

NEC's 1310 nm InGaAsP MQW FP LASER DIODE IN COAXIAL PACKAGE FOR 155 Mb/s AND 622 Mb/s APPLICATIONS

NX7301BA-CC
NX7301CA-CC

FEATURES

- **CENTER WAVELENGTH:**
 $\lambda_c = 1310 \text{ nm}$
- **OPTICAL OUTPUT POWER:**
 $P_f = 0.2 \text{ mW}$
- **LOW THRESHOLD CURRENT:**
 $I_{TH} = 9 \text{ mA}$
- **HIGH CUT-OFF FREQUENCY:**
 $F_c = 2.0 \text{ GHz}$
- **WIDE OPERATING TEMPERATURE RANGE:**
-40 to +85°C
- **InGaAs MONITOR PIN-PD**
- **WITH SC-UPC CONNECTOR**
- **BASED ON TELCORDIA RELIABILITY**

DESCRIPTION

NEC's NX7301BA-CC and NX7301CA-CC are 1310 nm Fabry-Perot (FP) laser diode coaxial modules with single mode fiber. They have a Multiple Quantum Well (MQW) structure and a built-in InGaAs monitor photo diode. These modules are ideal as a light source for Synchronous Digital Hierarchy (SDH) systems, STM-4, intraoffice I-4, and STM-1, intraoffice I-1, short-haul S-1.1 ITU-T recommendations.

ELECTRO-OPTICAL CHARACTERISTICS (T_c = -40 to +85°C, unless otherwise specified)

PART NUMBER			NX7301BA-CC, NX7301CA-CC		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
P _f	Optical Output Power from Fiber	mW		0.2	
V _{OP}	Operating Voltage, P _f = 0.2 mW	V		1.2	1.5
I _{TH}	Threshold Current	T _c = +25°C	4	9	20
			2		50
P _{TH}	Threshold Output Power, I _F = I _{TH}	μW			15
I _{MOD}	Modulation Current	P _f = 0.2 mW, T _c = 25°C	7	15	20
		P _f = 0.2 mW	5		40
η _d	Differential Efficiency	P _f = 0.2 mW, T _c = 25°C	0.010	0.015	0.025
		P _f = 0.2 mW	0.005		0.040
Δη _d	Temperature Dependence of Differential Efficiency, $\Delta\eta_d = 10 \log \frac{\eta_d (@ T_c \text{ } ^\circ\text{C})}{\eta_d (@ 25 \text{ } ^\circ\text{C})}$	dB	-3	-2	
kink	Kink, P _f = Up to 0.24 mW (Refer to Definitions)	%			±20
λ _c	Center Wavelength, P _f = 0.2 mW, RMS (-20 dB)	nm	1261	1310	1360
Δλ/ΔT	Temperature Dependence of Center Wavelength	nm/°C		0.4	0.5
σ	Spectral Width, P _f = 0.2 mW RMS (-20 dB)	nm		1.3	4.0
f _c	Cut-off Frequency, -3 dB	GHz		2.0	
t _r	Rise Time, 10 to 90%, P _{pk} = 0.2 mW, I _F = I _{TH}	ns		0.2	0.5
t _f	Fall Time, 90 to 10%, P _{pk} = 0.2 mW, I _F = I _{TH}	ns		0.3	0.5
Applicable to Monitor PD: T _c = -40 to +85 °C unless otherwise specified					
I _m	Monitor Current, V _R = 5 V, P _r = 0.2 mW	μA	100	700	1200
I _D	Dark Current	V _R = 5 V, T _c = 25 °C	nA	0.1	50
		V _R = 5 V	nA	10	500
C _t	Terminal Capacitance, V _R = 5 V, f = 1 MHz	pF			20
LIN _m	Linearity, V _R = 5 V, P _r = 0.02 to 0.2 mW (Refer to Definitions)	%			±10
γ	Tracking Error, I _m = const. (Refer to Definitions)	dB		0.5	1.0

ABSOLUTE MAXIMUM RATINGS¹

(T_c = 25°C, unless otherwise specified)

