Datasheet

4.25 Gbps Fibre Channel CWDM SFP Transceiver

Features

- 1.06Gbps, 2.125Gbps, and 4.25 Gbps Fibre Channel support
- 1.25 Gbps Ethernet compatibility
- 80 km, 40 km, and 10 km reach models
- SFP MSA compliance (SFF-8074i)
- Digital Diagnostic (SFF-8472)
- Telecordia GR-468 compliance
- Single 3.3 volts power supply
- 18 CWDM wavelengths, DFB laser
- Class 1 laser product

General Operating

Parameter	Symbol	Min.	Typical	Max.	Unit
Supply Voltage	V_{cc}	3.135	3.3	3.465	V
Total Current	I_{cc}	-	-	300	mA
Power Supply Noise Rejection[a]	PSR	100	-	-	mV_{p-p}
Operating Case Temperature	T_{op}	-5	-	70	ºC
Storage Temperature	T_{st}	-40	-	85	ºC
Data Rate FC-400 Fibre Channel	DR	-	4250	-	Mbps

a) 20 Hz to 155 MHz

Transmitter Specifications (Optical)

Parameter	Symbol	Min	Typical	Max	Unit
Optical Power	P_{op}	0	2.5	5	dBm
Average Launch Power Of Off Tx	P_{off}	-	-	-30	dBm
Extinction Ratio	ER	5	-	-	dB
Eye Mask	Fibre Channel Compliant				
Optical Rise Time[b]	t_r	-	-	130	ps
Optical Fall Time[b]	t_f	-		130	ps
Mean Wavelength	λ	1xxx-6.5 nm	1xxx	1xxx+6.5 nm	nm
Spectral Width (20 dB)	$\Delta\lambda_{20}$	-	-	1	nm
Dispersion Penalty at Specified Distance: **SFPFC4CW08-xx**[c]	dp	-	2	3	dB
SFPFC4CW04-xx[d]	dp	-	1	2	dB
SFPFC4CW01-xx[e]	dp	-	0.5	1	dB
Relative Intensity Noise	RIN	-	-	-120	dB/Hz
Reflection Tolerance[f]	rp	-24	-	-	dB

b) 20% - 80% values
c) Measured at BER of $1e^{-12}$, PRBS of 2^7-1, at eye center, 4.25Gbps, 80 km
d) Measured at BER of $1e^{-12}$, PRBS of 2^7-1, at eye center, 4.25Gbps, 40 km
e) Measured at BER of $1e^{-12}$, PRBS of 2^7-1, at eye center, 4.25Gbps, 10 km
f) 1 dB degradation of receiver sensitivity

Transmitter Specifications (Electical)					
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**
Input Differential Impedence	R_{in}	80	100	120	Ω
PECL Single Ended Data Input Swing	$V_{in,p-p}$	250	-	1200	mV
TxFault_Fault	V_{fault}	2	-	V_{cc}	V
TxFault_Normal	V_{normal}	V_{ee}	-	V_{ee}+0.5	V
TxDisable_Disable	Vd	2	-	V_{cc}	V
TxDisable_Enable	V_{en}	V_{ee}	-	V_{ee}+0.8	V

