

## Specification

**Small Form Factor Pluggable**

**Transceiver (MSA)**


**LC Receptacle – SFP+**

**12 Gigabit SDI 1T/1R**



# TIM-A1EB1-F16

### Ordering Information:

Model Name	TIM-A1EB1-F16	Note
Voltage	3.3V	
Device type	1310nm DFB / 1310nm PIN detector	
Interface	AC-AC / TTL	
Temperature	0 °C~+70°C	
Distance	10km of single-mode fiber	
Latch Color	Blue 	

## ■ Features

- Compliant with SFP+ MSA
- Data Rate up to 12 Gbps
- LC receptacle
- Hot Pluggable
- All-metal housing for superior EMI shielding performance
- SFF-8472 built in digital diagnostic Functions
- Operating case temperature range: Commercial Temperature 0°C~ 70°C

## ■ Application

- SMPTE ST-2082, ST2081, 424M, 292M, 259M compliant
- Support video pathological patterns for 12G-SDI, 6G-SDI, 3G-SDI and HD-SDI, SD-SDI

■ Pin Definition and Descriptions

20	Vee
19	TD-
18	TD+
17	Vee
16	Vcc
15	Vcc
14	Vee
13	RD+
12	RD-
11	Vee

**Top of Board**

1	Vee
2	TX_FLT
3	TX_DIS
4	SDA
5	SCL
6	MOD-ABS
7	NC
8	RX_LOS
9	NC
10	Vee

**Bottom of Board  
(as view through top of board)**

PIN	Logic	Symbol	Name / Description	Note
1	Input	Vee	Signal Ground	1
2	LVTTTL-O	TX_Fault	Module Transmitter Fault	2
3	LVTTTL-I	TX_Dis	Transmitter Disable; Turns off transmitter laser output	3
4	Input/output	SDA	Data line for I2C Bus. Externally Pulled up	
5	Input	SCL	Clock for I2C Bus. Externally Pulled up	
6	Input	Mod_ABS	Module Absent, connected to Vee in the module	
7		NC	No connection	
8	LVTTTL-O	RX_LOS	Receiver Loss of Signal Indication	
9		NC	No connection	
10	Input	Vee	Signal Ground	1
11	Input	Vee	Signal Ground	1
12	LVPECL-O	RD-	Receiver Data Output (Inverted)	
13	LVPECL-O	RD+	Receiver Data Output (Non Inverted)	
14	Input	Vee	Signal Ground	1
15	Input	Vcc	Power Supply	
16	Input	Vcc	Power Supply	
17	Input	Vee	Signal Ground	1
18	LVPECL-I	TD+	Transmitter Data Input (Non Inverted)	
19	LVPECL-I	TD-	Transmitter Data Input (Inverted)	
20	Input	Vee	Signal Ground	1

**Note:**

1. Module ground pins are isolated from the module case and chassis ground within the module.
2. Shall be pulled up with 4.7k to 10k ohm to Vcc Host in the host board.
3. Shall be pulled up with 4.7k to 10k ohm to Vcc in the module.

## ■ Absolute Maximum Ratings

Parameters	Symbol	Min.	Max.	Unit
Power Supply Voltage	$V_{CC}$	0	3.6	V
Storage Temperature	$T_s$	-40	85	°C
Relative Humidity	RH	5	95	%
Optical Receiver Power (Damage)	$P_{max}$		1.5	dBm

## ■ Recommended Operating Environment

Parameters	Symbol	Min.	Typical	Max	Unit	Note
Power Supply Voltage	$V_{CC}$	3.135	3.3	3.465	V	
Operating Case Temperature	$T_{op}$	0		70	°C	
Data Rate			11.88		Gbps	
Power Supply Current	$I_{cc}$		250	500	mA	

■ Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
<b>Transmitter</b>						
Average Launch Power	P <sub>o</sub>	-5.0		1.0	dBm	
Center wavelength	λ	1260	1310	1360	nm	
Spectrum Width	σλ			1.0	nm	@-20dB
Side Mode Suppression Ratio	SMSR	30			dB	
Extinction ratio	ER	3.5			dB	
Relative Intensity Noise	RIN		-130		dB/Hz	
Average launch power of OFF transmitted	P <sub>off</sub>			-30	dBm	
<b>Receiver</b>						
Center wavelength	λ	1260		1620	nm	
Receiver Sensitivity				-11.0	dBm	1
Receiver LOS Assert Level	PRX_LOS A	-30			dBm	
Receiver LOS Deassert Level	PRX_LOS D			-12	dBm	
Receiver Loss of Signal Hysteresis	R <sub>LH</sub>	0.5			dB	
Optical Receiver Power (Damage)	P <sub>max</sub>			1.5	dBm	

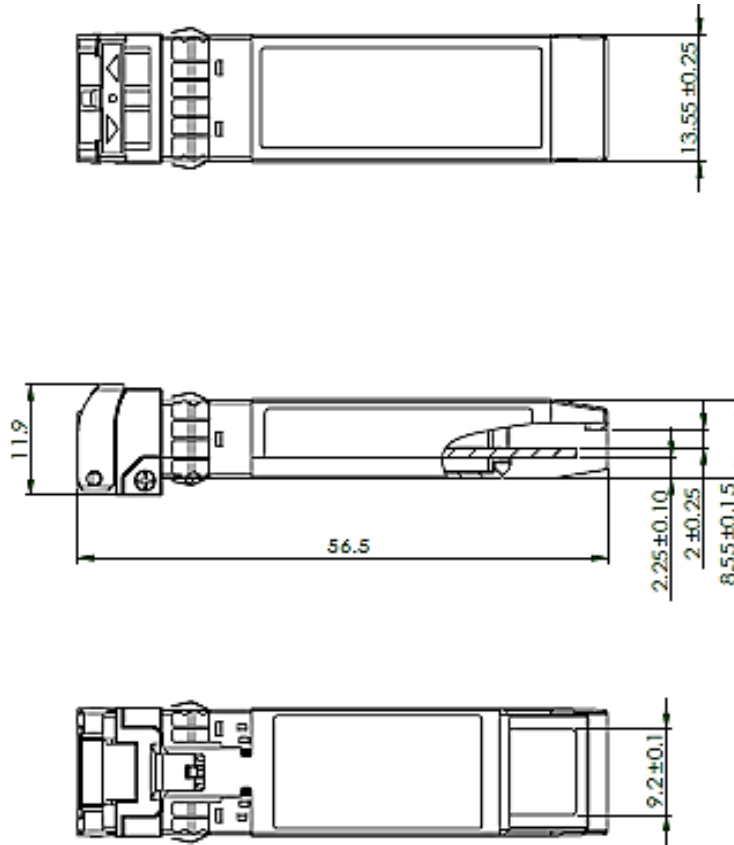
**Note-**

1. Measured with pathological pattern; BER < 10<sup>-12</sup>

■ Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Data Rate	DR		11.88		Gbps	
<b>Transmitter</b>						
Differential Input Impedance	RIN		100		$\Omega$	
Input Data Differential Swing	V <sub>I</sub>	180		700	mV	
Tx_Fault Voltage - High	V <sub>FH</sub>	2		V <sub>CC</sub>	V	
Tx_Fault Voltage - Low	V <sub>FL</sub>	0		0.8	V	
Tx_Disable Voltage - High	V <sub>DH</sub>	2		V <sub>CC</sub>	V	
Tx_Disable Voltage - Low	V <sub>DL</sub>	0		0.8	v	
<b>Receiver</b>						
Output Data Differential Swing	V <sub>O</sub>	300		850	mV	
Receiver Loss of Signal Output Voltage -Low	V <sub>LOSL</sub>	0		0.8	V	
Receiver Loss of Signal Output Voltage -High	V <sub>LOSH</sub>	2		V <sub>CC</sub>	V	

■ Mechanical (mm) :  $\pm 0.5\text{mm}$





■ 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. 56, MAY 8, 2019.

Caution:

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Attention: L'utilisation de commandes ou de réglages ou l'exécution de procédures autres que celles spécifiées dans le document peut entraîner une exposition à des radiations dangereuses.

■ Contact Information

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■ **Revision History**

Date	Version	Description
08/05/2021	1.0	Initial release.