DATA SHEET

NEC

LASER DIODE
NX5504 Series

1 550 nm FOR FTTH
InGaAsP MQW-FP LASER DIODE

DESCRIPTION

The NX5504 Series is a 1 550 nm Multiple Quantum Well (MQW) structured Fabry-Perot (FP) laser diodes with InGaAs monitor PIN-PD. These devices are designed and ideal for Fiber To The Home (FTTH).

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 ϕ5.6 mm
- Fiber coupling point 5.8 mm

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The mark <R> shows major revised points.

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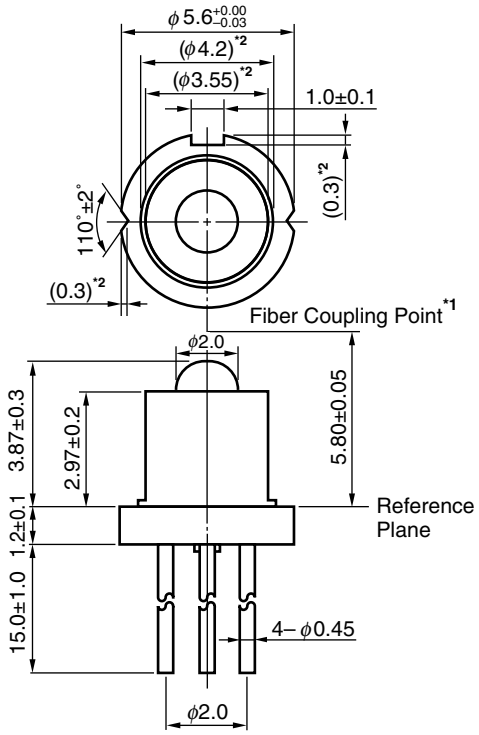
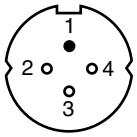
The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

<R> **PACKAGE DIMENSIONS (UNIT: mm)**

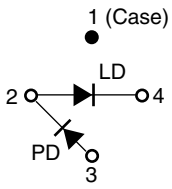


BOTTOM VIEW

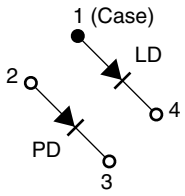


PIN CONNECTIONS

NX5504EH



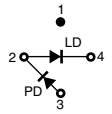
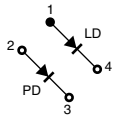
NX5504EK



***1** Recommendation of Fiber Coupling Conditions
Fiber : SMF with 8 degree angle-polished ferrule
Fiber coupling distance : 5.80±0.05 mm from reference plane.
Fiber coupling alignment : optimixed x, y, θ (Δx, Δy ≤ ±300 μm).

***2** ( ) indicates nominal dimension.

ORDERING INFORMATION

Part Number	Package	Pin Connections
NX5504EH	4-pin CAN with ball lens cap	
NX5504EK		

Remarks 1. The color of ball lens cap might be observed differently.

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

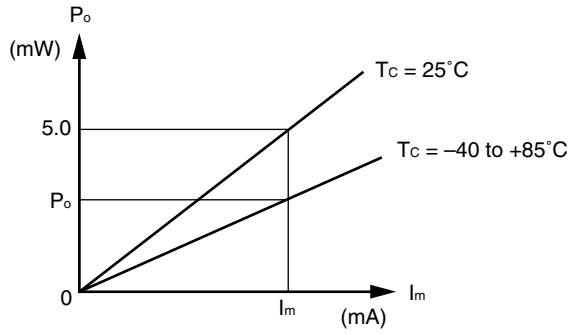
ABSOLUTE MAXIMUM RATINGS

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			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

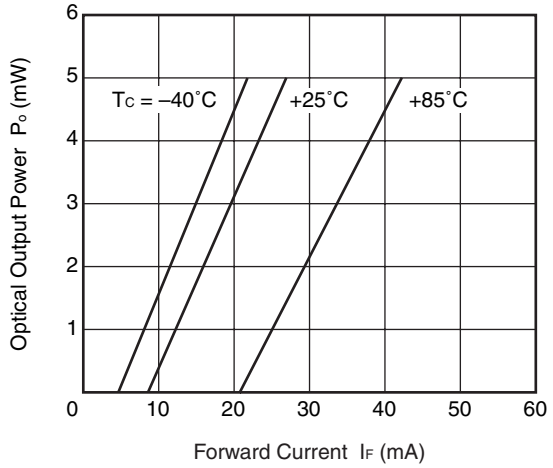
***1** Tracking Error: γ



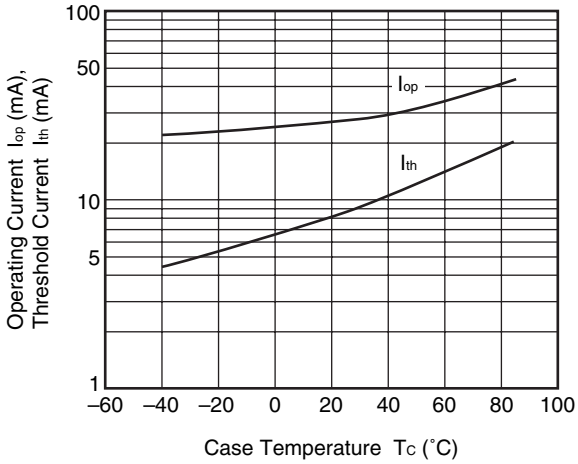
$$\gamma = \left| 10 \log \frac{P_o}{5.0} \right| [dB]$$

