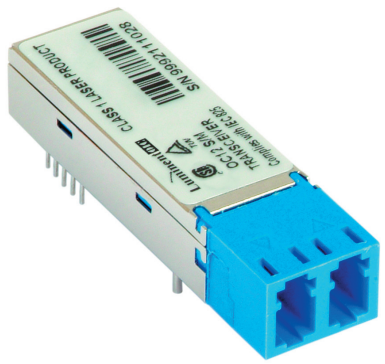
155 Mbps Single Mode SFF LC Transceiver

C-13-155-F-SLC3(5)A-12



Features

- Duplex LC Single Mode Transceiver
- Small Form Factor Multi-sourced 2x5 Pin Package
- Ultra Long reach SONET OC-3/SDH STM-1 Compliant
- Single +3.3V Power Supply
- LVPECL Differential Inputs and Outputs
- LVPECL Signal Detection Output
- Temperature Range: -40 to 85 °C
- Class 1 Laser International Safety Standard IEC 825 Compliant
- Solder ability 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 Telcordia(Bellcore) GR-468-CORE
- Uncooled laser diode with MQW structure
- EMI Shielding Finger Optional
- ATM 155 Mbps links
- RoHS compliance available

Absolute Maximum Rating

Parameter	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	V_{cc}	0	3.6	V	
Output Current	I_{out}	0	30	mA	
Soldering Temperature	-	-	260	°C	10 seconds on leads only
Operating Temperature	T_{opr}	-40	85	°C	
Storage Temperature	T_{stg}	-40	85	°C	

Recommended Operating Condition

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply Voltage	V_{cc}	3.1	3.3	3.5	V	
Operating Temperature (Case)	T_{opr}	-40	-	85	°C	
Data Rate	-	-	155	-	Mbps	

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Transmitter Specifications

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Optical						
Optical Transmit Power	P_o	-15	-	-8	dBm	C-13-155-F-SLC3A-12
Optical Transmit Power	P_o	-5	-	0	dBm	C-13-155-F-SLC5A-12
Output Center Wavelength	λ_p	1261	1310	1360	nm	C-13-155-F-SLC3A-12
Output Center Wavelength	λ_p	1263	1310	1360	nm	C-13-155-F-SLC5A-12
Output Spectrum Width	$\Delta\lambda_{rms}$	-	-	7.7	nm	RMS(σ), C-13-155-F-SLC3A-12
Output Spectrum Width	$\Delta\lambda_{rms}$	-	-	3	nm	RMS(σ), C-13-155-F-SLC5A-12
Extinction Ratio	ER	8.2	-	-	dB	C-13-155-F-SLC3A-12
Extinction Ratio	ER	10	-	-	dB	C-13-155-F-SLC5A-12
Output Eye		Compliant with Bellcore GR-253-CORE and ITU recommendation G.957				
Optical Rise Time	t_r	-	-	2	ns	10% to 90% Values
Optical Fall Time	t_f	-	-	2	ns	10% to 90% Values
Relative Intensity Noise	RIN	-	-	-116	dB/Hz	
Total Jitter	TJ	-	-	1.2	ns	Measured with 2^{23}-1 PRBS with 72 ones and 72 zeros.

Transmitter Specifications

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Electrical						
Power Supply Current	I_{CC}	-	-	180	mA	Maximum current is specified at Vcc= Maximum @ maximum temperature
Transmitter 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}	-2.0	-	-1.58	V	These inputs are compatible with 10K, 10KH and 100K ECL and PECL inputs
Data Input Voltage-High	V_{IH}-V_{CC}	-1.1	-	-0.74	V	

