Specification

1.25G Ethernet Optical Bypass Module Quad

Ports 1.25G Base-LX

OBM-A3BA4-C01

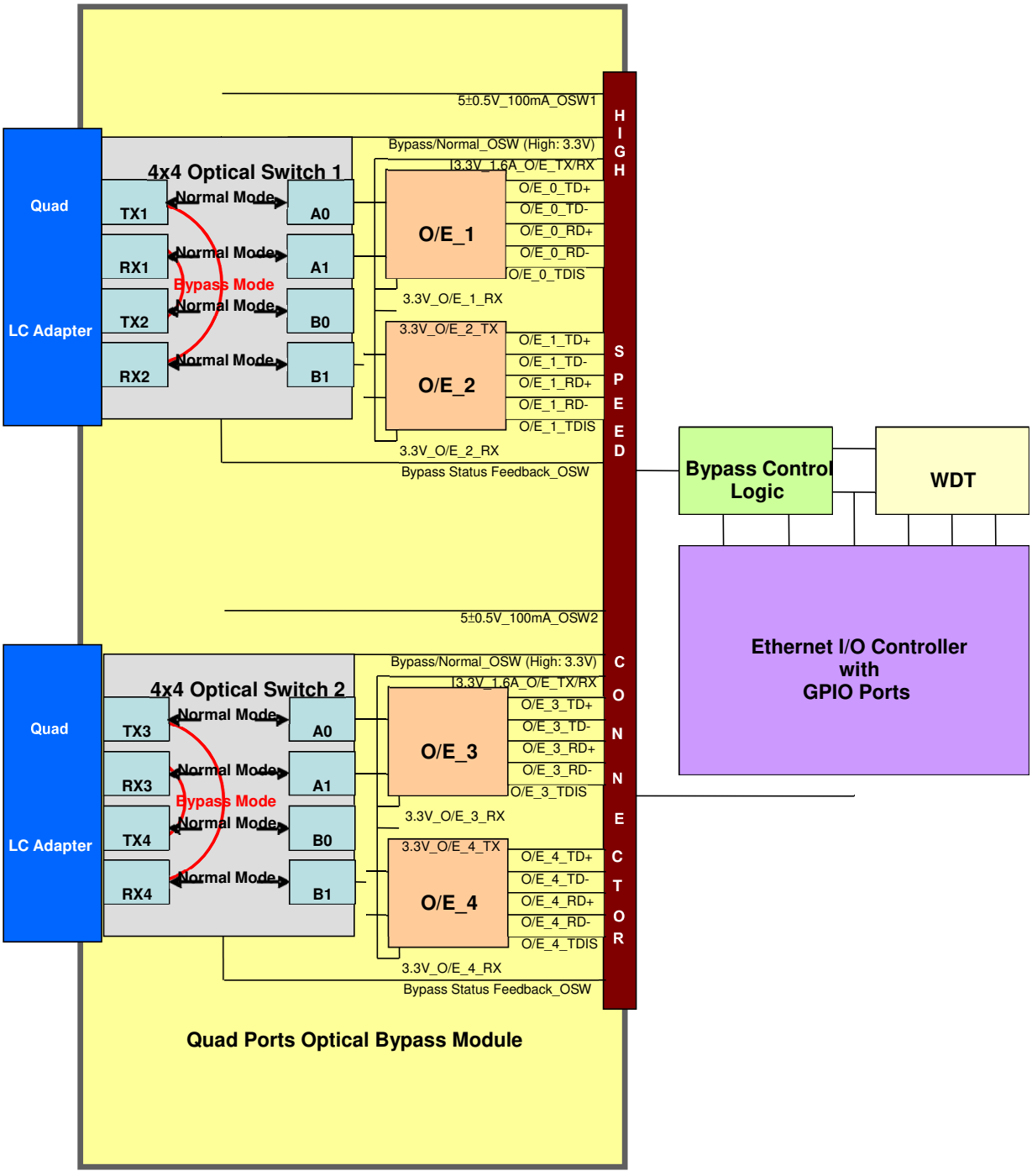
Product Overview

FormericaOEQuad Port 1.25 Gbit/s Optical Bypass Module is a compact box that contains four 1.25 G Base-LX1310nm (10KM) ports and can integrated with I/O ports controllers to be a Network Interface Card (NIC). The FormericaOE Quad Port 1.25 Gbit/s Optical Bypass Module is targeted to inline network system that maintains network connectivity when power failure or system fails. FormericaOE Quad Port 1.25 Gbit/s Optical Bypass Module supports Normal and Bypass modes, and can be controlled to perform the Block mode. In Normal mode, the ports are independent interfaces. In Bypass mode, all packets received from one port are transmitted to the adjacent port. In Block mode, the module blocks the route. FormericaOE Quad Port 1.25 Gbit/s Optical Bypass Module can Bypass or Block its I/O ports on a host system failure, power off, or up on software request. FormericaOE Quad Port 1.25 Gbit/s Optical Bypass