

CEL

**NEC's 1550 nm
InGaAsP MQW DFB
LASER DIODE IN COAXIAL PACKAGE
for 622 Mb/s APPLICATION**

**NX8504BE-CC
NX8504CE-CC**

FEATURES

- **PEAK EMISSION WAVELENGTH:**
 $\lambda_P = 1550 \text{ nm}$
- **OPTICAL OUTPUT POWER:**
 $P_f = 2.0 \text{ mW}$
- **INTERNAL OPTICAL ISOLATOR**
- **InGaAs MONITOR PIN-PD**
- **WIDE OPERATING TEMPERATURE RANGE:**
 $T_C = -10 \text{ to } +85^\circ\text{C}$
- **WITH SC-UPC CONNECTOR**
- **BASED ON TELCORDIA RELIABILITY**

DESCRIPTION

NEC's NX8504BE-CC and NX8504CE-CC are 1550 nm Distributed Feed-Back (DFB) laser diode coaxial modules with optical isolator.

These modules are ideal as a light source for Synchronous Digital Hierarchy (SDH) system, STM-4, long-haul L-4.2, L-4.3 ITU-T recommendations.

ELECTRO-OPTICAL CHARACTERISTICS ($T_C = -10 \text{ to } +85^\circ\text{C}$, unless otherwise specified)

PART NUMBER			NX8504BE-CC, NX8504CE-CC		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
P_f	Optical Output Power from Fiber, CW	mW		2.0	
V_{OP}	Operating Voltage, $P_f = 2.0 \text{ mW}$	V		1.1	1.6
I_{TH}	Threshold Current	$T_C = +25^\circ\text{C}$		15	25
			2		50
P_{TH}	Threshold Output Power, $I_F = I_{TH}$	μW			100
I_{MOD}	Modulation Current	$P_f = 2.0 \text{ mW}$, $T_C = 25^\circ\text{C}$	11	20	35
		$P_f = 2.0 \text{ mW}$	9		55
η_d	Differential Efficiency	$P_f = 2.0 \text{ mW}$, $T_C = 25^\circ\text{C}$	0.060	0.100	0.150
		$P_f = 2.0 \text{ mW}$	0.036		0.200
$\Delta\eta_d$	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	-1.6	
Kink	Kink, $P_f = \text{Up to } 2.4 \text{ mW}$ (Refer to definitions)	%			± 20
λ_p	Peak Emission Wavelength, $P_f = 2.0 \text{ mW}$	nm	1530	1550	1570
$\Delta\lambda/\Delta T$	Temperature Dependence of Peak Emission Wavelength	nm/ $^\circ\text{C}$		0.10	0.12
$\Delta\lambda$	Spectral Width, $P_f = 2.0 \text{ mW}$, -20 dB down width	nm		0.3	1.0
SMSR	Side Mode Suppression Ratio, $P_f = 2.0 \text{ mW}$	dB	30	40	
t_r	Rise Time, 10 to 90%, $P_{pk} = 2.0 \text{ mW}$, $I_F = I_{TH}$	ns			0.5
t_f	Fall Time, 90 to 10%, $P_{pk} = 2.0 \text{ mW}$, $I_F = I_{TH}$	ns			0.5
I_m	Monitor Current, $V_R = 5 \text{ V}$, $P_f = 2.0 \text{ mW}$	μA	200	1000	2000
I_D	Monitor Dark Current	$V_R = 5 \text{ V}$, $T_C = 25^\circ\text{C}$		1.0	50
		$V_R = 5 \text{ V}$		10	500
C_t	Monitor PD Terminal Capacitance, $V_R = 5 \text{ V}$, $f = 1 \text{ MHz}$	pF		1.0	20
LIN_m	Linearity, $V_R = 5 \text{ V}$, $P_f = 0.2 \text{ to } 2.0 \text{ mW}$ (Refer to definitions)	%			10
γ^1	Tracking Error, $I_m = \text{const.}$ (Refer to definitions)	dB		0.5	1.0

