

10G EPON OLT SFP+ 1577nm-TX/1270nm-RX and 1490nm-TX/1310nm-RX PR30 20km DOM SC SMF Optical Transceiver Module (Industrial)

10ESFP-52-PR30F-I



Application

- FTTx 10G EPON Access Network

Features

- Single Fiber, Integrated Triplexer Transceiver
- Support IEEE802.3 2018 10Gbase PR30-D 10GEPON OLT
- Support IEEE802.3 2018 1000Base-PX30 EPON OLT
- Integrated with Micro-optics WDM Filter
- 1577nm Continuous-mode Transmitter with EML Laser
- 1490nm Continuous-mode Transmitter with DFB Laser
- Optional Supported 1270nm/1310nm Burst-mode Receiver with APD-TIA
- Digital Diagnostic SFF-8472 Compliant
- +3.3V Power Supplies
- Operating Case Temperature:
Commercial Temp 0 to 70 °C
Industry Temp -40 to 85 °C
- 20km Transmission
- RoHS with Exemption

Description

The 10.3125G-TX/10.3125G-RX and 1.25G-TX/1.25G-RX transceiver module is specifically designed for 10Gigabit Ethernet Passive Optical Network (10G EPON & EPON) system. It integrates bidirectional data transmission over one single-mode optical fiber. The 10G EPON OLT Small Form-factor Pluggable Plus (SFP+) transceiver provides a symmetric 10.3125Gbps & 1.25Gbps upstream and 10.3125Gbps & 1.25Gbps downstream data rate, reaching a link up to 20km via an SC/UPC connector. It can operate at temperatures between -40 to 85°C. Digital diagnostic monitoring (DOM) allows access to real-time operating parameters. It is fully compliant with IEEE 802.3 2018, SFF 8472 and RoHS.

Product Specifications

I. Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature Range	Ts	-40	-	85	°C	
Operating Case Temperature	Tc	0	-	70	°C	
Operating Temperature	Tc	-40	-	+85	°C	
Supply Voltage	Vcc3	-0.3	-	+3.63	V	
Operating Relative Humidity	RH	5	-	85	%	

II. Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply Voltage	Vcc3	3.135	3.3	3.465	V	
Power Consumption	Pwc			2.5	W	1
	Pwi			3	W	2
Operating Temperature (Case)	Topr	0	-	70	°C	
	Topr	-20		80	°C	
	Topr	-40	-	+85	°C	
Transmission				20	km	

- Notes:
- 1. 0~70 °C
 - 2. -40~85 °C

III. Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
10G Transmitter						
Transmitter Signal Rate			10.3125		Gbps	
Centre Wavelength	λ_c	1575	1577	1580	nm	
Optical Spectrum Width (-20dB)	$\Delta\lambda$			1	nm	
Side Mode Suppression Mode	SMSR	30			dB	
Average Launch Power	P _{OUT}	2		5	dBm	
Average Launch Power-OFF Transmitter	P _{OFF}			-39	dBm	
Extinction Ratio	ER	6			dB	2
Optical Eye Mask	Compliant With IEEE Std 802.3 2018 section5					2,4
1G Transmitter						
Transmitter Signal Rate			1.25		Gbps	
Centre Wavelength	λ_c	1480	1490	1500	nm	
Side Mode Suppression Mode	SMSR	30			dB	
Average Launch Power	P _{OUT}	3		7	dBm	
Average Launch Power-OFF Transmitter	P _{OFF}			-39	dBm	

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Extinction Ratio	ER	9			dB	5
Optical Eye Mask	Compliant With IEEE Std 802.3 2018 section5					5,6

10G Receiver

Transmitter Signal Rate			10.3125		Gbps	
Operating Wavelength	λ_C	1260		1280	nm	
Sensitivity (BOL)	PSEN			-28	dBm	7
Saturation	PSAT	-6			dBm	
Loss of Signal Assert	PLOSA	-45	-	-	dBm	
Loss of Signal Deassert	PLOSD			-29	dBm	

1G Receiver

Operating Wavelength	λ_C	1260	1310	1360	nm	
Sensitivity	PSEN			-29.78	dBm	8
Saturation	PSAT	-9.38				
Loss of Signal Assert	PLOSA	-45	-	-	dBm	
Loss of Signal Deassert	PLOSD			-30	dBm	

Notes:

