BO-SFP+Dxx-80

1/10G SFP+ (Small Form Pluggable) 80km Single Mode Transceiver

Product Features

- Up to 1/10Gb/s data links
- Duplex LC connector
- Hot-pluggable SFP footprint
- 100GHz ITU Grid, C Band DWDM EML laser transmitter
- Compliant with SFF-8431 SFF-8432 and IEE802.3ae
- Single power supply 3.3V
- RoHS-6 compliant (lead-free)
- 80km link length
- Operating temperature range（Case Temperature）:

  C Grade 0◦C to 70◦C

  I Grade −40◦C to 85◦C

Applications

- 1/10GBASE-ZR/ZW Ethernet
- 10G Fibre Channel
- SONET OC-192/SDH STM-64
- DWDM Networks

Ordering Information

Part Number	Description
BO-SFP+Dxx-80	10 GBASE-DWDM SFP+, DWDM-C Band (ITU 100GHz Grid), 80km over SMF. DOM; 0◦C to 70◦C
BO-SFP+Dxx-80-I	10 GBASE-DWDM SFP+, DWDM-C Band (ITU 100GHz Grid), 80km over SMF. DOM; −40◦C to 85◦C

BO-SFP+Dxx-80

1/10G SFP+ DWDM Transceivers

General Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Data Rate	DR	8		10.31	Gb/s	
Bit Error Rate	BER			10 12		
Operating Temperature	TOP	0		70	℃	1
Storage Temperature	TSTO	40		85	℃	2
Supply Current	IS		195	450	mA	3
Input Voltage	VCC	3.14	3.3	3.46	V	
Maximum Voltage	VMAX	0.5		4	V	3

Notes:

1. Case temperature
2. Ambient temperature
3. For electrical power interface

Optical Characteristics – Transmitter

VCC=3.14V to 3.46V, TC=0℃ to 70℃

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Output Optical Power	PTX	-1		5	dBm	1
Optical Center Wavelength	C	As per ITU-T 694.1			nm	2
Extinction Ratio	ER	8			dB	
Side Mode Suppression Ratio	SMSR	30			dB	
Laser Off Power	Poff			-30	dBm	
Relative Intensity Noise	RIN			128	dB/Hz	3
Output Eye		Compliant with IEEE802.3 z (class 1 laser safety)				

Notes:

1. Average power figures are informative only, per IEEE802.3ae.
2. Refer to ITU-T 694.1 table.
3. 12dB reflection.

ITU-T 694.1 Table

ITU Number	Article number	Frequency (THZ)	Central Wavelength(nm) C band
15	BO-SFP+D15-80	191.5	1565.50
16	BO-SFP+D16-80	191.6	1564.68
17	BO-SFP+D17-80	191.7	1563.86
18	BO-SFP+D18-80	191.8	1563.05
19	BO-SFP+D19-80	191.9	1562.23
20	BO-SFP+D20-80	192.0	1561.42
21	BO-SFP+D21-80	192.1	1560.61
22	BO-SFP+D22-80	192.2	1559.79

23	BO-SFP+D23-80	192.3	1558.98
24	BO-SFP+D24-80	192.4	1558.17
25	BO-SFP+D25-80	192.5	1557.36
26	BO-SFP+D26-80	192.6	1556.55
27	BO-SFP+D27-80	192.7	1555.75
28	BO-SFP+D28-80	192.8	1554.94
29	BO-SFP+D29-80	192.9	1554.13
30	BO-SFP+D30-80	193.0	1553.33
31	BO-SFP+D31-80	193.1	1552.52
32	BO-SFP+D32-80	193.2	1551.72
33	BO-SFP+D33-80	193.3	1550.92
34	BO-SFP+D34-80	193.4	1550.12
35	BO-SFP+D35-80	193.5	1549.32
36	BO-SFP+D36-80	193.6	1548.51
37	BO-SFP+D37-80	193.7	1547.72
38	BO-SFP+D38-80	193.8	1546.92
39	BO-SFP+D39-80	193.9	1546.12
40	BO-SFP+D40-80	194.0	1545.32
41	BO-SFP+D41-80	194.1	1544.53
42	BO-SFP+D42-80	194.2	1543.73
43	BO-SFP+D43-80	194.3	1542.94
44	BO-SFP+D44-80	194.4	1542.14
45	BO-SFP+D45-80	194.5	1541.35
46	BO-SFP+D46-80	194.6	1540.56
47	BO-SFP+D47-80	194.7	1539.77
48	BO-SFP+D48-80	194.8	1538.98
49	BO-SFP+D49-80	194.9	1538.19
50	BO-SFP+D50-80	195.0	1537.40
51	BO-SFP+D51-80	195.1	1536.61
52	BO-SFP+D52-80	195.2	1535.82
53	BO-SFP+D53-80	195.3	1535.04
54	BO-SFP+D54-80	195.4	1534.25
55	BO-SFP+D55-80	195.5	1533.47
56	BO-SFP+D56-80	195.6	1532.68
57	BO-SFP+D57-80	195.7	1531.90
58	BO-SFP+D58-80	195.8	1531.12
59	BO-SFP+D59-80	195.9	1530.33
60	BO-SFP+D60-80	196.0	1529.55
61	BO-SFP+D61-80	196.1	1528.77

