PRELIMINARY DATA SHEET

NEC

LASER DIODE

NX5302 Series

1 310 nm FOR 156 Mb/s, SHORT HAUL 622 Mb/s InGaAsP MQW-FP LASER DIODE

★ **DESCRIPTION**

The NX5302 Series is a 1 310 nm Multiple Quantum Well (MQW) structured Fabry-Perot (FP) laser diodes with InGaAs monitor PIN-PD. These devices are ideal for Synchronous Digital Hierarchy (SDH) system, short haul and long haul STM-1, short haul STM-4, ITU-T recommendations.

FEATURES

- Optical output power P_o = 5.0 mW
- Low threshold current I_{th} = 10 mA
- ★ High speed t_r = 0.15 ns MAX.
  t_f = 0.3 ns MAX.
- Wide operating temperature range T_C = –40 to +85°C
- InGaAs monitor PIN-PD
- CAN package ϕ 5.6 mm
- Based on Telcordia reliability

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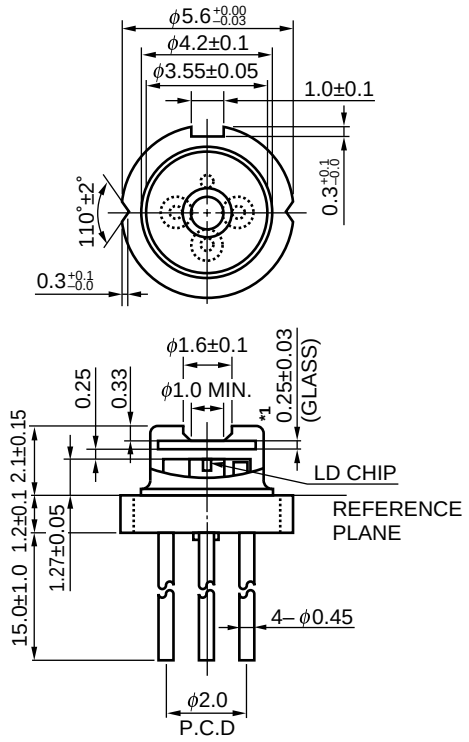
(Previous No. P15639EJ1V0DS00)
Date Published February 2002 CP(K)
Printed in Japan

The mark ★ shows major revised points.

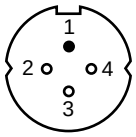
★ **PACKAGE DIMENSIONS (UNIT: mm)**

NX5302S Series



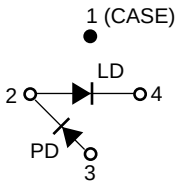
***1** n = 1.48 Bolosilicate Glass

BOTTOM VIEW

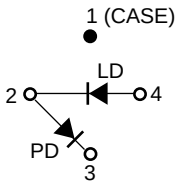


PIN CONNECTIONS

NX5302SH



NX5302SI



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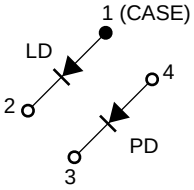
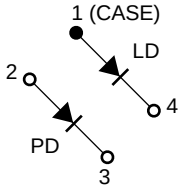
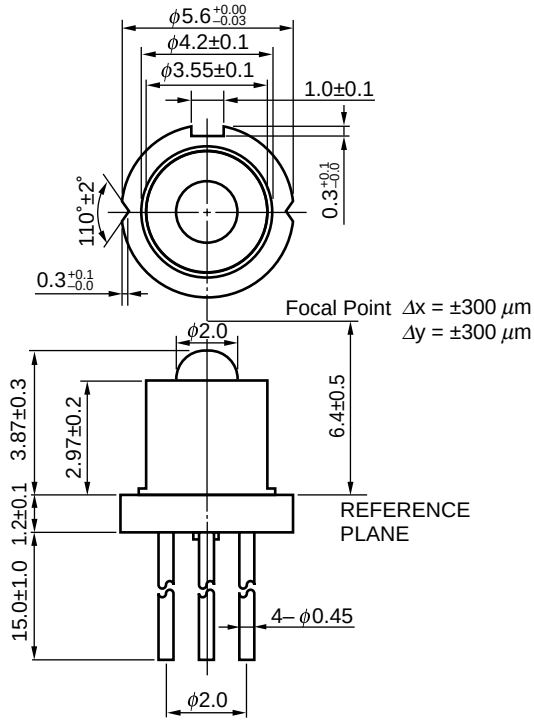


