

# 1X9 SC Duplex Gigabit 1310nm FP Laser Optic Transceiver Module for Gigabit Ethernet

## OPT-1250B2I1A

### Feature

- Industry Standard 1 x 9 Footprint
- Compliant with existing standards
- Single +3.3 V Power Supply
- PECL Differential Inputs and Outputs
- Wave Solderable and Aqueous Washable
- Class 1 Laser International Safety Standard IEC 825 Compliant
- Single Mode Fiber : OPT-1250B2I1X series for 5km Links.
- Signal detect indicator PECL: OPT-1250B2XX series .

### Absolute Maximum Ratings

| Parameter                  | Symbol            | Min. | Typ. | Max. | Unit | Reference |
|----------------------------|-------------------|------|------|------|------|-----------|
| Storage temperature        | T <sub>s</sub>    | -60  |      | 85   | °C   |           |
| Lead soldering temperature | T <sub>SOLD</sub> |      |      | 260  | °C   |           |
| Lead soldering time        | t <sub>SOLD</sub> |      |      | 10   | sec. |           |
| Supply voltage             | V <sub>cc</sub>   | 0    |      | 5    | V    |           |

### Recommended Operating Conditions:

| Parameter                           | Symbol                            | Min.   | Typ. | Max.   | Unit | Reference |
|-------------------------------------|-----------------------------------|--------|------|--------|------|-----------|
| Ambient Operating Temperature       | T <sub>A</sub>                    | 0      |      | 70     | °C   |           |
| Supply voltage                      | V <sub>cc</sub>                   | 3.135  | 3.3  | 3.465  | V    |           |
| Transmitter Data input voltage-Low  | V <sub>IL</sub> - V <sub>CC</sub> | -1.810 |      | -1.475 | V    |           |
| Transmitter Data input voltage-High | V <sub>IH</sub> - V <sub>CC</sub> | -1.165 |      | -0.880 | V    |           |
| Data Output Load                    | R <sub>DL</sub>                   |        | 50   |        | Ω    |           |

|                                                                                                                       |               |           |          |              |      |
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| <br><b>DELTA ELECTRONICS, INC.</b> | TITLE         |           |          | DATE:        |      |
|                                                                                                                       | OPT-1250B2I1A |           |          | Jan.31.2002  |      |
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### Transmitter Electro-Optical Performance Specifications:

| Parameter                | Symbol                                                    | Min. | Typ. | Max. | Unit   | Reference |
|--------------------------|-----------------------------------------------------------|------|------|------|--------|-----------|
| Supply current           | I <sub>cc</sub>                                           |      |      | 150  | mA     |           |
| Launched power(avg.)     | P <sub>O</sub>                                            | -12  |      | -3   | dBm    | Note(1)   |
| Optical extinction ratio |                                                           | 8.2  |      |      | dB     | Note(1)   |
| Center wavelength        | $\lambda_c$                                               | 1274 | 1310 | 1355 | nm     |           |
| Spectral width(RMS)      | $\sigma$                                                  |      |      | 3    | nm rms |           |
| Output Eye               | Compliant with Eye Mask Defined in IEEE 802.3z Draft 5.0. |      |      |      |        |           |

Note(1).Launched power is power coupled into a single mode fiber.

### Receiver Electro-Optical Performance Specifications:

| Parameter                       | Symbol                            | Min.   | Typ. | Max.   | Unit            | Reference |
|---------------------------------|-----------------------------------|--------|------|--------|-----------------|-----------|
| Supply current                  | I <sub>cc</sub>                   |        |      | 140    | mA              |           |
| Data output voltage-Low         | V <sub>OL</sub> - V <sub>CC</sub> | -1.950 |      | -1.620 | V <sub>CC</sub> |           |
| Data output voltage-High        | V <sub>OH</sub> - V <sub>CC</sub> | -1.045 |      | -0.740 | V <sub>CC</sub> |           |
| Optical input sensitivity(avg.) | P <sub>IN</sub>                   |        |      | -19    | dBm             | Note(1)   |
| Optical input saturation(avg.)  | P <sub>SAT</sub>                  | -3     |      |        | dBm             | Note(1)   |
| Output Data risetime            | t <sub>r</sub>                    |        |      | 0.4    | ns              | Note(2)   |
| Output Data falltime            | t <sub>f</sub>                    |        |      | 0.4    | ns              | Note(2)   |
| Optical wavelength              | $\lambda$                         |        | 1310 |        | nm              |           |
| Signal detect-Assert            | P <sub>A</sub>                    |        |      | -20    | dBm             |           |
| Signal detect-Deassert          | P <sub>D</sub>                    | -35    |      |        | dBm             |           |
| Signal detect-Hysteresis        | P <sub>A</sub> -P <sub>D</sub>    | 0.5    |      |        | dB              |           |

