

2X10 LC Duplex 155Mbps Single-mode Optical Transceiver Module for ATM, SONET OC-3/SDH STM-1

LC-155B4M7

Preliminary

Features

- LC Duplex Singlemode Transceiver
- Industry Standard 2 x 10 Footprint
- Intermediate SONET OC-3 / SDH STM-1 (L-1.1) Compliant
- Single +3.3 V Power Supply
- PECL Differential Inputs and Outputs
- TTL Signal Detect Output
- Wave Solderable and Aqueous Washable
- Class 1 Laser International Safety Standard IEC 825 Compliant

Applications


- ATM 155.52Mb/s Links
- SONET OC-3/SDH STM-1 Interconnections

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Reference
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	Reference
Ambient Operating Temperature	T _A	0		70	°C	
Supply Voltage	V _{CC}	3.135	3.3	3.465	V	
Transmitter Data Input Voltage-Low	V _{IL-VCC}	-1.95		-1.45	V	
Transmitter Data Input Voltage-High	V _{IH-VCC}	-1.17		-0.73	V	
Transmitter Differential Input Voltage	V _D	0.3		1.6	V	
Data Output Load	R _{DL}		50		ohm	

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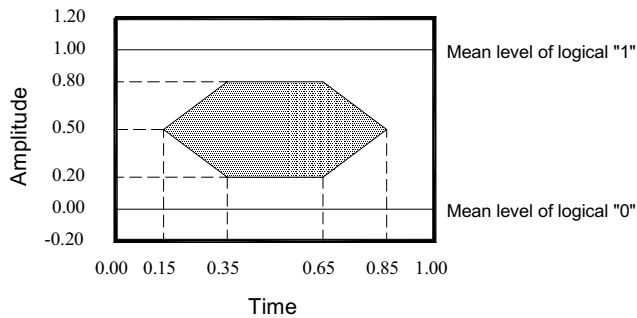
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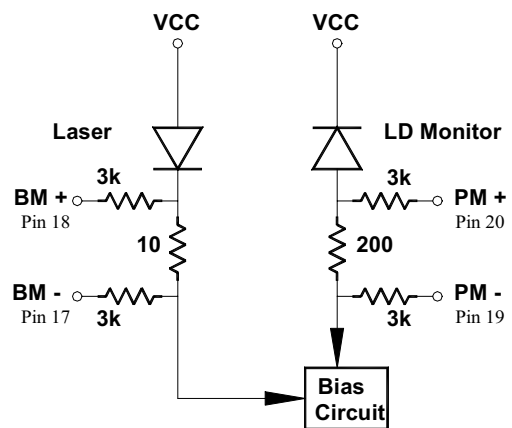
Transmitter Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Reference
Power Supply Voltage	V	3.135	3.3	3.465		
Supply Current	I _{CC} T			140	mA	
Output Optical Power	P _O	-5		-0	dBm avg.	
Optical Extinction Ratio		10			dB	
Center Wavelength	λ_c	1263	1310	1360	nm	
Optical Rise/Fall Times	tr/ta			1.5	ns	Note 1
Spectral Width (RMS)	σ			3	nm	
Disable Input Voltage-High	V _{DISH}	2.0			V	
Disable Input Voltage-Low	V _{DISL}			0.8	V	
Disable Output Optical Power	P _{OD}			-40	dBm	
LD Bias Monitor Voltage	V _{BM}	0.01		0.5	V	Note 2
Rear Facet Monitor Voltage	V _{PM}	0.01		0.2	V	Note 2

1. These are 20-80% values.
2. At ambient temp. of 25 degrees C.




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



Mask of the eye diagram for the optical transmit signal

Monitor Circuit Schematic Diagram

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Receiver Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Reference
Power Supply Voltage	V	3.135	3.3	3.465		
Supply Current	I _{CCR}			140	mA	
Data Output Voltage-Low	V _{OL-VCC}	-1.86		-1.62	V	
Data Output Voltage-High	V _{OH-VCC}	-1.10		-0.86	V	
Sensitivity	P _{IN}			-34	dBm avg.	Note 1
Input Optical Wavelength	λ	1100	1310	1600	nm	
SD Output Voltage-High	V _{SDH}	2.2		V _{CC}	V	
SD Output Voltage-Low	V _{SDL}	0		0.5	V	
Signal Detect-Asserted	P _A			-35	dBm avg.	
Signal Detect-De-asserted	P _D	-48			dBm avg.	
Signal Detect-Hysteresis	P _A -P _D	1.0			dB	
Overload	P _O	-8			dBm	

Note 1. The sensitivity is provided at a BER of 1×10^{-10} or better with an input signal consisting of 155.52 Mb/s, 2²³-1 PRBS.