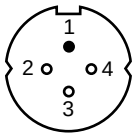
NX5302SK



NX5302E Series

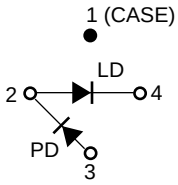


BOTTOM VIEW

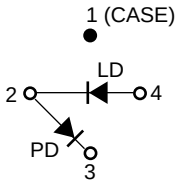


PIN CONNECTIONS

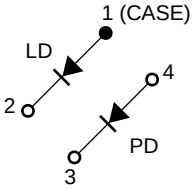
NX5302EH



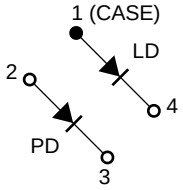
NX5302EI



NX5302EJ

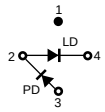
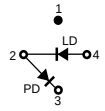
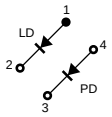
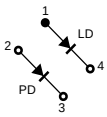


NX5302EK

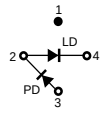
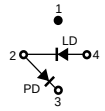
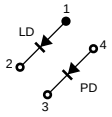
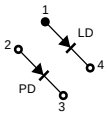


★ ORDERING INFORMATION

NX5302S Series

Part Number	Package	Pin Connections
NX5302SH	4-pin CAN with flat glass cap	
NX5302SI		
NX5302SJ		
NX5302SK		

NX5302E Series

Part Number	Package	Pin Connections
NX5302EH	4-pin CAN with spherical lens cap	
NX5302EI		
NX5302EJ		
NX5302EK		

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
★ Lead Soldering Temperature	T_{sld}	350 (3 sec.)	°C
Relative Humidity (noncondensing)	RH	85	%

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

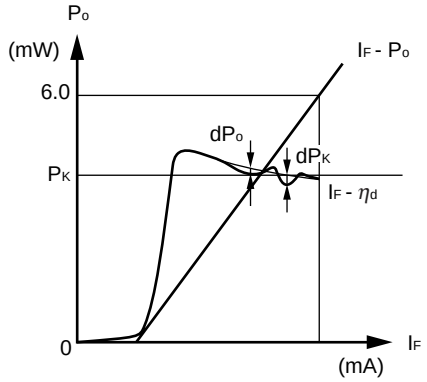
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Operating Voltage	V_{op}	P_o = 5.0 mW	–	1.1	1.3	V
Threshold Current	I_{th}		–	10	20	mA
		T_C = 85°C	–	25	35	
Threshold Output Power	P_{th}	T_C = −40 to +85°C, I_F = I_{th}	–	100	200	μW
Differential Efficiency	η_d		0.4	0.5	–	W/A
Temperature Dependence of 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	1 263	–	1 360	nm
Temperature Dependence of Center Wavelength	$\Delta\lambda/\Delta T$	T_C = −40 to +85°C	–	0.4	0.5	nm/°C
Spectral Width	σ	P_o = 5.0 mW, RMS (−20 dB) T_C = −40 to +85°C	–	1.0	2.5	nm
Vertical Beam Angle[*1]	$\theta_\perp$	P_o = 5.0 mW, FAHM[*2]	–	25	40	deg.
Lateral Beam Angle[*1]	$\theta_{//}$	P_o = 5.0 mW, FAHM[*2]	–	20	35	deg.
Rise Time	t_r	10-90%	–	0.05	0.15	ns
Fall Time	t_f	90-10%	–	0.15	0.3	ns
Monitor Current	I_m	V_R = 5 V, P_o = 5.0 mW	200	500	–	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
Kink (Refer to **DEFINITIONS**)	kink	P_o = Up to 6.0 mW, T_C = −40 to +85°C	−20	–	20	%
Tracking Error (Refer to **DEFINITIONS**)	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** Applicable to only NX5302S Series

***2** FAHM: Full Angle at Half Maximum

★ PARAMETER DEFINITIONS

Kink : kink

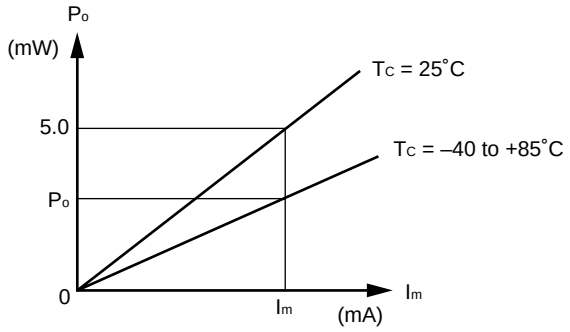


$$kink = \frac{|dP_K|}{P_K} \times 100\ [\%]$$

$dP_K = dP_o$ MAX.

