DATA SHEET

NEC

LASER DIODE

NX7303BA-CC,NX7303CA-CC

1 310 nm InGaAsP MQW-FP LASER DIODE
COAXIAL MODULE FOR 156 Mb/s

DESCRIPTION

★ The NX7303BA-CC and NX7303CA-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-1 and long-haul L-1.1 ITU-T recommendations.

FEATURES

- Center wavelength λ_C = 1 310 nm
- Optical output power P_f = 1.0 mW
- Low threshold current I_{th} = 9 mA
- High cut-off frequency f_C = 2.0 GHz
- Wide operating temperature range T_C = –40 to +85°C
- InGaAs monitor PIN-PD
- With SC-UPC connector
- Based on Telcordia reliability

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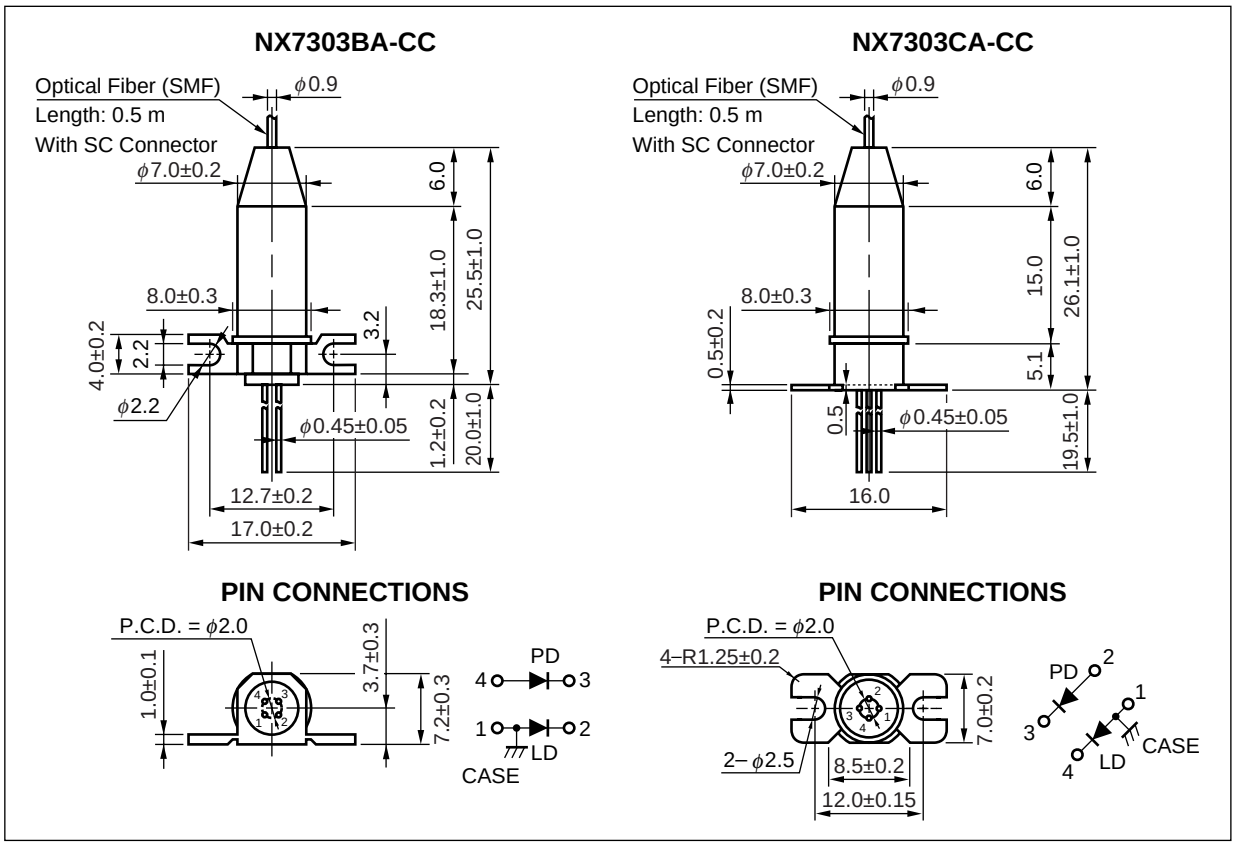
Date Published May 2002 CP(K)
Printed in Japan

