

Specification

Small Form Factor Pluggable

Duplex LC Receptacle – SFP

Optical Transceivers

1000BASE-LHX

1250Mbit/s




Ordering Information

T S P - S x C B 1 - K 1 1

Voltage / Temperature

1 : 3.3V / +0°C ~ +70°C

2 : 3.3V / -40 °C ~ +85°C

Model Name	Voltage	Category	Device type	Interface	SD/LOS	Temperature	Distance	Latch Color
TSP-S1CB1-K11	3.3V	W/O DDMI	DFB / PIN	AC / AC Coupling	LVTTTL	+0°C ~ +70°C	40km	Blue
TSP-S2CB1-K11						-40°C ~ +85°C		

Features

- ROHS Compliant
- Standard Small Form Factor Pluggable Package – SFP MSA Compliant
- Gigabit Ethernet Standard (IEEE802.3Z 1000BASE) Compliant
- Fibre Channel Standard (100-SM-LC-L) Compliant
- Laser Class 1 Product – IEC60825-1 Compliant
- Standard Duplex LC Receptacle Optical Interface
- Single + 3.3 V Power Supply
- Differential LVPECL Data Input and Output
- LVTTTL Loss of Signal
- Serial ID through I²C Interface
- Low Power Consumption

Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit
Storage temperature	T _s	-40		85	°C
Supply voltage	VCC	0		4	V
Operating Relative Humidity	RH	5		95	%
Input voltage	V _{IN}	0		VCC	V

Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	V _{CC}	3.1	3.3	3.5	V
Operating Case temperature (TSP-S1CB1-K11)	Top	0	-	70	°C
Operating Case temperature (TSP-S2CB1-K11)		-40		85	
Total Current (Transmitter + Receiver)	I _{CC}	-	-	300	mA

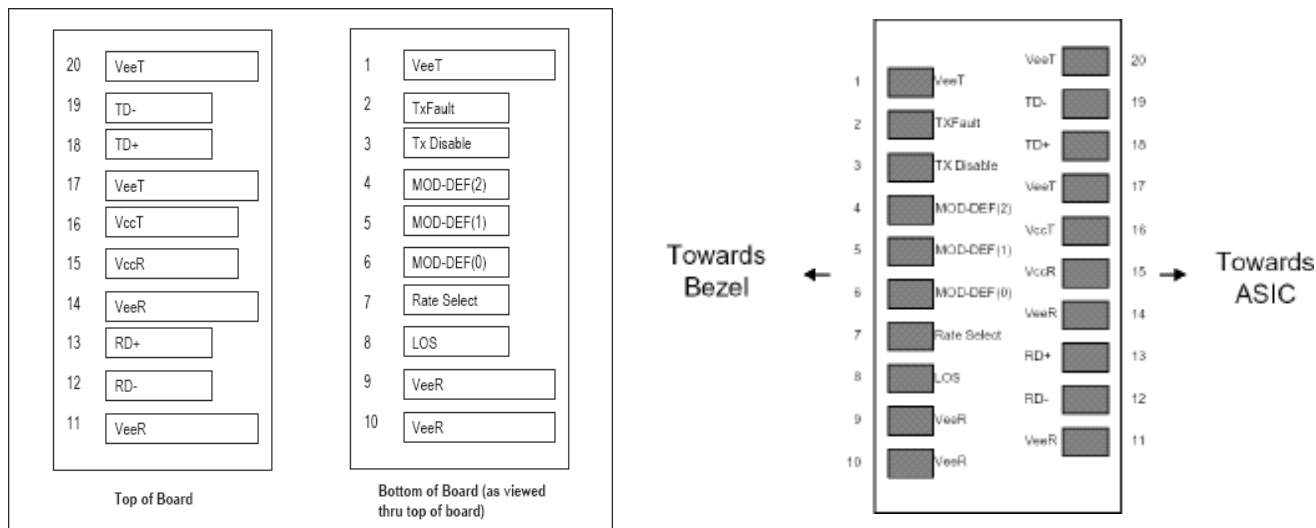
Transmitter Specifications (V_{CC}=3.1V~3.5V ; Top= 0°C~70°C / Top= -40°C~85°C)

