



125M / 1.25G 2x5 SFF 100BASE-SX /1000BASE-SX Dual-Rate Transceiver **Duplex LC, 850nm VCSEL, MMF OM2 2KM(100SX) / 550M(1000SX)**

Part Number: FSF1-C7-M85-X5TR



Overview

FSF1-C7-M85-X5TR 2x5 SFF package style transceivers are compliant with the industrial standard specification. The high performance 850nm VCSEL transmitter and high sensitivity PIN-TIA receiver provide superior performance for Ethernet 100BASE-SX, Gigabit Ethernet 1000BASE-SX and Fiber Channel 1GFC applications up to MMF OM2 550m optical links.

Applications

- Fast Ethernet 100BASE-SX @125M
- Gigabit Ethernet 1000BASE-SX @1.25G
- Fiber Channel 1GFC @1.0625G

Features

- Compatible with TIA/EIA-785 100BASE-SX
- Compliant with IEEE802.3z Gigabit Ethernet
- Compliant with Fiber Channel 100-M5-SN-I
- Industry Standard 2x5 SFF Footprint
- 850nm VCSEL laser transmitter and PIN-TIA receiver
- Duplex LC connector
- Single 3.3V power supply
- AC-coupled Differential LVPECL inputs and outputs
- LVTTTL Signal Detection Output
- Wave Solderable and Aqueous Washable
- Link distance 2km(100SX) and 550m(1000SX) over MM OM2 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	V _{CC}	0	+4.5	V

Recommended Operating Conditions

Parameters	Symbol	Min.	Typ.	Max.	Unit
Case Operating Temp. (FSF1-C7-M85-X5TR)	T _{OP}	0	-	+70	°C
Case Operating Temp. (FSF1-C7-M85-X5TRi)	T _{OP}	-40	-	+85	°C
Supply Voltage	V _{CC}	+3.13	+3.3	+3.47	V
Supply Current (FSF1-C7-M85-X5TR)	I _{CC}			270	mA
Supply Current (FSF1-C7-M85-X5TRi)	I _{CC}			300	mA
Lead Soldering Limits	T _{Sold}			260/10	°C/Sec

Transmitter Electro-optical Characteristics

V_{CC} = 3.13V~3.47V, T_{OP} = 0 °C to 70 °C(FSF1-C7-M85-X5TR); T_{OP} = -40 °C to 85 °C(FSF1-C7-M85-X5TRi)

Parameters	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Data Rate	DR	125	1250		Mb/s	
Optical Launch Power	P _o	-9		-3	dBm	
Optical Center Wavelength	λ	830	850	870	nm	
Spectral Width (RMS)	Δλ			0.85	nm	
Optical Extinction Ratio	ER	9			dB	
Optical Rise/Fall Time (20%~80%)	Tr/Tf			0.26	ns	
Optical Eye Mask		IEEE802.3z				
Differential Data Input Swing	V _{IN}	400		2000	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 50/125μm multi-mode fiber.

Receiver Electro-optical Characteristics

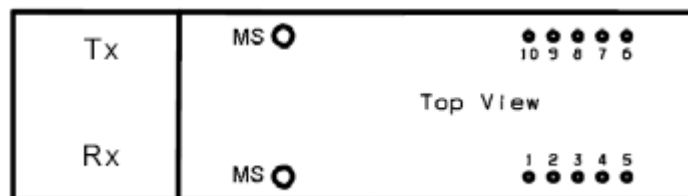
$V_{CC} = 3.13V \sim 3.47V$, $T_{OP} = 0\text{ }^{\circ}C \text{ to } 70\text{ }^{\circ}C$ (FSF1-C7-M85-X5TR); $T_{OP} = -40\text{ }^{\circ}C \text{ to } 85\text{ }^{\circ}C$ (FSF1-C7-M85-X5TRi)

Parameters	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Data Rate	DR	125	1250		Mb/s	
Receiver Sensitivity @1250Mbps	SEN			-20	dBm	1
Receiver Sensitivity @125Mbps				-24	dBm	2
Maximum Receive Power	PRX-MAX	-3			dBm	1
Optical Center Wavelength	λ_c	770		870	nm	
LOS De-Assert	LOS _D			-24	dBm	
LOS Assert	LOS _A	-36			dBm	
LOS Hysteresis	LOS _{HY}	0.5			dB	
Data Output Rise/Fall Time (20%~80%)	Tr/Tf			0.35	ns	
Differential Data Output Swing	V _{OUT}	500		1200	mV	
Receiver Signal Detect Output Voltage-Low	SDV _L	GND		0.8	V	
Receiver Signal Detect Output Voltage-High	SDV _H	2.0		V _{CC}	V	

Note1: Measured with a PRBS 2⁷-1 test pattern @1.25Gbps BER<10⁻¹².

Note2: Measured with a PRBS 2⁷-1 test pattern @125Mbps BER<10⁻¹².

