

10Gbps Tunable XFP Optical Transceiver, ZR, 80km



Features

- Monolithically integrated full C-band tunable transmitter
- 50 GHz ITU channel spacing with integrated wavelength locker
- Commercial operating temperature from -5°C to 70°C
- Maximum power dissipation of 3.5 W
- No reference clock required
- Digital diagnostic monitoring support
- Multiple Protocols

Applications

- Wide, local, and storage area networks
- SONET OC-192 and SDH STM-64
- Ethernet and Fiber Channel switches

Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Storage temperature	T _{ST}	-40 to +85	°C
Operating case temperature	T _{OP}	-5 to +70	°C
Relative humidity	RH	5 to 85 (non-condensing)	%
Static electrical discharge (Human Body Model)	ESD	500	V
Power supply voltages	V _{CC2} , max	-0.3 to 1.98	V
	V _{CC3} , max	-0.3 to 3.63	V
	V _{CC5} , max	-0.5 to 6.0	V
Receive input optical power (damage threshold)	P _{dth}	+3	dBm

Electrical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Supply currents and voltages						
Voltage ₃	V _{CC3}	3.13	3.3	3.47	V	With respect to GND
Voltage ₅	V _{CC5}	4.75	5	5.25	V	With respect to GND
Voltage ₂	V _{CC2}	1.71	1.8	1.89	V	With respect to GND
Supply current ₃	I _{CC3}		750		mA	3.3 V
Supply current ₅	I _{CC5}		500		mA	5.0 V
Supply current ₂	I _{CC2}		1000		mA	1.8 V
Power dissipation	P _{wr}		3.5		W	
Low speed control and sense signals (detailed specification in XFP MSA INF8077i Rev. 4.5)						
Outputs (Interrupt, Mod_NR, RX_LOS)	V _{OL}	0		0.4	V	Rpullup pulled to host_Vcc, measured at host side of connector. I _{OL} (max)=3 mA
	V _{OH}	host_Vcc-0.5		host_Vcc+ 0.3	V	Rpullup pulled to host_Vcc, measured at host side of connector.
Inputs (TX_DIS, P_Down/RST, M_DSEL)	V _{IL}	-0.3		0.8	V	Pulled up in module to Vcc3
SCL and SDA inputs	V _{IH}	2		Vcc3+ 0.3	V	Pulled up in module to Vcc3
	V _{IL}	-0.3		Vcc3*0.3		Rpullup pulled to host_Vcc, measured at XFP side of connector.
	V _{IH}	Vcc3*0.7		Vcc3+0.5		Rpullup pulled to host_Vcc, measured at XFP side of connector.
Transmitter input (detailed specification in XFP MSA INF8077i Rev. 4.5)						
Data input baud rate nominal		9.95		11.35	Gbps	
Data input bit rate tolerance (10GbE/10GFC)		-100		+100	ppm	
Data input bit rate tolerance (SONET/SDH)		-20		+20	ppm	
Data input compliance			B			Internally AC-coupled signals
Data input differential impedance	R _i	90	100	110	Ω	
Receiver output (detailed specification in XFP MSA INF8077i Rev. 4.5)						
Data output baud rate nominal		9.95		11.35	Gbps	
Data output compliance			C			Internally AC-coupled signals
Data output bit rate stability (10GbE / 10GFC)		-100		+100	ppm	
Data output bit rate stability (SONET/SDH)		-20		+20	ppm	

Jitter Specifications

Parameter	Symbol	Min	Max	Units	Notes
Transmitter electrical input jitter from host at B (detailed specification in XFP MSA INF8077i Rev. 4.5)					
Total non-EQJ jitter			0.41	UI(p-p)	Total jitter less ISI
Total jitter	TJ		0.61	UI(p-p)	
Eye mask	X1		0.305	UI	Mask coordinate X1=0.205 if total non-DDJ is measured.
Eye mask	Y1	60		mV	
Eye mask	Y2		410	mV	50 mV is allocated for multiple reflections.
Receiver electrical output jitter to host at C (detailed specification in XFP MSA INF8077i Rev. 4.5)					
Deterministic jitter	DJ		0.18	UI(p-p)	Includes jitter transferred from the optical receiver during any valid operational input condition.
Total jitter	TJ		0.34	UI(p-p)	Includes jitter transferred from the optical receiver during any valid operational input condition.
Eye mask	X1		0.17	UI	
Eye mask	X2		0.42	UI	
Eye mask	Y1	170		mV	
Eye mask	Y2		425	mV	
Jitter transfer bandwidth	BW		8	MHz	PRBS 2 ³¹ -1, OC-192 / SDH-64 Sinusoidal jitter tolerance mask
Jitter peaking			1	dB	Frequency >120 KHz
Transmitter jitter generation			0.3	UI _{pp}	20 KHz to 80 MHz
			0.1	UI _{pp}	4 MHz to 80 MHz

