

2X10 LC Duplex 155Mbps Single-mode Optical Transceiver Module for ATM, SONET OC-3/SDH STM-1

LC-155B4M7

Preliminary

Features

- LC Duplex Singlemode Transceiver
- Industry Standard 2 x 10 Footprint
- Intermediate SONET OC-3 / SDH STM-1 (L-1.1) Compliant
- Single +3.3 V Power Supply
- PECL Differential Inputs and Outputs
- TTL Signal Detect Output
- Wave Solderable and Aqueous Washable
- Class 1 Laser International Safety Standard IEC 825 Compliant

Applications

- ATM 155.52Mb/s Links
- SONET OC-3/SDH STM-1 Interconnections

Absolute Maximum Ratings

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Reference |
|----------------------------|-------------------|------|------|------|------|-----------|
| Storage Temperature | T _S | -40 | | 85 | °C | |
| Lead Soldering Temperature | T _{SOLD} | | | 260 | °C | |
| Lead Soldering Time | t _{SOLD} | | | 10 | sec. | |
| Supply Voltage | V _{CC} | 0 | | 5 | V | |

Recommended Operating Conditions

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Reference |
|--|----------------------------------|-------|------|-------|------|-----------|
| Ambient Operating Temperature | T _A | 0 | | 70 | °C | |
| Supply Voltage | V _{CC} | 3.135 | 3.3 | 3.465 | V | |
| Transmitter Data Input Voltage-Low | V _{IL} -V _{CC} | -1.95 | | -1.45 | V | |
| Transmitter Data Input Voltage-High | V _{IH} -V _{CC} | -1.17 | | -0.73 | V | |
| Transmitter Differential Input Voltage | V _D | 0.3 | | 1.6 | V | |
| Data Output Load | R _{DL} | | 50 | | ohm | |

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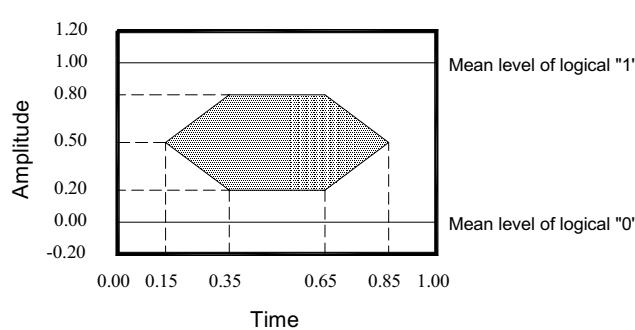
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Transmitter Electrical Characteristics

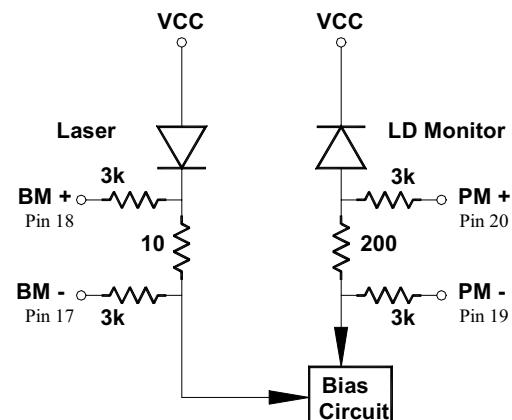
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Reference |
|------------------------------|-------------------|-------|------|-------|----------|-----------|
| Power Supply Voltage | V | 3.135 | 3.3 | 3.465 | | |
| Supply Current | I _{CCT} | | | 140 | mA | |
| Output Optical Power | P _O | -5 | | -0 | dBm avg. | |
| Optical Extinction Ratio | | 10 | | | dB | |
| Center Wavelength | λ _c | 1263 | 1310 | 1360 | nm | |
| Optical Rise/Fall Times | t _{r/tf} | | | 1.5 | ns | Note 1 |
| Spectral Width (RMS) | σ | | | 3 | nm | |
| Disable Input Voltage-High | V _{DISH} | 2.0 | | | V | |
| Disable Input Voltage-Low | V _{DISL} | | | 0.8 | V | |
| Disable Output Optical Power | P _{OD} | | | -40 | dBm | |
| LD Bias Monitor Voltage | V _{BM} | 0.01 | | 0.5 | V | Note 2 |
| Rear Facet Monitor Voltage | V _{PM} | 0.01 | | 0.2 | V | Note 2 |