Optical Characteristics – Receiver

V_{CC}=3.14V to 3.46V, T_C=0℃ to 70℃

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Optical Center Wavelength	C	1260		1620	nm	
Receiver Sensitivity	RX_SEN			23	dBm	1,2
Receiver Overload	Pol	-7			dBm	
LOS Assert	PLOS_A	36			dBm	
LOS De-Assert	PLOS_D			25	dBm	
LOS Hysteresis	LOS H	0.5			dB	

Notes:

1. Conditions of stressed receiver tests per IEEE802.3ae. CSRS testing requires the host board to be SFF-8431 compliant.
2. The receiver sensitivity over fiber may vary depending on the host's clock and data recovery model.

Electrical Characteristics – Transmitter

V_{CC}=3.14V to 3.46V, T_C=0℃ to 70℃

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Input differential impedance	RIN		100		Ω	1
Single ended data input swing	VIN_PP	180		700	mV	2
Transmit disable voltage	VD	2		VCC	V	3
Transmit enable voltage	VEN	VEE		VEE+0.8	V	
Transmit disable assert time				10	us	

Electrical Characteristics – Receiver

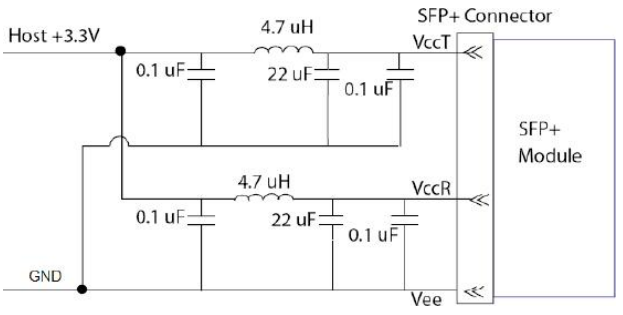
VCC=3.14V to 3.46V, TC=0℃ to 70℃

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Rx Output Diff Voltage	VOUT_PP	300		850	mV	3
Data output rise time	tr	30			ps	4
Data output fall time	tf	30			ps	4
LOS Fault	VLOS_Fault	VCC 0.5		VCC_HOST	V	5
LOS Normal	VLOS_Normal	VEE		VEE +0.8	V	5

