

155Mbps 2x5 SFF LC Duplex Optical Transceiver Module for Fast Ethernet, ATM, SONET/SDH STM-1/OC-3



Features :

- Full Compliance with the Optical Performance Requirements of the ATM 100Mbps and 100 Base-FX Version of IEEE 802.3u.
- Industry Standard 2x5 Footprint and Duplex LC Connector Interface.
- 3.3V Power Supply.
- PECL Differential Inputs and Outputs.
- PECL (LC-155A2 Series) or TTL (LC-155A4 Series) Receiver Signal Detect Indicator.
- Wave Solder and Aqueous Wash Process Compatible.
- RoHS Compliant per Directive 2002/95/EC

Description :

The LC-155Axxxxxx series are 2x5 optical transceiver modules designed expressly for high-speed communication applications that require rates of up to 155Mbps. They are all compliant with the SONET/SDH standards.

The LC-155Axxxxxx transceivers are supplied in industry standard 2x5 footprint and duplex LC connector.

The LC-155Axxxxxx series meet Class-1 eye safety standard and effective distance up to 2Km.

The transmitter sections utilize 1310nm Surface Emitting InGaAsP LEDs. These LEDs are packaged in the optical subassembly portion of the transmitter section. A custom silicon IC that converts differential PECL logical signals into an analog LED driving current then drive it.

The receiver sections utilize InGaAs PIN photodiodes coupled into a custom silicon transimpedance preamplifier IC. These are packaged in the optical subassembly portion of receiver.

These PIN / Preamplifier combinations are coupled into a custom quantizer IC which provides the final pulse shaping for the logic output and the Signal Detect function. The data output is differential. The signal detect output is single-ended.

Application :

- Multimode Fiber Backbone Links.
- Fast Ethernet and ATM Compatible.
- Multimode Fiber Media Converter.

Absolute Maximum Ratings

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|----------------------------|--------|------|------|------|------|------|
| Storage Temperature | Ts | -40 | | 85 | °C | |
| Lead Soldering Temperature | TSOLD | | | 260 | °C | |
| Lead Soldering Time | tsOLD | | | 10 | Sec. | |
| Supply Voltage | VCC | 0 | | 5 | V | |

Recommended Operating Conditions

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|-------------------------------|--------|------|--------|------|------|------|
| Data Rate | | | 155.52 | | Mbps | |
| Ambient Operating Temperature | TA | 0 | | 70 | °C | |
| Supply Voltage | VCC | 3.15 | | 3.45 | V | |

Note: See ordering information for detail

Electrical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|-------------------------------------|----------------------|--------|------|----------------------|------|------------|
| Transmitter | | | | | | |
| Transmitter Data Input Voltage-Low | V _{IL-VCC} | -1.81 | | -1.48 | V | |
| Transmitter Data Input Voltage-High | V _{IH-VCC} | -1.16 | | -0.88 | V | |
| Transmitter Disable Input-High | V _{DISH} | 2 | | V _{CC} +0.3 | V | |
| Transmitter Disable Input-Low | V _{DISL} | 0 | | 0.8 | V | |
| Receiver | | | | | | |
| Data Output Voltage-Low | V _{OL-VCC} | -1.95 | | -1.62 | V | |
| Data Output Voltage-High | V _{OH-VCC} | -1.045 | | -0.74 | V | |
| SD Output Voltage-Low | V _{SDH-VCC} | -1.95 | | -1.62 | V | ECL Family |
| SD Output Voltage-High | V _{SDL-VCC} | -1.05 | | -0.74 | V | |
| SD Output Voltage-Low | V _{SDH-VCC} | | | 0.8 | V | LVTTTL |
| SD Output Voltage-High | V _{SDL-VCC} | 2 | | | V | |

