

FIBERSTAMP 80KM DWDM SFP+ Optical Transceiver

FBB-D10K80C

Features

- ◆ Hot-pluggable SFP+ footprint
- ◆ Supports 9.8 to 11.3 Gb/s
- ◆ Link length up to 80km on G.652D SMF
- ◆ Suitable for use in 100GHz channel spacing DWDM systems
- ◆ Operating case temperature range:-5°C to +75°C
- ◆ Cooled EML transmitter and APD receiver
- ◆ Maximum power dissipation <1.8W (Typical 1.4W)
- ◆ Single 3.3V power supply
- ◆ Duplex LC connector
- ◆ Built-in digital diagnostic interface
- ◆ RoHS compliant (lead free)



Applications

- ◆ 10G Ethernet (with/without FEC)
- ◆ SDH(STM64)/SONET(OC-192)/OTN
- ◆ 10G Fiber Channel
- ◆ ITU-T G.698.1 DS100S1-2Dz(C)

Description

FIBERSTAMP SFP+ ZR DWDM Transceiver is a “Limiting module”, designed for SONET OC-192, SDH STM-64, 10G Ethernet ZR,OTU2,OTU2e and 10G Fibre Channel applications over 80km G.652 SMF.

The transceiver consists of two sections: The transmitter section incorporates a colded EML laser. And the receiver section consists of a APD photodiode integrated with a TIA. All modules satisfy class I laser safety requirements. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage.

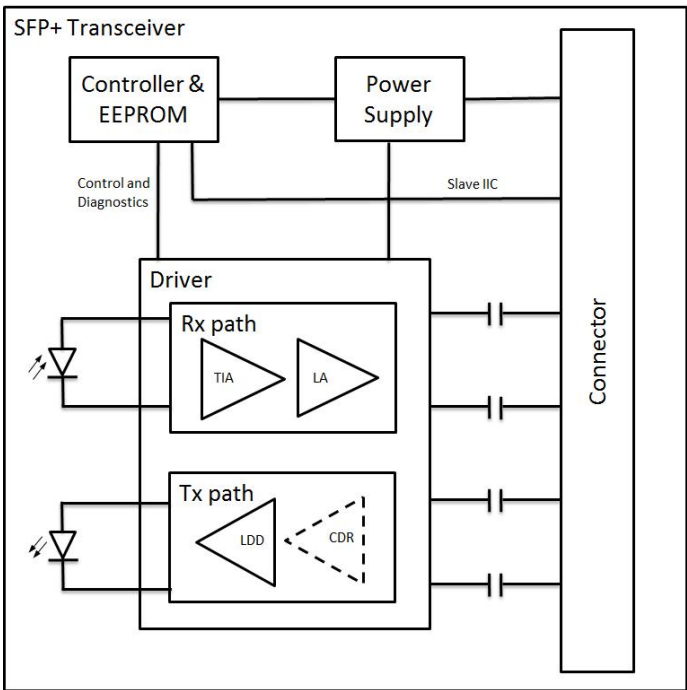


Figure1. Module Block Diagram



Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.5	+3.8	V
Storage Temperature	Tst	-40	+85	°C
Relative Humidity	Rh	0	85	%
Max Link Length	Lmax		80	km

Notes:

1. Non-condensing

Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Supply Voltage	Vcc	3.13	3.3	3.47	V
Supply current	Icc	-	420	550	mA
Operating Case temperature	Tca	-5	-	+75	°C
Module Power Dissipation	Pm	-	1.4	1.8	W

Transmitter Specifications – Optical

Parameter	Symbol	Min	Typical	Max	Unit	Ref.
Center Wavelength-End of life	λ_c	$\lambda_c - 100$	λ_c	$\lambda_c + 100$	pm	1
Spectral Width (-20dB)	$\Delta\lambda_{20}$	-	-	0.3	nm	
Average Optical Power	AOP	0	-	+4	dBm	2
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Optical Transmit Power (disabled)	Poff	-	-	-30	dBm	
Extinction Ratio	ER	8.2	-	-	dB	
Relative Intensity Noise	RIN	-	-	-128	dB/Hz	
Optical Return Loss Tolerance	Orl	-	-	21	dB	

Notes:

1. Wavelength stability is achieved within 60 seconds (max) of power up.
2. Minimum OMA = -2.4 dBm.

Receiver Specifications – Optical

Parameter	Symbol	Min	Typical	Max	Unit	Ref.
Input Operating Wavelength	λ	1260	-	1620	nm	
Average receive power	Pavg	-24	-	-5	dBm	
Sensitivity (0km,9.95~10.7G)	Rsen1	-	-	-24	dBm	2
Sensitivity (80KM,9.95~10.7G)	Rsen2			-22	dBm	2
Sensitivity (0km,11.1~11.3G)	Rsen3			-27	dBm	3
Sensitivity (80km,11.1~11.3G)	Rsen4			-24	dBm	3
Maximum Input Power	RX-overload	-5	-		dBm	
Loss of Signal Asserted	LOS _A	-34	-	-	dBm	
LOS De-Asserted	LOS _D	-	-	-24	dBm	
LOS Hysteresis	LOS _H	0.5	-		dB	

Notes:

- [1] Measured with conformance test signal for BER = 10⁻¹². The stressed sensitivity values in the table are for system level BER measurements which include the effects of CDR circuits. It is recommended that at least 0.4 dB additional margin be allocated if component level measurements are made without the effects of CDR circuits.
[2] Measured with worst ER=8.2dB; 2³¹ – 1 PRBS.BER<1E⁻¹²
[3] PRBS 2³¹ -1 and BER <1E⁻⁴

Transmitter Specifications – Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Bit Rate	BR	9.8		11.3168	Gbps
Input differential impedance	Rim	-	100	-	Ω
Differential data Input	VtxDIFF	120	-	850	mV
Transmit Disable Voltage	VD	2.0	-	Vcc3+0.3	V
Transmit Enable Voltage	Ven	0	-	+0.8	V
Transmit Disable Assert Time	Vn	-	-	100	us



Receiver Specifications – Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Bit Rate	BR	9.8		11.3168	Gbps
Differential Output Swing	Vout P-P	350	-	850	mV
Rise/Fall Time	Tr / Tf	24	-	-	ps
Loss of Signal –Asserted	VOH	2	-	Vcc3+0.3-	V
Loss of Signal –Negated	VOL	0	-	+0.4	V

Digital Diagnostic Functions

Parameter	Symbol	Min.	Max	Unit	Notes
Accuracy					
Transceiver Temperature	DMI_Temp	-3	+3	℃	
TX Output optical power	DMI_TX	-2	+2	dB	
RX Input optical power	DMI_RX	-2	+2	dB	
Transceiver Supply voltage	DMI_VCC	-3%	+3%	V	Full operating range
Bias current monitor	DMI_Ibias	-10%	10%	mA	
Dynamic Range					
Transceiver Temperature	DMI_Temp	-5	+75	℃	
TX Output optical power	DMI_TX	-1	+5	dBm	
RX Input optical power	DMI_RX	-28	-5	dBm	
Transceiver Supply voltage	DMI_VCC	3.0	3.6	V	
Bias current monitor	DMI_Ibias	0	120	mA	

C-band λc Wavelength Guide

ITU Channel Product Code	Frequency(THz)	Wavelength	ITU Channel Product Code	Frequency(THz)	Wavelength
17	191.7	1563.86	40	194.0	1545.32
18	191.8	1563.05	41	194.1	1544.53
19	191.9	1562.23	42	194.2	1543.73
20	192.0	1561.42	43	194.3	1542.94
21	192.1	1560.61	44	194.4	1542.14
22	192.2	1559.79	45	194.5	1541.35
23	192.3	1558.98	46	194.6	1540.56
24	192.4	1558.17	47	194.7	1539.77
25	192.5	1557.36	48	194.8	1538.98
26	192.6	1556.55	49	194.9	1538.19
27	192.7	1555.75	50	195.0	1537.40
28	192.8	1554.94	51	195.1	1536.61
29	192.9	1554.13	52	195.2	1535.82
30	193.0	1553.33	53	195.3	1535.04
31	193.1	1552.52	54	195.4	1534.25
32	193.2	1551.72	55	195.5	1533.47
33	193.3	1550.92	56	195.6	1532.68
34	193.4	1550.12	57	195.7	1531.90
35	193.5	1549.32	58	195.8	1531.12
36	193.6	1548.51	59	195.9	1530.33
37	193.7	1547.72	60	196.0	1529.55
38	193.8	1546.92	61	196.1	1528.77
39	193.9	1546.12			

Table 1. Product ordering codes: the central wavelength is defined as per ITU-T 694.1

