

# SO-SFP-100BASE-T

SFP, 125Mbps FE to 10/100Base-T convert

## OVERVIEW

The SO-SFP-100Base-T is a single-mode transceiver in small form-factor pluggable module for duplex optical data communications. They are designed to be compliant with SFF-8472 Multi-Source Agreement (MSA). Smartoptics SO-SFP-100Base-T electrical transceivers are designed to support 10/100BASE-T on 125 Mbps Fast Ethernet FX or LX ports. In addition, the SFP comply with the small form-factor pluggable Multi Sourcing Agreement (MSA).

## PRODUCT FEATURES

- Support 10/100Base-T operation in host system
- Up to 100 m reach on CAT 5 UTP Cable
- Hot-pluggable SFP footprint
- Fully metallic enclosure for low EMI
- Low power dissipation
- Compact RJ-45 connector assembly
- Access to physical layer IC via 2-wire serial bus
- Detailed product information in EEPROM
- Serial ID information compliant with SFP MSA
- Single power supply 3.3V
- RoHS compliance
- Class 1 laser product complies with EN 60825-1
- Operating temperature range: 0°C to 70°C or -40°C to 85°C.

## APPLICATIONS

- LAN 10/100Base-T in 125 Mbps Fast Ethernet FX and LX ports

## ORDERING INFORMATION

Part Number	Description
SO-SFP-100Base-T	SFP, 100Base-T Copper Interface, FX to TX convert
SO-SFP-100Base-T-I	SFP, 100Base-T Copper Interface, FX to TX convert, industrial temperature -40°C to 85°C

## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Storage Temperature	TSTO	-40	+85	°C
Maximum Voltage	VMAX	-0.5	4.0	V
Operating Relative Humidity			95	%

## RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Unit	
Case Operating Temperature	TA	SO-SFP-100Base-T	0		+70	°C
		SO-SFP-100Base-T-I	-40		+85	
Power Supply Voltage	Vcc	3.15	3.3	3.45	V	
Power Supply Current	Icc		170	300	mA	
Data rate	DR		125		Mbps	
Distance			100		meters	

## PERFORMANCE SPECIFICATIONS – ELECTRICAL TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Unit	Notes
LVPECL Inputs(Differential)	V <sub>IN</sub>	400		2000	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		0.5		

## PERFORMANCE SPECIFICATIONS – ELECTRICAL RECEIVER

Parameter	Symbol	Min	Typ	Max	Unit	Notes
LVPECL Outputs (Differential)	V <sub>out</sub>	400		2000	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	

## ELECTRICAL CHARACTERISTICS

V<sub>cc</sub>=3.13V to 3.45V, T<sub>c</sub>=0°C to 70°C or -40°C to 85°C, EOL

Parameter	Symbol	Min	Typ	Max	Unit	Notes
SFP Output LOW	VOL	0		0.5	V	4.7k to 10k pull-up to host-Vcc, measured at host side of connector
SFP Output HIGH	VOH	Host_Vcc-0.5		Host_Vcc+0.5	V	4.7k to 10k pull-up to host-Vcc, measured at host side of connector
SFP Input LOW	VIL	0		0.8	V	4.7k to 10k pull-up to Vcc, measured at SFP side of connector

Subject to change without notice.

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

SFP Input LOW	V <sub>IH</sub>	2	V <sub>CC</sub> +0.3	V	4.7k to 10k pull-up to V <sub>CC</sub> , measured at SFP side of connector
---------------	-----------------	---	----------------------	---	--

