Specification

Small Form Factor Pluggable

Duplex LC Receptacle – SFP+

Optical Transceivers

10Gbps Ethernet
10GBASE-ER/EW

Ordering Information

T AS – A 1 N S 5 – K A B

Model Name	TAS-A1NS5-KAB	Note
Device type	1550nm EML	
Interface	AC/AC	
Voltage	3.3V	
Temperature	0~70℃	
Distance	40Km	
Latch Color	Red	

Features

- Supports up to 10.7Gbps bit rates
- Hot-pluggable SFP+ footprint
- Un-cooled 1550nm Cooled EML laser and PIN photodiode, Up to 40km for SMF transmission
- Compliant with SFP+ MSA and SFF-8472 with duplex LC receptacle
- Compatible with RoHS
- Single +3.3V power supply
- Real Time Digital Diagnostic Monitoring
- Case operating temperature: -0℃ ~ +70℃

Product Applications

- 10Gbps Optical systems
- 10GBASE-ER at 10.3125Gbps
- 10GBASE-EW at 9.953Gbps
- LTE systems
- Optical links

General

The SFP+ transceivers are high performance, cost effective modules supporting data rate of 10Gbps and 40km transmission distance with SMF .

The transceiver consists of three sections: a Cooled EML laser transmitter, a PIN photodiode integrated with a trans-impedance preamplifier (TIA) and MCU control unit. All modules satisfy class I laser safety requirements.

The transceivers are compatible with SFP Multi-Source Agreement and SFF-8472 digital diagnostics functions.

Performance Specifications

Absolute Maximum Ratings					
Parameter	Symbol	Min.	Max.	Unit	Note
Storage Temperature	Ts	-40	85	℃	
Operating Humidity	RH	5	85	%	
Power Supply Voltage	VCC	-0.5	4.5	V	

Recommended Operating Conditions						
Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Case Operating Temperature	TC	0	-	70	℃	
Power Supply Voltage	VCC	3.14	3.3	3.47	V	-
Power Supply Current	ICC	-	-	550	mA	-
Transmission Distance	TD	-	-	40	Km	
Date Rate		1.0	10.3	10.7	Gbps	

Electrical Optical Characteristics							
Transmitter							
Parameter		Symbol	Min.	Typ.	Max.	Unit	Note
Centre Wavelength		λc	1530	1550	1565	nm	
Spectral Width（-20dB）		Δλ	-	-	1	nm	
Side-Mode Suppression Ratio		SMSR	30	-	-	dB	
Average Output Power		Pout	-1	-	+2	dBm	Note (1)
Extinction Ratio		ER	6.0	-	-	dB	
Data Input Swing Differential		V_{IN}	180	-	850	mV	Note (2)
Input Differential Impedance		Z_{IN}	90	100	110	Ω	
TX Disable	Disable	2.0	-	Vcc	V		
	Enable	0	-	0.8	V		
TX Disable	Fault	2.0	-	Vcc	V		
	Normal	0	-	0.8	V		
Receiver							
Centre Wavelength		λc	1260	-	1600	nm	
Receiver Sensitivity			-	-	-15.5	dBm	Note (3)

Receiver Overload		0.5			dBm	Note (3)
LOS De-Assert	LOS_D			-17	dBm	
LOS Assert	LOS_A	-28			dBm	
LOS Hysteresis		0.5		4	dB	
Data Output Swing Differential	Vout	300		900	mV	Note (4)
LOS	High	2.0		Vcc	V	
	Low			0.8	V	

Note:

1. The optical power is launched into SMF
2. PECL input, internally AC-coupled and terminated
3. Measured with RPBS 2^{31}-1 test pattern @10.3125Gbs BER≤$1x10^{-12}$
4. Internally AC-coupled

Timing and electrical

Parameter	Symbol	Min.	Typical	Max.	Unit
Tx Disable Negate Time	T_on	-	-	1	ms
Tx Disable Assert Time	T_off	-		10	μs
Time To Initialize, including Reset of Tx Fault	T-init	-	-	300	ms
Tx Fault Assert Time	T_fault	-	-	100	μs
Tx Disable To Reset	T_reset	10	-		μs
LOS Assert Time	T_loss_on	-	-	100	μs
LOS De-assert Time	T_loss_off	-	-	100	μs
Serial ID Clock Rate	F_serial_clock	-	100	400	KHz
MOD_DEF (0:2)-High	VH	2	-		V
MOD_DEF (0:2)-Low	VL	-	-	0.8	V

