



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**
 $P_o = 5.0 \text{ mW}$
- **LOW THRESHOLD CURRENT**
 $I_{th} = 10 \text{ mA}$
- **HIGH SPEED**
 $t_r = 0.3 \text{ ns MAX}$
 $t_f = 0.3 \text{ ns MAX}$
- **WIDE OPERATING TEMPERATURE RANGE**
 $T_c = -40 \text{ to } +85^\circ\text{C}$
- **InGaAs MONITOR PIN-PD**
- **CAN PACKAGE**
 $\varnothing 5.6 \text{ mm}$
- **FIBER COUPLING POINT**
 5.8 mm
- **BASED ON TELCORDIA RELIABILITY**



DESCRIPTION

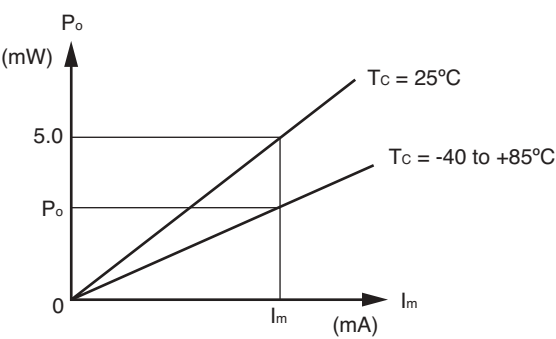
NEC's NX5304 Series is a 1310 nm Multiple Quantum Well (MQW) structured Fabry-Perot (FP) laser diodes with InGaAs monitor PIN-PD. These devices are designed for 155 Mb/s: STM-1 (I-1, S-1.1, L-1.1), 622 Mb/s: STM-4 (I-4, S-4.1) application and ideal for Synchronous Digital Hierarchy (SDH) system.

ELECTRO-OPTICAL CHARACTERISTICS ($T_c = 25^\circ\text{C}$, unless otherwise specified)

SYMBOL	PART NUMBER		NX5304 SERIES		
	PARAMETER AND CONDITIONS	UNIT	MIN.	TYP.	MAX.
V_{op}	Operating Voltage, $P_o = 5.0 \text{ mW}$, $T_c = -40 \text{ to } +85^\circ\text{C}$	V		1.1	1.5
I_{th}	Threshold Current	mA		10	15
	$T_c = 85^\circ\text{C}$			25	30
P_{th}	Threshold Output Power, $T_c = -40 \text{ to } +85^\circ\text{C}$, $I_F = I_{th}$	μW		100	200
η_d	Differential Efficiency	W/A	0.32	0.4	
$\Delta\eta_d$	Temperature Dependence of Differential Efficiency $\eta_d = 10 \log \frac{\eta_d (@ 85^\circ\text{C})}{\eta_d (@ 25^\circ\text{C})}$	dB	-3.0	-1.2	
λ_c	Center Wavelength, $P_o = 5.0 \text{ mW}$, RMS (-20 dB), $T_c = -40 \text{ to } +85^\circ\text{C}$	nm	1 263		1 360
$\Delta\lambda/\Delta T$	Temperature Dependence of Center Wavelength, $T_c = -40 \text{ to } +85^\circ\text{C}$	nm/ $^\circ\text{C}$		0.4	0.5
σ	Spectral Width, $P_o = 5.0 \text{ mW}$, RMS (-20 dB), $T_c = -40 \text{ to } +85^\circ\text{C}$	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, $V_R = 5 \text{ V}$, $P_o = 5.0 \text{ mW}$	μA	200	500	800
I_D	Monitor Dark Current, $V_R = 5 \text{ V}$	nA		0.1	10
	$V_R = 5 \text{ V}$, $T_c = -40 \text{ to } +85^\circ\text{C}$				500
C_t	Monitor PD Terminal Capacitance, $V_R = 5 \text{ V}$, $f = 1 \text{ MHz}$	pF		6	20
γ	Tracking Error ¹ , $I_m = \text{const.}$ (@ $P_o = 5.0 \text{ mW}$, $T_c = 25^\circ\text{C}$), $T_c = -40 \text{ to } +85^\circ\text{C}$	dB	-1.0		1.0

