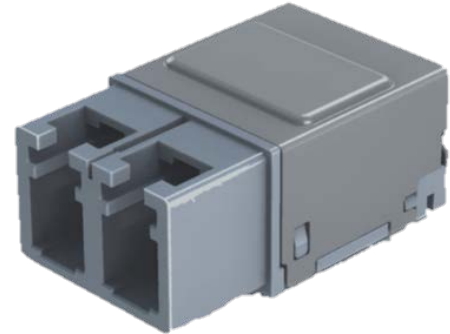


Features:

- Duplex transceiver module
- Supports data rates of 8Gbps to 10.3125Gbps
- Transmitter Options:
 - 1310nm wideband DFB transmitter
- PIN Receiver
- Transmitter compliant to IEC-60825-1, Class 1 Laser (eye safe)
- Option for RoHS 6/6 compliant and lead free per Directive 2011/65/EU
- Solder-down 1x12 electrical interface
- Screw posts for securing module to host
- SFF-8472 compliant control and diagnostics monitor interface
- -40°C to +85°C operating temperature
- -55°C to +100°C storage temperature
- Parylene conformal coating option



The RJ-10G-LR Transceiver is ideal for harsh environment connectivity because of its low cost, availability, and wide operating parameters



Commercial
Aerospace



Military
Tactical



Military
Aerospace



Industrial and
Oil & Gas

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Maximum Supply Voltage	V _{CC}	-0.3	4.0	V	
Electrostatic Discharge, Data I/O pins	ESD		500	V	(1)
Storage Temperature	T _{sto}	-55	100	°C	
Operating Temperature	T _{op}	-40	85	°C	
Relative Humidity	RH	0	95	%	(2)
Conformal Coating		0.8	1.2	mil	(3)

Notes:

- 1) Proper ESD conditions should be employed while attaching RJ to the host board
- 2) Non-condensing based on conformal coating
- 3) See "Ruggedization Notes" on pg. 7

General Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Supply Voltage	V _{CC}	3.14	3.3	3.47	V	+/- 5%
Data Rate	BR	8		10.3125	Gbps	Balanced NRZ data protocols
Operating Temperature	T _{OP}	-40		85	°C	

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

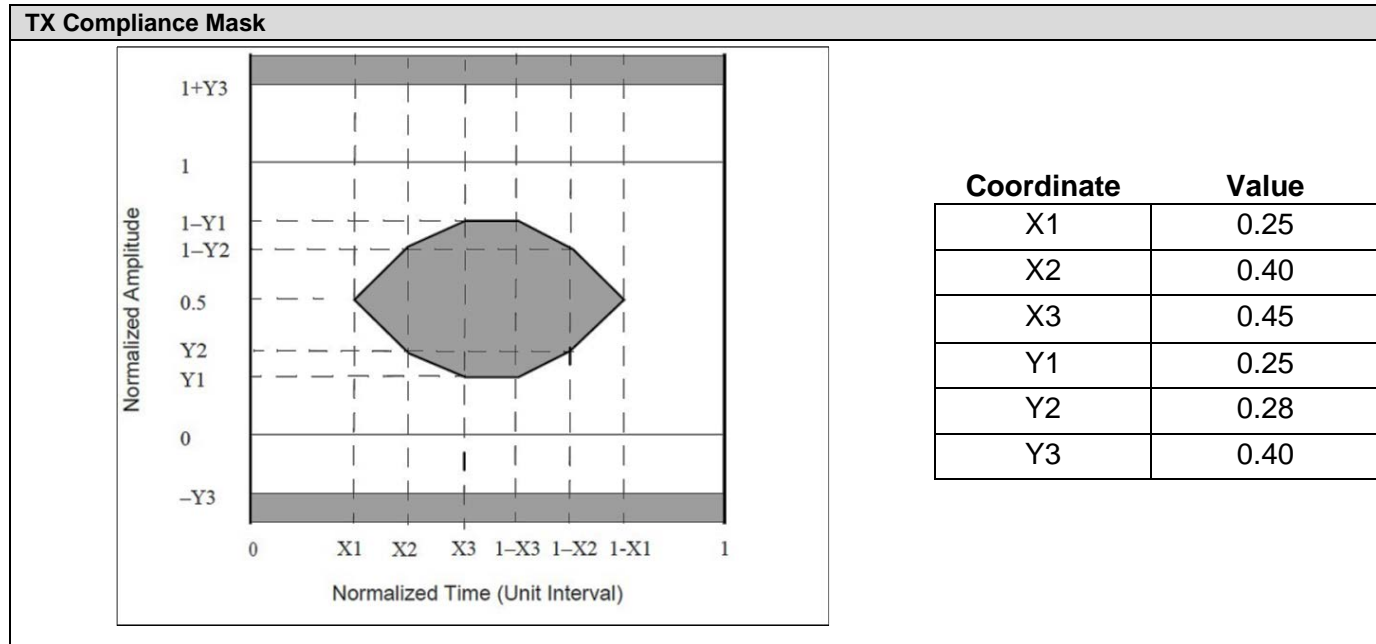
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Total Module Power Dissipation	P _{DISS}			1.32	W	
Transmitter						
Supply Current	I _{CC}			250	mA	
Input Differential Impedance	R _{in}	90	100	110	Ω	
Single Ended Input Voltage Swing	V _{in,pp}	100		800	mV _{pp}	
TX Disable Input Voltage	V _{DIS}	2.0			V	LVTTTL
TX Enable Input Voltage	V _{EN}			0.8	V	LVTTTL
Receiver						
Supply Current	I _{CC}			130	mA	
Output Differential Impedance	Z _{OUT}	90		110		
Single Ended Output Voltage Swing	V _{OPP}	250	350	450	mV	
Data Output Rise Time	t _r			45	ps	(1)
Data Output Fall Time	t _f			45	ps	(1)
Total Contributed Jitter	T _J			0.44	UI	
Signal Detect De-Assert	V _{SDD}			0.4	V	(2)
Signal Detect Assert	V _{SDA}	2.4			V	(2)
Notes:						
1) 20% to 80%						
2) SD is LVTTTL. Logic 1 indicates normal operation; logic 0 indicates no signal is detected.						

