

**SF-SM(S)31WD020D-GP**  
**SF-SM(S)55WD020D-GP**  
Single-Mode 1.25Gbps GBE /FC  
SC/LC Single-Fiber SFP Transceiver  
RoHS6 Compliant

**Product Features**

- Compliant with IEEE Std 802.3-2005,1000BASE-BX-U
- Compliant with SFF-8074i andSFF-8472
- Compliant with SFP MSA Specification
- Digital Diagnostic Monitoring available
- Uncooled 1310nm Fabry-Perot (FP) Laser
- 100Mb/s to 1.25Gb/s bi-directional data links
- Up to 20km on 9/125µm SMF
- Simplex LC connector compliant
- Single +3.3V DC power supply
- Hot-pluggable SFP footprint
- Class 1 laser safety certified
- Low power dissipation
- Operating temperature Options
  - (Commercial) 0 °C to +70°C
  - (Industrial) -40°C to +85°C
- RoHS6 Compliant

**Applications**

- 1000BASE-BX-U
- Fiber Channel Links:  
1.0625Gb/s
- WDM Gigabit Ethernet Links
- Fast Ethernet
- Other Optical Links

**Ordering Information**

Part No.	Description
SF-SM31WD020D-GP	SFP WDM 1.25Gbps 1310nm Tx/1550nm LC DDM SMF 20km
SF-SM55WD020D-GP	SFP WDM 1.25Gbps 1550nm Tx/1310nm LC DDM SMF 20km
SF-SMS31WD020D-GP	SFP WDM 1.25Gbps 1310nm Tx/1550nm SC DDM SMF 20km
SF-SMS55WD020D-GP	SFP WDM 1.25Gbps 1550nm Tx/1310nm SC DDM SMF 20km
SF-SM31WD020DI-GP	SFP WDM 1.25Gbps 1310nm Tx/1550nm LC DDM SMF 20km ind. ver.
SF-SM55WD020DI-GP	SFP WDM 1.25Gbps 1550nm Tx/1310nm LC DDM SMF 20km ind. ver.
SF-SMS31WD020DI-GP	SFP WDM 1.25Gbps 1310nm Tx/1550nm SC DDM SMF 20km ind. ver.
SF-SMS55WD020DI-GP	SFP WDM 1.25Gbps 1550nm Tx/1310nm SC DDM SMF 20km ind. ver.

## 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 Temperature	SF-SM31WD020D-GP / SF-SM55WD020D-GP T <sub>c</sub>	0	25	70	°C
	SF-SM31WD020DI-GP / SF-SM55WD020DI-GP T <sub>c</sub>	-40	25	85	°C
Supply Voltage	V <sub>cc</sub>	3.135	3.3	3.465	V
Data Rate	-	0.1	-	1.25	Gb/s

## Transceiver Electrical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Module Supply Current	I <sub>cc</sub>	-	-	220	mA	-
Power dissipation	P <sub>D</sub>	-	-	800	mW	-
Transmitter Differential Input Voltage (TD +/-)	-	300	-	2200	mV <sub>P-P</sub>	1
Receiver Differential Output Voltage (RD +/-)	-	600	-	1200	mV <sub>P-P</sub>	2
Low speed output: Transmitter Fault(TX_FAULT) / Loss of Signal (LOS)	VOH	2.0	-	V <sub>cc</sub>	V	3
	VOL	0	-	0.8	V	-
Low speed output: Transmitter Disable (TX_DISABLE), MOD_DEF 1, MOD_DEF 2	VIH	2.0	-	V <sub>cc</sub>	V	4
	VIL	0	-	0.8	V	-

### Notes:

- Internally AC coupled and terminated to 100Ω differential load.
- Internally AC coupled, but requires a 100Ω differential termination or internal to Serializer/Deserializer.
- Pulled up externally with a 4.7KΩ-10KΩ resistor on the host board to V<sub>CCT,R</sub>.
- Mod\_Def1 and Mod\_Def2 must be pulled up externally with a 4.7KΩ-10KΩ resistor on the host board to V<sub>CCT,R</sub>.

## Transmitter Optical Characteristics

### SF-SM(S)31WD020D-GP

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Launch Optical Power	P <sub>o</sub>	-9	-6	-3	dBm	-
Center Wavelength Range	λ <sub>c</sub>	1260	1310	1360	nm	-
Extinction Ratio	EX	9	-	-	dB	-
Spectral Width (RMS)	Δλ	-	-	4	nm	-
Side Mode Suppression Ratio	SMSR	30	-	-	dB	-
Optical Rise/Fall Time	T <sub>rise</sub> /T <sub>fall</sub>	-	-	260	ps	-
Total Jitter	TJ	-	-	260	ps	-
Relative Intense Noise	RIN	-	-	-113	dB/Hz	-
Pout @TX-Disable Asserted	P <sub>off</sub>	-	-	-45	dBm	-
Eye Diagram	IEEE Std 802.3-2005 1000BASE-BX-U compatible					

