

#### FEATURES

##### • TRANSMITTER/MUX SECTION

- The optical transmitter is driven by a 2.5 Gbps serial data generated from 16 parallel 155.52 Mbps data inputs by a parallel to serial converter (Mux) and a 2.5 GHz clock signal synthesized by an inside PLL from the 155.52 MHz reference Clock input (REFCLK) aligned to 155.52 MHz data input clock (PICLK).
- Uses a 1.3  $\mu\text{m}$  FP type laser.
- Optical Characteristics satisfies OC-48 SR/STM-16 I-16 spec.
- PLL Lock Detect Alarm (LOCKDET).
- Laser Bias Monitor Output (LsrBias).
- Laser Output Monitor Output (LP MON).
- Transmitter Disable Input (TxDis)

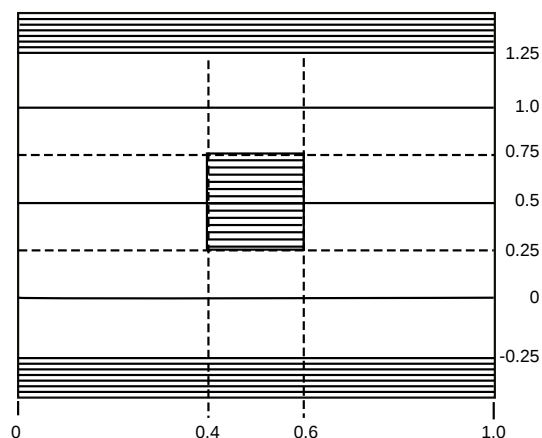
##### • RECEIVER/DMUX SECTION

- The optical receiver converts 2.5 Gbps optical signal into 2.5 Gbps electrical data and extracts 2.4 GHz clock from it using an inside PLL. Optical Characteristics satisfies OC-48 SR/STM-16 I-16 spec.
- A Serial to parallel converter (DMUX) converts serial 4 Gbps data signal into 16 parallel 155.52 Mbps data signals and a 155.52 MHz clock (POCLK) synchronized to these parallel outputs.
- Frame Search/Detection Output (FP, SEARCH).
- Optical Input Shutdown Alarm Output (LOS).
- Optical Receiver Photodiode Current Monitor (IPDMON).
- Out of Frame Input (OOF).

#### DESCRIPTION

OD-UB091 module can be used in section and photonics layers equipment of SONET/SDH protocols. This module performs parallel to serial conversion of 16 parallel 155.52 Mbps electrical signals into a single 2.5 Gbps electrical signal and then convert into a 2.5 Gbps optical signal; and vice versa a 2.5 Gbps optical signal into a 2.4 Gbps electrical signal and then performs serial to parallel conversion into 16 parallel 155.52 Mbps electrical signal. The parallel 155.52 Mbps input/output signals are differential LVPECL signals.

#### OPTICAL OUTPUT WAVEFORM MASK



#### OPTICAL CHARACTERISTICS

| PARAMETERS                     | UNITS | SPECIFICATIONS           |      |
|--------------------------------|-------|--------------------------|------|
|                                |       | MIN                      | MAX  |
| Transmitter                    |       |                          |      |
| Output Power                   | dBm   | -10                      | -3   |
| Output Wavelength              | nm    | 1270                     | 1360 |
| Spectral Maximum, -20 dB width | nm    |                          | 4    |
| Extinction Ratio               | dB    | 8.2                      |      |
| Wave-form                      |       | ITU-T G.957 MASK         |      |
| Laser Diode Class              |       | IEC825-2 class 1         |      |
| Optical Output Logic           |       | Positive Data "H" ➡LD On |      |
| Receiver                       |       |                          |      |
| Input Wavelength               | nm    | 1260                     | 1580 |
| Reflectance                    | dB    | 27                       |      |
| Maximum Overload               | dBm   | -3                       |      |
| Minimum Sensitivity            | dBm   | -18                      |      |
| Jitter Specification           |       | ITU-T G.958              |      |

