

SFP BIDI 1.25G 1310/1550 nm 20 km DDM



SFP+ Series

- Up to 1.25 Gb/s data rate
- A-type: 1310/1550 nm
- B-type: 1550/1310 nm
- Hot-pluggable SFP
- Single-LC bi-di interface
- 20 km on 9/125 μ m SMF
- RoHS compliant

Ascent's SFP BIDI 1.25G 20 km transceiver is a compact and efficient optical interface designed for switches, routers, servers, and other networking equipment. Supporting data rates up to 1.25 Gb/s, the module fully complies with the SFP Multi-Source Agreement (MSA) and enables cost-effective bi-directional transmission over a single strand of single-mode fiber.

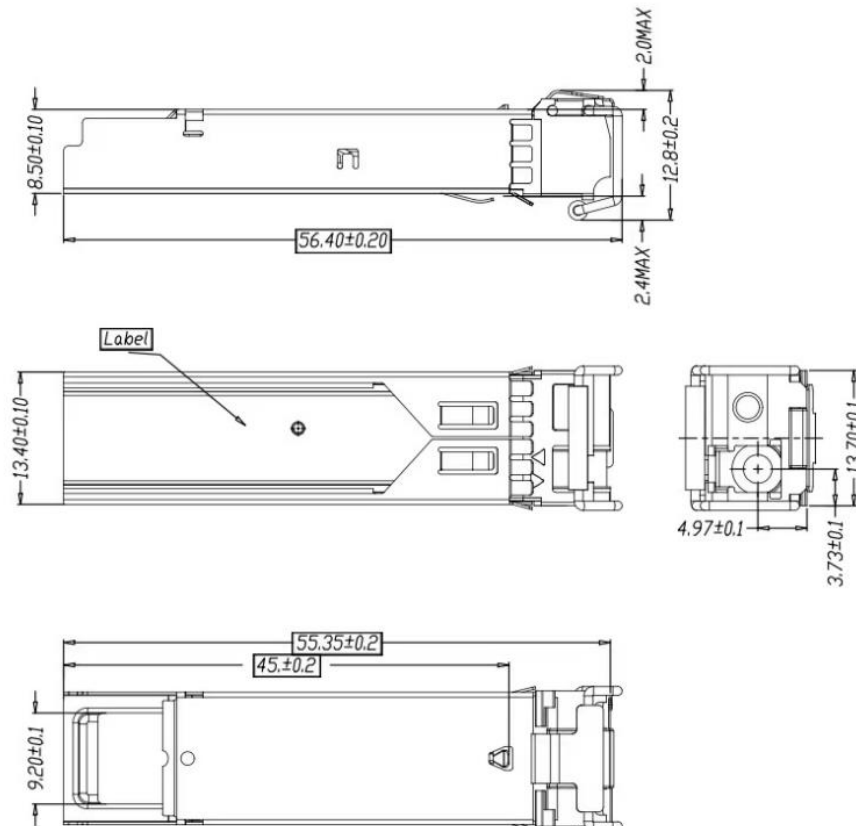
The module offers flexible control through both a TTL-level TX Disable input and an I²C-based digital management interface, allowing precise monitoring and protection of the optical transmitter. A TX Fault indicator provides early warning of potential laser degradation to help ensure long-term link stability.

A dedicated Loss of Signal (LOS) output enhances system reliability by detecting insufficient receiver input or partner-device link issues. All key operational states—LOS, link status, disable control, and fault conditions—are accessible via the integrated digital diagnostic interface, supporting real-time system monitoring and remote management.

