

DATA SHEET
UTX10E4D
10Gbps 1550nm XFP 40km Transceiver Overview

UTX10E4D Small Form Factor 10 G (XFP) transceivers are compliant with the current XFP Multi-Source Agreement (MSA) Specification1.They comply with 10-Gigabit Ethernet 10GBASE-LR/LW per IEEE 802.3ae and 10G Fiber Channel. Digital diagnostics functions are available via a 2-wire serial interface, as specified in the XFP MSA. The transceiver is RoHS compliant and lead-free per Directive 2002/95/EC3 .

Product Features

- XFI Loopback Mode
- Supports 9.95Gbps to 11.3Gbps bit rates
- Power dissipation <2.0W
- DFB laser and PIN receiver
- Single +3.3V power supply
- Hot-pluggable XFP footprint
- Maximum link length of 40km
- No Reference Clock required
- Operating temperature range:
- Commercial: -5°C~+70°C
- RoHS Compliant
- Full Duplex LC connector
- Built-in digital diagnostic functions
- Standard bail release mechanism

Applications

- 10GBASE-LR/LW 10G Ethernet
- 10G Fiber Channel
- SONET OC-192 SR-1 SDH STM I-64.1

Ordering Information

Part. No	Specifications								
	Pack	Rate (Gbps)	Tx (nm)	Po (dBm)	RX	Sen (dBm)	Temp (°C)	Reach (km)	DDM
UTX10E4D	XFP	10.3125	1550	-1~-4	PIN	<-16.5	-5~70	40	Y
For More Information:									
Room 608, Yuanzheng Building B, Nanshan District, Shenzhen, China, 518052									

General Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Data Rate	DR		10.3125		Gbps	
Bit Error Rate	BER			10 ⁻¹²		
Operating Temperature	T _{OP}	-5		70	°C	
Storage Temperature	T _{STO}	-40		85	°C	
Supply Current	I _S			450	mA	
Supply Voltage – 1.8V supply	V _{CC2}	1.71		1.89	V	
Supply Voltage – 3.3V supply	V _{CC3}	3.13		3.47	V	
Supply Current – 1.8V supply	I _{CC2}			180	mA	
Supply Current – 3.3V supply	I _{CC3}			640	mA	
Supply Voltage – 1.8V supply	V _{CC2}	1.71		1.89	V	
Module total power	P		2.5		W	

Optical Characteristics – Transmitter
V_{CC}=3.14V to 3.46V, T_C=-5°C to 70°C

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Output Optical Power	P _{TX}	-1		4	dBm	
Optical Center Wavelength	λ _C	1590		1570	nm	
Extinction Ratio	ER	8.2			dB	
Optical Rise/Fall Time (20% - 80%)	T _{RF_IN}			30	ps	
Relative Intensity Noise	RIN			-130	dB/Hz	
Transmitter and Dispersion Penalty	TDP			3.2	dBm	
Output Eye						Compliant with IEEE802.3 standard

Optical Characteristics – Receiver
V_{CC}=3.14V to 3.46V, T_C=-5°C to 70°C

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Receiver Sensitivity	S			-16.5	dBm	
Optical Center Wavelength	λ _C	1270		1610	nm	
Receiver Sensitivity	R _{X_SEN}			-15	dBm	
Optical Power Input Overload	P _{in-max}	+0.5			dbm	
Receiver Reflectance	R			-27	dB	
LOS Assert	P _{LOS_A}	-32			dBm	
LOS De-Assert	P _{LOS_D}			-18	dBm	

Electrical Characteristics – Transmitter
V_{CC}=3.14V to 3.46V, T_C=-5°C to 70°C

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Input differential impedance	R _{IN}		100		Ω	
Transmit differential output Voltage		120		820	mV	
Transmit disable voltage	V _D	V _{CC} -0.5		V _{CC}	V	
Transmit enable voltage	V _{EN}	V _{EE}		V _{EE} +0.8	V	
Transmit disable assert time				10	us	

