




**DW-D96CXX-80C2**  
**10Gb/s 80km CWDM X2 Transponder**

**Features**

- ◆ X2 MSA Compliant
- ◆ 70-PIN connector
- ◆ SC duplex receptacle package
- ◆ Wavelength selectable to ITU-T standards covering CWDM grid wavelengths
- ◆ Cooled EA-DFB/APD-PD
- ◆ 1470nm~1570nm link length up to 80km (1600ps/nm)  
1590nm~1610nm link length up to 70km (1400ps/nm)
- ◆ Power supply: +5.0 V, +3.3 V, APS:+1.2 V
- ◆ Power Dissipation 4W Maximum
- ◆ 0°C to 70°C Operating Case Temperature
- ◆ Digital Diagnostic Monitoring
- ◆ Management and control with MDIO 2-wire bus
- ◆ XAUI electrical interface 4 x 3.125 Gb/s Ethernet
- ◆ RoHS6 compliant and lead free 



**Applications**

- ◆ 10 Gb/s Ethernet transmission systems

**Absolute Maximum Ratings**

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	PIN	-	-7	dBm



### 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

### Transmitter Specifications – Optical

Parameter	Symbol	Min	Typical	Max	Unit
Center Wavelength	$\lambda_c$	1464.5		1617.5	nm
Center wavelength stability	$\Delta\lambda_D$	-6.5	$\lambda_c$	6.5	nm
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			

### Transmitter Specifications – Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Data Rate (TXLINE0-3)	TX-xaui	-	3125	-	Mbps
Differential impedance	Zo	80	100	120	$\Omega$
Differential Input Amplitude	Vin P-P	160	-	2000	mVpp
Input Rise/Fall	TR / TF	60	-	130	ps
Differential Impedance of Zin	Zin	-	100	-	ohm

**Receiver Specifications – Optical**

Parameter	Symbol	Min	Typical	Max	Unit
Input Operating Wavelength	$\lambda$	1260	-	1600	nm
Received power 1	Rpo	-24	-	-7	dBm
Maximum Input Power	RX-overload	-7	-	-	dBm
Reflectance	Rrx	-	-	-27	dB

**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

**Signal Specifications – Electrical**

Parameter	Symbol	Min	Typ	Max	Units
1.2 V CMOS					
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					
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



### Pin Definitions

Pin No	Name	Dir	Function	Notes
1	GND		Electrical Ground	1
2	GND		Electrical Ground	1
3	GND		Electrical Ground	1
4	5.0V		Power	2
5	3.3V		Power	2
6	3.3V		Power	2
7	APS =1.2V		Adaptive Power Supply	2
8	APS =1.2V		Adaptive Power Supply	2
9	LASI		Open Drain Compatible 10K-22K pull up on host. Logic High: Normal Operation Logic Low: LASI Asserted	3
10	RESET	I	Open Drain compatible. 10-22K pull-up on transceiver Logic high = Normal operation Logic low = Reset Minimum reset assert time 1 ms	3
11	VEND SPECIFIC		Vendor Specific Pin. Leave unconnected when not in use.	6
12	TX ON/OFF	I	Open Drain compatible. 10-22K pull-up on transceiver Logic high = Transmitter On (capable) Logic low = Transmitter Off (always)	3
13	RESERVED		Reserved	3
14	MOD DETECT	O	Pulled low inside module through 1k	
15	VEND SPECIFIC		Vendor Specific Pin. Leave unconnected when not in use.	6
16	VEND SPECIFIC		Vendor Specific Pin. Leave unconnected when not in use.	6
17	MDIO	I/O	Management Data IO	3, 4
18	MDC	I	Management Data Clock	3, 4
19	PRTAD4	I	Port Address Bit 4 (Low = 0)	3
20	PRTAD3	I	Port Address Bit 3 (Low = 0)	3
21	PRTAD2	I	Port Address Bit 2 (Low = 0)	3
22	PRTAD1	I	Port Address Bit 1 (Low = 0)	3
23	PRTAD0	I	Port Address Bit 0 (Low = 0)	3
24	VEND SPECIFIC		Vendor Specific Pin. Leave unconnected when not in use.	6