RJ-10G-LR Host Pin Assignment

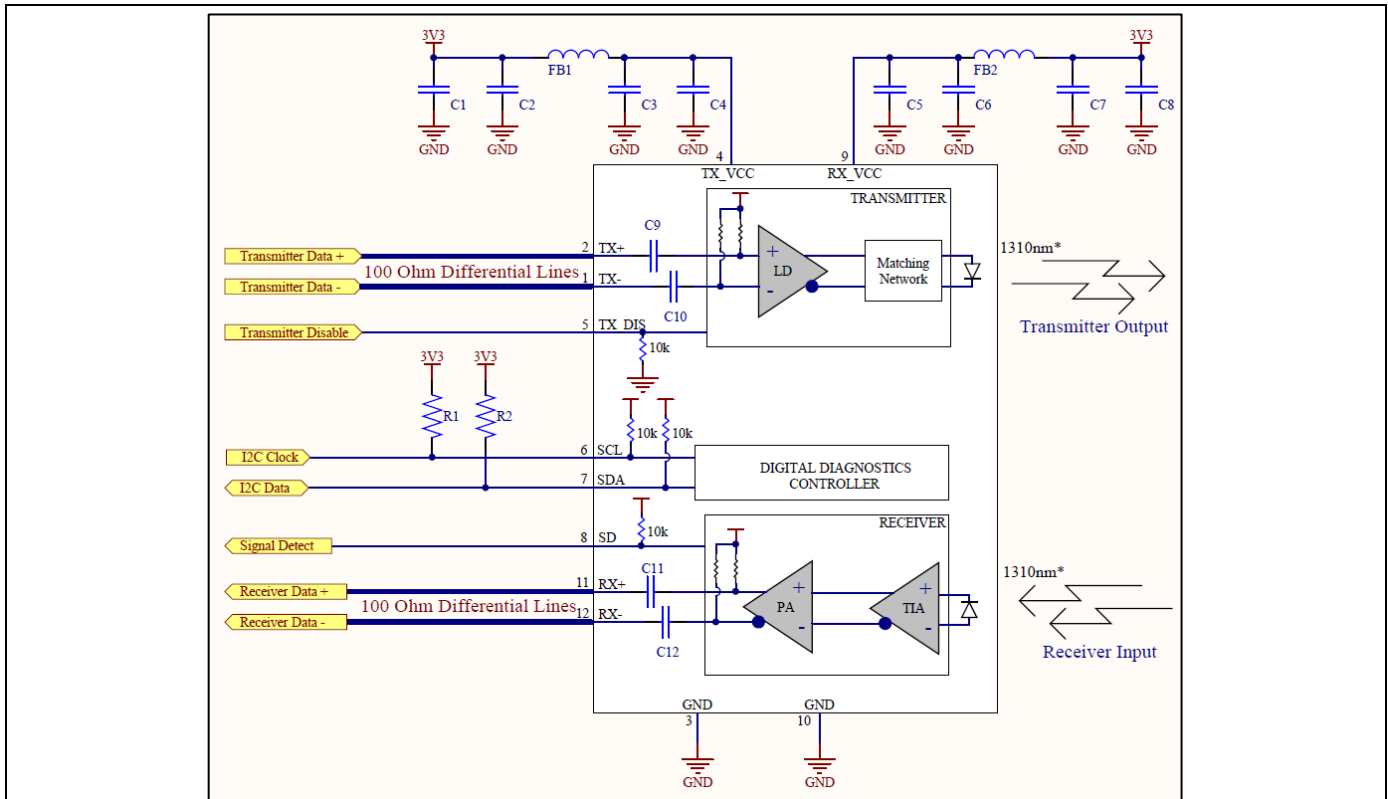
Pin	Symbol	Description	Logic/Protocol
1	TX-	Transmitter Data Input, Negative	CML
2	TX+	Transmitter Data Input, Positive	CML
3	GND	Ground	0V
4	TX_VCC	Transmitter Supply	3.3V
5	TX_DIS	Transmitter Disable	LVTTTL
6	SCL	I2C Clock	I2C
7	SDA	I2C Data	I2C
8	SD	Receiver Signal Detect	LVTTTL
9	RX_VCC	Receiver Supply	3.3V
10	GND	Ground	0V
11	RX+	Receiver Data Output, Positive	CML
12	RX-	Receiver Data Output, Negative	CML

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Output Optical Power	P _{OUT}	-5		-1	dBm	(1,2)
Extinction ratio	ER	3.5			dB	
RMS Spectral Width	Δλ _{RMS}			0.45	nm	
TX Mask Compliance	See TX Compliance Mask			(3)		
Receiver						
Receiver Sensitivity	RX _{SENS}			-12.6	dBm	(3) , BER = 1E-12
Receiver Saturation	RX _{SAT}	0.5			dBm	
Receiver Wavelength Range	λ _{RX}	1260		1620	nm	
Return Loss	RL	12			dB	
Signal Detect Assert	P _{SDA}			-17	dBm	
Signal Detect De-Assert	P _{SDD}	-30			dBm	
Signal Detect Hysteresis	P _{SHD}	1		5		
Notes:						
1) Class 1 Laser Safety per IEC-60825-1 regulations						
2) Measured with 2-5 meter patch cord consisting of 9/125μm SMF						
3) Measured using PRBS 2 ³¹ -1 pattern						



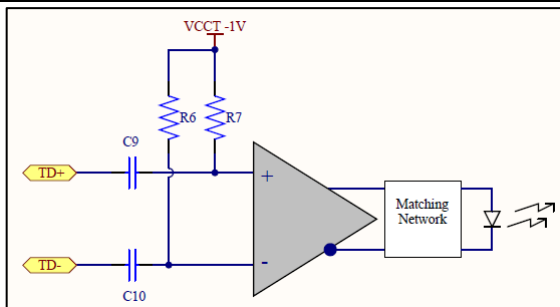
Application Schematics



Notes:

