NX8349TB

LASER DIODE

1 310 nm AlGaInAs MQW-DFB LASER DIODE FOR 10 Gb/s APPLICATION

DESCRIPTION

The NX8349TB is a 1 310 nm Multiple Quantum Well (MQW) structured Distributed Feed-Back (DFB) laser diode TOSA (transmitter optical subassembly) with InGaAs monitor PIN-PD in a receptacle type package designed for SFP+/XFP transceiver.

FEATURES

- Internal optical isolator
- Optical output power $P_r = -2$ dBm
- Low threshold current $I_{th} = 8$ mA TYP. @ $T_C = 25^\circ$C
- Wide operating temperature range $T_C = -20$ to $+95^\circ$C
- InGaAs monitor PIN-PD

APPLICATIONS

- 10 G BASE-LW_LR
- 10 G Fibre Channel
- SONET OC-192
PACKAGE DIMENSIONS (UNIT: mm)

**Remarks**

1. Receptacle is electrically isolated from CAN.
2. Characteristic impedance of flexible printed circuit is 25 Ω.
3. NX8349TB has no matching resistor installed.
4. ( ) indicates nominal dimension.
**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Receptacle Type</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>NX8349TB</td>
<td>LC, Electrically isolated</td>
<td>Differential input with flexible PCB, without matching resistor</td>
</tr>
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</table>
### ABSOLUTE MAXIMUM RATINGS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Ratings</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Temperature</td>
<td>$T_{stg}$</td>
<td>−40 to +95°C</td>
<td>°C</td>
</tr>
<tr>
<td>Operating Case Temperature</td>
<td>$T_C$</td>
<td>−20 to +95°C</td>
<td>°C</td>
</tr>
<tr>
<td>Forward Current of LD</td>
<td>$I_{FLD}$</td>
<td>120 mA</td>
<td></td>
</tr>
<tr>
<td>Reverse Voltage of LD</td>
<td>$V_{RLD}$</td>
<td>2 V</td>
<td></td>
</tr>
<tr>
<td>Forward Current of PD</td>
<td>$I_{FPO}$</td>
<td>10 mA</td>
<td></td>
</tr>
<tr>
<td>Reverse Voltage of PD</td>
<td>$V_{RPO}$</td>
<td>15 V</td>
<td></td>
</tr>
<tr>
<td>Soldering Temperature (Flexible Printed Circuit)</td>
<td>$T_{Sld}$</td>
<td>350 (10 sec.)</td>
<td>°C</td>
</tr>
<tr>
<td>Optical Output Power</td>
<td>$P_f$</td>
<td>5 mW</td>
<td></td>
</tr>
</tbody>
</table>
## ELECTRO-OPTICAL CHARACTERISTICS

