



# LTB3452 1250 Mb/sec BX10-D P2P Downstream 2x5 SFF E-PON Transceiver, 10 km

The LTB3452 E-PON downstream transceiver module has been designed for low cost point to point (P2P) Fiber to the Home, Business or Curb (FTTx) systems employing high-speed CW mode receivers/transmitters in 1250 Mb/sec symmetrical duplex data links. The device is based on the IEEE 802.3ah 1000BASE BX-10D specification for bi-directional communications over a single fiber and incorporates a high performance 1490 nm CW mode DFB transmitter and 1310 nm CW mode PIN/TIA receiver. It is capable of serving in advanced P2P FTTH equipment over distances of up to 10 km. The LVTTTL compatible Tx Disable feature controls the laser transmitter and the Rx Signal Detect indicator feature monitors the status of the receiver. The industry standard 2x5 small form factor (SFF) package incorporates a pigtail fiber with SC/APC or SC/PC connector and is fabricated with a rugged die cast metal housing and cage assembly and operates over the extended temperature range from -40 to +85 degrees Centigrade.



**Applications**

- Gigabit Ethernet Access Networks
- Fiber to the FTTx:
  - Home
  - Curb
  - Node
  - Business
  - Office
- Point to Point Service (P2P)

**Features**

- 1250 Mb/s Downstream Transmit
- 1490 nm DFB Laser
- CW mode
- 1250 Mb/s Upstream Receive
- 1310 nm PIN/TIA
- CW Mode
- Single 3.3 Volt DC Supply
- IEEE 802.3ah 1000BASE BX-10D
- Reach: 10 km
- 2x5 SFF Package Outline
- Dual Wavelength (WDM)

- Single Fiber, Full Duplex Operation
- Operating Temperature Ranges
  - Commercial 0° to 70° C
  - Extended -10° to 80° C
  - Industrial -40° to 85° C
- Data and Control Interfaces
  - Tx\_DATA LVPECL Differential
  - Rx\_DATA LVPECL Differential
  - Rx\_SD LVTTTL Single Ended
  - Tx\_Disable LVTTTL Single Ended
- BER <math>10^{-12}</math> (PRBS = 2<sup>7</sup>-1)

**Recommended Operating Conditions**

Parameter	Symbol	Min	Typ	Max	Units
Ambient Operating Temperature	T <sub>amb</sub>	-40	25	+85	°C
DC Supply Voltage	V <sub>CC</sub>	3.135	3.3	3.465	Volts
Module Supply Current	I <sub>N</sub>	-	150	200	mA
Module Power Dissipation	P <sub>D</sub>	-	500	700	mW
Signaling Speed +/- 100 ppm	S	-	1.25	-	GBd

**Ordering Information**

Part Number	Package Option (X)		Temperature Option (Y)	
	<b>LTB3452 XY</b>	A	Pigtail, no connector	C
B		Pigtail, SC/APC	E	Extended
C		Pigtail, SC/PC	H	Industrial



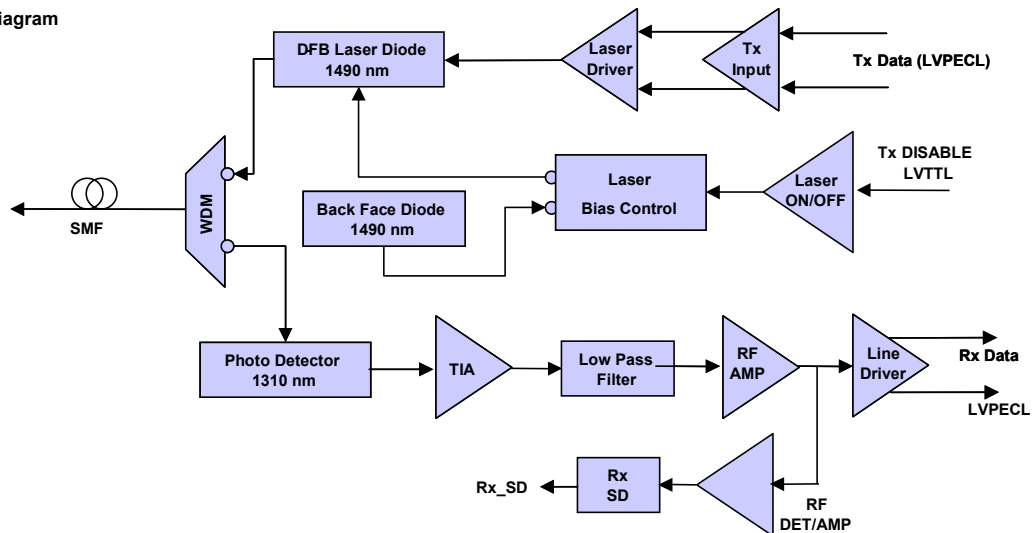
Absolute Maximum Ratings					
Parameter	Symbol	Min	Max	Units	Notes
Storage Temperature	T <sub>stg</sub>	-40	+85	°C	Exceeding the Absolute Maximum Ratings may cause irreversible damage to the device.
Operating Temperature	T <sub>O</sub>	-40	+85	°C	
Relative Humidity - Storage	RH <sub>S</sub>	0	95	%	
Relative Humidity - Operating	RH <sub>O</sub>	0	85	%	The device is not intended to be operated under the condition of simultaneous Absolute Maximum Ratings, a condition which may cause irreversible damage to the device.
DC Supply Voltage	V <sub>CC</sub>	0	3.6	V	
Soldering Temperature	T <sub>slid</sub>	0	260	°C	
Soldering Duration	t <sub>slid</sub>	0	10	sec	

