RSPD-04C80-XX

2.5Gb/s 80km SFP Transceiver (Multi-rate)

Hot Pluggable, Duplex LC, +3.3V, CWDM, DFB-LD&APD, Single-mode, DDM

Features:

- Up to 2.67Gb/s Data Links
- Hot-Pluggable
- Duplex LC connector
- Up to 80km on 9/125μm SMF
- CWDM DFB laser transmitter
- APD receiver
- Single +3.3V Power Supply
- Monitoring Interface Compliant with SFF-8472
- Maximum Power <1W
- Industrial /Extended/ Commercial operating temperature range: -40°C to 85°C/-5°C to 85°C/-0°C to 70°C Version available
- RoHS compliant and Lead Free

Applications:

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

Description

The RSPD-04C80-XX Transceivers are a high performance, cost effective module which have a duplex LC optics interface. They are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA) and Digital diagnostics functions are available via the 2-wire serial bus specified in SFF-8472. The receiver section uses a APD receiver, and the transmitter uses a CWDM DFB laser, up to 26dB link budge ensure this module SONET OC-48 / SDH STM -16 80km application.

Wavelength guide

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

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit
Storage Temperature	TS	-40		+85	°C
Supply Voltage	VCC	-0.5		4	V
Relative Humidity	RH	0		85	%

Recommended Operating Environment:

Parameter		Symbol	Min.	Typical	Max.	Unit
Case operating Temperature	Industrial	TC	-40		85	°C
	Extended		-5		85	°C
	Commercial		0		+70	°C
Supply Voltage		VCC	3.135		3.465	V
Supply Current		Icc			300	mA
Inrush Current		Isurge			Icc+30	mA
Maximum Power		Pmax			1	W

Electrical Characteristics (TOP = -40 to 85°C, VCC = 3.135 to 3.465 Volts)

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Transmitter Section:						
Input differential impedance	Rin	90	100	110		
Single ended data input swing	Vin PP	250		1200	mVp-p	
Transmit Disable Voltage	VD	Vcc – 1.3		Vcc	V	2
Transmit Enable Voltage	VEN	Vee		Vee+ 0.8	V	
Transmit Disable Assert Time	Tdessert			10	us	
Receiver Section:						
Single ended data output swing	Vout,pp	300		800	mv	3
LOS Fault	Vlosfault	Vcc – 0.5		VCC_host	V	5
LOS Normal	Vlos norm	Vee		Vee+0.5	V	5
Power Supply Rejection	PSR	100			mVpp	6

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.

Optical Parameters (TOP = -40 to 85°C, VCC = 3.135 to 3.465 Volts)

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Transmitter Section:						
Center Wavelength	λc	-6.5	CWDM	+6.5	nm	
Spectral Width@-20dBm	σ			1	nm	
Sidemode Suppression ratio	SSRmin	30			dB	
Optical Output Power	Pout	0		5	dBm	1
Extinction Ratio	ER	8.2			dB	
Optical Rise/Fall Time	tr / tf			260	ps	2
Relative Intensity Noise	RIN			-120	dB/Hz	
Total Generated Transmitter Jitter (peak to peak)	JTXp-p			0.07	UI	
Total Generated Transmitter Jitter (rms)	JTXrms			0.007	UI	
Output Eye Mask	Compliant with eye mask Telcordia GR-253-GORE					
Receiver Section:						
Optical Input Wavelength	λc	1270		1610	nm	
RX Sensitivity @ OC-48/STM-16	Sen_1			-28	dBm	3
RX Sensitivity @ 2xFibre channel	Sen_2			-28	dBm	4
RX Sensitivity @ Gigabit Ethernet	Sen_3			-30	dBm	4
RX Sensitivity @ OC-12/STM-4	Sen_4			-29	dBm	5
RX Sensitivity @ OC-4/STM-1	Sen_5			-30	dBm	5
RX_LOS Assert	LOS_A	-40			dBm	
RX_LOS De-assert	LOS_D			-29	dBm	
RX_LOS Hysteresis	LOS_H	0.5			dB	
Receiver Overload	Pol	-9			dBm	

