

## Features

- Operating Data Rate Support 25.78Gbps
- 1300nm EML laser on transmitter side
- Integrated SOA and PIN TIA on receiver side
- Single 3.3V Power Supply
- Distance up to 80Km over SMF
- Duplex LC Connector Interface, Hot Pluggable
- Built-in Dual CDR
- Compliant with MSA SFP+ Specification SFF-8472
- Power Dissipation: < 2.5W



- Operating Case Temperature Commercial: 0°C~70°C
- Safety Certification: TUV/UL/FDA

## Applications

- 25GbE applications with FEC on host side
- Other Optical Links

## 1. Absolute Maximum Ratings

Exceeding the absolute maximum ratings table may cause permanent damage to the device. This is just an emphasized rating, and does not involve the functional operation of the device that exceeds the specifications of this technical specification under these or other conditions. Long term operation under absolute maximum ratings will affect the reliability of the device.

Parameter	Symbol	Min	Typ	Max	Unit
3.3V Power Supply Voltage	Vcc	-0.5	3.3	3.6	V
Storage Temperature	TS	-40		85	°C
Relative Humidity (Non-Cond.)	RH	0		85	%

## 2. Recommended Operating Conditions

For operations beyond the recommended operating conditions, optical and electrical characteristics are not defined, reliability is not implied, and such operations for a long time may damage the module.

Parameter	Symbol	Min.	Typical	Max.	Unit
Storage Temperature	Ts	-40		85	°C
Operating Case Temperature*6	TC	0		70	°C

Operating Relative Humidity	RH			65	%
Power Supply Voltage	Vcc	3.135	3.3	3.465	V
Power Supply Noise*7				25	mVpp
Power Dissipation	PD			2.5	W
Electrical Signal Rate *8			25.78125		GBd
Optical Signal Rate *9			25.78125		GBd
Receiver Differential Data Output Load		90	100	110	Ohm
Fiber Length *10				80	Km

- Power Supply specifications, Instantaneous, sustained and steady state current compliant with SFP28 MSA Power Classification.
- The position of case temperature measurement is shown in Figure 8. Continuous operation at the maximum Recommended Operating Case Temperature should be avoided in order not to degrade reliability.
- Power Supply Noise is defined as the peak-to-peak noise amplitude over the frequency range at the host supply side of the recommended power supply filter with the module and recommended filter in place. Voltage levels including peak-to-peak noise are limited to the recommended operating range of the associated power supply.
- 25GAUI operation with Host generated FEC. The transmitter must receive pre-coded FEC signals from the host ASIC.
- 25G ZR operation with Host generated FEC. The transmitter must receive pre-coded FEC signals from the host ASIC.
- 9um SMF. The maximum link distance is based on an allocation of 27dB of attenuation and 3dB total connection and splice loss. The loss of a single connection shall not exceed 0.5dB.

### 3. Electrical Characteristics

Unless otherwise stated, the following characteristics are defined under recommended operating conditions.

Parameter	Symbol	Min.	Typical	Max.	Unit	Standard
<b>General</b>						
Transceiver Power Consumption	PD			2.5	W	
Transceiver Power Supply Total Current	ICC			722	mA	
AC Coupling Internal Capacitor			0.1		uF	
Parameter	TP	Min.	Typical	Max.	Unit	Standard
<b>High Speed Electrical Input</b>						
Signaling Rate Per Lane	TP1	25.78125+/-100 ppm			GBd	
DC Common-Mode Output Voltage*13	TP1	-350		2850	mV	
Differential peak-peak Input Voltage Tolerance	TP1a	900			mV	

Single-Ended Voltage Tolerance Range	TP1a	-400		3300	mV	
Differential Input Return Loss (Min)	TP1	Equation (83E-2)			dB	802.3ba
Common To Differential Mode Conversion Return Loss (Min)	TP1	Equation (83E-3)			dB	802.3ba
Differential Termination Mismatch	TP1		10		%	
Module Stressed Input Test <sup>*14</sup>		83E.3.4.1				
Eye Width	TP1a		0.46		UI	
Eye Height	TP1a		95		mV	
Applied peak-peak Sinusoidal Jitter	TP1a	Table 88-13				802.3ba
<b>High Speed Electrical Output</b>						
Signaling Rate Per Lane (Range)	TP4a	25.78125 ± 100 ppm			GBd	
Common Mode Voltage	TP4a	-0.3	2.8		V	
Differential peak-peak Input Voltage Tolerance	TP4	900			mV	
Differential Input Return Loss (Min)	TP4a	Equation(83E-2)			dB	
Differential To Common Mode Input Return Loss (Min)	TP4a	Equation(83E-3)			dB	
Differential Termination Mismatch	TP4a	10			%	
Host Stressed Input Test		83E3.3.2				
Eye Width	TP4	0.57			UI	
Eye Height	TP4	228			mV	
Applied peak-peak Sinusoidal Jitter	TP4	Table 88-13				

