DATA SHEET

NEC

LASER DIODE

NX8303BG-CC

1 310 nm InGaAsP MQW-DFB LASER DIODE COAXIAL MODULE FOR 622 Mb/s

DESCRIPTION

The NX8303BG-CC is a 1 310 nm Distributed Feed-Back (DFB) laser diode coaxial module with single mode fiber. Multiple Quantum Well (MQW) structure is adopted to achieve stable dynamic single longitudinal mode operation over wide temperature range of –10 to +85 °C.

This module is ideal as a light source for Synchronous Digital Hierarchy (SDH) system, STM-4, long-haul L-4.1 ITU-T recommendations.

FEATURES

- Peak emission wavelength λ_p = 1 310 nm
- Optical output power P_f = 2.0 mW
- Wide operating temperature range T_C = –10 to +85 °C
- Side Mode Suppression Ratio SMSR = 40 dB
- InGaAs monitor PIN-PD
- With SC-UPC connector
- Based on Telcordia reliability

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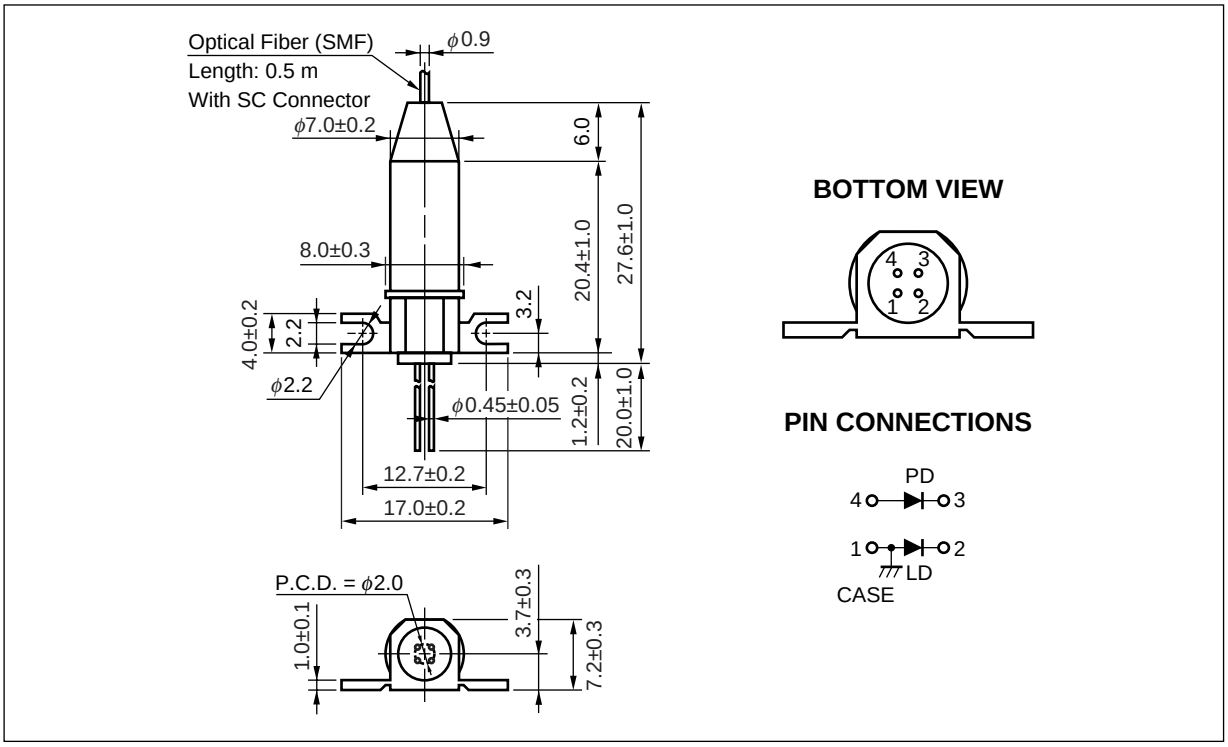
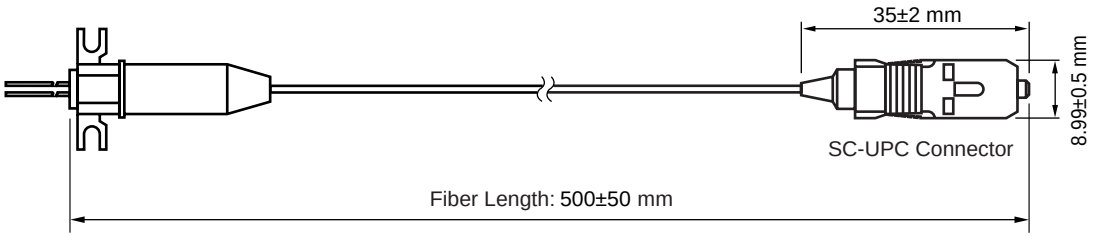
PACKAGE DIMENSIONS (UNIT : mm)