Note(1).With BER better than or equal to  $1 \times 10^{-12}$ , measured in the center of the eye opening with  $2^{23}$ -1 NRZ PRBS

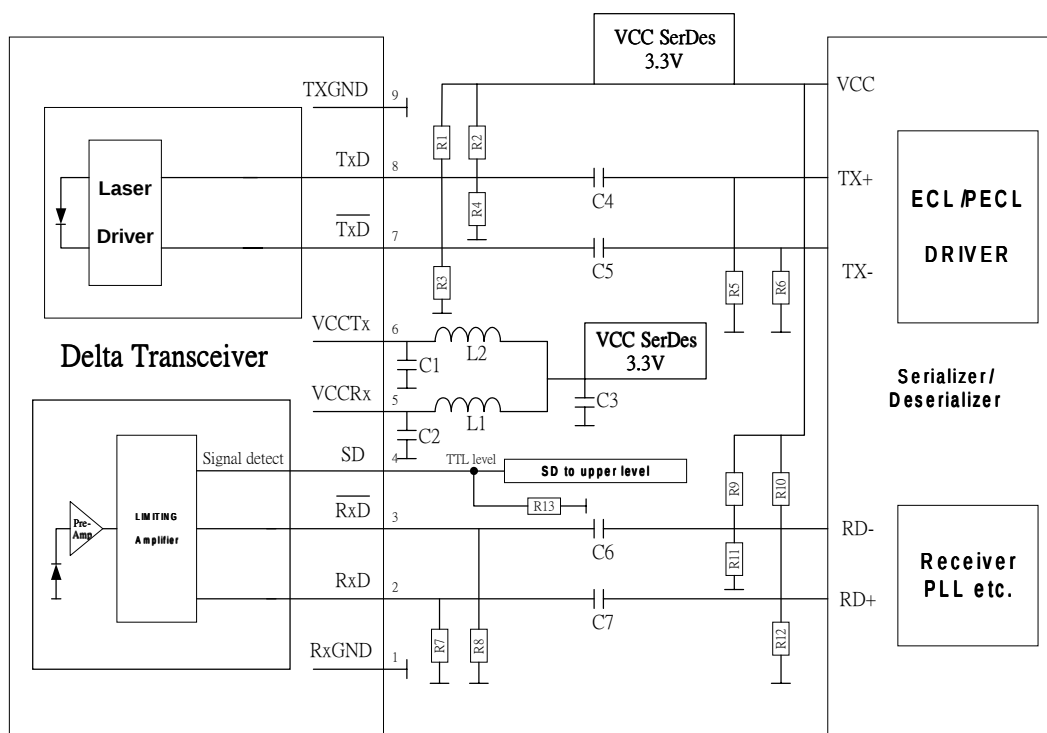
Note(2).These are 20%~80% values

|                                                                                                                       |               |           |          |              |             |      |
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## OPT-1250B2I1A

### Recommended Circuit Schematic



$C1/2/3 = 4.7 \mu F$

$C4/5/6/7 = 10 \text{ nF}$

$L1/2 = 1 \mu H$

$R1/2 = 82 \Omega$   $R3/4 = 130 \Omega$   $R7/8 = 150 \Omega$   $R5/6/9/10/11/12$  Depend on SerDes chip used.

$R13 = 270 \Omega$  (For PECL output).

$R13 = \text{Open}$  (For TTL output).

Values of  $R5/6/9/10/11/12$  may vary as long as proper  $50 \Omega$  termination to VEE or  $100 \Omega$  differential is provided. For good EMI performance, the power supply filter is required. Use short tracks from the inductor  $L1/L2$  to the module  $VccTx/VccRx$ .