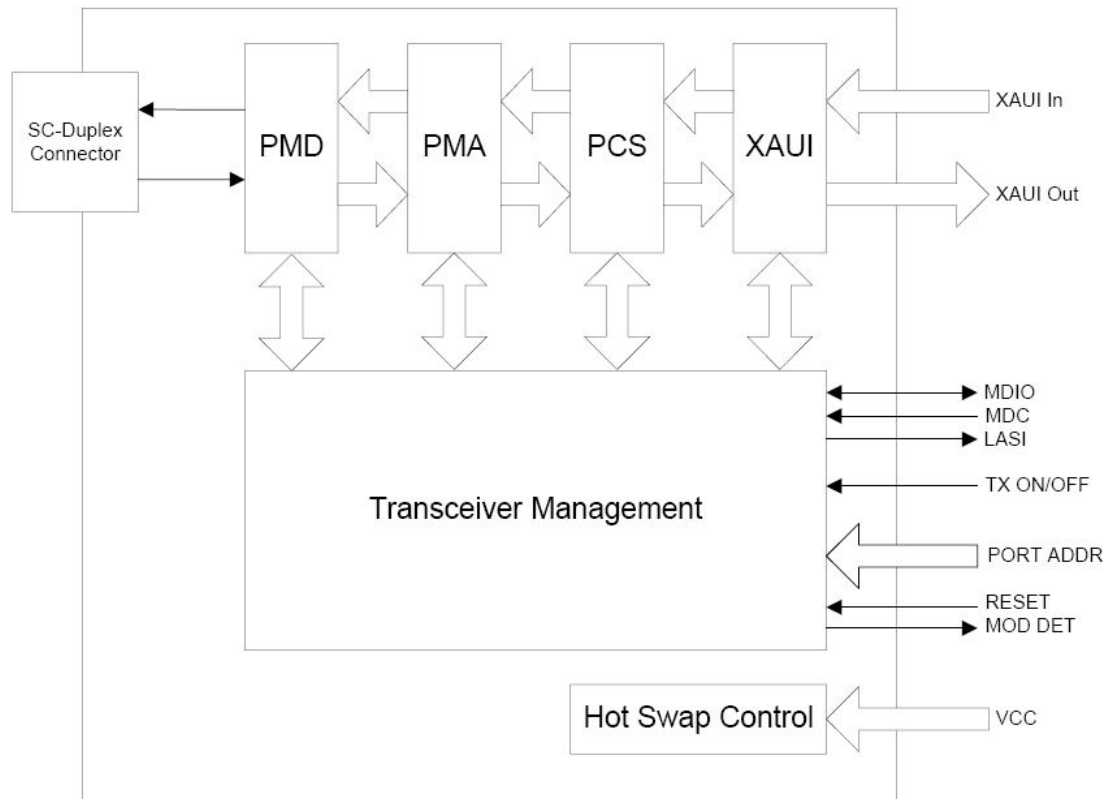
25	APS SET		Feedback input for APS	
26	RESERVED		Reserved for Avalanche Photodiode use.	6
27	APS SENSE		APS Sense Connection	
28	APS =1.2V		Adaptive Power Supply	2
29	APS =1.2V		Adaptive Power Supply	2
30	3.3V		Power	2
31	3.3V		Power	2
32	5.0V		Power	2
33	GND		Electrical Ground	1
34	GND		Electrical Ground	1
35	GND		Electrical Ground	1
36	GND		Electrical Ground	1
37	GND		Electrical Ground	1
38	RESERVED		Reserved	
39	RESERVED		Reserved	
40	GND		Electrical Ground	1
41	RX LANE0+	O	Module XAUI Output Lane 0+	5
42	RX LANE0-	O	Module XAUI Output Lane 0-	5
43	GND		Electrical Ground	1
44	RX LANE1+	O	Module XAUI Output Lane 1+	5
45	RX LANE1-	O	Module XAUI Output Lane 1-	5
46	GND		Electrical Ground	1
47	RX LANE2+	O	Module XAUI Output Lane 2+	5
48	RX LANE2-	O	Module XAUI Output Lane 2-	5
49	GND		Electrical Ground	1
50	RX LANE3+	O	Module XAUI Output Lane 3+	5
51	RX LANE3-	O	Module XAUI Output Lane 3-	5
52	GND		Electrical Ground	1
53	GND		Electrical Ground	1
54	GND		Electrical Ground	1
55	TX LANE0+	I	Module XAUI Input Lane 0+	5
56	TX LANE0-	I	Module XAUI Input Lane 0-	5
57	GND		Electrical Ground	1



