

# Network Wide

## Optical Transceivers

---

### **X2-10GB-LR- NW**

10GBASE-LR X2 MODULE 10Km Single mode Fiber



#### **Features**

- Up to 10 GBd bi-directional data links.
- Compliant with IEEE 802.3ae, 10GBASE-LR application.
- Compliant with X2 MSA.
- 1310nm DFB laser.
- PIN Photo-detector.
- XAUI electrical interface: 4 lanes @ 3.125 GBd.
- MDIO, DOM (Digital Optics Monitoring) support.
- Hot Z-Pluggable.
- SC Connectors
- Power Supply: 5V/3.3V/Adaptable Power Supply (APS: 1.2V)
- RoHS Compliance
- Operating temperature range: 0°C to 70°C.

#### **Applications**

- 10GE Ethernet switches and routers

#### **Product Description**

The **X2-10GB-LR-NW** is a highly integrated serial optical module for high-speed, 10Gbit/s data transmission applications. 4×3.125Gbps Ethernet Signal Input by XAUI Interface.

An integrated Coder / Decoder and multiplexer / demultiplexer (SERDES: Serializer / Deserializer). Designing for 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. 1310nm.



# Network Wide

## Optical Transceivers

---

### NW Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Ref.
Storage Ambient Temperature Range		-40	+85	°C	non condensing
Powered case Temperature Range		0	+70	°C	non condensing
Adaptable Power Supply (APS)	Vapsense	0	1.5	V	Voltage @ Pin APS Sense
Supply Voltage Range @ 3.3V	Vcc3	-0.5	4.0	V	

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

### NW Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	Tc	0		+70	°C
Power Supply Voltage	Vcc3	3.14	3.0	3.47	V
	VAPS	1.152	1.2	1.248	
Power Dissipation	PD		1.7	2.4	W

### NW XAUI I/O Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
XAUI Data Rate	DR		3.125		Gb/s	
XAUI Baud Rate Tolerance		-100		+100	ppm	Relative Tolerance
Differential Input Voltage Swing		220		1600	mv	8B/10B Coded Input Signal
Differential Output Voltage Swing		800		1600	mVp-p	RLOAD = 100Ω ± 5%
Differential Input Impedance		80	100	120	Ω	
Total Output Jitter	TJXAUI			0.35	UI	no pre-equalization
Total Deterministic Output Jitter	DJXAUI			0.17	UI	no pre-equalization



# Network Wide

## Optical Transceivers

---

### NW Optical Interface

#### Transmitter Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Range					m	<b>NW</b>
Operating Data Rate			10.3125		Gb/s	NW
Overload	Po	-3		-1	dBm	NW
Input Centre Wavelength	$\lambda$		<b>1310</b>		nm	NW
Spectral Width	$\Delta\lambda$		0.4	0.45	dB	NW
Extinction Ratio	ER	5	6.5			NW
Optical Modulation Amplitude	OMA	525			$\mu$ W	NW
Transmitter and Dispersion Penalty	TDP			3.9	dB	<b>NW</b>

