



1.25G 1x10 Mini SFF 1000BASE Dual Transmitter **Duplex LC, 1310nm FP, MMF OM2 300M, I-Temp**

Part Number: FSFM-CT-M13-X3Di



Overview

FSFM-CT-M13-X3Di is a 1x10 Mini SFF package dual transmitter with duplex LC connector, compliant with the industrial standard specification. The high performance uncooled 1310nm FP transmitter provides superior performance for Gigabit Ethernet 1000BASE and Fiber Channel 1GFC application up to MMF OM2 30m optical links when linked with the receiver FSFM-CQ-M13-X3Di in Industrial Temperature range.

Applications

- Gigabit Ethernet 1000BASE @1.25G
- Fiber Channel 1GFC @1.0625G

Features

- Compliant with IEEE802.3z Gigabit Ethernet
- Compatible with Fiber Channel 100-M5-SN-I
- 1x10 Mini SFF Footprint
- Aluminum alloy case; Screw mount
- Surface mount I/O pins for high-speed signal integrity
- 1310nm FP laser transmitter
- Duplex LC connector
- AC-coupled CML Differential inputs
- Single +3.3V power supply
- Link distance 300m over MM OM2 fiber (linked with the receiver FSFM-CQ-M13-X3D)
- Operating Temperature -40~+85°C
- Maximum Power consumption 1.7W
- RoHS Compliant

Laser Safety

- This is a Class 1 Laser Product complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.
- Caution: Use of control or adjustments or performance of procedure other than those specified herein may result in hazardous radiation exposure.



Absolute Maximum Ratings

Parameters	Symbol	Min.	Max.	Unit
Storage Temperature	T _{ST}	-40	+85	°C
Storage Relative Humidity	RH	5	95	%
Supply Voltage	V _{CC}	-0.5	+4.0	V

Recommended Operating Conditions

Parameters	Symbol	Min.	Typ.	Max.	Unit
Case Operating Temperature	T _{OP}	-40	-	+85	°C
Supply Voltage	V _{CC}	+3.13	+3.3	+3.47	V
Supply Current	I _{CC}			500	mA
Power Consumption	P			1.7	W
Lead Soldering Limits	T _{Sold}			260/10	°C/Sec

Transmitter Electro-optical Characteristics

V_{CC} = 3.13V to 3.47V, T_{OP} = -40 °C to 85 °C

Parameters	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Data Rate	DR		1250		Mb/s	
Optical Launch Power (Tx1 & Tx2)	P _o	-7		0	dBm	1
Optical Center Wavelength	λ _c	1260	1310	1360	nm	
Spectral Width (RMS)	Δλ			4	nm	
Optical Extinction Ratio	ER	9			dB	
Optical Eye Mask		IEEE802.3z				
Differential Data Input Swing	V _{IN}	300		1000	mV	
Tx Disable Input Voltage-Low (Tx ON)	TDISV _L	GND		0.8	V	
Tx Disable Input Voltage-High (Tx OFF)	TDISV _H	2.0		V _{CC}	V	

Note1: The optical power is launched into a 62.5/125μm multi-mode fiber.