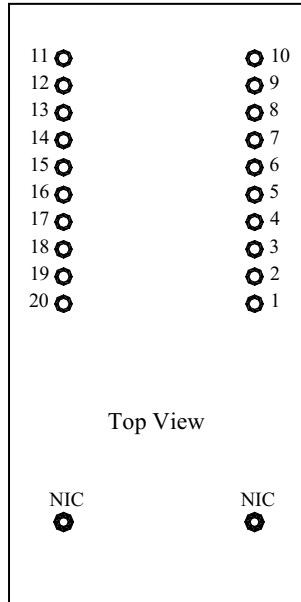
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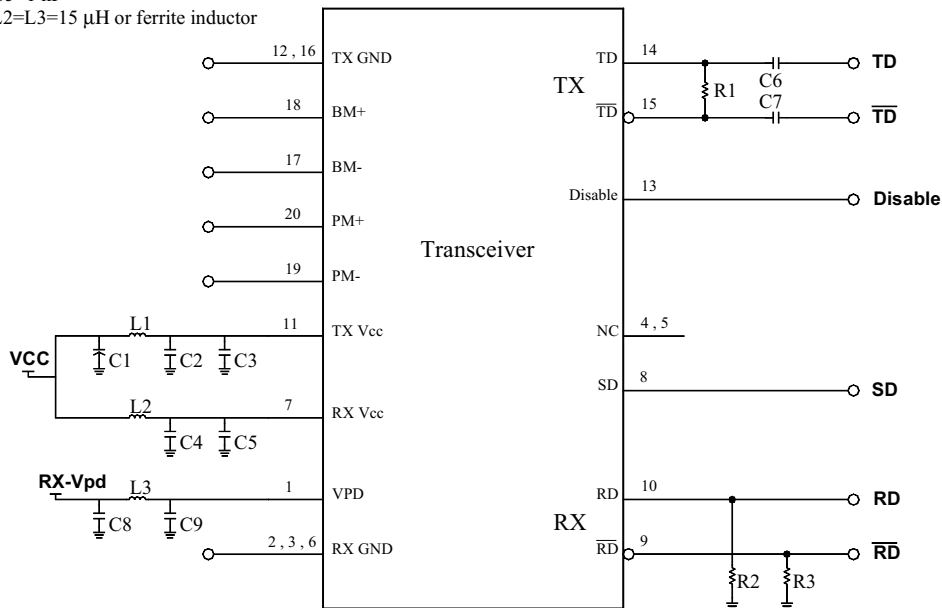
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- 11 Transmitter Power Supply
- 12 Transmitter Ground
- 13 Transmitter Disable
- 14 Transmitter Input Data
- 15 Transmitter Input Data Bar
- 16 Transmitter Ground
- 17 LD Bias Current Monitor Bar
- 18 LD Bias Current Monitor
- 19 Rear Facet Monitor Bar
- 20 Rear Facet Monitor



- 10 Receiver Output Data
- 9 Receiver Output Data Bar
- 8 Signal Detect
- 7 Receiver Power Supply
- 6 Receiver Ground
- 5 NC
- 4 NC
- 3 Receiver Ground
- 2 Receiver Ground
- 1 DC Bias Supply for Photo Detector

Note:
 R1=100 Ω
 R2=R3=240 Ω
 C1=C8=10 μF
 C2=C4=C6=C7=C9=C10=C11=100 nF
 C3=C5=1 nF
 L1=L2=L3=15 μH or ferrite inductor



Recommended Circuit Schematic

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LC-155B4M7

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Table 1: Pin Out Table

PIN		Functional description
1	VPD	DC Bias Supply for Photo Detector.
2	GND	Receiver Power Ground
3	GND	Receiver Power Ground
4	NC	Pin Not Connected
5	NC	Pin Not Connected
6	GND	Receiver Power Ground
7	VccR	Receiver Power Supply
8	SD	Signal Detect (LVTTTL)
9	RD (-)	Receiver Data Output - (LVPECL)
10	RD (+)	Receiver Data Output + (LVPECL)

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LC-155B4M7


Preliminary

Table 2: Pin Out Table

PIN		Functional description
11	VccT	Transmitter Power Supply
12	GND	Transmitter Signal Ground
13	Disable	Transmitter Disable (LVTTTL)
14	TD (+)	Transmitter Data In + (LVPECL)
15	TD (-)	Transmitter Data In – (LVPECL)
16	GND	Transmitter Signal Ground
17	BM (-)	Laser Bias Monitor $I_{BIAS} = (BM_{(+)} - BM_{(-)}) / 10 \Omega$
18	BM (+)	
19	PM (-)	Rear Facet Monitor $I_{PM} = (PM_{(+)} - PM_{(-)}) / 1 k\Omega$
20	PM (+)	

Note :

The BM and FM currents are calculated as ratios of the corresponding Voltages to their current-sensing resistors, 10Ω and 1kΩ (refer to Monitor Circuit Schematics Diagram).