Module can be integrated with any brand's Controllers CPU. It is suitable for connecting with in-line equipment's for power failure or system maintenance. When the In-Line unit is not on or is in bypass mode, the relays within the Optical Bypass Module are set to bridge the optical signals directly through the optical switch, completely bypassing the In-Line equipment. If the In-Line equipment is on and operating normally, then it supplies power to the switch through a high speed connector PIN. Compact and competitive cost, this module provides excellent performance on your network.

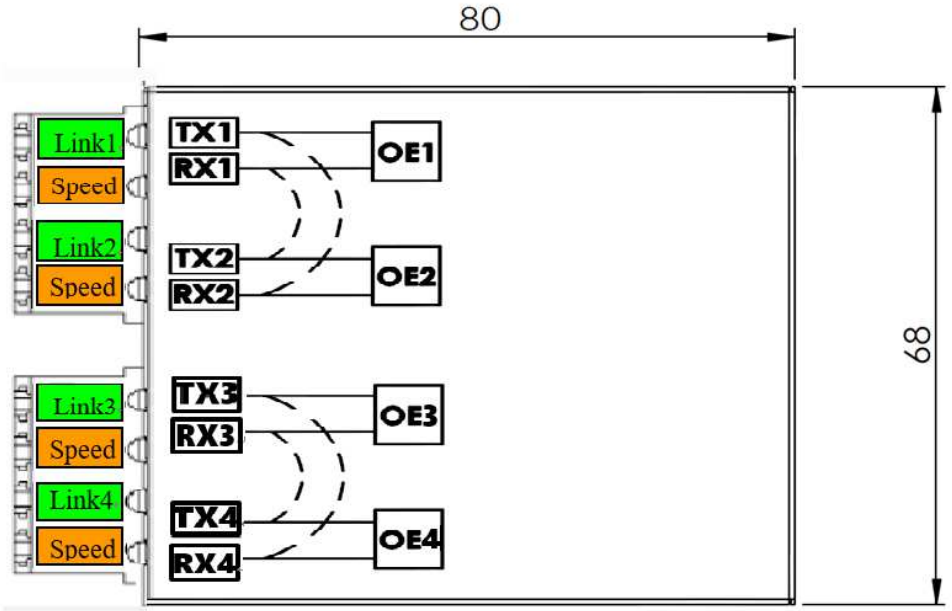
Features

- Reliable Passive Fiber Bypass (Latching)
- Low Return Loss
- Available in 9/125µm Single mode Fiber
- PCB Mountable Type
- Fast Ethernet Standard Compliant
- Digital Diagnostic SFF-8472 Rev.10.2 Compliant
- SONET/SDH Standard Compliant
- Two Quad LC Adapter
- Class 1 Laser Product Complies with IEC / EN 60825-1
- 1.25G-BASE-LX are available
- Compliant with CE& FCC Standard
- Compact Format and ROHS Compliant