Optical Transmitter Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Average optical power (EOL)	P _{avg}	-1.0		3.0	dBm
Extinction ratio ¹	ER	9			dB
Wavelength range ²	λ _c	1528.384		1568.773	nm
Frequency range ³		191.1		196.15	THz
Channel spacing		50			GHz
Frequency stability (BOL)		f _c -1.5	f _c	f _c +1.5	GHz
Frequency stability (EOL)		f _c -2.5	f _c	f _c +2.5	GHz
Channel tuning time ⁴				50	ms
Side-mode suppression ratio	SMSR	35			dB
Relative intensity noise	RIN			-130	dB/Hz
Return loss tolerance				27	dB

Note:

1. Tested with PRBS 2³¹-1 pattern
2. ITU grid wavelength
3. ITU grid frequency
4. Any channel to any channel

Optical Receiver Characteristics

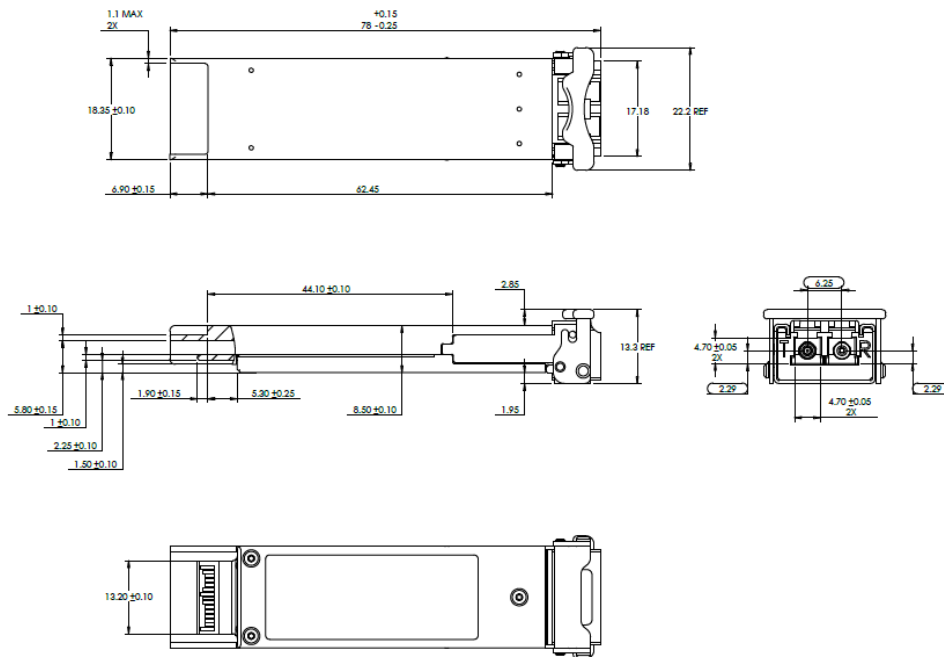
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Center wavelength	λ	1260		1600	nm
Receiver sensitivity (EOL) ¹					
Back to back (0 ps/nm)	R_{sen}			-24	dBm
Fiber (-400 to 1600 ps/nm)	R_{senf}			-21.5	dBm
Receive overload ²	P_{max}	-7			dBm
Receiver reflectance	R_{rx}			-27	dB
LOS assert	P_{los_on}	-33.5		-28	dBm
LOS deassert	P_{los_off}	-33		-26	dBm
LOS hysteresis		0.5		4	dB

Note:

1. Guaranteed at 10.709 Gbps. Measured with worst ER; BER<10⁻¹²; PRBS 2³¹-1 pattern.

2. Guaranteed up to 10.709 Gbps.

Module Outline



Ordering information

Part Number	Product Description
TXFP-C11H61	10Gbps Tunable XFP DWDM 50GHz C-band, C-temp