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

NX5302 Series

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:**
  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_C = 25°C, unless otherwise specified)

PART NUMBER			NX5302 Series		
SYMBOLS	**PARAMETERS AND CONDITIONS**	**UNITS**	**MIN**	**TYP**	**MAX**
V_{OP}	Operating Voltage, P_O = 5.0 mW	V	–	1.1	1.3
I_{TH}	Threshold Current	mA	–	10	20
	T_C = +85°C	mA	–	25	35
P_{TH}	Threshold Output Power, T_C = -40 to +85°C, I_F = I_{TH}	μW	–	100	200
ηd	Differential Efficiency	W/A	0.40	0.50	–
$\Delta\eta d$	Temperature Dependence of Differential Efficiency $\Delta\eta d = 10 \log \frac{\eta d\ (@\ 85°C)}{\eta d\ (@\ 25°C)}$	dB	-3.0	-1.5	
λc	Center Emission Wavelength, P_O = 5.0 mW, RMS (-20 dB), T_C = -40 to +85°C	nm	1263	–	1360
$\Delta\lambda c/\Delta T$	Temperature Dependence of Center Wavelength, T_C = -40 to +85°C	nm/°C	–	0.4	0.5
σ	Spectral Width, P_O = 5.0 mW, RMS (-20 dB), T_C = -40 to +85°C	nm	–	1.0	2.5
$\theta_\perp$	Vertical Beam Angle[1], P_O = 5.0 mW, FAHM[2]	°	–	25	40
$\theta_\parallel$	Lateral Beam Angle[1], P_O = 5.0 mW, FAHM[2]	°	–	20	35
t_r	Rise Time, 10 to 90%	ns	–	0.05	0.15
t_f	Fall Time, 10 to 90%	ns	–	0.15	0.30
I_m	Monitor Current, P_O = 5.0 mW, V_R = 5 V	μA	200	500	800
I_D	Monitor Dark Current, V_R = 5 V	nA	–	0.1	10
	V_R = 5 V, T_C = -40 to +85°C	nA	–	–	500
C_t	Monitor PD Terminal Capacitance, V_R = 5 V, f = 1 MHz	pF	–	6	20
kink	Kink (Refer to **Definitions**) Po = Up to 6.0 mW, TC = -40 to +85°C	%	-20	–	20
γ	Tracking Error (Refer to **Definitions**) Im = const. (@ P_O = 5.0 mW) T_C = -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.

ABSOLUTE MAXIMUM RATINGS[1]

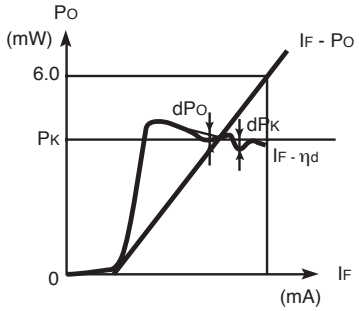
(T_C = 25°C, unless otherwise specified)

SYMBOLS	PARAMETERS	UNITS	RATINGS
P_f	Optical Output Power	mW	10
I_F	Forward Current of LD	mA	150
V_R	Reverse Voltage of LD	V	2.0
I_F	Forward Current of PD	mA	10
V_R	Reverse Voltage of PD	V	20
T_C	Operating Case Temperature	°C	-40 to +85
T_{STG}	Storage Temperature	°C	-40 to +85
T_{ASB}	Assembly Temperature	°C	150 (15 Hr)
T_{SLD}	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

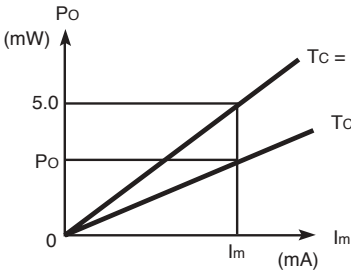


$$kink = \frac{|dP_K|}{P_K} \times 100\ [\%]$$

$dP_K = dP_O$ MAX

$P_K \le 6.0$ (mW)

