DATA SHEET

NEC

LASER DIODE
NX5501 Series

1 550 nm FOR FTTH
InGaAsP MQW-FP LASER DIODE

★ DESCRIPTION

The NX5501 Series is a 1 550 nm Multiple Quantum Well (MQW) structured Fabry-Perot (FP) laser diode with InGaAs monitor PIN-PD.

★ APPLICATION

- FTTH (Fiber To The Home)

FEATURES

- Optical output power P_o = 5.0 mW
- Low threshold current I_{th} = 8 mA
- ★ Differential efficiency η_d = 0.3 W/A
- ★ Wide operating temperature range T_C = –40 to +85°C
- InGaAs monitor PIN-PD
- CAN package ϕ 5.6 mm

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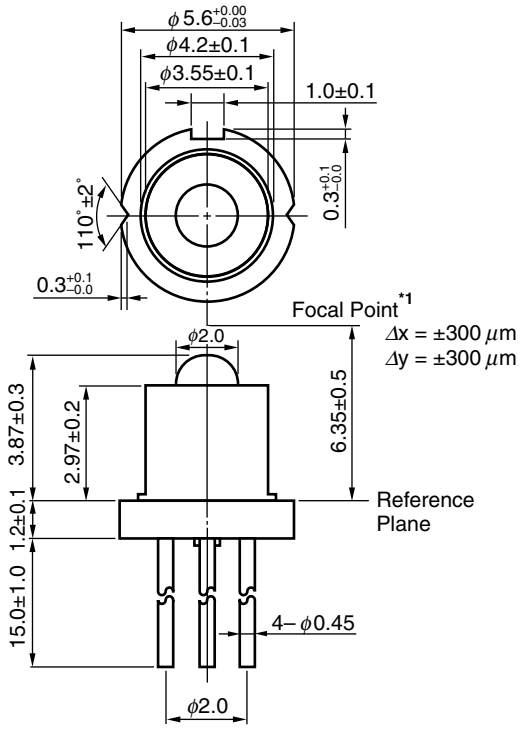
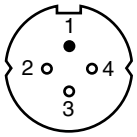
Date Published June 2004 CP(K)
Printed in Japan

The mark ★ shows major revised points.

★ **PACKAGE DIMENSIONS (UNIT: mm)**

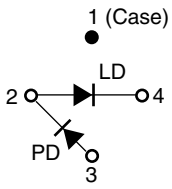


BOTTOM VIEW

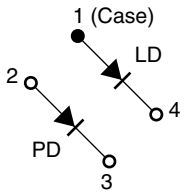


PIN CONNECTIONS

NX5501EH

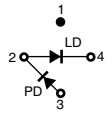
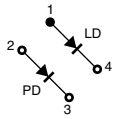


NX5501EK



***1** Focal Point: A point to get maximum optical output power from fiber.

★ ORDERING INFORMATION

Part Number	Package	Pin Connections
NX5501EH	4-pin CAN with ball lens cap	
NX5501EK		

Remarks 1. The color of ball lens cap might be observed differently from our can package products.

2. The hermetic test will be performed as AQL 1.0%.

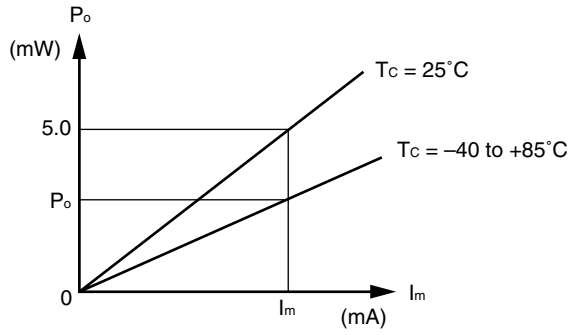
ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit
Optical Output Power	P_o	10	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
Assembly Temperature	T_{asb}	150 (15 Hr)	°C
Lead Soldering Temperature	T_{sld}	350 (3 sec.)	°C
Relative Humidity (noncondensing)	RH	85	%

ELECTRO-OPTICAL CHARACTERISTICS (T_C = 25°C, unless otherwise specified)

	Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
★	Operating Voltage	V_{op}	P_o = 5.0 mW, T_C = –40 to +85°C		1.1	1.5	V
	Threshold Current	I_{th}			8	20	mA
			T_C = 85°C		20	40	
★	Threshold Output Power	P_{th}	T_C = –40 to +85°C, I_F = I_{th}		100	200	μW
	Differential Efficiency	η_d		0.15	0.3		W/A
	Temperature Dependence of Differential Efficiency	$\Delta\eta_d$	$\Delta\eta_d = 10 \log \frac{\eta_d\ (@\ 85°C)}{\eta_d\ (@\ 25°C)}$	–3.0	–1.5		dB
★	Center Wavelength	λ_C	P_o = 5.0 mW, RMS (–20 dB), T_C = –40 to +85°C	1 480		1 580	nm
★	Temperature Dependence of Center Wavelength	$\Delta\lambda/\Delta T$	T_C = –40 to +85°C		0.5		nm/°C
★	Spectral Width	σ	P_o = 5.0 mW, RMS (–20 dB), T_C = –40 to +85°C		1.5	3.0	nm
	Rise Time	t_r	10-90%			0.7	ns
	Fall Time	t_f	90-10%			0.7	ns
	Monitor Current	I_m	V_R = 5 V, P_o = 5.0 mW	200		800	μA
	Monitor Dark Current	I_D	V_R = 5 V		0.1	10	nA
★			V_R = 5 V, T_C = –40 to +85°C			500	
	Monitor PD Terminal Capacitance	C_t	V_R = 5 V, f = 1 MHz		6	20	pF
★	Tracking Error[*1]	γ	I_m = const. (@ P_o = 5.0 mW, T_C = 25°C), T_C = –40 to +85°C	–1.0		1.0	dB

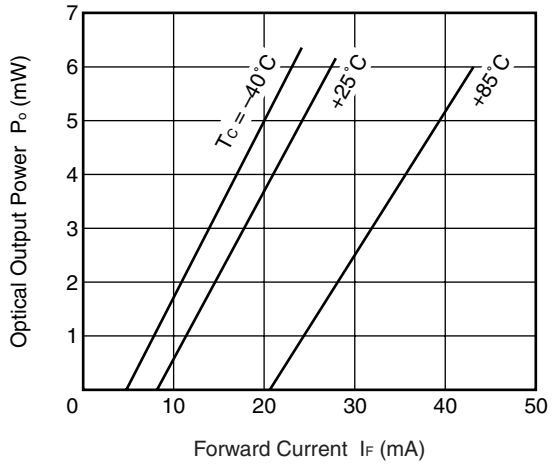
***1** Tracking Error: γ



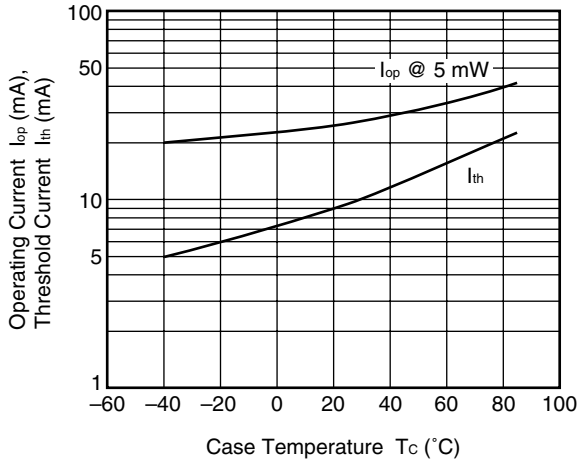
$$\gamma = \left| 10 \log \frac{P_o}{5.0} \right| [dB]$$

★ **TYPICAL CHARACTERISTICS (T_C = –40 to +85°C, unless otherwise specified)**

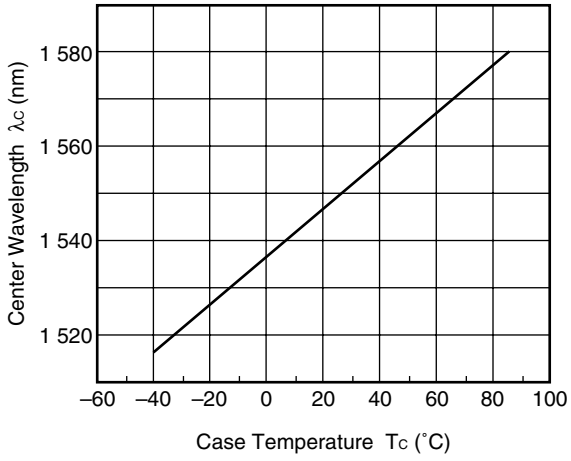
OPTICAL OUTPUT POWER vs. FORWARD CURRENT



OPERATING CURRENT AND THRESHOLD CURRENT vs. CASE TEMPERATURE



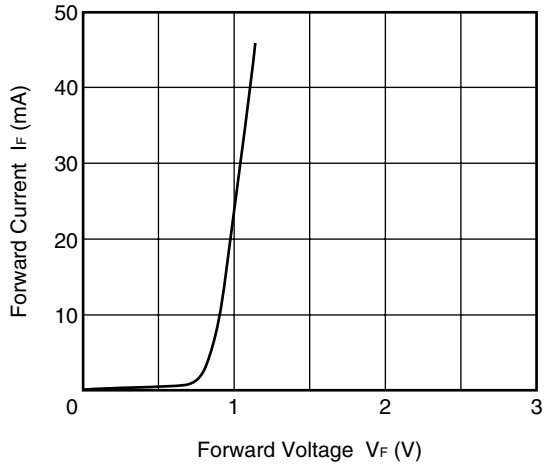
TEMPERATURE DEPENDENCE OF CENTER WAVELENGTH



