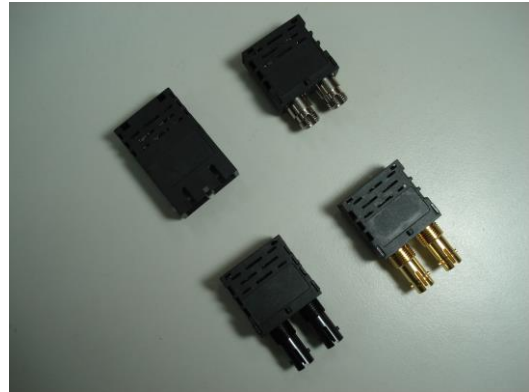


Single-Mode 155Mbps Optical Transceiver

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	
Transmitter						
Data Rate (NRZ)	B	10	155	250	Mb/s	
Optical Output Power (avg.) ^{(1) (2) (3)}						
-1	P _o	-12	-	-6	dBm	
-2	P _o	-6	-	0	dBm	
-3	P _o	0	-	-	dBm	
Extinction Ratio	ER	8.3	-	-	dB	
Optical Wavelength						
1310nm FP LD	λ_c	1260	1310	1360	nm	
1310nm DFB LD	λ_c	1290	1310	1330	nm	
1550nm FP LD	λ_c	1490	1550	1610	nm	
1550nm DFB LD	λ_c	1530	1550	1570	nm	
Spectral Width (RMS, -20dB)						
1310nm FP LD	$\Delta\lambda$	-	1.0	2.0	nm	
1550nm FP LD	$\Delta\lambda$	-	1.0	2.5	nm	
Side Mode Suppression Ratio						
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 ⁽⁶⁾	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	
Receiver						
Data Rate (NRZ)	B	10	155	250	Mb/s	
Optical Input (avg.) Sensitivity ^{(1) (5)}	P _{IN}	-	-38	-35	dBm	
Saturation	P _{SAT}	-3	0	-	dBm	
Optical Wavelength	λ	1100	-	1600	nm	
Output Rise Time (10-90%)	t _r	-	1.5	2.5	ns	
Output Fall Time (10-90%)	t _f	-	1.5	2.5	ns	
Data Output ⁽⁶⁾	DC Coupled	V _{OL} V _{OH}	V _{CC} -1.840 V _{CC} -1.045	- -	V _{CC} -1.62 V _{CC} -0.88	V V
	AC Coupled (Differential)	V _I	0.6	-	1.8	V
Signal Detect Asserted (avg.)	P _A	-	-	-35	dBm	
Signal Detect Deasserted (avg.)	P _D	-45	-	-	dBm	
Hysteresis	P _{HYS}	-	3	-	dB	
Supply Voltage	V _{CC}	3.10 4.75	3.3 5.0	3.50 5.25	V	
Supply Current	I _{CC}	-	-	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) 2²³ -1 PRBS, BER= 10⁻¹⁰.
- (6) Compatible with LVPECL and PECL logic levels.
- (7) The transmitter output should not be viewed directly.

