OC3 155 Mbps 1310 nm Single-mode SFP Optical Transceiver 15km Reach

SFP Transceiver Series

- 155 Mbps data rate
- 15/40/80 km range
- Hot-pluggable SFP footprint duplex
- LC connector interface
- Class 1 FDA and IEC60825-1 laser safety compliant
- Digital diagnostics monitoring
- Compatible with SFP MSA
- Compatible with SFF-8472

SFP Optical Transceiver is a flexible solution as an interface for switches, routers, servers, and other optical links. This Small Form-factor Pluggable (SFP) transceiver can carry data links at rates up to 155 Mb/s, and is compatible with the SFP Multi-Sourcing Agreement (MSA).

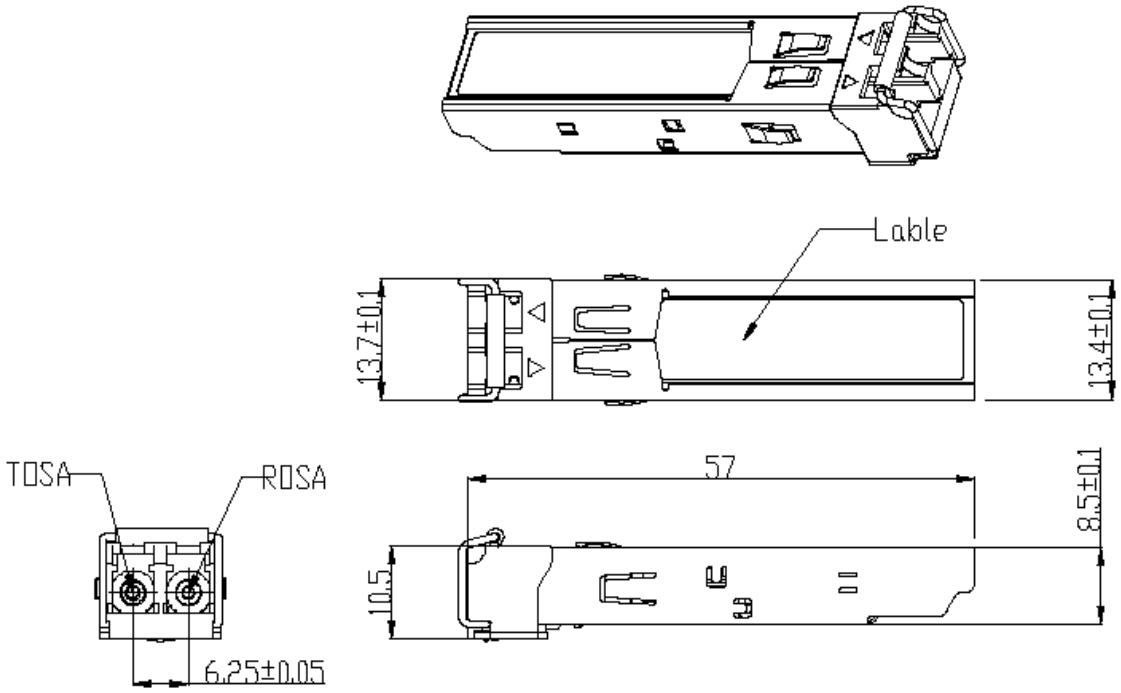
ACT OC-3/STM-1 is a network line optical transceiver with transmission speeds of up to 155.52 Mbit/s (payload: 148.608 Mbit/s; overhead: 6.912 Mbit/s, including path overhead) using fiber optics. Depending on the system, the OC-3 is also known as STS-3 (electrical level) and STM-1 (SDH).

These modules are ideal for Fast Ethernet applications, ATM switches and routers, or other situations involving an optical link.