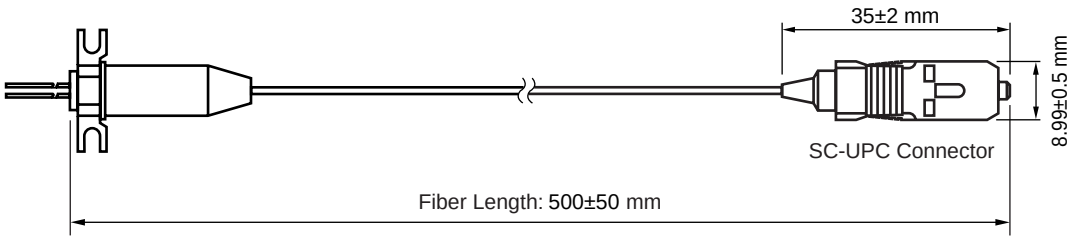
The mark ★ shows major revised points.

★ **PACKAGE DIMENSIONS (UNIT: mm)**



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	1 100 to 1 270	nm
Minimum Fiber Bending Radius	30	mm
Fiber Length	500±50	mm
Flammability	UL1581 VW-1	



ORDERING INFORMATION

Part Number	Flange Type	Available Connector
NX7303BA-CC	Flat Mount Flange	With SC-UPC Connector
★ NX7303CA-CC	Vertical Mount Flange	

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit
Optical Output Power from Fiber	P_f	3.0	mW
Forward Current of LD	I_F	150	mA
Reverse Voltage of LD	V_R	2.0	V
Forward Current of PD	I_F	10	mA
Reverse Voltage of PD	V_R	20	V
Operating Case Temperature	T_C	–40 to +85	°C
Storage Temperature	T_{stg}	–40 to +85	°C
★ Lead Soldering Temperature	T_{sld}	350 (3 sec.)	°C
Relative Humidity (noncondensing)	RH	85	%

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

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Optical Output Power from Fiber	P_f			1.0		mW
Operating Voltage	V_{op}	P_f = 1.0 mW		1.2	1.5	V
Threshold Current	I_{th}	T_C = 25°C	4	9	20	mA
			2		50	
Threshold Output Power	P_{th}	$I_F = I_{th}$			75	μW
Modulation Current	I_{mod}	P_f = 1.0 mW, T_C = 25°C	8	15	35	mA
		P_f = 1.0 mW	5		60	
Differential Efficiency	η_d	P_f = 1.0 mW, T_C = 25°C	0.030	0.070	0.100	W/A
		P_f = 1.0 mW	0.018		0.150	
Temperature Dependence of Differential Efficiency	$\Delta\eta_d$	$\Delta\eta_d = 10 \log \frac{\eta_d\ (@\ T_C°C)}{\eta_d\ (@\ 25°C)}$	–3	–2		dB
Kink (Refer to **DEFINITIONS**)	kink	P_f = Up to 1.2 mW			±20	%
Center Wavelength	λ_C	P_f = 1.0 mW, RMS (–20 dB)	1 263	1 310	1 360	nm
Temperature Dependence of Center Wavelength	$\Delta\lambda/\Delta T$			0.4	0.5	nm/°C
Spectral Width	σ	P_f = 1.0 mW, RMS (–20 dB)		1.3	4.0	nm
Cut-off Frequency	f_C	–3 dB		2.0		GHz
Rise Time	t_r	10-90%, P_{pk} = 1.0 mW, $I_F = I_{th}$		0.2	0.5	ns
Fall Time	t_f	90-10%, P_{pk} = 1.0 mW, $I_F = I_{th}$		0.3	0.5	ns