Parameter	Symbol	Min	Typ	Max	Unit
Optical Characteristics					
Output Optical Power	P _O	-3	--	+2	dBm
Extinction Ratio	ER	9	--	--	dB
Center Wavelength	λ	1270	1310	1355	nm
Spectral Width (RMS)	σλ	--	--	1	nm
Side Mode Suppression Ratio	SMSR	30		--	dB
Rise/Fall time (20-80%)	T _{r,f}	--	--	260	ps
Relative Intensity Noise	RIN	--	--	-120	dB/H z
Output Eye	Compliant with IEEE 802.3z				
Max. P _{out} TX-DISABLE Asserted	P _{OFF}	--	--	-45	dBm
Electrical Characteristics					
Differential Input Voltage	V _{DIFF}	0.4	--	2.0	V
Tx_Disable_Input_High	V _{DISH}	2.0	--	V _{CC} +0.3	V
Tx_Disable_Input_Low	V _{DISL}	0	--	0.8	V
Tx_Fault_Output_High	V _{FH}	2.0	--	V _{CC} +0.3	V
Tx_Fault_Output_Low	V _{FL}	0	--	0.8	V

Receiver Specifications ($V_{CC}=3.1V\sim 3.5V$; $Top= 0^{\circ}C\sim 70^{\circ}C / Top= -40^{\circ}C\sim 85^{\circ}C$)

Parameter	Symbol	Min	Typ	Max	Unit
Optical Characteristics					
Optical Input Power-maximum	P _{MAX}	-3	--	--	dBm
Receiver Sensitivity (PRBS=2 ⁷ -1 ; BER ≤ 10 ⁻¹²)	Sens	--	--	-23	dBm
Operating Center Wavelength	λ	1260		1610	nm
Optical Return Loss	ORL	12	--	--	dB
Loss of Signal – De-asserted	PSD	--	--	-23	dBm
Loss of Signal - Asserted	PSA	-45	--	--	dBm
Loss of Signal - Hysteresis	PSH	0.5		6	dB
Electrical Characteristics					
Differential Output Voltage	V _{DIFF}	0.4	--	2.0	V
Receiver Loss of Signal Output Voltage -Low	V _{LOSH}	0	--	0.8	V
Receiver Loss of Signal Output Voltage -High	V _{LOSL}	2	--	V _{CC} +0.3	V