Absolute Maximum Ratings: Control Function Logic Levels					
Tx_DISABLE Logic HIGH State	Tx_DIS	-	VCC+0.5	V	LVTTTL
Rx_SD Logic HIGH State	Rx_SD	-	VCC+0.8	mV	LVTTTL

Transmitter Electrical Specifications						
Parameter	Symbol	Min	Typ	Max	Unit	Conditions / Notes
Tx DC Supply Current	I <sub>CC</sub>	-	-	150	mA	
Tx_Data Differential Input Voltage	V <sub>IH-VIL</sub>	300	-	-	mV p-p	LVPECL Tx_DATA Electrical Signal
Tx_DIS = HIGH (Transmitter OFF)	V <sub>OH</sub>	2.4	-	3.3	V	LVTTTL
Tx_DIS = LOW (Transmitter ON)	V <sub>OL</sub>	0	-	0.8	V	LVTTTL

Receiver Electrical Specifications						
Parameter	Symbol	Min	Typ	Max	Unit	Conditions / Notes
Rx DC Supply Current	I <sub>RX</sub>	-	-	125	mA	
Rx_Data Differential Output Voltage	V <sub>IH-VIL</sub>	600	-	1900	mV p-p	LVPECL Rx_DATA Electrical Signal
Rx_Data Output Rise / Fall Time	t <sub>r</sub> / t <sub>f</sub>	-	156	260	ps	20% to 80%
Rx_SD = HIGH (Receiver ON)	V <sub>OH</sub>	2.4	-	3.3	V	LVTTTL
Rx_SD = LOW (Receiver OFF)	V <sub>OL</sub>	0	-	0.8	V	LVTTTL

LTB3452 Block Diagram

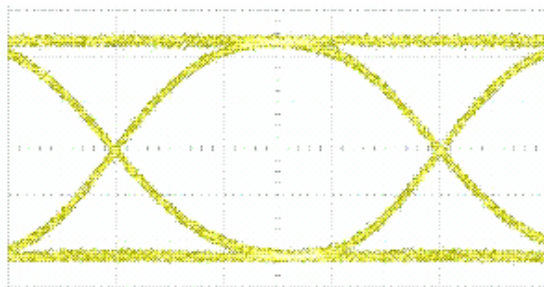




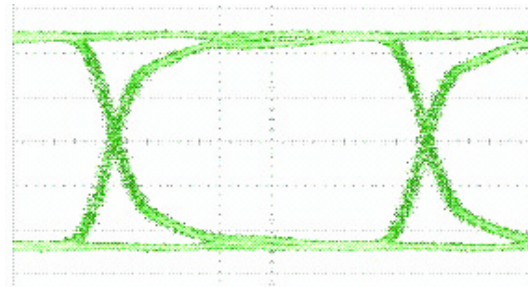
Transmitter Optical Specification						
Parameter	Symbol	Min	Typ	Max	Units	Conditions / Notes
Transmitter Type		1490 nm DFB CW Mode				
Average Output Power (9/125 $\mu$ SMF)	Pout	-9	-	-3	dBm	
Optical Rise and Fall Time	$t_r / t_f$	-	150	260	ps	20% to 80%
Tx Wavelength	$\lambda$	1480	1490	1500	nm	
Spectral Line Width @ -20dB	$\Delta\lambda$	-	-	0.88	nm	IEEE 802.3ah Compliant
Extinction Ratio	ER	6	9	-	dB	
Relative Intensity Noise	RIN	-	-	-113	dB/Hz	
Optical Return Loss	RL	-	-	15	dB	
Total Jitter	Tj	-	-	0.2	UI	
Optical Cross Talk	C <sub>RT</sub>	-	40	-	dB	
Transmit Reflectance	RFL	-	-	-12	dB	