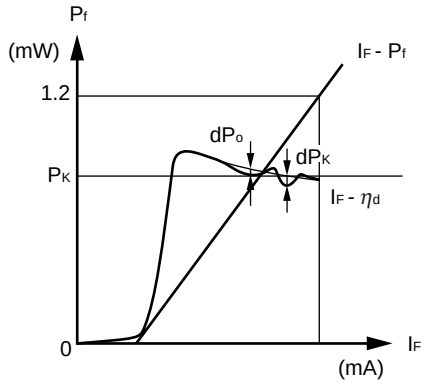
ELECTRO-OPTICAL CHARACTERISTICS

(Applicable to Monitor PD: T_C = –40 to +85°C, unless otherwise specified)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Monitor Current	I_m	V_R = 5 V, P_f = 1.0 mW	100	700	1 200	μA
Dark Current	I_D	V_R = 5 V, T_C = 25°C		0.1	50	nA
		V_R = 5 V		10	500	
Terminal Capacitance	C_t	V_R = 5 V, f = 1 MHz			20	pF
Linearity (Refer to **DEFINITIONS**)	LIN_m	V_R = 5 V, P_f = 0.1 to 1.0 mW			±10	%
Tracking Error (Refer to **DEFINITIONS**)	γ	I_m = const.		0.5	1.0	dB

PARAMETER DEFINITIONS

Kink : kink

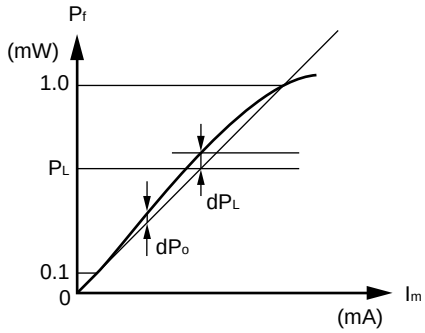


$$kink = \frac{|dP_K|}{P_K} \times 100\ [\%]$$

$dP_K = dP_o$ MAX.

$P_K \leq 1.2$ (mW)

Linearity : LIN_m

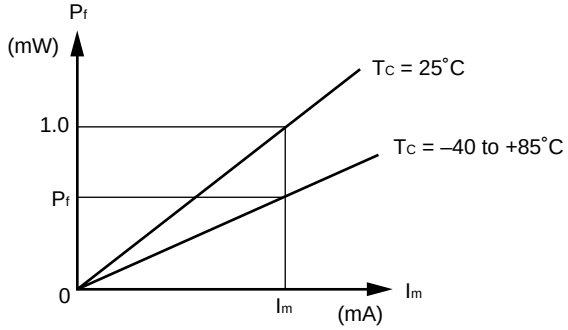


$$LIN_m = \frac{|dP_L|}{P_L} \times 100\ [\%]$$

$dP_L = dP_o$ MAX.

$0.1 < P_L < 1.0$ (mW)