## ELECTRICAL CHARACTERISTICS – HIGH-SPEED ELECTRICAL INTERFACE, TRANSMISSION LINE-SFP

V<sub>CC</sub>=3.13V to 3.45V, T<sub>C</sub>=0°C to 70°C or -40°C to 85°C, EOL

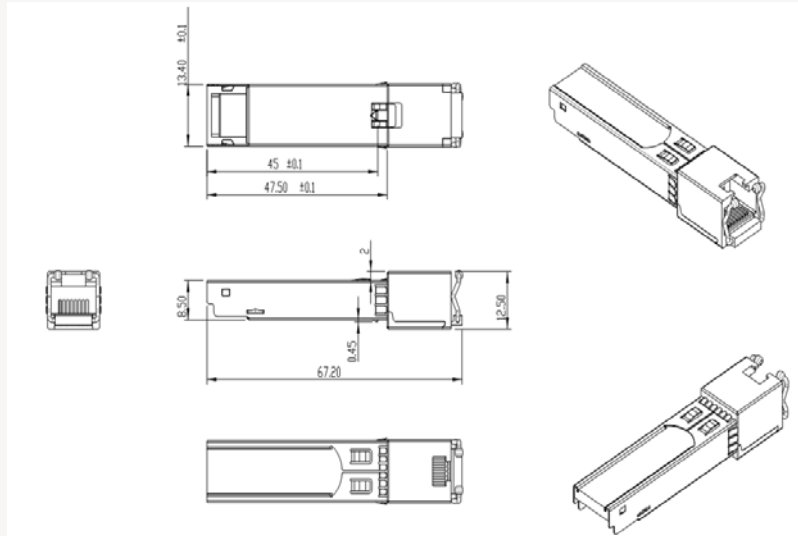
Parameter	Symbol	Min	Typ	Max	Unit	Notes
Line Baud Rates	$f_L$		125		MHz	MLT-3 encoding per IEEE802.3u
TX Output Impedance	$Z_{out}$		100		Ω	Differential, AC coupled internally
TX Input Impedance	$Z_{in}$		100		Ω	Differential, AC coupled internally
Differential data output swing	$V_{OUT\_PP}$	400		2000	mVpp	Internally AC coupled

## ELECTRICAL CHARACTERISTICS – HIGH-SPEED ELECTRICAL INTERFACE, HOST-SFP

V<sub>CC</sub>=3.13V to 3.45V, T<sub>C</sub>=0°C to 70°C or -40°C to 85°C, EOL

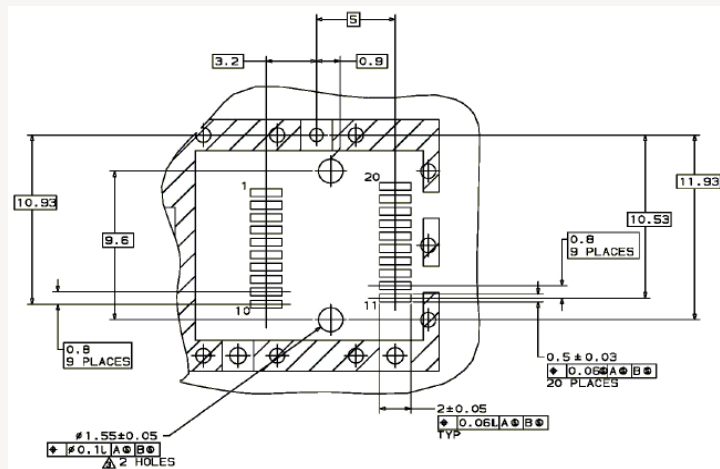
Parameter	Symbol	Min	Typ	Max	Unit	Notes
Single ended data input swing	$V_{in}$	250		1200	mV	Single ended
Single ended data input swing	$V_{out}$	300		1000	mV	Single ended
Rise/Fall Time	$T_r, T_f$		3		nsec	20% - 80%
TX Input Impedance	$Z_{in}$		50		Ω	Single ended
RX Output Impedance	$Z_{out}$		50		Ω	Single ended