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Y.Y Tsai

DOCUMENT NO:

REV:

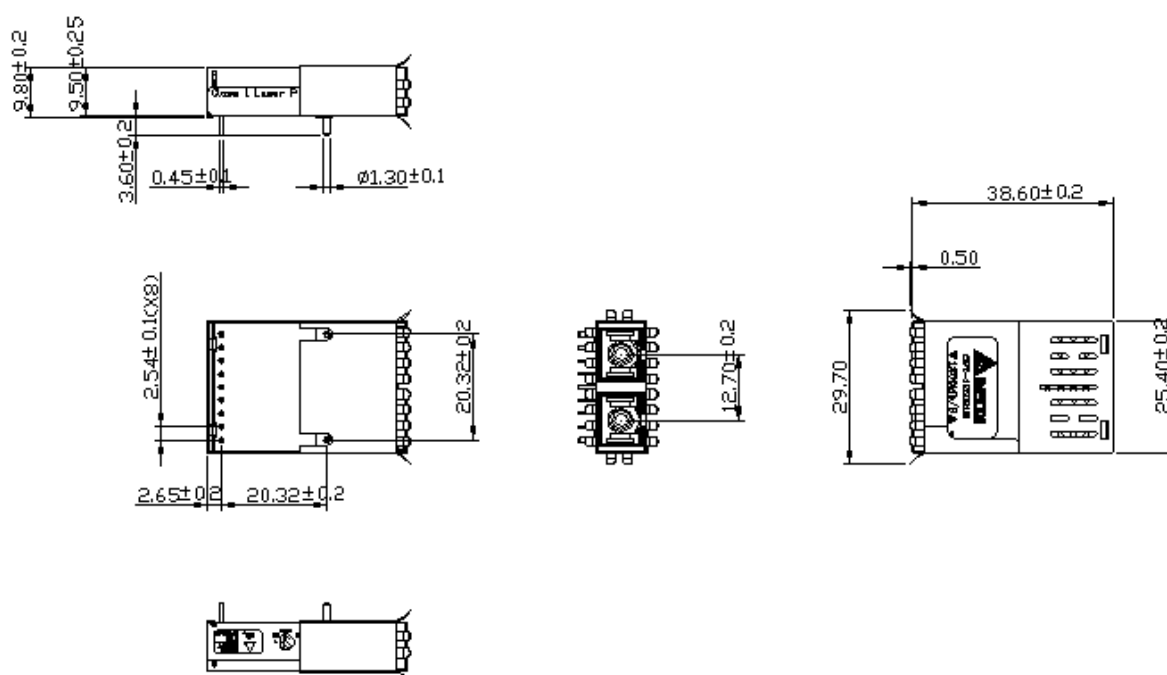
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## OPT-1250B2I1A

### Mechanical Dimensions

Unit : mm



### LASER SAFETY

This single mode transceiver is a Class 1 laser product. It complies with IEC 825 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated within the specified temperature and voltage limits. The optical ports of the module shall be terminated with an optical connector or with a dust plug.

|                                                                                                                |               |           |          |              |             |
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### Regulatory Compliance

| Test Item                                                                 | Reference                                                                          | Qty' | Evaluation                                                                                   |
|---------------------------------------------------------------------------|------------------------------------------------------------------------------------|------|----------------------------------------------------------------------------------------------|
| (#1) Electromagnetic Interference EMI                                     | FCC Class B<br>EN 55022 Class B<br>CISPR 22                                        | 5    | (1) Satisfied with electrical characteristics of product spec.<br><br>(2) No physical damage |
| (#2) Immunity :<br>Radio Frequency<br>Electromagnetic Field               | EN 61000-4-3<br>IEC 1000-4-3                                                       | 5    |                                                                                              |
| (#3) Immunity :<br>Electrostatic Discharge to<br>the Duplex SC Receptacle | EN 61000-4-2<br>IEC 1000-4-2<br>IEC 801.2                                          | 5    |                                                                                              |
| (#4) Electrostatic Discharge<br>to the Electrical Pins                    | MIL-STD-883C<br>Method 3015.4<br><br>EIAJ#1988.3.2B<br>Version 2,<br>Machine model | 5    |                                                                                              |

|                                                                                                                       |               |           |          |              |      |
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