#### NW Receiver Characteristics

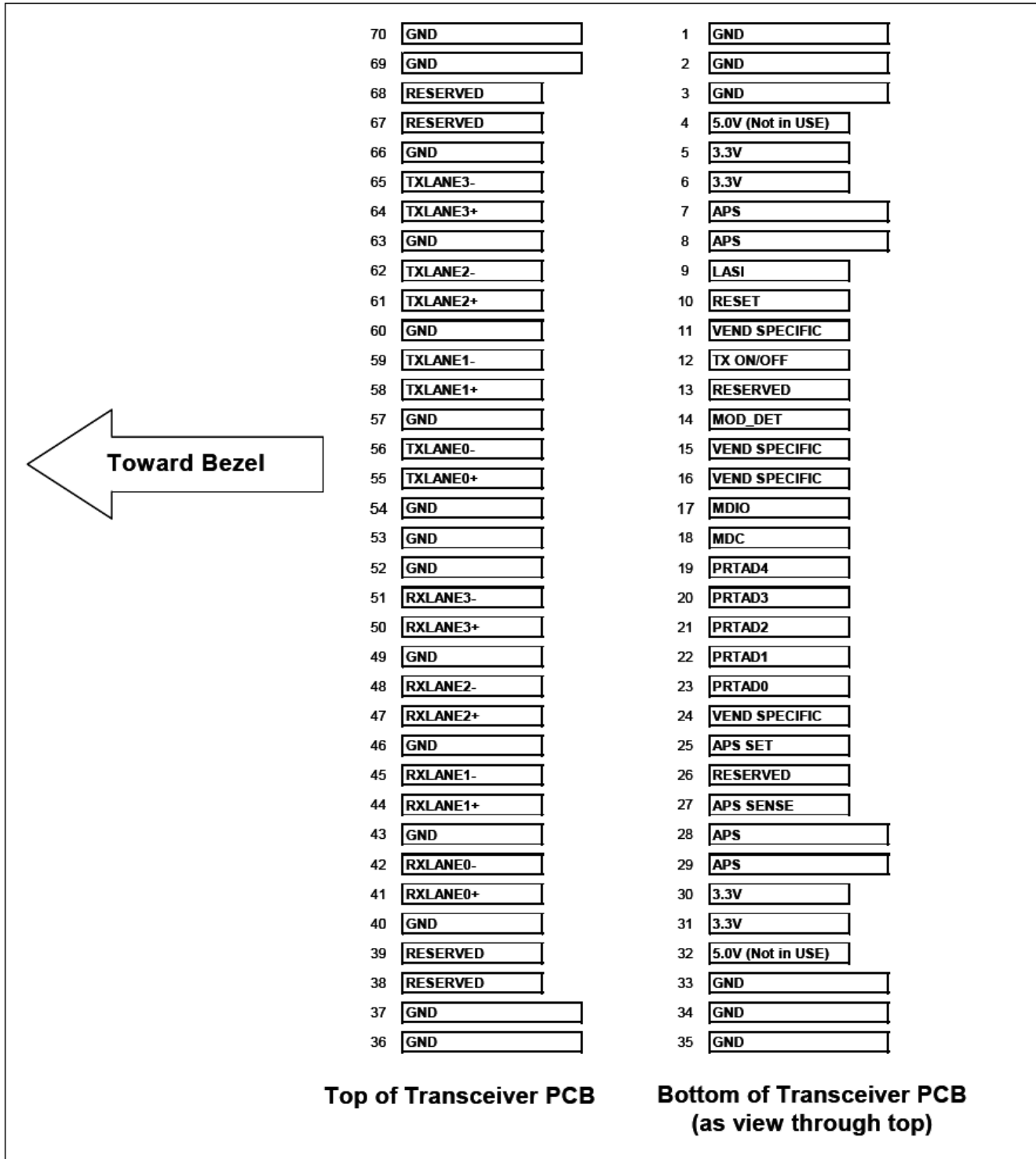
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Data Rate			10.3125		Gb/s	
Overload	Po	1			dBm	
Minimum Sensitivity	Pmin			-11.1	dBm	1
Stressed Sensitivity in OMA				-7.5	dBm	1

Note :1. Measured at 10.3125Gb/s,Non-framed PRBS2<sup>31</sup>-1,NRZ

# Network Wide

## Optical Transceivers

### NW Electrical PAD Layout



# Network Wide

## Optical Transceivers

### NW Host PCB X2 PINOUT

1	GND	GND	70
2	GND	GND	69
3	GND	RESERVED	68
4	5.0V (Not in USE)	RESERVED	67
5	3.3V	GND	66
6	3.3V	TXLANE3-	65
7	APS	TXLANE3+	64
8	APS	GND	63
9	LASI	TXLANE2-	62
10	RESET	TXLANE2+	61
11	VEND SPECIFIC	GND	60
12	TX ON/OFF	TXLANE1-	59
13	RESERVED	TXLANE1+	58
14	MOD_DET	GND	57
15	VEND SPECIFIC	TXLANE0-	56
16	VEND SPECIFIC	TXLANE0+	55
17	MDIO	GND	54
18	MDC	GND	53
19	PRTAD4	GND	52
20	PRTAD3	RXLANE3-	51
21	PRTAD2	RXLANE3+	50
22	PRTAD1	GND	49
23	PRTAD0	RXLANE2-	48
24	VEND SPECIFIC	RXLANE2+	47
25	APS SET	GND	46
26	RESERVED	RXLANE1-	45
27	APS SENSE	RXLANE1+	44
28	APS	GND	43
29	APS	RXLANE0-	42
30	3.3V	RXLANE0+	41
31	3.3V	GND	40
32	5.0V (Not in USE)	RESERVED	39
33	GND	RESERVED	38
34	GND	GND	37
35	GND	GND	36