Receiver Optical Specifications						
Parameter	Symbol	Min	Typ	Max	Units	Conditions / Notes
Receiver Type		1310 nm P-I-N/TIA CW Mode				
Wavelength	$\lambda$	1260	1310	1360	nm	
Received Optical Power	Pin	-20	-	-3	dBm	BER<10 <sup>-12</sup> , 1250 Mb/s, PRBS 2 <sup>7</sup> -1
Maximum Input Optical Power	Pin(max)	-	-	0	dBm	Damage Threshold
OMA Receiver Sensitivity	Pin	-	-	-20	dBm	
Receiver Reflectance	RFL	-	-	-12	dB	
Stressed Receiver Sensitivity	Pin	-	-	-17	dBm	
OMA Stressed Receiver Sensitivity	Pin	-	-	-16.3	dBm	
	Pin	-	-	24	$\mu$ W	

**Eye Diagram**



- Transmitter Test Conditions**
- Optical Output Power = -5 dBm
  - Test Pattern = 2<sup>7</sup>-1 NRZ PRBS



- Receiver Test Conditions**
- Optical Input Power = -17 dBm
  - Test Pattern = 2<sup>7</sup>-1 NRZ PRBS



**Ligent**

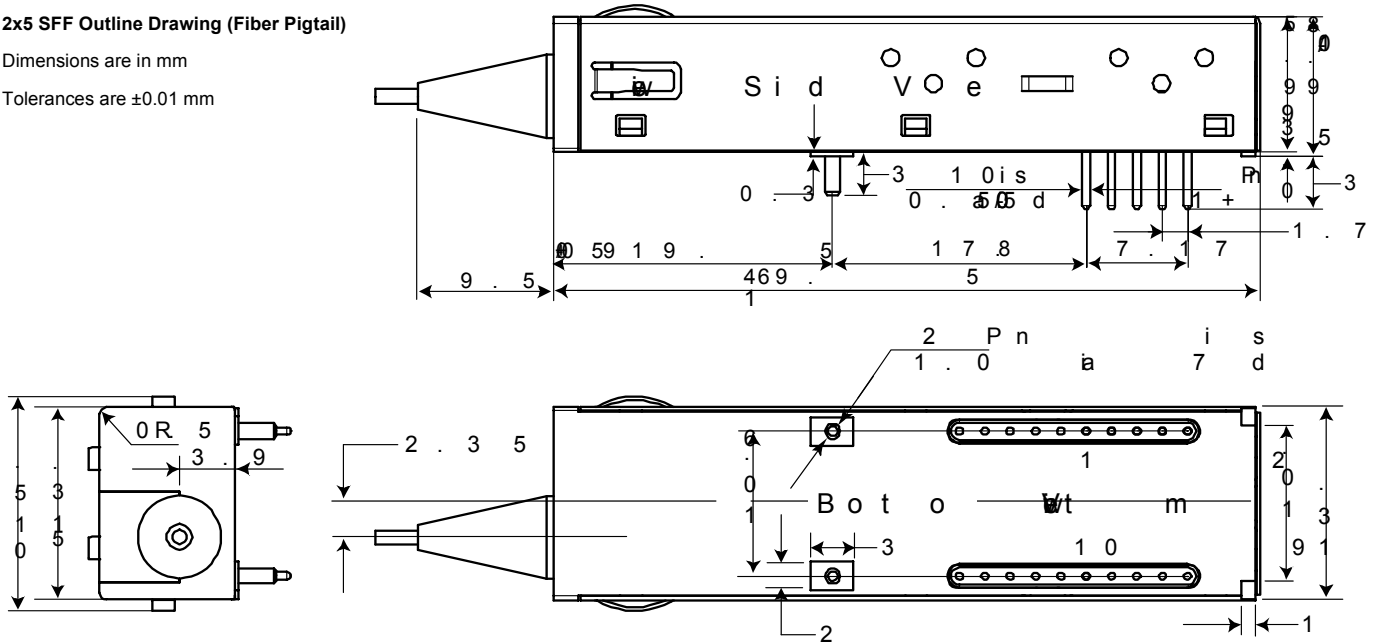
intelligent photonics

# LTB3452 1250 Mb/sec BX10-D P2P Downstream 2x5 SFF E-PON Transceiver, 10 km

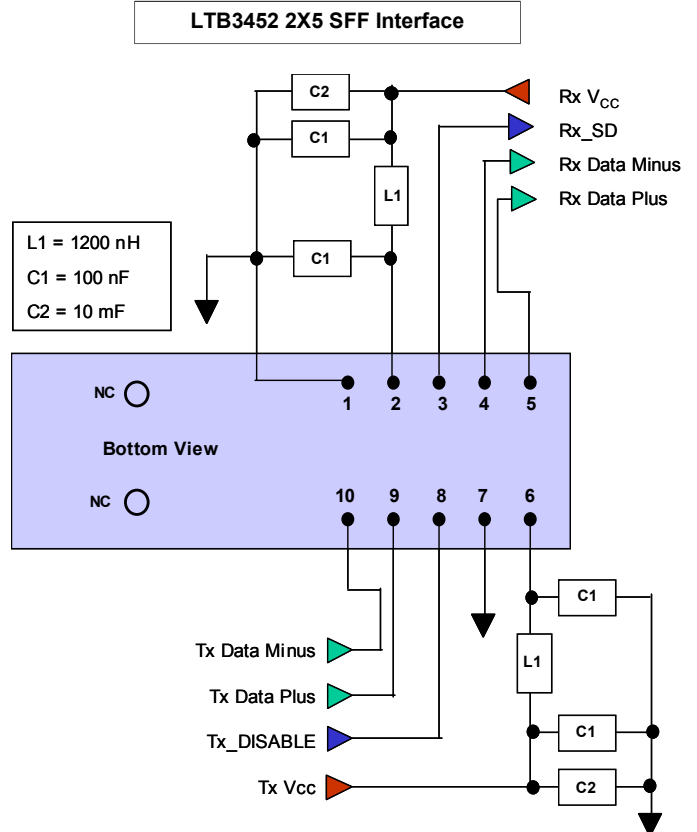
## 2x5 SFF Outline Drawing (Fiber Pigtail)

Dimensions are in mm

Tolerances are ±0.01 mm



SFF PIN ASSIGNMENT		
Pin	Symbol	Description
1	VEER	Receiver Signal Ground
2	VCCR	+3.3 Volt Receiver Power Supply
3	Rx_SD	CW Mode Receiver Signal Detect
4	RD-	Rx Data - Inverted Differential Output
5	RD+	Rx Data - Non Inverted Differential Output
6	VCCT	+3.3 Volt Transmitter Power Supply
7	VEET	Transmitter Signal Ground
8	Tx_DIS	Burst Mode Transmitter Disable
9	TD+	Tx Data - Non Inverted Differential Input
10	TD-	Tx Data - Inverted Differential Input
