

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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# NX8510UD Series

1 470 TO 1 610 nm FOR CWDM 2.5 Gb/s  
InGaAsP MQW-DFB LASER DIODE TOSA

## DESCRIPTION

The NX8510UD is a 1 470 to 1 610 nm Multiple Quantum Well (MQW) structured Distributed Feed-Back (DFB) laser diode TOSA (transmitter optical sub-assembly) with InGaAs monitor PIN-PD in a receptacle type package designed for SFF/SFP transceiver with LC duplex receptacle. This device is ideal for 2.5 Gb/s CWDM application.

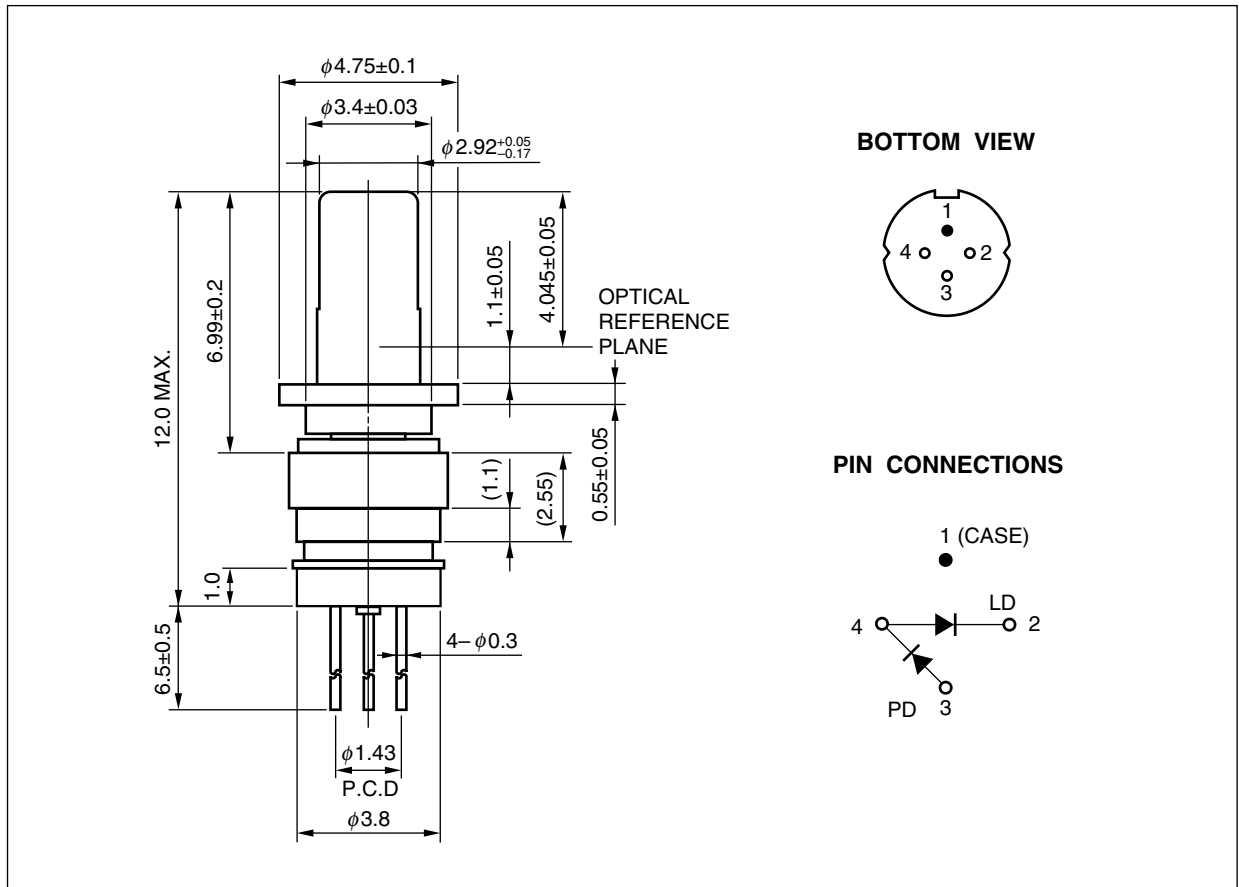
## FEATURES

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• Internal optical isolator</li> <li>• Optical output power</li> <li>• Peak emission wavelength</li> <li>• Low threshold current</li> <li>★ • Operating case temperature range</li> <li>• Side mode suppression ratio</li> <li>• InGaAs monitor PIN-PD</li> <li>• Small package</li> </ul> | <p><math>P_i = 2.0 \text{ mW}</math></p> <p><math>\lambda_p = 1\,470 \text{ to } 1\,610 \text{ nm (Based on CWDM)}</math></p> <p><math>I_{th} = 10 \text{ mA TYP. @ } T_c = 25^\circ\text{C}</math></p> <p><math>T_c = -20 \text{ to } +85^\circ\text{C}</math></p> <p>SMSR = 40 dB</p> <p><math>\phi 3.8 \text{ mm TOSA (Total length } 12.0 \text{ mm MAX.)}</math></p> |
|---|---|



