

YAB-3424-1Lx

1.25Gbps Bi-directional SFP Transceiver

Features

- Compliant with IEEE802.3z Gigabit Ethernet Standard
- Compliant with Fiber Channel 100-SM-LC-L standard
- Industry standard small form pluggable (SFP) package
- Simplex LC connector
- Differential LVPECL inputs and outputs
- Single power supply 3.3V
- TTL signal detect indicator
- Hot Pluggable
- Class 1 laser product complies with EN 60825-1
- RoHS Compliant



Applications

- Gigabit Ethernet Application
- Point-to-Point FTTX Application

The YAB-3424-1LX Small Form Factor Pluggable (SFP) transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA)¹. They are simultaneously compatible with Gigabit Ethernet as specified in IEEE Std 802.3² and Fibre Channel FC- PI-2 Rev. 7.0³. They are RoHS compliant and lead-free per Directive 2002/95/EC⁴

I . Pin Descriptions

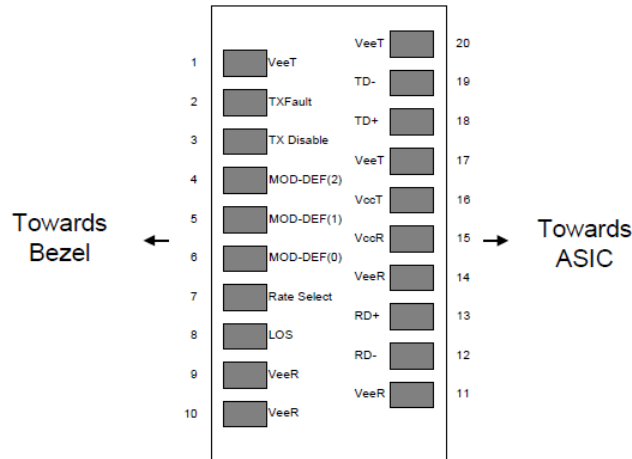


Diagram of Host Board Connector Block Pin Numbers and Names

Pin	Symbol	Name/Description	Ref.
1	V _{EET}	Transmitter Ground (Common with Receiver Ground)	1
2	T _{FAULT}	Transmitter Fault. Not supported.	
3	T _{DIS}	Transmitter Disable. Laser output disabled on high or open.	2
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	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	4
9	V _{EER}	Receiver Ground (Common with Transmitter Ground)	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. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
3. Should be pulled up with 4.7k – 10kohms 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. LOS is open collector output. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

II. Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	<i>TS</i>	-40	+100	°C
Supply Voltage	<i>Vcc</i>	-0.5	4.0	V
Input Voltage	<i>VIN</i>	-0.5	<i>Vcc</i>	V
Operating Current	<i>IOP</i>		400	mA
Case Operating Temperature	<i>TC</i>	0	+70	°C
Supply Current	<i>ITX + IRX</i>		250	mA

III. Transmitter Electro-optical Characteristics

Vcc = 3.1 V to 3.5 V, *TC* = 0°C to +70 °C

Parameter	Symbol	Min.	Typ.	Max	Units	Note
Output Optical Power 9/125 μm fiber	<i>Pout</i>	-9	---	-3	dBm	1
		-4	---	+3	dBm	2
		-3	---	+3	dBm	3
Extinction Ratio	<i>ER</i>	9	---	---	dB	
Center Wavelength	λ_c	1260	1310	1360	nm	
Spectral Width (RMS)	$\Delta\lambda$	---	---	2.5	nm	1
				1		2,3
Rise/Fall Time, (20–80%)	<i>Tr/f</i>	---	---	260	ps	
Relative Intensity Noise	<i>RIN</i>	---	---	-120	dB/Hz	
Total Jitter	<i>TJ</i>	---	---	227	ps	
Output Eye	<i>Compliant with IEEE802.3z</i>					
Max. <i>Pout</i> TX-DISABLE Asserted	<i>POFF</i>	---	---	-45	dBm	
Differential Input Voltage	<i>VDIFF</i>	0.4	---	2.0	V	

Note:

1.YAB-3424-1L2

2.YAB-3424-1L4

3.YAB-3424-1L6.

