DATA SHEET

UTS01E4C-XX

1.25GBase-CWDM SFP Transceiver(SMF,1270~1610nm,10-40KM,LC)

Features

- Up to 1.25Gbps Data Links
- DFB laser transmitter and PIN receiver
- Metal enclosure, for lower EMI
- Single +3.3V power supply
- Hot-pluggable
- Duplex LC/UPC type pluggable optical interface
- Operating temperature range:
  Commercial: -5℃~+70℃
- RoHS Compliant
- 2-wire interface with integrated Digital Diagnostic monitoring
- Up to 40km transmission distance over Single Mode Fiber(SMF)
- Low power dissipation

Application

- Switch to Switch Interface
- Gigabit Ethernet
- Switched Backplane Applications
- Router/Server Interface
- Other Optical Links

Standard

- Compliant with SFF-8472
- Compliant with SFP MSA
- Compliant to IEEE 802.3ae

Product selection

Wavelength	xx	Clasp Color Code	Wavelength	xx	Clasp Color Code
1270 nm	27	Gray	1370 nm	37	Green
1290 nm	29	Gray	1390 nm	39	Yellow
1310 nm	31	Gray	1410 nm	41	Orange
1330 nm	33	Purple	1430 nm	43	Red
1350 nm	35	Blue	1450 nm	45	Brown
1470 nm	47	Gray	1550 nm	55	Yellow
1490 nm	49	Purple	1570 nm	57	Orange
1510 nm	51	Blue	1590 nm	59	Red
1530 nm	53	Green	1610 nm	61	Brown

Specification

Absolute Maximum Ratings				
Parameter	Symbol	Min	Max	Unit
Storage temperature	TS	-40	85	℃
Power Supply Voltage	Vcc3	-0.5	+4	V
Relative Humidity	RH	5	95	%
Signal Input Voltage		-0.3	Vcc+0.3	V

Recommended Operating Conditions					
Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature (Commercial)	Tc	-5		70	℃
Power Supply Voltage	Vcc3	3.13	3.3	3.47	V
Supply Current	Icc3			280	mA
Power Supply Noise Rejection				100	100 mVp-p
Data Rate			1.25		Gbps
Fiber Length 9/125µm core SMF		-	40	-	km

Electrical Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmit Total Supply Current	Icc			A	mA	
Transmit disable voltage	VIH	2		Vcc+0.3	V	1
Transmit enable voltage	VIL	0		0.8	V	1
Transmitter Fault Input-High	VDISL	2		Vcc+0.3	V	

Transmitter Fault Input-Low	VTxFH	0		0.8	V	
Receiver Total Supply Current	Icc			280-A	mA	
LOS output high level	VLOS-H	2.0		Vcc+0.3	V	2
LOS output low level	VLOS-L	0		0.8	V	2

Notes:

1) Connected directly to TX data input pins. AC coupled thereafter.

2) Loss Of Signal is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

Optical transmitter Characteristics						
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**	**Notes**
Launched Power (avg.)	Pout	-5		0	dBm	3
Operating Wavelength Range	λc	λ-10	λ	λ+10	nm	4
Spectral Width(-20dB)	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio	ER	9			dB	
Transmitter OFF Output Power	POff			-45	dBm	
Differential Line Input Impedance	RIN	90	100	110	Ohm	
Output Eye Diagram	Compliant with ITU-T G.957 eye mask and IEEE802.3ae eye mask					
Optical receiver Characteristics						
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**	**Notes**
Receiver Sensitivity	S			-24	dBm	5
Wavelength Range	λc	1270		1610	nm	
Optical Power Input Overload	P_{in-max}	-1			dBm	
Receiver Damage Threshold				5	dBm	
LOS — Optical De-assert	Pd			-25	dBm	
LOS — Optical Assert	Pa	-38			dBm	
LOS hysteresis		0.5	2	6	dB	

Notes:

3) Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulations.

4) "λ" is: 1270,1290,1310,1330,1350,1370,1390,1410,1430,1450,1470,1490,1510,1530,1550,1570,1590,1610，please the "product selection".

5) Receiver Reflectance Measured with a PRBS 2^7-1 test pattern, @1250Mbps, ER=9dB, BER<10^{-12}.

Digital Diagnostic Monitoring Information

UNIVISO's UTS01E4C-XX transceivers support the 2-wire serial communication protocol as defined in the SFP MSA. It is very closely related to the EEPROM defined in the GBIC standard, with the same electrical specifications. The standard SFP serial ID provides access to identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information.

Additionally, UNIVISO 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 interface is identical to, and is thus fully backward compatible with both the GBIC Specification and the SFP Multi Source Agreement.

