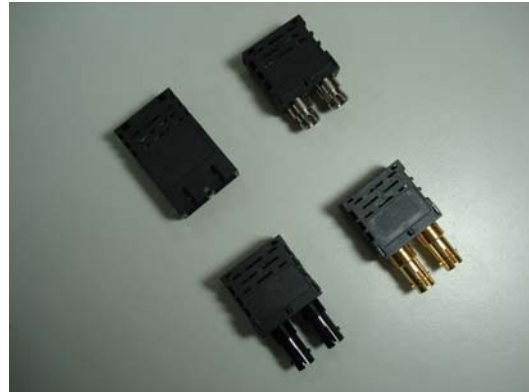


# Single-Mode 155Mbps Optical Transceiver

## Features

- Intermediate and long reach
- Industrial standard 1x9 pin footprint
- Duplex SC/ST/FC single mode 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
- RoHS compliant



## Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	
<b>Transmitter</b>						
Data Rate (NRZ)	B	10	155	250	Mb/s	
Optical Output Power (avg.) <sup>(1)(2)(3)</sup>						
-1	$P_o$	-12	-	-6	dBm	
-2	$P_o$	-6	-	0	dBm	
Extinction Ratio	ER	8.3	-	-	dB	
<b>Optical Wavelength</b>						
1310nm FP LD	$\lambda_c$	1260	1310	1360	nm	
1310nm DFB LD	$\lambda_c$	1290	1310	1330	nm	
1550nm FP LD	$\lambda_c$	1490	1550	1610	nm	
1550nm DFB LD	$\lambda_c$	1530	1550	1570	nm	
<b>Spectral Width (RMS, -20dB)</b>						
1310nm FP LD	$\Delta\lambda$	-	1.0	2.0	nm	
1550nm FP LD	$\Delta\lambda$	-	1.0	2.5	nm	
<b>Side Mode Suppression Ratio</b>						
1310nm DFB LD	SMSR	30	40	-	dB	
1550nm DFB LD	SMSR	30	40	-	dB	
Output Rise Time (10-90%)	$t_r$	-	0.4	1	ns	
Output Fall Time (10-90%)	$t_f$	-	1.0	1.5	ns	
Data Input <sup>(6)</sup>	DC Coupled	$V_{IL}$ $V_{IH}$	$V_{CC} - 1.810$ $V_{CC} - 1.165$	- -	$V_{CC} - 1.475$ $V_{CC} - 0.880$	V V
	AC Coupled (Differential)	$V_I$	0.25	-	1.6	V
Supply Voltage	$V_{CC}$	3.10 4.75	3.3 5.0	3.50 5.25	V	
Supply Current	$I_{CC}$	-	-	110	mA	

# Single-Mode 155Mbps Optical Transceiver

Parameter	Symbol	Min.	Typ.	Max.	Unit	
<b>Receiver</b>						
Data Rate (NRZ)	B	10	155	250	Mb/s	
Optical Input (avg.) Sensitivity <sup>(1)(5)</sup>	P <sub>IN</sub>	-	-38	-35	dBm	
Saturation	P <sub>SAT</sub>	-3	0	-	dBm	
Optical Wavelength	λ	1100	-	1600	nm	
Output Rise Time (10-90%)	t <sub>r</sub>	-	1.5	2.5	ns	
Output Fall Time (10-90%)	t <sub>f</sub>	-	1.5	2.5	ns	
Data Output <sup>(6)</sup>	DC Coupled	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 V
	AC Coupled (Differential)	V <sub>I</sub>	0.6	-	1.8	V
Signal Detect Asserted (avg.)	P <sub>A</sub>	-	-	-35	dBm	
Signal Detect Deasserted (avg.)	P <sub>D</sub>	-45	-	-	dBm	
Hysteresis	P <sub>HYS</sub>	-	3	-	dB	
Supply Voltage	V <sub>CC</sub>	3.10 4.75	3.3 5.0	3.50 5.25	V	
Supply Current	I <sub>CC</sub>	-	-	100	mA	

