

Specification

Small Form Factor Pluggable

Duplex LC Receptacle – SFP+

Optical Transceivers

10 Gigabit Ethernet

10GBASE-ZR




Ordering Information

TAS – AxUL5 – QA6



Operating Case Temperature

Model Name	Voltage	Category	Device type	Interface	LOS	Temperature	Distance	Latch Color
TAS-A1UL5-QA6	3.3V	With DDMI	1550 nm EML	AC/AC	LVTTTL	0°C~+70°C	80km	White 
TAS-A2UL5-QA6						-40°C ~+85°C		

Features

- Supports data rate 9.95~11.3Gbps
- Up to 80km transmission distance over SMF
- 1550nm EML Laser transmitter
- 1550nm receiver with APD-TIA
- 2-wire interface for integrated digital diagnostic Monitoring
- Operation case temperature -40~85°C for industrial and 0~70°C for commercial
- Single +3.3V power supply
- SFP+ package with duplex LC/UPC receptacle optical interface and SFI electrical interface
- RoHS compliance

Pin Definition and Descriptions

The SFP+ modules are hot-pluggable. Hot pluggable refers to plugging in or unplugging a module while the host board is powered. The SFP+ host connector is a 0.8 mm pitch 20 position right angle improved connector specified by SFF-8083, or stacked connector with equivalent with equivalent electrical performance. Host PCB contact assignment is shown in Figure 2 and contact definitions are given in Table 1. SFP+ module contacts mates with the host in the order of ground, power, followed by signal as illustrated by Figure 3 and the contact sequence order listed in the PIN description table.