- 1. The optical power is launched into 9/125um SMF.
- 2. Measured with PRBS 2³¹- 1 test pattern @10.3125Gbps.
- 3. Measured with the Bessel-Thompson filter OFF.
- 4. Transmitter eye mask definition {0.25UI, 0.40UI, 0.45UI, 0.25UI, 0.28UI,0.40UI}.
- 5. Measured with PRBS 2⁷- 1 test pattern @1.25Gbps.
- 6. Transmitter eye mask definition {0.22UI, 0.375UI, 0.20UI, 0.20UI, 0.30UI}.
- 7. Measured with a PRBS 2³¹- 1 test pattern @10.3125Gbps and ER=6dB, BER=10⁻³
- 8. Measured with a PRBS 2⁷- 1 test pattern @1.25Gbps and ER=9 dB, BER=10⁻¹²

IV. Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Time to Initialize	t_start_up	-	-	300	ms	
10G Transmitter						
Data Input Differential Swing	V _{IN}	120		800	mVp-p	1
Input Differential Impedance	Z _{IN}	80	100	120	Ω	
Transmitter Disable Voltage - Low	V _{TDIS, L}	0		0.8	V	2
Transmitter Disable Voltage - High	V _{TDIS, H}	2.0		V _{cc}	V	2
1G Transmitter						
Data Input Differential Swing	V _{IN}	200		1600	mVp-p	3
Input Differential Impedance	Z _{IN}	90	100	110	Ω	
Transmitter Fault Indication Voltage - Low	V _{TFI, L}	0		0.4	V	
Transmitter Fault Indication Voltage - High	V _{TFI, H}	2.4		V _{cc}	V	
10G Receiver						
Data Output Differential Swing	V _{OUT}	400		800	mVP-P	4
Loss of Signal Detected Voltage - Low	V _{los, L}	0		0.8	V	5
Loss of Signal Detected Voltage - High	V _{los, H}	2.4		V _{CC3}	V	
Loss of Signal Assert Time	T _{LOSA}			1024	ns	
Loss of Signal Deassert Time	T _{LOSD}			512	ns	
Output Differential Impedance	R _{out}	80	100	120	Ω	
1G Receiver						
Data Output Differential Swing	V _{OUT}	1200		1600	mVP-P	6
Loss of Signal Detected Voltage - Low	V _{los, L}	0		0.4	V	

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Loss of Signal Detected Voltage - High	$V_{los, H}$	2.4		V_{CC3}	V	
Loss of Signal Assert Time	T_{LOSA}			1024	ns	
Loss of Signal Deassert Time	T_{LOSD}			512	ns	
Output Differential Impedance	R_{out}	80	100	120	Ω	

- Notes:
- 1. Compatible with CML input, AC coupled internally.
 - 2. Tx_Disable
 - 3. Compatible with LVPECL input, AC coupled internally.
 - 4. Compatible with CML Output, AC coupled internally. guaranteed in the full range of input optical power
 - 5. LOS
 - 6. Compatible with LVPECL Output, DC coupled internally. guaranteed in the full range of input optical power

V. RSSI Timing

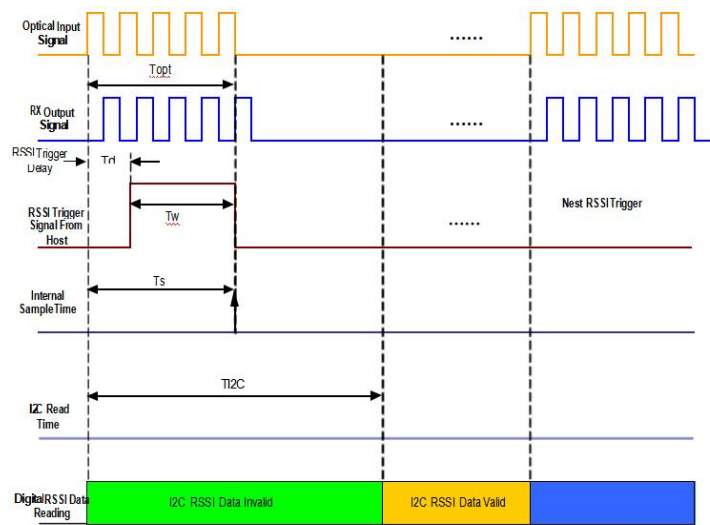


Figure 1, RSSI Timing

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Optical Signal Length	T_{opt}	1000	1200	1700	ns	
RSSI Trigger Delay	T_d	100	300	400	ns	
RSSI Trigger Signal Width	T_w	600	800	1000	ns	
I ² C Read Time	T_{I2C}	500			us	

