

# **1X9 Multi Mode Fiber DUAL Transceiver**

## **155Mbps 2km**

RTR1-1303-6\*\*\*

### **Product Features**

- 1310nm FP Laser Transmitter
- InGaAs PIN-TIA Photodiode Receiver
- Reach 2km Transmission Distance on 62.5/125μm MMF
- DUAL Multi Mode Transceiver 1x9 Footprint
- SC, FC or ST Optical Interface are Optional
- Single +3.3V/5V Power Supply
- LVPECL Differential Inputs and Outputs
- LVPECL/LVTTL Signal Detection Output
- Compliant With RoHS and Lead Free
- Metal Enclosure for Lower EMI
- Operating Case Temperature:
  - Standard: 0 to +70°C
  - Extend: -20 to +75°C
  - Industrial: -40 to +85°C

### **Product Applications**

- Fast Ethernet
- ATM/SONET/SDH
- Switch/Router
- Other Optical Transmission Systems

## Performance Specifications

### ➤ Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	
Storage Temperature	Tst	-40	+85	°C	
Operating Temperature	To	RTR1-1303-6C**	0	+70	°C
		RTR1-1303-6E**	-20	+75	°C
		RTR1-1303-6I**	-40	+85	°C
Input Voltage	-	GND	Vcc	V	
Power Supply Voltage	Vcc-Vee	0	+6	V	

**Note:** Stress in excess of maximum absolute ratings can cause permanent damage to the module

### ➤ Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit	
Storage Temperature	Tst	-40	-	+85	°C	
Operating Case Temperature	Tc	RTR1-1303-6C**	0	-	+70	°C
		RTR1-1303-6E**	-20	-	+75	°C
		RTR1-1303-6I**	-40	-	+85	°C
Power Supply Voltage	Vcc	3.13	3.3	3.47	V	
Power Supply Voltage	Vcc	4.75	5.0	5.25	V	
Power Supply Current	Icc	-	-	300	mA	
Data Rate	DR	-	155	-	Mbps	

### ➤ Optical Specification

Transmitter							
Parameter		Symbol	Min	Typ	Max	Unit	Note
Center Wavelength	1310 FP	$\lambda_c$	1260	1310	1360	nm	-
Spectral Width	FP	$\Delta\lambda$	-	-	3	nm	-
Average Optical Output Power		Po	-20	-	-14	dBm	-
Extinction Ratio		ER	11	-	-	dB	-
Optical Rise/Fall Time(20%-80%)		Tr/Tf	-	-	2.8	ns	-
Output Eye Diagram	Compliant with ITU-T G.957						
Receiver							
Parameter		Symbol	Min	Typ	Max	Unit	Note
Operate Wavelength		-	1260	-	1620	nm	-
Receiver Sensitivity		RSENS	-	-	-30	dBm	1
Receiver Saturation		PRS	-3	-	-	dBm	1
SD Assert		-	-45	-	-	dBm	Alarm: High-level
SD De-Assert		-	-	-	-30	dBm	
SD Hysteresis		-	0.5	-	5	dBm	-

