

**FIM81550-A**  
10GBASE, X2, ZR Transceiver

**Features**

- Compatible with X2 MSA Rev2.0b
- Support of IEEE 802.3ae 10GBASE-ER at 10.3125Gbps
- Transmission Distance up to 80Km(SMF)
- SC Receptacle 1550nm Cooled EA-DFB Laser
- SC Duplex Optical Connector
- Hot Pluggable 70-PIN Connector with XAUI Electrical Interface
- Management and control via MDIO 2-wire interface
- Power Supply : +5V, +3.3V, APS(+1.2V)
- Diagnostic Optics Monitoring
- Temperature Range: 0~ 70 °C
- ROHS Compatible



**Applications**

- 10GE Ethernet switches and routers
- 10GE Core-routers
- 10GE Storage
- Other 10Gbps Ethernet Transmission Systems

**1. Product Description**

The 10GBASE-XR-ZR is a highly integrated Serial optical transponder module for high-speed, 10Gbit/s data transmission applications. 4x3.125Gbps Ethernet Signal Input by XAUI Interface. An integrated Coder / Decoder and multiplexer / demultiplexer (SERDES: Serializer / Deserializer). Designing for 300m transmission with a vertical cavity surface emitting laser (VCSEL). Digital diagnostics functions are available via a 2-wire serial interface, as specified in the XENPAK MSA 3.0.

## 2. Absolute Maximum Ratings

Any stress beyond the maximum ratings can result in permanent damage. The device specifications are guaranteed only under the recommended operating conditions.

Parameter	Symbol	Min	Max	Unit
Supply Voltage+5V	Vcc5		6.0	V
Supply Voltage_3.3V	Vcc3		4	V
Supply Voltage APS	Vaps		2	V
Storage Temperature	Tst	-20	85	°C
Optical Input Received Power	APD	-	-7	dBm

## 3. Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case temperature	Tca	0	-	70	°C
Supply Voltage+5V	Vcc5	4.75	5	5.25	V
Supply Current+5V	Icc5			500	mA
Supply Voltage_3.3V	VCC3	3.14	3.3	3.47	V
Supply Current+3.3V	Icc3			1000	mA
Supply Voltage APS	Vaps	1.14	1.2 1	.26	V
Supply Current APS	Iaps			1100	mA
Module Power Dissipation	Pm	-		4	W

## 4. Transmitter Specifications – Optical

Parameter	Symbol	Min	Typical	Max	Unit
Center Wavelength	$\lambda_c$	1530		1565	pm
Optical Transmit Power	Po	0		4	dBm
Optical Transmit Power (disabled)	Ptx-dis	-	-	-40	dBm
Extinction Ratio	ER	9		-	dB
Side Mode Suppression Ratio	SMSR	30	-	-	dB
Eye Mask	IEEE 802.3ae Compliant				

## 5. Transmitter Specifications – Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Received power	Rpo	-24.0	-	-7	dBm
Maximum Input Power	RX-overload	-7	-	-	dBm
Input Operating Wavelength	$\lambda$	1260	-	1565	nm
Dispersion tolerance	Dt	0	-	1600	ps/nm

