

10G Tunable DWDM XFP 80km Optical Transceiver GXU-Cxxx-08C

Features

- XFP MSA Rev 4.5 Compliant
- Support 9.95Gb/s to 11.1Gb/s
- Tunability over full C-band 50GHz ITU-T wavelengths (SFF-8477 Control)
- 80km 50GHZ tunable laser
- Adaptive Receiver Decision Threshold Control for improved OSNR range
- High performance APD photodiode receiver
- Duplex LC fiber connector
- Compliant with XFP Electrical and Mechanical MSA INF-8077
- Digital diagnostics and alarm reporting
- -5°C to 70°C Operating Case Temperature
- Power Dissipation 3.5W Maximum
- ROHS6 Compliant(lead free)

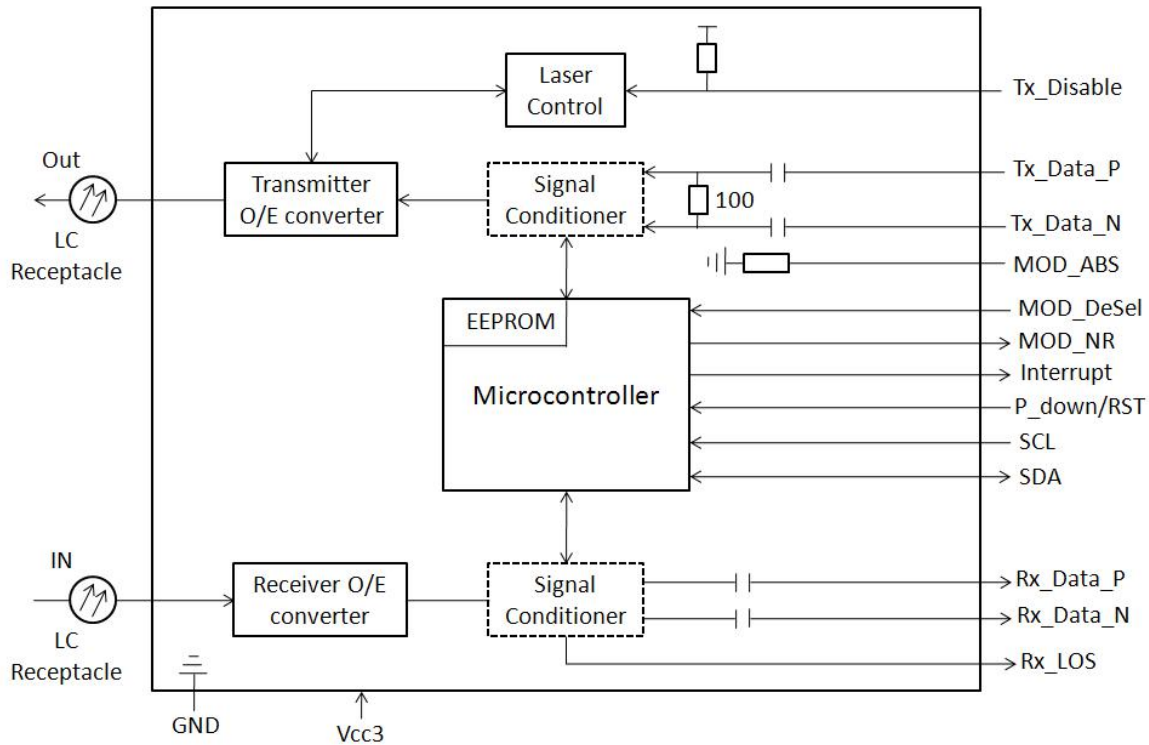


Applications

- 10G Fibre Channel
- 10G Ethernet
- SONET OC-192 / SDH STM-64

Description

Gigalight Tunable XFP Optical transceiver is designed for use in high speed serial link up to 80km with single fiber at data rates from 9.95Gbps to 11.1Gbps. The transceiver is fully tunable over the entire C-Band and supports ITU-T wavelengths with 50GHZ channel spacing. This XFP transceiver conforms to XFP multisource agreement (MSA). It supports 10GBASE-ZR/ZW applications along with DWDM SONET OC-192 / SDH STM-64 applications for Ethernet Switch, IP Router Interconnect or SONET/SDH optical interfaces and 10G Fibre Channel. Digital Optical Monitoring interfaces are available via a 2-wire serial interface.



Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage 1	Vcc3	-0.5	4	V
Supply Voltage 2	Vcc5	-0.5	6	V
Supply Voltage 3	Vcc2	-0.5	2	V
Storage Temperature	Tst	-40	85	°C
Case Operating Temperature	Top	-5	70	°C

Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Supply Voltage 1	Vcc3	3.13	3.3	3.47	V
Supply Current 1	Icc3	-	-	750	mA
Supply Voltage 2	Vcc5	4.75	5	5.25	V
Supply Current 2	Icc5	-	-	500	mA
Supply Voltage 3	Vcc2	1.71	1.8	1.89	V
Supply Current 3	Icc2	-	-	1000	mA
Module Power Dissipation	Pm	-	-	3.5	W

Transmitter Specifications-Optical

Parameter	Symbol	Min.	Type.	Max.	Unit	Note
Operating Data Rate	-	9.95	10.3125	11.1	Gb/s	-
Center Wavelength	λ	1528.38	-	1565.50	nm	ITU-T
Side Mode Suppression Ratio	SMSR	30	-	-	dB	-
Wavelength Stability after Startup	$\Delta\lambda_{EOL}$	λ_i-25	-	λ_i+25	pm	
Average Optical Output Power	Po	-1	-	+3	dBm	1
Extinction Ratio	Er	9.0	-	-	dB	-
Differential data Inputs swing	Vinpp	120	-	820	mV	2
Output Power after Disabled	-	-	-	-30	dBm	-
Output Eye Diagram	Compliant with ITU-T and IEEE recommendation MASK					

Receiver Specifications-Optical

Parameter	Symbol	Min.	Type.	Max.	Unit	Note
Operating Data Rate	-	9.95	10.3125	11.1	Gb/s	-
DWDM Wavelength Range	-	1528.38	-	1565.50	nm	
Channel Spacing	fspacing	50			GHz	
Sensitivity@9.95 to 10.3Gbps	Sen1			-24	dBm	1
Sensitivity@11.1Gbps	Sen1			-23	dBm	1
Saturation	Ps	-7	-	-	dBm	1
Optical path penalty@9.95Gbps 1600ps/nm	OPP1			2	dB	1, 3
Optical path penalty@10.7Gbps 1600ps/nm	OPP2			3	dB	1,3
Optical path penalty@11.1Gbps 1450ps/nm	OPP3			3	dB	1,3
LOS Asserted	-	-37	-	-	dBm	High level: Alarm
LOS De-Asserted	-	-	-	-30	dBm	
LOS Hysteresis	-	0.5	-	-	dB	

Notes

1. Measured at PRBS 2³¹-1, NRZ, BER≤10⁻¹²
2. Internally AC coupled
3. With optimized CDR decision threshold

Transmitter Specifications-Electrical

Parameter	Symbol	Min	Typical	Max	Unit	Note
Input differential impedance	Rim	-	100	-	Ω	1
Differential data input swing	Vin-pp	120	-	820	mV	
Transmit Disable Voltage	V _D	2.0	-	Vcc+0.3	V	

Transmit Enable Voltage	V _{En}	0	-	0.8	V	
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Receiver Specifications-Electrical

Parameter	Symbol	Min	Typical	Max	Unit	Note
Output differential impedance	Rom	-	100	-	Ω	
Differential data output swing	Vout-pp	-	-	850	mV	
Rise/Fall time	Tr/Tf			40	ps	2
Loss of signal-Asserted	VOH	2	-	V _{cc} +0.3	V	
Loss of signal-Negated	VOL	GND	-	GND+0.5	V	

Notes

1. After internally AC coupled
2. 20%-80%

DDM Alarm Thresholds and I2C Locations

All Alarm Thresholds for OTN XFP are configured at the manufacturer and cannot be configured through the I2C interface (i.e. thresholds are not provisionable). Alarm thresholds for each DDM parameter are located in the following registers.

