Features

- Compliant with SFF-8431,SFF-8432 and IEE802.3ae
- 10GBASE-ZR, and 2G/4G/ 8G/10G Fiber Channel applications.
- Suitable for use in 100GHz channel spacing DWDM systems
- Cooled EML transmitter and APD receiver
- link length up to 80km
- Low Power Dissipation 1.4W Typical (Maximum:2W)
- -5ºC to 70ºC Operating Case Temperature
- Single 3.3V power supply
- Diagnostic Performance Monitoring of module temperature, supply
- Voltages, laser bias current, transmit optical power, receive optical power
- RoHS6 compliant

Applications

- 10G Ethernet (with/without FEC)
- 10G Fiber Channel

Description

Optech SFP+ DWDM 80km Transceiver is a “Limiting module”, designed for 10G Ethernet, and 2G/4G/ 8G/10G Fiber- Channel applications.

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.

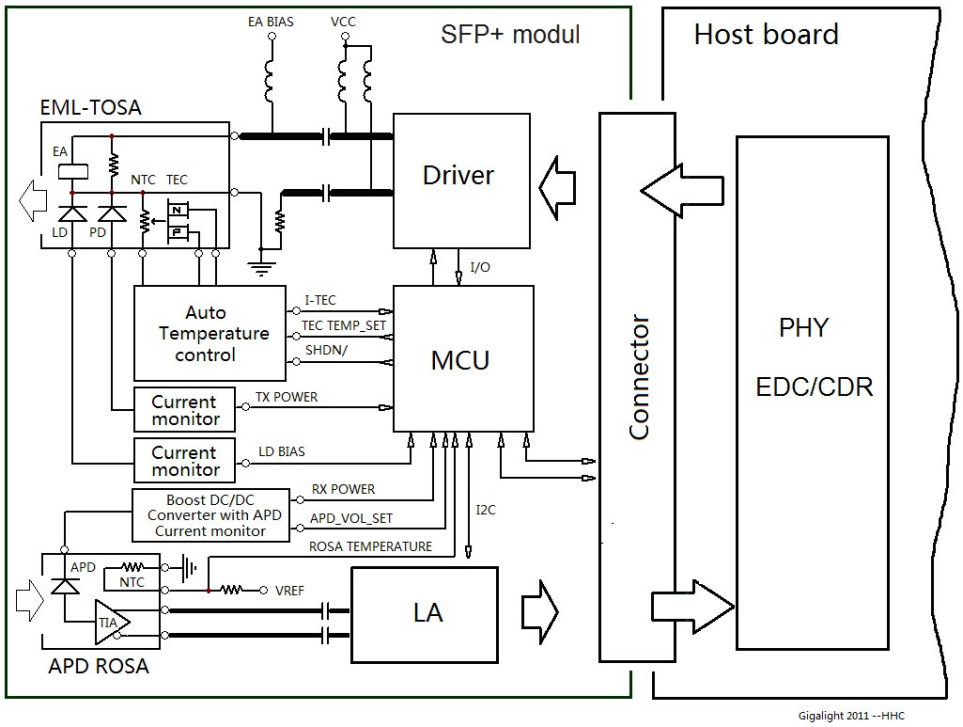
Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units	Remarks
Storage Temperature	T_{Str}	–40	85	°C	
Supply Voltage	*Vcc*	-0.5	3.8	V	
Relative Humidity	*Rh*	0	85	%	

Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Units	Remarks
Operating Case temperature	*Tca*	*-5*	-	70	ºC	
Supply Voltage	V_{cc}	3.13	3.3	3.47	V	
Supply Current	I_{cc}	-	420	610	mA	
Module Power Dissipation	*Pm*		1.4	2	W	

Block Diagram of Transceiver



Diagnostics Monitoring

Parameter	Accuracy	Unit	Notes
Temperature	± 3	°C	Over operating temp.
Voltage	± 0.08	V	Full operating range
Bias Current	± 10%	mA	
TX Power	± 3 dB	dBm	
RX Power	± 3 dB	dBm	-3dBm to -12 dBm range

