



DATENBLATT

RPC-CWDM-10G-10D

Produktspezifikationen

Stand: 06/2015



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RPC-CWDM-10G-10D

10Gb/s CWDM Single-mode SFP+ Transceiver

PRODUCT FEATURES

- 10Gb/s serial optical interface compliant to 802.3ae 10GBASE-LR
- Uncooled CWDM DFB LD: 1270nm to 1330nm
- Duplex LC connector
- Up to 10km transmission.
- Metal enclosure, for lower EMI
- Electrical interface compliant to SFF-8431
- 2-wire interface for management
- Specifications compliant with SFF 8472
- Single 3.3V power supply
- Case operating temperature range: -5°C to 70°C
- Class 1 Laser International Safety Standard IEC-60825 compliant

APPLICATIONS

- 10GBASE-LR/LW 10G Ethernet

STANDARD

- Compliant to 802.3ae 10GBASE-LR
- Compliant to SFP+ SFF-8431 and SFF-8432.
- Compliant to SFF 8472
- RoHS Compliant.

PRODUCT SELECTION

RPC-CWDM-10G-10D

Wavelength	xx	Wavelength	xx
1270 nm	27	1310 nm	31
1290 nm	29	1330 nm	33

I. Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Maximum Supply Voltage	Vcc	-0.5		4.7	V	
Storage Temperature	TS	-40		85	°C	
Case Operating Temperature	Tcase	-5		70	°C	

II. Electrical Characteristics (T_{case} = -5 to 70°C, V_{CC} = 3.14 to 3.46 Volts)

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Supply Voltage	V _{cc}	3.14	3.3	3.46	V	
Supply Current	I _{cc}			350	mA	
Transmitter						
Input differential impedance	R _{in}		100		Ω	1
Differential data input swing	V _{in,pp}	180		1200	mV	
Transmit Disable Voltage	VD	V _{cc} -1.3		V _{cc}	V	
Transmit Enable Voltage	VEN	V _{ee}		V _{ee} + 0.8	V	2
Transmit Disable Assert Time				10	us	
Receiver						
Differential data output swing	V _{out,pp}	300		850	mV	3
Data output rise time	t _r	30			ps	4
Data output fall time	t _f	30			ps	4
LOS Fault	VLOS fault	V _{cc} -1.3		V _{CCHOST}	V	5
LOS Normal	VLOS norm	V _{ee}		V _{ee} +0.8	V	5
Power Supply Rejection	PSR	100			mVpp	6

Notes:

1. Connected directly to TX data input pins. AC coupled thereafter.
2. Or open circuit.
3. Input 100 ohms differential termination.
4. These are unfiltered 20-80% values
5. Loss Of Signal is LVTTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
6. Receiver sensitivity is compliant with power supply sinusoidal modulation of 20 Hz to 1.5 MHz up to specified value applied through the recommended power supply filtering network.

III. Optical Characteristics ($T_{\text{case}} = -5 \text{ to } 70^{\circ}\text{C}$, $V_{\text{CC}} = 3.14 \text{ to } 3.46 \text{ Volts}$)

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						
Output Opt. Pwr	P_{OUT}	-6		-1	dBm	1
Optical Wavelength	λ	$\lambda-6.5$		$\lambda+6.5$	nm	2
Wavelength Temperature Dependence			0.08	0.125	nm/°C	
Spectral Width (-20dB)	σ			1	nm	
Optical Extinction Ratio	ER	3.5			dB	
Transmitter and Dispersion Penalty	TDP			3.2	dB	
Sidemode Suppression ratio	SSRmin	30			dB	
RIN	RIN			-128	dB/Hz	
Output Eye Mask		Compliant with IEEE 0802.3ae				
Receiver						
Rx Sensitivity	R_{SENS}			-15	dBm	3
Input Saturation Power (Overload)	P_{sat}	0.5			dBm	
Wavelength Range	λ_{C}	1270		1610	nm	
LOS De -Assert	LOSD			-17	dBm	
LOS Assert	LOSA	-30			dBm	
LOS Hysteresis		0.5	1.0		dB	

Notes:

- Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulations.
- " λ " is: 1270, 1290, 1310, 1330, please the "product selection"
- With worst-case extinction ratio. Measured with a PRBS $2^{31}-1$ test pattern, @10.325Gb/s, $\text{BER} < 10^{-12}$.