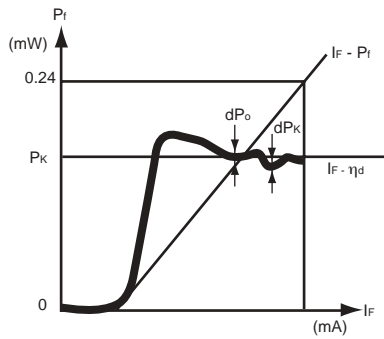
SYMBOLS	PARAMETERS	UNITS	RATINGS
P _f	Optical Output Power from Fiber	mW	0.5
I _F	Forward Current of LD	mA	150
V _R	Reverse Voltage of LD	V	2.0
I _F	Forward Current of PD	mA	10
V _R	Reverse Voltage of PD	V	20
T _C	Operating Case Temperature	°C	-40 to +85
T _{STG}	Storage Temperature	°C	-40 to +85
T _{SLD}	Lead Soldering Temperature (10 s)	°C	260
RH	Relative Humidity (noncondensing)	%	85

Note:

1. Operation in excess of any one of these parameters may result in permanent damage.

PARAMETER DEFINITIONS

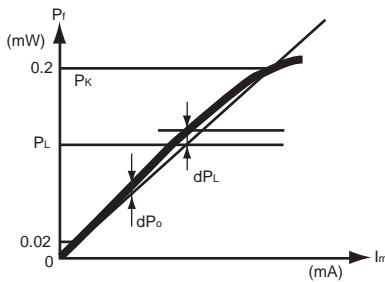
Kink : kink



$$\text{kink} = \frac{|dP_k|}{P_k} \times 100 \text{ [%]}$$

dP_k = dP_o MAX
 P_k ≤ 0.24 (mW)

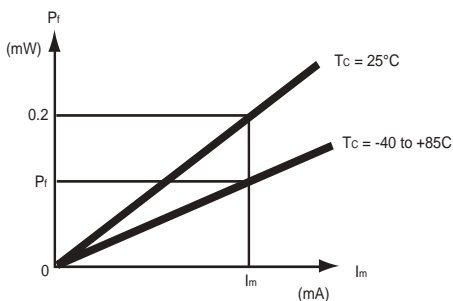
Linearity : LINm



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

dP_L = dP_o MAX
 0.02 < P_k < 0.2 (mW)

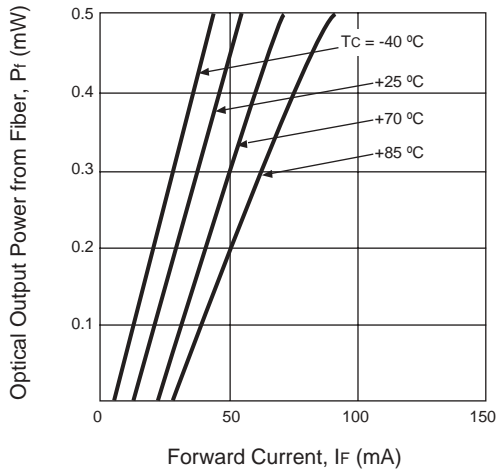
Tracking Error : γ



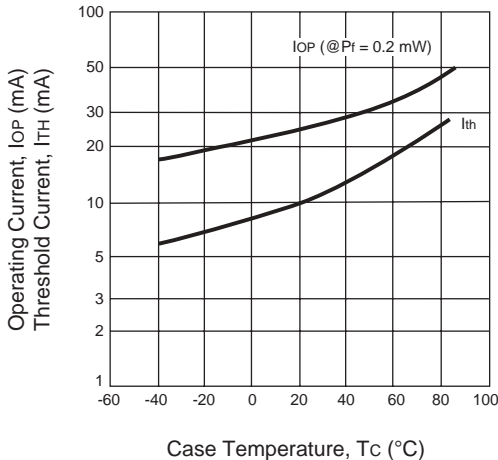
$$\gamma = \left| 10 \log \frac{P_f}{0.2} \right| \text{ [dB]}$$

