

# SO-TSFP-10G-ZR-DWDM

SFP+, 10GBase-ZR, Multirate 9.95-11.3 Gbps, C-band Tunable, DWDM, 50GHz, 22dB, 80km

## OVERVIEW

The SO-TSFP-10G-ZR-DWDM C-band 50GHz Tunable SFP+ Optical Transceiver is a full duplex, integrated fiber optic transceiver that provides a high-speed serial link at 9.95 to 11.3 Gbps signaling rates. The transceiver supports the enhanced small form factor pluggable module (SFP+) specification SFF-8431 Rev. 4.1 for the electrical interface, SFF-8432 Rev. 5.0 for the mechanical interface, SFF-8690 Rev. 1.4 for the tunability interface, and SFF-8472 Rev. 11.3 for the management interface. The transceiver complies with IEEE 802.3-2012 clause 52 and it supports 10GBase-ZR/ZW (Ethernet), 10G Fibre Channel (FC), and corresponding forward error correction (FEC) rates. It supports Telcordia GR-253-CORE OC-192 LR-2 and ITU-T G.959.1 P1L1-2D2 data rates.

## PRODUCT FEATURES

- Full C-band tunable laser source
- 50 GHz ITU channel spacing
- Up to 80 km reach
- Operating temperature range of -5 to +70°C
- RoHS 6/6 compliant
- Limiting SFI AC-coupled electrical output interface
- APD receiver with limiting transimpedance amplifier
- Supports digital diagnostic monitoring
- Maximum power dissipation of 1.5 W

## APPLICATIONS

- 10GBASE-X
- Wide area networks (WAN)
- Storage area networks (SAN)
- Ethernet switches and applications
- FC switches and applications

## ORDERING INFORMATION

Part Number	Description
SO-TSFP-10G-ZR-DWDM	SFP+, 10GBase-ZR, Multirate 9.95-11.1 Gbps, C-band Tunable, DWDM, 50GHz, 22dB, 80km

### ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Storage Temperature	TS	-40	+85	°C
Supply Voltage	VCC	0	4	V

### RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Unit
Case Operating Temperature	Tc	-5		+70	°C
Power Supply Voltage	Vcc	3.135	3.3	3.465	V
Power Supply Current	Icc			500	mA

### OPTICAL CHARACTERISTICS – TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Average Optical Power	P <sub>OUT</sub>	-1		+3	dBm	coupled into 9/125um SMF
Extinction ratio	Er	9.0			dB	
Wavelength range	λ <sub>r</sub>	1528.38		1568.77	nm	ITU-Grid 50GHz
Frequency range	f <sub>r</sub>	191.1		196.15	THz	ITU-Grid 50GHz
Frequency center spacing			50		GHz	
Frequency stability (EOL)		f <sub>c</sub> -2.5		f <sub>c</sub> +2.5	GHz	
Channel tuning time				50	msec	Any channel to any channel
Side Mode Suppression Ratio	SMSR	35			dB	
Spectral width				200	pm	@-20dB, 0.01 nm RBW
Jitter generation	4MHz to 80MHz			0.1	UI <sub>[p-p]</sub>	
	20kHz to 80MHz			0.3	UI <sub>[p-p]</sub>	
Relative Intensity noise	RIN			-130	dB/Hz	
Return loss		24			dB	

### OPTICAL CHARACTERISTICS – RECEIVER

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Receiver Overload	P <sub>MAX</sub>	-7			dBm	
Optical Return Loss	ORL			-27	dB	
Loss of Signal-Asserted	P <sub>LOS_A</sub>	-33.5			dBm	
Loss of Signal-Deasserted	P <sub>LOS_D</sub>			-26	dBm	
Loss hysteresis		0.5		4	dB	

Data-rate [Gbps]	BER	RX Sensitivity		Unit
		0 ps/nm [max]	-400 to +1450 ps/nm [max]	
9.95, 10.3, 10.5	1E-12	-23	-21	dBm
10.709	1E-4	-27	-25	dBm
11.1	1E-4	-27	-25	dBm
11.3	1E-4	-26.5	-24	dBm

Subject to change without notice.

For more information, visit [smaroptics.com](http://smaroptics.com).

OSNR Characteristics with External CDR implemented on the host board					
Data-rate [Gbps]	BER	Dispersion ps/nm	RX Power Range		OSNR [dB]
			Min	Max	
10.709	1E-4	0	-18	-7	16
10.709	1E-4	-400 to +1450	-18	-7	19
11.1	1E-4	0	-18	-7	17
11.1	1E-4	-400 to +1450	-18	-7	20