Receiver Specifications (Optical)						
Parameter		**Symbol**	**Min**	**Typical**	**Max**	**Unit**
Receive Power Low:	**SFPFC4CW08-xx**[g]	$R_{sens,low}$	-	-26	-24	dBm
	SFPFC4CW04-xx[h]	$R_{sens,low}$	-	-19	-17.5	dBm
	SFPFC4CW01-xx[i]	$R_{sens,low}$	-	-18	-16	dBm
Receive Power High:	**SFPFC4CW08-xx**[g]	$R_{sens,high}$	-6	-	-	dBm
	SFPFC4CW04-xx[h]	$R_{sens,high}$	0	-	-	dBm
	SFPFC4CW01-xx[i]	$R_{sens,high}$	0	-	-	dBm
Damage Threshold for Receiver		$P_{in,damage}$	4	-	-	dBm
Wavelength		λ	1200	-	1625	nm
Maximum Reflectance of Receiver		RX_r	-	-	-27	dB
LOS Assert:	**SFPFC4CW08-xx**	-	-38	-	-	dBm
	SFPFC4CW04-xx	-	-30	-	-	dBm
	SFPFC4CW01-xx	-	-30	-	-	dBm
LOS De-assert:	**SFPFC4CW08-xx**	-	-	-	-24	dBm
	SFPFC4CW04-xx	-	-	-	-20	dBm
	SFPFC4CW01-xx	-	-	-	-20	dBm
LOS Hysteresis		-	0.5	-	-	dB

g) 10^{-12} BER, PRBS 2^7-1
h) 10^{-10} BER, PRBS 2^{23}-1
i) 10^{-12} BER, PRBS 2^7-1

Receiver Specifications (Electrical)					
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**
PECL Single Ended Data Output Swing	$V_{out,p-p}$	185	-	800	mV
Data Output Rise Time	t_r	-	-	175	ps
Data Output Fall Time	t_f	-	-	175	ps

Timing and Electrical					
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**
Tx Disable Negate Time	t_on	-	-	50	µs
Tx Disable Assert Time	t_off	-	-	10	µs
Time To Initialize, Including Reset of Tx Fault	t_init	-	-	200	ms
Tx Fault Assert Time	t_fault	-	-	100	µs
Tx Disable To Reset	t_reset	10	-	-	µs
LOS Assert Time	t_loss_on	-	-	100	µs
LOS De-assert Time	t_loss_off	-	-	100	µs
Serial ID Clock Rate	f_serial_clock	2	-	100	KHz
RX_LOS Voltage (High)	-	2	-	V_{cc}	V
RX_LOS Voltage (Low)	-	-	-	0.8	V
LOS Output Voltage-Fault	V_{LOS} fault	2	-	V_{cc}	V
LOS Output Voltage-Normal	V_{LOS}normal	V_{ee}	-	V_{ee}+0.5	V
MOD_DEF (0:2)-High	V_H	2	-	V_{cc}	V
MOD_DEF (0:2)-Low	V_L	V_{ee}	-	V_{ee}+0.5	V

Ordering Information				
Model	**Description**	**Data Rate (Mbps)**	**Bail Latch Color**	**Distance Range (km)**
SFPFC4CW08-*xx**	SFP CWDM Transceiver	1/2/4 Gbps Fibre Channel/ Gigabit Ethernet	Yellow	0 - 80
SFPFC4CW04-*xx**	SFP CWDM Transceiver	1/2/4 Gbps Fibre Channel/ Gigabit Ethernet	Yellow	0 - 40
SFPFC4CW01-*xx**	SFP CWDM Transceiver	1/2/4 Gbps Fibre Channel/ Gigabit Ethernet	Yellow	0 - 10

