

155Mbps 1x9 SC/ST Duplex Optical Transceiver Module for Fast Ethernet, ATM, SONET/OC-3, SDH/STM-1



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.
- RoHS Compliance.
- Wave Solder and Aqueous Wash Process Compatible.

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 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 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.

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 signal-ended.

Application:

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

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	T_s	-40		85	$^{\circ}\text{C}$	
Lead Soldering Temperature	T_{sold}			260	$^{\circ}\text{C}$	
Lead Soldering Time	t_{sold}			10	Second	
Supply Voltage	Vcc	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	$^{\circ}\text{C}$	Note1
Supply Voltage	Vcc	3.15	3.3	3.45	V	

Note1: See "order 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	Mbps	
Transmitter Data Input Voltage-High	V_{IH-Vcc}	-1.16		-0.88	$^{\circ}\text{C}$	
Transmitter Disable Input-High	V_{DISH}	2		Vcc +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	$V_{SDL-Vcc}$	-1.95		-1.62	V	ECL Family
SD Output Voltage-High	$V_{SDH-Vcc}$	-1.045		-0.74	V	
SD Output Voltage-Low	V_{SDL}			0.8	V	LVTTTL
SD Output Voltage-High	V_{SDH}	2			V	

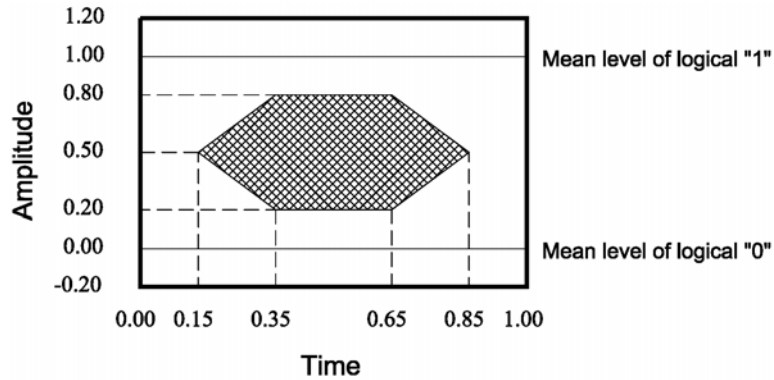
Optical Characteristics

(Data Rate = 155.52Mbps, PRBS= $2^{23}-1$, NRZ, 62.5/125um MMF)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Supply Current	Icc			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/r_f			3.0	ns	10%~90%
Output Eye Diagram	Compliant with ITU-T recommendation G.957					
Receiver						
Supply Current	Icc			145	mA	
Sensitivity	P_{IN}			-31	dBm	Note2
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_{SAT}	-14			dBm	

Notes2: The Sensitivity should be tested at BER of 1×10^{-10} or better with an input signal consisting of 155Mbps,

NRZ, PRBS=2²³-1 and E.R= 9dB.

