



AXFT-A253 1.25Gbps GEPON 1000Base-PX10 2x5 SFF ONU Transceiver



Product Overview

The AXFT-A253 is specifically designed for Gigabit Ethernet Passive Optical Network (GEPON) transmission. These transceiver modules are compliant with the Small Form-factor (SFF) Multisource Agreement (MSA) and 2x5 pin package with SC/PC pigtail connector.

The AXFT-A253 GEPON ONU transceivers are based on the IEEE 802.3ah 1000BASE-PX10 specification for bi-directional communication up to 10km over a single fiber. The module incorporates a high performance 1310 nm burst mode FP transmitter and 1490 nm continuous mode PIN-TIA receiver.

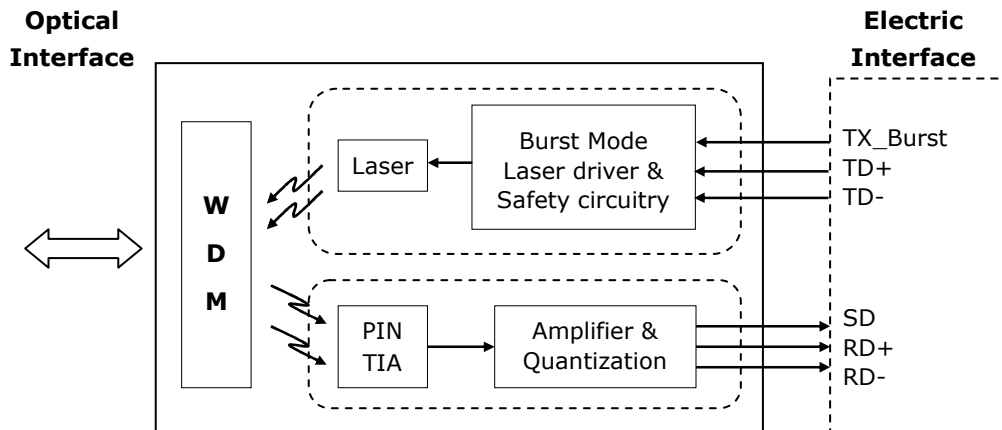
Applications

- **Gigabit Ethernet PON System**
- **Gigabit Ethernet Point-to-Point Bi-directional Transmission**

Features

- **1.25G bi-directional single-fiber link**
- **2x5 SFF compatible package with SC/PC pigtail connector**
- **1310nm burst-mode transmitter with FP Laser, 1490nm continuous-mode receiver with PIN-TIA**
- **10km point to multi-point transmission**
- **IEEE 802.3ah 1000BASE-PX10-U compliant**
- **Differential LVPECL inputs and outputs**
- **Class 1 laser safety standard IEC 60825 compliant**
- **Single +3.3V power supply**
- **RoHS compliant**
- **Low power dissipation**

Block diagram



The transceiver is fundamentally consisted by two parts: transmitter and receiver. The transmitter features LVPECL differential data inputs (TD+ and TD-) and an LVTTTL for TX burst mode control (TX_Burst). The receiver features LVPECL differential data outputs (RD+ and RD-) and LVTTTL for signal detect output (SD).

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Storage Temperature	T_s	-40	+85	°C	
Supply Voltage	V_{CC}	-0.5	+4.5	V	
Storage Relative Humidity	RH	5	95	%	
Soldering Temperature / Time	T_{SOLD} / t_{SOLD}		260/10	°C/sec	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Case Operating Temperature	T_C	0		70	°C	
Supply Voltage	V_{CCT} V_{CCR}	3.1	3.3	3.5	V	
Supply Current	$I_{TX} + I_{RX}$		150	300	mA	



