DATA SHEET

CEL

NEC's 1310 nm InGaAsP MQW-FP LASER DIODE IN CAN PACKAGE FOR 155 Mb/s, 622 Mb/s AND 1.25 Gb/s APPLICATIONS

NX5304 Series

FEATURES

- **OPTICAL OUTPUT POWER**
  P_O = 5.0 mW
- **LOW THRESHOLD CURRENT**
  I_{th} = 10 mA
- **HIGH SPEED**
  t_r = 0.3 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
- **FIBER COUPLING POINT**
  5.8 mm
- **BASED ON TELCORDIA RELIABILITY**

DESCRIPTION

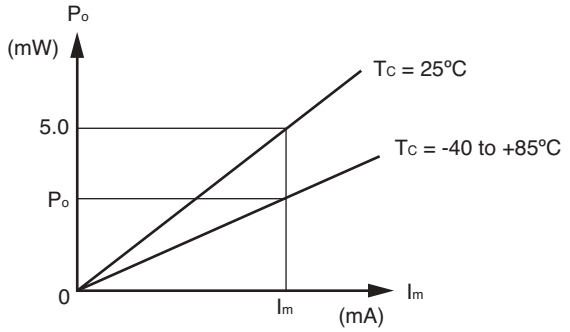
NEC's NX5304 Series is a 1 310 nm Multiple Quantum Well (MQW) structured Fabry-Perot (FP) laser diodes with InGaAs monitor PIN-PD. These devices are designed for 156 Mb/s: STM-1 (I-1, S-1.1, L-1.1), 622 Mb/s: STM-4 (I-4, S-4.1) application and ideal for Synchronous Digital Hierarchy (SDH) system.

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

	PART NUMBER		NX5304 SERIES		
SYMBOL	PARAMETER AND CONDITIONS	UNIT	MIN.	TYP.	MAX.
V_{op}	Operating Voltage, P_o = 5.0 mW, T_C = –40 to +85°C	V		1.1	1.5
I_{th}	Threshold Current	mA		10	15
	T_C = 85°C			25	30
P_{th}	Threshold Output Power, T_C = –40 to +85°C, I_F = I_{th}	μW		100	200
η_d	Differential Efficiency	W/A	0.32	0.4	
$\Delta\eta_d$	Temperature Dependence of Differential Efficiency $\eta_d = 10 \log \frac{\eta_d (@ 85°C)}{\eta_d (@ 25°C)}$	dB	–3.0	–1.2	
λ_C	Center Wavelength, P_o = 5.0 mW, RMS (–20 dB), T_C = –40 to +85°C	nm	1 263		1 360
$\Delta\lambda/\Delta T$	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
t_r	Rise Time, 10-90%	ns		0.15	0.3
t_f	Fall Time, 90-10%	ns		0.15	0.3
I_m	Monitor Current, V_R = 5 V, P_o = 5.0 mW	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°				500
C_t	Monitor PD Terminal Capacitance, V_R = 5 V, f = 1 MHz	pF		6	20
γ	Tracking Error*1, I_m = const. (@ P_o = 5.0 mW, T_C = 25°C), T_C = –40 to +85°C	dB	–1.0		1.0

Notes continued on next page

***1** Tracking Error: γ



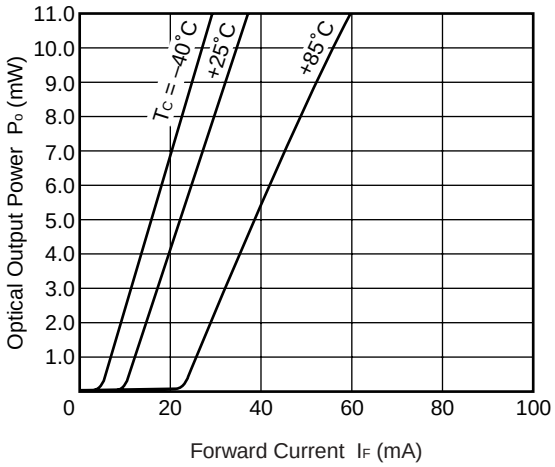
$$\gamma = \left| 10 \log \frac{P_o}{5.0} \right| \text{[dB]}$$