Notes continued on next page

*1 Tracking Error: γ

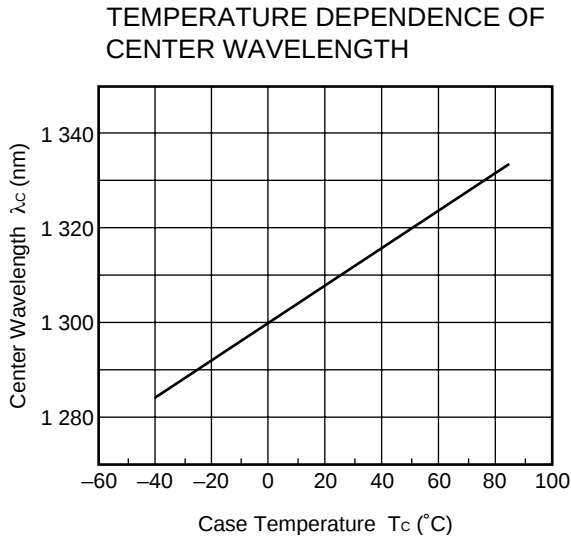
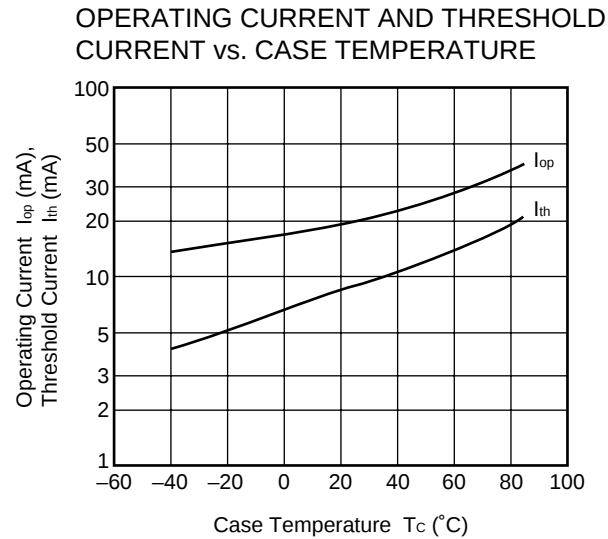
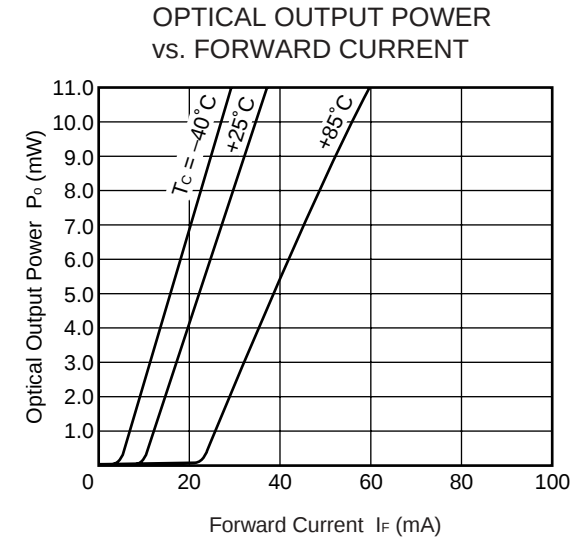


