

Features:

- 100Mb/s to 155Mb/s duplex data links
- 1310nm LED transmitter and PIN receiver
- Class 1 Laser Int. Safety Std. IEC-60825-1 compliant
- Standard reach 2km on 62.5/125 μ m MMF
- 1 x 10 surface mount connector standard
- Metal LC connector receptacle with secure optical elements
- MIL STD 883 tested and certified, MIL 810/DO-160x tested
- -40 to +85 C operating temperature standard
- RoHS compliant and lead free per Directive 2002/95/EC option
- Single +3.3V power supply
- AC-Coupled Transmitter & Receiver Data
- Conformal coated for harsh environment use
- Tested over the operating temperature range



The RJ-155M-FX-DPLX is ideal for harsh environment connectivity because of its low cost, availability, and wide operating parameters



Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Maximum Supply Voltage	V _{CC}	-0.5	4.5	V	
Storage Temperature	T _{sto}	-55	100	°C	
Case Operating Temperature	T _{OP}	-40	85	°C	
Relative Humidity	RH	0	85	%	Based on conformal coating
Hand Lead Soldering Temperature			260	°C	10 seconds leads only, Note 3
Conformal Coating		0.8	1.2	mil	See ruggedization notes

NOTES:

- 1) RJ transceivers may be water washed. The process must be followed by an 80°C bake for one hour to ensure drying of any water inside the shell.
- 2) The components should not undergo Reflow Soldering under any circumstances.

General Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Data Rate	BR	100	155	160	Mbps	8b10b standard encoding

Electrical Specifications (T_{OP} = -40 to 85°C, V_{CC} = 3.14 to 3.47 Volts)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Supply Voltage	V _{CC}	3.135	3.3	3.465	V	
Total Module Power Dissipation	P _{DISS}		.650	1.1	W	
Transmitter						
Supply Current	I _{CC}		180	200	mA	
Input differential impedance	R _{in}		100		Ω	CML
Tx Differential Input Voltage	V _{D_{TX}}	200		1600	mV	CML
Transmit Disable Voltage	V _D	2.0		V _{CC}	V	LVTTTL
Transmit Enable Voltage	V _{EN}	V _{EE}		0.8	V	LVTTTL
Receiver						
Supply Current	I _{CC}		80	120	mA	
Rx Differential Output Voltage	V _{D_{RX}}	600		1200	mV	CML
Signal Detect Assert	SD _{norm}	2.0		V _{CC}	V	LVTTTL
Signal Detect De-assert	SD _{fault}	V _{EE}		V _{EE} +0.5	V	LVTTTL

