Finisar

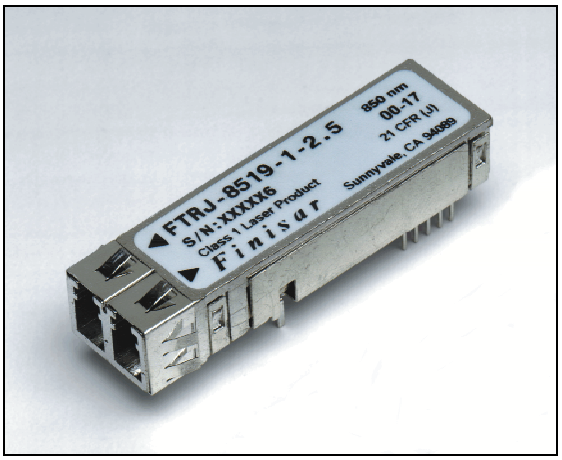
Product Specification

2 Gigabit Short-Wavelength 2x5 Pin SFF Transceiver

FTRJ-8519-1-2.5

PRODUCT FEATURES

- Up to 2.125 Gb/s bi-directional data links
- Standard 2x5 pin RJ-45 footprint (MSA compliant)
- 850nm VCSEL laser transmitter
- Duplex LC connector
- Very low jitter
- No Rate Select input required for Fibre Channel 1x/2x Operation.
- Up to 300m on 50/125µm MMF, 150m on 62.5/125µm MMF
- Metal enclosure, for lower EMI
- Single 3.3V power supply
- Low power dissipation <750mW
- Extended operating temperature range: -10°C to 85°C



APPLICATIONS

- 2.125Gb/s Fibre Channel
- Dual Rate 1.06 / 2.125 Gb/s Fibre Channel

Finisar's FTRJ-8519-1-2.5 Small Form Factor (SFF) transceivers comply with the 2x5 standard package defined by the Small Form Factor Multi-Sourcing Agreement (MSA). They are simultaneously compatible with 1x and 2x Fibre Channel as defined in FC-PI 7.3.

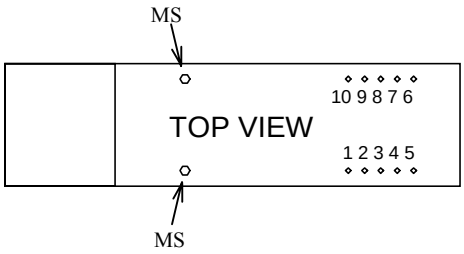
PRODUCT SELECTION

FTRJ-8519-x-2.5

x=1: LC connector

I. Pin Descriptions

Pin	Symbol	Name/Description	Logic Family
MS	MS	Mounting Studs for mechanical attachment. Internally connected to transceiver grounds. Connection to user's ground plane is recommended.	NA
1	V_{EER}	Receiver Ground (Common with Transmitter Ground)	NA
2	V_{CCR}	Receiver Power Supply	NA
3	SD	Signal Detect. Logic 1 indicates normal operation.	LVTTL
4	RD-	Receiver Inverted DATA out. AC Coupled	PECL Swing
5	RD+	Receiver Non-inverted DATA out. AC Coupled	PECL Swing
6	V_{CCT}	Transmitter Power Supply	NA
7	V_{EET}	Transmitter Ground (Common with Receiver Ground)	NA
8	T_{DIS}	Transmitter Disable	LVTTL
9	TD+	Transmitter Non-Inverted DATA in. 100-ohm termination between TD+ and TD-, AC Coupled thereafter.	PECL Swing
10	TD-	Transmitter Inverted DATA in. See TD+	PECL Swing



II. Absolute Maximum Ratings

Finisar SFF transceivers have a power supply voltage range of 3.15V to 3.60V and an extended operating temperature range from –10°C to +85°.

