Product Specification

1.25 Gb/s RoHS Compliant Long-Wavelength Pluggable SFP Transceiver

FTLF1318P2xCL

PRODUCT FEATURES

- Up to 1.25Gb/s bi-directional data links
- Hot-pluggable SFP footprint
- 1310nm Fabry-Perot laser transmitter
- Duplex LC connector
- RoHS compliant and Lead Free
- Up to 10 km on 9/125μm SMF
- Metal enclosure for lower EMI
- Single 3.3V power supply
- Low power dissipation <500mW typical
- Commercial operating temperature range: 0°C to 70°C



APPLICATIONS

- 1.25Gb/s 1000Base-LX Ethernet
- 1.06 Gb/s Fibre Channel

Finisar's FTLF1318P2xCL Small Form Factor Pluggable (SFP) transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA)⁴. They simultaneously comply with Gigabit Ethernet as specified in IEEE Std 802.3¹ and 1x Fibre Channel as defined in FC-PI-2 Rev. 10.0³. They are RoHS compliant and lead-free per Directive 2002/95/EC⁵ and Finisar Appl. Note AN-2038.

PRODUCT SELECTION

FTLF1318P2xCL

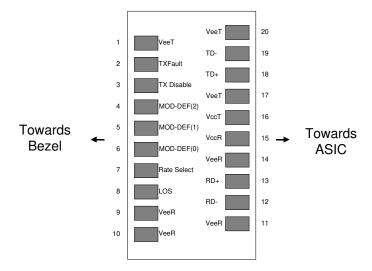
X	W	Wide Extraction Bail
	В	Narrow Extraction Bail

I. Pin Descriptions

Pin	Symbol	Name/Description			
1	$ m V_{EET}$	Transmitter Ground (Common with Receiver Ground)	1		
2	T_{FAULT}	Transmitter Fault. Not supported.			
3	T_{DIS}	Transmitter Disable. Laser output disabled on high or open.	2		
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	3		
5	MOD_DEF(1)	Module Definition 1. Clock line for Serial ID.	3		
6	MOD_DEF(0)	Module Definition 0. Grounded within the module.	3		
7	Rate Select	No connection required	4		
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	5		
9	$V_{ m EER}$	Receiver Ground (Common with Transmitter Ground)	1		
10	$V_{ m EER}$	Receiver Ground (Common with Transmitter Ground)	1		
11	$V_{ m EER}$	Receiver Ground (Common with Transmitter Ground)	1		
12	RD-	Receiver Inverted DATA out. AC Coupled			
13	RD+	Receiver Non-inverted DATA out. AC Coupled			
14	$V_{ m EER}$	Receiver Ground (Common with Transmitter Ground)	1		
15	V_{CCR}	Receiver Power Supply			
16	V_{CCT}	Transmitter Power Supply			
17	$V_{ m EET}$	Transmitter Ground (Common with Receiver Ground)	1		
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.			
19	TD-	Transmitter Inverted DATA in. AC Coupled.			
20	$V_{ m EET}$	Transmitter Ground (Common with Receiver Ground)	1		

Notes:

- 1. Circuit ground is internally isolated from chassis ground.
- 2. Laser output disabled on $T_{DIS} > 2.0 \text{V}$ or open, enabled on $T_{DIS} < 0.8 \text{V}$.
- 3. Should be pulled up with 4.7k 10 kohms on host board to a voltage between 2.0V and 3.6V. MOD_DEF(0) pulls line low to indicate module is plugged in.
- 4. Finisar FTLFxx18xxxxx transceivers operate at 1x Fibre Channel and Gigabit Ethernet data rates and respective protocols without active control.
- 5. LOS is open collector output. Should be pulled up with 4.7k 10 kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.



