

# OC48 SFP 15km SMF Optical Transceiver

## Product Features

- Supports up to 2.67Gbps bit rates
- Hot-pluggable SFP footprint
- 1310nm DFB laser and PIN photo detector, Up to 15km for SMF transmission
- Compliant with SFP MSA and SFF-8472 with duplex LC receptacle
- Compatible with RoHS
- Single +3.3V power supply
- Real Time Digital Diagnostic Monitoring
- Operating case temperature: 0 to +70° C

The Axiom AC-B-SFPO48-xx is a high performance, cost effective modules supporting data rate of 2.67 Gbps and 15km transmission distance with SMF.

The transceiver consists of three sections: a DFB laser transmitter, a PIN photodiode integrated with a trans-impedance preamplifier (TIA) and MCU control unit. All modules satisfy class I laser safety requirements.

The transceivers are compatible with SFP Multi-Source Agreement and SFF-8472 digital diagnostics functions.

## Ordering Information

Part Number	Description
AC-B-SFPO48-xx	SFP OC48 1310nm 15km optical transceiver with full real-time digital diagnostic monitoring

## Applications

- 2.5Gbps Optical systems
- Fiber Channel
- Other Optical links

## Regulatory Compliance

Feature	Standard	Performance
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN 55022:2010, Class B	Compatible with standards
Electromagnetic susceptibility (EMS)	EN 55024:2010	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2	Compatible with Class I laser product

### Absolute Maximum Ratings

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

Parameter	Symbol	Min	Max	Unit	Notes
Storage Temperature	TS	-40	85	°C	
Power Supply Voltage	V <sub>CC</sub>	-0.5	4.5	V	
Relative Humidity (non-condensation)	RH	0	85	%	
Input Voltage	V <sub>in</sub>	-0.3	V <sub>CC</sub> +0.3	V	

### Recommended Operating Conditions and Power Supply Requirements

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	TOP	0		70	°C	
Power Supply Voltage	V <sub>CC</sub>	3.135	3.3	3.465	V	
Power Supply Current				300	mA	
Data Rate	DR			2.67	Gbps	

### Optical Characteristics

All parameters are specified under the recommended operating conditions unless otherwise specified..

Parameter	Symbol	Min	Typical	Max	Unit	Notes
<b>Transmitter</b>						
Centre Wavelength	$\lambda_c$	1260	1310	1360	nm	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Side-Mode Suppression Ratio	SMSR	30	-	-	dB	
Average Output Power	P <sub>out</sub>	-5		0	dBm	1
Extinction Ratio	ER	9.0			dB	

Data Input Swing Differential		$V_{IN}$	180		1200	mV	2
Input Differential Impedance		$Z_{IN}$	90	100	110	$\Omega$	
TX Disable	Disable		2.0		Vcc	V	
	Enable		0		0.8	V	
TX Fault	Fault		2.0		Vcc	V	
	Normal		0		0.8	V	
<b>Receiver</b>							
Centre Wavelength		$\lambda_c$	1260		1610	nm	
Receiver Sensitivity					-18	dBm	3
Receiver Overload			-1			dBm	3
LOS De-Assert		LOS <sub>D</sub>			-19	dBm	
LOS Assert		LOS <sub>A</sub>	-30			dBm	
LOS Hysteresis			0.5		4	dB	
Data Output Swing Differential		$V_{out}$	600	800	1000	mV	4
LOS	High		2.0		Vcc	V	
	Low				0.8	V	

