DATA SHEET

NEC

LASER DIODE

NX8530NH,NX8531NH

1 550 nm InGaAsP MQW-DFB LASER DIODE MODULE
2.5 Gb/s DIRECTLY MODULATION LIGHT SOURCE FOR DWDM APPLICATIONS

DESCRIPTION

The NX8530NH and NX8531NH are 1 550 nm Multiple Quantum Wells (MQW) structured Distributed Feed-Back (DFB) laser diode module TOSA integrated a mini-TEC, with InGaAs monitor PIN-PD in a ceramic package designed for SFP transceivers and other types of modules with LC receptacle.

FEATURES

- Optical output power P_{AVG} = 0 dBm MIN. (NX8530NH)
  P_{AVG} = 4 dBm MIN. (NX8531NH)
- Available for DWDM C-band and L-band wavelengths based on ITU-T recommendations
  (100 GHz grid, please refer to the **ORDERING INFORMATION**)
- Built-in mini thermo-electric cooler with low power consumption
- Miniature 18.5 mm package with LC receptacle

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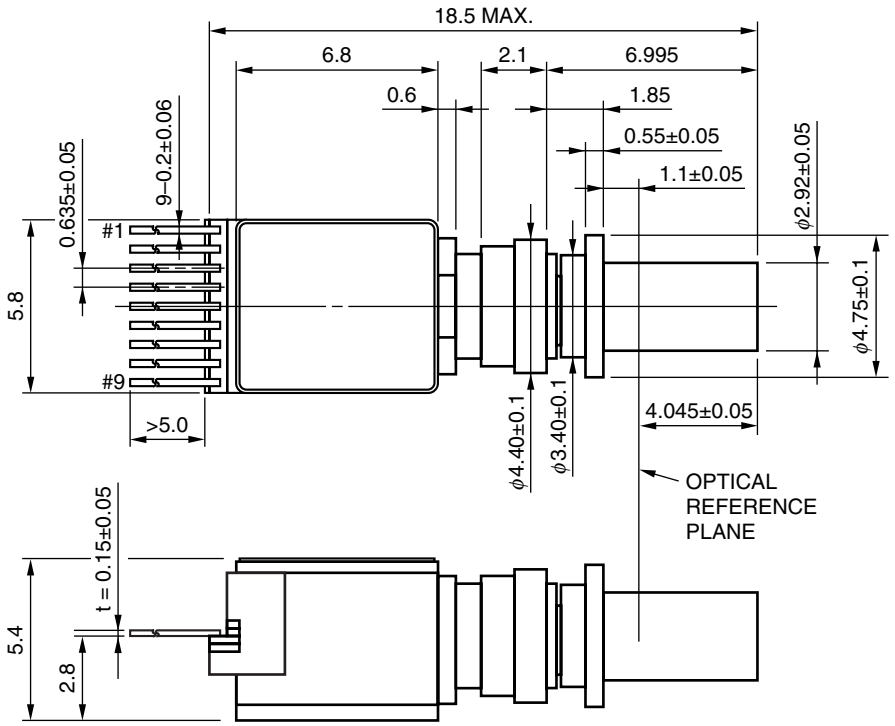
PACKAGE DIMENSIONS (UNIT: mm)



PIN CONNECTIONS

Pin No.	Function
1	Thermistor
2	Thermistor
3	LD Bias, LD Cathode
4	PD Anode
5	RF GND, LD Anode, PD Cathode
6	DATA, LD Cathode
7	RF GND, LD Anode, PD Cathode
8	TEC (+)
9	TEC (–)

ORDERING INFORMATION

NX8530NH□□□
NX8531NH□□□

Wavelength Code : Refer to **Table A**

Table A: DWDM wavelength based on ITU-T recommendations (@T_{LD} = T_{set}) (1/2)