Pin Configuration

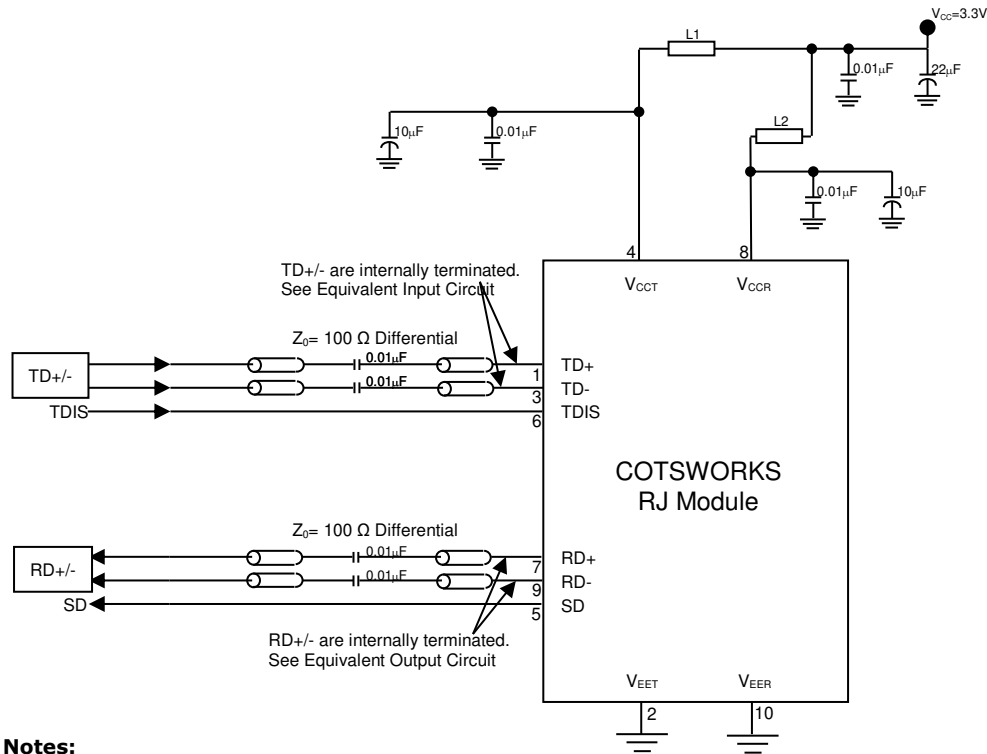
PIN #	Symbol	Description	Logic Family
1	TD+	Transmitter DATA In +	CML/LVPECL
2	V _{EET}	Transmitter Signal Ground	N/A
3	TD-	Transmitter DATA In -	CML/LVPECL
4	V _{CC_T}	Transmitter Power Supply	N/A
5	SD	Signal Detect output Satisfactory Optical Input: Logic "1" Output Fault Condition: Logic "0" Output	LVTTTL
6	T _{DIS}	Transmit Disable input Logic 1 = Disable Optical Output Logic 0 = Enable Optical Output	LVTTTL
7	RD+	Receiver DATA Out +	CML/LVPECL
8	V _{CC_R}	Receiver Power Supply	N/A
9	RD-	Receiver DATA Out -	CML/LVPECL
10	V _{EER}	Receiver Signal Ground	N/A

Optical Characteristics (T_{OP} = -40 to 85°C, V_{CC} = 3.14 to 3.47 Volts)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Optical Output Power	P _{OUT}	-20		-14	dBm	62.5 MMF
Optical Center Wavelength	λ	1270	1310	1380	nm	
Spectral Width	Δλ _{FWHM}			170	nm	
Extinction Ratio:	ER	9			dB	
Optical Rise/Fall Time	t _r /t _f			3.5	ns	10%-90%
Receiver						
Receiver Sensitivity	RX _{SENS}			-33	dBm	PRBS 2 ⁷ -1, BER = 1E ⁻¹⁰
Receiver Overload	P _{POL}	-7.5				
Receiver Wavelength Range	λ	1100	1310	1650	nm	1310nm center wavelength
Return Loss	RL	12			dB	
Signal Detect Assert	P _A			-29	dBm	
Signal Detect De-Assert	P _D	-39			dBm	
Signal Detect Hysteresis	SD _{HYS}	1		5	dB	

Application Schematics

Host Board Application Schematic

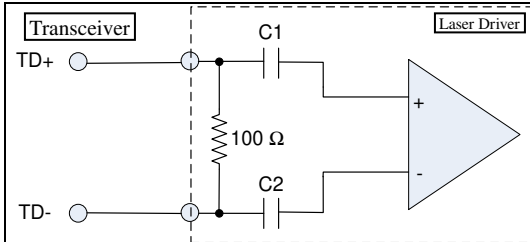


Notes:

- L1 & L2 = 600Ω @ 100MHz or better
- Route the differential pairs together using 50Ω impedance matched traces.
- Use separate power supply filtering for V_{CCCT} & V_{CRR} as shown.
- Use low ESR capacitors for AC coupling of the TD+/- and RD+/- data signals
- Screw/Solder Posts are isolated from Signal Ground and may be connected to Chassis Ground or Signal Ground if Chassis Ground is not available

Equivalent Input Circuit

Host Board

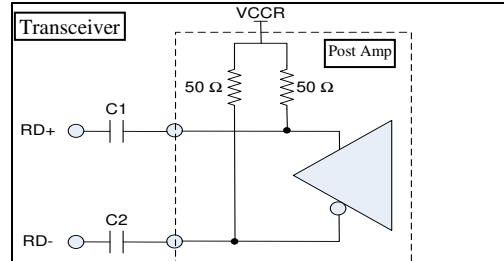


Optical Transmit Input Equivalent Circuit

100 ohm differential input, AC coupled, LVDS and PECL compatibility
C1, C2 = Distributed highpass filter with approx. 2nd order characteristics.