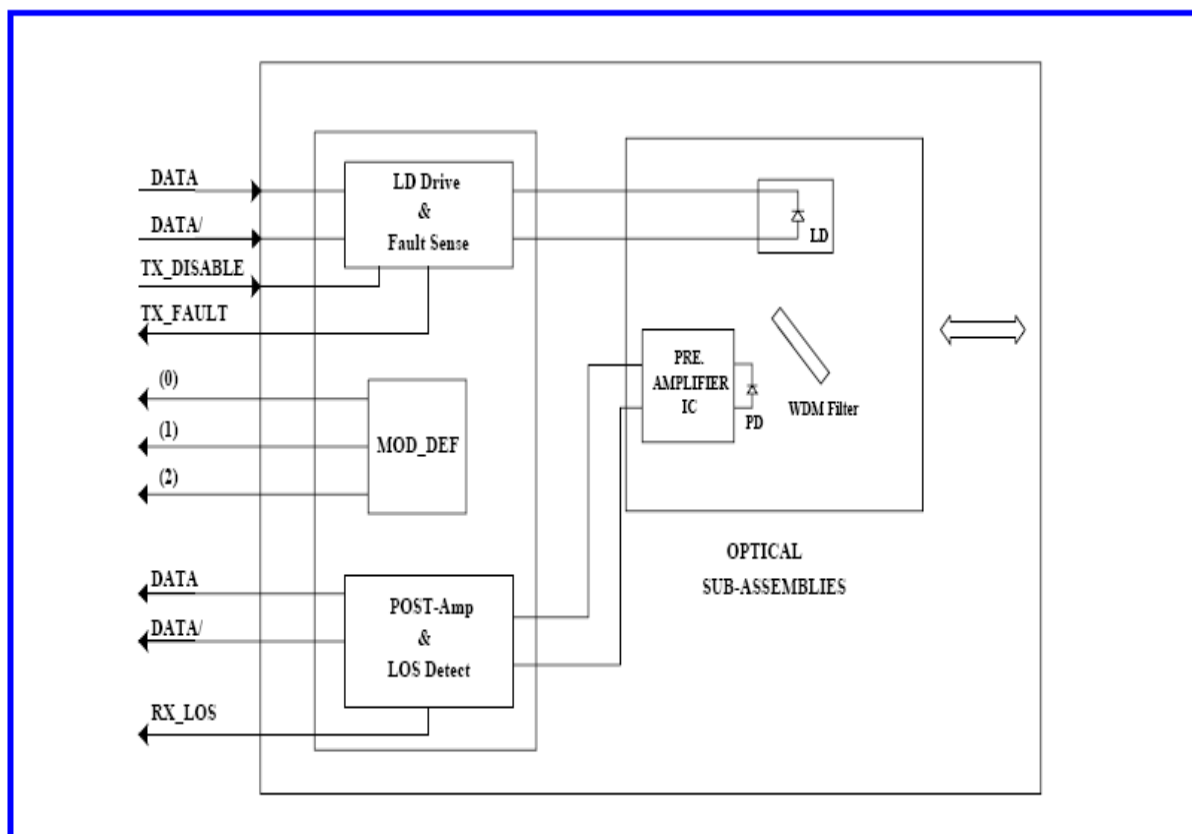
IV. Receiver Electro-optical Characteristics

Vcc = 3.1 V to 3.5 V, *TC* = 0°C to +70 °C

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Optical Input Power-maximum	<i>PIN</i>	0	---	---	dBm	BER < 10 ⁻¹²
Optical Input Power-minimum (Sensitivity)	<i>PIN</i>	---	---	-24	dBm	BER < 10 ⁻¹²
Operating Center Wavelength	λ_C	1480		1580	nm	
Optical Return Loss	<i>ORL</i>	14	---	---	dB	1480~1580nm

Optical isolation	<i>ISO</i>	---	---	-40	dB	1480~1580nm
Signal Detect-Asserted	<i>PA</i>	---	---	-24	dBm	
Signal Detect-Deasserted	<i>PD</i>	-35	---		dBm	
Differential Output Voltage	<i>VDIFF</i>	0.5	---	1.2	V	
Data Output Rise, Fall Time (20~80%)	<i>T_{r/f}</i>	---	---	0.35	ns	
Receiver Loss of Signal Output Voltage-Low	<i>RX_LOSL</i>	0	---	0.5	V	
Receiver Loss of Signal Output Voltage-High	<i>RX_LOSH</i>	2.4	---	V_{cc}	V	

