Specification

Small Form Factor Pluggable Bidirectional

Optical Transceivers

LC Receptacle

1550nm TX / 1310nm RX

1250Mbit /s

T B S – S x C K 1 – F 1 1

1. 3.3V / 0 ~ 70℃
2. 3.3V / -40 ~ 85℃

Ordering Information:

Model Name	TBS-S1CK1-F11	TBS-S2CK1-F11	Note
Voltage	3.3V		
Device Type	DFB Laser / PIN Detector		
LOS	AC / AC Coupling		
Temperature	0 ~ +70℃	-40℃ ~ +85℃	
Distance	10km		
Latch Color	Blue		

Features

- Standard Small Form Factor Pluggable Package MSA Compliant
- Simplex LC Receptacle Optical Interface
- 2 Wavelengths in One Single-Mode fiber
- Integrated WDM Filter for Transmitting and Receiving Signal
- Single + 3.3 V Power Supply
- Differential LVPECL Data Input and Output
- LVTTL Loss of Signal
- Serial ID through I2C Interface
- Metal Enclosure and Low Power Consumption
- RoHS Compliant

Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit
Storage Temperature	T_S	-40	--	85	℃
Supply Voltage	V_{CC}	0	--	3.8	V
Relative humidity (non-condensing)	RH	--	--	85	%
Input voltage	V_{IN}	0	--	V_{CC}	V

Recommand Operation Enviroment

Parameter	Symbol	Min	Typ	Max	Unit
Case Operating Temperature (TBS-S1CK1-F11)	Tc	0	--	70	℃
Case Operating Temperature (TBS-S2CK1-F11)	Tc	-40	--	85	℃
Supply Voltage	V_{CC}	3.1	3.3	3.5	V
Supply Current (Total Current)	I_{Total}	--	--	300	mA

Transmitter Specifications (VCC=3.1V~3.5V ; Top= 0℃~70℃ / Top -40℃~ 85 ℃)

Parameter	Symbol	Min	Typ	Max	Unit
Optical Characterstics					
Optical Output Power	P_O	-9	--	-3	dBm
Optical Extinction Ratio	E_R	8.2	--	--	dB
Center Wavelength	λ	1480	--	1580	nm
Spectral Width (RMS)	Δλ	--	--	1	nm
Side Mode Suppression Ratio	SMSR	30	--	--	dB
Optical Rise / Fall Time	t_r / t_f	--	--	260	psec
Electrical Characteristics					
Transmitter Differential Input Voltage	V_{DIFF}	400	--	2000	mVp-p
Tx_Fault - High	V_{FH}	2	--	V_{CC}+0.3	V
Tx_Fault - Low	V_{FL}	0	--	0.8	V
Tx_Disable - High	V_{DISH}	2	--	V_{CC}+0.3	V
Tx_Disable - Low	V_{DISL}	0	--	0.8	V

Notes:

1. All of data is measured at 1250Mbps, PRBS 2^7-1 ,NRZ.
2. 20%~80% for Optical Rise/Fall Time measurement

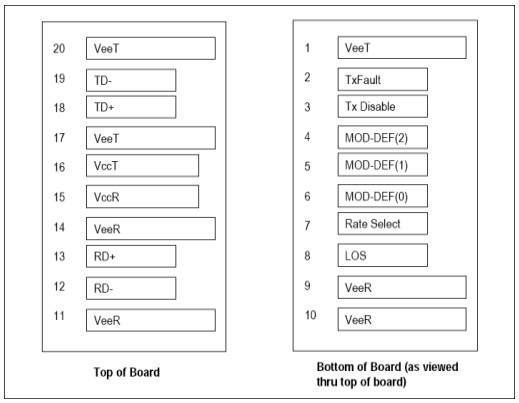
Receiver Specifications (VCC=3.1V~3.5V ; Top= 0℃~70℃ / Top -40℃~ 85 ℃)

