



T1-SFP-10G-SR Optical Transceiver Datasheet

Overview

T1Nexus T1-SFP-10G-SR is is high performance, cost effective module. The transceiver consists of three sections: a VCSEL laser transmitter, a PIN photodiode integrated with a trans-impedance preamplifier (TIA,) and an MCU control unit. All modules satisfy class I laser safety requirements.

The transceivers are compatible with SFP Multi-Source Agreement and SFF-8472 digital diagnostics functions.

Product Features

- Hot-pluggable SFP+ footprint
- 850nm VCSEL laser and PIN photodiode, Up to 300m for OM3-MMF transmission
- Compliant with SFP+ MSA and SFF-8472 with duplex LC receptacle
- Compatible with RoHS
- Single +3.3V power supply
- Power dissipation <1W
- Real Time Digital Diagnostic Monitoring
- Operating case temperature:
- 0 to +70°C

Applications

- 10 Gigabit Ethernet
- Also support 10M/100M/1G/2.5G/5G data rate

Regulatory Compliance

Feature	Standard	Performance
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN 55022:2010, Class B	Compatible with standards
Electromagnetic susceptibility (EMS)	EN 55024:2010	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2	Compatible with Class I laser product

Ordering Information

Part Number	Description
T1-SFP-10G-SR	SFP+ 10G 850nm 300m optical transceiver with full real-time digital diagnostic monitoring

For more information:

T1Nexus

Address: 4701 Patrick Henry Drive, Bldg 16, Santa Clara, CA 95054

Toll-free phone number: 1-877-T1Nexus (1-877-816-3987)

Email: sales@t1nexus.com

General Specifications

Absolute Maximum Ratings

The operation in excess of any absolute maximum ratings might cause permanent damage to this module.

Parameter	Symbol	Min	Max	Unit	Notes
Storage Temperature	TS	-40	85	°C	
Operating Case Temperature	TOP	0	70	°C	
Power Supply Voltage	V _{CC}	-0.3	3.6	V	
Relative Humidity (non-condensation)	RH	5	85	%	

Recommended Operating Conditions and Power Supply Requirements

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	TOP	0		70	°C	
Power Supply Voltage	V _{CC}	3.135	3.3	3.465	V	
Power Consumption				1	W	
Data Rate	DR		10.3125		Gbps	

Optical Characteristics

All parameters are specified under the recommended operating conditions unless otherwise specified..

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter						
Centre Wavelength	λ_c	840	850	860	nm	
Spectral Width (RMS)	$\Delta\lambda$			0.65	nm	
Side-Mode Suppression Ratio	SMSR	30			dB	
Average Output Power	P _{out}	-6.0		-1	dBm	1
Extinction Ratio	ER	3.5			dB	
Data Input Swing Differential	V _{IN}	180		700	mV	2
Receiver						
Centre Wavelength	λ_c	840	850	860	nm	
Receiver Sensitivity				-10.5	dBm	3
Receiver Overload		0.5			dBm	3
LOS De-Assert	LOS _D			-12	dBm	
LOS Assert	LOS _A	-30			dBm	
LOS Hysteresis		0.5		5	dB	
Data Output Swing Differential	V _{out}	500	700	900	mV	4
LOS	High	2.0		V _{CC}	V	
	Low			0.8	V	

