

To our customers,

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## Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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# NX8563LA Series

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

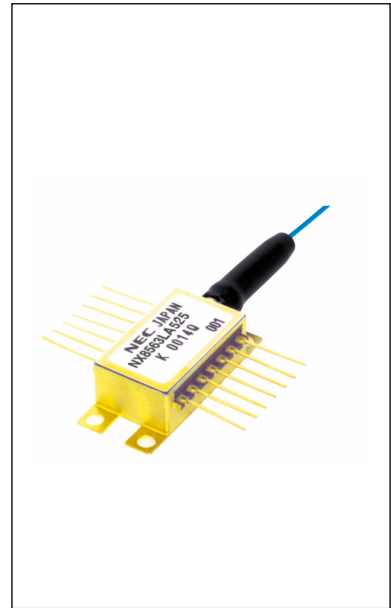
### DESCRIPTION

The NX8563LA Series is a 1 550 nm Multiple Quantum Well (MQW) structured Distributed Feed-Back (DFB) laser diode module with Single Mode Fiber.

It is designed as directly modulation light source and ideal for optical transmission systems. The device is available for Dense Wavelength Division Multiplexing (DWDM) wavelengths based on ITU-T recommendations, enabling a wide range of applications.

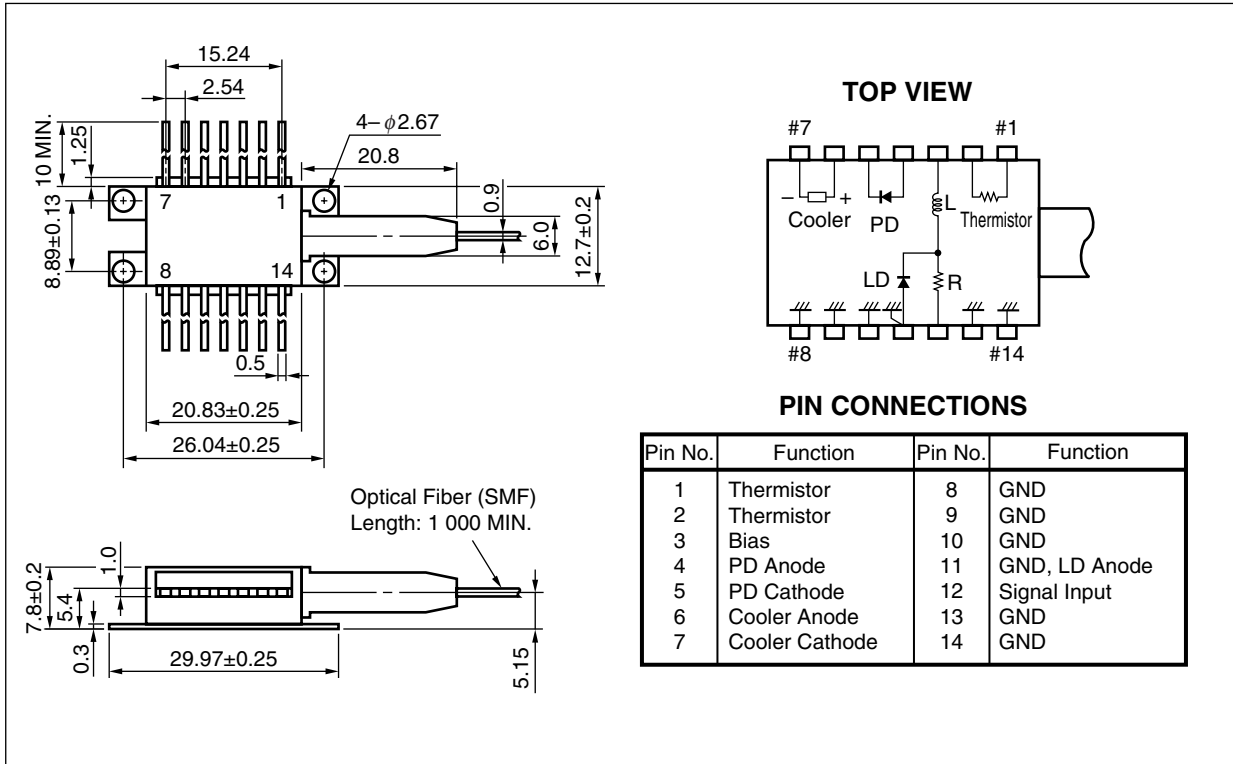
### FEATURES

- Peak output power  $P_r = 10 \text{ mW MIN.}$
- Available for DWDM wavelengths based on ITU-T recommendations (100 GHz grid, please refer to the **ORDERING INFORMATION**)
- Internal thermo-electric cooler and isolator
- Hermetically sealed 14-pin butterfly package
- Single mode fiber pigtail
- Wide operation temperature range



