

# 155Mbps 1X9 SC Duplex Single Mode Laser Transceiver for ATM, SONET OC-3/SDH STM-1

## 155B2L1T

### 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
- OPT-155B2L1T for 30km Links;

### Applications

- ATM 155Mb/s Links
- SONET/SDH Equipment Interconnect
- WDM Application

### 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>                    | -40    |      | 85     | °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    |           |

|                                                                                                                |                       |           |          |              |                      |            |
|----------------------------------------------------------------------------------------------------------------|-----------------------|-----------|----------|--------------|----------------------|------------|
| <br>DELTA ELECTRONICS, INC. | TITLE<br>OPT-155B2L1T |           |          |              | DATE:<br>JAN.31.2002 |            |
|                                                                                                                | WRITTEN               | CHECKED   | APPROVED | DOCUMENT NO: |                      | REV:<br>S1 |
|                                                                                                                | Yuhong                | Teddy Kuo | Y.Y Tsai |              |                      |            |

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### Transmitter Electro-Optical Performance Specifications:

| Parameter                | Symbol                                                             | Min. | Typ. | Max. | Unit   | Reference |
|--------------------------|--------------------------------------------------------------------|------|------|------|--------|-----------|
| Supply current           | I <sub>cc</sub>                                                    |      |      | 140  | mA     |           |
| Launched power(avg.)     | P <sub>O</sub>                                                     | -8   |      | -2   | dBm    | Note(1)   |
| Optical extinction ratio |                                                                    | 10   |      |      | dB     | Note(1)   |
| Center wavelength        | $\lambda_c$                                                        | 1274 | 1310 | 1355 | nm     |           |
| Spectral width(RMS)      | $\sigma$                                                           |      |      | 3    | nm rms |           |
| Optical risetime         | t <sub>r</sub>                                                     |      |      | 1.3  | ns     | Note(2)   |
| Optical falltime         | t <sub>f</sub>                                                     |      |      | 1.3  | ns     | Note(2)   |
| Output Eye               | Compliant with Bellcore TR-NWT-000253 and ITU recommendation G.957 |      |      |      |        |           |

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

Note(2).These are 10-90% values.

### Receiver Electro-Optical Performance Specifications:

| Parameter                       | Symbol                            | Min.   | Typ. | Max.   | Unit            | Reference |
|---------------------------------|-----------------------------------|--------|------|--------|-----------------|-----------|
| Supply current                  | I <sub>cc</sub>                   |        |      | 130    | 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>                   |        |      | -32    | dBm             | Note(1)   |
| Optical input saturation(avg.)  | P <sub>SAT</sub>                  | -7.5   |      |        | dBm             | Note(1)   |
| Optical wavelength              | $\lambda$                         |        | 1310 |        | nm              |           |
| Signal detect-Assert            | P <sub>A</sub>                    |        |      | -33    | dBm             |           |
| Signal detect-Deassert          | P <sub>D</sub>                    | -48    |      |        | dBm             |           |
| Signal detect-Hysteresis        | P <sub>A</sub> -P <sub>D</sub>    | 0.5    |      |        | dB              |           |

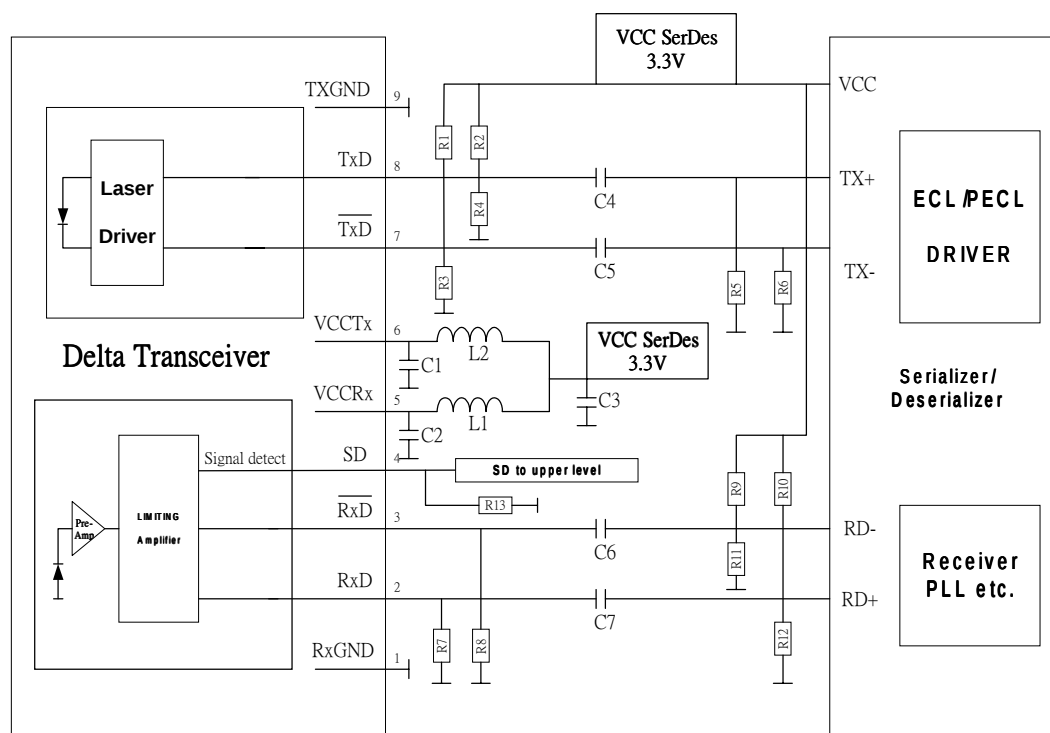
Note(1).With BER better than or equal to  $1 \times 10^{-12}$ , measured in the center of the eye opening with  $2^{23}$ -1 NRZ PRBS