Equivalent Output Circuit

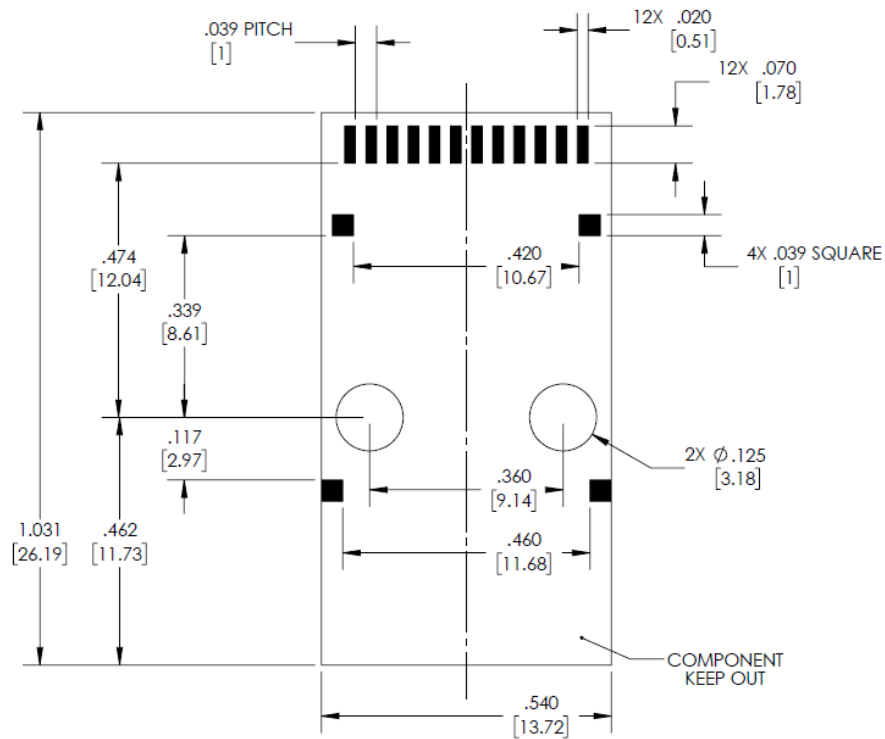
Host Board



Optical Receive Output Equivalent Circuit

50 ohm single-ended output, AC coupled, CML compatibility
C1, C2 = 0.01 uF

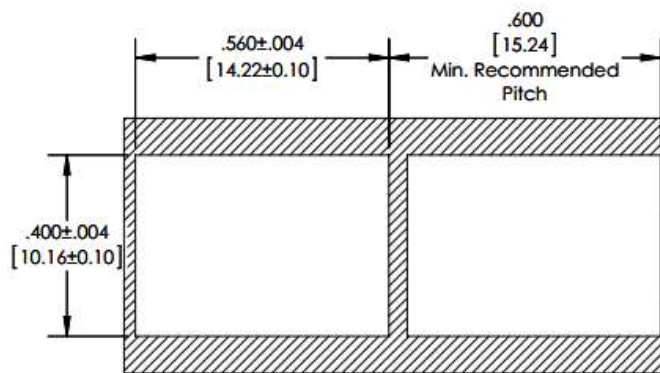
PCB Design Guidelines



Notes:

