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Bringing Communications to Light™

PRELIMINARY - 622 Mbps Singlemode SFF LC Transceiver(3.3V) (LR)

C-1x-622(C)-Fx-SLC(4)

Features

- Duplex LC Singlemode Transceiver
- Small Form Factor Multi-sourced 2 x 5 Pin Package
- Complies with ITU-T/STM-4, OC-12
- 1310 nm / 1550 nm Wavelength, FP / DFB Laser
- Single +3.3V Power Supply
- LVPECL Differential Inputs and Outputs
- LVTTL Signal Detection Output (C-1X 622C-FX-SLCX)
- Temperature Range: 0 to +70˚C
- Class 1 Laser International Safety Standard IEC 825 Compliant
- Solderability to MIL-STD-883, Method 2003
- Pin coating is Sn/Pb with minimum 2% Pb content
- Flammability to UL94V0
- Humidity RH 5-85% (5-95% short term) to IEC 68-2-3
- Complies with Bell core TA-NWT-000983
- Uncooled laser diode with MQW structure

Applications

- ATM 622 Mbps Links
- SONET/SDH Equipment Interconnect

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Power Supply Voltage	V_{cc}	0	3.6	V
Data Input Voltage	-	GND	V_{cc}	V
Output Current	I_{out}	0	30	mA
Soldering Temperature*	-	-	260	˚C
Operating Temperature	T_{opr}	0	70	˚C
Storage Temperature	T_{stg}	-40	+85	˚C

*Note: 10 seconds on leads only

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Power Supply Voltage	V_{cc}	3.1	3.3	3.5	V
Operating Temperature	T_{opr}	0	-	70	˚C
Data Rate	-	-	622	-	Mbps

Transmitter Specifications (0°C < T_{opr} < 70°C, 3.1 V < V_{cc} < 3.5 V)

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Optical						
Optical Transmit Power	P_o	-14	-	-7	dBm	C-13-622(C)-F-SLC
Optical Transmit Power	P_o	-3	-	2	dBm	C-1X-622(C)-FX-SLC4
Output Center Wavelength	λ_c	1274	1310	1356	nm	C-13-622(C)-F-SLC
Output Center Wavelength	λ_c	1296	1310	1330	nm	C-13-622(C)-F-SLC4
Output Center Wavelength	λ_c	1280	1310	1335	nm	C-13-622(C)-FDFB-SLC4
Output Center Wavelength	λ_c	1480	1550	1580	nm	C-15-622(C)-FDFB-SLC4
Output Spectrum Width	$\Delta\lambda_{rms}$	-	-	2.5	nm	RMS (σ), C-13-622(C)-F-SLC
Output Spectrum Width	$\Delta\lambda_{rms}$	-	-	1.7	nm	RMS (σ), C-13-622(C)-F-SLC4
Output Spectrum Width	$\Delta\lambda$	-	-	1	nm	-20 dB width, C-1X-622(C)-FDFB-SLC4
Side Mode Suppression Ratio	Sr	30	35	-	dB	CW, P_o=5 mW, C-1X-622(C)-FDFB-SLC4
Extinction Ratio	E_R	8.2	-	-	dB	
Output Eye	Compliant with ITU-T G.957/STM-4 Eye Mask					
Optical Rise Time	t_r	-	-	1.2	ns	10%-90% Values
Optical Fall Time	t_f	-	-	1.2	ns	10%-90% Values
Relative Intensity Noise	RIN	-	-	-120	dB/Hz	
Total Jitter	TJ	-	-	0.55	ns	Measured with 2^{23}-1 PRBS with 72 ones and 72 zeros.
Electrical						
Power Supply Current	I_{cc}	-	-	160	mA	Maximum current is specified at V_{cc}=Maximum @maximum temperature.
Transmit Enable Voltage	V_{EN}	0	-	0.8	V	
Transmitter Disable Voltage	V_D	2	-	Vcc	V	
Data Input Current-Low	I_{IL}	-200	-	-	µA	
Data Input Current-High	I_{IH}	-	-	200	µA	
Data Input Voltage-Low	V_{IL}-V_{CC}	-2	-	-1.58	V	These inputs are compatible with 10K, 10KH and 100K ECL and LVPECL inputs.
Data Input Voltage-High	V_{IH}-V_{CC}	-1.1	-	-0.74	V	