$$\gamma = \left| 10 \log \frac{P_o}{5.0} \right| [\text{dB}]$$

ABSOLUTE MAXIMUM RATINGS

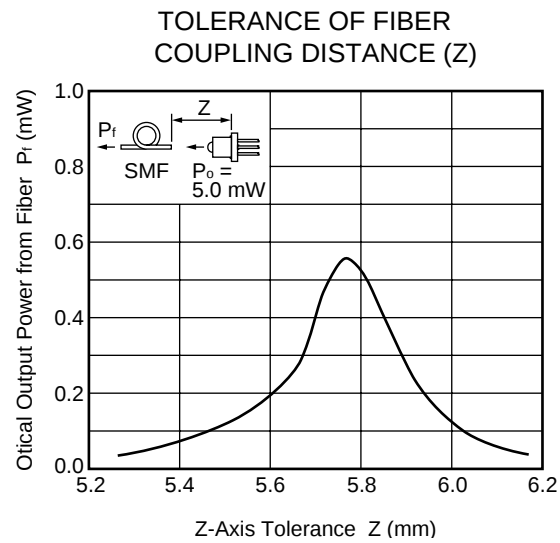
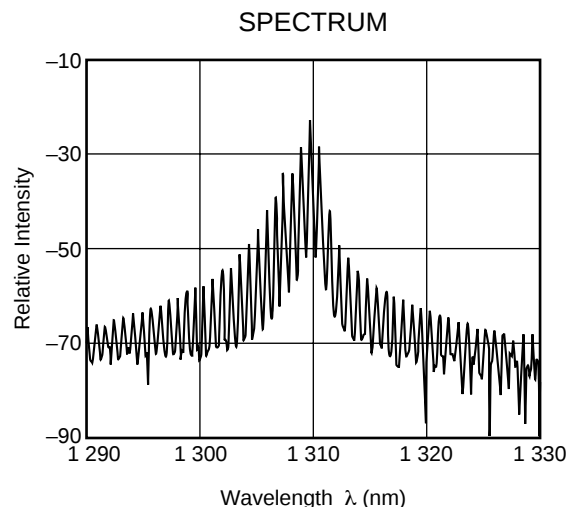
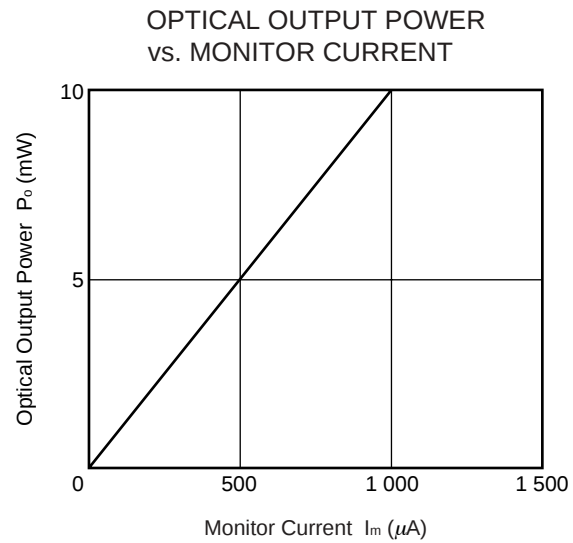
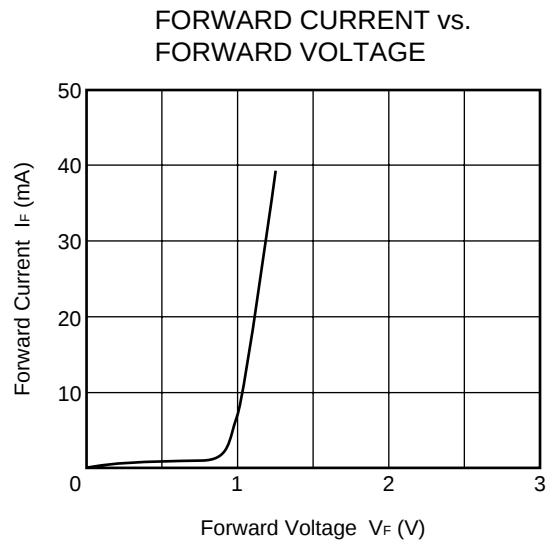
SYMBOL	PARAMETER	UNIT	RATINGS
P_o	Optical Output Power from Fiber	mW	10
I_F	Forward Current of LD	mA	150
V_R	Reverse Voltage of LD	V	2.0
I_F	Forward Current of PD	mA	10
V_R	Reverse Voltage of PD	V	20
T_c	Operating Case Temperature	$^\circ\text{C}$	-40 to +85
T_{stg}	Storage Temperature	$^\circ\text{C}$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

TYPICAL CHARACTERISTICS ($T_c = -40$ to $+85^\circ\text{C}$, unless otherwise specified)



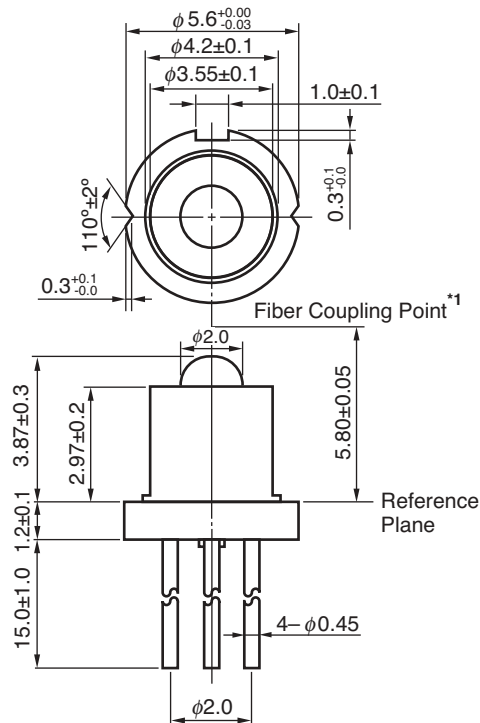
Remark The graphs indicate nominal characteristics.

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

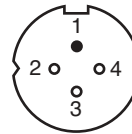


Remark The graphs indicate nominal characteristics.

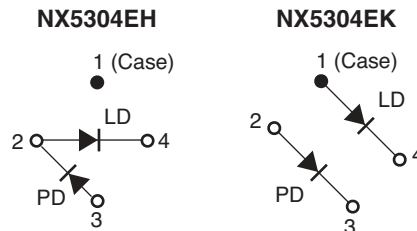
PACKAGE DIMENSIONS (Units in mm)



BOTTOM VIEW



PIN CONNECTIONS



***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 ($\Delta x, \Delta y \leq \pm 300 \mu\text{m}$).

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%.

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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