Threshold Value Register	Latched Alarm	Threshold Size (Bytes)	Name
02-03	80.7	2	Transceiver Temp High Alarm
04-05	80.6	2	Transceiver Temp Low Alarm
06-07	82.7	2	Transceiver Temp High Warning
08-09	82.6	2	Transceiver Temp Low Warning
10-17	N/A	8	Reserved
18-19	80.3	2	Laser Bias Current High Alarm
20-21	80.2	2	Laser Bias Current Low Alarm
22-23	82.3	2	Laser Bias Current High Warning
24-25	82.2	2	Laser Bias Current Low Warning
26-27	80.1	2	Laser Output Power High Alarm
28-29	80.0	2	Laser Output Power Low Alarm
30-31	82.1	2	Laser Output Power High Warning
32-33	82.0	2	Laser Output Power Low Warning
34-35	81.7	2	Receive Optical Power High Alarm
36-37	81.6	2	Receive Optical Power Low Alarm
38-39	83.7	2	Receive Optical Power High Warning
40-41	83.6	2	Receive Optical Power Low Warning
N/A	86.7	N/A	5V High Alarm
	86.6		5V Low Alarm
	86.5		3.3V High Alarm
	86.4		3.3V Low Alarm
	86.3		1.8V High Alarm

Threshold Value Register	Latched Alarm	Threshold Size (Bytes)	Name
	86.2		1.8V Low Alarm
	86.1		-5V High Alarm (Not Used)
	86.0		-5V Low Alarm (Not Used)
	87.7		5V High Warning
	87.6		5V Low Warning
	87.5		3.3V High Warning
	87.4		3.3V Low Warning
	87.3		1.8V High Warning
	87.2		1.8V Low Warning
	87.1		-5V High Warning (Not Used)
	87.0		-5V Low Warning (Not Used)

Pin Description

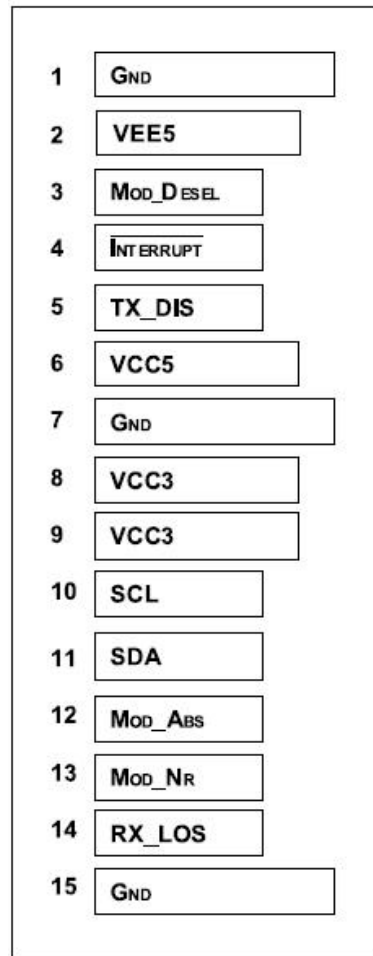
Pin No	Name	Logic	Function	Notes
1	GND		Electrical Ground	1
2	VEE5		Optional -5.2V power Supply (Not used)	
3	Mod_DeSel	LVTTTL-I	Module De-select; When held low allows module to respond to 2-wire serial interface	
4	Interrupt	LVTTTL-O	Interrupt; Indicates presence of an important condition which can be read over the 2-wire serial interface	2
5	Tx_DIS	LVTTTL-I	Transmitter Disable; Turns off transmitter laser output	
6	VCC5		+5V Power Supply	
7	GND		Module Ground	1
8	VCC3		+3.3V Power Supply	
9	VCC3		+3.3V Power Supply	
10	SCL	LVTTTL-I/O	2-Wire Serial Interface Clock	2
11	SDA	LVTTTL-I/O	2-Wire Serial Interface Data Line	2
12	Mod_Abs	LVTTTL-O	Indicates Module is not present. Grounded in the Module	2
13	Mod_NR	LVTTTL-O	Module Not Ready; Indicating Module Operational Fault	2
14	RX_LOS	LVTTTL-O	Receiver Loss Of Signal Indicator	2
15	GND		Module Ground	1
16	GND		Module Ground	1
17	RD-	CML-O	Receiver Inverted Data Output	
18	RD+	CML-O	Receiver Non-Inverted Data Output	
19	GND		Module Ground	1
20	VCC2		+1.8V Power Supply	
21	P_Down/RST	LVTTTL-I	Power down; When high, requires the module to limit power consumption. 2-Wire serial interface must be functional in the low power mode.	