Transmitter Electro-Optical Interface

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
TX Differential Input Voltage	TD +/-	400		2400	mV	
TX Burst Control Voltage - Low	V _{Burst, L}	V _{eeT}		V _{eeT} +0.8	V	
TX Burst Control Voltage - High	V _{Burst, L}	2		V _{ccT}	V	
Optical Output Power (BOF)	P _o	-0.5		+4	dBm	1
Optical Output Power (EOF)	P _o	-1		+4	dBm	1
Optical Extinction Ratio	E _R	9			dB	
Center Wavelength	λ _C	1260	1310	1360	nm	2
Spectral Width (RMS)	Δλ				nm	2
Optical Burst On / Off Time	T _{on} / T _{off}			30	ns	3
Optical Rise / Fall Time	t _r / t _f			260	ps	
Relative Intensity Noise	RIN			-113	dB/Hz	
Total Contributed Jitter	TJ			227	ps	

Notes:

1. Coupling into a 9/125μm single-mode fiber.
2. Compliant With IEEE Std 802.3ah™-2004 ,Table 1
3. Figure 1

Table1. 1000BASE-PX10-U transmitter spectral limits

Center Wavelength	RMS spectral width (max)
nm	nm
1260	2.09
1270	2.52
1280	3.13
1286	3.50
1290	
1297	
1329	
1340	
1343	3.06
1350	
1360	2.58
1480 to 1500	0.88

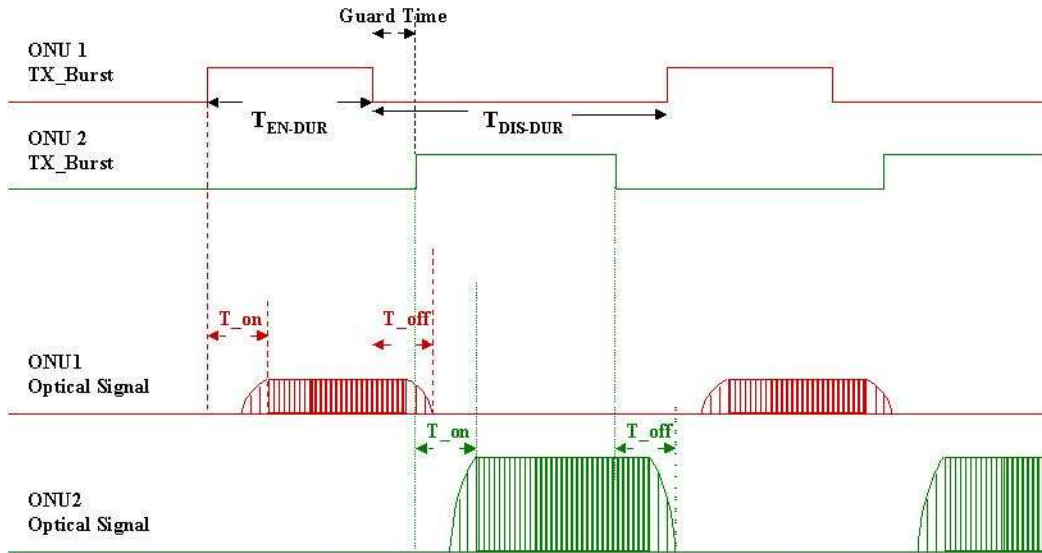


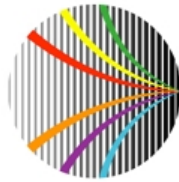
Figure1. Timing Parameter Definition in Burst Mode Sequence

Receiver Electro-Optical Interface

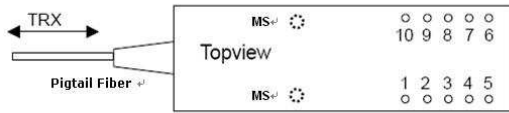
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
RX Differential Output Voltage	RD +/-	400		2000	mV	
Receiver Overload	P _{IN} MAX	-3			dBm	1
Receiver Sensitivity	P _{IN} MIN			-26	dBm	1
Operating Center Wavelength	λ_c	1480		1500	nm	
Receiver Reflectance	RL			-12	dB	
Signal Detect - Assert Power	P _A			-26	dBm	
Signal Detect - Deassert Power	P _D	-45			dBm	
Receiver Signal Detect - Hysteresis	P _{RX_SDH}	0.5			dB	
Signal Detect Output Voltage - Low	V _{SD, L}	V _{eeT}		V _{eeT} +0.8	V	
Signal Detect Output Voltage - High	V _{SD, H}	2		V _{ccT}	V	

