

45W4739-A

1GBASE, SFP, SX Transceiver

Features

- Up to 1.25Gb/s Data Links
- Hot-Pluggable
- Duplex LC connector
- Up to 550m on 50/125μm MMF
- 850nm VCSEL laser transmitter
- Single +3.3V Power Supply
- Low power dissipation <1W typically
- Commercial operating temperature range: 0°C to 70°C
- RoHS compliant and Lead Free



Applications

- 1.25 Gb/s 1000Base-SX Ethernet
- Metro/Access Networks
- 1×Fibre Channel
- Other Optical Links

1. Description

Approved Networks SFP SX Transceiver is a high performance, cost effective module which have a duplex LC optics interface. Standard AC coupled CML for high speed signal and LVTTL control and monitor signals. The receiver section uses a PIN receiver and the transmitter uses a 850 nm VCSEL laser, up to 8dB link budge ensure this module 1000Base Ethernet 550m application.



2. Absolute Maximum Ratings

Operation in excess of any absolute maximum ratings might cause permanent damage to this module.

Parameter	Symbol	Min	Тур	Max	Units
Storage Temperature	TS	-40		+85	۰C
Power Supply Voltage	VCC	-0.5		4	V
Relative Humidity	RH	0		85	%

3. Recommended Operating Environment

Parameter	Symbol	Min	Тур	Max	Unit
Case operating Temperature (Commercial)	TC	0		70	°C
Supply Voltage	VCC	3.135		3.465	V
Supply Current	lcc			300	mA
Inrush Current	Isurge			lcc+30	mA
Maximum Power	Pmax			1	W

4. Electrical Characteristics

 $(TOP = -40 \text{ to } 85^{\circ}C, VCC = 3.135 \text{ to } 3.465 \text{ Volts})$

Transmitter Section:							
Parameter	Symbol	Min	Тур	Max	Unit	Note	
Input differential impedance	Rin	90	100	110		1	
Single ended data input swing	Vin PP	250		800	mVpp		
Transmit Disable Voltage	VD	Vcc –1.3		Vcc	V	2	
Transmit Enable Voltage	VEN	Vee		Vee+0.8	V		
Transmit Disable Assert Time	Tdessert			10	us		
	Receiver Section:						
Parameter	Symbol	Min	Тур	Max	Unit	Note	
Single ended data output swing	Vout,pp	250		800	mv	3	
LOS Fault	Vlosfault	Vcc -0.5		VCC_host	V	5	
LOS Normal	Vlosnorm	Vee		Vee+0.5	V	5	
Power Supply Rejection	PSR	100			mVpp	6	

Notes:

- 1. AC coupled.
- 2. Or open circuit.



- 3. Into 100 ohm differential termination.
- 4. 20 80 %
- 5. LOS is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

All transceiver specifications are compliant with a power supply sinusoidal modulation of 20 Hz to 1.5MHz up to specified value applied through the power supply filtering network shown on page 23 of the Small Form-factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA), September 14, 2000.

5. Optical Parameters

 $(TOP = -40 \text{ to } 85^{\circ}C, VCC = 3.135 \text{ to } 3.465 \text{ Volts})$

Transmitter Section:						
Parameter	Symbol	Min	Тур	Max	Unit	Notes
Center Wavelength	λс	840	850	860	nm	
Spectral Width	σ			0.85	nm	
Optical Output Power	Pout	-9		-3	dBm	1
Extinction Ratio	ER	9			dB	
Optical Rise/Fall Time	tr / tf			260	ps	2
Relative Intensity Noise	RIN			-120	dB/Hz	
Output Eye Mask	Complia	nt with IEE	E802.3 z (class 1 lase	er safety)	
	Receiver	Section:				
Parameter	Symbol	Min	Тур	Max	Unit	Notes
Optical Input Wavelength	λс	770		860	nm	
Receiver Overload	Pol	0			dBm	4
RX Sensitivity	Sen			-17	dBm	4
RX_LOS Assert	LOS A	-35			dBm	
RX_LOS De-assert	LOS D			-18	dBm	
RX_LOS Hysteresis	LOS H	0.5			dB	
G	eneral Spe	ecification	ıs:			
Parameter	Symbol	Min	Тур	Max	Unit	Notes
Data Rate	BR		1.25		Gb/s	
Bit Error Rate	BER			10 ⁻¹²		
Max. Supported Link Length on 9/125μm SMF@1.25Gb/s	LMAX		550		m	
Total System Budget	LB	8			dB	