**Note:** 1. Minimum Sensitivity and saturation levels for a 2<sup>23</sup>-1 PRBS test pattern @155Mbps.

## Electrical Specification

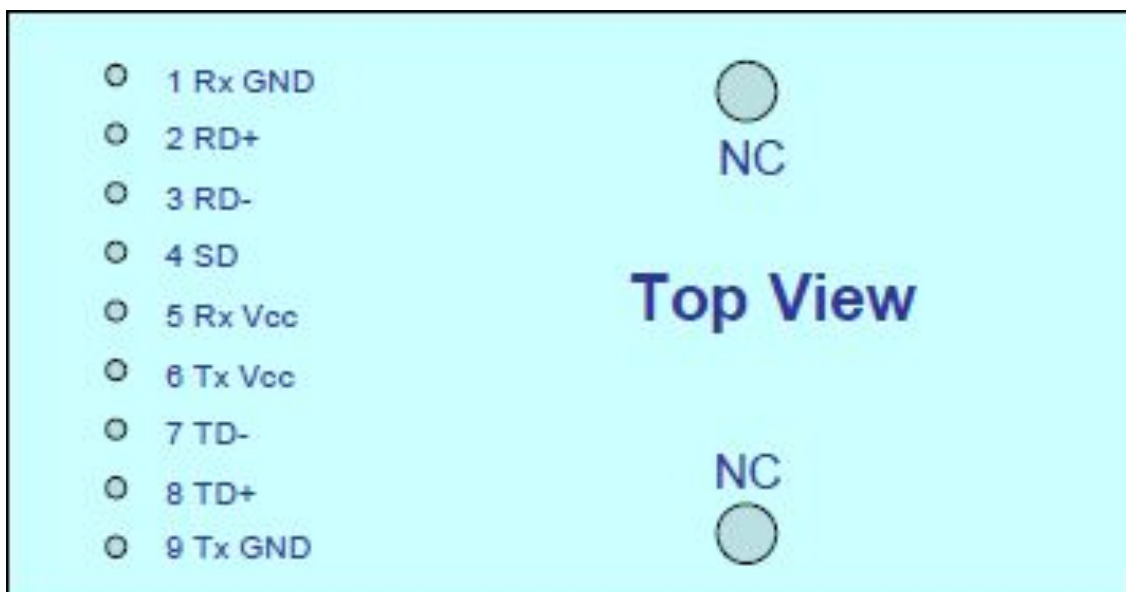
Transmitter						
Parameter	Symbol	Min	Typ	Max	Unit	Note
Power Supply Current	$I_{CC}$	-	70	180	mA	2
Input Differential Impedance	$Z_{IN}$	90	100	110	$\Omega$	-
Single-terminal Input Voltage	$V_{IH} - V_{IL}$	300	-	1000	mV	-
Data Input Voltage-Low	$V_{IL} - V_{CC}$	-1.81		-1.48	V	-
Data Input Voltage-High	$V_{IH} - V_{CC}$	-1.16		-0.88	V	-
Receiver						
Parameter	Symbol	Min	Typ	Max	Unit	Note
Power Supply Current	$I_{CC}$	-	70	150	mA	2
Data Output Voltage-Low	$V_{OL} - V_{CC}$	-1.81	-	-1.62	V	3
Data Output Voltage-High	$V_{OH} - V_{CC}$	-1.025	-	-0.88	V	3
Signal Detect Output Voltage-Low	$V_{SDL} - V_{CC}$	-1.81	-	-1.62	V	PECL/LVPECL
Signal Detect Output Voltage-High	$V_{SDH} - V_{CC}$	-1.025	-	-0.88	V	
Signal Detect Output Voltage-Low	$V_{SDL} - V_{CC}$	-	-	0.8	V	TTL/LVTTL
Signal Detect Output Voltage-High	$V_{SDH} - V_{CC}$	2.0	-	-	V	

Note: 2. The current excludes the output load current.

