

# SO-SFP-4GFC-L50D

SFP, 4/2/1 Gbps FC/FICON, 1550nm, SM, DDM, 18dB, 50km

## OVERVIEW

The SO-SFP-4GFC-L50D fiber optical SFP (small form pluggable) transceivers includes a PIN diode and an uncooled DFB laser at 1550nm wavelengths. The modules operate at data rates of 4.25 Gbps, 2.125Gbps, 1.0625 Gbps and 1.250 Gbps.. The SFP transceiver can operate over 50 km's of optical G.652 compliant fiber. 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
- Duplex LC connector
- Compliant with SFP+ MSA
- Hot-pluggable SFP footprint
- Uncooled DFB, directly modulated laser transmitter
- Broadband PIN receiver
- Built-in digital diagnostic functions
- Up to 50km 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

## APPLICATIONS

- 4/2/1/Gbps Fibre Channel / Ficon and 1.25G Gigabit Ethernet
- SAN / WAN Connectivity

## ORDERING INFORMATION

Part Number	Description
SO-SFP-4GFC-L50D	SFP, 4/2/1 Gbps FC/FICON, 1550nm, SM, DDM, 18dB, 50km

Subject to change without notice.

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

## 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	0		+4	dBm	Average, coupled into 9/125um SMF
Optical Center Wavelength	$\lambda_c$	1480		1580	nm	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Optical Rise / Fall Time	tr / tf			90	ps	20% to 80%, unfiltered
Relative Intensity noise	RIN			-128	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			0	dBm	Average
Optical Center Wavelength	$\lambda_c$	1260		1620	nm	
Receiver Sensitivity @ 10.3GBps	RX_SENS			-18	dBm	BER<10 <sup>-12</sup> , PRBS 2 <sup>31</sup> -1
Loss of Signal-Asserted	PLOS_A	-30			dBm	
Loss of Signal-Deasserted	PLOS_D			-18	dBm	
Loss of Signal Hysteresis		0.1			dB	

## ELECTRICAL CHARACTERISTICS – HIGH-SPEED SIGNAL INTERFACE (CML)

VCC=3.13V to 3.47V, TC=0°C to 70°C

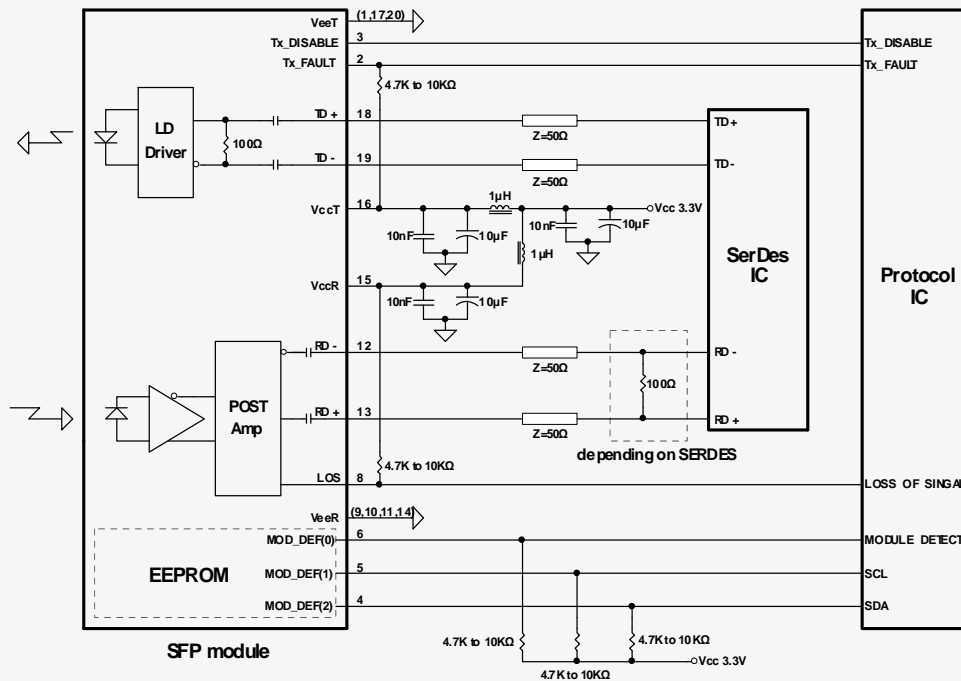
Parameter	Symbol	Min	Typ	Max	Unit	Notes
Data Input Current - Low	IIL	-350			350	
Data Input Current - High	IIH			350	2.4	
Differential Input Voltage	VIH-VIL	0.5		2.4	0.5	Peak-to-Peak
TX Disable Input Voltage - Low	TDIS, L	0		0.5	Vcc	
TX Disable Input Voltage - High	TDIS, H	2.0		Vcc	10	
TX Disable Assert Time	TAssert			10	1	
TX Disable Deassert Time	TDeassert			1	0.5	
TX Fault Output Voltage – Low	TFaultL	0		0.5	Vcc+0.3	
TX Fault Output Voltage – High	TFaultH	2.0		Vcc+0.3	350	

## 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



### 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 (LVTTL). 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 (LVTTL). 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

