CWDM SFP 1.25G 40KM LC Duplex

SLSC-12XX-40-D

Features

♦ Data-rate of 1.25Gbps operation

♦ 18 CWDM DFB wavelengths laser and PIN photo detector for 40km transmission

♦ Compliant with SFP MSA and SFF-8472 with duplex LC

♦ 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:
Commercial Temperature: 0 to +70℃
Industrial Temperature: -40 to +85℃

Overview

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

The transceiver consists of three sections: an uncooled CWDM 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 SFP transceivers are compatible with SFP Multi-Source Agreement (MSA) and SFF-8472. For further information, please refer to SFP MSA.

Applications

♦ Gigabit Ethernet

♦ Fiber Channel

♦ Switch to Switch interface

♦ Switched backplane applications

♦ Router/Server interface

♦ Other optical transmission systems

Ordering Information

Part Number	Product Description
SLSC-12XX-40-D	CWDM SFP 1.25Gbps, XX = 27~61, 40km, 0ºC ~ +70ºC, With Digital Diagnostic Monitoring
SLSC-12XX-40T-D	CWDM SFP 1.25Gbps, XX = 27~61, 40km, -40ºC ~ +85ºC, With Digital Diagnostic Monitoring

Note:
[1] XX = the wavelength support, available from 1270 (27) ~ 1610 (61) nm

Module Block Diagram
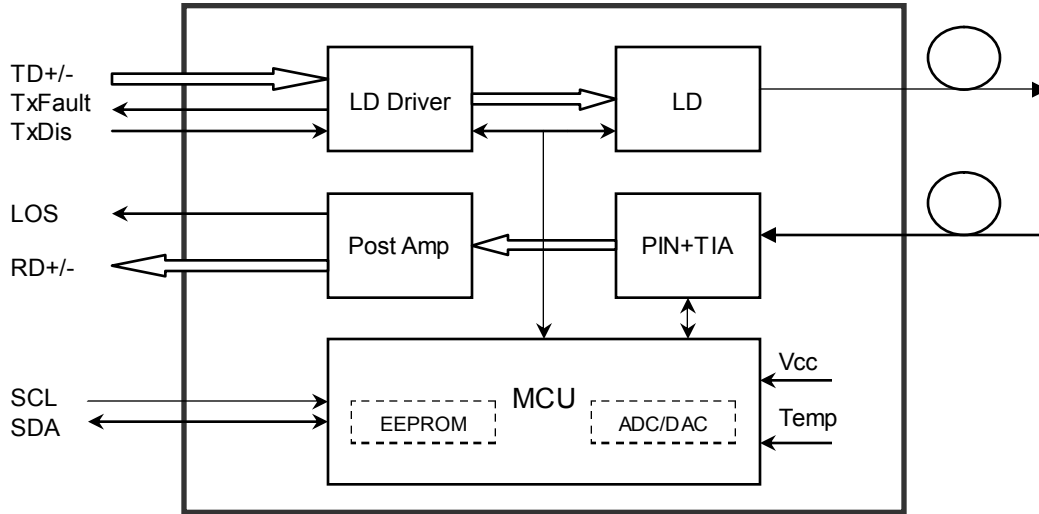
Figure 1: Pin Definitions

Absolute Maximum Ratings

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

Recommended Operating Conditions

Parameter		Symbol	Min	Typical	Max	Unit
Operating Case Temperature	Commercial	Tc	0		+70	°C
	Industrial		-40		+85	
Power Supply Voltage		Vcc	3.13	3.3	3.47	V
Power Supply Current		Icc			300	mA
Data Rate				1.25		Gbps

λC Wavelength Guide

SLSC-12XX-40-D (See table below for "xx" values)

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			

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Optical and Electrical Characteristics