Notes:

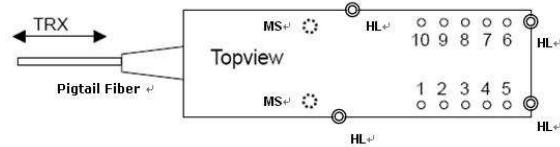
1. With BER better than or equal to 1×10^{-12} , measured in the center of the eye opening with PRBS $2^7 - 1$



Pin Description



SFF 2x5 without housing leads



SFF 2x5 with housing leads

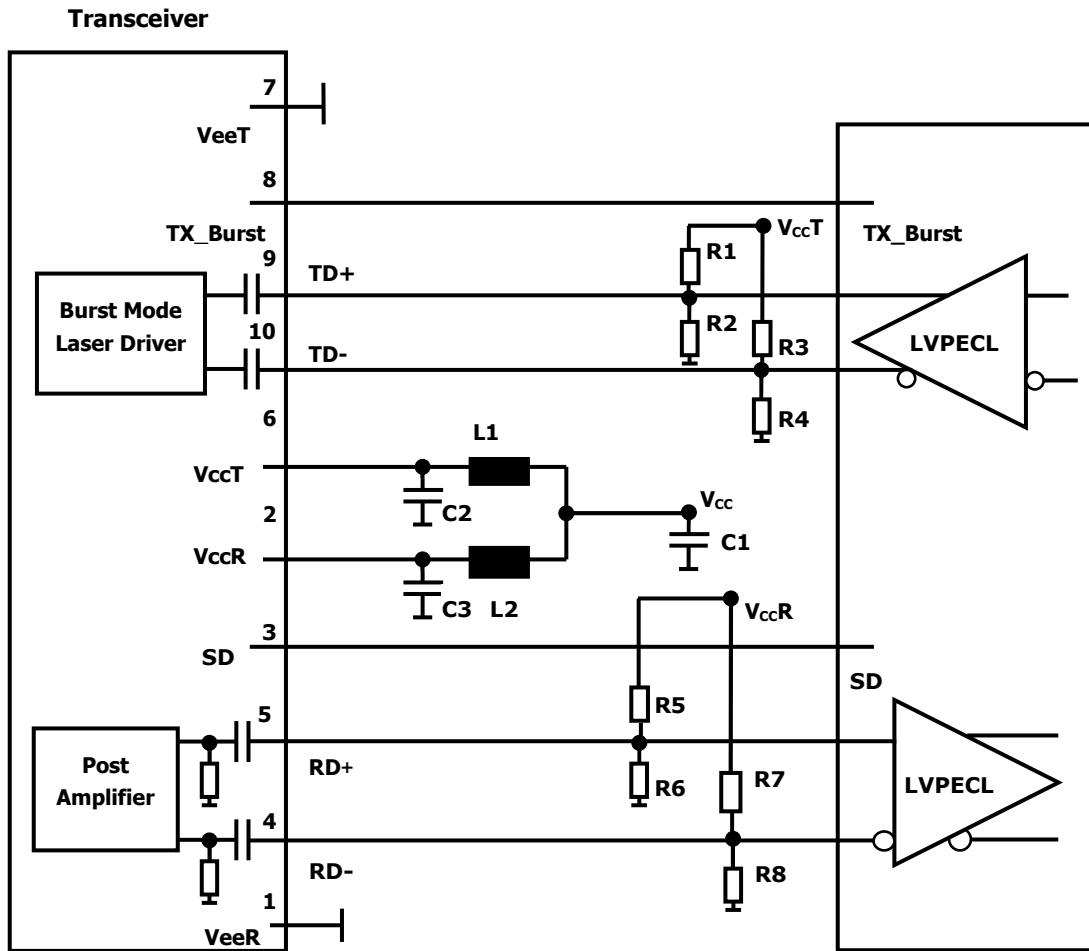
Pin No.	Pin Name	Function	Notes
MS	MS	Mounting Stubs	1
HL	HL	Housing Leads	2
1	VeeR	Receiver Signal Ground	
2	VccR	Receiver Power Supply	
3	SD	Signal Detect	3
4	RD-	Receiver Data Out Bar	4
5	RD+	Receiver Data Out	4
6	VccT	Transmitter Power Supply	
7	VeeT	Transmitter Signal Ground	
8	TX_Burst	Transmitter Burst mode Control	5
9	TD+	Transmitter Data In	6
10	TD-	Transmitter Data In Bar	6