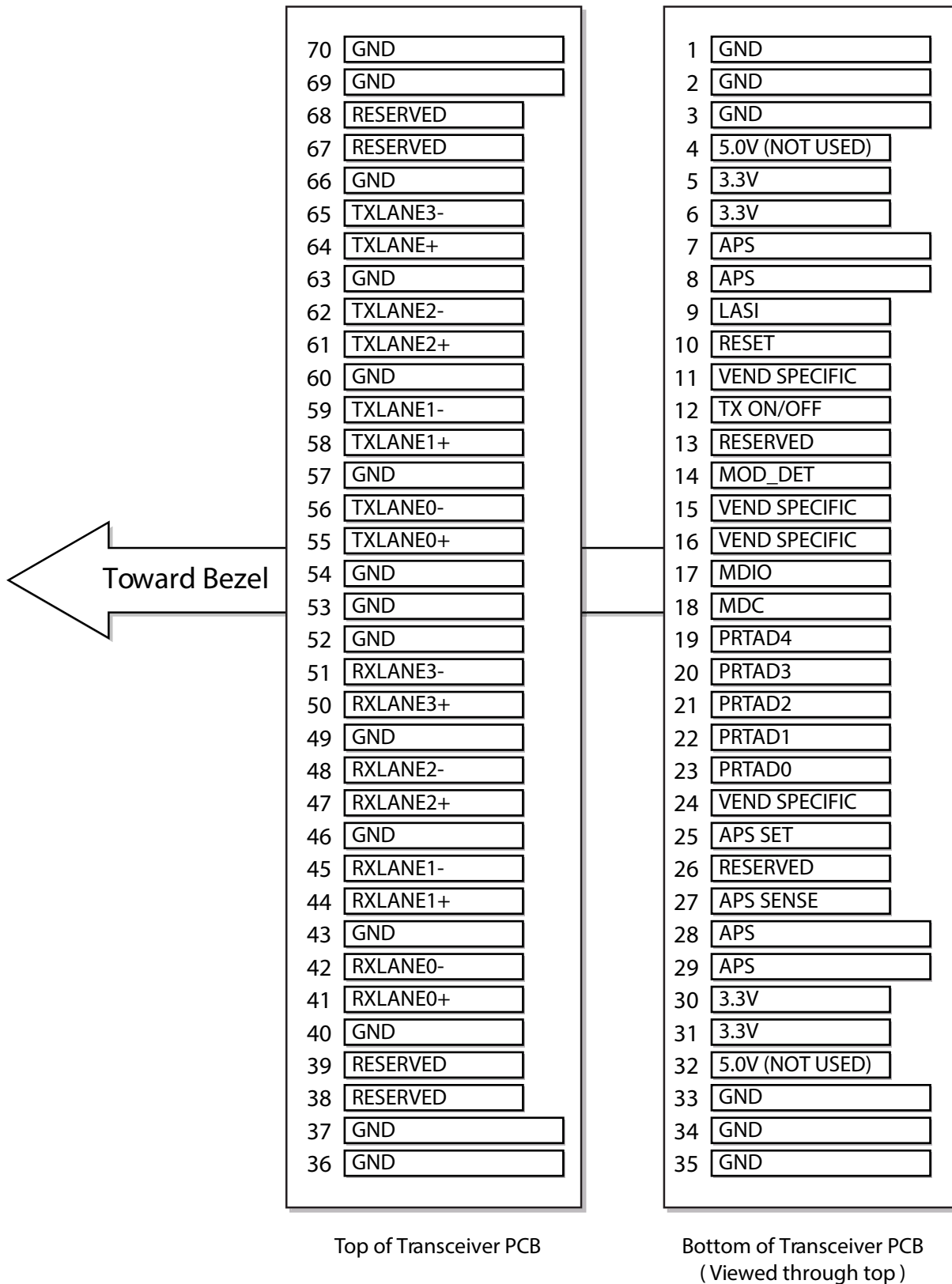
## 6. Receiver Specifications – Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Data Rate (TXLINE0-3)	RX-xaui		3125		Mbps
Supply Voltage	VccRX	3.13	3.3	3.47	V
Differential Output Amplitude	Vout P-P	800	-	1600	mV
Rise/Fall Time	Tr / Tf	50	-	90	ps
Differential Impedance of Zout	Zout	-	100	-	ohm

## 7. Signal Specifications – Electrical

1.2 V CMOS					
Parameter	Symbol	Min	Typ	Max	Units
Input High Voltage	VIL(MAX)	-	-	0.36	V
Input Low Voltage VIH(MIN)	0.84	-	1.25	V	
Capacitance		-	-	320	pF
Pull Up Resistance	Rpull	10k	-	22k	ohm
MDIO I/O					
Parameter	Symbol	Min	Typ	Max	Units
Output Low Voltage	VOL	-0.3	-	0.2	V
Output Low Current	IOL	-	-	4	mA
Input High Voltage	VIH	0.84	-	1.5	V
Input Low Voltage	VIL	-0.3	-	0.36	V
Pull-up Supply Voltage	VPULL	1.14	1.2	1.26	
Input Capacitance	CIN	-	-	10	Pf
Load Capacitance	CLOD	-	-	470	Pf
External Pull-up Resistance	EPULL	200	-	-	Ohm

