

## 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
<b>Transmitter</b>						
Transmitter Data Input Voltage-Low	V <sub>IL-VCC</sub>	-1.81		-1.48	V	
Transmitter Data Input Voltage-High	V <sub>IH-VCC</sub>	-1.16		-0.88	V	
Transmitter Disable Input-High	V <sub>DISH</sub>	2		V <sub>CC</sub> +0.3	V	
Transmitter Disable Input-Low	V <sub>DISL</sub>	0		0.8	V	
<b>Receiver</b>						
Data Output Voltage-Low	V <sub>OL-VCC</sub>	-1.95		-1.62	V	
Data Output Voltage-High	V <sub>OH-VCC</sub>	-1.045		-0.74	V	
SD Output Voltage-Low	V <sub>SDH-VCC</sub>	-1.95		-1.62	V	ECL Family
SD Output Voltage-High	V <sub>SDL-VCC</sub>	-1.05		-0.74	V	
SD Output Voltage-Low	V <sub>SDH-VCC</sub>			0.8	V	LVTTTL
SD Output Voltage-High	V <sub>SDL-VCC</sub>	2			V	

### Optical Characteristics

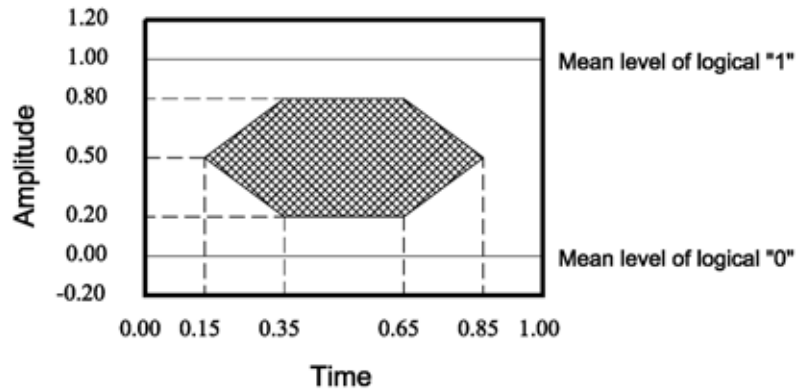
( Data Rate = 155.52Mbps, PRBS=2<sup>23</sup>-1, NRZ, 62.5/125um MMF )

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

Notes :

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

PRBS=2<sup>23</sup>-1 and E.R.= 9dB.

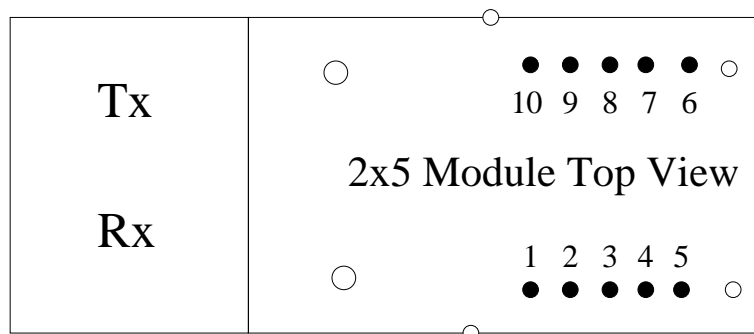


Optical Pulse Mask with Bessel Filter Specified in ITU-T G.957  
Mask of the eye diagram for the optical transmit signal