V. Block Diagram of Transceiver



Note

Transmitter and Receiver Optical Sub-assembly Section

A 1310 nm InGaAsP laser and an InGaAs PIN photodiode integrate with an WDM filter to form a bi-directional single fiber optical subassembly (OSA). The laser of OSA is driven by a LD driver IC which converts differential input LVPECL logic signals into an analog laser driving current. And, The photodiode of OSA is connected to a circuit providing post-amplification quantization, and optical

signal detection.

TX_DISABLE

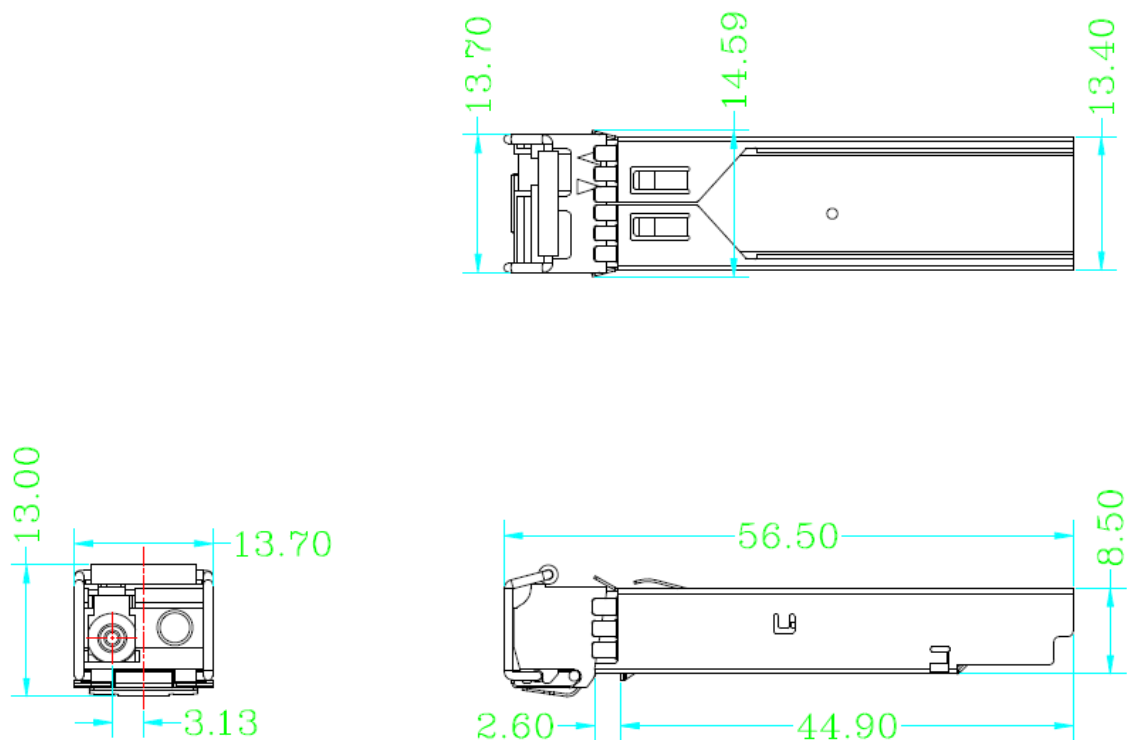
The TX_DISABLE signal is high (TTL logic “1”) to turn off the laser output.