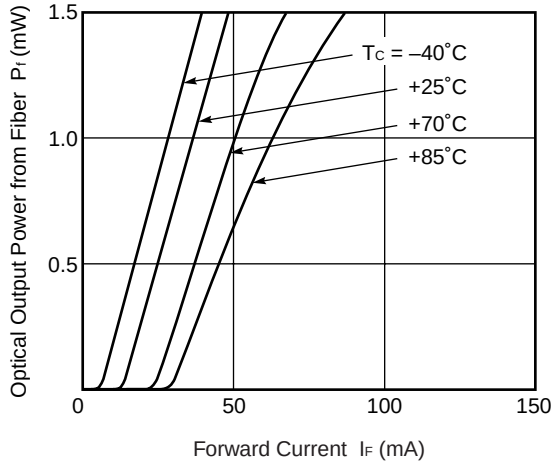
Tracking Error : γ



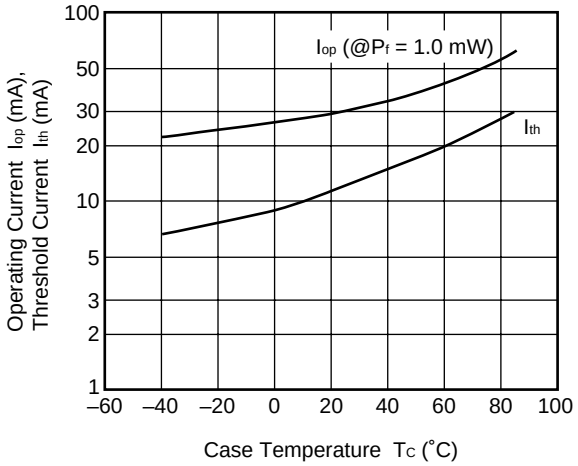
$$\gamma = \left| 10 \log \frac{P_f}{1.0} \right| [dB]$$

TYPICAL CHARACTERISTICS (T_C = –40 to +85°C)

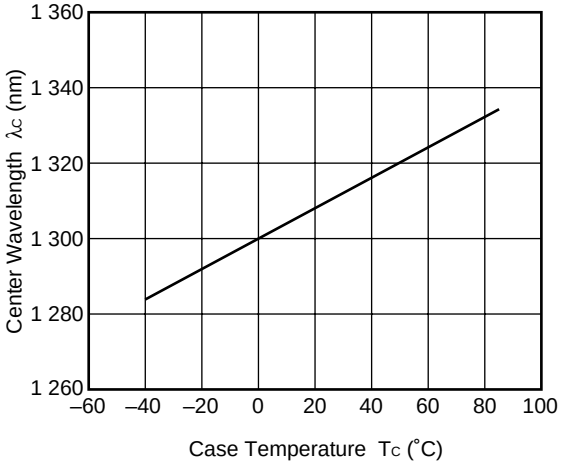
OPTICAL OUTPUT POWER FROM FIBER vs. FORWARD CURRENT



