

10GBASE-120km SFP+ 1550nm 120km Transceiver

P/N: AE-SFP+-ZR120

Features

- Supports 9.95 to 11.3Gb/s bit rates
- Hot-Pluggable
- Duplex LC connector
- 1550nm cooled EML transmitter, APD photo-detector
- SMF links up to 120km
- Support digital diagnostic monitoring interface
- Power Supply: +3.3V
- Power consumption<1.8W
- Compliant with SFF+MSA and SFF-8472
- Temperature Range: -5~ 70°C
- RoHS compliant

Applications

- 10GBASE-120KM &10G Ethernet
- SONET OC-192 / SDH STM64
- Other Optical Links

I. Absolute maximum rating

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.

Parameter	Symbol	Min.	Typical	Max.	Unit
Storage Temperature	TS	-40		+85	°C
Case Operating Temperature	TA	0		70	°C
Maximum Supply Voltage	Vcc	-0.5		4	V
Relative Humidity	RH	0		85	%

II. Optical characteristics

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

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Transmitter Section:						
Center Wavelength	λ_t	1530	1550	1565	nm	1
Optical spectral width	$\Delta\lambda$			1	nm	
Average Optical Power	Pavg	+1		+5	dBm	2
Side Mode Suppression Ratio	SMSR	30			dB	
Laser Off Power	Poff			-30	dBm	
Extinction Ratio	ER	8.2			dB	
Transmitter Dispersion Penalty	TDP			3.2	dB	
Transmitter Eye Mask	Compliant with IEEE802.3ae					
Receiver Section:						
Center Wavelength	λ_r	1260		1600	nm	
Receiver Sensitivity	Sen			-26	dBm	3
Los Assert	LOSA	-35			dBm	
Los Dessert	LOSD			-27	dBm	
Los Hysteresis	LOSH	0.5			dB	
Overload	Sat	-8			dBm	

Notes:

1. Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulations.
2. Launched power (avg.) is power coupled into a single mode fiber with master connector (Before of Life).
3. Measured with Light source 1550nm, ER=8.2dB; BER $\leq 1E-12$ @10.3125Gbps, PRBS=2³¹-1 NRZ.

III. Electrical characteristics

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

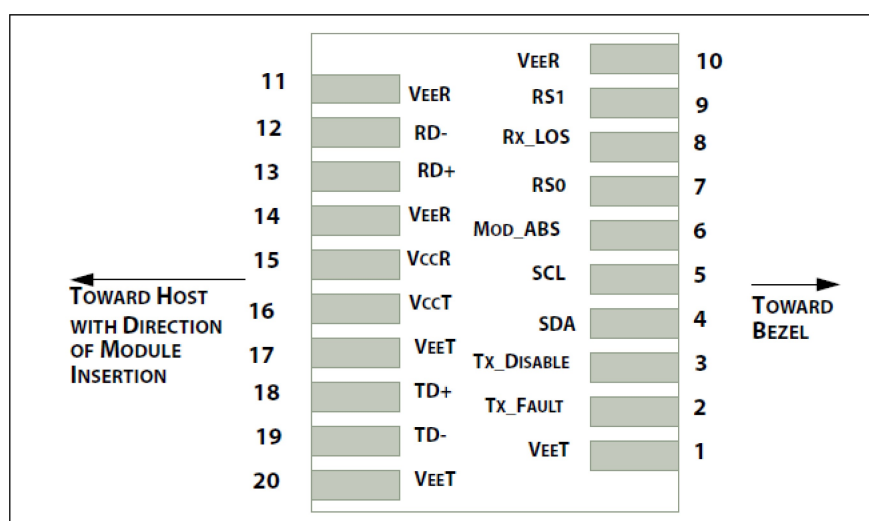
Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Supply Voltage	V _{cc}	3.135		3.465	V	
Supply Current	I _{cc}			500	mA	
Power Consumption	P			1.8	W	
Transmitter Section						
Input differential impedance	R _{in}		100		Ω	1
Tx Input Single Ended DC Voltage Tolerance (Ref V _{eeT})	V	-0.3		4	V	
Differential input voltage swing	V _{in,pp}	180		700	mV	2
Transmit Disable Voltage	VD	2		V _{cc}	V	3
Transmit Enable Voltage	VEN	V _{ee}		V _{ee} +0.8	V	
Receiver Section						
Single Ended Output Voltage Tolerance	V	-0.3		4	V	
Rx Output Diff Voltage	V _o	300		850	mV	
Rx Output Rise and Fall Time	Tr/Tf	30			ps	4
LOS Fault	VLOS fault	2		V _{cc} HOST	V	5
LOS Normal	VLOS norm	V _{ee}		V _{ee} +0.8	V	5

Notes:

1. TX data input pins. AC coupling.
2. Into 100 ohms differential termination.

IV. Pin definition

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 2. 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 Table 2.

**Figure 1: Interface to Host PCB**

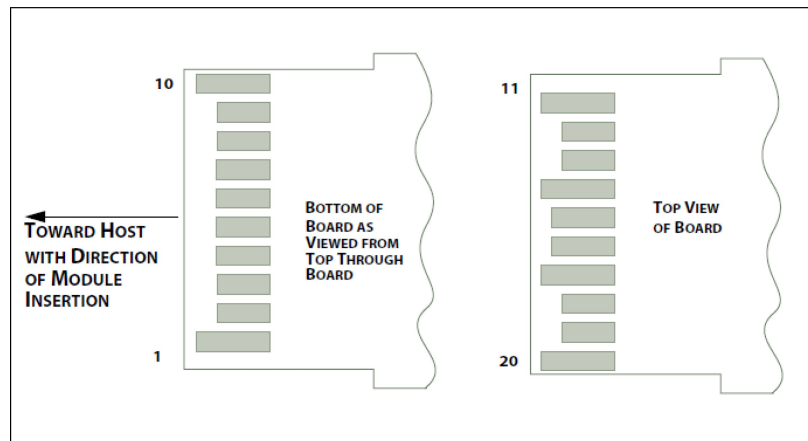


Figure2: Module Contact Assignment

V. Pin Descriptions

Pin	Symbol	Description	Ref.
1	VEET	Transmitter Ground (Common with Receiver Ground)	1
2	TFAULT	Transmitter Fault.	2
3	TDIS	Transmitter Disable. Laser output disabled on high or open.	3
4	SDA	2-wire Serial Interface Data Line (MOD-DEF2)	4
5	SCA	2-wire Serial Interface Clock (MOD-DEF1)	4
6	MOD_ABS	Module Absent, connected to VEET or VEER	4
7	RS0	No connection required	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	5
9	RS1	No connection required	
10	VEER	Receiver Ground (Common with Transmitter Ground)	1
11	VEER	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled	
13	RD+	Receiver Non-inverted DATA out. AC Coupled	
14	VEER	Receiver Ground (Common with Transmitter Ground)	1
15	VCCR	Receiver Power Supply	
16	VCCT	Transmitter Power Supply	
17	VEET	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	VEET	Transmitter Ground (Common with Receiver Ground)	1

Notes:

1. Circuit ground is internally isolated from chassis ground.
2. TFAULT 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 $V_{cc} + 0.3V$. A high output indicates a transmitter fault caused by either the TX bias current or the TX 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. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 3.6V.

MOD_ABS pulls line low to indicate module is plugged in.

5. LOS is open collector output. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

VI. Ordering information

Part Number	Product Description
AE-SFP+-ZR120	SFP+, 10Gbps, 1550nm, SMF, 120KM, DDM, LC connector, -5 °C ~ 70 °C