13. DC common mode voltage generated by the host. Specification includes effects of ground offset voltage.

14. Module stressed input tolerance is measured using the procedure defined in 83E.3.4.1.

## 4. Optical Characteristics

@TP2 Test Point

Parameter	Symbol	Min	Typical	Max	Unit
<b>Transmitter</b>					
Signaling Speed			25.78		Gbps
Modulation Format			NRZ		
Center Wavelength	$\lambda_C$	1299.02	1300.05	1301.09	nm
Side-mode suppression ratio	SMSR	30			dB
Spectral Width (20dB)	$\Delta\lambda$			1	nm
Extinction Ratio	ER	8			dB
Average Launch Power <sup>*15</sup>	Pavg	2		7	dBm
Optical Modulation Amplitude (OMA) <sup>*16</sup>	POMA	3.7		8.6	dBm
Average launch power of OFF transmitter	Poff			-30	dBm
Transmitter dispersion penalty*17	TDP			3	dB
Optical Return Loss Tolerance				20	dB
Transmitter reflectance <sup>*18</sup>				-26	dB
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3} <sup>*19</sup>		{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}			
<b>Receiver</b>					
Signaling Speed			25.78125		Gbps
Center Wavelength	$\lambda_C$	1299.02	1300.05	1301.09	nm
Receiver overload	Psat	-6			dBm
Average Receive Power <sup>*20</sup>	Rx_pow	-31		-6	dBm
Damage threshold(min) <sup>*21</sup>	PDAMAGE			-5	dBm
Receiver Sensitivity(OMA) <sup>*22</sup>	Rx_sens			-26.5	dBm
LOS Assert(Avg.)	LOSA	-40		-32.5	dBm
LOS De-Assert(Avg.)	LOSD			-29.5	dBm
LOS Hysteresis		0.5			dB
Receiver Reflectance	ORL			-26	dB

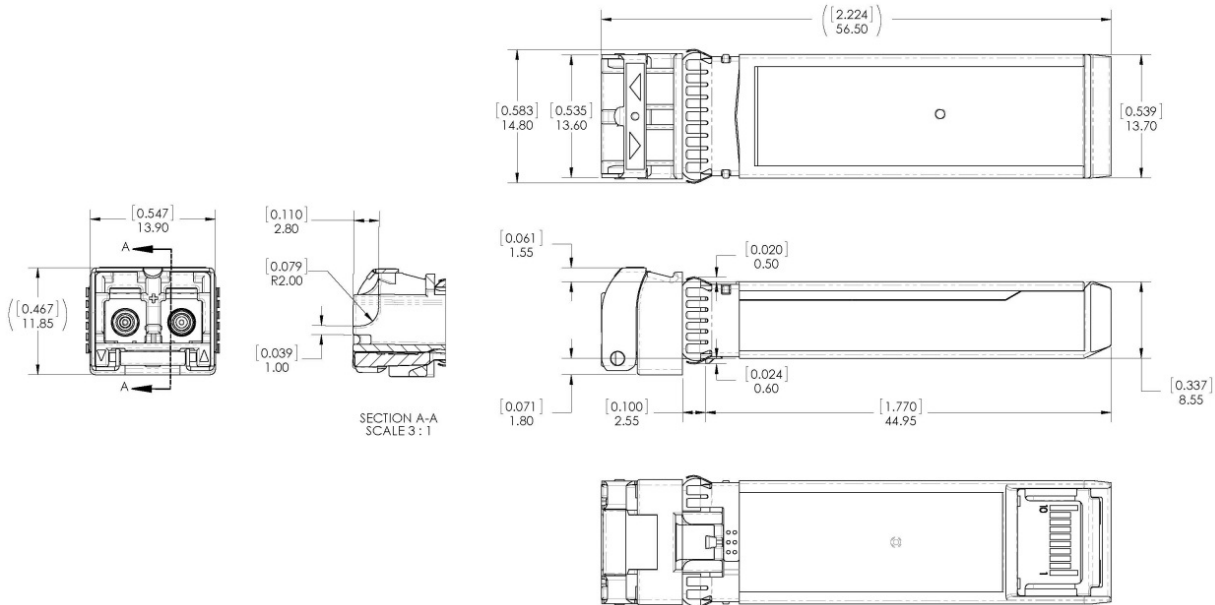
15. Average launch power, each lane (min) is informative and not the principal indicator of signal strength. A transmitter with launch power below this value cannot be compliant; however, a value above this does not ensure compliance.
16. Even if the TDP < 1.0dB, the OMA (min) must exceed 0.5dB.
17. Measured at 25.78125Gbps & BER = 5\*10<sup>-5</sup>.
18. Transmitter reflectance is defined looking into the transmitter.
19. Vertical eye closure penalty, stressed eye J2 Jitter, stressed eye J4 Jitter, and SRS eye mask definition are test conditions

for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

20. Average receive power, each lane (min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant; however, a value above this does not ensure compliance.
21. The receiver shall be able to tolerate, without damage, continuous exposure to an optical signal having this average power level.
22. Receiver sensitivity (OMA), each lane (max) at 5\*10<sup>-5</sup> BER is a normative specification.

## 5. Mechanical Diagram

The module is designed to meet the package outline defined in the SFP28 MSA specification. See the package outline for details.



**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-SFP25G-ZR		

## 7. Contact Information

Tel: 800.590.9535

Web: <http://www.approvednetworks.com>