Electrical Characteristics – Receiver
V_{CC}=3.14V to 3.46V, T_C=-5°C to 70°C

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Differential data out put swing	V _{OUT_PP}	340	650	850	mV	
Data output rise/fall time (20%-80%)	T _R			38	ps	
LOS Fault	V _{LOS_Fault}	V _{CC} - 0.5		V _{CC_HOST}	V	
LOS Normal	V _{LOS_Normal}	V _{EE}		V _{EE} +0.5	V	

Notes:

- 1) The supply current is XFP module's working current.
- 2) For the measurements, the device was driven with 10Gbps data pattern with 2³¹-1 PRBS payload.
- 3) Optical transition time is the time interval required for the rising or falling edge of an optical pulse to transition between the 20% and 80% amplitudes relative to the logical 1 and 0 levels
- 4) Measured with a PRBS 2³¹-1 test pattern, @10Gbps, ER=3.5dB, BER<10⁻¹²
- 5) The LOS Hysteresis minimizes 'chatter' on the output line. In principle, Hysteresis alone does not guarantee chatter-free operation.

Transmitter Section

The FP driver accepts differential input data and provide bias and modulation currents for driving a laser. An automatic power-control (APC) feedback loop is incorporated to maintain a constant average optical power.

TX_DISABLE

The TX_DISABLE signal is high (TTL logic "1") to turn off the laser output. The laser will turn on within 1ms when TX_DISABLE is low (TTL logic "0").

TX_FAULT

When the TX_FAULT signal is high, output indicates a laser fault of some kind. Low indicates normal operation.

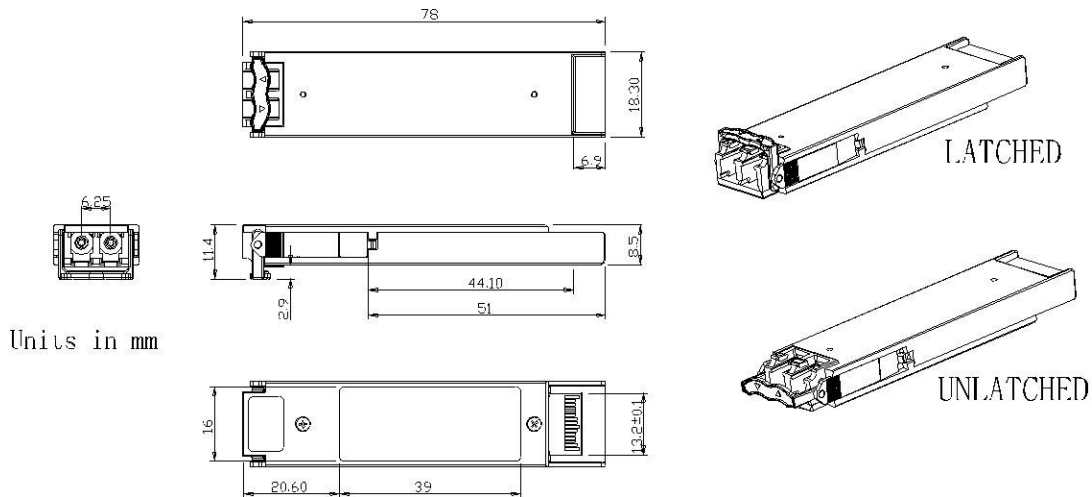
Receiver Section

The receiver utilizes a PIN detector integrated with a trans-impedance preamplifier in an OSA. This OSA is connected to a Limiting Amplifier which providing post-amplification quantization, and optical signal detection. The limiting Amplifier is AC-coupled to the transimpedance amplifier, with internal 100Ω differential termination.