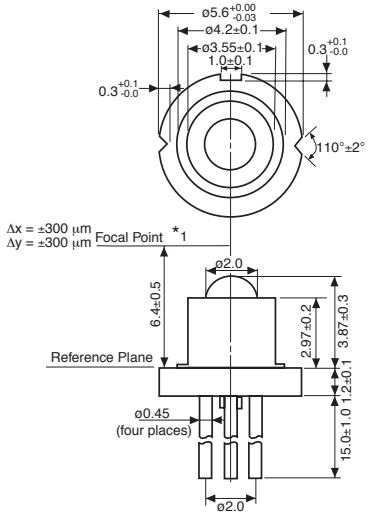
Tracking Error: γ

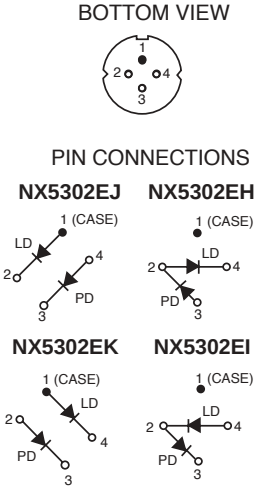


$$\gamma = \left| 10 \log \frac{P_O}{5.0} \right| [dB]$$

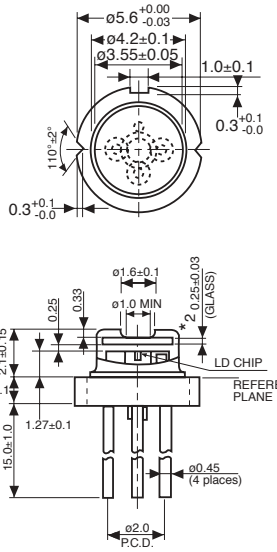
OUTLINE DIMENSIONS (Units in mm)

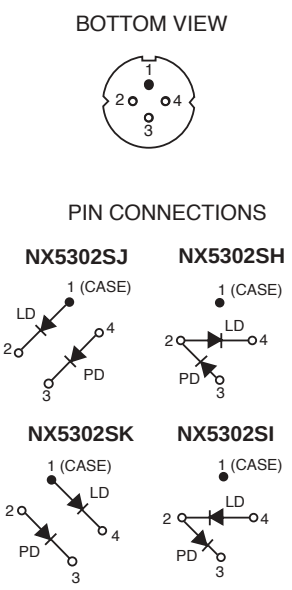
NX5302E SERIES





NX5302S SERIES



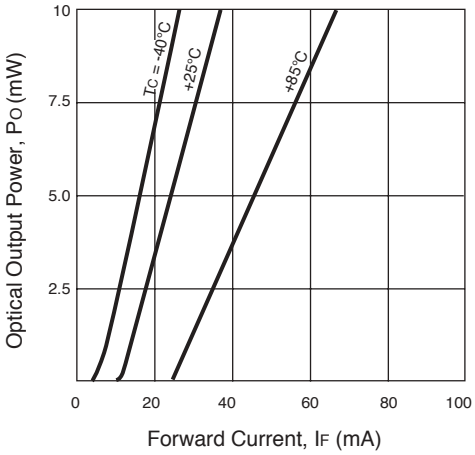


*1 Focal Point:
A point to get maximum optical output power from fiber.

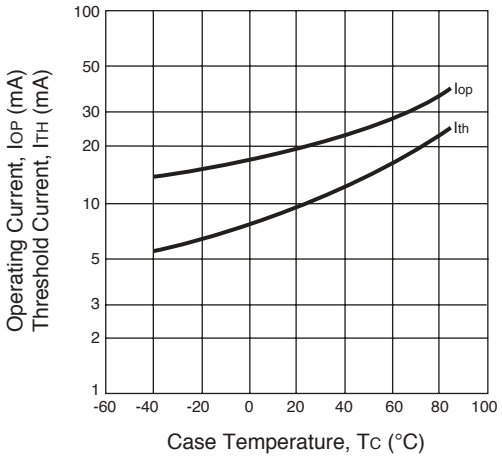
*2: n = 1.48 Bolosilicate Glass

TYPICAL PERFORMANCE CURVES (T_C = -40 to +85°C)

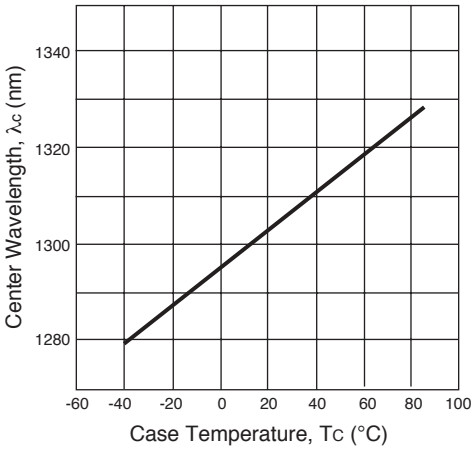
OPTICAL OUTPUT POWER vs. FORWARD CURRENT



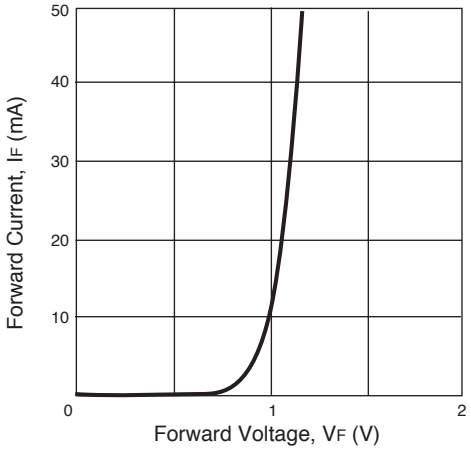
OPERATING CURRENT AND THRESHOLD CURRENT vs. CASE TEMPERATURE



