

# SO-SFP-4GFC-40D-Cxx

SFP, 4/2/1 Gbps FC/FICON, CWDM, SM, DDM, 18dB, 40km

## OVERVIEW

The SO-SFP-4GFC-40D-CXX series single mode transceiver is small form factor pluggable module for bi-directional serial optical data communications such as SONET OC-48 / SDH STM-16, Gigabit Ethernet 1000BASE and Fibre Channel SM-LC-L FC-PI. It is with the SFP 20-pin connector to allow hot plug capability. This module is designed for single mode fiber and operates at a nominal wavelength of CWDM wavelength. There are eighteen center wavelengths available from 1270nm to 1610nm, with each step 20nm. The transmitter section uses a multiple quantum well CWDM DFB laser and is a class 1 laser compliant according to International Safety Standard IEC-60825. The receiver section uses an integrated InGaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC. The SO-SFP-4GFC-40D-CXX series are designed to be compliant with SFF-8472 Multi-source Agreement (MSA).

## PRODUCT FEATURES

- Operating data rate up to 4.25Gbps
- 18-Wavelength CWDM DFB LD transmitter from 1270nm to 1610nm, with step 20nm
- Single 3.3V power supply and TTL control logic interface
- Hot-Pluggable SFP footprint duplex LC connector interface
- Class 1 FDA and IEC60825-1 laser safety compliant
- Operating temperature
  - Standard: 0°C~+70 °C
  - Extended:-20 °C~+85 °C
- Compliant with SFP MSA specification
- Compliant with Digital Diagnostic Monitor (DDM) interface

## APPLICATIONS

- Fibre Channel switch infrastructure
- ATM switches and routers
- SONET / SDH switch
- CWDM, WAN, SAN networking
- Fast Ethernet, Gigabit Ethernet

## ORDERING INFORMATION

Part Number	Description
SO-SFP-4GFC-40D-Cxx	SFP, 4/2/1 Gbps FC/FICON, CWDM, SM, DDM, 18dB, 40km
SO-SFP-4GFC-40D-Cxx -E	SFP, 4/2/1 Gbps FC/FICON, CWDM, SM, DDM, 18dB, 40km, ext.temp.

Subject to change without notice.

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

## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Storage Temperature	TS	-40	+85	°C
Supply Voltage	VCC	-0.5	3.6	V
Operating Relative Humidity			95	%

## RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	TA	SO-SFP-4GFC-40D-Cxx	0	+70	°C
		SO-SFP-4GFC-40D-Cxx -I	-20	+85	°C
Power Supply Voltage	Vcc	3.15	3.3	3.45	V
Power Supply Current	Icc			300	mA
Data Rate	4FC		4.25		Gbps
	2FC		2.125		
	FC		1.063		

## PERFORMANCE SPECIFICATIONS – ELECTRICAL TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Unit	Notes
CML Inputs(Differential)	V <sub>IN</sub>	400		1600	mVpp	AC coupled inputs
Input Impedance (Differential)	Z <sub>IN</sub>	85	100	115	ohms	R <sub>in</sub> > 100 kohms @ DC
TX Disable	Disable	2		Vcc	V	
	Enable	0		0.8		
TX FAULT	Fault	2		Vcc+0.3	V	
	Normal	0		0.8		

## PERFORMANCE SPECIFICATIONS – ELECTRICAL RECEIVER

Parameter	Symbol	Min	Typ	Max	Unit	Notes
CML Outputs (Differential)	V <sub>out</sub>	400		1200	mVpp	AC coupled outputs
Output Impedance (Differential)	Z <sub>out</sub>	85	100	115	ohms	
Rx_LOS Output Voltage – High		2		Vcc+0.3	V	
Rx_LOS Output Voltage – Low		0		0.8	V	
MOD_DEF ( 2:0 )	VoH	2.5			V	With Serial ID
	VoL	0		0.5	V	

## OPTICAL AND ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Min	Typ	Max	Unit
Power Budget		18			dB
Data Rate				4.25	Gbps

