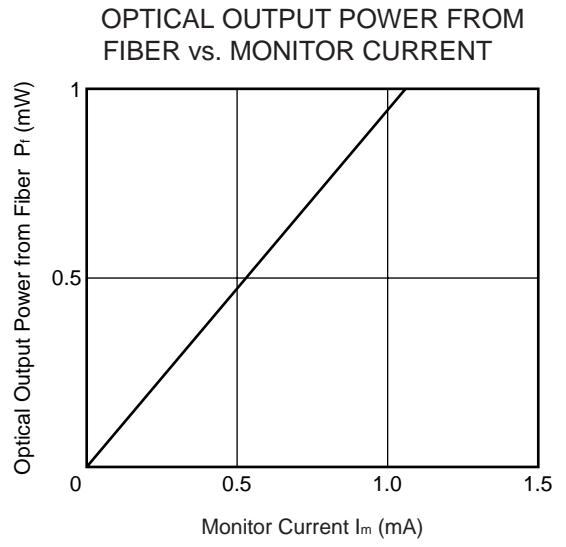
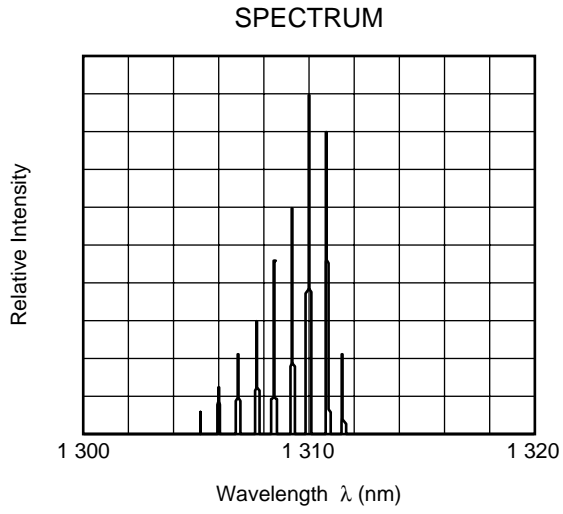


TEMPERATURE DEPENDENCE OF DIFFERENTIAL EFFICIENCY



**Remark** The graphs indicate nominal characteristics.

★ TYPICAL CHARACTERISTICS (T<sub>c</sub> = 25 °C)



**Remark** The graphs indicate nominal characteristics.

★ FP-LD FAMILY

Part Number	Absolute Maximum Ratings		Electro-Optical Characteristics (T <sub>c</sub> = -40 to +85 °C)				Applications	Package
	T <sub>c</sub> (°C)	T <sub>stg</sub> (°C)	P <sub>i</sub> (mW)	λ <sub>c</sub> (nm)		σ (nm)		
				TYP.	MIN.			
NX7300BA-CC NX7300CH-CC	-40 to +85	-40 to +85	0.7	1 266	1 360	4.0	2.5 Gb/s: STM-16 (I-16)	Coaxial
NX7301BA-CC NX7301CH-CC	-40 to +85	-40 to +85	0.2	1 261	1 360	4.0	156 Mb/s: STM-1 (I-1, S-1.1)	Coaxial
							622 Mb/s: STM-4 (I-4)	
NX7302BA-CC NX7302CH-CC	-40 to +85	-40 to +85	0.2	1 274	1 356	2.5	622 Mb/s: STM-4 (S-4.1)	Coaxial
NX7303BA-CC NX7303CH-CC	-40 to +85	-40 to +85	1.0	1 263	1 360	4.0	156 Mb/s: STM-1 (L-1.1)	Coaxial
NX7304BG-CC	-40 to +85	-40 to +85	2.0 <sup>*1</sup>	1 260	1 360	4.0	For fiberoptic communications	Coaxial

\*1 MIN.

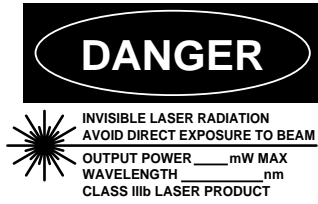


**REFERENCE**

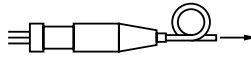
Document Name	Document No.
Optical semiconductor devices for fiberoptic communications Selection Guide	P12480E
Opto-Electronics Devices Pamphlet	P13623E
Opto-Electronics Devices (CD-ROM)	P12944X
NEC semiconductor device reliability/quality control system	C11159E
Quality grades on NEC semiconductor devices	C11531E
SEMICONDUCTOR SELECTION GUIDE –Products and Packages–	X13769E

[MEMO]

SAFETY INFORMATION ON THIS 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.

<p><b>Warning</b> Laser Beam</p>	<p>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.</p> <ul style="list-style-type: none"> <li>• Do not look directly into the laser beam.</li> <li>• Avoid exposure to the laser beam, any reflected or collimated beam.</li> </ul>
<p><b>Caution</b> GaAs Products</p>	<p>The product contains gallium arsenide, GaAs.                  GaAs vapor and powder are hazardous to human health if inhaled or ingested.</p> <ul style="list-style-type: none"> <li>• Do not destroy or burn the product.</li> <li>• Do not cut or cleave off any part of the product.</li> <li>• Do not crush or chemically dissolve the product.</li> <li>• Do not put the product in the mouth.</li> </ul> <p>Follow related laws and ordinances for disposal. The product should be excluded from general industrial waste or household garbage.</p>
<p><b>Caution</b> Optical Fiber</p>	<p>A glass-fiber is attached on the product. Handle with care.</p> <ul style="list-style-type: none"> <li>• When the fiber is broken or damaged, handle carefully to avoid injury from the damaged part or fragments.</li> </ul>

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