



TOPSTAR TECHNOLOGY INDUSTRIAL CO., LIMITED

产 品 规 格 书

Product Specification Sheet

TOP-SFP+-DWDM-ER-XX

RoHS Compliant 10Gb/s SFP+ DWDM 40km Optical Transceiver



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PRODUCT FEATURES

- Compliant with SFF-8431, SFF-8432 and IEEE802.3ae
- Cooled EML transmitter and PIN receiver
- Suitable for use in 100GHz channel spacing DWDM systems
- Digital Diagnostic Monitor Interface
- Hot pluggable
- link length up to 40km
- 10GBASE-ER, and 2G/4G/ 8G/10G Fiber Channel applications.
- Low power consumption
- Operating case temperature: 0 to 70 °C

APPLICATIONS

- 10GBASE-ER
- 10G Fiber Channel

PRODUCT DESCRIPTIONS

This SFP+ ER DWDM transceiver is designed to transmit and receive optical data over single mode optical fiber for link length 40km.

The transceiver consists of two sections: The transmitter section incorporates a cooled EML laser. And the receiver section consists of a PIN 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

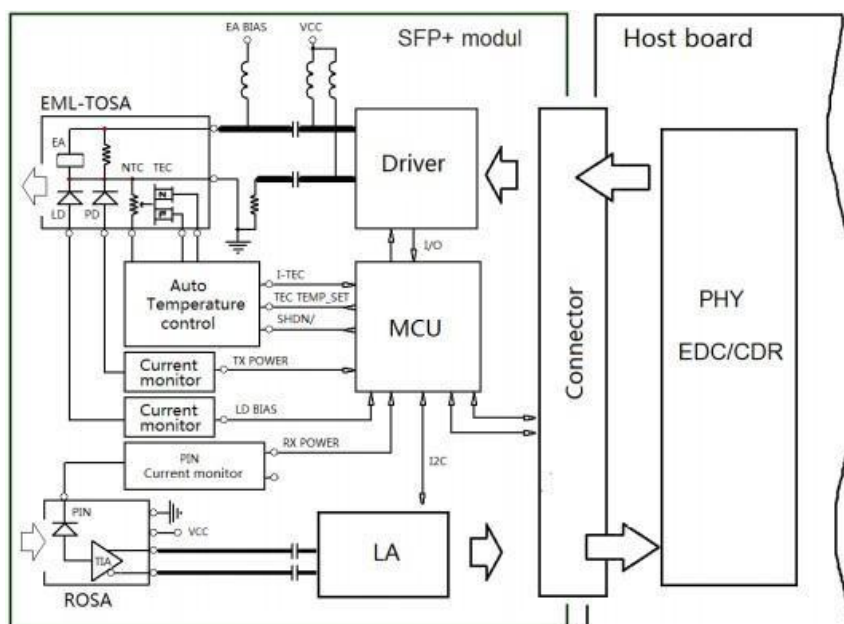
C-band λ_c Wavelength Guide Pin Descriptions

