SFP Duplex 1.25Gbps 3.3V Single-Mode Transceiver

TSFPGLX10-T

1310nm FP / PIN-TIA 10km

Description

General

The transceiver is small form factor pluggable module with standard duplex connector for fiber communications. This module is designed for single-mode-fiber (SMF) and operates at a nominal wavelength of 1310 nm with cost effective and high performance. It is with the SFP 20-pin connector to allow hot plug capability.

Transmitter Section

The transmitter consists of a high-performance 1310 nm Febry-Perot (FP) laser in the optical subassembly (OSA), which is housed within a metal package. In addition, this component is also class 1 laser compliant with according to International Safety Standard IEC-825 Compliant. Complies with EN60825-1 and FDA 21 CFR 1040.10 and 1040.11

Receiver Section

The receiver contain of an InGaAs PIN photodiode coupled to a high sensitivity transimpedance amplifier (TIA) in an OSA. This OSA combination is mated to a post amplifier IC that provides the post amplification and SD (Signal Detection) or LOS (Loss of Signal) indication circuit, which provides logic high state output when an unusable input optical signal level is detected.

Features

- Single + 3.3V power supply
- Differential Inputs and Outputs
- Small Form Factor Pluggable MSA Compliant.
- Compliant with SFF-8472 MSA Digital Diagnostic Monitor (DDM), Internal Calibration.
- Class 1 Laser International Safety Standard IEC 825 Compliant. Complies with EN60825-1 and FDA 21 CFR 1040.10 and 1040.11
- Industrial Operation Temp.: -40 °C to +85 °C
- RoHS Compliant

Applications

- Bridges/Routers/intelligent hub and concentrators
- Gigabit Ethernet / Fiber Channel
- Storage Area Network

Performance Specifications

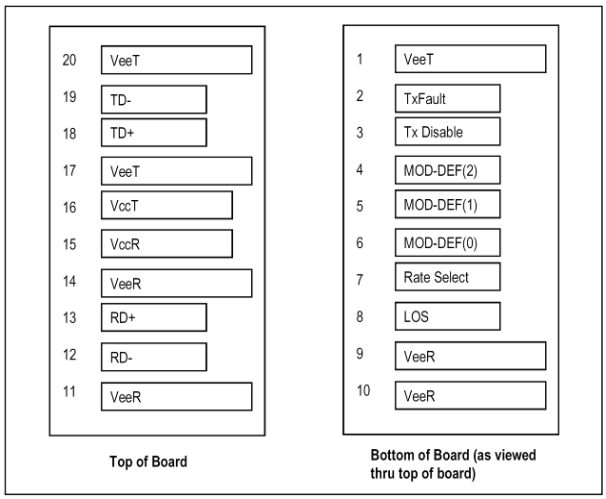
Absolute Maximum Ratings					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**
Supply Voltage	V_{CC}	0	-	4	V
Storage Temperature	T_S	-40	-	85	°C
Operating Temperature	T_{OP-ind}	-40	-	85	°C
Lead Soldering Limits	T_{SOLD}	-	-	260/10	°C /sec
General Specifications					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**
Data Rate	B	0.80	1.25	1.50	Gbps
Supported Link Length on 9/125μm SMF	L	10	-	-	Km
Supply Current	$I_{Tx}+I_{Rx}$	-	-	300	mA
Power Dissipation	P_{Dis}	-	-	1000	mW

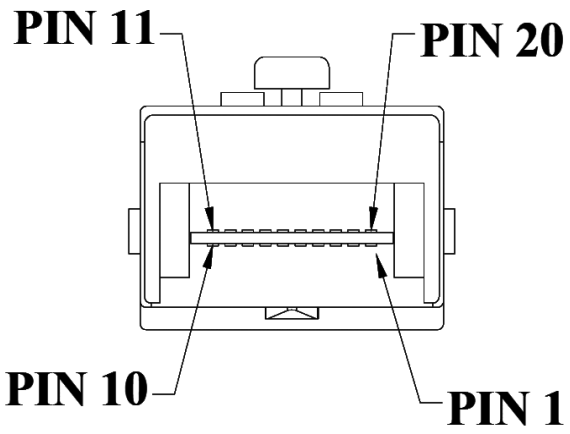
Optical and Electrical Characteristics

Transmitter Electrical Characteristics					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**
Supply Voltage	V_{CC}	3.15	3.3	3.45	V
Data Differential Input Voltage	$V_{in,\ pp}$	400	-	2000	mV
Disable Input Voltage	V_{IL} - V_{CC}	-1.81	-	-1.48	V
Enable Input Voltage	V_{IH} - V_{CC}	-1.16	-	-0.88	V
TX Fault Voltage-High (Fault)	V_{TF}	2.0	-	V_{CC}	V
TX Fault Voltage-Low (Normal)	V_{TN}	0	-	0.8	V
POut@TX Disable Asserted	P_{OFF}	-	-	-45	dBm
Transmitter Optical Characteristics					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**
Output Optical Power on 9μm SMF	P_O	-9	-	-3	dBm
Center Wavelength	λ_C	1280	1310	1340	nm
Spectral Width (RMS)	$\Delta\lambda_{RMS}$	-	-	2	nm
Optical Rise Time (20%-80%)	t_r	-	-	0.26	ns
Optical Fall Time (20%-80%)	t_f	-	-	0.26	ns
Extinction Ratio	ER	9	-	-	dB