Wavelength Code	ITU-T Wavelength*1 (nm)	Frequency (THz)	Wavelength Code	ITU-T Wavelength*1 (nm)	Frequency (THz)
279	1 527.99	196.20	485	1 548.51	193.60
287	1 528.77	196.10	493	1 549.32	193.50
295	1 529.55	196.00	501	1 550.12	193.40
303	1 530.33	195.90	509	1 550.92	193.30
311	1 531.12	195.80	517	1 551.72	193.20
318	1 531.90	195.70	525	1 552.52	193.10
326	1 532.68	195.60	533	1 553.33	193.00
334	1 533.47	195.50	541	1 554.13	192.90
342	1 534.25	195.40	549	1 554.94	192.80
350	1 535.04	195.30	557	1 555.75	192.70
358	1 535.82	195.20	565	1 556.55	192.60
366	1 536.61	195.10	573	1 557.36	192.50
373	1 537.40	195.00	581	1 558.17	192.40
381	1 538.19	194.90	589	1 558.98	192.30
389	1 538.98	194.80	597	1 559.79	192.20
397	1 539.77	194.70	606	1 560.61	192.10
405	1 540.56	194.60	614	1 561.42	192.00
413	1 541.35	194.50	622	1 562.23	191.90
421	1 542.14	194.40	630	1 563.05	191.80
429	1 542.94	194.30	638	1 563.86	191.70
437	1 543.73	194.20	646	1 564.68	191.60
445	1 544.53	194.10	654	1 565.50	191.50
453	1 545.32	194.00	663	1 566.31	191.40
461	1 546.12	193.90	671	1 567.13	191.30
469	1 546.92	193.80	679	1 567.95	191.20
477	1 547.72	193.70	687	1 568.77	191.10

***1** The value which omitted and computed the 3rd place below the decimal point

Table A: DWDM wavelength based on ITU-T recommendations (@$T_{LD} = T_{set}$) (2/2)

Wavelength Code	ITU-T Wavelength*1 (nm)	Frequency (THz)	Wavelength Code	ITU-T Wavelength*1 (nm)	Frequency (THz)
695	1 569.59	191.00	904	1 590.41	188.50
704	1 570.42	190.90	912	1 591.26	188.40
712	1 571.24	190.80	921	1 592.10	188.30
720	1 572.06	190.70	929	1 592.95	188.20
728	1 572.89	190.60	937	1 593.79	188.10
737	1 573.71	190.50	946	1 594.64	188.00
745	1 574.54	190.40	954	1 595.49	187.90
753	1 575.37	190.30	963	1 596.34	187.80
761	1 576.20	190.20	971	1 597.19	187.70
770	1 577.03	190.10	980	1 598.04	187.60
778	1 577.86	190.00	988	1 598.89	187.50
786	1 578.69	189.90	997	1 599.75	187.40
795	1 579.52	189.80	6006	1 600.60	187.30
803	1 580.35	189.70	6014	1 601.46	187.20
811	1 581.18	189.60	6023	1 602.31	187.10
820	1 582.02	189.50	6031	1 603.17	187.00
828	1 582.85	189.40	6040	1 604.03	186.90
836	1 583.69	189.30	6048	1 604.88	186.80
845	1 584.53	189.20	6057	1 605.74	186.70
853	1 585.36	189.10	6066	1 606.60	186.60
862	1 586.20	189.00	6074	1 607.47	186.50
870	1 587.04	188.90	6083	1 608.33	186.40
878	1 587.88	188.80	6091	1 609.19	186.30
887	1 588.73	188.70	6100	1 610.06	186.20
895	1 589.57	188.60			

***1** The value which omitted and computed the 3rd place below the decimal point

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit
Forward Current of LD	I_{FLD}	300	mA
Reverse Voltage of LD	V_{RLD}	2.0	V
Forward Current of PD	I_{FPD}	2.0	mA
Reverse Voltage of PD	V_{RPD}	20	V
Operating Case Temperature	T_C	–5 to +75	°C
Storage Temperature	T_{stg}	–40 to +85	°C
Lead Soldering Temperature	T_{sld}	350 (3 sec.)	°C
Cooler Current	I_C	0.9	A
Cooler Voltage	V_C	1.8	V

ELECTRO-OPTICAL CHARACTERISTICS ($T_{LD} = T_{set}$, T_C = –5 to +75°C, BOL)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Laser Set Temperature	T_{set}		35		50	°C
Operating Voltage	V_{op}		0.9		2.0	V
Threshold Current	I_{th}		5	20	40	mA
Optical Output Power (average)	P_{AVG}	$I_F = I_{op}$, $T_{LD} = T_{set}$ (NX8530NH)	0		4	dBm
		$I_F = I_{op}$, $T_{LD} = T_{set}$ (NX8531NH)	4		7	
Operating Current	I_{op}				100	mA
Threshold Output Power	P_{th}	$I_F = I_{th}$			100	μW
Slope Efficiency	η	CW (NX8530NH)	0.04	0.1		W/A
		CW (NX8531NH)	0.08	0.18		
Peak Emission Wavelength	λ_p	P_f = 10 mW, CW, $T_{LD} = T_{set}$	1 528	ITU-T[*1]	1 563	nm
			1 564		1 610	
Side Mode Suppression Ratio	SMSR	CW, $I_F = I_{op}$	30	35		dB
Relative Intensity Noise	RIN	CW, $I_F = I_{op}$, f = 20 MHz to 3 GHz			–140	dB/Hz
Rise Time	t_r	20-80%, T_C = 25°C			120	ps
Fall Time	t_f	80-20%, T_C = 25°C			120	ps
Electrical Input Return Loss	S_{11}	f = 50 MHz to 3 GHz	6			dB
		f = 3 GHz to 5 GHz	3			
Band Width	BW	–3 dB, $I_F = I_{op}$	2.5			GHz
Dispersion Penalty	DP	T_C = 25°C[*2]			2.0	dB