3. Terminated with 500hm to  $V_{CC} - 2V$ .

## Pin Definitions

### PIN Diagram

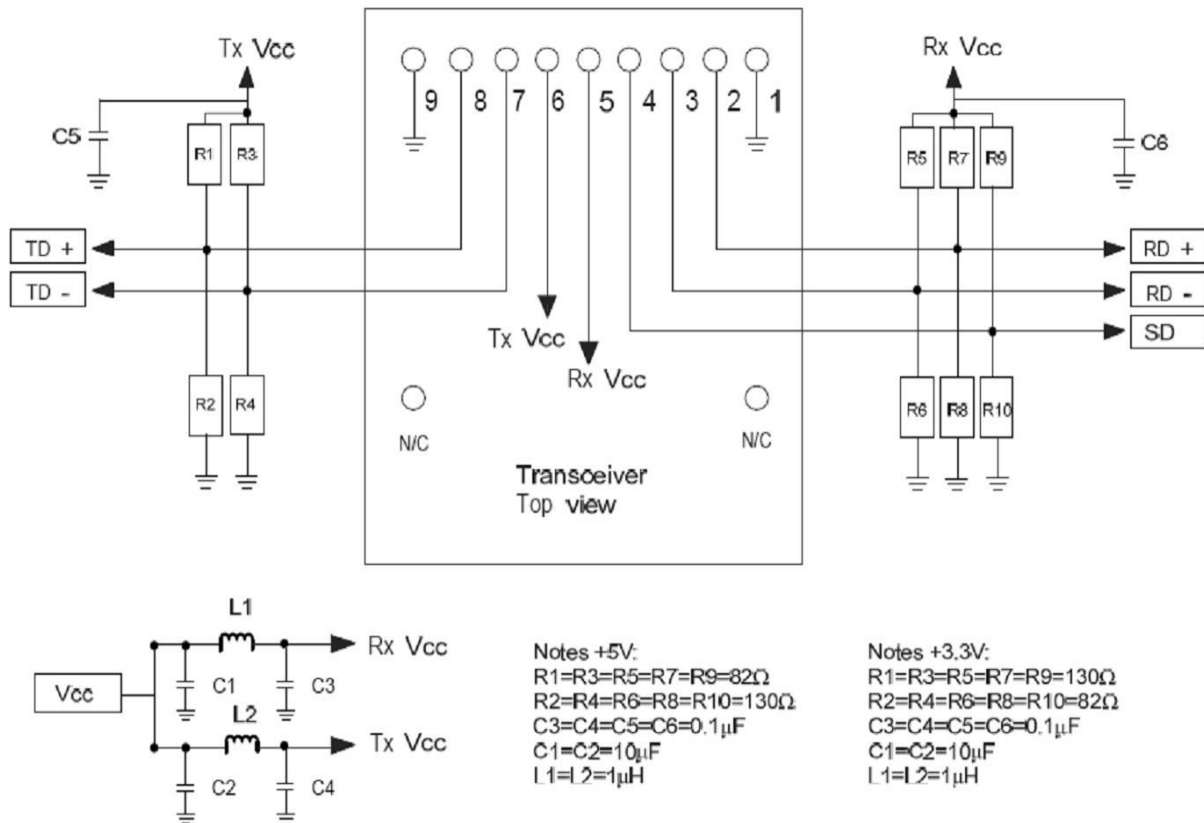


➤ PIN Description

PIN	Symbol	Note
1	GNDR	Directly connect this pin to receiver signal ground plane.
2	RD+	See recommended circuit schematic.
3	RD-	See recommended circuit schematic.
4	SD	Active high on this indicates a receiver optical signal.
5	V <sub>ccR</sub>	+3.3V/+5.0V DC power for the receiver section.
6	V <sub>ccT</sub>	+3.3V/+5.0V DC power for the transmitter section.
7	TD-	See recommended circuit schematic.
8	TD+	See recommended circuit schematic.
9	GNDT	Directly connect this pin to transmitter signal ground plane.

Recommended Circuit

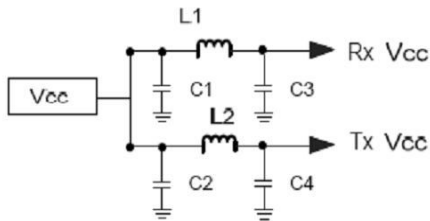
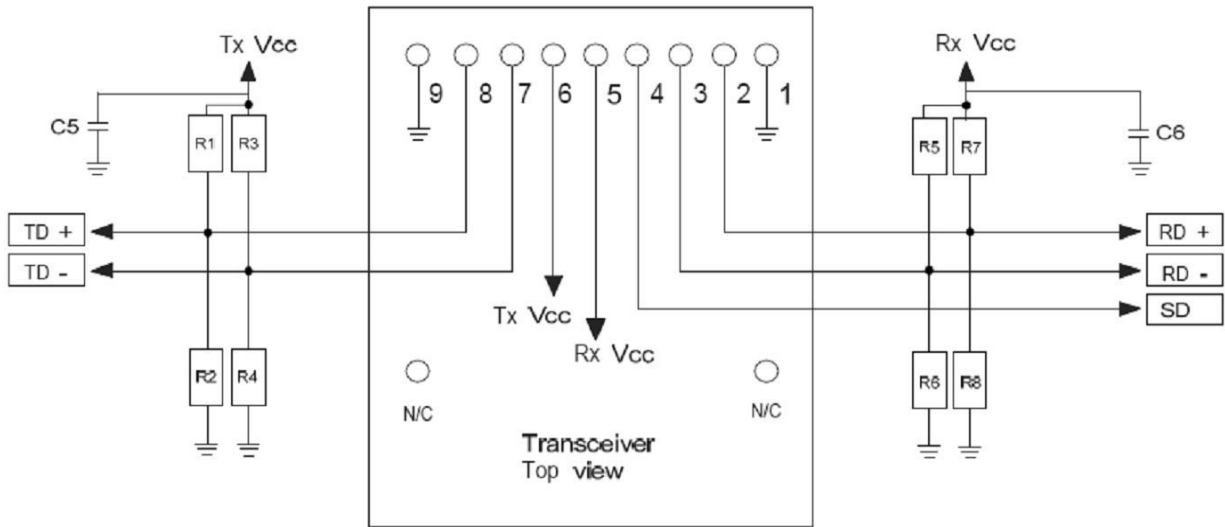
➤ PECL Signal Detect