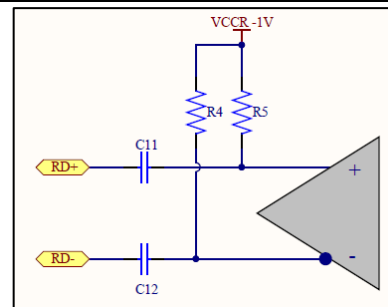
- Recommend host routes separate supply voltages and filtering for RJ-module transmitter and receiver as shown in the schematic above:
 - FB1/FB2 ferrite bead for power supply noise suppression; Murata BLM18KG601SN1, 0603, 600Ω @ 100MHz, 1300mA .
 - C1/C4/C5/C8 bulk capacitance; Murata GRM21BR61C106KE15L, 0805, 10μF, 16V.
 - C2/C3/C6/C7 de-coupling capacitors; Murata GRM155R71C104KA88D, 0402, 0.1μF, 16V.
- R1/R2 2-wire bus pull-up resistors required on host for implementing optional digital diagnostics; 4.7kΩ to 10kΩ.
- Screw or solder posts are not internally connected to signal ground. Recommend screw or solder posts be connected to chassis ground if available, otherwise they should be tied to local signal ground.
- For host with LVPECL electrical interface contact COTSWORKS' applications engineering.

TRANSMITTER EQUIVALENT INPUT CIRCUIT



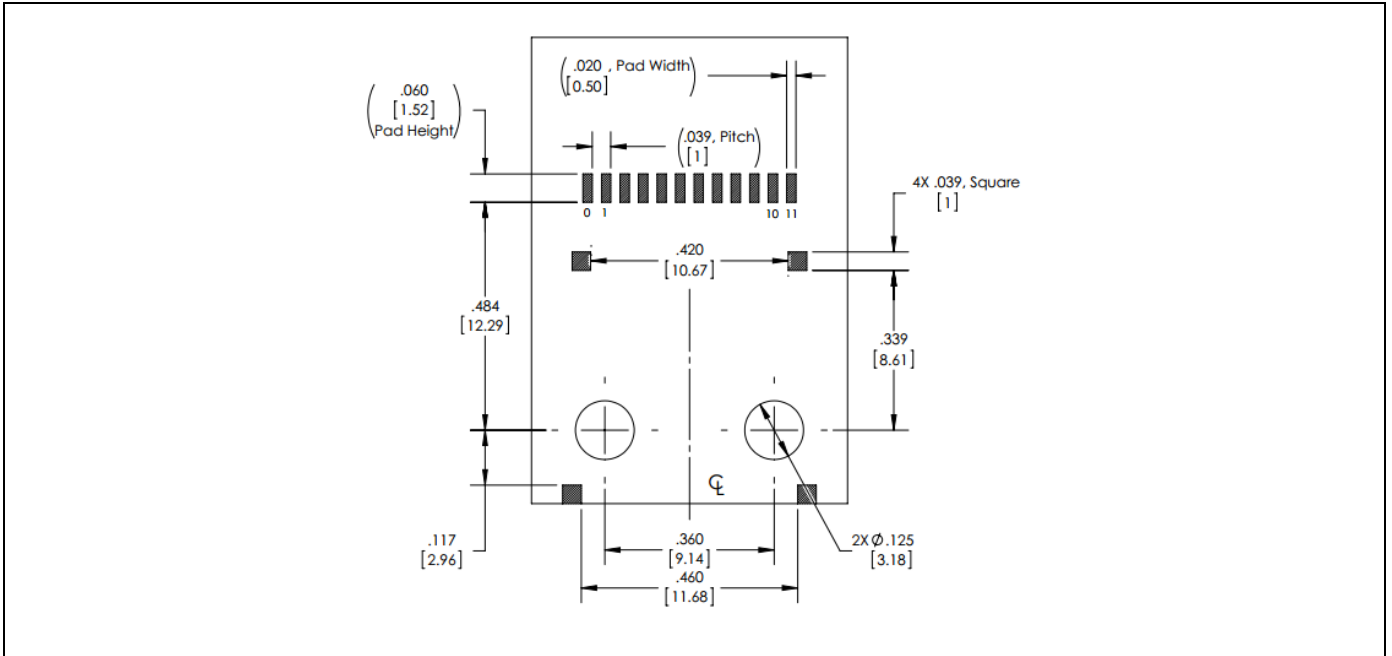
- C9/C10 0.1μF internal input data coupling capacitors.
- R6/R7 are 50Ω pull-up resistors to Vcc.
- Transmitter electrical input is CML compatible.