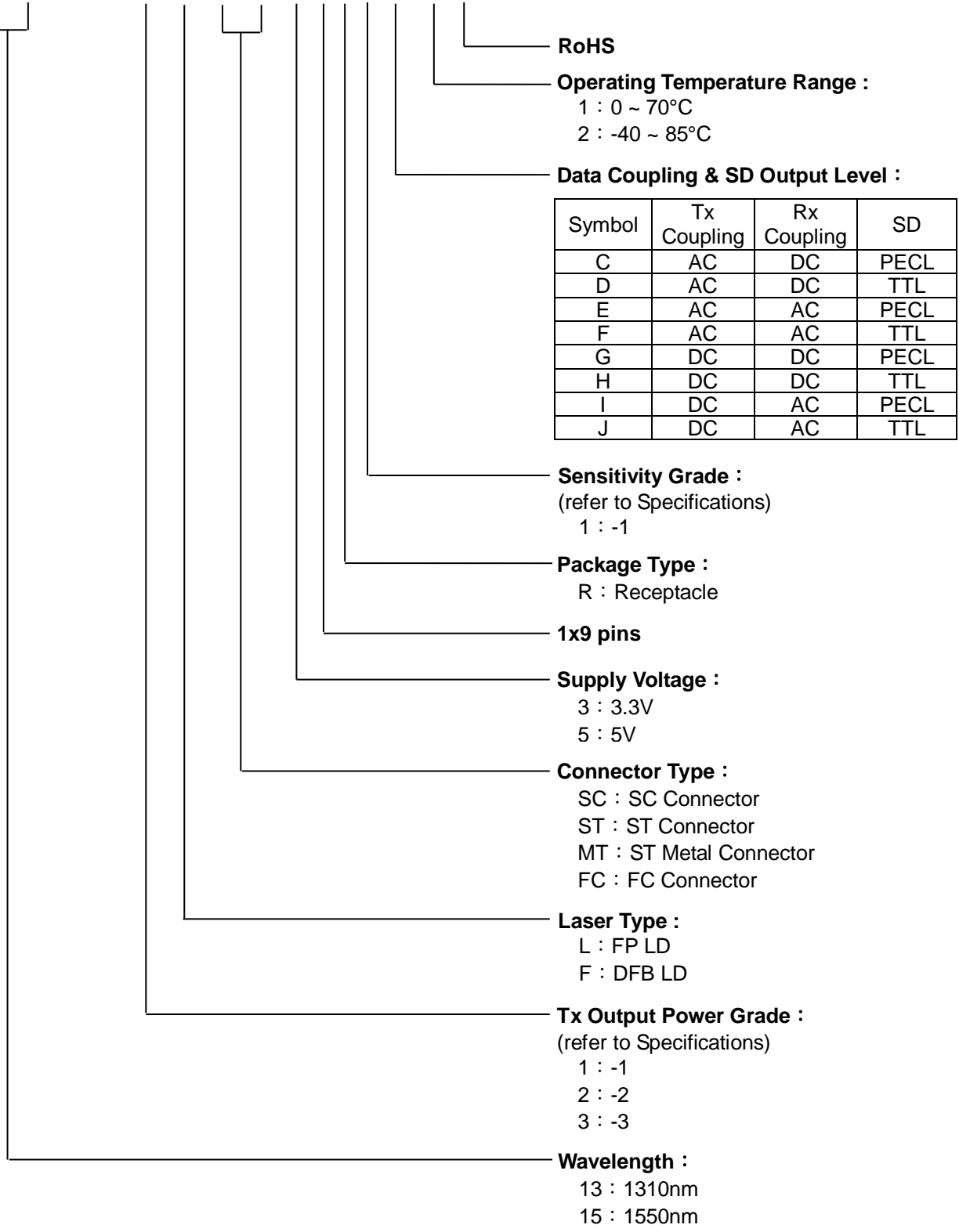
Absolute Maximum Ratings

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

Single-Mode 155Mbps Optical Transceiver

Ordering Information

TR SM1- 9R1 G



RoHS

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

Sensitivity Grade :

(refer to Specifications)

1 : -1

Package Type :

R : Receptacle

1x9 pins

Supply Voltage :

3 : 3.3V

5 : 5V

Connector Type :

SC : SC Connector

ST : ST Connector

MT : ST Metal Connector

FC : FC Connector

Laser Type :

L : FP LD

F : DFB LD

Tx Output Power Grade :

(refer to Specifications)

1 : -1

2 : -2

3 : -3

Wavelength :

