

10Gb/s Spring-Latch SFP+ Transceiver

With DDM Function
(For 1550nm 20km transmission)



Features

- ◆ Operating data rate 8.5-10.51875Gbps
- ◆ 1550nm DFB laser and PIN photo detector
- ◆ Hot pluggable 20pin connector
- ◆ 20km transmission with SMF
- ◆ SFP MSA package with duplex LC connector
- ◆ With Spring-Latch for high density application
- ◆ Very low EMI and excellent ESD protection
- ◆ $+3.3V \pm 5\%$ single power supply
- ◆ Operating case temperature:
Standard: 0 to $+70^{\circ}C$
Industrial: -40 to $+85^{\circ}C$ (Optional)
- ◆ Real time monitoring of:
 - Transmitted optical power
 - Received optical power
 - Laser bias current
 - Temperature
 - Supply voltage

Applications

- ◆ 10GBASE-LR/LW 10G Ethernet
- ◆ 10GFC
- ◆ 8GFC

Standard

- ◆ Compatible with SFP+ MSA

- ◆ Compatible with IEEE 802.3ae 10GBASE-LR/LW
- ◆ FC-P1-4 Rev 7.0
- ◆ SFF-8431 Rev 3.0
- ◆ SFF-8472 Rev 10.2
- ◆ 10GFC Rev 4.0
- ◆ RoHS compliance (Optional)

Description

The SFP transceiver is high performance, cost effective module supporting dual data-rate of 8.5-10.51875Gbps and 10km transmission distance with SMF.

The transceiver consists of two sections: The transmitter section incorporates a DFB laser. And the receiver section consists of a High sensitivity PIN photodiode integrated with a TIA. All modules satisfy class I laser safety requirements.

It incorporates the SFP MSA LVTTTL Loss of Signal (Rx_LOS), Tx Fault (Tx_FAULT) and Tx Disable (Tx_DIS) monitor and control functions and the SFF-8472 Rev 10.2 compliant digital diagnostic monitor feature which is accessed via the I²C 2-wire serial ID interface (MOD_DEF 0-1-2). The differential AC coupled Tx and Rx data interfaces (50 ohms to ground, 100 ohms line to line) are CML compatible. The device is Class I laser safety compliant.

For further information, please refer to SFP MSA and SFF-8472 Rev10.2.

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Absolute Maximum Ratings

Table 1 - Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Units
Storage Temperature	Tstg	-40	+85	°C
Relative Humidity -Storage	RHS	0	95	%
Relative Humidity -Operating	RHO	0	85	%
DC Supply Voltage	VCC	0	3.6	V
Tx DATA	Vin	0	VCC + 0.5	V
Optical and Electrical Signal Absolute Maximum Ratings				
Signal / Data Input Voltage (Tx_DATA)	VIN PK-PK	-	2.4	V
Rx Optical Input Power	PIN-MAX		3	dBm
Logic State Absolute Maximum Ratings				
Tx_DISABLE Logic HIGH State	Tx_DIS	-	VCC+0.5	V
Tx_FAULT Logic HIGH State	Tx_FAULT	-	VCC+0.5	V
Rx_LOS Logic HIGH State	Rx_LOS	-	VCC+0.5	V

Note: Exceeding these ratings may cause irreversible damage to the device.

Recommended Operating Conditions

Table 2- Recommended Operating Conditions

Parameter		Symbol	Min.	Typical	Max.	Unit
Operating Temperature	Standard	TC	0		+70	°C
	Industrial		-40		+85	
Power Supply Voltage		VCC	3.13		3.47	V
Power Supply Current		Icc		260	300	mA
Data Rate	800-SM-LC-L	DR		8.5		Gbps
	10GBASE-LW			9.953		
	10GBASE-LR			10.3125		
	1200-SM-LL-L			10.51875		

Digital Diagnostic Monitor Characteristics

Parameter	Min.	Unit
Tx Output Power Accuracy	±3.0	dBm
Rx Input Power Accuracy	±3.0	dBm
Laser Bias Current Accuracy	±1 0	%
Transceiver Internal Temperature Accuracy	±3.0	°C
Transceiver Internal Supply Voltage Accuracy	±0.1	V

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(1310nm DFB and PINTIA, 10km)

Table 3 - Optical and Electrical Characteristics

Parameter		Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter							
Centre Wavelength		λ_C	1520	1550	1580	nm	
Average Output Power		P _{0ut}	-8.2		0.5	dBm	1
P _{0ut} @TX Disable Asserted		P _{0ut}			-35	dBm	1
Side Mode Suppression Ratio		SMSR	30			dB	
Spectral Width (-20dB)		σ			0.3	nm	
Extinction Ratio		EX	3.5	5.0		dB	3
Optical Return Loss Tolerance		ORLT			12	dB	
Output Optical Eye		IEEE 802.3z and ANSI Fibre Channel Compatible					4
Data Input Swing Differential		V _{IN}	180		700	mV	5
Input Differential Impedance		Z _{IN}	90	100	110	Ω	
TX Disable	Disable		2.0		V _{cc}	V	
	Enable		0		0.8	V	
TX Fault	Fault		2.0		V _{cc} +0.3	V	
	Normal		0		0.8	V	
Receiver							
Centre Wavelength		λ_C	1100	1550	1650	nm	
Receiver Sensitivity					-12.6	dBm	6
Receiver Overload			-0.8			dBm	6
Return Loss					12	dB	
LOS De-Assert		LOSD			-17	dBm	
LOS Assert		LOSA	-30			dBm	
LOS Hysteresis			0.5			dB	
DataOutput Swing Differential		V _{OUT}	370	600	850	mV	5
Output Rise Time		T _{RISE}	25			pS	2
Output Fall Time		T _{FALL}	25			pS	2
LOS	High		2.0		V _{cc} +0.3	V	
	Low		0		0.8	V	

