

# SFP-7040-WB

1.25Gbps SFP Bi-Directional Transceiver, 40km reach 1550nm Tx / 1310nm Rx

### Features

- Dual data-rate of 1.25Gbps/1.063Gbps operation
- 1550nm DFB laser and PIN photo-detector for 40km transmission
- Compliant with SFP MSA and SFF-8472 with simplex LC receptacle
- Digital Diagnostic Monitoring:
  - Internal Calibration or External Calibration
- Compatible with SONET OC-24-LR-1
- Compatible with RoHS
- +3.3V single power supply
- Operating case temperature:
   Standard : 0 to +70°C

## **Applications**

- Gigabit Ethernet
- Fiber Channel
- Switch to Switch interface
- Switched backplane applications
- Router/Server interface
- Other optical transmission systems

#### Description

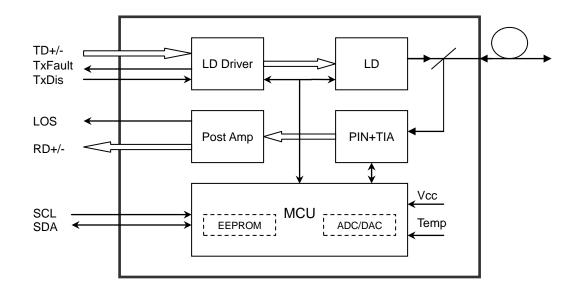
The SFP-BIDI transceivers are high performance, cost effective modules supporting dual data-rate of 1.25Gbps/1.0625Gbps and 40km transmission distance with SMF.

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 (MSA) and SFF-8472. For further information, please refer to SFP MSA.







## **Absolute Maximum Ratings**

#### Table 1 - Absolute Maximum Ratings

Parameter	Symbol	Min	Мах	Unit
Supply Voltage	Vcc	-0.5	4.5	V
Storage Temperature	Ts	-40	+85	°C
Operating Humidity	-	5	85	%

## **Recommended Operating Conditions**

## **Table 2 - Recommended Operating Conditions**

Parameter		Symbol	Min	Typical	Max	Unit	
Operating Cas	se Temperature	Standard	Тс	0		+70	°C
Power Supply	Voltage		Vcc	3.13	3.3	3.47	V
Power Supply	Current		lcc			300	mA
Gigabit Ethernet				1.25		Ohaa	
Data Rate	Fiber Channel				1.063		Gbps

## **Optical and Electrical Characteristics**

### SFP-7040-WB: (DFB and PIN, 40km reach)

#### **Table 3 - Optical and Electrical Characteristics**

Para	meter	Symbol	Min	Typical	Max	Unit	Notes
			Transmi	tter			
Centre V	Vavelength	λς	1530	1550	1570	nm	
Spectral V	Vidth (-20dB)	Δλ			1	nm	
Side Mode Su	uppression Ratio	SMSR	30			dB	
Average C	Output Power	Pout	-5		0	dBm	1
Extinct	tion Ratio	ER	9			dB	
Optical Rise/Fal	l Time (20%~80%)	tr/tf			0.26	ns	
Data Input S	wing Differential	V <sub>IN</sub>	400		1800	mV	2
Input Differential Impedance		Z <sub>IN</sub>	90	100	110	Ω	
TY Disable	Disable		2.0		Vcc	V	
TX Disable	Enable		0		0.8	V	
	Fault		2.0		Vcc	V	
TX Fault Normal			0		0.8	V	
			Receiv	er			
Centre Wavelength		λc	1260		1360	nm	
Receive	r Sensitivity				-23	dBm	3
Receive	r Overload		-3			dBm	3
LOS De-Assert		LOSD			-24	dBm	
LOS Assert		LOS <sub>A</sub>	-35			dBm	
LOS Hysteresis			1		4	dB	
Data Output S	Swing Differential	Vout	400		1800	mV	4
1	00	High	2.0		Vcc	V	
L	.OS	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  $2^7$ -1 test pattern @1250Mbps, BER  $\leq 1 \times 10^{-12}$ .

