CEL

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

NX8304BE-CC
NX8304CE-CC

FEATURES

- **INTERNAL OPTICAL ISOLATOR**
- **PEAK EMISSION WAVELENGTH:** λp = 1310 nm
- **OPTICAL OUTPUT POWER:** P_f = 2.0 mW
- **WIDE OPERATING TEMPERATURE RANGE:** T_C = -40 to +85°C
- **InGaAs MONITOR PIN-PD**
- **WITH SC-UPC CONNECTOR**
- **BASED ON TELCORDIA RELIABILITY**

DESCRIPTION

NEC's NX8304BE-CC and NX8304CE-CC are 1310 nm Distributed Feed-Back (DFB) laser diode coaxial modules with an internal optical isolator. These modules are light source for fiber optic communications.

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

PART NUMBER				NX8304BE-CC, NX8304CE-CC		
SYMBOLS	**PARAMETERS AND CONDITIONS**		**UNITS**	**MIN**	**TYP**	**MAX**
P_f	Optical Output Power from Fiber, CW		mW		2.0	
V_{OP}	Operating Voltage, P_f = 2.0 mW		V		1.2	1.6
I_{TH}	Threshold Current	T_C = +25°C	mA		15	25
			mA			55
P_{TH}	Threshold Output Power, $I_F = I_{TH}$		μW			100
I_{MOD}	Modulation Current	P_f = 2.0 mW, T_C = 25°C	mA	8	20	30
		P_f = 2.0 mW	mA	6		50
η_d	Differential Efficiency	P_f = 2.0 mW, T_C = 25°C	W/A	0.07	0.100	0.2
		P_f = 2.0 mW	W/A	0.040		0.300
$\Delta\eta_d$	Temperature Dependence of Differential Efficiency, $\Delta\eta_d = 10 \log \frac{\eta_d (@ T_C °C)}{\eta_d (@ 25 °C)}$		dB	-3.5	-2.2	
Kink	Kink, P_f = Up to 2.4 mW (Refer to defenitions)		%			±20
λp	Peak Emission Wavelength, P_f = 2.0 mW		nm	1280	1310	1335
$\Delta\lambda/\Delta T$	Temperature Dependence of Peak Emission Wavelength		nm/°C		0.09	0.1
$\Delta\lambda$	Spectral Width, P_f = 2.0 mW, -20 dB down width		nm		0.1	1.0
SMSR	Side Mode Suppression Ratio, P_f = 2.0 mW		dB	30	40	
f_c	Cut-Off Frequency, P_f = 2.0mW		GHz		2.0	
t_r	Rise Time, 10 to 90%, P_{pk} = 2.0 mW, $I_F = I_{TH}$		ns		0.15	0.5
t_f	Fall Time, 90 to 10%, P_{pk} = 2.0 mW, $I_F = I_{TH}$		ns		0.15	0.5
I_m	Monitor Current, V_R = 5 V, P_f = 2.0 mW		μA	200	700	1500
I_D	Monitor Dark Current	V_R = 5 V, T_C = 25 °C	nA		0.1	50
		V_R = 5 V	nA		10	500
C_t	Monitor PD Terminal Capacitance, V_R = 5 V, f = 1 MHz		pF		1.0	20
LIN_m	Linearity, V_R = 5 V, P_f = 0.2 to 2.0 mW (Refer to defenitions)		%			15
γ^1	Tracking Error, I_m = const.(Refer to defenitions)		dB		0.5	1.0
R_{IN}	Relative Intensity Noise		dB/Hz		-135	
ORL	Optical Return Loss, SMF		dB	35	52	

ABSOLUTE MAXIMUM RATINGS[1]

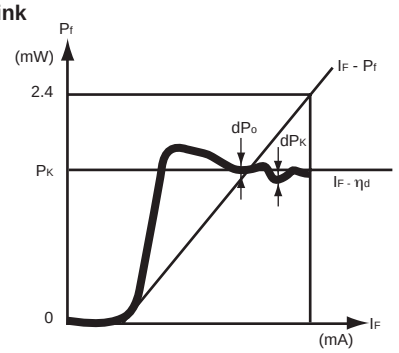
(T_C = 25°C, unless otherwise specified)

SYMBOLS	PARAMETERS	UNITS	RATINGS
P_f	Optical Output Power from Fiber	mW	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	2.0
V_R	Reverse Voltage of PD	V	15
T_C	Operating Case Temperature	°C	-40 to +85
T_{STG}	Storage Temperature	°C	-40 to +85
T_{SLD}	Lead Soldering Temperature (3 s)	°C	350
RH	Relative Humidity (noncondensing)	%	85

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

PARAMETER DEFINITIONS

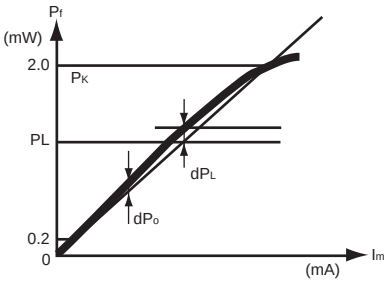
Kink : kink



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

dP_K = dPo MAX
$P_K \leq 2.4$ (mW)