General Specifications:						
Data Rate	BR	155		2667	Mb/s	
Bit Error Rate	BER			10^{-12}		
Max. Supported Link Length on 9/125μm SMF @ OC-48/STM-16	$LMAX_1$		80		km	
Max. Supported Link Length on 9/125μm SMF @ 2xFibre channel	$LMAX_2$		85		km	
Max. Supported Link Length on 9/125μm SMF @ Gigabit Ethernet	$LMAX_3$		100		km	
Max. Supported Link Length on 9/125μm SMF @ OC-12/STM-4	$LMAX_4$		100		km	
Max. Supported Link Length on 9/125μm SMF @ OC-4/STM-1	$LMAX_5$		100		km	

Note:

1. Compliant with FDA/CDRH and EN (IEC) 60825 regulations (Class 1 Laser Safety).
2. 20-80%.
3. Measured with PRBS 2^{31}-1 at 10^{-12} BER
4. Measured with PRBS 2^{7}-1 at 10^{-12} BER
5. Measured with PRBS 2^{23}-1 at 10^{-12} BER

Pin Assignment

Diagram of Host Board Connector Block Pin Numbers and Name

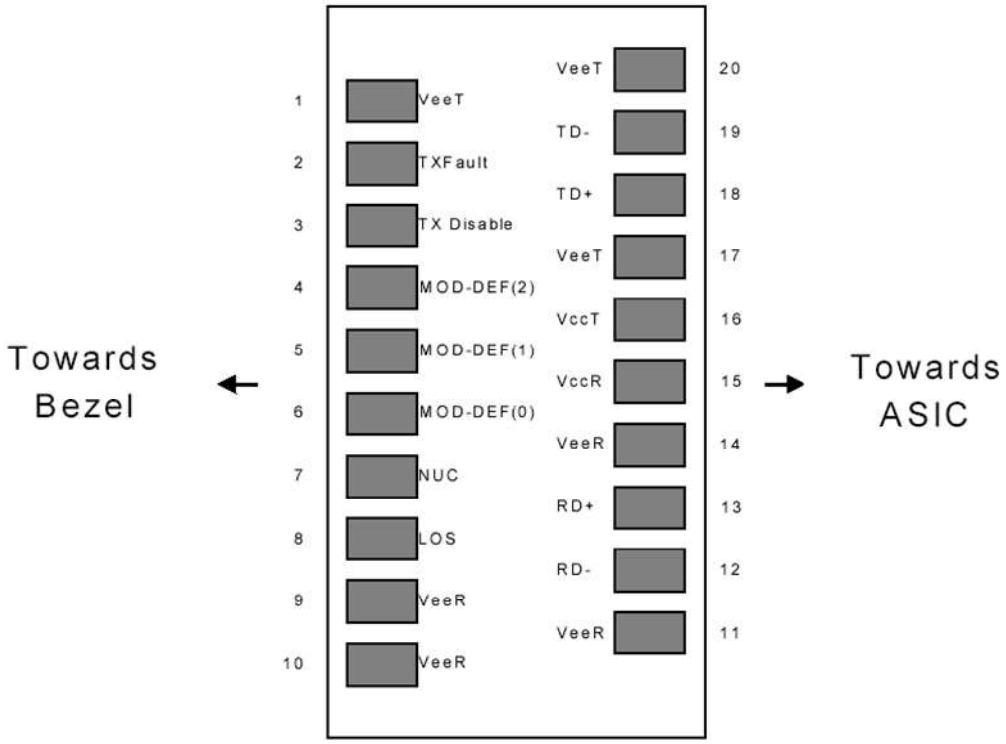


Diagram of Host Board Connector Block Pin Numbers and Names

Pin Function Definitions

Pin No	Name	Function	Plug Seq	Notes
1	VeeT	Transmitter Ground	1	1
2	TX Fault	Transmitter Fault Indication	3	
3	TX Disable	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	Rate Select	Not Connected	3	4
8	LOS	Loss of 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
19	TD-	Inv. Transmit In	3	6
20	VeeT	Transmitter Ground	1	

Notes:

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

SFP Module EEPROM Information and Management

The SFP modules implement the 2-wire serial communication protocol as defined in the SFP -8472. The serial ID information of the SFP modules and Digital Diagnostic Monitor parameters can be accessed through the I2C interface at address A0h and A2h. The memory is mapped in Table 1. Detailed ID information (A0h) is listed in Table 2. And the DDM specification at address A2h. For more details of the memory map and byte definitions, please refer to the SFF-8472, “Digital Diagnostic Monitoring Interface for Optical Transceivers”. The DDM parameters have been internally calibrated.

