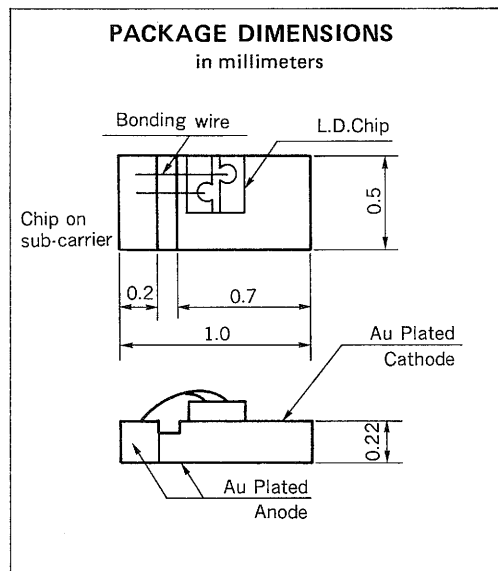


1 310 nm OPTICAL FIBER COMMUNICATIONS
InGaAsP PHASE-SHIFTED DFB-DC-PBH
LASER DIODE FOR 2.5 Gb/s
DESCRIPTION

NDL5800C is 1310 nm DFB (Distributed Feed-back) laser diode chip on sub-carrier. This device is designed mainly for high speed, high capacity transmission systems, for example 2.5 Gb/s system. The phase-shifted DFB-DC-PBH (Double Channel Planar Buried Heterostructure) has achieved stable single longitudinal mode oscillation under high speed modulation as well as in wide temperature range. Also, pad-electrode structure has realized quite high speed modulation, for example 2.5 Gb/s.

NEC has two types of laser diode chip on carriers with ribbon lead NDL5800D and NDL5800D1 and one type of laser diode chip on sub-carrier NDL5800C.

**FEATURES**

- High speed $t_r = 100 \text{ ps}$, $t_f = 170 \text{ ps}$
- High output power $P_O = 8 \text{ mW}$ @ $I_F = I_{th} + 30 \text{ mA}$
- Low threshold current $I_{th} = 20 \text{ mA}$
- Long wavelength $\lambda_p = 1310 \text{ nm}$
- Single longitudinal mode SMSR = 40 dB
- Narrow vertical angle and wide lateral beam angle $\theta_{\perp} \times \theta_{\parallel} = 40^{\circ} \times 30^{\circ}$
- Fundamental transverse mode
- Wide operating temperature range
- High reliability

QUALITY GRADE

Standard

Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

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

ABSOLUTE MAXIMUM RATINGS

($T_a = 25^\circ\text{C}$ in dry nitrogen atmosphere)

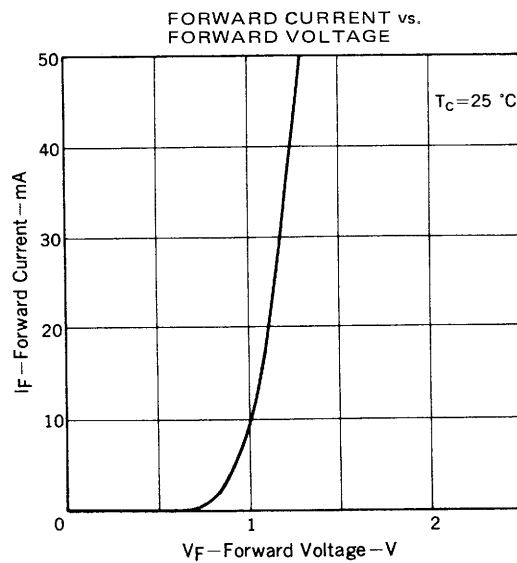
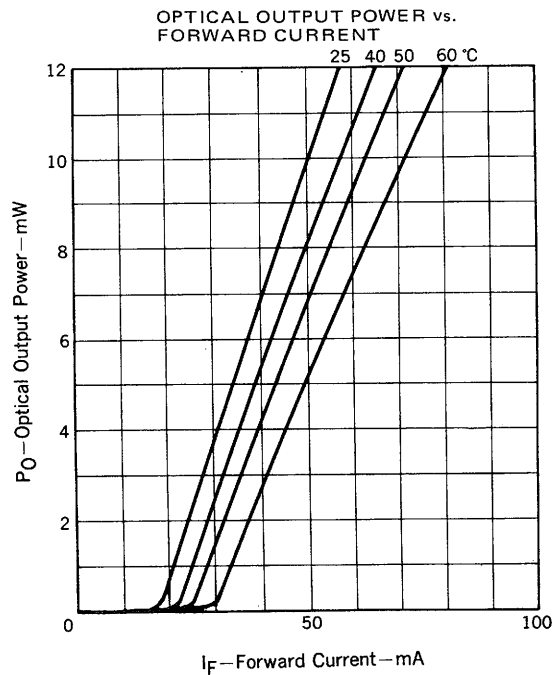
Reverse Voltage	V_R	2.0	V
Optical Output Power	P_O	15	mW
Operating Temperature	T_{op}	0 to +60	$^\circ\text{C}$
Storage Temperature	T_{stg}	0 to +70	$^\circ\text{C}$