IV. Pin Descriptions

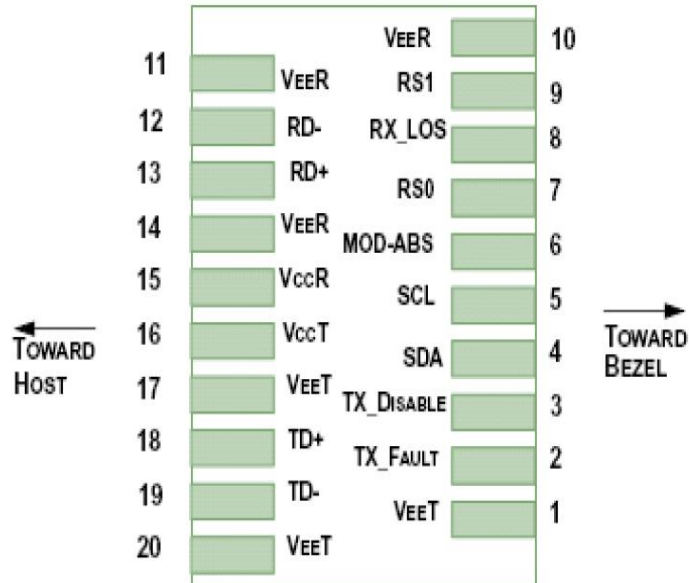


Diagram of Host Board Connector Block Pin Numbers and Name

Pin	Symbol	Name/Description	Ref.
1	V _{EET}	Transmitter Ground (Common with Receiver Ground)	1
2	T _{FAULT}	Transmitter Fault.	2
3	T _{DIS}	Transmitter Disable. Laser output disabled on high or open.	3
4	SDA	2-wire Serial Interface Data Line	4
5	SCL	2-wire Serial Interface Clock Line	4
6	MOD_ABS	Module Absent. Grounded within the module	4
7	RS0	Rate Select 0	5
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	6
9	RS1	No connection required	1
10	V _{EER}	Receiver Ground (Common with Transmitter Ground)	1
11	V _{EER}	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled	
13	RD+	Receiver Non-inverted DATA out. AC Coupled	
14	V _{EER}	Receiver Ground (Common with Transmitter Ground)	1
15	V _{CCR}	Receiver Power Supply	
16	V _{CCT}	Transmitter Power Supply	
17	V _{EET}	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	V _{EET}	Transmitter Ground (Common with Receiver Ground)	1

Notes:

1. Circuit ground is internally isolated from chassis ground.
2. TFAULT is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V. A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
3. Laser output disabled on T_{DIS} >2.0V or open, enabled on T_{DIS} <0.8V.
4. Should be pulled up with 4.7kΩ- 10kΩ host board to a voltage between 2.0V and 3.6V. MOD_ABS pulls line low to indicate module is plugged in.
5. Internally pulled down per SFF-8431 Rev 4.1.
6. LOS is open collector output. It should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

V. Digital Diagnostic Functions

RAPIDCON RPC-CWDM-10G-10D transceivers support the 2-wire serial communication protocol as defined in the SFP MSA.

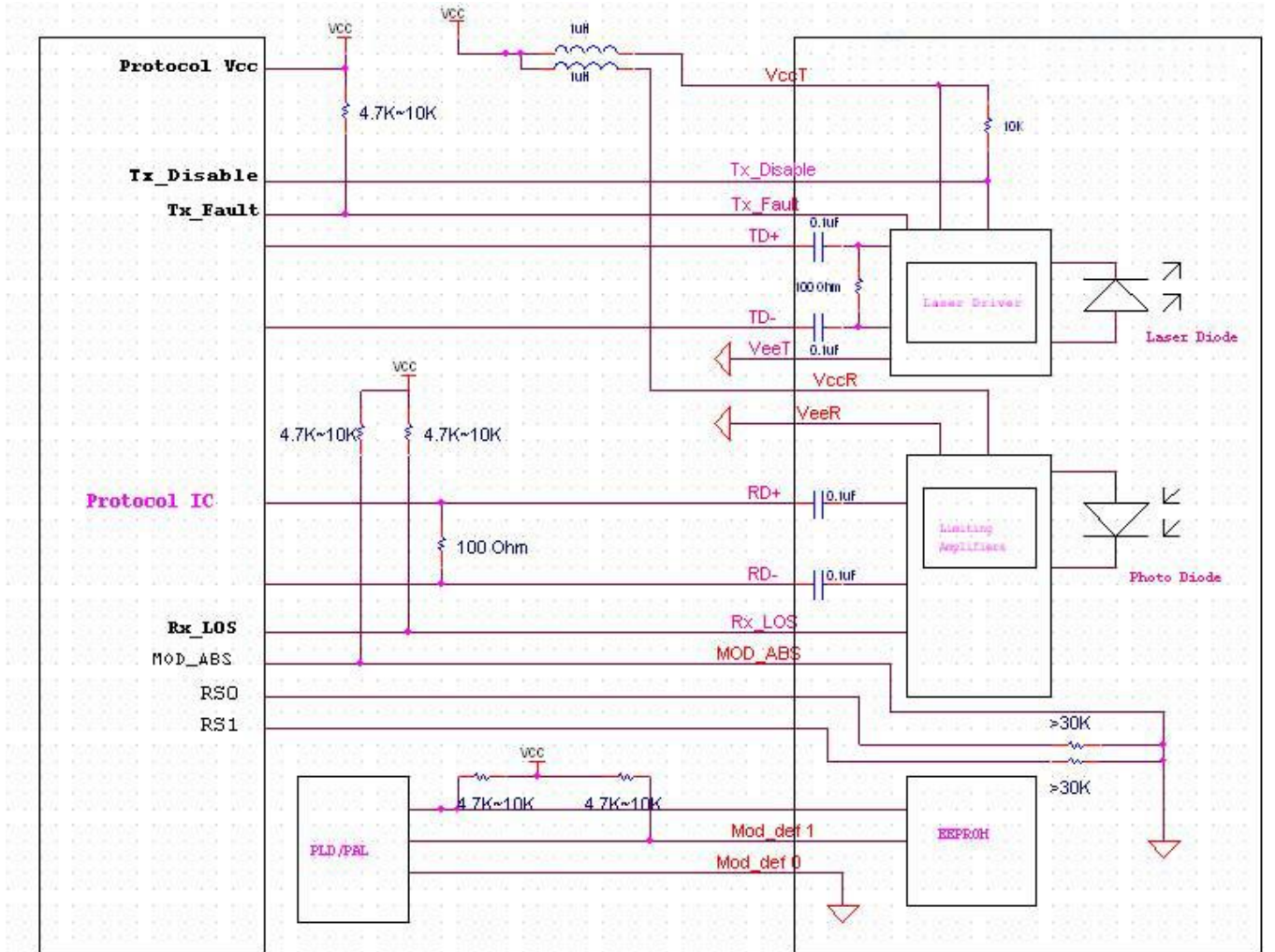
The standard SFP serial ID provides access to identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information.

