



Ultra-Low Data-Rate 1X9 DC~10Mbps Transceiver Duplex Plastic ST, 850nm VCSEL, MMF 2KM, LVTTL / TTL Signal Detection

Part Number: F1X9-05-M85-02B



Overview

F1X9-05-M85-02B 1X9 SIP package style transceivers are compliant with the industrial standard specification. The high performance uncooled 850nm VCSEL transmitter and high sensitivity PIN receiver provide superior performance for Ultra-Low Data-Rate applications such as RS232 / RS422 / RS485 and IEEE C37.94 / IEC 62843 up to MMF 2km optical links.

Applications

- Ultra-Low Data-Rate DC~10Mbps
- RS232 / RS422 / RS485
- IEEE C37.94 / IEC 62843
- Fiber Monitor System
- Industrial Control System
- V.35(RS449)/X.21/G.703(E1)

Features

- Industry Standard 1x9 Footprint
- 850nm VCSEL laser transmitter
- Duplex Plastic ST connector
- Single 3.3V or 5V Power Supply
- DC-coupled Differential TTL inputs and outputs
- LVTTL / TTL Signal Detection Output
- Wave Solderable and Aqueous Washable
- Link distance 2km over MM fiber
- 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 (F1X9-05-M85-02B)	V _{CC}	0	+4.5	V
Supply Voltage (F1X9-05-M85-02B5)	V _{CC}	0	+6.0	V

Recommended Operating Conditions

Parameters	Symbol	Min.	Typ.	Max.	Unit
Case Operating Temp. (F1X9-05-M85-02B)	T _{OP}	0	-	+70	°C
Case Operating Temp. (F1X9-05-M85-02Bi)	T _{OP}	-40	-	+85	°C
Supply Voltage (F1X9-05-M85-02B)	V _{CC}	+3.13	+3.3	+3.47	V
Supply Voltage (F1X9-05-M85-02B5)	V _{CC}	+4.75	+5.0	+5.25	V
Data Rate	DR	DC		10	Mb/s
Supply Current	I _{CC}		40	60	mA
Power Consumption	P			400	mW
Lead Soldering Limits	T _{SOld}			240/10	°C/Sec
Control Output Voltage High	V _{OH}	2.4		V _{CC}	V
Control Output Voltage Low	V _{OL}	GND		0.8	V

Transmitter Electro-optical Characteristics

T_{OP} = 0 °C to 70 °C (F1X9-05-M85-02B); T_{OP} = -40 °C to 85 °C (F1X9-05-M85-02Bi)

Parameters	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Data Rate	DR	DC		10	Mb/s	
Optical Launch Power	P _O	-9		-2	dBm	1
Optical Center Wavelength	λ _C	820	850	880	nm	
Spectral Width (RMS)	Δλ			2	nm	
Optical Extinction Ratio	ER	8.2			dB	
Optical Rise/Fall Time (20%~80%)	T _R / T _F			10	ns	

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



Receiver Electro-optical Characteristics

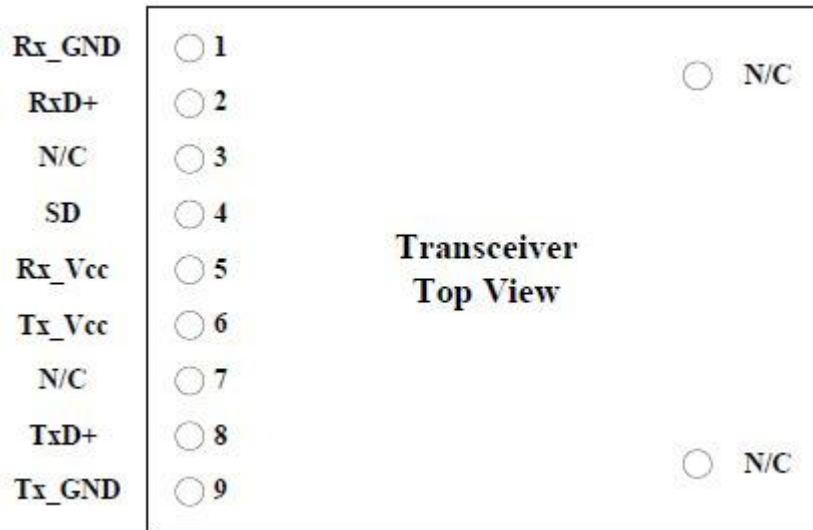
$T_{OP} = 0\text{ }^{\circ}\text{C to }70\text{ }^{\circ}\text{C}$ (F1X9-05-M85-02B); $T_{OP} = -40\text{ }^{\circ}\text{C to }85\text{ }^{\circ}\text{C}$ (F1X9-05-M85-02Bi)

Parameters	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Data Rate	DR	DC		10	Mb/s	
Receiver Sensitivity	SEN			-24	dBm	1
Maximum Receive Power	P _{Rx-MAX}	-1			dBm	1
Optical Center Wavelength	λ_c	820		880	nm	
Data Output Rise/Fall Time (20%~80%)	T _r / T _f			20	ns	
Signal Detect Assert	SD _A			-24	dBm	
Signal Detect De-Assert	SD _D	-32			dBm	
Signal Detect Hysteresis	SD _{HY}	0.1			dB	

Note1: Measured with a PRBS 2¹⁰-1 test pattern @10Mbps BER<10⁻¹⁰.