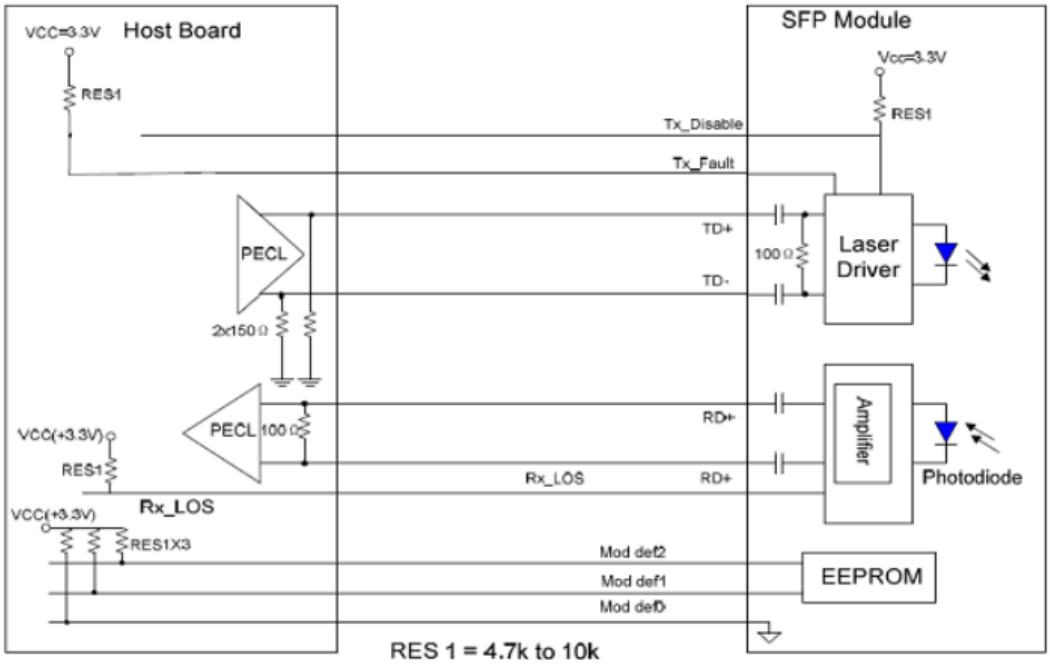
Key Features

- 155 Mbps data rate
- 15 km range with 9/125 µm SMF
- Hot-pluggable SFP footprint duplex LC connector interface
- Class 1 FDA and IEC60825-1 laser safety compliant
- Digital diagnostics monitoring
- Compatible with SFP MSA
- Compatible with SFF-8472
- +3.3 V single power supply
- Fast Ethernet
- OC-3 IR-1 / STM-1 (S-1.1)
- ATM switches and routers
- Other optical links