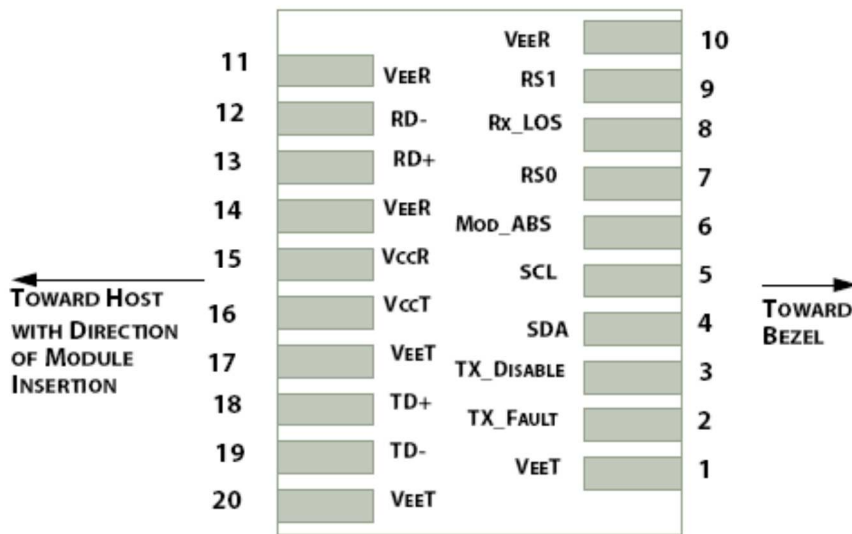


Figure 1: Module Interface to Host

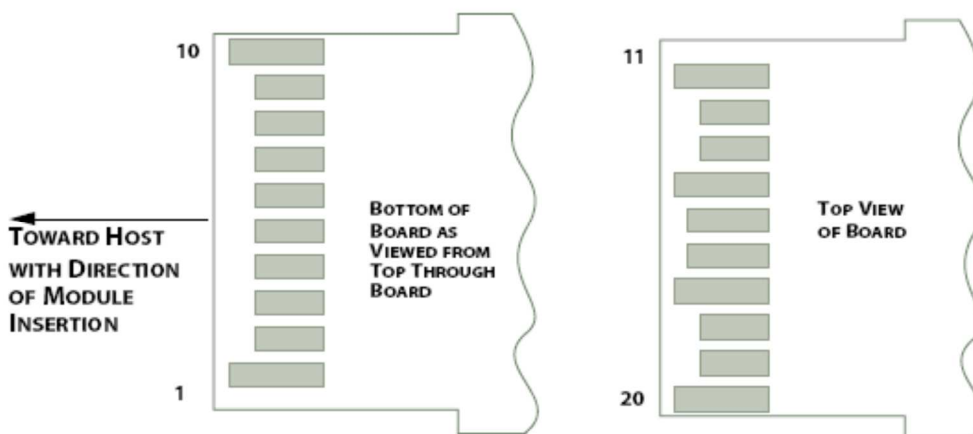


Figure 2: Module Contact Assignment

PIN	Logic	Symbol	Name / Description	Note
1		VeeT	Module Transmitter Ground	1
2	LVTTL-O	TX_Fault	Module Transmitter Fault	2
3	LVTTL-I	TX_Dis	Transmitter Disable; Laser output disabled on high or open.	3
4	LVTTL-I/O	SDA	2-Wire Serial Interface Data Line	2
5	LVTTL-I	SCL	2-Wire Serial Interface Clock	2
6		MOD_ABS	Module Absent, Grounded in the module	2
7	LVTTL-I	RS0	Rate Select 0	4
8	LVTTL-O	RX_LOS	Receiver Loss of Signal Indication Active LOW	5
9	LVTTL-I	RS1	Rate Select 1	4
10		VeeR	Module Receiver Ground	1
11		VeeR	Module Receiver Ground	1
12	CML-O	RD-	Receiver Inverted Data Output	
13	CML-O	RD+	Receiver Data Output	
14		VeeR	Module Receiver Ground	1
15		VccR	Module Receiver 3.3 V Supply	6
16		VccT	Module Receiver 3.3 V Supply	6
17		VeeT	Module Transmitter Ground	1
18	CML-I	TD+	Transmitter Non-Inverted Data Input	
19	CML-I	TD-	Transmitter Inverted Data Input	
20		VeeT	Module Transmitter Ground	1

Table 1: SFP+ Module PIN Definition

Note:

1. Module ground pins GND are isolated from the module case.
2. T_{FAULT} is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V. A high output indicates a transmitter fault caused by either the T_X bias current or the T_X output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
3. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
4. Internally pulled down per SFF-8431.
5. 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.
6. Internally connected

Absolute Maximum Ratings

These values represent the damage threshold of the module. Stress in excess of any of the individual Absolute Maximum Ratings can cause immediate catastrophic damage to the module even if all other parameters are within Recommended Operating Conditions.

Parameters	Symbol	Min.	Max.	Unit
Power Supply Voltage	V _{CC}	3.15	3.45	V
Power Dissipation			2	W
Storage Temperature	T _c	-40	85	°C
Operating Case Temperature	T _c	0	70	°C
		-40	85	

Table 2: Absolute Maximum Rating

Optical Characteristics

The following optical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Operating Reach, OM1 MMF				80	Km	
Transmitter						
Center Wavelength	λ_t	1528	1550	1565	nm	
Spectral Width (-20dB)				1	nm	
Side Mode Suppression Ratio (SMSR)		30			dB	
Average Optical Power	P _{avg}	0		5	dBm	
Optical Modulation Amplitude (OMA)	P _{oma}	-2.1			dBm	
Transmitter and dispersion penalty (max)	TDP			3.0	dB	3
Average launch power of Off transmitter	P _{off}			-45	dBm	
Extinction Ratio	ER	8.2			dB	
Transmitter Mask (PRBS2 ³¹ -1@10.3125G)		Compliant With IEEE Std 802.3ae				
Receiver						
Center Wavelength	λ_r	1260		1600	nm	
Sensitivity (PRBS2 ³¹ -1@10.3125G, ER=6, BER<10 ⁻¹²)				-23	dBm	
Overload (PRBS2 ³¹ -1@10.3125G, ER=6, BER<10 ⁻¹²)		-8			dBm	

Los Assert	LosA	-35			dBm	
Los Dessert	LosD			-24	dBm	
Los Hysteresis	LosH	0.5			dB	

Table 3: Optical Characteristics

Note:

1. Average optical power shall be measured using the methods specified in TIA/EIA-455-95.
2. Receiver sensitivity is informative. Stressed receiver sensitivity shall be measured with conformance test signal for BER = 1×10^{-12} .
3. Path penalty is intended as the power penalty of the interface between back-to-back and the maximum applied dispersion.

