



# A-GEAR Product Specification

## Single Fiber Bi-Di SFP Transceiver SFP-1SM-3SC

### PRODUCT FEATURES

Up to 1.25 Gb/s bi-directional data links  
 Hot-pluggable SFP footprint  
 1310nm FP Transmitter and 1550 PIN Receiver for SFP-1SM-1310nm-3SC  
 1550nm FP Transmitter and 1310 PIN Receiver for SFP-1SM-1550nm-3SC  
 Single SC connector  
 Low power dissipation  
 Metal enclosure, for lower EMI  
 Up to 3km point to point transmission  
 Single 3.3V power supply  
 Operating temperature range: -40°C to 85°C

### APPLICATIONS

1.25Gb/s Gigabit Ethernet  
 Point-to-point FTTX Application

### PRODUCT SELECTION

#### Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Maximum Supply Voltage	Vcc	-0.5		4.7	V	
Storage Temperature	TS	-40		85	°C	
Case Operating Temperature	TOP	-40		85	°C	

Electrical Characteristics (TOP = -40 to 85°C, VCC = 3.15 to 3.60Volts)

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Supply Voltage	Vcc	3.15	3.3	3.6	V	
Supply Current	Icc		185	250	mA	
<b>Transmitter</b>						
Input differential impedance	Rin		100		Ω	1
Single ended data input swing	Vin,pp	250		1200	mV	
Transmit Disable Voltage	VD	Vcc- 1.3		Vcc	V	
Transmit Enable Voltage	VEN	Vee		Vee+ 0.8	V	2
Transmit Disable Assert Time				10	us	
<b>Receiver</b>						
Single ended data output swing	Vout,pp	250		800	mV	3
Data output rise time	tr		100	175	ps	4
Data output fall time	tf		100	175	ps	4



LOS Fault	VLOS fault	Vcc-0.5		VccHOST	V	5
LOS Normal	VLOS norm	Vee		Vee+0.5	V	5
Power Supply Rejection	PSR	100			mVpp	6

Notes:

1. Connected directly to TX data input pins. AC coupled thereafter.
2. Or open circuit.
3. Into 100 ohms differential termination.
4. 20 – 80 %
5. Loss Of Signal is LVTTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
6. Receiver sensitivity is compliant with power supply sinusoidal modulation of 20 Hz to 1.5 MHz up to specified value applied through the recommended power supply filtering network.

**Optical Characteristics (TOP = -40 to 85°C, VCC = 3.15 to 3.60 Volts)**

**SFP-1SM-1310nm-3SC**

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
<b>Transmitter</b>						
Output Opt. Pwr (End of Life)	POUT	-11		-5	dBm	1
Optical Wavelength	$\lambda$	1270	1310	1360	nm	
Wavelength Temperature Dependence			0.08	0.125	nm/°C	
Spectral Width (-20dB)	$\sigma$			3.0	nm	
Optical Extinction Ratio	ER	8			dB	
Sidemode Supression ratio	SSRmin	30			dB	
Optical Rise/Fall Time	tr/ tf		100	160	ps	
RIN	RIN			-120	dB/Hz	
Transmitter Jitter (peak to peak)				100	ps	
<b>Receiver</b>						
Average Rx Sensitivity @ Gigabit Ethernet	RSSENS3			-23.0	dBm	2
Maximum Input Power	PMAX	-3.0			dBm	
Optical Center Wavelength	$\lambda C$	1540	1550	1560	nm	
LOS De -Assert	LOSD			-30	dBm	
LOS Assert	LOSA	-35			dBm	
LOS Hysteresis		0.5		4	dB	
Receiver Jitter Generation @1.25Gbps				160	ps	3

**SFP-1SM-1550nm-3SC**

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
<b>Transmitter</b>						
Output Opt. Pwr (End of Life)	POUT	-11		-5	dBm	1
Optical Wavelength	$\lambda$	1530	1550	1570	nm	
Wavelength Temperature Dependence			0.08	0.125	nm/°C	
Spectral Width (-20dB)	$\sigma$			3.0	nm	
Optical Extinction Ratio	ER	8			dB	

Sidemode Suppression ratio	SSRmin	30			dB	
Optical Rise/Fall Time	tr/ tf		100	160	ps	
RIN	RIN			-120	dB/Hz	
Transmitter Jitter (peak to peak)				100	ps	
<b>Receiver</b>						
Average Rx Sensitivity @ Gigabit Ethernet	RSSENS3			-23.0	dBm	2
Maximum Input Power	PMAX	-3.0			dBm	
Optical Center Wavelength	$\lambda$ C	1260	1310	1360	nm	
LOS De -Assert	LOSD			-30	dBm	
LOS Assert	LOSA	-35			dBm	
LOS Hysteresis		0.5		4	dB	
Receiver Jitter Generation @1.25Gbps				160	ps	3

Notes:

1. Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulations.
2. With worst-case extinction ratio. Measured with a PRBS  $2^7-1$  test pattern, @1.25Gb/s, BER <math>10^{-12}</math> .
3. Jitter added by receiver (peak to peak). Measured at -18.0dBm average Rx sensitivity, PRBS  $2^7-1$  test pattern.

