SFP-M 1.25 Gigabit Ethernet-Multimode Transceiver

SFP, Duplex LC Connector, 850nm VCSEL for Multimode Fiber, RoHS Compliant



Features

- 850nm VCSEL
- Data Rate: 1.25Gbps, NRZ
- Single +3.3V Power Supply
- RoHS Compliant and Lead-free
- AC/AC Differential Electrical Interface
- Compliant with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP)
- Duplex LC Connector
- Compliance with specifications for IEEE-802.3z Gigabit Ethernet at 1.25 Gbps
- Compliance with ANSI specifications for Fiber Channel applications at 1.06 Gbps
- Eye Safety
  Designed to meet Laser Class 1, complies with EN60825-1

Applications

- Gigabit Ethernet Links
- Fiber Channel Links at 1.06 Gbps
- High Speed Backplane Interconnects
- Switched Backbones

Description

The SFP-M from AAXEON is the high performance and cost-effective module for serial optical data communication applications specified for multimode of 1.25 Gb/s. It operates on +3.3V power. The module is intended for multimode fiber, operates at a nominal wavelength of 850nm, and complies with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP). Each module consists of a transmitter optical subassembly, a receiver optical subassembly, and an electrical subassembly. All are housed in a metal package and the combination produces a reliable component.

The module is a duplex LC connector transceiver designed for use in Gigabit Ethernet applications and to provide IEEE-802.3z compliant link for 1.25Gb/s short reach applications. The characteristics are performed in accordance with Telcordia Specification GR-468-CORE.

EMC

Most equipment utilizing high-speed transceivers will be required to meet the following requirements:

1) FCC in the United States
2) CENELEC EN55022 (CISPR 22) in Europe

To assist the customer in managing the overall equipment EMC performance, the transceivers have been designed to satisfy FCC class B limits and provide good immunity to radio-frequency electromagnetic fields.

Eye Safety

The transceivers have been designed to meet Class 1 eye safety and comply with EN 60825-1.

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Product Information

Model Number	Operating Voltage & SD Output	Wavelength	Output Power	Sensitivity	Distance
SFP-M	*3.3V TTL AC/AC*	*850 nm*	*-9.5 ~ -4 dBm*	*≤-17 dBm*	*550 m(50/125μm)* *275 m(62.5/125μm)*

ABSOLUTE MAX RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNIT	NOTE
Storage Temperature	T_S	-40	85	°C	
Supply Voltage	V_{CC}	0	6	V	
Supply Current	I_S		240	mA	

OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
Case Operating Temperature	T_A	0		70	°C	
Supply Voltage	V_{CC}	3.1		3.5	V	
Data Input Voltage Swing	V_{ID}	400		1660	mV	

ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	MAX	UNIT	NOTE
Transmitter					
Transmitter Supply Current	I_{CCT}		140	mA	
Tx_ Disable Input Voltage - Low	V_{IL}	0	0.8	V	
Tx_ Disable Input Voltage - High	V_{IH}	2.0	Vcc	V	
Tx_ Fault Output Voltage - Low	V_{OL}	0	0.8	V	
Tx_ Fault Output Voltage - High	V_{OH}	2.0	Vcc	V	
Receiver					
Receiver Supply Current	I_{CCR}		100	mA	
Receiver Data Output Differential Voltage	V_{OD}	0.4	1.3	V	
Rx_LOS Output Voltage - Low	V_{OL}	0	0.8	V	
Rx_LOS Output Voltage - High	V_{OH}	2.0	Vcc	V	
MOD_DEF (1) , MOD_DEF (2) - Low	V_{IL}	-0.6	Vcc × 0.3	V	
MOD_DEF (1) , MOD_DEF (2) - High	V_{IH}	Vcc × 0.7	Vcc + 0.5	V	

TRANSMITTER ELECTRO-OPTICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTE
Optical Output Power	Po	-9.5		-4	dBm	1
Extinction Ratio	ER	9			dB	
Center Wavelength	λ_c	830	850	860	nm	
Spectral Width (RMS)	Δλ			0.85	nm	
RIN	RIN			-117	dB/Hz	
Coupled Power Ratio	CPR	9			dB	2
Optical Rise time (20%-80%)	t_r			260	ps	3
Optical Fall time (20%-80%)	t_f			260	ps	3
Output Eye	Compliant with IEEE802.3z/D5.0					

RECEIVER ELECTRO-OPTICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTE
Maximum Input Optical Power	P_{max}	-3			dBm	4
Minimum Input Optical Power	P_{min}			-17	dBm	4
Operating Wavelength	λ	770		860	nm	
Optical Return Loss	ORL	12			dB	
Receiver Electrical 3dB Upper Cutoff Frequency	---			1500	MHz	
LOS of Signal - Asserted	P_A	-30			dBm	
LOS of Signal - Deasserted	P_D			-17	dBm	
Loss of Signal -Hysterisis	P_D -P_A	0.5			dB	