## PIN ASSIGNMENTS

|     |          |                              |      |          |                            |      |          |                |
|-----|----------|------------------------------|------|----------|----------------------------|------|----------|----------------|
| 1   | GND      | Ground                       | 71.  | D_OUT+2  | 156M Data Out+             | 141. | D_OUT+11 | 156M Data Out+ |
| 2   | IPDMON   | Rx PD Monitor Output         | 72.  | D_OUT- 2 | 156M Data Out-             | 142. | D_OUT-11 | 156M Data Out- |
| 3   | TxGND    | Tx Ground                    | 73.  | D_OUT+0  | 156M Data Out+             | 143. | D_OUT+9  | 156M Data Out+ |
| 4   | D_IN +15 | 156M Data IN+                | 74.  | D_OUT- 0 | 156M Data Out-             | 144. | D_OUT- 9 | 156M Data Out- |
| 5   | D_IN -15 | 156M Data IN-                | 75.  | RxGND    | Rx Ground                  | 145. | RxGND    | Rx Ground      |
| 6   | D_IN +13 | 156M Data IN+                | 76.  | NC       | Open                       | 146. | D_OUT+7  | 156M Data Out+ |
| 7   | D_IN -13 | 156M Data IN-                | 77.  | NC       | Open                       | 147. | D_OUT-7  | 156M Data Out- |
| 8   | TxGND    | Tx Ground                    | 78.  | NC       | Open                       | 148. | D_OUT+5  | 156M Data Out+ |
| 9   | D_IN +11 | 156M Data IN+                | 79.  | NC       | Open                       | 149. | D_OUT-5  | 156M Data Out- |
| 10  | D_IN -11 | 156M Data IN-                | 80.  | GND      | Ground                     | 150. | RxGND    | Rx Ground      |
| 11  | D_IN +9  | 156M Data IN+                | 81.  | GND      | Ground                     | 151. | D_OUT+3  | 156M Data Out+ |
| 12  | D_IN - 9 | 156M Data IN-                | 82.  | RESET    | Maser Reset Input          | 152. | D_OUT-3  | 156M Data Out- |
| 13  | TxGND    | Tx Ground                    | 83.  | TxGND    | Tx Ground                  | 153. | D_OUT+1  | 156M Data Out+ |
| 14  | D_IN +7  | 156M Data IN+                | 84.  | REFCLK+  | Ref. Clock IN+             | 154. | D_OUT-1  | 156M Data Out- |
| 15  | D_IN -7  | 156M Data IN-                | 85.  | REFCLK-  | Ref. Clock IN-             | 155. | RxGND    | Rx Ground      |
| 16  | D_IN +5  | 156M Data IN+                | 86.  | D_IN +14 | 156M Data IN+              | 156. | NC       | Open           |
| 17  | D_IN -5  | 156M Data IN-                | 87.  | D_IN -14 | 156M Data IN-              | 157. | NC       | Open           |
| 18  | TxGND    | Tx Ground                    | 88.  | TxGND    | Tx Ground                  | 158. | NC       | Open           |
| 19  | D_IN +3  | 156M Data IN+                | 89.  | D_IN +12 | 156M Data IN+              | 159. | NC       | Open           |
| 20  | D_IN -3  | 156M Data IN-                | 90.  | D_IN -12 | 156M Data IN-              | 160. | GND      | Ground         |
| 21  | D_IN +1  | 156M Data IN+                | 91.  | D_IN +10 | 156M Data IN+              |      |          |                |
| 22  | D_IN -1  | 156M Data IN-                | 92.  | D_IN -10 | 156M Data IN-              |      |          |                |
| 23  | TxGND    | Tx Ground                    | 93.  | TxGND    | Tx Ground                  |      |          |                |
| 24  | PICLK+   | 156M Clock IN+               | 94.  | D_IN +8  | 156M Data IN+              |      |          |                |
| 25  | PICLK-   | 156M Clock IN-               | 95.  | D_IN -8  | 156M Data IN-              |      |          |                |
| 26  | LOCKDET  | Lock Detect Out              | 96.  | D_IN +6  | 156M Data IN+              |      |          |                |
| 27  | TxGND    | Tx Ground                    | 97.  | D_IN -6  | 156M Data IN-              |      |          |                |
| 28  | +3.3V    | +3.3V (Tx Digital)           | 98.  | TxGND    | Tx Ground                  |      |          |                |
| 29  | +3.3V    | +3.3V (Tx Digital)           | 99.  | D_IN +4  | 156M Data IN+              |      |          |                |
| 30  | TxAGND   | Tx Analog Ground             | 100. | D_IN -4  | 156M Data IN-              |      |          |                |
| 31  | +3.3V    | +3.3V (Tx Analog)            | 101. | D_IN +2  | 156M Data IN+              |      |          |                |
| 32  | +3.3V    | +3.3V (Tx Analog)            | 102. | D_IN -2  | 156M Data IN-              |      |          |                |
| 33  | TxAGND   | Tx Analog Ground             | 103. | TxGND    | Tx Ground                  |      |          |                |
| 34  | LP MON   | Laser Output Monitor Output  | 104. | D_IN +0  | 156M Data IN+              |      |          |                |
