

# Singlemode 1.25Gbps Bi-Directional Single Fiber 2x5 SFF Optical Transceiver

## Features

- Intermediate and long reach
- Industrial standard 2 x 5 pin footprint
- Single SC/ST/FC connector interface
- Receiver signal detect function
- Wide dynamic rang receiver with AGC
- PECL/LVPECL logic interface, DC or AC coupling
- Single supply 5V/3.3V
- Low power consumption



## Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit
<b>Transmitter</b>					
Data Rate (NRZ)	B	-	1250	-	Mb/s
Optical Output Power (avg.) <sup>(1) (3)</sup>					
-1	P <sub>o</sub>	-15	-	-8	dBm
-2	P <sub>o</sub>	-8	-	-3	dBm
-3	P <sub>o</sub>	-3	-	0	dBm
Extinction Ratio	ER	9	-	-	dB
<b>Optical Wavelength</b>					
TR13R15 (1310nm FP LD)	$\lambda_c$	1260	1310	1360	nm
TR31R15 (1310nm DFB LD)	$\lambda_c$	1290	1310	1330	nm
TR15R13 (1550nm FP LD)	$\lambda_c$	1490	1550	1610	nm
TR55R13 (1550nm DFB LD)	$\lambda_c$	1530	1550	1570	nm
<b>Spectral Width</b>					
TR13R15 (RMS) TR15R13 (RMS)	$\Delta\lambda$	-	1.0	2.5	nm
TR31R15 (-20dB) TR55R13 (-20dB)	$\Delta\lambda$	-	-	1	nm
<b>Side Mode Suppression Ratio</b>					
TR31R15 TR55R13	SMSR	30	-	-	dB
Output Rise Time (10-90%)	t <sub>r</sub>	-	0.4	0.5	ns
Output Fall Time (10-90%)	t <sub>f</sub>	-	0.4	0.5	ns
Data Input <sup>(6)</sup>	V <sub>IL</sub> V <sub>IH</sub>	V <sub>CC</sub> -1.810 V <sub>CC</sub> -1.165	- -	V <sub>CC</sub> -1.475 V <sub>CC</sub> -0.880	V
Tx Disable Input	V <sub>DIL</sub> V <sub>DIH</sub>	0 2	- -	0.8 V <sub>CC</sub>	V
Supply Voltage	V <sub>CC</sub>	4.75 3.10	5.0 3.3	5.25 3.50	V
Supply Current	I <sub>CC</sub>	-	-	110	mA

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Parameter	Symbol	Min.	Typ.	Max.	Unit
<b>Receiver</b>					
Data Rate (NRZ)	B	-	1250	-	Mb/s
Optical Input (avg.) Sensitivity <sup>(1) (5)</sup>					
-1	P <sub>IN</sub>	-	-19	-17	dBm
-2	P <sub>IN</sub>	-	-23	-20	dBm
Saturation	P <sub>SAT</sub>	-3	0	-	dBm
Optical Wavelength					
TR13R15 TR31R15	λ	1500	1550	1600	nm
TR15R13 TR55R13	λ	1100	1310	1350	nm
Output Rise Time (10-90%)	t <sub>r</sub>	-	-	0.4	ns
Output Fall Time (10-90%)	t <sub>f</sub>	-	-	0.4	ns
Data Output <sup>(6)</sup>	V <sub>OL</sub> V <sub>OH</sub>	V <sub>CC</sub> -1.840 V <sub>CC</sub> -1.045	- -	V <sub>CC</sub> -1.62 V <sub>CC</sub> -0.88	V
Signal Detect Asserted (avg.)	P <sub>A</sub>	-	-	-17	dBm
Signal Detect Deasserted (avg.)	P <sub>D</sub>	-32	-	-	dBm
Hysteresis	P <sub>HYS</sub>	-	2	-	dB
Supply Voltage	V <sub>CC</sub>	4.75 3.10	5.0 3.3	5.25 3.50	V
Supply Current	I <sub>CC</sub>	-	-	100	mA
Optical Return Loss	RL	50	-	-	dB
Optical Cross Talk	CT	20	-	-	dB

Notes :

- (1) With 0.275 NA, 9/125μm fiber.
- (2) Driven with a differential signal.
- (3) Class 1 eye safe per FDA and IEC.
- (4) Eye mask diagram is compliant to IEEE802.3z Eye Diagram
- (5) 2<sup>7</sup> -1 PRBS, BER= 10<sup>-12</sup>.
- (6) Compatible with LVPECL and PECL logic levels.
- (7) The transmitter output should not be viewed directly.