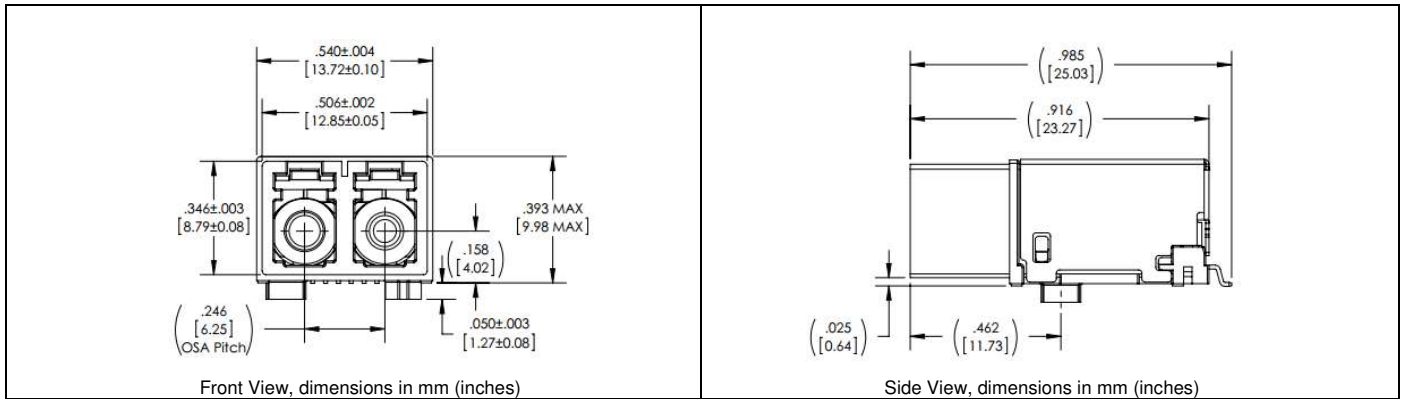
- 1) Pads 0 and 11 are optional pins but are not available on the RJ-155M-FX-DPLX.
- 2) Pads 1-10 need to be designed in for every COTSWORKS RJ transceiver.

Panel Cutout

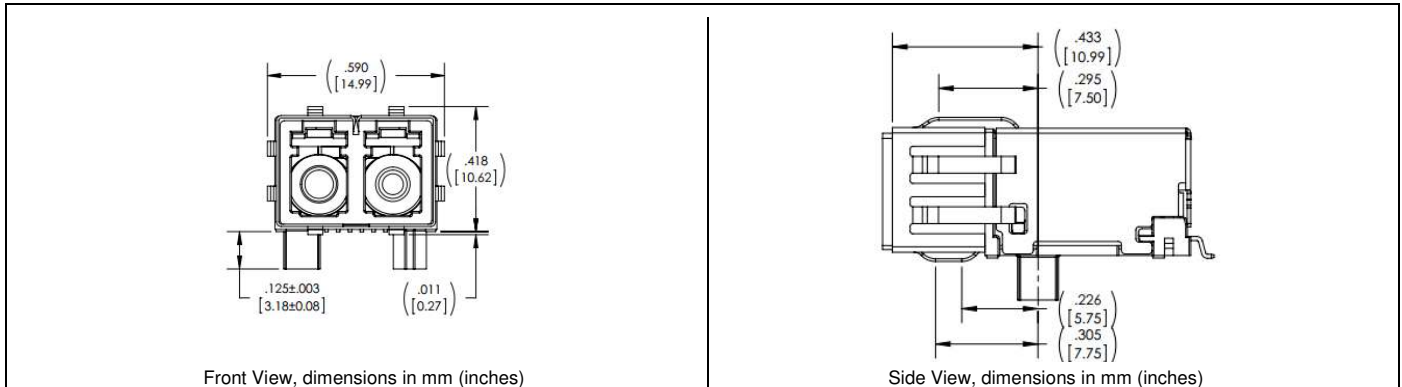


Minimum recommended pitch is 0.600"

