

Singlemode 155Mbps Bi-Directional Single Fiber Optical Transceiver

Features

- 1310nm/1550nm operating wavelength
- Industrial standard 1 x 9 pin footprint
- 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
Transmitter					
Data Rate (NRZ)	B	10	155	250	Mb/s
Optical Output Power (avg.) ⁽¹⁾⁽³⁾					
-1	P _o	-12	-	-8	dBm
-2	P _o	-8	-	-3	dBm
-3	P _o	-3	-	0	dBm
Extinction Ratio	ER	8.3	-	-	dB
Optical Wavelength					
TR13R15 (1310nm FP LD)	λ_c	1260	1310	1360	nm
TR31R15 (1310nm DFB LD)	λ_c	1290	1310	1330	nm
TR15R13 (1550nm FP LD)	λ_c	1490	1550	1610	nm
TR55R13 (1550nm DFB LD)	λ_c	1530	1550	1570	nm
Spectral Width					
TR13R15 (RMS) TR15R13 (RMS)	$\Delta\lambda$	-	1.0	2.5	nm
TR31R15 (-20dB) TR55R13 (-20dB)	$\Delta\lambda$	-	-	1	nm
Side Mode Suppression Ratio					
TR31R15 TR55R13	SMSR	30	40	-	dB
Output Rise Time (10-90%)	t _r	-	0.4	1.0	ns
Output Fall Time (10-90%)	t _f	-	1.0	1.5	ns
Data Input ⁽⁶⁾	V _{IL} V _{IH}	V _{CC} -1.810 V _{CC} -1.165	- -	V _{CC} -1.475 V _{CC} -0.880	V
Supply Voltage	V _{CC}	4.75 3.10	5.0 3.3	5.25 3.50	V
Supply Current	I _{CC}	-	-	110	mA



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Parameter		Symbol	Min.	Typ.	Max.	Unit
Receiver						
Data Rate (NRZ)		B	10	155	250	Mb/s
Optical Input Sensitivity (avg.) ^{(1) (5)}						
-1		P _{IN}	-	-30	-28	dBm
-2		P _{IN}	-	-34	-32	dBm
Saturation		P _{SAT}	-3	0	-	dBm
Optical Wavelength						
TR13R15 TR31R15		λ	1500	1550	1600	nm
TR15R13 TR55R13		λ	1260	1310	1360	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	-	-	-28	dBm
Signal Detect Deasserted (avg.)		P _D	-42	-	-	dBm
Hysteresis		P _{HYS}	-	3	-	dB
Supply Voltage		V _{CC}	3.10 4.75	3.3 5.0	3.50 5.25	V V
Supply Current		I _{CC}	-	-	100	mA
Optical Return Loss		RL	50	-	-	dB
Optical Cross Talk		CL	35	-	-	dB

Note:

- (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 PECL and LVPECL 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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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 (fiber length = 100cm)
- 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)

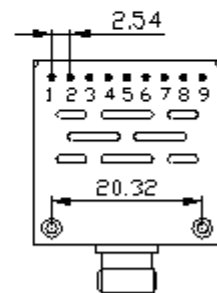
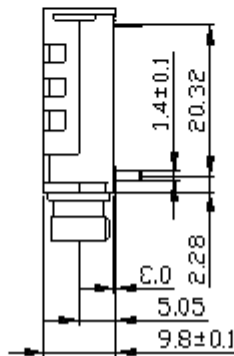
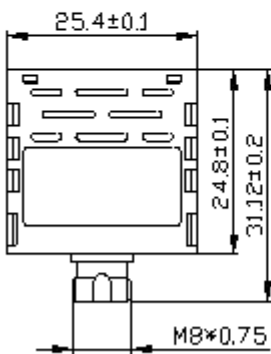
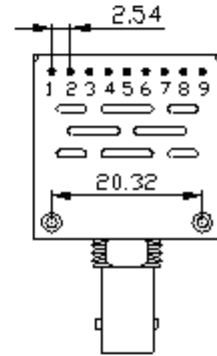
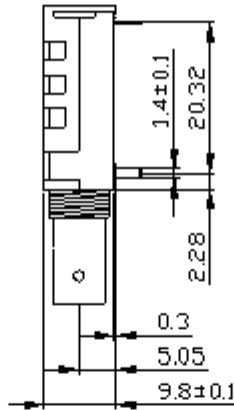
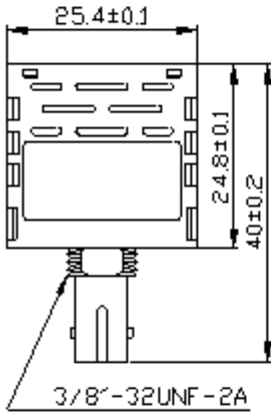
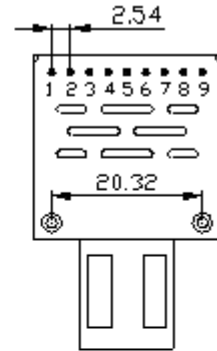
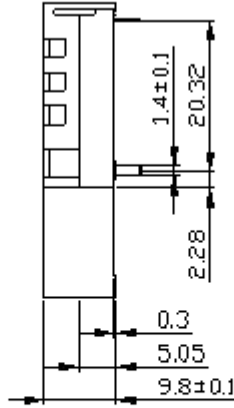
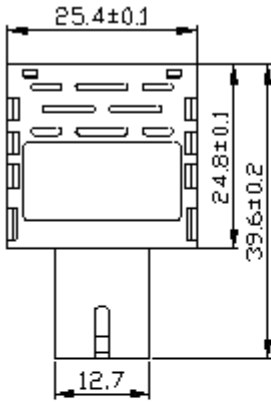
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Outline Drawing