### Absolute Maximum Ratings

Parameter		Min.	Max.	Unit
Operating Temperature	-1	0	70	°C
	-2	-40	85	°C
Storage Temperature		-40	100	°C
Lead Soldering Limits		-	240/10	°C /sec
Supply Voltage	5V	-0.2	7	V
	3.3V	-0.2	4	V

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## Ordering Information

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**Operating Temperature Range :**

1 : 0 ~ 70°C

2 : -40 ~ 85°C

**Data Coupling & SD Output Level :**

Symbol	Tx Coupling	Rx Coupling	SD
C	AC	DC	PECL
D	AC	DC	TTL
E	AC	AC	PECL
F	AC	AC	TTL
G	DC	DC	PECL
H	DC	DC	TTL
I	DC	AC	PECL
J	DC	AC	TTL

**Supply Voltage :**

5 : 5V

3 : 3.3V

**Connector Type :**

SC : SC Connector

FC : FC Connector

ST : ST Connector

**Package Type :**

P : Pigtail

R : Receptacle

**Sensitivity Grade :**

(refer to Specifications)

1 : -1

2 : -2

**Tx Output Power Grade :**

(refer to Specifications)

1 : -1

2 : -2

3 : -3

**Receiver Wavelength / Laser Type :**

13 : 1310nm (FP LD)

15 : 1550nm (FP LD)

31 : 1310nm (DFB LD)

55 : 1550nm (DFB LD)

**Transmitter Wavelength / Laser Type :**

13 : 1310nm (FP LD)

15 : 1550nm (FP LD)

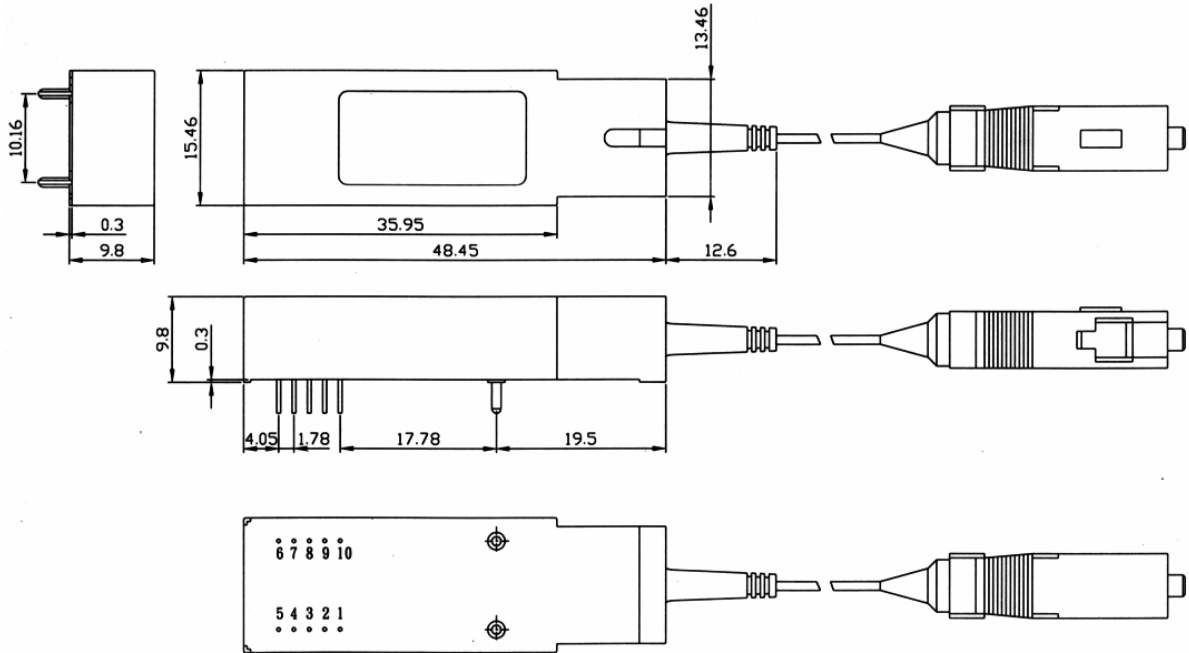
31 : 1310nm (DFB LD)

55 : 1550nm (DFB LD)