|                                                                                                                       |                       |           |          |              |                      |            |
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|                                                                                                                       | Yuhong                | Teddy Kuo | Y.Y Tsai |              |                      |            |

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### Recommended Circuit Schematic



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

C4/5/6/7 = 10 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 = 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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TITLE

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WRITTEN

Yuhong

CHECKED

Teddy Kuo

APPROVED

Y.Y Tsai

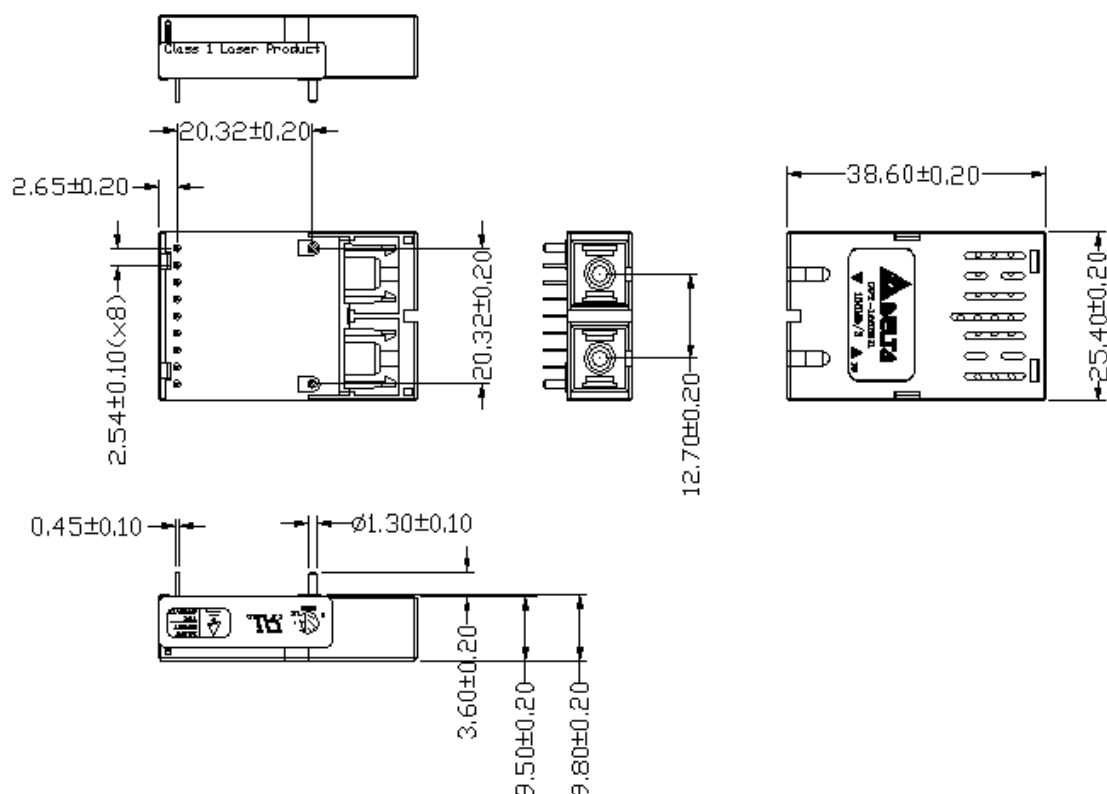
DOCUMENT NO:

REV:

S1

**155B2L1T**

## Unit : mm



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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