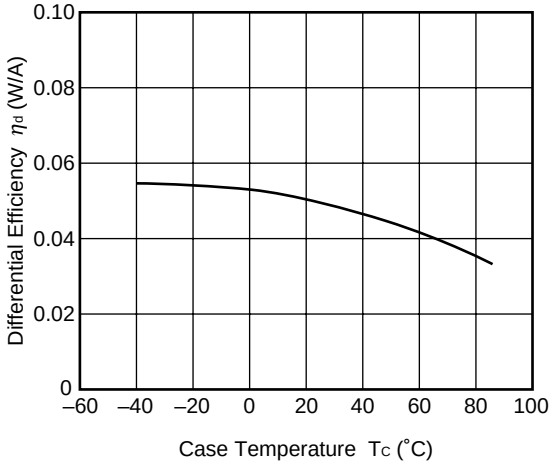
OPERATING CURRENT AND THRESHOLD CURRENT vs. CASE TEMPERATURE



TEMPERATURE DEPENDENCE OF CENTER WAVELENGTH



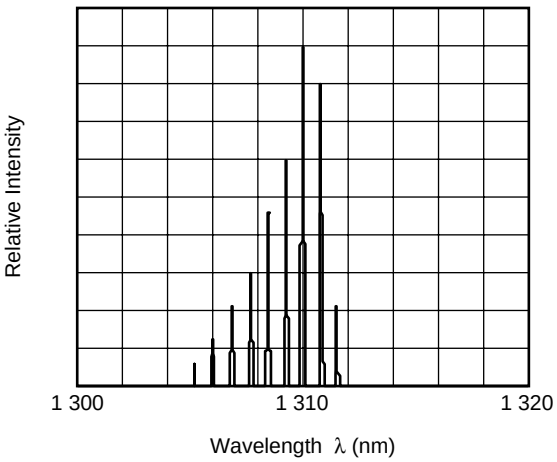
TEMPERATURE DEPENEDENCE OF DIFFERENTIAL EFFICIENCY



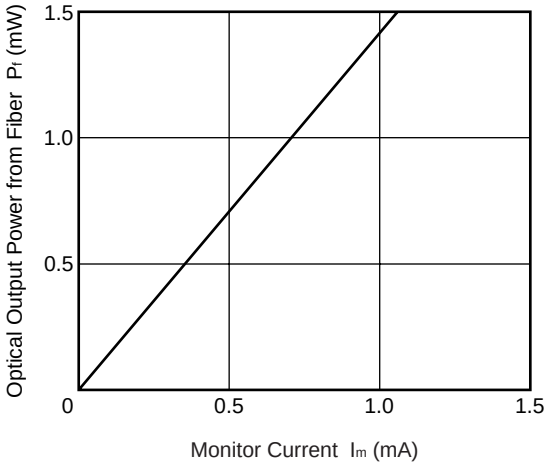
Remark The graphs indicate nominal characteristics.

TYPICAL CHARACTERISTICS (T_C = 25°C)

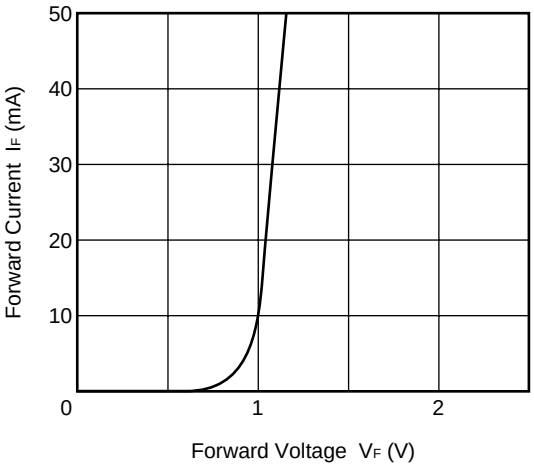
SPECTRUM



OPTICAL OUTPUT POWER FROM FIBER vs. MONITOR CURRENT



FORWARD CURRENT vs. FORWARD VOLTAGE



Remark The graphs indicate nominal characteristics.

FP-LD FAMILY

Part Number	Absolute Maximum Ratings		Electro-Optical Characteristics (T_C = –40 to +85°C)				Applications	Package
	T_C (°C)	T_{stg} (°C)	P_f (mW)	λ_C (nm)		σ (nm)		
			TYP.	MIN.	MAX.	MAX.		
★ NX7301BA-CC NX7301CA-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) 622 Mb/s: STM-4 (I-4)	Coaxial
★ NX7302BA-CC NX7302CA-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 NX7303CA-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*1	1 260	1 360	4.0	For fiberoptic communications	Coaxial

***1** MIN.

REFERENCE

Document Name	Document No.
Optical semiconducrtor 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[*1]	C11159E
Quality grades on NEC semiconductor devices[*1]	C11531E
SEMICONDUCTOR SELECTION GUIDE –Products and Packages–[*1]	X13769E

***1** Published by NEC Corporation

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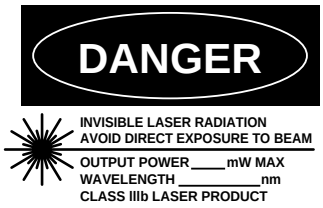

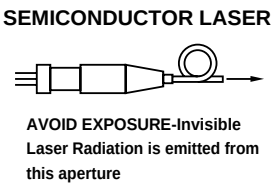

Warning Laser Beam	A laser beam is emitted from this diode during operation. The laser beam, visible or invisible, directly or indirectly, may cause injury to the eye or loss of eyesight. • Do not look directly into the laser beam. • Avoid exposure to the laser beam, any reflected or collimated beam.
Caution GaAs Products	The product contains gallium arsenide, GaAs. GaAs vapor and powder are hazardous to human health if inhaled or ingested. • Do not destroy or burn the product. • Do not cut or cleave off any part of the product. • Do not crush or chemically dissolve the product. • Do not put the product in the mouth. Follow related laws and ordinances for disposal. The product should be excluded from general industrial waste or household garbage.
Caution Optical Fiber	A glass-fiber is attached on the product. Handle with care. • When the fiber is broken or damaged, handle carefully to avoid injury from the damaged part or fragments.

▶Business issue

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▶Technical issue

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