Pin No	Name	Logic	Function	Notes
			Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle.	
22	VCC2		+1.8V Power Supply	
23	GND		Module Ground	1
24	RefCLK+	PECL-I	Reference Clock Non-Inverted Input, AC coupled on the host board	
25	RefCLK-	PECL-I	Reference Clock Inverted Input, AC coupled on the host board	
26	GND		Module Ground	1
27	GND		Module Ground	1
28	TD-	CML-I	Transmitter Inverted Data Input	
29	TD+	CML-I	Transmitter Non-Inverted Data Input	
30	GND		Module Ground	1

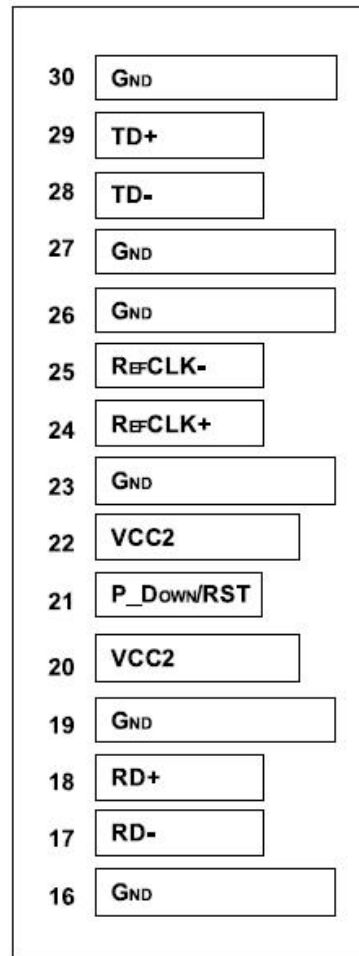
Notes:

1. Module ground pins (GND) are isolated from the module case and chassis ground within the module.
2. Shall be pulled up with 4.7K-10K ohms to a voltage between 3.15V and 3.45V on the host board.

The XFP PCB host electrical connections are shown in the figure below.



Bottom of Board
(As viewed thru top of board)



Top of Board

Supported Wavelengths

The following table provides correlation of the ITU-T DWDM wavelength and frequency as it relates to Gigalight ID.

Frequency	Wavelength	Gigalight ID
196.15	1528.38	615
196.10	1528.77	610
196.05	1529.16	605
196.00	1529.55	600
195.95	1529.94	595
195.90	1530.33	590
195.85	1530.72	585
195.80	1531.12	580
195.75	1531.51	575
195.70	1531.90	570
195.65	1532.29	565

Frequency	Wavelength	Gigalight ID
195.60	1532.68	560
195.55	1533.07	555
195.50	1533.47	550
195.45	1533.86	545
195.40	1534.25	540
195.35	1534.64	535
195.30	1535.04	530
195.25	1535.43	525
195.20	1535.82	520
195.15	1536.22	515
195.10	1536.61	510