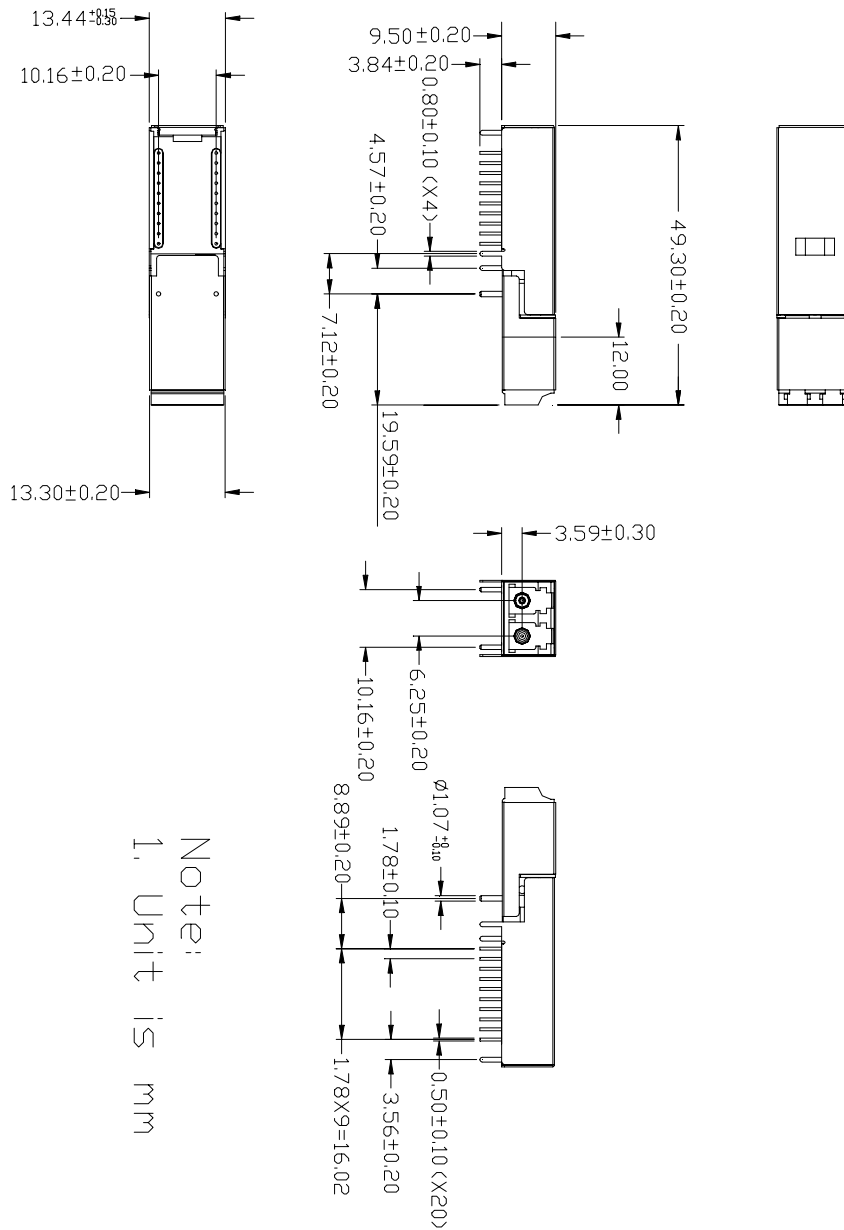
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Mechanical Dimensions



Note:
1. Unit is mm


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Test Item	Reference	Qty'	Evaluation
(#1) Electromagnetic Interference EMC	FCC Class B EN 55022 Class B CISPR 22	5	(1) Satisfied with electrical characteristics of product spec. (2) No physical damage
(#2) Immunity : Radio Frequency Electromagnetic Field	EN 61000-4-3 IEC 1000-4-3	5	
(#3) Immunity : Electrostatic Discharge to the Duplex SC Receptacle	EN 61000-4-2 IEC 1000-4-2 IEC 801.2	5	
(#4) Electrostatic Discharge to the Electrical Pins	MIL-STD-883C Method 3015.4 EIAJ#1988.3.2B Version 2, Machine model	5	

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