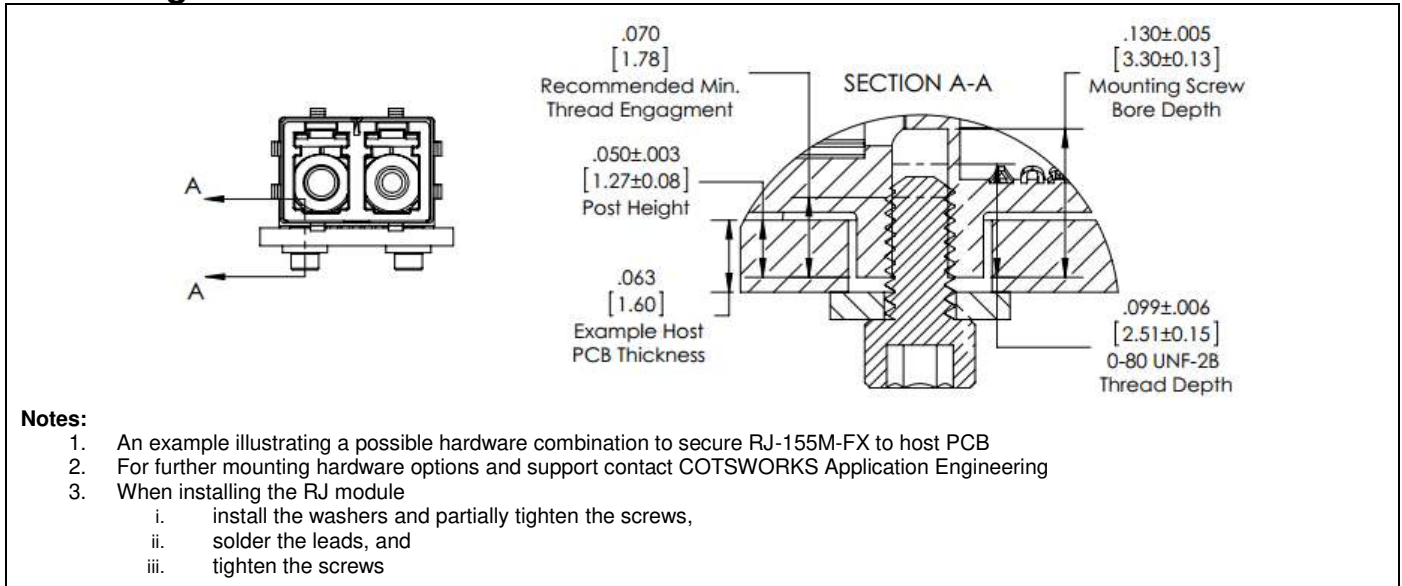
Screw Post Mechanical Dimensions



Solder Post Mechanical Dimensions



Mounting Hardware Guidelines



Ruggedization Notes

- Parylene C coating can be used for conformal coating with a 1.0 mil ± 0.2 mil thickness through a deposition process. It has a 5600 VPM rating, withstands temperatures of 350°F, and is extremely resistant to oil/dirt, and object impact.
- This part can come in a pigtail fiber optic version.
- Contact COTSWORKS for all MSDS, case composition, and burn analysis.

Reference Information

- 1) IEEE Standard 802.3, 2002 Edition
- 2) Directive 2002/95/EC of the European Council Parliament and of the Council, "on the restriction of the use of certain hazardous substances in electrical and electronic equipment." January 27, 2003

Regulatory Compliance

- COTSWORKS transceivers are Class 1 Laser Products and comply with US FDA regulations.
- These products are designed to comply with TÜV and Class 1 eye safety requirements of EN (IEC) 60825 and the electrical safety requirements of EN (IEC) 60950.
- This part has an option for compliance with Directive 2002/95/EC covering restriction on certain hazardous substances (RoHS). It invokes item 5 of the Annex which allows "Pb in the glass of cathode ray tubes, electronic components, and fluorescent tubes." This part may contain Pb for components such as lenses, windows, isolators, and other electronic components

Warnings:

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended.

Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

Ordering Information

RJ-155M-FX-	DPLX	-LC-	x	- x -	x	- x -	x	-x
RJ Form Factor	Duplex LC Connector		Ruggedized Coating	Operating Temp Range	EMI Shield	RoHS Level	Mounting	ATEX & IECEx Certification
155Mbps Max Data Rate			(): Non-coated	A: -40 to 85C	(): No Shield	(): Lvl 5	(): Imperial Screw	(): Not Certified
1300nm LED			R: Parylene		E: Shield	6: Lvl 6	U: Metric Screw P: Posts	T: Certified

Example part number: RJ-155M-FX-DPLX-LC-R-A
[100BASE-FX RJ Transceiver, 1300nm LED, Duplex LC connectors,
Parylene-coated, Industrial operating temp. range, Imperial screw posts]

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