Table 1. Digital Diagnostic Memory Map (Specific Data Field Descriptions)

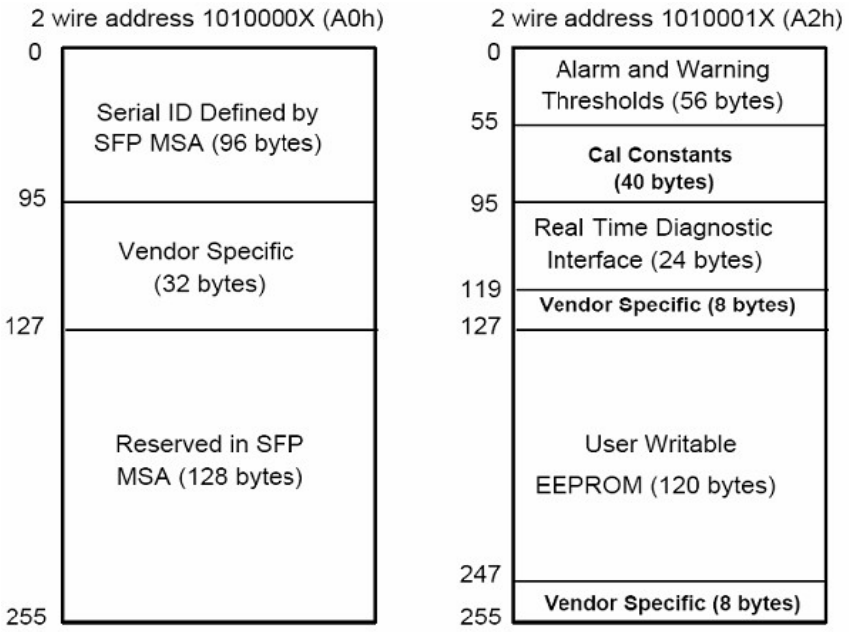


Table 2 - EEPROM Serial ID Memory Contents (A0h)

Data Address	Length (Byte)	Name of Length	Description and Contents
Base ID Fields			
0	1	Identifier	Type of Serial transceiver (03h=SFP)
1	1	Reserved	Extended identifier of type serial transceiver (04h)
2	1	Connector	Code of optical connector type (07=LC)
3-10	8	Transceiver	
11	1	Encoding	NRZ (03h)
12	1	BR, Nominal	Nominal baud rate, unit of 100Mbps
13-14	2	Reserved	(0000h)
15	1	Length(9um)	Link length supported for 9/125um fiber, units of 100m
16	1	Length(50um)	Link length supported for 50/125um fiber, units of 10m
17	1	Length(62.5um)	Link length supported for 62.5/125um fiber, units of 10m
18	1	Length (Copper)	Link length supported for copper, units of meters

19	1	Reserved	
20-35	16	Vendor Name	SFP vendor name: TIBTRONIX
36	1	Reserved	
37-39	3	Vendor OUI	SFP transceiver vendor OUI ID
40-55	16	Vendor PN	Part Number: “TSPL2G80D-XX” (ASCII)
56-59	4	Vendor rev	Revision level for part number
60-62	3	Reserved	
63	1	CCID	Least significant byte of sum of data in address 0-62
Extended ID Fields			
64-65	2	Option	Indicates which optical SFP signals are implemented (001Ah = LOS, TX_FAULT, TX_DISABLE all supported)
66	1	BR, max	Upper bit rate margin, units of %
67	1	BR, min	Lower bit rate margin, units of %
68-83	16	Vendor SN	Serial number (ASCII)
84-91	8	Date code	TIBTRONIX’s Manufacturing date code
92-94	3	Reserved	
95	1	CCEX	Check code for the extended ID Fields (Addresses 64 to 94)
Vendor Specific ID Fields			
96-127	32	Readable	TIBTRONIX specific date, read only
128-255	128	Reserved	Reserved for SFF-8079

Digital Diagnostic Monitor Characteristics(A2h)

Data Address	Parameter	Accuracy	Unit
96-97	Transceiver Internal Temperature	±3.0	°C

