

**1 550 nm InGaAsP MQW-DFB LASER DIODE  
COAXIAL MODULE FOR 156 Mb/s, 622 Mb/s****DESCRIPTION**

The NX8503BG-CC is a 1 550 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-1, long-haul L-1.2, L-1.3 and STM-4, long-haul L-4.2, L-4.3 ITU-T recommendations.

**FEATURES**

- Peak emission wavelength  $\lambda_p = 1\ 550$  nm
- Optical output power  $P_f = 2.0$  mW
- Low threshold current  $I_{th} = 15$  mA @  $T_c = 25$  °C
- Wide operating temperature range  $T_c = -10$  to  $+85$  °C
- InGaAs monitor PIN-PD
- With SC-UPC connector
- Based on Telcordia reliability

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Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.



**ORDERING INFORMATION**

Part Number	Available Connector	Flange Type
NX8503BG-CC	With SC-UPC Connector	Flat Mount Flange

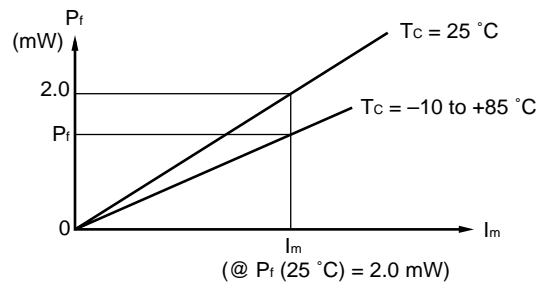
**ABSOLUTE MAXIMUM RATINGS**

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<sub>c</sub> = -10 to +85 °C, unless otherwise specified)**

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Optical Output Power from Fiber	P <sub>f</sub>	CW		2.0		mW
Operating Voltage	V <sub>op</sub>	P <sub>f</sub> = 2.0 mW		1.1	1.6	V
Threshold Current	I <sub>th</sub>	T <sub>c</sub> = 25 °C		15	25	mA
			2		50	
Threshold Output Power	P <sub>th</sub>	I <sub>f</sub> = I <sub>th</sub>			100	μW
Modulation Current	I <sub>mod</sub>	P <sub>f</sub> = 2.0 mW, T <sub>c</sub> = 25 °C	15	25	40	mA
			13		60	
Differential Efficiency	η <sub>d</sub>	P <sub>f</sub> = 2.0 mW, T <sub>c</sub> = 25 °C	0.050	0.080	0.130	W/A
			0.030		0.150	
Temperature Dependence of Differential Efficiency	Δη <sub>d</sub>	$\Delta\eta_d = 10 \log \frac{\eta_d (@ T_c \text{ °C})}{\eta_d (@ 25 \text{ °C})}$	-3	-1.6		dB
Kink	kink	P <sub>f</sub> = Up to 2.4 mW			±20	%
Peak Emission Wavelength	λ <sub>p</sub>	P <sub>f</sub> = 2.0 mW	1 530	1 550	1 570	nm
Temperature Dependence of Peak Emission Wavelength	Δλ/ΔT			0.1	0.12	nm/°C
Spectral Width	Δλ	P <sub>f</sub> = 2.0 mW, -20 dB down width		0.3	1.0	nm
Side Mode Suppression Ratio	SMSR	P <sub>f</sub> = 2.0 mW	30	40		dB
Cutt-off Frequency	f <sub>c</sub>	-3 dB, V <sub>R</sub> = 5 V, P <sub>f</sub> = 2.0 mW		2.0		GHz
Rise Time	t <sub>r</sub>	10-90 %, P <sub>pk</sub> = 2.0 mW, I <sub>f</sub> = I <sub>th</sub>			0.5	ns
Fall Time	t <sub>f</sub>	90-10 %, P <sub>pk</sub> = 2.0 mW, I <sub>f</sub> = I <sub>th</sub>			0.5	ns
Monitor Current	I <sub>m</sub>	V <sub>R</sub> = 5 V, P <sub>f</sub> = 2.0 mW	200	1 000	2 000	μA
Monitor Dark Current	I <sub>d</sub>	V <sub>R</sub> = 5 V, T <sub>c</sub> = 25 °C		1.0	50	nA
					10	
Monitor PD Terminal Capacitance	C <sub>t</sub>	V <sub>R</sub> = 5 V, f = 1 MHz		1.0	20	pF
Linearity	LIN <sub>m</sub>	V <sub>R</sub> = 5 V, P <sub>f</sub> = 0.2 to 2.0 mW			10	%
Tracking Error	γ <sup>*1</sup>	I <sub>m</sub> = const.		0.5	1.0	dB
Relative Intensity Noise	RIN	Ref = -14 dB		-135		dB/Hz

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



★ DFB-LD FAMILY

Part Number	Absolute Maximum Ratings		Electro-Optical Characteristics (T <sub>c</sub> = 25 °C)			Application	Package
	T <sub>c</sub> (°C)	T <sub>stg</sub> (°C)	I <sub>th</sub> (mA)	P <sub>f</sub> (mW)	λ <sub>p</sub> (nm)		
			TYP.	MIN.	TYP.		
NX8300BE-CC NX8300CE-CC	0 to +75	-40 to +85	15	2 <sup>*1</sup>	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 <sup>*1</sup>	1 310	622 Mb/s: STM-4 (L-4.1)	Coaxial
NX8503BG-CC	-10 to +85	-40 to +85	15	2 <sup>*1</sup>	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 <sup>*1</sup>	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 <sup>*2</sup>	≤ 10 Gb/s: STM-64	BFY with GPO
NX8562LB	-20 to +65	-40 to +85	20	20	1 550 <sup>*2</sup>	CW Light Source for external modulator	BFY
NX8563LB	-20 to +65	-40 to +85	20	10	1 550 <sup>*2</sup>	CW Light Source for external modulator	BFY
NX8564LE-CC	-20 to +70	-40 to +85	7	0.6 <sup>*1</sup>	1 550 <sup>*2</sup>	2.5 Gb/s: STM-16 EA modulator integrated	BFY
NX8565LE-CC	-20 to +70	-40 to +85	7	0.6 <sup>*1</sup>	1 550 <sup>*2</sup>	2.5 Gb/s: STM-16 EA modulator integrated	BFY
NX8570SA	-20 to +70	-40 to +85	20	20	1 550 <sup>*2</sup>	CW Light Source with λ monitoring PD	BFY

\*1 TYP.

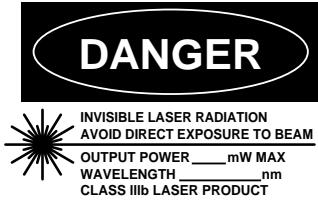
\*2 Available for DWDM Wavelength based on ITU-T recommendation

**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.

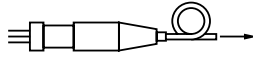


**DANGER**

INVISIBLE LASER RADIATION  
AVOID DIRECT EXPOSURE TO BEAM

OUTPUT POWER \_\_\_\_\_mW MAX  
WAVELENGTH \_\_\_\_\_nm  
CLASS IIIb LASER PRODUCT

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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