Single-mode 155Mbps 2X5 SFF Transceiver

Features

- LC duplex receptacle
- Standard 2 x 5 footprint
- 1310nm or 1550nm laser transmitter with automatic power control
- AC or DC coupled LVPECL/PECL compatible data input and output
- Transmitter disable input
- PECL or TTL signal detect output
- Single 3.3V or 5V power supply

Specifications

Parameter		Symbol	Min.	Typ.	Max.	Unit
Transmitter						
Data Rate (NRZ)		B	10	155	250	Mb/s
Optical Output Power (avg.) (1) (5)						
-1		P_o	-12	-	-6	dBm
-2		P_o	-5	-	0	dBm
-3		P_o	-3	-	+2	dBm
Extinction Ratio (2) (3) (4)		ER	10	-	-	dB
Optical Wavelength						
1310nm FP LD (2) (3)		λ_C	1270	1310	1360	nm
1550nm DFB LD (4)		λ_C	1530	1550	1570	nm
Spectral Width						
1310nm FP LD (RMS) (2) (3)		$\Delta\lambda$	-	-	2.5	nm
1550nm DFB LD (-20dB) (4)		$\Delta\lambda$	-	-	1	nm
Side Mode Suppression Ratio						
1550nm DFB LD (4)		SMSR	30	-	-	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 (9)	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
Tx Disable Input		V_{DIL} V_{DIH}	0 2	- -	0.8 V_{CC}	V
Supply Voltage		V_{CC}	3.10 4.75	3.3 5.0	3.50 5.25	V V
Supply Current		I_{CC}	-	-	110	mA

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Parameter		Symbol	Min.	Typ.	Max.	Unit
Receiver						
Data Rate (NRZ)		B	10	155	200	Mb/s
Optical Input Sensitivity (avg.) (1) (2) (3) (4) (7)		P_{IN}	-	-38	-34	dBm
Saturation		P_{SAT}	-3	-	-	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 (9)	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	-	-	-34	dBm
Signal Detect Deasserted (avg.)		P_D	-48	-	-	dBm
Signal Detect Hysteresis		P_{HYS}	-	2	-	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

Notes：

(1) With 0.275 NA, 9/125μm fiber.
(2) Compliant to GR-253-CORE SONET OC-3 IR-1 and ITU-T G.957 STM-1 S-1.1.
(3) Compliant to GR-253-CORE SONET OC-3 LR-1 and ITU-T G.957 STM-1 L-1.1.
(4) Compliant to GR-253-CORE SONET OC-3 LR-2 and ITU-T G.957 STM-1 L-1.2.
(5) Class 1 eye safe per FDA and IEC.
(6) Transmitter eye mask diagram is compliant to ITU-T G.957 Eye Diagram.
(7) 2^{23} -1 PRBS, BER= 10^{-10}.
(8) The transmitter output should not be viewed directly.
(9) Compatible with PECL and LVPECL logic levels.

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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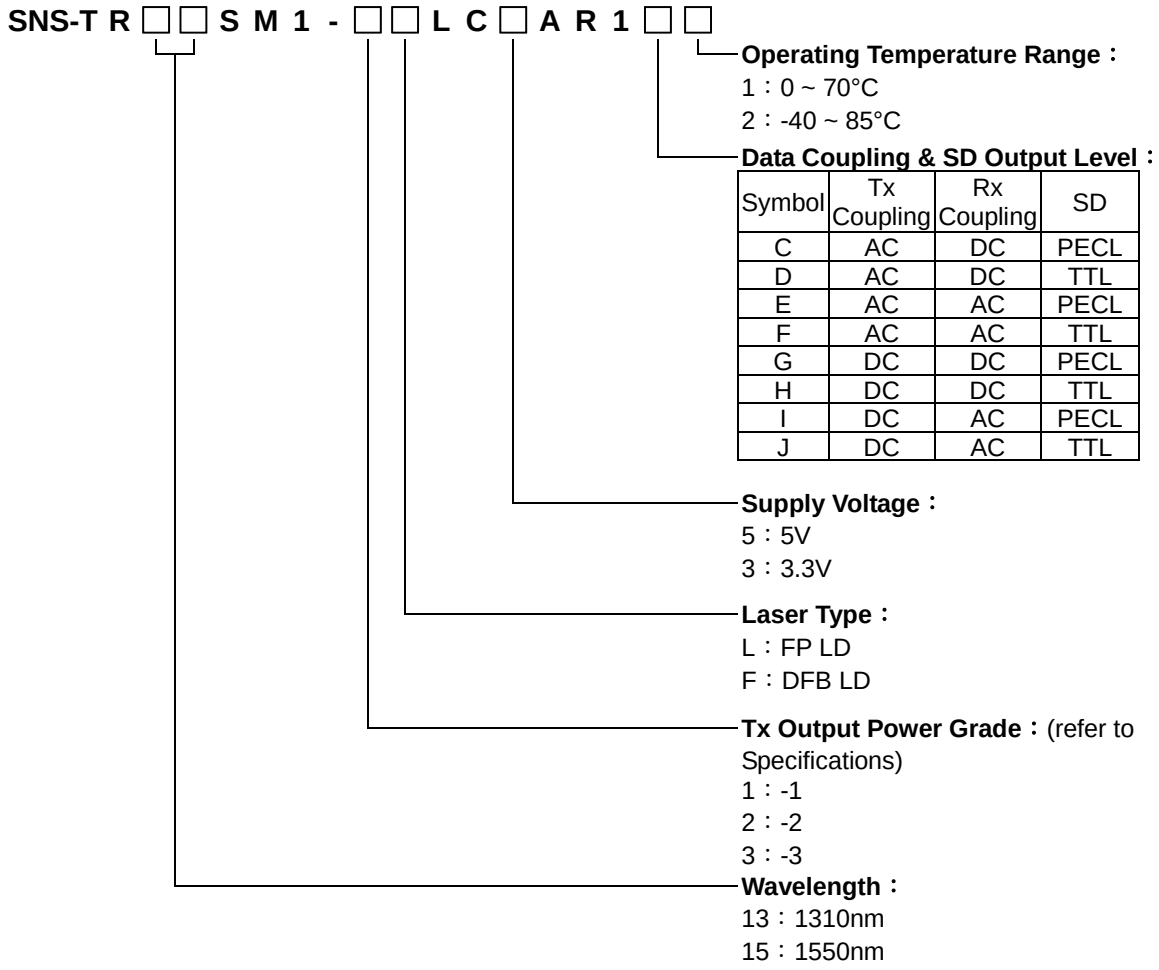
Ordering Information