| 35  | LsrALM   | Laser Alarm Output           | 105. | D_IN -0  | 156M Data IN-              |      |          |                |
| 36  | LsrBias  | Laser Bias Monitor Output    | 106. | TxGND    | Tx Ground                  |      |          |                |
| 37  | NC       | Open                         | 107. | PCLK+    | 156M Clock Out+ (MUX)      |      |          |                |
| 38  | DLOOP    | System Loopback Enable Input | 108. | PCLK-    | 156M Clock Out- (MUX)      |      |          |                |
| 39  | NC       | Open                         | 109. | TxAGND   | Tx Analog Ground           |      |          |                |
| 40  | FP       | Frame Pulse Output           | 110. | TxAGND   | Tx Analog Ground           |      |          |                |
| 41  | FRAMEEN  | Frame Enable Input           | 111. | +3.3V    | +3.3V (Tx Digital)         |      |          |                |
| 42  | RxGND    | Rx Ground                    | 112. | +3.3V    | +3.3V (Tx Analog)          |      |          |                |
| 43  | +3.3V    | +3.3V (Rx Digital)           | 113. | NC       | Open                       |      |          |                |
| 44  | +3.3V    | +3.3V (Rx Digital)           | 114. | READ     | FIFO Initialization Input  |      |          |                |
| 45  | NC       | Open                         | 115. | TxDis    | Optical Tx Output Shutdown |      |          |                |
| 46  | RxAGND   | Rx Analog Ground             | 116. | NC       | Open                       |      |          |                |
| 47  | RxAGND   | Rx Analog Ground             | 117. | PULSE    | Phase Error Signal Output  |      |          |                |
| 48  | +3.3V    | +3.3V (Rx Analog)            | 118. | LLOOP    | Line Loopback Enable Input |      |          |                |
| 49  | RxAGND   | Rx Analog Ground             | 119. | LOS      | Optical Input Down Alarm   |      |          |                |
| 50  | RxAGND   | Rx Analog Ground             | 120. | RxGND    | Rx Ground                  |      |          |                |
| 51  | RxAGND   | Rx Analog Ground             | 121. | OOF      | Out Of Frame Input         |      |          |                |
| 52  | NC       | Open                         | 122. | RxGND    | Rx Ground                  |      |          |                |
| 53  | NC       | Open                         | 123. | +3.3V    | +3.3V (Rx Digital)         |      |          |                |
| 54  | NC       | Open                         | 124. | +3.3V    | +3.3V (Rx Digital)         |      |          |                |
| 55  | RxGND    | Rx Ground                    | 125. | SEARCH   | A1, A2 Frame Search Output |      |          |                |
| 56  | D_OUT+14 | 156M Data Out+               | 126. | RxAGND   | Rx Analog Ground           |      |          |                |
| 57  | D_OUT-14 | 156M Data Out-               | 127. | RxAGND   | Rx Analog Ground           |      |          |                |
| 58  | D_OUT+12 | 156M Data Out+               | 128. | +3.3V    | +3.3V (Rx Analog)          |      |          |                |
| 59  | D_OUT-12 | 156M Data Out-               | 129. | POCLK+   | 156M Clockout+ (DEMUX)     |      |          |                |
| 60  | RxGND    | Rx Ground                    | 130. | POCLK-   | 156M Clockout- (DEMUX)     |      |          |                |
| 61  | D_OUT+10 | 156M Data Out+               | 131. | NC       | Open                       |      |          |                |
| 62  | D_OUT-10 | 156M Data Out-               | 132. | NC       | Open                       |      |          |                |
| 63  | D_OUT+8  | 156M Data Out+               | 133. | NC       | Open                       |      |          |                |
| 64  | D_OUT- 8 | 156M Data Out-               | 134. | NC       | Open                       |      |          |                |
| 65  | RxGND    | Rx Ground                    | 135. | RxGND    | Rx Ground                  |      |          |                |
| 66  | D_OUT+6  | 156M Data Out+               | 136. | D_OUT+15 | 156M Data Out+             |      |          |                |
| 67  | D_OUT-6  | 156M Data Out-               | 137. | D_OUT-15 | 156M Data Out-             |      |          |                |
| 68  | D_OUT+4  | 156M Data Out+               | 138. | D_OUT+13 | 156M Data Out+             |      |          |                |
| 69  | D_OUT- 4 | 156M Data Out-               | 139. | D_OUT-13 | 156M Data Out-             |      |          |                |
| 70. | RxGND    | Rx Ground                    | 140. | RxGND    | Rx Ground                  |      |          |                |

