Features:

- Hot-pluggable SFP+ footprint
- Supports 8.5 and 9.95 to 11.3 Gb/s
- Up to 80km link length
- 50GHz ITU-based channel spacing (C-Band) with a wavelength locker
- -40 to +85°C case temperature range
- Single 3.3V power supply
- Monolithic MZM Tunable TOSA
- Linear or Limiting electrical interface receiver
- Duplex LC connector
- Built-in digital diagnostic functions
- RoHS-6 compliant (lead-free)

Applications:

- DWDM 80km point to point links:
  - 8G Fibre Channel
  - 10Gb/s SONET/SDH
  - 10G Ethernet
  - 10G Fibre Channel
- ITU-T G.698.1 DS100S1-2Dz(C)
- ITU-T G.709

1. Absolute Maximum Ratings

Exceeding the limits below may damage the transceiver module permanently.

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Maximum Supply Voltage	Vcc	-0.5		4.0	V	
Storage Temperature	TS	-40		85	°C	
Relative Humidity	RH	0		85	%	1
Receiver Optical Damage Threshold	RxDamage	5			dBm	

Note 1: Non-condensing

2. Electrical Characteristics

(TOP = -5 to +85 °C)

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
Supply Voltage	Vcc	3.14		3.46		
Supply Current	Icc			800	mA	1
Module total power dissipation	P			2.5	W	2
Transmitter						
Input differential impedance	Rin	80	100	120	Ω	
Differential data input swing	Vin,pp	200		850	mV	3
Transmit Disable Voltage	VD	Vcc-0.8		Vcc	V	
Transmit Enable Voltage	VEN	Vee		Vee+ 0.8	V	
Receiver						
Output differential impedance	Rout	80	100	120	Ω	
Differential data output swing (Rx input power - 18dBm to -7dBm)	Vout,pp	150		850	mV	4
Output rise time and fall time	Tr, Tf	28			ps	4,5
LOS asserted	VLOS_A	Vcc-0.8		Vcc	V	
LOS de-asserted	VLOS_D	Vee		Vee+0.8	V	
Power Supply Noise Tolerance	VccT/ VccR	Per SFF-8431 Rev 4.1			mVpp	

Notes:

1. Compliant with the SFP+ Module Power Supply Requirements defined in SFF-8431.
2. Maximum total power value is specified across the full temperature and voltage range.
3. Connected directly to TX data input pins.
4. Into 100Ω differential termination.
5. 20 – 80%. Measured with Module Compliance Test Board and OMA test pattern.
   Use of four 1's and four 0's sequence in the PRBS 9 is an acceptable alternative. SFF-8431 Rev 4.1.

3. Optical Characteristics

(TOP = -5 to +85 °C, VCC = 3.14 to 3.46 Volts)

Parameter		Symbol	Min	Typ	Max	Unit	Ref.
Transmitter (Tx)							
Average Launch Power		PAVE	-1		+3	dBm	
Optical Wavelength		λc	As per ITU-T 694.1, 50GHz spacing 1528.77 to 1563.86			nm	
Side-Mode Suppression Ratio		SMSR	30			dB	
Optical Extinction Ratio		ER	8.2			dB	
Average Launch power when Tx is OFF		POFF			-30	dBm	
Tx Jitter 20kHz - 80MHz		Txj1			0.3	UI	
Tx Jitter 4MHz - 80MHz		Txj2			0.1	UI	
Relative Intensity Noise		RIN			-128	dB/Hz	
Center Wavelength	Beginning of Life	λc_BOL	z-1.5	z	z+1.5	GHz	
	End of Life	λc_EOL	z-2.5	z	z+2.5	GHz	
Receiver (Rx) at 0ps/nm							
Bit rate	**BER**						
8.5, 9.95	<1E-12	RSENS1			-24.0	dBm	1,2
10.7 Gb/s	<1E-12	RSENS2			-23.0	dBm	1,2
11.1 Gb/s	<1E-4	RSENS3			-27.0	dBm	
11.3 Gb/s	<1E-4	RSENS4			-27.0	dBm	
Overload (Average Power)		PAVE			-7	dBm	
Optical Center Wavelength		λC	1260		1600	nm	
LOS De-Assert		LOSD			-25	dBm	
LOS Assert		LOSA	-34		-27	dBm	
LOS Hysteresis		LOSH	0.5			dB	
Receiver Reflectance		Rrx			-27	dB	