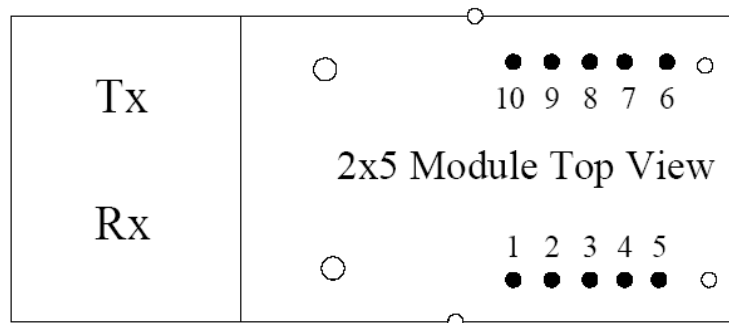


Optical Pulse Mask with Bessel Filter Specified in ITU-T G.957

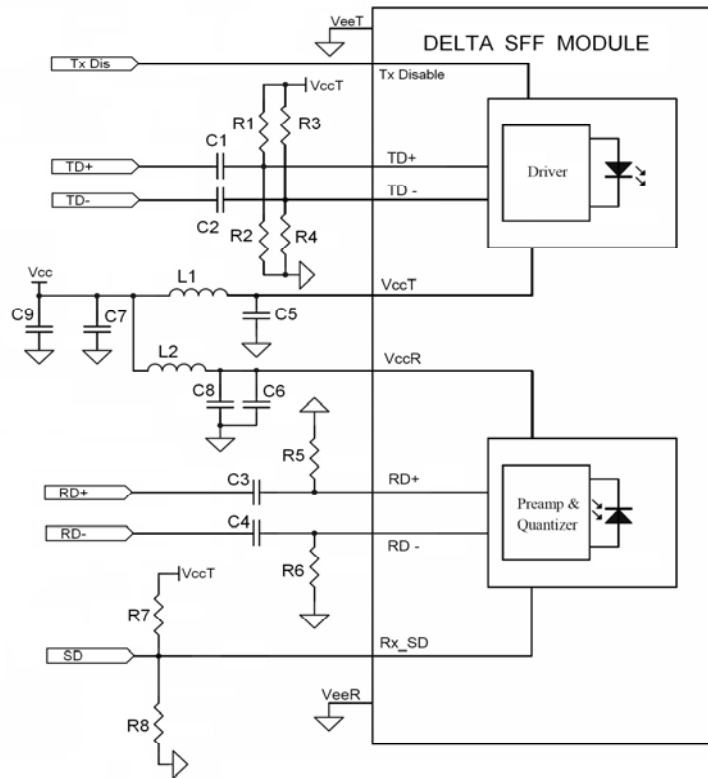
Pin Definition

PIN	Symbol	Functional description
1	GND	Receiver Signal Ground
2	VccR	Receiver Power Supply
3	SD	Receiver Signal Detect (LVPECL or LVTTTL)
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

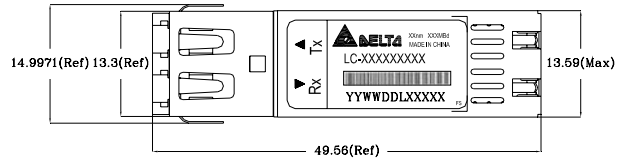
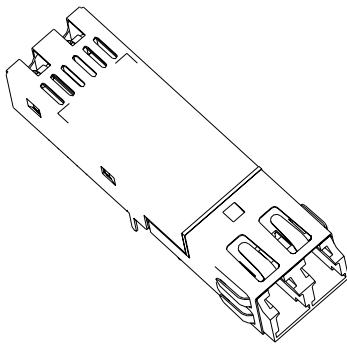


Recommend Circuit Schematic for Internal DC Coupled Transceivers

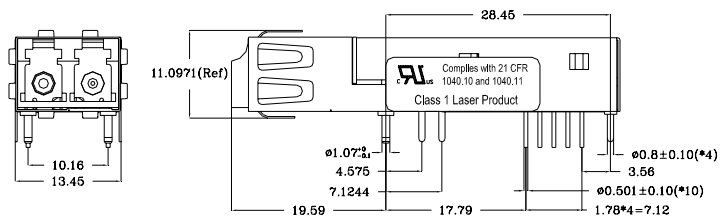


- R1=R3=82 ohm (3.3V),68 ohm(5V)
- R2=R4=130 ohm (3.3V),191 ohm (5V)
- R5=R6=150 ohm (3.3V),270 ohm (5V)
- R7=130 ohm (3.3V PECL),82 ohm(5V),NC (TTL)
- R8=82 ohm (3.3V PECL),130 ohm(5V),NC (TTL)
- C1=C2=C3=C4=C5=C6=C7=100 nF
- C8=C9=10uF
- L1=L2=1uH

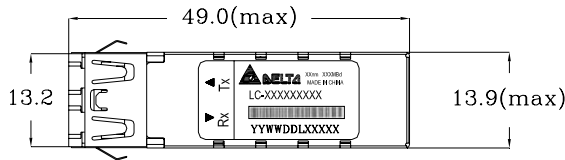
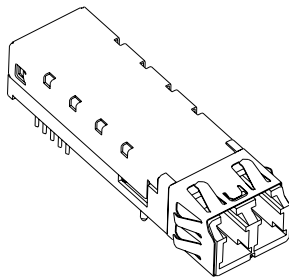
Package Outline (Plastic Housing):



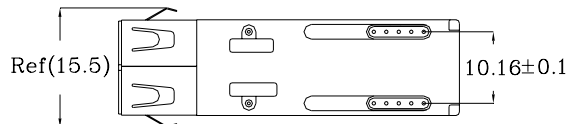
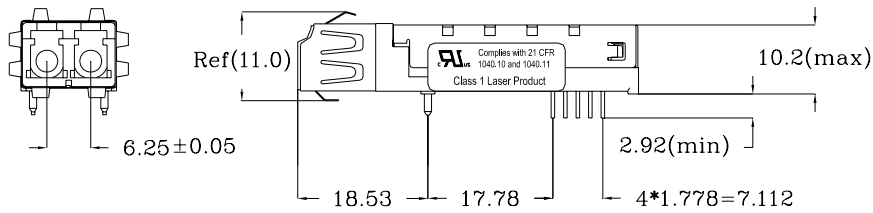
UNIT : mm
TOLERANCE : ±0.2



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. (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- 155AX₁X₂X₃X₄X₅X₆

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: 2×5 LC DC/DC

X₄ RoHS

Blank: Non-RoHS Compliant
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
H: -10 to + 85 degree C
T: -40 to + 85 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