Parameter		Symbol	Min	Typical	Max	Unit	Notes
Transmitter							
Centre Wavelength		λc	λc-6.5	λc	λc+6.5	nm	
Spectral Width (-20dB)		Δλ			1	nm	
Side Mode Suppression Ratio		SMSR	30			dB	
Average Output Power		Pout	-5		0	dBm	1
Extinction Ratio		ER	9			dB	
Optical Rise/Fall Time (20%~80%)		tr/tf			180	ps	
Data Input Swing Differential		V_{IN}	400		1800	mV	2
Input Differential Impedance		Z_{IN}	90	100	110	Ω	
TX Disable	Disable		2.0		Vcc	V	
	Enable		0		0.8	V	
TX Fault	Fault		2.0		Vcc	V	
	Normal		0		0.8	V	
Receiver							
Receiver Sensitivity					-23	dBm	3
Receiver Overload			-3			dBm	3
LOS De-Assert		LOS_D			-24	dBm	
LOS Assert		LOS_A	-35			dBm	
LOS Hysteresis			1		4	dB	
Data Output Swing Differential		Vout	370		1800	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 2^7-1 test pattern @1250Mbps, BER ≤1×10^{-12}.
4. Internally AC-coupled.

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_H	2		Vcc	V
MOD_DEF (0:2)-Low	V_L			0.8	V

Diagnostics

Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70 or -40 to +85	°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.
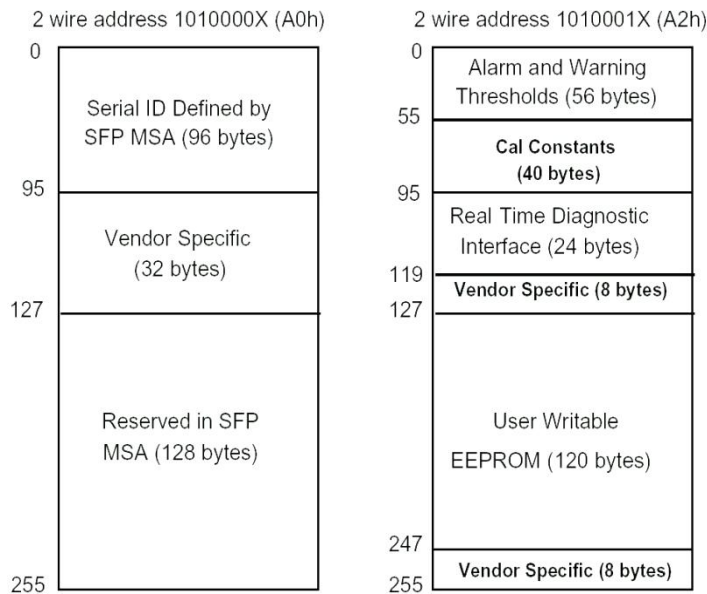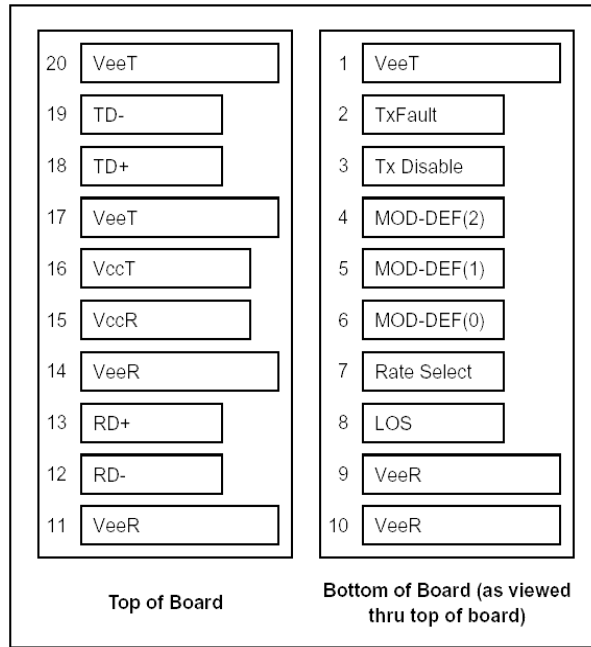

