EB45(54)24-A0D(I)

2.488Gbps SFP Bi-Directional 100km SFP Transceiver

PRODUCT FEATURES

- Up to 2.5Gb/s data links
- 1490nm DFB laser transmitter and APD photo-detector
- 1550nm DFB laser transmitter and APD photo-detector
- Up to 100km on 9/125μm SMF
- Hot-pluggable SFP footprint
- BIDI LC/UPC type pluggable optical interface
- Low power dissipation
- Metal enclosure, for lower EMI
- RoHS-10 compliant and lead-free
- Support Digital Diagnostic Monitoring interface
- Single +3.3V power supply
- Compliant with SFF-8472
- Operating case temperature range of

  0°C to +70°C (Commercial)

  -40°C to +85°C (Industrial)

  -10 ~ +80oC (Extended)

APPLICATIONS

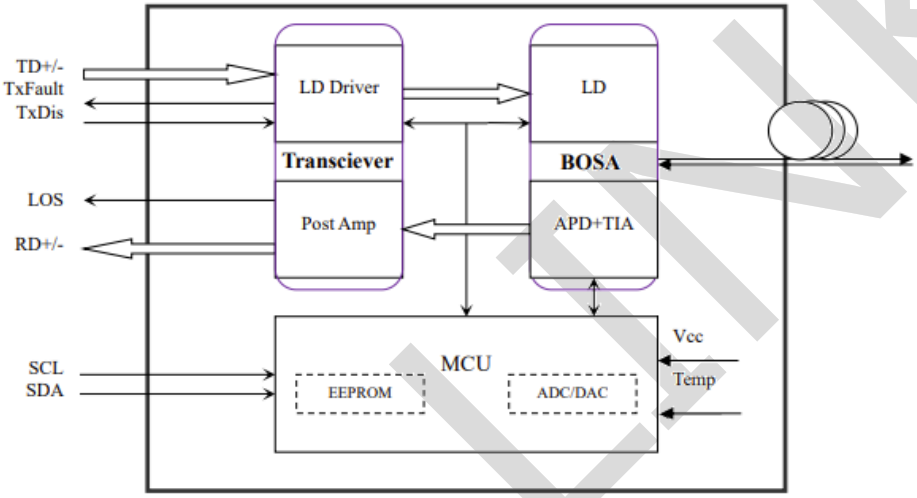
- Switch to Switch Interface
- Gigabit Ethernet
- Switched Backplane Applications
- Router/Server Interface
- Other Optical Links

DESCRIPTIONS

The Small Form Factor Pluggable (SFP) transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA), The transceiver consists of five sections: the LD driver, the limiting amplifier, the digital diagnostic monitor, the DFB laser and the APD photo-detector .The module data link up to 100km in 9/125um single mode fiber.

The optical output can be disabled by a TTL logic high-level input of Tx Disable, and the system also can disable the module via I2C. Tx Fault is provided to indicate that degradation of the laser. Loss of signal (LOS) output is provided to indicate the loss of an input optical signal of receiver or the link status with partner. The system can also get the LOS (or Link)/Disable/Fault information via I2C register access.

Module Block Diagram



Ordering Information

Part No.	Data Rate(optical)	Laser	Fiber Type	Distance	Optical Interface	Temp	DDMI	Latch Color
EB4524-A0D	2.488G	DFB	SMF	100KM	LC	0~70℃	Y	Purple
EB5424-A0D	2.488G	DFB	SMF	100KM	LC	0~70℃	Y	Yellow
EB4524-A0DI	2.488G	DFB	SMF	100KM	LC	-40~85℃	Y	Purple
EB5424-A0DI	2.488G	DFB	SMF	100KM	LC	-40~85℃	Y	Yellow

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Storage Temperature	TS	-40		85	°C	
Power Supply Voltage	VCC	-0.3		3.6	V	
Relative Humidity (non-condensation)	RH	5		95	%	
Damage Threshold	THd	0			dBm	

Recommended Operating Conditions

Operating Case Temperature	TOP	0		70	°C	commercial
		-10		80		extended
		-40		85		industrial
Power Supply Voltage	VCC	3.135	3.3	3.465	V	
Data Rate			2.5		Gb/s	
Control Input Voltage High		2		Vcc	V	
Control Input Voltage Low		0		0.8	V	
Link Distance (SMF)	D			100	km	9/125um

Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Power Consumption	P			0.95	W	commercial
				1.00		Industrial
Supply Current	Icc			280	mA	commercial
				300		Industrial
Transmitter (Module Input)						
Single-ended Input Voltage Tolerance	V_{CC}	-0.3		4.0	V	
Differential Input Voltage Swing	Vin,pp	200		2400	mVpp	
Differential Input Impedance	Zin	90	100	110	Ohm	
Transmit Disable Assert Time				5	us	
Transmit Disable Voltage	Vdis	Vcc-1.3		Vcc	V	
Transmit Enable Voltage	Ven	Vee-0.3		0.8	V	
Receiver (Module Output)						
Differential Output Voltage Swing	Vout,pp	500		900	mVpp	
Differential Output Impedance	Zout	90	100	110	Ohm	
Data output rise/fall time	Tr/Tf		100		ps	20% to 80%
LOS Assert Voltage	VlosH	Vcc-1.3		Vcc	V	
LOS De-assert Voltage	VlosL	Vee-0.3		0.8	V	

Optical and Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter						
Operating Wavelength	λC	1470 1530	1490 1550	1510 1570	nm	EB4524-A0D(I) EB5424-A0D(I)
Spectrum Bandwidth(RMS)	σ			1	nm	

Side Mode Suppression Ratio	SMSR	30			dB	
Average Optical Power	P_{AVG}	0		5	dBm	1
Optical Extinction Ratio	ER	9			dB	
Transmitter OFF Output Power	POff			-45	dBm	
Transmitter Eye Mask		Compliant with G.959(class 1 laser safety)				
Receiver						
Operating Wavelength	1530 1470	1550 1490		1570 1510	nm	EB4524-A0D(I) EB5424-A0D(I)
Center Wavelength	λ_C	1530	1550	1570	nm	
Receiver Sensitivity (Average Power)	Sen.			-30	dBm	3
Input Saturation Power (overload)	Psat	-10			dBm	
LOS Assert	LOSA	-41			dB	
LOS De-assert	LOSD			-31	dBm	
LOS Hysteresis	LOSH	0.5	2	6	dBm	

Notes:

1. Measure at 2^23-1 NRZ PRBS pattern

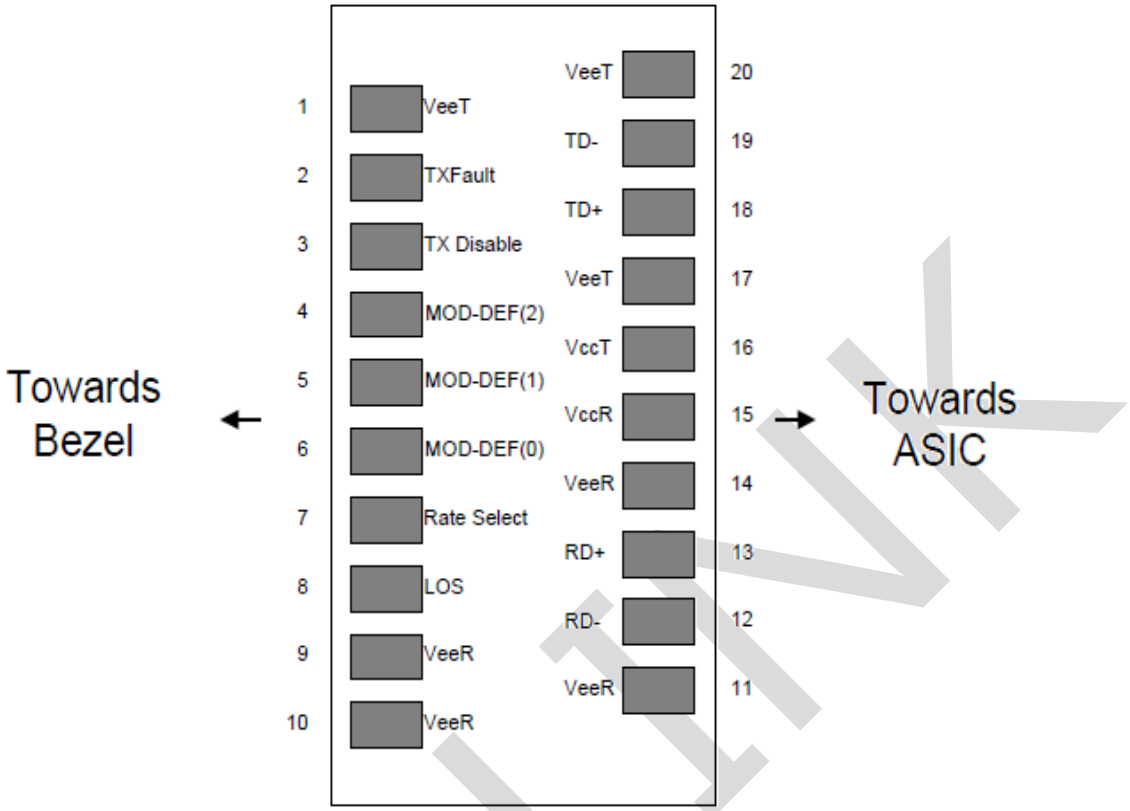
2. Measured with Light source 1490nm, ER=9dB; BER =<10^-12 @PRBS=2^23-1 NRZ

