

Finisar

Product Specification

Short-Wavelength 2x5 Pin SFF Transceiver

FTRJ-8519-1

PRODUCT FEATURES

- Up to 1.25 Gb/s bi-directional data links
- Standard 2x5 pin SFF footprint (MSA compliant)
- 850nm VCSEL laser transmitter
- Duplex LC connector
- Very low jitter
- Up to 500m on 50/125µm MMF, 220m 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

- 1.25Gb/s 1000Base-SX Ethernet
- 1.0625Gb/s Fibre Channel

Finisar's FTRJ-8519-1 Small Form Factor (SFF) transceivers comply with the 2x5 standard package defined by the Small Form Factor Multi-Sourcing Agreement (MSA)¹. They are compatible with Gigabit Ethernet as specified in IEEE Draft P802.3z/D5.0² and Fibre Channel FC-PH, PH2, PH3³ and FC-PI 10.0⁴.

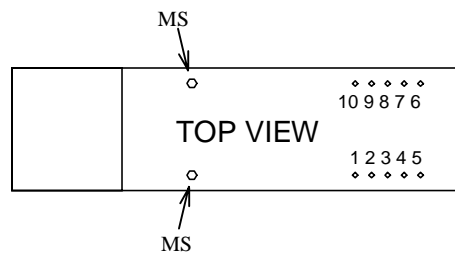
PRODUCT SELECTION

FTRJ-8519-x

x=1: LC connector

I. Pin Descriptions

Pin	Symbol	Name/Description	Logic Family
MS	MS	Mounting Studs for mechanical attachment. Chassis ground is internally connected to circuit ground. 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**

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Maximum Supply Voltage	V _{cc}	0.5		5.0	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 Voltage	V_{CC}	3.15		3.60	V	
Supply Current	I_{CC}		180	220	mA	
Transmitter						
Input differential impedance	R_{in}		100		Ω	1
Single ended data input swing	$V_{in,pp}$	250		1200	mV	
Transmit Disable Voltage	V_D	$V_{CC} - 1.3$		V_{CC}	V	
Transmit Enable Voltage	V_{EN}	V_{EE}		$V_{EE} + 0.8$	V	2
Receiver						
Single ended data output swing	$V_{out,pp}$	185	250	600	mV	3
Data output rise time	t_r		120	350	ps	4
Data output fall time	t_f		120	350	ps	4
Signal Detect Normal	$V_{SD\ norm}$	$V_{CC} - 0.5$		V_{CC}	V	5
Signal Detect Fault	$V_{SD\ fault}$	V_{EE}		$V_{EE} + 0.5$	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. AC coupled, then into $100\ \Omega$ differential termination.
4. 20 – 80 %
5. Signal detect is LVTTTL. 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}	-9.5		-4	dBm	1
Optical Wavelength	λ	830		860	nm	
Spectral Width	σ			0.85	nm	
Optical Extinction Ratio	ER	9			dB	2
Optical Rise/Fall Time	t_r/ t_f		120	260	ps	3
RIN				-120	dB/Hz	
Total Transmitter Jitter at TP2				227	ps	4
Peak-to-Peak Jitter Contribution	TX J-pp		40		ps	5
Receiver						
Receiver Sensitivity	RX_{SENS}	0	-21	-18	dBm	6, 8
Stressed receiver sensitivity				-13.5	dBm	7
Stressed receiver eye opening		201			ps	7
Receiver Elec. 3 dB cutoff freq.				1500	MHz	7
Peak-to-Peak Jitter Contribution	RX J-pp		60		ps	5
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	2		dB	

Notes:

1. Gigabit Ethernet specification, Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulations.
2. With 1.25Gb/s 8B/10B signal pattern.
3. Unfiltered. Complies with GBE eye mask when filtered.
4. TP2 defined in Gigabit Ethernet specification.
5. Typical peak-to-peak jitter (=6*RMS width of Jitter)
6. With worst-case extinction ratio. -17 dBm is GBE specification.
7. Defined in Gigabit Ethernet specification. Tested on 62.5/125 μ m MMF. Covers both GBE requirements.
8. Minimum receiver sensitivity of 0dBm is the maximum input power allowed to the receiver without saturation.

V. General Specifications

Parameter	Symbol	Min	Typ	Max	Units	Ref.
Data Rate	BR		1.25, 1.0625		Gb/sec	1
Fiber Length on 50/125 μ m MMF	L			550	m	
Fiber Length on 62.5/125 μ m MMF	L			300	m	

Notes:

1. Fibre Channel and IEEE 802.3 (Gigabit Ethernet) compatible. Typical maximum data rate extends to 1.5Gb/s.

VI. Environmental Specifications

Finisar SFF transceivers have an extended operating temperature range from -10°C to $+85^{\circ}\text{C}$ case temperature.