Frequency	Wavelength	Gigalight ID
195.05	1537.00	505
195.00	1537.40	500
194.95	1537.79	495
194.90	1538.19	490
194.85	1538.58	485
194.80	1538.98	480
194.75	1539.37	475
194.70	1539.77	470
194.65	1540.16	465
194.60	1540.56	460
194.55	1540.95	455
194.50	1541.35	450
194.45	1541.75	445
194.40	1542.14	440
194.35	1542.54	435
194.30	1542.94	430
194.25	1543.33	425
194.20	1543.73	420
194.15	1544.13	415
194.10	1544.53	410
194.05	1544.92	405
194.00	1545.32	400
193.95	1545.72	395
193.90	1546.12	390
193.85	1546.52	385
193.80	1546.92	380
193.75	1547.32	375
193.70	1547.72	370
193.65	1548.11	365
193.60	1548.51	360
193.55	1548.91	355
193.50	1549.32	350
193.45	1549.72	345
193.40	1550.12	340
193.35	1550.52	335
193.30	1550.92	330
193.25	1551.32	325
193.20	1551.72	320
193.15	1552.12	315
193.10	1552.52	310
193.05	1552.93	305
193.00	1553.33	300
192.95	1553.73	295
192.90	1554.13	290

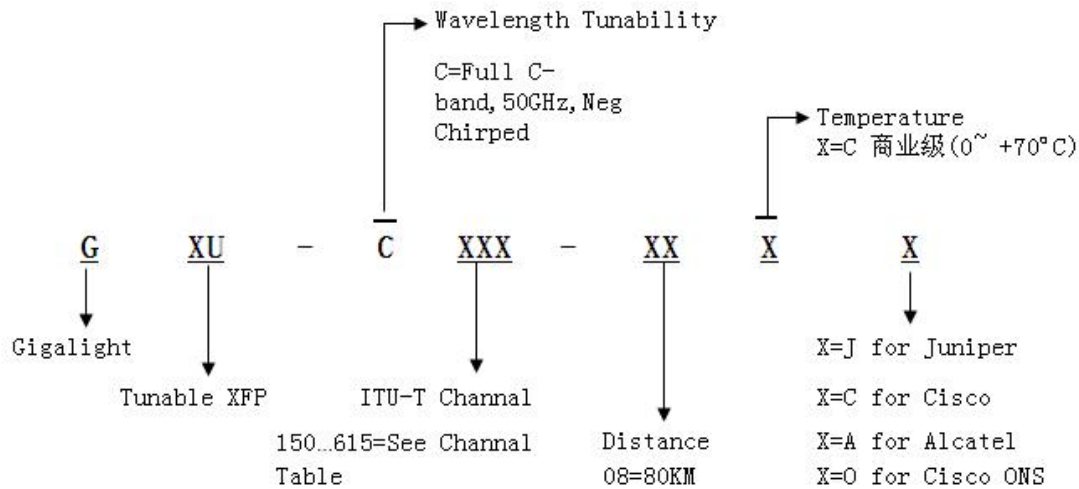
Frequency	Wavelength	Gigalight ID
192.85	1554.54	285
192.80	1554.94	280
192.75	1555.34	275
192.70	1555.75	270
192.65	1556.15	265
192.60	1556.55	260
192.55	1556.96	255
192.50	1557.36	250
192.45	1557.77	245
192.40	1558.17	240
192.35	1558.58	235
192.30	1558.98	230
192.25	1559.39	225
192.20	1559.79	220
192.15	1560.20	215
192.10	1560.61	210
192.05	1561.01	205
192.00	1561.42	200
191.95	1561.83	195
191.90	1562.23	190
191.85	1562.64	185
191.80	1563.05	180
191.75	1563.45	175
191.70	1563.86	170
191.65	1564.27	165
191.60	1564.68	160
191.55	1565.09	155
191.50	1565.50	150

Ordering information

Part Number	Product Description
GXU-Cxxx-08Cy	xxx=ITU channel (Gigalight ID), C-band Tunable DWDM XFP, 80km, 0°C~70°C

y=J for Juniper
y=C for Cisco
y=A for Alcatel
y=O for Cisco ONS

e. g. GXU-C165-08CJ: Full C-band Tunable XFP, ITU-T Channel 16.5 Default Wavelength, 80KM, for Juniper Switch



e. g. GXU-C165-08CJ Full C-band Tunable XFP, ITU-T Channel 16.5 Default Wavelength, 80KM, for Juniper Switch

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