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

Part Number	Laser Type	Power Budget (1)	Recommended Maximum Reach (2)	Compliant to SONET OC-3 / SDH STM-1 (4)
TR13SM1-1LLC□AR1□□	1310nm, FP	22dB	54Km	IR-1 / S-1.1
TR13SM1-2LLC□AR1□□	1310nm, FP	29dB	74Km	LR-1 / L-1.1
TR15SM1-2FLC□AR1□□	1550nm, DFB	29dB	104Km	LR-2 / L-1.2

Notes：

(1) Power Budget (min.) = TX Output Power (min.) - RX Sensitivity (min.)
(2) Assuming connector loss 3dB; 1310nm fiber attenuation coefficient 0.35dB/Km; 1550nm fiber attenuation coefficient 0.25dB/Km.
(3) The maximum reach value is recommended, not guaranteed. The exact transmission distance depends on fiber loss, connector loss and system penalty.
(4) SONET/SDH standard specification is defined in GR-253-CORE/ITU-T G.957.

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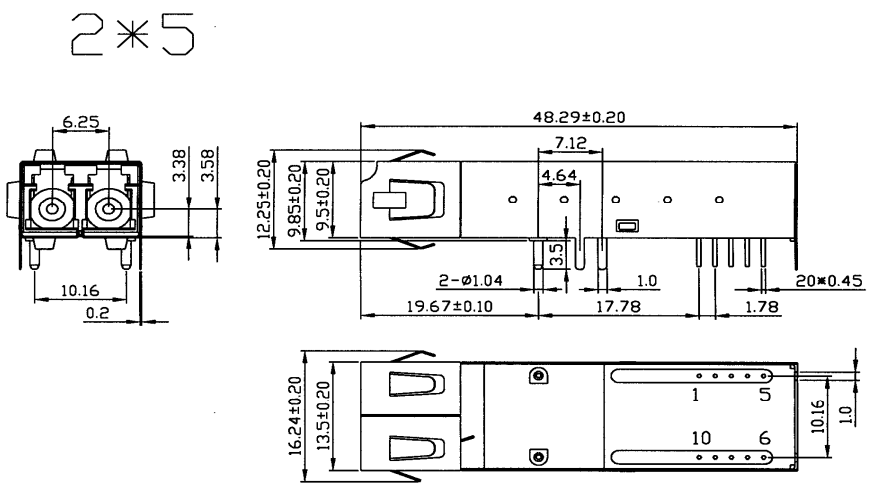
Outline Drawing



UNIT：mm

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)