ABSOLUTE MAXIMUM RATINGS

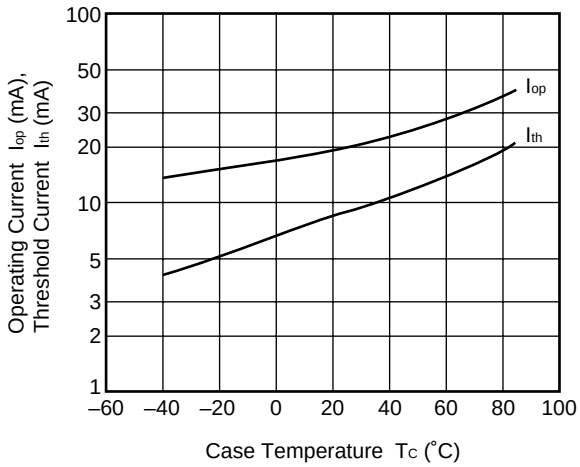
SYMBOL	PARAMETER	UNIT	RATINGS
P_o	Optical Output Power from Fiber	mW	10
I_F	Forward Current of LD	mA	150
V_R	Reverse Voltage of LD	V	2.0
I_F	Forward Current of PD	mA	10
V_R	Reverse Voltage of PD	V	20
T_C	Operating Case Temperature	°C	-40 to +85
T_{stg}	Storage Temperature	°C	–40 to +85
T_{asb}	Assembly Temperature	°C	150 (15 Hr.)
T_{sld}	Lead Soldering Temperature	°C	350 (3 sec.)
RH	Relative Humidity (noncondensing)	%	85

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

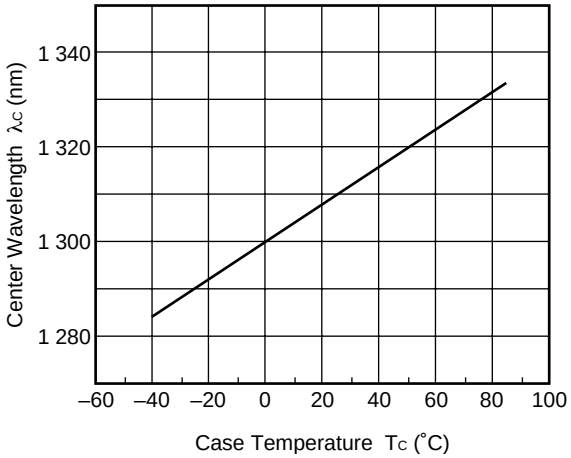
OPTICAL OUTPUT POWER vs. FORWARD CURRENT



OPERATING CURRENT AND THRESHOLD CURRENT vs. CASE TEMPERATURE



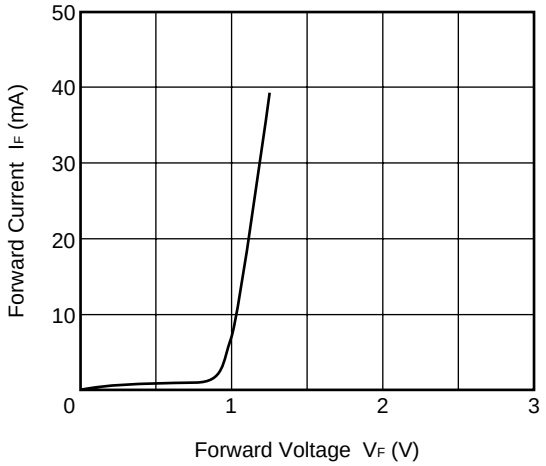
TEMPERATURE DEPENDENCE OF CENTER WAVELENGTH



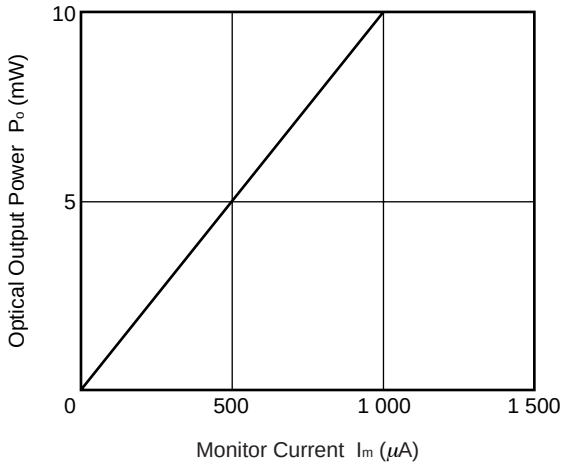
Remark The graphs indicate nominal characteristics.

