

# PRELIMINARY DATA SHEET



## NEC's 1310 nm InGaAsP MQW FP LASER DIODE IN COAXIAL PACKAGE FOR FIBER OPTIC COMMUNICATIONS

**NX7304BG-CC**  
**NX7304CG-CC**

### FEATURES

- **CENTER WAVELENGTH:**  
 $\lambda_c = 1310 \text{ nm}$
- **HIGH OUTPUT POWER FROM FIBER:**  
 $P_F = 2.0 \text{ mW MIN}$
- **LOW THRESHOLD CURRENT:**  
 $I_{TH} = 10 \text{ mA}$
- **HIGH CUT-OFF FREQUENCY:**  
 $f_c = 2.0 \text{ GHz}$
- **InGaAs MONITOR PIN-PD**
- **WIDE OPERATING TEMPERATURE RANGE:**  
 $T_c = -40 \text{ to } +85^\circ\text{C}$
- **WITH SC-UPC CONNECTOR**
- **BASED ON TELCORDIA RELIABILITY**

### DESCRIPTION

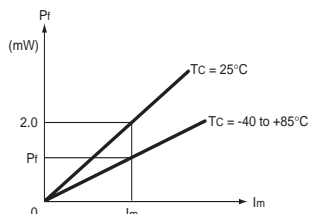
NEC's NX7304BG-CC and NX7304CG-CC are 1310 nm Multiple Quantum Well (MQW) structured Fabry-Perot (FP) laser diode coaxial modules with single mode fiber. These modules are ideal as a light source for ITU-T recommended Synchronous Digital Hierarchy (SDH) systems, for fiberoptic communications such as SONET and for digital transmission.

### ELECTRO-OPTICAL CHARACTERISTICS ( $T_c = 25^\circ\text{C}$ , unless otherwise specified)

PART NUMBER			NX7304BG-CC NX7304CG-CC		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
$V_{OP}$	Operating Voltage, $P_f = 2.0 \text{ mW}$	V		1.1	1.3
$I_{TH}$	Threshold Current, $T_c = 85^\circ\text{C}$	mA		10 25	25 50
$I_{MOD}$	Modulation Current, $P_f = 2.0 \text{ mW}$	mA		15	20
$\eta_D$	Differential Efficiency, $T_c = 85^\circ\text{C}$	W/A	0.100 0.075	0.150 0.100	
$\lambda_c$	Center Wavelength, $P_f = 2.0 \text{ mW, RMS (-20 dB)}$ $T_c = -40 \text{ to } +85^\circ\text{C}$	nm	1290 1260	1310	1330 1360
$\Delta\lambda/\Delta T$	Temperature Dependence of Center Emission Wavelength, $T_c = -40 \text{ to } +85^\circ\text{C}$	nm/ $^\circ\text{C}$		0.4	0.5
$\sigma$	Spectral Width, $P_f = 2.0 \text{ mW, RMS (-20 dB)}$ $T_c = 85^\circ\text{C}$	nm		1.3 1.5	2.5 4.0
$t_r$	Rise Time, 10 to 90%	ns		0.2	0.5
$t_f$	Fall Time, 90 to 10%	ns		0.3	0.5
$I_m$	Monitor Current, $V_R = 5 \text{ V, } P_f = 2.0 \text{ mW}$	$\mu\text{A}$	100	700	
$I_D$	Monitor Dark Current, $V_R = 5 \text{ V}$	nA		0.1	10
$\gamma^1$	Tracking Error, $I_m = \text{const.}, T_c = -40 \text{ to } +85^\circ\text{C}$	dB			1.0

Note:

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



California Eastern Laboratories

**ABSOLUTE MAXIMUM RATINGS<sup>1</sup>**

(T<sub>c</sub> = 25°C, unless otherwise specified)

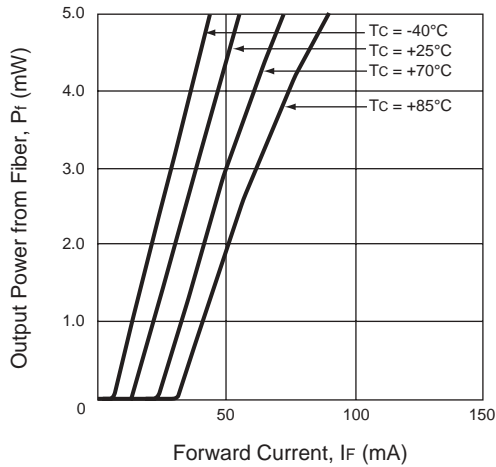
SYMBOLS	PARAMETERS	UNITS	RATINGS
P <sub>f</sub>	Optical Output Power from Fiber		
I <sub>F</sub>	Forward Current of LD	mA	150
V <sub>R</sub>	Reverse Voltage of LD	V	2.0
I <sub>F</sub>	Forward Current of PD	mA	10
V <sub>R</sub>	Reverse Voltage of PD	V	20
T <sub>c</sub>	Operating Case Temperature	°C	-40 to +85
T <sub>STG</sub>	Storage Temperature	°C	-40 to +85
T <sub>SLD</sub>	Lead Soldering Temperature (10 s)	°C	260
RH	Relative Humidity (noncondensing)	%	85

