155Mbps, 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-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.**

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 complaint 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.

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	Ts	-40		85	ºC	
Lead Soldering Temperature	TSOLD			260	ºC	
Lead Soldering Time	tSOLD			10	Sec.	
Supply Voltage	VCC	0		5	V	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Data Rate		100	155.52	200	Mbps	
Ambient Operating Temperature	TA	0		70	ºC	1
Supply Voltage	VCC	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	VIL-VCC	-1.81		-1.48	V	
Transmitter Data Input Voltage-High	VIH-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	VOL-VCC	-1.95		-1.62	V	
Data Output Voltage-High	VOH-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	

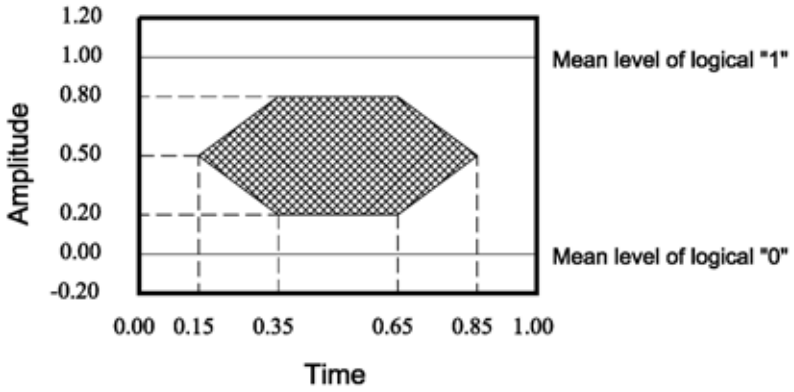
Optical Characteristics

（Data Rate = 155.52Mbps, PRBS=2^{23}-1, NRZ, 9/125um SMF）

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Supply Current	Icc			150	mA	
Mean Launch Power	P_O	-15		-8	dBm	
		-5		0		LC-155BxMxxxxx
Optical Extinction Ratio	E.R.	9			dB	
Center Wavelength	λ_C	1280	1310	1340	nm	
Spectral Width (RMS)	σ			7.7	nm	
				3		LC-155BxMxxxxx
Output Eye Diagram	Compliant with ITU-T recommendation G.957					
Receiver						
Supply Current	Icc			150	mA	
Sensitivity	P_{IN}			-31	dBm	
				-34		LC-155BxMxxxxx
Overload	Pol	-8			dBm	
		-10				LC-155BxMxxxxx
Signal Detect-Asserted	P_A			-31	dBm	
				-34		LC-155BxMxxxxx
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=2^{23}-1 and E.R.= 9dB.



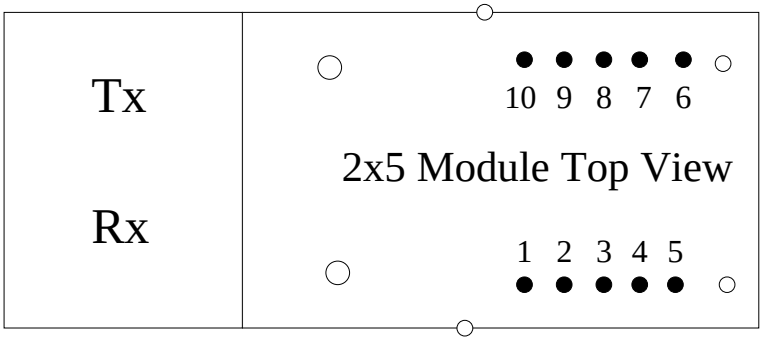
Optical Pulse Mask with Bessel Filter Specified in ITU-T G.957

