

SPB-77120W-1590G / SPB-77120LW-1590G (RoHS Compliant)

1590 nm TX / 1510 nm RX , 3.3V / 1250 Mbps Digital Diagnostic Single-Fiber SFP Transceiver

FEATURES

- | 1-Fiber Bi-Directional SFP Optical Transceiver
- | Compliant with IEEE 802.3ah-2004 1000BASE-BX
- | Simplex SC Connector: SPB-77120W-1590G
- | Simplex LC Connector: SPB-77120LW-1590G
- | **SFF-8472 Digital Diagnostic Function**
- | 1590 nm DFB LD Transmitter
- | 1510 nm Receiver
- | Distance Up to 120 km
- | AC/AC Coupling according to MSA
- | Single +3.3 V Power Supply
- | 0 to 70°C Operating
- | Class 1 Laser International Safety Standard IEC 60825 Compliant

APPLICATIONS

- | WDM Gigabit Ethernet Links
- | SONET/SDH Equipment Interconnect
- | Fibre Channel Links

DESCRIPTION

The SPB-77120W-1590G series is small form factor pluggable module for Gigabit Ethernet 1000BASE-BX and Fibre Channel single fiber communications by using 1590 nm transmitter and 1510 nm receiver. It is with the SFP 20-pin connector to allow hot plug capability. Digital diagnostic functions are available via an I²C. The transmitter section uses a multiple quantum well 1590 nm DFB laser and is a class 1 laser compliant according to International Safety Standard IEC 60825. The receiver section uses an integrated 1510 nm detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.

LASER SAFETY

This single mode transceiver is a Class 1 laser product. It complies with IEC 60825 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated within the specified temperature and voltage limits. The optical ports of the module shall be terminated with an optical connector or with a dust plug.

ORDER INFORMATION

P/No.	Bit Rate (Gb/s)	Distance (km)	TX (nm)	RX (nm)	Package	Temp (°C)	TX Power (dBm)	RX Sens. (dBm)	RoHS Compliant
SPB-77120W-1590G	1.25	120	1590 DFB	1510	SC SFP with DMI	0 to 70	3 to -2	-33	Yes
SPB-77120LW-1590G	1.25	120	1590 DFB	1510	LC SFP with DMI	0 to 70	3 to -2	-33	Yes

Absolute Maximum Ratings					
Parameter	Symbol	Min	Max	Units	Notes
Storage Temperature	Tstg	-40	85	°C	
Operating Case Temperature	ToPr	0	70	°C	
Relative Humidity	RH	0	85	%	Non condensing
Power Supply Voltage	Vcc	0	3.6	V	
Input Voltage	---	GND	Vcc	V	
Output Current	Iout	0	30	mA	

Recommended Operating Conditions					
Parameter	Symbol	Min	Typ	Max	Units / Notes
Power Supply Voltage	Vcc	3.13	3.3	3.47	V
Power Supply Current	I _{CC(TX+RX)}		200	300	mA
Case Operating Temperature	ToPr	0		70	°C
Data Rate			1250	1300	Mb/s

