OP-S10GXXXX-40
10G DWDM SFP+ Module, SM 40km LC DDM

Features

- Optical interface compliant to IEEE802.3ae 10GBase-ER
- Electrical interface compliant with SFF-8431 and SFF-8432
- Suitable for use in 100GHz channel spacing DWDM system
- Cooled EML laser transmitter and PIN receiver
- Case operating temperature range 0℃ to 70℃
- Duplex LC connector interface
- Built-in digital diagnostic functions
- Low power consumption ＜1.5W

Applications

- 10GBASE-ER/EW
- Other Optical Links

Description

OP-S10GXXXX-40 SFP+ER DWDM transceiver is designed to deploy in the DWDM networking equipment in metropolitan access and core networks. It operates at a nominal wavelength of ITU Grid, C band DWDM wavelength and up to 40km transmission distance on single mode fiber. The transmitter section use a DWDM EML laser, the receiver section consists of a PIN photodiode integrated with a TIA. The OP-S10GXXXX-40 series are compliant with SFP+ Multi-Source Agreement(MSA) Specification SFF-8431.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	Ts	-40	85	℃
Supply Voltage	Vcc	-0.5	4	V
Operating Humidity	RH	5	95	％
Power Consumption			1.5	W

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	Tc	0		70	℃
Power Supply Voltage	Vcc	3.15	3.3	3.45	V
Power Supply Current	Icc			290	mA
Data Rate	-		10.3125		Gbps

Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit
Transmitter					
Average Output Power	Po	-2		3	dBm
Center Wavelength	λ	λc-0.1	λc	λc+0.1	nm
Center Wavelength Spacing			100		GHz
Extinction Ratio	Er	3.5			dB
Side Mode Suppression Ratio	SMSR	30			dB
Transmitter and Dispersion Penalty	TDP			3	dB
Average Launch Power OFF Transmitter	Poff			-30	dBm
Output Optical Eye Mask	Compliant with IEEE 802.3ae				
Receiver					
Receiver Sensitivity	S			-14	dBm
Center Wavelength	λc	1260		1620	nm
Receiver Overload	P_{in}	-1			dBm
LOS De-Assert	LOS_D			-17	dBm
LOS Assert	LOS_A	-30			dBm
LOS Hysteresis		0.5			dB

Notes:

1. The optical power is launched into SMF

2. Minimum average optical power measured at the BER$\leqslant$1x10^{-12}

   The measure pattern is PRBS 2^{31}-1 @10.3125Gbps

Electrical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit
Transmitter						
Differential Data Input Swing		Vin	15		850	mV
Input Differential Impedance		Zin		100		Ω
TX_Fault	Normal Operation		0		0.5	V
	Transmitter Fault		2		Vcc	V
TX_Disable	Laser Enable		0		0.8	V
	Laser Disable		2		Vcc+0.3	V
Receiver						

| Differential Data Output Swing		Vout	350		850	mV
Output Differential Impedance		Zo		100		mV
Rx_LOS	Normal Operation		0		0.8	V
	Loss of Signal		2		Vcc	V

Digital Diagnostic Function

OP-S10GXXXX-40 transceiver supports the 2-wire serial communication protocol as defined in SFP MSA. The standard SFP serial ID provides access to identification information that describes the transceiver's capabilities, manufacturer, part no and other information.

Additionally, the digital diagnostic monitoring interface also defines another 256-byte memory map in EEPROM, which makes use of the 8 bit address 1010001X (A2h). It allows real-time access to transceiver's working temperature, laser bias current, transmitted optical power, receiver sensitivity and supply voltage.

## Pin Definitions

Diagram of Connector Block Pins on Host Board
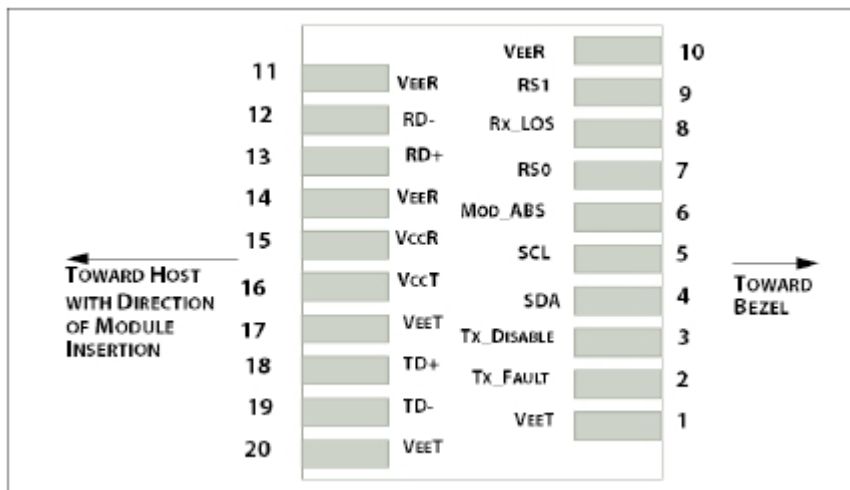
Pin	Symbol	Name/Description
1	VeeT	Transmitter Ground
2	Tx_FAULT	Transmitter Fault
3	Tx_DISABLE	Transmitter Disable. Laser output disabled on high or open
4	SDA	2-wire Serial Interface Data Line
5	SCL	2-wire Serial Interface Clock Line
6	MOD_ABS	Module Absent, connected to VeeT or VeeR in the module
7	RS0	Rate Select 0, not implement
8	RX_LOS	Receiver loss of signal
9	RS1	Rate Select 1, not implement
10	VeeR	Receiver Ground
11	VeeR	Receiver Ground

12	RD-	Receiver Inverted Data Output
13	RD+	Receiver Non-Inverted Data Output
14	VeeR	Receiver Ground
15	VccR	Receiver Power Supply
16	VccT	Transmitter Power Supply
17	VeeT	Transmitter Ground
18	TD+	Transmitter Non-Inverted Data Input
19	TD-	Transmitter Inverted Data Input
20	VeeT	Transmitter Ground

Notes:

1. Circuit ground is internally isolated from chassis ground.

2. TFAULT is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V.A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.

3. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.

4. Should be pulled up with 4.7kΩ- 10kΩ host board to a voltage between 2.0V and 3.6V. MOD_ABS pulls line low to indicate module is plugged in.

5. Internally pulled down per SFF-8431 Rev 4.1.

6. LOS is open collector output. It should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.
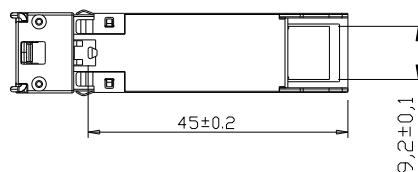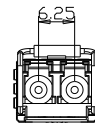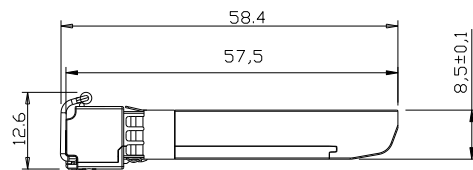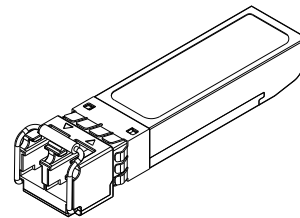
Recommended Host Board Power Supply Unit
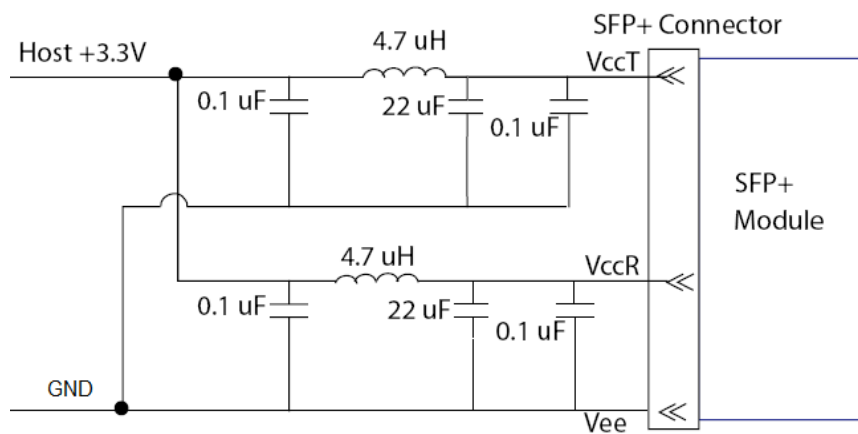
Recommended Interface Circuit
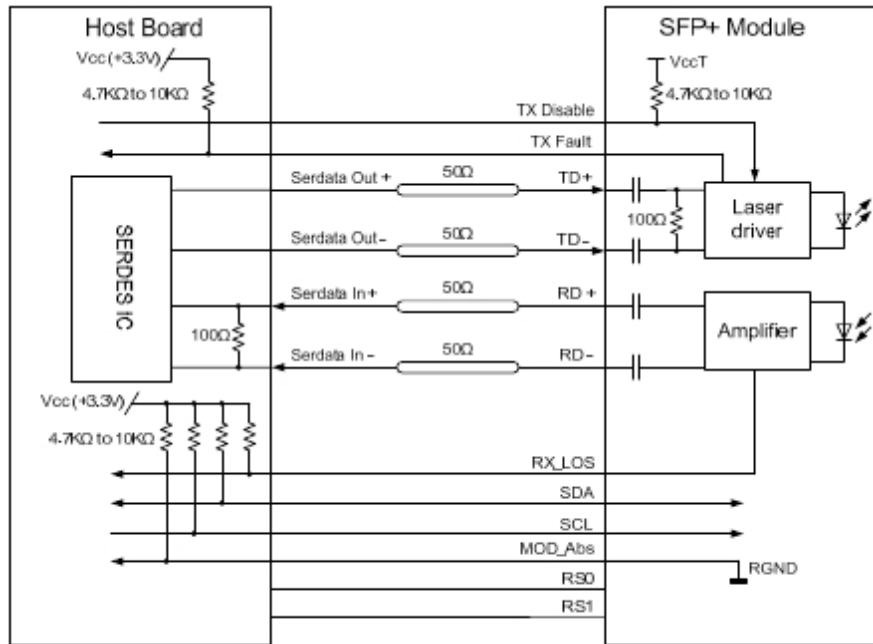
Mechanical Diagram
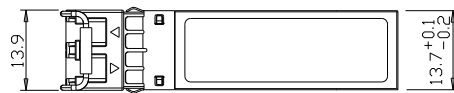
Units in mm

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			

Ordering Information

Part No	Data Rate	Wavelength	Reach	Temp	DDM
OP-S10GXXXX-40	10Gbps	100GHz C17-61	40KM	0~70℃	YES
OP-S10GXXXX-40	10Gbps	50GHz C17-61	40KM	0~70℃	YES

Note1: XXXX refers to DWDM Wavelength channel as ITU-T specified, please refer the following table for detailed center wavelength information.

Warnings

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge(ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.