SO-SFP-1000BASE-TX & -TX-I

SFP, 10/100/1000Base-T SERDES/SGMII Interface, 100m, RJ45

OVERVIEW

The SO-SFP-1000BASE-TX is a transceiver with a high-performance integrated duplex data link for bidirectional communication over copper cable. It is specifically designed for high speed communication links that require 1Gbps Ethernet (GbE) over LAN cable.

SO-SFP-1000BASE-T supports 10/100/1000BASE-T Operation in Host Systems with SGMII interface.
SGMII is a serial connection bus for Ethernet MACs and PHYs defined by Cisco Systems. SGMII runs its physical layer at 1.25Gb/s, 8B10B encoded at all times, regardless of the negotiated data rate. If the rate is 100Mbps it will repeat the same symbol ten times or one hundred times for 10Mbps.

This transceiver provides a 2-wire serial interface as defined by the SFF-8472 specification.
The transceiver module is compliant to RoHS-6/6.

The transceiver is available in two temperature range options, one being the Industrial temperature range (I-temp): -40°C to +85°C (-40°F to +185°F).

TECHNICAL DATA

Parameter	Value
Technology	Grey SFP (copper)
Transmission media	Electrical (1x RJ45)
Typical reach	100m [1)]
Interface standards	1000BASE-T IEEE 802.3
	100BASE-T IEEE 802.3
	10BASE-T IEEE 802.3
Protocol support	1Gbps Ethernet (GbE)
	100Mbps Ethernet (FE)
	10Mbps Ethernet
Operating temperature	0°C to +70°C (-TX)
	-40°C to +85°C (-TX-I)
Power consumption	< 1.2W
Storage temperature	-40°C to +85°C

Parameter	Value
Sync on line side	Preferred slave [2)]
Auto- negotiation	Yes, SGMII auto-neg
Rx LOS	No
MSA compliance	SFP MSA
	SFF-8472

[1)] Using CAT5e cable or better

[2)] Slave mode means it uses the recovered clock from its link partner.

Safety/regulatory compliance:
TUV/UL/FDA (contact Smartoptics for latest certification information)
RoHS compliance

10/100/1000 BASE-T operation requires an SGMII interface with no clocks in the host system, and the module will operate as 1000BASE-T when the host system uses SERDES interface. It depends on the module PHY configuration

ORDERING INFORMATION

Ordering number	Description
SO-SFP-1000Base-TX	SFP, 10/100/1000Base-T SERDES/SGMII Interface, 100m, RJ45
SO-SFP-1000Base-TX-I	SFP, 10/100/1000Base-T SERDES/SGMII Interface, 100m, RJ45, I-temp

RECOMMENDED SW CONFIGURATION

SO-SFP-1000BASE-TX supports 10/100/1000Mbps full duplex SGMII interface default. But it also can operate with 1000Mbps of SERDES operation. Please refer the following steps to configure:

Step 1: Access the PHY at 0Xac via two-wire serial interface.
Step 2: Configure 0Xac as below table

Register address	Write Data	Description
0x16	0x0001	Select page 1
0x1B	0x9088	Enable SerDes mode
0x00	0x9140	Software reset to allow changes to take effect
0x16	0x0000	Select page 0

SO-SFP-1000BASE-TX operate at mode of “Auto-negotiation enable” by default. But it also can operate with “Auto-negotiation disable”. Please refer the following steps to configure:

Step 1: Access the PHY at 0Xac via two-wire serial interface.
Step 2: Configure 0Xac as below table

Register address	Write Data	Description
0x16	0x0001h	Select page 1
0x00h	0x8140h	Disable Auto-negotiation
0x16h	0x0000h	Select page 0

GENERAL DEFINITIONS

Parameter	Description
Technology	Grey; Transceiver type for non-WDM applications. Electrical or optical. CWDM; Transceiver type for CWDM applications using G.694.2 channel grid. DWDM; Transceiver type for DWDM applications using G.694.1 channel grid. BiDi; Transceiver pair using two different wavelength channels operating on a single-fiber. DAC: Direct Attach Cable. Electrical cable with attached connectors. AOC: Active Optical Cable. Optical cable with attached connectors.
Transmission Media	Type of fiber, e.g. Multimode (MM) or Singlemode (SM). Number of and connector type within brackets (e.g. 2x LC, 1x MPO).
Typical reach	Nominal distance performance based on typical fiber dispersion, fiber loss and power budget properties, i.e. w/o dispersion compensation and optical amplification. Actual distance is dependent on actual optical path loss and dispersion properties.
Bit rate range	Supported bit rate range in Gigabit or Megabit per second (Gbps or Mbps).
Protocols	Protocols within supported bit rate range.
Nominal wavelength	Typical wavelength(s) from transmitter.
Interface standards	Referenced interface standards or MSA's, e.g. IEEE 802.3 standard for 10GbE services or 100G 4WDM-10 etc.
Power budget	Min and max power budget between Transmitter and Receiver w/o optical path penalties.
Dispersion tolerance/penalty	Maximum amount of tolerated dispersion and required reduction of power budget to maintain stipulated Bit Error Rate (BER) and at a given bit rate.
Temperature range	Max operating case temperature range. Standard temperature range (C-temp): 0°C to +70°C (32°F to +158°F) Extended temperature range (E-temp): typically -20°C to +75°C (-4°F to +167°F) Industrial temperature range (I-temp): -40°C to +85°C (-40°F to +185°F)
Power consumption	Worst case power consumption. Will vary over temperature.
Transmitter Output power	Average output power. Provided in min and max values.
Receiver minimum input power	Minimum average input power at specified BER, normally $1E^{-12}$. Note that some protocols require FEC to achieve sufficient BER.
Receiver max input power	Maximum average input power giving a BER, normally $1E^{-12}$.
DDM	Digital Diagnostic Monitoring functionality as defined in e.g. SFF-8472 MSA.