VI. Diagnostics

Parameter	Range	Accuracy	Unit	Calibration	Notes
Temperature	0 to 70 -40 to 85	±3	°C	Internal	LSB Equal to 1/256C
Voltage	3 to Vcc	±3%	V	Internal	LSB Equal to 100uV
Bias Current (10G)	0 to 140	10%	mA	Internal	LSB Equal to 4uA
Bias Current (1G)	0 to 80	10%	mA	Internal	LSB Equal to 4uA
Tx Power (10G)	2 to 5	±3	dBm	Internal	LSB Equal to 0.2uW
Tx Power (1G)	3 to 7	±3	dBm	Internal	LSB Equal to 0.2uW
Rx Power (10G)	-28 to -6	±3	dBm	Internal	LSB Equal to 0.1uW
Rx Power (1G)	-30 to -10	±3	dBm	Internal	LSB Equal to 0.1uW

VII. Pin Function Definitions

Pin	Symbol	Logic
1	1G_TD+	CML/LVPECL
2	1G_TD-	CML/LVPECL
3	GND	
4	SDA	LVTTTL
5	SCL	LVTTTL
6	1G_RD-	
7	NC	
8	LOS	
9	Trigg/Txdis	LVTTTL

Pin	Symbol	Logic
10	1G_RD+	LVTTTL
11	GND	
12	10G_RD-	CML
13	10G_RD+	CML
14	Tx_Fault	LVTTTL
15	Vcc3_Rx	
16	Vcc3_Tx	
17	NC	
18	10G_TD+	CML
19	10G_TD-	CML
20	GND	

Notes:
1. Pin 9 Trigg/Txdis selection

A2.118 BIT6	PIN9	Notes
0	Tx Disable	if A2.118 BIT6 is 0, Pin9 use as Tx disable, when pin9 is high, disable both 1G and 10G Tx
1	Rx Trigger	if A2.118 BIT6 is 1, Pin9 use as Rx Trigger.