58	TX LANE1+	I	Module XAUI Input Lane 1+	5
59	TX LANE1-	I	Module XAUI Input Lane 1-	5
60	GND		Electrical Ground	1
61	TX LANE2+	I	Module XAUI Input Lane 2+	5
62	TX LANE2-	I	Module XAUI Input Lane 2-	5
63	GND		Electrical Ground	1
64	TX LANE3+	I	Module XAUI Input Lane 3+	5
65	TX LANE3-	I	Module XAUI Input Lane 3-	5
66	GND		Electrical Ground	1
67	RESERVED		Reserved	
68	RESERVED		Reserved	
69	GND		Electrical Ground	1
70	GND		Electrical Ground	1

Notes:

- 1) Ground connections are common for TX and RX.
- 2) All connector contacts are rated at 0.5A nominal.
- 3) 1.2V CMOS compatible.
- 4) MDIO and MDC timing must comply with IEEE802.3ae, Clause 45.3
- 5) XAUI output characteristics should comply with IEEE802.3ae Clause 47.
- 6) Transceivers will be MSA compliant when no signals are present on the vendor specific pins.



◆ **Figure1.** Functional Diagram of Typical X2 Style Transceiver

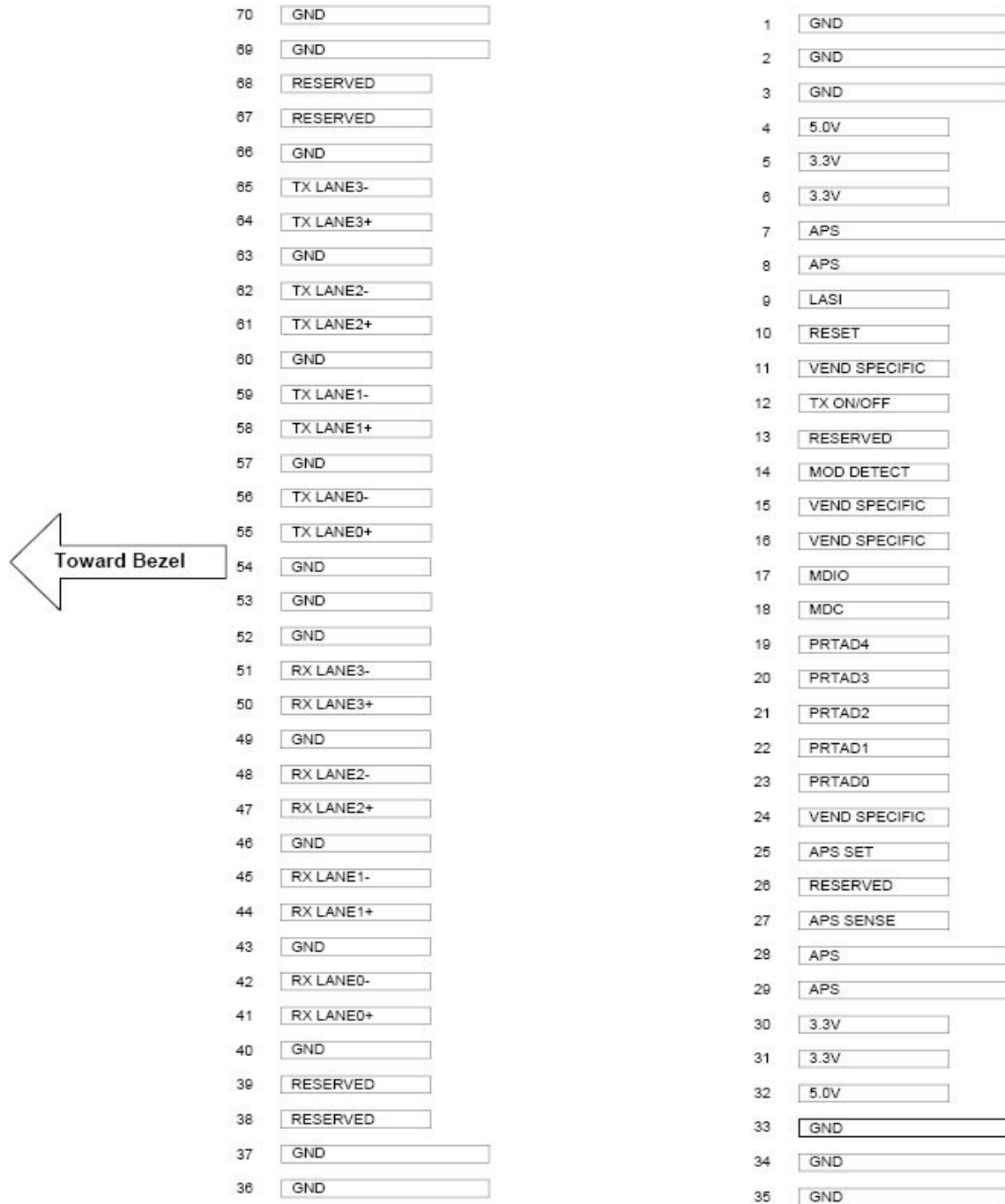
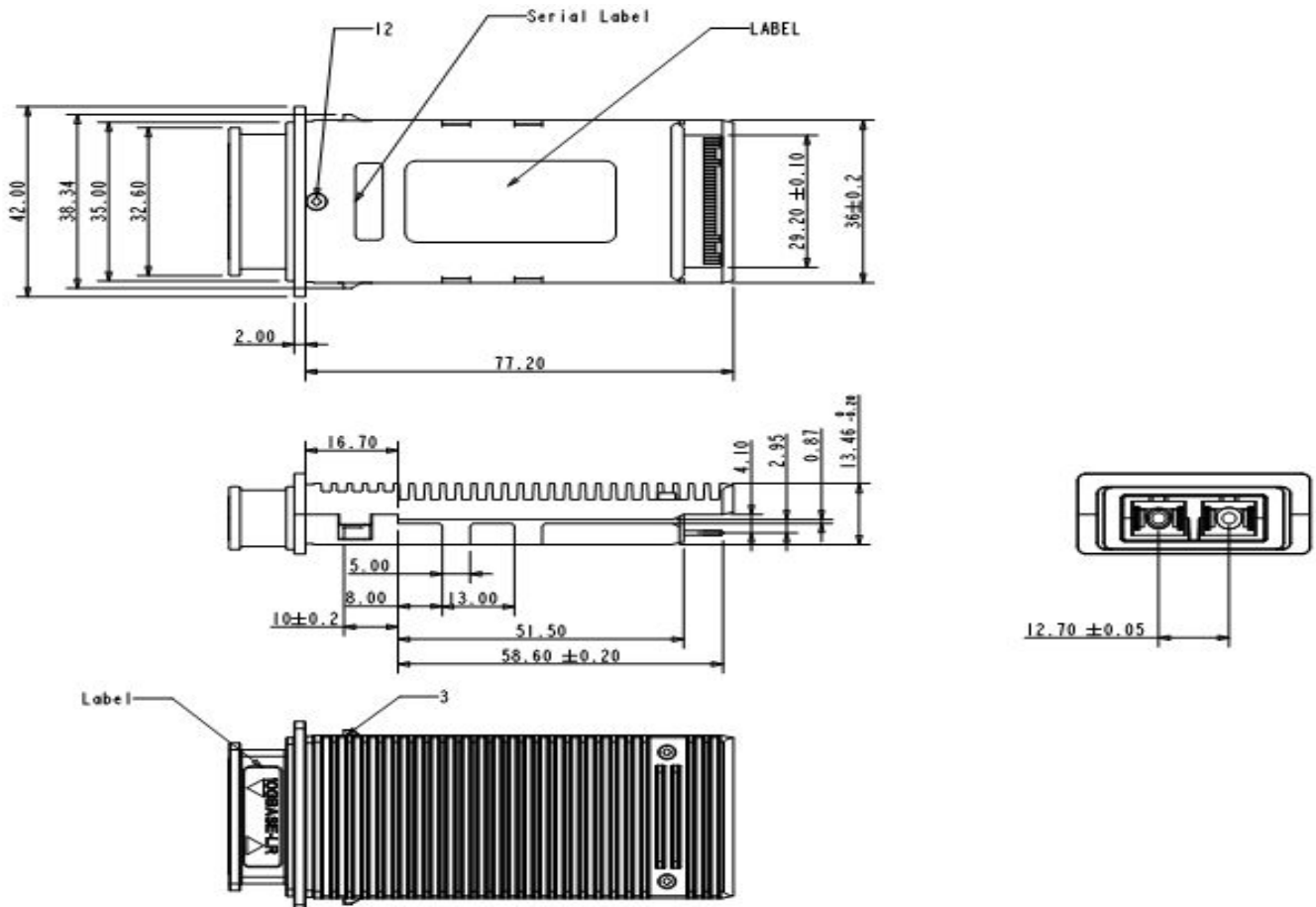