ABSOLUTE MAXIMUM RATINGS¹

(T_c = 25°C, unless otherwise specified)

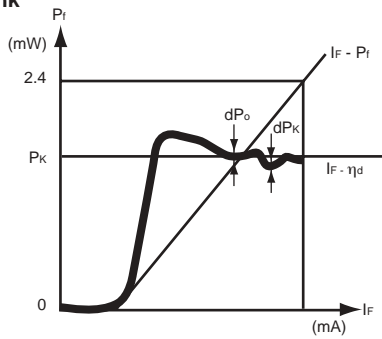
SYMBOLS	PARAMETERS	UNITS	RATINGS
I _F	Forward Current of LD	mA	150
P _f	Optical Output Power	mW	5.0
V _R	Reverse Voltage of LD	V	2.0
I _F	Forward Current of PD	mA	2.0
V _R	Reverse Voltage of PD	V	15
T _c	Operating Case Temperature	°C	-10 to +85
T _{STG}	Storage Temperature	°C	-40 to +85
T _{SLD}	Lead 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

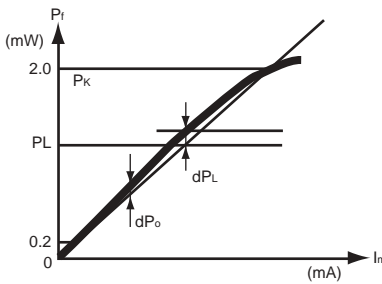
Kink : kink



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

dPk = dPo MAX
 P_K ≤ 2.4 (mW)

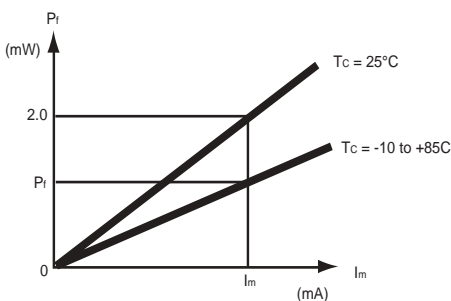
Linearity : LINm



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

dPL = dPo MAX
 0.2 < P_L < 2.0 (mW)

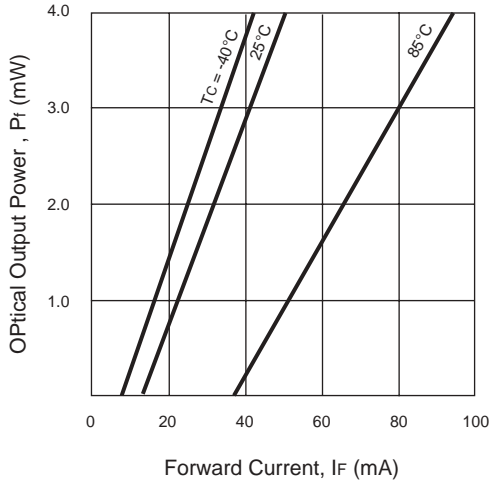
Tracking Error : γ



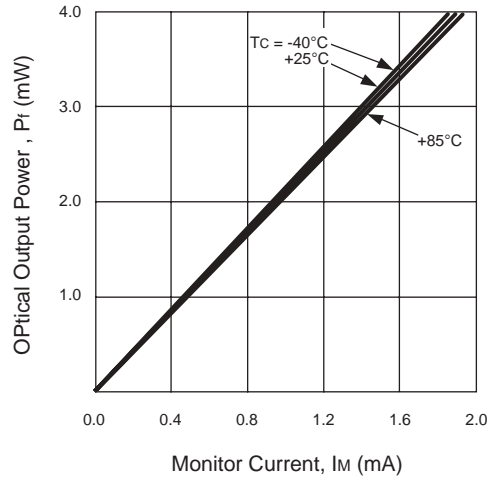
$$\gamma = \left| 10 \log \frac{P_f}{2.0} \right| \text{ [dB]}$$