Pin Assignment

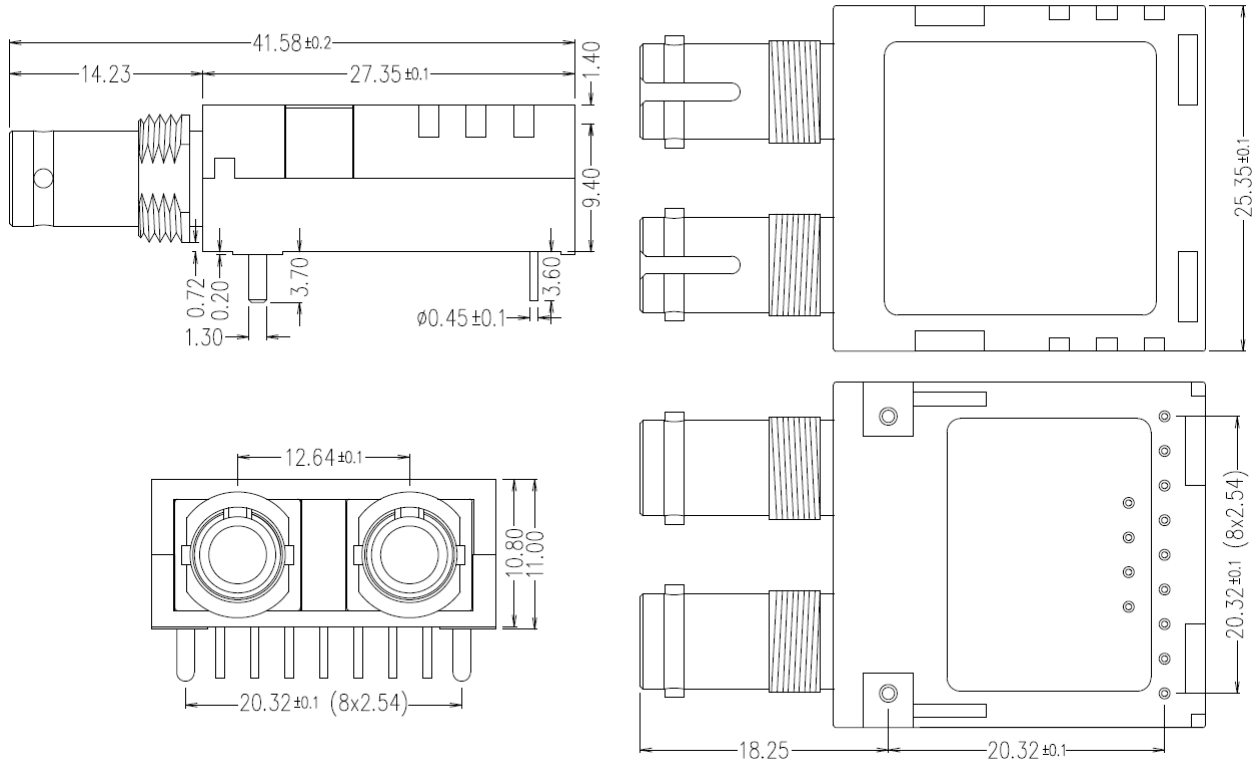


Pin Description

Pin	Name	Function / Description
1	Rx_GND	Receiver Signal Ground
2	RxD+	Receiver Data Out, RD+ is used to TTL output
3	N/C	Non-Connection
4	SD	Signal detect is used to open collector output with TTL level Normal optical input levels to the receiver result in a logic "1" output
5	Rx_Vcc	Receiver Power Supply
6	Tx_Vcc	Transmitter Power Supply
7	N/C	Non-Connection
8	TxD+	Transmitter Data In, TxD+ is used to TTL input
9	Tx_GND	Transmitter Signal Ground



Mechanical Dimensions



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

Ordering Information

Part No.	Tx	Rx	Conn.	I/O	SD	Link	Voltage	Temp.
F1X9-05-M85-02B	850nm	820nm ~ 880nm	ST	DC/DC	LVTTL	2km	3.3V	0~70°C
F1X9-05-M85-02Bi					LVTTL		3.3V	-40~85°C
F1X9-05-M85-02B5					TTL		5V	0~70°C
F1X9-05-M85-02B5i					TTL		5V	-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.