

To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics Corporation

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LASER DIODE NX8511UD

1 550 nm FOR LONG HAUL 2.5 Gb/s InGaAsP MQW-DFB LASER DIODE TOSA

DESCRIPTION

The NX8511UD is a 1 550 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 Synchronous Digital Hierarchy (SDH) system, long haul STM-16 (L-16.2), ITU-T recommendations, and SONET OC-48 (LR-2).

FEATURES

- Peak emission wavelength $\lambda_p = 1\ 550\ \text{nm}$
- Optical output power $P_t = 2.0\ \text{mW}$
- Wide operating temperature range $T_c = -20\ \text{to}\ +85^\circ\text{C}$
- Side mode suppression ratio $\text{SMSR} = 40\ \text{dB}$
- InGaAs monitor PIN-PD
- Internal optical isolator
- Based on Telcordia reliability



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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.

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 |
| Relative Humidity (noncondensing) | RH | 85 | % |

ELECTRO-OPTICAL CHARACTERISTICS ($T_c = -20$ to $+85^\circ\text{C}$, unless otherwise specified)

| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---------------------------------|-------------|-------------------------------------------|-------|-------|-------|---------------|
| Optical Output Power from Fiber | P_f | CW | | 2.0 | | mW |
| Operating Voltage | V_{op} | $P_f = 2.0$ mW | | 1.1 | 1.6 | V |
| Threshold Current | I_{th} | $T_c = 25^\circ\text{C}$ | | 10 | 20 | mA |
| | | | | | 50 | |
| Threshold Output Power | P_{th} | $I_F = I_{th}$ | | | 100 | μW |
| Differential Efficiency | η_d | $P_f = 2.0$ mW, $T_c = 25^\circ\text{C}$ | 0.07 | 0.1 | | W/A |
| | | $P_f = 2.0$ mW | 0.04 | | | |
| Peak Emission Wavelength | λ_p | CW, $P_f = 2.0$ mW | 1 530 | 1 550 | 1 570 | nm |
| Side Mode Suppression Ratio | SMSR | $P_f = 2.0$ mW | 30 | 40 | | dB |
| Rise Time | t_r | 20-80%, $P_{pk} = 2.0$ mW, $I_F = I_{th}$ | | | 100 | ps |
| Fall Time | t_f | 80-20%, $P_{pk} = 2.0$ mW, $I_F = I_{th}$ | | | 150 | ps |
| Monitor Current | I_m | $V_R = 1.5$ V, $P_f = 1.0$ mW | 100 | 500 | 1 000 | μA |
| Monitor Dark Current | I_D | $V_R = 1.5$ V, $T_c = 25^\circ\text{C}$ | | 0.1 | 50 | nA |
| | | $V_R = 1.5$ V | | 10 | 500 | |
| Tracking Error | γ | $I_m = \text{const.}$ | -1.0 | | 1.0 | dB |
| Connector Repeatability | - | With master pigtail | -1.0 | | 1.0 | dB |

LD ϕ 3.8 mm FP-TOSA PACKAGES FAMILY FOR OPTICAL FIBER COMMUNICATIONS

| Part Number | Absolute Maximum Ratings | | Electro-Optical Characteristics | | | | Application | Package |
|-------------|--------------------------|-----------------------|---------------------------------|---------------------|------------------|-------|-------------------------|--------------------|
| | | | @T _c = 25°C | @T _c | | | | |
| | T _c (°C) | T _{stg} (°C) | I _{th} (mA) | P _f (mW) | λ_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) | ϕ 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 | ϕ 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) | ϕ 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) | ϕ 3.8 mm TOSA |

LD ϕ 3.8 mm DFB-TOSA PACKAGES FAMILY FOR OPTICAL FIBER COMMUNICATIONS

| Part Number | Absolute Maximum Ratings | | Electro-Optical Characteristics | | | | Application | Package |
|-----------------|--------------------------|-----------------------|---------------------------------|---------------------|--------------------|--------------------|---------------------------|--------------------|
| | | | @T _c = 25°C | @T _c | | | | |
| | T _c (°C) | T _{stg} (°C) | I _{th} (mA) | P _f (mW) | λ_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) | ϕ 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) | ϕ 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) | ϕ 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) | ϕ 3.8 mm TOSA |
| NX8510UD Series | 0 to +70 | -40 to +85 | 10 | 2.0 | λ_p-3^{*1} | λ_p+3^{*1} | 2.5 Gb/s: CWDM | ϕ 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) | ϕ 3.8 mm TOSA |

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

$\lambda_p = 1\ 470, 1\ 490, 1\ 510, 1\ 530, 1\ 550, 1\ 570, 1\ 590, 1\ 610\ \text{nm}$

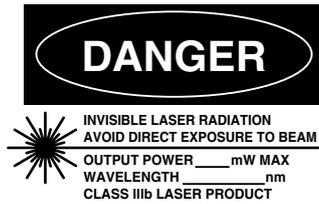
REFERENCE

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

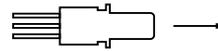
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M8E 00.4-0110

SAFETY INFORMATION ON THIS PRODUCT



SEMICONDUCTOR LASER



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. |
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► For further information, please contact

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