

MFEFX1-LEG
LINKSYS 100BASE-FX SFP MMF
1310NM 2KM REACH LC



MFEFX1-LEG

155Mbps SFP Transceiver

Features

- Operating Data Rate up to 155Mbps
- 1310 FP Laser transmitter
- 2km with 50/125 μ m MMF
2km with 62.5/125 μ m MMF
- 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
- Commercial and industrial
operating temperature optional
- Low power dissipation <800mW
- Compliant with SFP MSA
- Compatible with SFF-8472



Applications

- SDH STM-1, I-1.1
- SONET OC-3 SRI 1
- Fast Ethernet
- Other Optical Link

Product Description

Legrand MFEFX1-LEG Small Form Factor Pluggable (SFP) transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA). The SFP transceivers are high performance, cost effective modules supporting dual data-rate of 155Mbps and support distance up to 2km with MMF.

Legrand SFP transceivers are RoHS compliant and lead-free.

Regulatory Compliance

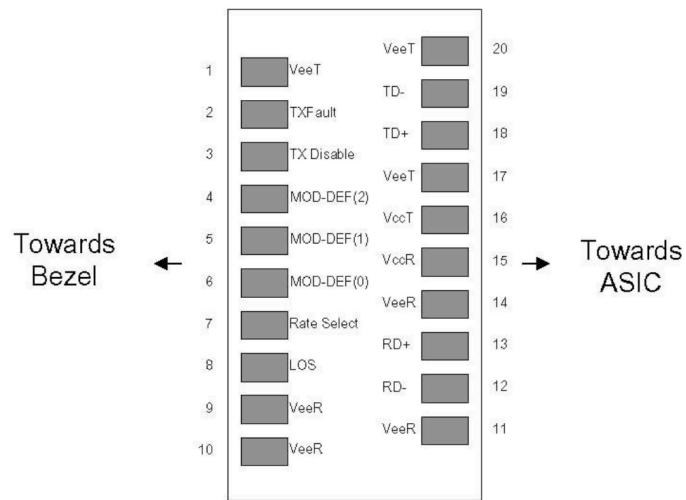
- ESD to the Electrical PINs: compatible with MIL-STD-883G Method 3015.7.
- ESD to the Duplex LC Receptacle: compatible with IEC 61000-4-2.
- Immunity compatible with EN 55024: 1998+A1+A2, IEC 6100-4-3.
- EMI compatible with FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B.
- Laser Eye Safety compatible with FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2.
- RoHs6 compliant with 2002/95/EC 4.1&4.2 2005/747/EC 5&7&13.

Pin Descriptions

Pin	Symbol	Name/Descriptions	Ref.
1	VeeT	Transmitter Ground (Common with Receiver Ground)	1
2	TX Fault	Transmitter Fault.	
3	TX Disable	Transmitter Disable. Laser output disabled on high or open.	2
4	MOD_DEF (2)	Module Definition 2. Data line for Serial ID.	3
5	MOD_DEF (1)	Module Definition 1. Clock line for Serial ID.	3
6	MOD_DEF (0)	Module Definition 0. Grounded within the module.	3
7	Rate Select	No connection required.	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	4
9	VeeR	Receiver Ground (Common with Transmitter Ground)	1
10	VeeR	Receiver Ground (Common with Transmitter Ground)	1
11	VeeR	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled.	
13	RD+	Receiver Non-inverted DATA out. AC Coupled.	
14	VeeR	Receiver Ground (Common with Transmitter Ground)	1
15	VccR	Receiver Power Supply.	
16	VccT	Transmitter Power Supply.	
17	VeeT	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	VeeT	Transmitter Ground (Common with Receiver Ground)	1