Note:

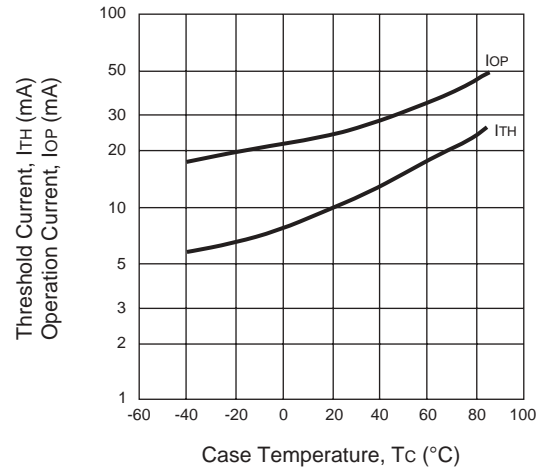
1. Operation in excess of any one of these parameters may result in permanent damage.

**TYPICAL PERFORMANCE CURVES** (T<sub>c</sub> = -40 to +85°C)

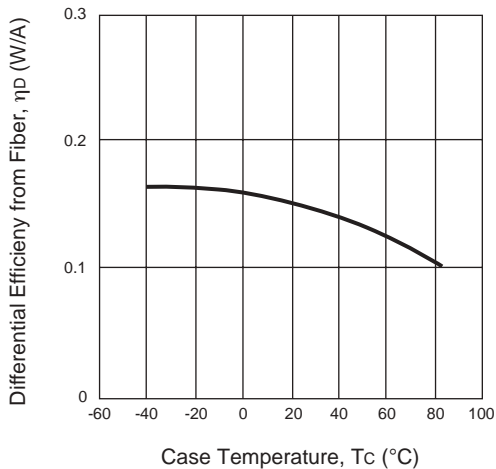
**OUTPUT POWER FROM FIBER vs. FORWARD CURRENT**