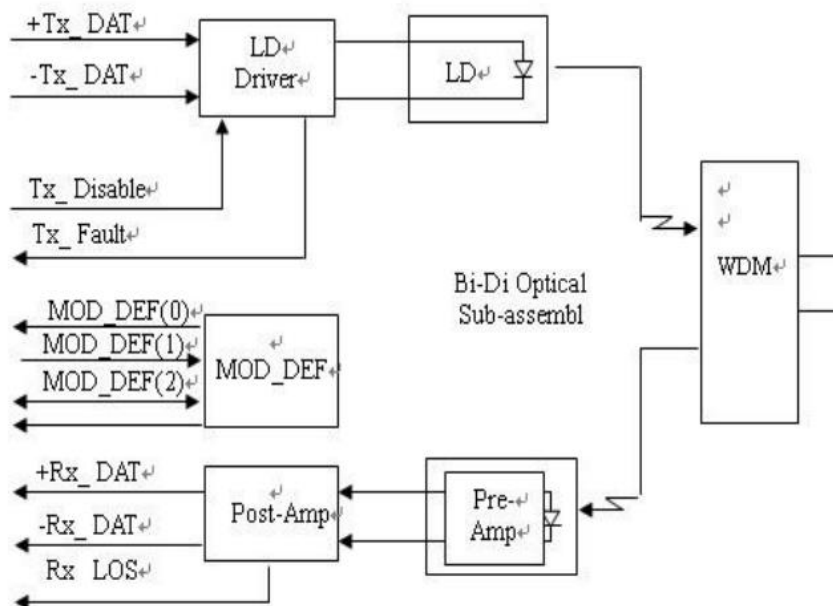
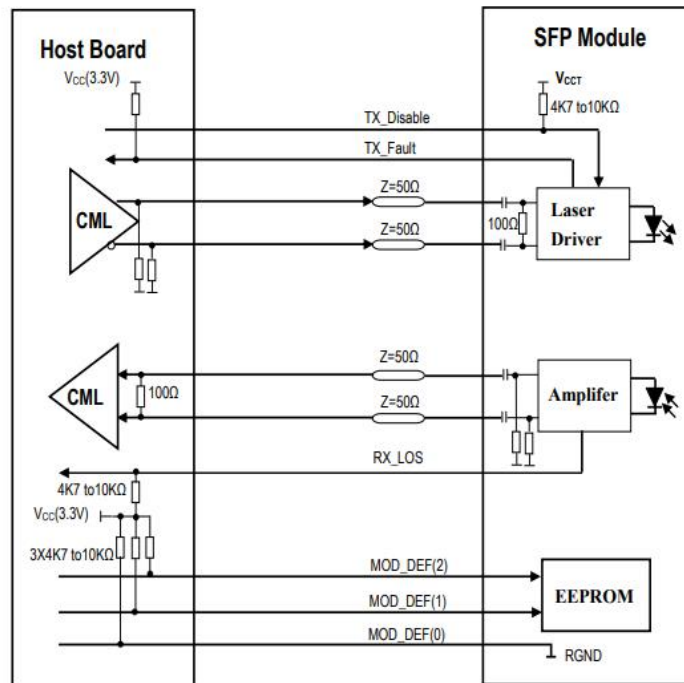
Key Features

- Up to 1.25Gb/s Data Links
- A type:1310nm FP Tx/1550nm Rx
- B type:1550nm DFB Tx/1310nm Rx
- Hot-Pluggable SFP footprint
- Single LC for Bi-directional Transmission
- Built-in digital diagnostic functions
- Up to 20km on 9/125μm SMF
- Single +3.3V Power Supply
- Operating Temperature:
Standard: 0°C to +70°C
Industrial: -40°C to +85°C
- Very low EMI and excellent ESD protection
- RoHS compliant and Lead Free

