

Features

- Supports rate selectable 1.25Gb/s or 9.83 Gb/s to 11.3 Gb/s bit rates
- Compliant with IEEE 802.3-2012 10GBASE-SR/SW and 1000Base-SX
- Compliant with SFF-8431
- Hot-pluggable SFP+ footprint
- 850nm VCSEL laser transmitter
- Duplex LC connector
- Built-in digital diagnostic functions
- Single power supply 3.3V
- RoHS Compliant
- Class 1 laser product complies with EN 60825-1
- Operating case temperature: 0°C ~70°C



Applications

- 10GBASE-SR/SW Ethernet
- 1000Base-SX Ethernet

Description

This SFP-SX / SFP+ SR dual rate SFP+ optical transceivers are based on 1G and 10G Ethernet standard, which are compliant with SFF-8431, IEEE 802.3-2012 10GBASE-SR/SW and 1000BASE-SX and provide a quick and reliable interface for the 1G and 10G Ethernet application. The digital diagnostics functions are available via the 2-wire serial bus, as specified in SFF-8472.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Data Rate (RS0=LOW)	DR		1.25G		Gb/s	1
Data Rate (RS0=HIGH)	DR	9.83	10.3125	11.3	Gb/s	1
Storage Temperature	T_c	-40		85	°C	3
Operating Case Temperature	T_c	0		70	°C	2
Supply Current	I_{CC}		180	220	mA	4
Input Voltage	V _{CC}	3.14	3.3	3.46	V	
Maximum Voltage	V _{MAX}	-0.5		4	V	4

Notes:

1. IEEE 802.3-2012
2. Case Temperature
3. Ambient Temperature
4. For Electrical power interface

Digital Diagnostic Functions

Parameter	Symbol	Accuracy	Unit	Notes
Temperature monitor absolute error	DMI_Temp	± 3	°C	
Supply voltage monitor absolute error	DMI_VCC	±0.1	V	
TX power	DMI_TX	± 3 dB	dB	
RX power	DMI_RX	± 3 dB	dB	
Bias Current monitor	DMI_Ibias	± 10%	mA	

Optical Characteristics (1G Operation)

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Transmitter						
Output Optical Power	PTX	-9.5		-1	dBm	1
Optical Center Wavelength	λ_C	840	850	860	nm	
Rise/Fall Time (20%-80%)	tr/ta			260	ps	
Extinction Ratio	ER	9			dB	
Spectral Width (RMS)	$\Delta\lambda$			0.45	nm	
Relative Intensity Noise	RIN			-120	dB/Hz	
Transmitter Jitter	TJ					2
Launch Power of OFF Transmitter	POUT_OFFH			-30	dB	3
Receiver						
Center wavelength	λ_C	840		860	nm	
Receiver Sensitivity @1.25Gb/s	RX_{SEN}			-17	dBm	4
Receiver Overload	P_{OL}	0.5			dBm	
Optical Return Loss	ORL	12			dB	
LOS Assert	LOS_A	-30			dBm	
LOS De-assert	LOS_D			-18	dBm	
LOS Hysteresis	LOS_H	0.5			dB	

Notes:

1. Class 1 product
2. According to IEEE 802.3-2012 requirement
3. Average
4. Measure with worst ER; BER<10⁻¹²;2⁷-1 PRBS

Optical Characteristics (10G Operation)

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Transmitter						
Output Optical Power	P_{TX}	-5		-1	dBm	1
Optical Center Wavelength	λ_c	840	850	860	nm	
Optical Modulation Amplitude	OMA		-1.5		dBm	2
Extinction Ratio	ER	3	5.5		dB	
Spectral Width (RMS)	$\Delta\lambda$			0.45	nm	
Relative Intensity Noise	RIN			-128	dB/Hz	
Transmitter Dispersion Penalty	TDP			3.9	dB	
Transmitter Jitter	TJ					3
Launch Power of OFF Transmitter	P_{OUT_OFF}			-30	dBm	4
Receiver						
Center wavelength	λ_c	840		860	nm	
Receiver Sensitivity @1.25Gb/s	RX_{SEN}			-10	dBm	5
Receiver Overload	P_{OL}	0.5			dBm	
Receiver Reflectance	TR_{RX}			-12	dB	
LOS Assert	LOS_A	-30			dBm	
LOS De-assert	LOS_D			-14	dBm	
LOS Hysteresis	LOS_H	0.5			dB	

