10G SFP+ 1310nm Duplex LC

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Variants

40KM 10KM 20KM

Details

General Description of SFP+ 10G, 1310nm Duplex LC:

SFP+ transceiver is designed for use in 10-Gigabit Ethernet links up to 10 km over single-mode fiber. The module consists of 1310 DFB Laser, PIN and Preamplifier in a highly integrated optical sub-assembly. Digital diagnostic functions are available via a 2-wire serial interface, as specified in SFF-8472.

HTSX-S3196Lx transceivers provide a unique enhanced digital diagnostic monitoring interface that allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power, and transceiver supply voltage. It also defines a sophisticated system of alarm and warning flags that alerts end-users when particular operating parameters are outside of a factory-set normal range.

The SFP+ MSA defines a 256-byte memory map in EEPROM that is accessible over a 2-wire serial interface at the 8-bit address 1010000X (A0h). The digital diagnostic monitoring interface makes use of the 8-bit address 1010001X (A2h), so the originally defined serial ID memory map

Features of the SFP+ 10G, 1310nm Duplex LC:

High Data Rate: Supports up to 11.3 GB/s of data links.

Transmitter and Receiver: Equipped with a 1310nm DFB transmitter and a PIN receiver.

Long-Distance Transmission: Capable of transmitting up to 10 km on 9/125µm single-mode fiber (SMF).

Hot-Pluggable: Features a hot-pluggable SFP+ footprint for easy installation and removal.

Optical Interface: Uses a duplex LC/UPC-type pluggable optical interface.

Durable Design: Enclosed in a metal casing to reduce electromagnetic interference (EMI).

Environmental Compliance: RoHS-compliant and lead-free.

Monitoring Interface: Supports Digital Diagnostic Monitoring (DDM) interface.

Power Supply: Operates on a single +3.3V power supply.

Power Consumption: Maximum power consumption is 1.2 W.

Standards Compliance: Compliant with SFF+MSA and SFF8472 standards.

Operating Temperature Ranges:
Commercial: 0 ~ +70 °C

Extended: -10 ~ +80 °C

Absolute Maximum Rating:

It has to be noted that the operation in excess of any individual absolute maximum ratings might cause permanent damage to this module.

Parameter	Symbol	Min	Max	Unit	Notes
Storage Temperature	TS	-40	85	°C	
Power Supply Voltage	VCC	-0.5	3.6	V	
Relative Humidity (non-condensation)	RH	5	95	%	
Damage Threshold	THd	5		dB	

Recommended Operating Conditions and Power Supply Requirements:

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	TOP	0		70	°C	commercial
		-40		85	°C	industrial
Power Supply Voltage	VCC	3.135	3.3	3.465	V	
Data Rate			10.3125		Gb/s	
Control Input Voltage is high.		2		Vcc	V	
Control Input Voltage is low.		0		0.8	V	
Link Distance (SMF)	D			10	km	9/125um

Electrical Characteristics of SFP:

The following electrical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Power Consumption	P			1.2	W	

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Supply Current	Icc			360	mA	
Transmitter						
Single-ended Input Voltage Tolerance		-0.3		4.0	V	
AC Common Mode Input Voltage Tolerance (RMS)				15	mV	
Differential Input Voltage Swing	Vin,pp	180		700	mVp	
Differential Input Impedance	Zin	90		100	110	Ohm
Transmit Disable Assert Time				10	µs	
Transmit Disable Voltage	Vdis			Vcc-1.3	Vcc	V
Transmit Enable Voltage	Ven	Vee		Vee+0.8	V	2
Receiver						
Differential Output Voltage Swing	Vout,pp	300		850	mVpp	
Differential Output Impedance	Zout	90		100	110	Ohm
Data Output Rise/Fall Time	Tr/Tf			28	ps	4
LOS Assert Voltage	VlosH			Vcc-1.3	Vcc	V
LOS De-assert Voltage	VlosL	Vee		Vee+0.8	V	5
Power Supply Rejection	PSR			100	mVpp	6

Optical Characteristics of SFP:

The following optical characteristics are defined over the Recommended Operating Environment, unless otherwise specified.

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Transmitter						
Center Wavelength	?C	1260		1310	1355	nm
Optical Spectral Width	??			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Average Optical Power	PAVG	-6		-0.5	dBm	2
Optical Extinction Ratio	ER	3.5			dB	
Transmitter OFF Output Power	Poff			-30	dBm	
Transmitter Eye Mask				Compliant with IEEE802.3ae		
Receiver						
Center Wavelength	?C	1270			1610	nm
Receiver Sensitivity (Average Power)	Sen.			-14.4	dBm	3
Input Saturation Power (overload)	Psat			0.5	dBm	
LOS Assert	LOSA			-30	dBm	
LOS De-assert	LOSD			-17	dBm	
LOS Hysteresis	LOSH	0.5			dB	

Digital Diagnostic Functions of SFP:

The following digital diagnostic characteristics are defined over the Recommended Operating Environment, unless otherwise specified. It is compliant to SFF8472 Rev10.2 with internal calibration mode. For external calibration mode, please.

Parameter	Symbol	Min.	Max	Unit	Notes
Temperature Monitor: Absolute Error	DMI_Temp	-3	3	°C	Over operating temperature range
Supply Voltage Monitor: Absolute Error	DMI_VCC	-0.15	0.15	V	Full operating range
RX Power Monitor: Absolute Error	DMI_RX	-3	3	dB	
Bias Current Monitor Absolute Error	DMI_bias	-10%	10%	mA	
TX Power Monitor: Absolute Error	DMI_TX	-3		dB	