

## SP-SMxxCW070D-GP

10G Ethernet 70km  
CWDM SFP+ Transceiver  
10GBASE-ZR

### Product Features

- Compliant with IEEE Std 802.3-2005  
10G Ethernet 10GBase-ZR
- Electrical interface specifications per SFF-8431
- Management interface specifications per  
SFF-8431 and SFF-8472
- SFP+ MSA package with duplex LC connector
- Cooled EML Laser
- Up to 10.3Gb/s bi-directional data links
- Single +3.3V power supply
- Class 1 laser safety certified
- Commercial operating temperature:0°C to +70°C
- Up to 80km on 9/125µm SMF
- RoHS Compliant

### Applications

- 10G Ethernet 10GBASE-ZR
- 70km 10G CWDM Network

### Ordering information

Part No.	Description
SP-SMxxCW070D-GP	SFP+ CWDM 10G (1470-1610nm) LC DDM SMF EML Laser

Part Number	Transmitter	Receiver	Reach	Temp	DDM	RoHS
SP-SM47CW070D-GP	1470nm EML	APD	70km	0 ~ 70°C	Available	Compliant
SP-SM49CW070D-GP	1490nm EML	APD	70km	0 ~ 70°C	Available	Compliant
SP-SM51CW070D-GP	1510nm EML	APD	70km	0 ~ 70°C	Available	Compliant
SP-SM53CW070D-GP	1530nm EML	APD	70km	0 ~ 70°C	Available	Compliant
SP-SM55CW070D-GP	1550nm EML	APD	70km	0 ~ 70°C	Available	Compliant
SP-SM57CW070D-GP	1570nm EML	APD	70km	0 ~ 70°C	Available	Compliant
SP-SM59CW070D-GP	1590nm EML	APD	70km	0 ~ 70°C	Available	Compliant
SP-SM61CW070D-GP	1610nm EML	APD	70km	0 ~ 70°C	Available	Compliant

### Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Unit
Storage Temperature	T <sub>s</sub>	-40	85	°C
Relative Humidity	RH	5	95	%
Supply Voltage	V <sub>CC</sub>	-0.5	4.0	V

### Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	T <sub>c</sub>	0	25	70	°C
Supply Voltage	V <sub>CC</sub>	3.135	3.3	3.465	V
Data Rate	-	-	10.3125	-	Gb/s

### Transceiver Electrical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes	
Module Supply Current	I <sub>CC</sub>	-	-	450	mA	-	
Power Dissipation	P <sub>D</sub>	-	-	1500	mW	-	
<b>Transmitter</b>							
Input Differential Impedance	Z <sub>IN</sub>	-	100	-	Ω	-	
Differential Data Input Swing	V <sub>IN, P-P</sub>	180	-	700	mV <sub>P-P</sub>	-	
TX_FAULT	Transmitter Fault	V <sub>OH</sub>	2.0	-	V <sub>CCHOST</sub>	V	-
	Normal Operation	V <sub>OL</sub>	0	-	0.8	V	-
TX_DISABLE	Transmitter Disable	V <sub>IH</sub>	2.0	-	V <sub>CCHOST</sub>	V	-
	Transmitter Enable	V <sub>IL</sub>	0	-	0.8	V	-

Receiver							
Output Differential Impedance	Z <sub>O</sub>	-	100	-	Ω	-	
Differential Data Output Swing	V <sub>OUT, P-P</sub>	300	-	850	mV <sub>P-P</sub>	1	
Data Output Rise Time, Fall Time	t <sub>r</sub> , t <sub>f</sub>	28	-	-	ps	2	
RX_LOS	Loss of signal (LOS)	V <sub>OH</sub>	2.0	-	V <sub>CCHOST</sub>	V	3
	Normal Operation	V <sub>OL</sub>	0	-	0.8	V	3

**Notes:**

1. Internally AC coupled, but requires a external 100Ω differential load termination.
2. 20–80%.
3. LOS is an open collector output. Should be pulled up with 4.7kΩ on the host board.