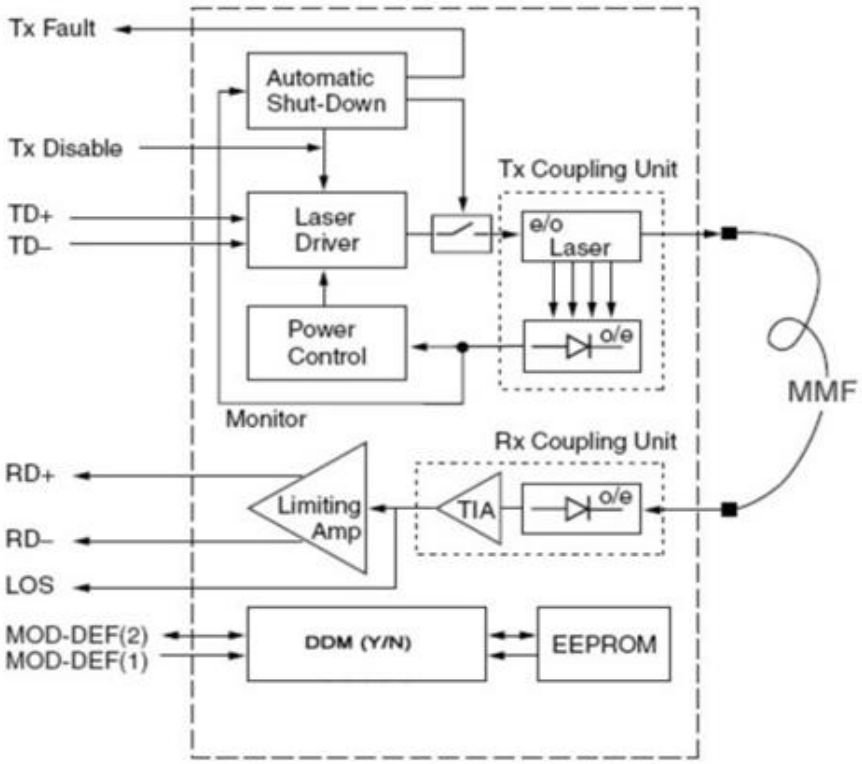
Outline Diagram



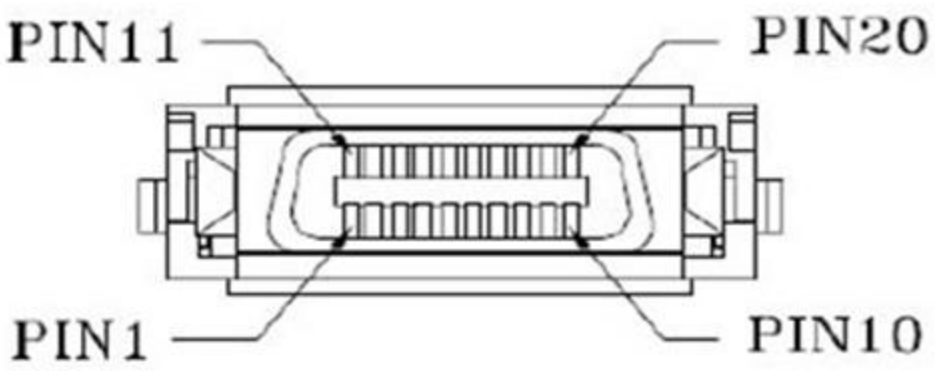
Recommended Interface Circuit



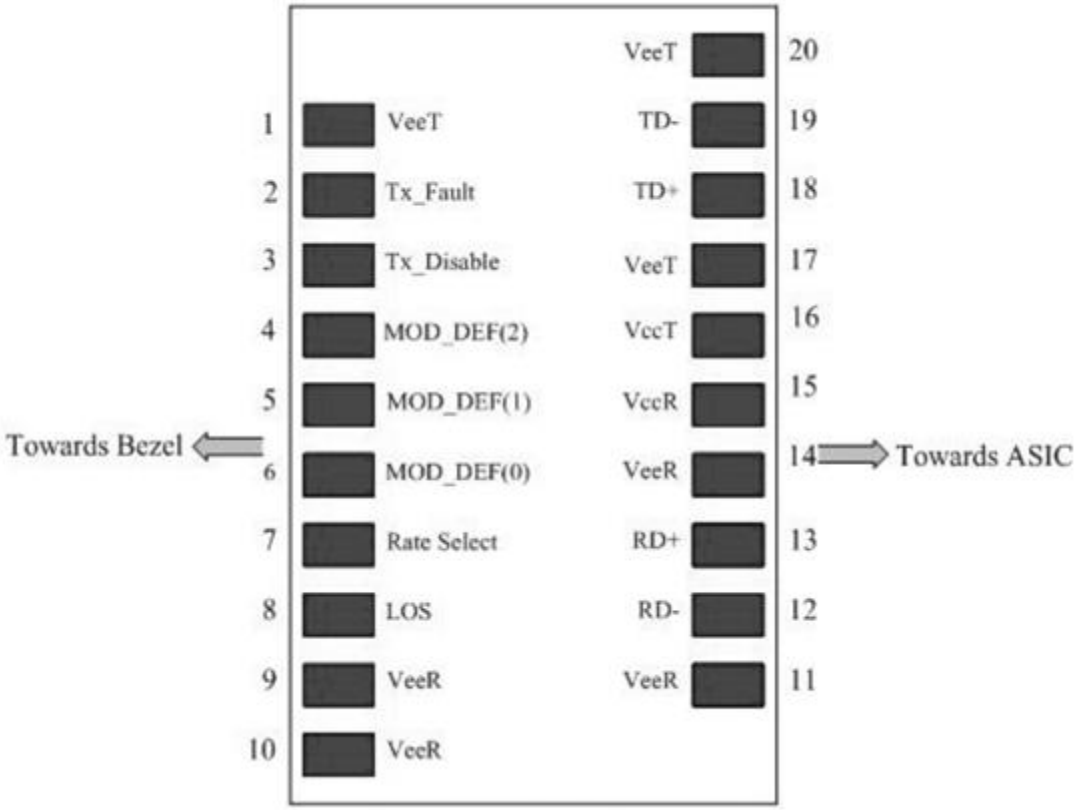
Functional Description of Transceiver



SFP Transceiver Electrical Pad Layout



Pin Descriptions



Pin	Signal Name	Description	Plug Seq.	Notes
1	V_{EET}	Transmitter Ground	1	
2	TX FAULT	Transmitter Fault Indication	3	1
3	TX DISABLE	Transmitter Disable	3	2
4	MOD_DEF(2)	SDA Serial Data Signal	3	3

5	MOD_DEF(1)	SCL Serial Clock Signal	3	3
6	MOD_DEF(0)	TTL Low	3	3
7	Rate Select	Not Connected	3	
8	LOS	Loss of Signal	3	4
9	V_{EER}	Receiver Ground	1	
10	V_{EER}	Receiver Ground	1	
11	V_{EER}	Receiver Ground	1	
12	RD-	Inv. Received Data Out	3	5
13	RD+	Received Data Out	3	5
14	V_{EER}	Receiver Ground	1	
15	V_{CCR}	Receiver Power Supply	2	
16	V_{CCT}	Transmitter Power Supply	2	