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

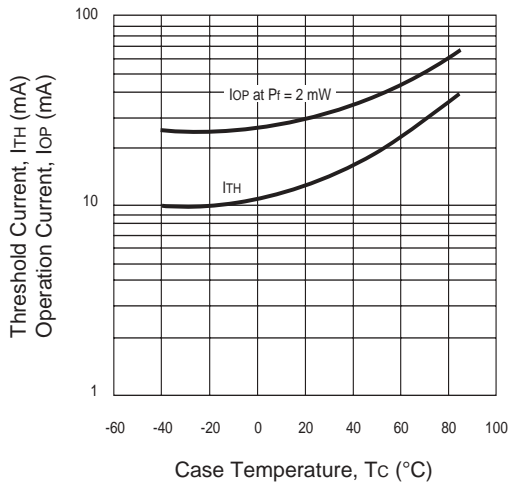
OPTICAL OUTPUT POWER vs. FORWARD CURRENT



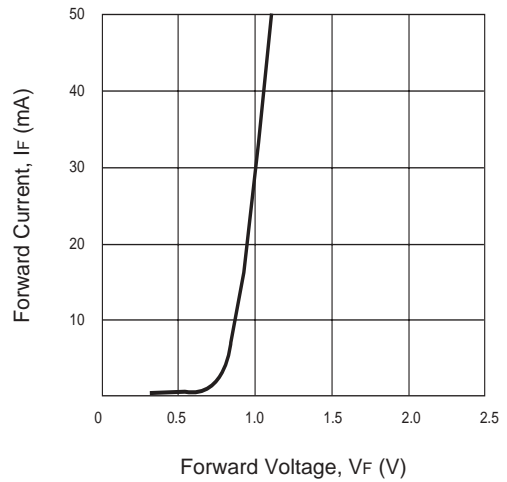
OPTICAL OUTPUT POWER vs. MONITOR CURRENT