Optical Characteristics

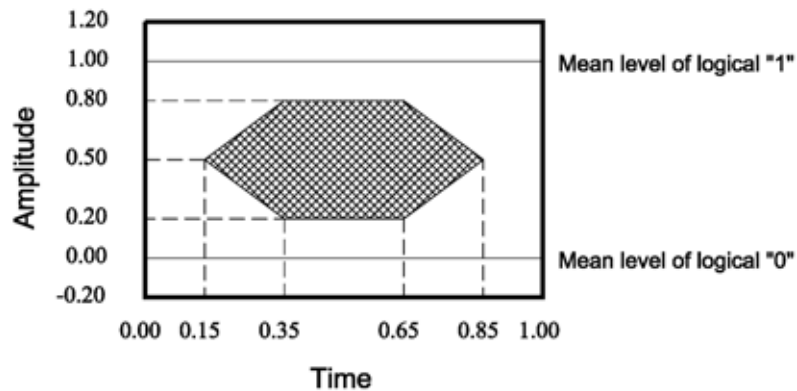
(Data Rate = 155.52Mbps, PRBS=2²³-1, NRZ, 62.5/125um MMF)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|-----------------------------|---|------|------|------|------|---------|
| Transmitter | | | | | | |
| Supply Current | I _{CC} | | | 185 | mA | |
| Mean Launch Power | P _O | -20 | | -14 | dBm | |
| Optical Extinction Ratio | E.R. | 9 | | | dB | |
| Center Wavelength | λ _C | 1280 | 1310 | 1340 | nm | |
| Spectral Width (RMS) | σ | | | 200 | nm | |
| Optical Risetime / Falltime | t _r /t _f | | | 3.0 | ns | 10%~90% |
| Output Eye Diagram | Compliant with ITU-T recommendation G.957 | | | | | |
| Receiver | | | | | | |
| Supply Current | I _{CC} | | | 145 | mA | |
| Sensitivity | P _{IN} | | | -31 | dBm | 1 |
| Input Optical Wavelength | λ | 1100 | | 1600 | nm | |
| Signal Detect-Asserted | P _A | | | -31 | dBm | |
| Signal Detect-DeAsserted | P _D | -45 | | | dBm | |
| Signal Detect-Hysteresis | P _A -P _D | 0.5 | | | dB | |
| Overload | P _O | -14 | | | dBm | |

Notes :

- The sensitivity should be tested at BER of 1×10⁻¹⁰ or better with an input signal consisting of 155Mb/s, NRZ,

PRBS=2²³-1 and E.R.= 9dB.

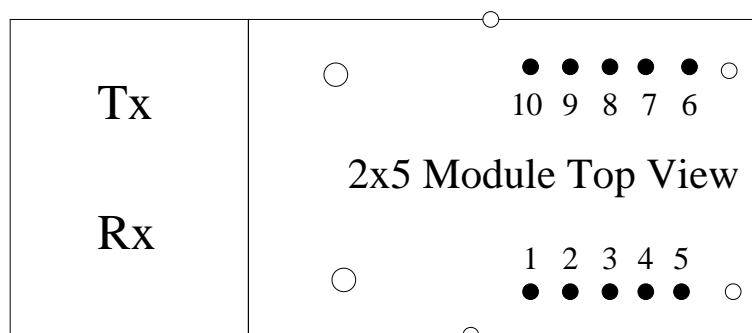


Optical Pulse Mask with Bessel Filter Specified in ITU-T G.957
Mask of the eye diagram for the optical transmit signal