Notes:

1. The optical power is launched into SMF.



- 2. 20-80%.
- 3. Jitter measurements taken using Agilent OMNIBERT 718 in accordance with GR-253.
- 4. Measured with PRBS 27-1 at 10-12 BER

6. Pin Assignment and Description

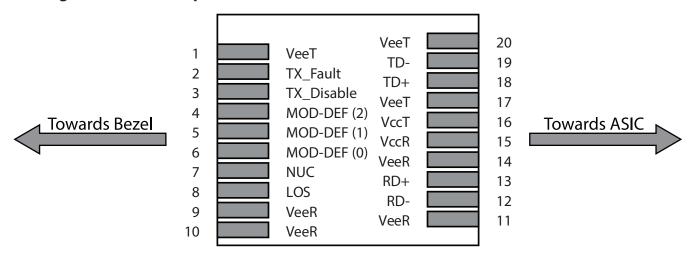


Figure 1. Host Board Connector Block Pin Numbers and Names

7. Pin Function Definitions

Pin No	Name	Function	Plug Seq	Notes
1	VeeT	Transmitter Ground	1	1
2	TX Fault	Transmitter Fault Indication	3	
3	TX Disable	Transmitter Disable	3	2
4	MOD-DEF2	Module Definition	2	3
5	MOD-DEF1	Module Definition 1	3	3
6	MOD-DEF0	Module Definition 0	3	3
7	Rate Select	Not Connected	3	4
8	LOS	Loss of Signal	3	5
9	VeeR	Receiver Ground	1	1
10	VeeR	Receiver Ground	1	1
11	VeeR	Receiver Ground	1	
12	RD-	Inv. Received Data Out	3	6
13	RD+	Received Data Out	3	6
14	VeeR	Receiver Ground	3	1
15	VccR	Receiver Power	2	1
16	VccT	Transmitter Power	2	
17	VeeT	Transmitter Ground	1	



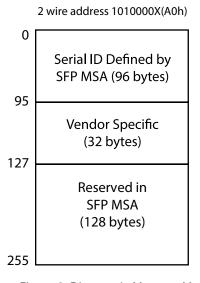
Pin No	Name	Function	Plug Seq	Notes
18	TD+	Transmit Data In	3	6
19	TD-	Inv. Transmit In	3	6
20	VeeT	Transmitter Ground	1	

Notes:

- 1. Circuit ground is internally isolated from chassis ground.
- 2. Laser output disabled on TDIS > 2.0V or open, enabled on TDIS < 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.
- Rate select is not used
- 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.
- 6. AC Coupled

8. SFP Module EEPROM Information and Management

The SFP modules implement the 2-wire serial communication protocol as defined in the SFP -8472. The serial ID information of the SFP modules and Digital Diagnostic Monitor parameters can be accessed through the I2C interface at address A0h and A2h. The memory is mapped in Table 1. Detailed ID information (A0h) is listed in the following table, and the DDM specification at address A2h. For more details of the memory map and byte definitions, please refer to the SFF-8472, "Digital Diagnostic Monitoring Interface for Optical Transceivers". The DDM parameters have been internally calibrated.



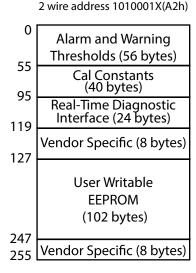


Figure 2. Diagnostic Memory Map (Specific Data Field Descriptions)