Pin Definition and Descriptions



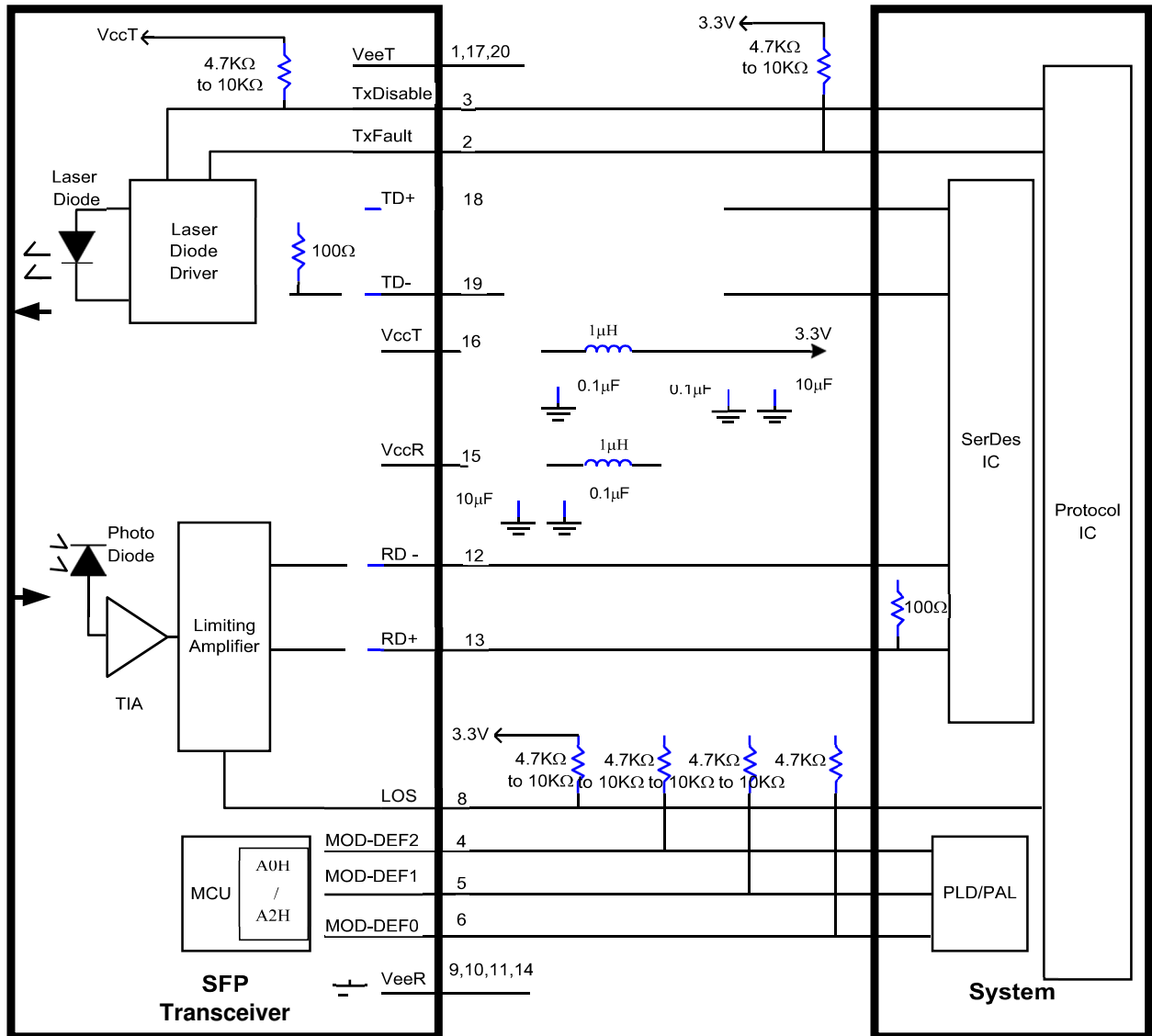
Pin	Name	Input/Output Level	Description
1	VeeT	Input	Transmitter ground
2	TXFault	Output/LVTTL	Laser failure indication. High level indicates "laser failure". Externally pulled up
3	TXDisable	Input/LVTTL	Transmitter disable, High signal/open disables TX laser output. Low level enables TX output, internally pulled up.
4	MOD-DEF(2)	Input/output	Module definition 2, SDA, Data line for I2C bus. Externally pulled up
5	MOD-DEF(1)	Input	Module definition 1, SCL, Clock for I2C bus. Externally pulled up
6	MOD-DEF(0)	Output	Module definition 0, Module present. Ground inside module.
7	Rate Select	-	No connection.
8	LOS	Output/LVTTL	Receiver loss of signal indication. Low signal indicates optical signal is present at RX input. Should be Externally pulled up.
9	VeeR	Input	Receiver ground
10	VeeR	Input	Receiver ground
11	VeeR	Input	Receiver ground