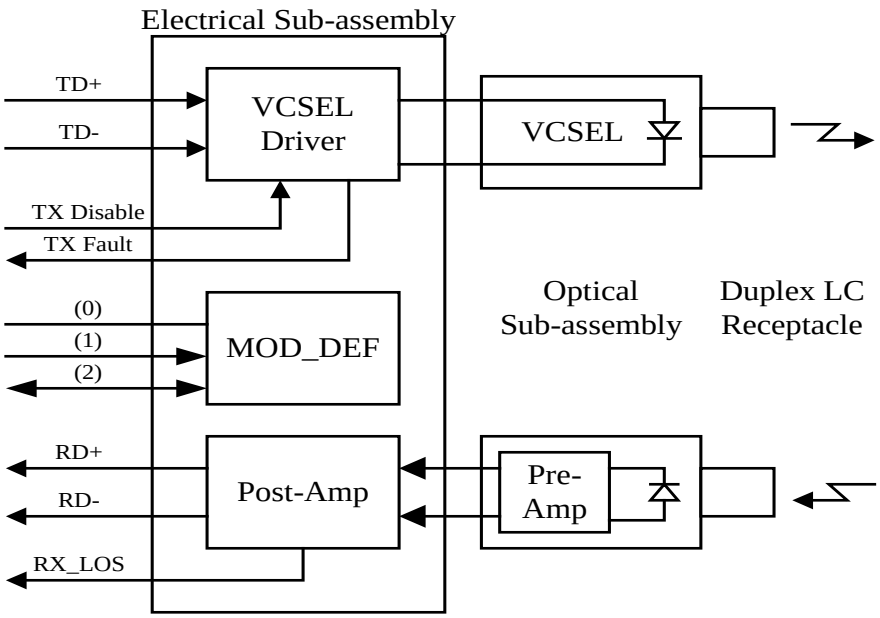
Notes:

1. Measured average power coupled into 62.5/125μm, 0.275 NA or 50/125μm, 0.2 NA graded index multimode Fiber.
2. CPR is measured in accordance with EIA/TIA-526-14A as referenced in IEEE 802.3 section 38.6.10.
3. These are 20-80% values.
4. Measured with 2^7-1 PRBS at BER<10^{-12}

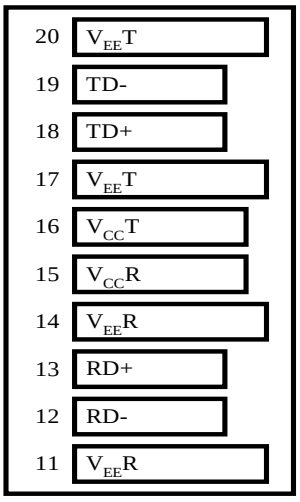
TIMING CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTE
TX_DISABLE Assert Time	t_off			10	μs	
TX_DISABLE Negate Time	t_on			1	ms	
Time to initialize, include reset of TX_FAULT	t_init			300	ms	
TX_FAULT from fault to assertion	t_fault			100	μs	
TX_DISABLE time to start reset	t_reset	10			μs	
Receiver Loss of Signal Assert Time (off to on)	t_{A,RX_LOS}			100	μs	
Receiver Loss of Signal Assert Time (on to off)	t_{D,RX_LOS}			100	μs	