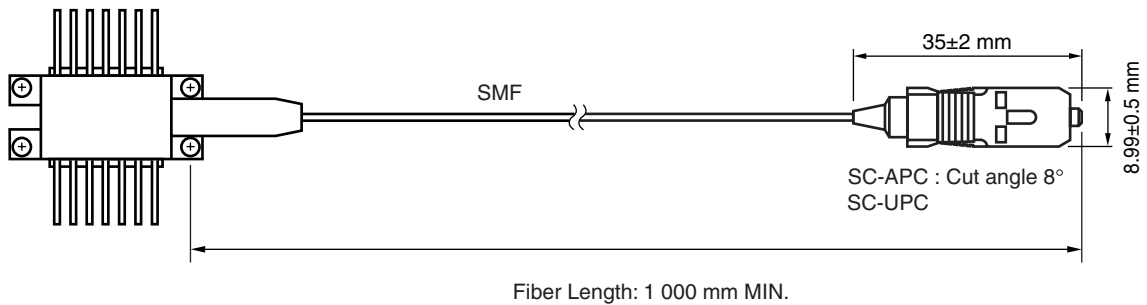
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★ PACKAGE DIMENSIONS (UNIT: mm)

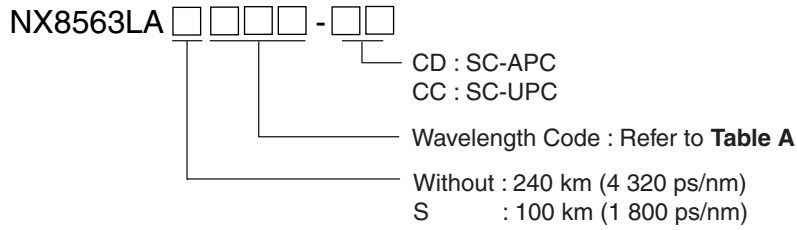


OPTICAL FIBER DIMENSIONS (UNIT: mm)

Parameter	Specification	Unit
Outer Diameter	0.9±0.1	mm
Minimum Fiber Bending Radius	30	mm
Fiber Length	1 000 MIN.	mm



ORDERING INFORMATION



**Table A: DWDM wavelength based on ITU-T recommendations (@T<sub>LD</sub> = T<sub>set</sub>)**

Wavelength Code	ITU-T Wavelength* <sup>1</sup> (nm)	Frequency (THz)	Wavelength Code	ITU-T Wavelength* <sup>1</sup> (nm)	Frequency (THz)
303	1 530.33	195.90	509	1 550.91	193.30
311	1 531.11	195.80	517	1 551.72	193.20
318	1 531.89	195.70	525	1 552.52	193.10
326	1 532.68	195.60	533	1 553.32	193.00
334	1 533.46	195.50	541	1 554.13	192.90
342	1 534.25	195.40	549	1 554.94	192.80
350	1 535.03	195.30	557	1 555.74	192.70
358	1 535.82	195.20	565	1 556.55	192.60
366	1 536.60	195.10	573	1 557.36	192.50
373	1 537.39	195.00	581	1 558.17	192.40
381	1 538.18	194.90	589	1 558.98	192.30
389	1 538.97	194.80	597	1 559.79	192.20
397	1 539.76	194.70	606	1 560.60	192.10
405	1 540.55	194.60	614	1 561.41	192.00
413	1 541.34	194.50			
421	1 542.14	194.40			
429	1 542.93	194.30			
437	1 543.73	194.20			
445	1 544.52	194.10			
453	1 545.32	194.00			
461	1 546.11	193.90			
469	1 546.91	193.80			
477	1 547.71	193.70			
485	1 548.51	193.60			
493	1 549.31	193.50			
501	1 550.11	193.40			

\*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	$I_F$	300	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
Operating Case Temperature	$T_C$	-20 to +85	°C
Storage Temperature	$T_{stg}$	-40 to +85	°C
Lead Soldering Temperature	$T_{sld}$	260 (10 sec.)	°C