Pinout of Connector Block on Host Board

II. Absolute Maximum Ratings

Parameter	Symbol	Min	Тур	Max	Unit	Ref.
Maximum Supply Voltage	Vcc	-0.5		4.0	V	
Storage Temperature	T_{S}	-40		100	°C	
Case Operating Temperature	T_{OP}	0		70	°C	
Relative Humidity	RH	0		85	%	1

III. Electrical Characteristics ($T_{OP} = 0$ to 70 °C, $V_{CC} = 3.00$ to 3.60 Volts)

Parameter	Symbol	Min	Тур	Max	Unit	Ref.
Supply Voltage	Vcc	3.00		3.60	V	
Supply Current	Icc		130	300	mA	
Transmitter						
Input differential impedance	R _{in}		100		Ω	2
Single ended data input swing	Vin,pp	250		1200	mV	
Transmit Disable Voltage	V_{D}	Vcc – 1.3		Vcc	V	
Transmit Enable Voltage	$ m V_{EN}$	Vee		Vee+ 0.8	V	3
Transmit Disable Assert Time				10	us	
Receiver						
Single ended data output swing	Vout,pp	300	400	800	mV	4
Data output rise time	$t_{\rm r}$			300	ps	5
Data output fall time	t_{f}			300	ps	5
LOS Fault	$V_{LOS\ fault}$	Vcc - 0.5		Vcc _{HOST}	V	6
LOS Normal	V _{LOS norm}	Vee		Vee+0.5	V	6
Power Supply Rejection	PSR	100			mVpp	7
Deterministic Jitter Contribution	RX ∆ DJ			80	ps	8
Total Jitter Contribution	RX Δ TJ			122.4	ps	

Notes:

- 1. Non condensing.
- 2. AC coupled.
- 3. Or open circuit.
- 4. Into 100 ohm differential termination.
- 5. 20 80 %
- 6. LOS is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
- All transceiver specifications are compliant with a power supply sinusoidal modulation of 20 Hz to 1.5
 MHz up to specified value applied through the power supply filtering network shown on page 23 of the
 Small Form-factor Pluggable (SFP) Transceiver MultiSource Agreement (MSA), September 14, 2000.
- 8. Measured with DJ-free data input signal. In actual application, output DJ will be the sum of input DJ and Δ DJ.

IV. Optical Characteristics ($T_{OP} = 0$ to 70 °C, $V_{CC} = 3.00$ to 3.60 Volts)

Parameter	Symbol	Min	Тур	Max	Unit	Ref.		
Transmitter								
Output Opt. Power	P_{OUT}	-9.5		-3	dBm	1		
Optical Wavelength	λ	1270		1360	nm	2		
Spectral Width	σ			3	nm	2		
Optical Modulation Amplitude	OMA	174			μW	2,3		
Optical Rise/Fall Time	t _r / t _f		150	260	ps	4		
RIN				-120	dB/Hz			
Deterministic Jitter Contribution	TX Δ DJ		20	56.5	ps	5		
Total Jitter Contribution	тх Д тј		50	119	ps			
Optical Extinction Ratio	ER	9			dB			
Receiver	Receiver							
Average Rx Sensitivity @ 1.25 Gb/s	R _{SENS2}			-19	dBm	6, 7		
(Gigabit Ethernet)								
Average Rx Sensitivity @ 1.06 Gb/s	R_{SENS1}			-21	dBm	6, 7		
(1X Fibre Channel)								
Stressed RX sens. =1.25 Gb/s				-14.5	dBm			
Average Received Power	Rx _{MAX}			0	dBm			
Receiver Elec. 3 dB cutoff freq.				1500	MHz			
Optical Center Wavelength	λ_{C}	1265		1600	nm			
Return Loss		12			dB			
LOS De-Assert	LOS_D			-19	dBm			
LOS Assert	LOS_A	-30			dBm			
LOS Hysteresis		0.5			dB			

Notes:

- 1. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.
- 2. Also specified to meet curves in FC-PI-2 Rev. 10.0 Figure 18, which allow trade-off between wavelength, spectral width and OMA.
- 3. Equivalent extinction ratio specification for Fibre Channel. Allows smaller ER at higher average power.
- 4. Unfiltered, 20-80%. Complies with IEEE 802.3 (Gig. E) and FC 1x eye masks when filtered.
- 5. Measured with DJ-free data input signal. In actual application, output DJ will be the sum of input DJ and Δ DJ.
- 6. Measured with conformance signals defined in FC-PI-2 Rev. 10.0 specifications.
- 7. Measured with PRBS 2⁷-1 at 10⁻¹² BER

V. General Specifications

Parameter	Symbol	Min	Тур	Max	Units	Ref.
Data Rate	BR	1062		1250	Mb/sec	1
Bit Error Rate	BER			10 ⁻¹²		2
Max. Supported Link Length on	L_{MAX1}		10		km	3, 4
9/125µm SMF @ 1X Fibre Channel						
Max. Supported Link Length on	L_{MAX2}		10		km	3, 4
9/125µm SMF @ Gigabit Ethernet						

Notes:

- 1. Gigabit Ethernet and 1x Fibre Channel compliant.
- 2. Tested with a PRBS 2⁷-1 test pattern.
- 3. Dispersion limited per FC-PI-2 Rev. 10
- 4. Attenuation of 0.55 dB/km is used for the link length calculations. <u>Distances are indicative only.</u> Please refer to the Optical Specifications in Table IV to calculate a more accurate link budget based on specific conditions in your application.

VI. Environmental Specifications

Finisar 1310nm Industrial Temperature SFP transceivers have an operating temperature range from 0°C to +70°C case temperature.

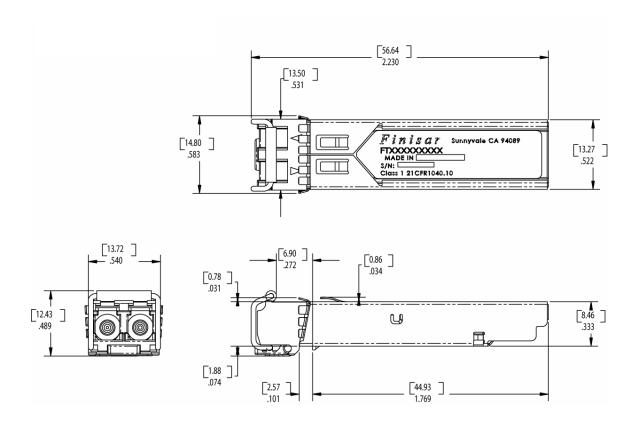
Parameter	Symbol	Min	Тур	Max	Units	Ref.
Case Operating Temperature	T_{op}	0		70	°C	
Storage Temperature	T_{sto}	-40		100	°C	

VII. Regulatory Compliance

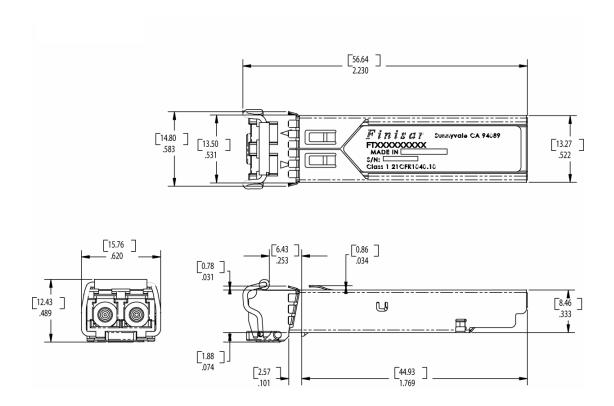
Finisar transceivers are Class 1 Laser Products and comply with US FDA regulations. These products are certified by TÜV and CSA to meet the Class 1 eye safety requirements of EN (IEC) 60825 and the electrical safety requirements of EN (IEC) 60950. Copies of certificates are available at Finisar Corporation upon request.

IX. Mechanical Specifications

Finisar's Small Form Factor Pluggable (SFP) transceivers are compatible with the dimensions defined by the SFP Multi-Sourcing Agreement (MSA)³.



