NEC

LASER DIODE
NDL7673P

1310 nm OPTICAL CATV/ANALOG APPLICATIONS
InGaAsP STRAINED MQW-DFB LASER DIODE MODULE

DESCRIPTION

NDL7673P is a 1310 nm DFB (Distributed Feed-Back) laser diode, that has a newly developed Strained Multiple Quantum Well (MQW) structure, butterfly package module with optical isolator. It is especially designed for a 16 mW light source of CATV analog applications.

FEATURES

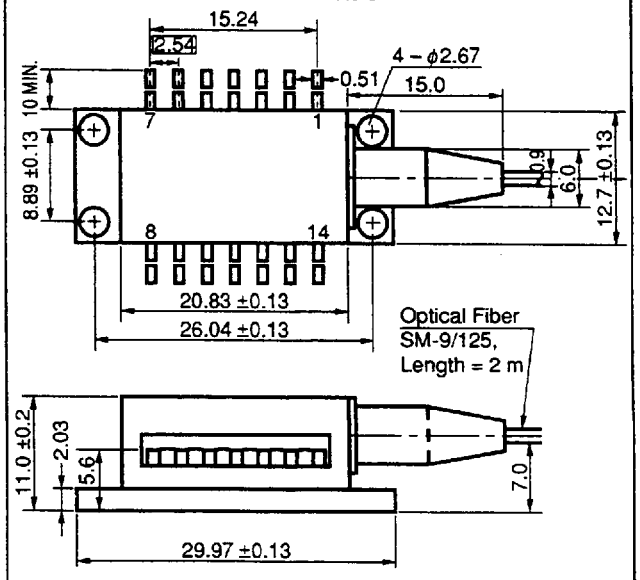
- Low noise — RIN = –155 dB/Hz Max.
- Low distortion — CSO = –55 dBc Max.; CTB = –60 dBc Max.
- High output power — P_f = 16.0 mW
- Long wavelength — λ_P = 1310 nm
- High isolation — 40 dB
- Internal InGaAs monitor PD
- Internal thermoelectric cooler
- Hermetically sealed 14 pin butterfly Package
- Singlemode fiber pigtail
- Wide operating temperature range
- High reliability

ORDERING INFORMATION

Part Number	Available Connector
NDL7673P	Without Connector
NDL7673PC	With FC-UPC Connector
NDL7673PD	With SC-UPC Connector

PACKAGE DIMENSIONS

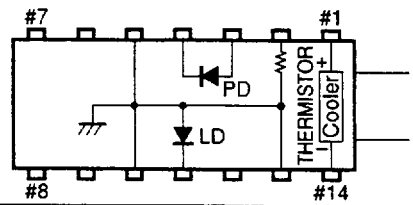
in millimeters



PIN CONNECTIONS

PIN No.	FUNCTION	PIN No.	FUNCTION
1	COOLER ANODE	8	NC
2	THERMISTOR	9	NC
3	PD ANODE	10	CASE GROUND
4	PD CATHODE	11	LD CATHODE
5	CASE GROUND	12	NC
6	NC	13	LD ANODE, CASE GROUND
7	NC	14	COOLER CATHODE

TOP VIEW



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ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C)

Parameter	Symbol	Ratings	Unit
Operating Case Temperature	T_C	–20 to +65	°C
Storage Temperature	T_{stg}	–40 to +70	°C
Lead Soldering Temperature (10 s)	T_{sld}	260	°C
Optical Output Power	P_f	25	mW
Forward Current of LD	I_F	150	mA
Reverse Voltage of LD	V_R	2.0	V
Forward Current of PD	I_F	10	mA
Reverse Voltage of PD	V_R	20	V
Cooler Current	I_C	1.0	A
Cooler Voltage	V_C	2.0	V

ELECTRO-OPTICAL CHARACTERISTICS (T_{LD} = 25 °C, T_C = –20 °C to +65 °C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Threshold Current	I_{th}			20	35	mA
Forward Voltage	V_F	I_F = 30 mA	0.9	1.2	1.4	V
Optical Output Power from Fiber (Recommended Operating Point)	P_{op} *1		15.0	16.0		mW
Spontaneous Emission Power from Fiber	P_s	$I_b = I_{th}$			50	μW
Differential Efficiency from Fiber	η_d	$P_f \leq P_{op}$	0.25			mW/mA
Peak Emission Wavelength	λ_P	$P_f = P_{op}$	1290	1310	1330	nm
Sub-mode Suppression Ratio	SMSR	$P_f = P_{op}$	30	35		dB
1 dB Bandwidth	f	$P_f = P_{op}$	900			MHz
Relative Intensity Noise	RIN*2	$P_f = P_{op}$			–155	dB/Hz
Composite Second Order Distortion	CSO*3	$P_f = P_{op}$			–55	dBc
Composite Triple Beat Distortion	CTB*3	$P_f = P_{op}$			–60	dBc
Carrier to Noise Ratio	CNR*3	$P_f = P_{op}$	49			dBc
Isolation	Is		35	40		dB

*1 Recommended Pop value is supplied with each device.