Notes:

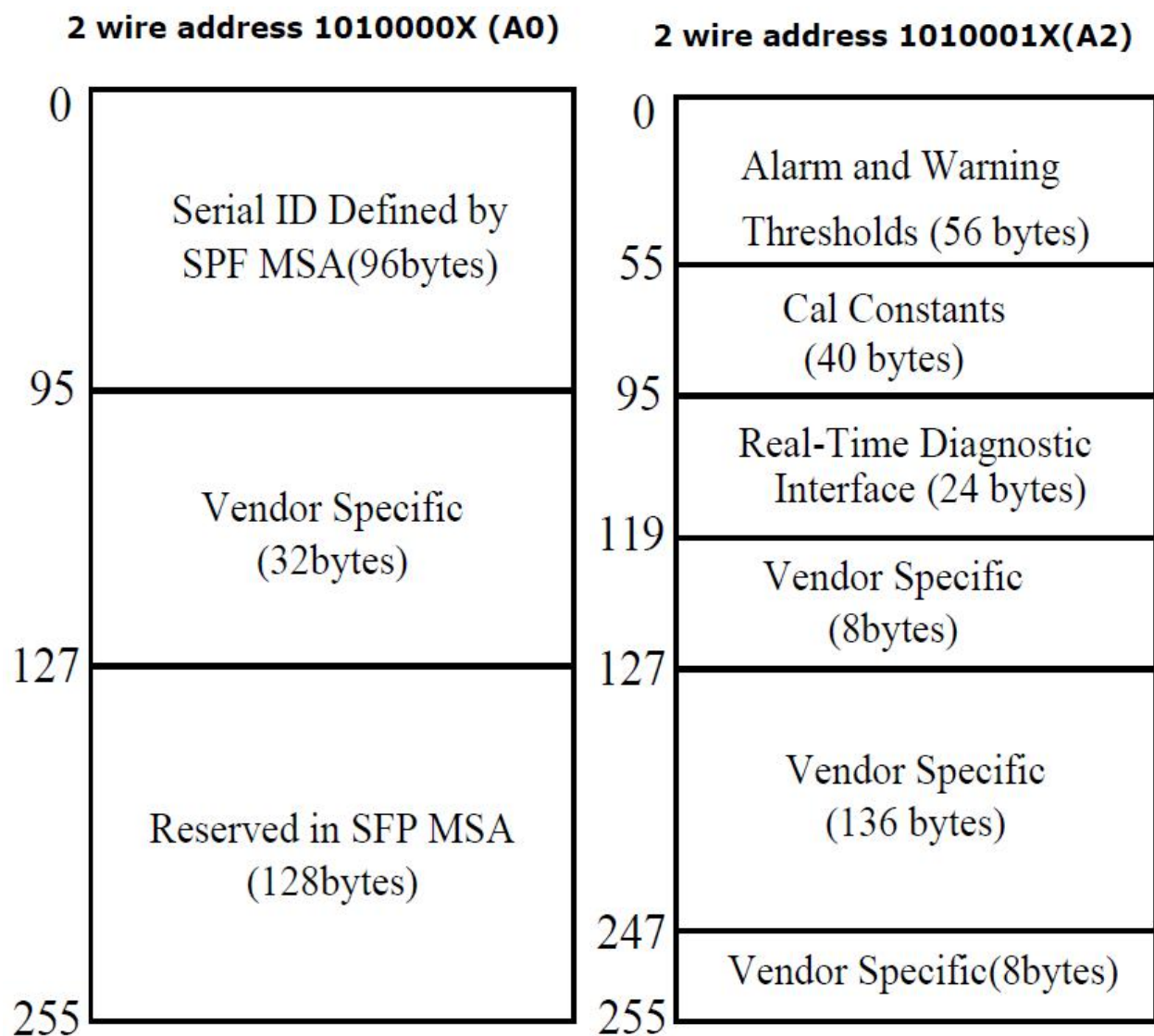
1. The optical power is launched into SMF.
2. Unfiltered, measured with a PRBS 2³¹-1 test pattern @10Gbps
3. Meet the specified maximum output jitter requirements if the specified maximum input jitter is present.
4. Measured with a PRBS 2³¹-1 test pattern @10Gbps.
5. CML logic, internally AC coupled.
6. Measured with a PRBS 2³¹-1 test pattern @10Gbps, worst-case extinction ratio, BER ≤1×10⁻¹².

