NEC

LASER DIODE
NDL7910P

1 550 nm OPTICAL FIBER COMMUNICATIONS EA MODULATOR INTEGRATED MQW-DFB LASER DIODE MODULE FOR 2.5 Gb/s ULTRALONG-REACH APPLICATIONS

DESCRIPTION

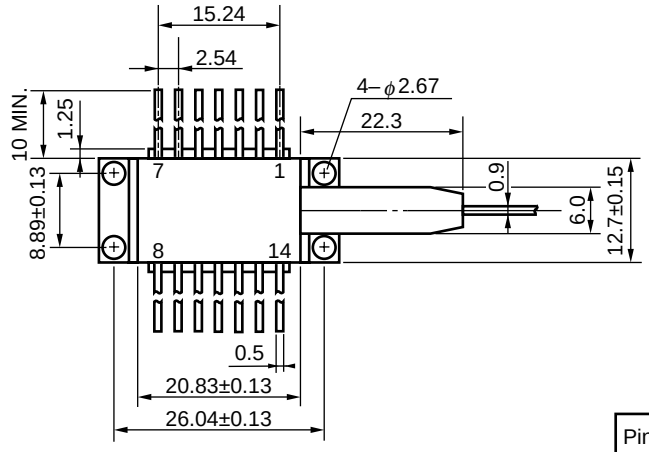
The NDL7910P is an EA modulator integrated 1 550 nm DFB-LD for 2.5 Gb/s. The newly developed bandgap energy controlled Selective MOVPE technology is utilized as fabrication method. It is designed for 2.5 Gb/s ultralong-reach applications.

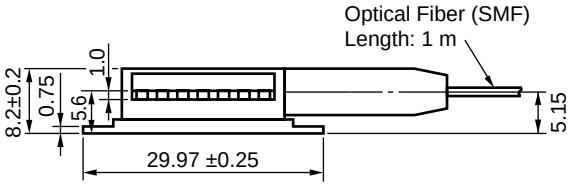
FEATURES

- Integrated electroabsorption modulator
- Low modulation voltage
- Wavelength selectable for ITU-T standards
- 14-pin butterfly package

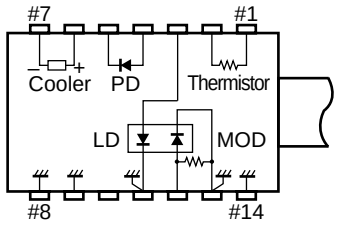
PACKAGE DIMENSIONS

in millimeters





TOP VIEW



PIN CONNECTIONS

Pin No.	Function	Pin No.	Function
1	Thermistor	8	GND
2	Thermistor	9	GND
3	LD DC Bias	10	NC
4	PD Anode	11	GND
5	PD Cathode	12	Signal Input (MOD), 50 Ω RF Input
6	Cooler Anode		
7	Cooler Cathode	13	GND
		14	GND

The information in this document is subject to change without notice.

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The mark ★ shows major revised points.

ORDERING INFORMATION

Part Number	Available Connector
NDL7910P	Without Connector
NDL7910PC	With FC-PC Connector

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Optical Output Power from Fiber	P_f	10	mW
Forward Current of LD	I_{FLD}	150	mA
Reverse Voltage of LD	V_{RLD}	2.0	V
Forward Voltage of Modulator	V_{Fm}	1	V
Reverse Voltage of Modulator	V_{Rm}	5	V
Forward Current of PD	I_{FPD}	1	mA
Reverse Voltage of PD	V_{RPD}	10	V
Cooler Current	I_C	1.5	A
Cooler Voltage	V_C	2.5	V
Operating Case Temperature	T_C	–20 to +70	°C
Storage Temperature	T_{stg}	–40 to +85	°C
Lead Soldering Temperature (10 s)	T_{sld}	260	°C

ELECTRO-OPTICAL CHARACTERISTICS
(T_{LD} = 25 °C, T_C = –20 to +70 °C, unless otherwise specified)