# Network Wide

## Optical Transceivers

### NW Pin Descriptions

PIN NO	Name	Dir	Logic	Function	Notes
1	GND			Electrical Ground	NW Tested
2	GND			Electrical Ground	NW Tested
3	GND			Electrical Ground	NW Tested
4	5.0V			Power	NW Tested
5	3.3V			Power	NW Tested
6	3.3V			Power	NW Tested
7	APS			Adaptive Power Supply	NW Tested
8	APS			Adaptive Power Supply	NW Tested
9	LASI	O	1.2V CMOS Open Drain	Link Alarm Status Interrupt, low active, Open Drain Output A pull-up resistor with 10-22K $\Omega$ to 1,2V is expected. Logic High: Normal Operation Logic Low: Link Alarm is indicated	NW Tested
10	Reset	I	1.2V CMOS Open Drain	Low active Reset Input 10K $\Omega$ pull-up on Transceiver Logic high = Normal Operation Logic Low = Reset asserted	NW Tested
11	VEND SPECIFIC			Vendor Specific Pin,. leave unconnected	NW Tested
12	TX ON/OFF	I	1.2V CMOS Open Drain	High active Transmitter Enable Input 10K $\Omega$ 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	NW Tested
13	RESERVED			RESERVED	NW Tested
14	MOD DETECT	O		1k $\Omega$ to Ground On Transceiver	NW Tested
15	VEND SPECIFIC			Vendor Specific Pin,. leave unconnected	NW Tested
16	VEND SPECIFIC			Vendor Specific Pin,. leave unconnected	NW Tested
17	MDIO	I/O	1.2V CMOS	Management Data I/O. Requires external 10-22 k $\Omega$ pull- up to 1.2 V on host.	NW Tested
18	MDC	I	1.2V CMOS	Management Clock Input	NW Tested
19	PRTAD4	I		Port Address Bit 4(LOW=0)	NW Tested
20	PRTAD3	I		Port Address Bit 3(LOW=0)	NW Tested
21	PRTAD2	I		Port Address Bit 2(LOW=0)	NW Tested



# Network Wide

## Optical Transceivers

22	PRTAD1	I		Port Address Bit 1(LOW=0)	NW Tested
23	PRTAD0	I		Port Address Bit 0(LOW=0)	NW Tested
24	VEND SPECIFIC			Vendor Specific Pin,. leave unconnected	NW Tested
25	APS SET	I		Feedback Input for APS, Input of APS Setting Resistor	NW Tested
26	RESERVED			RESERVED	NW Tested
27	APS SENSE	O		APS Sense Output for APS Control Circuit	NW Tested
28	APS			Adaptive Power Supply	NW Tested
29	APS			Adaptive Power Supply	NW Tested
30	3.3V			Power	NW Tested
31	3.3V			Power	NW Tested
32	5.0V			Power	NW Tested
33	GND			Electrical Ground	NW Tested
34	GND			Electrical Ground	NW Tested
35	GND			Electrical Ground	NW Tested

PIN NO	Name	Dir	Logic	Function	Notes
36	GND			Electrical Ground	NW Tested
37	GND			Electrical Ground	NW Tested
38	RESERVED			RESERVED	NW Tested
39	RESERVED			RESERVED	NW Tested
40	GND			Electrical Ground	NW Tested
41	RX LANE 0+			Module XAUI Output Lane 0+	NW Tested
42	RX LANE 0-			Module XAUI Output Lane 0-	NW Tested
43	GND			Electrical Ground	NW Tested
44	RX LANE 1+			Module XAUI Output Lane 1+	NW Tested
45	RX LANE 1-			Module XAUI Output Lane 1-	NW Tested
46	GND			Electrical Ground	NW Tested
47	RX LANE 2+			Module XAUI Output Lane 2+	NW Tested
48	RX LANE 2-			Module XAUI Output Lane 2-	NW Tested
49	GND			Electrical Ground	NW Tested