Receive Loss (RX_LOS)

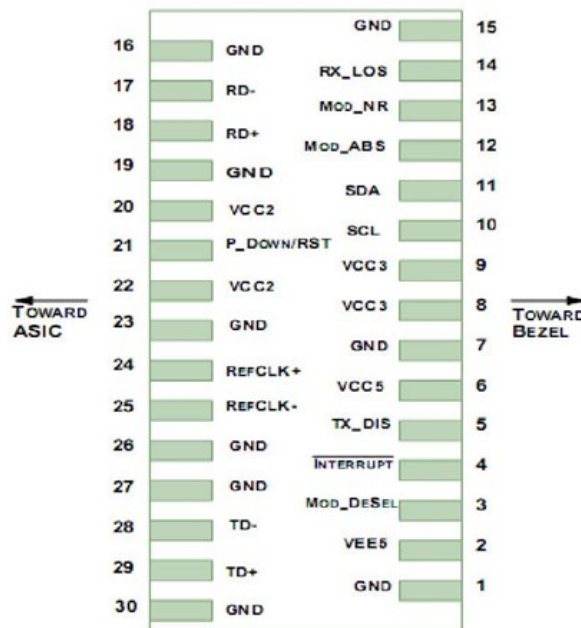
The RX_LOS is high (logic "1") when there is no incoming light from the companion transceiver. This signal is normally used by the system for the diagnostic purpose. The signal is operated in TTL level.

Dimensions



**ALL DIMENSIONS ARE ±0.2mm UNLESS OTHERWISE SPECIFIED
UNIT: mm**

Electrical Pad Layout



Pin	Signal Name	Description	Plug Seq.	Notes
1	GND	Module Ground		1
2	VEE5	Optional -5.2 Power Supply – Not required		
3	Mod-Desel	Module De-select; When held low allows the module to respond to 2-wire serial interface commands	LVTTTL-I	
4	Interrupt	Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface	LVTTTL-O	2
5	TX_DIS	Transmitter Disable; Transmitter laser source turned off	LVTTTL-I	
6	VCC5	+5 Power Supply		
7	GND	Module Ground		1
8	VCC3	+3.3V Power Supply		
9	VCC3	+3.3V Power Supply		
10	SCL	Serial 2-wire interface clock	LVTTTL-I	2
11	SDA	Serial 2-wire interface data line	LVTTTL-I/O	2
12	Mod_Abs	Module Absent; Indicates module is not present. Grounded in the module.	LVTTTL-I	2
13	Mod_NR	Module Not Ready; defines it as a logical OR between RX_LOS and Loss of Lock in TX/RX.	LVTTTL-I	2
14	RX_LOS	Receiver Loss of Signal indicator	LVTTTL-I	2
15	GND	Module Ground		1
16	GND	Module Ground		1
17	RD-	Receiver inverted data output	CML-O	
18	RD+	Receiver non-inverted data output	CML-O	
19	GND	Module Ground		1
20	VCC2	+1.8V Power Supply – Not required		
21	P_Down/RST	Power Down; When high, places the module in the low power stand-by mode and on the falling edge of P_Down initiates a module reset Reset; The falling edge initiates a complete reset of the module	LVTTTL-I	
22	VCC2	including the 2-wire serial interface, equivalent to a power cycle. +1.8V Power Supply – Not required		
23	GND	Module Ground		1
24	RefCLK+	Reference Clock non-inverted input, AC coupled on the host board – Not required	PECL-I	3
25	RefCLK-	Reference Clock inverted input, AC coupled on the host board – Not required	PECL-I	3
26	GND	Module Ground		1
27	GND	Module Ground		1

28	TD-	Transmitter inverted data input	CML-I	
29	TD+	Transmitter non-inverted data input	CML-I	
30	GND	Module Ground		1

Notes:

Plug Seq.: Pin engagement sequence during hot plugging.

- 1) Module circuit ground is isolated from module chassis ground within the module.
- 2) Open collector; should be pulled up with 4.7k – 10kohms on host board to a voltage between 3.15V and 3.6V.
- 3) A Reference Clock input is not required by the UTX10E4D. If present, it will be ignored.

References

1. IEEE standard 802.3. IEEE Standard Department, 2005.
2. Small Form Factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA), September 2000.