Receive Loss (RX_LOS)

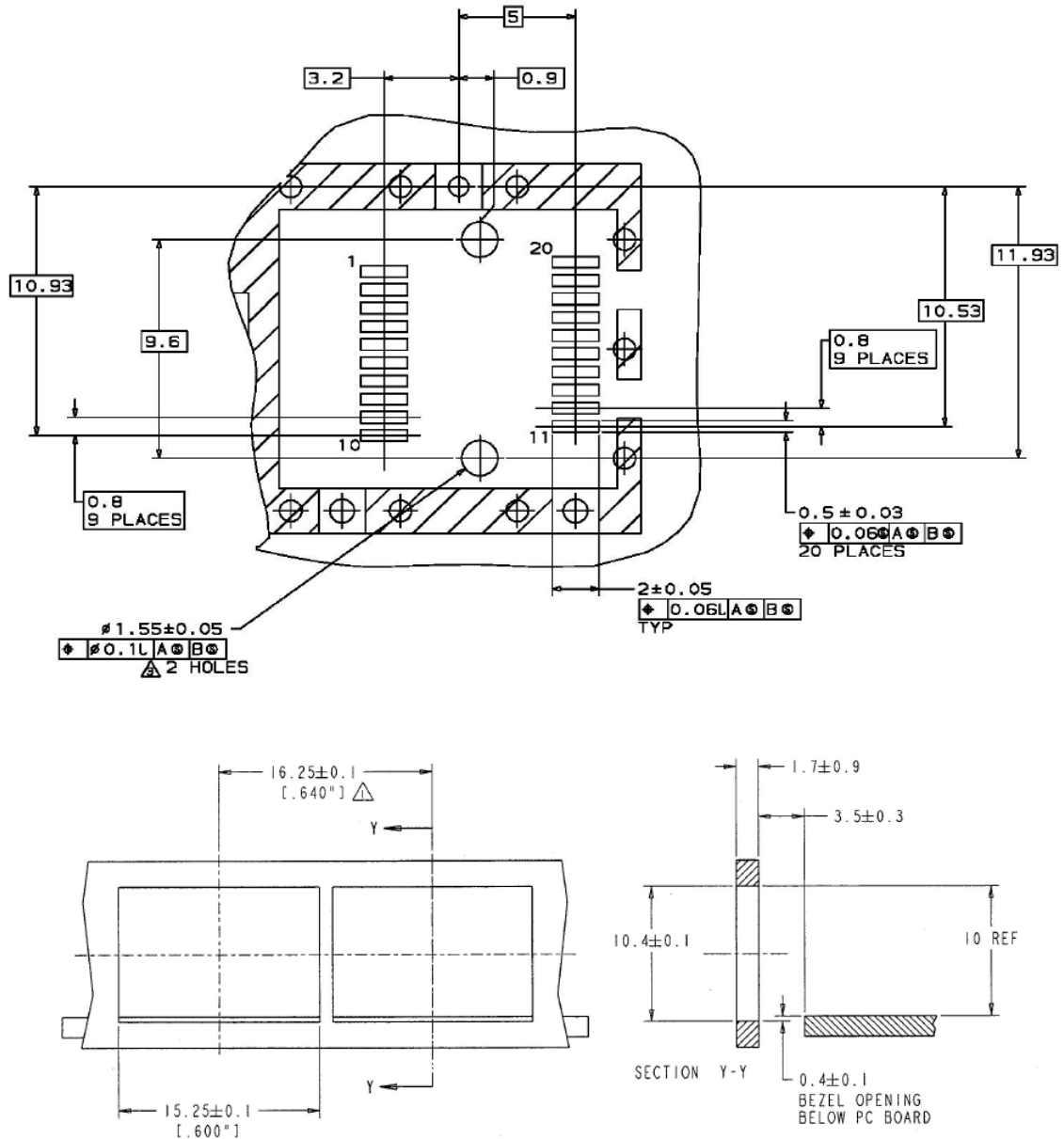
The RX_LOS is high (logic “1”) when there is no incoming light from the companion transceiver. This signal is normally used by the system for the diagnostic purpose. The signal is operated in TTL level.

VI. Dimensions

YAB-3424-1LX Small Form Factor Pluggable (SFP) transceivers are compatible with the dimensions defined by the SFP Multi-Sourcing Agreement (MSA).

