Product Features

- Hot pluggable XENPAK form factor
- Wavelength selectable to C-band grid wavelengths
- Hot Pluggable 70-PIN Connector with XAUI Electrical Interface
- SC Duplex Optical Receptacle
- Cooled EA-DFB Laser
- Full duplex transmission mode
- Digital Optics Monitoring
- Management and control via MDIO 2-wire bus
- Power Supply :+5.0V,+3.3V, APS(+1.2V)
- Commercial operating temperature:0ºC to +70ºC
- Up to 40Km on 9/125μm SMF
- RoHS Compliant

Applications

- 40Km 10G DWDM Network

Descriptions

LX61xxCDR is a high performance and cost effective optical transponder module. It consists of 10.3Gbit/s cooled EML optical transmitter and PIN receiver, 4x3.125Gbps Ethernet Signal input XAUI interface, Mux and Demux with clock and data recovery (CDR). Digital diagnostics functions are available via MDIO 2-wire bus, They meet the t requirements for 40km 10G DWDM Network and XENPAK MSA Rev 3.0.

LX61xxCDR is compliant with RoHS.

Ordering Information

Table 1. Ordering Information

Part Number	Transmitter	Output Power	Receiver	Sensitivity	Reach	Temp	DDM	RoHS
LX61xxCDR	DWDM EML	-1 ~ +3dBm	PIN	< -16.0dBm	40Km	0 ~ 70 ºC	Available	Compliant

Notes: See Table 2 – Wavelength Guide for “xx” value.

Table 2. Wavelength Guide for “xx” value (100GHz ITU-T channel)

Channel #	Product Part Number	Frequency (THz)	Center Wavelength (nm)
17	LX6117CDR	191.7	1563.86
18	LX6118CDR	191.8	1563.05
19	LX6119CDR	191.9	1562.23
20	LX6120CDR	192.0	1561.42
21	LX6121CDR	192.1	1560.61
22	LX6122CDR	192.2	1559.79

23	LX6123CDR	192.3	1558.98
24	LX6124CDR	192.4	1558.17
25	LX6125CDR	192.5	1557.36
26	LX6126CDR	192.6	1556.55
27	LX6127CDR	192.7	1555.75
28	LX6128CDR	192.8	1554.94
29	LX6129CDR	192.9	1554.13
30	LX6130CDR	193.0	1553.33
31	LX6131CDR	193.1	1552.52
32	LX6132CDR	193.2	1551.72
33	LX6133CDR	193.3	1550.92
34	LX6134CDR	193.4	1550.12
35	LX6135CDR	193.5	1549.32
36	LX6136CDR	193.6	1548.51
37	LX6137CDR	193.7	1547.72
38	LX6138CDR	193.8	1546.92
39	LX6139CDR	193.9	1546.12
40	LX6140CDR	194.0	1545.32
41	LX6141CDR	194.1	1544.53
42	LX6142CDR	194.2	1543.73
43	LX6143CDR	194.3	1542.94
44	LX6144CDR	194.4	1542.14
45	LX6145CDR	194.5	1541.35
46	LX6146CDR	194.6	1540.56
47	LX6147CDR	194.7	1539.77
48	LX6148CDR	194.8	1538.98
49	LX6149CDR	194.9	1538.19
50	LX6150CDR	195.0	1537.40
51	LX6151CDR	195.1	1536.61
52	LX6152CDR	195.2	1535.82
53	LX6153CDR	195.3	1535.04
54	LX6154CDR	195.4	1534.25
55	LX6155CDR	195.5	1533.47
56	LX6156CDR	195.6	1532.68
57	LX6157CDR	195.7	1531.90
58	LX6158CDR	195.8	1531.12
59	LX6159CDR	195.9	1530.33