$P_K \leq 6.0$ (mW)

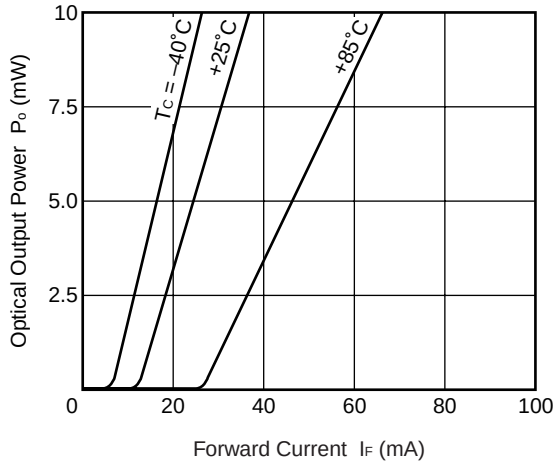
Tracking Error : γ



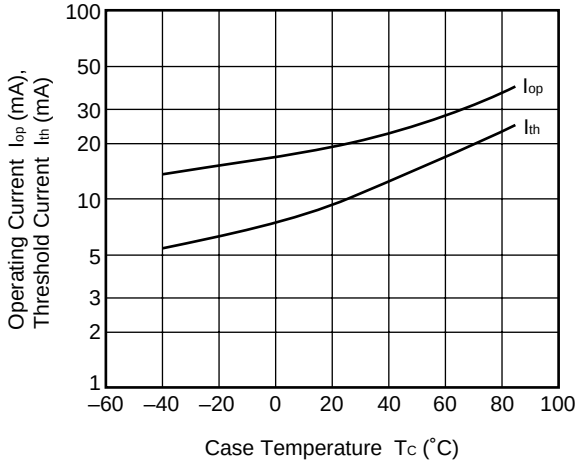
$$\gamma = \left| 10 \log \frac{P_o}{5.0} \right| [dB]$$

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

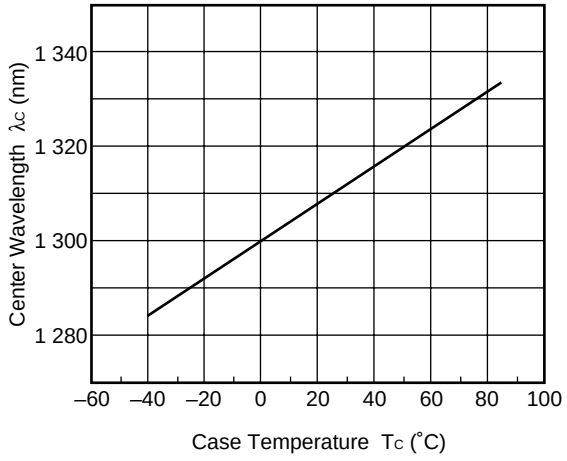
OPTICAL OUTPUT POWER vs. FORWARD CURRENT



OPERATING CURRENT AND THRESHOLD CURRENT vs. CASE TEMPERATURE



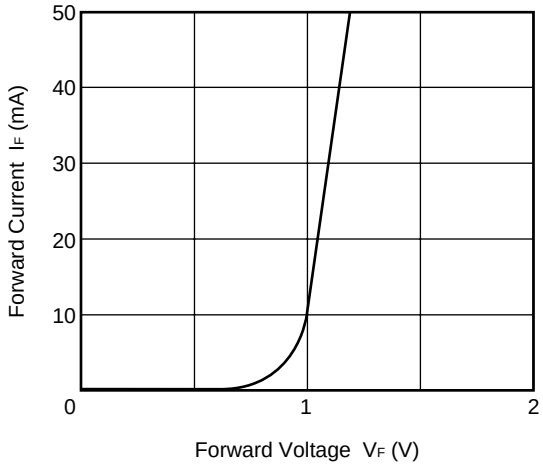
TEMPERATURE DEPENDENCE OF CENTER WAVELENGTH



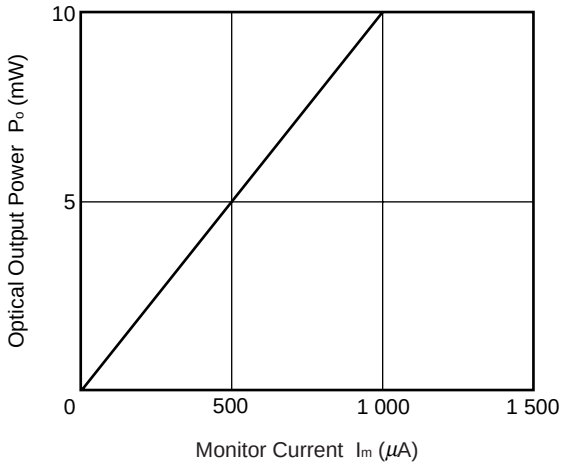
Remark The graphs indicate nominal characteristics.