Figure2.Electrical Pin-out Details





Dimensions in mm

Figure3. Mechanical Dimensions

**Regulatory Compliance**

DONGWE X2 Transponder is designed to be Class I Laser safety compliant and is certified per the following standards:

Feature	Agency	Standard	Certificate / Comments
Laser Safety	FDA	CDRH 21 CFR 1040 and Laser Notice No. 50	1120291-000
Product Safety	UL	UL and CUL EN60950-2:2007	WT10093765-D-E-E
Environmental protection	SGS	RoHS Directive 2002/95/EC	GZ1001008706/CHEM
EMC	WALTEK	EN 55022:2006+A1:2007 EN 55024:1998+A1+A2:2003 -	WT10093768-D-E-E

**Ordering information**

Part Number	Product Description
DW-D96C47-80C2	X2,1470nm 80km(ZR), 0°C ~ 70°C, Cooled EA-DFB/APD
DW-D96C49-80C2	X2,1490nm 80km(ZR), 0°C ~ 70°C, Cooled EA-DFB/ APD
DW-D96C51-80C2	X2,1510nm 80km(ZR), 0°C ~ 70°C, Cooled EA-DFB/ APD
DW-D96C53-80C2	X2,1530nm 80km(ZR), 0°C ~ 70°C, Cooled EA-DFB/ APD
DW-D96C55-80C2	X2,1550nm 80km(ZR), 0°C ~ 70°C, Cooled EA-DFB/ APD
DW-D96C57-80C2	X2,1570nm 80km(ZR), 0°C ~ 70°C, Cooled EA-DFB/ APD
DW-D96C59-80C2	X2,1590nm 70km(ZR), 0°C ~ 70°C, Cooled EA-DFB/ APD
DW-D96C61-80C2	X2,1610nm 70km(ZR), 0°C ~ 70°C, Cooled EA-DFB/ APD

**Important Notice**

Performance figures, data and any illustrative material provided in this data sheet are typical and must be specifically confirmed in writing by DONGWE before they become applicable to any particular order or contract. In accordance with the DONGWE policy of continuous improvement specifications may change without notice.

The publication of information in this data sheet does not imply freedom from patent or other protective rights of DONGWE or others. Further details are available from any DONGWE sales representative.