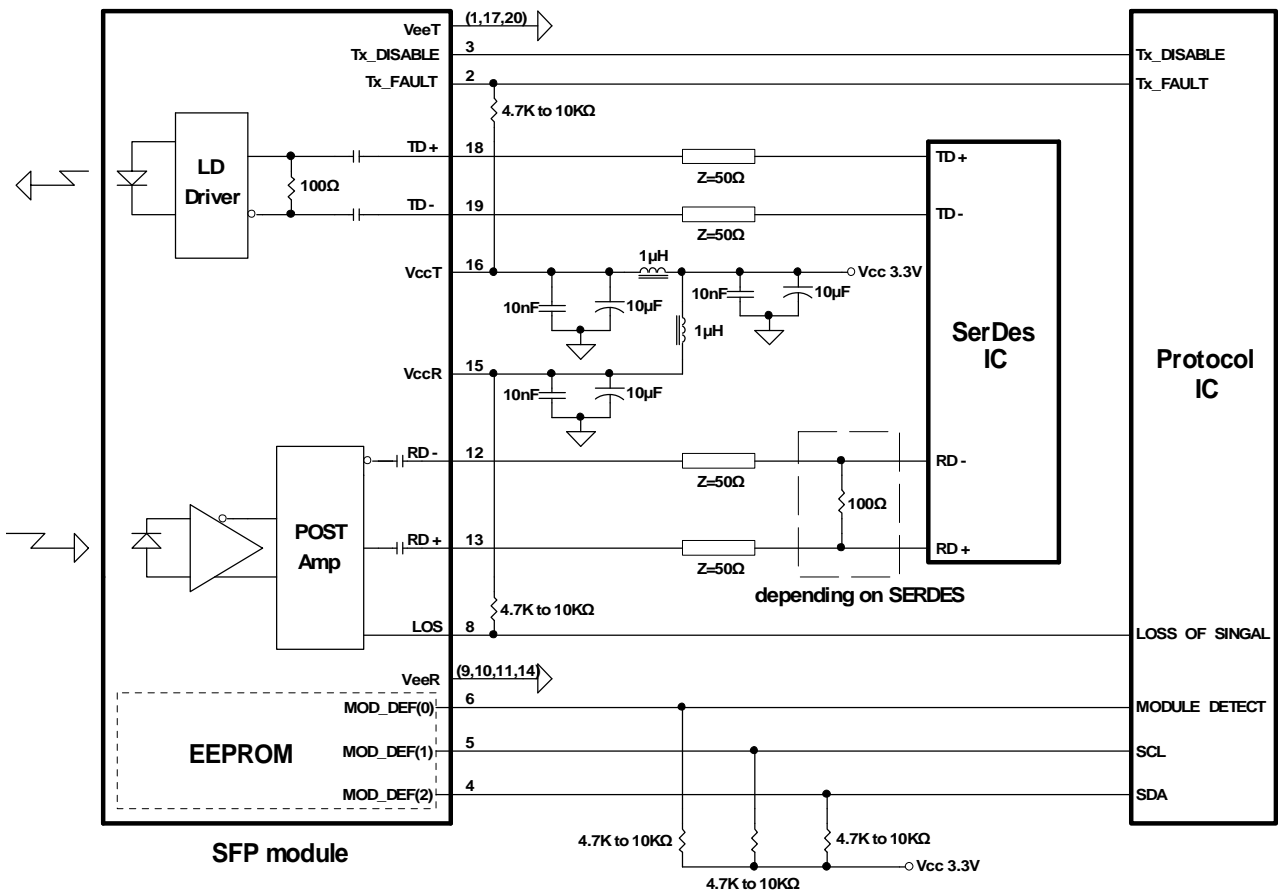
Transmitter Specifications (0°C < ToPr < 70°C, 3.13V < Vcc < 3.47V)						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Optical						
Optical Transmit Power	Po	-2		3	dBm	1
Output Center Wavelength	λ	1580		1620	nm	
Output Spectrum Width	σ _λ			1	nm	-20 dB width
Side Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio	E _R	9			dB	
Output Eye	Compliant with IEEE 802.3z					
Optical Rise Time	t _r			0.26	ns	20% to 80% Values
Optical Fall Time	t _f			0.26	ns	20% to 80% Values
Relative Intensity Noise	RIN			-120	dB/Hz	
Total Jitter	TJ			0.227	ns	2
Electrical						
Data Input Current – Low	I _{IL}	-350			μA	
Data Input Current – High	I _{IH}			350	μA	
Differential Input Voltage	V _{IH} - V _{IL}	0.5		2.4	V	Peak-to-Peak
TX Disable Input Voltage – Low	T _{DIS, L}	0		0.5	V	3
TX Disable Input Voltage – High	T _{DIS, H}	2.0		Vcc	V	3
TX Disable Assert Time	T _{ASSERT}			10	μs	
TX Disable Deassert Time	T _{DEASSERT}			1	ms	
TX Fault Output Voltage -- Low	T _{FAULTL}	0		0.5	V	4
TX Fault Output Voltage -- High	T _{FAULTH}	2.0		Vcc+0.3	V	4

- Notes: 1. Output power is power coupled into a 9/125 μm single mode fiber.
 2. Measured with a 2⁷-1 PRBS.
 3. There is an internal 4.7K to 10K ohm pull-up resistor to VccTX.
 4. Open collector compatible, 4.7K to 10K ohm pull-up to Vcc (Host Supply Voltage).