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Digital Diagnostic Memory Map



EEPROM Information

The SFP SMA defines a 256-byte memory map in EEPROM describing the transceiver's capabilities, standard interfaces, manufacturer, and other information, which is accessible over a 2 wire serial interface at the 8-bit address 1010000X (A0h). The memory contents refer to Table 6

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Table 6 - EEPROM Serial ID Memory Contents (A0h)

Addr.	Field Size (Bytes)	Name of Field	Hex	Description
0	1	Identifier	03	SFP+
1	1	Ext. Identifier	04	SFP function is defined by serial ID only
2	1	Connector	07	LC
3—10	8	Transceiver		Transmitter Code
11	1	Encoding	03	NRZ
12	1	BR, nominal	64	8.5-10.52Gbps
13	1	Reserved	00	
14	1	Length (9um)-km	Xx	20km
15	1	Length (9um)		20km
16	1	Length (50um)		
17	1	Length (62.5um)		
18	1	Length (copper)	00	
19	1	Reserved	00	
20—35	16	Vendor name	4E 4F 41 48 20 20 20 20 20 20 20 20 20 20 20 20	"NOAH "(ASC II)
36	1	Reserved	00	
37—39	3	Vendor OUI	00 00 00	
40—55	16	Vendor PN	4E 53 33 39 32 39 33 33 2D 44 20 20 20 20 20 20	"NS392933-D " (ASC II)
56—59	4	Vendor rev	xx xx xx xx	ASC II ("31 30 20 20" means 1.0 revision)
60-61	2	Wavelength	06 0E	1550nm
62	1	Reserved	00	
63	1	CC BASE	xx	Check sum of bytes 0 - 62
64—65	2	Options	00 1A	LOS, TX_FAULT and TX_DISABLE
66	1	BR, max	00	
67	1	BR, min	00	
68—83	16	Vendor SN	xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx	ASC II
84—91	8	Vendor date code	xx xx xx xx xx xx 20 20	Year(2 bytes), Month(2 bytes), Day (2 bytes)
92	1	Digital diagnostic monitoring type	68	Digital diagnostic monitoring implemented, "externally calibrated" is implemented, RX measurement type is "Average Power".
93	1	Enhanced	F6	Optional Alarm/Warning flags

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		Options		implemented for all monitored quantities, Optional Soft TX_FAULT monitoring implemented, Optional Soft RX_LOS monitoring implemented.
94		SFF_8472 Compliance	03	Includes functionality described in Rev10.2 SFF-8472.
95		CC_EXT		
96-127		Vendor specifi	Read only	Depends on customer information
128-255		Reserved	Read only	

Note: The “xx” byte should be filled in according to practical case. For more information, please refer to the related document of SFP Multi-Source Agreement (MSA).

Diagnostic Monitor Functions

Diagnostic Monitor Functions interface uses the 2 wire address 1010001X(A2). Memory contents of Diagnostic Monitor Functions are shown in Table 7

Table 7 Memory contents of Diagnostic Monitor Function

Data Address	Field Size (bytes)	Name	Contents and Description
Alarm and Warning Thresholds			
00-01	2	Temperature High Alarm	Set to 70℃
02-03	2	Temperature Low Alarm	Set to -5 ℃
04-05	2	Temperature High Warning	Set to 65 ℃
06-07	2	Temperature Low Warning	Set to 0 ℃
08-09	2	Vcc High Alarm	Set to 3.6 V
10-11	2	Vcc Low Alarm	Set to 3.0 V
12-13	2	Vcc High Warning	Set to 3.5 V
14-15	2	Vcc Low Warning	Set to 3.1 V
16-17	2	Bias High Alarm	$2 \times \text{IBias}(25^\circ\text{C}) + 20$
18-19	2	Bias Low Alarm	$25\% \times \text{IBias}(25^\circ\text{C})$
20-21	2	Bias High Warning	$2 \times \text{IBias}(25^\circ\text{C}) + 10$
22-23	2	Bias Low Warning	$50\% \times \text{IBias}(25^\circ\text{C})$
24-25	2	TX Power High Alarm	Manufacture measurement plus 2dB
26-27	2	TX Power Low Alarm	Manufacture measurement minus 2dB
28-29	2	TX Power High Warning	Manufacture measurement plus 1dB
30-31	2	TX Power Low Warning	Manufacture measurement minus 1dB
32-33	2	RX Power High Alarm	Maximum input optical power
34-35	2	RX Power Low Alarm	Minimum input optical power

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36-37	2	RX Power High Warning	Maximum input power minus 3dB
38-39	2	RX Power Low Warning	Manufacture measurement plus 3dB
40-55	16	Reserved	
Calibration Constants			
56-59	4	RX Power Calibration Data4	Single precision floating-point
60-63	4	RX Power Calibration Data3	(various values at each device)
64-67	4	RX Power Calibration Data2	Single precision floating-point (various values at each device)
68-71	4	RX Power Calibration Data1	
72-75	4	RX Power Calibration Data0	
76-77	2	Bias Calibration Data1	00 01 (fixed)
78-79	2	Bias Calibration Data0	00 00 (fixed)
80-81	2	TX Power Calibration Data1	00 01 (fixed)
82-83	2	TX Power Calibration Data0	00 00 (fixed)
84-85	2	Temperature Calibration Data1	00 01 (fixed)
86-87	2	Temperature Calibration Data0	00 00 (fixed)
88-89	2	Vcc Calibration Data1	00 01 (fixed)
90-91	2	Vcc Calibration Data0	00 00 (fixed)
92-94	3	Reserved	00 00 00 (fixed)
95	1	Check Sum	Checksum of bytes 0-94
Real Time Diagnostic Monitor Interface			
96-97	2	Measured Temperature	Yield a 16-bit A/D value (see Table 8)
98-99	2	Measured Vcc	Yield a 16-bit A/D value (see Table 8)
100-101	2	Measured Bias	Yield a 16-bit A/D value (see Table 8)
102-103	2	Measured TX Power	Yield a 16-bit A/D value (see Table 8)
104-105	2	Measured RX Power	Yield a 16-bit A/D value (see Table 8)
106-109	4	Reserved	
110	1	Logic Status	See Table9
111	1	AD Conversion Updates	See Table 9
112-119	8	Alarm and Warning Flags	See Table 10
Vendor Specific			
120-127	8	Vendor Specific	Don't Access
128-247	120	User writable EEPROM	
248-255	8	Vendor Specific	Don't Access