Mounting Posts		The mounting posts are provided for mechanically attaching the transceiver to the circuit board. They should not be connected to the circuit ground but can be connected to the chassis
Housing Leads		The housing leads should be connected to





### Eye Safety

The transceiver is a Class 1 eye-safe device according to FDA 21CFR1040.10 and 1040.11, IEC 60825-1 and IEC 60825-2.

### Electromagnetic Interference (EMI), Immunity and Product Safety

The transceiver is ESD safe (electrical pins) when tested according to MIL-STD-883, Method 3015.4 and ESD safe (optical connector) when tested according to IEC 61000-4-2. The device is immune to strong RF fields when tested in accordance with IEC 610004-3. The device complies with (US) FCC, Part 15, Subpart J; (Europe) CENELEC EN 55022; (Canada) Class B (CISPR22A); and (Japan) VCCI Class 1. The device has been designed to conform to product safety requirements including UL1950, CSA 22.2, and IEC 60950, and has been designed to meet the flammability requirements of UL94.

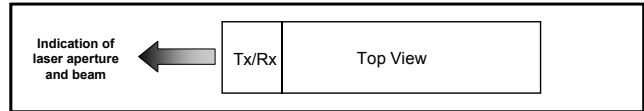
### Notice

The factory has made all adjustments to this device prior to shipment. No adjustments or modifications to the device are required or permitted. Any adjustment, modification or tampering of the device voids the product warranty. The US Food and Drug Administration may consider that any adjustment or modification to this device is an act of manufacturing and therefore will require that the device be recertified in accordance with 21 CFR 1040.10 Subpart j.

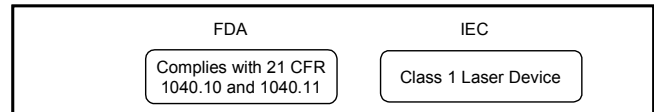
### Required Label and Laser Emission

This device is labeled in accordance with FDA and IEC requirements for laser safety.

