

# SO-SFP-4GFC-80D-Cxx

SFP, 4/2/1Gbps FC/FICON, CWDM 1270nm-1610nm, SM, DDM, 28dB, 80km

## OVERVIEW

The SO-SFP-4GFC-80D-Cxx fiber optical SFP (small form pluggable) transceivers includes an APD receiver and an uncooled DFB laser at CWDM wavelengths. The modules operate at data rates of 4.25 Gbps, 2.125Gbps, 1.0625 Gbps and 1.250 Gbps..CWDM modules operate at nominal Coarse Wavelength Division Multiplexing (CWDM) wavelengths. Eighteen center wavelengths available from 1271 nm to 1611 nm with each step being 20 nm. The CWDM characteristics are fully compliant to the wavelength parameters specified in ITU standards G.694.2 and G.695. The transceiver is compliant to wavelength requirements from ITU-T G.957 and ITU-T G.695. The SFP transceivers for ITU channels 1271nm to 1611nm can operate over 80 km's together with the T-3009 Mux/Demux family. The module has a duplex LC optical interface and all mechanical characteristics are compliant with the current SFP specification (SFF-8431 and SFF-8432). All SFP modules fulfill the content of the serial EEPROM described in the SFP MSA, Appendix B4, table 3.1, at base data fields (defined as addresses 0 to 63) and extended data fields (defined as addresses 64 to 95). The nominal transmitter output wavelength is stated at the reserved addresses 60-61 according to SFF document SFF-8472 rev 10.4, "Digital Diagnostics Monitoring Interface". Wavelengths stated in the specification are measured in vacuum. All requirements in this specification must be valid throughout the specified lifetime and operational environmental temperature range unless otherwise stated. The transceiver modules are compliant to RoHS-6/6

## PRODUCT FEATURES

- Brocade layer 1 tested and approved
- 4/2/1Gbps Fibre Channel and 1GE bi-directional data links
- Compliant with SFP MSA
- Hot-pluggable SFP footprint with duplex LC connector
- Uncooled CWDM DFB, directly modulated laser transmitter
- Broadband APD receiver
- Up to 80km on 9/125um SMF (G.652)
- Single power supply 3.3V
- RoHS6 Compliant
- Class 1 laser product complies with EN 60825-1
- Operating temperature range: 0°C to 70°C

## ORDERING INFORMATION

Part Number	Description
SO-SFP-4GFC-80D-Cxx	SFP, 4/2/1 Gbps FC/FICON, CWDM 1270nm-1610nm, SM, DDM, 28dB, 80km

## APPLICATIONS

- 4/2/1 Gbps Fibre Channel / Ficon and 1GE Ethernet networking
- CWDM, SAN, WAN connectivity

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- Used with M-Series for multichannel 400km connectivity

## GENERAL SPECIFICATIONS

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Data Rate	DR	1.0625		4.3	Gbps	
Bit Error Rate	BER			10-12		
Operating Temperature	TOP	0		70	°C	Case temperature
Storage Temperature	TSTO	-40		85	°C	Ambient temperature
Supply Current	IS		200	300	mA	For electrical power interface
Input Voltage	VCC	3.13	3.3	3.47	V	
Maximum Voltage	VMAX	-0.5		3.6	V	For electrical power interface

## OPTICAL CHARACTERISTICS – TRANSMITTER

VCC=3.13V to 3.47V, TC=0°C to 70°C

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Output Optical Power	PTX	+1		+5	dBm	Average, coupled into 9/125um SMF
Optical Center Wavelength	$\lambda_c$	ITU-6.5	ITU	ITU+6.5	nm	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Optical Rise / Fall Time	$t_r / t_f$			90	ps	20% to 80%, unfiltered
Relative Intensity noise	RIN			-120	dB/Hz	Peak-to-Peak
Launch Power OFF	Poff			-30	dBm	Average

## OPTICAL CHARACTERISTICS – RECEIVER

VCC=3.13V to 3.47V, TC=0°C to 70°C

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Optical Receiver Power	PRX			-9	dBm	Average
Optical Center Wavelength	$\lambda_c$	1260		1620	nm	
Receiver Sensitivity	RX_SENS			-27	dBm	BER<10 <sup>-12</sup> , PRBS 2 <sup>31</sup> -1
Loss of Signal-Asserted	PLOS_A	-40			dBm	
Loss of Signal-Deasserted	PLOS_D			-27	dBm	
Loss of Signal Hysteresis		1.0			dB	