60	LX6160CDR	196.0	1529.55
61	LX6161CDR	196.1	1528.77

Electrical Pin Description

Table 3. Electrical Pin Description

Pin	Logic	Symbol	Name/Description
1	-	GND	Electrical Ground
2	-	GND	Electrical Ground
3	-	GND	Electrical Ground
4	-	5.0V	Power Supply
5	I	3.3V	Power Supply
6	I	3.3V	Power Supply
7	I	APS	Adaptive power supply
8	I	APS	Adaptive power supply
9	Open Drain-O	LASI	Link Alarm Status Interrupt. 10-22KΩ resistor pull-up to 1.2V on host Logic High: Normal Operation; Logic low: Link Alarm is indicated
10	Open Drain-I	RESET	Low active Reset input ,10KΩ pull-up inside Transponder Logic High: Normal Operation; Logic low: Reset asserted
11	-	VEND SPECIFIC	Vendor Specific Pin, leave unconnected
12	Open Drain-I	TX ON/OFF	High active Transmitter Enable, 10kΩ pull-up inside Transponder Logic High: Transmitter on ; Logic low: Transmitter off
13	-	RESERVED	Reserved
14	O	MOD DETECT	1KΩ to Ground inside Transponder
15	-	VEND SPECIFIC	Vendor Specific Pin, leave unconnected
16	-	VEND SPECIFIC	Vendor Specific Pin, leave unconnected
17	Open Drain-I/O	MDIO	Management Data I/O. Requires external 10-22KΩ pull-up to 1.2V on host
18	1.2V COMS-I	MDC	Management Clock Input
19	1.2V COMS-I	PRTAD4	Port Address bit 4(low=0)
20	1.2V COMS-I	PRTAD3	Port Address bit 3(low=0)
21	1.2V COMS-I	PRTAD2	Port Address bit 2(low=0)
22	1.2V COMS-I	PRTAD1	Port Address bit 1(low=0)
23	1.2V COMS-I	PRTAD0	Port Address bit 0(low=0)
24	-	VEND SPECIFIC	Vendor Specific Pin, leave unconnected
25	I	APS SET	Feedback input for APS, Input of APS setting resistor
26	-	RESERVED	Reserved
27	O	APS SENSE	APS Sense output for APS control circuit
28	I	APS	Adaptive power supply
29	I	APS	Adaptive power supply
30	I	3.3V	Power Supply

31	I	3.3V	Power Supply
32	-	5.0V	Power Supply
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	O	RX LANE 0+	Module XAUI output lane 0+
42	O	RX LANE 0-	Module XAUI output lane 0-
43		GND	Electrical Ground
44	O	RX LANE 1+	Module XAUI output lane 1+
45	O	RX LANE 1-	Module XAUI output lane 1-
46		GND	Electrical Ground
47	O	RX LANE 2+	Module XAUI output lane 2+
48	O	RX LANE 2-	Module XAUI output lane 2-
49		GND	Electrical Ground
50	O	RX LANE 3+	Module XAUI output lane 3+
51	O	RX LANE 3-	Module XAUI output lane 3-
52		GND	Electrical Ground
53		GND	Electrical Ground
54		GND	Electrical Ground
55	I	TX LANE 0+	Module XAUI Input lane 0+
56	I	TX LANE 0-	Module XAUI Input lane 0-
57		GND	Electrical Ground
58	I	TX LANE 1+	Module XAUI Input lane 1+
59	I	TX LANE 1-	Module XAUI Input lane 1-
60		GND	Electrical Ground
61	I	TX LANE 2+	Module XAUI Input lane 2+
62	I	TX LANE 2-	Module XAUI Input lane 2-
63		GND	Electrical Ground
64	I	TX LANE 3+	Module XAUI Input lane 3+
65	I	TX LANE 3-	Module XAUI Input lane 3-
66		GND	Electrical Ground
67		RESERVED	Reserved
68		RESERVED	Reserved