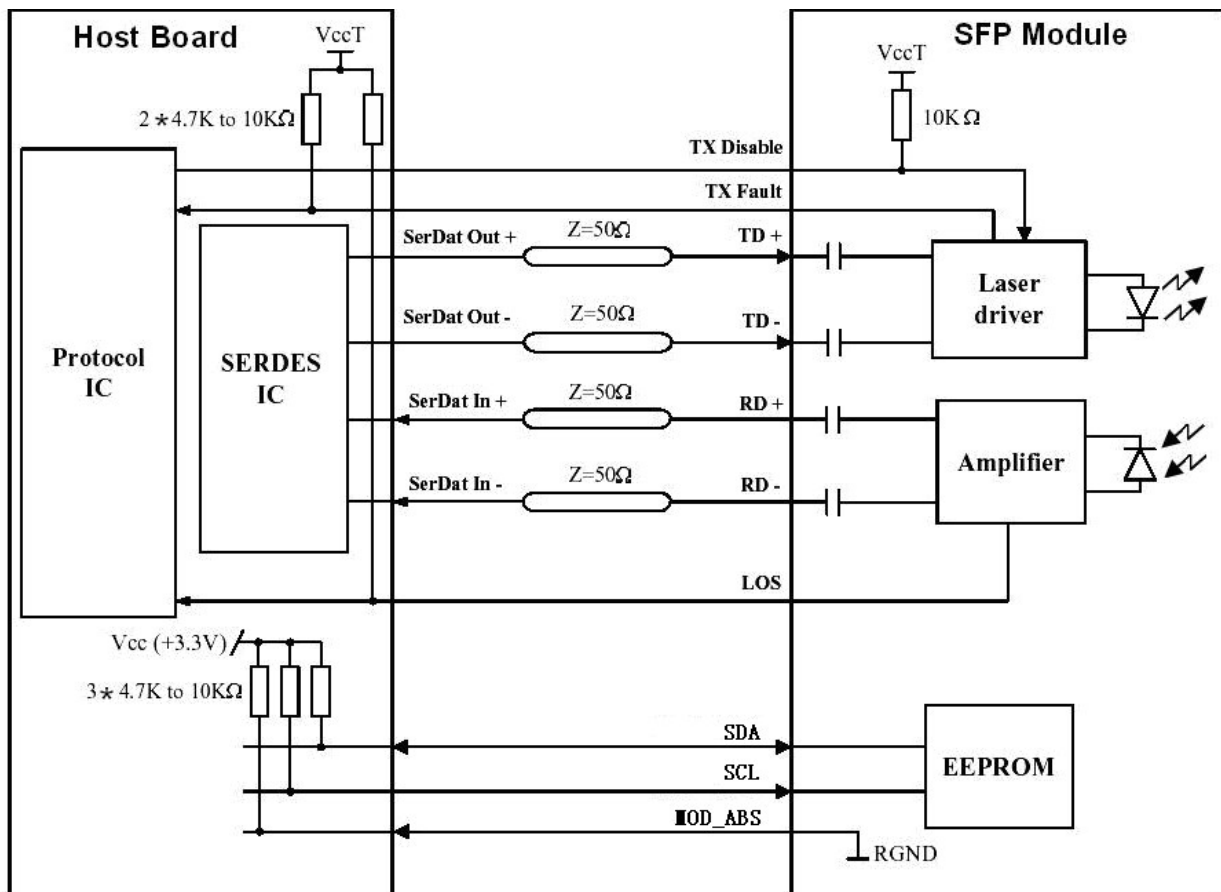
**Notes:**

1. The optical power is launched into SMF.
2. PECL input, internally AC-coupled and terminated.
3. Measured with a PRBS 223-1 test pattern @2500Mbps, BER  $\leq 1 \times 10^{-12}$ .
4. Internally AC-coupled.

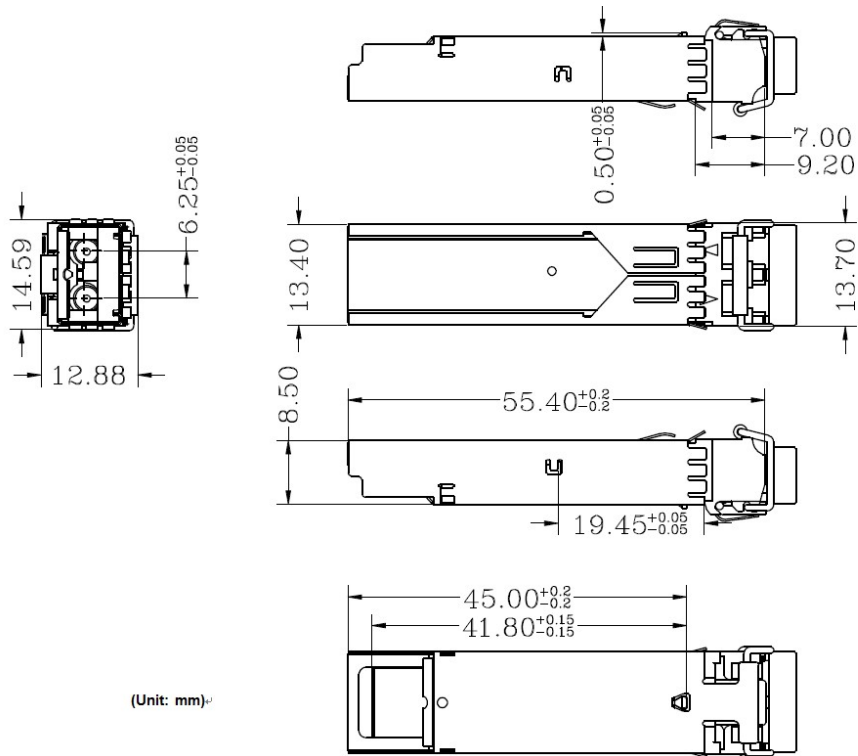
**Digital Diagnostic Functions**

Parameter	Symbol	Min	Max	Unit	Notes
Temperature monitor absolute error	DMI_Temp	-3	+3	°C	
Supply voltage monitor absolute error	DMI_VCC	-3%	+3%	V	
TX power monitor absolute error	DMI_RX	-3	+3	dB	
RX power monitor absolute error	DMI_RX	-3	+3	dB	
Bias current monitor	DMI_Ibias	-10%	+10%	mA	

