

Product Features

- ✧ Compliant with SFF-8431, SFF-8432 and IEEE802.3ae
- ✧ Suitable for use in 100GHz channel spacing DWDM systems
- ✧ Cooled EML transmitter and APD receiver
- ✧ Digital Diagnostic Monitor Interface
- ✧ Hot pluggable
- ✧ link length up to 80km
- ✧ 10GBASE-ZR, and 2G/4G/ 8G/10G Fiber Channel applications.
- ✧ Low power consumption
- ✧ Operating case temperature: 0 to 70 °C



Applications

- ✧ 10G Ethernet
- ✧ 10G Fiber Channel
- ✧ RoHS compliant

Ordering Information

Part Number	Output Power	Rec. Sens	Data Rate	Wavelength	Distance
FH-SPDxx1TCDL80	0 ~ +5db	-23db	10G	C-BAND	80KM

General

FH-SPDxx1TCDL80 SFP+ DWDM transceiver is designed to transmit and receive optical data over single mode optical fiber for link length 80km.

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.

Product Selection

Channel#	Product Code	Frequency (THz)	Cent Wavelength (nm)
17	FH-SPD171TCDL80	191.7	1563.86
18	FH-SPD181TCDL80	191.8	1563.05
19	FH-SPD191TCDL80	191.9	1562.23
20	FH-SPD201TCDL80	192.0	1561.42
21	FH-SPD211TCDL80	192.1	1560.61
22	FH-SPD221TCDL80	192.2	1559.79
23	FH-SPD231TCDL80	192.3	1558.98
24	FH-SPD241TCDL80	192.4	1558.17
25	FH-SPD251TCDL80	192.5	1557.36
26	FH-SPD261TCDL80	192.6	1556.55
27	FH-SPD271TCDL80	192.7	1555.75
28	FH-SPD281TCDL80	192.8	1554.94
29	FH-SPD291TCDL80	192.9	1554.13
30	FH-SPD301TCDL80	193.0	1553.33
31	FH-SPD311TCDL80	193.1	1552.52
32	FH-SPD321TCDL80	193.2	1551.72
33	FH-SPD331TCDL80	193.3	1550.92
34	FH-SPD341TCDL80	193.4	1550.12
35	FH-SPD351TCDL80	193.5	1549.32
36	FH-SPD361TCDL80	193.6	1548.51
37	FH-SPD371TCDL80	193.7	1547.72
38	FH-SPD381TCDL80	193.8	1546.92
39	FH-SPD391TCDL80	193.9	1546.12
40	FH-SPD401TCDL80	194.0	1545.32

41	FH-SPD411TCDL80	194.1	1544.53
42	FH-SPD421TCDL80	194.2	1543.73
43	FH-SPD431TCDL80	194.3	1542.94
44	FH-SPD441TCDL80	194.4	1542.14
45	FH-SPD451TCDL80	194.5	1541.35
46	FH-SPD461TCDL80	194.6	1540.56
47	FH-SPD471TCDL80	194.7	1539.77
48	FH-SPD481TCDL80	194.8	1538.98
49	FH-SPD491TCDL80	194.9	1538.19
50	FH-SPD501TCDL80	195.0	1537.40
51	FH-SPD511TCDL80	195.1	1536.61
52	FH-SPD521TCDL80	195.2	1535.82
53	FH-SPD531TCDL80	195.3	1535.04
54	FH-SPD541TCDL80	195.4	1534.25
55	FH-SPD551TCDL80	195.5	1533.47
56	FH-SPD561TCDL80	195.6	1532.68
57	FH-SPD571TCDL80	195.7	1531.90
58	FH-SPD581TCDL80	195.8	1531.12
59	FH-SPD591TCDL80	195.9	1530.33
60	FH-SPD601TCDL80	196.0	1529.55
61	FH-SPD611TCDL80	196.1	1528.77

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Note
Storage Temperature	TS	-40	85	°C	
Relative Humidity	RH	0	85	%	
Supply Voltage	Vcc	-0.5	4.0	V	

General Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit	Note
Power Supply Voltage	Vcc	3.13	3.30	3.47	V	
Power Supply Current	Icc	-	-	450	mA	
Case Operating Temperature	Tc	0	-	+70	°C	

Electrical Input/Output Characteristics

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Transmitter						
Tx Disable input	H	VIH	2.0		Vcc+0.3	V
	L	VIL	0		0.8	
Tx Fault output	H	VOH	2.0		Vcc+0.3	V
	L	VOL	0		0.8	
Input Diff. Impedance	Zin		100		Ω	
Receiver						
Diff. output voltage swing		340	650	800	mVpp	3
Rx LOS Output	H	C				2
	L	VOL	0		0.8	

Notes1:TD+/- are internally AC coupled with 100Ω differential termination inside the module.