69	GND	Electrical Ground
70	GND	Electrical Ground

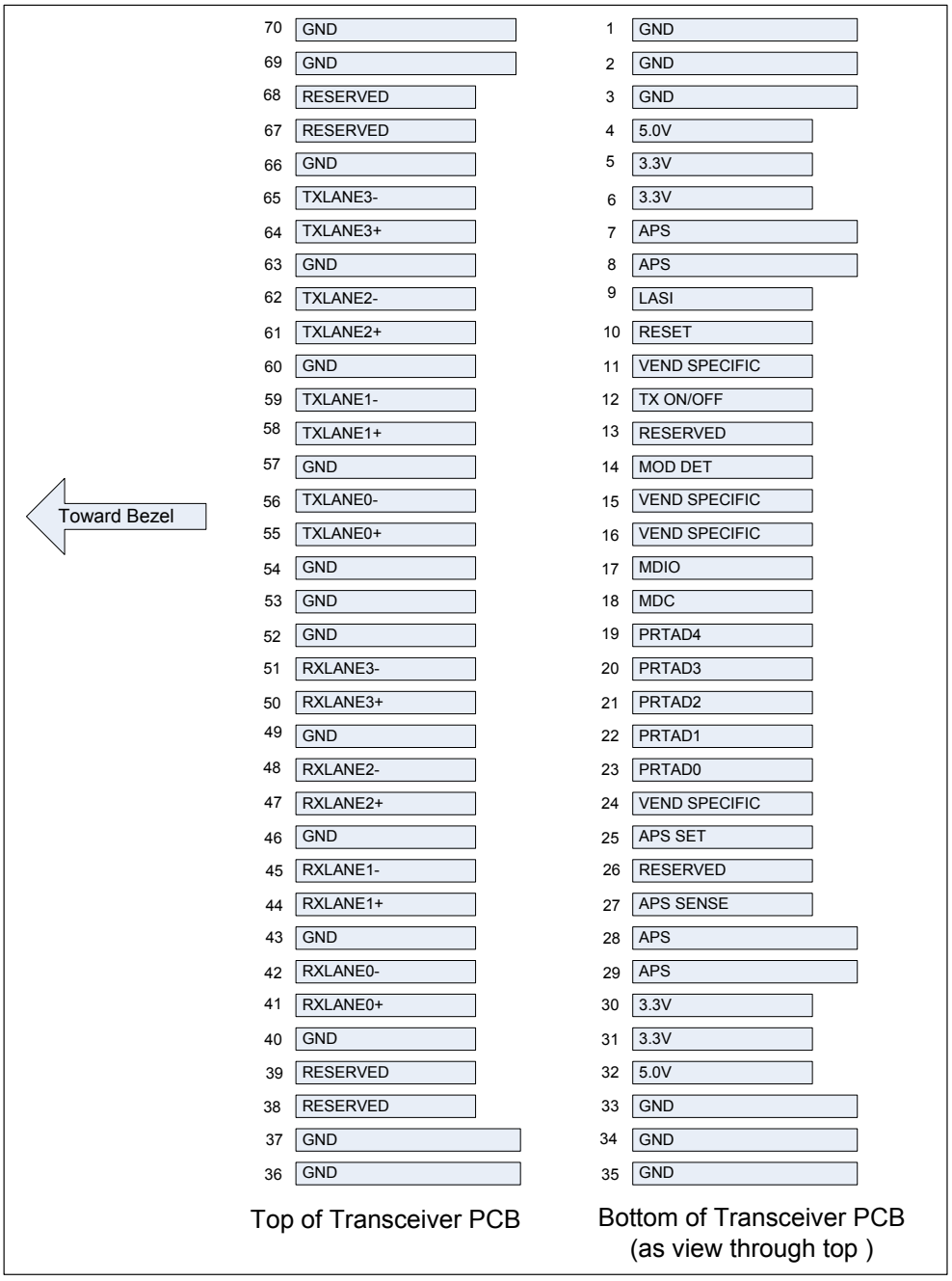

Figure 1. XENPAK Transponder Electrical Pad Layout

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

Table 4. Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Unit
Storage Temperature	T_S	-20	85	°C
Supply Voltage5.0v	V_{CC5}	0	6.0	V
Supply Voltage3.3v	V_{CC3}	0	4.0	V
Supply Voltage APS	V_{CC5}	0	1.5	V
Average Receive Optical Power	RX_{Pmax}		-7	dBm

Recommended Operating Conditions

Table 5. Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	T_C	0	25	70	°C
Supply Voltage	V_{CC5}	4.75	5.0	5.25	V
Supply Voltage	V_{CC3}	3.135	3.3	3.465	V
Supply Voltage	V_{aps}	1.152	1.2	1.248	V
Total Power Dissipation	-		-	4.0	W

Transponder Electrical Characteristics

Table 6. Transponder Electrical Characteristics

XAUI I/O	Symbol	Minimum	Typical	Maximum	Unit	Notes
XAUI Data Rate	DR	-	3.125		Gb/s	-
XAUI Baud Rate Tolerance		-100	-	+100	ppm	-
XAUI Eye Mask	According to IEEE 802.3ae					
Output Differential Impedance	Z_{OUT_XAUI}	80	100	120	Ω	
Differential Input Amplitude	V_{in_xaui}	220		1600	mv	1
Differential Output Amplitude	V_{out_xaui}	800		1600	mv	1
Total Jitter	T_{JXAUI}			0.35	UI	2
Deterministic Jitter	D_{JXAUI}			0.37	UI	2
1.2V CMOS I/O						
Output High Voltage	V_{OH}	1	-	-	V	-
Output Low Voltage	V_{OL}	-	-	0.15	V	-
Input High Voltage	V_{IH}	0.84	-	1.5	V	-
Input Low Voltage	V_{IL}	-	-	0.36	V	-
MDIO I/O						
Output High Voltage	V_{OHM}	1.0	-	1.5	V	-
Output Low Voltage	V_{OLM}	-0.3	-	0.2	V	

Input High Voltage	V_{IHM}	0.84	-	1.5	V
Input Low Voltage	V_{ILM}	-0.3		0.36	V
MDIO Data Hold Time	t_{HOLD}	10			ns
MDIO Data Setup Time	t_{SU}	10			ns
Delay from MDC Rising Edge to MDIO Data Change	t_{DELAY}			300	ns
MDC Clock Rate	f_{MAX}			2.5	MHz

Notes:
1. Internally AC coupled.
2. XAUI Output ,No pre-equalization.