ELECTRO-OPTICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Threshold Current	I_{th}		20	35	mA	
Forward Voltage	V_F	0.9	1.2	1.4	V	$I_F = 30\text{ mA}$
Optical Output Power	P_O	5.0	8.0		mW	$I_F = I_{th} + 30\text{ mA}$
Peak Emission Wavelength	λ_p	1290	1310	1330	nm	$P_O = 8.0\text{ mW}$
Half Power Spectral Width	$\Delta\lambda$			0.1	nm	$P_O = 8.0\text{ mW}$
Sub-mode Suppression Ratio	SMSR	30	40		dB	$P_O = 8.0\text{ mW}$
Vertical Beam Angle	θ_{\perp}		40		deg.	$P_O = 8.0\text{ mW}$, FAHM*1
Lateral Beam Angle	θ_{\parallel}		30		deg.	$P_O = 8.0\text{ mW}$, FAHM*1
Rise Time	t_r		100		ps	10 – 90 %
Fall Time	t_f		170		ps	90 – 10 %

*1 FAHM: Full Angle at Half Maximum

TYPICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)



LASER DIODE CHIP ON CARRIER HANDLING PRECAUTION

LASER DIODE CHIP ON CARRIER IS NON HERMETIC SEALED DEVICE. THEREFORE, THERE IS A POSSIBILITY THAT RELIABILITY OF THE DEVICE IS AFFECTED BY STORAGE AND/OR ASSEMBLY CONDITION. IN ORDER TO ASSURE DEVICE RELIABILITY, NEC RECOMMENDS FOLLOWING CONDITIONS FOR HANDLING.

1) STORAGE CONDITION

WHEN THE DEVICE IS PRESERVED AFTER BREAKING CONTAINER SEAL, FOLLOWING CONDITION SHOULD BE MAINTAINED. (DURING CUSTOMER'S ASSEMBLY PROCESS, THE CONDITION ALSO SHOULD BE APPLIED FOR THE UNSEALED PACKAGE WHICH IS EQUIPPED WITH THE DEVICE.)

STORAGE TEMPERATURE: +20 TO +30 °C
 CONTAINER: CLEAN DRY BOX WITH ESD PROTECTION
 AMBIENT GAS: AIR OR NITROGEN (DEW POINT: LESS THAN -30 °C)

RECOMMENDABLE STORAGE PERIOD IS AS FOLLOWS.

STORAGE CONDITION	STORAGE DURATION
IN NEC'S CONTAINER BEFORE SEAL BREAK	6 MONTHS MAX.
AFTER SEAL BREAK	1 MONTH MAX.

2) HANDLING/ASSEMBLY CONDITIONS

2-1) BONDING WIRE

ANY CONTACT TO BONDING WIRE SHOULD BE AVOIDED.