Parameter	Symbol	Min	Typ	Max	Unit
Optical Characteristics					
Operating Center Wavelength	λ_c	1260	--	1360	nm
Receiver Overload	P_{max}	-3	--	--	dBm
Receiver Sensitivity	Sens	--	--	-21	dBm
Loss of Signal – Asserted	P_{SA}	-45	--	--	dBm
Loss of Signal– De asserted	P_{SD}	--	--	-22	dBm
Loss of Signal – Hysteresis	P_{SH}	0.5	--	6	dB
Electrical Characteristics					
Differential Output Voltage	V_{DIFF}	0.4	--	2.0	V
Receiver Loss of Signal Output Voltage - Low	V_{LOSL}	0	--	0.8	V
Receiver Loss of Signal Output Voltage - High	V_{LOSH}	2	--	V_{CC}+0.3	V

Notes:

1. With BER better than or equal to 10^{-12}
2. Measured in the center of the eye opening with 2^7 -1 PRBS, NRZ

Pin Definition and Descriptions



SFP Transceiver Electric Pad Layout

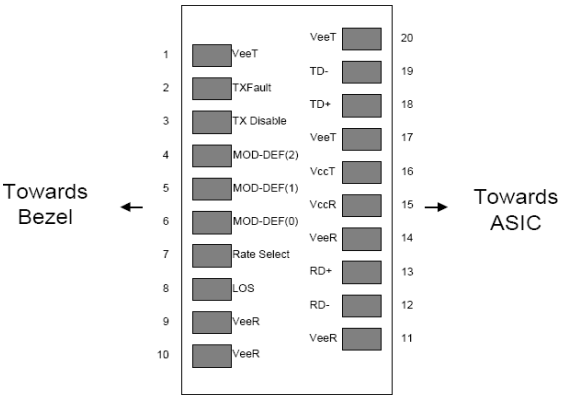
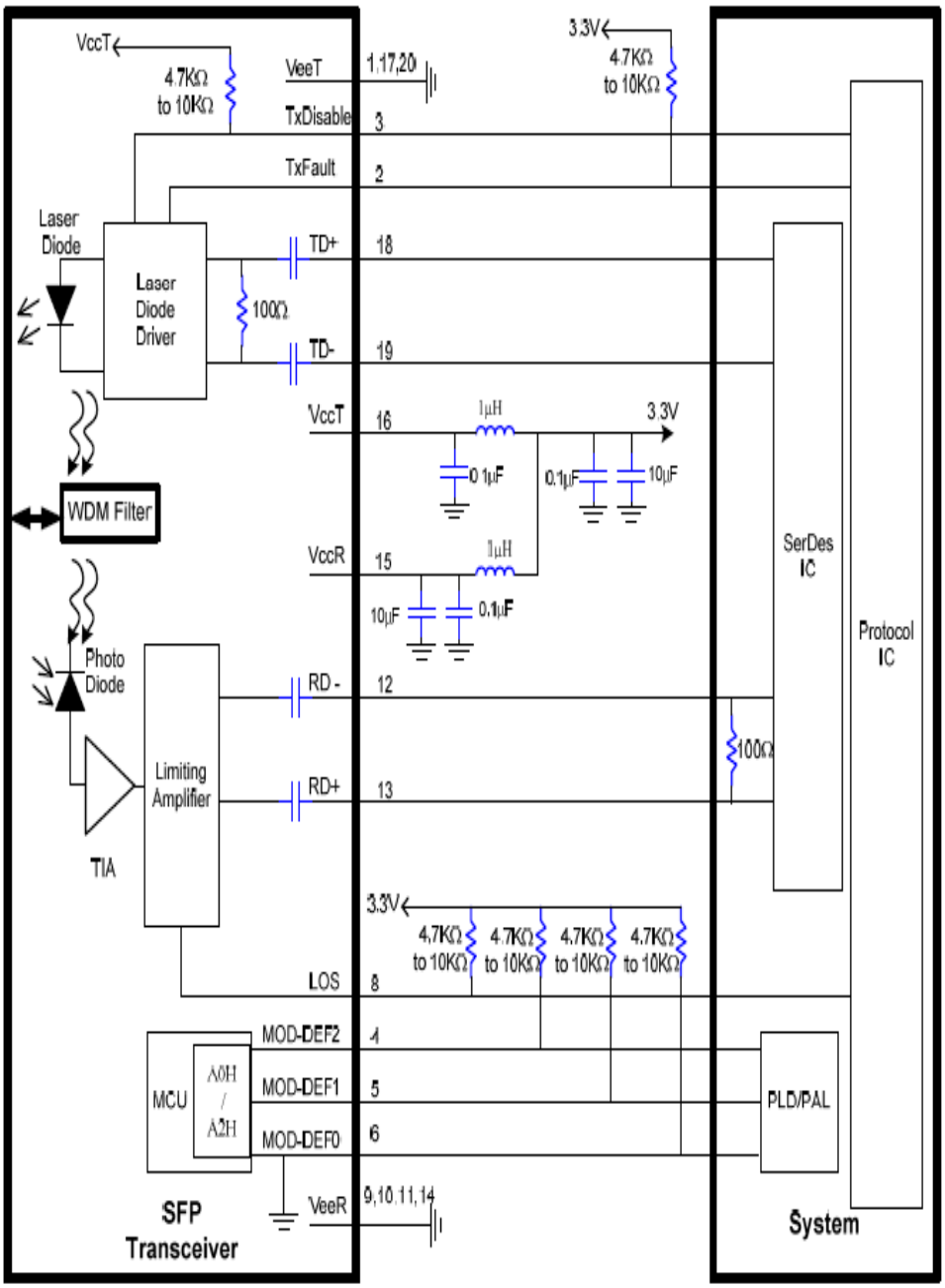