Mask of the eye diagram for the optical transmit signal

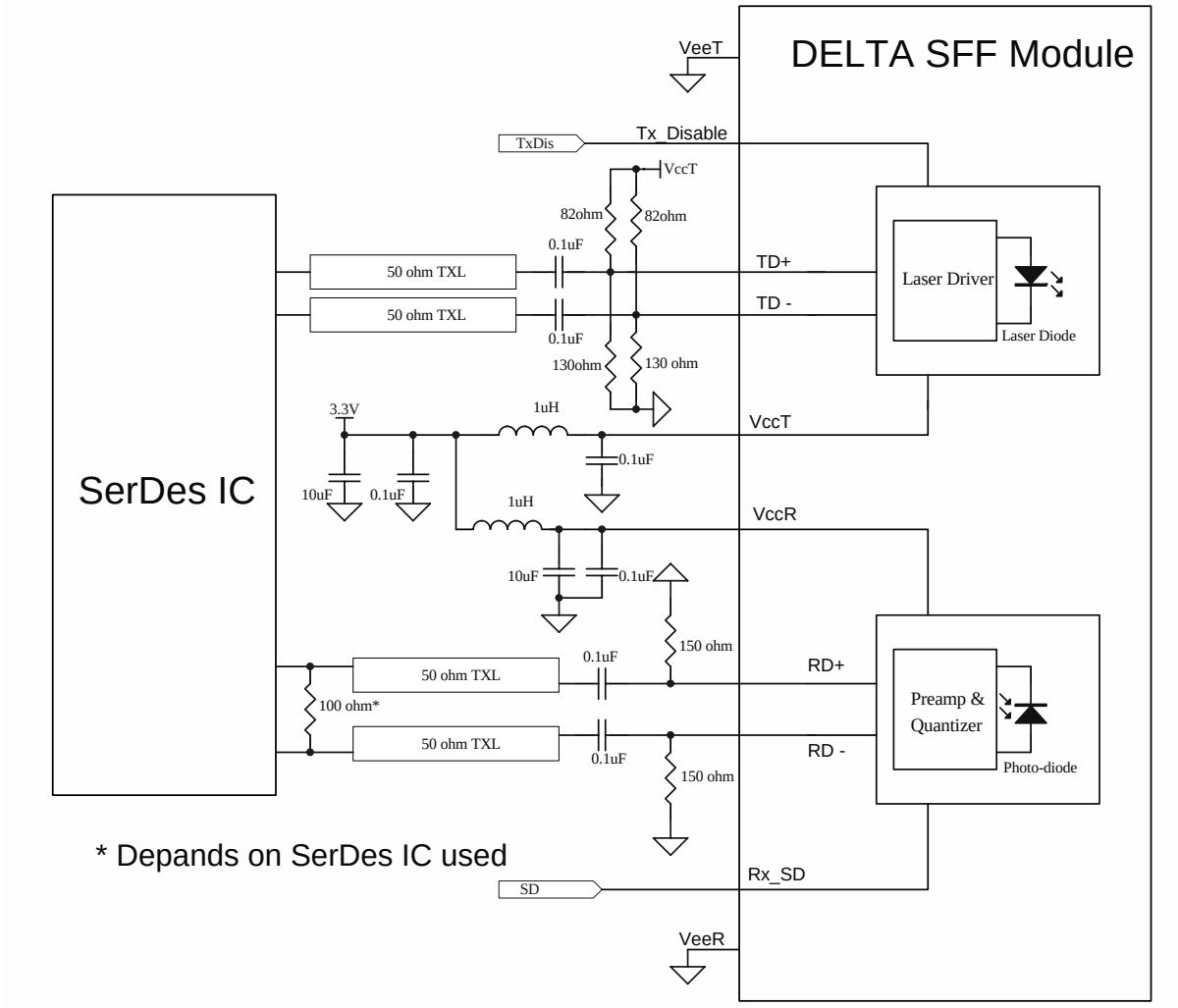
Pin Definition：

PIN	Symbol	Functional description
1	GND	Receiver Signal Ground
2	VccR	Receiver Power Supply
3	SD	Receiver Signal Detect (LVPECL、LVTTL 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:



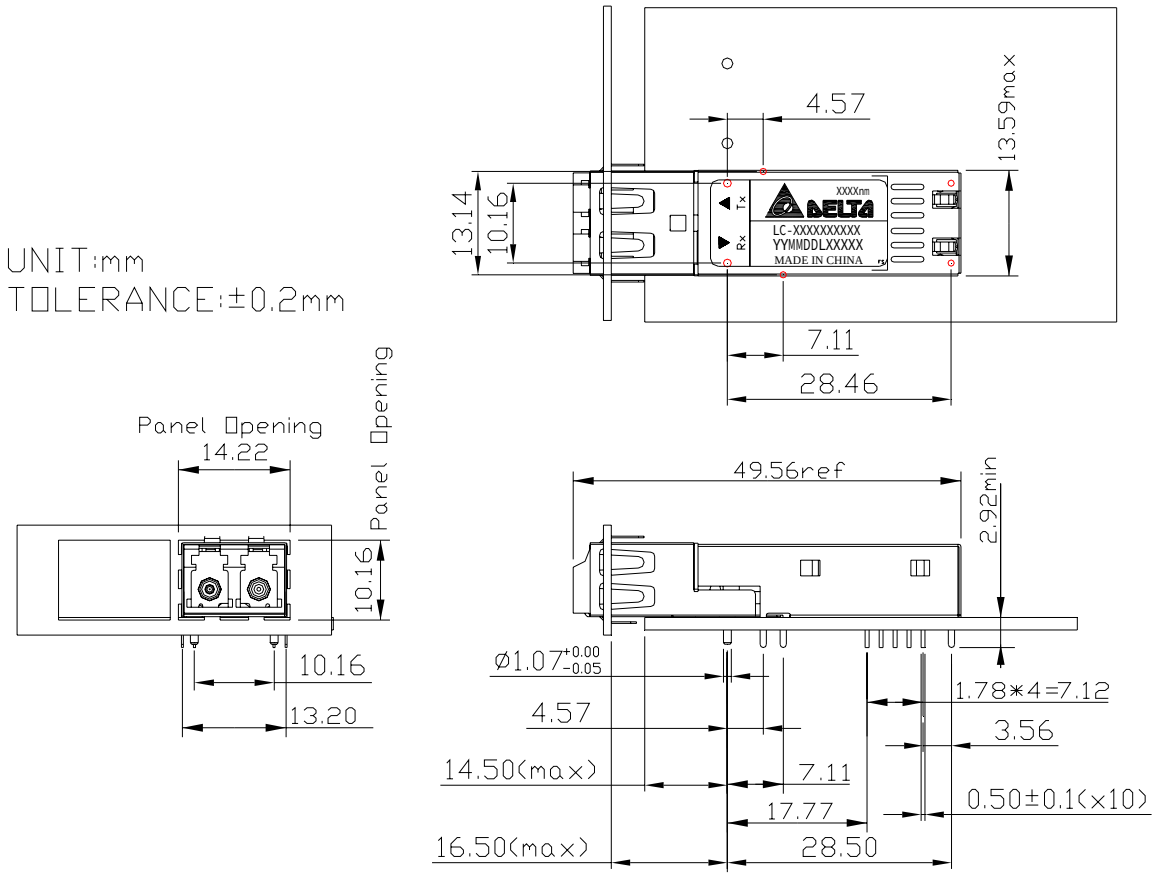
Recommend Circuit Schematic：



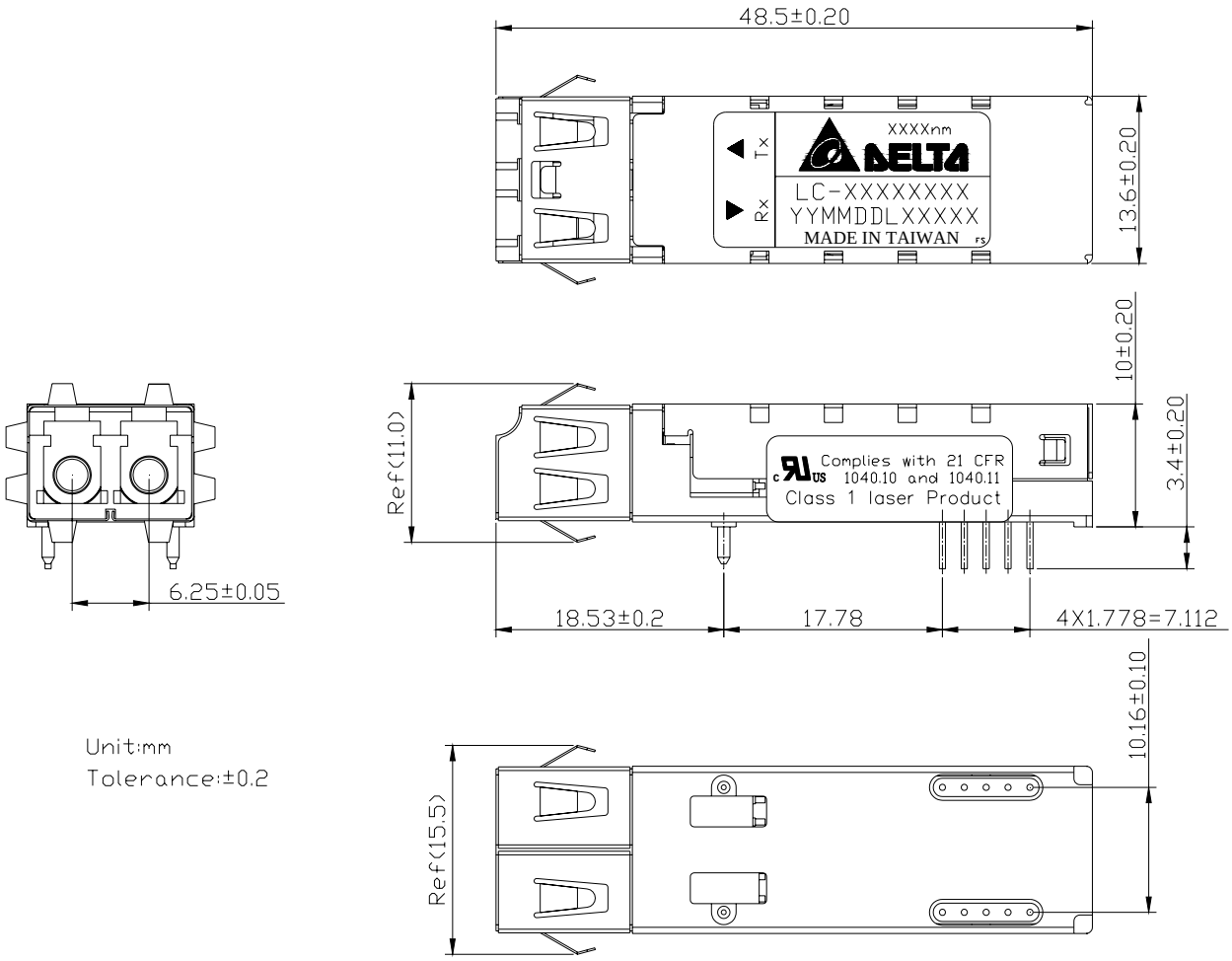
Note:

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

Package Outline (Plastic Housing)：



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℃