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	Available Connector	Flange Type
NX8303BG-CC	With SC-UPC Connector	Flat Mount Flange

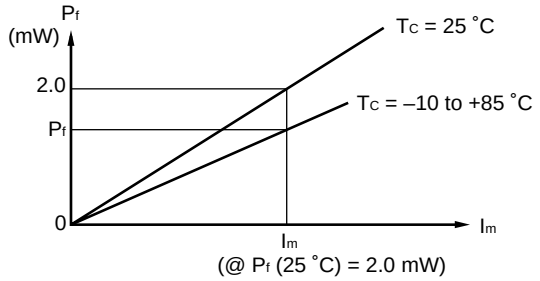
ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit
Optical Output Power from Fiber	P_f	5	mW
Forward Current of LD	I_F	150	mA
Reverse Voltage of LD	V_R	2.0	V
Forward Current of PD	I_F	2.0	mA
Reverse Voltage of PD	V_R	15	V
Operating Case Temperature	T_C	−10 to +85	°C
Storage Temperature	T_{stg}	−40 to +85	°C
Lead Soldering Temperature	T_{sld}	260 (10 sec.)	°C
Relative Humidity (noncondensing)	RH	85	%

ELECTRO-OPTICAL CHARACTERISTICS (T_C = –10 to +85 °C, unless otherwise specified)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Optical Output Power from Fiber	P_f	CW		2.0		mW
Operating Voltage	V_{op}	P_f = 2.0 mW		1.2	1.6	V
Threshold Current	I_{th}	T_C = 25 °C		15	25	mA
					55	
Threshold Output Power	P_{th}	$I_F = I_{th}$			100	μW
Modulation Current	I_{mod}	P_f = 2.0 mW, T_C = 25 °C	8	20	30	mA
		P_f = 2.0 mW	6		50	
Differential Efficiency	η_d	P_f = 2.0 mW, T_C = 25 °C	0.070	0.100	0.200	W/A
		P_f = 2.0 mW	0.040		0.300	
Temperature Dependence of Differential Efficiency	$\Delta\eta_d$	$\Delta\eta_d = 10 \log \frac{\eta_d\ (@\ T_C\ °C)}{\eta_d\ (@\ 25\ °C)}$	–3.5	–2.2		dB
Kink	kink	P_f = Up to 2.4 mW			±20	%
Peak Emission Wavelength	λ_p	P_f = 2.0 mW	1 280	1 310	1 335	nm
Temperature Dependence of Peak Emission Wavelength	$\Delta\lambda/\Delta T$			0.09	0.1	nm/°C
Spectral Width	$\Delta\lambda$	P_f = 2.0 mW, –20 dB down width		0.1	1.0	nm
Side Mode Suppression Ratio	SMSR	P_f = 2.0 mW	30	40		dB
Cutt-off Frequency	f_C	–3 dB, V_R = 5 V, P_f = 2.0 mW		2.0		GHz
Rise Time	t_r	10-90 %, P_{pk} = 2.0 mW, $I_F = I_{th}$		0.15	0.5	ns
Fall Time	t_f	90-10 %, P_{pk} = 2.0 mW, $I_F = I_{th}$		0.15	0.5	ns
Monitor Current	I_m	V_R = 5 V, P_f = 2.0 mW	200	700	1 500	μA
Monitor Dark Current	I_D	V_R = 5 V, T_C = 25 °C		0.1	50	nA
		V_R = 5 V		10	500	
Monitor PD Terminal Capacitance	C_t	V_R = 5 V, f = 1 MHz		1.0	20	pF
Linearity	LIN_m	V_R = 5 V, P_f = 0.2 to 2.0 mW			10	%
Tracking Error	γ *1	I_m = const.		0.5	1.0	dB
Relative Intensity Noise	RIN	Ref = –14 dB		–135		dB/Hz