SFP Gigabit Ethernet Transceiver
PRODUCT NUMBER: TSP-SXCB1-K11

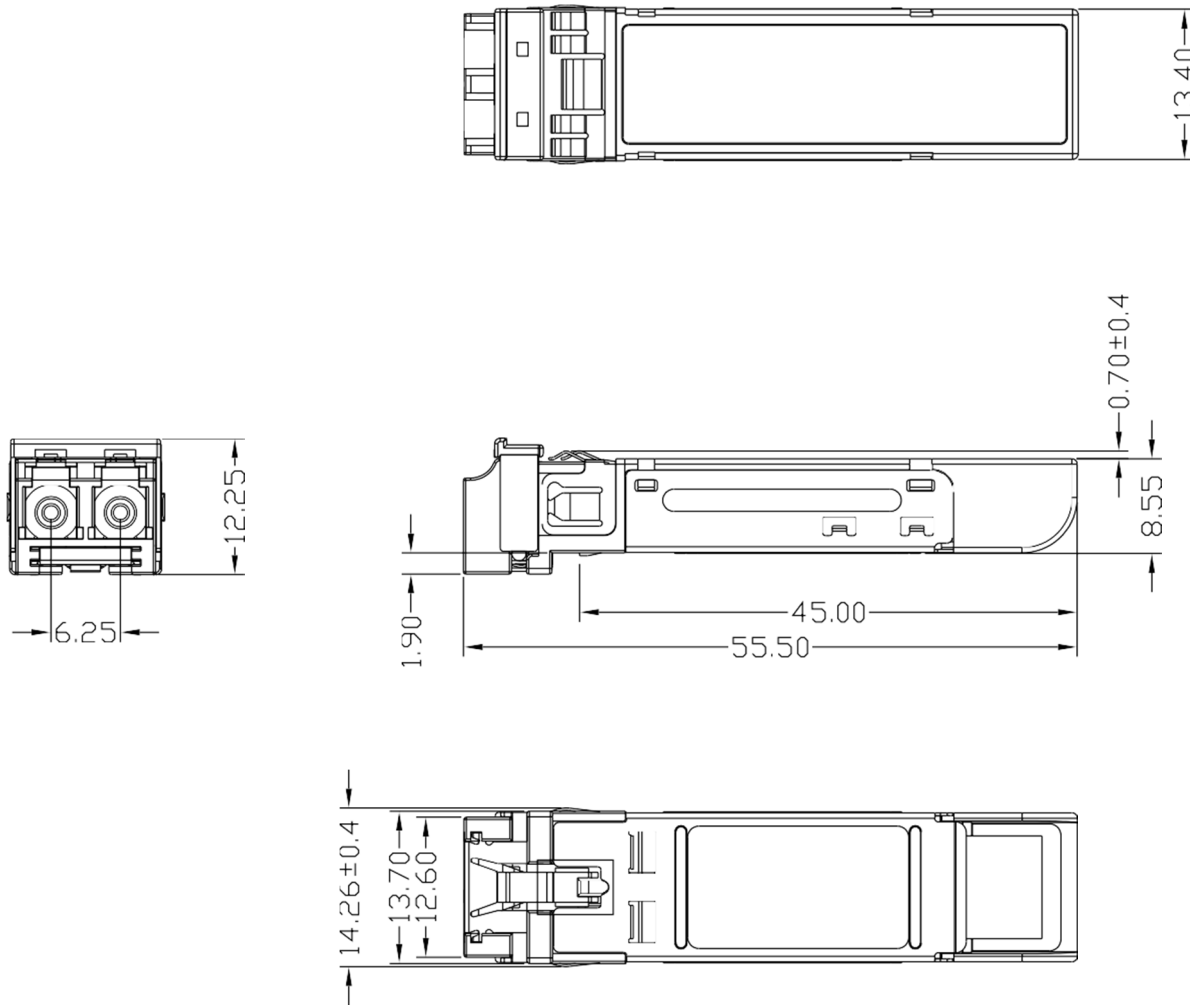
12	RD -	Output/LVPECL	Inverted receiver data output (AC coupled)
13	RD +	Output/LVTTL	Non-inverted receiver data output (AC coupled)
14	VeeR	Input	Receiver ground
15	VccR	Input	Receiver power supply
16	VccT	Input	Transmitter power supply
17	VeeT	Input	Transmitter ground
18	TD +	Input/LVPECL	non-inverted transmitter data input (AC coupled)
19	TD -	Input/LVPECL	Inverted transmitter data input (AC coupled)
20	VeeT	Input	Transmitter ground

Recommended Circuit Diagram



Mechanical Outlines

(Unit : mm)



ESD

Normal ESD precautions are required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.



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