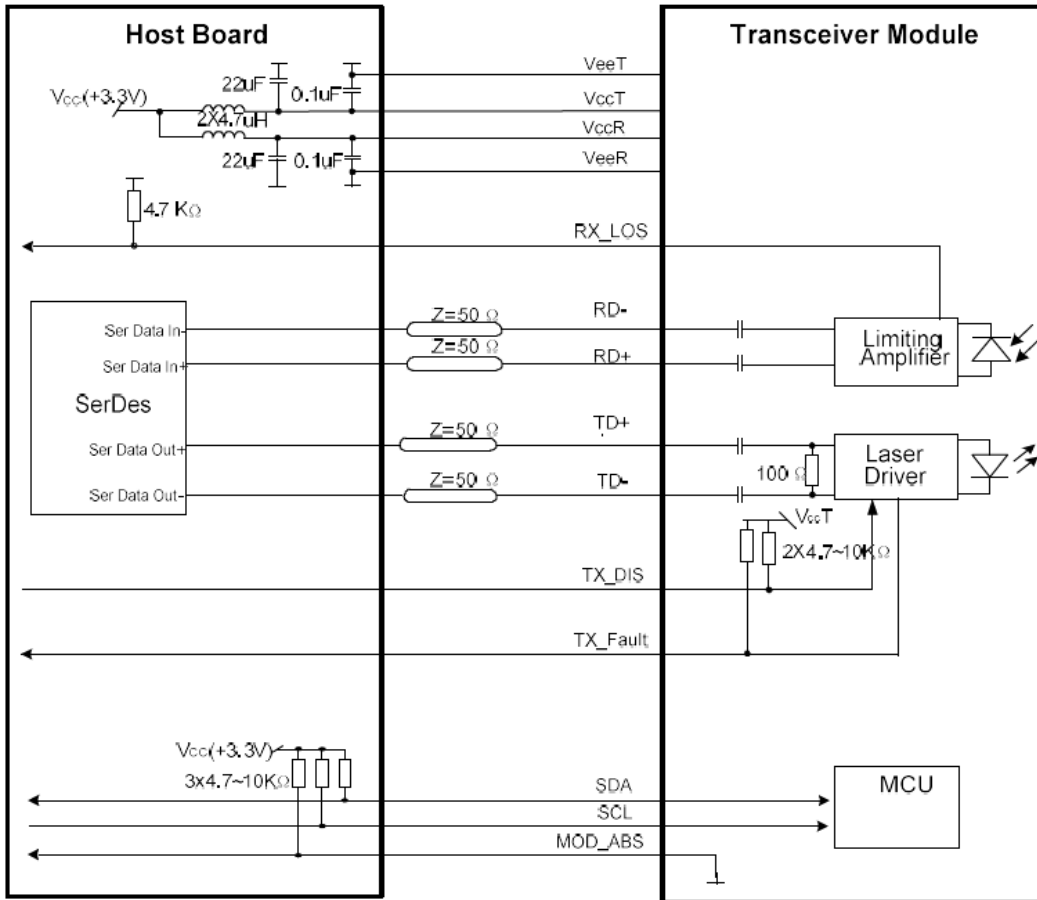
Electrical Characteristics

The following electrical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

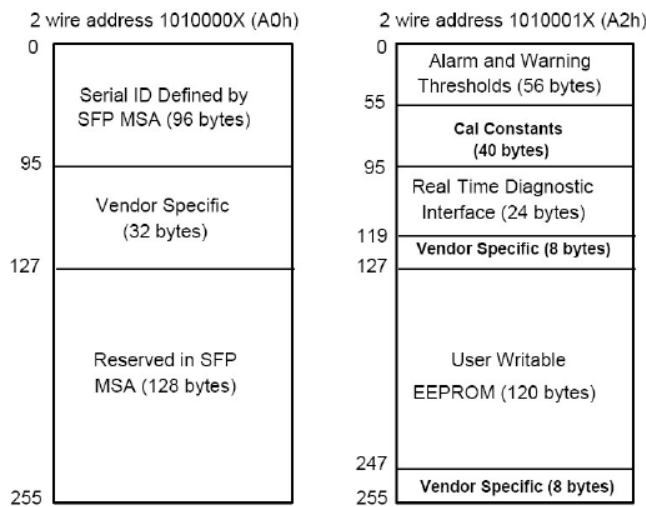
Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Data Rate		-	10.3125	11.3	Gbps	
Data Input Swing Differential/TX		200		2000	mV	
Data Output Swing Differential/RX		400		1600	mV	
Date Differential Impedance		90	100	110	Ω	
Output High		2.4		V _{cc}	V	
Output Low		0		0.4	V	
Input High		2		V _{cc} +0.3	V	
Input Low		0		0.8	V	