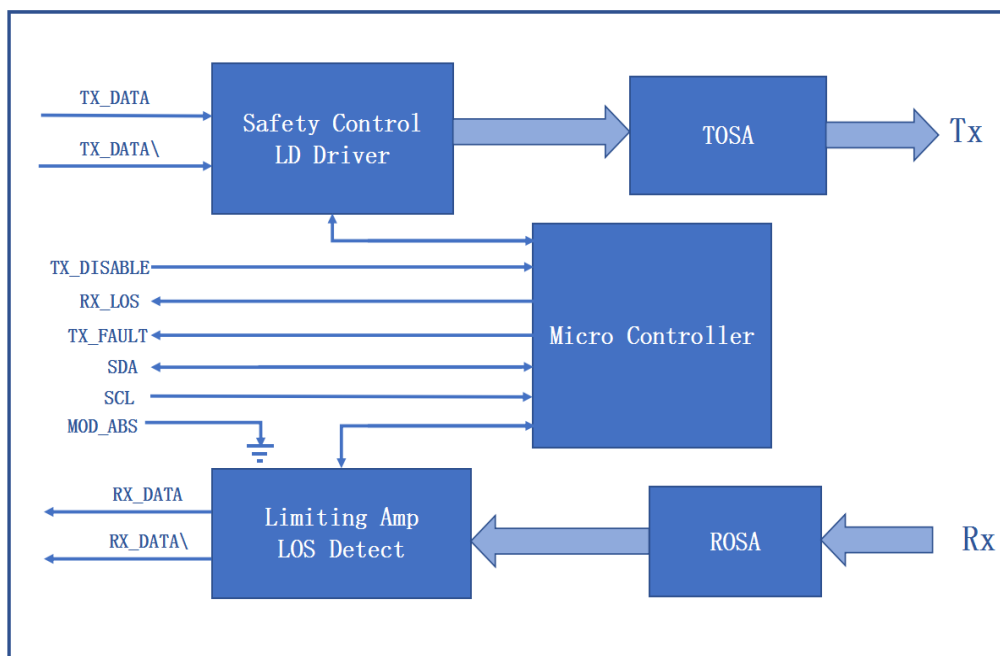
Notes:

1. Class 1 product
2. IEEE 802.3-2012
3. According to IEEE 802.3-2012 requirement
4. Average
5. Measure with worst ER; BER<10⁻¹² 2³¹-1 PRBS

Electro Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Transmitter						
Input differential impedance	R_{IN}		100		Ω	
Single ended data input swing	V_{in_PP}	180		700	mV	
Disable Voltage	V_D	2		V_{CC}	V	
Enable Voltage	V_{EN}	V_{EE}		$V_{EE}+0.8$	V	
Receiver						
Single Ended Data Output Swing	V_{OUT_PP}	300		850	mV	
Output Rise and Fall time (20% to 80%)	T_r, T_f	28			ps	
LOS Assert	V_{LOS_A}	2		V_{CC_HOST}	V	
LOS De-Assert	V_{LOS_D}	V_{EE}		$V_{EE}+0.5$	V	