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 ITU-T G.957 Eye Diagram.
- (5) 2<sup>23</sup> -1 PRBS, BER= 10<sup>-10</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	°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

# Single-Mode 155Mbps Optical Transceiver

## Ordering Information

T R   S M 1 -      9 R 1   G

**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

**Laser Type :**

L : FP LD

F : DFB LD

**Tx Output Power Grade :**

(refer to Specifications)

1 : -1

2 : -2

**Wavelength :**

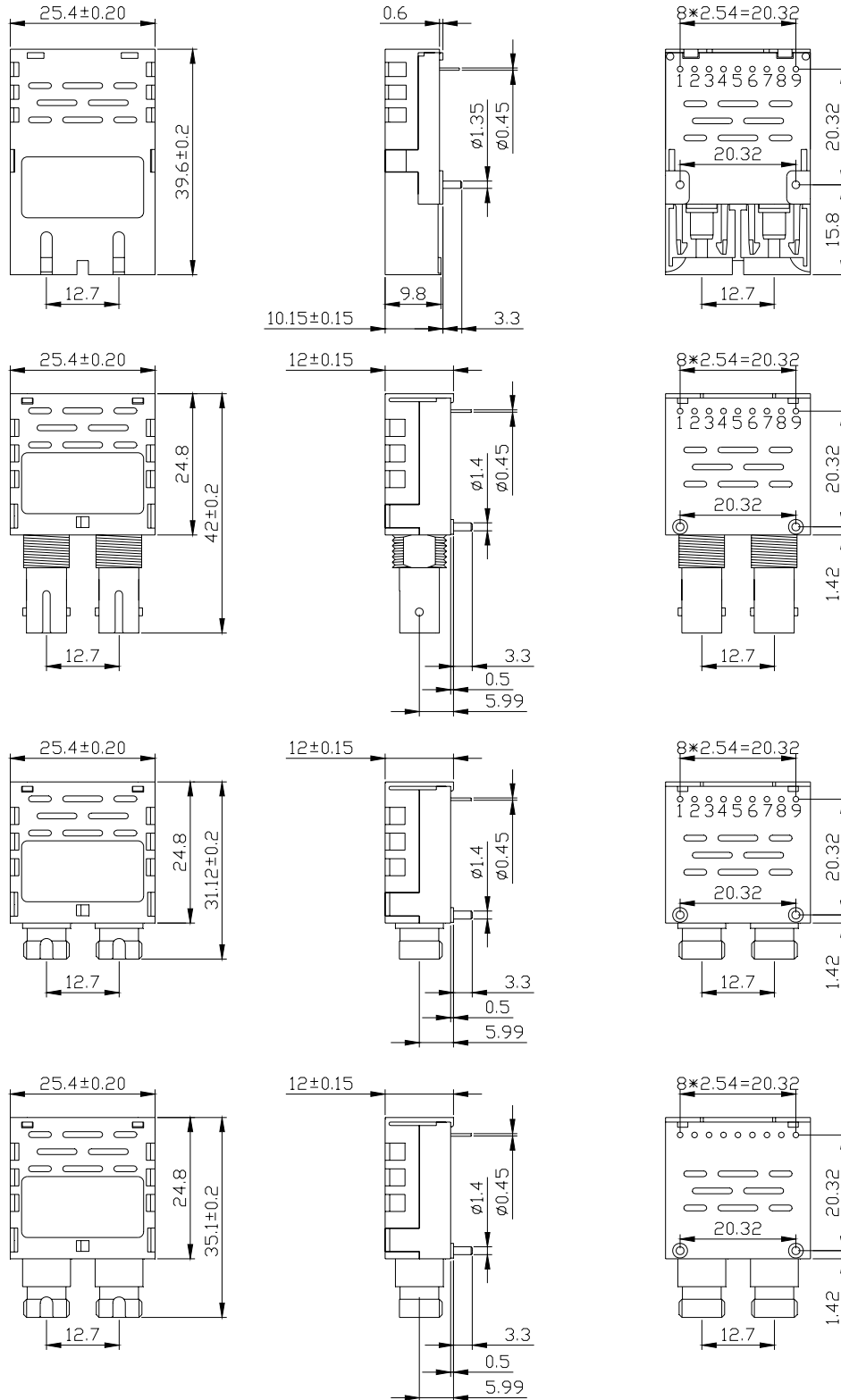
