



# NEC's 1310 nm InGaAsP MQW FP LASER DIODE IN CAN PACKAGE FOR FIBER OPTIC COMMUNICATIONS

## NX5302 Series

### FEATURES

- **OPTICAL OUTPUT POWER:**  
Po = 5.0 mW
- **LOW THRESHOLD CURRENT :**  
I<sub>TH</sub> = 10 mA
- **HIGH SPEED:**  
t<sub>r</sub> = 0.15 ns MAX  
t<sub>f</sub> = 0.3 ns MAX
- **WIDE OPERATING TEMPERATURE RANGE:**  
T<sub>c</sub> = -40 to +85°C
- **InGaAs MONITOR PIN-PD**
- **CAN PACKAGE:**  
ø5.6 mm
- **BASED ON TELCORDIA RELIABILITY**

### DESCRIPTION

NEC's NX5302 series is a 1310 nm Multiple Quantum Well (MQW) structured Fabry-Perot (FP) laser diode with InGaAs monitor PIN-PD. This device is ideal for SONET systems, short haul and long haul OC-3, and short haul OC-12 applications.

### NX7312UA ELECTRO-OPTICAL CHARACTERISTICS (T<sub>c</sub> = 25°C, unless otherwise specified)

PART NUMBER			NX5302 Series		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
V <sub>OP</sub>	Operating Voltage, Po = 5.0 mW	V	–	1.1	1.3
I <sub>TH</sub>	Threshold Current	mA	–	10	20
	T <sub>c</sub> = +85°C	mA	–	25	35
P <sub>TH</sub>	Threshold Output Power, T <sub>c</sub> = -40 to +85°C, I <sub>F</sub> = I <sub>TH</sub>	μW	–	100	200
η <sub>d</sub>	Differential Efficiency	W/A	0.40	0.50	–
Δη <sub>d</sub>	Temperature Dependence of Differential Efficiency Δη <sub>d</sub> = 10 log $\frac{\eta_d (@ 85^\circ\text{C})}{\eta_d (@ 25^\circ\text{C})}$	dB	-3.0	-1.5	
λ <sub>c</sub>	Center Emission Wavelength, Po = 5.0 mW, RMS (-20 dB), T <sub>c</sub> = -40 to +85°C	nm	1263	–	1360
Δλ <sub>c</sub> /ΔT	Temperature Dependence of Center Wavelength, T <sub>c</sub> = -40 to +85°C	nm/°C	–	0.4	0.5
σ	Spectral Width, Po = 5.0 mW, RMS (-20 dB), T <sub>c</sub> = -40 to +85°C	nm	–	1.0	2.5
θ <sub>⊥</sub>	Vertical Beam Angle <sup>1</sup> , Po = 5.0 mW, FAHM <sup>2</sup>	°	–	25	40
θ <sub>  </sub>	Lateral Beam Angle <sup>1</sup> , Po = 5.0 mW, FAHM <sup>2</sup>	°	–	20	35
t <sub>r</sub>	Rise Time, 10 to 90%	ns	–	0.05	0.15
t <sub>f</sub>	Fall Time, 10 to 90%	ns	–	0.15	0.30
I <sub>m</sub>	Monitor Current, Po = 5.0 mW, V <sub>R</sub> = 5 V	μA	200	500	800
I <sub>D</sub>	Monitor Dark Current, V <sub>R</sub> = 5 V	nA	–	0.1	10
	V <sub>R</sub> = 5 V, T <sub>c</sub> = -40 to +85°C	nA	–	–	500
C <sub>t</sub>	Monitor PD Terminal Capacitance, V <sub>R</sub> = 5 V, f = 1 MHz	pF	–	6	20
kink	Kink (Refer to <b>Definitions</b> ) Po = Up to 6.0 mW, T <sub>c</sub> = -40 to +85°C	%	-20	–	20
γ	Tracking Error (Refer to <b>Definitions</b> ) I <sub>m</sub> = const. (@ Po = 5.0 mW) T <sub>c</sub> = -40 to +85°C	dB	-1.0	–	1.0

**Notes:**

1. Applicable only to flat window type, NX5302S Series.
2. FAHM: Full Angle at Half Maximum.

# NX5302 SERIES

## ABSOLUTE MAXIMUM RATINGS<sup>1</sup>

(T<sub>c</sub> = 25°C, unless otherwise specified)