Parameter	Symbol	Min	Typ	Max	Units	Ref.
Ambient Operating Temperature	T _{op}	-10		85	$^{\circ}\text{C}$	
Storage Temperature	T _{sto}	-40		85	$^{\circ}\text{C}$	

VII. Regulatory Compliance

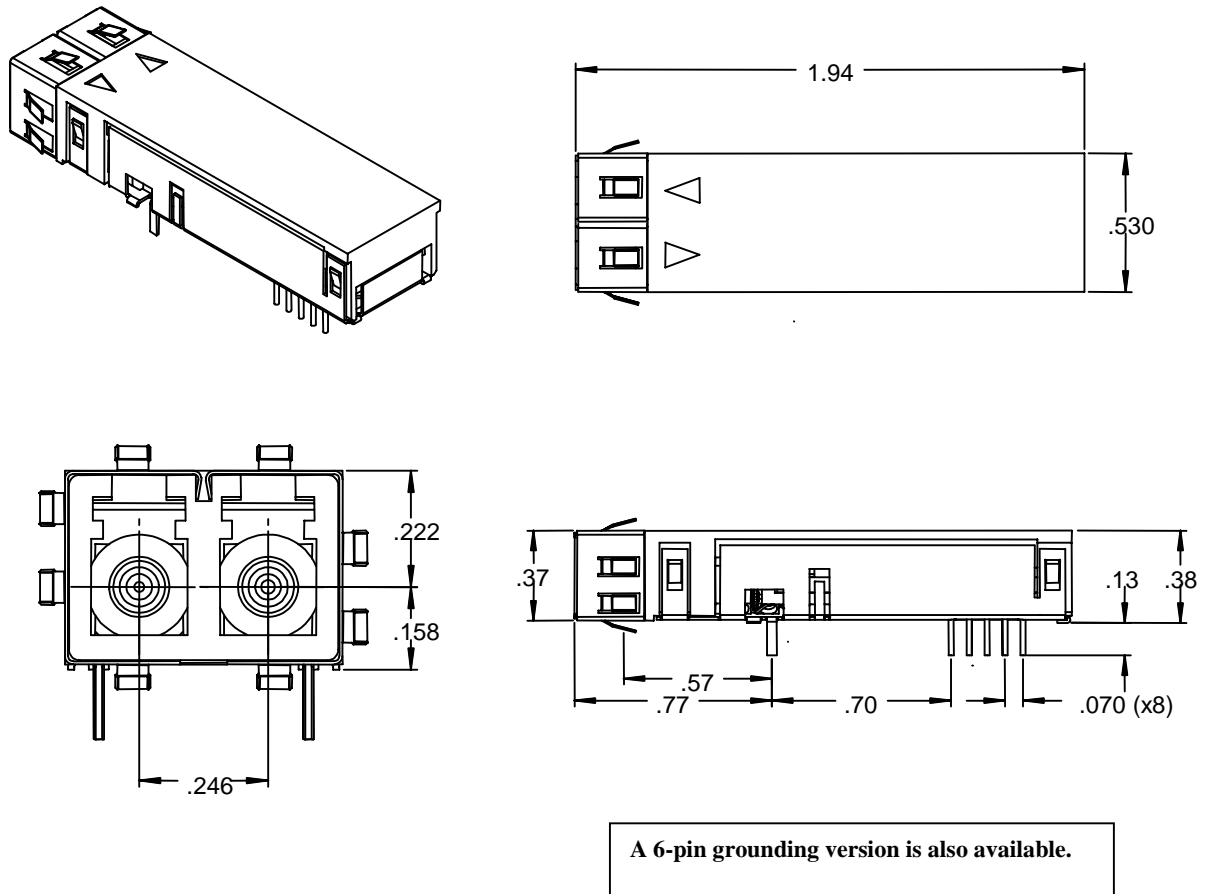
Finisar 850nm SFF transceivers are Class 1 Laser Products. They are certified per the following standards:

Feature	Agency	Standard	Certificate Number
Laser Eye Safety	FDA/CDRH	FDA 21(J) CFR	9210176-17
Laser Eye Safety	TÜV	EN 60950 EN 60825-1 EN 60825-2	R9772230.07
Electrical Safety	UL/CSA	CLASS 3862.07 CLASS 3862.87	CSA 1034405

Copies of the referenced certificates are available at Finisar Corporation upon request.

