

**1.25Gbps Single-Mode 80km CWDM SFP Optical Transceiver  
CSFP-1GXX-80-xx****Features**

- Data-rate of 1.25Gbps operation
- 18-Wavelength CWDM DFB LD Transmitter from 1270nm to 1610nm, with Step 20nm
- Compliant with SFP MSA and SFF-8472
- Compatible with SONET OC-24-LR-1
- Compatible with RoHS
- +3.3V single power supply
- Hot-Pluggable SFP Footprint Duplex LC
- Operating case temperature
  - Standard : 0°C to +70°C
  - Extended: -20°C to +85°C
  - Industrial: -40°C to +85°C

**Applications**

- Gigabit Ethernet
- Fiber Channel Switch Infrastructure
- Router/Server interface
- Other optical transmission systems

**Description**

The CSFP-1GXX-80-xx series single mode transceiver is small form factor pluggable module for duplex optical data communications such as Gigabit Ethernet 1000BASE-ZX and Fiber Channel 1x SM-LC-L FC-PI. It is with the SFP 20-pin connector to allow hot plug capability. This module is designed for single mode fiber and operates at a nominal wavelength of CWDM wavelength. There are eighteen center wavelengths available from 1270nm to 1610nm, with each step 20nm.

The transmitter section uses a multiple quantum well CWDM DFB laser and is a class 1 laser compliant according to International Safety Standard IEC-60825. The receiver section uses an integrated InGaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC. The CSFP-1GXX-80-xx series are designed to be compliant with SFF-8472.

## Specifications

**Table 1 - Absolute Maximum Ratings**

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.5	3.6	V
Storage Temperature	Ts	-40	+85	°C
Operating Humidity	-	-	95	%

\*Exceeding any one of these values may destroy the device immediately.

**Table 2 - Recommended Operating Conditions**

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature(Standard)	Tc	0		+70	°C
Power Supply Voltage	Vcc	3.15	3.3	3.45	V
Power Supply Current	Icc			300	mA
Data Rate	GBE		1.25		Gbps
	FC		1.063		

**Table3 -λC Wavelength Guide**

λC Wavelength Guide											
Code	λC	Unit	Code	λC	Unit	Code	λC	Unit	Code	λC	Unit
27	1270	nm	37	1370	nm	47	1470	nm	57	1570	nm
29	1290	nm	39	1390	nm	49	1490	nm	59	1590	nm
31	1310	nm	41	1410	nm	51	1510	nm	61	1610	nm
33	1330	nm	43	1430	nm	53	1530	nm			
35	1350	nm	45	1450	nm	55	1550	nm			

### (CWDM and PIN, 80km Reach)

**Table 4 - Optical and Electrical Characteristics**

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Link Budget		24			dB	
Data Rate			1.063/1.25			Gpbs
<b>Transmitter</b>						
Centre Wavelength	$\lambda_c$	$\lambda_c-6$	$\lambda_c$	$\lambda_c+7.5$	nm	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Output Power	P <sub>out</sub>	0		5	dBm	1
Extinction Ratio	ER	8.2			dB	
Optical Rise/Fall Time (20%~80%)	tr/ta			0.26	ns	
Data Input Swing Differential	V <sub>IN</sub>	400		2000	mV	2
Input Differential Impedance	Z <sub>IN</sub>	85	100	115	$\Omega$	
TX Disable	Disable		2.0	V <sub>cc</sub>	V	
	Enable		0	0.8	V	
TX Fault	Fault		2.0	V <sub>cc</sub>	V	
	Normal		0	0.8	V	
<b>Receiver</b>						
Receiver Sensitivity	P <sub>min</sub>			-24	dBm	3
Receiver Overload	P <sub>max</sub>	-3			dBm	3
LOS De-Assert	LOS <sub>D</sub>			-25	dBm	
LOS Assert	LOS <sub>A</sub>	-42			dBm	
LOS Hysteresis		0.5		-	dB	
Data Output Swing Differential	V <sub>out</sub>	370		1800	mV	4
LOS	High	2.0		V <sub>cc</sub>	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 2<sup>7</sup>-1 test pattern @1250Mbps, BER  $\leq 1 \times 10^{-12}$ .
4. Internally AC-coupled.