17	V_{EET}	Transmitter Ground	1	
18	TD+	Transmit Data In	3	6
19	TD-	Inv. Transmit Data In	3	6
20	V_{EET}	Transmitter Ground	1	

Notes:

Plug Seq.: Pin engagement sequence during hot plugging.

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 within the module with a 4.7k~10kΩ resistor. Its states are:

Low (0 to 0.8V): Transmitter on

(>0.8V, < 2.0V): Undefined

High (2.0 to 3.465V): Transmitter Disabled

Open: Transmitter Disabled

3. Mod-Def 0, 1, 2. These are the module definition pins. They should be pulled up with a 4.7k~10kΩ resistor on the host board. The pull-up voltage shall be VccT or VccR.

Mod-Def 0 is grounded by the module to indicate that the module is present

Mod-Def 1 is the clock line of two wire serial interface for serial ID

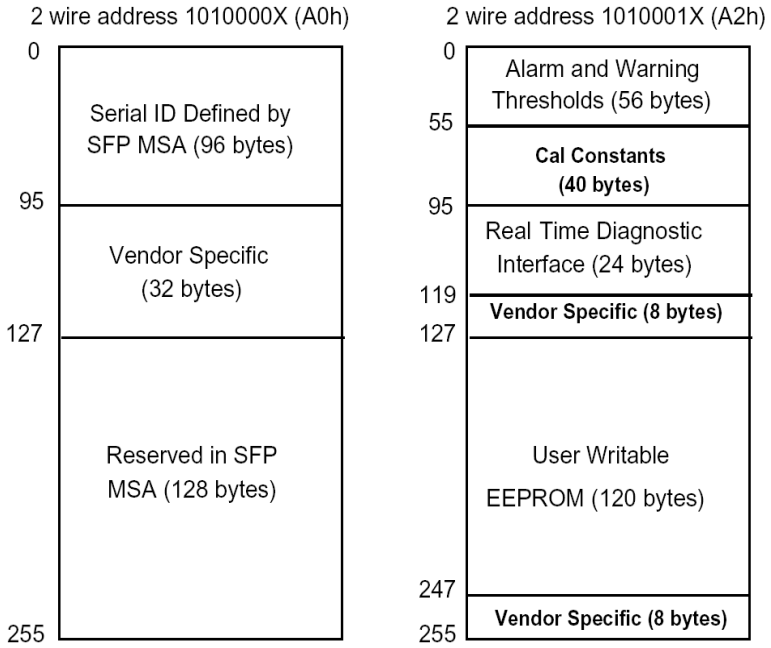
Mod-Def 2 is the data line of two wire serial interface for serial ID

