

RoHS Compliant SFF LC Duplex Optical Transceiver For Fast Ethernet, ATM, SONET OC-3/SDH STM-1



Description

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

The LC-155Axxxx series meet Class 1 eye safety standard.

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 drives it.

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

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 Receiver Signal Detect Indicator
- RoHS Compliance
- Wave Solder and Aqueous Wash Process Compatible

These PIN/Preamplifier combinations are coupled into a custom quantizer IC which provides the final pulse shaping for 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 Convert

Performance

- LC-155AxHxx data link up to 2Km in 62.5/125µm Multi-Mode Fiber.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	T_S	-40		85	°C	
Lead Soldering Temperature	T_{SOLD}			260	°C	
Lead Soldering Time	t_{SOLD}			10	Second	
Supply Voltage	V_{CC}	0		5	V	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Data Rate			155.52		Mbps	
Ambient Operating Temperature	T_A	0		70	°C	
Supply Voltage	V_{CC}	3.15	3.3	3.45	V	

Electrical Characteristics

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

Optical Characteristics

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

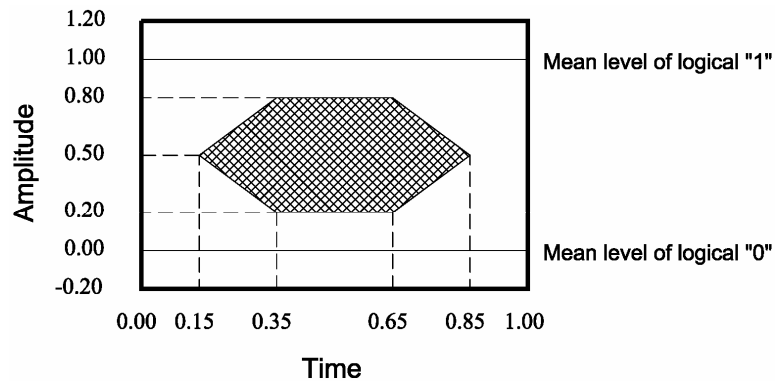
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Supply Current	I_{CC}			185	mA	
Mean Launch Power	P_0	-20		-14	dBm	
Optical Extinction Ratio	ER	9			dB	
Center Wavelength	λ_C	1280	1310	1340	nm	
Spectral Width (RMS)	σ			200	nm	
Optical Risetime/Falltime	t_r/t_f			3.0	ns	10%~90%
Output Eye Diagram	Compliant with ITU-T recommendation G.957					
Receiver						
Supply Current	I_{CC}			145	mA	
Sensitivity	P_{IN}			-31	dBm	Note1
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	
Receiver Saturation Power	P_{SAT}	-14			dBm	

Note1: The Sensitivity should be tested at BER of 1×10^{-10} or better with an input signal consisting of

2

Apr., 2009
Rev. 0G

155Mbps, NRZ, PRBS=2²³-1 and ER= 9dB.

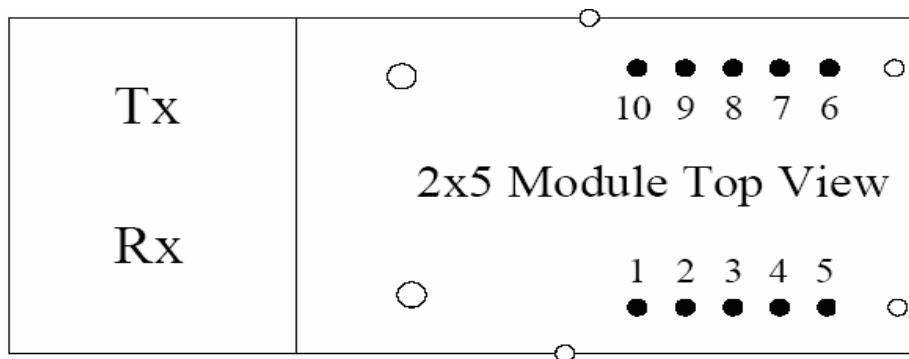


Optical Pulse Mask with Bessel Filter Specified in ITU-T G.957

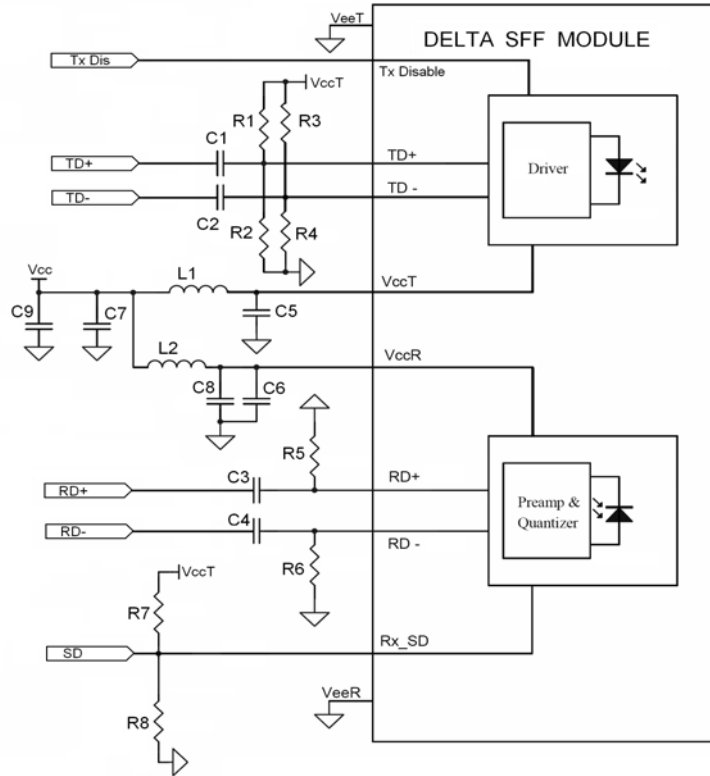
Pin Definition

Pin No.	Pin Name	Description
1	GND	Receiver Signal Ground
2	VccR	Receiver Power Supply
3	SD	Receiver Signal Detect (LVPECL)
4	RD(-)	Receiver Data Out Inverted (LVPECL)
5	RD(+)	Receiver Data Out Non-inverted (LVPECL)
6	VccT	Transmitter Power Supply
7	GND	Transmitter Signal Ground
8	TxDis	Transmitter Disable
9	TD (+)	Transmitter Data In Non-inverted (LVPECL)
10	TD (-)	Transmitter Data In Inverted (LVPECL)

