

**SFPP-10G-10km-1310-S**

Hybriflex SFP+ Modul 10G 10 km LR



SFP+ transceivers, according to Enhanced Small Form Factor Pluggable "SFP+ Multi-Sourcing Agreement (MSA) SFF-8431 and SFF-8472, are designed for 10G Ethernet serial optical data communication up to 10km on single mode fiber. They are compatible with IEEE Std 802.3 10G Ethernet 10GBase-LR

Features / Benefits

- Compliant with IEEE Std 802.3 10G Ethernet 10GBase LR
- Electrical interface specifications per SFF 8431
- Management interface specifications per SFF 8431 and SFF 8472
- SFP+ MSA package with duplex LC connector
- Uncooled DFB laser
- PIN receiver
- Up to 10.3Gb/s data links
- Single +3.3V power supply
- Class 1 laser safety certified
- Operating temperature: 0 °C to 70 °C
- Up to 10km on SMF
- RoHS Compliant
- 10G Ethernet 10GBASE LR

Technical Features**ABSOLUTE MAXIMUM RATINGS**

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Storage Temperature	Ts	-40	-	85	°C	Ambient temperature
Operating Humidity	RH	+5	-	+95	%	-
Supply Voltage	Vcc	-0.5	-	4.0	V	-

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Unit	Notes
	DR	-	10.3125	-	Gb/s	-
Bit Error Rate	BER	-	-	10 ⁻¹²	-	-
Operating Temperature	Tc	0	-	70	°C	-
Power Supply Voltage	Vcc	3.14	3.3	3.46	V	-

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TRANSMITTER OPTICAL CHARACTERISTICS

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Output Optical Power	P _{out}	-8.2	-	0.5	dBm	Measured with PRBS31 test pattern, 10.3125Gb/s, BER<10 ⁻¹² .
Optical Center Wavelength	λ _C	1260	1310	1355	nm	-
Extinction Ratio@1.25Gb/s	ER	3.5	-	-	dB	-
Tx Disabled Power	PTX_DIS	-	-	-30	dBm	-
Spectral Width (RMS) at -20dB	RMS	-	-	1	nm	-
Side Mode Suppression Ratio	SMSR	30	-	-	dB	-
Optical Rise/Fall Time(20%-80%)	tr/tf	-	100	150	ps	-
Relative Intensity Noise	RIN	-	-	-120	dB/Hz	-
Jitter	J _I	-	-	0.3	UI	-
Optical Return Loss Tolerance	TORL	-	-	12	dB	-
Transmitter Dispersion Penalty	TDP	-	-	2	dB	-

RECEIVER OPTICAL CHARACTERISTICS

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Receiver Overload	P _{ol}	0.5	-	-	dBm	-
Optical Center Wavelength	λ _C	1260	-	1335	nm	-
Receiver Sensitivity (PAVG)	-	-	-	-14.4	ddBm	Measured with PRBS31 test pattern, 10.3125Gb/s, BER<10 ⁻¹² .
Receiver Sensitivity OMA	SOMA	-	-	-12.6	dBm	Measured with PRBS31 test pattern, 10.3125Gb/s, BER<10 ⁻¹² .
Receiver Reflectance	RREFL	-	-	-12	dB	-
Receiver Electrical 3dB Upper cutoff frequency	-	-	-	1500	MHz	-
LOS Assert	LOS-A	-30	-	-	dBm	-
LOS De-Assert	LOS-D	-	-	-15	dBm	-
LOS Hysteresis	LOS-H	0.5	-	-	dB	-
Generated Jitter(peak to peak)	R _{jp-p}	-	-	0.3	UI	-



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ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Module Supply Current	Icc	-	250	360	mA	-
Power Dissipation	PD	-	-	1000	mW	-
Transmitter Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Input differential impedance	RIN	-	100	-	Ω	-
Single ended data input swing	VIN PP	250	-	1200	mV	-
Transmit disable voltage	VD	VCC-1.3	-	Vcc	V	-
Transmit enable voltage	VEN	VEE	-	VEE+0.8	V	-
Transmit disable assert time	-	-	-	10	µs	-
Receiver Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Single ended data output swing	VOUT PP	300	-	800	mV	-
Data output rise/fall time (20%-80%)	tr/tf	-	-	300	PS	-
RX_LOS Loss of signal (LOS)	VOH	VCC-0.5	-	VCC HOST	V	-
RX_LOS Normal Operation	VOL	VEE	-	VEE+0.5	V	-

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PIN DESCRIPTION

PIN	Name	Function / Description	Notes
1	VEET	Transmitter ground (common with receiver ground)	Circuit ground is isolated from chassis ground
2	TX_FAULT	Transmitter Fault. Not supported	-
3	TX DISABLE	Transmitter Disable. Laser output disabled on high or open	Disabled:TDIS>2Vor open, Enabled: TDIS<0.8V
4	MOD_DEF(2)	Module Definition 2. Data line for serial ID	Should Be pulled up with 4.7k –10k ohm on host board to a voltage between 2V and 3.6V
5	MOD_DEF(1)	Module Definition 1. Clock line for serial ID	Should Be pulled up with 4.7k –10k ohm on host board to a voltage between 2V and 3.6V
6	MOD_DEF(0)	Module Definition 0. Grounded within the module	Should Be pulled up with 4.7k –10k ohm on host board to a voltage between 2V and 3.6V
7	Rate Select	No connection required	-
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation	LOS is open collector output
9	VEER	Receiver ground (common with transmitter ground)	Circuit ground is isolated from chassis ground
10	VEER	Receiver ground (common with transmitter ground)	Circuit ground is isolated from chassis ground
11	VEER	Receiver ground (common with transmitter ground)	Circuit ground is isolated from chassis ground
12	RD-	Receiver Inverted DATA out. AC coupled	-
13	RD+	Receiver Non-inverted DATA out. AC coupled	-
14	VEER	Receiver ground (common with transmitter ground)	Circuit ground is isolated from chassis ground
15	VCCR	Receiver power supply	-
16	VCCT	Transmitter power supply	-
17	VEET	Transmitter ground (common with receiver ground)	Circuit ground is isolated from chassis ground
18	TD+	Transmitter Non-Inverted DATA in. AC coupled	-
19	TD-	Transmitter Inverted DATA in. AC coupled	-
20	VEET	Transmitter ground (common with receiver ground)	Circuit ground is isolated from chassis ground