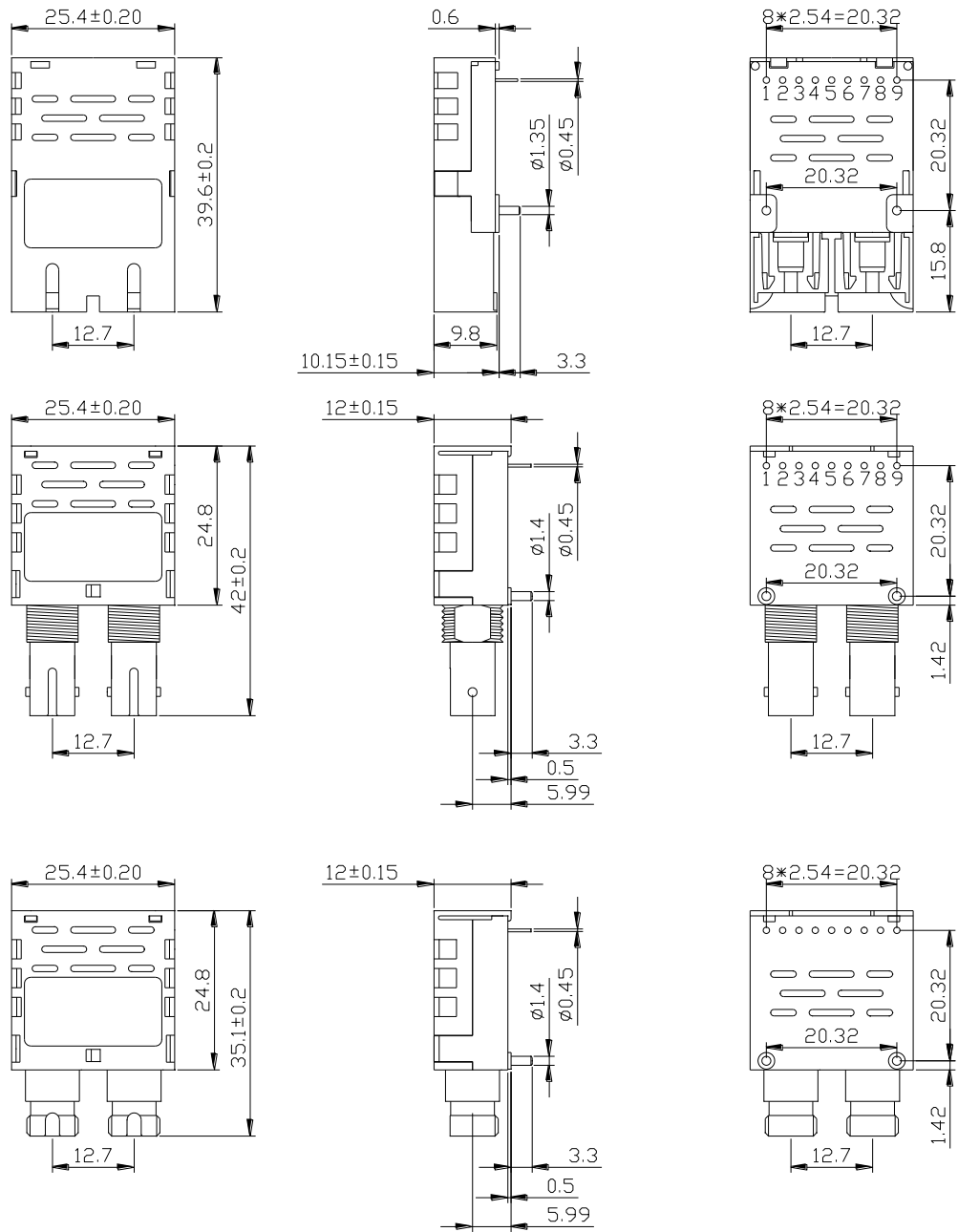
13 : 1310nm

15 : 1550nm

Single-Mode 155Mbps Optical Transceiver

Outline Drawing

UNIT : mm



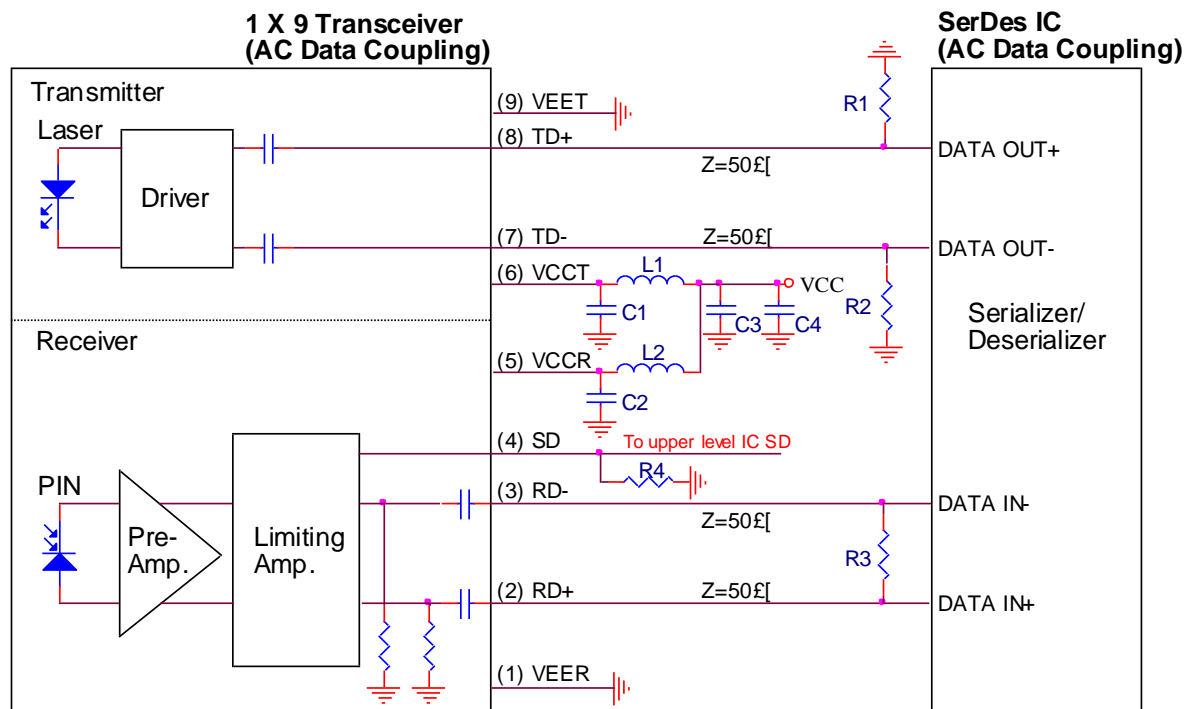
Single-Mode 155Mbps Optical Transceiver

Pinout Description

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

Application Notes

Recommended AC Coupling Interface Circuit :



L1=L2=1ΩgH or ferrite bead

C1=C2=C3=0.1ΩgF

C4=10ΩgF

