



NEC's 1550 nm InGaAsP MQW DFB LASER DIODE IN CAN PACKAGE FOR FIBER OPTIC COMMUNICATIONS

NX6504 Series

FEATURES

- **OPTICAL OUTPUT POWER:**
 $P_o = 5.0$ mW
- **LOW THRESHOLD CURRENT:**
 $I_{TH} = 12$ mA
- **HIGH SPEED:**
 $t_r, t_f = 0.5$ ns MAX
- **SMSR:**
45 dB
- **WIDE OPERATING TEMPERATURE RANGE:**
 $T_c = -10$ to $+85^\circ\text{C}$
- **InGaAs MONITOR PIN-PD**
- **CAN PACKAGE:**
 $\varnothing 5.6$ mm
- **BASED ON TELCORDIA RELIABILITY**

DESCRIPTION

NEC's NX6504 Series is a 1550 nm Multiple Quantum Well (MQW) structured Distributed Feed-Back (DFB) laser diode with InGaAs monitor PIN-PD. This device is ideal for Synchronous Digital Hierarchy (SDH) system, STM-1/OC-3, STM-4/OC-12 and ITU-T recommendations.

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

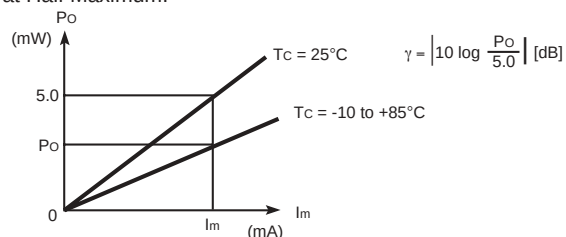
PART NUMBER			NX6504 Series		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
V_{OP}	Operating Voltage, $P_o = 5.0$ mW, $T_c = -10$ to $+85^\circ\text{C}$	V	–	1.0	1.5
I_{TH}	Threshold Current	mA	–	12	25
	$T_c = 85^\circ\text{C}$	mA	–	35	50
P_{TH}	Threshold Output Power, $T_c = -10$ to $+85^\circ\text{C}$, $I_F = I_{TH}$	μW	–	–	200
η_d	Differential Efficiency	W/A	0.15	0.25	–
$\Delta\eta_d$	Temperature Dependence of Differential Efficiency $\Delta\eta_d = 10 \log \frac{\eta_d (@ 85^\circ\text{C})}{\eta_d (@ 25^\circ\text{C})}$	dB	-3.0	-1.5	–
λ_p	Peak Emission Wavelength, $P_o = 5.0$ mW, RMS (-20 dB), $T_c = -10$ to $+85^\circ\text{C}$	nm	1530	–	1570
SMSR	Side mode Suppression Ratio $P_o = 5.0$ mW, $T_c = -10$ to $+85^\circ\text{C}$	dB	30	45	
$\theta_{\perp}$	Vertical Beam Angle ¹ , (Refer to Definitions) $P_o = 5.0$ mW, FAHM ²	deg	–	30	40
$\theta_{\parallel}$	Lateral Beam Angle ¹ , $P_o = 5.0$ mW, FAHM ²	deg	–	25	35
t_r	Rise Time, 10 to 90%	ns	–	0.05	0.5
t_f	Fall Time, 10 to 90%	ns	–	0.2	0.5
I_m	Monitor Current, $P_o = 5.0$ mW, $V_R = 5$ V	μA	200	600	1000
I_D	Monitor Dark Current, $V_R = 5$ V	nA	–	0.1	10
	$V_R = 5$ V, $T_c = -10$ to $+85^\circ\text{C}$	nA	–	–	500
C_t	Monitor PD Terminal Capacitance, $V_R = 5$ V, $f = 1$ MHz	pF	–	6	20
γ	Tracking Error ³ $I_m = \text{const}$, (@ $P_o = 5.0$ mW, $T_c = 25^\circ\text{C}$) $T_c = -10$ to $+85^\circ\text{C}$	dB	-1.0	–	1.0

Notes:

1. Applicable only to NX6504S Series.

2. FAHM: Full Angle at Half Maximum.

3. Tracking Error: γ



ABSOLUTE MAXIMUM RATINGS¹

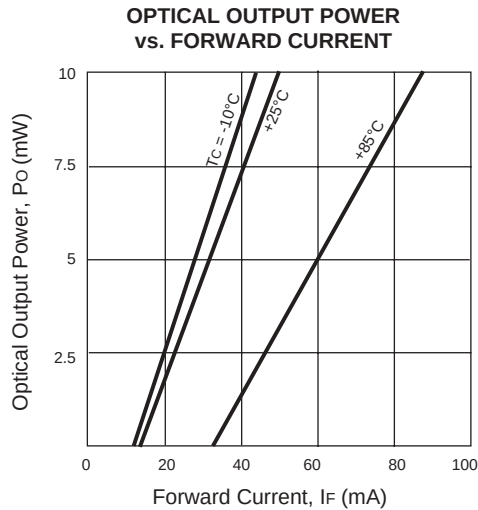
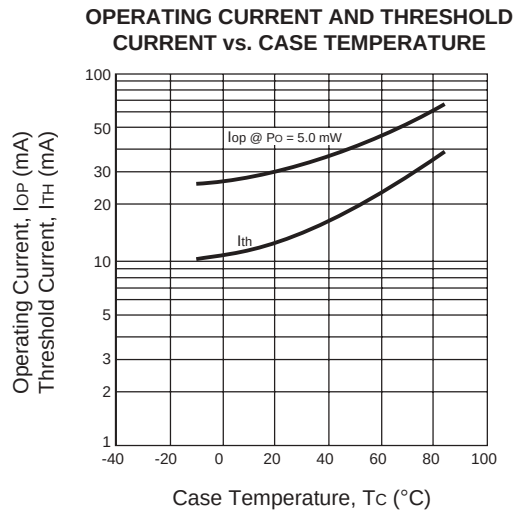
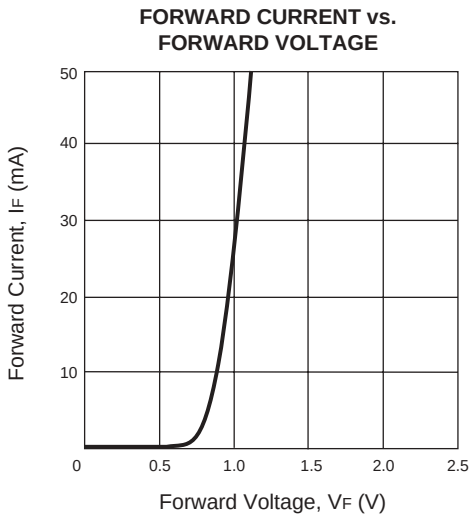
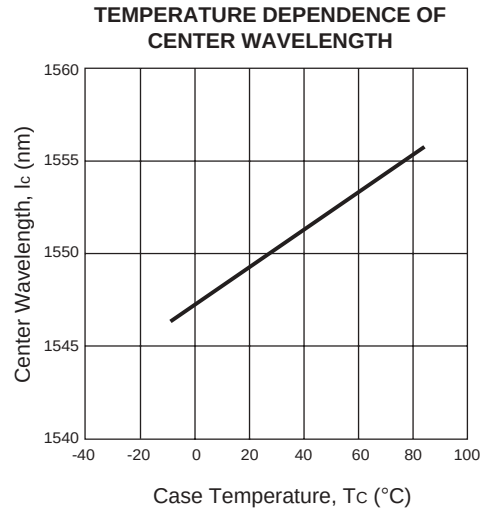
(T_c = 25°C, unless otherwise specified)

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	-10 to +85
T _{stg}	Storage Temperature	°C	-40 to +85
T _{SLD}	Lead Soldering Temperature (10 s)	°C	350 (3 sec.)
RH	Relative Humidity (noncondensing)	%	85

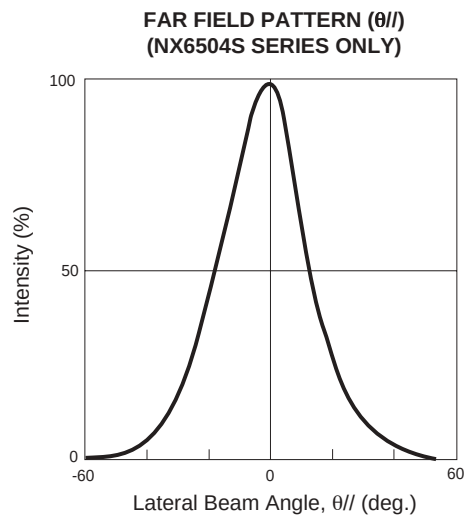
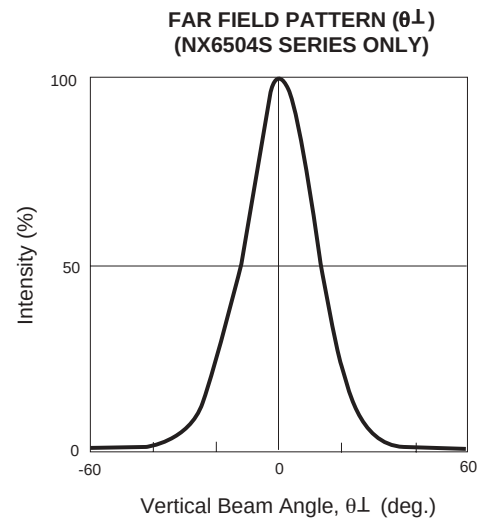
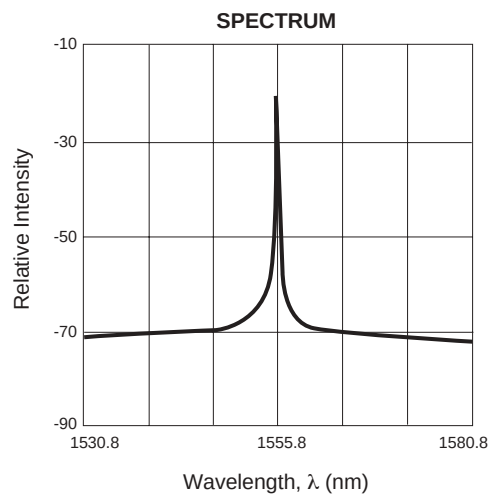
Note:

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

TYPICAL PERFORMANCE CURVES (T_c = -10 to +85°C)



TYPICAL PERFORMANCE CURVES (T_C = 25°C)

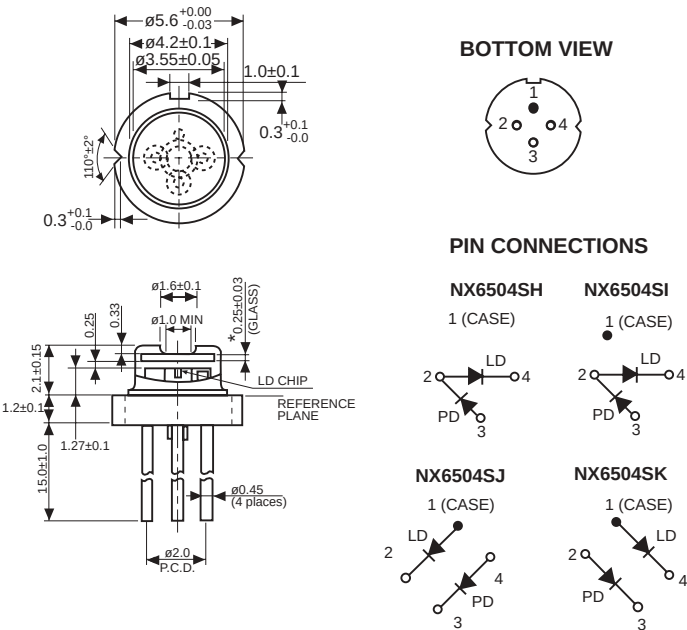


Note: The graphs indicate nominal characteristics.

NX6504 SERIES

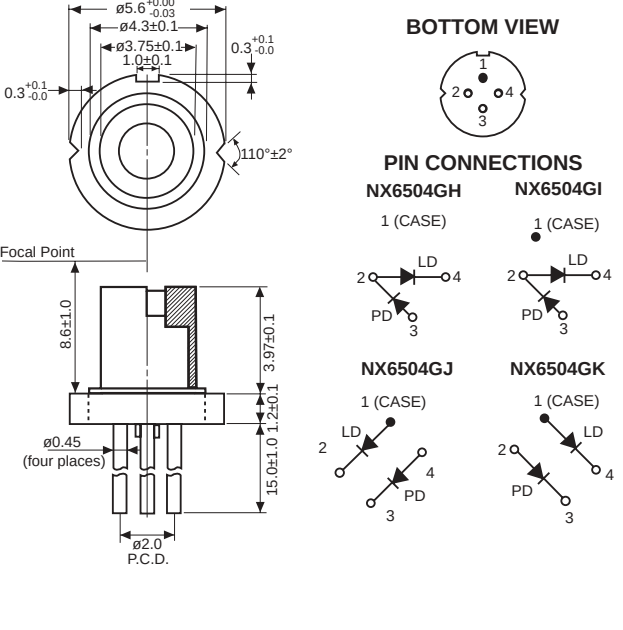
OUTLINE DIMENSIONS (Units in mm)

NX6504S SERIES



*n = 1.48 Bolosilicate Glass

NX6504G SERIES



ORDERING INFORMATION

NX6504S SERIES

PART NUMBER	PACKAGE
NX6504SH	4-pin CAN with flat glass cap
NX6504SI	
NX6504SJ	
NX6504SK	

NX6504G SERIES

PART NUMBER	PACKAGE
NX6504GH	4-pin CAN with aspherical lens cap
NX6504GI	
NX6504GJ	
NX6504GK	

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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