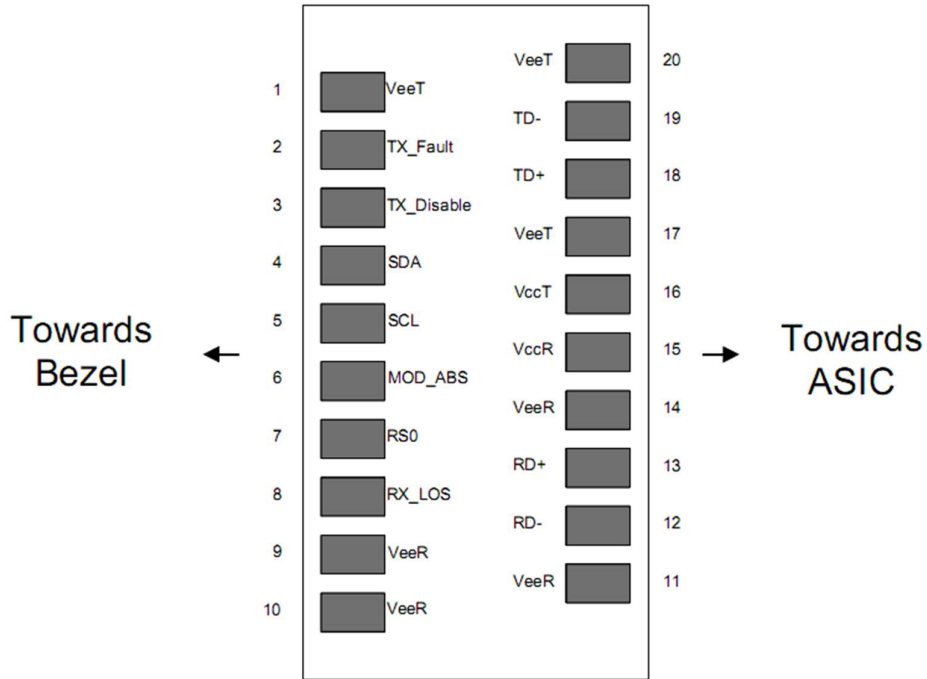
**Recommended Circuit**



**Mechanical Dimensions**



**Pin Assignment and Description**



**Pin Assignment**

Pin	Signal Name	Description	Plug Seq.	Notes
1	V <sub>EET</sub>	Transmitter Ground	1	
2	TX_FAULT	Transmitter Fault Indication	3	Note 1
3	TX_DISABLE	Transmitter Disable	3	Note 2
4	SDA	SDA Serial Data Signal	3	
5	SCL	SCL Serial Clock Signal	3	
6	MOD_ABS	Module Absent. Grounded within the module	3	

7	RS0	Not Connected	3	
8	LOS	Loss of Signal	3	Note 3
9	V <sub>EEER</sub>	Receiver ground	1	
10	V <sub>EEER</sub>	Receiver ground	1	
11	V <sub>EEER</sub>	Receiver ground	1	
12	RD-	Inv. Received Data Out	3	Note 4
13	RD+	Received Data Out	3	Note 4
14	V <sub>EEER</sub>	Receiver ground	1	
15	V <sub>CCR</sub>	Receiver Power Supply	2	
16	V <sub>CCT</sub>	Transmitter Power Supply	2	
17	V <sub>EET</sub>	Transmitter Ground	1	
18	TD+	Transmit Data In	3	Note 5
19	TD-	Inv. Transmit Data In	3	Note 5
20	V <sub>EET</sub>	Transmitter Ground	1	

**Notes:**

Plug Seq.: Pin engagement sequence during hot plugging.

- TX Fault is an open collector output, which should be pulled up with a  $4.7k \sim 10k \Omega$  resistor on the host board to a voltage between 2.0V and  $V_{cc} + 0.3V$ . Logic 0 indicates normal operation; Logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.
- Laser output disabled on  $TDIS > 2.0V$  or open, enabled on  $TDIS < 0.8V$ .
- LOS is open collector output. Should be pulled up with  $4.7k \sim 10k \Omega$  on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.
- RD-/+: These are the differential receiver outputs. They are internally AC-coupled 100 differential lines which should be terminated with  $100 \Omega$  (differential) at the user SERDES.
- TD-/+: These are the differential transmitter inputs. They are internally AC-coupled, differential lines with  $100 \Omega$  differential termination inside the module.