Pin Assignment

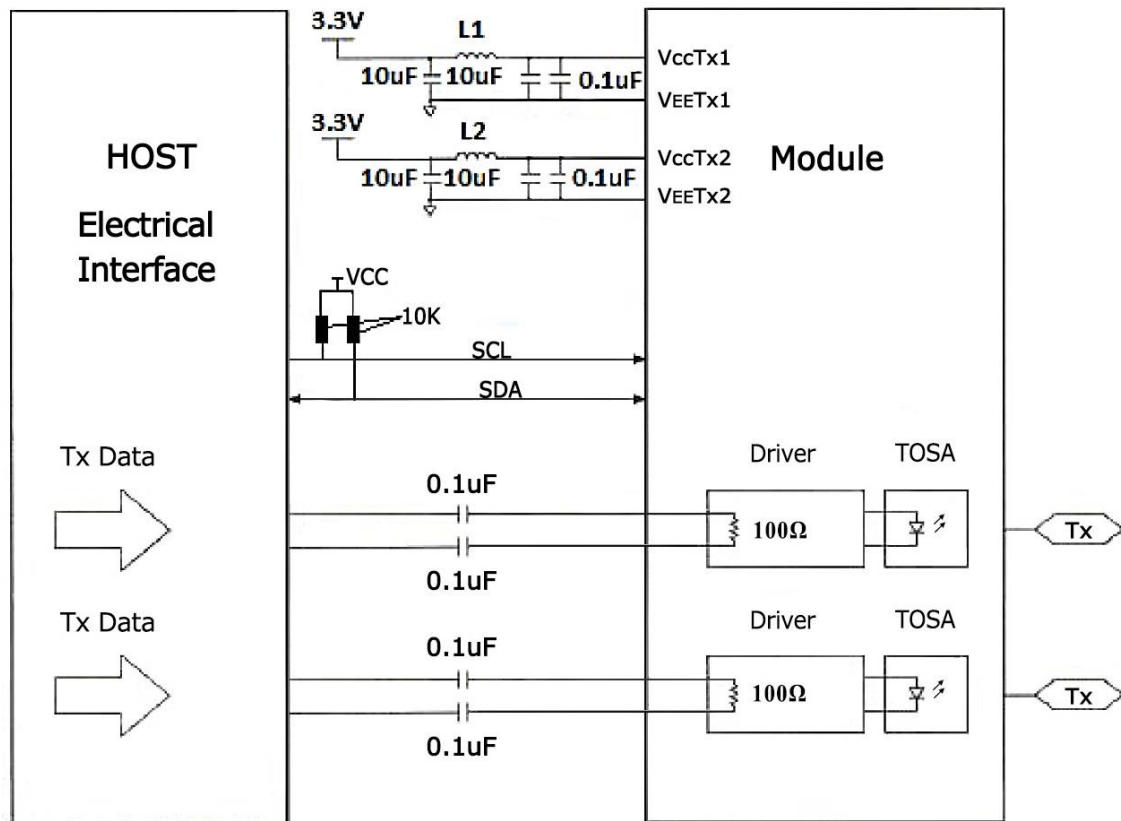


Pin Description

Pin	Name	Function / Description
1	TD1+	Channel 1 Tx—Data Input (Non Inverted) (CML)
2	V _{EE} Tx1	Channel 1 Signal Ground
3	TD1-	Channel 1 Tx—Data Input (Inverted) (CML)
4	V _{CC} Tx1	Channel 1 Power Supply
5	SDA	2-wire Serial Interface Data Line (SDA: Serial Data Signal) (LVTTTL)
6	SCL	2-wire Serial Interface Clock (SCL: Serial Clock Signal) (LVTTTL)
7	TD2+	Channel 2 Tx—Data Input (Non Inverted) (CML)
8	V _{CC} Tx2	Channel 2 Power Supply
9	TD2-	Channel 2 Tx—Data Input (Inverted) (CML)
10	V _{EE} Tx2	Channel 2 Signal Ground



Recommended Circuit





Digital Diagnostic Functions

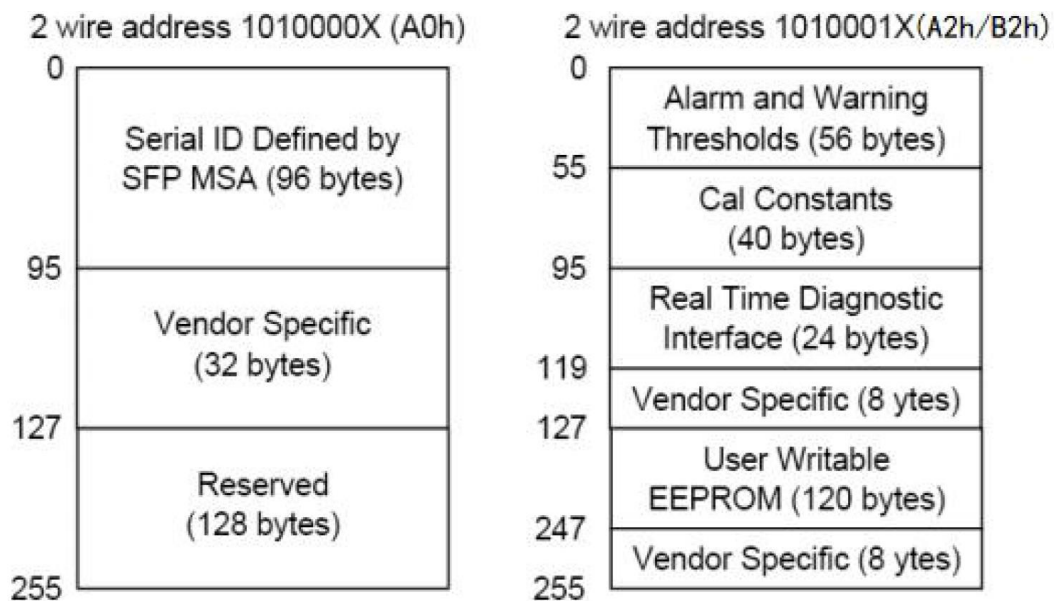
As defined by the SFF-8472, Ficer's Mini SFF Dual Receivers provide digital diagnostic functions via a 2-wire serial interface, which allows real-time access to the following operating parameters:

- Transceiver temperature
- Laser bias current
- Transmitted optical power
- Transceiver supply voltage

It also provides a sophisticated system of alarm and warning flags, which may be used to alert end-users when particular operating parameters are outside of a factory-set normal range.

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Controller (DDC) inside the transceiver, which is accessed through the 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL pin) is generated by the host. The positive edge clocks data into the SFP transceiver into those segments of its memory map that are not write-protected. The negative edge clocks data from the SFP transceiver. The serial data signal (SDA pin) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.

Digital Diagnostic Memory Map



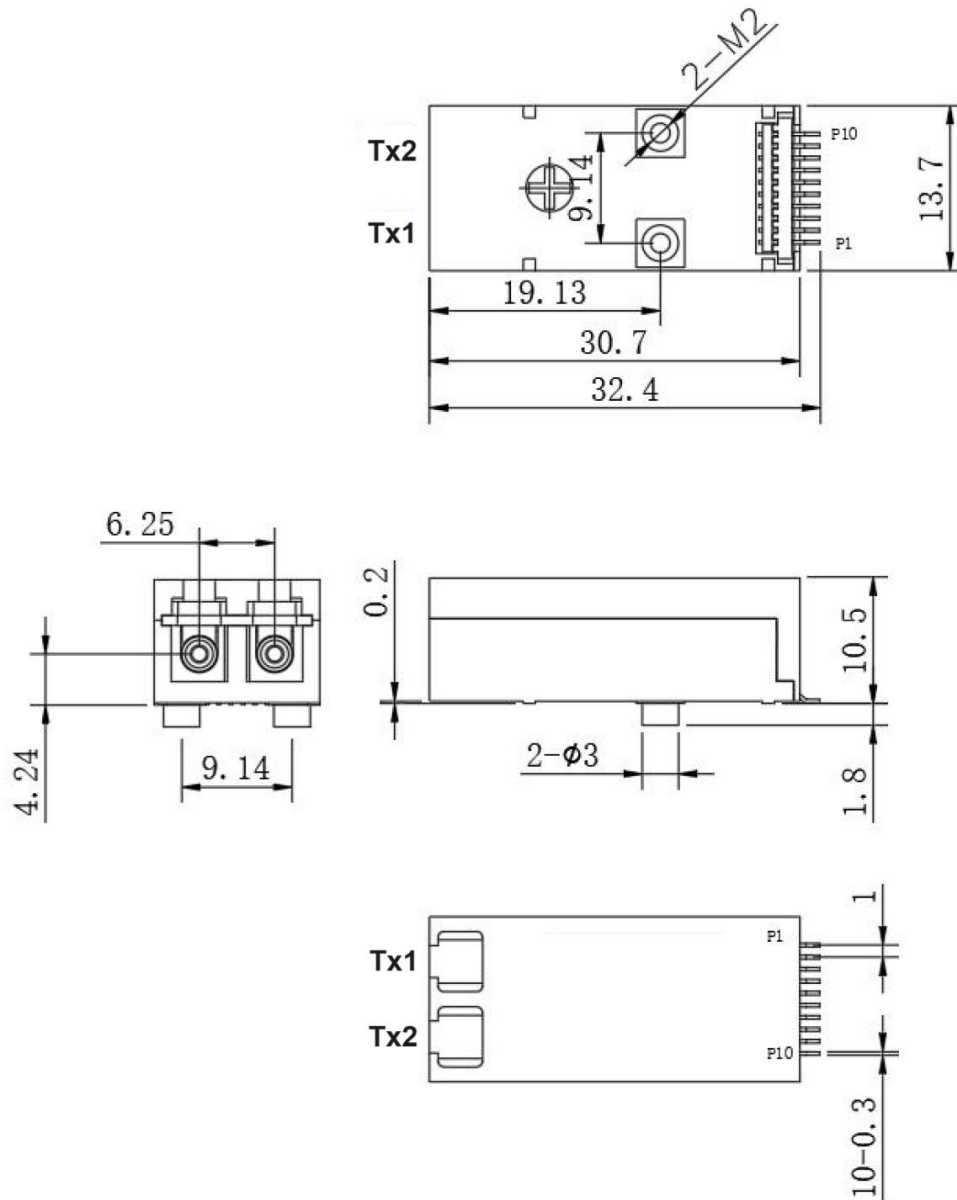


EEPROM Serial ID Memory Contents (A2h for Channel 1, B2h for Channel 2)

Data Address	Size	Name of Field	Description
Alarm and Warning Thresholds			
00-01	2	Temperature High Alarm	See SFF-8472 specification
02-03	2	Temperature Low Alarm	See SFF-8472 specification
04-05	2	Temperature High Warning	See SFF-8472 specification
06-07	2	Temperature Low Warning	See SFF-8472 specification