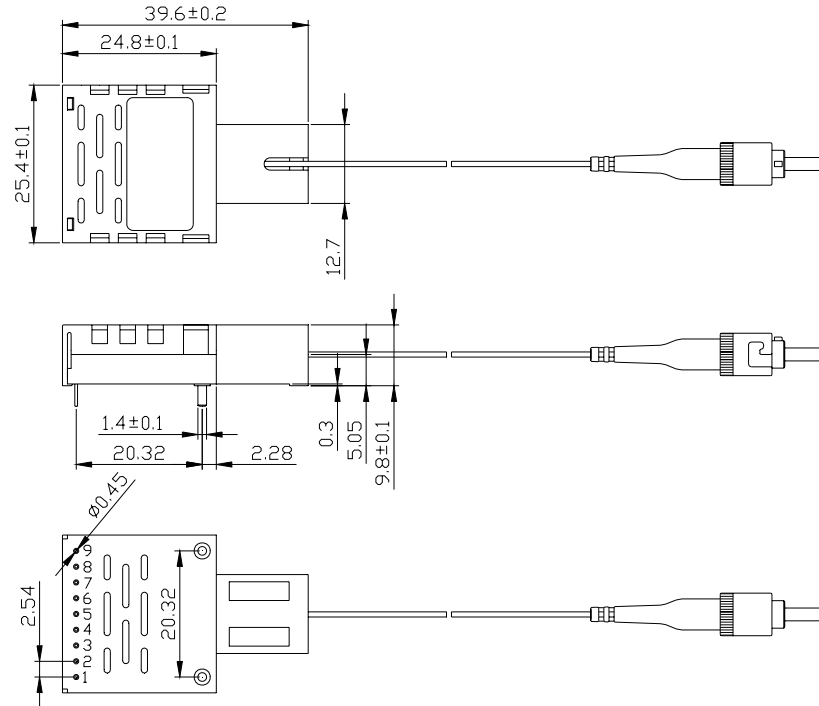
Receptacle Type :



UNIT : mm

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Pigtail Type :