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Supply Voltage	Vcc	3.15		3.60	V	
Storage Temperature	T_S	-40		85	°C	
Ambient Operating Temperature	T_A	-10		85	°C	
Lead Soldering Temperature/Time				260/10	°C/s	

III. Electrical Characteristics (T_A = -10 to 85 °C, V_{CC} = 3.15 to 3.60 Volts)

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Supply Current	Icc		180	240	mA	
Transmitter						
Input differential impedance	R_{in}		100		Ω	1
Single ended data input swing	Vin,pp	200		1200	mV	
Transmit Disable Voltage	V_D	Vcc – 1.3		Vcc	V	
Transmit Enable Voltage	V_{EN}	Vee		Vee+ 0.8	V	2
Receiver						
Single ended data output swing	Vout,pp	450	550	900	mV	3
Data output rise time	t_r		90	175	ps	4
Data output fall time	t_f		90	175	ps	4
Signal Detect Normal	$V_{SD\ norm}$	Vcc – 0.5		Vcc	V	5
Signal Detect Fault	$V_{SD\ fault}$	Vee		Vee+0.5	V	5
Power Supply Rejection	PSR	100			mVpp	6

Notes:
1. Connected directly to TX data input pins. AC coupling from pins into laser driver IC.
2. Or open circuit.
3. Into 100 Ω differential termination.
4. 20 – 80 %
5. Signal detect is LVTTL. Logic 1 indicates normal operation; logic 0 indicates no signal detected.
6. Receiver sensitivity is compliant with power supply sinusoidal modulation of 20 Hz to 1.5 MHz up to specified value applied through the recommended power supply filtering network.

IV. Optical Characteristics (T_A = -10 to 85 °C, V_{CC} = 3.15 to 3.60 Volts)

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						
Output Opt. Pwr: 50 or 62.5 MMF	P_{OUT}	-9		-4	dBm	1
Optical Wavelength	λ	830		860	nm	
Spectral Width	σ			0.85	nm	
Optical Modulation Amplitude	OMA	196			mW	2
Optical Rise/Fall Time	t_r/ t_f		100	150	ps	3
RIN				-120	dB/Hz	
Deterministic Jitter Contribution	TX ΔDJ		20	56.5	ps	4
Total Jitter Contribution	TX ΔTJ		70	119	ps	5
Peak-to-Peak Jitter Contribution	TX J-pp		40		ps	6
Receiver						
Receiver Sensitivity <=1.06 Gb/s	Rx_{SENS} (FC1x)		-22	-18	dBm	7
Receiver Sensitivity > 1.06 Gb/s	Rx_{SENS} (FC2x)		-20	-15	dBm	7
Stressed RX sens. <=1.062 Gb/s				-13.5	dBm	8
Stressed RX sens. 2.125Gb/s			-18	-12.1	dBm	8
Receiver Elec. 3 dB cutoff freq.				1500	MHz	
Deterministic Jitter Contribution	RX ΔDJ			51.7	ps	9
Total Jitter Contribution	RX ΔTJ			122.4	ps	10
Peak-to-Peak Jitter Contribution	RX J-pp		55		ps	6
Optical Center Wavelength	λ_C	770		860	nm	
Return Loss		12			dB	
Signal Detect Assert	P_A		-22	-18	dBm	
Signal Detect De-Assert	P_D	-30	-24		dBm	
Signal Detect Hysteresis	P_A - P_D	0.5			dB	

Notes:
1. Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulations.
2. Equivalent extinction ratio specification for Fibre Channel. Allows smaller ER at higher average power.
3. Unfiltered, 20-80%. Complies with FC 1x and 2x eye mask when filtered.
4. Measured with DJ-free data input signal. In actual application, output DJ will be the sum of input DJ and ΔDJ.
5. If measured with TJ-free data input signal. In actual application, output TJ will be given by:

$$TJ_{OUT} = DJ_{IN} + \Delta DJ + \sqrt{(TJ_{IN} - DJ_{IN})^2 + (\Delta TJ - \Delta DJ)^2}$$

6. Typical peak-to-peak jitter (=6*RMS width of Jitter).
7. As measured with 9dB extinction ratio.
8. Measured with conformance signals defined in FC-PI 7.3 specifications.
9. Measured with DJ-free data input signal. In actual application, output DJ will be the sum of input DJ and ΔDJ.
10. If measured with TJ-free data input signal. In actual application, output TJ will be given by:

$$TJ_{OUT} = DJ_{IN} + \Delta DJ + \sqrt{(TJ_{IN} - DJ_{IN})^2 + (\Delta TJ - \Delta DJ)^2}$$

V. General Specifications

Parameter	Symbol	Min	Typ	Max	Units	Ref.
Data Rate	BR		1.062 2.125		Gb/sec	1
Fiber Length on 50/125µm MMF	L			300	m	2
Fiber Length on 62.5/125µm MMF	L			150	m	2

Notes:
1. 1x, 2x Fibre Channel compatible, per FC-PI 7.3. Typical maximum data rate extends to 2.5Gb/s.
2. At 2x Fibre Channel data rate.