Receiver Specifications (0°C < Topr < 70°C, 3.13 V < Vcc < 3.47V)						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Optical						
Sensitivity	---	---	---	-33	dBm	5
Maximum Input Power	Pin	-9	---	---	dBm	
Signal Detect -- Asserted	Pa	---	---	-33	dBm	Transition: low to high
Signal Detect -- Deasserted	Pd	-45	---	---	dBm	Transition: high to low
Signal detect -- Hysteresis		1.0	---		dB	
Wavelength of Operation		1480		1520	nm	6
Optical Return Loss	ORL	14			dB	
Electrical						
Differential Output Voltage	$V_{OH} - V_{OL}$	0.6		2.0	V	
Output LOS Voltage -- Low	V_{OL}	0		0.5	V	7
Output LOS Voltage -- High	V_{OH}	2.0		$V_{cc}+0.3$	V	7
Signal Detect Assert Time	AS_{MAX}			100	μs	OFF to ON
Signal Detect Deassert Time	ANS_{MAX}			300	μs	ON to OFF

- Notes: 5. Minimum sensitivity and saturation levels at BER 1E-12 for a 2⁷-1 PRBS.
 6. At least 30 dB optical isolation for the wavelength 1580 to 1620 nm.
 7. Open collector compatible, 4.7K to 10K ohm pull-up to Vcc (Host Supply Voltage).

RECOMMENDED CIRCUIT SCHEMATIC

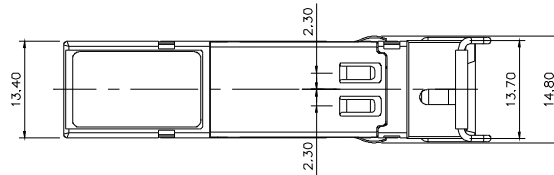


PACKAGE DIAGRAM

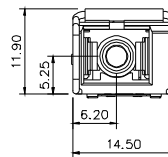
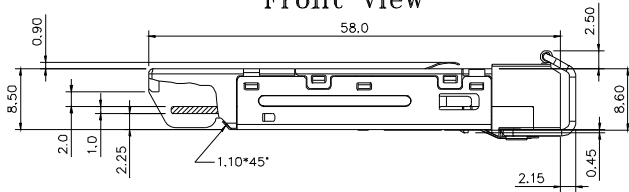
Units in mm

A) SC SFP

Top View

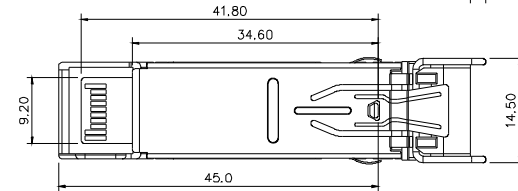


Front View



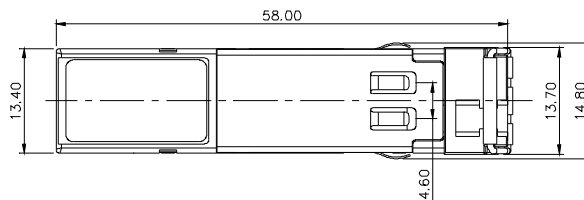
Side View

Bottom View

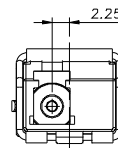
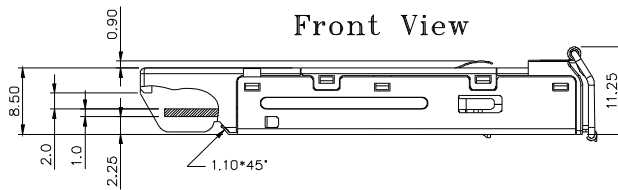


A) LC SFP

Top View

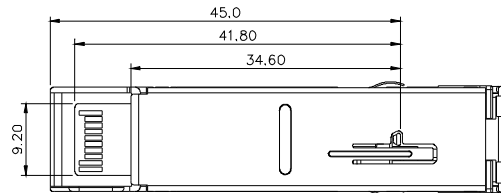


Front View



Side View

Bottom View



Note: Specifications subject to change without notice.