Block Diagram and Optical Paths



Quad Ports Optical Bypass Module



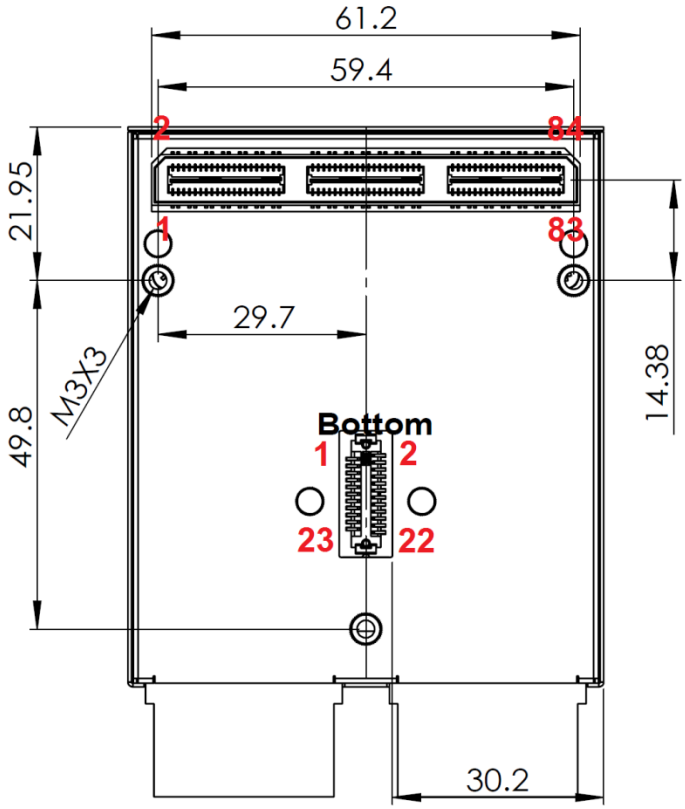
- **Link1, Link2, Link3, Link4 indications:**

  Green: **Link**

- **Speed1, Speed2, Speed3, Speed4 indications:**

  Orange: **Data rate 1.25G**

Module Pin Out



84 PIN Assignments:

Pin Number	Name	I/O	Function	Note
1	Vcc5_2		5.0V Power Supper (OSW2 Power)	
2	GND			
3	On-Line	O	1K Ohm to Ground	
4	GND			
5	OE1 TX Disable	I	Transmitter Disable for OE-1	2
6	OE1 TX Fault	O	Transmitter Fault Indication for OE-1	1
7	OE1 MOD-DEF2	I/O	2 Wire Serial ID Interface (Data) for OE-1	3
8	OE1 MOD-DEF1	I	2 Wire Serial ID Interface (Clock) for OE-1	3
9	OE1 Vcc		3.3V for Tx1 Power Supply and Rx1 Power Supply – 300mA	
10	OE1-Link	I	OE1-Link LED Indicator (Voltage Low/ LED Green)	
11	OE1-Speed	I	OE1-Speed LED Indicator (Voltage Low / LED Orange)	
12	OE1 Rate Select	I	NA	
13	GND			
14	OE3 TX Disable	I	Transmitter Disable for OE-3	2
15	OE3 TX Fault	O	Transmitter Fault Indication for OE-3	1
16	OE3 MOD-DEF2	I/O	2 Wire Serial ID Interface (Data) for OE-3	3
17	OE3 MOD-DEF1	I	2 Wire Serial ID Interface (Clock) for OE-3	3
18	OE3 Vcc		3.3V for Tx3 Power Supply and Rx3 Power Supply – 300mA	
19	OE3-Link	I	OE3-Link LED Indicator (Voltage Low/ LED Green)	
20	OE3-Speed	I	OE3-Speed LED Indicator (Voltage Low / LED Orange)	
21	OE3 Rate Select	I	NA	
22	GND			
23	OE2 TX Disable	I	Transmitter Disable for OE-2	2
24	OE2 TX Fault	O	Transmitter Fault Indication for OE-2	1
25	OE2 MOD-DEF2	I/O	2 Wire Serial ID Interface (Data) for OE-2	3
26	OE2 MOD-DEF1	I	2 Wire Serial ID Interface (Clock) for OE-2	3
27	OE2 Vcc		3.3V for Tx2 Power Supply and Rx2 Power Supply – 300mA	
28	OE-2-Link	I	OE2-Link LED indicator (Voltage Low / LED Green)	
29	OE-2-Speed	I	OE2-Speed LED indicator (Voltage Low / LED Orange)	
30	OE2 Rate Select	I	NA	
31	GND			
32	OE4 TX Disable	I	Transmitter Disable for OE-4	2
33	OE4 TX Fault	O	Transmitter Fault indication for OE-4	1
34	OE4 MOD-DEF2	I/O	2 Wire Serial ID Interface (Data) for OE-4	3
35	OE4 MOD-DEF1	O	2 Wire Serial ID Interface (Clock) for OE-4	3
36	OE4 Vcc4		3.3V for Tx4 Power Supply and Rx4 Power Supply – 300mA	
37	OE-4-Link	I	OE4-Link LED Indicator (Voltage Low / LED Green)	
38	OE-4-Speed	I	OE4-Speed LED Indicator (Voltage Low / LED Orange)	
39	OE4 Rate Select	I	NA	
40	GND			
41	GND			
42	Vcc5_1		5.0V Power Supply (OSW 1 Power)	8
43	OSW 1 N1	I	Change to Normal mode for OSW1	7/9
44	OSW 1 B1	I	Change to Bypass mode for OSW1	7/9
45	OSW 1 State Output	O	High=Normal Mode, Low=Bypass Mode for OSW1	
46	OE4 GND		OE4 Signal Ground	
47	OE4 RD-	O	OE4 Inversed Data Output	5
48	OE4 RD+	O	OE4 Data Output	5
49	OE4 GND		OE4 Signal Ground	