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 EEPROM 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.
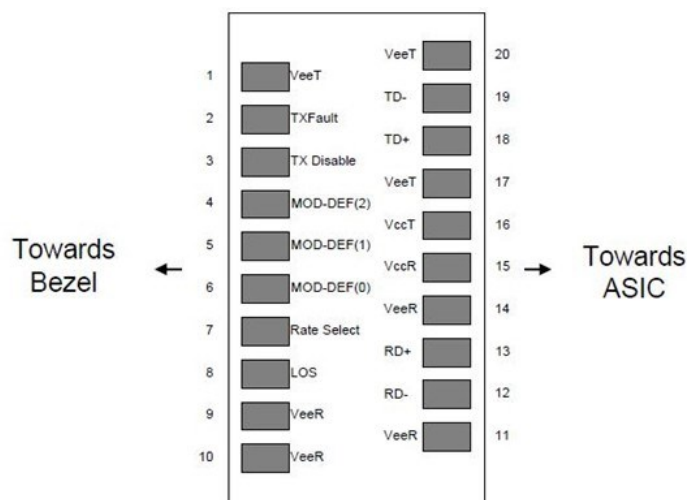
Pin Descriptions


Diagram of Host Board Connector Block Pin Numbers and Name

Pin Assignment

| Pin	Symbol	Description	Notes
1	VeeT	Transmitter Ground (Common with Receiver Ground)	1
2	TX_Fault	Transmitter Fault, Low: normal; High: abnormal	2
3	TX_Disable	Transmitter Disable High: Transmitter off Low: Transmitter on	3
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	3
5	MOD_DEF(1)	Module Definition 1. Clock line for Serial ID.	3
6	MOD_DEF(0)	Module Definition 0. Grounded within the module.	3
7	Rate Select	No connection required	4
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	5
9	VEER	Receiver Ground(Common with Transmitter Ground)	1
10	VEER	Receiver Ground(Common with Transmitter Ground)	1
11	VEER	Receiver Ground(Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled. CML-O	
13	RD+	Receiver Non-inverted DATA out. AC Coupled. CML-O	
14	VeeR	Receiver Ground	1
15	VccR	Receiver Power Supply	
16	VccT	Transmitter Power Supply	
17	VeeT	Transmitter Ground	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled. CML-I	
19	TD-	Transmitter Inverted DATA in. AC Coupled. CML-I	
20	VeeT	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 TDIS >2.0V or open, enabled on TDIS <0.8V.

4) This is an optional input used to control the receiver bandwidth for compatibility with multiple data rates (most likely Fiber Channel 1x and 2x Rates).If implemented, the input will be internally pulled down with > 30kΩ resistor. The input states are:

- Low (0 – 0.8V): Reduced Bandwidth
- (>0.8, < 2.0V): Undefined
- High (2.0 – 3.465V): Full Bandwidth

5) LOS is open collector output. It should be pulled up with 4.7kΩ – 10kΩ on host board to a typical 3.3V voltage. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