4. Internally AC-coupled.



## **Timing and Electrical**

### Table 4 - Timing and Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Tx Disable Negate Time	t_on			1	ms
Tx Disable Assert Time	t_off			10	μs
Time To Initialize, including Reset of Tx Fault	t_init			300	ms
Tx Fault Assert Time	t_fault			100	μs
Tx Disable To Reset	t_reset	10			μs
LOS Assert Time	t_loss_on			100	μs
LOS De-assert Time	t_loss_off			100	μs
Serial ID Clock Rate	f_serial_clock			400	KHz
MOD_DEF (0:2)-High	V <sub>H</sub>	2		Vcc	V
MOD_DEF (0:2)-Low	VL			0.8	V

## **Diagnostics**

## Table 5 – Diagnostics Specification

Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70	°C	±3°C	Internal / External
Voltage	3.0 to 3.6	V	±3%	Internal / External
Bias Current	0 to 100	mA	±10%	Internal / External
TX Power	-5 to 0	dBm	±3dB	Internal / External
RX Power	-23 to -3	dBm	±3dB	Internal / External

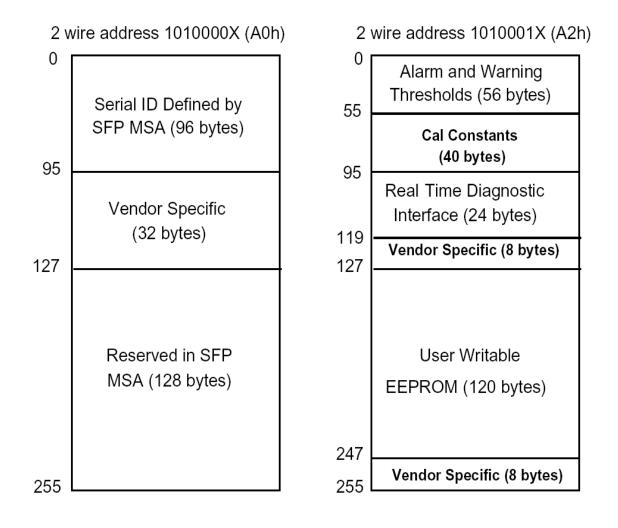


## **Digital Diagnostic Memory Map**

The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

The diagnostic information with internal calibration or external calibration all are implemented, including received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring.

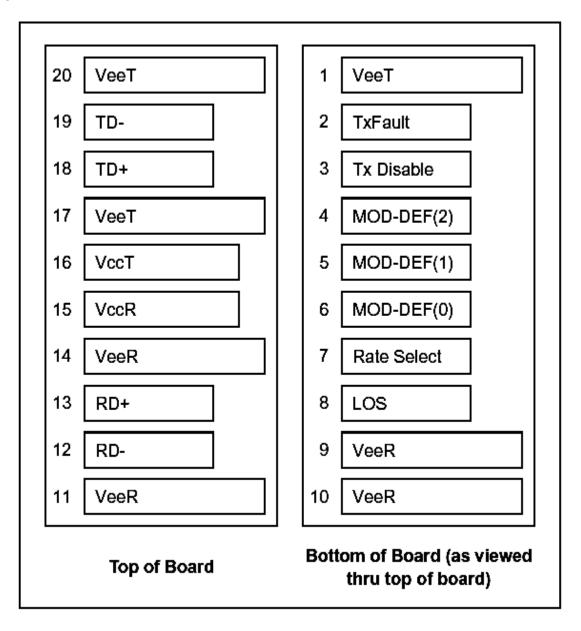
The digital diagnostic memory map specific data field defines as following.