UNIT : mm

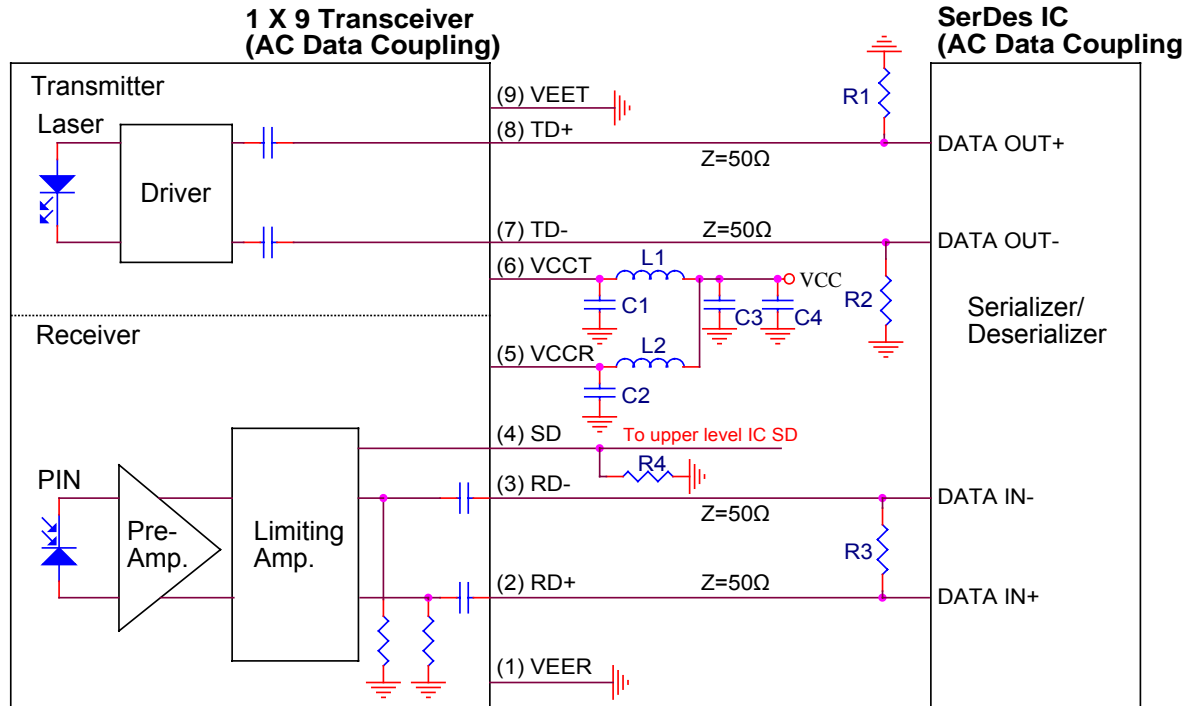
Pinout Description

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

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Application Notes

Recommended AC Coupling Interface Circuit :

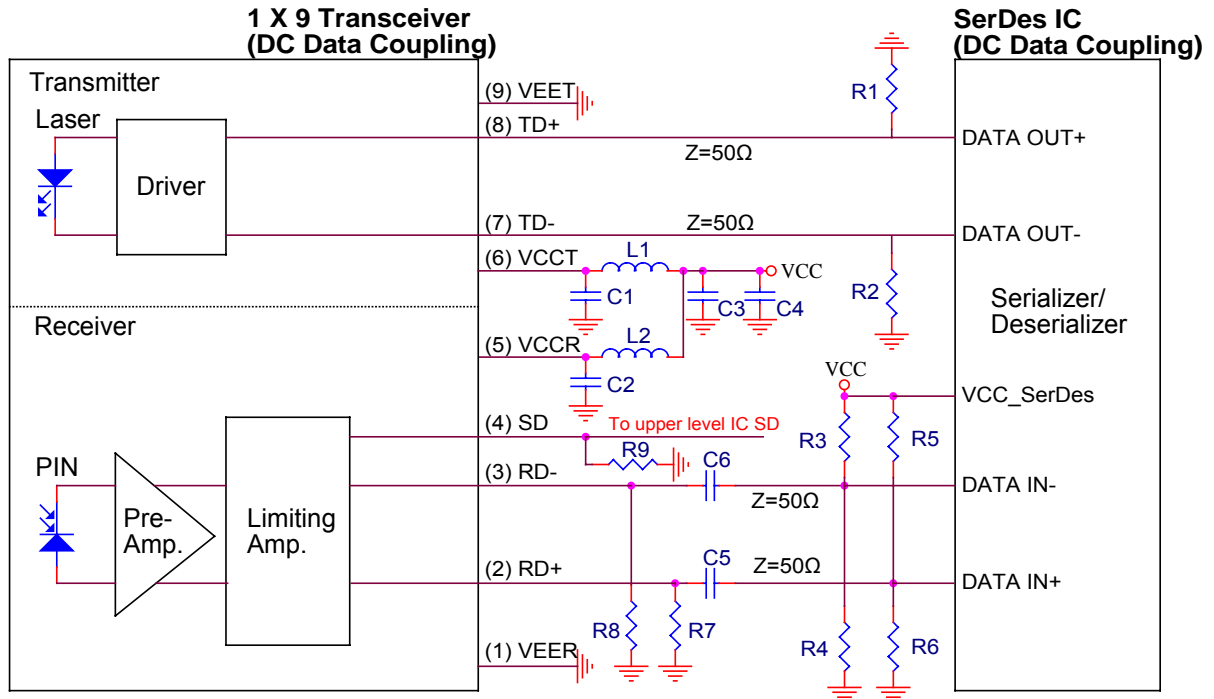


$L1=L2=1\mu\text{H}$ or ferrite bead
 $C1=C2=C3=0.1\mu\text{F}$
 $C4=10\mu\text{F}$
 $R1, R2, R3$ depends on SerDes IC specification.
 (Consult the SerDes IC application information)
 $R4=510\Omega$

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

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Recommended DC Coupling Interface Circuit :



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

NOTE :
 1. Transmission line characteristic impedance Z=50 Ω .
 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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