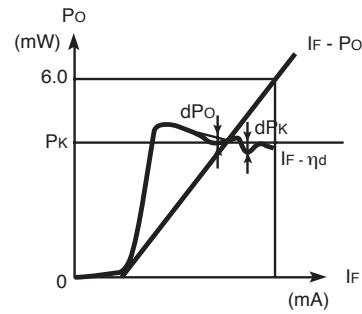
SYMBOLS	PARAMETERS	UNITS	RATINGS
P <sub>f</sub>	Optical Output Power	mW	10
I <sub>F</sub>	Forward Current of LD	mA	150
V <sub>R</sub>	Reverse Voltage of LD	V	2.0
I <sub>F</sub>	Forward Current of PD	mA	10
V <sub>R</sub>	Reverse Voltage of PD	V	20
T <sub>C</sub>	Operating Case Temperature	°C	-40 to +85
T <sub>STG</sub>	Storage Temperature	°C	-40 to +85
T <sub>ASB</sub>	Assembly Temperature	°C	150 (15 Hr)
T <sub>SLD</sub>	Lead Soldering Temperature (10 s)	°C	350 (3 sec.)
RH	Relative Humidity (noncondensing)	%	85

Note:

1. Operation in excess of any one of these parameters may result in permanent damage.

## PARAMETER DEFINITIONS

Kink: kink

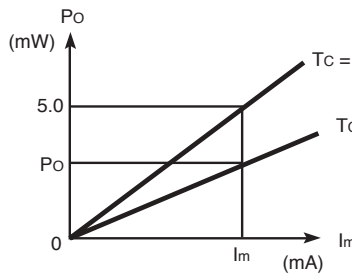


$$\text{kink} = \frac{|dP_k|}{P_k} \times 100 [\%]$$

$$dP_k = dP_o \text{ MAX}$$

$$P_k \leq 6.0 \text{ (mW)}$$

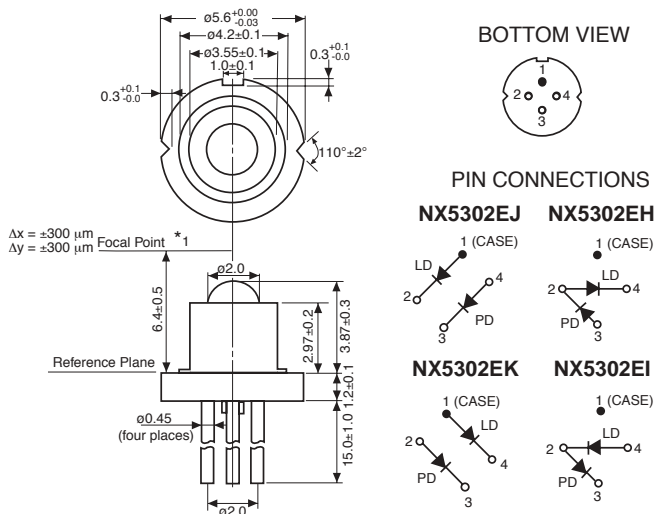
Tracking Error:  $\gamma$



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

## OUTLINE DIMENSIONS (Units in mm)

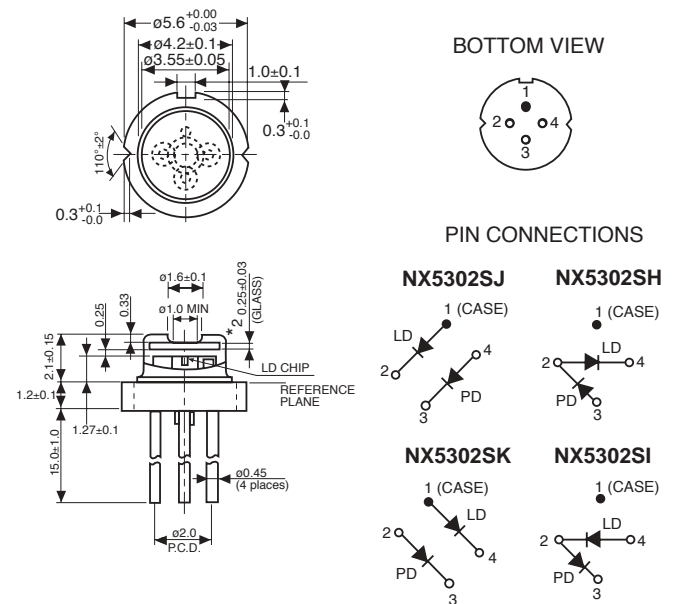
### NX5302E SERIES



\*1 Focal Point:

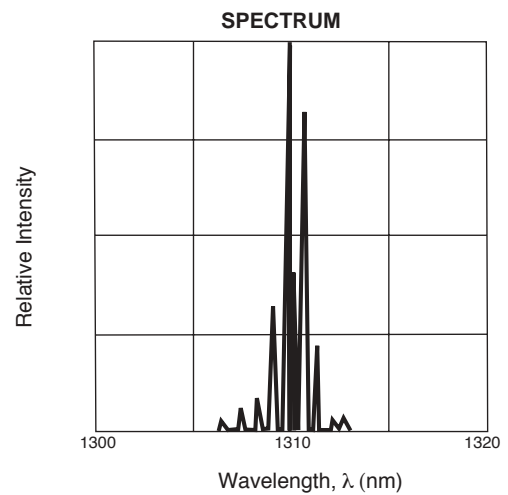
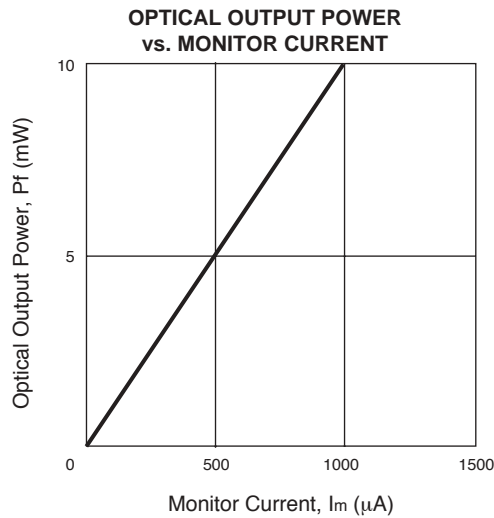
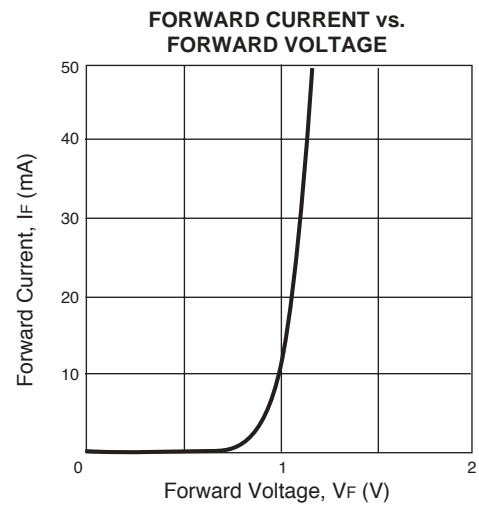
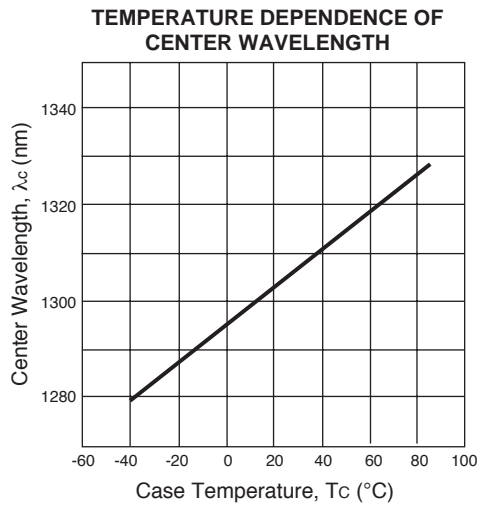
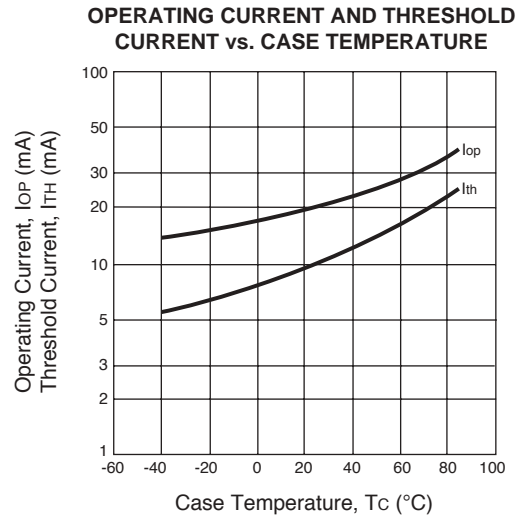
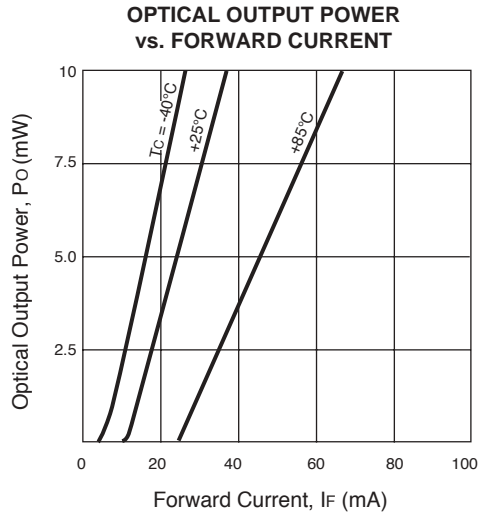
A point to get maximum optical output power from fiber.