**Table 5 - Timing and Electrical**

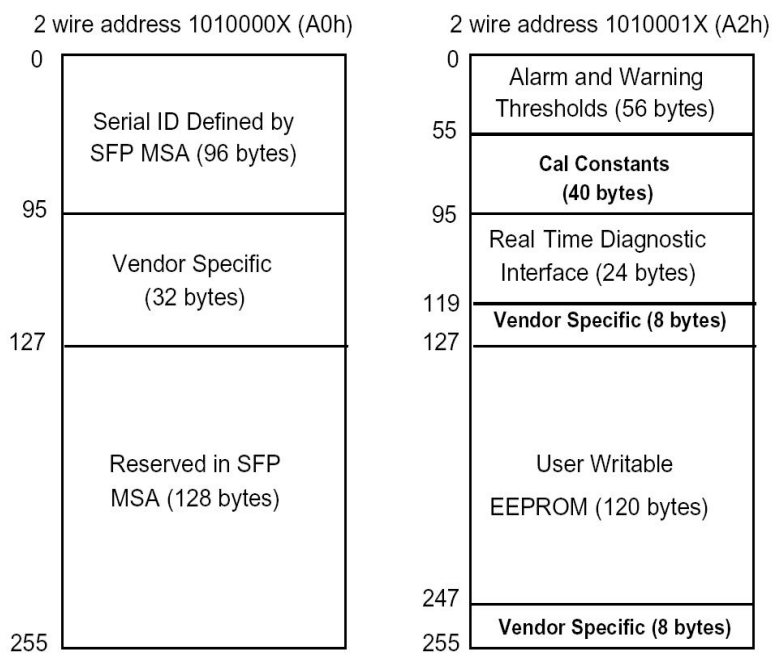
Parameter	Symbol	Min	Typical	Max	Unit
Tx Disable Negate Time	t_on			1	ms
Tx Disable Assert Time	t_off			10	μs
Time To Initialize, including Reset of Tx Fault	t_init			300	ms
Tx Fault Assert Time	t_fault			100	μs
Tx Disable To Reset	t_reset	10			μs
LOS Assert Time	t_loss_on			100	μs
LOS De-assert Time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

### Digital Diagnostic Memory Map

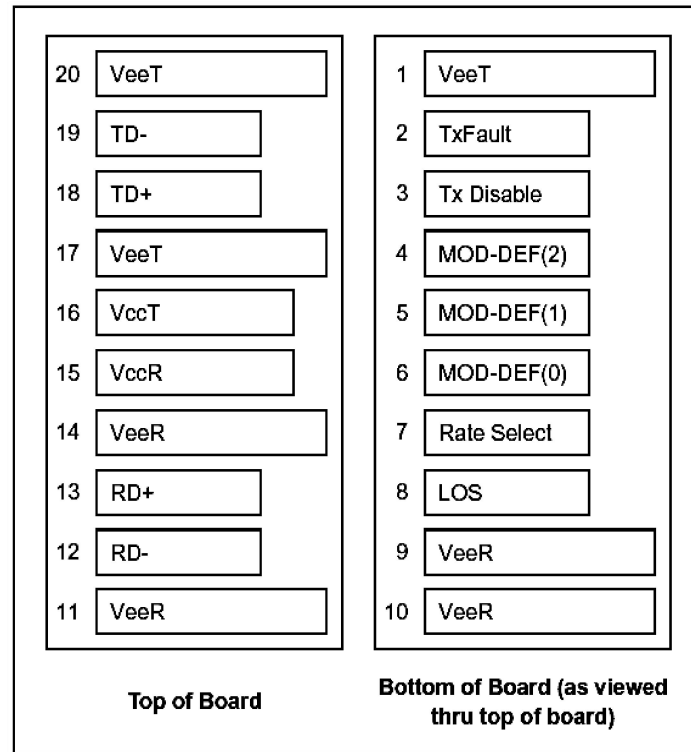
The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

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 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	V <sub>EET</sub>	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	

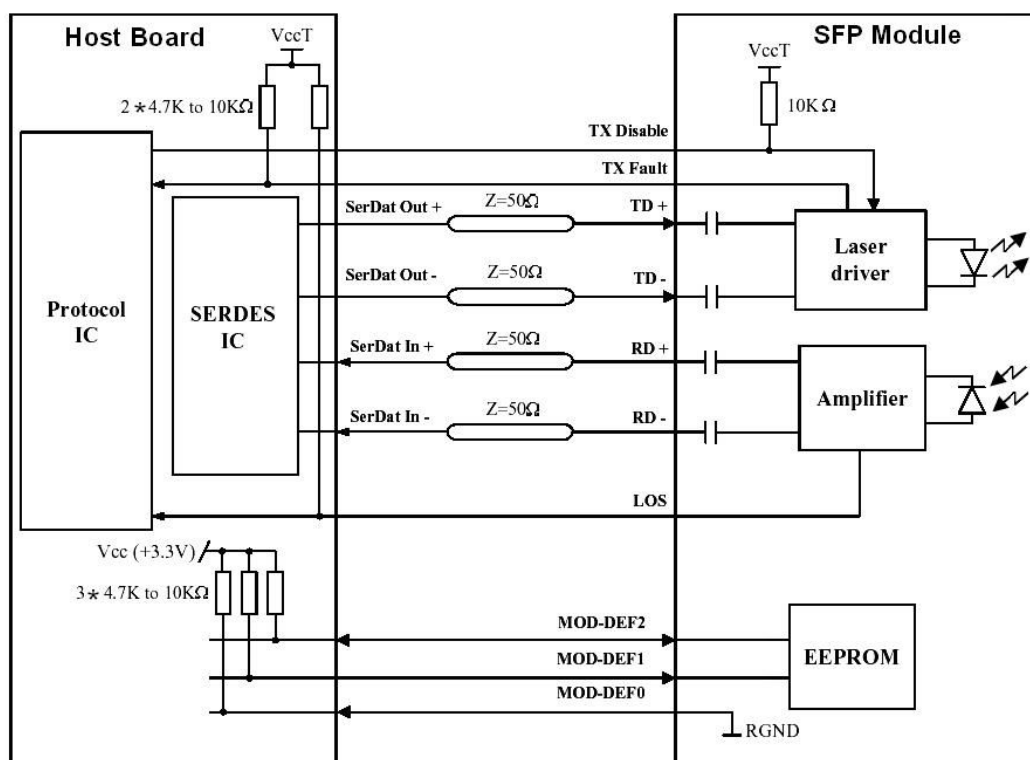
### Notes:

Plug Seq.: Pin engagement sequence during hot plugging.