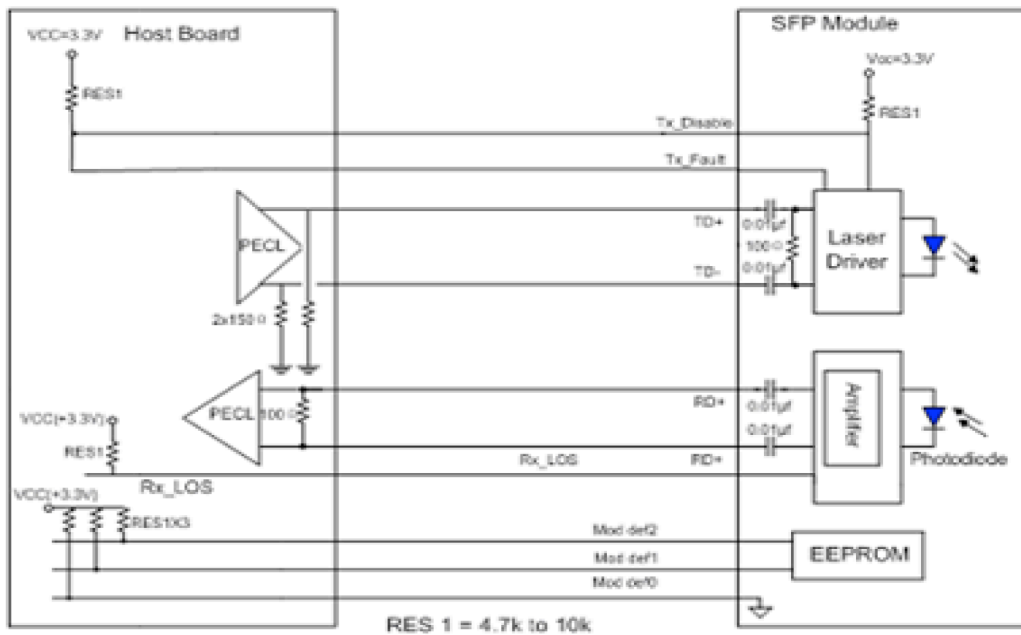
Notes:

1. Circuit ground is internally isolated from chassis ground.
2. Laser output disabled on TX Disable >2.0V or open, enabled on TX Disable <0.8V.
3. Should be pulled up with 4.7k-10kohms on host board to a voltage between 2.0V and 3.6V. MOD_DEF (0) pulls line low to indicate module is plugged in.
4. LOS is open collector output. Should be pulled up with 4.7k-10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.



Pin-out of connector Block on Host board

Recommend Circuit Schematic



Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Supply Voltage	Vcc	-0.5	3.6	V
Storage Temperature	TS	-40	85	°C
Operating Humidity	RH	5	95	%

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power Supply Voltage	Vcc	3.13	3.30	3.45	V
Power Supply Current	Icc			300	mA
Case Operating Temperature – Commercial	Ta	0		70	°C
Case Operating Temperature – Industrial	Ta	-40		85	°C
Data Rate (Gigabit Ethernet)			155		Mbps
Data Rate (Fibre Channel)			100		Mbps
50/125µm MMF	L			2	km

Electrical Characteristics (TOP=25°C, Vcc=3.3V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Input differential impedance	Zin	85	100	115	ohms	2
Single ended data input swing	Vin	400		2000	mVpp	1
TX Disable-High		2		Vcc+0.3	V	
TX Disable-Low		0		0.8	V	
TX Fault-High		2		Vcc+0.3	V	
TX Fault-Low		0		0.5	V	
Receiver						
Output differential impedance	Zout	85	100	115	ohm	1
Single ended data output swing	Vout,	400		2000	mVpp	
RX_Los (LOS)		2		Vcc+0.3	V	
RX_Los (Normal)		0		0.8	V	
MOD-DEF (1)	VoH	2.5			V	3
MOD-DEF (2)	VoL	0		0.5	V	3

Notes:

1. AC coupled.
2. Rin > 100 kohms @DC.
3. With serial ID.

Optical and Electrical Characteristics

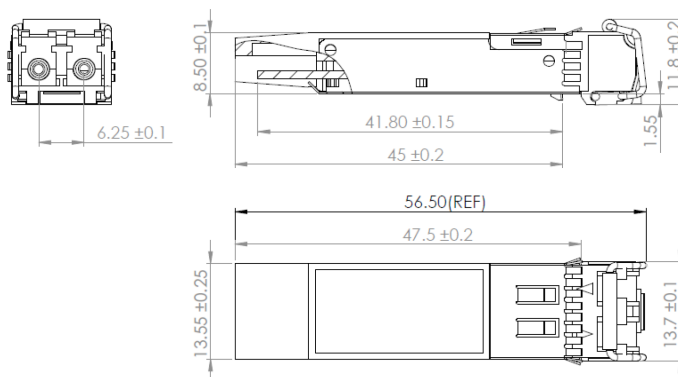
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Average Output Power	PO	-15		-8	dBm	1
Extinction Ratio	ER	8.2			dB	2
Optical Wavelength	λ_C	1260	1310	1360	nm	
Spectral Width	$\Delta\lambda$			10	nm	
Optical Rise/Fall Time	tr/ta			3	ns	
Total Jitter	TJ				ns	2
Output Optical Eye	Telcordia GR-253-CORE and IUT-T G.957 Compliant					2
TX_Disable Assert Time	t_off			10	us	
Receiver						
Receiver Sensitivity	Pmin			-23	dBm	3
Maximum Received Power	P _{MAX}	-8			dBm	
Centre Wavelength	λ_C	1260		1600	nm	
LOS De-Assert	LOSD			-24	dBm	
LOS Assert	LOSA	-45			dBm	
LOS Hysteresis		0.5			dB	4

Notes:

1. Output power is measured by coupling into a 62.5/125 mm multi-mode fiber.
2. Filtered, measured with a PRBS 2²³-1 test pattern @155Mbps.
3. Minimum average optical power is measured by coupling into at 62.5/125 mm multi-mode fiber; the BER is less than 1E or lower, measure with a 2²³-1 NRZ PRBS and ER=9dB.
4. Eye Pattern Mask.

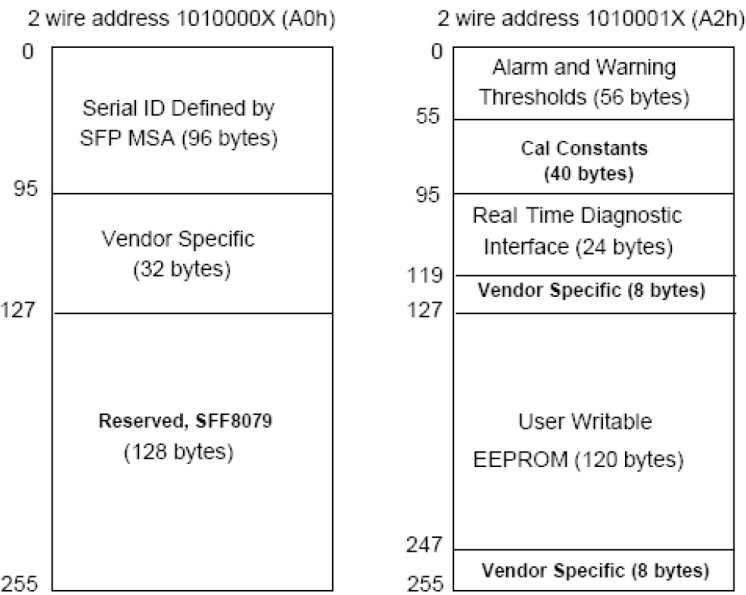
Mechanical Specifications

Small Form Factor Pluggable (SFP) transceivers are compatible with the dimensions defined by the SFP Multi-Sourcing Agreement (MSA).



EEPROM Information

EEPROM memory map specific data field description is as below:



Digital Diagnostic Monitoring Interface

Five transceiver parameter values are monitored. The following table defines the monitored parameter's accuracy.

Parameter	Range	Accuracy	Calibration
Temperature	0°C to 70°C (C)	±3°C	Internal
	-40°C to 85°C (I)		
Voltage	2.97V to 3.63V	±3%	Internal
Bias Current	0mA to 100mA	±10%	Internal
TX Power	-9dBm to -4dBm	±3dB	Internal
RX Power	-18dBm to 0dBm	±3dB	Internal



Data Communications

125 Eugene O'Neill Drive
New London, CT 06320
800.934.5432
www.legrand.us

570 Applewood Crescent
Vaughan, Ontario L4K 4B4
905.738.9195
www.legrand.ca