Receiver Specifications

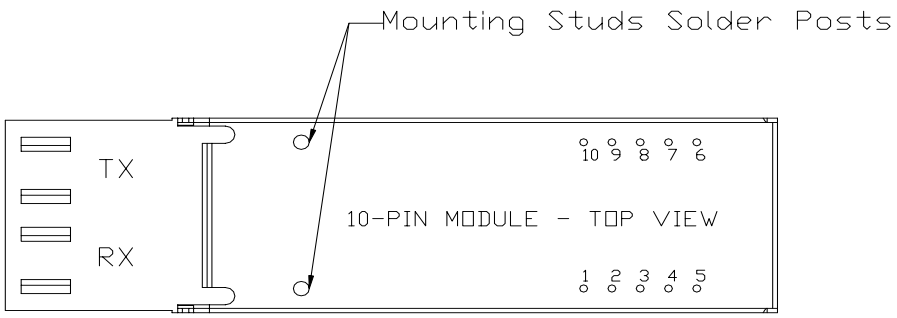
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Optical						
Sensitivity[1]	-	-	-	-32	dBm	C-13-155-F-SLC3A-12
Sensitivity[1]	-	-	-	-34	dBm	C-13-155-F-SLC5A-12
Maximum Input Power	P_{in}	-7	-	-	dBm	C-13-155-F-SLC3A-12
Maximum Input Power	P_{in}	-3	-	-	dBm	C-13-155-F-SLC5A-12
Signal Detect-Asserted	Pa	-	-	-32	dBm	C-13-155-F-SLC3A-12 Measured on transition: low to high
Signal Detect-Asserted	Pa	-	-	-34	dbm	C-13-155-F-SLC5A-12 Measured on transition: low to high
Signal Detect-Deasserted	Pd	-48	-	-	dBm	Measured on transition: high to low
Signal Detect-Hysteresis		1	-	4	dB	
Wavelength of Operation		1100	-	1600	nm	

Note1: Measured with 2^{23}-1 PRBS/BER=10^{-10}

Receiver Specifications

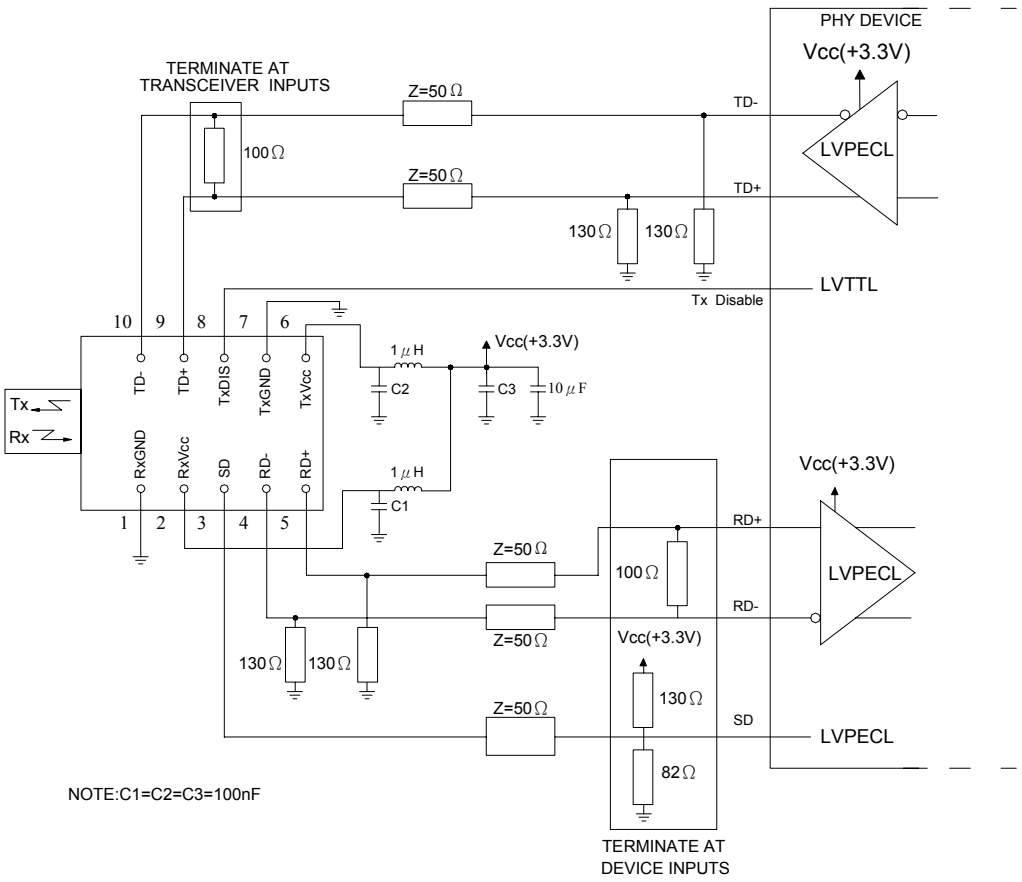
Parameter	Symbol	Min	Typical	Max	Unit	Note
Electrical						
Power Supply Current	I_{CC}	-	-	100	mA	The current excludes the output load current
Data Output Voltage-Low	V_{OL} -V_{cc}	-2.0	-	-1.58	V	These outputs are compatible with 10K, 10KH and 100KECL and LVPECL outputs
Data Output Voltage-High	V_{OH}- V_{cc}	-1.1	-	-0.74	V	
Signal Detect Output Voltage-Low	V_{SDL} -V_{cc}	-2.0		-1.58	V	
Signal Detect Output Voltage-High	V_{SDH}- V_{cc}	-1.1		-0.74	V	