The measured values located at bytes 96-105(in the 2 wire address 0xA2) are raw A/D values (16-bit integers) of transceiver temperature, supply voltage, laser bias current, laser optical output power and received power. All the measured values are “Externally Calibrated”, and then it is necessary to convert raw A/D values to real world units by the manner as shown in Table 8.

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Table 8 Real Time Diagnostic Monitor Values

Byte	Name	Description
96	Temperature MSB	Internally measured transceiver temperature. Compliant with External Calibration of SFF-8472.
97	Temperature LSB	
98	Vcc MSB	Internally measured supply voltage. Compliant with External Calibration of SFF-8472.
99	Vcc LSB	
100	Laser Bias MSB	Measured Laser bias current. Compliant with External Calibration of SFF-8472.
101	Laser Bias LSB	
102	Tx Power MSB	Measured Tx power. Compliant with External Calibration of SFF-8472.
103	Tx Power LSB	
104	Rx Power MSB	Measured Tx power. Compliant with External Calibration of SFF-8472.
105	Rx Power LSB	

This transceiver implements two optional status bytes, “Logic States” at byte 110(0xA2)” and “A/D Updated” at byte 111(0xA2) as shown in Table 9. “A/D Updated” status bits allow the user to verify if an update from the analog-digital conversion has occurred of the measured values, temperature, Vcc, laser bias, Tx power and Rx power. The user writes the byte to 0x00. Once a conversion is completed for a given value, its bit will change to ‘1’

Table 9 Logic Status and AD Conversion Updates

Byte	Bit	Name	Description
110	7	Tx Disable State	Optional digital State of the Tx Disable input pin.
110	6	Soft Tx Disable Control	Not supported (set to 0).
110	5	Reserved	Set to 0.
110	4	Rx Rate Select State	Not supported (set to 1).
110	3	Soft Rate Select Control	Not supported (set to 0).
110	2	Tx Fault	Optional digital state of the Tx Fault output pin.
110	1	LOS	Optional digital state of the LOS output pin.
110	0	Power on Logic	Bit will be 0 when the analog monitoring is active.
111	7	Temp A/D Valid	Indicates A/D value in Bytes 96/97 is valid.
111	6	Vcc A/D Valid	Indicates A/D value in Bytes 98/99 is valid.
111	5	Laser Bias A/D Valid	Indicates A/D value in Bytes 100/101 is valid.
111	4	Tx Power A/D Valid	Indicates A/D value in Bytes 102/103 is valid.
111	3	Rx Power A/D Valid	Indicates A/D value in Bytes 104/105 is valid.
111	2	Reserved	Set to 0.
111	1	Reserved	Set to 0.
111	0	Reserved	Set to 0.

Each of the measured values has a corresponding high alarm, low alarm, high warning and low warning threshold level at location 00-39(x0A2) written as the data format of a corresponding valued shown in

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Table10.Alarm and warning flags at bytes 112-119(0xA2) are defined as follows.

(1) Alarm flags indicate conditions likely to result (or have resulted) in link failure and cause for immediate action.

(2) Warning flags indicate conditions outside the guaranteed operating specification of transceiver but not necessarily causes of immediate link failures.

Table 10 Alarm and Warning Flags

Byte	Bit(s)	Name	Description
112	7	Temperature High Alarm	Set when temperature monitor value exceeds high alarm level.
112	6	Temperature Low Alarm	Set when temperature monitor value exceeds low alarm level.
112	5	Vcc High Alarm	Set when Vcc monitor value exceeds high alarm level.
112	4	Vcc Low Alarm	Set when Vcc monitor value exceeds Low alarm level.
112	3	Laser Bias High Alarm	Set when laser bias monitor value exceeds high alarm level.
112	2	Laser Bias Low Alarm	Set when laser bias monitor value exceeds low alarm level.
112	1	Tx Power High Alarm	Set when Tx power monitor value exceeds high alarm level
112	0	Tx Power Low Alarm	Set when Tx power monitor value exceeds low alarm level.
113	7	Rx Power High Alarm	Set when Rx power monitor value exceeds high alarm level
113	6	Rx Power Low Alarm	Set when Rx power monitor value exceeds low alarm level
113	5-0	Reserved	All bits set to 0.
114	7-0	Reserved	All bits set to 0.
115	7-0	Reserved	All bits set to 0.
116	7	Temperature High warning	Set when temperature monitor value exceeds high warning level.
116	6	Temperature Low warning	Set when temperature monitor value exceeds low warning level.
116	5	Vcc High warning	Set when Vcc monitor value exceeds high warning level.
116	4	Vcc Low warning	Set when Vcc monitor value exceeds Low warning level.
116	3	Laser Bias High warning	Set when laser bias monitor value exceeds high warning level.
116	2	Laser Bias Low warning	Set when laser bias monitor value exceeds low warning level.

