



SFP13002FE2D821

Moxa® SFP-1FEMLC-T Compatible 100Base-FX SFP Transceiver (MMF, 1310nm, 2km, LC, DOM, -40 to 85C)

Product Description

This Moxa® SFP-1FEMLC-T Compatible SFP transceiver provides 100Base-FX throughput up to 2km over multi-mode fiber (MMF) using a wavelength of 1310nm via an LC connector. It is also capable of withstanding rugged environments and can operate at temperatures between -40 to 85C. It is guaranteed to be 100% compatible with the equivalent Moxa® transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. Digital optical monitoring (DOM) support is also present to allow access to real-time operating parameters. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

Skylane's transceivers are RoHS compliant and lead-free.

Features:

- INF-8074 and SFF-8472 Compliance
- Duplex LC Connector
- Industrial Temperature -40 to 85 Celsius
- Multi-mode Fiber
- Hot Pluggable
- Excellent ESD Protection
- Metal with Lower EMI
- RoHS Compliant and Lead Free



Applications:

- 100Base Ethernet
- Access and Enterprise

For your product safety, please read the following information carefully before any manipulation of the transceiver:



ESD

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all others electrical input pins, tested per MIL-STD-883G, Method 3015.4 /JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module.



LASER SAFETY

This is a Class1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

The optical ports of the module need to be terminated with an optical connector or with a dust plug in order to avoid contamination.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit
Maximum Supply Voltage	V _{CC}	-0.5		3.6	V
Storage Temperature	T _{stg}	-40		85	°C
Operating Case Temperature	T _c	-40		85	°C
Operating Humidity	RH			95	%
Receiver Power	R _{MAX}			-12	dBm
Data Rate			100/155		Mbps
50µm Core Diameter MMF	L		2		km

Electrical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage		V _{CC}	3.15	3.30	3.45	V	
Power Supply Current		I _{CC}			300	mA	
Transmitter							
LVPECL Differential Inputs		V _{IN}	400		2000	mVp-p	1
Input Differential Impedance		Z _{IN}	85	100	120	Ω	2
Tx_Disable	Disable		2		V _{CC}	V	
	Enable		0		0.8	V	
Tx_Fault	Fault		2		V _{CC} +0.3	V	
	Normal		0		0.5	V	
Receiver							
LVPECL Differential Outputs		V _{OUT}	400		2000	mVp-p	1
Output Differential Impedance		Z _{IN}	85	100	120	Ω	
Tx_Disable Assert Time		T _{off}			10	us	
Rx_LOS	LOS		2		V _{CC} +0.3	V	
	Normal		0		0.8	V	
MOD_DEF (0.2)		VOH	2.5			V	3
		VOL	0		0.8	V	3

Notes:

1. AC Coupled.
2. R_{IN}> 100kΩ @ DC.
3. With Serial ID.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Average Output Power	POUT	-19		-14	dBm	1
Optical Extinction Ratio	ER	10			dB	2
Optical Wavelength	Tλ	1260	1310	1360	nm	
Spectral Width (RMS)	Δλ			4	nm	
Total Jitter	TJ			1	ns	2
Tx_Disable Asserted Time	T_off			10	us	
POUT @ Tx_Disable Asserted	POUT			-45	dBm	
Rise/Fall Time (20-80%)	Tr/Tf			2	ns	
Output Optical Eye		IUT-T G.957 Compliant				
Receiver						
Receiver Sensitivity	Pmin			-31	dBm	3
Receiver Overload	Pmax	-12			dBm	
Optical Center Wavelength	λC	1260		1600	nm	
Return Loss		14			dB	

Notes:

1. Output power is measured by coupling into a 50/125mm multi-mode fiber.
2. Filtered. Measured with a PRBS $2^{23}-1$ test pattern @155Mbps.
3. Minimum average optical power is measured at BER less than $1E^{-12}$ with $2^{23}-1$ PRBS and ER=9dB.

Pin Descriptions

Pin	Symbol	Name/Description	Note
1	VeeT	Transmitter Ground. Common with Receiver Ground.	1
2	Tx_Fault	Transmitter Fault. LVTTTL-O.	2
3	Tx_Disable	Transmitter Disable. Laser output disabled on "high" or "open." LVTTTL-I.	3
4	SDA	2-Wire Serial Interface Data (Same as MOD-DEF2 in INF-8074i). LVTTTL-I/O.	
5	SCL	2-Wire Serial Interface Clock (Same as MOD-DEF2 in INF-8074i). LVTTTL-I.	
6	MOD_ABS	Module Absent. Connect to VeeT or VeeR in the module.	4
7	RS0	Rate Select 0. Not Used.	5
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation. LVTTTL-O.	2
9	RS1	Rate Select 1. Not Used.	5
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. CML-O.	
13	RD+	Receiver Non-Inverted Data Out. AC Coupled. CML-O.	
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. CML-I.	
19	TD-	Transmitter Inverted Data In. AC Coupled. CML-O.	
20	VeeT	Transmitter Ground. Common with Receiver Ground.	1

Notes:

1. The module signal ground contacts, VeeR and VeeT, should be isolated from the module case.
2. This contact is an open collector/drain output and should be pulled up to the Host_Vcc with a resistor in the range 4.7kΩ-10kΩ. Pull-ups can be connected to one or several power supplies; however, the host board design shall ensure that no module contact has a voltage exceeding the module VccT/R+0.5V.
3. Tx_Disable is an input contact with a 4.7kΩ-10kΩ pull-up resistor to the VccT inside the module.
4. MOD_ABS is connected to the VeeT or VeeR in the SFP+ module. The host may pull the contact up to the Host_Vcc with a resistor in the range from 4.7kΩ-10kΩ. MOD_ABS is asserted "high" when the SFP+ module is physically absent from a host slot.
5. Internally pulled down per SFF-8431.



Pin-Out of Connector Block on the Host Board

Recommended Circuit Schematic



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:

2 wire address 1010000X (A0h)	2 wire address 1010001X (A2h)
0	0
Serial ID Defined by SFP MSA (96 bytes)	Alarm and Warning Thresholds (56 bytes)
95	55
Vendor Specific (32 bytes)	Cal Constants (40 bytes)
127	95
Reserved, SFF8079 (128 bytes)	Real Time Diagnostic Interface (24 bytes)
	119
	127
	Vendor Specific (8 bytes)
	User Writable EEPROM (120 bytes)
	247
255	255
	Vendor Specific (8 bytes)

About Skylane Optics

Skylane is a leading provider of transceivers for optical communication.

We offer an extensive portfolio for the enterprise, access, datacenter and metropolitan fiber optical market as well as for smart home applications and home networks.

We cover the European, South American and North American market with a strong partner network and have offices in Belgium, Brazil, Sweden and USA.

Our offerings are characterized by high quality and performance. In combination with our strong technical support, we enable our customers to build cost optimized network solutions.

We offer an extensive range of high-quality products including transceivers (Optical and copper), Active Optical Cable (AOC), Direct Attach Cable (DAC), Mux/Demux, Coding Box.