Note: 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 inductors L1/L2 to the module Rx Vcc/Tx Vcc. A GND plane under the module is required for good EMI and sensitivity performance.

➤ **TTL Signal Detect**

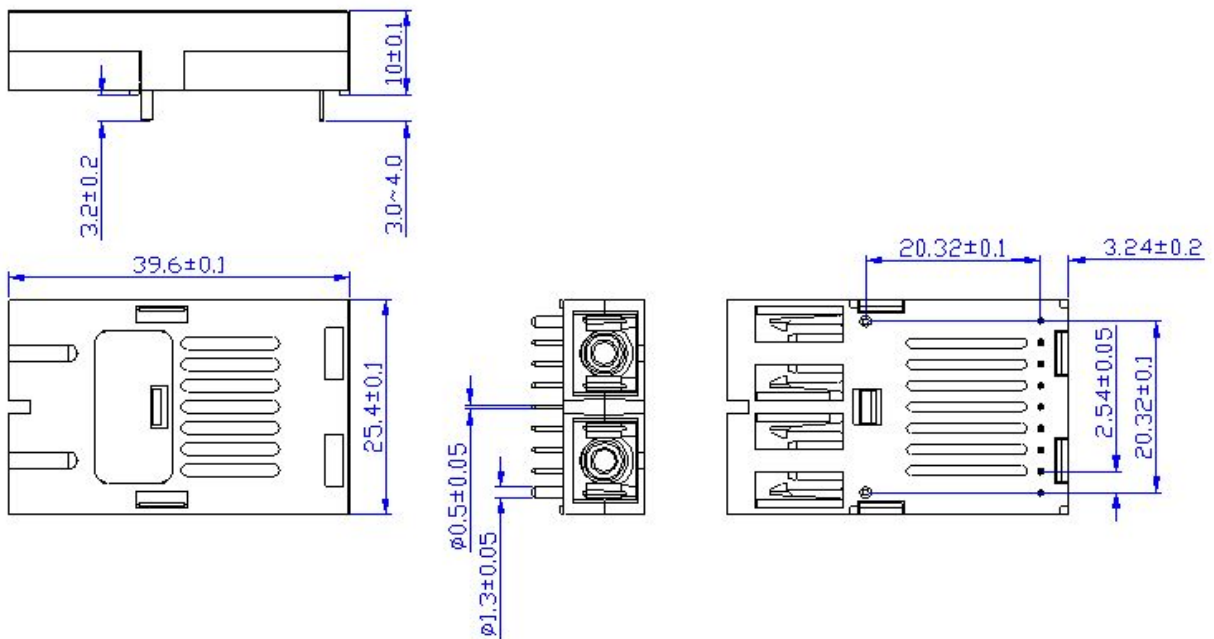


Notes +5V:  
 R1=R3=R5=R7=82Ω  
 R2=R4=R6=R8=130Ω  
 C3=C4=C5=C6=0.1μF  
 C1=C2=10μF  
 L1=L2=1μH