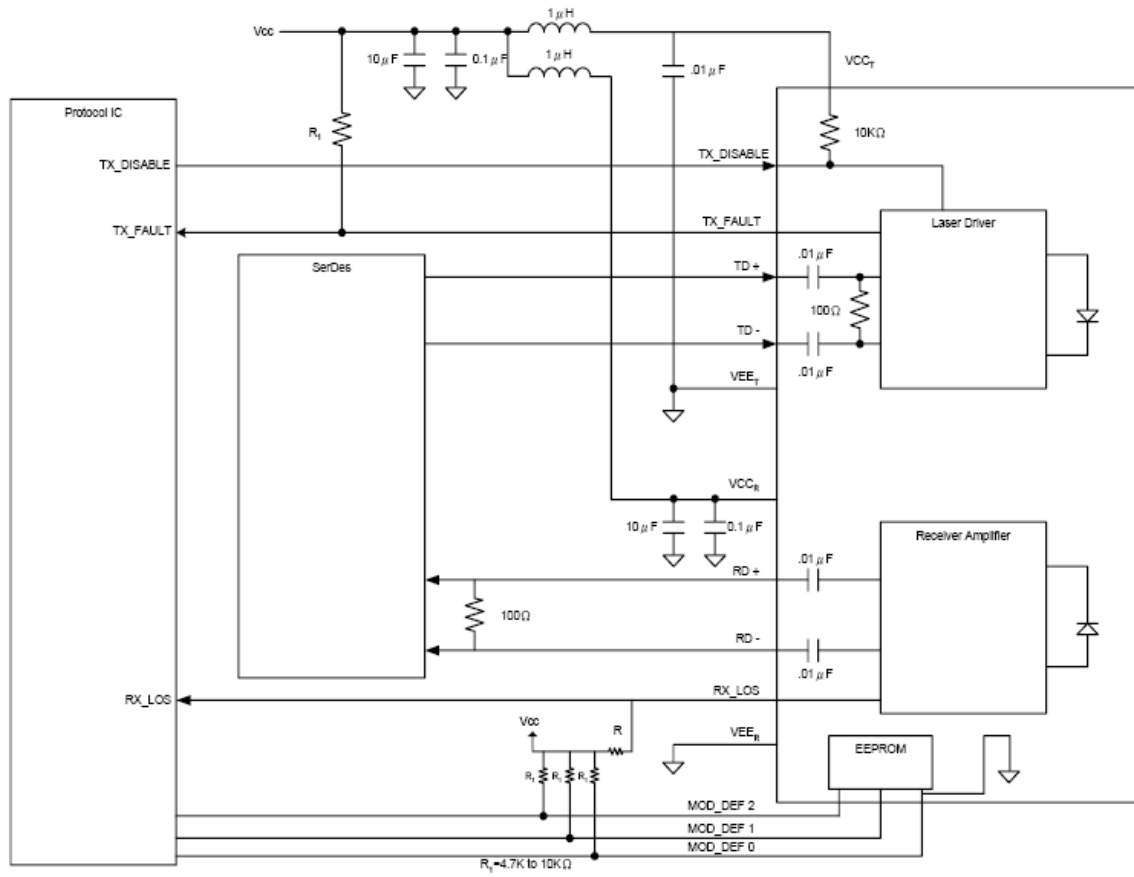


VII. PCB Layout and Bezel Recommendations



- NOTES:
- 1. Δ MINIMUM PITCH ILLUSTRATED, ENGLISH DIMENSIONS ARE FOR REFERENCE ONLY
 - 2. NOT RECOMMENDED FOR PCI EXPANSION CARD APPLICATIONS

VIII. Recommended Interface Circuit



IX. Ordering Information

Part Number	Tx/Rx	Input/Output	Signal Detect	Temperature	LD Type	Distance
YAB-3424-1L2	1310/1490	AC/AC	TTL	0°C~70°C	1310FP	20km
YAB-3424-1L4	1310/1490	AC/AC	TTL	0°C~70°C	1310DFB	40km
YAB-3424-1L6	1310/1490	AC/AC	TTL	0°C~70°C	1310DFB	60km

X. References

- Small Form Factor Pluggable (SFP) Transceiver Multi-source Agreement (MSA). September 14, 2000.
- IEEE Std 802.3, 2002 Edition, Clause 38, PMD Type 1000BASE-SX. IEEE Standards Department 2002.
- “Fibre Channel Draft Physical Interface Specification (FC-PI-2 Rev. 7.0)”. American National Standard For Information Systems.
- Directive 2002/95/EC of the European Council Parliament and of the Council, “on the restriction of the use of certain hazardous substances in electrical and electronic equipment.” January 27, 2003.

Warnings:

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.