## **Pin Definitions**

Pin Diagram





### **Pin Descriptions**

Pin	Signal Name	Description	Plug Seq.	Notes
1	VEET	Transmitter Ground	1	
2	TX FAULT	Transmitter Fault Indication	3	Note 1
3	TX DISABLE	Transmitter Disable	3	Note 2
4	MOD_DEF(2)	SDA Serial Data Signal	3	Note 3
5	MOD_DEF(1)	SCL Serial Clock Signal	3	Note 3
6	MOD_DEF(0)	TTL Low	3	Note 3
7	Rate Select	Not Connected	3	
8	LOS	Loss of Signal	3	Note 4
9	V <sub>EER</sub>	Receiver ground	1	
10	V <sub>EER</sub>	Receiver ground	1	
11	V <sub>EER</sub>	Receiver ground	1	
12	RD-	Inv. Received Data Out	3	Note 5
13	RD+	Received Data Out	3	Note 5
14	V <sub>EER</sub>	Receiver ground	1	
15	V <sub>CCR</sub>	Receiver Power Supply	2	
16	V <sub>CCT</sub>	Transmitter Power Supply	2	
17	VEET	Transmitter Ground	1	
18	TD+	Transmit Data In 3		Note 6
19	TD-	Inv. Transmit Data In 3		Note 6
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~10kΩ resistor on the host board to a voltage between 2.0V and Vcc+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.
- 2) TX Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a  $4.7k \sim 10k\Omega$  resistor. Its states are:

Low (0 to 0.8V):	Transmitter on
(>0.8V, < 2.0V):	Undefined
High (2.0 to 3.465V):	Transmitter Disabled
Open:	Transmitter Disabled

3) Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7k~10kΩ resistor on the host board. The pull-up voltage shall be VccT or VccR.

Mod-Def 0 is grounded by the module to indicate that the module is present

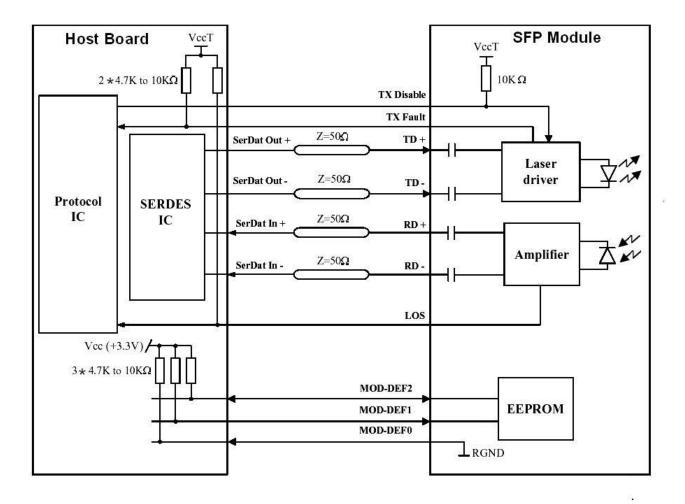
Mod-Def 1 is the clock line of two wire serial interface for serial ID

Mod-Def 2 is the data line of two wire serial interface for serial ID

- 4) LOS is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor. Pull up voltage between 2.0V and Vcc+0.3V. Logic 1 indicates loss of signal; Logic 0 indicates normal operation. In the low state, the output will be pulled to less than 0.8V.
- 5) RD-/+: These are the differential receiver outputs. They are internally AC-coupled 100 differential lines which should be terminated with 100Ω (differential) at the user SERDES.
- 6) TD-/+: These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module.



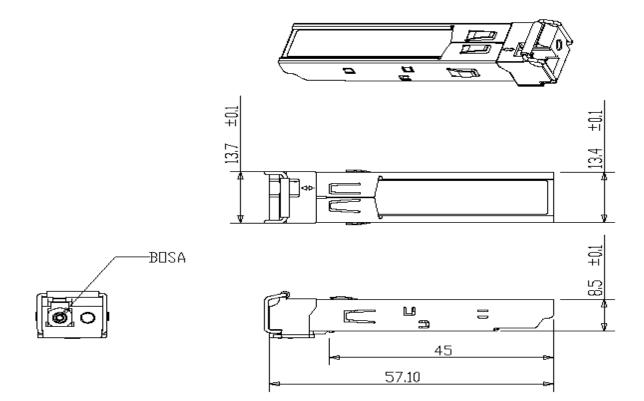
## **Recommended Interface Circuit**



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## **Mechanical Dimensions**



# **Ordering information**

Part Number	Product Description	
SFP-7040-WB-SC	1550nm, 1.25Gbps, SC,40km,	0°C~+70°C, With Digital Diagnostic Monitoring
SFP-7040-WB	1550nm, 1.25Gbps, LC,40km,	0°C~+70°C, With Digital Diagnostic Monitoring

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