Receiver Electrical Characteristics					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**
Supply Voltage	V_{CC}	3.15	3.3	3.45	V
Data Differential Output Voltage	$V_{out,\ pp}$	500	-	1200	mV
Receiver LOS/SD Output Voltage-High	V_{RH}	2.0	-	V_{CC}	V
Receiver LOS/SD Output Voltage-Low	V_{RL}	0	-	0.8	V
Data Output Rise Time (20%-80%)	t_r	-	-	0.35	ns
Data Output Fall Time (20%-80%)	t_f	-	-	0.35	ns
Receiver Optical Characteristics					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**
Maximum Receiver Power	P_{in}	-3	-	-	dBm
Receiver Sensitivity	P_S	-	-	-21	dBm
Operating Wavelength	λ_C	1100	-	1600	nm
Optical Return Loss	P_R	-	-	12	dB
Signal Detect-Asserted	P_A	-	-	-21	dBm avg.
Signal Detect-Deasserted	P_D	-36	-	-	dBm avg.
Signal Detect-Hysteresis	P_A-P_D	0.5	-	-	dB

SFP Transceiver Electrical Pad Layout





Pinout Table

Pin	Symbol	Name/Description	Ref.
1	V_{EET}		
2	T_{FAULT}	Transmitter Fault.	3
3	T_{DIS}	Transmitter Disable. Laser output disabled on high or open.	1
4	MOD_DEF (2)	Module Definition 2. Data line (SDA) for Serial ID.	2
5	MOD_DEF (1)	Module Definition 1. Clock line (SCL) for Serial ID.	2
6	MOD_DEF (0)	Module Definition 0. Grounded within the module.	2
7	Rate Select	Open Circuit	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	3
9	V_{EER}	Receiver Ground	
10	V_{EER}	Receiver Ground	
11	V_{EER}	Receiver Ground	
12	RD-	Receiver Inverted DATA out. AC Coupled	
13	RD+	Receiver Non-inverted DATA out. AC Coupled	
14	V_{EER}	Receiver Ground	
15	V_{CCR}	Receiver Power Supply	
16	V_{CCT}	Transmitter Power Supply	
17	V_{EET}	Transmitter Ground	
18	TD+	Transmitter Non-Inverted DATA in. 100 ohm termination between TD+ and TD-, AC Coupled thereafter.	
19	TD-	Transmitter Inverted DATA in. See TD+	
20	V_{EET}	Transmitter Ground	

Notes:

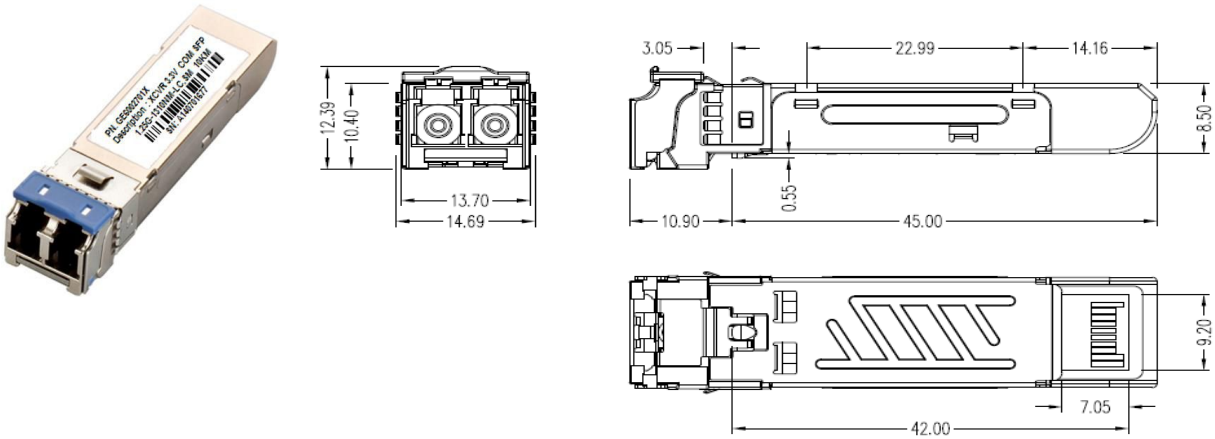
1. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
2. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 5.5V. MOD_DEF (0) pulls line low to indicate module is plugged in.
3. TX-Fault and LOS are open collector output. Should be pulled up with 4.7k – 10k ohms on host board to a voltage between 2.0V and 5.5V.

Package Outline Drawing

LC Type

DIMENSIONS ARE IN MILLIMETERS (unit:mm)

ALL DIMENSIONS ARE 0.2mm UNLESS OTHERWISE SPECIFIED



Eye Safety

The transceiver is a class 1 laser product. It complies with EN 60825-1 and FDA 21 CFR 1040.10 and 1040.11. In order to meet laser safety requirements the transceiver shall be operated within the Absolute Maximum Ratings.

Caution

All adjustments have been done at the factory before the shipment of the devices. No maintenance and user serviceable part is required. Tampering with and modifying the performance of the device will result in voided product warranty.