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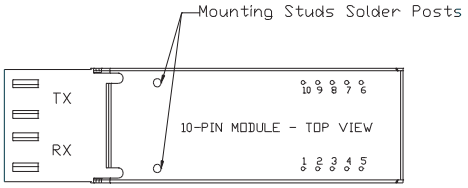
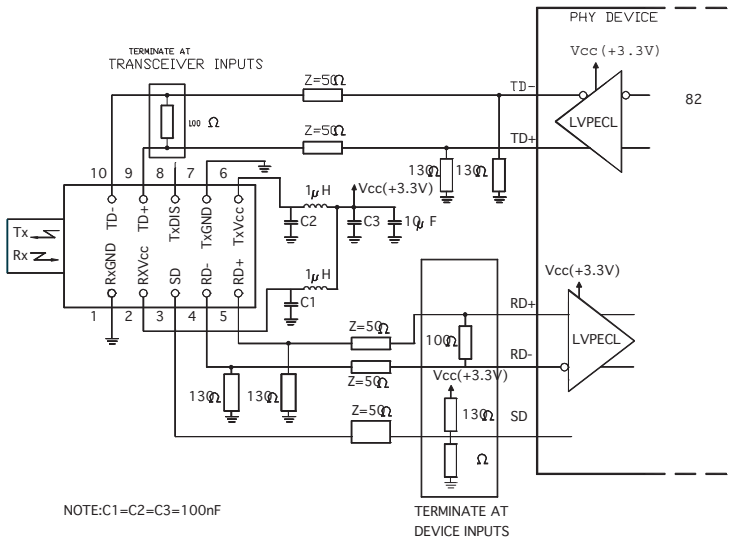
Connection Diagram



PIN	Symbol	Notes
1	Rx GND	Directly connect this pin to the receiver ground plane
2	Rx Vcc	+3.3V dc power for the receiver section
3	SD	Active high on this indicates a received optical signal (LVPECL / LVTTL)
4	RD-	Receiver Data Out Bar (LVPECL)
5	RD+	Receiver Data Out (LVPECL)
6	Tx Vcc	+3.3V dc power for the transmitter section
7	Tx GND	Directly connect this pin to the transmitter ground plane
8	Tx DIS	Transmitter disable (LVTTL)
9	TD+	Transmitter Data In (LVPECL)
10	TD-	Transmitter Data In Bar (LVPECL)
Attaching Posts		The attaching posts are at case potential and may be connected to chassis ground. They are isolated from circuit ground.

Recommended Circuit Schematic

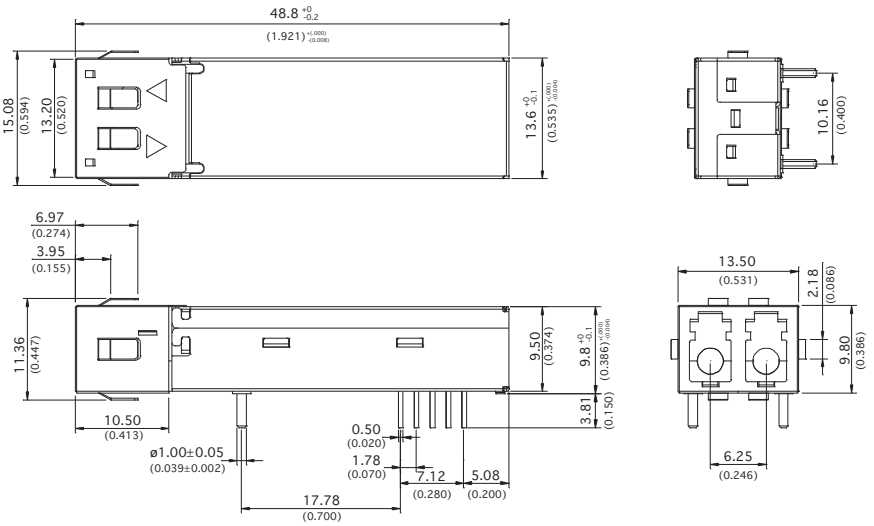


The split-load terminations for ECL signals need to be located at the input of devices receiving those ECL signals. The power supply filtering is required for good EMI performance. Use short tracks from the inductor L1/L2 to the module Rx Vcc and Tx Vcc. A GND plane under the module is required for good EMI and sensitivity performance.

Note: For SD LVTTL level, external bias resistors are not needed.

Package Diagram

Units in mm



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Printed Circuit Board Layout Considerations

A fiber-optic receiver employs a very high gain, wide bandwidth transimpedance amplifier. This amplifier detects and amplifies signals that are only tens of nA in amplitude when the receiver is operating near its limit. Any unwanted signal currents that couple into the receiver circuitry causes a decrease in the receiver's sensitivity and can also degrades the of the receiver's signal detect (SD) circuit. To minimize the coupling of unwanted noise into the receiver, careful attention must be given to the printed circuit board.