*2 Conditions : $P_f = P_{op}$, CW
Measuring Bandwidth: 50 MHz to 600 MHz
Optical Reflection –40 dB

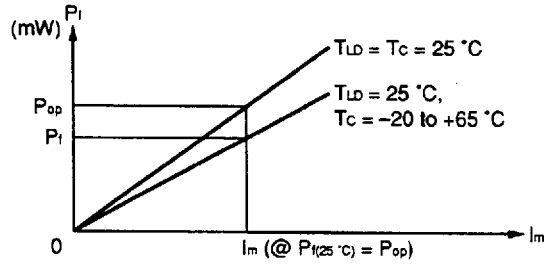
*3 Conditions : $P_f = P_{op}$, Optical Modulation Index = 3.5 %/channel
79 channel unmodulated carriers (55.25 MHz to 547.25 MHz)
Optical Reflection –40 dB, Optical Loss = 12 dB

ELECTRO-OPTICAL CHARACTERISTICS
(Applicable to Monitor PD: T_{LD} = 25 °C, T_C = –20 °C to +65 °C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Monitor Current	I_m	V_R = 5 V, $P_f = P_{op}$	50			μA
Dark Current	I_D	V_R = 5 V		2	10	nA
Tracking Error	γ *4	I_m = const.			0.5	dB

*4 Tracking Error : γ

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



ELECTRO-OPTICAL CHARACTERISTICS
(Applicable to Thermistor and TE Cooler: T_{LD} = 25 °C, T_C = –20 °C to +65 °C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Thermistor Resistance	R *5	T_{LD} = 25 °C	9.5	10	10.5	kΩ
Cooler Current	I_C	ΔT = 40 K		0.6	0.8	A
Cooler Voltage	V_C	ΔT = 40 K		1.1	1.5	V
Cooling Capacity	ΔT *6	I_C = 0.8 A, $P_f = P_{op}$	40			K

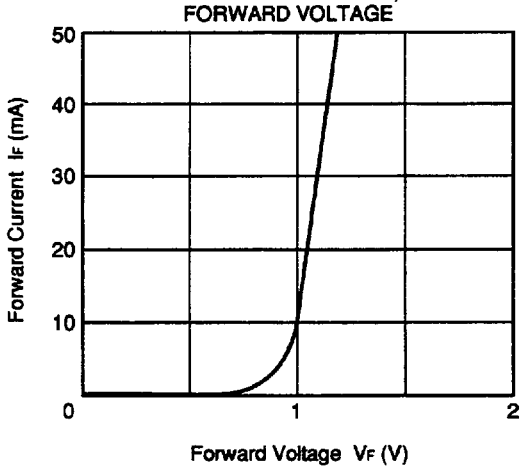
*5 B Constant = 3400 ±100 K
*6 $\Delta T = |T_C - T_{LD}|$

DFB LASER FAMILY FOR CATV/ANALOG APPLICATIONS

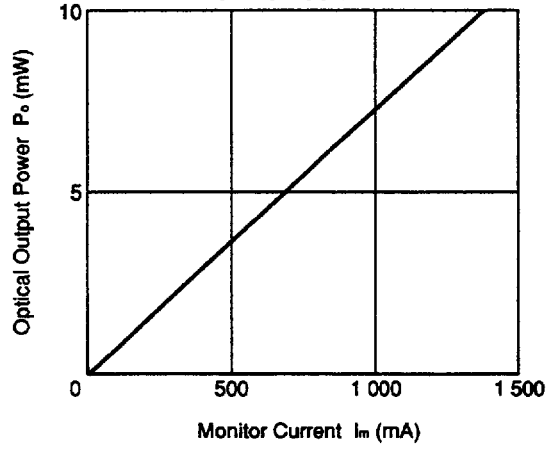
FEATURES	P_{op}: Operating point power (min. value)					
	3 mW min.	4 mW min.	6 mW min.	8 mW min.	12 mW min.	15 mW min.
14 PIN BFY MODULE WITH SMF	NDL7680P	NDL7650P	NDL7660P	NDL7670P	NDL7672P	NDL7673P

TYPICAL CHARACTERISTICS (T_C = 25 °C)

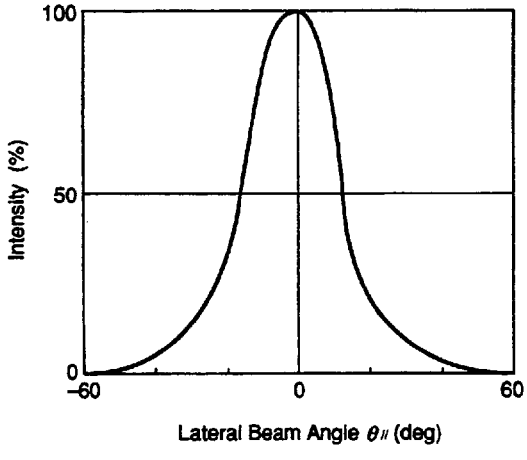
FORWARD CURRENT vs. FORWARD VOLTAGE



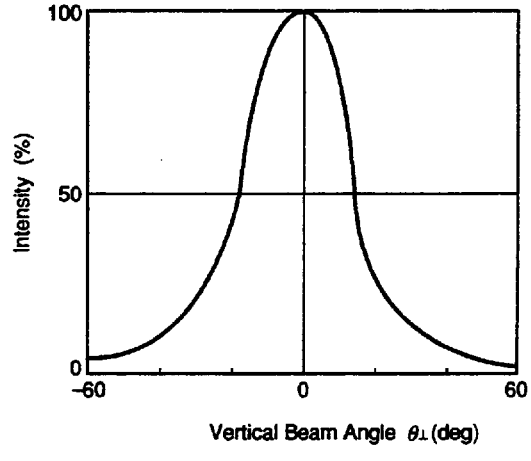
OPTICAL OUTPUT POWER vs. LD MONITOR CURRENT



FAR FIELD PATTERN ($\theta_{//}$)



FAR FIELD PATTERN ($\theta_{\perp}$)



LONGITUDINAL MODE