## Transmitter Optical Characteristics

### SF-SM(S)55WD020D-GP

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Launch Optical Power	P <sub>o</sub>	-9	-6	-3	dBm	-
Center Wavelength Range	λ <sub>c</sub>	1530	1550	1570	nm	-
Extinction Ratio	EX	9	-	-	dB	-
Spectral Width (-20dB)	Δλ	-	-	1	nm	-
Side Mode Suppression Ratio	SMSR	30	-	-	dB	-
Optical Rise/Fall Time	T <sub>rise</sub> /T <sub>fall</sub>	-	-	260	ps	-
Total Jitter	TJ	-	-	260	ps	-
Relative Intense Noise	RIN	-	-	-113	dB/Hz	-
Pout @TX-Disable Asserted	P <sub>off</sub>	-	-	-45	dBm	-
Eye Diagram	IEEE Std 802.3-2005 1000BASE-BX-D compatible					

## Receiver Optical Characteristics

### SF-SM(S)31WD020D-GP

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Wavelength Range	-	1470	1550	1600	nm	-
Receiver Sensitivity	S	-	-	-23	dBm	1
Receiver Overload	P <sub>OL</sub>	-3	-	-	dBm	1
Receiver optical path penalty	-	-	-	1	dB	
Optical Return Loss	ORL	12	-	-	dB	-
LOS De-Assert	LOS <sub>D</sub>	-	-	-24	dBm	-
LOS Assert	LOS <sub>A</sub>	-35	-	-	dBm	-
LOS Hysteresis	-	0.5	3	5	dB	-

**Notes:**

1. Measured with PRBS 2<sup>7</sup>-1 test pattern, 1.25Gb/s, EX=9dB, BER<10<sup>-12</sup>.

## Receiver Optical Characteristics

### SF-SM(S)55WD020D-GP

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Wavelength Range	-	1260	1310	1360	nm	-
Receiver Sensitivity	S	-	-	-23	dBm	1
Receiver Overload	P <sub>OL</sub>	-3	-	-	dBm	1
Receiver optical path penalty	-	-	-	1	dB	
Optical Return Loss	ORL	12	-	-	dB	-
LOS De-Assert	LOS <sub>D</sub>	-	-	-24	dBm	-
LOS Assert	LOS <sub>A</sub>	-35	-	-	dBm	-
LOS Hysteresis	-	0.5	3	5	dB	-

**Notes:**

2. Measured with PRBS 2<sup>7</sup>-1 test pattern, 1.25Gb/s, EX=9dB, BER<10<sup>-12</sup>.

## Mechanical specifications

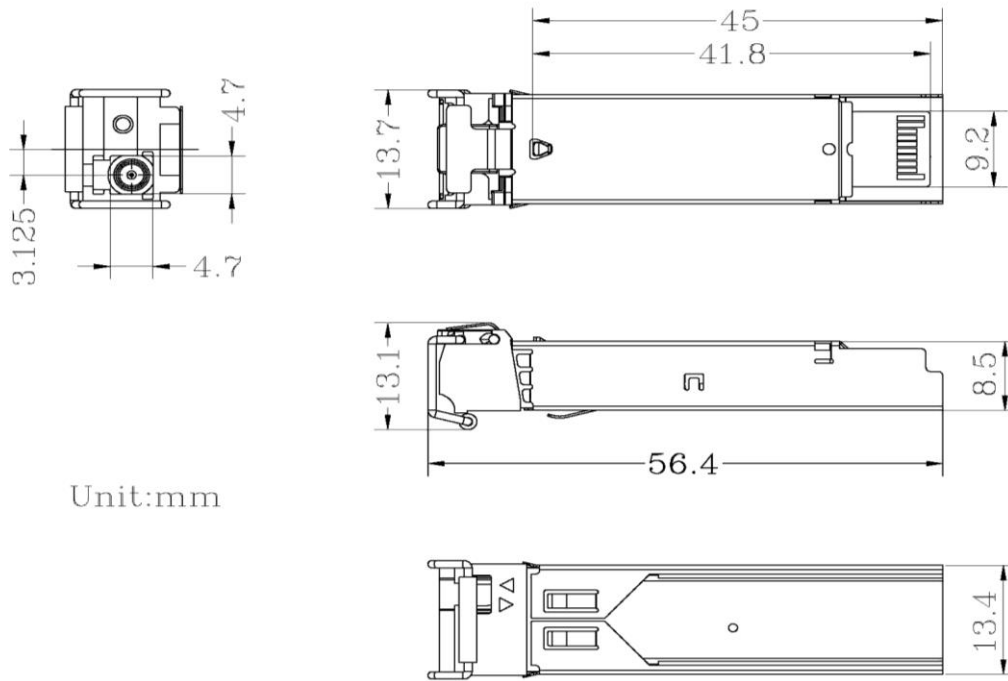


Figure 5. Outline Drawing