At a minimum, a double-sided printed circuit board (PCB) with a large component side ground plane beneath the transceiver must be used. In applications that include many other high speed devices, a multi-layer PCB is highly recommended. This permits the placement of power and ground on separate layers, which all them to be isolated from the signal lines. Multilayer construction also permits the routing of signal traces away from high level, high speed signal lines. To minimize the possibility of coupling noise into the receiver section, high level, high speed signals such as transmitter inputs and clock lines should be routed as far away as possible from the receiver pins.

Noise that couples into the receiver through the power supply pins can also degrade performance. It is recommended that a pi filter in both the transmitter and receiver power supplies.

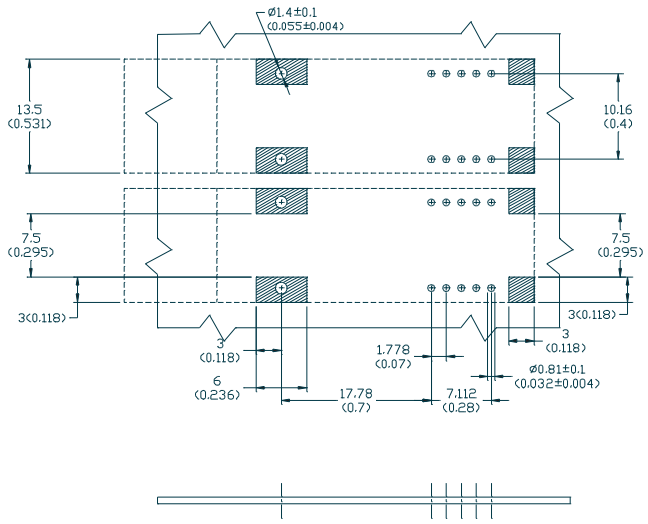
EMI and ESD Considerations

OIC transceivers offer a metalized plastic case and a special chassis grounding clip. As shown in the drawing, this clip connects the module case to chassis ground then installed flush through the panel cutout. The grounding clip in this way brushes the edge of the cutout in order to make a proper contact. The use of a grounding clip also provides increased electrostatic protection and helps reduce radiated emissions from the module or the host circuit board through the chassis faceplate. The attaching posts are at case potential and may be connected to chassis ground. They should not be connected to circuit ground.

Plastic optical subassemblies are used to further reduce the possibility of radiated emissions by eliminating the metal from the transmitter and receiver diode housings, which extend into connector space. By providing a non-metal receptacle for the optical cable ferrule, the gigabit speed RF electrical signal is isolated form the connector area thus preventing radiated energy leakage from these surfaces to the outside of the panel.

Recommended Board Layout Hole Pattern

Dimension in Millimeter (inches)



Notes:

1. This figure describes the recommended circuit board layout for the SFF transceiver.
2. The hatched areas are keep-out areas reserved for housing standoff. No metal traces or ground connection in keep-out areas.
3. The mounting studs should be soldered to chassis ground for mechanical integrity.

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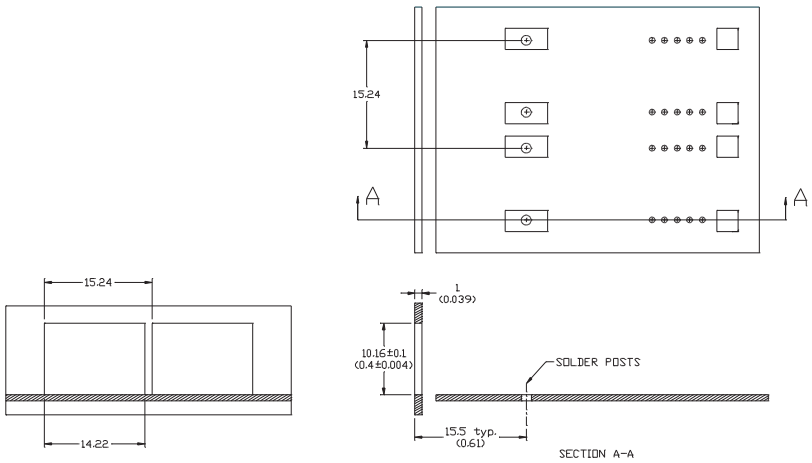
Recommended Panel Mounting

Dimension in Millimeter (inches)



This singlemode transceiver is a class I laser product. it complies with IES 825 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated within the specified temperature and voltage limits. The optical parts of the module will terminate with an optical connector or with a dust plug.

Ordering Information

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- 13 = 1310 nm; 15=1550 nm
- 622M = LVPECL signal detection output; 622C = LVTTL signal detection output
- F = SFF Laser; FDFB = SFF Laser
- LC connector
- Optical transmit

Warnings

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.
Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

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