## ELECTRICAL CHARACTERISTICS

VCC=3.13V to 3.47V, TC=0°C to 70°C

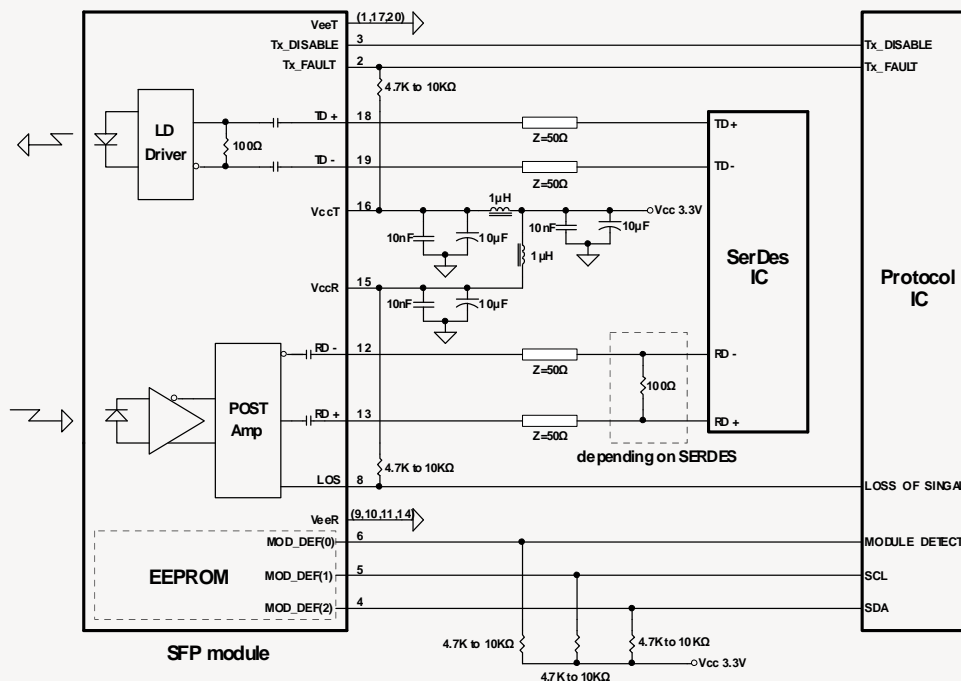
Parameter	Symbol	Min	Typ	Max	Unit	Notes
Data Input Current - Low	$I_{IL}$	-350			$\mu A$	
Data Input Current - High	$I_{IH}$			350	$\mu A$	
Differential Input Voltage	$V_{IH-VIL}$	0.5		2.4	V	Peak-to-Peak
TX Disable Input Voltage - Low	$T_{DIS, L}$	0		0.5	V	
TX Disable Input Voltage - High	$T_{DIS, H}$	2.0		Vcc	V	
TX Disable Assert Time	$T_{Assert}$			10	$\mu s$	
TX Disable Deassert Time	$T_{Deassert}$			1	ms	
TX Fault Output Voltage - Low	$T_{FaultL}$	0		0.5	V	
TX Fault Output Voltage - High	$T_{FaultH}$	2.0		Vcc+0.3	V	

## ELECTRICAL CHARACTERISTICS – LOW-SPEED SIGNAL INTERFACE (LVTTTL)

VCC=3.13V to 3.47V, TC=0°C to 70°C

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Differential Output Voltage	$VOH-VOL$	0.6		2.0	V	
Output LOS Voltage - Low	$VOL$	0		0.5	V	
Output LOS Voltage - High	$VOH$	2.0		Vcc+0.3	V	

## RECOMMENDED CIRCUIT SCHEMATIC



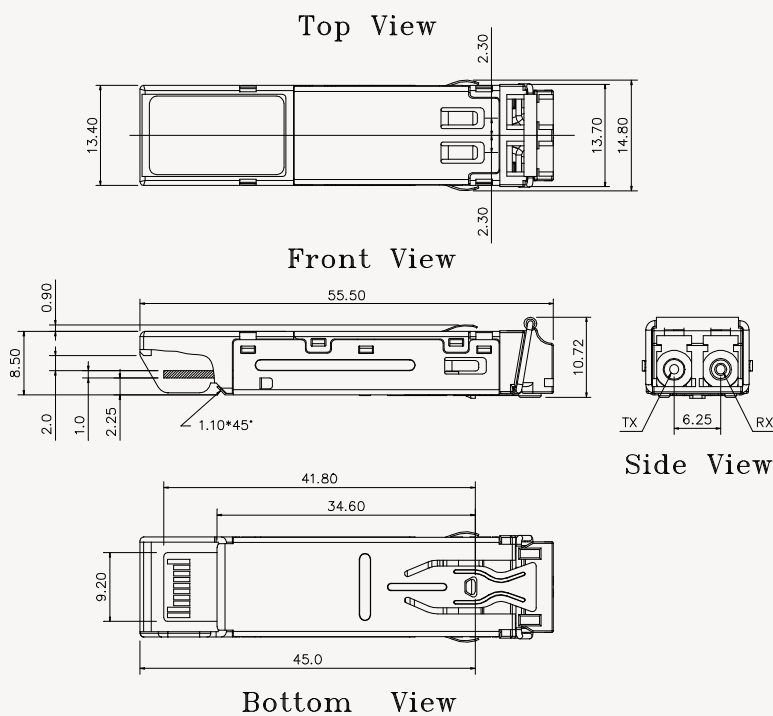
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## PIN FUNCTION DEFINITIONS

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



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