Note 2) Tx Fault and Rx LOS are open collector outputs, which should be pulled up with 4.7k to 10kΩ resistors on the host board. Pull up voltage between 2.0V and Vcc+0.3V.

Note 3) RD+/- outputs are internally AC coupled, and should be terminated with 100Ω (differential) at the user SERDES.

Optical Characteristics

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Transmitter						
Operating Wavelength			xx		nm	4
Ave. output power (Enabled)	Po	0		5	dBm	1
Extinction Ratio	ER	8.2			dB	1
RMS spectral width	$\Delta\lambda$			1	nm	
Rise/Fall time (20%~80%)	Tr/Tf			50	ps	2
Optical modulation amplitude	OMA	-6.2			dBm	
Dispersion penalty				1	dB	
Output Optical Eye	Compliant with IEEE 0802.3ae					
Receiver						
Operating Wavelength		1260		1610	nm	
Sensitivity	Psen			-23	dBm	3
Min. overload	Pimax	-7			dBm	
LOS Assert	Pa	-32			dBm	
LOS De-assert	Pd			-25	dBm	
LOS Hysteresis	Pd-Pa	0.5		4	dB	

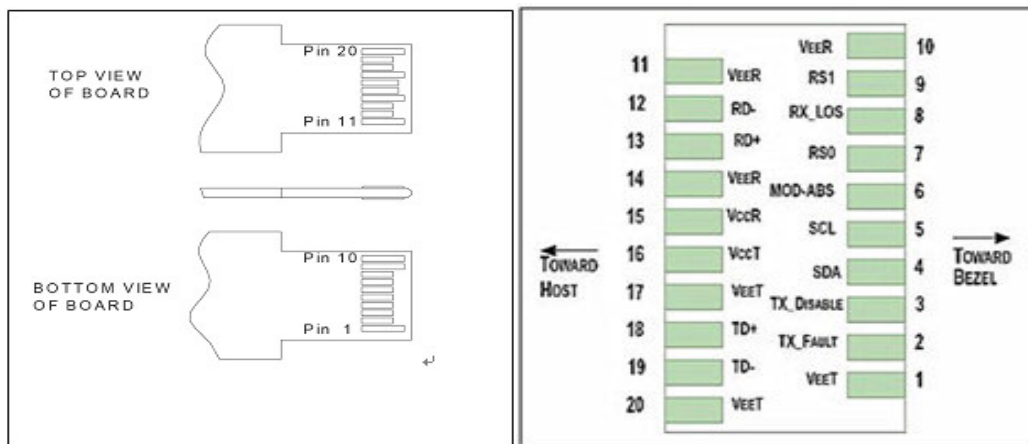
Notes1) Measured at 10.3125b/s with PRBS 2³¹ – 1 NRZ test pattern.

Note 2) 20%~80%

Note 3) Under the ER worst case, measured at 10.3125 Gb/s with PRBS 2³¹ - 1 NRZ test pattern for BER < 1x10⁻¹²

Note 4) If there is DWDM Product ,the wavelength XX— CH 17-61

Pin Definitions And Functions



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
7	RS0 [5]	Rate Select 0
8	RX_LOS [2]	Loss of Signal indication. Logic 0 indicates normal operation
9	RS1 [5]	Rate Select 1
10	VEER [1]	Receiver Ground
11	VEER [1]	Receiver Ground
12	RD-	Receiver Inverted DATA out. AC Coupled
13	RD+	Receiver DATA out. AC Coupled
14	VEER [1]	Receiver Ground

15	VCCR	Receiver Power Supply
16	VCCT	Transmitter Power Supply
17	VEET [1]	Transmitter Ground
18	TD+	Transmitter DATA in. AC Coupled
19	TD-	Transmitter Inverted DATA in. AC Coupled
20	VEET [1]	Transmitter Ground

Notes: [1] Module circuit ground is isolated from module chassis ground within the module.