★ TYPICAL CHARACTERISTICS (T_C = 25°C)

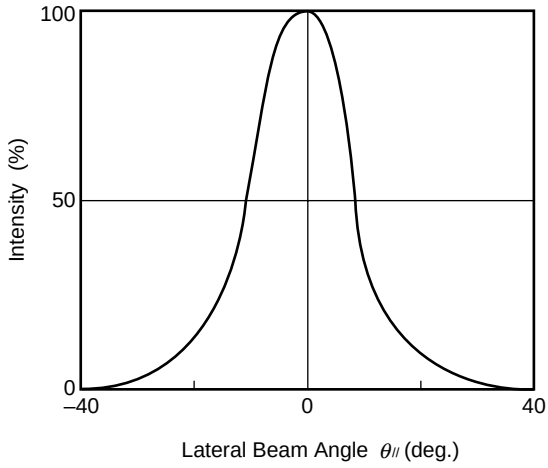
FORWARD CURRENT vs.
FORWARD VOLTAGE



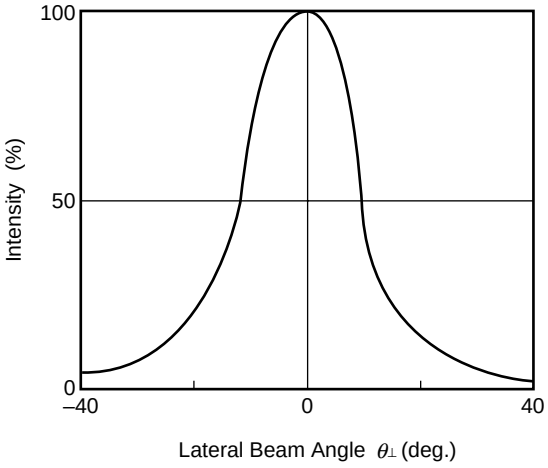
OPTICAL OUTPUT POWER
vs. MONITOR CURRENT



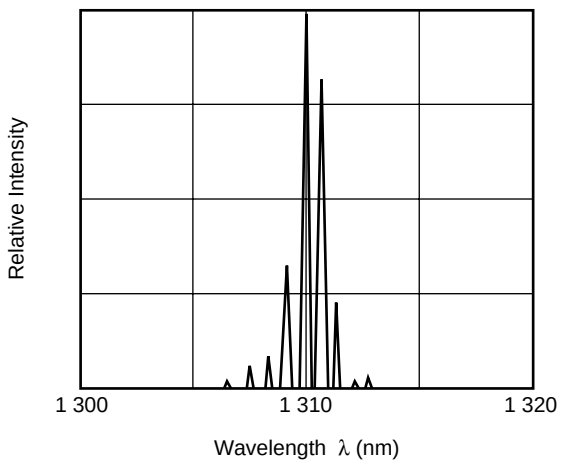
FAR FIELD PATTERN ($\theta_{//}$)
(NX5302S SERIES ONLY)



FAR FIELD PATTERN ($\theta_{\perp}$)
(NX5302S SERIES ONLY)



SPECTRUM



Remark The graphs indicate nominal characteristics.

★ LD CAN PACKAGES FAMILY FOR OPTICAL FIBER COMMUNICATIONS

Part Number	Absolute Maximum Ratings		Electro-Optical Characteristics				Application	Package
			@T_C = 25°C	@T_C				
	T_C (°C)	T_{stg} (°C)	I_{th} (mA)	P_o (mW)	λ (nm)			
			TYP.	TYP.	MIN.	MAX.		
NX5302 Series	−40 to +85	−40 to +85	10	5	1 263	1 360	156 Mb/s: STM-1 (I-1, S-1.1, L-1.1)	CAN
							622 Mb/s: STM-4 (I-4, S-4.1)	
NX6300 Series	0 to +75	−40 to +85	12	10	1 280	1 335	2.5 Gb/s: STM-16 (S-16.1, L-16.1)	CAN
NX6301 Series	−40 to +85	−40 to +85	13	5	1 280	1 335	156 Mb/s: STM-1	CAN
							622 Mb/s: STM-4	
NX6504 Series	−10 to +85	−40 to +85	12	5	1 530	1 570	156 Mb/s: STM-1	CAN
							622 Mb/s: STM-4	

★ 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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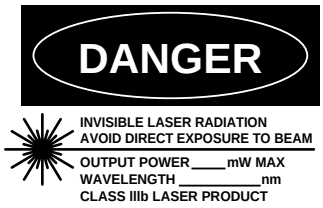
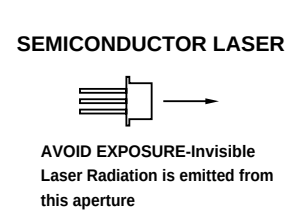
M8E 00.4-0110

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	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.

▶Business issue

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▶Technical issue

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