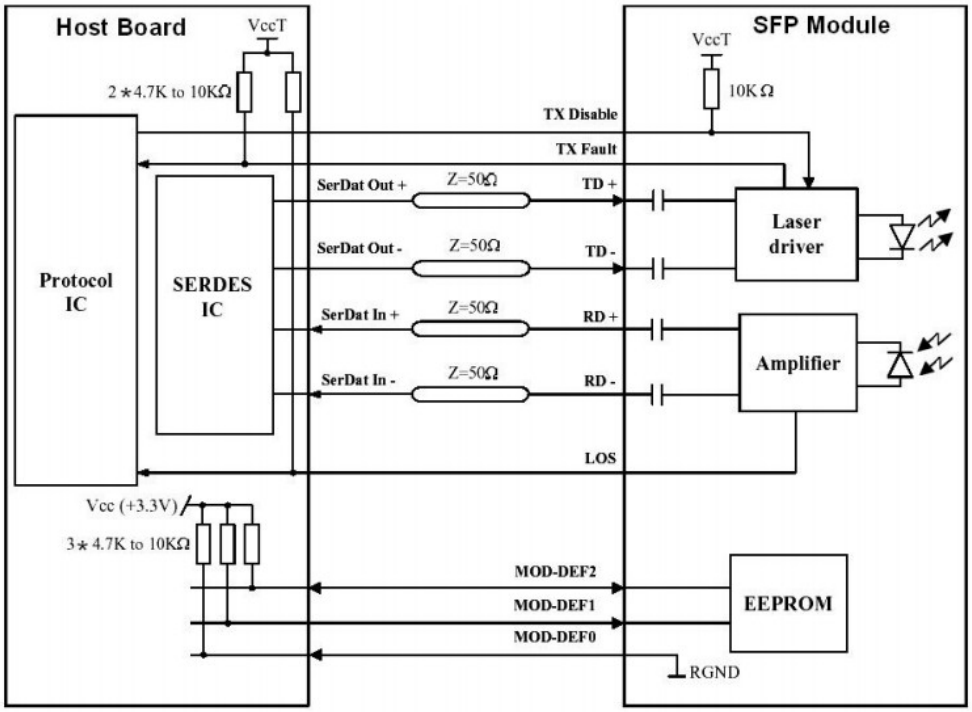
98-99	VCC3 Internal Supply Voltage	±3.0	%
100-101	Laser Bias Current	±10	%
102-103	Tx Output Power	±3.0	dB
104-105	Rx Input Power	±3.0	dB

Regulatory Compliance

The RSPD-04C80-XX complies with international Electromagnetic Compatibility (EMC) and international safety requirements and standards (see details in Table following).

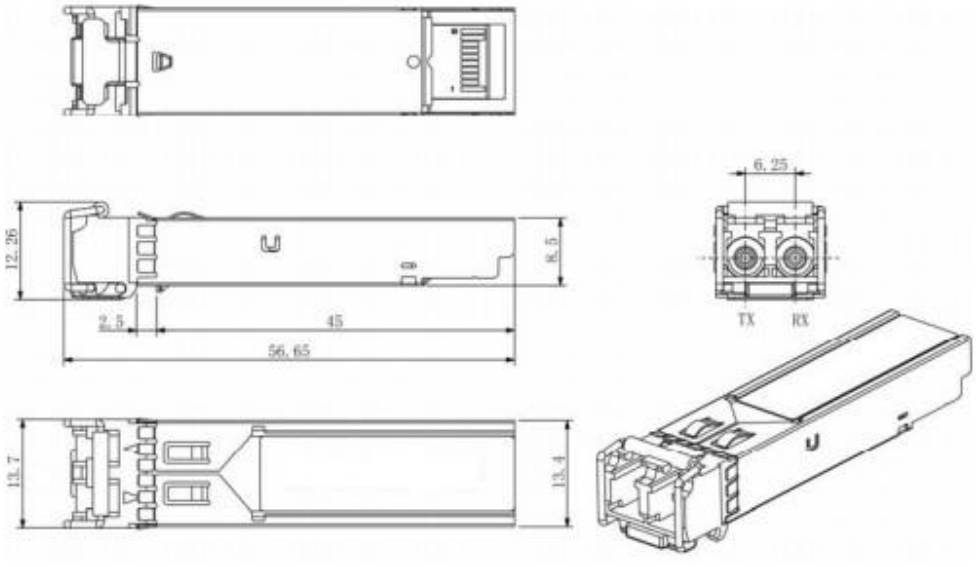
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1(>1000 V)
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	IEC 61000-4-2 GR-1089-CORE	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2	Compatible with Class 1 laser product.

Recommended Circuit



SFP Host Recommended Circuit

Mechanical Dimensions



Mechanical Drawing

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