Outline Dimensions



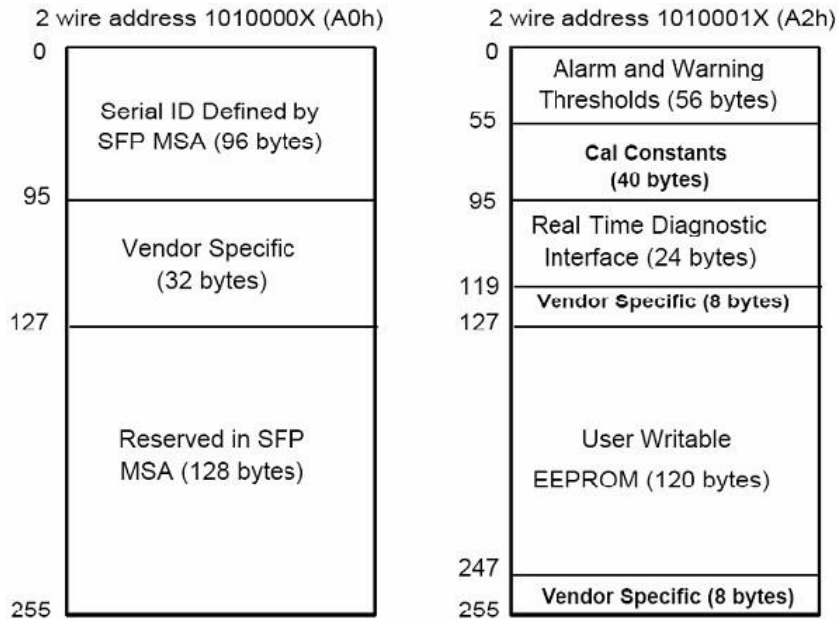
Recommend Circuit Schematic



EEPROM

The SFP modules implement the 2-wire serial communication protocol as defined in the SFP-8472. The serial ID information of the SFP modules and Digital Diagnostic Monitor parameters can be accessed through the I2C interface at address A0h and A2h. The memory is mapped in Digital Diagnostic Memory Map (Specific Data Field Descriptions). Detailed ID information (A0h) is listed in EEPROM Serial ID Memory Contents(A0h). And the DDM specification is at address A2h. For more details of the memory map and byte definitions, please refer to the SFF-8472, "Digital Diagnostic Monitoring Interface for Optical Transceivers". The DDM parameters have been internally calibrated

Digital Diagnostic Memory Map (Specific Data Field Descriptions)



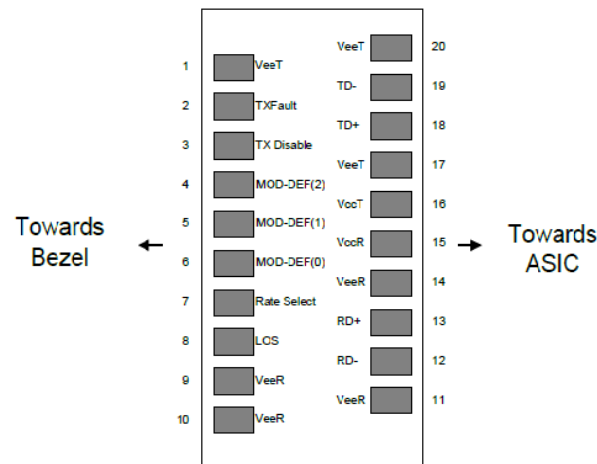
Data Address	Length (Byte)	Name of Length	Description and Contents
Base ID Fields			
0	1	Identifier	Type of Serial transceiver (03h=SFP)
1	1	Reserved	Extended identifier of type serial transceiver (04h)
2	1	Connector	Code of optical connector type (07=LC)
3-10	8	Transceiver	
11	1	Encoding	NRZ(03h)
12	1	BR,Nominal	Nominal baud rate, unit of 100Mbps
13	1	Reserved	(0000h)
14	1	Length(9um,km)	Link length supported for 9/125um fiber, units of km
15	1	Length(9um)	Link length supported for 9/125um fiber, units of 100m
16	1	Length(50um)	Link length supported for 50/125um fiber, units of 10m
17	1	Length(62.5um)	Link length supported for 62.5/125um fiber, units of 10m
18	1	Length(Copper)	Link length supported for copper, units of meters
19	1	Reserved	
20-35	16	Vendor Name	SFP vendor name:
36	1	Reserved	
37-39	3	Vendor OUI	SFP transceiver vendor OUI ID
40-55	16	Vendor PN	Part Number: "xxxxxxx" (ASCII)
56-59	4	Vendor rev	Revision level for part number
60-61	2	Wavelength	Laser wavelength