13 : 1310nm

15 : 1550nm

# Single-Mode 155Mbps Optical Transceiver

## Outline Drawing

UNIT : mm



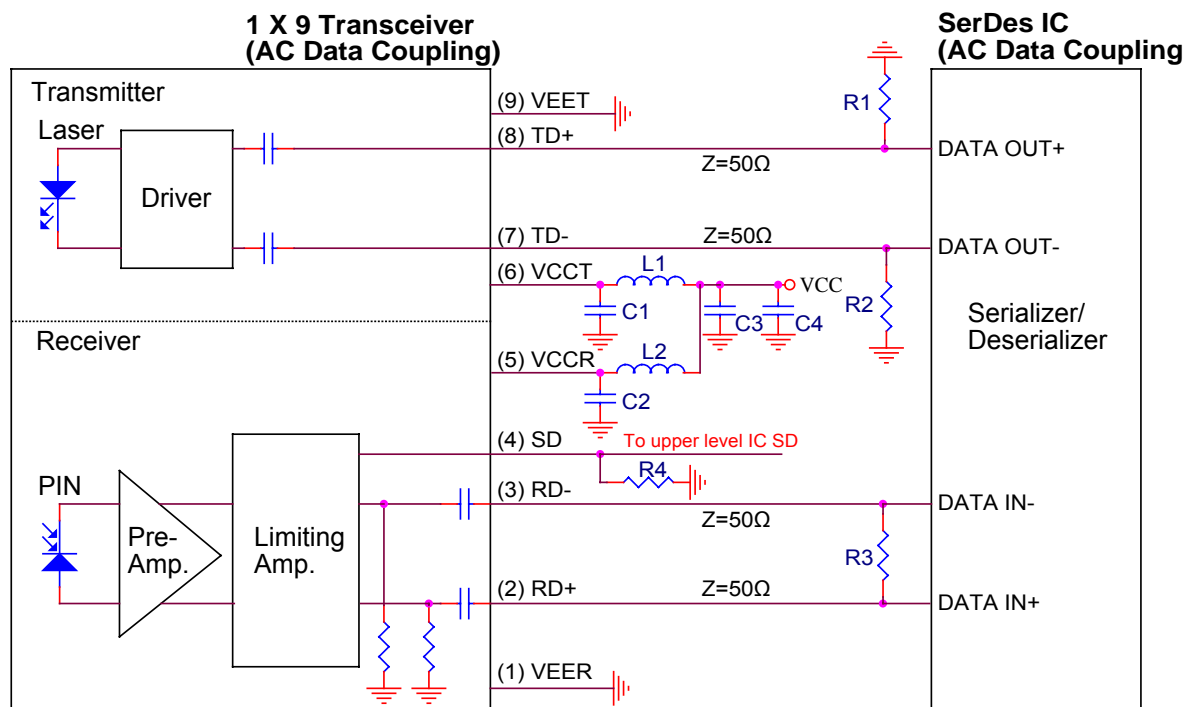
# Single-Mode 155Mbps Optical Transceiver

## Pinout Description

Pin No.	Symbol	Description
1	V <sub>EER</sub>	Receiver Ground
2	RD+	Receiver Data Out
3	RD-	Receiver Data Out (Inverted)
4	SD	Receiver Signal Detect
5	V <sub>CCR</sub>	Receiver Power Supply (5V/3.3V)
6	V <sub>CCT</sub>	Transmitter Power Supply (5V/3.3V)
7	TD-	Transmitter Data In (Inverted)
8	TD+	Transmitter Data in
9	V <sub>EET</sub>	Transmitter Ground