Connection Diagram



PIN	Symbol	Notes
1	RxGND	Directly connect this pin to the receiver ground plane
2	RxVcc	+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	TxVcc	+3.3V dc power for the trasmitter section
7	TxGND	Directly connect this pin to the transmitter ground plane
8	TxDIS	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

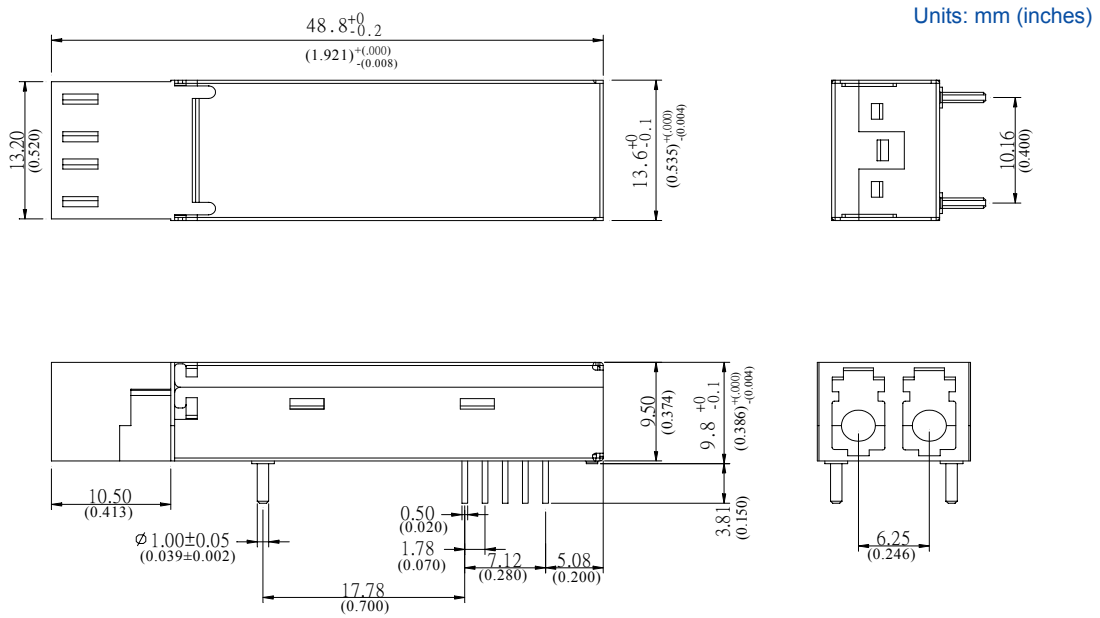


The split-loaded terminations for ECL signals need to be located at the input of devices receiving those ECL signals.
The power supply filtering is required for good EMI performance. Use short tracks from the inductor L1/L2 to the module Rx Vcc.
A GND plane under the module is required for good EMI and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

