

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



Description :

The LC-155Bxxxxxx series from DELTA are SFF (Small Form Factor) 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-155Bxxxxxx transceivers are supplied in 2x5 DIP package style with duplex LC connector and are fully compliant with SFF Multi Source Agreement (MSA).

All LC-155Bxxxxxx series can meet Class-1 eye safety standard and effective distance depends on ITU-T G.957 standard or power penalty.

The transmitter sections utilize 1310nm Edge Emitting InGaAsP Laser Diode. This Laser Diode is packaged in the optical subassembly portion of the transmitter section. A custom silicon IC that converts differential PECL logical signals into an analog LD driving current then drive it.

Features :

- Full Compliance with the Optical Performance Requirements of the ATM 100Mbps and 100 Base-LX Version of IEEE 802.3u.
- Multisource 2x5 package styles with LC Receptacle.
- Single 3.3V Power Supply.
- PECL Differential Inputs and Outputs.
- PECL (LC-155B2xxxxxx Series) or TTL (LC-155B4xxxxxx Series) Receiver Signal Detect Indicator.
- Wave Solder and Aqueous Wash Process Compatible.
- RoHS Compliant per Directive 2002/95/EC.

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 :

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

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	Sec.	
Supply Voltage	V _{CC}	0		5	V	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Data Rate		100	155.52	200	Mbps	
Ambient Operating Temperature	T _A	0		70	°C	1
Supply Voltage	V _{CC}	3.15	3.3	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	LVTTL
SD Output Voltage-High	V _{SDL-VCC}	2			V	

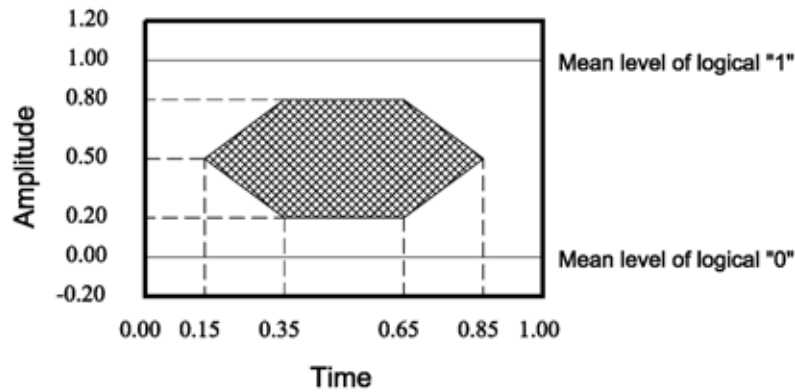
Optical Characteristics

(Data Rate = 155.52Mbps, PRBS=2²³-1, NRZ, 9/125um SMF)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Supply Current	I _{CC}			150	mA	
Mean Launch Power	P _O	-15		-8	dBm	LC-155BxMxxxxx
		-5		0		
Optical Extinction Ratio	E.R.	9			dB	
Center Wavelength	c	1280	1310	1340	nm	
Spectral Width (RMS)				7.7	nm	LC-155BxMxxxxx
				3		
Output Eye Diagram	Compliant with ITU-T recommendation G.957					
Receiver						
Supply Current	I _{CC}			150	mA	
Sensitivity	P _{IN}			-31	dBm	LC-155BxMxxxxx
				-34		
Overload	P _{OL}	-8			dBm	LC-155BxMxxxxx
		-10				
Signal Detect-Asserted	P _A			-31	dBm	LC-155BxMxxxxx
				-34		
Signal Detect-DeAsserted	P _D	-45			dBm	
Signal Detect-Hysteresis	P _A -P _D	0.5			dB	

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.

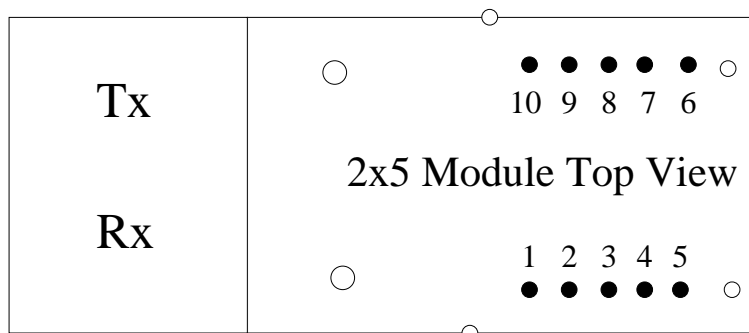


Optical Pulse Mask with Bessel Filter Specified in ITU-T G.957
Mask of the eye diagram for the optical transmit signal