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

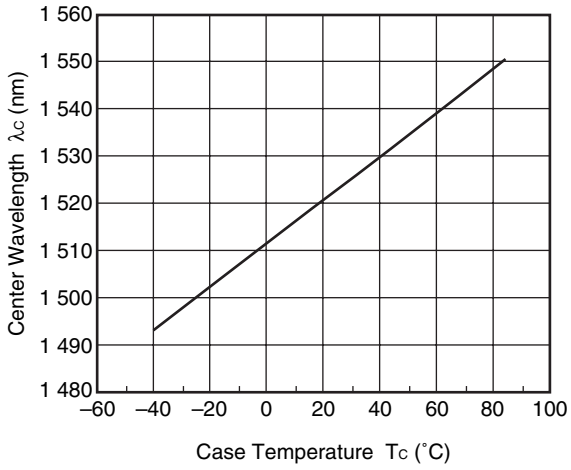
OPTICAL OUTPUT POWER vs. FORWARD CURRENT



OPERATING CURRENT AND THRESHOLD CURRENT vs. CASE TEMPERATURE



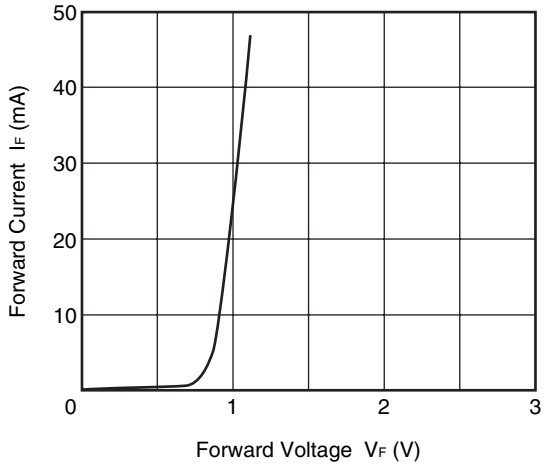
TEMPERATURE DEPENDENCE OF CENTER WAVELENGTH



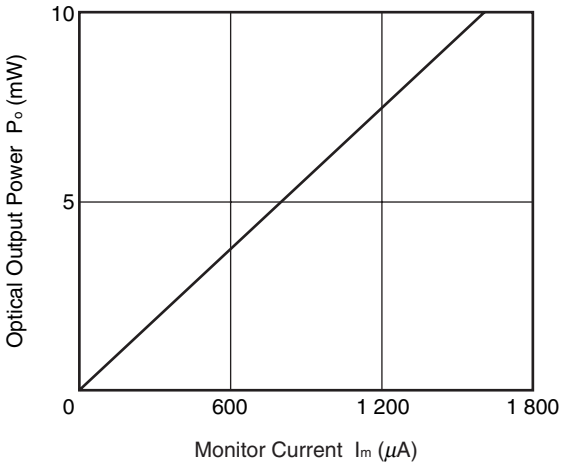
Remark The graphs indicate nominal characteristics.

<R> **TYPICAL CHARACTERISTICS (T_C = 25°C, unless otherwise specified)**

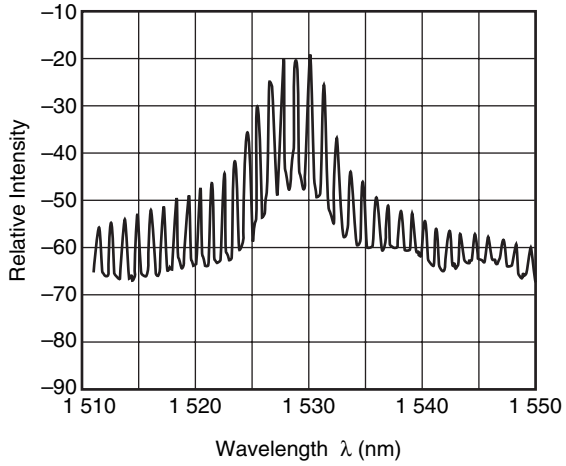
FORWARD CURRENT vs. FORWARD VOLTAGE



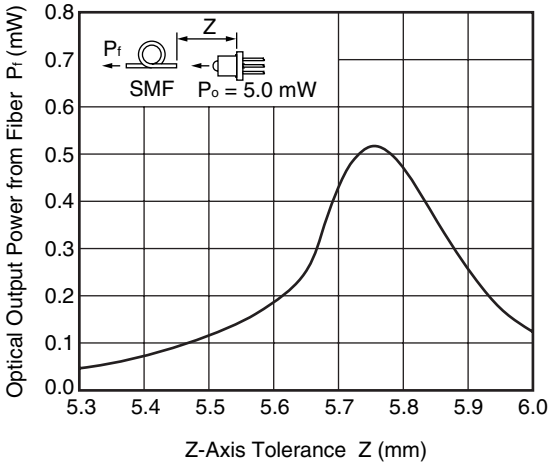
OPTICAL OUTPUT POWER vs. MONITOR CURRENT



SPECTRUM



TOLERANCE OF FIBER COUPLING DISTANCE (Z)



Remark The graphs indicate nominal characteristics.

REFERENCE

Document Name	Document No.
Opto-Electronics Devices Pamphlet*1	PX10160E

***1** Published by the former NEC Compound Semiconductor Devices, Ltd.

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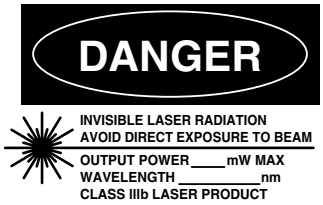
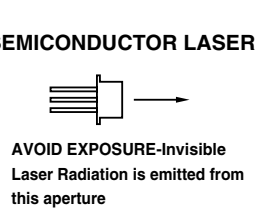
SAFETY INFORMATION ON THIS PRODUCT





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.

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