3. When LOS de-asserted, the RX data+/- output is High-level (fixed).

Digital Diagnostics

Parameter	Symbol	Min.	Max.	Unit	Notes
Temperature monitor absolute error	DMI_ Temp	-3	3	degC	Over operating temp
Supply voltage monitor absolute error	DMI _VCC	-0.15	0.15	V	Full operating range
RX power monitor absolute error	DMI_RX	-3	3	dB	
Bias current monitor	DMI_ bias	-10%	10%	mA	
TX power monitor absolute error	DMI_TX	-3	3	dB	

Pin Diagram



Pin Definitions

PIN #	Name	Function	Notes
1	VEET	Transmitter Ground (Common with Receiver Ground)	1
2	TXFAULT	Transmitter Fault.	
3	TXDIS	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	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	
13	RD+	Receiver Non-inverted DATA out. AC Coupled	
14	VEER	Receiver Ground (Common with Transmitter Ground)	1
15	VCCR	Receiver Power Supply	
16	VCCT	Transmitter Power Supply	
17	VEET	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	VEET	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-10k ohms 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. 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:

1) Low (0 – 0.8V): Reduced Bandwidth

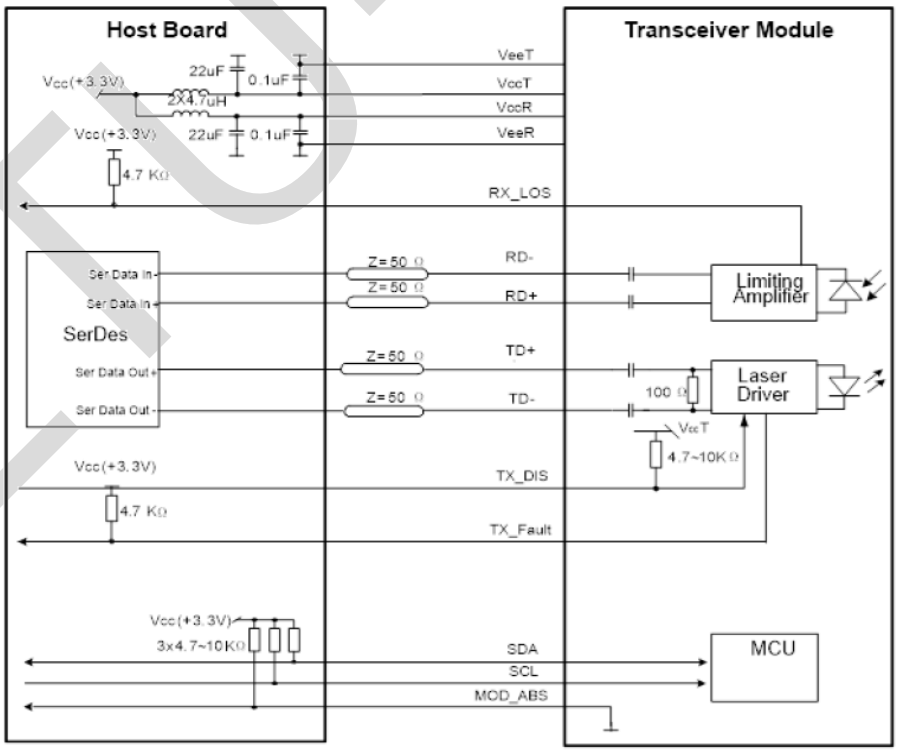
2) (>0.8, < 2.0V): Undefined

3) High (2.0 – 3.465V): Full Bandwidth

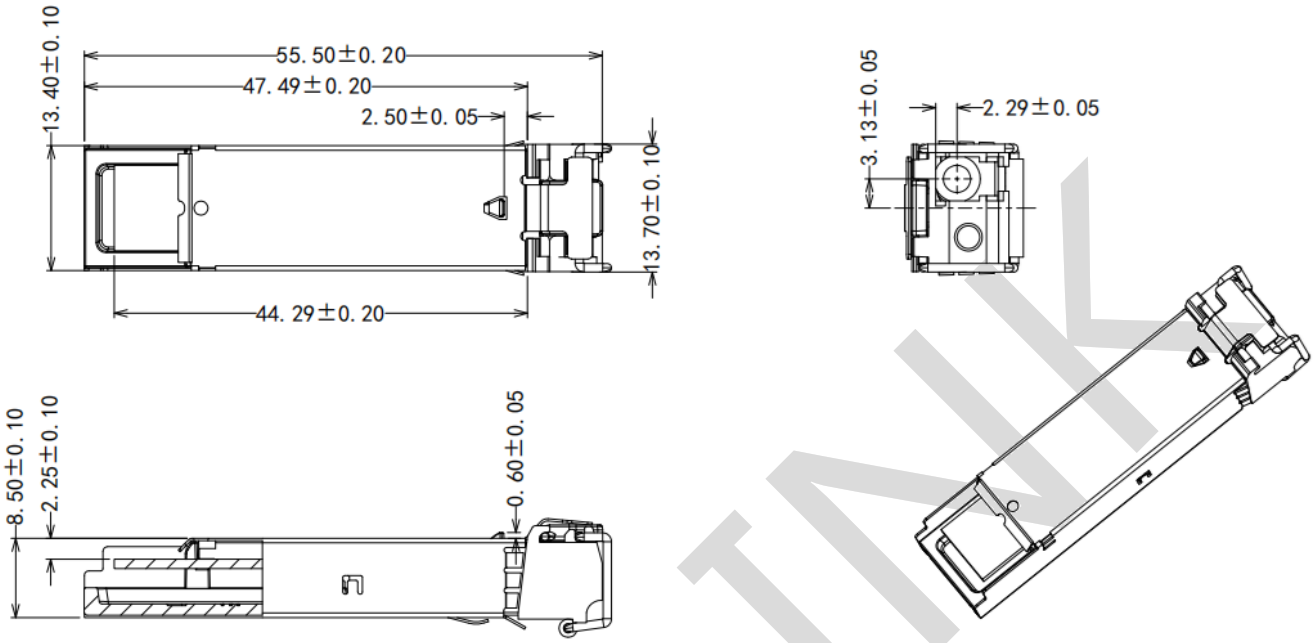
4) Open: Reduced Bandwidth

5. LOS is open collector output should be pulled up with 4.7k-10k ohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

Recommended Interface Circuit



Mechanical Diagram



Revision History

Version No.	Date	Description
1.0	February 8, 2015	Preliminary datasheet
2.0	October 11,2018	Product upgrades
3.0	July 22, 2024	Format change

Company: ETU-Link Technology Co., LTD
Production base: Right side of 3rd floor, No. 102 building, Longguan expressway, Dalang street, Longhua District, Shenzhen city, GuangDongProvince,China 518109
R&D base: Floor 4, Building 4, Nanshan Yungu Phase LI, Taoyuan Community, XiliStreet,Nanshan District, Shenzhen
Tel: +86-755 2328 4603

Addresses and phone number also have been listed at www.etulinktechnology.com.
Please e-mail us at sales@etulinktechnology.com or call us for assistance.