R1, R2, R3 depends on SerDes IC specification.

(Consult the SerDes IC application information)

R4=510Ω

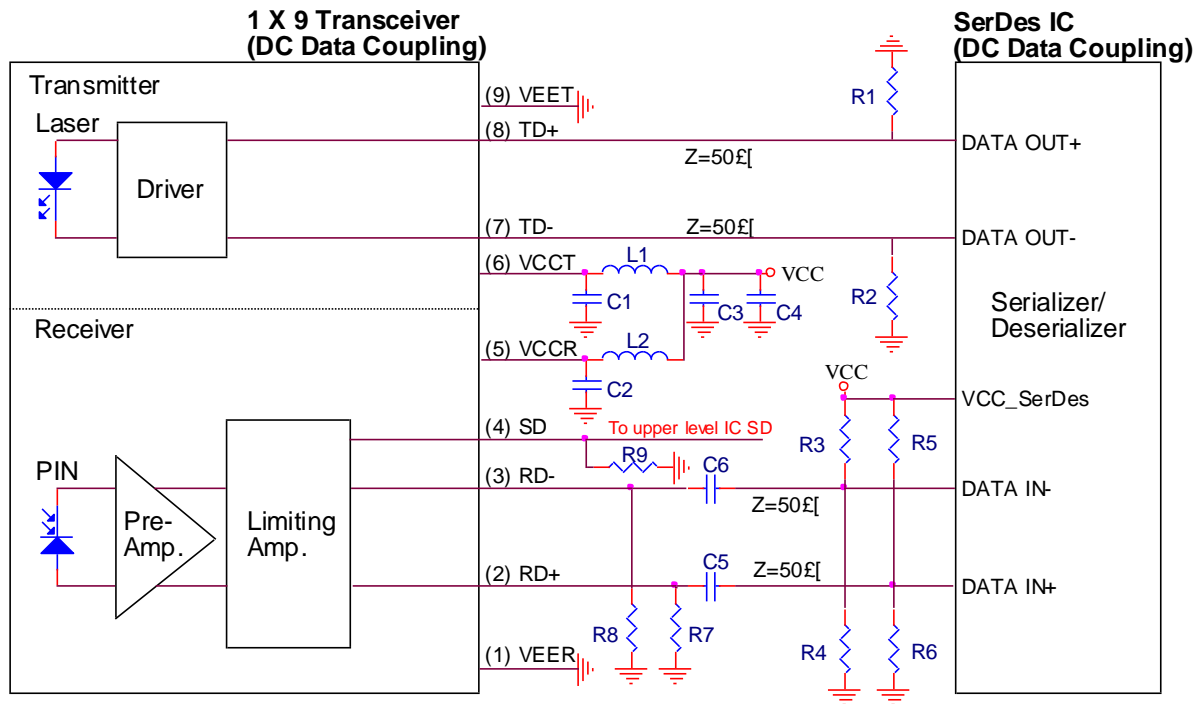
NOTE:G

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 :



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

NOTE;G

1. Transmission line characteristic impedance $Z=50\text{g}\Omega$.
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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