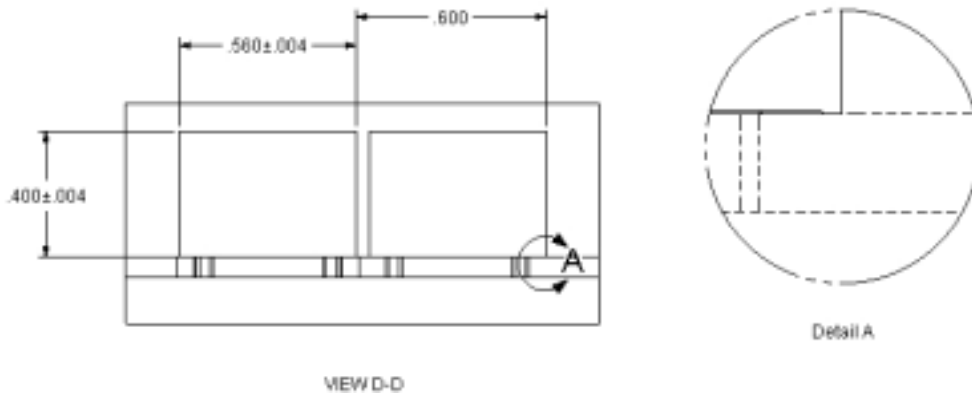
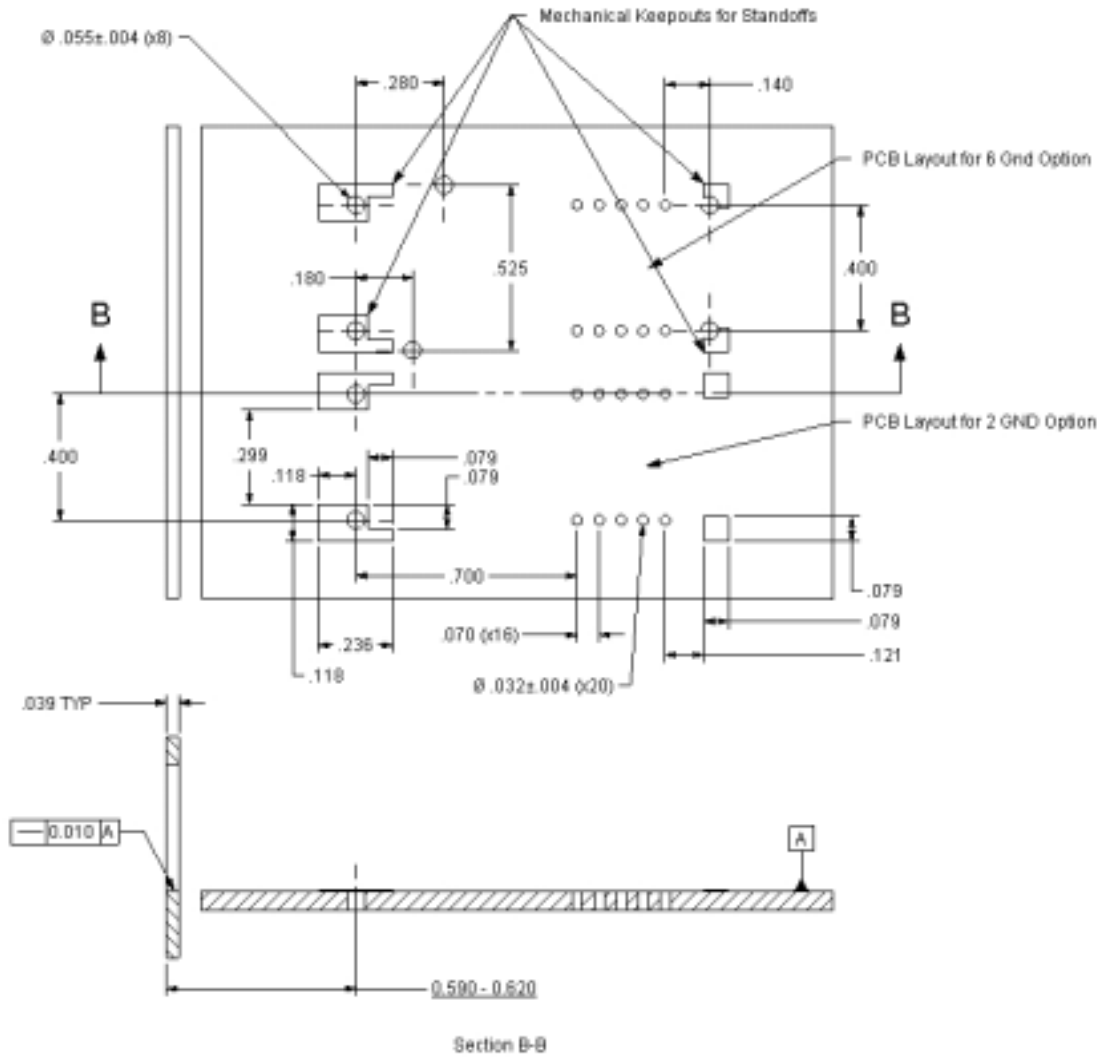
VIII. Mechanical Specifications

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



FTRJ-8519-1 (dimensions are inches)

IX. PCB Layout and Bezel Recommendations



Minimum Recommended Pitch is 0.600"

X. References

1. Small Form Factor (SFF) Transceiver Multisource Agreement (MSA). January 6, 1998. <http://www.schelto.com/SFP/SFF/original%20approved%20spec.pdf>
2. “IEEE Draft P802.3z/D5.0 ‘Media Access Control (MAC) Parameters, Physical Layer, Repeater and Management Parameters for 1000Mb/s Operation’”. IEEE Standards Department, 1998.
3. “Fibre Channel Physical and Signaling Interface (FC-PH, FC-PH2, FC-PH3)”. American National Standard for Information Systems.
4. “Fibre Channel Draft Physical Interface Specification (FC-PI 10.0)”. American National Standard for Information Systems.

XI. For More Information

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