Channl #	Product Code	Frequency (THz)	Cent Wavelength (nm)
17	TOP-SFP+-DWDM-ER-171	191.7	1563.86
18	TOP-SFP+-DWDM-ER-181	191.8	1563.05
19	TOP-SFP+-DWDM-ER-191	191.9	1562.23
20	TOP-SFP+-DWDM-ER-201	192.0	1561.42
21	TOP-SFP+-DWDM-ER-211	192.1	1560.61
22	TOP-SFP+-DWDM-ER-221	192.2	1559.79
23	TOP-SFP+-DWDM-ER-231	192.3	1558.98
24	TOP-SFP+-DWDM-ER-241	192.4	1558.17
25	TOP-SFP+-DWDM-ER-251	192.5	1557.36
26	TOP-SFP+-DWDM-ER-261	192.6	1556.55
27	TOP-SFP+-DWDM-ER-271	192.7	1555.75
28	TOP-SFP+-DWDM-ER-281	192.8	1554.94
29	TOP-SFP+-DWDM-ER-291	192.9	1554.13
30	TOP-SFP+-DWDM-ER-301	193.0	1553.33
31	TOP-SFP+-DWDM-ER-311	193.1	1552.52
32	TOP-SFP+-DWDM-ER-321	193.2	1551.72
33	TOP-SFP+-DWDM-ER-331	193.3	1550.92
34	TOP-SFP+-DWDM-ER-341	193.4	1550.12
35	TOP-SFP+-DWDM-ER-351	193.5	1549.32
36	TOP-SFP+-DWDM-ER-361	193.6	1548.51
37	TOP-SFP+-DWDM-ER-371	193.7	1547.72
38	TOP-SFP+-DWDM-ER-381	193.8	1546.92
39	TOP-SFP+-DWDM-ER-391	193.9	1546.12
40	TOP-SFP+-DWDM-ER-401	194.0	1545.32
41	TOP-SFP+-DWDM-ER-411	194.1	1544.53
42	TOP-SFP+-DWDM-ER-421	194.2	1543.73
43	TOP-SFP+-DWDM-ER-431	194.3	1542.94
44	TOP-SFP+-DWDM-ER-441	194.4	1542.14
45	TOP-SFP+-DWDM-ER-451	194.5	1541.35
46	TOP-SFP+-DWDM-ER-461	194.6	1540.56
47	TOP-SFP+-DWDM-ER-471	194.7	1539.77
48	TOP-SFP+-DWDM-ER-481	194.8	1538.98
49	TOP-SFP+-DWDM-ER-491	194.9	1538.19
50	TOP-SFP+-DWDM-ER-501	195.0	1537.40
51	TOP-SFP+-DWDM-ER-511	195.1	1536.61
52	TOP-SFP+-DWDM-ER-521	195.2	1535.82



53	TOP-SFP+-DWDM-ER-531	195.3	1535.04
54	TOP-SFP+-DWDM-ER-541	195.4	1534.25
55	TOP-SFP+-DWDM-ER-551	195.5	1533.47
56	TOP-SFP+-DWDM-ER-561	195.6	1532.68
57	TOP-SFP+-DWDM-ER-571	195.7	1531.90
58	TOP-SFP+-DWDM-ER-581	195.8	1531.12
59	TOP-SFP+-DWDM-ER-591	195.9	1530.33
60	TOP-SFP+-DWDM-ER-601	196.0	1529.55
61	TOP-SFP+-DWDM-ER-611	196.1	1528.77

FUNCTIONAL DIAGRAM



ABSOLUTE MAXIMUM RATINGS

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

Note: Stress in excess of the maximum absolute ratings can cause permanent damage to the module



GENERAL OPERATING CHARACTERISTICS

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Data Rate	Ethernet		10.3125		Gb/s	
	Fiber Channel		10.518			
Supply Voltage	V _{cc}	3.13	3.3	3.47	V	
	V _{cc}				V	
Supply Current	I _{cc_s}				mA	
	I _{cc₃}			400	mA	
Operating Case Temp.	T _c	0		70	°C	

ELECTRICAL INPUT/OUTPUT CHARACTERISTICS

● Transmitter

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Diff. input voltage swing		120		820	mVpp	1
Tx Disable input	H	V _{IH}	2.0	V _{cc} +0.3	V	
	L	V _{IL}	0	0.8		
Tx Fault output	H	V _{OH}	2.0	V _{cc} +0.3	V	2
	L	V _{OL}	0	0.8		
Input Diff. Impedance	Z _{in}		100		Ω	

● Receiver

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Diff. output voltage swing		340	650	800	mVpp	3
Rx LOS Output	H	V _{OH}	2.0	V _{cc} +0.3	V	2
	L	V _{OL}	0	0.8		

Note 1) 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 V_{cc}+0.3V.

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

OPTICAL CHARACTERISTICS

● Transmitter

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Operating Wavelength			XX		nm	4
Ave. output power (Enabled)	P _o	-3		3	dBm	1
Extinction Ratio	ER	4.5			dB	1
RMS spectral width	Δλ			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