50	OE4 GND		OE4 Signal Ground	
51	OE4 TD+	I	OE4 Data Input	6
52	OE4 TD-	I	OE4 Data Input	6
53	OE4 GND		OE4 Signal Ground	
54	OE4 LOS	O	Loss of Signal for OE-4	4
55	OE2 LOS	O	Loss of Signal for OE-2	4
56	OE2 GND		OE2 Signal Ground	
57	OE2 RD-	O	OE2 Inversed Data Output	5
58	OE2 RD+	O	OE2 Data Output	5
59	OE2 GND		OE2 Signal Ground	
60	OE2 GND		OE2 Signal Ground	6
61	OE2 TD+	I	OE2 Data Input	6
62	OE2 TD-	I	OE2 Inversed Data Input	
63	OE2 GND		OE2 Signal Ground	
64	OE3 GND		OE3 Signal Ground	
65	OE3 RD-	O	OE3 Inversed Data Output	5
66	OE3 RD+	O	OE3 Data Output	5
67	OE3 GND		OE3 Signal Ground	
68	OE3 GND		OE3 Signal Ground	
69	OE3 TD+	I	OE3 Data Input	6
70	OE3 TD-	I	OE3 Inversed Data Input	6
71	OE3 GND		OE3 Signal Ground	
72	OE3 LOS	O	Loss of Signal for OE-3	4
73	OE1 LOS	O	Loss of Signal for OE-1	4
74	OE1 GND		OE1 Signal Ground	
75	OE1 RD-	O	OE1 Inversed Data Output	5
76	OE1 RD+	O	OE1 Data Output	5
77	OE1 GND		OE1 Signal Ground	
78	OE1 GND		OE1 Signal Ground	
79	OE1 TD+	I	OE1 Data Input	6
80	OE1 TD-	I	OE1 Inversed Data Input	6
81	OE1 GND		OE1 Signal Ground	
82	OSW 2 N2	I	Change to Normal mode for OSW2	7/9
83	OSW 2 B2	I	Change to Bypass mode for OSW2	7/9
84	OSW 2 State Output	O	High=Normal mode, Low=Bypass mode for OSW2	

23 PIN Assignments:

Pin Number	Name	I/O	Function	Note
1	Vcc5_1		5.0V Power Supper (OSW1 Power)	
2	Vcc5_1		5.0V Power Supper (OSW1 Power)	
3	OE4-Speed	I	OE4-Speed LED Indicator (Voltage Low / LED Orange)	
4	OE1-Link	I	OE1-Link LED Indicator (Voltage Low/ LED Green)	
5	OE4-Link	I	OE4-Link LED Indicator (Voltage Low / LED Green)	
6	OE1-Speed	I	OE1-Speed LED Indicator (Voltage Low / LED Orange)	
7	OE3-Speed	I	OE3-Speed LED Indicator (Voltage Low / LED Orange)	
8	OE2-Link	I	OE2-Link LED indicator (Voltage Low / LED Green)	
9	OE3-Link	I	OE3-Link LED Indicator (Voltage Low/ LED Green)	
10	OE2-Speed	I	OE2-Speed LED indicator (Voltage Low / LED Orange)	
11	OSW 2 State Output	O	High=Normal mode, Low=Bypass mode for OSW2	
12	OSW 1 State Output	O	High=Normal Mode, Low=Bypass Mode for OSW1	
13	GND			
14	GND			
15	OSW 2 B2	I	Change to Bypass mode for OSW2	
16	OSW 1 B1	I	Change to Bypass mode for OSW1	
17	OSW 2 N2	I	Change to Normal mode for OSW2	
18	OSW 1 N1	I	Change to Normal mode for OSW1	
19			No Connector	
20			No Connector	
21			No Connector	
22	Vcc5_2		5.0V Power Supper (OSW2 Power)	
23	Vcc5_2		5.0V Power Supper (OSW2 Power)	