#### Required Label



#### Laser Emission



Laser Radiation Information	
Wavelength	1490 nm
FDA Total Optical Pout : 7 mm aperture at 20 cm distance	< 790 microwatts
IEC Total Optical Pout: 7 mm aperture at 14 cm distance	< 10000 microwatts
Beam Divergence	17.25°



**Ligent**

intelligent photonics

**LTB3452 1250 Mb/sec BX10-D P2P Downstream**

**2x5 SFF E-PON Transceiver, 10 km**

**North American Sales Offices**

**Ligent Photonics**

2701 Dukane Drive  
Suite 200  
St. Charles, IL 60174  
PH (630) 513-7226  
FX (630) 513-9173  
WS www.ligentphotonics.com

**Ligent Photonics**

(Virginia Sales Office)  
8210 Strathmore Lane  
Roanoke, VA 24019  
PH (540) 797-5793  
FX (540) 366-5793  
WS www.ligentphotonics.com

**Gigatron Associates**

968 St. Laurent Boulevard  
Ottawa, Ontario K1K 3B3  
PH (613) 747-3472  
FX (613) 747-3474  
WS www.gigatron.com

**Gigatron Associates**

56 Bartleman Crescent  
Cambridge, ON  
PH: (519) 220-1856  
FX: (510) 220-1938  
WS: www.gigatron.com

**Gigatron Associates**

450 Avenue Racine PH #5  
Dorval, QB H9S 3K8  
PH: (514) 984-2598  
FX: (514) 620-7812  
WS: www.gigatron.com

**Gigatron Associates**

2388 Eversyde Avenue SW  
Calgary, AB T2Y 4X6  
PH: (403) 257-0636  
FX: (403) 257-0569  
www.gigatron.com

**Gigatron Associates**

406-838 Agnes Street  
New Westminster, BC V3M 6R3  
PH: (604) 787-2340  
FX: (604) 787-2343  
WS: www.gigatron.com

**New Age Electronics**

3000 Northwood's Parkway  
Suite 280  
Norcross, GA 30071  
PH (770) 242-8800  
FX (770) 242-8180  
WS www.newagelec.com

**New Age Electronics**

8376 Six Forks Road  
Suite 202  
Raleigh, NC 27615  
PH (919) 866-0620  
FX (919) 866-0621  
WS www.newagelec.com

**New Age Electronics**

4900 Corporate Drive  
Suite B  
Huntsville, AL 35805  
PH (256) 430-8000  
FX (256) 430-8414  
WS www.newagelec.com

**New Age Electronics**

182 Sunset Drive  
Mt. Dora, FL 32757  
PH: (352) 735-6101  
FX: (352) 735-6116  
WS: www.newagelec.com

**New Age Electronics**

100 SE 5th Court  
Suite 37  
Pompano Beach, FL 33060  
PH: (407) 804-1210  
FX: (954) 928-2889  
WS: www.newagelec.com

**KJS Marketing**

PO Box 72  
Crystal Lake, IL 60039  
PH (815) 788-1002  
FX (815) 788-1004  
WS www.kjsmarketing.com

**KJS Marketing**

4610 Hemlock Lane North  
Plymouth, MN 55442  
PH (763) 205-1402  
FX (763) 205-1403  
WS www.kjsmarketing.com

**KJS Marketing**

2A Street  
Lake Lotawana, MO 64086  
PH (816) 578-4751  
FX (816) 774-2571  
WS www.kjsmarketing.com

**KJS Marketing**

1802 Hammer Drive, NW  
Cedar Rapids, IA 52405  
PH (319) 265-8592  
FX (319) 265-8593  
WS www.kjsmarketing.com

**KJS Marketing**

PO Box 1521  
Maryland Heights, MO 63043  
PH (314) 469-4544  
FX (314) 469-4535  
WS www.kjsmarketing.com

**KJS Marketing**

154 Struckman Blvd  
Bartlett, IL 60103  
PH (630) 289-4548  
FX (630) 289-3778  
WS www.kjsmarketing.com

**Kruvand Associates**

1202 Richardson Drive  
Suite 113  
Richardson, TX 75080  
PH (972) 437-3355  
FX (972) 680-8854  
WS www.kruvand.com

**Kruvand Associates**

8100 Shoal Creek Boulevard  
Suite 250  
Austin, TX 75080  
PH (512) 454-1111  
FX (512) 454-9858  
WS www.kruvand.com

**Kruvand Associates**

10601 Grant Road  
Suite 104  
Houston, TX 77070  
PH (713) 956-6741  
FX (713) 972-680-8854  
WS www.kruvand.com

**K-Tech Sales**

100 Century Center Court  
Suite 405  
San Jose, CA 95112  
PH (408) 437-1808  
FX (408) 437-1883  
WS www.ktechsales.com