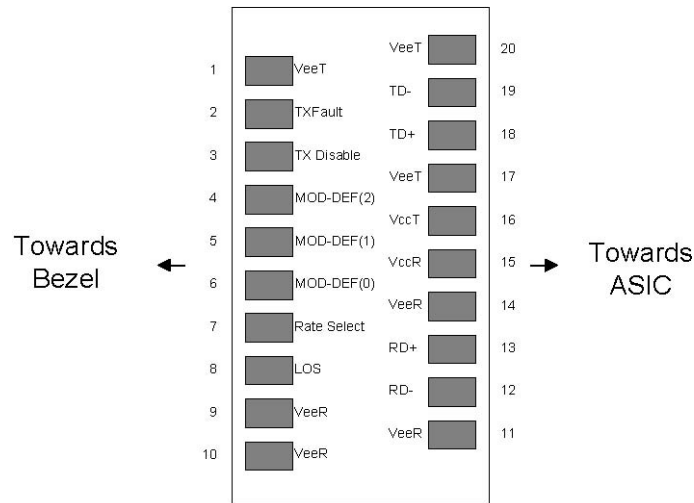
**Pin Descriptions**

Pin	Symbol	Name/Description	Ref.
1	V <sub>EET</sub>	Transmitter Ground (Common with Receiver Ground)	1
2	T <sub>FAULT</sub>	Transmitter Fault. Not supported.	
3	T <sub>DIS</sub>	Transmitter Disable. Laser output disabled on high or open.	2
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	3
5	MOD_DEF(1)	Module Definition 1. Clock line for Serial ID.	3
6	MOD_DEF(0)	Module Definition 0. Grounded within the module.	3
7	Rate Select	No connection required	4
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	5
9	V <sub>EER</sub>	Receiver Ground (Common with Transmitter Ground)	1
10	V <sub>EER</sub>	Receiver Ground (Common with Transmitter Ground)	1
11	V <sub>EER</sub>	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	V <sub>EER</sub>	Receiver Ground (Common with Transmitter Ground)	1
15	V <sub>CCR</sub>	Receiver Power Supply	
16	V <sub>CCT</sub>	Transmitter Power Supply	
17	V <sub>EET</sub>	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	V <sub>EET</sub>	Transmitter Ground (Common with Receiver Ground)	1

Notes:

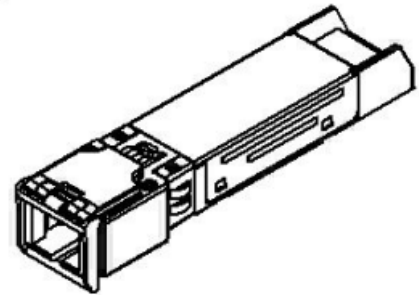
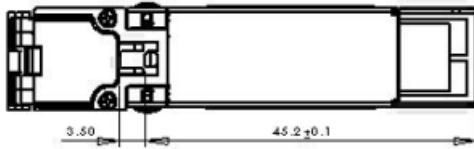
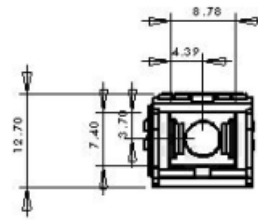
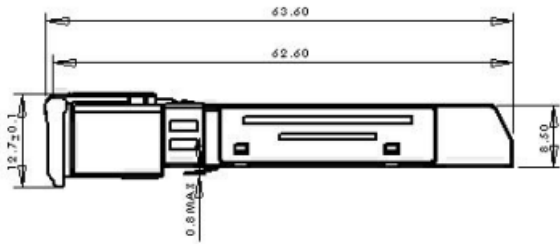
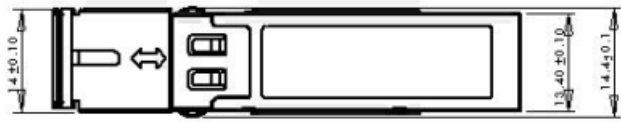
1. Circuit ground is internally isolated from chassis ground.

2. Laser output disabled on  $T_{DIS} > 2.0V$  or open, enabled on  $T_{DIS} < 0.8V$ .
3. Should be pulled up with 4.7k - 10 kohms on host board to a voltage between 2.0V and 3.6V. MOD\_DEF(0) pulls line low to indicate module is plugged in.
4. A-GEAR transceivers operate between 1x Fibre Channel, and Gigabit Ethernet data rates and respective protocols without active control. A-GEAR transceivers operate at 1x and Gigabit Ethernet data rates and respective protocols without active control.
5. LOS is open collector output. Should be pulled up with 4.7k – 10 kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.



**Pinout of Connector Block on Host Board**

**Mechanical Dimensions:**



**Visual look:**