Block Diagram
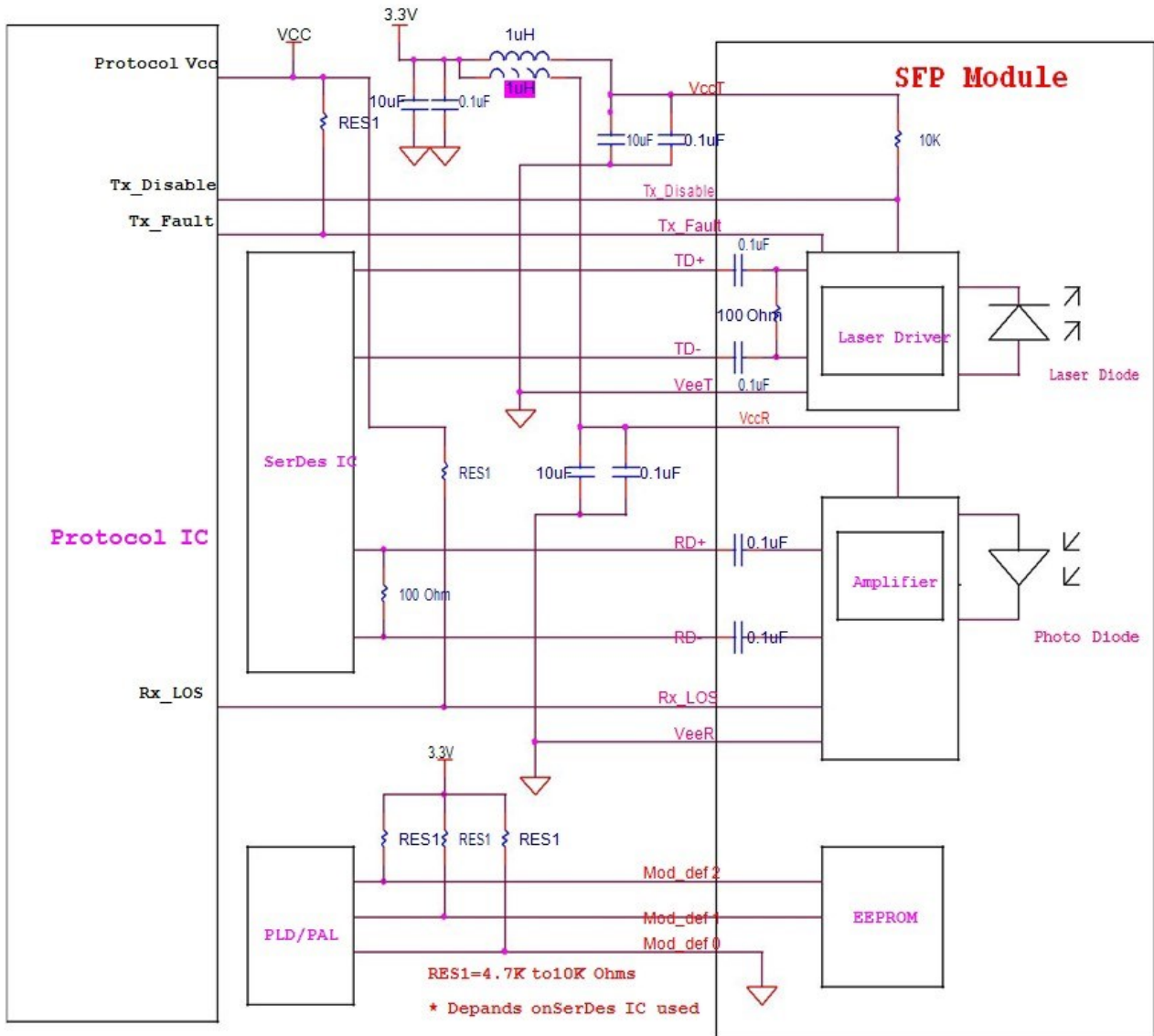
Package Outline

Dimensions are in millimeters. All dimensions are ±0.2mm unless otherwise specified. (Unit: mm)

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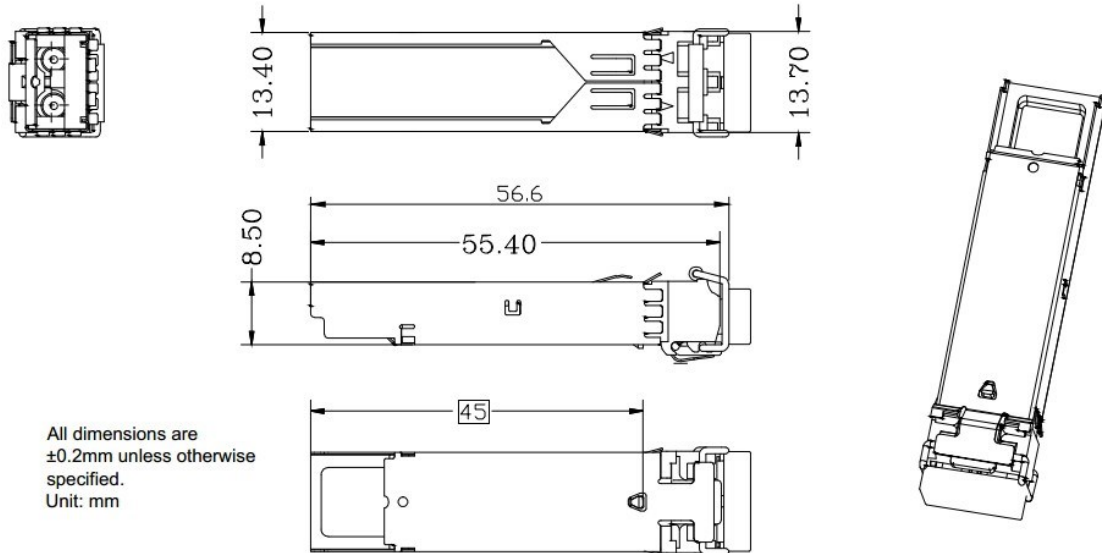
Regulatory Compliance

Feature	Test	Method
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1(>1000V for SFI pins, >2000Vfor other pins.)
Electrostatic Discharge (ESD) Immunity	IEC61000-4-2	Class 2(>4.0kV)
Electromagnetic Interference (EMI)	CISPR22 ITE Class B FCC Class B CENELEC EN55022 VCCI Class 1	Comply with standard
Immunity	IEC61000-4-3	Comply with standard
Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN (IEC) 60825-1,2	Compatible with Class I laser Product

Ordering information

Part. No	Specifications								
	Pack	Rate (Gbps)	Tx (nm)	Po (dBm)	RX	Sen (dBm)	Temp (°C)	Reach (km)	DDM
UTS01E4C-XX	SFP	1.25	DFB CWDM	-5~0	PIN	<-24	-5~70	40	Y