Notes:

1. **TX Fault is an open collector/drain output, which should be pulled up with a 4.7K – 10KΩ resistor on the hostboard. Pull up voltage between 2.0V and VccT, R+0.3V. When high, output indicates a laser fault of some kind.Low indicates normal operation. In the low state, the output will be pulled to < 0.5V.**
2. **TX disable is an input that is used to shut down the transmitter optical output. It is pulled up within the modulewith a**

   4.7 – 10 K Ω resistor. Its states are:

   - **Low (0 – 0.8V): Transmitter on**

     (>0.8, < 2.0V): Undefined

   - **High (2.0 – 3.465V): Transmitter Disabled**

   - **Open: Transmitter Disabled**

3. **Mod-Def 1,2, These are the module definition pins. They should be pulled up with a 4.7K – 10KΩ resistor on thehost board. The pull-up voltage shall be VccT or VccR (see Section IV for further details). Mod-Def 0 is groundedby the module to indicate that the module is present Mod-Def 1 is the clock line of two wire serial interface forserial ID Mod-Def 2 is the data line of two wire serial interface for serial ID**
4. **LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K – 10KΩ resistor.Pull up voltage between 2.0V and VccT, R+0.3V. When high, this output indicates the received optical power isbelow the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. Inthe low state, the output will be pulled to < 0.5V.**
5. **RD-/+: These are the differential receiver outputs. They are AC coupled 100Ω differential lines which should beterminated with 100Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thusnot required on the host board. The voltage swing on these lines will be between 350 and 850 mV differential(175 – 425 mV single ended) when properly terminated.**
6. **TD-/+: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differentialtermination inside the module. The AC coupling is done inside the module and is thus not required on the host board.The inputs will accept differential swings of 180 – 700 mV (90 – 350 mV single-ended).**
7. **Latching Type - The input is used to control the optical switch mode for OSW**
   - **Normal mode:**
     - **OSW N1/N2: > 3.75V and OSW B1/B2 < 0.5V and over 20ms.**
   - **Bypass mode:**
     - **OSW N1/N2: < 0.5V and OSW B1/B2 >3.75V and over 20ms**
8. **Non-Latching Type - High =Normal Mode, Low=Bypass Mode for OSW.**
9. **Non-Latching Type - Pin 43, 44, 82 and 83: Ground**

Absolute Maximum Ratings

Paramet	Symb	Min	Typ.	Max	Uni
Power Supply Voltage	Vcc	0		3.6	V
Storage Temperature	Ts	-40		85	℃
Supply Voltage	Vcc	0		5	V
Optical Receiver Power (Damage)	Pmax			15	dB

Recommended Operating Conditions

Paramet	Symb	Min.	Typ	Max.	Unit	Not
Case Operating Temperature	Tc	0		70	℃	1
+5.0V Supply Voltage	Vcc5	4.75		5.25	V	Vcc
+3.3V Supply Voltage	Vcc3	3.10		3.50	V	
Relative Hunidity (non		5		85	%	
Data Rate		-	1.2	+100pp	Gbp	

Note1 : Please see order information

Electrical Characteristics

Paramet	Symb	Min.	Typ	Max.	Unit	Not
+5.0V Supply Current	Icc5			100	mA	
+3.3V Supply Current	Icc3			1200	mA	
Transmitter						
Transmitter Differential Input	V_{DT}	180		700	mV	1
Transmitter Disable Input-High	V_{DISH}	2		Vcc+0.	V	
Transmitter Disable Input-Low	V_{DISL}	0		0.8	V	
Receiver						
Receiver Differential Output	V_{DR}	350		850	mV	3
LOS Output Voltage-High	V_{LOSH}	2.4		Vcc	V	2
LOS Output Voltage-Low	V_{LOSL}	0		0.5	V	2
Optical Switch						
Latching Voltage-High	V_{LATH}	4.75	5	5.25	V	
Latching Voltage-Low	V_{LATL}	0		0.8	V	
Latching Resistance	R_{LAT}		125		Ω	

Notes:

1. **Internally AC coupled and terminated to 100Ohm differential load.**
2. **Pull up to Vcc on Host Board.**
3. **Internally AC coupled, but requies a 100Ohm differential termination at or internal to**

Serializer/Deserializer.