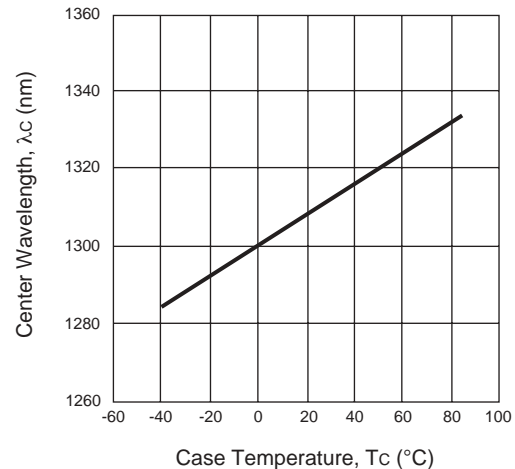
**THRESHOLD CURRENT AND OPERATION CURRENT vs. CASE TEMPERATURE**



**TEMPERATURE DEPENDENCE OF DIFFERENTIAL EFFICIENCY FROM FIBER**

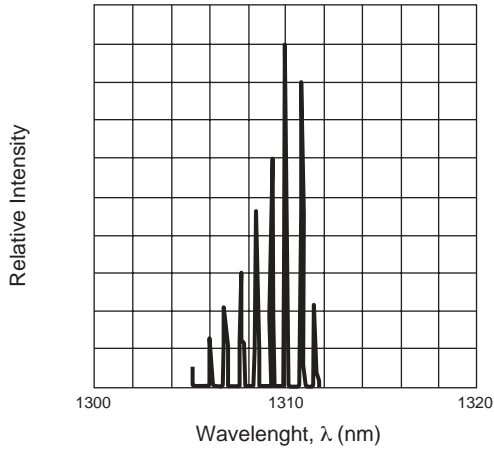


**TEMPERATURE DEPENDENCE OF CENTER WAVELENGTH**

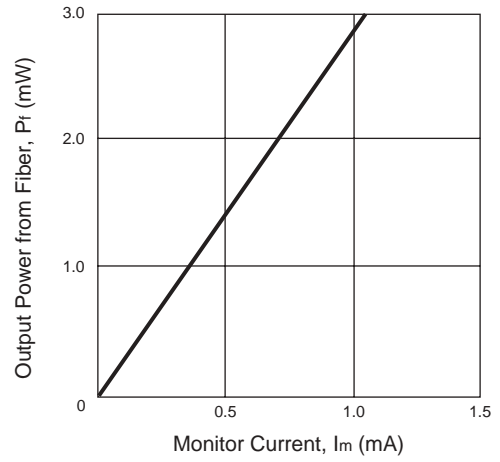


**TYPICAL PERFORMANCE CURVES** ( $T_C = 25^\circ\text{C}$ )

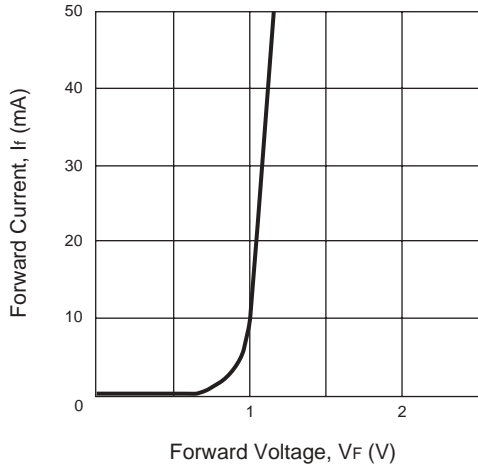
**LONGITUDINAL MODE FROM FIBER**



**OUTPUT POWER FROM FIBER vs. MONITOR CURRENT**



**FORWARD CURRENT vs. FORWARD VOLTAGE**

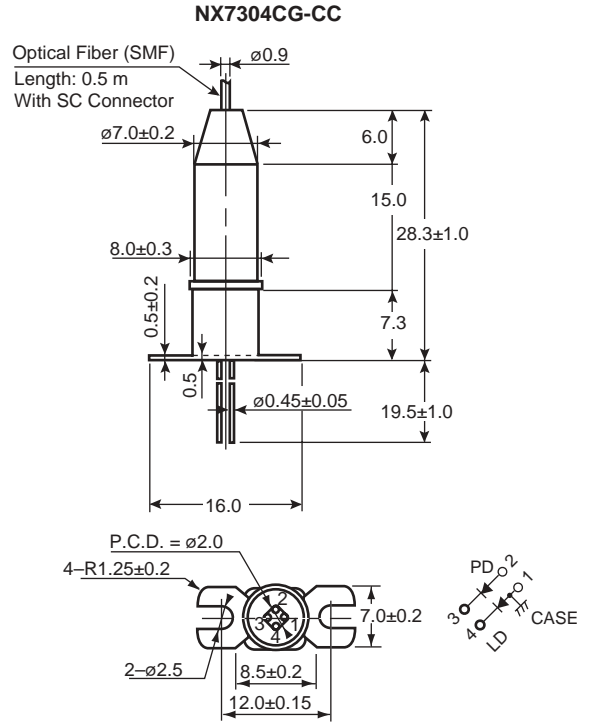
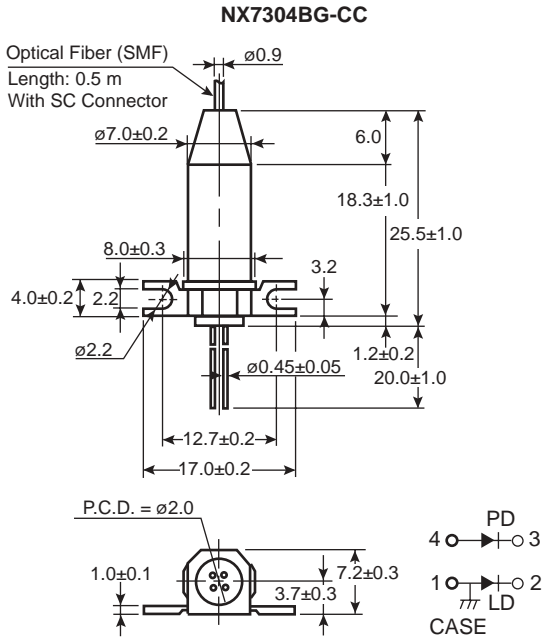


**ORDERING INFORMATION**

PART NUMBER	AVAILABLE CONNECTOR	DESCRIPTION
NX7304BG-CC	Flat Mount Flange	With SC-UPC Connector
NX7304CG-CC		

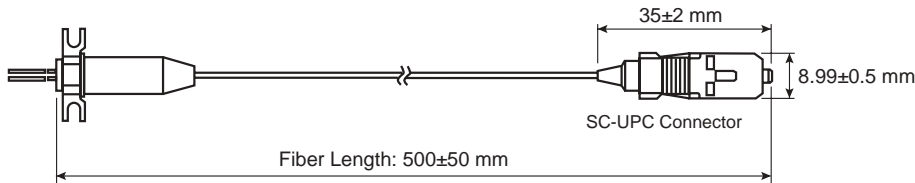
Remark: The graphs indicate nominal characteristics.

OUTLINE DIMENSIONS (Units in mm)



OPTICAL FIBER CHARACTERISTICS

PARAMETER	UNITS	SPECIFICATION
Mode Field Diameter	$\mu\text{m}$	9.5 $\pm$ 1
Cladding Diameter	$\mu\text{m}$	125 $\pm$ 2
Maximum Cladding Noncircularity	%	2
Maximum Core/Cladding Concentricity	%	1.6
Outer Diameter	mm	0.9 $\pm$ 0.1
Cut-off Wavelength	nm	1100 to 1270
Minimum Fiber Bending Radius	mm	30
Fiber Length	mm	500 $\pm$ 50
Flammability		UL 1581 VW-1



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](http://www.cel.com)

DATA SUBJECT TO CHANGE WITHOUT NOTICE

02/27/2003