Pin Out Drawing

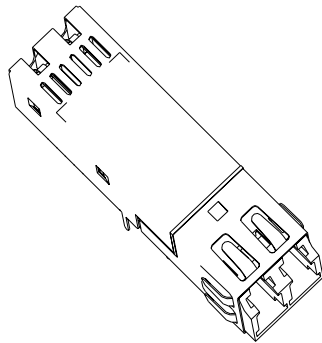


Recommend Circuit Schematic

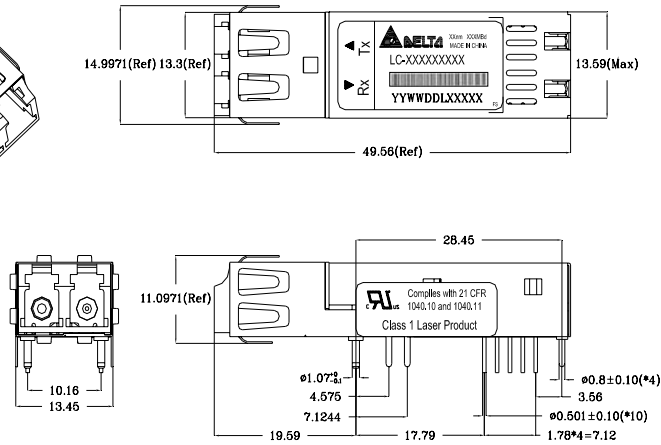


- R1=R3=82 ohm (3.3V)
- R2=R4=130 ohm (3.3V)
- R5=R6=150 ohm (3.3V)
- R7=130 ohm (3.3V PECL)
- R8=82 ohm (3.3V PECL)
- C1=C2=C3=C4=C5=C6=C7=100 nF
- C8=C9=10uF
- L1=L2=1uH

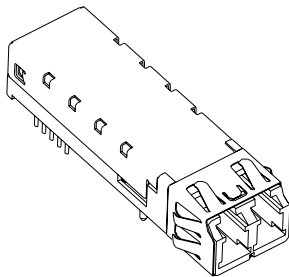
Package Outline (Plastic Housing)



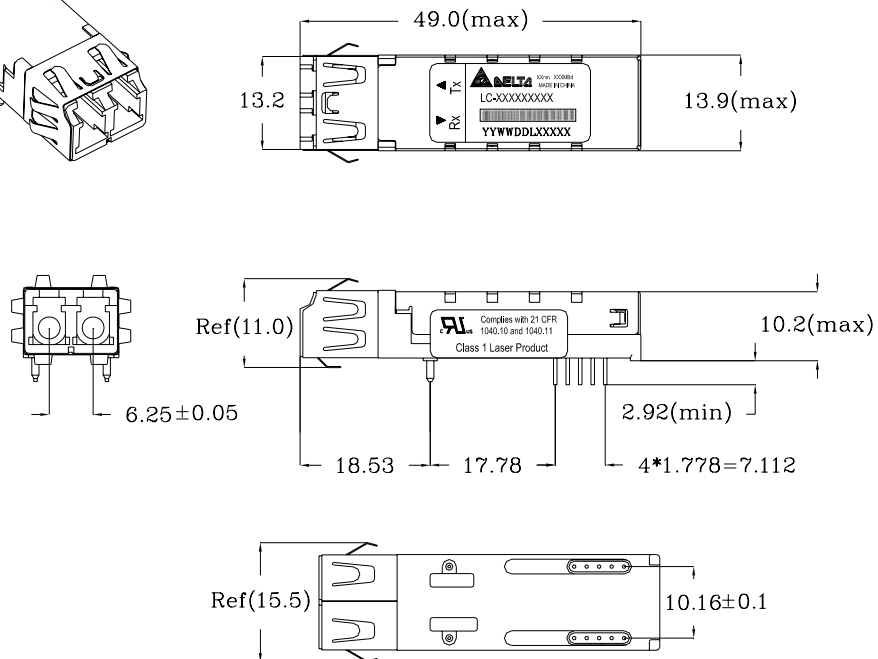
UNIT: mm
TOLERANCE: ±0.2



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.
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	(2) No physical damage
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- 155AX₁X₂X₃X₄X₅X₆

X₁ Power Supply Voltage and SD Level

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

X₂ Effective Distance

H: 2Km

X₃ Package Type & Coupling Type

1: SFF LC DC/DC

X₄ RoHS

R: RoHS Compliant

X₅ Housing Type & Revision Code

A: New Design
P: Plastic Housing
M: Metal Housing

X₆ Temperature

Blank: 0 to +70 degree C

Appendix A. Document Revision

Version No.	Date	Description
0E	2006-09	Release
0F	2008-01	Correct Schematic, Package Outline, Pin Definition, Order Information.
0G	2009-04	Revise Document Style; Cut off LC-155A4xxx PNs, Extended and Industrial Temperature PNs, Non-RoHS PNs; Revise Parameter symbols.