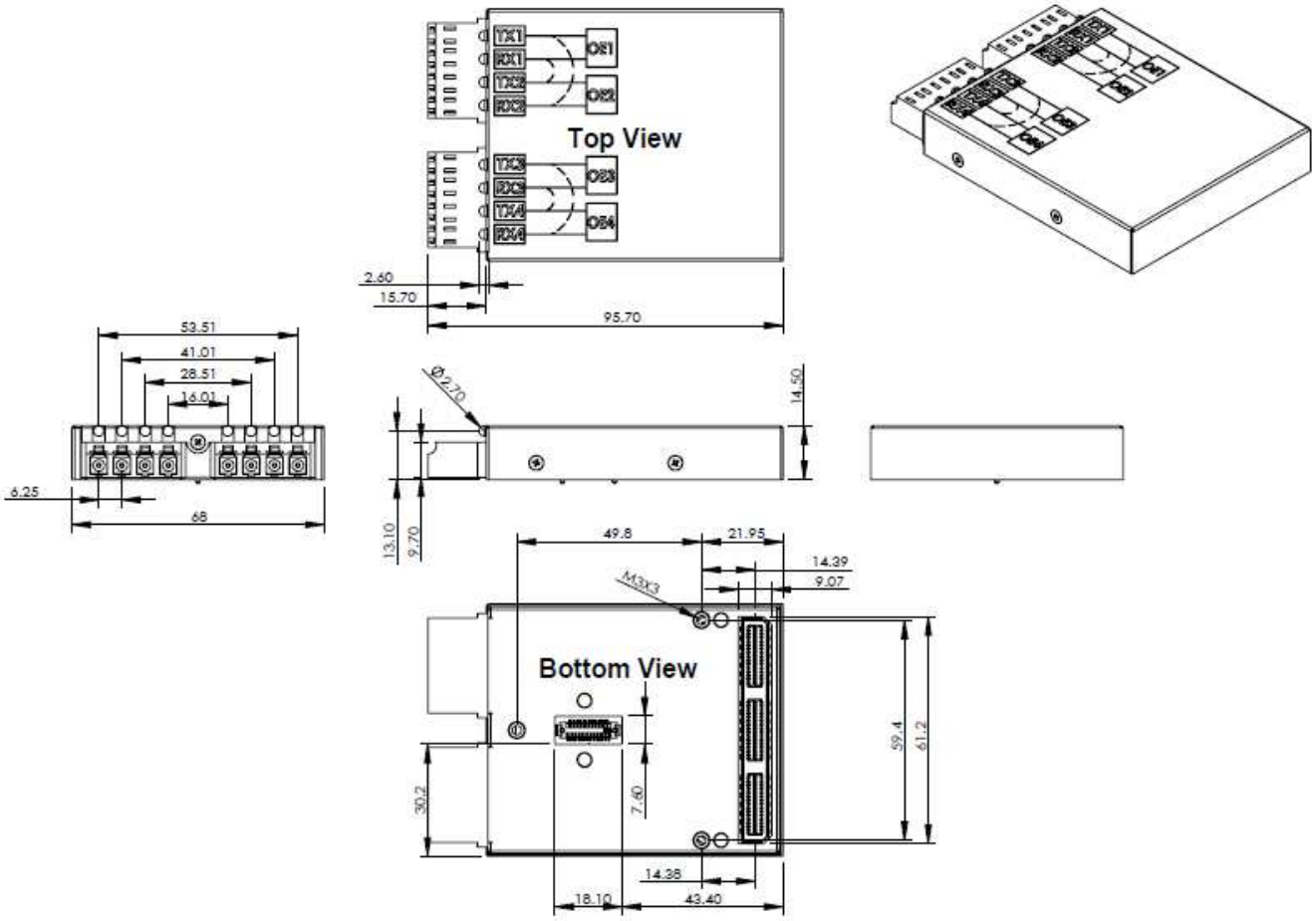
Optical Characteristics (Tc=0~70℃, Data Rate=1.25Gb/sec, PRBS=2^7-1 NRZ)