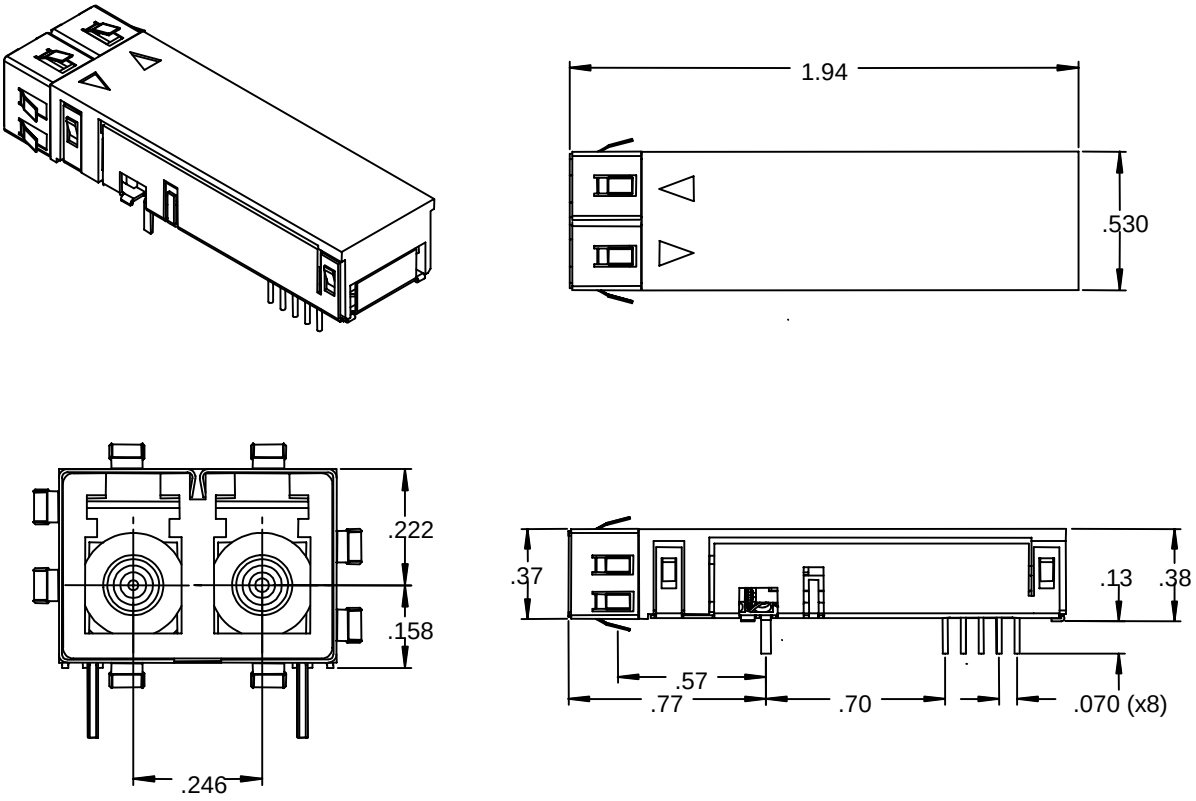
VI. Environmental Specifications

Finisar SFF transceivers have an extended operating temperature range from –10°C to +85°C case temperature.

Parameter	Symbol	Min	Typ	Max	Units	Ref.
Ambient Operating Temperature	T_{op}	-10		85	°C	
Storage Temperature	T_{sto}	-40		85	°C	
Eye Safety	CDRH and IEC-825 Class 1 Laser Product.					