Transmitter Electro-optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Data Rate	*Mra*	0.6	10.3	11.3	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	
Center Wavelength-Start of Life	*λc*	λc -25	λc	λc +25	pm	1
Center Wavelength-End of life	*λc*	λc -100	λc	λc+100	pm	1
Spectral Width (-20dB)	*Δλ20*	-	-	0.3	nm	
Average Optical Power	*Po*	-1	-	+3	dBm	2
Side Mode Suppression Ratio	*SMSR*	30	-	-	dB	
Optical Transmit Power (disabled)	*PTX_DISABLE*	-	-	-30	dBm	
Extinction Ratio	*ER*	8.2	-	-	dB	
Relative Intensity Noise	*RIN*	-	-	-128	dB/Hz	
Optical Return Loss Tolerance	*Orl*	-	-	21	dB	

Note:

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

Receiver Electro-optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Data Rate	*Mra*	0.6	10.3	11.3	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	
Input Operating Wavelength	*λ*	1260	-	1620	nm	
Receiver Sensitivity 9.95~10.3125Gb/s	*Rsen1*	-	-	-24	dBm	1
Receiver Sensitivity 10.5~11.1Gb/s	*Rsen2*	-	-	-23	dBm	1
Path penalty at 1600 ps/nm9.95~10.3125Gb/s	*DP1*		2	2.5	dBm	
Path penalty at 1600 ps/nm10.5~10.7Gb/s	*DP2*			3	dBm	
Path penalty at 1450 ps/nm~11.1Gb/s	*DP3*			3	dBm	
Maximum Input Power	*RX-overload*	-7	-		dBm	
Loss of Signal Asserted	*Lsa*	-34	-	-	dBm	
LOS De-Asserted	*Lda*	-	-	-24	dBm	
LOS Hysteresis	*Lh*	0.5	-	-	dB	

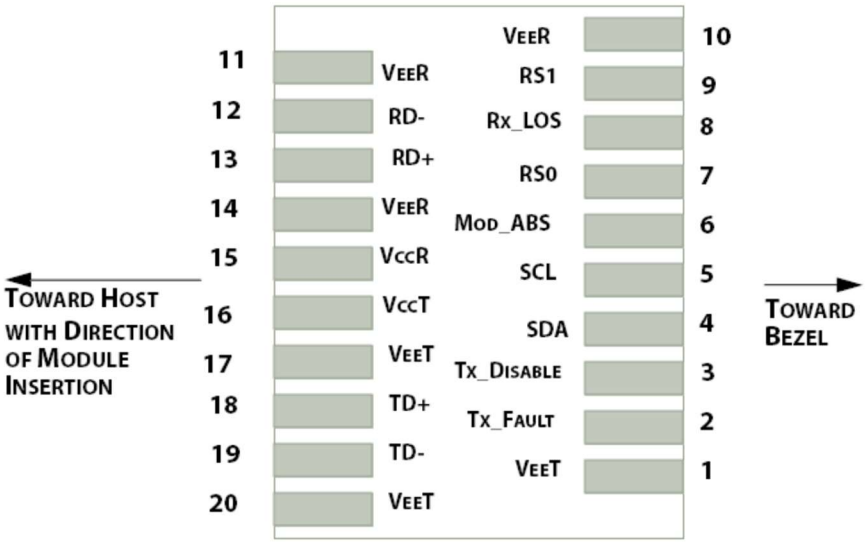
Notes:

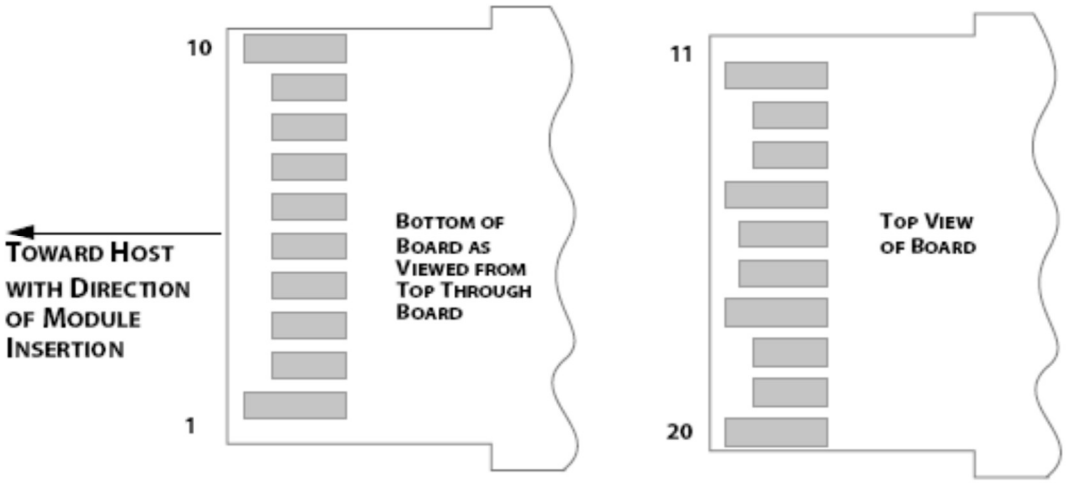
1. Measured with conformance test signal for BER = 10^{-12}. The stressed sensitivity values in the table are for system level BER measurements which include the effects of CDR circuits. It is recommended that at least 0.4 dB additional margin be allocated if component level measurements are made without the effects of CDR circuits.

C-band λc Wavelength Guide

ITU Channel Product Code	Frequency	Wavelength	ITU Channel Product Code	Frequency	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			