Notes:

1. The mounting stubs are provided for transceiver mechanical attachment to the circuit board. They may also provide an optional connection of the transceiver to the equipment chassis ground.
2. The optional transceiver housing leads may be provided for additional signal grounding. These additional grounds may improve signal integrity, EMC, or ESD performance.
3. Normal Operation: Logic "1" Output; Fault Condition: Logic "0" Output..
4. No internal terminations will be provided.
5. Burst mode Enabled: $(V_{ccT}-1.3V) < V < V_{ccT}$
Burst mode Disabled: $V_{eeT} < V < (V_{eeT}+0.8V)$ or open circuit
6. An internal 50ohm termination will be provided.

Recommended Interface Circuit

TX AC Coupling / RX AC Coupling



Notes:

R1/R2/R3/R4/R5/R6/R7/R8=Depends on SerDes chip used.

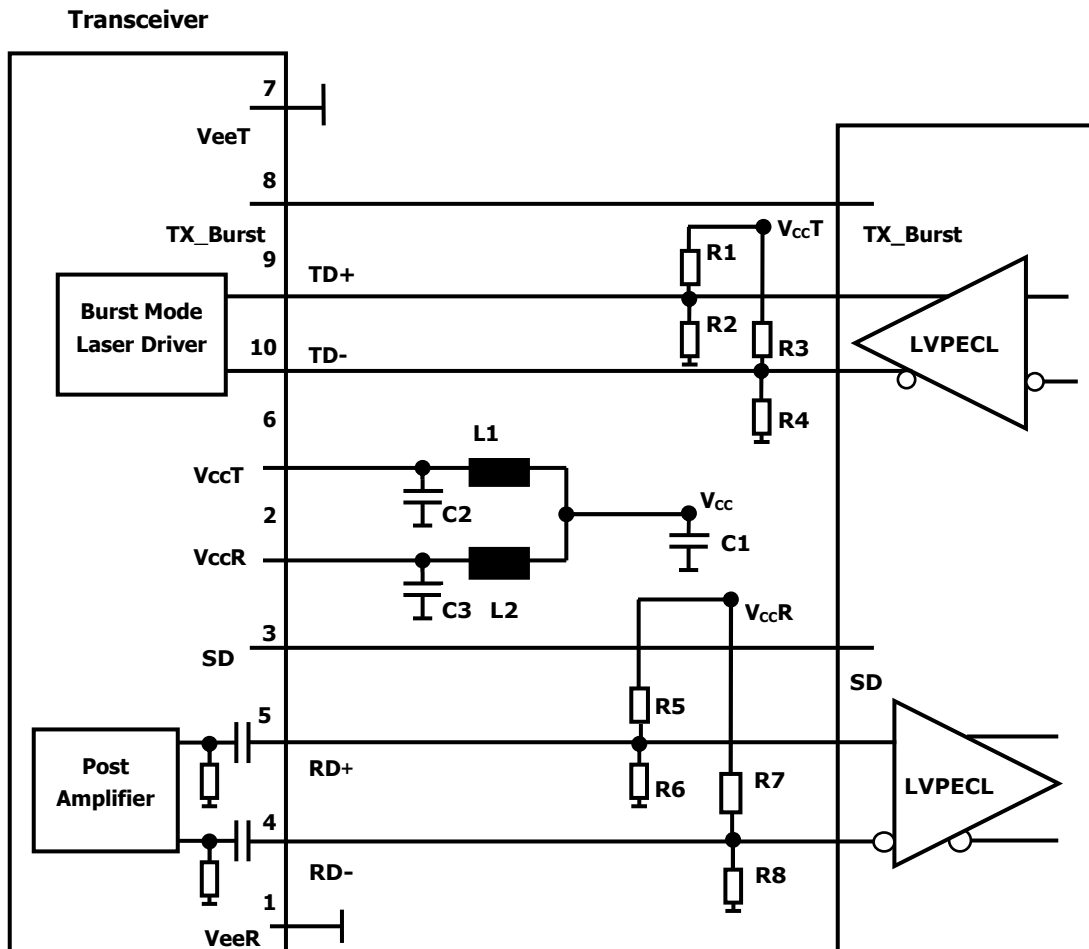
C1=10uF

C2=C3=0.1uF

L1=L2=1uH

Recommended Interface Circuit

TX DC Coupling / RX AC Coupling



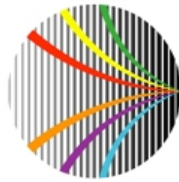
Notes:

R1/R2/R3/R4/R5/R6/R7/R8=Depends on SerDes chip used.