1. These are 20-80% values.

2. At ambient temp. of 25 degrees C.



Optical Pulse Mask with Bessel Filter Specified in ITU-T G.957



Mask of the eye diagram for the optical transmit signal

Monitor Circuit Schematic Diagram

| | | | | | |
|---|-------------------|----------|--------------|--|-------------|
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Receiver Electrical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Reference |
|---------------------------|----------------------------------|-------|------|----------------|----------|-----------|
| Power Supply Voltage | V | 3.135 | 3.3 | 3.465 | | |
| Supply Current | I _{CCR} | | | 140 | mA | |
| Data Output Voltage-Low | V _{OLO} -V _C | -1.86 | | -1.62 | V | |
| Data Output Voltage-High | V _{OHI} -V _C | -1.10 | | -0.86 | V | |
| Sensitivity | P _{IN} | | | -34 | dBm avg. | Note 1 |
| Input Optical Wavelength | λ | 1100 | 1310 | 1600 | nm | |
| SD Output Voltage-High | V _{SDH} | 2.2 | | V _C | V | |
| SD Output Voltage-Low | V _{SDL} | 0 | | 0.5 | V | |
| Signal Detect-Asserted | P _A | | | -35 | dBm avg. | |
| Signal Detect-De-asserted | P _D | -48 | | | dBm avg. | |
| Signal Detect-Hysteresis | P _A -P _D | 1.0 | | | dB | |
| Overload | P _O | -8 | | | dBm | |

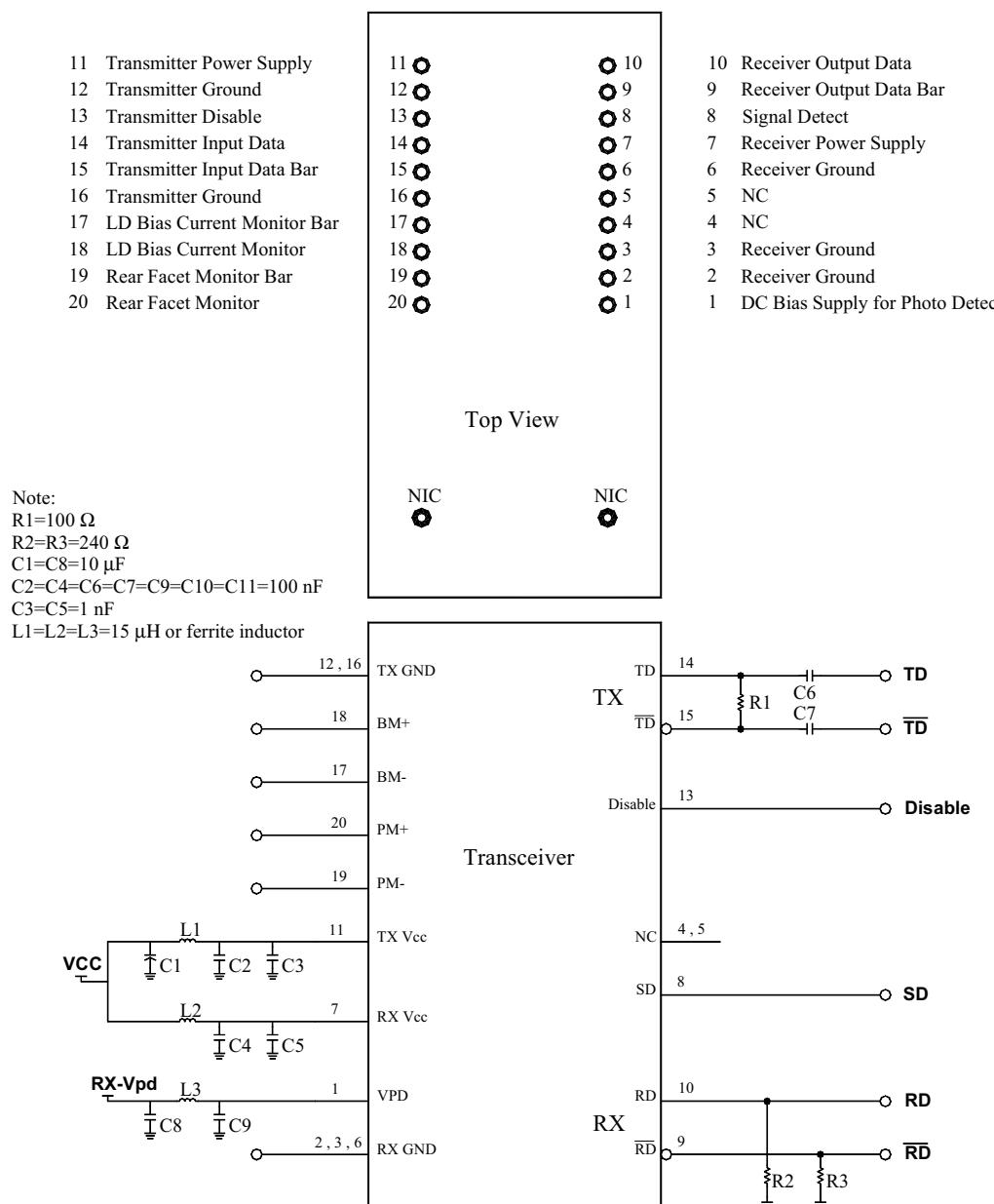
Note 1. The sensitivity is provided at a BER of 1×10^{-10} or better with an input signal consisting of 155.52 Mb/s, 2²³-1 PRBS.