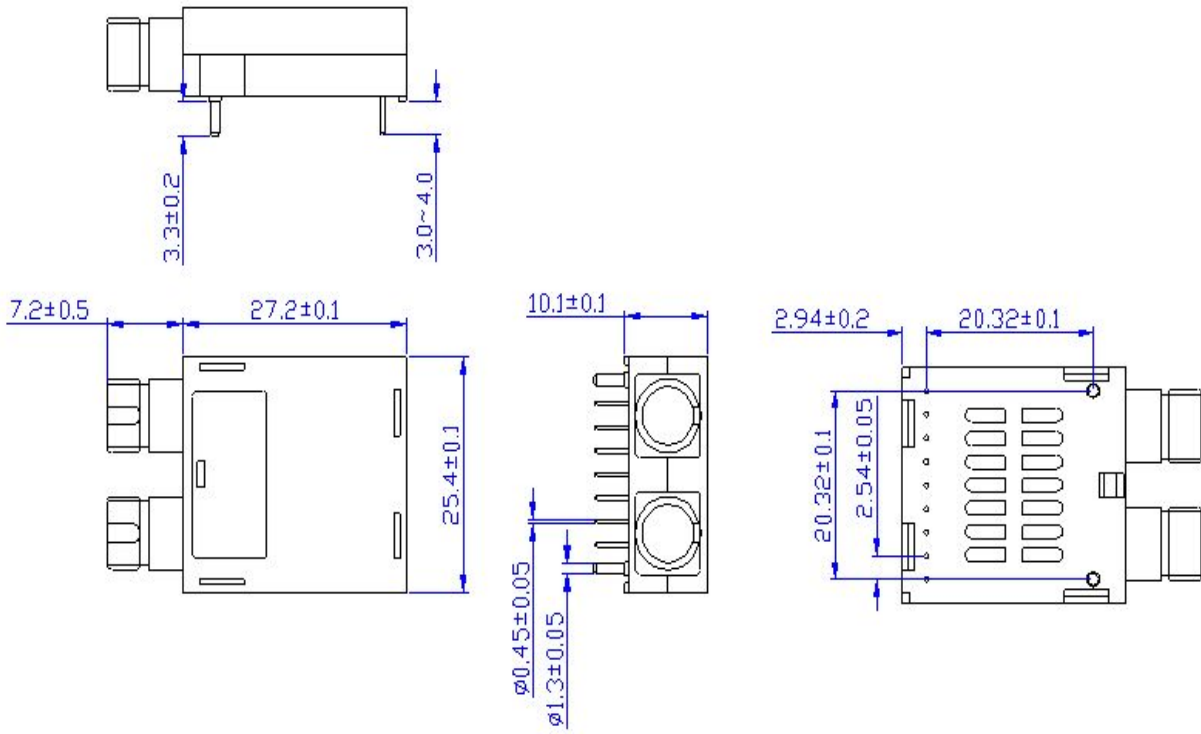
Notes +3.3V:  
 R1=R3=R5=R7=130Ω  
 R2=R4=R6=R8=82Ω  
 C3=C4=C5=C6=0.1μF  
 C1=C2=10μF  
 L1=L2=1μH