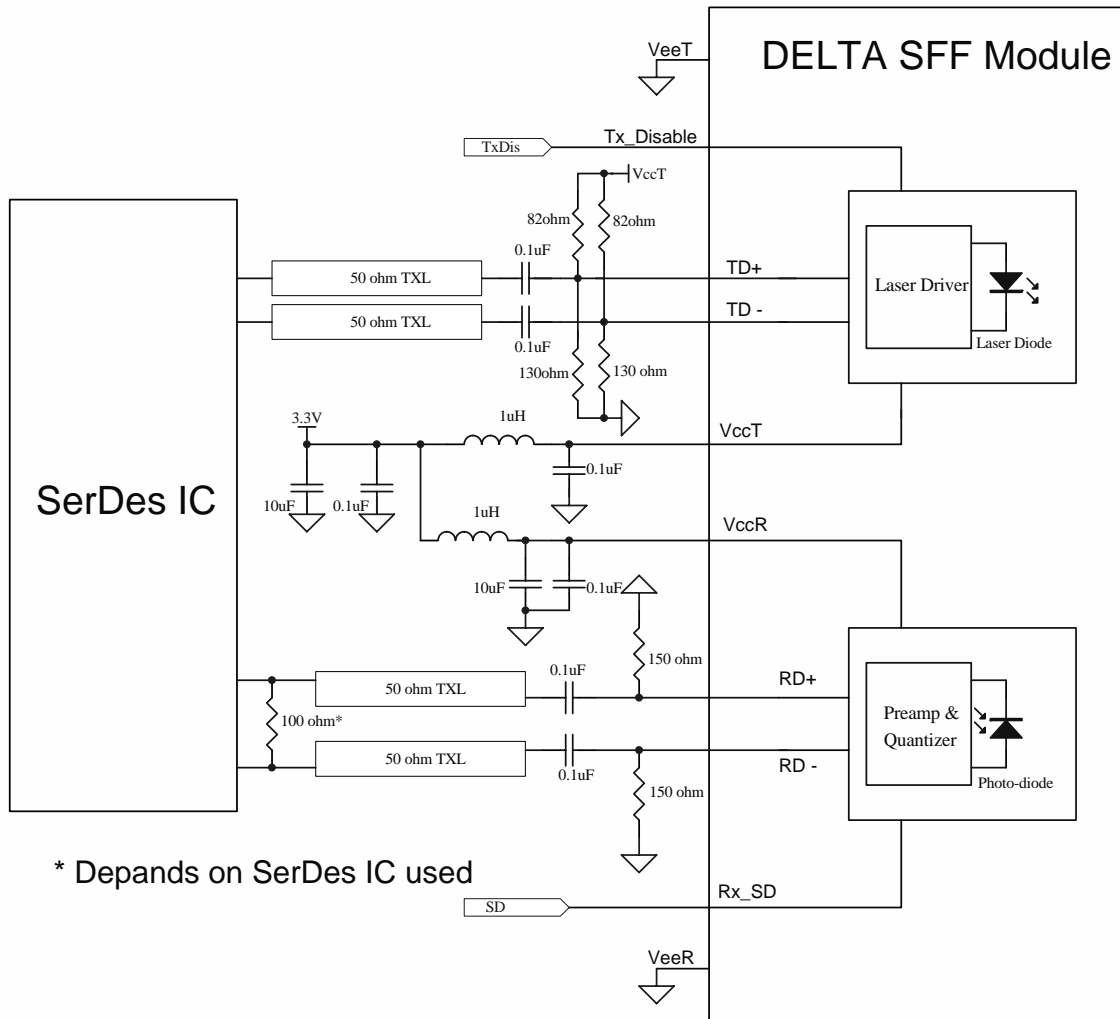
Pin Definition :

| PIN (2X5) | Symbol | Functional description |
|-----------|-------------------|----------------------------------|
| 1 | GND | Receiver Signal Ground |
| 2 | RXV _{CC} | Receiver Power Supply |
| 3 | SD | Signal Detect |
| 4 | RD (-) | Receiver Data Out Bar (LVPECL) |
| 5 | RD (+) | Receiver Data Out (LVPECL) |
| 6 | TXV _{CC} | Transmitter Power Supply |
| 7 | GND | Transmitter Signal Ground |
| 8 | Disable | Transmitter Disable (LVTTTL) |
| 9 | TD (+) | Transmitter Data In (LVPECL) |
| 10 | TD (-) | Transmitter Data In Bar (LVPECL) |

Pin Drawing:



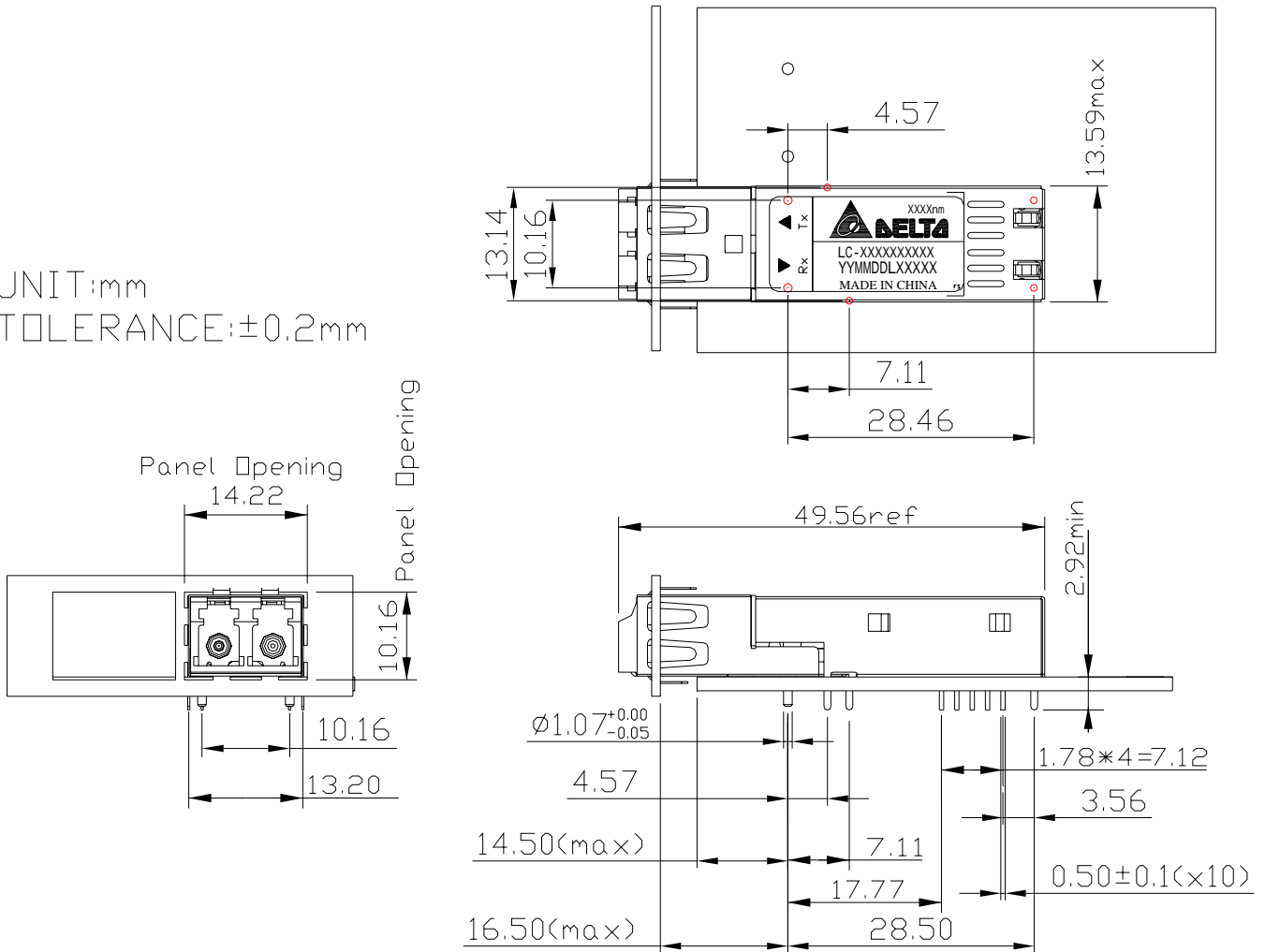
Recommend Circuit Schematic



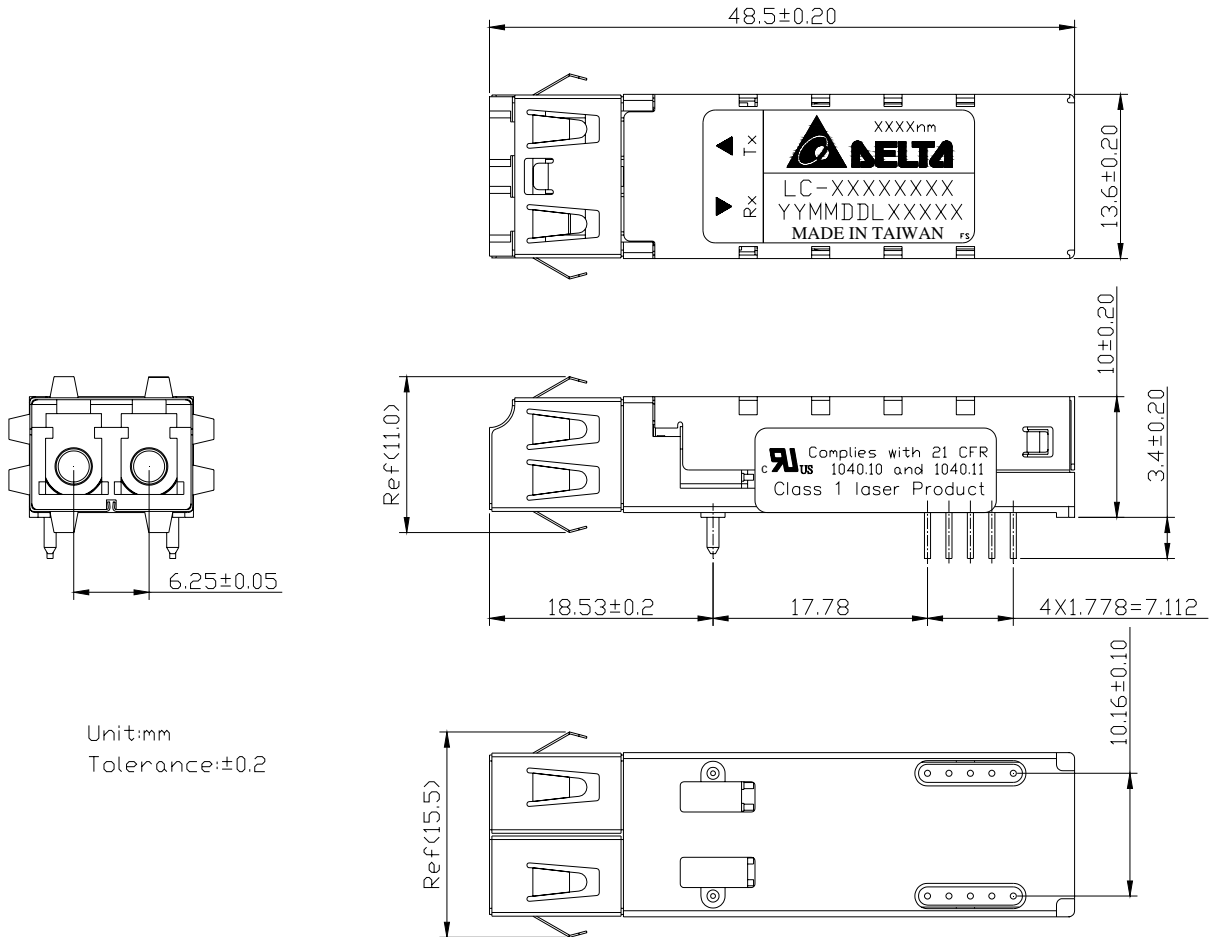
Note:

1. 270 Ohm SD Output pull-down resistors required for LVPECL SD Output.
2. No connected for TTL SD Output.

Package Outline(Plastic housing) :

 UNIT:mm
 TOLERANCE:±0.2mm


Package Outline(Metal housing) :



Unit:mm
Tolerance: ± 0.2

Regulatory Compliance

| Feature | Reference | Performance |
|---|---|--|
| Electromagnetic Interference (EMI) | FCC Class B EN 55022 Class B (CISPR 22A) | (1) Satisfied with electrical characteristics of product spec. (2) No physical damage |
| Radio Frequency Electromagnetic Field | EN 61000-4-3 IEC 1000-4-3 | |
| Electrostatic Discharge to the Duplex LC Receptacle | EN 61000-4-2 IEC 1000-4-2 IEC 801.2 | |
| Electrostatic Discharge to the Electrical Pins | MIL-STD-883E Method 3015.7 | |
| Eye Safety | US FDA CDRH AEL Class 1 EN 60950: 2000 EN 60825-1: 1994+A11+A2 EN 60825-2: 2000 | CDRH File # 0321539-00 TUV Certificate No. R50032471 |
| Component Recognition | Underwriters Laboratories and Canadian Standards Association Joint Component Recognition for Information Technology Equipment Including Electrical Business Equipment | UL File # E239394 |

Order information :LC-155Ax₁x₂x₃x₄x₅x₆x₇**X₁ : Power Supply Voltage and SD Level**

2 : 3.3V ; Data In/Out (PECL) ; SD Output (PECL)

4 : 3.3V ; Data In/Out (PECL) ; SD Output (TTL)

x₂ : Effective Distance Grade

H : 2Km

x₃ : Package type & coupling type

1 : 2X5LC DC/DC

x₄ : RoHS

Blank : Non-RoHS Compliant

R : RoHS Compliant

x₅ : Housing Type

Blank : Plastic Housing

M : Metal Housing

MU : W/O Shielding

x₆ : Performance

Blank : Old Design

A : New Design

X₇ : Temperature

Blank : 0°C to 70°C

H : -10°C to 85°C

T : -40°C to 85°C