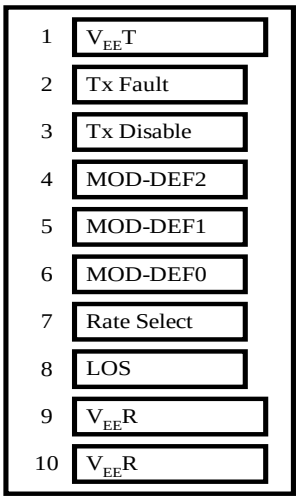
BLOCK DIAGRAM OF TRANSCEIVER



PIN OUT DIAGRAM OF TRANSCEIVER



Top of Board

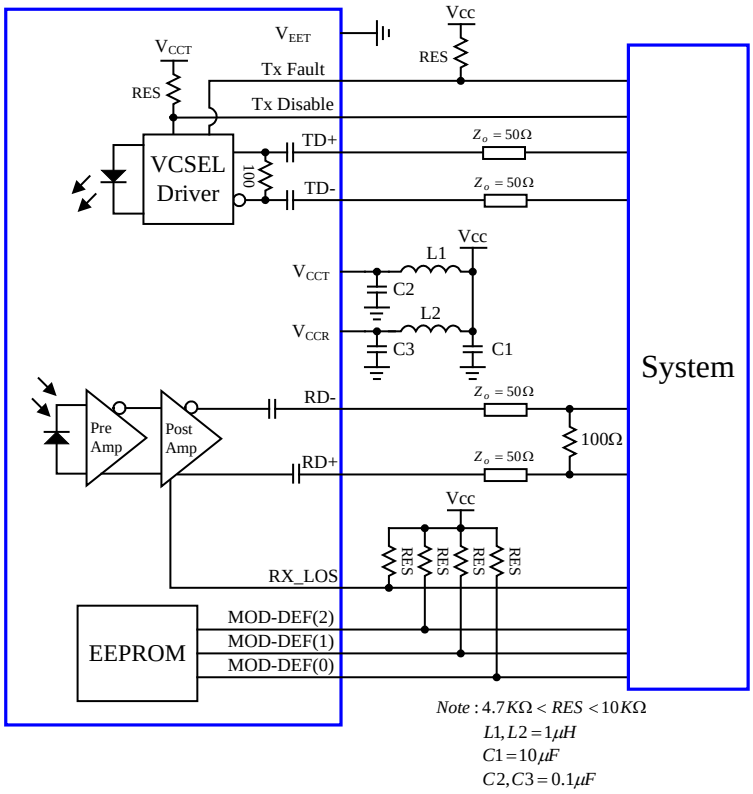


Buttom of Board (As Viewed through Top of Board

PIN OUT TABLE

Pin	Symbol	Functional Description
1	VeeT	Transmitter Ground
2	TX Fault	Transmitter Fault Indication
3	TX Disable	Transmitter Disable – Module disables on high or open
4	MOD-DEF(2)	Module Definition 2 – Two wire serial ID interface
5	MOD-DEF(1)	Module Definition 1 – Two wire serial ID interface
6	MOD-DEF(0)	Module Definition 0 – Grounded in module
7	Rate Select	Not Connected
8	LOS	Loss of Signal
9	VeeR	Receiver Ground
10	VeeR	Receiver Ground
11	VeeR	Receiver Ground
12	RD-	Inverse Received Data Out
13	RD+	Received Data Out
14	VeeR	Receiver Ground
15	VccR	Receiver Power
16	VccT	Transmitter Power
17	VeeT	Transmitter Ground
18	TD+	Transmitter Data In
19	TD-	Inverse Transmitter Data In
20	VeeT	Transmitter Ground

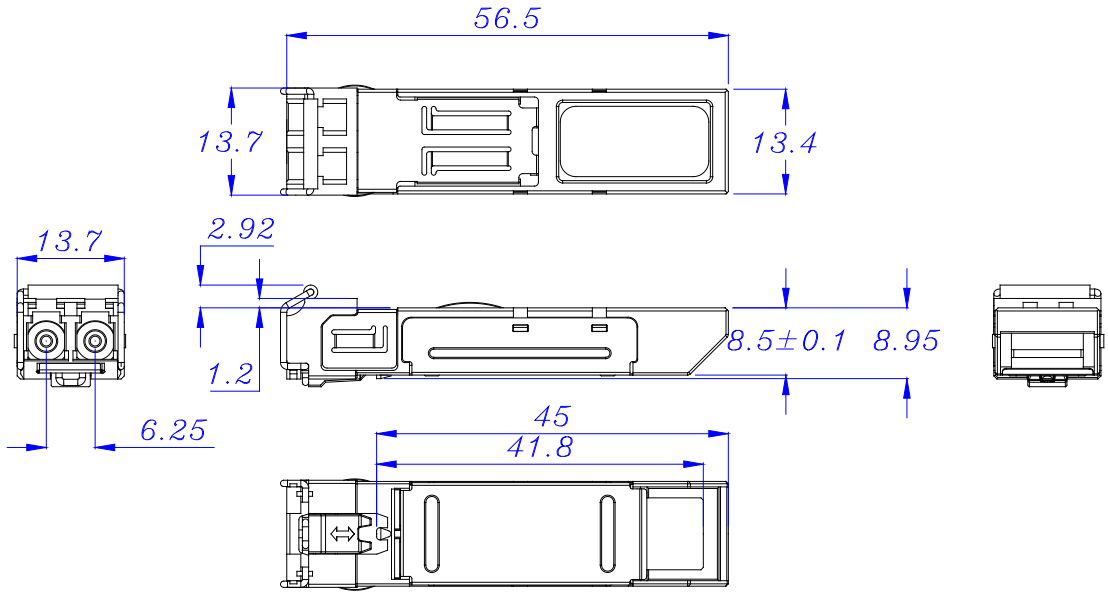
RECOMMENDED CIRCUIT SCHEMATIC



Note : $4.7K\Omega < RES < 10K\Omega$
$L1, L2 = 1\mu H$
$C1 = 10\mu F$
$C2, C3 = 0.1\mu F$

MECHANICAL DIMENSIONS

Units in mm



All dimensions are ±0.2mm unless otherwise specified.