Diagnostics

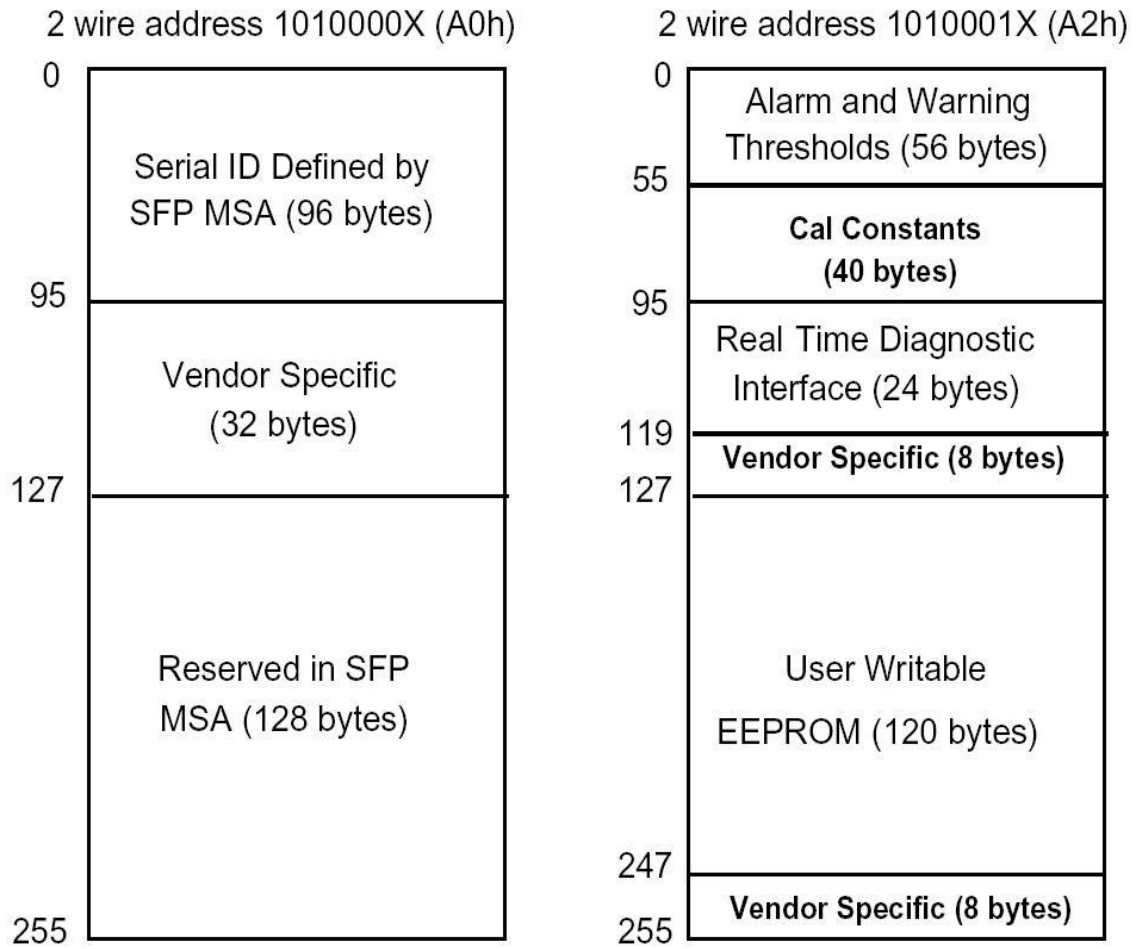
Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70	°C	±3°C	Internal
Voltage	3.0 to 3.6	V	±3%	Internal
Bias Current	0 to 100	mA	±10%	Internal
TX Power	-1 to +2	dBm	±3dB	Internal
RX Power	-16 to -1	dBm	±3dB	Internal