**8. Electrical PAD Layout**



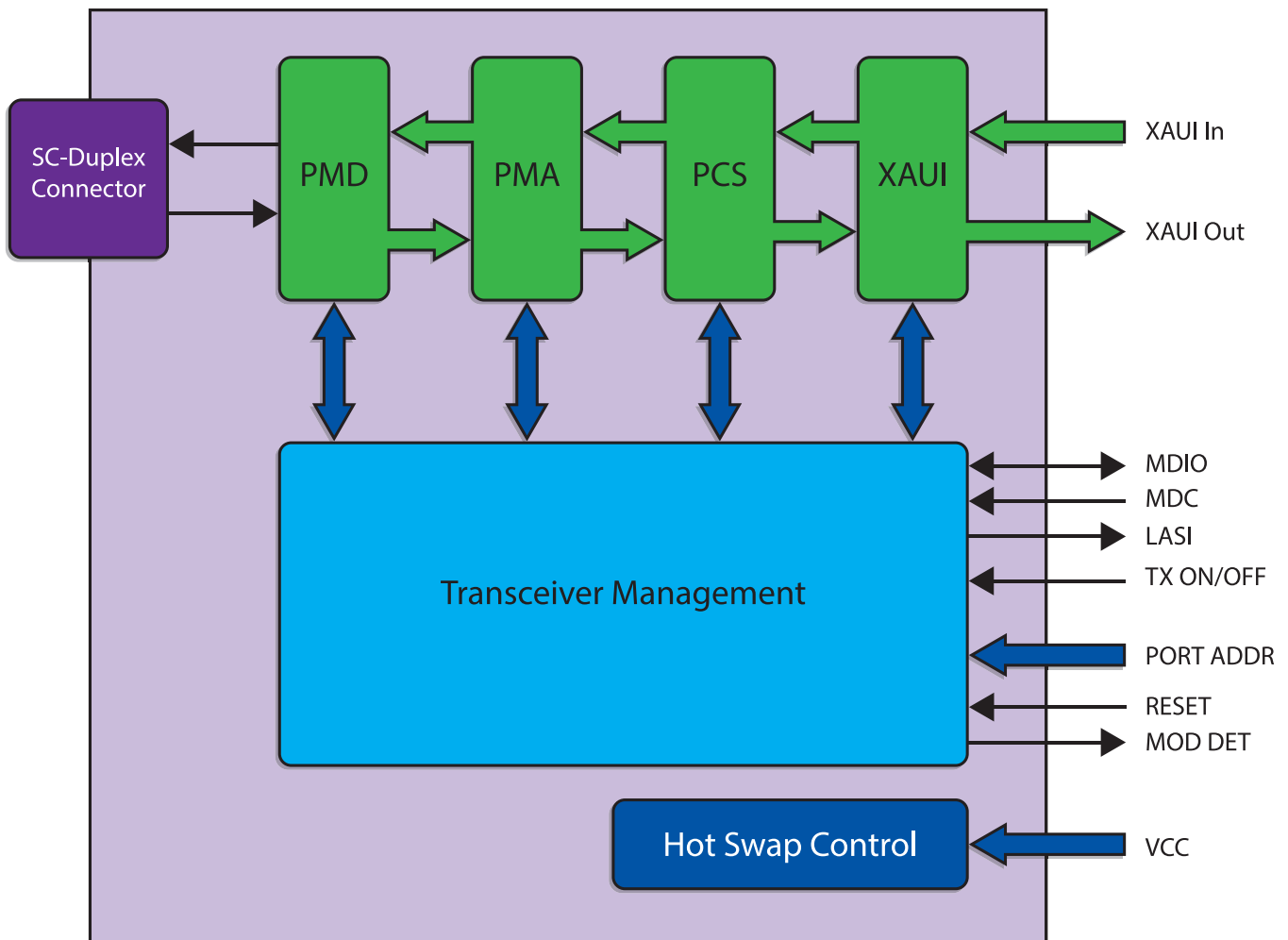
## 9. Pin Descriptions

Pin	Name	Dir	Logic	Function
1	GND			Electrical Ground
2	GND			Electrical Ground
3	GND			Electrical Ground
4	5.0V			Power
5	3.3V			Power
6	3.3V			Power
7	APS			Adaptive Power Supply
8	APS			Adaptive Power Supply
9	LASI	O	1.2V CMOS Open Drain	Link Alarm Status Interrupt, low active, Open Drain Output A pull-up resistor with 10-22KΩ to 1,2V is expected. Logic High: Normal Operation Logic Low: Link Alarm is indicated
10	Reset	I	1.2V CMOS Open Drain	Low active Reset Input 10KΩ pull-up on Transceiver Logic high = Normal Operation Logic Low = Reset asserted
11	VEND SPECIFIC			Vendor Specific Pin, leave unconnected
12	TX ON/OFF	I	1.2V CMOS Open Drain	High active Transmitter Enable Input 10KΩ pull-up on Transceiver Logic high = Transmitter active (normal operation) And Register Bit 1.9.0 set to low as well Logic Low = shut down of Transmitter
13	RESERVED			RESERVED
14	MOD DETECT	O		1kΩ to Ground On Transceiver
15	VEND SPECIFIC			Vendor Specific Pin, leave unconnected
16	VEND SPECIFIC			Vendor Specific Pin, leave unconnected
17	MDIO	I/O	1.2V CMOS	Management Data I/O. Requires external 10-22 kΩ pullup to 1.2 V on host.
18	MDC	I	1.2V CMOS	Management Clock Input
19	PRTAD4	I		Port Address Bit 4(LOW=0)
20	PRTAD3	I		Port Address Bit 3(LOW=0)
21	PRTAD2	I		Port Address Bit 2(LOW=0)
22	PRTAD1	I		Port Address Bit 1(LOW=0)
23	PRTAD0	I		Port Address Bit 0(LOW=0)
24	VEND SPECIFIC			Vendor Specific Pin,. leave unconnected
25	APS SET	I		Feedback Input for APS, Input of APS Setting Resistor