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

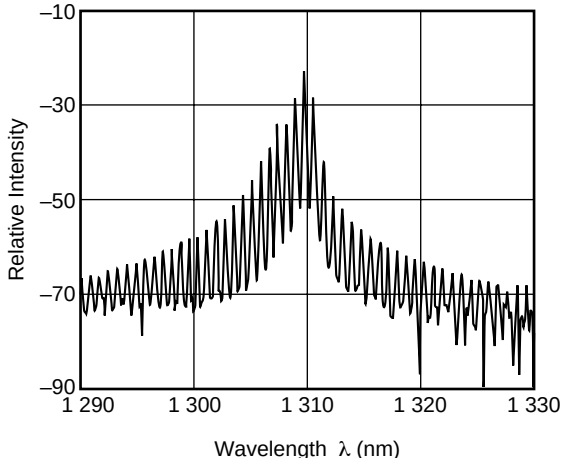
FORWARD CURRENT vs.
FORWARD VOLTAGE



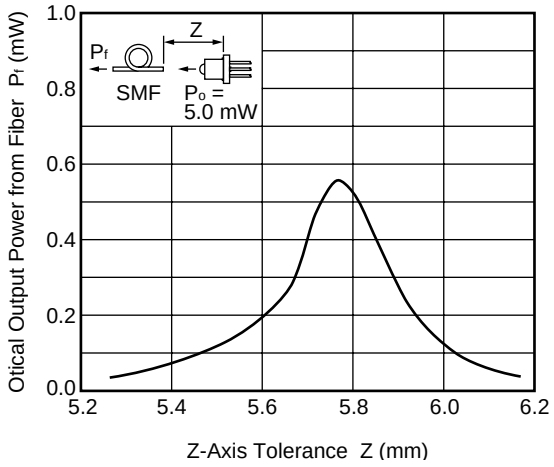
OPTICAL OUTPUT POWER
vs. MONITOR CURRENT



SPECTRUM

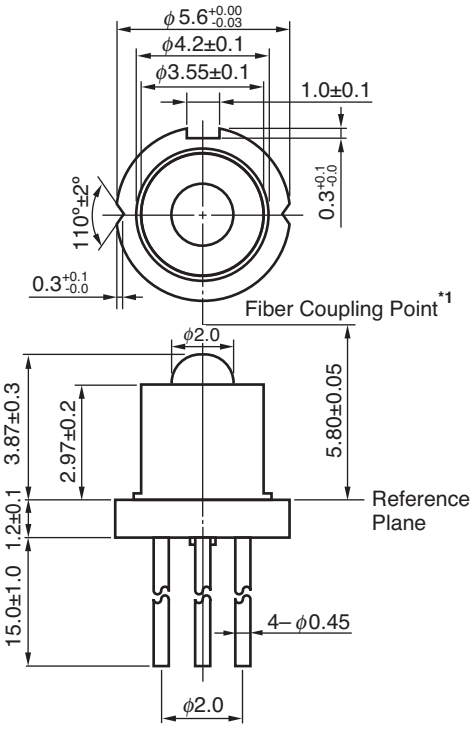


TOLERANCE OF FIBER
COUPLING DISTANCE (Z)

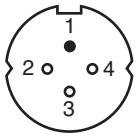


Remark The graphs indicate nominal characteristics.

PACKAGE DIMENSIONS (Units in mm)

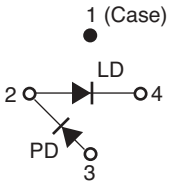


BOTTOM VIEW

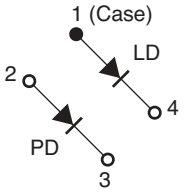


PIN CONNECTIONS

NX5304EH



NX5304EK



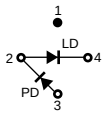
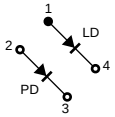
***1** Recommendation of Fiber Coupling Conditions

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 $\leq$ ±300 μm).

ORDERING INFORMATION

Part Number	Package	Pin Connections
NX5304EH	4-pin CAN with ball lens cap	
NX5304EK		

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%.