Digital Diagnostic Memory Map

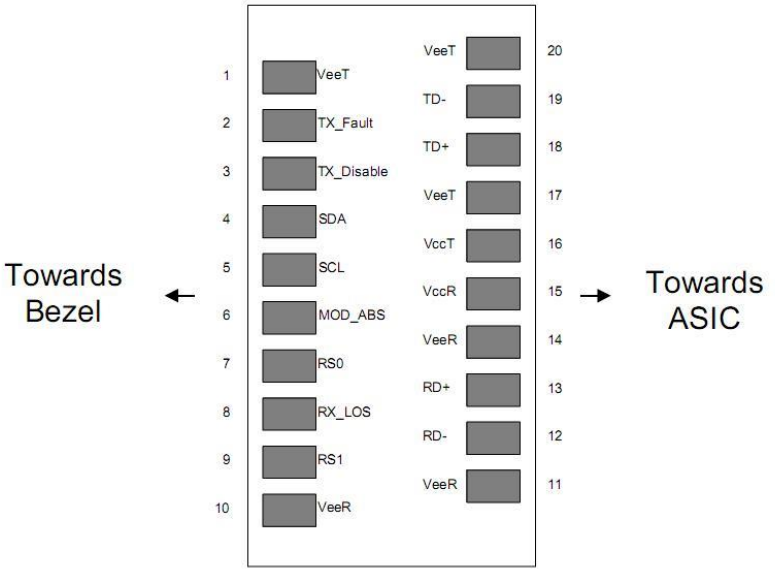
The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

The diagnostic information with internal calibration or external calibration all are implemented, including received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring.

The digital diagnostic memory map specific data field defines as following.