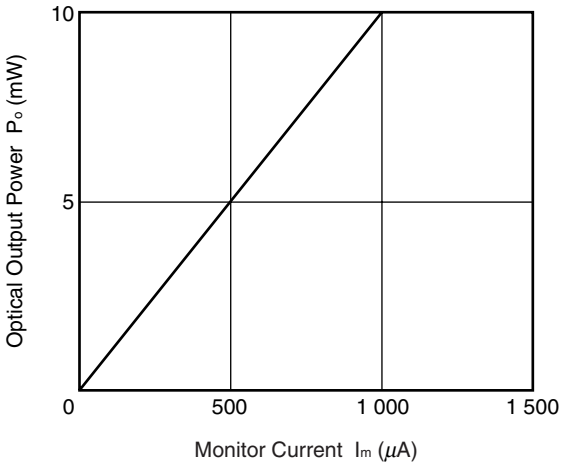
Remark The graphs indicate nominal characteristics.

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

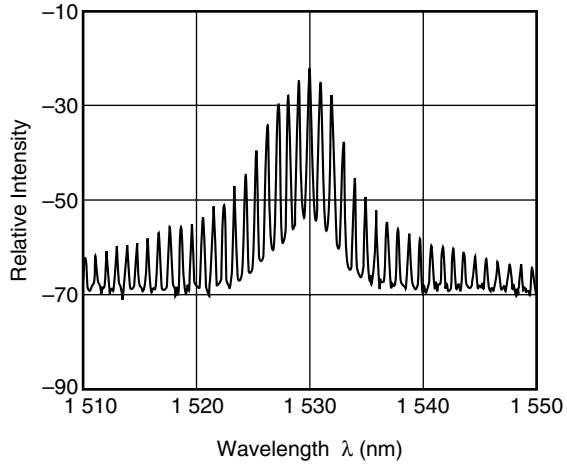
FORWARD CURRENT vs.
FORWARD VOLTAGE



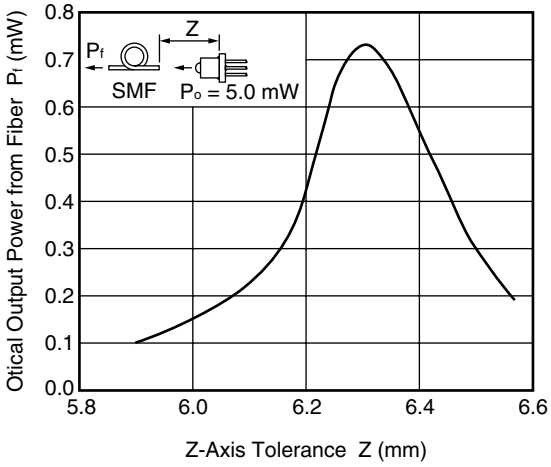
OPTICAL OUTPUT POWER
vs. MONITOR CURRENT



SPECTRUM



TOLERANCE OF FIBER
COUPLING DISTANCE (Z)



Remark The graphs indicate nominal characteristics.

REFERENCE

Document Name	Document No.
OPTICAL SEMICONDUCTOR DEVICES FOR FIBEROPTIC COMMUNICATIONS SELECTION GUIDE	PL10161E
Opto-Electronics Devices Pamphlet	PX10160E

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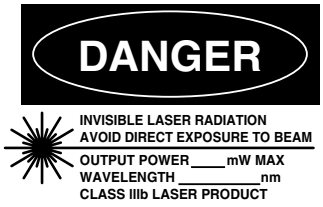

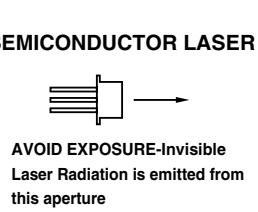

Warning Laser Beam	A laser beam is emitted from this diode during operation. The laser beam, visible or invisible, directly or indirectly, may cause injury to the eye or loss of eyesight. • Do not look directly into the laser beam. • Avoid exposure to the laser beam, any reflected or collimated beam.
Caution GaAs Products	This product uses gallium arsenide (GaAs). GaAs vapor and powder are hazardous to human health if inhaled or ingested, so please observe the following points. • Follow related laws and ordinances when disposing of the product. If there are no applicable laws and/or ordinances, dispose of the product as recommended below. 1. Commission a disposal company able to (with a license to) collect, transport and dispose of materials that contain arsenic and other such industrial waste materials. 2. Exclude the product from general industrial waste and household garbage, and ensure that the product is controlled (as industrial waste subject to special control) up until final disposal. • Do not burn, destroy, cut, crush, or chemically dissolve the product. • Do not lick the product or in any way allow it to enter the mouth.

▶**For further information, please contact**

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