08-09	2	Vcc High Alarm	See SFF-8472 specification
10-11	2	Vcc Low Alarm	See SFF-8472 specification
12-13	2	Vcc High Warning	See SFF-8472 specification
14-15	2	Vcc Low Warning	See SFF-8472 specification
16-17	2	Bias High Alarm	See SFF-8472 specification
18-19	2	Bias Low Alarm	See SFF-8472 specification
20-21	2	Bias High Warning	See SFF-8472 specification
22-23	2	Bias Low Warning	See SFF-8472 specification
24-25	2	Tx Power High Alarm	See SFF-8472 specification
26-27	2	Tx Power Low Alarm	See SFF-8472 specification
28-29	2	Tx Power High Warning	See SFF-8472 specification
30-31	2	Tx Power Low Warning	See SFF-8472 specification
32-95	64	Reserved	-
Real Time Diagnostic Monitor Interface			
96-97	2	Measured Temperature	Yield to a 16-bit A/D value
98-99	2	Measured Vcc	Yield to a 16-bit A/D value
100-101	2	Measured Bias	Yield to a 16-bit A/D value
102-103	2	Measured Tx Power	Yield to a 16-bit A/D value
104-109	6	Reserved	-
110	1	Logic Status	See SFF-8472 specification
111	1	AD Conversion Updates	See SFF-8472 specification
112-117	6	Alarm and Warning Flags	See SFF-8472 specification
118-127	10	Reserved	-
Vendor Specific			
128-247	120	User Writable EEPROM	-
248-255	8	Reserved	-