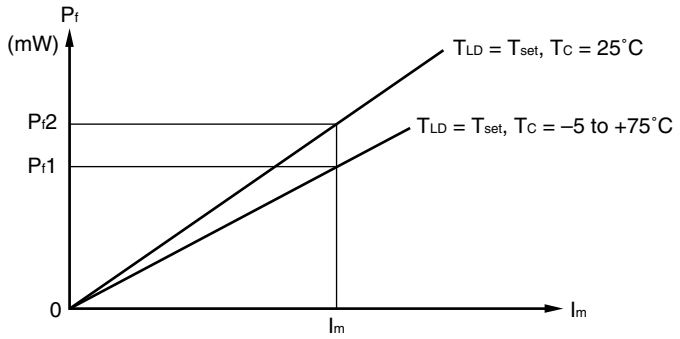
***1** Available for DWDM wavelengths based on ITU-T recommendations
(100 GHz grid, please refer to the **ORDERING INFORMATION**)

***2** 2.48832 Gb/s, PRBS 2^{23}–1, NRZ, Extinction Ratio $\geq$ 9.0 dB, 2 400 ps/nm

ELECTRO-OPTICAL CHARACTERISTICS
(Applicable to Monitor PD: $T_{LD} = T_{set}$, T_C = –5 to +75°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Monitor Current	I_m	P_f = 5 mW (NX8530NH)	0.08		2.0	mA
		P_f = 10 mW (NX8531NH)				
Dark Current	I_D	V_R = 5 V			100	nA
Tracking Error	γ *1	I_m = const.	–1.0		1.0	dB

*1 $\gamma = \left| 10 \log \frac{P_f1}{P_f2} \right|$



ELECTRO-OPTICAL CHARACTERISTICS
(Applicable to Thermistor and TEC: $T_{LD} = T_{set}$, T_C = –5 to +75°C, BOL)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Thermistor Resistance	R	T_{LD} = 25°C	9.5	10.0	10.5	kΩ
B Constant	B		3 350	3 450	3 550	K
Cooler Current	I_C	ΔT = 40°C (NX8530NH)			0.4	A
		ΔT = 40°C (NX8531NH)			0.5	
Cooler Voltage	V_C	ΔT = 40°C (NX8530NH)			1.0	V
		ΔT = 40°C (NX8531NH)			1.5	

REFERENCE

Document Name	Document No.
Opto-Electronics Devices Pamphlet	PX10160E

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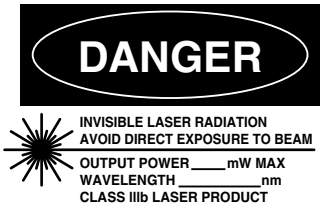

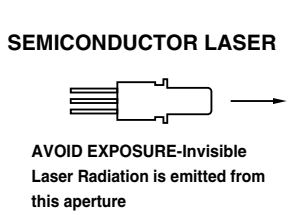

Warning Laser Beam	A laser beam is emitted from this diode during operation. The laser beam, visible or invisible, directly or indirectly, may cause injury to the eye or loss of eyesight. • Do not look directly into the laser beam. • Avoid exposure to the laser beam, any reflected or collimated beam.
Caution GaAs Products	This product uses gallium arsenide (GaAs). GaAs vapor and powder are hazardous to human health if inhaled or ingested, so please observe the following points. • Follow related laws and ordinances when disposing of the product. If there are no applicable laws and/or ordinances, dispose of the product as recommended below. 1. Commission a disposal company able to (with a license to) collect, transport and dispose of materials that contain arsenic and other such industrial waste materials. 2. Exclude the product from general industrial waste and household garbage, and ensure that the product is controlled (as industrial waste subject to special control) up until final disposal. • Do not burn, destroy, cut, crush, or chemically dissolve the product. • Do not lick the product or in any way allow it to enter the mouth.
Caution Optical Fiber	A glass-fiber is attached on the product. Handle with care. • When the fiber is broken or damaged, handle carefully to avoid injury from the damaged part or fragments.