Figure2. Digital Diagnostic Memory Map

Pin Definitions

Figure3. Pin Diagram

Pin Descriptions

Pin	Signal Name	Description	Plug Seq.	Notes
1	V_{EET}	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_{EER}	Receiver ground	1	
10	V_{EER}	Receiver ground	1	
11	V_{EER}	Receiver ground	1	
12	RD-	Inv. Received Data Out	3	Note 5
13	RD+	Received Data Out	3	Note 5
14	V_{EER}	Receiver ground	1	
15	V_{CCR}	Receiver Power Supply	2	

16	V_{CCT}	Transmitter Power Supply	2	
17	V_{EET}	Transmitter Ground	1	
18	TD+	Transmit Data In	3	Note 6
19	TD-	Inv. Transmit Data In	3	Note 6
20	V_{EET}	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~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~10kΩ 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.
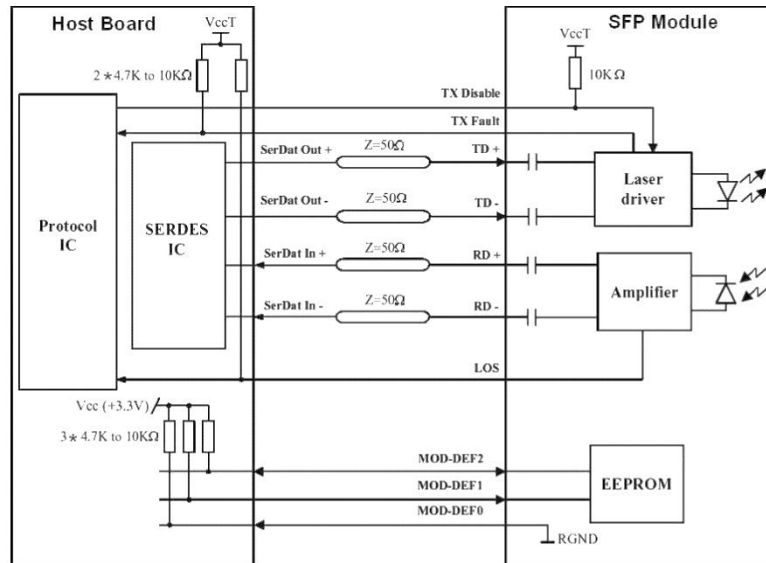
Recommended Interface Circuit

Figure4. Interface Circuit

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Datasheet
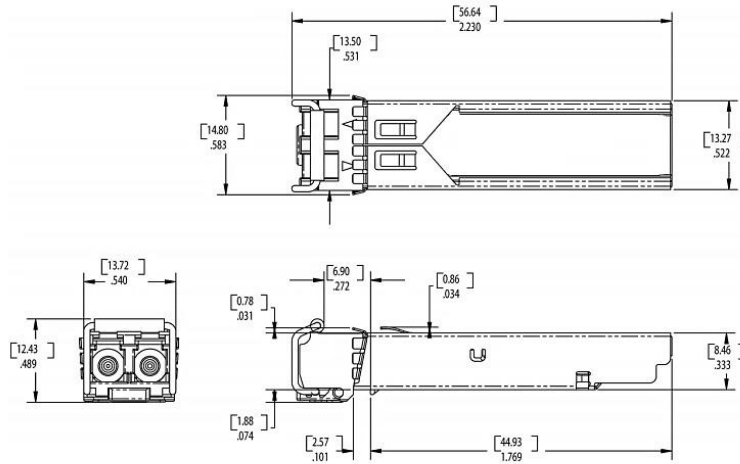
Mechanical Dimensions

Figure5. Mechanical Dimensions

References

1. Small Form Factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA), September 2000.
2. Telcordia GR-253-CORE and ITU-T G.957 Specifications.

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