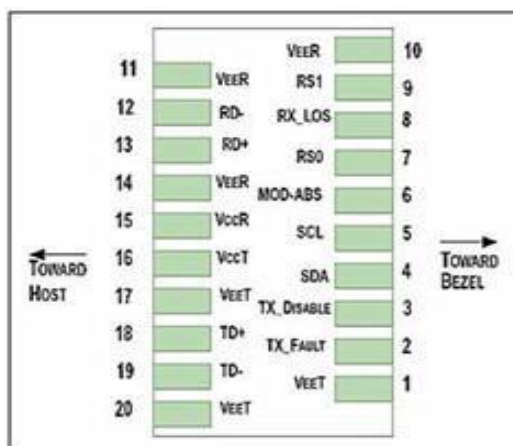
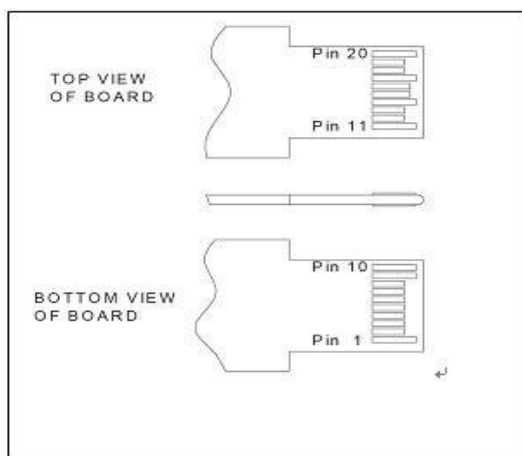


● Receiver

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Operating Wavelength		1260		1610	nm	
Sensitivity	Psen			-16	dBm	3
Min. overload	Pimax	0.5			dBm	
LOS Assert	Pa	-30			dBm	
LOS De-assert	Pd			-17	dBm	
LOS Hysteresis	Pd-Pa	0.5		4	dB	

Note 1) 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) Notice: 1. 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

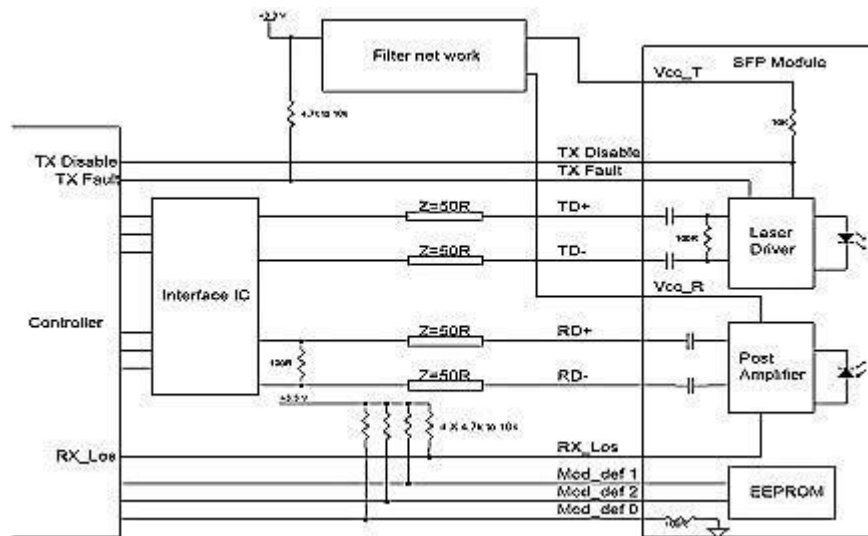


11	VEER [1]	Receiver Ground												
12	RD-	Receiver Inverted DATA out. AC Coupled												
13	RD+	Receiver DATA out. AC Coupled												
14	VEER [1]	Receiver Ground												
15	VCCR	Receiver Power Supply												
16	VCCT	Transmitter Power Supply	17	VEET [1]	Transmitter Ground	18	TD+	Transmitter DATA in. AC Coupled	19	TD-	Transmitter Inverted DATA in. AC Coupled	20	VEET [1]	Transmitter Ground
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												