RECEIVER EQUIVALENT OUTPUT CIRCUIT

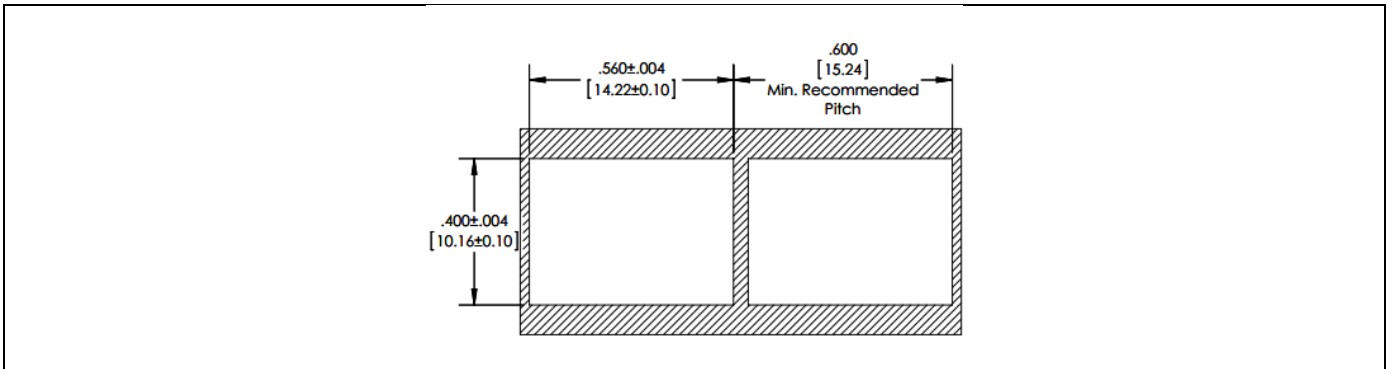


- C11/C12 are 0.1μF output data coupling capacitors.
- R4/R5 are 50Ω pull-up resistors to Vcc.
- Receiver electrical output is CML compatible.