4. LOS is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor. Pull up voltage between 2.0V and Vcc+0.3V. Logic 1 indicates loss of signal; Logic 0 indicates normal operation. In the low state, the output will be pulled to less than 0.8V.

5. 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.

6. TD-/+: These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module.

EEPROM Serial ID Memory Contents



Add.	Size (Bytes)	Name of Field	Hex	Description
BASE ID FIELDS				
0	1	Identifier	03	SFP
1	1	Ext. Identifier	04	SFP function is defined by serial ID only
2	1	Connector	07	LC connector
3-10	8	Transceiver	XX(note)	Transmitter Code
11	1	Encoding	03	NRZ
12	1	BR, Nominal	02	155 Mbps
13	1	Reserved	00	
14	1	Length (9µm) km	XX (0F/28/3C)	Transceiver transmit distance
15	1	Length(9µm) 100m	XX (96/FF/FF)	
16	1	Length (50µm) 10m	00	
17	1	Length(62.5µm)10m	00	
18	1	Length (Copper)	00	Not compliant
19	1	Reserved	00	
20-35	16	Vendor name	XX XX XX XX XX XX XX XX(note)20 20 20 20 20 20 20 20	Vendor name (ASCII)
36	1	Reserved	00	
37-39	3	Vendor OUI	00 00 00	
40-35	16	Vendor PN	XX XX XX XX XX XX XX XX XX XX	Vendor part number r

			XX XX XX XX XX	
56-59	4	Vendor rev	XX XX XX XX[(note)]	
60-61	2	Wavelength	05 1E	1310 nm
62	1	Reserved	00	
63	1	CC_BASE	Check Sum (Variable)	Check code for base ID fields
EXTENDED ID FIELDS				
64-65	2	Options	00 1A	TX_DISABLE, TX_FAULT and Loss of Signal implemented.
66	1	BR, max	00	
67	1	BR, min	00	
68-83	16	Vendor SN	XX XX XX XX XX XX XX XX[(note)] 20 20 20 20 20 20 20 20	Serial Number of transceiver (ASCII). For example “B000822”.
84-91	8	Date Code	XX XX XX XX XX XX XX XX[(note)]	Manufactory Date Code. For example “080405”
92	1	Diagnostic Monitoring Type	XX[(note)]	Digital Diagnostic Monitoring Implemented
93	1	Enhanced Options	XX[(note)]	Optional Flags
94	1	SFF_8472 Compliance	XX[(note)]	01 for Rev9.3 SFF-8472
95	1	CC_EXT	Check Sum (Variable)	Check Sum for Extended ID Field
VENDOR SPECIFIC ID FIELDS				
96-127	32	Vendor Specific	Read Only	Depends on Customer Information
128-255	128	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).

Specifications

Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Supply Voltage	Vcc	-0.5		4.5	V	
Storage Temperature	Ts	-40		+85	°C	
Operating Humidity	-			95	%	

