

# Small Form Factor

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

### FEATURES

- Full compliant with all major standard
- Single +3.3 V Power Supply
- Multisourced 2x5 package style with LC receptacle
- PECL Differential Inputs and Outputs
- Wave Solderable and Aqueous Washable
- Class 1 Laser International Safety Standard IEC 825 Compliant
- LC-155B2J1 for 15km 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>                    | 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    |           |
| Transmitter Differential Input Voltage | V <sub>D</sub>                    | 0.3    |      | 1.6    | V    |           |
| Data Output Load                       | R <sub>DL</sub>                   |        | 50   |        | Ω    |           |

|  |            |          |          |              |      |
|--|------------|----------|----------|--------------|------|
| <br>DELTA ELECTRONICS, INC. | TITLE      |          |          | DATE:        |      |
|  | LC-155B2J1 |          |          | Jan.31.2002  |      |
|  | WRITTEN    | CHECKED  | APPROVED | DOCUMENT NO: | REV: |
|  | Nick.Deng  | Yuhong S | YY. Tsai |              | S1   |

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### Transmitter Performance Specifications:

| Parameter                  | Symbol   | Min.  | Typ. | Max.  | Unit | Reference |
|----------------------------|--|-------|------|-------|------|-----------|
| Power supply voltage       | V <sub>CC</sub>  | 3.135 | 3.3  | 3.465 | V    |           |
| Supply current             | I <sub>CC</sub>  |       |      | 140   | mA   |           |
| Output optical power(avg.) | P <sub>O</sub>   | -15   |      | -8    | dBm  | Note(1)   |
| Optical extinction ratio   |  | 10    |      |       | dB   | Note(1)   |
| Center wavelength          | $\lambda_c$  | 1274  | 1310 | 1355  | nm   |           |
| Spectral width             | $\Delta \lambda$   |       |      | 3     | nm   |           |
| 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 Performance Specifications:

| Parameter                       | Symbol                            | Min.   | Typ. | Max.   | Unit            | Reference |
|---------------------------------|-----------------------------------|--------|------|--------|-----------------|-----------|
| Power supply voltage            | V <sub>CC</sub>                   | 3.135  | 3.3  | 3.465  | V               |           |
| 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  $1 \times 10^{-10}$ , measured in the center of the eye opening with  $2^{23}-1$  PRBS at 155 Mbps