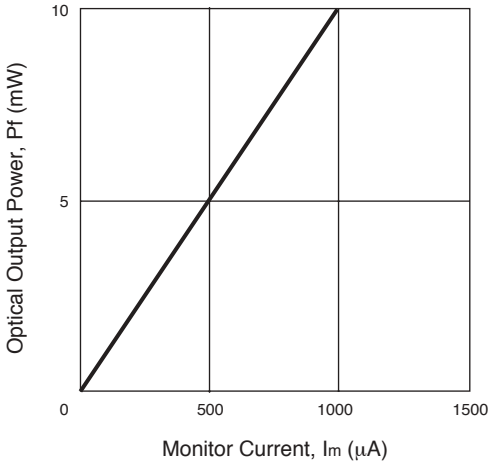
TEMPERATURE DEPENDENCE OF CENTER WAVELENGTH



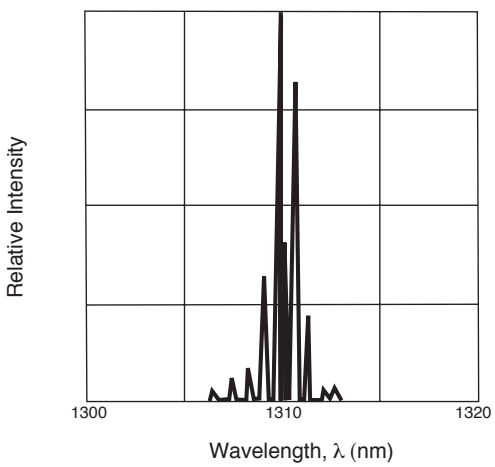
FORWARD CURRENT vs. FORWARD VOLTAGE



OPTICAL OUTPUT POWER vs. MONITOR CURRENT



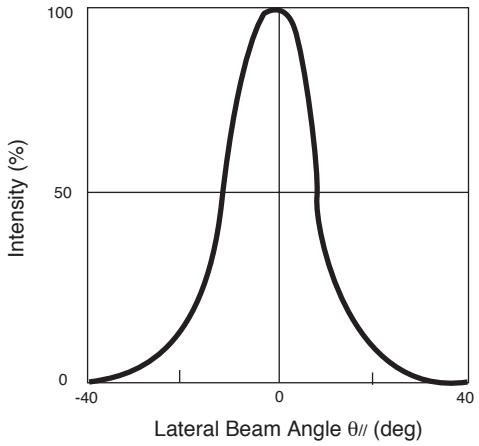
SPECTRUM



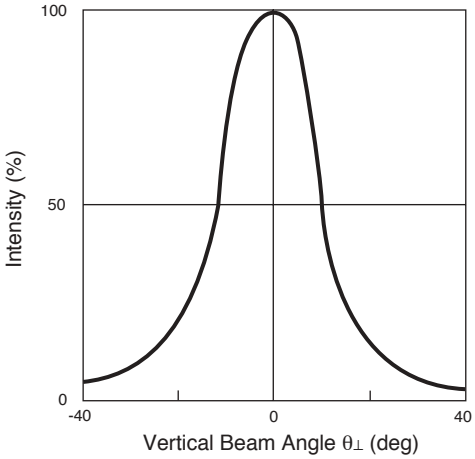
Note: The graphs indicate nominal characteristics.

TYPICAL CHARACTERISTICS (T_C = 25°C)

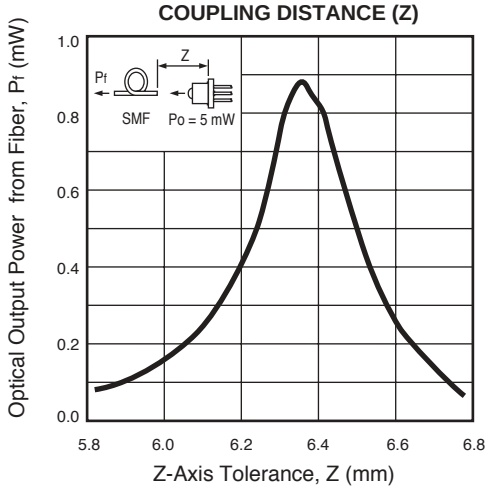
FAR FIELD PATTERN ($\theta_{//}$)
(NX5302S SERIES ONLY)



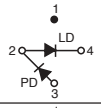
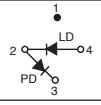
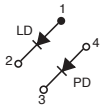
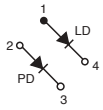
FAR FIELD PATTERN ($\theta_{\perp}$)
(NX5302S SERIES ONLY)



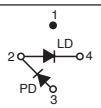
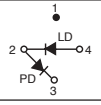
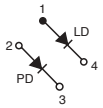
TOLERANCE OF FIBER
COUPLING DISTANCE (Z)



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.