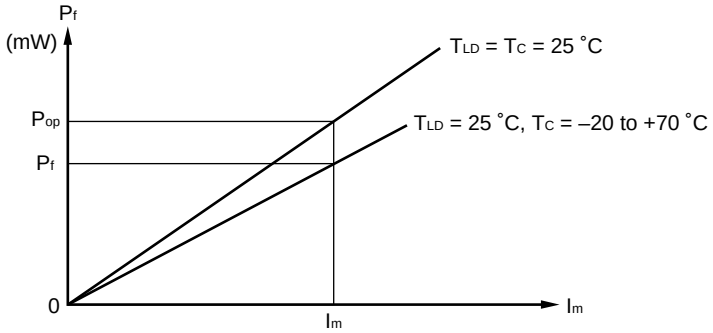
	Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
	Operating Current	I_{op}		50		100	mA
★	Modulation Center Voltage	V_{Rmc}		0.5		1.5	V
	Modulation Voltage	V_{Rmpp}		2		3	V
	Forward Voltage of LD	V_{FLD}	$I_{FLD} = I_{op}$			1.8	V
	Threshold Current	I_{th}			7	20	mA
	Optical Output Power from Fiber	P_f	V_{Rm} = 0 V, $I_{FLD} = I_{op}$	0.5			mW
	Peak Emission Wavelength	λ_p	$I_{FLD} = I_{op}$, V_{Rm} = 0 V	1 545		1 560	nm
	Spectral Line Width	$\Delta\nu$	$I_{FLD} = I_{op}$, –20 dB, Under modulation[*1]		4		GHz
	Side Mode Suppression Ratio	SMSR	$I_{FLD} = I_{op}$, V_{Rm} = 0 V	30			dB
	Extinction Ratio	ER	$I_{FLD} = I_{op}$, Under modulation[*1]	10			dB
	Cut-off Frequency	f_C	$I_{FLD} = I_{op}$, V_{Rm} = 1/2 V_{Rmpp}, –3 dB, 50 Ω	3.2			GHz
	Rise Time	t_r	$I_{FLD} = I_{op}$, 20-80 %, Under modulation[*1]			125	ps
	Fall Time	t_f	$I_{FLD} = I_{op}$, 80-20 %, Under modulation[*1]			125	ps
	Isolation	I_s		30			dB

***1** 2.48832 Gb/s, PRBS 2^{23-1}, $V_{Rm} = V_{Rmc} \pm 1/2\ V_{Rmpp}$, NEC Test System

ELECTRO-OPTICAL CHARACTERISTICS
(Applicable to Monitor PD: T_{LD} = 25 °C, T_C = –20 to +70 °C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Monitor Current	I_m	$I_{FLD} = I_{op}$, V_{Rm} = 0 V	20		1 000	μA
Dark Current	I_D	V_{RPD} = 5 V			10	nA
Tracking Error	γ^{*1}	I_m = const.			0.5	dB
Monitor Capacitance	C_t	V_{RPD} = 5 V, f = 1 MHz			15	pF

***1** $\gamma = \left| 10 \log \frac{P_f}{P_{op}} \right|$

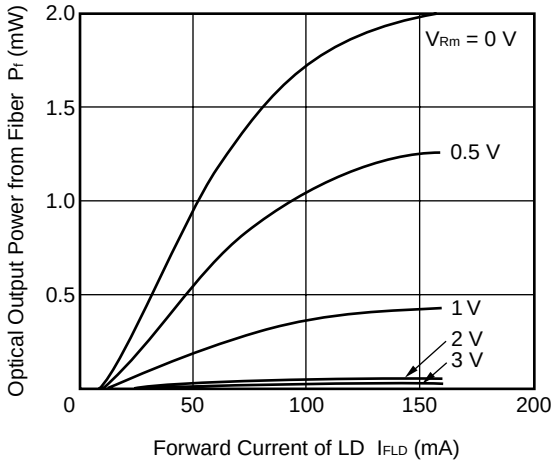


ELECTRO-OPTICAL CHARACTERISTICS
(Applicable to Thermistor and TEC: T_{LD} = 25 °C, T_C = –20 to +70 °C)