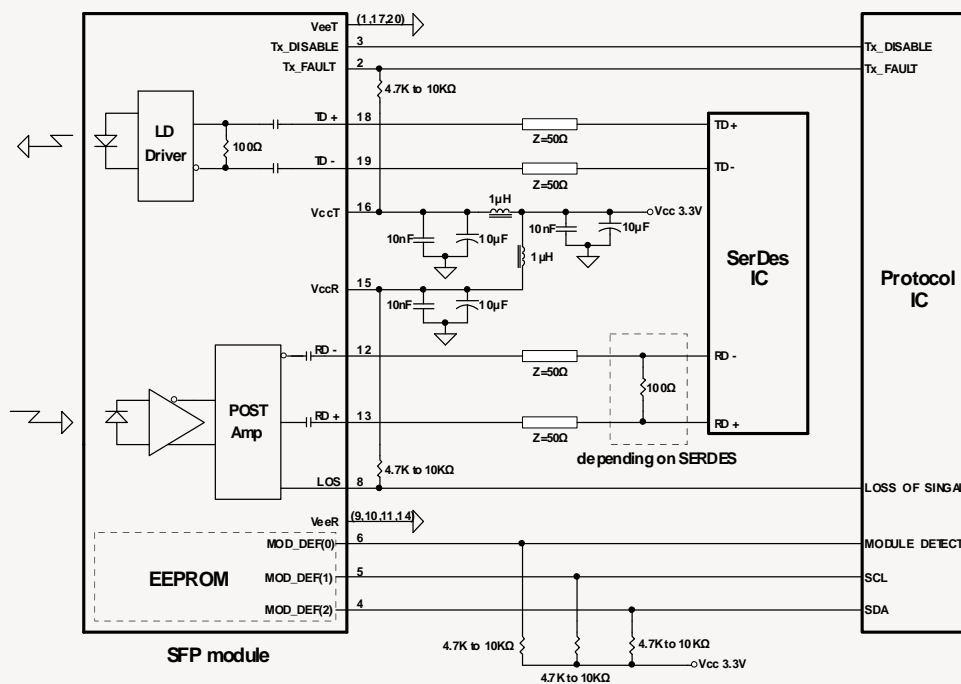
## OPTICAL AND ELECTRICAL CHARACTERISTICS TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Unit
Centre Wavelength	$\lambda_c$	$\lambda_c - 5.5$	$\lambda_c$	$\lambda_c + 7.5$	nm
Spectral Width (-20dB)	$\Delta\lambda$			1	nm
Average Output Power @9/125um SMF	$P_{out}$	0		5	dBm
Extinction Ratio@4.25Gb/s	$ER$	4.5			dB
Side Mode Suppression Ratio	$SMSR$	30			dB
Rise/Fall Time(Unfiltered 20%~80%)	$t_r/t_f$			120	ps
Output Optical Eye		ANSI Fiber Channel and Gigabit Ethernet Compliant			
TX Disable Assert Time	$t_{off}$			10	us
Pout@TX Disable Asserted	$P_{out}$			-45	dBm

## OPTICAL AND ELECTRICAL CHARACTERISTICS RECEIVER

Parameter	Symbol	Min	Typ	Max	Unit
Centre Wavelength	$\lambda$	1260		1600	nm
Receiver Sensitivity	$P_{min}$			-18	dBm
Receiver Overload	$P_{max}$	-3			dBm
Return Loss		12			dB
Optical Path Penalty				1	dB
LOS De-Assert	$LOSD$			-19	dBm
LOS Assert	$LOSA$	-35			dBm
LOS Hysteresis		0.5			dB

## RECOMMENDED CIRCUIT SCHEMATIC



## PIN FUNCTION DEFINITIONS

PIN	Signal Name	Description	PIN	Signal Name	Description
1	V <sub>EE</sub> T	Transmitter Signal Ground	11	V <sub>EE</sub> R	Receiver Signal Ground
2	TX_Fault	Transmitter Fault Indication. Logic "1" Output = Laser Fault. Logic "0" Output = Normal Operation	12	RD-	Inverse Receiver Data Out
3	TX_Disable	Logic "1" Input (or no connection) = Laser off, Logic "0" = Laser on.	13	RD+	Receiver Data Out
4	SDA	Modulation Definition 2 – Two wires serial ID Interface	14	V <sub>EE</sub> R	Receiver Signal Ground
5	SDL	Modulation Definition 1 – Two wires serial ID Interface	15	V <sub>CC</sub> R	Receiver Power – 3.3V±5%
6	MOD-ABS	Modulation Definition 0 – Ground in Module	16	V <sub>CC</sub> T	Transmitter Power – 3.3V±5%
7	RS0	RX Rate Select (LVTTTL). This pin has an internal 30k pulldown to ground. A signal on this pin will not affect module performance.	17	V <sub>EE</sub> T	Transmitter Signal Ground
8	RX_LOS	Loss of Signal Out (OC).	18	TD+	Transmitter Data In
9	RS1	TX Rate Select (LVTTTL). This pin has an internal 30k pulldown to ground. A signal on this pin will not affect module performance.	19	TD-	Inverse Transmitter Data In
10	V <sub>EE</sub> R	Receiver Signal Ground	20	V <sub>EE</sub> T	Transmitter Signal Ground

## MECHANICAL DRAWING