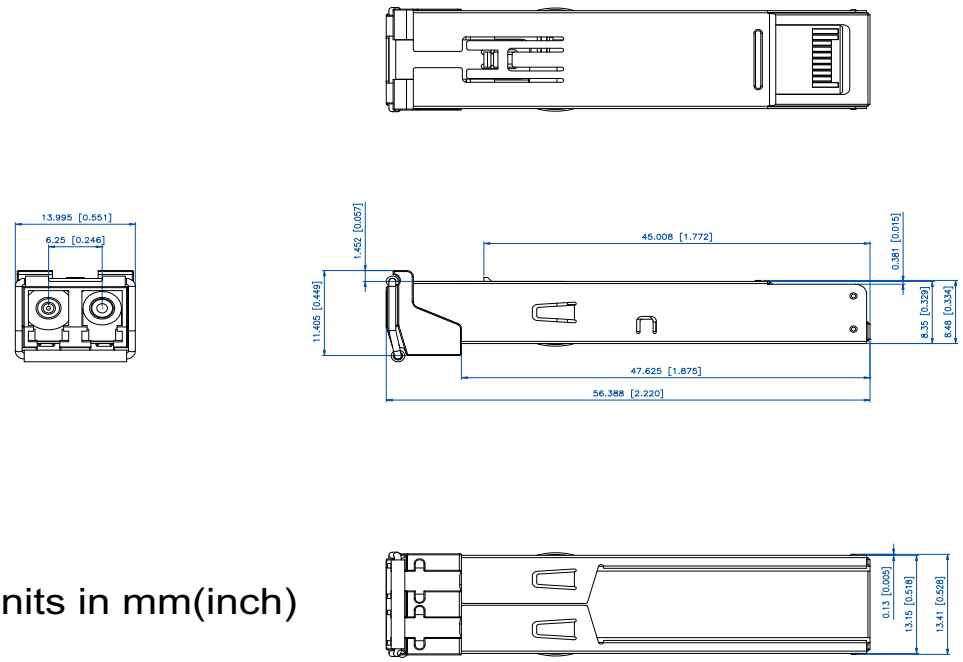
See Wavelength Guide below for "***xx***" values

λc Wavelength Guide								
Code	**λc**	**Unit**	**Code**	**λc**	**Unit**	**Code**	**λc**	**Unit**
27	1271	nm	39	1391	nm	51	1511	nm
29	1291	nm	41	1411	nm	53	1531	nm
31	1311	nm	43	1431	nm	55	1551	nm
33	1331	nm	45	1451	nm	57	1571	nm
35	1351	nm	47	1471	nm	59	1591	nm
37	1371	nm	49	1491	nm	61	1611	nm

Digital Diagnostics						
Parameter	**Range**	**Accuracy**	**Unit**	**Calibration**	**Bit Value**	**Formula**
Temperature (-CDx)	-5 to 70	± 3	° C	Internal	1/256 C	Tc(C)=Tad(16 bit signed twos complement)/256
Voltage	0 to V_{CC}	0.1	V	Internal	100µV	V(Volts)=Vad(16 bit unsigned integer)*0.1
Bias Current	0 to 120	5	mA	External	-	I(mA)=Islope*Iad(16 bit unsigned integer)+Ioffset
TX Power	0 to +5	±3 dB	dBm	External	-	TX_PWR(µW)=TX_PWRslope*TX_PWRad(16 bit unsigned integer +TX_PWRoffset
RX Power	-18 to 0	±3 dB	dBm	External	-	RX_PWR(µW)=A0+A1*x+A2*x^2+A3*x^3+A4*x^4

Pin	Function	Notes
1	$V_{ee}T$	TX GND
2	TX_FAULT	Open Collector
3	TX_DISABLE	Internally Pulled High
4	MOD_DEF2	Serial Data Input
5	MOD_DEF1	Serial Clock Input
6	MOD_DEF0	Internally Grounded
7	NC	Not Connected
8	LOS	Open Collector
9	$V_{ee}R$	RX Ground
10	$V_{ee}R$	RX Ground
11	$V_{ee}R$	RX Ground
12	RXD-	RX Data Negative
13	RXD+	RX Data Positive
14	$V_{ee}R$	RX GND
15	V_{ccR}	RX Power
16	V_{ccT}	TX Power
17	$V_{ee}T$	TX GND
18	TXD+	TX Data Positive
19	TXD-	TX Data Negative
20	$V_{ee}T$	TX GND

Outline Drawing



Units in mm(inch)

Regulatory and Industry Compliances

RoHS directive; China RoHS; USA and Canada UL listing; 21CFR 1040.10, MSA SFF-8074i; SFF-8472; Telecordia GR-468;

Warnings

Handling Precautions: This device is susceptible to damage as a result of electrostatic descharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indeirect radiation.

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