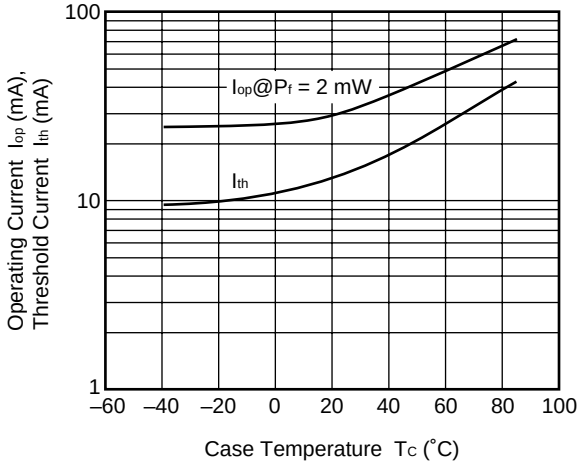
***1** $\gamma = \left| 10 \log \frac{P_f}{2.0\ mW} \right|$



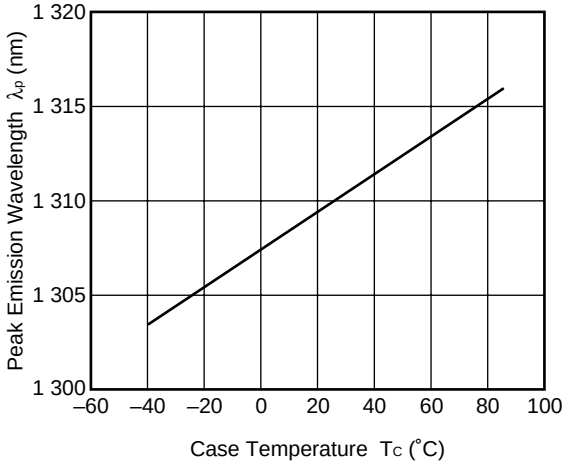
(@ P_f (25 ˚C) = 2.0 mW)

TYPICAL CHARACTERISTICS (T_C = 25 °C, unless otherwise specified)