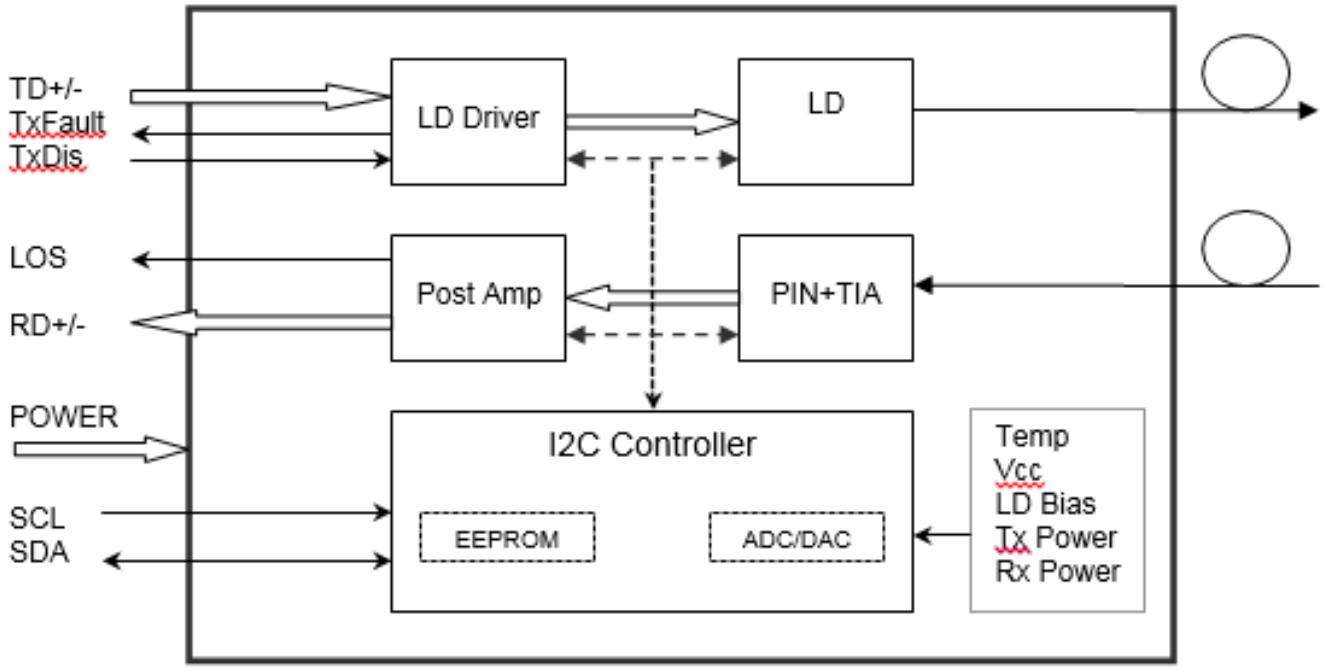
PIN Diagram



Pin No.	Name	Function	Notes
1	VeeT	Transmitter Ground	
2	Tx Fault	Transmitter Fault Indication	1
3	Tx Disable	Transmitter Disable	2
4	SDA	SDA Serial data singal	
5	SCL	SCL Serial Clock Signal	
6	MOD-ABS	Module absent. Grounded with the module.	
7	RS0	Not connected	
8	LOS	Loss of Signal	3
9	RS1	No connection required	
10	VeeR	Receiver Ground	
11	VeeR	Receiver Ground	
12	RD-	Inv. Receiver Data Out	4
13	RD+	Receiver Data Out	4
14	VeeR	Receiver Ground	
15	VccR	Receiver Power Supply	
16	VccT	Transmitter Power Supply	
17	VeeT	Transmitter Ground	
18	TD+	Transmitter Data In	5
19	TD-	Inv.Transmitter Data In	5
20	VeeT	Transmitter Ground	