Diagram of Host Board Connector Block Pin Numbers and Names

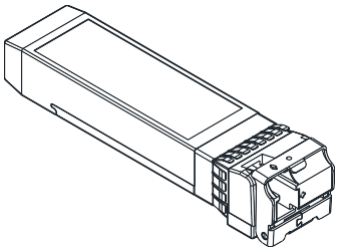
Pin No.	Pin Name	Description	I/O / Level
1	VeeT	Transmitter Ground	Input
2	TxFault	Transmitter Fault Indication. High Level Indicates “Laser Failure”. Externally Pulled up	Output / LVTTL
3	TxDisable	Transmitter Disable. High Signal/Open Disables TX Laser Output. Low Level Enables TX Output, Internally Pulled up.	Input / LVTTL
4	MOD_DEF(2)	SDA, Data line for I2C Bus. Externally Pulled up	Input/output
5	MOD_DEF(1)	SCL, Clock for I2C Bus. Externally Pulled up	Input
6	MOD_DEF(0)	Module Present. Ground Inside Module.	Output
7	Rate Select	Select Between Full or Reduced Receiver Bandwidth. No Connection.	--
8	LOS	Receiver Loss of Signal Indication. Low Signal Indicates Optical Signal is Present at RX Input. Should be Externally Pulled up.	Output / LVTTL
9	VeeR	Receiver Ground	Input
10	VeeR	Receiver Ground	Input
11	VeeR	Receiver Ground	Input
12	RD -	Inverted receiver data output	Output / LVPECL
13	RD +	Non-inverted receiver data output	Output / LVPECL
14	VeeR	Receiver Ground	Input
15	$V_{CC}R$	Receiver Power	Input
16	$V_{CC}T$	Non-Inverted Transmitter Data Input	Input
17	VeeT	Inverted Transmitter Data Input	Input
18	TD +	Transmitter Data In	Input / LVPECL
19	TD -	Inv. Transmitter Data In	Input / LVPECL
20	VeeT	Transmitter Ground	Input

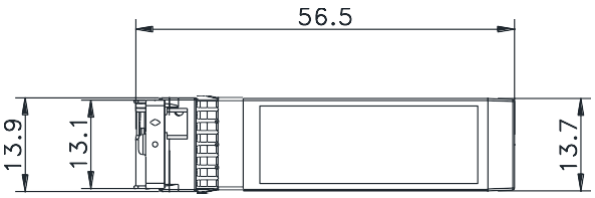
Recommended Circuit Diagram

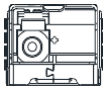


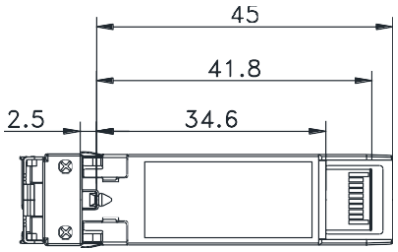
Mechanical Outlines:

(Units in mm)









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Revision History

Date	Version	Description
03/14/2024	1.0	Initial release