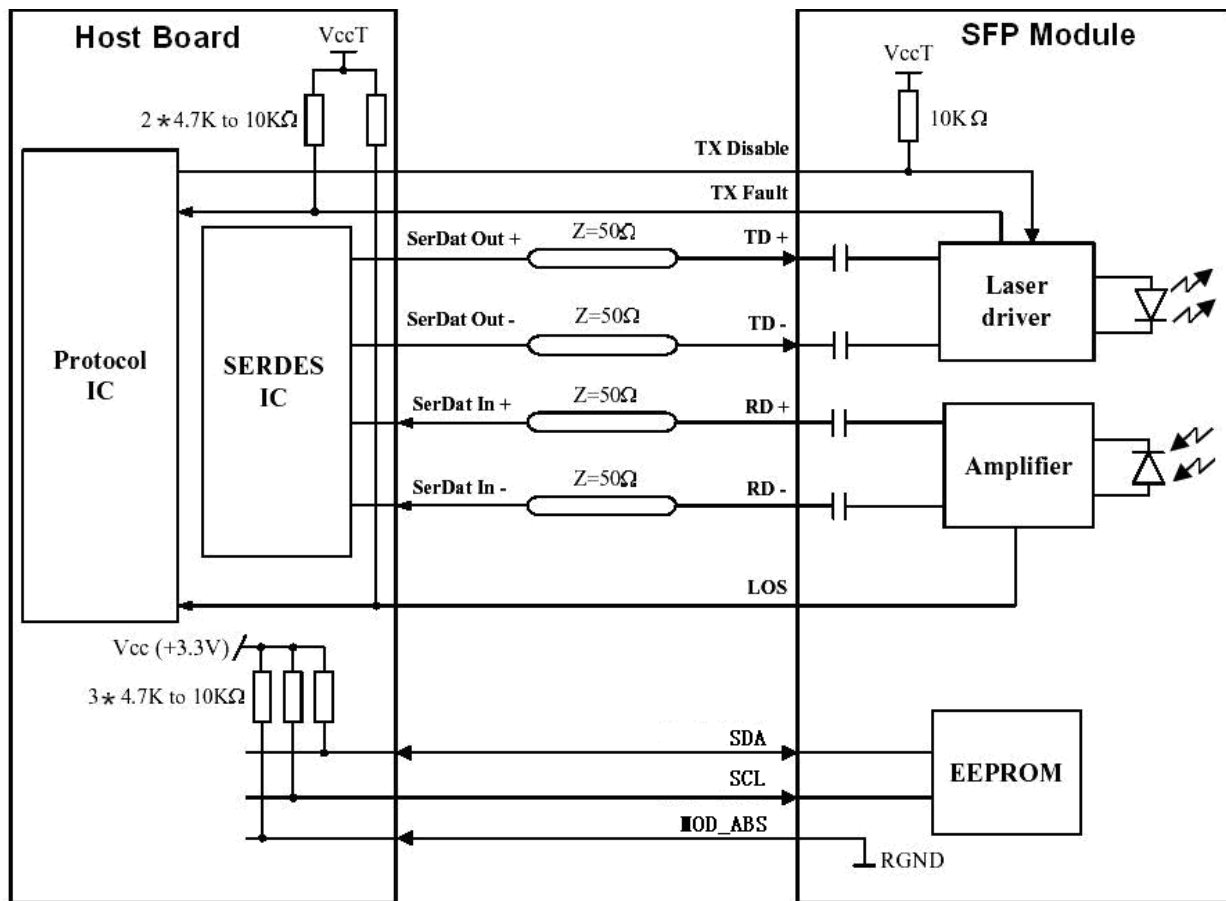
Notes:

1. The optical power is launched into MMF.
2. PECL input, internally AC-coupled and terminated.
3. Measured with a PRBS 2³¹-1 test pattern @10312Mbps, BER ≤1×10⁻¹².
4. Internally AC-coupled.
5. Compliant with ITUT and IEEE recommendation MASK.