Data Address	Length (Byte)	Name of Length	Description and Contents
62	1	Reserved	
63	1	CCID	Least significant byte of sum of data in address 0-62
Extended ID Fields			
64-65	2	Option	Indicates which optical SFP signals are implemented(001Ah = LOS, TX_FAULT, TX_DISABLE all supported)
66	1	BR, max	Upper bit rate margin, units of %
67	1	BR, min	Lower bit rate margin, units of %
68-83	16	Vendor SN	Serial number (ASCII)
84-91	8	Date code	Manufacturing date code
92	1	Diagnostic Type	Diagnostics
93	1	Enhanced	Diagnostics
94	1	SFF-8472	Diagnostics
95	1	CCEX	Check code for the extended ID Fields (addresses 64 to 94)
Vendor Specific ID Fields			
96-127	32	Readable	Vendor specific date, read only
128-255	128	Reserved	Reserved for SFF-8079

Digital Diagnostic Monitor Characteristics

Parameter	Range	Unit	Accuracy	Calibration
96-97	Transceiver Internal Temperature	±3.0	°C	Internal
98-99	VCC3 Internal Supply Voltage	±5.0	%	Internal
100-101	Laser Bias Current	±10	%	Internal
102-103	Tx Output Power	±3.0	dBm	Internal
104-105	Rx Input Power	±3.0	dBm	Internal

Pin Assignment



Pin	Symbol	Description	Plug Seq	Notes
1	VeeT	Transmitter Ground	1	1
2	Tx Fault	Transmitter Fault Indication	3	2
3	Tx Disable	Transmitter Disable	3	3
4	MOD-DEF2	Module Definition	2	3
5	MOD-DEF1	Module Definition 1	3	3
6	MOD-DEF0	Module Definition 0	3	4
7	Rate Select	Not Connected	3	5
8	LOS	Loss of Signal	3	1
10	VeeR	Receiver ground	1	1
11	VeeR	Receiver ground		6
12	RD-	Inv. Received Data Out	3	1
13	RD+	Received Data Out	3	1
14	VeeR	Module receiver ground	3	
15	VccR	Module receiver 3.3V supply	2	
16	VccT	Module transmitter 3.3V supply	2	
17	VeeT	Module transmitter ground	1	
18	TD+	Transmitter inverted data out put	3	6
19	TD-	Transmitter non-inverted data out put	3	6
20	VeeT	Module transmitter ground	1	

Notes:

1. Circuit ground is internally isolated from chassis ground.
2. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
3. Should be pulled up with 4.7k to 10kohms on host board to a voltage between 2.0V and 3.6V. MOD_DEF(0) pulls line low to indicate module is plugged in.
4. Rate select is not used.
5. LOS is open collector output. Should be pulled up with 4.7k to 10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.
6. AC Coupled.

Specifications

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Case Temperature	T _{op}	0		+70	°C	Commercial
		-40		+85	°C	Industrial
Power Supply Voltage	V _{cct, R}	-0.5		4	V	
Relative Humidity	RH	0		85	%	

Optical Characteristics(TOP = T_c, V_{cc} = 3.135 to 3.465 Volts)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Center Wavelength	λ _c	1290	1310	1330	nm	SFP-LP-3155-20 1 SFP-LP-3155-20A 1
	λ _c	1530	1550	1570	nm	SFP-LP-5531-20 1 SFP-LP-5531-20A 1
Spectral Width	σ			3	nm	
Optical Output Power	P _{out}	-9		-3	dBm	2
Optical Rise/Fall Time	t _r / t _f			160	ps	3
Extinction Ratio	ER	9			dB	
Deterministic Jitter Contribution	TXΔDJ			56.5	ps	4
Total Jitter Contribution	TXΔTJ			119	ps	3
Eye Mask for Optical Output	Compliant with Eye Mask Defined in IEEE 802.3 standard					
Relative Intensity Noise	RIN			-120	dB/Hz	
Receiver						
Optical Input Wavelength	λ _c	1530	1550	1570	nm	SFP-LP-3155-20 SFP-LP-3155-20A
	λ _c	1290	1310	1330	nm	SFP-LP-5531-20 SFP-LP-5531-20A
Receiver Overload	Pol	-3			dBm	5.6
RX Sensitivity	Sen			-22	dBm	5.6
RX_LOS Assert	LOS _A	-38			dBm	
RX_LOS Deassert	LOS _D			-23	dBm	
RX_LOS Hysteresis	LOS _H	0.5			dB	
General Characteristics						
Data Rate						
Data Rate	BR		1.25		Gbps	
Bit Error Rate	BER			10 ⁻¹²		
Max. Supported Link Length on 9/125μm SMF@1.25G	LMAX		20		km	7
Total System Budget	LB	14			dB	8