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116	1	Tx Power High warning	Set when Tx power monitor value exceeds high warning level
116	0	Tx Power Low warning	Set when Tx power monitor value exceeds low warning level.
117	7	Rx Power High warning	Set when Rx power monitor value exceeds high warning level
117	6	Rx Power Low warning	Set when Rx power monitor value exceeds low warning level
117	5-0	Reserved	All bits set to 0.
118	7-0	Reserved	All bits set to 0.
119	7-0	Reserved	All bits set to 0.

Transceiver Timing Characteristics

($T_c=0^{\circ}\text{C}$ to 70°C and V_{ccT} , $V_{ccR} = 3.145$ to 3.465)

Parameter	Symbol	Min	Max	Unit	Notes
Hardware TX_DISABLE Assert Time	t.off		10	us	1
Hardware TX_DISABLE Negate Time	t.on		1	ms	2
Time to initialize including reset of TX_FAULT	t.init		300	ms	3
Hardware TX_FAULT Assert Time	t.fault		100	us	4
Hardware TX_DISABLE to Reset	t.reset	10		us	5
Hardware RX_LOS DeAssert Time	t.loss-on		100	us	6
Hardware RX_LOS Assert Time	t.loss-off		100	us	7
Software TX_DISABLE Assert Time	t.off-soft		100	ms	8
Software TX_DISABLE Negate Time	t.on-soft		100	ms	9
Software Tx_FAULT Assert Time	t.fault-soft		100	ms	10
Software Rx_LOS Assert Time	t.loss_on_soft		100	ms	11
Software Rx_LOS De-Assert Time	t_loss_off_soft		100	ms	12
Analog parameter data ready	t_data		1000	ms	13
Serial bus hardware ready	t_serial		300	ms	14
Write Cycle Time	t_write		10	ms	15
Serial ID Clock Rate	f_serial_clock		400	kHz	

Note 1: Time from rising edge of TX_DISABLE to when the optical output falls below 10% of nominal.

Note 2: Time from falling edge of TX_DISABLE to when the modulated optical output rises above 90% of nominal.

Note 3: Time from power on or falling edge of Tx_Disable to when the modulated optical output rises above 90% of nominal.

Note 4: From power on or negation of TX_FAULT using TX_DISABLE.

Note 5: Time TX_DISABLE must be held high to reset the laser fault shutdown circuitry.

Note 6: Time from loss of optical signal to Rx_LOS Assertion.

Note 7: Time from valid optical signal to Rx_LOS De-Assertion.

Note 8: Time from two-wire interface assertion of TX_DISABLE (A2h, byte 110, bit 6) to when the optical output falls below 10% of nominal. Measured from falling clock edge after stop bit of write transaction.

Note 9: Time from two-wire interface de-assertion of TX_DISABLE (A2h, byte 110, bit 6) to when the modulated optical output rises above 90% of nominal.

Note 10: Time from fault to two-wire interface TX_FAULT (A2h, byte 110, bit 2) asserted.

Note 11: Time for two-wire interface assertion of Rx_LOS (A2h, byte 110, bit 1) from loss of optical signal.

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Note 12: Time for two-wire interface de-assertion of Rx_LOS (A2h, byte 110, bit 1) from presence of valid optical signal.

Note 13: From power on to data ready bit asserted (A2h, byte 110, bit 0). Data ready indicates analog monitoring circuitry is functional.

Note 14: Time from power on until module is ready for data transmission over the serial bus (reads or writes over A0h and A2h).

Note 15: Time from stop bit to completion of a 1-8 byte write command.

Pin Description

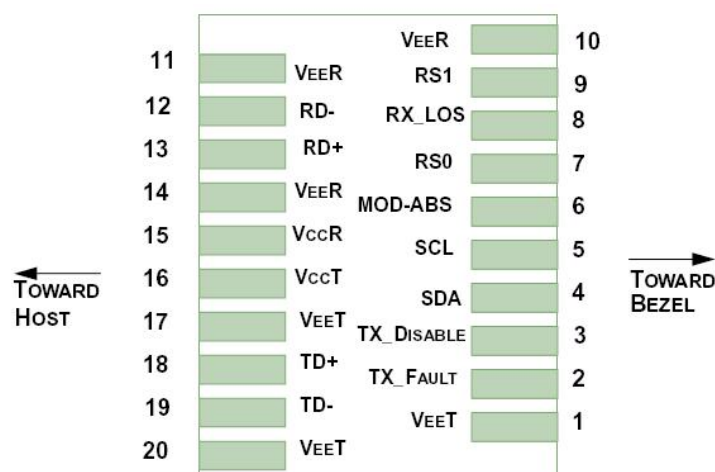


Figure 1.Pin function definitions

Pin	Name	Function/Description	Notes
1	VeeT	Transmitter Ground	
2	TX Fault	Transmitter Fault Indication Out	1
3	TX Disable	Transmitter Disable-Module disables on high or open	2
4	SDA	Module Definition Identifiers	3
5	SCL		
6	MOD-ABS		
7	RS0	Receiver Rate Select (LVTTTL)	4
9	RS1	Transmitter Rate Select (LVTTTL)	
8	LOS	Loss of Signal	5
10	VeeR	Receiver Ground	
11	VeeR	Receiver Ground	
12	RD-	Inverse Received Data out (CML)	6
13	RD+	Received Data out (CML)	6
14	VeeR	Receiver Ground	
15	VccR	Receiver Power — +3.3V±5%	7
16	VccT	Transmitter Power — +3.3 V±5%	7
17	VeeT	Transmitter Ground	
18	TD+	Transmitter Data In (CML)	8
19	TD-	Inverse Transmitter Data In (CML)	8
20	VeeT	Transmitter Ground	