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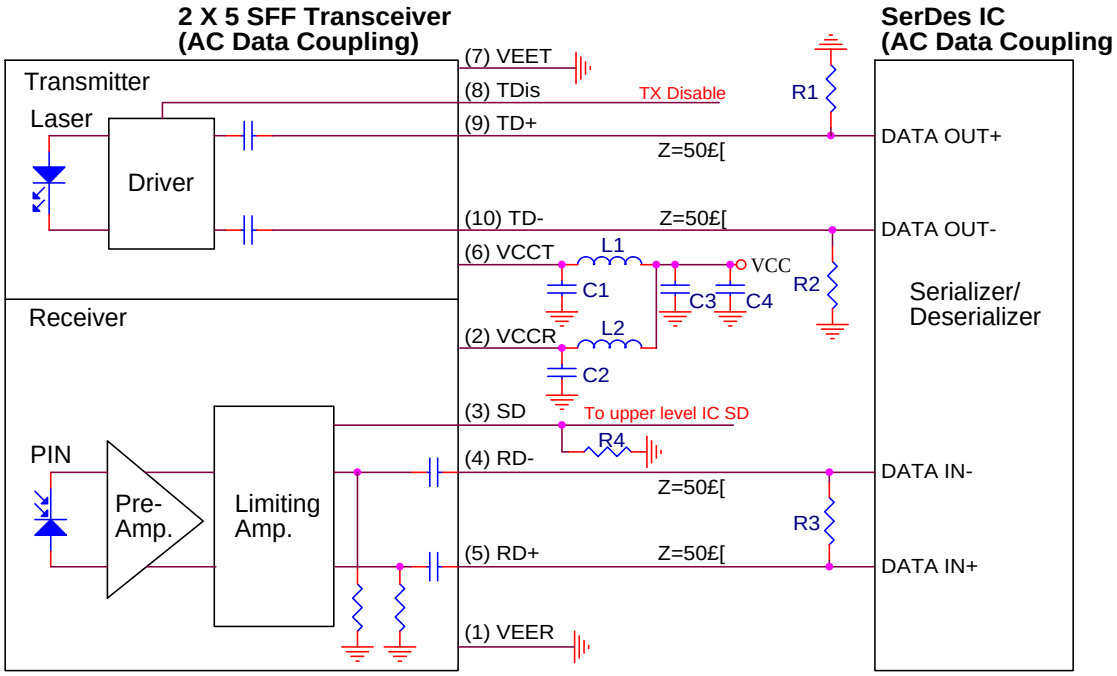
Application Notes

Recommended AC Coupling Interface Circuit：



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

NOTE¡G
1. Transmission line characteristic impedance Z=50£[.
2. R1, R2, R3 as close to SerDes IC as possible.

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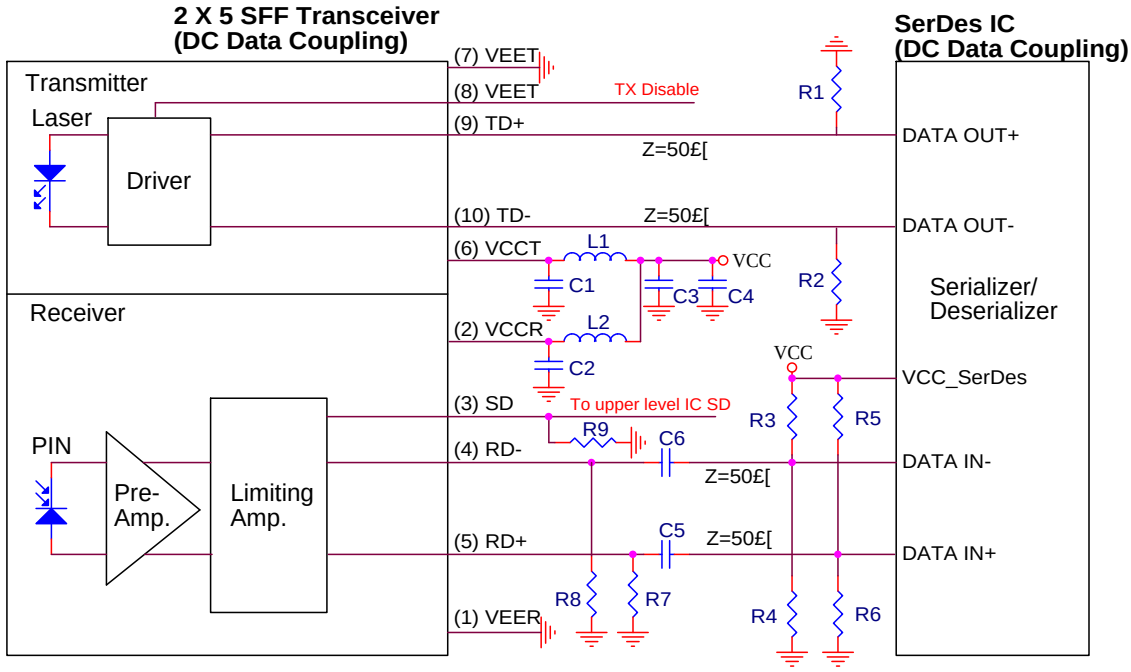
Recommended DC Coupling Interface Circuit：



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 possibl
3. R7, R8 as close to 1X9 Transceiver as possible.