Notes:

1. The optical power is launched into SMF.
2. 20 to 80%.
3. Contributed total jitter is calculated from DJ and RJ measurements using TJ = RJ + DJ. Contributed RJ is calculated for 1x10⁻¹² BER by multiplying the RMS jitter (measured on a single rise or fall edge) from the oscilloscope by 14. Per FC-PI, the actual contributed RJ is allowed to increase above its limit if the actual

contributed DJ decreases below its limits, as long as the component output DJ and TJ remain within their specified FC-PI maximum limits with the worst case specified component jitter input.

4. Measured with PRBS 2^{7-1} at 10^{-12} BER.

Electrical Characteristics (TOP = Tc, Vcc = 3.135 to 3.465 Volts)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Supply Voltage	V _{cc}	3.14	3.30	3.47	V	
Supply Current	I _{cc}			300	mA	
Inrush Current	I _{surge}			I _{cc} +30	mA	
Maximum Power	P _{max}			1.0	mW	
Transmitter						
Input Differential Impedance	R _{in}	90	100	110		
Single Ended Data Input Swing	V _{in,pp}	200		1200	mVp-p	
Transmit Disable Voltage	VD	V _{cc} - 1.3		V _{cc}	V	2
Transmit Enable Voltage	VEN	V _{ee}		V _{ee} + 0.8	V	
Transmit Disable Assert Time	T _{dessert}			10	us	
Receiver						
Single Ended Data Output Swing	V _{out,pp}	300		80	mv	3
Data Output Rise Time	tr			150	ps	4
Data Output Fall Time	tf			150	ps	4
LOS Fault	V _{losfault}	V _{cc} - 0.5		V _{cc_host}	V	5
LOS Fault	V _{los norm}	V _{ee}		V _{ee} +0.5	V	5
Power Supply Rejection	PSR	100		0.5	mVpp	6
Deterministic Jitter Contribution	RXΔDJ			51.7	ps	7
Total Jitter Contribution	RXΔTJ			122.4	ps	

Notes:

1. AC coupled.
2. Or open circuit.
3. Into 100 ohm differential termination.
4. LOS is LVTTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
5. All transceiver specifications are compliant with a power supply sinusoidal modulation of 20Hz to 1.5MHz up to specified value applied through the power supply filtering network shown on page23 of the Small Form-factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA), September 14, 2000.
6. Measured with DJ-free data input signal. In actual application, output DJ will be the sum of input DJ and . DJ.

Ordering Information

Product Name	Product Description
SFP-LP-3155-20	SFP Plug-in, 1.25 Gbps, 20 km, BIDI, TX = 1310 nm, RX = 1550 nm, LC/PC Blue
SFP-LP-5531-20	SFP Plug-in, 1.25 Gbps, 20 km, BIDI, TX = 1550 nm, RX = 1310 nm, LC/PC Blue
SFP-LP-3155-20A	SFP Plug-in, 1.25 Gbps, 20 km, BIDI, TX = 1310 nm, RX = 1550 nm, LC/PC Blue, Industrial Temp
SFP-LP-5531-20A	SFP Plug-in, 1.25 Gbps, 20 km, BIDI, TX = 1550 nm, RX = 1310 nm, LC/PC Blue, Industrial Temp

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