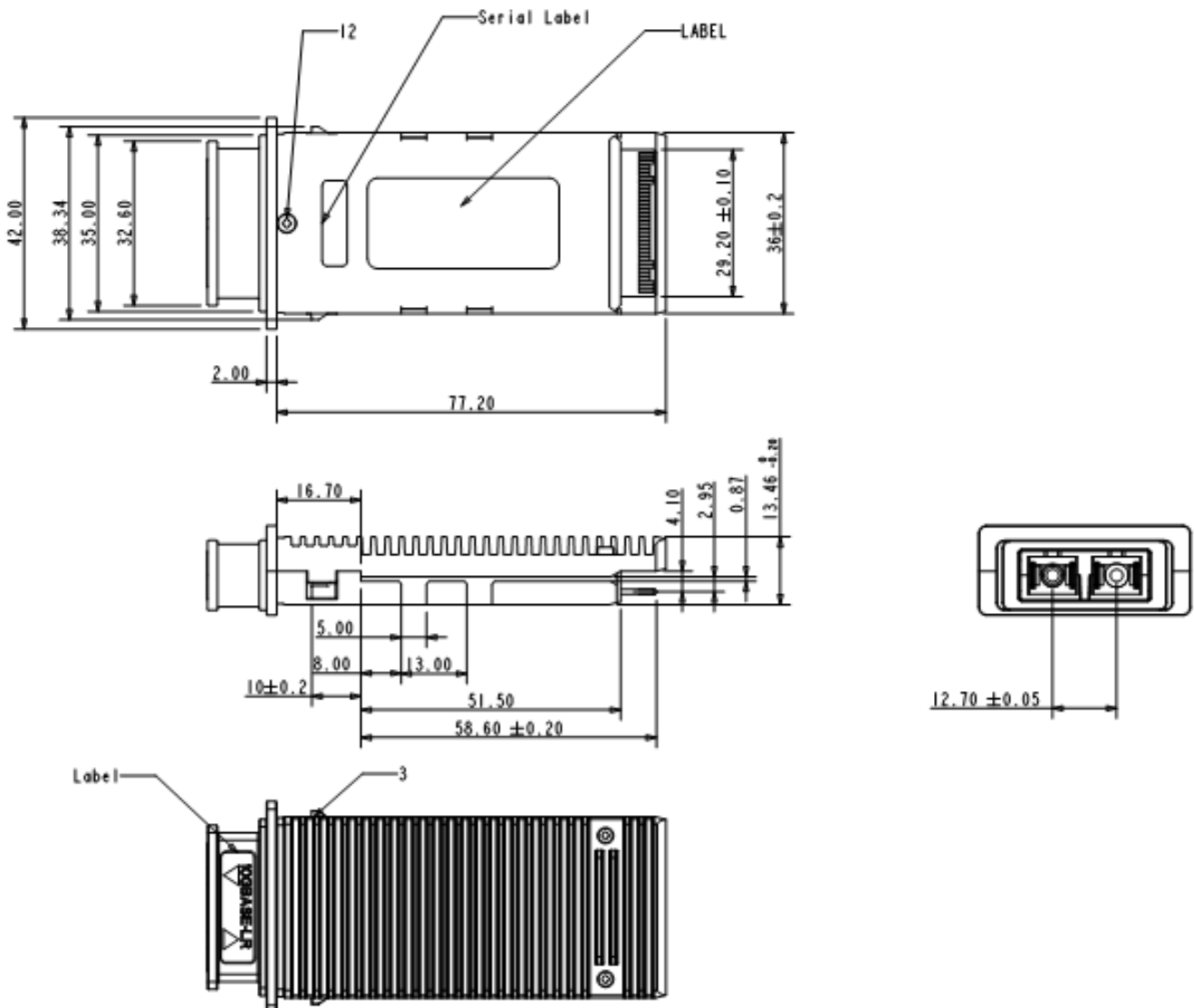
Pin	Name	Dir	Logic	Function
26	RESERVED			RESERVED
27	APS SENSE	O		APS Sense Output for APS Control Circuit
28	APS			Adaptive Power Supply
29	APS			Adaptive Power Supply
30	3.3V			Power
31	3.3V			Power
32	5.0V			Power
33	GND			Electrical Ground
34	GND			Electrical Ground
35	GND			Electrical Ground
36	GND			Electrical Ground
37	GND			Electrical Ground
38	RESERVED			RESERVED
39	RESERVED			RESERVED
40	GND			Electrical Ground
41	RX LANE 0+			Module XAUI Output Lane 0+
42	RX LANE 0-			Module XAUI Output Lane 0-
43	GND			Electrical Ground
44	RX LANE 1+			Module XAUI Output Lane 1+
45	RX LANE 1-			Module XAUI Output Lane 1-
46	GND			Electrical Ground
47	RX LANE 2+			Module XAUI Output Lane 2+
48	RX LANE 2-			Module XAUI Output Lane 2-
49	GND			Electrical Ground
50	RX LANE 3+			Module XAUI Output Lane 2+
51	RX LANE 3-			Module XAUI Output Lane 2-
52	GND			Electrical Ground
53	GND			Electrical Ground
54	GND			Electrical Ground
55	RX LANE 0+			Module XAUI Output Lane 0+
56	RX LANE 0-			Module XAUI Output Lane 0-
57	GND			Electrical Ground
58	TX LANE 1+			Module XAUI Output Lane 1+
59	TX LANE 1-			Module XAUI Output Lane 1-
60	GND			Electrical Ground
61	TX LANE 2+			Module XAUI Output Lane 2+
62	TX LANE 2-			Module XAUI Output Lane 2-

Pin	Name	Dir	Logic	Function
63	GND			Electrical Ground
64	TX LANE 3+			Module XAUI Output Lane 2+
65	TX LANE 3-			Module XAUI Output Lane 2-
66	GND			Electrical Ground
67	RESERVED			RESERVED
68	RESERVED			RESERVED
69	GND			Electrical Ground
70	GND			Electrical Ground

**10. Functional Diagram of Typical X2 Style Transceiver**



## 11. Package Dimensions



## 12. Contact Information

Approved Networks is a leading supplier of Network Transceivers and Connectivity products to Channel Partners, Resellers, and OEMs. With more than 9 years of direct industry experience, our products are resident in the most demanding and mission critical functional networks Worldwide. We serve as a Master Distributor to the largest CMs in the world and deploy the most rigorous testing and firmware management programs to bring the highest level of functional product to the market at a cost that makes sense.

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