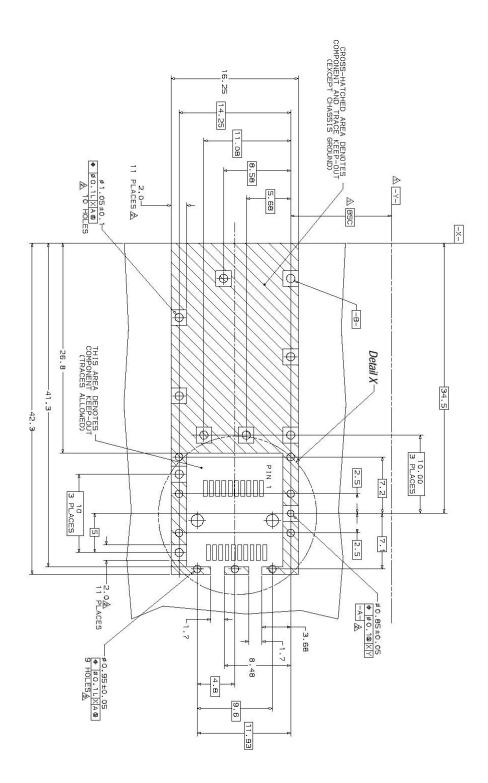
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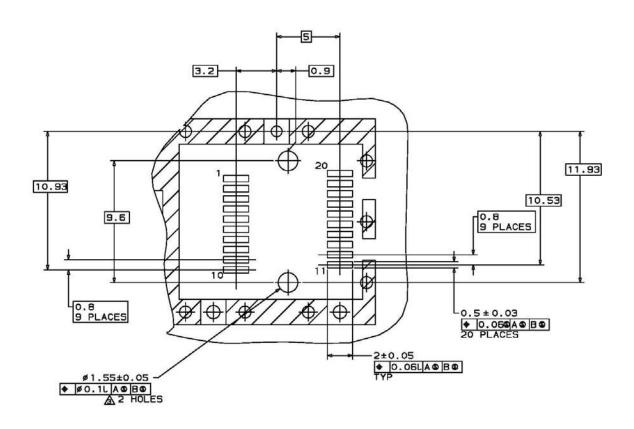


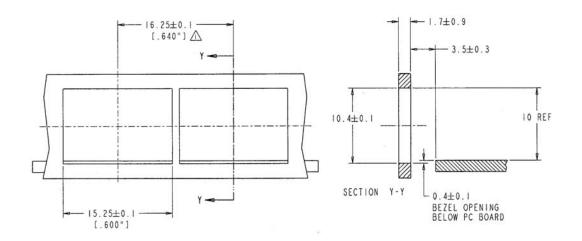
FTLF1318P2WCL

X. PCB Layout and Bezel Recommendations

<u>Matum</u> and Basic Dimension Established by Customer <u>A</u>Rads and Vias are Chassis Ground, 11 Places <u>A</u>Through Holes are Unplated







NOTES:

⚠ MINIMUM PITCH ILLUSTRATED, ENGLISH DIMENSIONS ARE FOR REFERENCE ONLY

2. NOT RECOMMENDED FOR PCI EXPANSION CARD APPLICATIONS

XI. References

- 1. IEEE Std 802.3, 2002 Edition, Clause 38, PMD Type 1000BASE-LX. IEEE Standards Department, 2002.
- 2. "Fibre Channel Physical and Signaling Interface (FC-PH, FC-PH2, FC-PH3)". American National Standard for Information Systems.
- 3. "Fibre Channel Physical Interface Specification (FC-PI-2 Rev. 10.0)". American National Standard for Information Systems.
- 4. Small Form-factor Pluggable (SFP) Transceiver Multi-source Agreement (MSA), September 14, 2000.
- 5. Directive 2002/95/EC of the European Council Parliament and of the Council, "on the restriction of the use of certain hazardous substances in electrical and electronic equipment." January 27, 2003.

XII. For More Information

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