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## Outline Drawing

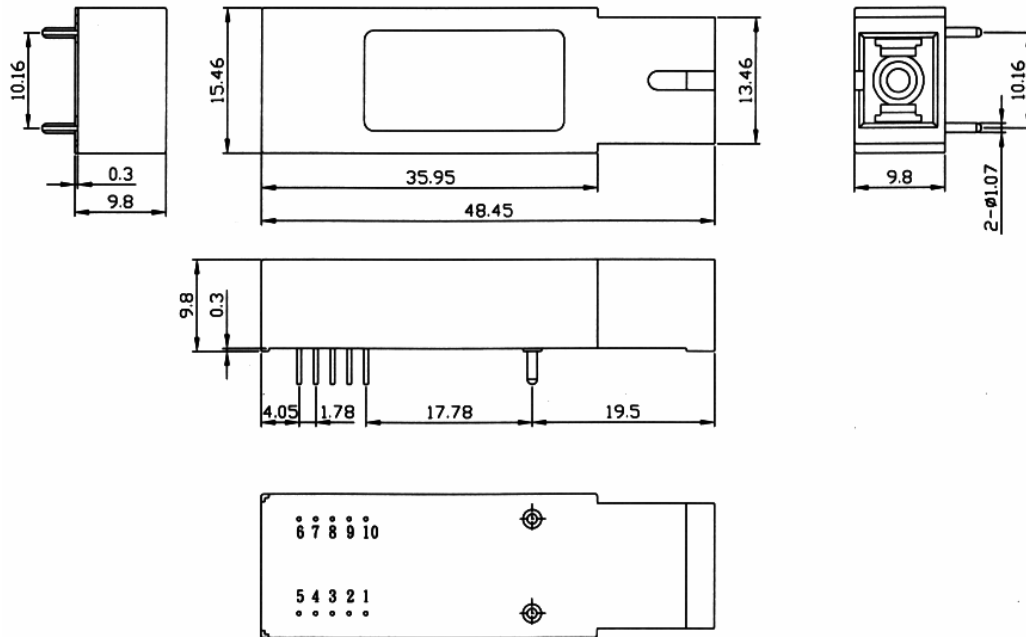
### Pigtail 2x5 pins SFF



UNIT : mm

### Receptacle 2x5 pins SFF

# Singlemode 1.25Gbps Bi-Directional Single Fiber 2x5 SFF Optical Transceiver



UNIT : mm

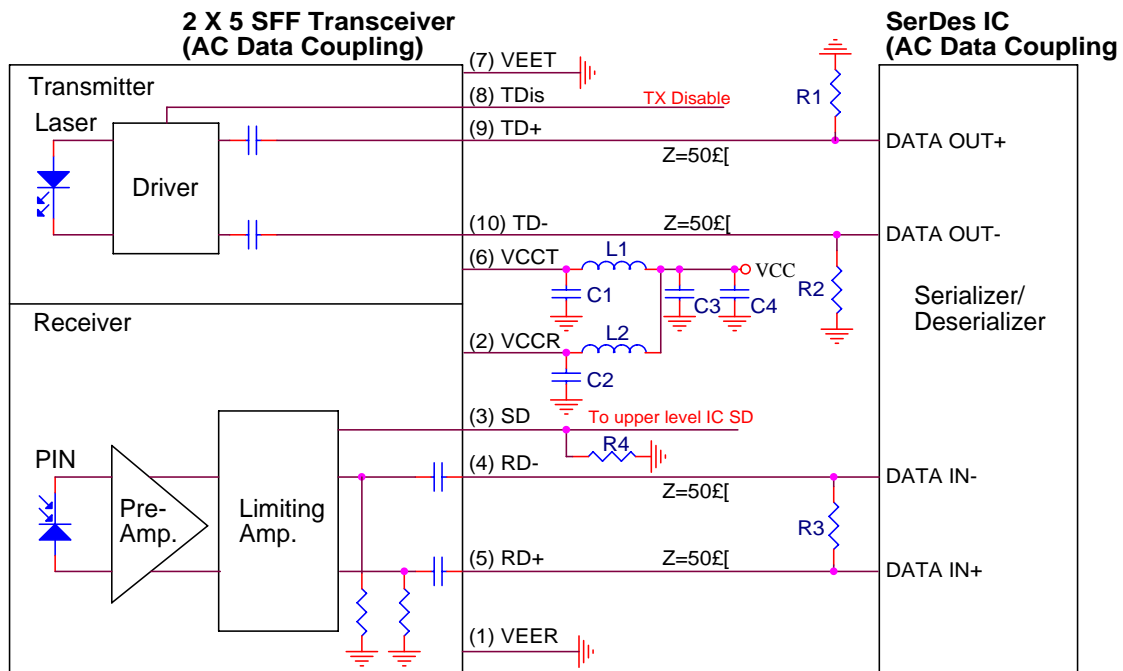
# Singlemode 1.25Gbps Bi-Directional Single Fiber 2x5 SFF Optical Transceiver