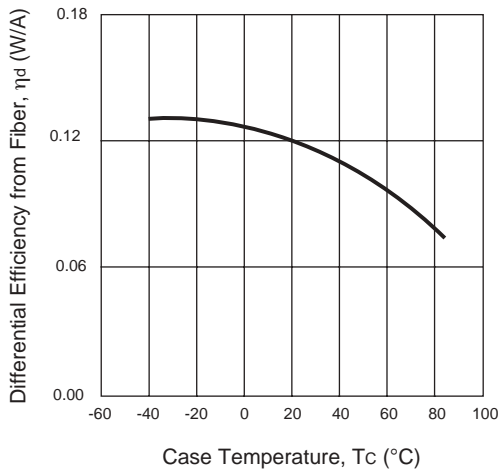
OPERATING CURRENT AND THRESHOLD CURRENT vs. CASE TEMPERATURE



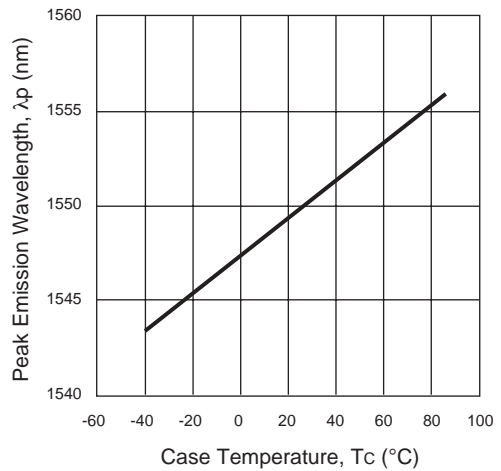
FORWARD CURRENT vs. FORWARD VOLTAGE



TEMPERATURE DEPENDENCE OF DIFFERENTIAL EFFICIENCY FROM FIBER

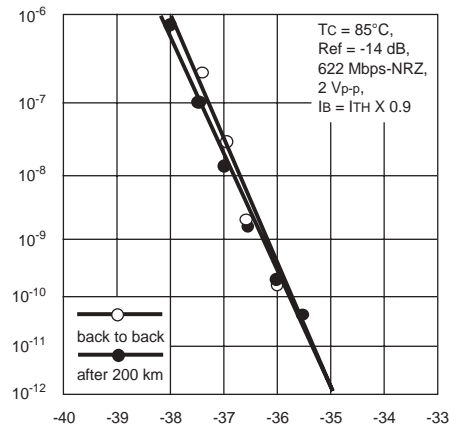
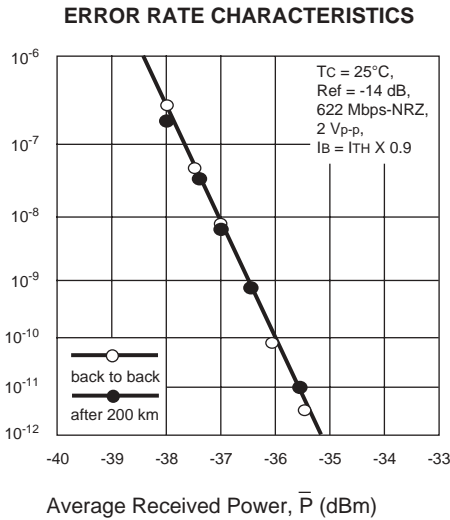
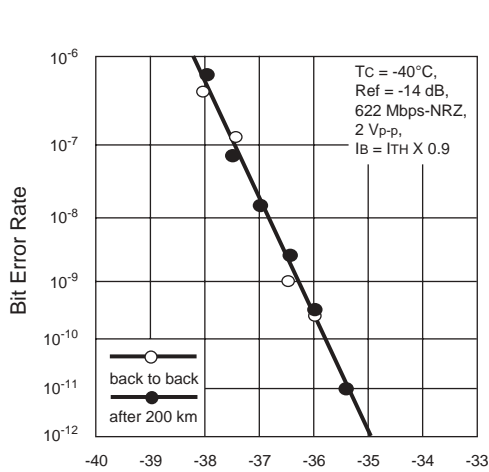
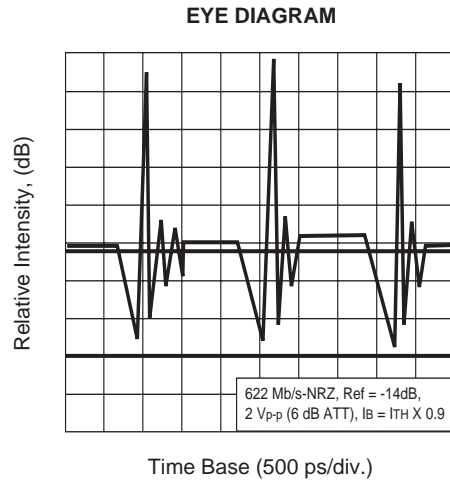
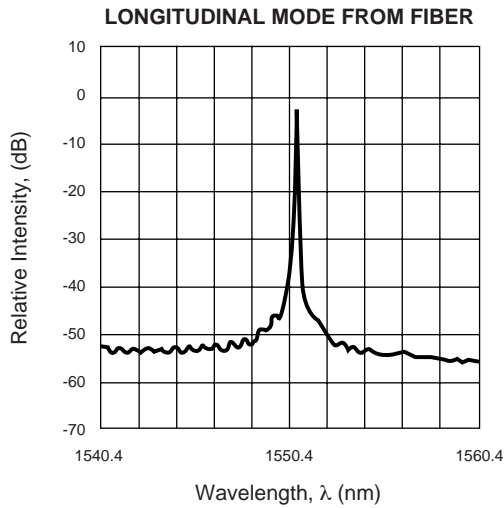