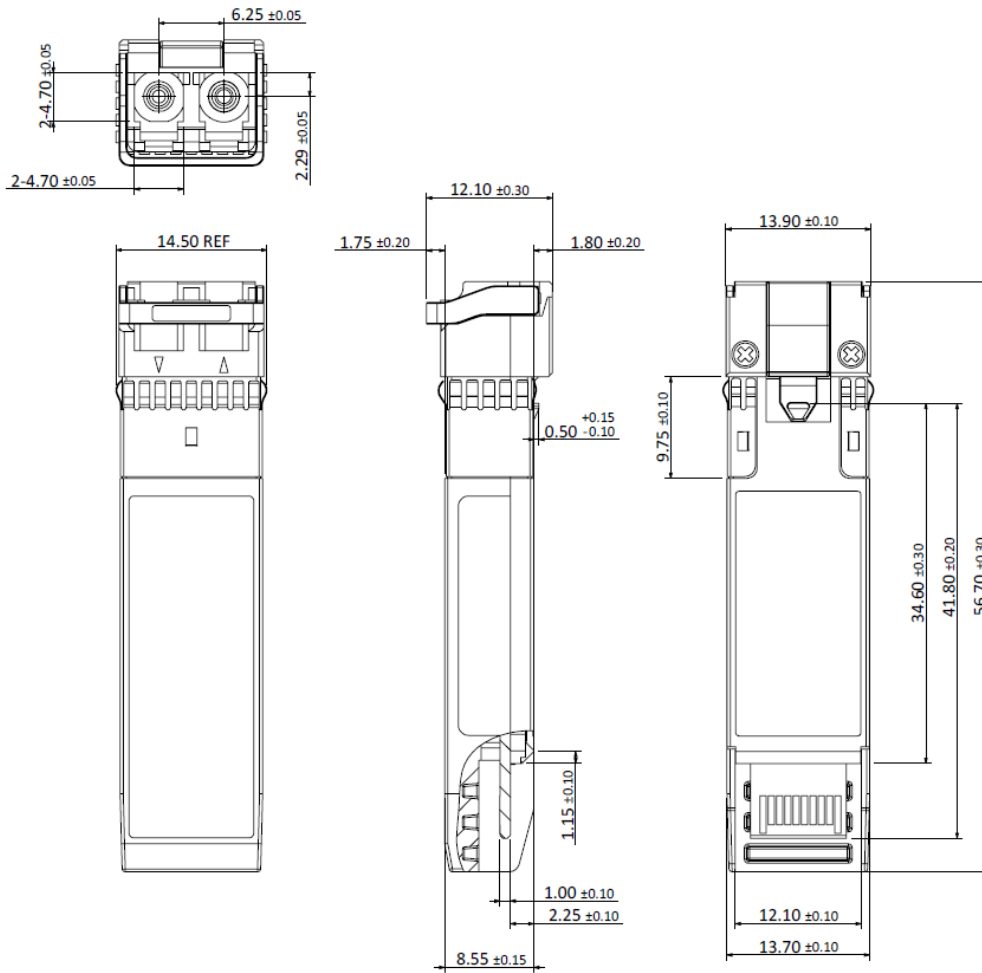
Digital Diagnostic Functions

Parameter	Symbol	Min	Max	Unit	Notes
Temperature monitor absolute error	DMI_Temp	-3	+3	°C	
Supply voltage monitor absolute error	DMI_VCC	-3%	+3%	V	
TX power monitor absolute error	DMI_RX	-3	+3	dB	
RX power monitor absolute error	DMI_RX	-3	+3	dB	
Bias current monitor	DMI_Ibias	-10%	+10%	mA	

Recommended Circuit

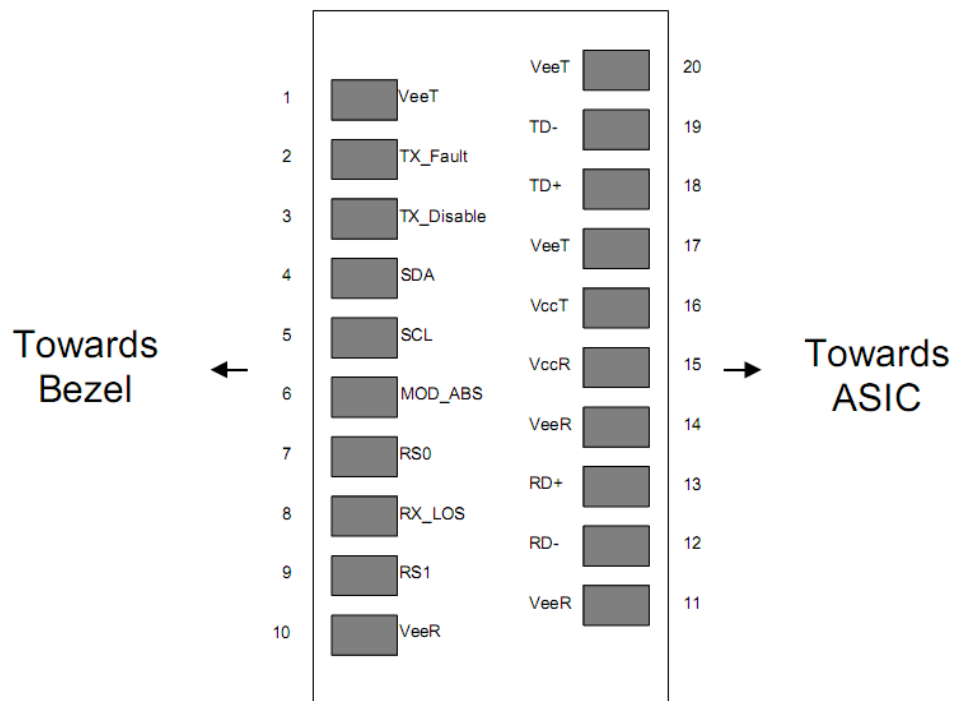


Mechanical Dimension



(Unit: mm [inch])

Electrical Pad Layout



Pin Assignment

PIN #	Symbol	Description	Notes
1	VEET	Transmitter Ground	1
2	TX FAULT	Transmitter Fault Indication	3
3	TX DISABLE	Transmitter Disable	3
4	SDA	SDA Serial Data Signal	3
5	SCL	SCL Serial Clock Signal	3
6	MOD_ABS	Module Absent. Grounded within the module	3

7	RS0	Not Connected	3
8	LOS	Loss of Signal	3
9	RS1	Not Connected	3
10	VEER	Receiver ground	1
11	VEER	Receiver ground	1
12	RD-	Inv. Received Data Out	3
13	RD+	Received Data Out	3
14	VEER	Receiver ground	1
15	VCCR	Receiver Power Supply	2
16	VCCT	Transmitter Power Supply	2
17	VEET	Transmitter Ground	1
18	TD+	Transmit Data In	3
19	TD-	Inv. Transmit Data In	3
20	VEET	Transmitter Ground	1

Notes:

Plug Seq.: Pin engagement sequence during hot plugging.

1. TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; Logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.
2. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
3. LOS is open collector output. Should be pulled up with 4.7k~10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.
4. RD-/+: These are the differential receiver outputs. They are internally AC-coupled 100 Ω differential lines which should be terminated with 100Ω (differential) at the user SERDES.
5. TD-/+: These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module.