Receiver Sensitivity[3]					
Data rate (Gb/s)	BER	Dispersion (ps/nm)	Sensitivity back-to- back at OSNR>30dB (dBm)	Dispersion Penalty at OSNR>30dB (dB)	Threshold Adjust Required
9.95	1e-12	-300 to 1450	-24	2	No[5]
10.3	1e-12	-300 to 1450	-23	2.5	No[5]
10.7	1e-4	-300 to 1300	-27	3	Yes[6]
11.1	1e-4	-300 to 1300	-27	3	Yes[6]
11.3	1e-4	-300 to 1300	-27	3.5	Yes[6]

OSNR Performance[4]					
Data rate (Gb/s)	BER	Dispersion (ps/nm)	Min OSNR Back- to-back at Power: -18dBm to -7dBm (dB)	Max OSNR Penalty at Power: -18 to -7dBm (dB)	Threshold Adjust Required
9.95	1e-12	-300 to 1450	24	4	Yes[6]
10.3	1e-12	-300 to 1450	24	4	Yes[6]
10.7	1e-4	-300 to 1300	16	4	Yes[6]
11.1	1e-4	-300 to 1300	16	4	Yes[6]
11.3	1e-4	-300 to 1300	17	4	Yes[6]

Notes:

1. Measured with worst ER=8.2dB; BER<10^{-12}; 2^{31} – 1 PRBS.
2. For 10GEthernet application, -24dBm is equivalent to an OMA of -22.09dBm for an ER = 8.2 dB.
3. Measured at 1528-1600nm with worst ER; PRBS31.
4. All OSNR measurements are performed with 0.1nm resolution.
5. Linecard SerDes input threshold adjustment required (set to 50%) at 9.95 and 10.3Gb for AGC ROSA only
6. Linecard SerDes input threshold adjustment required for AGC ROSA. RxDTV control required for Limiting ROSA

4. General Specifications

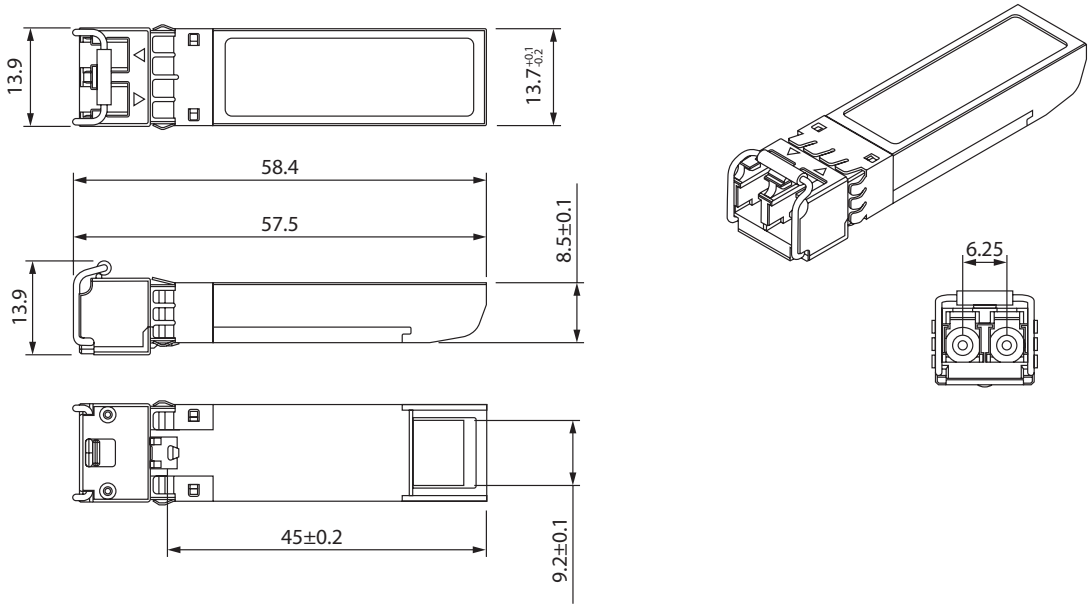
Parameter	Symbol	Min	Typ	Max	Units	Ref.
Bit Rate	BR	8.5		11.3168	Gb/s	1
Max. Supported Link Length	LMAX			80	km	2
Case Operating Temperature	Top	0		70	°C	
Storage Temperature	Tsto	-40		85	°C	

Notes:

1. Tested with a 2^{31} – 1 PRBS pattern at the BER defined in Table 4.

2. Over G.652 single mode fiber.

5. Mechanical Diagram



Note: External physical characteristics are subject to variation. This may include, but is not limited to, external case designs, pull tab colors and/or shapes, removal latch styles or colors, and label sizes and placement. These variations do not affect the function or characteristics of the transceivers.

6. Ordering Information

OEM	Part Number	OEM	Part Number
MSA	AN-SFPP-ATUNE-80		

7. Contact Information

Tel: 800.590.9535
Web: http://www.approvednetworks.com