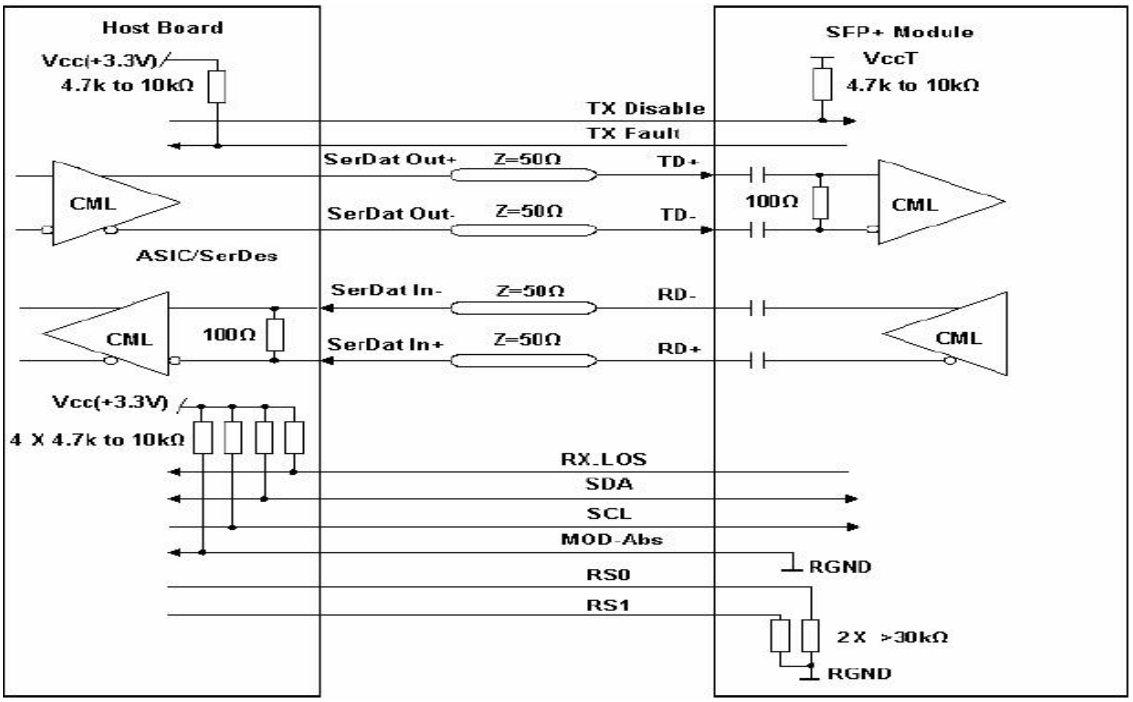
Note:

1. Connected directly to TX data input pins. AC coupling from pins into laser driver IC.
2. Per SFF-8431 Rev 3.0
3. Into 100 ohms differential termination.
4. 20%～80%
5. LOS is an open collector output. Should be pulled up with 4.7k – 10kΩ on the host board. Normal operation is logic 0; loss of signal is logic 1. Maximum pull-up voltage is 5.5V.

Recommended Circuit



Block Diagram of Transceiver



Transmitter Section

The EML driver accepts differential input data and provide bias and modulation currents for driving a laser. An automatic power-control (APC) feedback loop is incorporated to maintain a constant average optical power. 1550nm EML in an eye safe optical subassembly (OSA) mates to the fiber cable.

TX_DISABLE

The TX_DISABLE signal is high (TTL logic “1”) to turn off the laser output. The laser will turn on within 1ms when TX_DISABLE is

low (TTL logic “0”).

TX_FAULT

When the TX_FAULT signal is high, output indicates a laser fault of some kind. Low indicates normal operation.

Receiver Section

The receiver utilizes a APD detector integrated with a trans-impedance preamplifier in an OSA. This OSA is connected to a Limiting Amplifier which providing post-amplification quantization, and optical signal detection. The limiting Amplifier is AC-coupled to the transimpedance amplifier, with internal 100Ω differential termination.

Timing Parameters

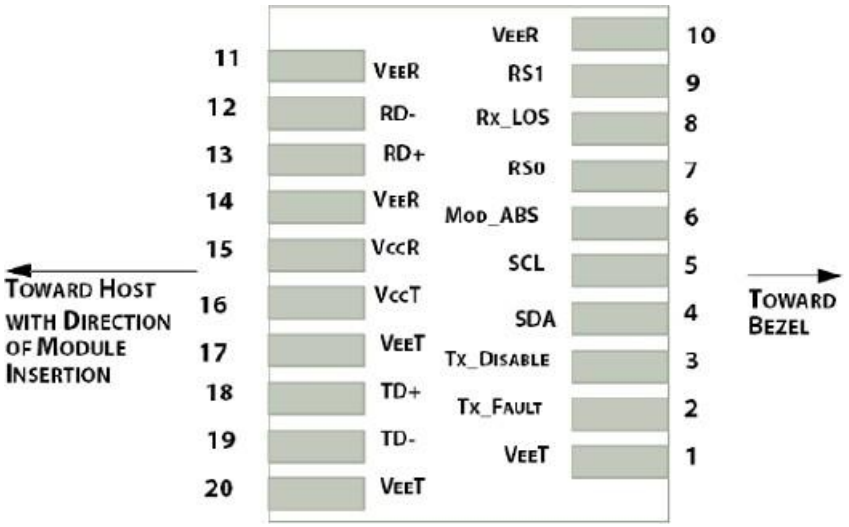
Parameter	Symbol	Min	Typ	Max	Units	Ref.
Time to initialization stabilization	t_start_up			30	S	

General Specifications

Parameter	Symbol	Min	Typ	Max	Units	Ref.
Bit Rate	BR	8		10.31	Gb/s	
Max. Supported Link Length	LMAX			80	KM	1

Notes: 1. Over G.652 single mode fiber.