**ELECTRO-OPTICAL CHARACTERISTICS ( $T_{LD} = T_{set}$ ,  $T_C = -20$  to  $+85^\circ\text{C}$ )**

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Laser Set Temperature	$T_{set}$		30		45	°C
Forward Voltage	$V_F$	$P_f = 10$ mW	0.9		2.0	V
Threshold Current	$I_{th}$			20	40	mA
Optical Output Power from Fiber	$P_f$	$I_F = I_{op}$ , $T_{LD} = T_{set}$	10			mW
Operation Current	$I_{op}$				125	mA
Threshold Output Power	$P_{th}$	$I_F = I_{th}$			100	μW
Quantum Efficiency	$\eta$	CW	0.142	0.17		W/A
Peak Emission Wavelength	$\lambda_p$	$P_f = 10$ mW, CW, $T_{LD} = T_{set}$	1 530	ITU-T <sup>*1</sup>	1 562	nm
Spectral Line Width	$\Delta\nu$	$P_f = 10$ mW, CW, 3 dB down		1	5	MHz
Side Mode Suppression Ratio	SMSR	$P_f = 10$ mW, under modulation	30	35		dB
Input Impedance	ZIN			25		Ω
Relative Intensity Noise	RIN	$P_f = 10$ mW, 20 MHz to 3 GHz			-140	dB/Hz
Rise and Fall Time	$t_r / t_f$	20-80%/80-20%, $T_C = 25^\circ\text{C}$			120	ps
Input Return Loss	$S_{11}$	f = 50 MHz to 3 GHz	6			dB
		f = 3 GHz to 6 GHz	3			
Band Width	BW	-3 dB, $P_f = 10$ mW	2.5			GHz
Dispersion Penalty	DP	$T_C = 25^\circ\text{C}^2$			2.0	dB

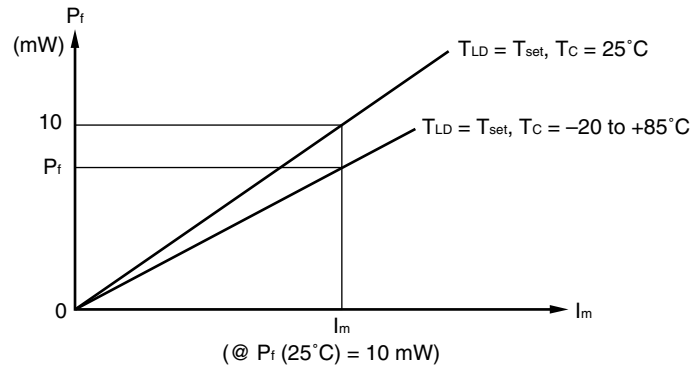
\*1 Available for DWDM wavelengths based on ITU-T recommendations (100 GHz grid, please refer to the **ORDERING INFORMATION**)

\*2 2.48832 Gb/s, PRBS 2<sup>23</sup>-1, duty cycle, Extinction Ratio ≥ 8.5 dB, BER = 10<sup>-10</sup>, NX8563LAS: 1 800 ps/nm (100 km), NX8563LA: 4 320 ps/nm (240 km)

**ELECTRO-OPTICAL CHARACTERISTICS**  
 (Applicable to Monitor PD:  $T_{LD} = T_{set}$ ,  $T_c = -20$  to  $+85^\circ\text{C}$ )

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Monitor Current	$I_m$	$P_f = 10 \text{ mW}$ , $V_R = 5 \text{ V}$	100		2 000	$\mu\text{A}$
Dark Current	$I_D$	$V_R = 5 \text{ V}$			10	nA
Tracking Error	$\gamma^{*1}$	$I_m = \text{const.}$			0.6	dB

$$*1 \gamma = \left| 10 \log \frac{P_f}{10 \text{ mW}} \right|$$



**ELECTRO-OPTICAL CHARACTERISTICS**  
 (Applicable to Thermistor and TEC:  $T_{LD} = T_{set}$ ,  $T_c = -20$  to  $+85^\circ\text{C}$ )

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Thermistor Resistance	R	$T_{LD} = 25^\circ\text{C}$	9.5	10.0	10.5	$\text{k}\Omega$
B Constant	B		3 350	3 450	3 550	K
Cooler Current	$I_c$	$\Delta T = 85 - T_{set}$ , $P_f = 10 \text{ mW}$			1.2	A
Cooler Voltage	$V_c$	$\Delta T = 85 - T_{set}$ , $P_f = 10 \text{ mW}$			2.4	V

**REFERENCE**

Document Name	Document No.
OPTICAL SEMICONDUCTOR DEVICES FOR FIBEROPTIC COMMUNICATIONS SELECTION GUIDE	PL10161E
Opto-Electronics Devices Pamphlet	PX10160E

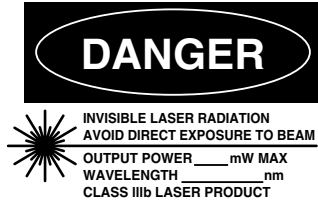


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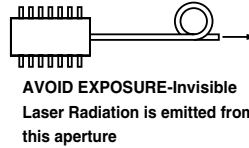
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M8E 00.4-0110

**SAFETY INFORMATION ON THIS PRODUCT**



**SEMICONDUCTOR LASER**



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<p><b>Caution</b> 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"> <li>• 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"> <li>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.</li> <li>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.</li> </ol> </li> <li>• Do not burn, destroy, cut, crush, or chemically dissolve the product.</li> <li>• Do not lick the product or in any way allow it to enter the mouth.</li> </ul>
<p><b>Caution</b> Optical Fiber</p>	<p>A glass-fiber is attached on the product. Handle with care.</p> <ul style="list-style-type: none"> <li>• When the fiber is broken or damaged, handle carefully to avoid injury from the damaged part or fragments.</li> </ul>

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