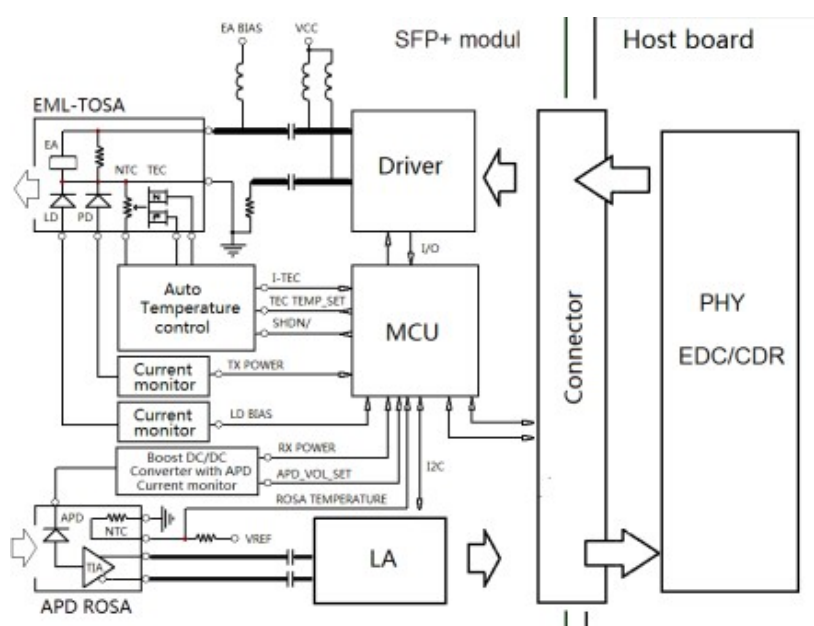
[2].should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15V and 3.6V.

[3]Tx_Disable is an input contact with a 4.7 kΩ to 10 kΩ pullup to VccT inside the module.

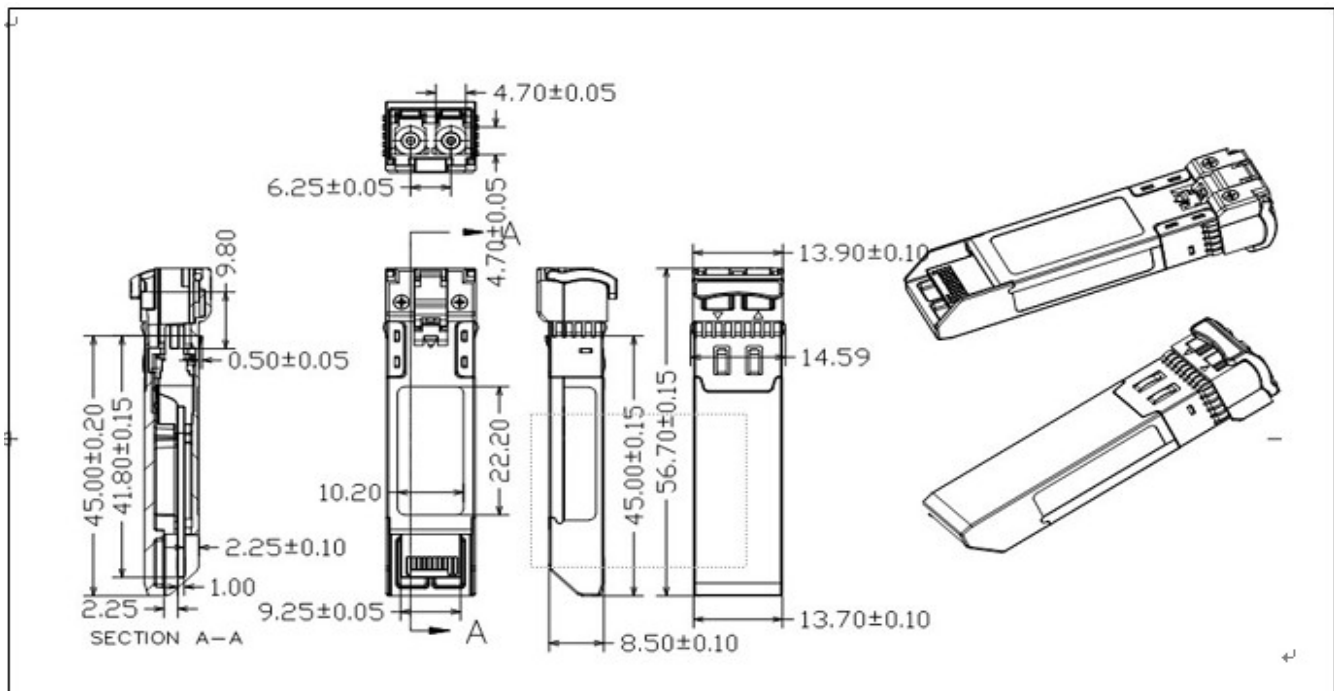
[4]Mod_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull this contact up to Vcc_Host with a resistor in the range 4.7 kΩ to 10 kΩ. Mod_ABS is asserted “High” when the SFP+ module is physically absent from a host slot.

[5] RS0 and RS1 are module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.

Functional Diagram



Package Dimensions



For More Information

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