Pin Descriptions

Pin	Symbol	Name/Description
1	VEET [1]	Transmitter Ground
2	Tx_FAULT [2]	Transmitter Fault
3	Tx_DIS [3]	Transmitter Disable. Laser output disabled on high or open
4	SDA [2]	2-wire Serial Interface Data Line
5	SCL [2]	2-wire Serial Interface Clock Line
6	MOD_ABS [4]	Module Absent. Grounded within the module



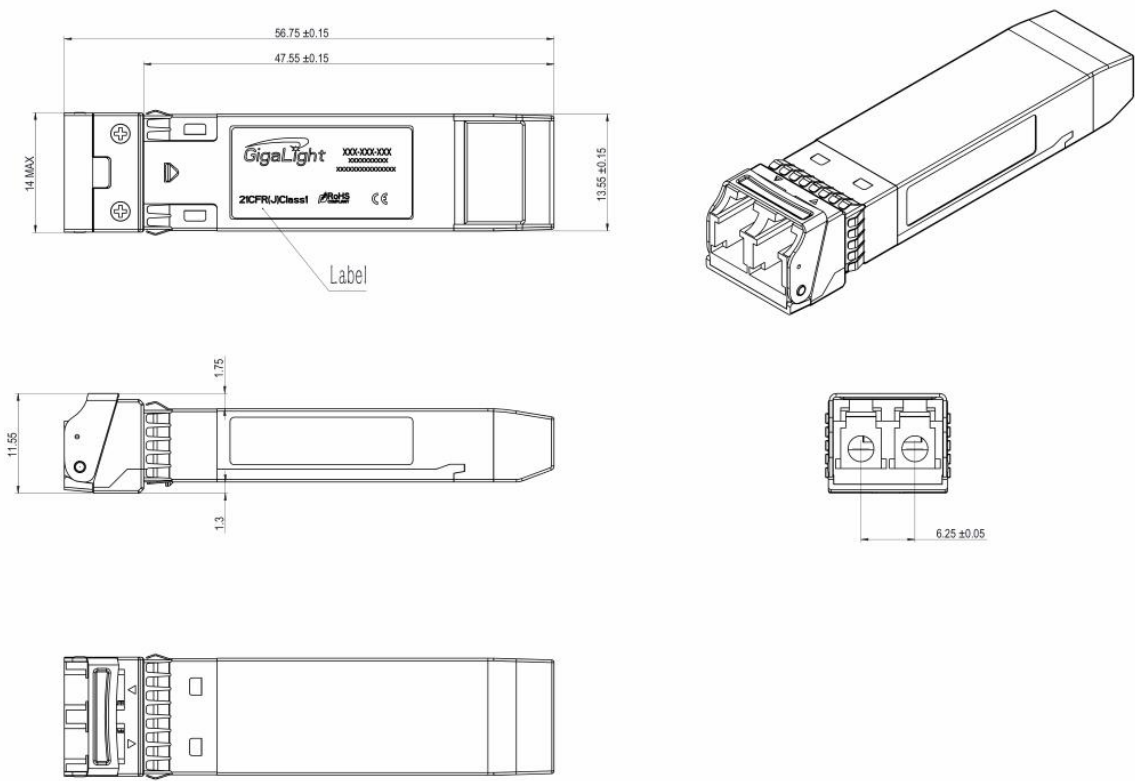


Figure5. Mechanical Specifications

Regulatory Compliance

FIBERSTAMP SFP+ transceiver is designed to be Class I Laser safety compliant and is certified per the following standards:

Feature	Standard
Laser Safety	IEC 60825-1:2014 (Third Edition)
Environmental protection	2011/65/EU
CE EMC	EN55032: 2015 EN55035: 2017 EN61000-3-2:2014 EN61000-3-3:2013
FCC	FCC Part 15, Subpart B; ANSI C63.4-2014

Ordering information

Part Number	Product Description
FBB-D10K80C	XX= ITU Grid 18~61, 10Gbps, 80km DWDM SFP+, -5°C ~ +75°C

References

- “Specifications for Enhanced Small Form Factor Pluggable Module SFP+”, SFF-8431, Rev 4.1, July 6, 2009.
- “Improved Pluggable Formfactor”,SFF-8432, Rev 4.2, Apr 18,2007
- IEEE802.3ae – 2002
- “Diagnostic Monitoring Interface for Optical Transceivers” SFF-8472, Rev 10.3, Dec 1,2007

Important Notice

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

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Revision History

Revision	Date	Description
V0	Mar. 28,2019	Advance Release.