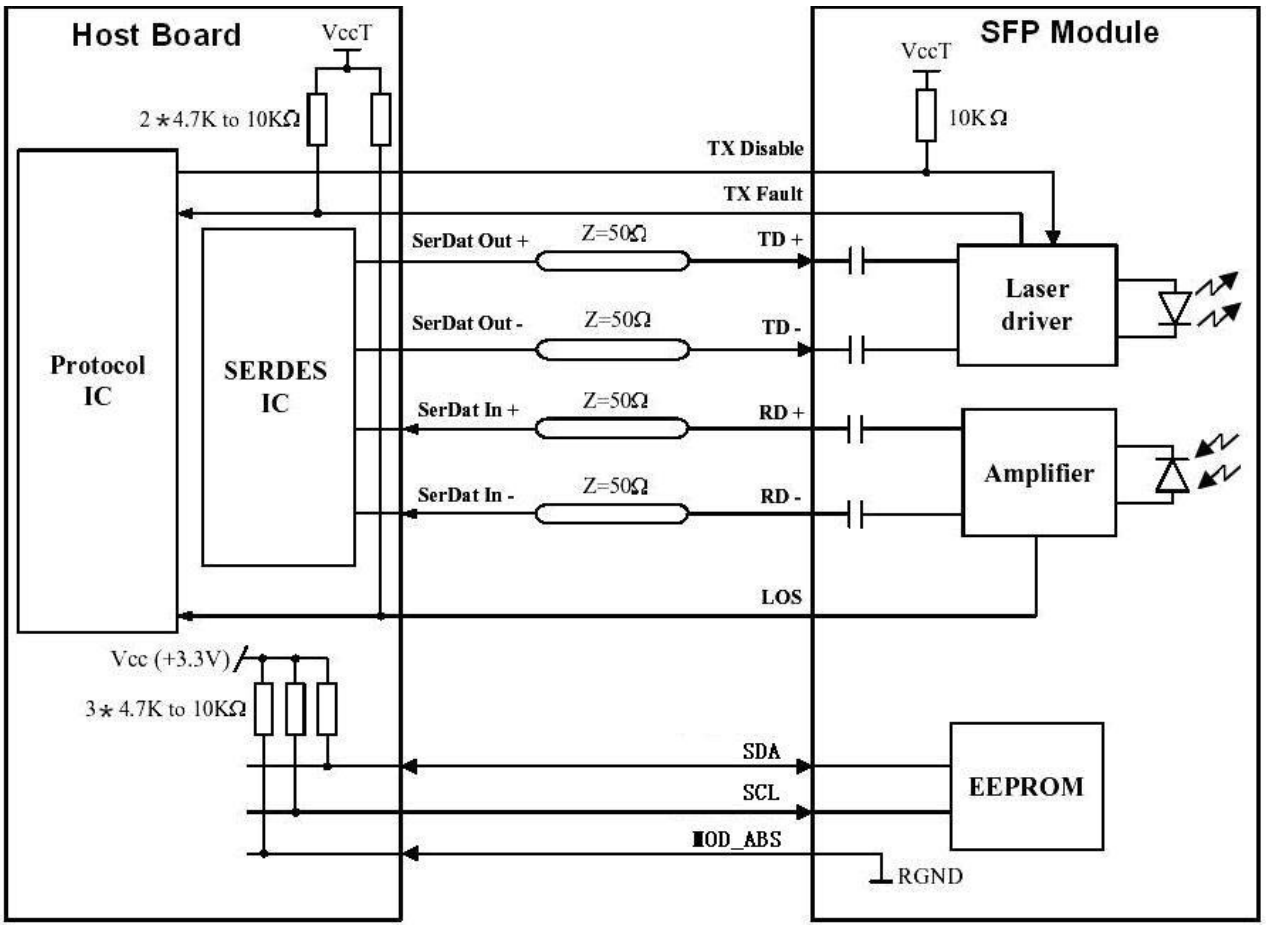
Note

1. **TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; Logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.**
2. **Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.**
3. **LOS is open collector output. Should be pulled up with 4.7k~10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.**
4. **RD-/+: These are the differential receiver outputs. They are internally AC-coupled 100 differential lines which should be terminated with 100Ω (differential) at the user SERDES.**
5. **TD-/+: These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module.**

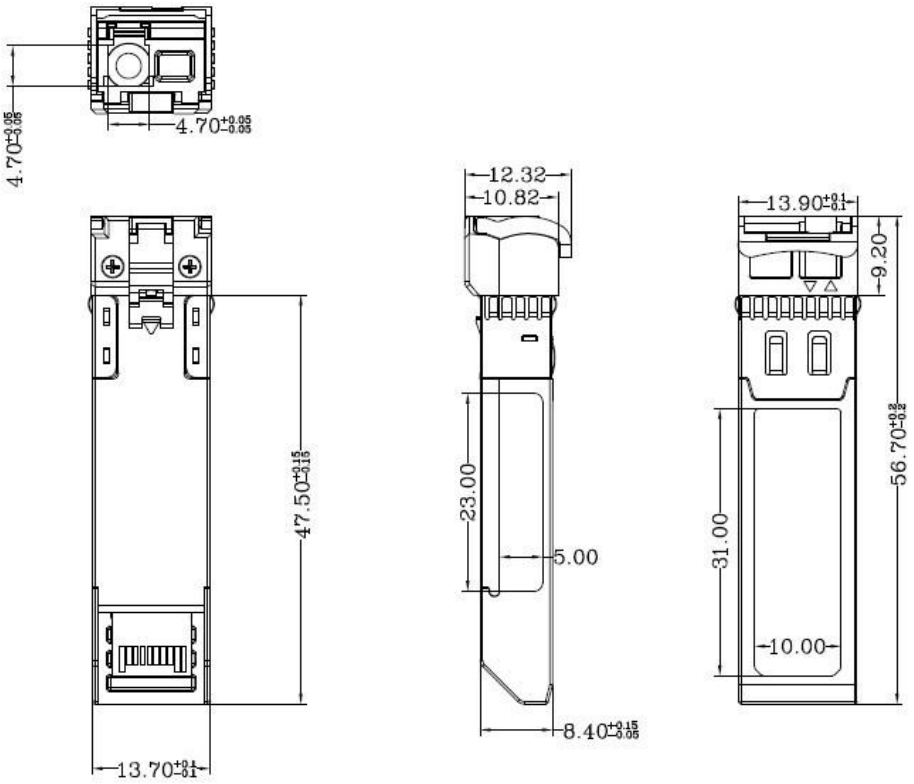


Transceiver functional diagram

Recommended Circuit



Package Diagram



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Revision History

Date	Version	Description
12/21/2020	1.0	Initial release