**Package Diagram**

➤ **SC Interface**

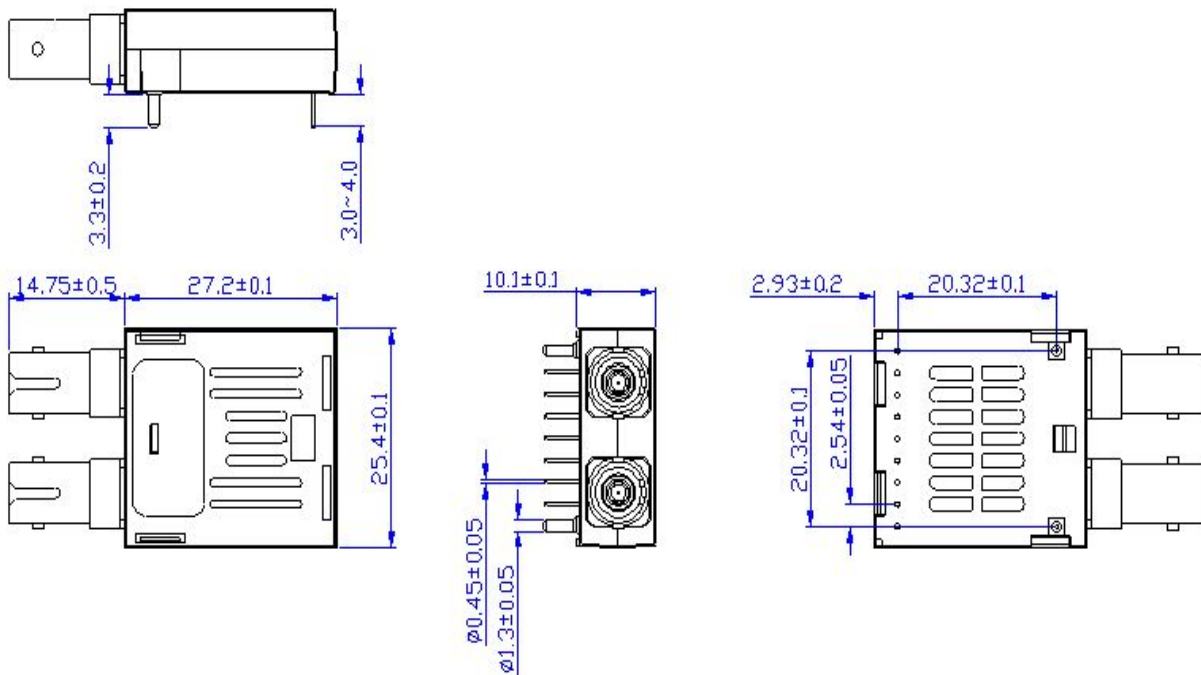


➤ **FC Interface**



Unit: mm

➤ **ST Interface**



Unit: mm

**Order Information**

R	TR	1	-	13	03	-	6	*	*	*	*						
REON	1X9	1=DUAL Fiber Inter- face	-	13=1310nm FP	03=155 Mbps	-	-14~-20 dBm	<table border="1"> <tr> <td>C</td> <td>0~+70 °C</td> </tr> <tr> <td>E</td> <td>-20~+75 °C</td> </tr> <tr> <td>I</td> <td>-40~+85 °C</td> </tr> </table>	C	0~+70 °C	E	-20~+75 °C	I	-40~+85 °C	2=SC/PC 3=SC/APC 4= FC/PC 5=FC/APC 6=ST/PC 7=ST/APC	1=3.3V PECL signal/PECL alarm 2=3.3V PECL signal /TTL alarm 5=5V PECL signal/PECL alarm 6=5V PECL signal /TTL alarm	Customer Information
C	0~+70 °C																
E	-20~+75 °C																
I	-40~+85 °C																

P/N	Package	Fiber Type	Data Rate (bps/Hz)	Reach	Tx(nm)	Rx	Temperature (°C)	Connector Type	Voltage
RTR1-1303-6C21	1x9	SM	100~155M	10~20km	1310 FP	PIN	0~+70	SC	3.3V
RTR1-1303-6I21	1x9	SM	100~155M	10~20km	1310 FP	PIN	-40~+85	SC	3.3V
RTR1-1303-6C25	1x9	SM	100~155M	10~20km	1310 FP	PIN	0~+70	SC	5V
RTR1-1303-6I25	1x9	SM	100~155M	10~20km	1310 FP	PIN	-40~+85	SC	5V
RTR1-1303-6C41	1x9	SM	100~155M	10~20km	1310 FP	PIN	0~+70	FC	3.3V
RTR1-1303-6I41	1x9	SM	100~155M	10~20km	1310 FP	PIN	-40~+85	FC	3.3V
RTR1-1303-6C45	1x9	SM	100~155M	10~20km	1310 FP	PIN	0~+70	FC	5V
RTR1-1303-6I45	1x9	SM	100~155M	10~20km	1310 FP	PIN	-40~+85	FC	5V
RTR1-1303-6C61	1x9	SM	100~155M	10~20km	1310 FP	PIN	0~+70	ST	3.3V
RTR1-1303-6I61	1x9	SM	100~155M	10~20km	1310 FP	PIN	-40~+85	ST	3.3V
RTR1-1303-6C65	1x9	SM	100~155M	10~20km	1310 FP	PIN	0~+70	ST	5V
RTR1-1303-6I65	1x9	SM	100~155M	10~20km	1310 FP	PIN	-40~+85	ST	5V

**For more information:**

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