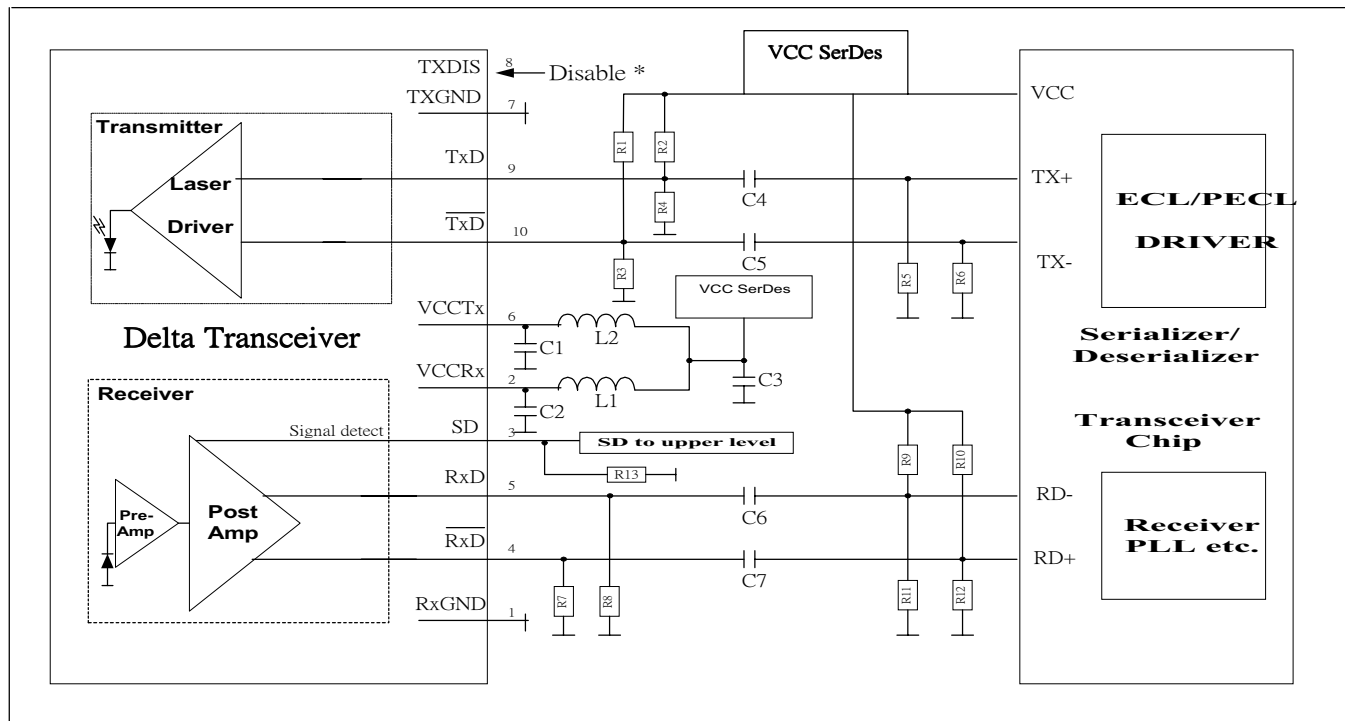
Note(2). These are 20%~80% values

|   |            |          |          |              |      |
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## Recommended Circuit Schematic

## Small Form Factor Multimode 1310nm 155M ATM 2x5 Transceiver, DC/DC , 3.3V Transceiver Version



|          |       |            |
|----------|-------|------------|
| C1/2/3   | = 4.7 | uF         |
| C4/5/6/7 | = 10  | nF         |
| L1/2     | = 1   | uH         |
| R1/2     | = 82  | $\Omega$   |
| R3/4     | = 130 | $\Omega$   |
| R7/8     | = 150 | $\Omega$   |
| R13      | = 270 | $\Omega$ . |

\* Disable Pin truth table

| Input Level (LV-TTL) | TX Function |
|----------------------|-------------|
| Low                  | ON          |
| High                 | OFF         |
| NIC                  | ON          |

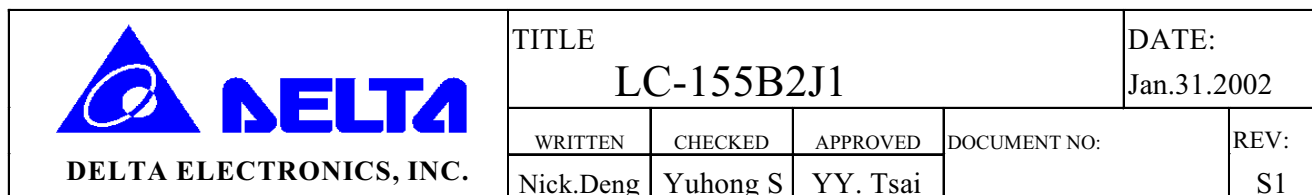
R5/6/9/10/11/12 Depend on SerDes chip used and desired line termination (50  $\Omega$  Strip line)

Value of R5/6/9/10/11/12 may vary as long as proper 50  $\Omega$  termination to VEE, it depends on SerDes chip used and desired line termination. Reset depends on the power OFF and then ON. For good EMI performance the power supply filter is required. Use short tracks from the inductor L1/2 to the module VccTx/VccRx. This recommended circuit uses 3.3V power supply and SerDes Chip using 3.3 / 5 V power supply.



|                            |          |          |                             |      |
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## Mechanical Dimensions Unit : mm



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| Test Item   | Reference  | Qty' | Evaluation   |
|---|--|------|--|
| (#1)<br>Electromagnetic Interference<br>EMC                               | 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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