VIII. Recommended Host Board Power Supply Circuit

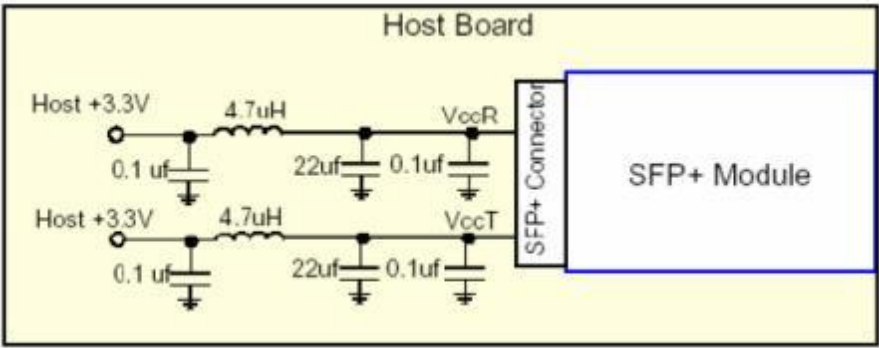


Figure 2, Recommended Host Board Power Supply Circuit

IX. Recommended Interface Circuit

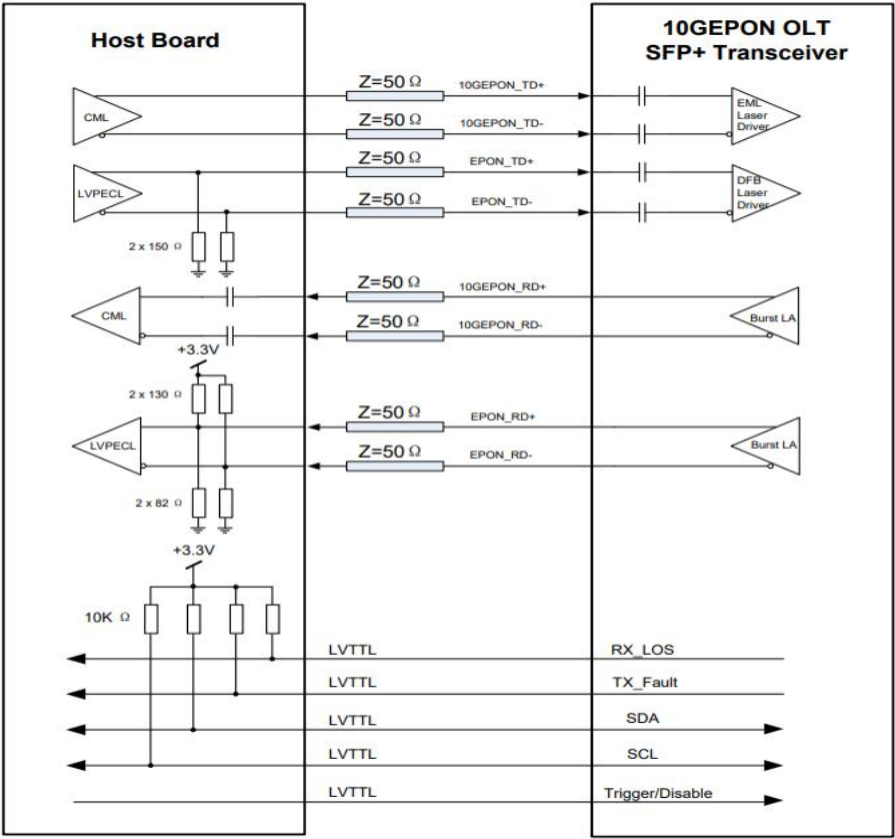
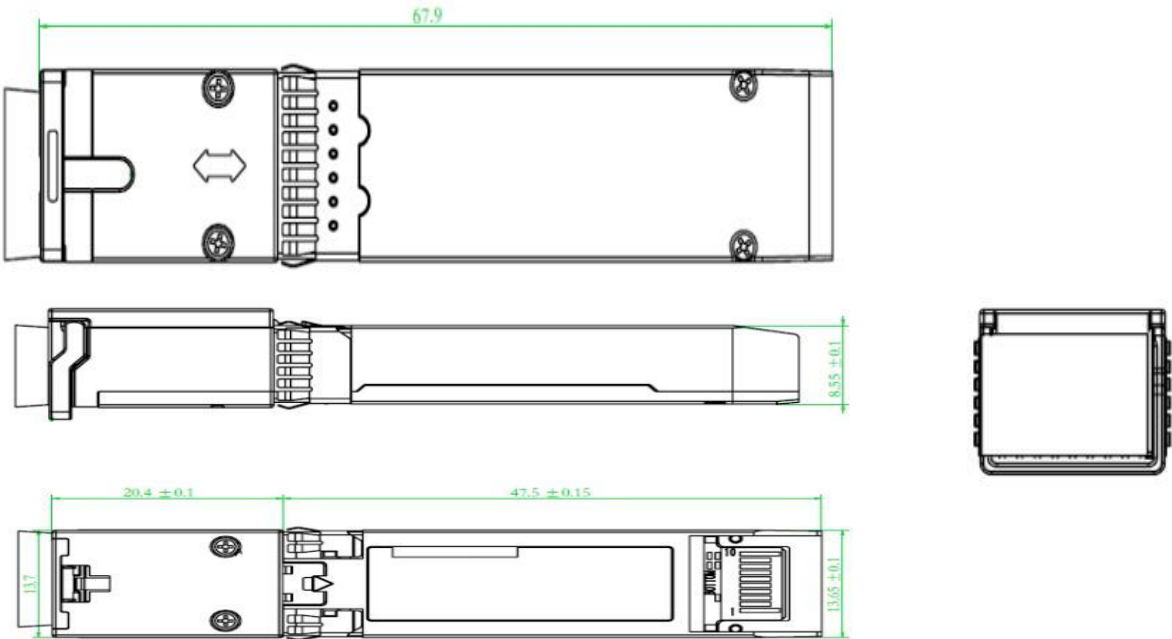


Figure 3, Recommended Interface Circuit

X. Mechanical Drawing



Units:mm
Figure 4, Product outline Drawing
(Notes: 20.4±0.05 is exceeding SFF-8432 A dimension)

XI. Order Information

Part Number	Description
10ESFP-52-PR30F-I	10G EPON OLT SFP+ 1577nm-TX/1270nm-RX and 1490nm-TX/1310nm-RX PR30 20km DOM SC SMF Optical Transceiver Module (Industrial)
10ESFP-52-PR30-I	10G EPON OLT SFP+ 1577nm-Tx/1270nm-Rx and 1490nm-Tx/1310nm-Rx PR30 20km DOM SC SMF Optical Transceiver Module (Industrial, 20PIN)
10ESFP-25-PR30-I	10G EPON ONU SFP+ 1270nm-Tx/1577nm-Rx 10.3125G-TX/10.3125G-RX PR30 20km DOM SC SMF Optical Transceiver Module (Industrial, 20PIN)
ESFP-43-20PX30-I	EPON OLT 1000BASE-PX30 SFP 1490nmTx/1310nmRx 20km DOM SC SMF Optical Transceiver Module (Industrial, 20PIN)
ESFP-43-20	EPON OLT SFP 1490nm-TX/1310nm-RX 1.25G-TX/1.25G-RX 20km DDM SC SMF Transceiver Modules
ESFP-34-20N-I	EPON ONU SFP 1310nm-TX/1490nm-RX 1.25G-TX/1.25G-RX PX20+ 20km DDM SC SMF Optical Transceiver Module (Industrial)