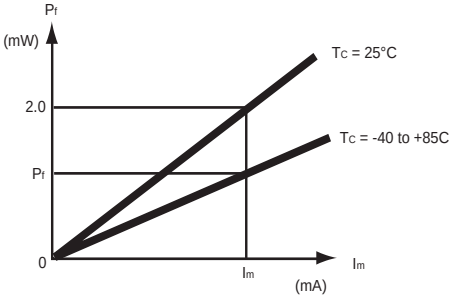
Linearity : LINm



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

dP_L = dPo MAX
$0.2 < P_L < 2.0$ (mW)

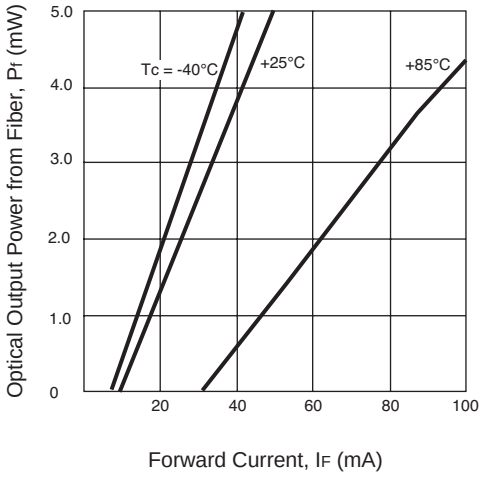
Tracking Error : γ



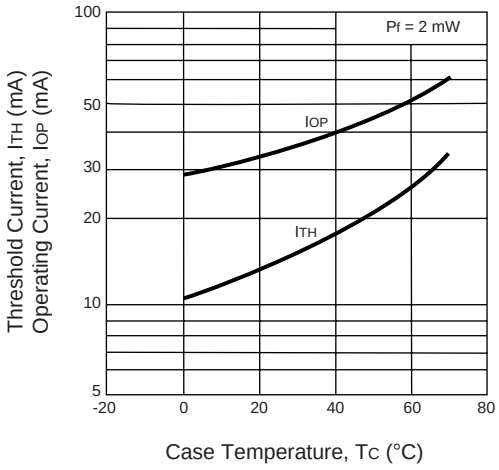
$$\gamma = \left|10 \log \frac{P_f}{2.0}\right| [dB]$$

TYPICAL PERFORMANCE CURVES (T_C = 25°C unless otherwise specified)

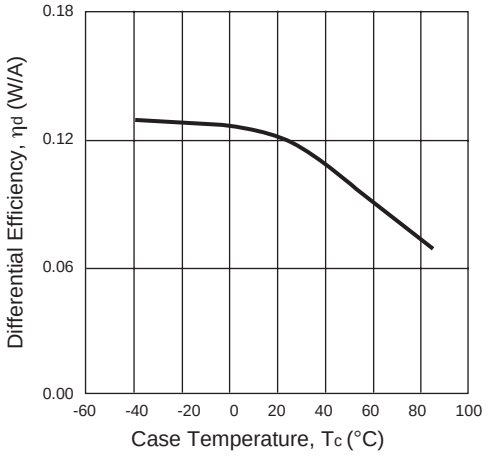
OPTICAL OUTPUT POWER FROM FIBER vs. FORWARD CURRENT