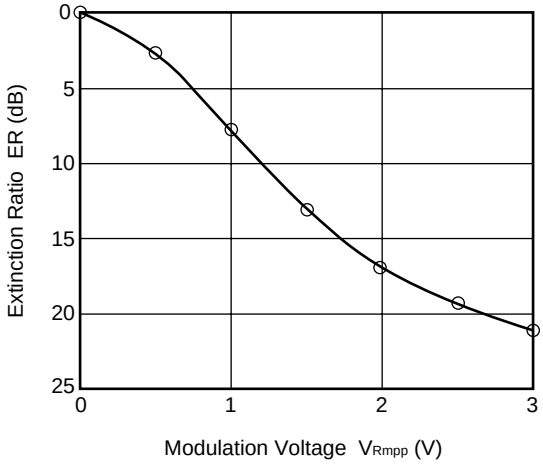
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Thermistor Resistance	R	T_{LD} = 25 °C	9.5	10.0	10.5	kΩ
B Constant	B		3 300	3 400	3 500	K
Cooler Current	I_C	$\Delta T = 70 - T_{set}$			1.5	A
Cooler Voltage	V_C	$\Delta T = 70 - T_{set}$			2.5	V

TYPICAL CHARACTERISTICS (T_{LD} = 25 °C, unless otherwise specified)

OPTICAL OUTPUT POWER FROM FIBER vs. FORWARD CURRENT OF LD (CW)



EXTINCTION RATIO vs. MODULATION VOLTAGE (CW)



Remark The graphs indicate nominal characteristics.

★ DFB-LD FAMILY FOR TELECOM

Part Number	Absolute Maximum Ratings		Typical Characteristics			SDH Application	Package
	T_C (°C)	T_{stg} (°C)	I_{th} (mA)	P_f (mW)	λ_C (nm)		
			TYP.	MIN.	TYP.		
NDL7603P Series	–40 to +85	–40 to +85	15	2	1 310	≤ STM-4 : 622 Mb/s	Coaxial
NDL7620P Series	0 to +70	–40 to +85	45 (MAX.)	2	1 310	≤ STM-16: 2.5 Gb/s	Coaxial
NDL7701P Series	–20 to +85	–40 to +85	15	2	1 550	≤ STM-4 : 622 Mb/s	Coaxial
NDL7705P Series	–40 to +85	–40 to +85	15	2	1 550	≤ STM-4 : 622 Mb/s	Coaxial
NX8562LB	–20 to +65	–40 to +85	20	20	1 550*1	CW Light Source for external modulator	BFY
NX8563LB Series	–20 to +65	–40 to +85	20	10	ITU-T*2	CW Light Source for external modulator	BFY
NDL7910P	–20 to +70	–40 to +85	7	0.5	1 550*1	≤ STM-16: 2.5 Gb/s EA modulator integrated DFB-LD	BFY

***1** Wavelength selectable for ITU-T standards upon request.

***2** Wavelength selectable for ITU-T standards.

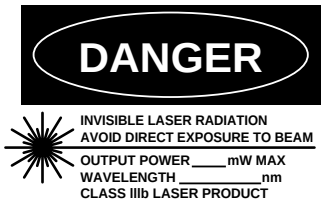
REFERENCE

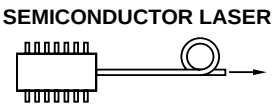
Document Name	Document No.
NEC semiconductor device reliability/quality control system	C11159E
Quality grades on NEC semiconductor devices	C11531E
Semiconductor device mounting technology manual	C10535E
Semiconductor selection guide	X10679E

[MEMO]

CAUTION

Within this device there exists GaAs (Gallium Arsenide) material which is a harmful substance if ingested. Please do not under any circumstances break the hermetic seal.





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Type number: _____
Manufactured: _____
Serial Number: _____
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