Pin Assignment





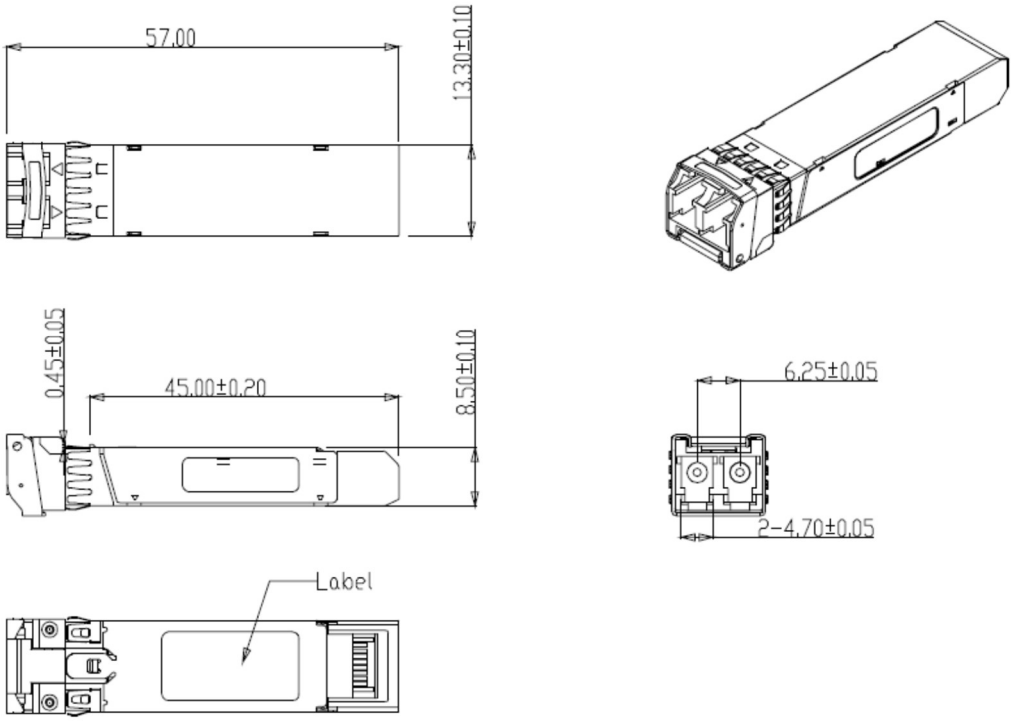
Pin Descriptions

Pin	Symbol	Name/Description	Notes
1	VEET	Transmitter Ground	1
2	Tx_FAULT	Transmitter Fault	2
3	Tx_DIS	Transmitter Disable. Laser output disabled on high or open	3
4	SDA	2-wire Serial Interface Data Line	2
5	SCL	2-wire Serial Interface Clock Line	2
6	MOD_ABS	Module Absent. Grounded within the module	4
7	RS0	Rate Select 0	5
8	RX_LOS	Loss of Signal indication. Logic 0 indicates normal operation	2
9	RS1	Rate Select 1	5
10	VEER	Receiver Ground	1
11	VEER	Receiver Ground	1
12	RD-	Receiver Inverted DATA out. AC Coupled	
13	RD+	Receiver DATA out. AC Coupled	
14	VEER	Receiver Ground	1
15	VCCR	Receiver Power Supply	
16	VCCT	Transmitter Power Supply	
17	VEET	Transmitter Ground	1
18	TD+	Transmitter DATA in. AC Coupled	
19	TD-	Transmitter Inverted DATA in. AC Coupled	
20	VEET	Transmitter Ground	1

Notes:

1. Module circuit ground is isolated from module chassis ground within the module.
2. should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15Vand 3.6V.
3. Tx_Disable is an input contact with a 4.7 kΩ to 10 kΩ pullup to VccT inside the module.
4. Mod_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull this contact up to Vcc_Host with a resistor in the range 4.7 kΩ to10 kΩ.Mod_ABS is asserted “High” when the SFP+ module is physically absent from a host slot.
5. RS0 and RS1 are module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.

Dimensions

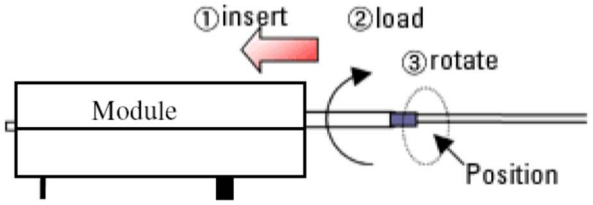


Optical Receptacle Cleaning Recommendations :

All fiber stubs inside the receptacle portions were cleaned before shipment. In the event of contamination of the optical ports, the recommended cleaning process is the use of forced nitrogen. If contamination is thought to have remained, the optical ports can be cleaned using a NTT international Cletop® stick type and HFE7100 cleaning fluid. Before the mating of patch-cord, the fiber end should be cleaned up by using Cletop® cleaning cassette.

Cleaning of patch-cord

Cleaning of fiber stub



1. Insert
   Ensure that stick is held straight when inserting into sleeve.
2. Load
   Apply sufficient pressure (approx 600-700g) to ensure ferrule a little depressed in sleeve.
3. Rotate
   Rotate stick clockwise 4-5 times, while ensuring direct contact with ferrule end-face is maintained.

Notice: Number of possible wipes: Maintenance (repair) ~1 use / piece Equipment construction: 4 uses / piece (max.)

Note: The pictures were extracted from NTT-ME website. And the Cletop® is a trademark registered by NTT-ME

Ordering Information

Model Number	Part Number	Voltage	Temperature
SFP+-DWDM-80	OPAK-D80-xx-CF	3.3V	-5°C to 70 °C

Modification History

Revision	Date	Description
A1	Sep. 2017	Initial Release
A2	Jul. 2024	Revised

Note: All information contained in this document is subject to change without notice.