| | | | | | | |
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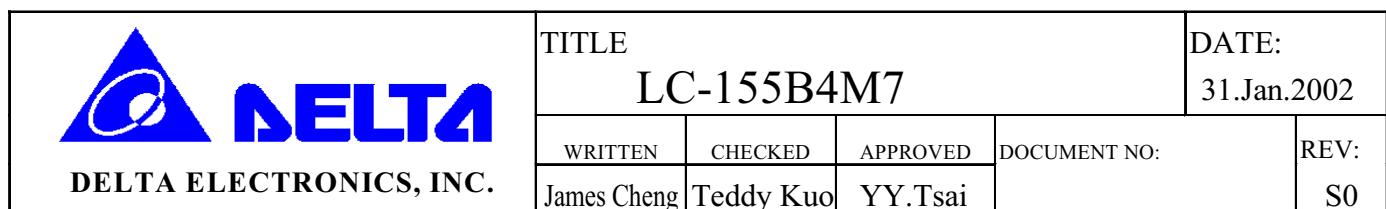
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Recommended Circuit Schematic



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Table 1: Pin Out Table

| PIN | | Functional description |
|-----|--------|------------------------------------|
| 1 | VPD | DC Bias Supply for Photo Detector. |
| 2 | GND | Receiver Power Ground |
| 3 | GND | Receiver Power Ground |
| 4 | NC | Pin Not Connected |
| 5 | NC | Pin Not Connected |
| 6 | GND | Receiver Power Ground |
| 7 | VccR | Receiver Power Supply |
| 8 | SD | Signal Detect (LVTTL) |
| 9 | RD (-) | Receiver Data Output - (LVPECL) |
| 10 | RD (+) | Receiver Data Output + (LVPECL) |

| | | | | | |
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Table 2: Pin Out Table

| PIN | | Functional description |
|------------|---------|--|
| 11 | VccT | Transmitter Power Supply |
| 12 | GND | Transmitter Signal Ground |
| 13 | Disable | Transmitter Disable (LVTTL) |
| 14 | TD (+) | Transmitter Data In + (LVPECL) |
| 15 | TD (-) | Transmitter Data In - (LVPECL) |
| 16 | GND | Transmitter Signal Ground |
| 17 | BM (-) | Laser Bias Monitor $I_{BIAS} = (BM_{(+)} - BM_{(-)}) / 10 \Omega$ |
| 18 | BM (+) | |
| 19 | PM (-) | Rear Facet Monitor $I_{PM} = (PM_{(+)} - PM_{(-)}) / 1 k\Omega$ |
| 20 | PM (+) | |

Note :

The BM and FM currents are calculated as ratios of the corresponding Voltages to their current-sensing resistors, 10Ω and $1k\Omega$ (refer to Monitor Circuit Schematics Diagram).