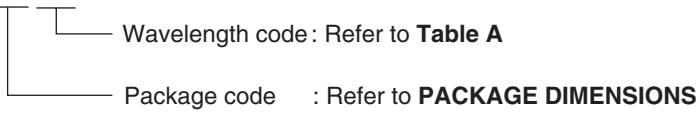
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Not all devices/types available in every country. Please check with local NEC Compound Semiconductor Devices representative for availability and additional information.

PACKAGE DIMENSIONS (UNIT: mm)



**ORDERING INFORMATION**

NX8510UD xx



**ABSOLUTE MAXIMUM RATINGS**

Parameter	Symbol	Ratings	Unit
Optical Output Power from Fiber	$P_f$	5.0	mW
Forward Current of LD	$I_F$	150	mA
Reverse Voltage of LD	$V_R$	2.0	V
Forward Current of PD	$I_F$	2.0	mA
Reverse Voltage of PD	$V_R$	15	V
★ Operating Case Temperature	$T_C$	-20 to +85	°C
Storage Temperature	$T_{stg}$	-40 to +85	°C
Lead Soldering Temperature	$T_{sld}$	350 (3 sec.)	°C

★ ELECTRO-OPTICAL CHARACTERISTICS (Tc = -20 to +85°C, unless otherwise specified)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Operating Voltage	V <sub>op</sub>	CW, P <sub>f</sub> = 2.0 mW		1.1	1.6	V
Threshold Current	I <sub>th</sub>	CW, T <sub>c</sub> = 25°C		10	20	mA
		CW			50	
Optical Output Power from Fiber	P <sub>f</sub>	CW, T <sub>c</sub> = 25°C, I <sub>f</sub> = I <sub>th</sub> + 20 mA		2.0		mW
Differential Efficiency	η <sub>d</sub>	CW, P <sub>f</sub> = 2.0 mW, T <sub>c</sub> = 25°C	0.07	0.1		W/A
		CW, P <sub>f</sub> = 2.0 mW	0.04			
Peak Emission Wavelength	λ <sub>p</sub>	CW, P <sub>f</sub> = 2.0 mW, RMS (-20 dB), T <sub>c</sub> = 35°C	λ <sub>p</sub> -2	λ <sub>p</sub> *1	λ <sub>p</sub> +2	nm
Temperature Dependence of Peak Emission Wavelength	Δλ/ΔT	CW	0.08	0.10	0.12	nm/°C
Side Mode Suppression Ratio	SMSR	CW, P <sub>f</sub> = 2.0 mW	30	40		dB
Rise Time	t <sub>r</sub>	I <sub>b</sub> = I <sub>th</sub> , 20-80%, P <sub>f</sub> = 2.0 mW			100	ps
Fall Time	t <sub>f</sub>	I <sub>b</sub> = I <sub>th</sub> , 80-20%, P <sub>f</sub> = 2.0 mW			150	ps
Monitor Current	I <sub>m</sub>	CW, V <sub>R</sub> = 1.5 V, P <sub>f</sub> = 1.0 mW	100	500	1 000	μA
Monitor Dark Current	I <sub>D</sub>	V <sub>R</sub> = 1.5 V, T <sub>c</sub> = 25°C		0.1	10	nA
		V <sub>R</sub> = 1.5 V		10	100	
Tracking Error <sup>2</sup>	γ	CW, I <sub>m</sub> = const. (@ P <sub>f</sub> = 2.0 mW)	-1.0		1.0	dB
Connector Repeatability	-	With master pigtail	-1.0		1.0	dB

\*1 Available Available for CWDM Wavelengths based on ITU-T recommendations

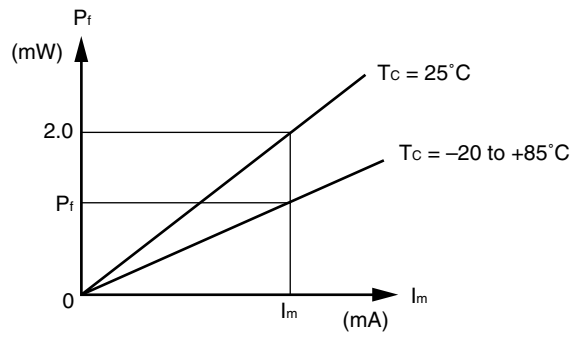
λ<sub>p</sub> = 1 470, 1 490, 1 510, 1 530, 1 550, 1 570, 1 590, 1 610 nm

Please refer to **Table A**.

