SO-TSFP10GER-AxI

SFP+ 10G Multirate 1.0-11.3Gbps DWDM 100GHz 40km 22dB Auto Tunable D920-960 I-temp LC

OVERVIEW

The SO-TSFP10GER-AxI is a set of five SFP+ form-factor, narrow-band tunable DWDM transceivers for multiple applications. The transceiver supports a bit rate range from 1Gbps to 11.3Gbps enabling a wide span of protocols to be carried. The optical performance supports distances up to 40km over a SingleMode (SM) fiber without dispersion compensation.

There are five transceivers that can be tuned to 9 channels in overlapping bands from 192.00 to 196.00THz in the 100GHz DWDM ITU-T 694.1 grid. When two transceivers covering same band are connected over a link, they can also be set into an auto-tunable mode where an out-of-band protocol ensures that both transceivers are tuned to the correct wavelength to establish a connection. This also works in single-fiber configurations where the up-link and down-link wavelengths cannot be the same.

The transceivers provide digital diagnostic functions via a 2-wire serial interface as defined by the SFF-8472 specification. The transceiver supports the Industrial temperature range (I-temp): -40°C to 85°C (-40°F to 185°F).

TECHNICAL DATA

Parameter	Value
Technology	DWDM SFP+
Transmission media	SM (2x LC)
Typical reach	40km
Nominal wavelength	192.00 - 192.80THz (9ch) [1]
	192.80 - 193.60THz (9ch) [2]
	193.60 - 194.40THz (9ch) [3]
	194.40 - 195.20THz (9ch) [4]
	195.20 - 196.00THz (9ch) [5]
Bit rate support	1.0Gbps to 11.3Gbps
Protocol support	GbE, 10GbE-LAN, 10GbE-WAN
	STM-16/OC48
	OTU1, OTU2, OTU2e
	1G, 2G, 4G, 8G, 10G FC
	CPRI Opt, 2, 3, 4, 5, 6, 7, 7A, 8
	OBSAI 2x, 4x, 8x
Power budget	12 – 22dB
Dispersion tolerance	0 to +700ps/nm
Dispersion penalty	Max 3dB
Power consumption	< 2.0 W
Operating temperature	-40°C to +85°C
Storage temperature	-40°C to +85°C

[1] SO-TSFP10GER-A1I

[2] SO-TSFP10GER-A2I

[3] SO-TSFP10GER-A3I

[4] SO-TSFP10GER-A4I

[5] SO-TSFP10GER-A5I

Parameter	Value
Transmitter data:	
Output power	Min: -1.0 dB [6]
	Max: +5.0 dBm [6]
Transmit wavelength	192.00 - 196.00THz
	5x 9 groups / 100GHz
Tuning speed	Typical 10s ch to ch
Receiver data:	
Minimum input power	-23.0 dBm [6] [7]
OSNR tolerance	25dB [8] [9]
	28dB [8] [10]
Overload (max power)	-7.0 dBm [6] [7]
Wavelength range	191.00 – 197.00THz
LOS assert	Min -35dBm
LOS de-assert	Max -28dBm
LOS assert/de-assert hysteresis	Min 0.5dB
DDM	Yes
MSA compliance	SFF-8083/-8418/-8419
	SFF-8432/-8472/-8690

[6] Average power

[7] At BER 10^{-12}, 10.3Gbps PRBS 2^{31}-1, OSNR>30dB

[8] 0.55nm 3dB filter BW; OSNR resolution 0.2 nm; PRBS 2^{31}-1

[9] 1-10.7Gbps, BER 10^{-12} , 0ps/nm, -7 to -18dBm Rx power

[10] 1-10.7Gbps, BER 10^{-12} , 0-700ps/nm, -7 to -18dBm Rx power

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

ORDERING INFORMATION

Parameter	Value
SO-TSFP10GER-A1I	SFP+ 10G Multirate 1.0-11.3Gbps DWDM 100GHz 40km 22dB Auto Tunable D920-928 I-temp LC
SO-TSFP10GER-A2I	SFP+ 10G Multirate 1.0-11.3Gbps DWDM 100GHz 40km 22dB Auto Tunable D928-936 I-temp LC
SO-TSFP10GER-A3I	SFP+ 10G Multirate 1.0-11.3Gbps DWDM 100GHz 40km 22dB Auto Tunable D936-944 I-temp LC
SO-TSFP10GER-A4I	SFP+ 10G Multirate 1.0-11.3Gbps DWDM 100GHz 40km 22dB Auto Tunable D944-952 I-temp LC
SO-TSFP10GER-A5I	SFP+ 10G Multirate 1.0-11.3Gbps DWDM 100GHz 40km 22dB Auto Tunable D952-960 I-temp LC

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.