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Notes:

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. TX Disable is an input that is used to shut down the transmitter optical output. It is pulled up to VccT with a 4.7k~10kΩ resistor. Its states are:
Low (0~0.8V)Logic"0 ": Transmitter on
(>0.8V, <2.0V): Undefined
High (2.0~3.465V)Logic"1": Transmitter Disabled
Open: Transmitter Disabled
3. Serial ID with SFF 8472 Diagnostics. Module Definition pins should be pulled up to Host Vcc with 10 kΩ resistors.
4. These pins have an internal 30kΩ pull-down to ground. A signal on either of these pins will not affect module performance.
5. LOS 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 loss of signal. In the low state, the output will be pulled to less than 0.8V.
6. These are the differential receiver output. They are internally AC-coupled 100Ω differential lines which should be terminated with 100Ω (differential) at the user SERDES.
7. This pin should be connected to a filtered +3.3V power supply on the host board. See Figure 3.Recommended power supply filter
8. These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module.

Block Diagram

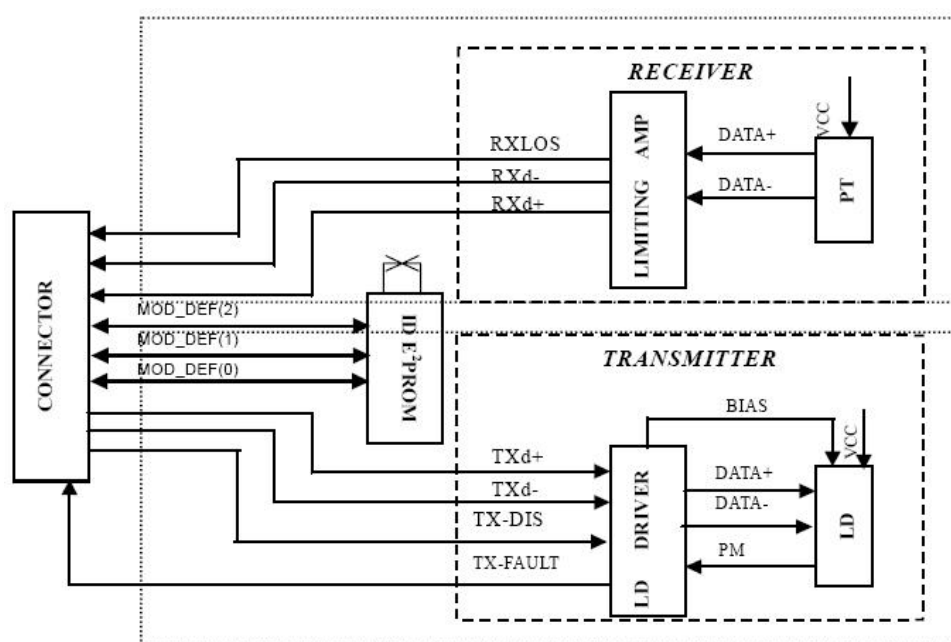


Figure 2. Transceiver functional diagram

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Required Host Board Components

The MSA power supply noise rejection filter is required on the host PCB to meet data sheet performance. The MSA filter incorporates an inductor which should be rated 400mADC and 1 Ω serial resistance or better. It should not be replaced with a ferrite. The required filter is illustrated in Figure 3. The MSA also specifies that 4.7K to 10K Ω pull-up resistors for TX_FAULT, LOS, and MOD_DEF0,1,2 are required on the host PCB. Figure is the suggested transceiver/host interface.

