2G Fiber Channel CWDM SFP 40km DOM LC SMF Transceiver

CWDM-SFP2G-EX



Applications

- SDH STM-16
- SONET OC-48
- 2x Fiber Channel
- Other Optical Link

Features

- Up to 2.5Gb/s Data Links
- Hot-Pluggable
- CWDM DFB Laser Transmitter
- Duplex LC Connector
- RoHS Compliant and Lead Free
- Up to 40km on 9/125μm SMF
- Single +3.3V Power Supply
- Low Power Dissipation <600mW Typically
- Industrial /Extended/ Commercial Operating Temperature Range:
 -40°C to 85°C/-5°C to 85°C/0°C to 70°C Version Available

Description

CWDM- SFP2G -EX transceiver is a high performance, cost effective module which has a Duplex LC optics interface. Standard AC coupled CML for high speed signal and LVTTL controls and monitor signals. The receiver section uses a PIN receiver and the transmitter uses CWDM DFB laser, and up to 16dB link budget ensures this module STM-16/OC-48 40km application.

Product Specifications

I. Absolute Maximum Ratings

Parameter		Symbol	Min.	Max.	Unit
Storage Temperature		TS	-40	85	°C
Supply Voltage		V _{CC} T, R	-0.5	4	V
Relative Humidity		RH	0	85	%
	Industrial		-40	85	
Case Operating Temperature	Extended	Тор	-5	85	°C
	Commercial		0	70	

II. Recommended Operating Environment

Parameter		Symbol	Min.	Max.	Unit
	Industrial		-40	85	
Case Operating Temperature	Extended	Тс	-5	85	°C
	Commercial		0	70	
Supply Voltage		V _{CC} T, R	3.0	3.6	V

III. Electrical Characteristics (TOP = 0 to 70 $^{\circ}$ C, V_{cc} = 3.0 to 3.60 Volts)

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Supply Voltage	V _{cc}	3.0	3.30	3.60	V	

2G FIBER CHANNEL CWDM SFP 40KM DOM LC SMF TRANSCEIVER

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Supply Current	I _{cc}		150	170	mA	
		Transmitt	er Section			
Input Differential Impedance	R _{in}	90	100	110	Ω	1
Single Ended Data Input Swing	V _{in} PP	200		1200	mVp-p	
Transmit Disable Voltage	V _D	V _{cc} -1.3		V _{cc}	V	2
Transmit Enable Voltage	V_{EN}	Vee		V _{ee} +0.8	V	
Transmit Disable Assert Time	T _{dessert}			10	us	
		Receive	r Section			
Single Ended Data Output Swing	Vout, pp	300		1000	mv	3
Data Output Rise Time	t _r			260	ps	4
Data Output Fall Time	t _f			260	ps	4
LOS Fault	V _{losfault}	V _{cc} -0.5		V _{cc} _host	V	5
LOS Normal	V _{losnorm}	Vee		V _{ee} +0.5	V	5
Power Supply Rejection	PSR	100			mVpp	6
Total Generated Receiver Jitter (Peak to Peak)	J _{RXp-p}			0.07	UI	
Total Generated Receiver Jitter(rms)	J _{RXrms}			0.007	UI	

Note:

1. AC coupled.

2. Or open circuit.

3. Into 100 ohm differential termination.

4.20 – 80 %

5. LOS is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

6. All transceiver specifications are compliant with a power supply sinusoidal modulation of 20 Hz to 1.5MHz up to specified value applied through the power supply filtering network shown on page 23 of the Small Form-factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA), September 14, 2000.

S

IV. Optical Parameters(TOP = 0 to 70 $^{\circ}$ C, V_{cc} = 3.00 to 3.60 Volts)

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
		Transmitt	er Section			
Center Wavelength	λς	λс-7.5	I	λc+7.5	nm	1
Spectral Width(-20dB)	σ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Optical Output Power	P _{out}	0		5	dBm	2
Optical Rise/Fall Time	t _r /t _f			260	ps	3
Extinction Ratio	ER	9			dB	
Total Generated Transmitter Jitter (Peak to Peak)	J_{TXp-p}			0.07	UI	
Total Generated Transmitter Jitter(rms)	J _{TXrms}			0.007	UI	
Eye Mask for Optical Output	Co	mpliant with Eye	Mask Defined in	IEEE 802.3 Standa	ard	

Receiver Section

Optical Input Wavelength	Ιλς	λc-10	λc+10	nm	
RX Sensitivity	Sen		-18	dBm	4.5
Receiver Overload	P _{ol}		0	dBm	4.5
RX_LOS Assert	LOS _A	-35		dBm	
RX_LOS Deassert	LOS _D		-24	dBm	
RX_LOS Hysteresis	LOS _H	0.5	4	dB	

General Specifications

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Data Rate	BR	2125		2500	Mb/s	
Bit Error Rate	BER			10-12		
Max.Supported Link Length on 50/125µm MMF@2.5Gb/s	LMAX			40	km	6
Total System Budget	LB	16			dB	7

Note:

1. Also specified to meet curves in FC-PI 13.0 Figures 18 and 19, which allow trade-off between wavelength spectral width.

2. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.

3. Unfiltered, 20-80%. Complies with IEEE 802.3 (Gig. E), FC 1x and 2x eye masks when filtered.

4. Measured with conformance signals defined in FC-PI 13.0 specifications.

5. Measured with PRBS 27 -1at 10-12 BER

6. Dispersion limited per FC-PI Rev. 13

7. Attenuation of 0.25 dB/km is used for the link length calculations. Distances are indicative only. Please refer to the Optical Specifications in Table IV to calculate a more accurate link budget based on specific conditions in your application.

V. Recommended Circuit



Figure 1. SFP Host Recommended Circuit



Figure 2. Diagram of Host Board Connector Block Pin Numbers and Names



Figure 3. SFP Host Board Mechanical Layout



Figure 4. SFP Host Board Mechanical Layout(Cont)

VII. Pin Description

Pin	Name	Function	Plug Seq	Notes
1	VeeT	Transmitter Ground	1	1
2	TXFault	Transmitter Fault Indication	3	
3	TXDisable	Transmitter Disable	3	2
4	MOD-DEF2	Module Definition	2	3
5	MOD-DEF1	Module Definition 1	3	3
6	MOD-DEF0	Module Definition 0	3	3
7	RateSelect	Not Connected	3	4
8	LOS	Lossof Signal	3	5
9	VeeR	Receiver Ground	1	1
10	VeeR	Receiver Ground	1	1
11	VeeR	Receiver Ground		1
12	RD-	Inv. Received Data Out	3	6
13	RD+	Received Data Out	3	6
14	VeeR	Receiver Ground	3	1
15	VccR	Receiver Power	2	1
16	VccT	Transmitter Power	2	
17	VeeT	Transmitter Ground	1	
18	TD+	Transmit Data In	3	6

Pin	Name	Function	Plug Seq	Notes
19	TD-	Inv. TransmitIn	3	6
20	VeeT	Transmitter Ground	1	

Note:

1. Circuit ground is internally isolated from chassis ground.

2. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.

3. Should be pulled up with 4.7k - 10 kohms on host board to a voltage between 2.0V and 3.6V.MOD_DEF(0) pulls line low to indicate module is plugged in.

4. Rate select is not used.

5. LOS is open collector output. Should be pulled up with 4.7k – 10 kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

6. AC Coupled.

VIII. Block Diagram of Transceiver



Figure 5. Block Diagram

IX. Mechanical Specifications



Note:

In the Part No. of CWDM- SFP2G -EX, stands for wavelength, such as: 27: for 1270nm, 29: for 1290nm, 31: for 1310nm, 33: for 1330nm, 35: for 1350nm, 37: for 1270nm, 39: for 1290nm, 41: for 1410nm, 43: for 1430nm, 45: for 1450nm, 47: for 1470nm, 49: for 1490nm, 51: for 1510nm, 53: for 1530nm, 55: for 1550nm, 57: for 1570nm, 59: for 1590nm, 61: for 1610nm.

Test Center

I. Compatibility Testing

Each fiber optical transceiver has been tested in host device on site in FS Assured Program to ensure full compatibility with over 200 vendors.



Cisco Catalyst C9500-24Y4C



Cisco MS425-16



Brocade VDX 6940-144S



Dell EMC Networking Z9100-ON



Force[®]tm S60-44T



HUAWEI S6720-30L-HI-24S

Above is part of our test bed network equipment. For more information, please click the <u>Test Bed PDF</u>. It will be updated in real time as we expand our portfolio.

II. Performance Testing

Each fiber optical transceiver has been fully tested in FS Assured Program equipped with world's most advanced analytical equipment to ensure that our transceivers work perfectly on your device.



1. TX/RX Signal Quality Testing

Equipped with the all-in-one tester integrated 4ch BERT & sampling oscilloscope, and variable optical attenuator to ensure the input and output signal quality.

- Eye Pattern Measurements: Jitter, Mask Margin, etc
- Average Output Power
- OMA
- Extinction Ratio
- Receiver Sensitivity
- BER Curve

2. Reliability and Stability Testing

Subject the transceivers to dramatic changes in temperature on the thermal shock chamber to ensure reliability and stability of the transceivers.

- Commercial: 0 °C to 70 °C
- Extended: -5 °C to 85 °C
- Industrial: -40 °C to 85 °C





3. Transfer Rate and Protocol Testing

Test the actual transfer data rate and the transmission ability under different protocols with Network Master Pro.

- Ethernet
- Fibre Channel
- SDH/SONET
- CPRI

4. Optical Spectrum Evaluation

Evaluate various important parameters with the Optical Spectrum Analyzer to meet the industry standards.

- Center Wavelength, Level
- OSNR
- SMSR
- Spectrum Width



Ordering Information

Part Number	Description
CWDM-SFP2G-ZX	2G Fiber Channel CWDM SFP 80km DOM LC Transceiver for SMF



17





The information in this document is subject to change without notice. FS has made all efforts to ensure the accuracy of the information, but all information in this document does not constitute any kind of warranty.

Copyright © 2009-2022 FS.COM All Rights Reserved.