Block Diagram of Transceiver



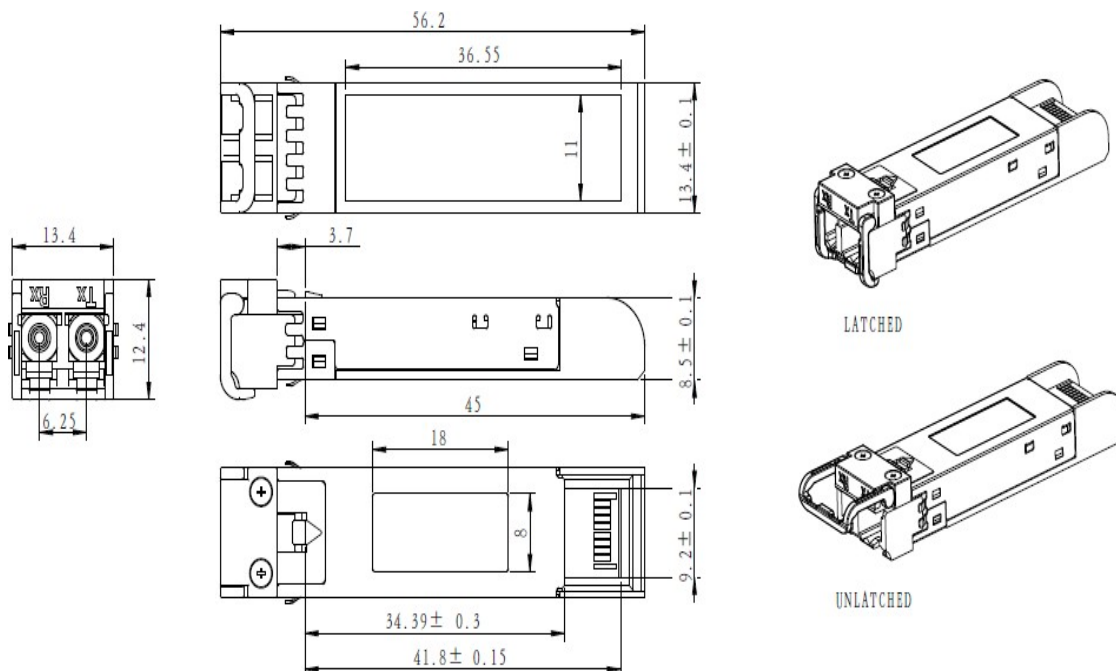
Pin Assignment

Pin	Symbol	Function/Description	Note
1	V _{EET}	Transmitter ground (common with receiver ground)	1
2	TX_FAULT	Transmitter Fault. Not supported	
3	TX DISABLE	Transmitter Disable. Laser output disabled on high or open	2
4	SDA	2-wire Serial Interface Data Line	3
5	SCL	2-wire Serial Interface Clock Line	3
6	MOD ABS	Module Absent. Grounded within the module	3
7	RS0	Rate selection	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation	4
9	RS1	No connection required	1
10	V _{EER}	Receiver ground (common with transmitter ground)	1
11	V _{EER}	Receiver ground (common with transmitter ground)	1
12	RD-	Receiver Inverted DATA out. AC coupled	
13	RD+	Receiver Non-inverted DATA out. AC coupled	
14	V _{EER}	Receiver ground (common with transmitter ground)	1
15	V _{CCR}	Receiver power supply	
16	V _{CCT}	Transmitter power supply	
17	V _{EET}	Transmitter ground (common with receiver ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC coupled	
19	TD-	Transmitter Inverted DATA in. AC coupled	
20	V _{EET}	Transmitter ground (common with receiver ground)	1

Notes:

1. Circuit ground is isolated from chassis ground
2. Disabled: TDIS>2V or open, Enabled: TDIS<0.8V
3. Should Be pulled up with 4.7k –10k ohm on host board to a voltage between 2V and 3.6V
4. LOS is open collector output

Dimensions



ALL DIMENSIONS ARE ±0.2mm UNLESS OTHERWISE SPECIFIED UNIT: mm

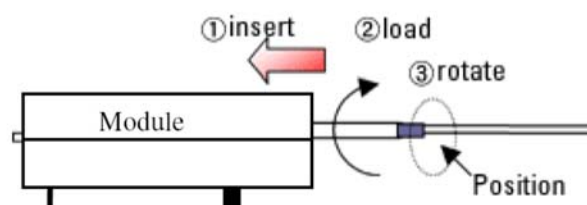
Optical Receptacle Cleaning Recommendations

All fiber stubs inside the receptacle portions were cleaned before shipment. In the event of contamination of the optical ports, the recommended cleaning process is the use of forced nitrogen. If contamination is thought to have remained, the optical ports can be cleaned using a NTT international Cletop® stick type and HFE7100 cleaning fluid. Before the mating of patch-cord, the fiber end should be cleaned up by using Cletop® cleaning cassette.

Cleaning of patch-cord



Cleaning of fiber stub



1. Insert
Ensure that stick is held straight when inserting into sleeve.
2. Load
Apply sufficient pressure (approx 600-700g) to ensure ferrule a little depressed in sleeve.
3. Rotate
Rotate stick clockwise 4-5 times, while ensuring direct contact with ferrule end-face is maintained.

*Notice: Number of possible wipes:
Maintenance (repair) ~1 use / piece
Equipment construction: 4 uses / piece (max.)*

Note: The pictures were extracted from NTT-ME website. And the Cletop® is a trademark registered by NTT-ME

Ordering Information

<i>Model Number</i>	<i>Part Number</i>	<i>Wavelength</i>	<i>Temperature</i>
SFP-1G/10G-SR(dual rate)	OPAT-MX3-85-CD	850nm	0 to 70 °C

Modification History

<i>Revision</i>	<i>Date</i>	<i>Description</i>
A1	Nov. 2021	Initial Release

Note: All information contained in this document is subject to change without notice.