



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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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 _{FDP}	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 _{slid}	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 _t = 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**)

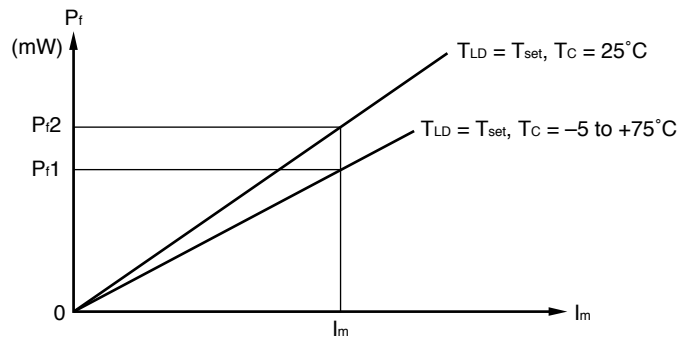
*2 2.48832 Gb/s, PRBS 2²³-1, NRZ, Extinction Ratio ≥ 9.0 dB, 2 400 ps/nm

ELECTRO-OPTICAL CHARACTERISTICS

(Applicable to Monitor PD: $T_{LD} = T_{set}$, $T_c = -5$ to $+75^\circ\text{C}$)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Monitor Current	I_m	$P_f = 5 \text{ mW}$ (NX8530NH)	0.08		2.0	mA
		$P_f = 10 \text{ mW}$ (NX8531NH)				
Dark Current	I_D	$V_R = 5 \text{ V}$			100	nA
Tracking Error	γ^*	$I_m = \text{const.}$	-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 $+75^\circ\text{C}$, BOL)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Thermistor Resistance	R	$T_{LD} = 25^\circ\text{C}$	9.5	10.0	10.5	k Ω
B Constant	B		3 350	3 450	3 550	K
Cooler Current	I_c	$\Delta T = 40^\circ\text{C}$ (NX8530NH)			0.4	A
		$\Delta T = 40^\circ\text{C}$ (NX8531NH)			0.5	
Cooler Voltage	V_c	$\Delta T = 40^\circ\text{C}$ (NX8530NH)			1.0	V
		$\Delta T = 40^\circ\text{C}$ (NX8531NH)			1.5	

REFERENCE

Document Name	Document No.
Opto-Electronics Devices Pamphlet	PX10160E

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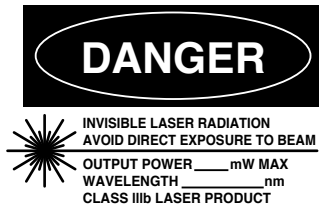
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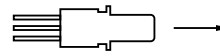
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SEMICONDUCTOR LASER



**AVOID EXPOSURE-Invisible
Laser Radiation is emitted from
this aperture**

<p>Warning Laser Beam</p>	<p>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.</p> <ul style="list-style-type: none"> • Do not look directly into the laser beam. • Avoid exposure to the laser beam, any reflected or collimated beam.
<p>Caution GaAs Products</p>	<p>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.</p> <ul style="list-style-type: none"> • 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. <ol style="list-style-type: none"> 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.
<p>Caution Optical Fiber</p>	<p>A glass-fiber is attached on the product. Handle with care.</p> <ul style="list-style-type: none"> • When the fiber is broken or damaged, handle carefully to avoid injury from the damaged part or fragments.

Subject: Compliance with EU Directives

CEL certifies, to its knowledge, that semiconductor and laser products detailed below are compliant with the requirements of European Union (EU) Directive 2002/95/EC Restriction on Use of Hazardous Substances in electrical and electronic equipment (RoHS) and the requirements of EU Directive 2003/11/EC Restriction on Penta and Octa BDE.

CEL Pb-free products have the same base part number with a suffix added. The suffix –A indicates that the device is Pb-free. The –AZ suffix is used to designate devices containing Pb which are exempted from the requirement of RoHS directive (*). In all cases the devices have Pb-free terminals. All devices with these suffixes meet the requirements of the RoHS directive.

This status is based on CEL’s understanding of the EU Directives and knowledge of the materials that go into its products as of the date of disclosure of this information.

Restricted Substance per RoHS	Concentration Limit per RoHS (values are not yet fixed)	Concentration contained in CEL devices	
		-A	-AZ
Lead (Pb)	< 1000 PPM	Not Detected	(*)
Mercury	< 1000 PPM	Not Detected	
Cadmium	< 100 PPM	Not Detected	
Hexavalent Chromium	< 1000 PPM	Not Detected	
PBB	< 1000 PPM	Not Detected	
PBDE	< 1000 PPM	Not Detected	

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