Paramet		Symb	Min.	Typ.	Max	Unit	Not
Transmitter							
Average Launch Power		P	-9		-3	dBm	
Center Wavelength		λC	1270		135	nm	
Extinction Ratio		ER	9	--	--	dB	
Output eye		Compliant with IEEE802.3z eye mask					
Receiver							
Center Wavelength		λC	1260		161	nm	
Average receiver power		Pmax			-3	dBm	
Receiver Sensitivity					-21	dBm	
Vertical eye closure penalty			2.2			dB	2
LOS	Assert	LOSA	-45			dBm	
	Deassert	LOSD			-21	dBm	
LOS Hysteresis		LOSH	0.5		6	dB	
Optical Switch							
Wavelength Range		λR	1260~1360 and			nm	
Insertion Loss		OIL		0.35	2	dB	
Return Loss		ORL	50			dB	
Switch Time					8	ms	
Lifetime				≧		times	
Latching Resistance		RLAT		125		Ω	

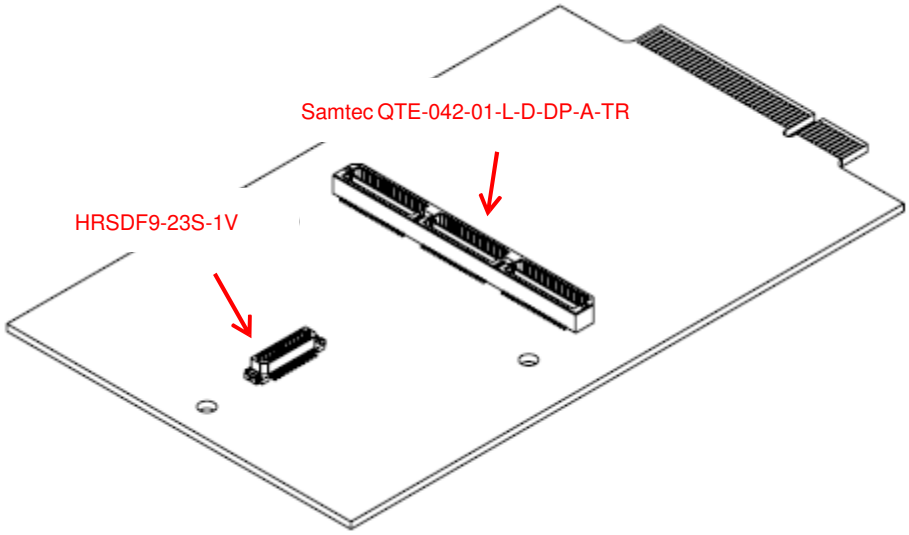
Notes:

1. **Receiver Sensitivity is informative. Stressed receiver sensitivity shall be measured with conformance test signal for BER 1×10-12.**
2. **Vertical eye closure penalty and stressed eye jitter are the test conditions for measuring stressed receiver sensitivity. They are not the required characteristic of the receiver.**

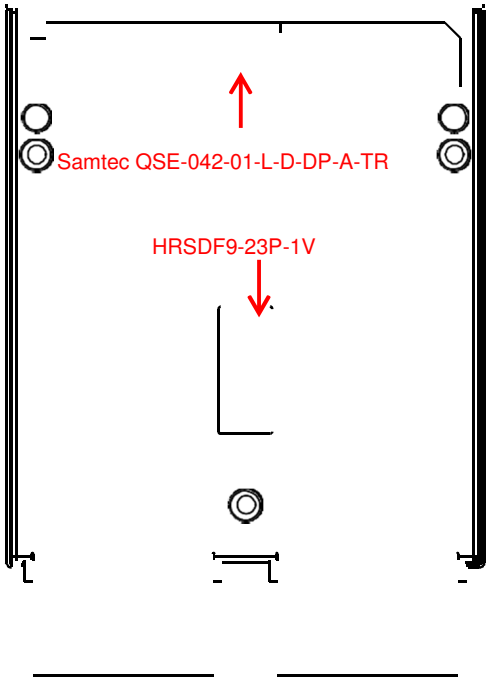
Package Outline Drawing (mm)



Host Board B2B Connector



Customer Host Board Top View



Fiber Bypass Module: Bottom View

ESD

Normal ESD precautions are required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

LASER Safety

This is a Class 1 Laser Product according to IEC / EN 60825-1: 2014 (Third Edition). This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

Caution: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Contact Information

Formerica OptoElectronics Inc.
5F-11, No.38, Taiyuan St., Zhubei City,
Hsinchu County 30265, Taiwan
Tel: +886-3-5600286
Fax: +886-3-5600239

San Diego, CA
Tel: 1-949-466-8069

inquiry@formericaoe.com
www.formericaoe.com

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