Pin Assignment



Pin Description

Pin	Name	Function
1	Rx GND	Receiver Signal Ground
2	VccR	Receiver Power Supply
3	SD	Signal Detect (1)
4	RD-	Receiver Data Out Bar
5	RD+	Receiver Data Out
6	VccT	Transmitter Power Supply

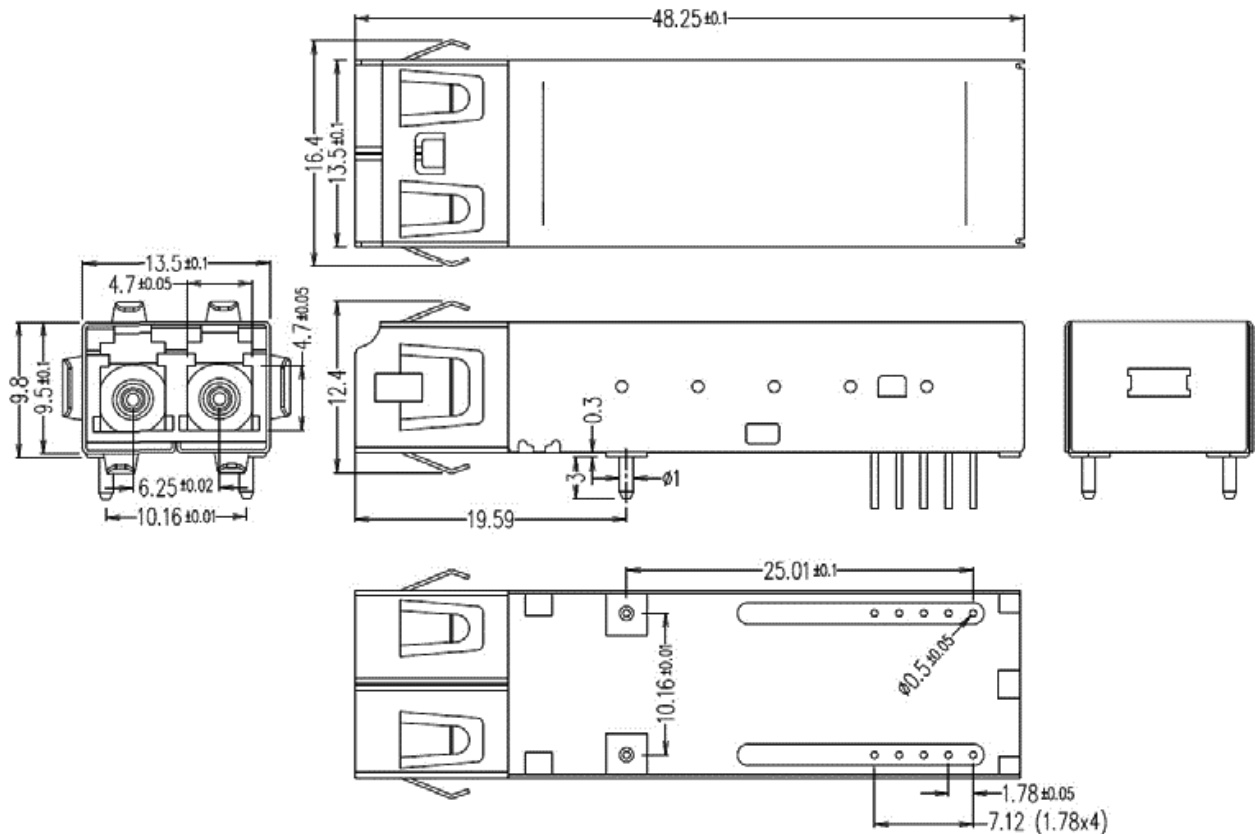


7	Tx GND	Transmitter Signal Ground
8	Tx DISABLE	Transmitter Disable Control (2)
9	TD+	Transmitter Data In
10	TD-	Transmitter Data In Bar
MS	MS	Mounting Stubs
HL	HL	Housing Leads

Note1: Signal Detect is a basic fiber failure indicator. This is a single-ended LVTTTL output. As the input optical power is decreased, Signal Detect will switch from high to low (de-assert point) somewhere between sensitivity and the no light input level. As the input optical power is increased from very low levels, Signal Detect will switch back from low to high (assert point).

Note2: Transmitter Disable: Connect this pin to Vcc (+3.3V) logic high "1" to disable module. To enable module, connect this pin to logic low "0" (GND).

Mechanical Dimensions



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



Ordering Information

Part No.	Tx	Rx	I/O	SD	Link	Voltage	Temp.
FSF1-C7-M85-X5TR	850nm	770nm ~ 870nm	AC/AC	LVTTTL	MM OM1 2km @125M 275m @1.25G	3.3V	0~70°C
FSF1-C7-M85-X5TRi					MM OM2 2km @125M 550m @1.25G		-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.