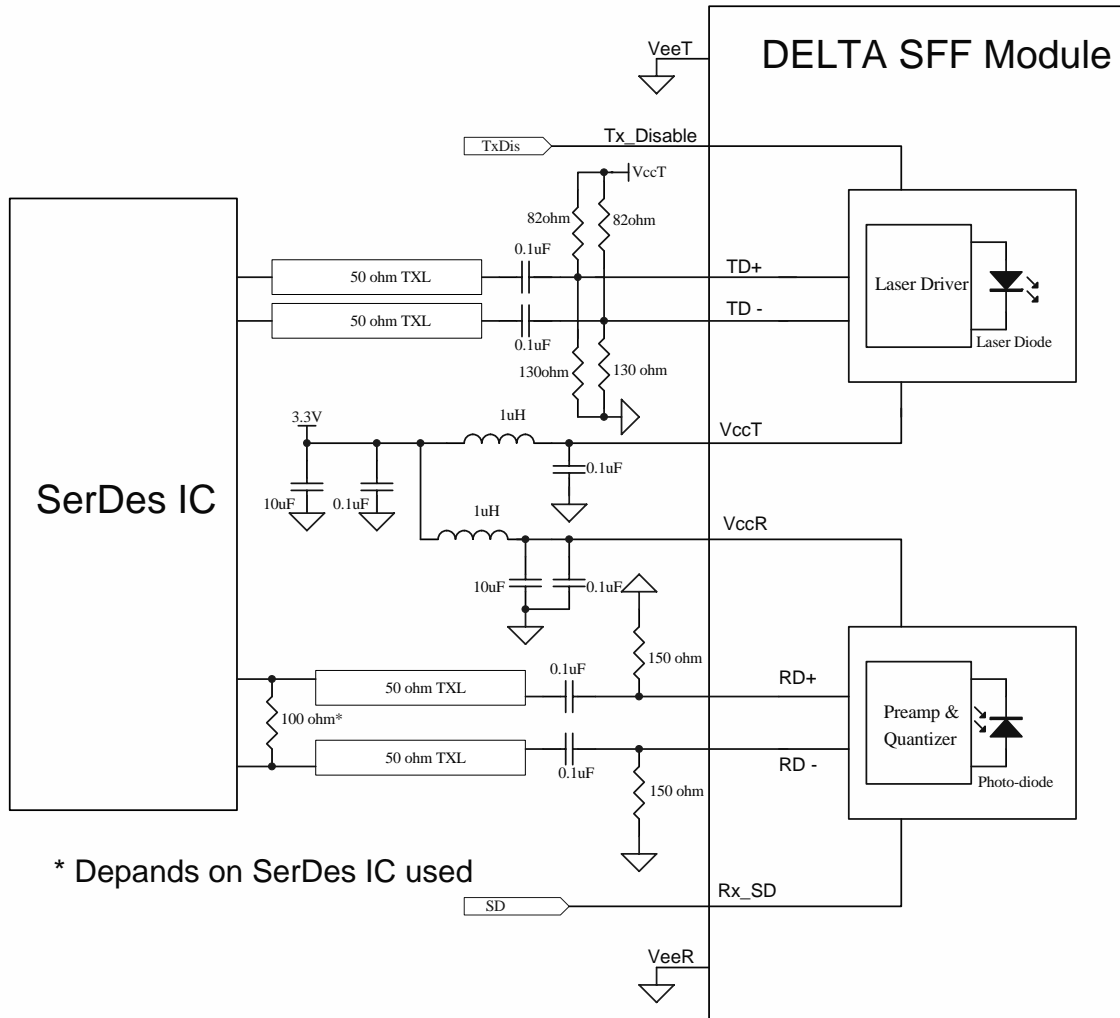
Pin Definition :

PIN	Symbol	Functional description
1	GND	Receiver Signal Ground
2	VccR	Receiver Power Supply
3	SD	Receiver Signal Detect (LVPECL, LVTTTL or TTL)
4	RD (-)	Receiver Data Out Bar (LVPECL or PECL)
5	RD (+)	Receiver Data Out (LVPECL or PECL)
6	VccT	Transmitter Power Supply
7	GND	Transmitter Signal Ground
8	TxDis	Transmitter Disable
9	TD (+)	Transmitter Data In (LVPECL or PECL)
10	TD (-)	Transmitter Data In Bar (LVPECL or PECL)

Pin Out Drawing:



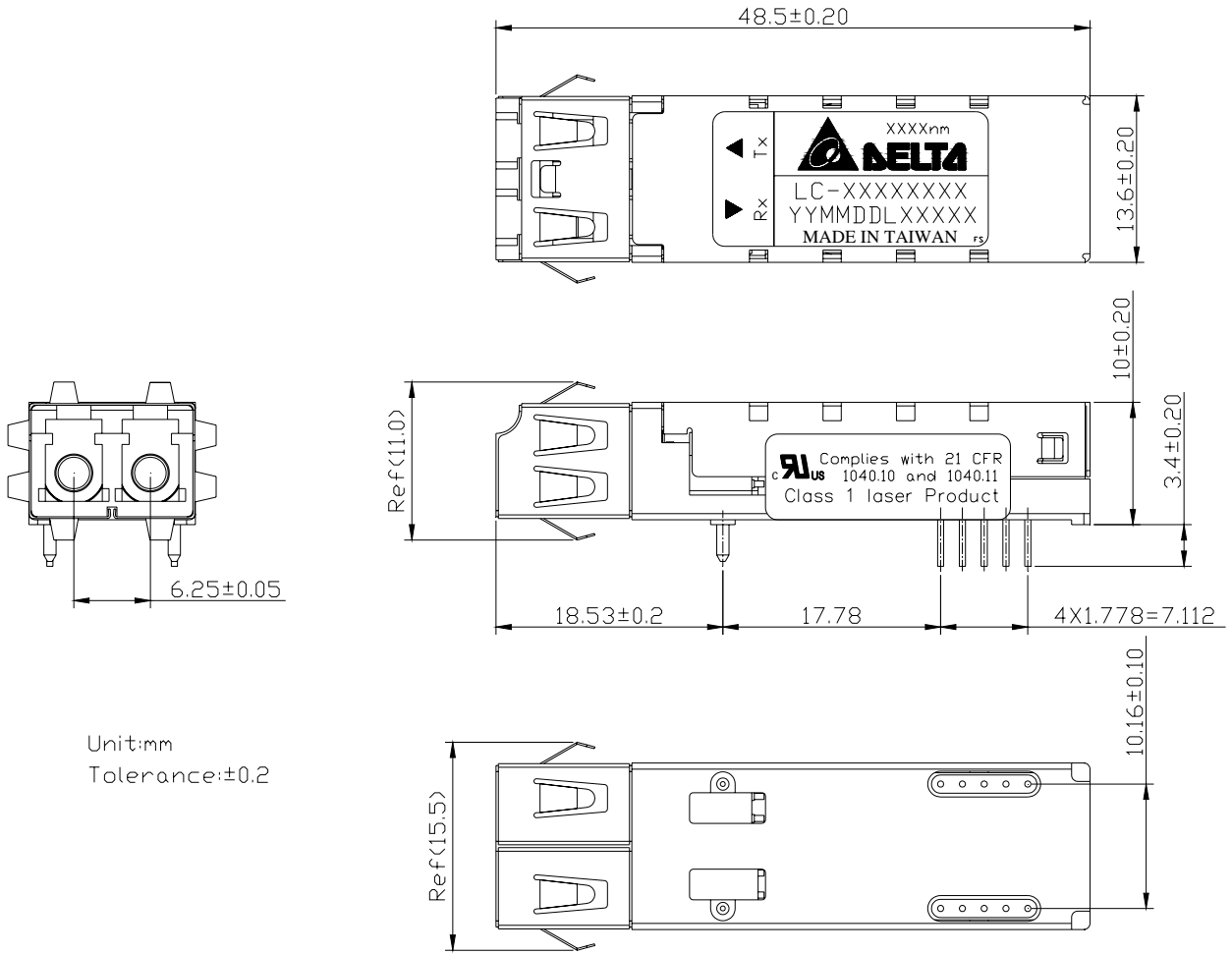
Recommend Circuit Schematic :



Note:

1. 270 Ohm (3.3V), 510 Ohm (5V) SD Output pull-down resistors required for LVPECL SD Output.
2. No connected for TTL SD Output.

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-155B $x_1x_2x_3x_4x_5x_6x_7$ **x_1 : 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_2 : Effective Distance Grade

J : 15Km

M : 40Km

 x_3 : Package type & coupling type

1 : 2X5LC DC/DC

 x_4 : RoHS

Blank : Non-RoHS Compliant

R : RoHS Compliant

 x_5 : Housing Type

Blank : Plastic Housing

M : Metal Housing

MU : W/O Shielding

 x_6 : Performance

Blank : Old Design

A : New Design

 x_7 : Temperature

Blank : 0 to 70

H : -10 to 85

T : -40 to 85