LOS Assert Time	T _{LOSA}			100	us	
LOS De-assert Time	T _{LOSD}			100	us	

Table 4: Electrical Characteristics

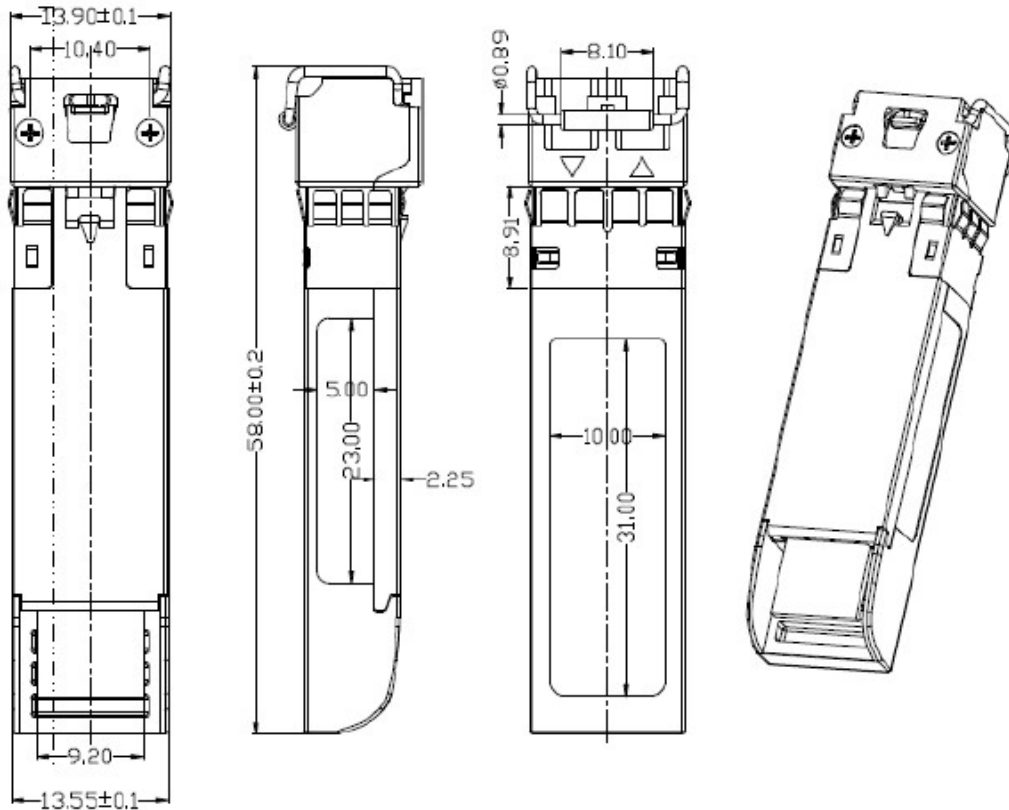
Typical Interface Circuit



EEPROM Memory Map



Mechanical



ESD

Normal ESD precautions are required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

LASER Safety

This is a Class 1 Laser Product according to IEC/EN60825-1:2014 (Third Edition).. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007)



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