Additionally, RAPIDCON SFP+ transceivers provide a unique enhanced digital diagnostic monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage. It also defines a sophisticated system of alarm and warning flags, which alerts end-users when particular operating parameters are outside of a factory set normal range.

The SFP MSA defines a 256-byte memory map in EEPROM that is accessible over a 2-wire serial interface at the 8 bit address 1010000X (A0h). The digital diagnostic monitoring interface makes use of the 8 bit address 1010001X (A2h), so the originally defined serial ID memory map remains unchanged.

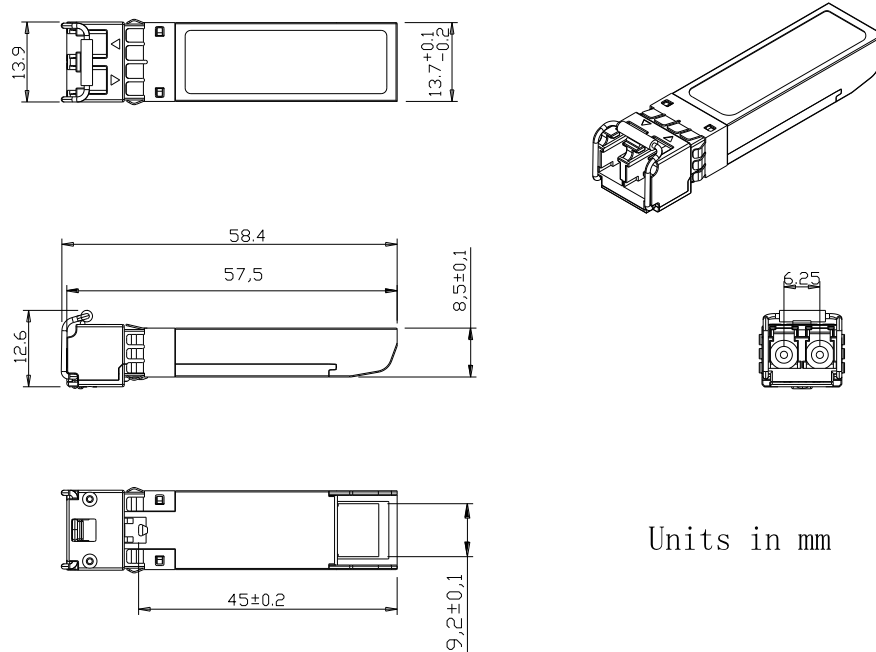
The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through a 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL, Mod Def 1) is generated by the host. The positive edge clocks data into the SFP transceiver into those segments of the E2PROM that are not write-protected. The negative edge clocks data from the SFP transceiver. The serial data signal (SDA, Mod Def 2) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.

VI. Host - Transceiver Interface Block Diagram



VII. Outline Dimensions

Comply to SFF-8432 rev. 5.0, the improved Pluggable form factor specification.



VIII. Regulatory Compliance

Feature	Reference	Performance
Electrostatic discharge (ESD)	IEC/EN 61000-4-2	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN 55022 Class B (CISPR 22A)	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10, 1040.11 IEC/EN 60825-1, 2	Class 1 laser product
Component Recognition	IEC/EN 60950 , UL	Compatible with standards
ROHS	2002/95/EC	Compatible with standards
EMC	EN61000-3	Compatible with standards