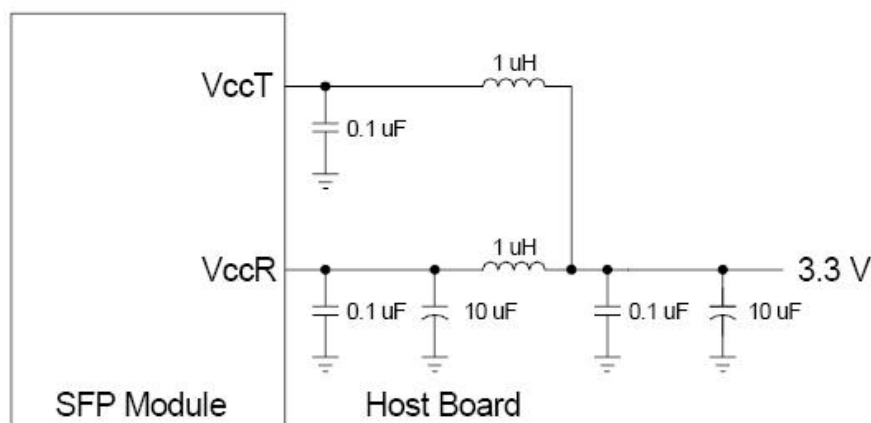


Figure 3. Typical power supply application schematics

Typical Application Circuit

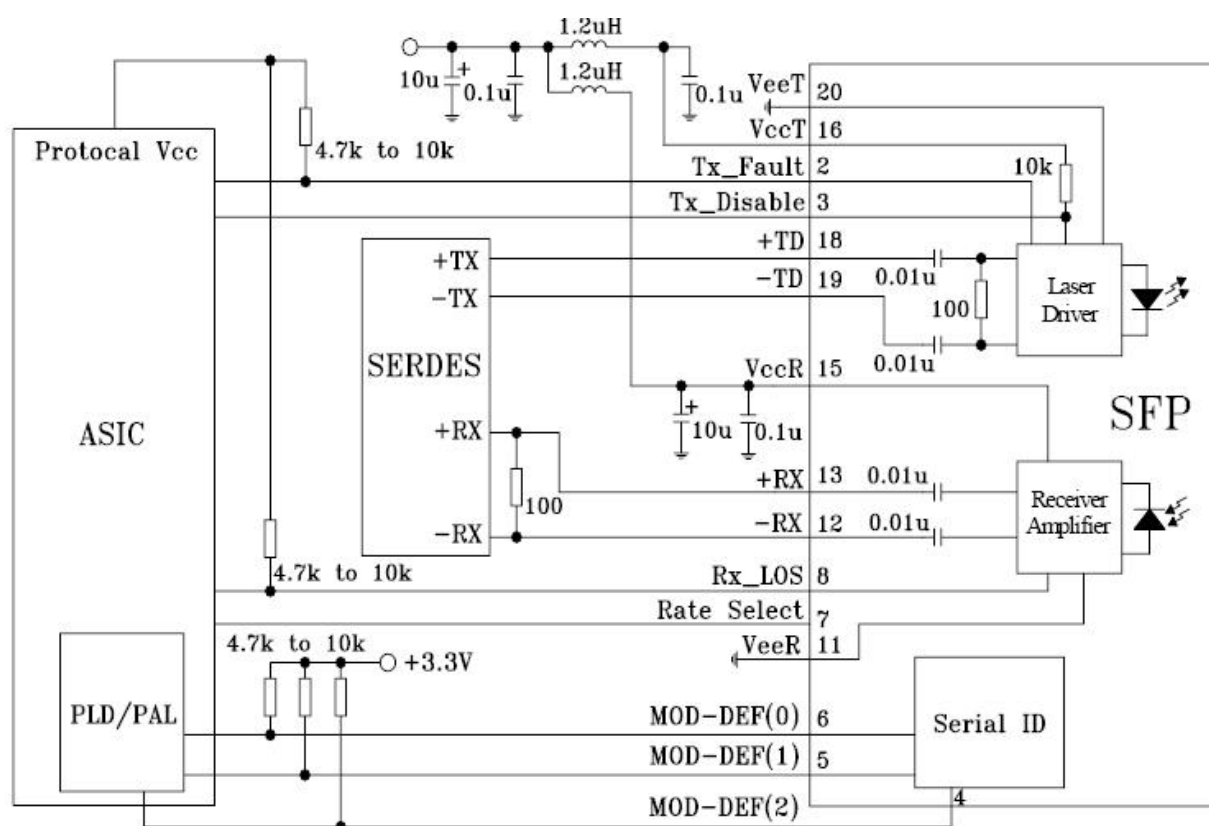


Figure 4. Typical application circuit

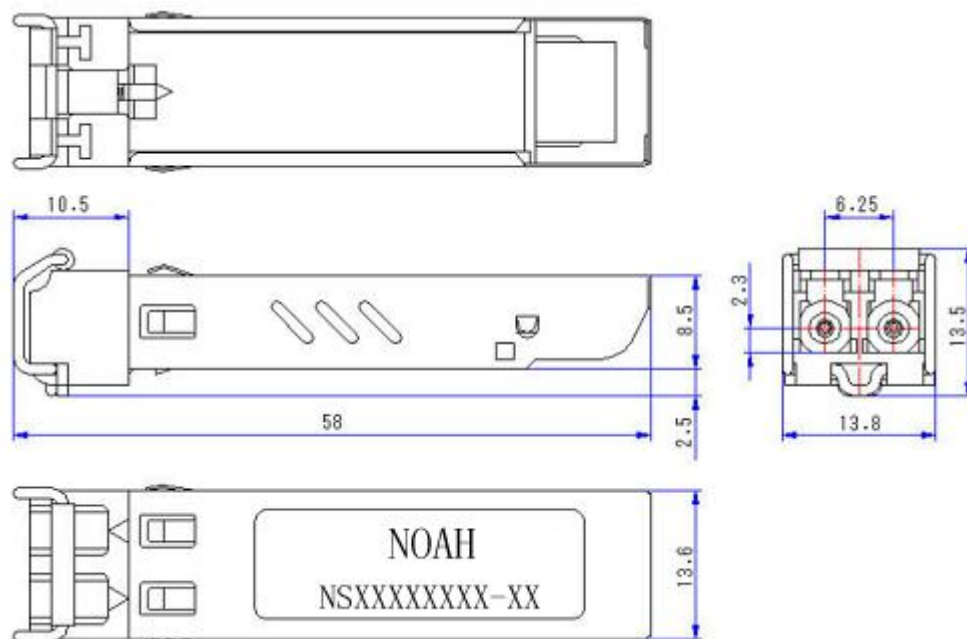
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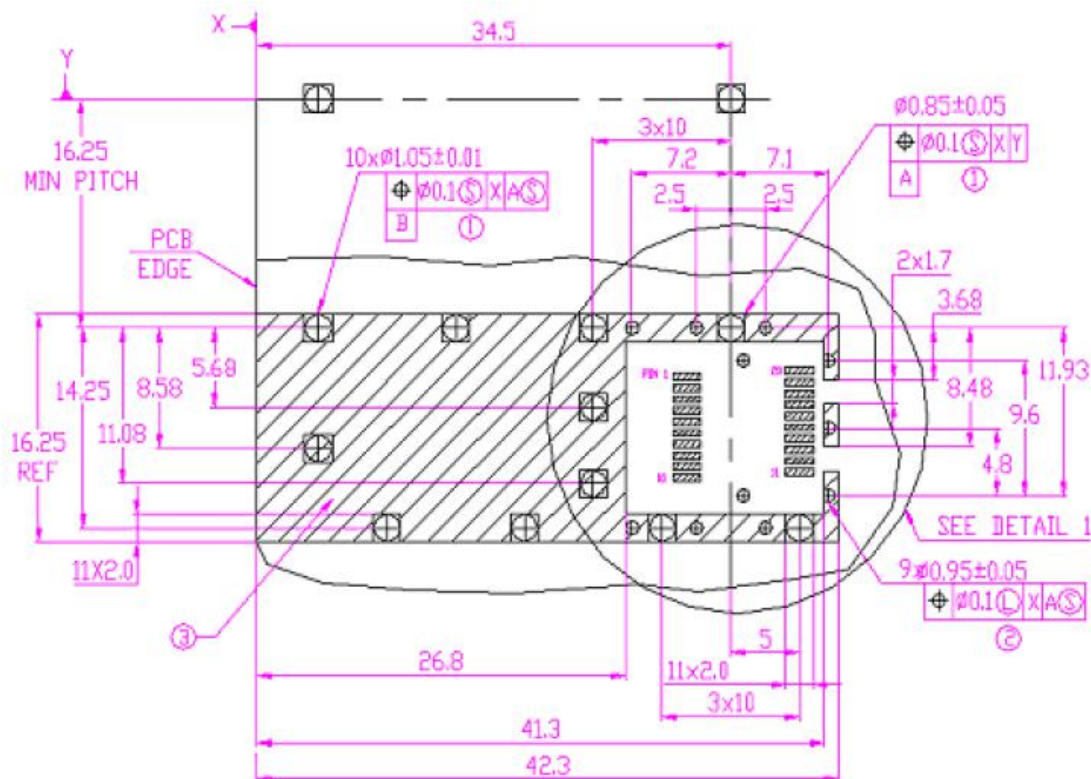
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Dimensions

Dimensions are in millimeters. All dimensions are ± 0.1 mm unless otherwise specified. (unit:mm).



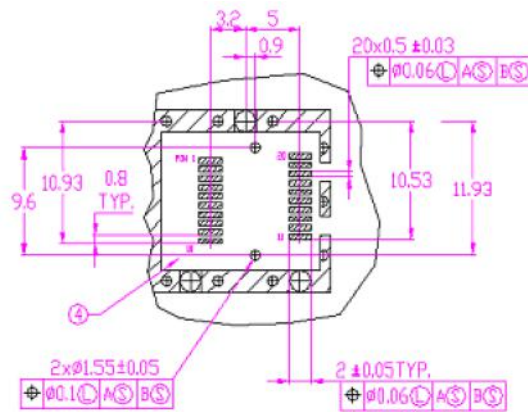
PCB layout Recommendation



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NOTES:

- 1.PADS AND VIAS ARE CHASSIS GROUND.
- 2.THROUGH HOLES,PLATING OPTIONAL.
- 3.HATCHED AREA DENOTES COMPONENT AND TRACE KEEPOUT (EXCEPT CHASSIS GROUND).
- 4.AREA DENOTES COMPONENT KEEPOUT (TRACES ALLOWED).

DIMENSIONS IN MILLIMETERS

DETAIL 1

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Ordering Information

标准位						扩展位		
NS(R)	发射器件类别	发射器件速率	接收器件类别	接收器件速率	传输距离	接口类型	—数字诊断	工作温度 (°C)
	↓	↓	↓	↓	↓	↓	↓	↓
3:	1310nm DFB LD	9: 10Gb/s	2: PINTIA	9: 10Gb/s	3: 10Km	3: 双LC	No D: DDM	-20~+70 I: -40~+85 J: 其它

注：1、扩展位说明：扩展位的第一行为常规默认值，即此位无标出时即为默认值；

2、以NS(R)开头的本命名规则用于SFP光模块的型号命名，其中符合ROHS 6标准的在NS后加R标识，不符合的则不加。

NOTICE: This document contains preliminary information on product but not yet fully characterized. Wuhan Noah Science & Tech Co., Ltd. reserves the right to change the specification in any manner without notice.

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