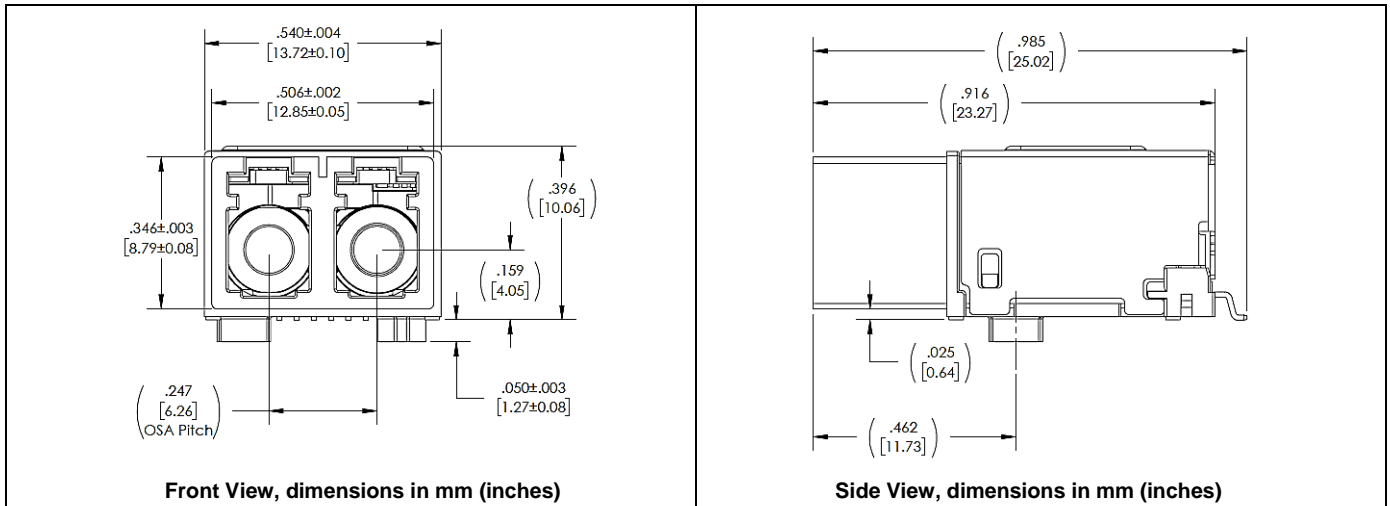
PCB Design Guidelines



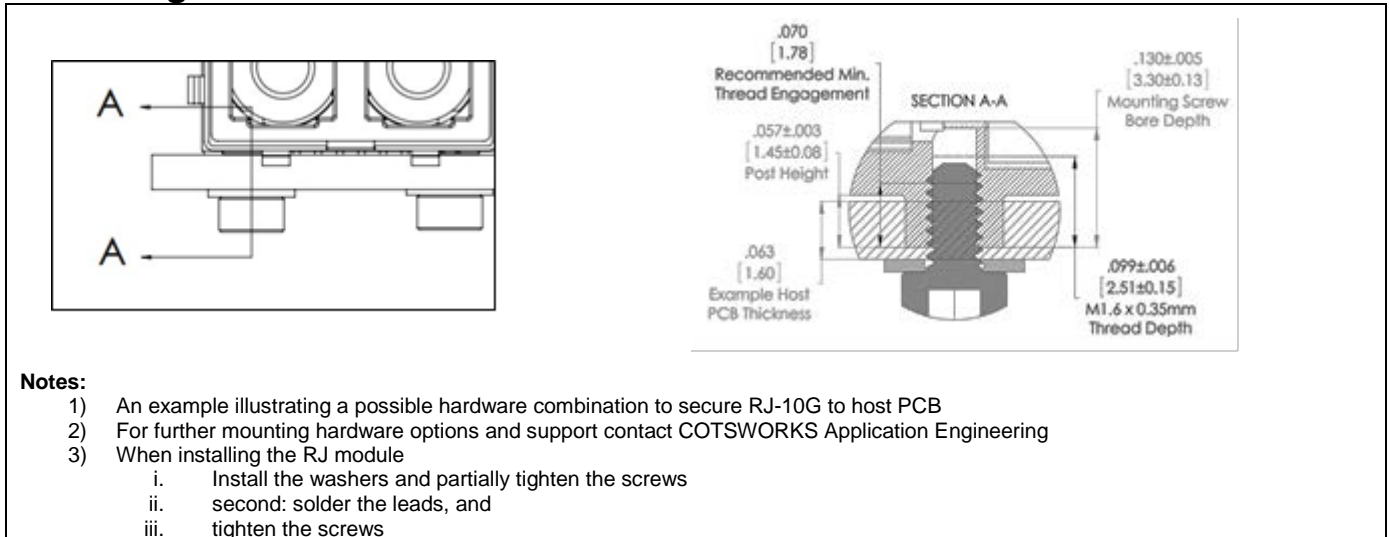
Panel Cutout



Standard 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.
- Parylene C has a 5600 VPM rating, withstands high temperatures, and is extremely resistant to oil/dirt, and object impact.
- Contact COTSWORKS for all MSDS, case composition, and burn analysis.

Reference Information

- 1) IEEE Standard 802.3-2008, Section 6
- 2) Directive 2011/65/EU of the European Parliament and of the Council, "on the restriction of the use of certain hazardous substances in electrical and electronic equipment." June 8th, 2011

Regulatory Compliance

- COTSWORKS transceivers are Class 1 Laser Products and comply with US FDA regulations.
- These products are designed to comply with the 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 2011/65/EU covering restriction on certain hazardous substances (RoHS)
 - Contact COTSWORKS support for a product compliance matrix

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-10G-LR-	-XX-	X	-X-	X	-X-	X
RJ Form Factor	Receptacle Type	Ruggedized Coating	Operating Temp Range	EMI Shield	RoHS Level	Mounting
10Gbps Max Data Rate	(): Standard LC	(): Non-coated	A: -40 to 85°C	(): No Shield	(): Level 5	(): Imperial Screw
Long Reach (SMF)	LX: ARINC-801	R: Parylene		E: Shield	6: Level 6	U: Metric Screw
						P: Posts

Example part numbers:

RJ-10G-LR-R-A

[10 Gbps RJ Transceiver, 1310nm, long-reach, Duplex LC receptacles, Parylene-coated, Industrial operating temperature range]

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