2-2) CHIP FACETS

CLEAN CONDITION OF LASER DIODE CHIP FACETS SHOULD BE KEPT.

2-3) DIE ATTACHMENT

WHEN THE DEVICE IS MOUNTED INTO CUSTOMER'S PACKAGE, THE DEVICE SHOULD BE PREVENTED FROM ANY SCRATCHES, CRACKS, CHIP OUT AND CONTAMINATION ON CHIP SURFACE (TOP AND FACETS).

2-4) ESD PROTECTION

DURING HANDLING PROCESS, ESD PROTECTION SUCH AS EARTH-BAND SHOULD BE CARRIED OUT.

2-5) SOLDERING CONDITION

THE FOLLOWING CONDITIONS SHOULD BE KEPT.

OTHERWISE, THERE IS A POSSIBILITY THAT THERE IS THE INFLUENCE ON ELECTRO-OPTICAL CHARACTERISTICS AND RELIABILITY OF THE DEVICE.

TEMPERATURE: +230 °C MAX.
 DURATION: 30 sec. MAX.
 ATMOSPHERE: INERT GAS (EX. NITROGEN)

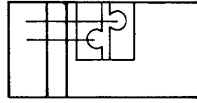
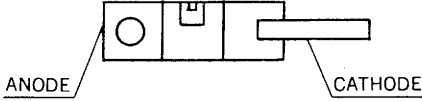
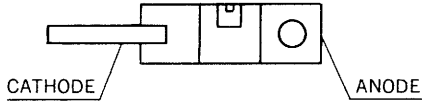
2-6) HERMETIC SEALING

THE DEVICE SHOULD BE FINALLY INSTALLED IN HERMETIC SEALED PACKAGE.

INERT GAS ATMOSPHERE SUCH AS NITROGEN IS RECOMMENDED.

HERMETISITY SHOULD BE LESS THAN 10^{-8} atm.cc/sec.

PHASE-SHIFTED DFBDC · PBH LASER DIODE FAMILY

PACKAGES	FEATURES	WAVELENGTH		REMARKS	
		1.3 μm	1.55 μm		
CHIP ON SUBCARRIER		NDL5800C	NDL5850C		
CHIP ON CARRIER WITH RIBBON LEAD (D TYPE)		NDL5800D	NDL5850D		
CHIP ON CARRIER WITH RIBBON LEAD (D1 TYPE)		NDL5800D1	NDL5850D1		
14PIN BFY MODULE WITH SMF		NDL5801P	NDL5851P	WITH ISOLATOR	
		NDL5803P	NDL5853P	WITH ISOLATOR $f_c = 4 \text{ GHz}$	
MAIN CHARACTERISTICS ($T_a = 25 \text{ }^\circ\text{C}$)				UNIT	CONDITIONS
OPTICAL OUTPUT POWER	P_O	8.0	5.0	mW	$I_F = I_{th} + 30 \text{ mA}$
THRESHOLD CURRENT	I_{th}	20	25	mA	
SUB-MODE SUPPRESSION RATIO	SMSR	40	40	dB	
RISE TIME	t_r	100	100	ps	$I_b = I_{th}$
FALL TIME	t_f	170	170	ps	$I_b = I_{th}$

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The devices listed in this document are not suitable for use in the field where very high reliability is required including, but not limited to, aerospace equipment, submarine cables, nuclear reactor control systems and life support systems. If customers intend to use NEC devices for above applications or those intended to use "Standard", or "Special" quality grade NEC devices for the applications not intended by NEC, please contact our sales people in advance.

Application examples recommended by NEC Corporation

Standard: Data processing and office equipment, Communication equipment (terminal, mobile), Test and Measurement equipment, Audio and Video equipment, Other consumer products, etc.

Special: Automotive and Transportation equipment, Communication equipment (trunk line), Train and Traffic control devices, industrial robots, Burning control systems, antidisaster systems, anticrime systems etc.