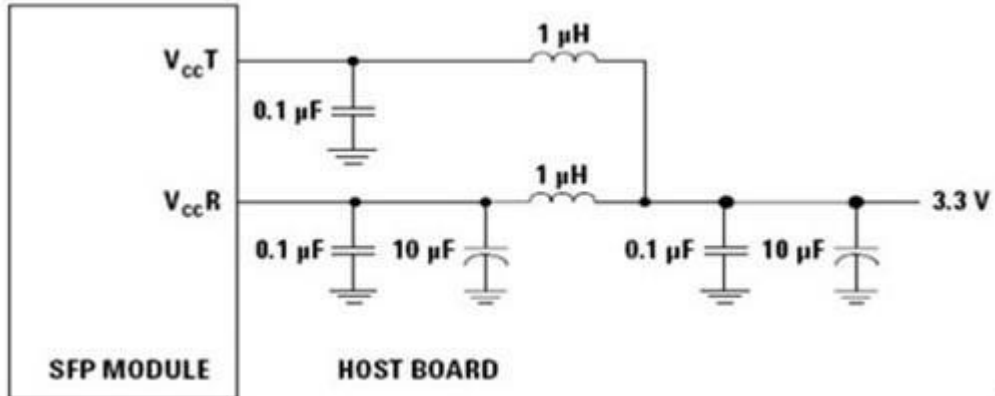
Notes:

- [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.

TYPICAL INTERFACE CIRCUIT

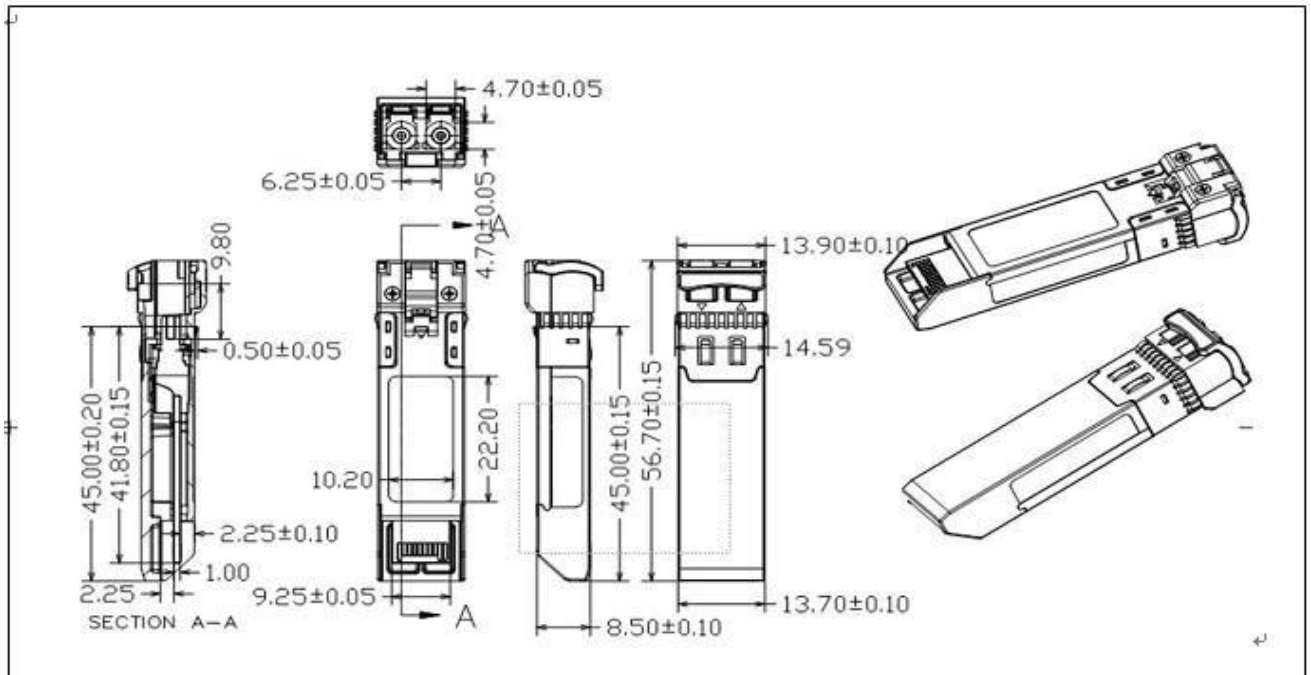


Recommended power supply filter



Note: Inductors with DC resistance of less than 1Ω should be used in order to maintain the required voltage at the SFP input pin with 3.3V supply voltage. When the recommended supply filtering network is used, hot plugging of the SFP transceiver module will result in an inrush current of no more than 30 mA greater than the steady state value

PACKAGE DIMENSIONS





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