★ **Table A: CWDM wavelength code (@ Tc = 35°C)**

Wavelength Code	MIN. (nm)	TYP. (nm)	MAX. (nm)
47	1 468	1 470	1 472
49	1 488	1 490	1 492
51	1 508	1 510	1 512
53	1 528	1 530	1 532
55	1 548	1 550	1 552
57	1 568	1 570	1 572
59	1 588	1 590	1 592
61	1 608	1 610	1 612

★ \*2 Tracking Error:  $\gamma$



$$\gamma = \left| 10 \log \frac{P_f}{2.0} \right| \text{ [dB]}$$

**LD  $\phi$ 3.8 mm FP-TOSA PACKAGES FAMILY FOR OPTICAL FIBER COMMUNICATIONS**

Part Number	Absolute Maximum Ratings		Electro-Optical Characteristics				Application	Package
			@T <sub>c</sub> = 25°C	@T <sub>c</sub>				
	T <sub>c</sub> (°C)	T <sub>stg</sub> (°C)	I <sub>th</sub> (mA)	P <sub>f</sub> (mW)	$\lambda_c$ (nm)			
			TYP.	TYP.	MIN.	MAX.		
NX7312UA	-40 to +85	-40 to +85	8	0.2	1 274	1 356	156 Mb/s: STM-1 (S-1.1)	$\phi$ 3.8 mm TOSA
							622 Mb/s: STM-4 (S-4.1)	
NX7313UA	-40 to +85	-40 to +85	8	0.6	1 270	1 355	1.25 Gb/s: GbE	$\phi$ 3.8 mm TOSA
NX7314UA	-40 to +85	-40 to +85	8	1.0	1 263	1 360	156 Mb/s: STM-1 (L-1.1)	$\phi$ 3.8 mm TOSA
NX7315UA	-40 to +85	-40 to +85	8	0.6	1 266	1 360	2.5 Gb/s: STM-16 (I-16)	$\phi$ 3.8 mm TOSA

**LD  $\phi$ 3.8 mm DFB-TOSA PACKAGES FAMILY FOR OPTICAL FIBER COMMUNICATIONS**

Part Number	Absolute Maximum Ratings		Electro-Optical Characteristics				Application	Package
			@T <sub>c</sub> = 25°C	@T <sub>c</sub>				
	T <sub>c</sub> (°C)	T <sub>stg</sub> (°C)	I <sub>th</sub> (mA)	P <sub>f</sub> (mW)	$\lambda_p$ (nm)			
			TYP.	TYP.	MIN.	MAX.		
NX8310UA	-40 to +85	-40 to +85	10	2.0	1 280	1 335	622 Mb/s: STM-4 (L-4.1)	$\phi$ 3.8 mm TOSA
NX8311UD	-20 to +85	-40 to +85	10	2.0	1 280	1 335	2.5 Gb/s: STM-16 (L-16.1)	$\phi$ 3.8 mm TOSA
NX8312UA	-20 to +85	-40 to +85	10	1.0	1 280	1 335	2.5 Gb/s: STM-16 (S-16.1)	$\phi$ 3.8 mm TOSA
NX8312UD	-20 to +85	-40 to +85	10	1.0	1 280	1 335	2.5 Gb/s: STM-16 (S-16.1)	$\phi$ 3.8 mm TOSA
★ NX8510UD Series	-20 to +85	-40 to +85	10	2.0	$\lambda_p-2^{*1}$	$\lambda_p+2^{*1}$	2.5 Gb/s: CWDM	$\phi$ 3.8 mm TOSA
★ NX8511UD	-20 to +85	-40 to +85	10	2.0	1 530	1 570	2.5 Gb/s: STM-16 (L-16.2)	$\phi$ 3.8 mm TOSA

- ★ \*1 T<sub>c</sub> = 35°C
- Available for CWDM Wavelengths based on ITU-T recommendations
- $\lambda_p$  = 1 470, 1 490, 1 510, 1 530, 1 550, 1 570, 1 590, 1 610 nm



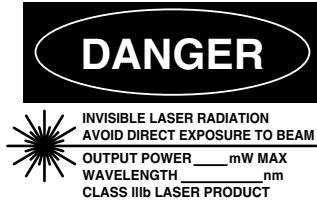
**REFERENCE**

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

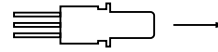
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M8E 00.4-0110

**SAFETY INFORMATION ON THIS PRODUCT**



**SEMICONDUCTOR LASER**



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