### NX5302S SERIES



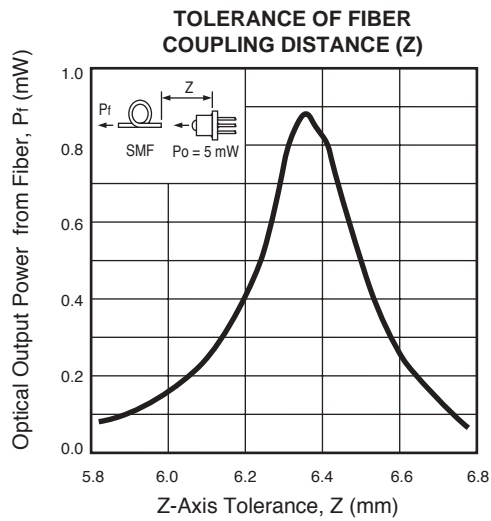
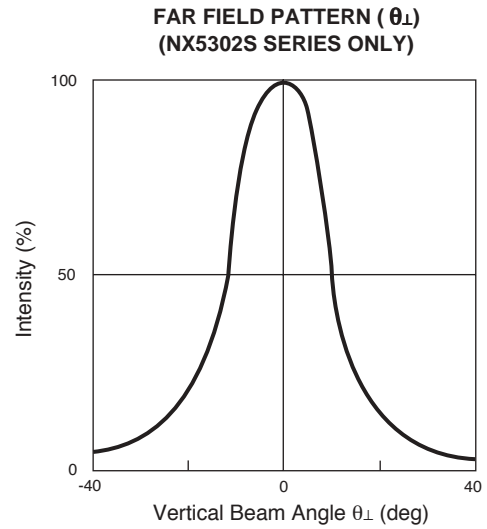
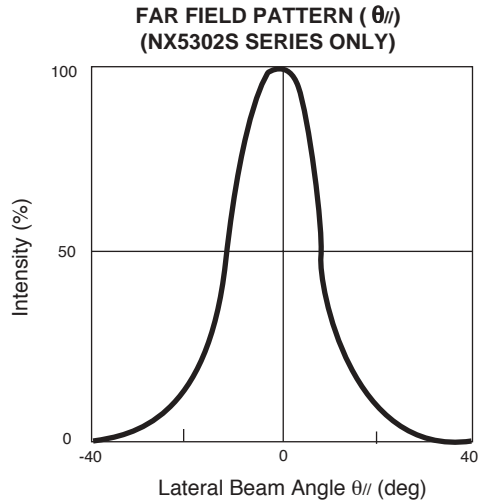
\*2: n = 1.48 Bolosilicate Glass

**TYPICAL PERFORMANCE CURVES** ( $T_C = -40$  to  $+85^\circ\text{C}$ )



Note: The graphs indicate nominal characteristics.

**TYPICAL CHARACTERISTICS** ( $T_C = 25^\circ\text{C}$ )



**NX5302S SERIES**

PART NUMBER	PACKAGE	PIN CONNECTIONS
NX5302SH	4-pin CAN with flat glass cap	
NX5302SH		
NX5302SJ		
NX5302SK		

**NX5302E SERIES**

PART NUMBER	PACKAGE	PIN CONNECTIONS
NX5302EH	4-pin CAN with flat glass cap	
NX5302EH		
NX5302EJ		
NX5302EK		

**Life Support Applications**

These NEC products are not intended for use in life support devices, appliances, or systems where the malfunction of these products can reasonably be expected to result in personal injury. The customers of CEL using or selling these products for use in such applications do so at their own risk and agree to fully indemnify CEL for all damages resulting from such improper use or sale.

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