TEMPERATURE DEPENDENCE OF PEAK EMISSION WAVELENGTH



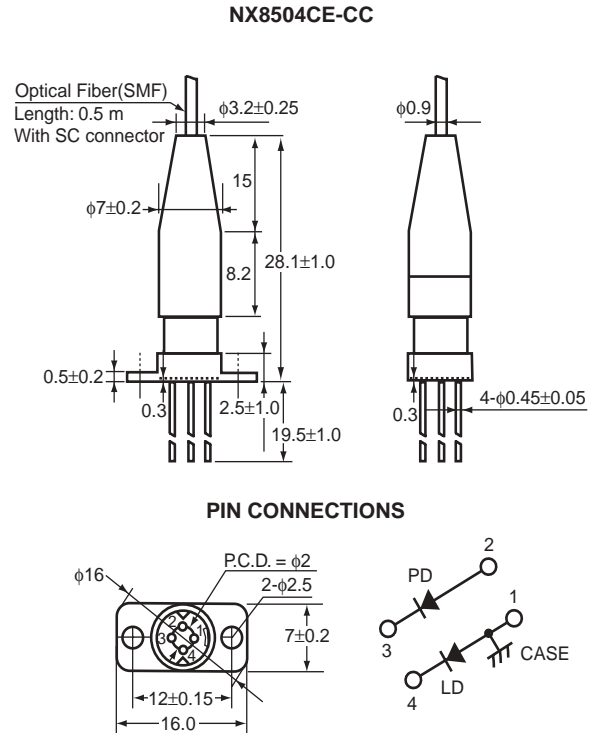
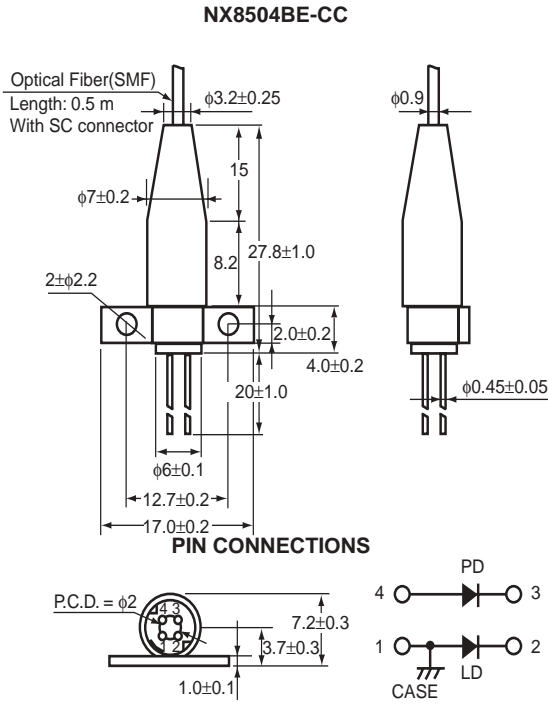
Remark: The graphs indicate nominal characteristics

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



Remark: The graphs indicate nominal characteristics

OUTLINE DIMENSIONS (Units in mm)

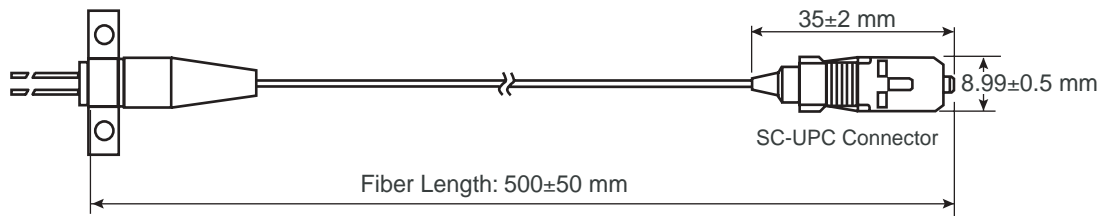


OPTICAL FIBER CHARACTERISTICS

PARAMETER	SPEC	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	

ORDERING INFORMATION

PART NUMBER	AVAILABLE CONNECTOR	DESCRIPTION
NX8504BE-CC	With SC-PC Connector	Flat Mount Flange
NX8504CE-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.

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