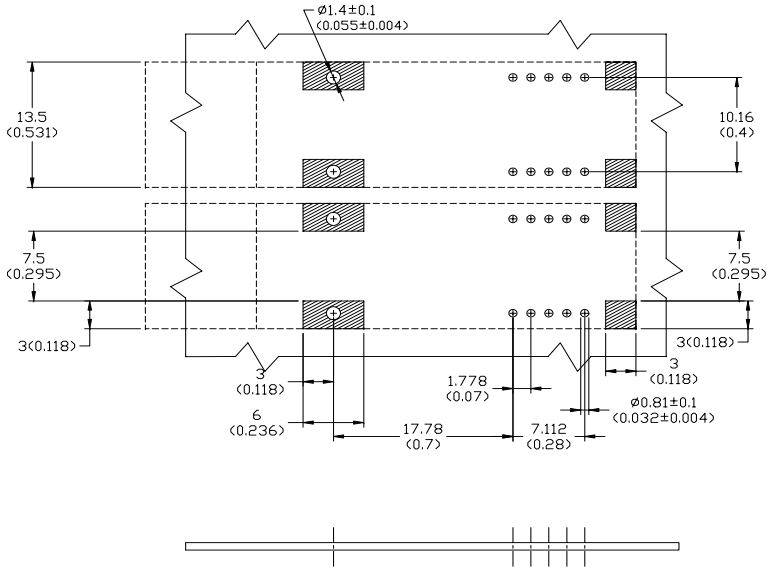
Package Diagram

C-13-155-F-SLC3(5)A-12

Units: mm (inches)



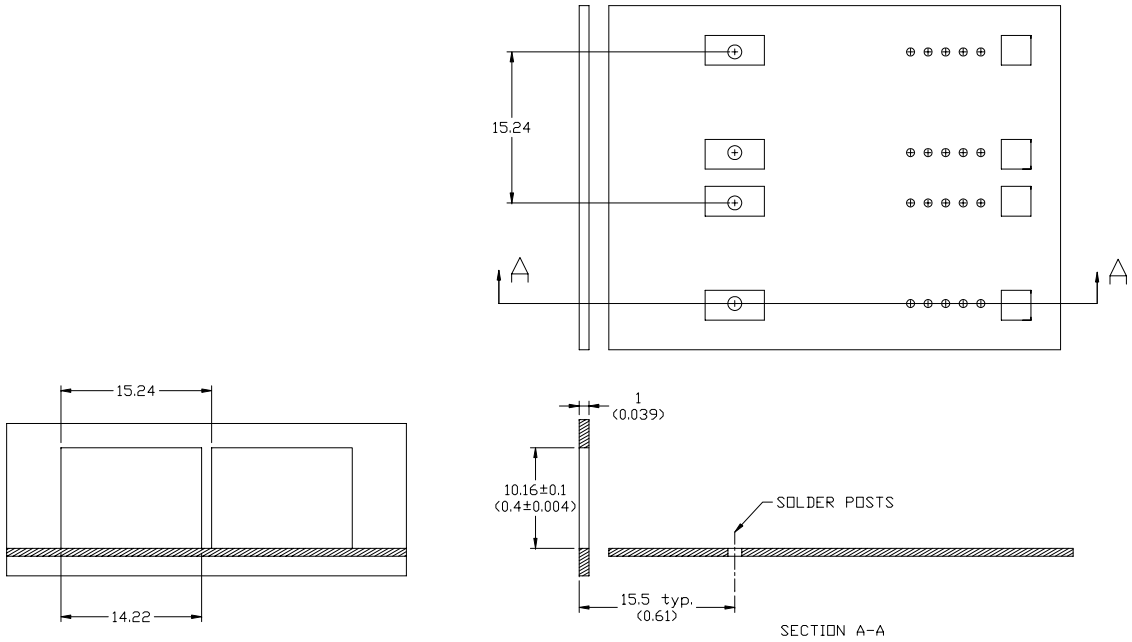
Recommended Board Layout Hole Pattern



DIMENSION IN MILLIMETER (INCHES)

NOTES:
1.THIS FIGURE DESCRIBE THE RECOMMAND 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.

Recommended Panel mounting



DIMENSION IN MILLIMETER (INCHES)

Ordering Information

Available Options:
C-13-155-F-SLC3A-12
C-13-155-F-SLC5A-12
C-13-155-F-SLC3A-12-G5
C-13-155-F-SLC5A-12-G5

Part numbering Definition:

C - 13 - 155 - F - S LC TxPower Temperature Package -12 -RoHS

- **13 = Wavelength 1310nm**
- **Communication protocol (155Mbps)**
  155 = PECL Signal Detection Output
- **F = +3.3V SFF Transceiver, FP**
- **Single mode fiber**
- **Connector options**
- **Tx Power range**
  3 = -15 to -8 dBm
  5 = -5 to 0 dBm
- **Temperature**
  A = -40 to 85 °C
- **Package**
  Blank = Standard package
- **-12 = Rubytech Customization**
- **Ordering Information**
  G5 = RoHS 5/6-compliant product (lead exemption)

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.

Legal Notes:

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