**ABSOLUTE MAXIMUM RATINGS<sup>1</sup>**

| SYMBOLS               | PARAMETERS                                   | UNITS | RATINGS |                 |
|-----------------------|----------------------------------------------|-------|---------|-----------------|
|                       |                                              |       | MIN     | MAX             |
| V <sub>CC</sub>       | Power Supply                                 | V     | -0.3    | 5.0             |
| LVPECL <sub>in</sub>  | LVPECL Input                                 | V     | 0       | V <sub>CC</sub> |
| LVPECL <sub>out</sub> | LVPECL Output Current                        | mA    |         | 50              |
| P <sub>IN</sub>       | Optical Input Power <sup>2</sup>             | dBm   |         | 0               |
| T <sub>STG</sub>      | Storage Temperature                          | °C    | -40     | +85             |
| HA                    | Storage Humidity<br>(No condensed condition) | %RH   | +10     | +85             |

Notes:

1. Operation in excess of any one of these parameters may result in permanent damage.
2. Average power; optical receiver.

**RECOMMENDED  
OPERATING CONDITIONS**

| SYMBOLS         | PARAMETERS            | UNITS | SPECIFICATIONS |      |
|-----------------|-----------------------|-------|----------------|------|
|                 |                       |       | MIN            | MAX  |
| V <sub>CC</sub> | Power Supply Voltage  | V     | 3.13           | 3.47 |
| T <sub>OP</sub> | Operating Temp. Range | °C    | 0              | 75   |
|                 | Power Consumption     | W     |                | 5.5  |

**OUTLINE DIMENSIONS** (Units in mm)

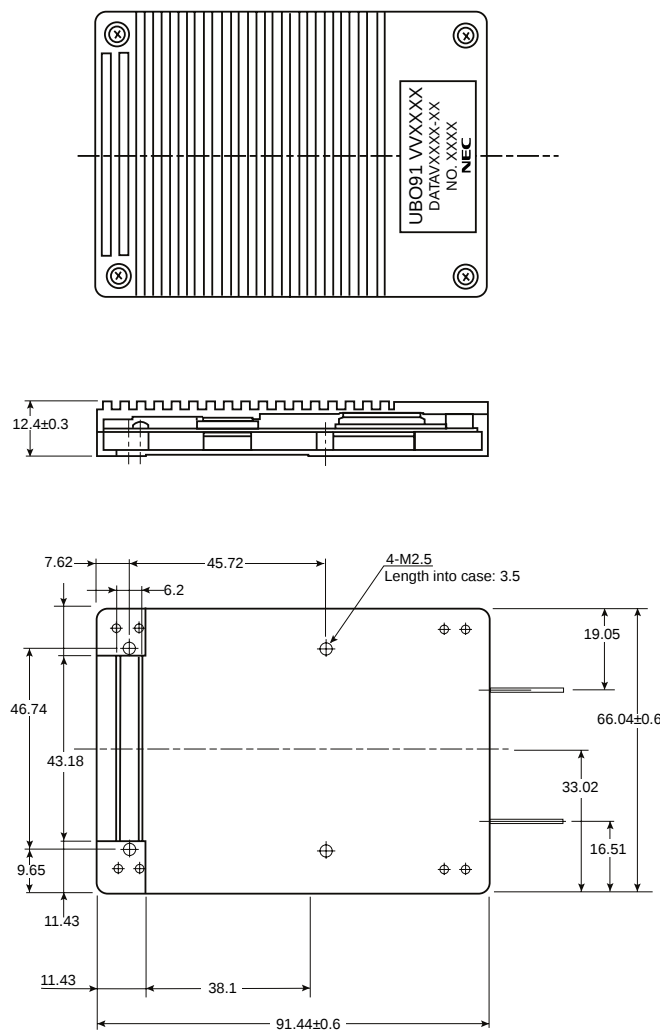
Product No.

OD-UB091-      ◀ Group No.

Group No.: SA01 : SC Connector (Case Temp. → 0-75°C)

FA01 : FC Connector (Case Temp. → 0-75°C)

Pigtail cord length: 1 m ± 33 cm

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