TYPICAL PERFORMANCE CURVES ($T_c = -40$ to $+85^\circ\text{C}$)

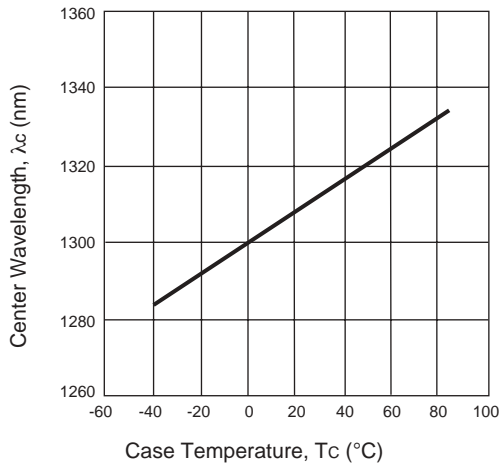
OPTICAL OUTPUT POWER FROM FIBER vs. FORWARD CURRENT



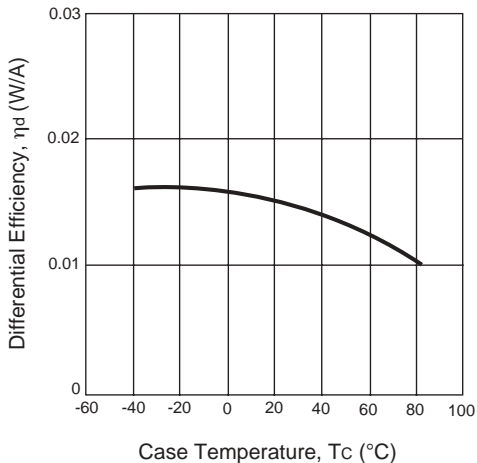
OPERATING CURRENT AND THRESHOLD CURRENT vs. CASE TEMPERATURE



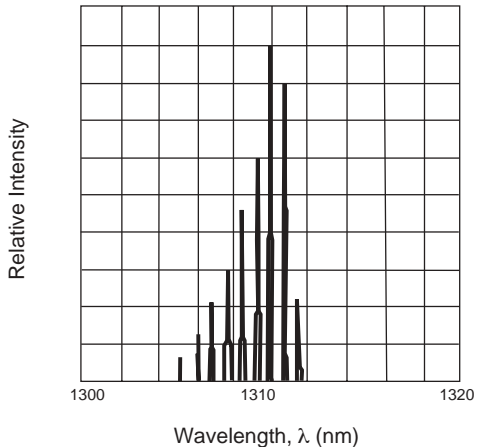
TEMPERATURE DEPENDENCE OF CENTER WAVELENGTH