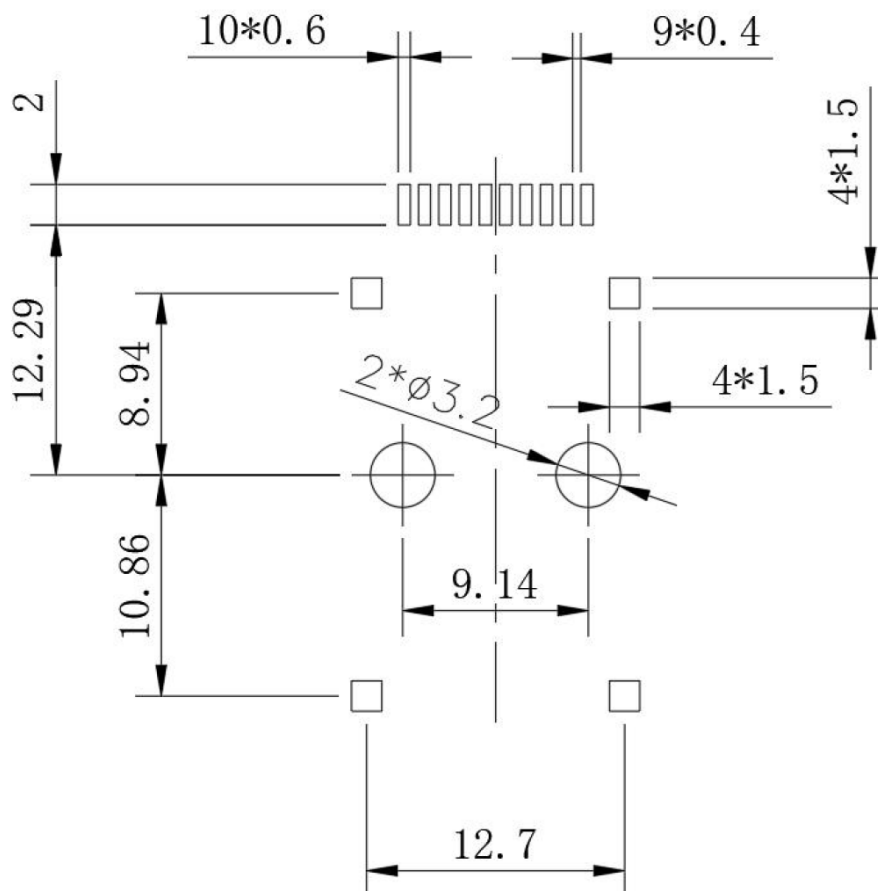
Mechanical Dimensions



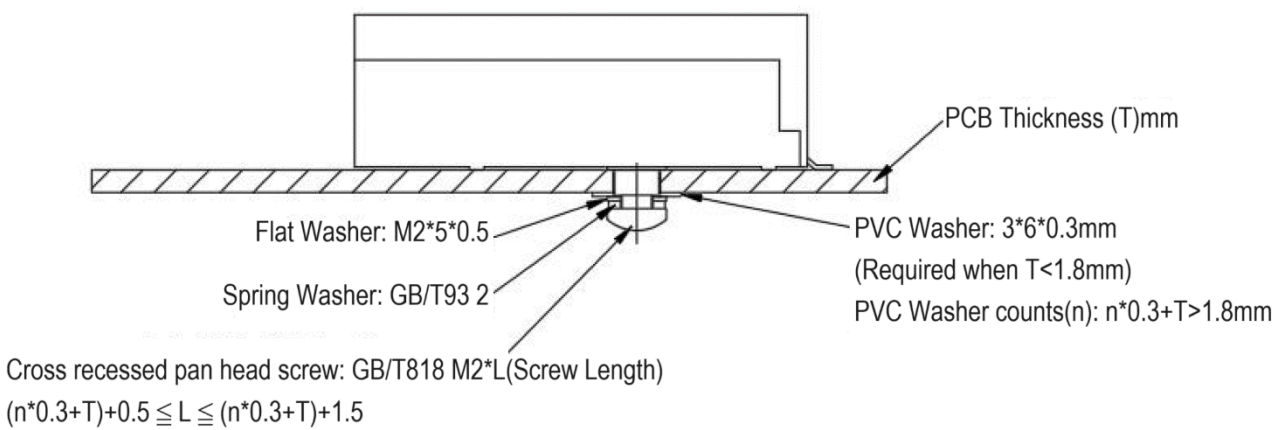
(All Dimensions are $\pm 0.20\text{mm}$ Unless Otherwise Specified, Unit: mm)



Recommended PCB Layout



Installation Diagram



Common PCB Thickness and Accessories											
PCB Thickness (T)mm	Cross recessed pan head screw		Flat Washer (Stainless)		Spring Washer (65Mn)		PVC Washer				
Value	SPEC	Qty	SPEC	Qty	SPEC	Qty	SPEC	Qty			
1.0	GB/T818 M2*3	2	M2*5*0.5	2	GB/T93 2	2	3*6*0.3mm Inner Dia: 3.0 Outer Dia: 6.0 Thickmess:0.3	6			
1.2								4			
1.6								2			
2.0	GB/T818 M2*4	2									0
2.5											
3.0											

Ordering Information

Part No.	Tx	Connector	Data Input	Link	Voltage	Temp.
FSFM-CT-M13-X3Di	1310nm	Duplex LC	AC-coupled CML	MMF OM2 300m	3.3V	-40~85°C

Note: Distances are indicative only. To calculate a more precise link budget based on specific conditions in your application, please refer to the optical characteristics.