**Transmitter Optical Characteristics**

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Launch Optical Power	P <sub>o</sub>	0	-	+4.0	dBm	1
Center Wavelength Range	λ <sub>c</sub>	1464.5	-	1617.5	nm	-
Center Wavelength Tolerance	Δλ <sub>c</sub>	-6.5	-	6.5	nm	-
Extinction Ratio	EX	9	-	-	dB	2
Side Mode Suppression Ratio	SMSR	30	-	-	dB	-
Transmitter and Dispersion Penalty	TDP	-	-	3.0	dB	-
Relative Intensity Noise	RIN	-	-	-128	dB/Hz	-
Optical Return Loss Tolerance	ORLT	-	-	21	dB	-
Pout @TX-Disable Asserted	P <sub>off</sub>	-	-	-30	dBm	1
Eye Diagram	IEEE Std 802.3-2005 10Gb Ethernet 10GBASE-ZR compatible					

**Notes:**

1. The optical power is launched into 9/125μm SMF.
2. Measured with a PRBS 2<sup>31</sup>-1 test pattern @10.3125Gbps.

**Receiver Optical Characteristics**

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Center Wavelength	λ <sub>c</sub>	1464.5	-	1617.5	nm	-
Receiver Sensitivity (P <sub>avg</sub> )	S	-	-	-24	dBm	1
Receiver Overload (P <sub>avg</sub> )	P <sub>OL</sub>	-7.0	-	-	dBm	1
Optical Return Loss	ORL	26	-	-	dB	-
LOS De-Assert	LOS <sub>D</sub>	-	-	-25	dBm	-
LOS Assert	LOS <sub>A</sub>	-35	-	-	dBm	-
LOS Hysteresis	-	0.5	-	-	dB	-

**Notes:**

1. Measured with PRBS 2<sup>31</sup>-1 test pattern, 10.3125Gb/s, BER<10<sup>-12</sup>.
2. Comply with IEEE 802.3-2005.

**Mechanical specifications**

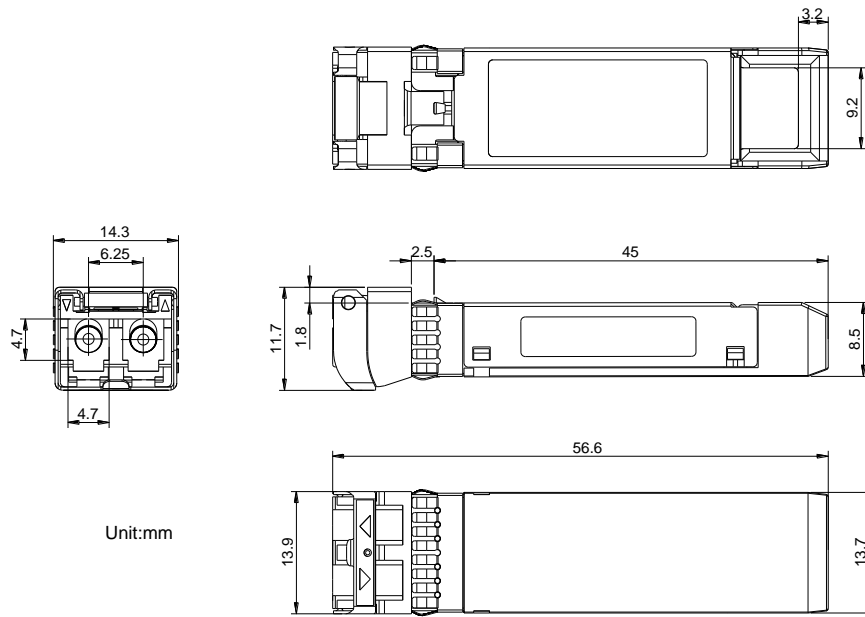


Figure 5. Outline Drawing