## Pinout Description

Pin No.	Symbol	Description
1	$V_{EER}$	Receiver Ground
2	$V_{CCR}$	Receiver Power Supply (5V/3.3V)
3	SD	Receiver Signal Detect
4	RD-	Receiver Data Out (Inverted)
5	RD+	Receiver Data Out
6	$V_{CCT}$	Transmitter Power Supply (5V/3.3V)
7	$V_{EET}$	Transmitter Ground
8	TDis	Input Logic Low Level to Switch Laser "ON" Input Logic High Level to Switch Laser "OFF"
9	TD+	Transmitter Data in
10	TD-	Transmitter Data In (Inverted)

## Application Notes

Recommended AC Coupling Interface Circuit :

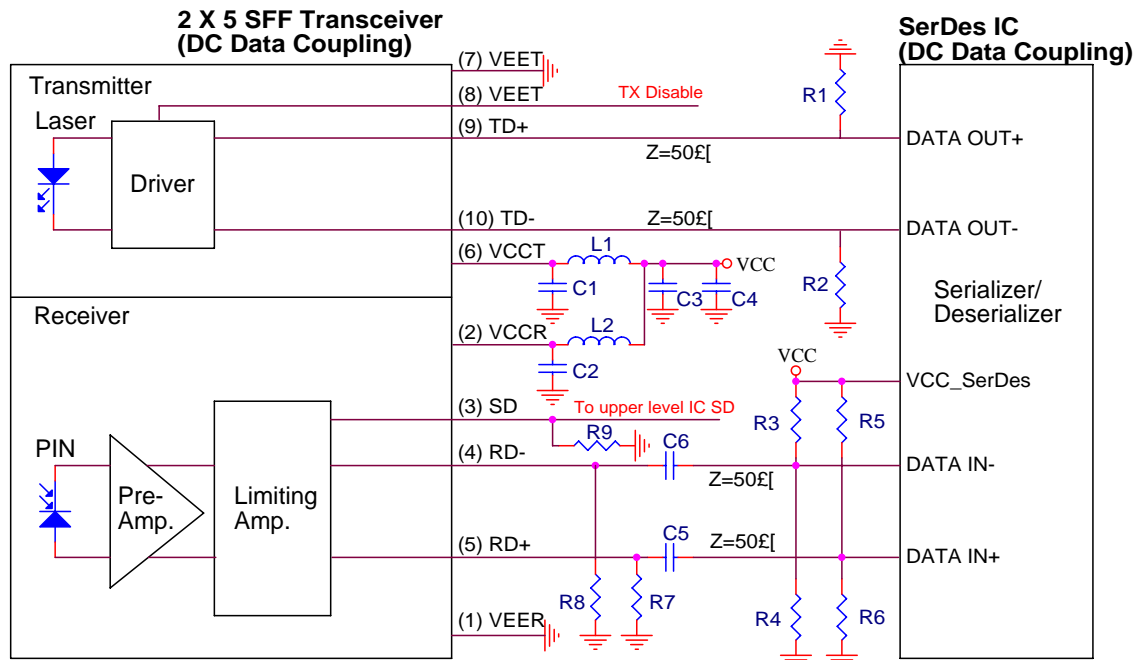


$L1=L2=1\mu\text{gH}$  or ferrite bead  
 $C1=C2=C3=0.1\mu\text{gF}$   
 $C4=10\mu\text{gF}$   
 $R1, R2, R3$  depends on SerDes IC specification.  
 (Consult the SerDes IC application information)  
 $R4=510\Omega$

**NOTE:G**  
 1. Transmission line characteristic impedance  $Z=50\Omega$ .  
 2.  $R1, R2, R3$  as close to SerDes IC as possible.

# Singlemode 1.25Gbps Bi-Directional Single Fiber 2x5 SFF Optical Transceiver

Recommended DC Coupling Interface Circuit :



L1=L2=1£gH or ferrite bead  
 C1=C2=C3=C5=C6=0.1£gF  
 C4=10£gF  
 R1, R2, R3, R4, R5, R6 depends on SerDes IC specification.  
 (Consult the SerDes IC application information)  
 R7=R8=270£[ (VCC=3.3V)  
 =510£[ (VCC=5V)  
 R9=510£[

**NOTE:G**

1. Transmission line characteristic impedance Z=50£[.
2. R1, R2, R3, R4, R5, R6 as close to SerDes IC as possible
3. R7, R8 as close to 1X9 Transceiver as possible.

**Appointech, Inc.**

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