(Tc = −20 to +95°C, BOL, unless otherwise specified)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Conditions</th>
<th>MIN.</th>
<th>TYP</th>
<th>MAX.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Optical Output Power</td>
<td>P_f</td>
<td>CW, P_f = −2 dBm</td>
<td>−2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak Emission Wavelength</td>
<td>λ_p</td>
<td>CW, P_f = −2 dBm, 20 dB down</td>
<td>1290</td>
<td>1300</td>
<td></td>
<td>nm</td>
</tr>
<tr>
<td>Spectral Width</td>
<td>Δλ_p</td>
<td>CW, P_f = −2 dBm</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Side Mode Suppression Ratio</td>
<td>SMRR</td>
<td>CW, P_f = −2 dBm</td>
<td>35</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Threshold Current</td>
<td>I_th</td>
<td>CW, T_C = 25°C</td>
<td>8</td>
<td>15</td>
<td></td>
<td>mA</td>
</tr>
<tr>
<td>Differential Efficiency</td>
<td>η_d</td>
<td>CW, P_f = −2 dBm, T_C = 25°C</td>
<td>0.020</td>
<td>0.029</td>
<td>0.040</td>
<td>W/A</td>
</tr>
<tr>
<td>Temperature Dependence of</td>
<td>Δη_d</td>
<td>CW, P_f = −2 dBm</td>
<td>−3.5</td>
<td></td>
<td>1.5</td>
<td>dB</td>
</tr>
<tr>
<td>Differential Efficiency</td>
<td></td>
<td>CW, P_f = −2 dBm, 20 dB dwn</td>
<td>0.008</td>
<td></td>
<td>0.060</td>
<td></td>
</tr>
<tr>
<td>Operation Voltage</td>
<td>V_op</td>
<td>CW, P_f = −2 dBm</td>
<td>0.5</td>
<td>2.2</td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Monitor Current</td>
<td>I_m</td>
<td>CW, P_f = −2 dBm</td>
<td>100</td>
<td>1000</td>
<td></td>
<td>μA</td>
</tr>
<tr>
<td>Monitor Dark Current</td>
<td>I_D</td>
<td>V_R = 3.3 V, T_C = 25°C</td>
<td>10</td>
<td></td>
<td></td>
<td>nA</td>
</tr>
<tr>
<td>Rise Time</td>
<td>t_r</td>
<td>20-80%</td>
<td>50</td>
<td></td>
<td></td>
<td>ps</td>
</tr>
<tr>
<td>Fall Time</td>
<td>t_f</td>
<td>20-80%</td>
<td>50</td>
<td></td>
<td></td>
<td>ps</td>
</tr>
<tr>
<td>Monitor PD Terminal Capacitance</td>
<td>C_t</td>
<td>V_R = 3.3 V, f = 1 MHz</td>
<td>6</td>
<td>20</td>
<td></td>
<td>pF</td>
</tr>
<tr>
<td>Relative Intensity Noise</td>
<td>RIN</td>
<td>*1</td>
<td>−128</td>
<td></td>
<td></td>
<td>dB/Hz</td>
</tr>
<tr>
<td>Tracking Error(^2)</td>
<td>γ</td>
<td></td>
<td>−1.0</td>
<td>1.0</td>
<td></td>
<td>dB</td>
</tr>
</tbody>
</table>

Notes:
*1. 9.95/10.3/10.5 Gb/s, PRBS 2\(^{31}\)−1, NRZ, Duty Cycle = 50%
*2. Tracking Error: γ

\[ γ = 10 \log \frac{P_f}{P_f @ 25^°C} \] [dB]

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**Diagram:**

- Plot of P_f vs. I_m, for temperatures T_c = 25°C and T_c = −20 to +95°C.
- Graph illustrates the relationship between optical output power (P_f) and operating current (I_m).

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**Abbreviations:**
- CW: Continuous Wave
- BOL: Beginning of Life
- T_C: Temperature
- V_R: Reference Voltage
- PRBS: Pseudorandom Binary Sequence
- NRZ: Non-Return-to-Zero
- Duty Cycle
- PS: Percent Signal

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**Conversion Notes:**
- dBm to mW: 1 dBm = 1 mW
- °C to °F: T_C = 25°C corresponds to T_C = 77°F

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**Units:**
- dBm
- nm
- dB
- W/A
- °C
- ps
- pF
- dB/Hz
- μA
REFERENCE

<table>
<thead>
<tr>
<th>Document Name</th>
<th>Document No.</th>
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<tbody>
<tr>
<td>Opto-Electronics Devices Pamphlet¹</td>
<td>PX10160E</td>
</tr>
</tbody>
</table>

Notes: *1. Published by the former NEC Electronics Corporation.
## SAFETY INFORMATION ON THIS PRODUCT

### 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.

**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.
<table>
<thead>
<tr>
<th>Rev.</th>
<th>Date</th>
<th>Page</th>
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<tr>
<td>1.00</td>
<td>Jul 26, 2010</td>
<td>–</td>
<td>First edition issued</td>
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