Electrical Pad Layout



Pin Assignment

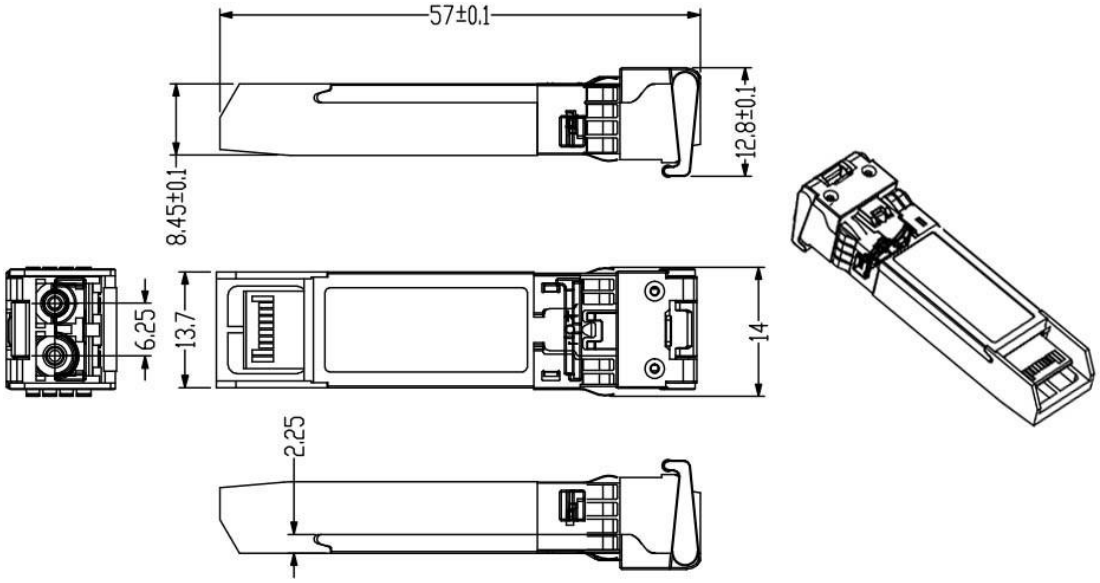
PIN #	Symbol	Description	Remarks
1	VeeT	Transmitter Ground	1
2	TX Fault	Transmitter Fault Indication	2
3	TX Disable	Transmitter Disable	3
4	SDL	2 wire serial interface data input/output (SDA)	
5	SCL	2 wire serial interface clock input (SCL)	
6	MOD-ABS	Module Absent, connect to VeeR or VeeT in the module	2
7	RS0	Rate select0, optionally control SFP+ receiver. When high, input data rate >4.5Gb/ s; when low, input data rate <=4.5Gb/s	
8	LOS	Loss of Signal	4
9	RS1	Rate select0, optionally control SFP+ transmitter. When high, input data rate >4.5Gb/s; when low, input data rate <=4.5Gb/s	
10	VeeR	Receiver Ground	1
11	VeeR	Receiver Ground	1
12	RD-	Inv. Received Data Out	

13	RD+	Received Data Out	
14	VeeR	Receiver Ground	1
15	VccR	Receiver Power	
16	VccT	Transmitter Power	
17	VeeT	Transmitter Ground	1
18	TD+	Transmit Data In	
19	TD-	Inv. Transmit In	
20	VeeT	Transmitter Ground	1

Notes:

1. The module ground pins shall be isolated from the module case.
2. This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10Kohms to Host_Vcc on the host board.
3. This pin shall be pulled up with 4.7K-10Kohms to VccT in the module.
4. This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10Kohms to Host_Vcc on thehost board.

Dimensions



ALL DIMENSIONS ARE ±0.2mm UNLESS OTHERWISE SPECIFIEDUNIT: mm

GUARANTEE:

1 year

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