C1=10uF

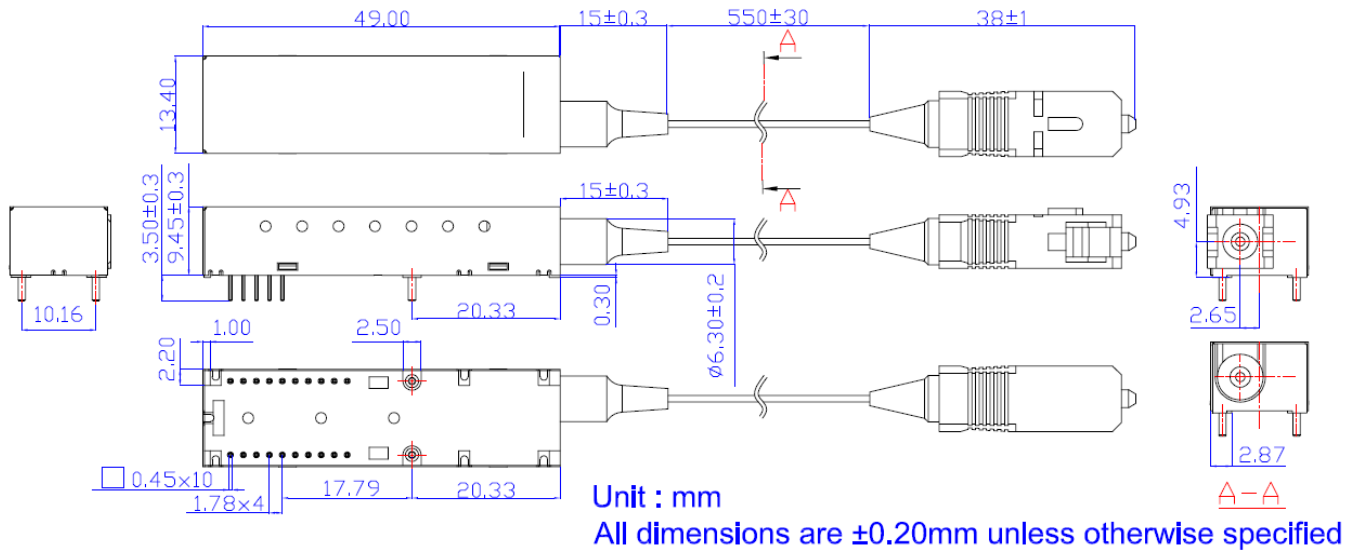
C2=C3=0.1uF

L1=L2=1uH

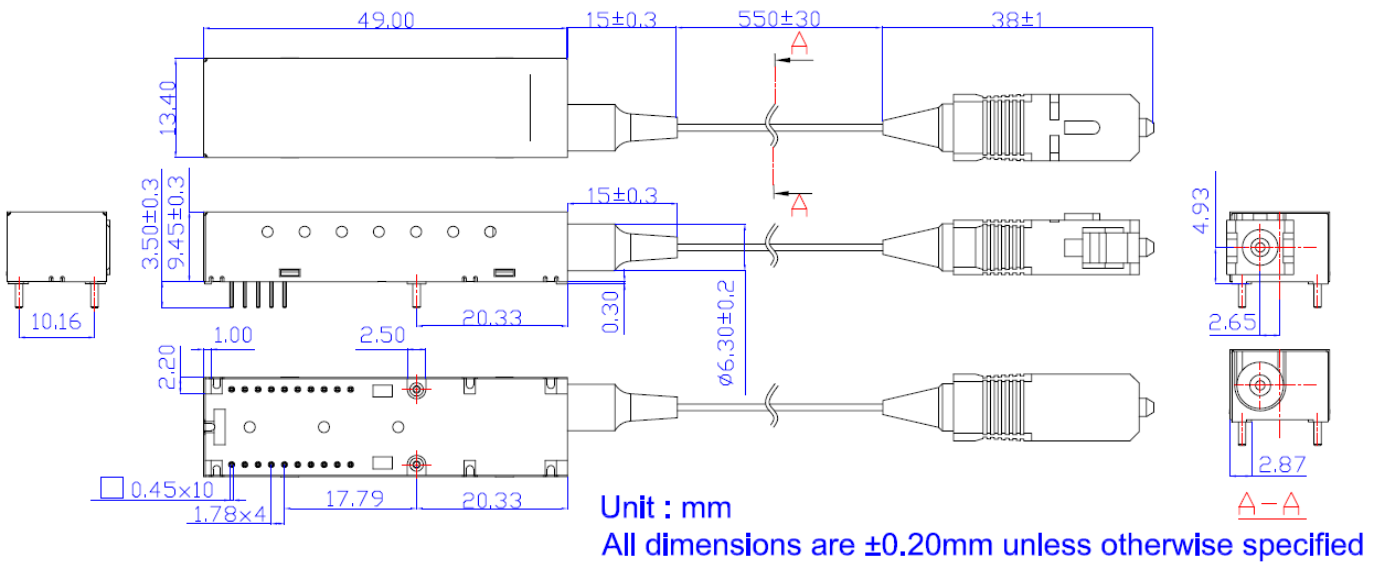


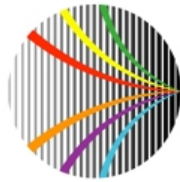
Mechanical Dimensions (Units in mm)

SFF 2x5 without housing leads



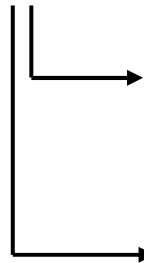
SFF 2x5 with housing leads





Ordering Information

AXFT-A253-xy31



I/O Interface

- 5: TX AC coupling / RX AC coupling
- 8: TX DC coupling / RX AC coupling

Case Type

- 4: Without Housing Leads
- 5: With Housing Leads

Model No.	Tx	LD	Rx	I/O	SD	Case	Link	Temp.
AXFT-A253-4531	1310nm	FP	1490nm	AC/AC	TTL	W/o Lead	10km	0~70°C
AXFT-A253-4831	1310nm	FP	1490nm	DC/AC	TTL	W/o Lead	10km	0~70°C
AXFT-A253-5531	1310nm	FP	1490nm	AC/AC	TTL	With Lead	10km	0~70°C
AXFT-A253-5831	1310nm	FP	1490nm	DC/AC	TTL	With Lead	10km	0~70°C