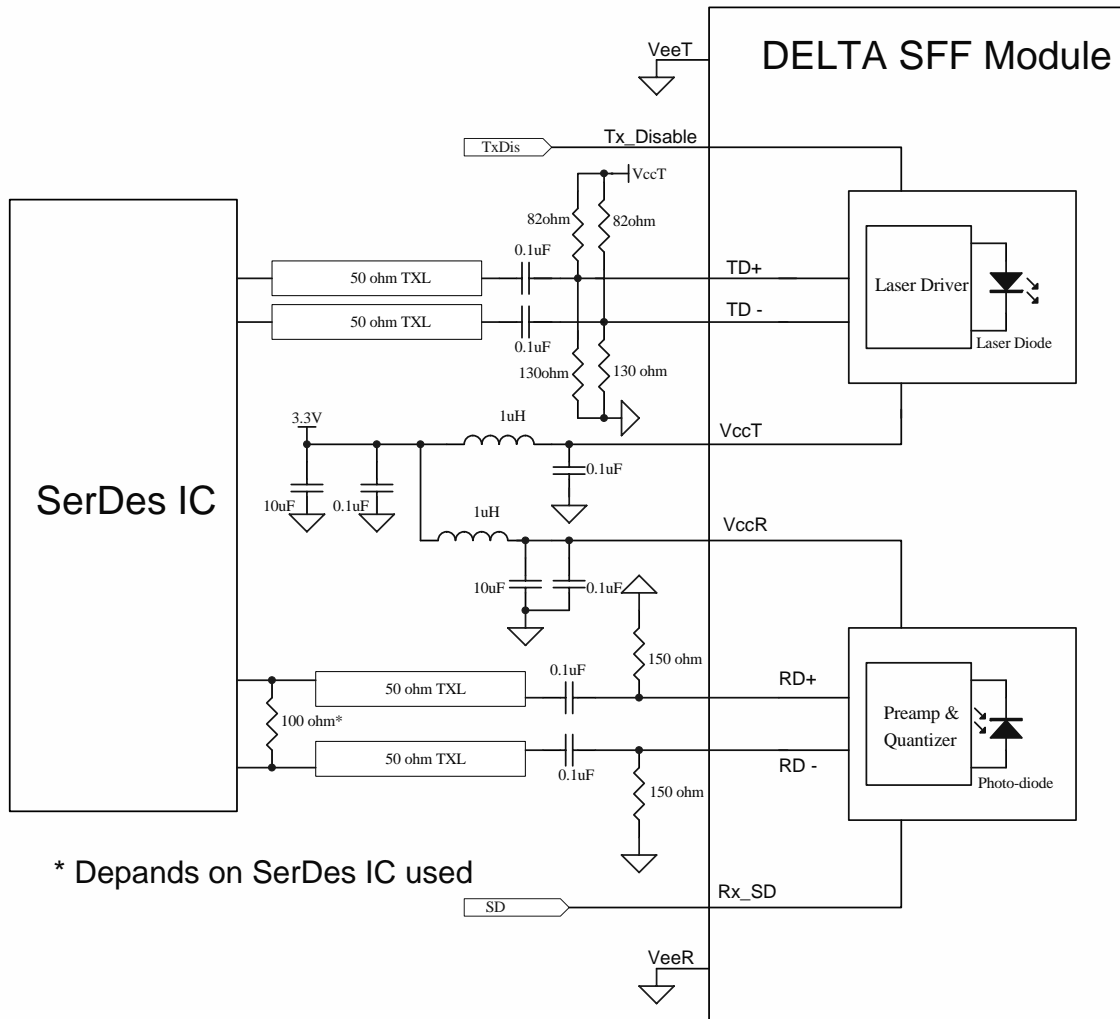
**Pin Definition :**

PIN (2X5)	Symbol	Functional description
1	GND	Receiver Signal Ground
2	RXV <sub>CC</sub>	Receiver Power Supply
3	SD	Signal Detect
4	RD (-)	Receiver Data Out Bar (LVPECL)
5	RD (+)	Receiver Data Out (LVPECL)
6	TXV <sub>CC</sub>	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