VII. Mechanical Specifications

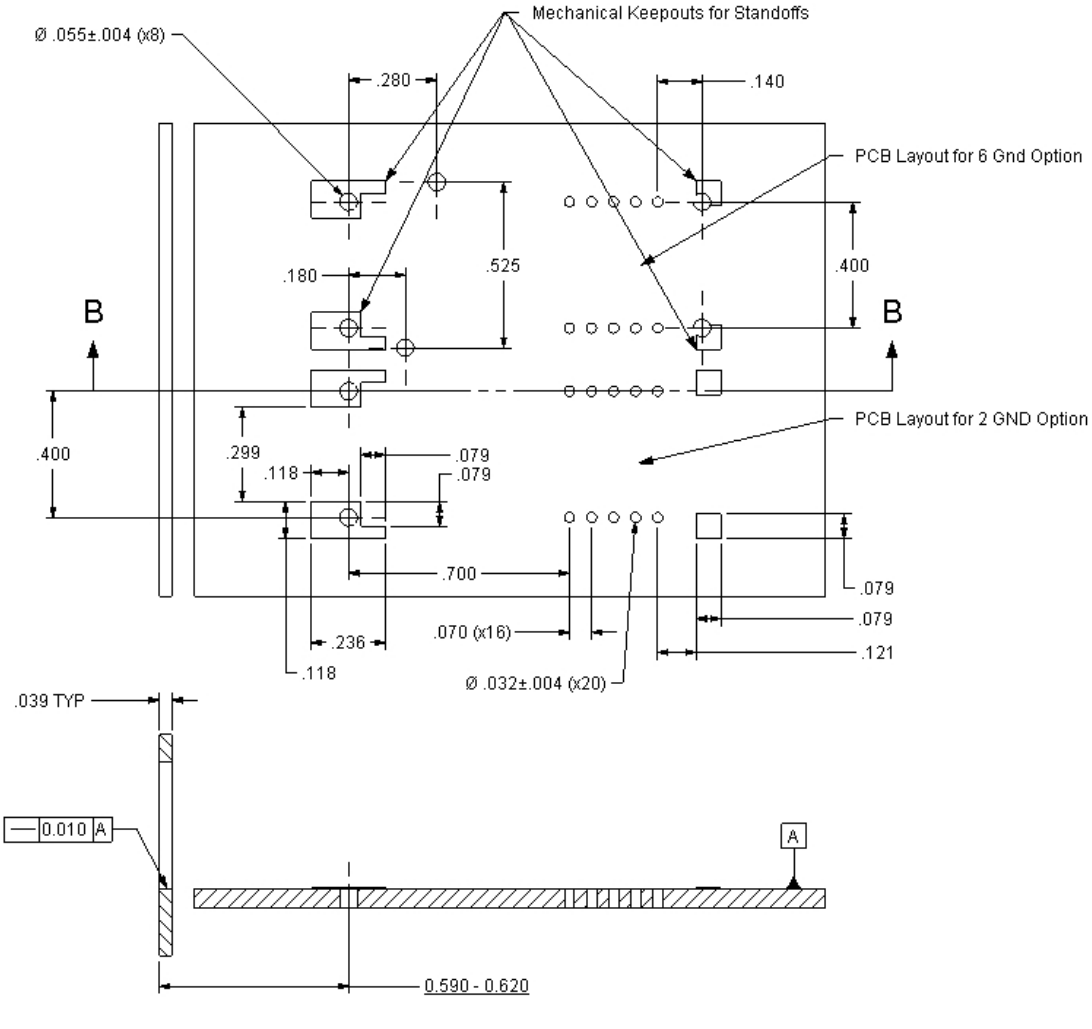
Finisar's Small Form Factor (SFF) transceivers comply with the standard dimensions defined by the Small Form Factor Multi-Sourcing Agreement (MSA).



A 6-pin grounding version is also available.

FTRJ-8519-1-2.5 Mechanical Dimensions

VIII. PCB Layout and Bezel Recommendations



Minimum Recommended Pitch is 0.600”

IX. References

1. "Fibre Channel Physical and Signaling Interface (FC-PH, FC-PH2, FC-PH3)". American National Standard for Information Systems.

2. "Fibre Channel Draft Physical Interface Specification (FC-PI 7.3)". American National Standard for Information Systems.

X. For More Information

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