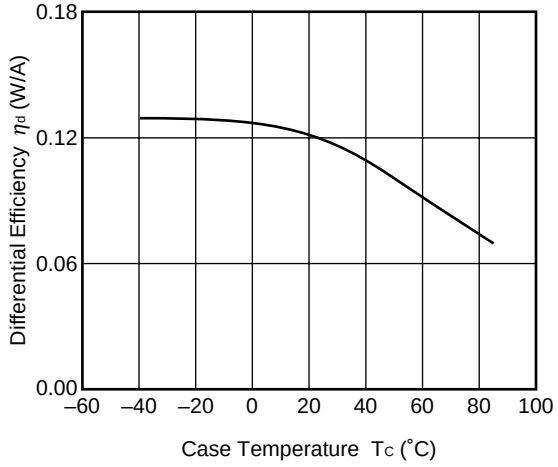
OPERATING CURRENT AND THRESHOLD CURRENT vs. CASE TEMPERATURE



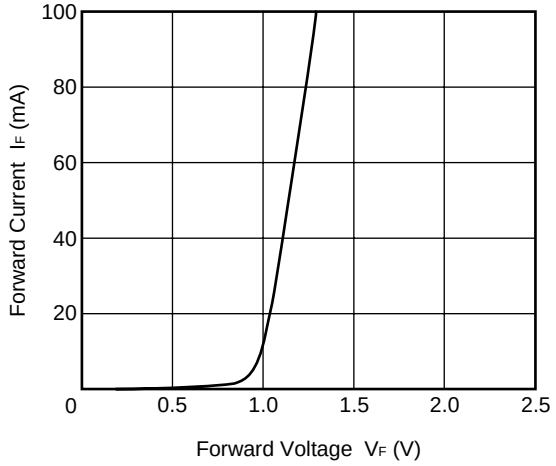
TEMPERATURE DEPENDENCE OF PEAK EMISSION WAVELENGTH



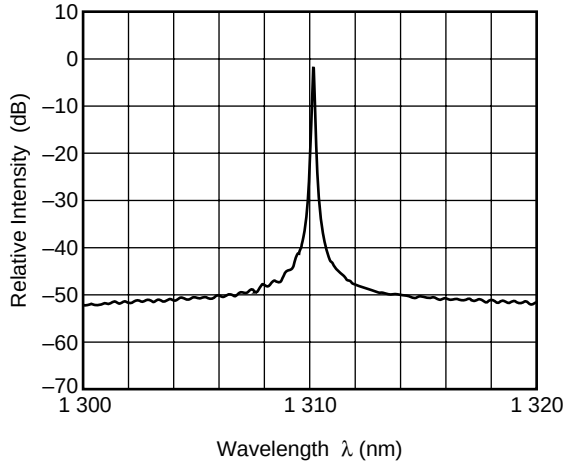
TEMPERATURE DEPENEDENCE OF DIFFERENTIAL EFFICIENCY



FORWARD CURRENT vs. FORWARD VOLTAGE



LONGITUDINAL MODE



Remark The graphs indicate nominal characteristics.

DFB-LD FAMILY

Part Number	Absolute Maximum Ratings		Electro-Optical Characteristics (T_C = 25 °C)			Application	Package
	T_C (°C)	T_{stg} (°C)	I_{th} (mA)	P_f (mW)	λ_p (nm)		
			TYP.	MIN.	TYP.		
NX8300BE-CC NX8300CE-CC	0 to +75	−40 to +85	15	2	1 310	2.5 Gb/s: STM-16 (S-16.1, L-16.1)	Coaxial
NX8303BG-CC	−10 to +85	−40 to +85	15	2*1	1 310	622 Mb/s: STM-4 (L-4.1)	Coaxial
NX8503BG-CC	−10 to +85	−40 to +85	15	2*1	1 550	156 Mb/s: STM-1 (L-1.2, L-1.3)	Coaxial
						622 Mb/s: STM-4 (L-4.2, L-4.3)	
NX8504BE-CC NX8504CE-CC	−10 to +85	−40 to +85	15	2	1 550	622 Mb/s: STM-4 (L-4.2, L-4.3)	Coaxial
NX8560LJ-CC	−10 to +70	−40 to +85	6	−2 dBm	1 550*2	≤ 10 Gb/s: STM-64	BFY with GPO
NX8562LB	−20 to +65	−40 to +85	20	20	1 550*2	CW Light Source for external modulator	BFY
NX8563LB	−20 to +65	−40 to +85	20	10	1 550*2	CW Light Source for external modulator	BFY
NX8564LE-CC	−20 to +70	−40 to +85	7	0.5	1 550*2	2.5 Gb/s: STM-16 EA modulator integrated	BFY
NX8565LE-CC	−20 to +70	−40 to +85	7	0.5	1 550*2	2.5 Gb/s: STM-16 EA modulator integrated	BFY
NX8570SA	−20 to +70	−40 to +85	20	20	1 550*2	CW Light Source with λ monitoring PD	BFY

***1** TYP.

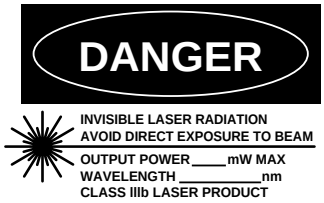
***2** Available for DWDM Wavelength based on ITU-T recommendation

REFERENCE

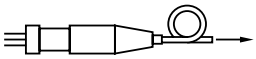
Document Name	Document No.
NEC semiconductor device reliability/quality control system	C11159E
Quality grades on NEC semiconductor devices	C11531E
Semiconductor device mounting technology manual	C10535E
SEMICONDUCTOR SELECTION GUIDE Products & Packages (CD-ROM)	X13769X

CAUTION

Within this device there exists GaAs (Gallium Arsenide) material which is a harmful substance if ingested. Please do not under any circumstances break the hermetic seal.



SEMICONDUCTOR LASER



AVOID EXPOSURE-Invisible Laser Radiation is emitted from this aperture

NEC Corporation
NEC Building, 7-1, Shiba 5-chome, Minato-ku, Tokyo 108-01, Japan

Type number: _____
Manufactured: _____
Serial Number: _____

This product conforms to FDA regulations as applicable to standards 21 CFR Chapter 1. Subchapter J.

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