Base ID Fields				
Data Address	Length (Byte)	Name of Length	Description and Contents	
0	1	Identifier	Type of Serial transceiver (03h=SFP)	
1	1	Reserved	Extended identifier of type serial transceiver (04h)	
2	1	Connector	Code of optical connector type (07=LC)	
3-10	8	Transceiver		
11	1	Encoding	NRZ(03h)	
12	1	BR, Nominal	Nominal baud rate, unit of 100Mbps	
13-14	2	Reserved	(0000h)	
15	1	Length(9um)	Link length supported for 9/125um fiber, units of 100m	
16	1	Length(50um)	Link length supported for 50/125um fiber, units of 10m	
17	1	Length(62.5um)	Link length supported for 62.5/125um fiber, units of 10m	
18	1	Length(Copper)	Link length supported for copper, units of meters	
19	1	Reserved		
20-35	16	Vendor Name	SFP vendor name	
36	1	Reserved		
37-39	3	Vendor OUI	SFP transceiver vendor OUI ID	
40-55	16	Vendor PN Part Number	Part Number (ASCII)	
56-59	4	Vendor rev	Revision level for part number	
60-62	3	Reserved		
63	1	CCID	Least significant byte of sum of data in address 0-62	
		Extended ID Fig	elds	
Data Address	Length (Byte)	Name of Length	Description and Contents	
64-65	2	Option	Indicates which optical SFP signals are implemented (001Ah = LOS, TX_FAULT, TX_DISABLE all supported)	
66	1	BR, max	Upper bit rate margin, units of %	
67	1	BR, min	Lower bit rate margin, units of %	
68-83	16	Vendor SN	Serial number (ASCII)	
84-91	8	Date code	Vendor Manufacturing date code	
92-94	3	Reserved		
95	1	CCEX	Check code for the extended ID Fields (addresses 64 to 94)	



Vendor Specific ID Fields				
Data Address	Length (Byte)	Name of Length	Description and Contents	
96-127	32	Readable	Vendor specific date, read only	
128-255	128	Reserved	Reserved for SFF-8079	

9. Regulatory Compliance

This transceiver complies with international Electromagnetic Compatibility (EMC) and international safety requirements and standards (see details in Table following).

Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1(>1000 V)
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	IEC 61000-4-2 GR-1089-CORE	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class BEN55022 Class B (CISPR 22B) VCCI Class B	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2	Compatible with Class 1 laser product.

10. Recommended Circuit

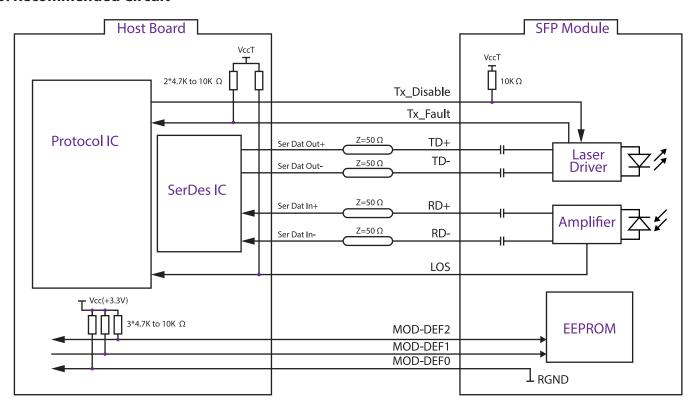


Figure 3. SFP Host Recommended Circuit



11. Mechanical Dimentions

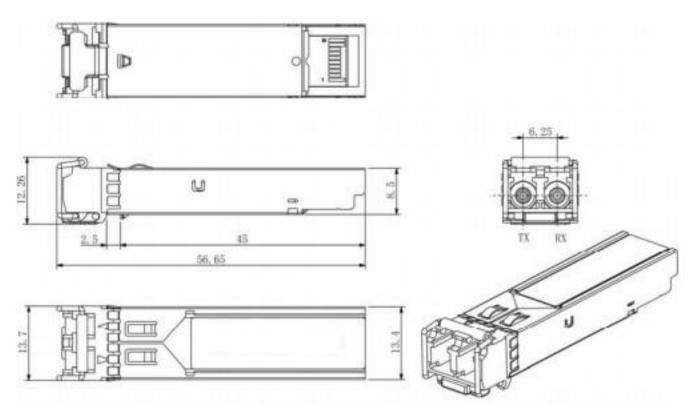


Figure 4. Mechanical Drawing

12. Contact Information

Approved Networks is a leading supplier of Network Transceivers and Connectivity products to Channel Partners, Resellers, and OEMs. With more than 9 years of direct industry experience, our products are resident in the most demanding and mission critical functional networks Worldwide. We serve as a Master Distributor to the largest CMs in the world and deploy the most rigorous testing and firmware management programs to bring the highest level of functional product to the market at a cost that makes sense.

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