Recommended Operating Conditions

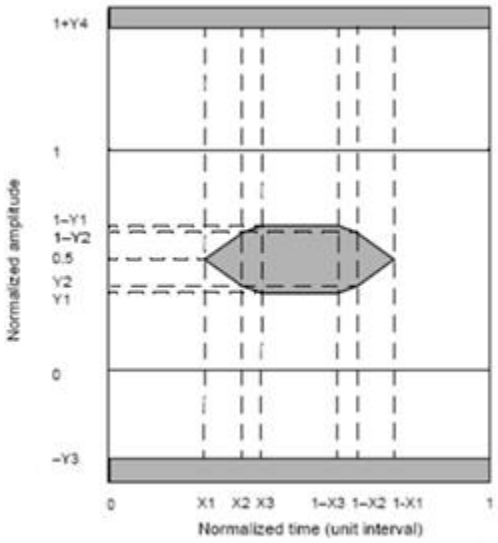
Parameter		Symbol	Min	Typ	Max	Unit	Notes
Operating Case Temperature	Standard	Tc	0		+70	°C	
	Industrial	Tc	-40		+85	°C	
Power Supply Voltage		Vcc	3.15	3.3	3.45	V	
Power Supply Current		Icc			300	mA	
Data Rate	OC-3/STM-1			155		Mbps	
	100M			100		Mbps	

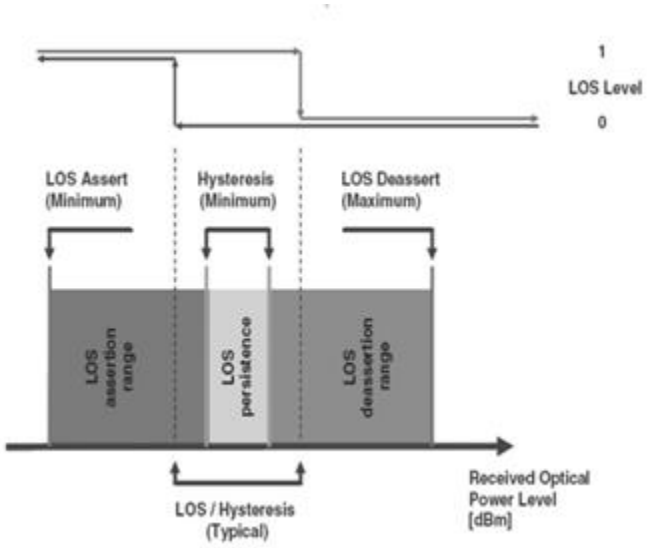
Optical and Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Notes
9 µm Core Diameter SMF	L		15		km	
Data Rate			100/155		Mbps	
Transmitter						
Centre Wavelength	λc	1260	1310	1360	nm	
Spectral Width (RMS)	Δλ			4	nm	
Average Output Power	Pout	-15		-8	dBm	1
Extinction Ratio	ER	8.2			dB	2
Optical Rise/Fall Time (20%~80%)	tr/tf			2	ns	
Output Optical Eye	Compliant with IUT-T G.957					2, 5
TX Disable Assert Time	t_off			10	us	
Receiver						
Centre Wavelength	λc	1260		1600	nm	
Receiver Sensitivity	Pmin			-28	dBm	4
Receiver Overload	Pmax	-8			dBm	
LOS De-Assert	LOS_D			-29	dBm	
LOS Assert	LOS_A	-45			dBm	
LOS Hysteresis		0.5			dB	5

Notes:

1. Output is coupled into a 9/125 µm single-mode fiber.
2. Filtered, measured with a PRBS 2^7-1 test pattern @1.25 Gbps
3. LVPECL logic, internally AC coupled. LVPECL logic, internally AC coupled.
4. Minimum average optical power measured at BER less than 1E-12, with a 2^7-1 NRZ PRBS and ER=9dB.
5. Eye Pattern Mask
6. LOS Hysteresis





Ordering Information

Part No.	Data Rate (Mbps)	Wavelength (nm)	Connector Type	Transmission Distance (km)	Operating case temperature (°C)	Digital Diagnostics
ONS-SI-155-I1D=	155	1310	LC	15	0 to +70	Yes
ONS-SI-155-I4D=	155	1310	LC	40	0 to +70	Yes
ONS-SI-155-I8D=	155	1310	LC	80	0 to +70	Yes

Note: Contact ACT for additional product variations on input & output options

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Specifications and product availability are subject to change without notice.

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