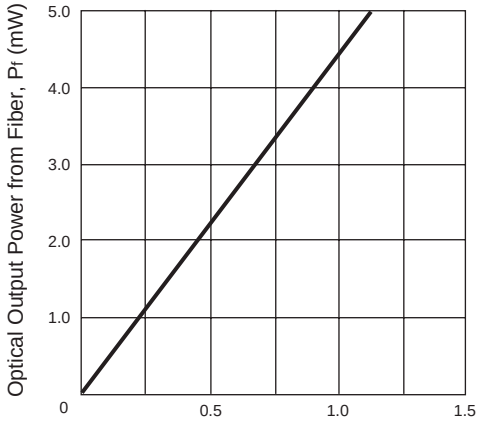
OPERATING CURRENT AND THRESHOLD CURRENT vs. CASE TEMPERATURE



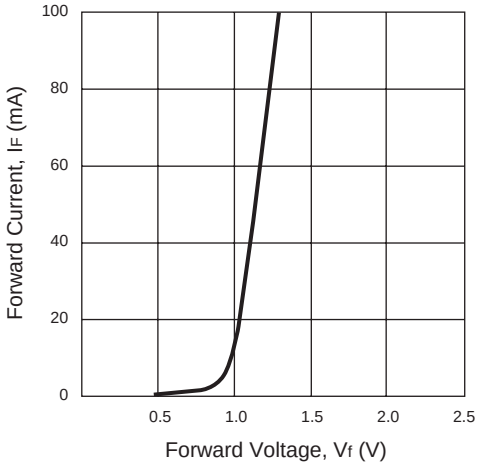
TEMPERATURE DEPENDENCE OF DIFFERENTIAL ENERGY



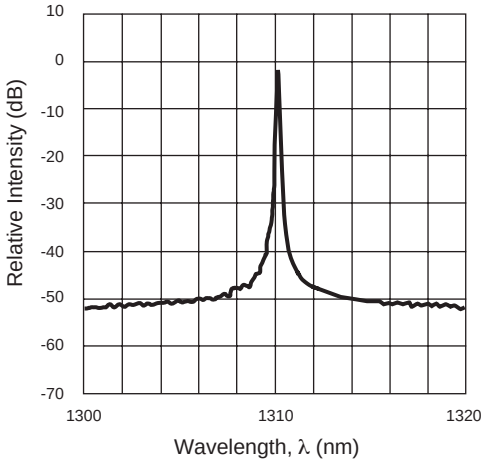
OPTICAL OUTPUT POWER FROM FIBER vs. MONITOR CURRENT



FORWARD CURRENT vs. FORWARD VOLTAGE

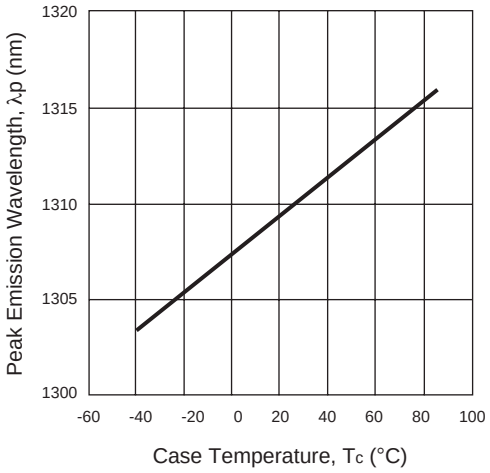


SPECTRUM



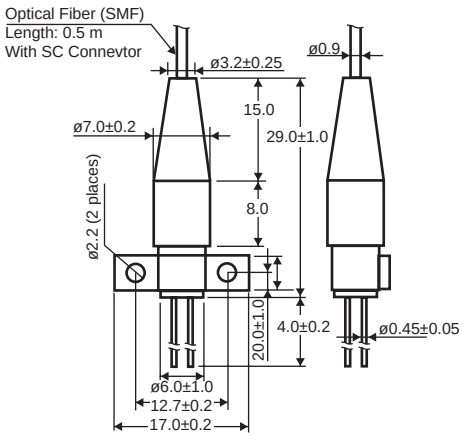
TYPICAL PERFORMANCE CURVES (Tc = 25°C unless otherwise specified)

TEMPERATURE DEPENDENCE OF PEAK EMISSION WAVELENGTH

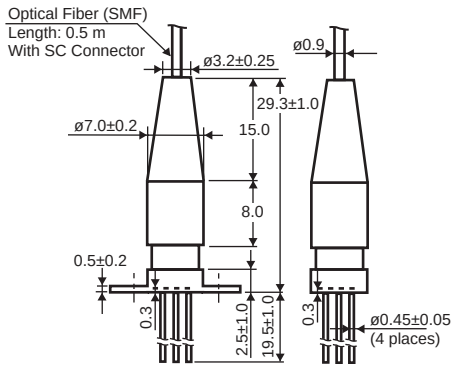


OUTLINE DIMENSIONS (Units in mm)

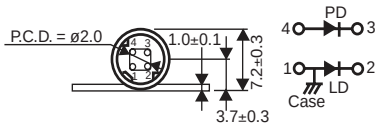
NX8304BE-CC



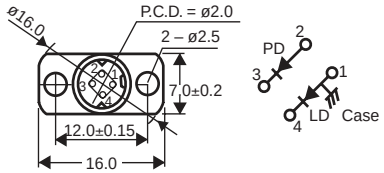
NX8304CE-CC



PIN CONNECTIONS



PIN CONNECTIONS

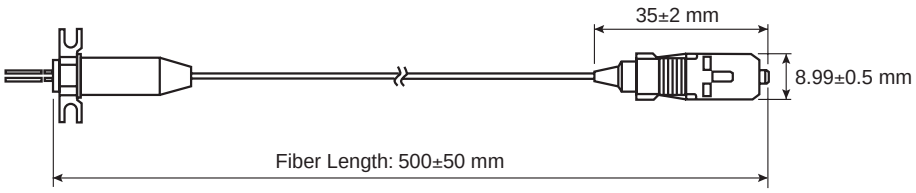


OPTICAL FIBER CHARACTERISTICS

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

ORDERING INFORMATION

PART NUMBER	AVAILABLE CONNECTOR	FLANGE TYPE
NX8304BE-CC	With SC-UPC Connector	Flat Mount Flange
NX8304CE-CC		Vertical Mount Flange



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.