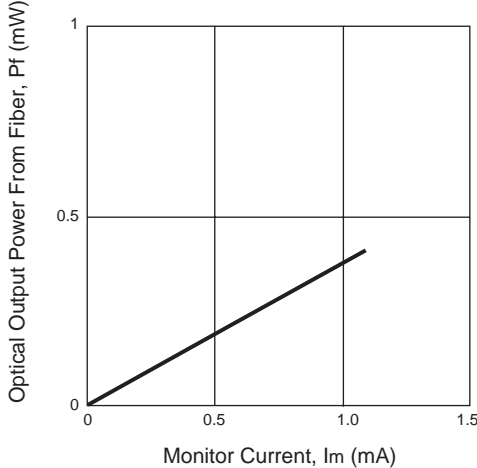
TEMPERATURE DEPENDENCE OF DIFFERENTIAL EFFICIENCY



LONGITUDINAL MODE

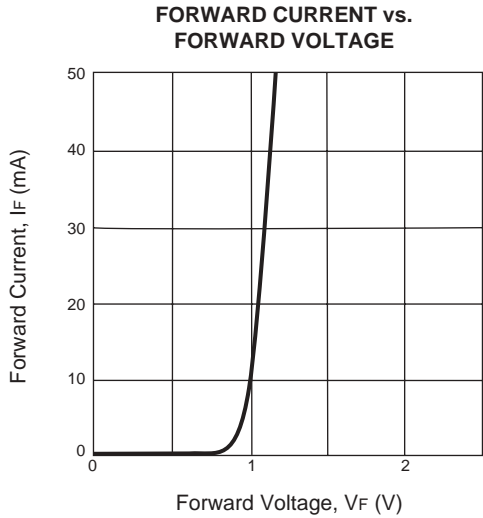


OPTICAL OUTPUT POWER FROM FIBER vs. MONITOR CURRENT



TYPICAL PERFORMANCE CURVES

(Tc = -40 to +85°C, unless otherwise specified)

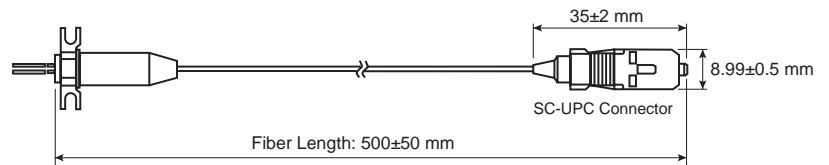


ORDERING INFORMATION

PART NUMBER	AVAILABLE CONNECTOR	FLANGE TYPE
NX7301BA-CC	With SC-UPC Connector	Flat Mount Flange
NX7301CA-CC	With SC-UPC Connector	Vertical Mount Flange

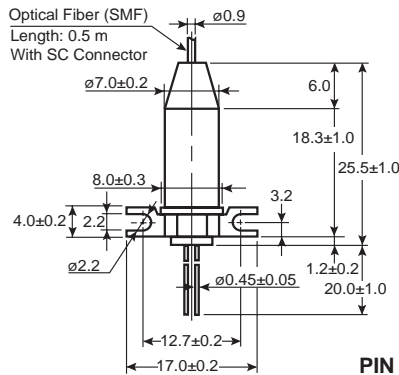
OPTICAL FIBER CHARACTERISTICS

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	1100 to 1270	nm
Minimum Fiber Bending Radius	30	mm
Fiber Length	500±50	mm
Flammability	UL1581 VW-1	

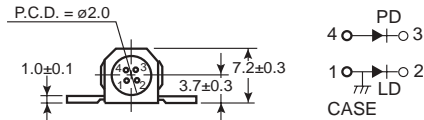


PACKAGE DIMENSIONS (Units in mm)

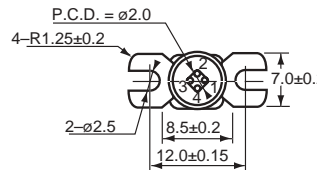
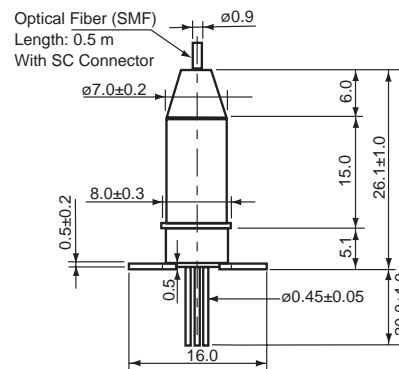
NX7301BA-CC



PIN CONNECTIONS



NX7301CA-CC



Life Support Applications

These NEC products are not intended for use in life support devices, appliances, or systems where the malfunction of these products can reasonably be expected to result in personal injury. The customers of CEL using or selling these products for use in such applications do so at their own risk and agree to fully indemnify CEL for all damages resulting from such improper use or sale.

CEL California Eastern Laboratories, Your source for NEC RF, Microwave, Optoelectronic, and Fiber Optic Semiconductor Devices.
 4590 Patrick Henry Drive • Santa Clara, CA 95054-1817 • (408) 988-3500 • FAX (408) 988-0279 • www.cel.com

DATA SUBJECT TO CHANGE WITHOUT NOTICE

02/27/2003