# Network Wide

## Optical Transceivers

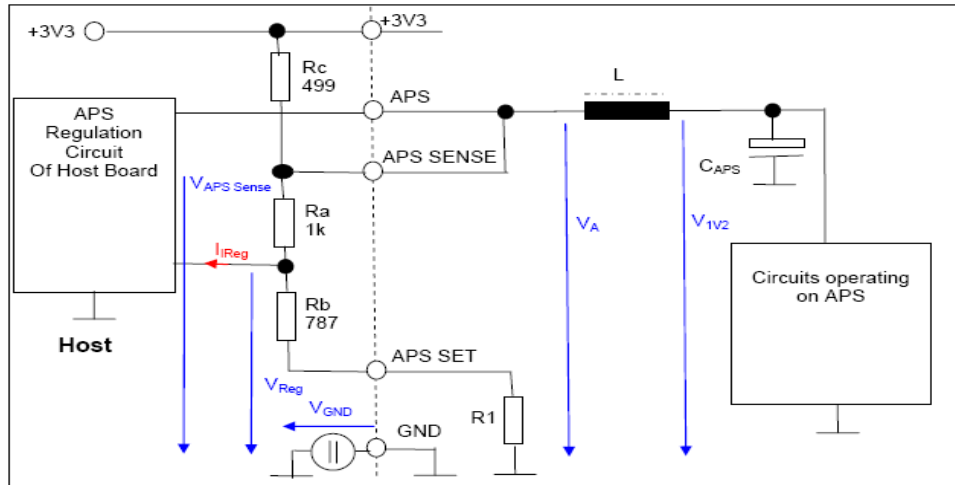
50	RX LANE 3+			Module XAUI Output Lane 2+	NW Tested
51	RX LANE 3-			Module XAUI Output Lane 2-	NW Tested
52	GND			Electrical Ground	NW Tested
53	GND			Electrical Ground	NW Tested
54	GND			Electrical Ground	NW Tested
55	RX LANE 0+			Module XAUI Output Lane 0+	NW Tested
56	RX LANE 0-			Module XAUI Output Lane 0-	NW Tested
57	GND			Electrical Ground	NW Tested
58	TX LANE 1+			Module XAUI Output Lane 1+	NW Tested
59	TX LANE 1-			Module XAUI Output Lane 1-	NW Tested
60	GND			Electrical Ground	NW Tested
61	TX LANE 2+			Module XAUI Output Lane 2+	NW Tested
62	TX LANE 2-			Module XAUI Output Lane 2-	NW Tested
63	GND			Electrical Ground	NW Tested
64	TX LANE 3+			Module XAUI Output Lane 2+	NW Tested
65	TX LANE 3-			Module XAUI Output Lane 2-	NW Tested
66	GND			Electrical Ground	NW Tested
67	RESERVED			RESERVED	NW Tested
68	RESERVED			RESERVED	NW Tested
69	GND			Electrical Ground	NW Tested
70	GND			Electrical Ground	NW Tested



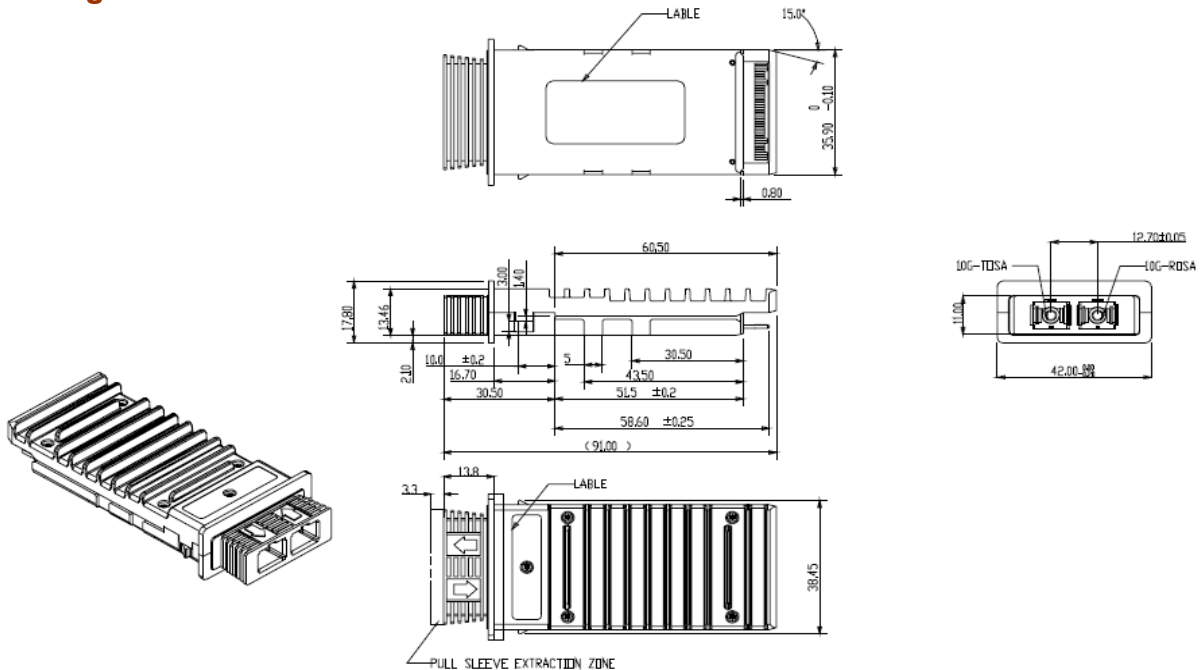
# Network Wide

## Optical Transceivers

### NW Block Diagram of Adapter Power Supply Circuit



### NW Package Dimensions



NW Ordering information: E\_mail: [sales@networkwide.co.uk](mailto:sales@networkwide.co.uk)

Part Number	Product Description
X2-10GB-LR- NW	1310nm, X2