DIMENSIONS

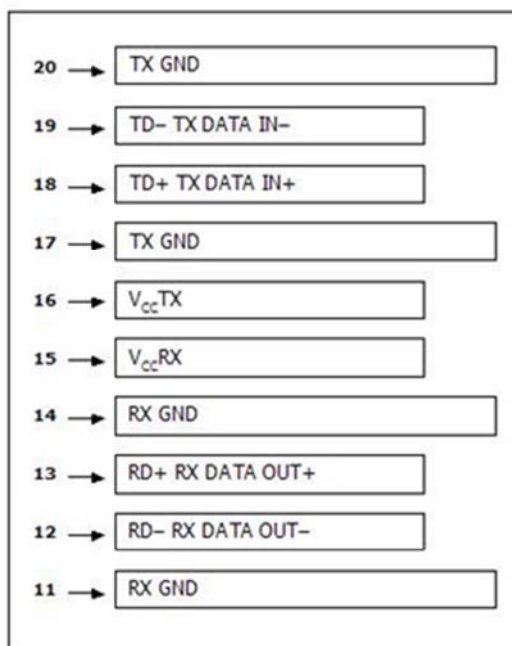
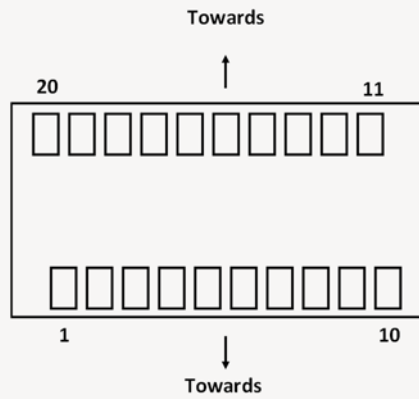


All dimensions are  $\pm 0.2\text{mm}$  unless otherwise specified  
Unit: mm

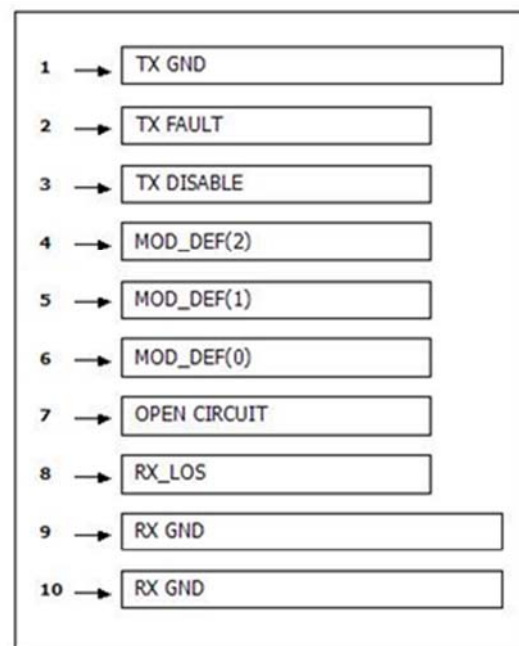
PCB LAYOUT RECOMMENDATION



ELECTRICAL PAD LAYOUT



Top of Board



Bottom of Board

## PIN ASSIGNMENT

Pin No	Symbol	Description	Notes
1	V <sub>EET</sub>	Transmitter ground (common with receiver ground)	
2	T <sub>FAULT</sub>	Transmitter Fault. Not supported	
3	T <sub>DIS</sub>	Transmitter Disable. Laser output disable on high or open	
4	MOD_DEF (2)	Module Definition 2. Data line for serial ID	Should Be pulled up with 4.7k – 10k ohm on host board to a voltage between 2V and 3.6V
5	MOD_DEF (1)	Module Definition 1. Clock line for serial ID	
6	MOD_DEF (0)	Module Definition 0. Grounded within the module	
7	Rate Select	Not connected	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation	LOS is open collector output
9	V <sub>EER</sub>	Receiver ground (common with transmitter ground)	
10	V <sub>EER</sub>	Receiver ground (common with transmitter ground)	
11	V <sub>EER</sub>	Receiver ground (common with transmitter ground)	
12	RD-	Receiver Inverted DATA out. AC coupled	
13	RD+	Receiver Non-inverted DATA out. AC coupled	
14	V <sub>EER</sub>	Receiver ground (common with transmitter ground)	
15	V <sub>CCR</sub>	Receiver power supply	
16	V <sub>CCT</sub>	Transmitter power supply	
17	V <sub>EET</sub>	Transmitter ground (common with receiver ground)	
18	TD+	Transmitter Non-Inverted DATA in. AC coupled	
19	TD-	Transmitter Inverted DATA in. AC coupled	
20	V <sub>EET</sub>	Transmitter ground (common with receiver ground)	