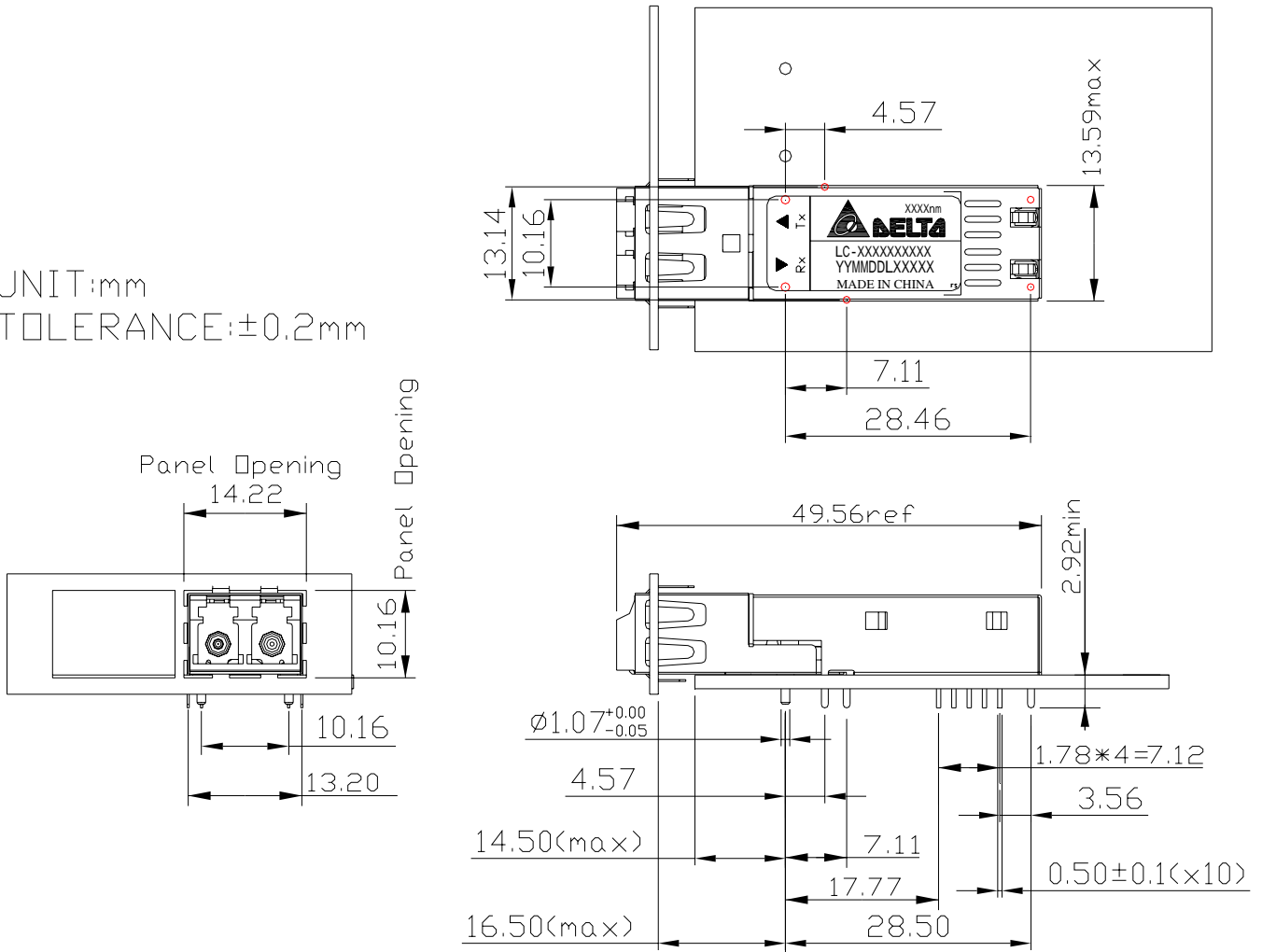


Note:

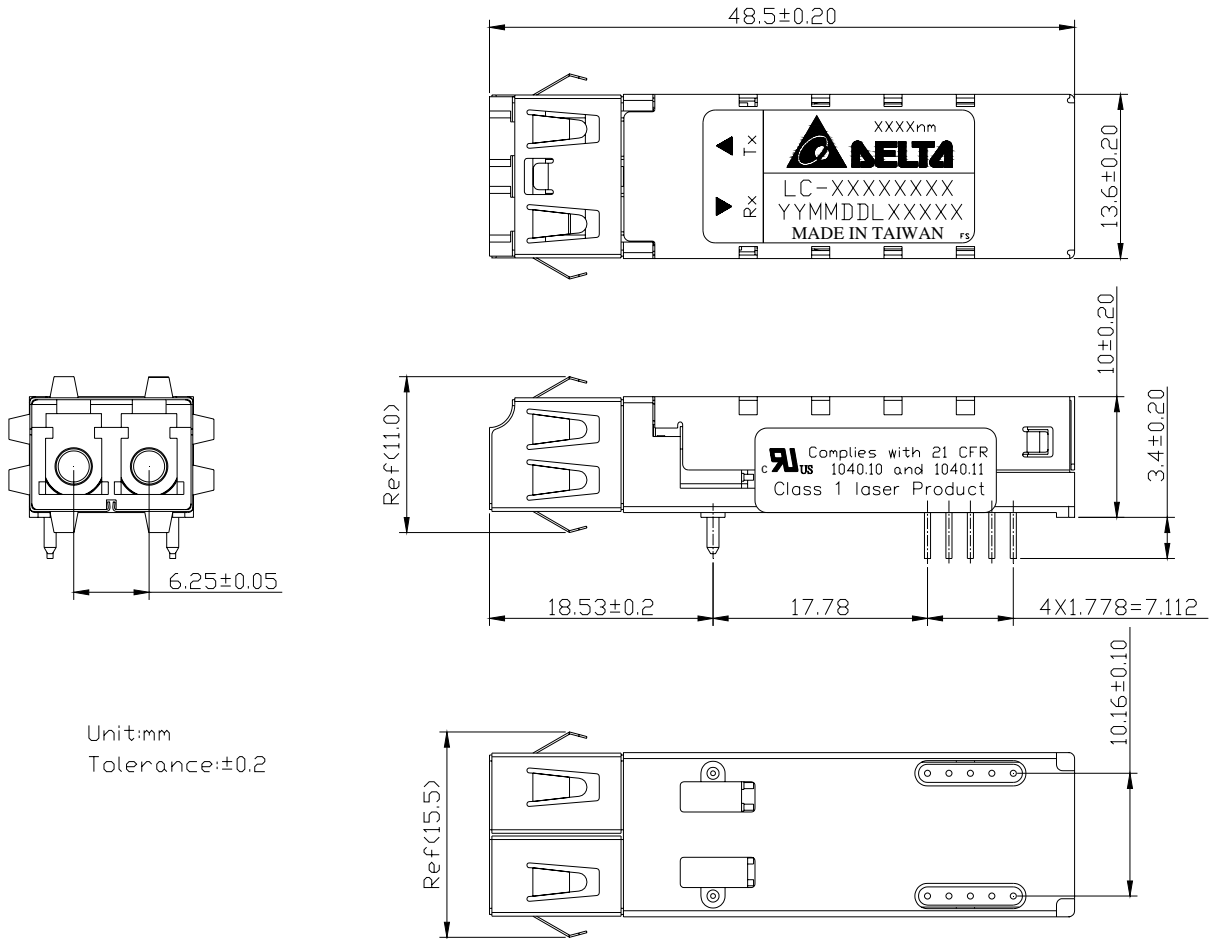
1. 270 Ohm SD Output pull-down resistors required for LVPECL SD Output.
2. No connected for TTL SD Output.

Package Outline(Plastic housing) :

UNIT:mm  
TOLERANCE:±0.2mm



Package Outline(Metal housing) :



Unit:mm  
Tolerance: $\pm 0.2$

**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-155Ax<sub>1</sub>x<sub>2</sub>x<sub>3</sub>x<sub>4</sub>x<sub>5</sub>x<sub>6</sub>x<sub>7</sub>**X<sub>1</sub> : 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 )

**x<sub>2</sub> : Effective Distance Grade**

H : 2Km

**x<sub>3</sub> : Package type & coupling type**

1 : 2X5LC DC/DC

**x<sub>4</sub> : RoHS**

Blank : Non-RoHS Compliant

R : RoHS Compliant

**x<sub>5</sub> : Housing Type**

Blank : Plastic Housing

M : Metal Housing

MU : W/O Shielding

**x<sub>6</sub> : Performance**

Blank : Old Design

A : New Design

**X<sub>7</sub> : Temperature**

Blank : 0°C to 70°C

H : -10°C to 85°C

T : -40°C to 85°C