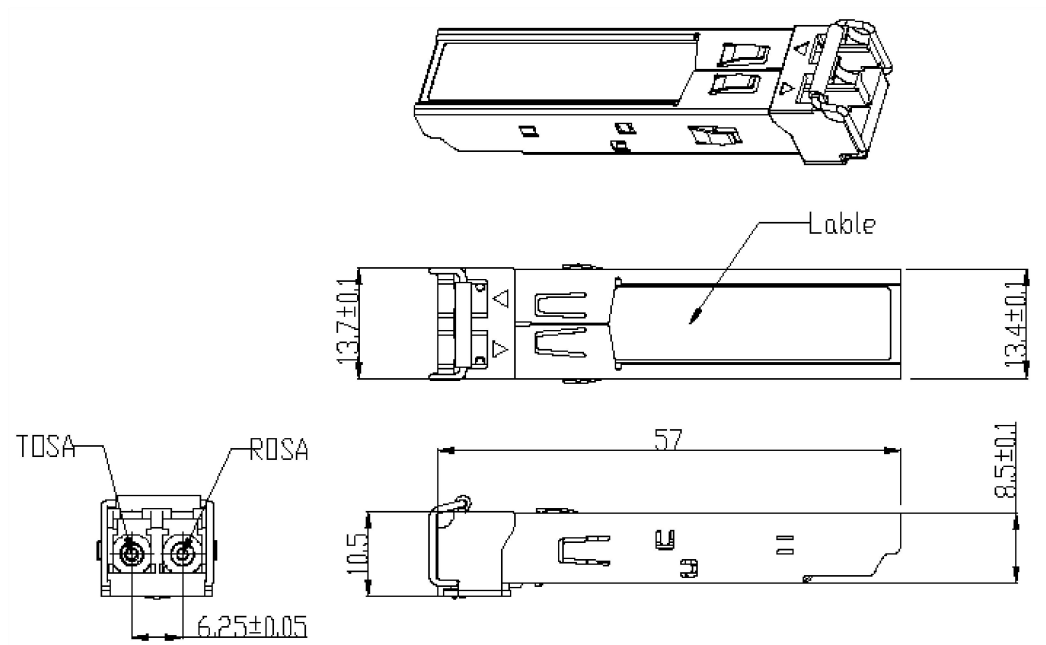
- 1) TX Fault is an open collector output, which should be pulled up with a  $4.7k \sim 10k\Omega$  resistor on the host board to a voltage between 2.0V and  $V_{cc}+0.3V$ . Logic 0 indicates normal operation; Logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.
- 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  $4.7k \sim 10k\Omega$  resistor on the host board. The pull-up voltage shall be  $V_{ccT}$  or  $V_{ccR}$ .  
 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  $4.7k \sim 10k\Omega$  resistor. Pull up voltage between 2.0V and  $V_{cc}+0.3V$ .  
 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  $100\Omega$  (differential) at the user SERDES.
- 6) TD-/+: These are the differential transmitter inputs. They are internally AC-coupled, differential lines with  $100\Omega$  differential termination inside the module.

### Recommended Interface Circuit



### Mechanical Dimensions



### Ordering Information

Part No.	Data Rate (Gbps)	Wavelength (nm)	Connector Type	Transmission Distance (km)	Operating case temperature (°C)	Digital Diagnostics
CSFP-1GXX-80-xx	1.25	1270 ~ 1450	LC	80	0 to +70	No
CSFP-1GXX-80D-xx	1.25	1270 ~ 1450	LC	80	0 to +70	Yes
CSFP-1GXX-80E-xx	1.25	1270 ~ 1450	LC	80	-20 to +85	No
CSFP-1GXX-80ED-xx	1.25	1270 ~ 1450	LC	80	-20 to +85	Yes
CSFP-1GXX-80I-xx	1.25	1270 ~ 1450	LC	80	-40 to +85	No
CSFP-1GXX-80ID-xx	1.25	1270 ~ 1450	LC	80	-40 to +85	Yes

#### Notes:

XX means CWDM wavelength (27 = 1270nm, 29 = 1290nm, 31 = 1310nm, 35 = 1350nm, etc., in 20nm increments)

xx means compatible brand. (For example: CO= Cisco, JU=Juniper, FD=Foundry, EX=Extreme, NE=Netgear,etc.)

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