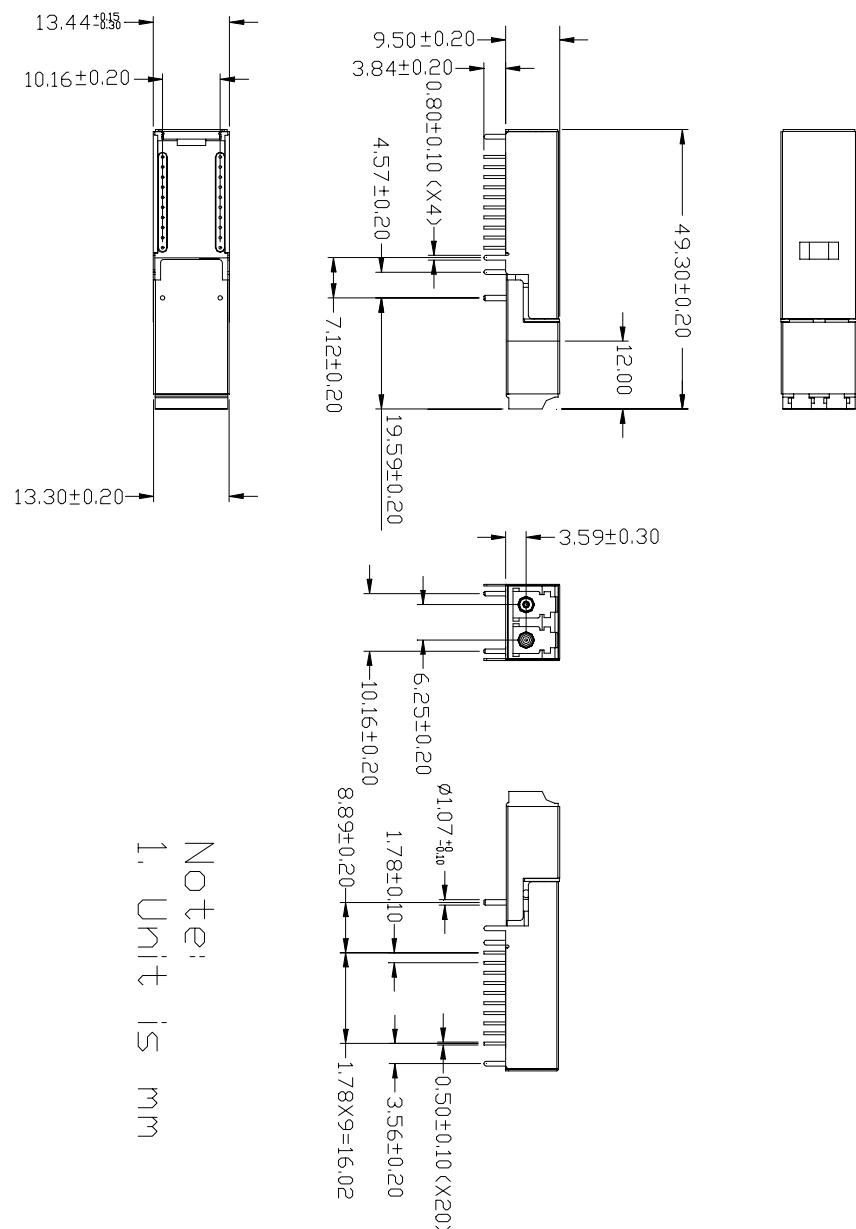
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Mechanical Dimensions



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

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