Transmitter Optical Characteristics

Table 7. Transmitter Optical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Operating Data Rate	-	-	10.3125	-	Gb/s	-
Launch Average Optical Power	Po	-1	-	+3	dBm	1
Center Wavelength Range	λc	1528.77	-	1563.86	nm	-
Center Wavelength Spacing	-	-	100	-	GHz	-
Center Wavelength Tolerance	Δλc	-100	-	100	pm	
Side Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio	EX	8.2	-	-	dB	-
Dispersion Penalty@800ps/nm	TDP	-	-	2.0	dB	-
Average Optical Power (Laser Off)	P_{OFF}	-	-	-30	dBm	1
Eye Diagram	IEEE802.3ae Compliant					

Notes:
1. The optical power is launched into 9/125μm SMF..

Receiver Optical Characteristics

Table 8. Receiver Optical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Operating Data Rate	-	-	10.3125	-	Gb/s	-
Center Wavelength	λc	1528	-	1565	nm	
Receiver Overload (P_{avg})	P_{OL}	-1	-	-	dBm	1
Average sensitivity	S			-16.0	dBm	1
Optical Return Loss	ORL	27	-	-	dB	-

Notes:
1. PRBS 2^{31}-1 test pattern, BER<10^{-12}.

Mechanical specifications

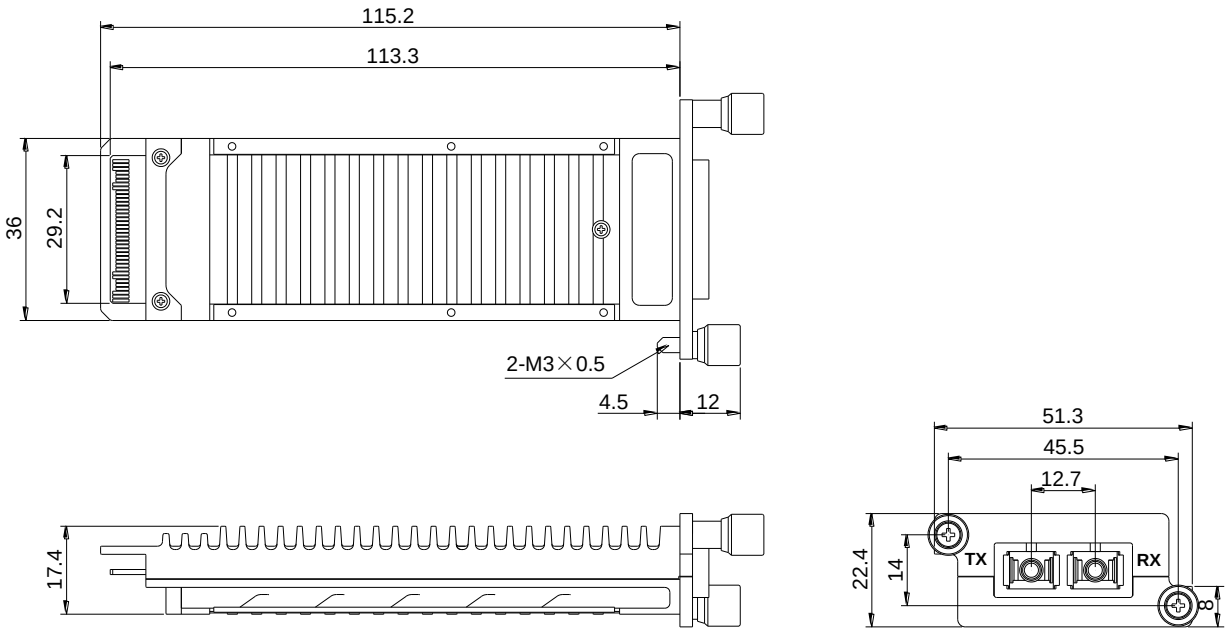

Figure 4. Outline Drawing

For More Information

Linktel Technologies Co., Ltd

sales@linkteltech.com

http://www.linkteltech.com

Linktel China

No.20 University Science Park Road,East-lake Hi-tech Development Zone, Wuhan, 430223, China

Tel: +86 27-87929302

Linktel USA

3311 Ingersoll Cout,San Jose,CA 95148

Tel: +1(408)833-9142

linktelus@linkteltech.com