

# SO-SFP-MR15D

SFP, 100Mbps-2.7Gbps, Multirate, 1310nm, SM, DDM, 13dB, 15km

## OVERVIEW

The SO-SFP-MR15D series single mode transceiver is small form factor pluggable module for duplex optical data communications such as Gigabit Ethernet 1000BASE-LX and Fiber Channel 1x/2x SM-LC-L FC-PI. It is with the SFP 20-pin connector to allow hot plug capability. This module is designed for singlemode fiber and operates at a nominal wavelength of 1310nm. The transmitter section uses a multiple quantum well 1310nm DFB or FP 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-MR15D series are designed to be compliant with SFF-8472 Multi-source Agreement (MSA).

## PRODUCT FEATURES

- Operating data rate up to 2.67Gbps
- 1310nm DFB/FP laser transmitter
- 15km with 9/125  $\mu$ m SMF
- Single 3.3V power supply and TTL 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
  - Industrial: -40 °C~+85 °C
- Compliant with SFP MSA specification
- Compliant with SFF-8472

## APPLICATIONS

- SONET / SDH
- Optical networking and equipment connectivity

## ORDERING INFORMATION

Part Number	Description
SO-SFP-MR15D	SFP, 100Mbps-2.7Gbps, Multirate, 1310nm, SM, DDM, 13dB, 15km
SO-SFP-MR15D-I	SFP, 100Mbps-2.7Gbps, Multirate, 1310nm, SM, DDM, 13dB, 15km, ind.temp.

## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Storage Temperature	TS	-40	+85	°C
Supply Voltage	VCC	-0.5	4	V
Operating Relative Humidity	RH	5	95	%

## RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	Tc	SO-SFP-MR15D	0	+70	°C
		SO-SFP-MR15D-I	-40	+85	°C
Power Supply Voltage	Vcc	3.15	3.3	3.45	V
Power Supply Current	Icc			300	mA
Data rate	OC-48/STM-16 FEC		2.67		Gbps
	OC-48/STM-16		2.488		
	2FC		2.125		
	GBE		1.25		
	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	800	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	

Subject to change without notice.

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

### OPTICAL AND ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Min	Typ	Max	Unit
9µm Core Diameter SMF	L		15		km
Data Rate	BR	100		2670	Mbps

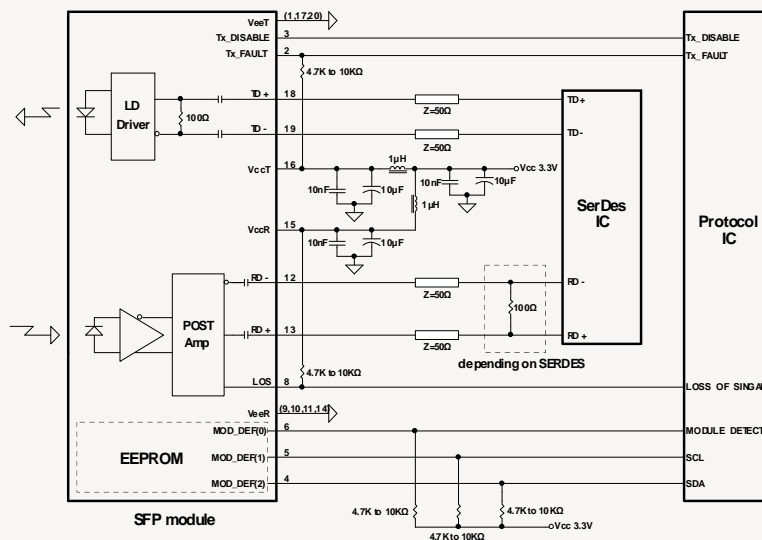
### OPTICAL AND ELECTRICAL CHARACTERISTICS TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Unit
Centre Wavelength	$\lambda_c$	1260	1310	1360	nm
Spectral Width (-20dBm)	$\Delta\lambda$			1	nm
Average Output Power	$P_{out}$	-5		0	dBm
Side Mode Suppression Ratio	SMSR	30			dB
Extinction Ratio	ER	8.2			dB
Rise/Fall Time(20%~80%)	$tr/tf$			160	Ps
Output Optical Eye		IUT-T G.957 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	Multirate			-18	dBm
Receiver Overload	$P_{max}$	-3			dBm
Reflection				-27	dB
LOS De-Assert	LOSD			-19	dBm
LOS Assert	LOSA	-35			dBm
LOS Hysteresis		0.5			dB

### RECOMMENDED CIRCUIT SCHEMATIC



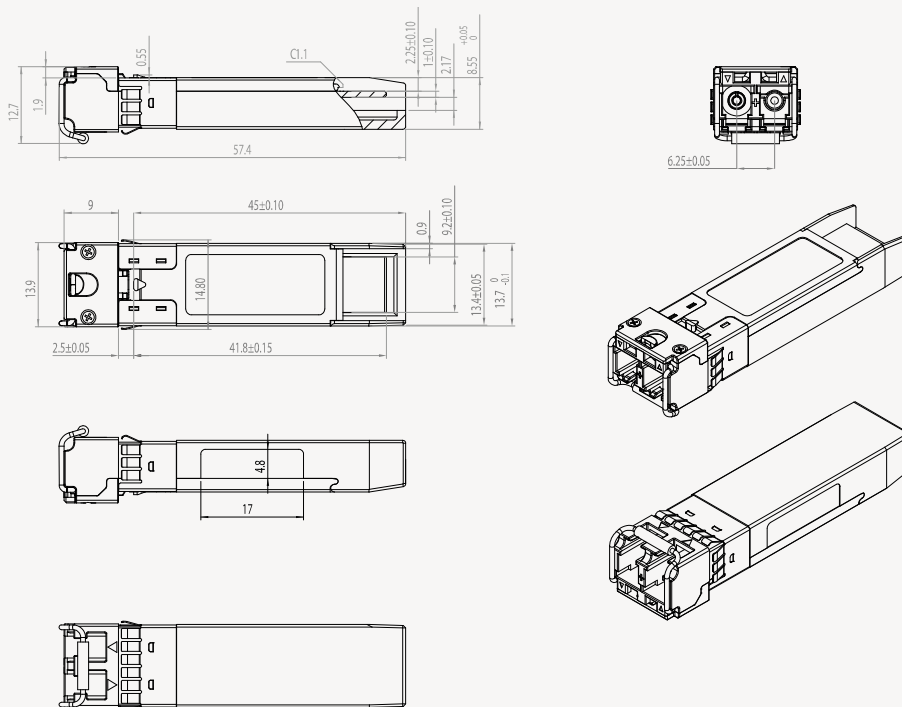
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## PIN FUNCTION DEFINITIONS

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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