## Application Notes

Recommended AC Coupling Interface Circuit :

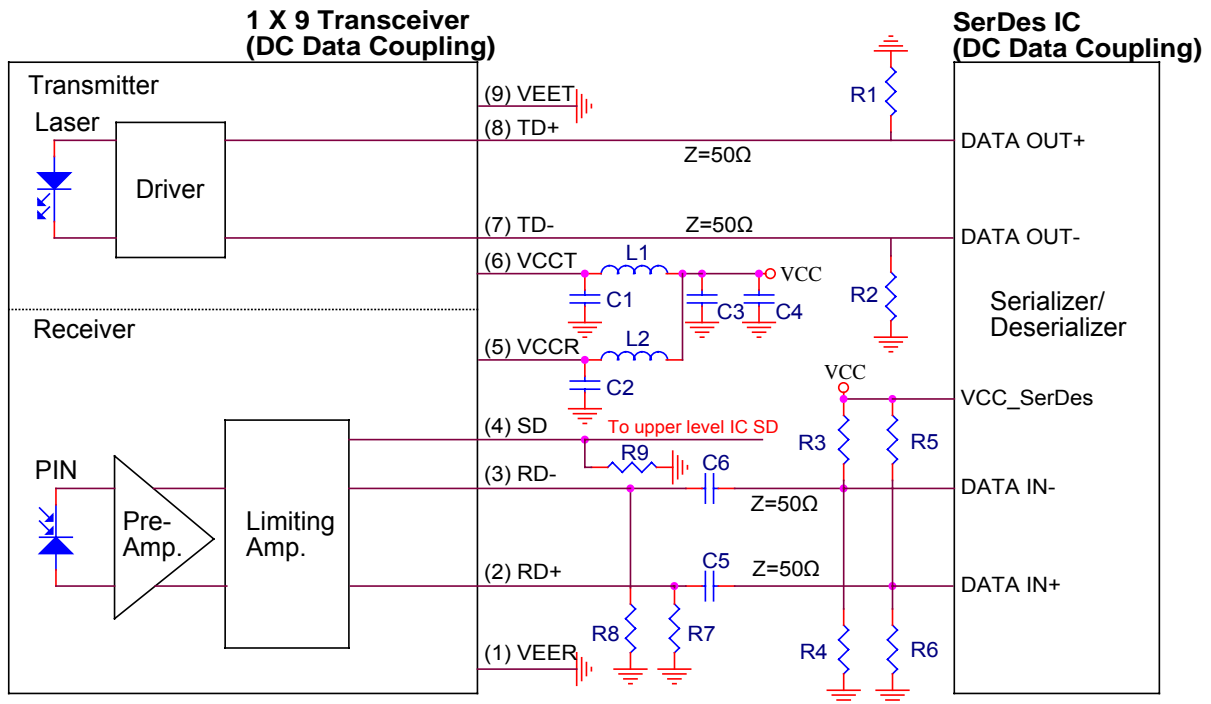


L1=L2=1μH or ferrite bead  
 C1=C2=C3=0.1μF  
 C4=10μF  
 R1, R2, R3 depends on SerDes IC specification.  
 (Consult the SerDes IC application information)  
 R4=510Ω

NOTE :  
 1. Transmission line characteristic impedance Z=50Ω.  
 2. R1, R2, R3 as close to SerDes IC as possible.

# Single-Mode 155Mbps Optical Transceiver

Recommended DC Coupling Interface Circuit :



$L1=L2=1\mu\text{H}$  or ferrite bead  
 $C1=C2=C3=C5=C6=0.1\mu\text{F}$   
 $C4=10\mu\text{F}$   
 $R1, R2, R3, R4, R5, R6$  depends on SerDes IC specification.  
 (Consult the SerDes IC application information)  
 $R7=R8=270\Omega$  ( $VCC=3.3\text{V}$ )  
 $=510\Omega$  ( $VCC=5\text{V}$ )  
 $R9=510\Omega$

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

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