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F i n i s a r

Product Specification

Short-Wavelength GBIC Transceiver

FTR-8519-3D

Product Features

- Up to 1.25Gb/s bi-directional data links
- 850nm VCSEL Laser Transmitter
- Optional Digital Diagnostics Functions
- Extended Operating Temperature Range (-10°C to +85°C)
- Compatible with 3.3V & 5V Systems
- Hot-Pluggable (complies with GBIC specification Rev. 5.5)
- Fully metallic enclosure for low EMI
- Low power dissipation



Applications

- 1.0625Gb/s Fibre Channel
- 1.25 Gigabit Ethernet

Finisar's FTR-8519-3D 850nm GBIC transceivers comply with GBIC Specification Revision 5.5[1]. They are compatible with the Gigabit Ethernet as specified in IEEE Std 802.3[2], Fibre Channel FC-PH, PH2, PH3[3] and FC-PI 13.0[4].

Product Selection

Part Number	Digital Diagnostics?
FTR-8519-3D	No
FTR-8519-3D-DD	Yes

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I. Pin Out

Pin Name	Pin #	Sequence
RX_LOS	1	2
GND	2	2
GND	3	2
MOD_DEF(0)	4	2
MOD_DEF(1)	5	2
MOD_DEF(2)	6	2
TX_DISABLE	7	2
GND	8	2
GND	9	2
TX_FAULT (not supported)	10	2
GND	11	1
-RX_DAT	12	1
+RX_DAT	13	1
GND	14	1
V_{CC}	15	2
V_{CC}	16	2
GND	17	1
+TX_DAT	18	1
-TX_DAT	19	1
GND	20	1

Table 1. GBIC to host connector pin assignment

"Sequence" indicates the order in which pins make contact when the device is hot plugged. Also see "Table 3: Signal Definitions" in the GBIC Specification Revision 5.5.[1]

II. Electrical Power Interface

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Finisar FTR-8519-3D GBICs have an extended power supply voltage range of 3.15 V to 5.5 V as described in Table 2. They are compatible with both 3.3V and 5 V systems.

+5/3.3 Volt Electrical Power Interface						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes/Conditions**
Supply Current	I_s		190	300	mA	
Surge Current	I_{surge}			330	mA	Hot plug
Absolute Supply Voltage	V_{max}	-0.3		6	V	Not to be applied continuously
Operating Supply Voltage	V_{cc}	3.15		5.5	V	

Table 2. Electrical power interface

III. Low Speed Signals

RX_LOS, and TX_DISABLE are TTL signals as described in Table 3. MOD_DEF(1) (SCL) and MOD_DEF(2) (SDA), are open drain CMOS signals (see section VI, "Serial Communication Protocol"). Both MOD_DEF(1) and MOD_DEF(2) must be pulled up to host_Vcc. If host_Vcc is 3.3V, then they must be pulled to 3.3V. If host_Vcc is 3.3V, do not pull the MOD_DEF pins to 5V.

For more detailed information, see sections 5.3.1 – 5.3.8 in the GBIC Specification Rev. 5.5[1].

Low Speed Signals, Electronic Characteristics					
Parameter	**Symbol**	**Min**	**Max**	**Units**	**Notes/Conditions**
GBIC Output LOW	V_{OL}	0	0.5	V	4.7k to 10k pull-up to host_Vcc, measured at host side of connector
GBIC Output HIGH	V_{OH}	host_Vcc - 0.5	host_Vcc + 0.3	V	4.7k to 10k pull-up to host_Vcc, measured at host side of connector
GBIC Input LOW	V_{IL}	0	0.8	V	4.7k to 10k pull-up to Vcc, measured at GBIC side of connector*
GBIC Input HIGH	V_{IH}	2	Vcc + 0.3	V	4.7k to 10k pull-up to Vcc, measured at GBIC side of connector*

*Note V_{IH} and V_{IL} are the same for both 5V and 3.3V operation

Table 3. Low speed signals – electronic characteristics

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Low Speed Signal Parameters						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes/Conditions**
RX_LOS Assert Level	--	-30			dBm	
RX_LOS Deassert Level	--			-19	dBm	
RX_LOS Hysteresis	--	0.5			dB	
RX_LOS Assert Delay	t_loss_on		44	100	µsec	From detection of loss of signal to assertion of RX_LOS
RX_LOS Negate Delay	t_loss_off		44	100	µsec	From detection of presence of signal to negation of RX_LOS
TX_DISABLE Assert Time	t_off			10	µsec	Rising edge of TX_DISABLE to fall of output signal below 10% of nominal
TX_DISABLE Negate Time	t_on			1000	µsec	Falling edge of TX_DISABLE to rise of output signal above 90% of nominal
TX_DISABLE Reset Time	t_reset	10			µsec	TX_DISABLE HIGH before TX_DISABLE set LOW

Table 4. Low speed signal parameters

IV. High Speed Electrical Interface

All high-speed PECL signals are AC-coupled internally.

High Speed Electrical Interface						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes/Conditions**
Data Input Voltage	V_{in}	650		2000	mV	PECL differential peak - peak
Data Output Voltage	V_{out}	370		2000	mV	PECL differential peak - peak
PECL rise/fall	t_r,t_f			260	psec	20%-80% differential
Bit Error Rate	BER			10^{-12}		PRBS 2^7 - 1 test data pattern
Tx Input Impedance	Z_{in}		75		ohm	
Rx Output Impedance	Z_{out}		75		ohm	

Table 5. High-speed electrical interface

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V. Optical Parameters

Optical Parameters						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes/Conditions**
Transmitter Center Wavelength	λ_c	820	850	860	nm	
Transmitter Spectral Width (RMS)	$\Delta\lambda$		0.5	0.85	nm	RMS
Transmitter Optical Output Power	P_{out}	-9.5		-3.5	dBm	Average Power
Transmitter Extinction Ratio	OMI	9			dB	
Relative Intensity Noise	RIN			-117	dB/Hz	
Transmitter Eye Opening	--	60			%	Conforms to IEEE 802.3 and Fibre Channel Eye Masks
Total Transmitter Jitter	TJ_{TX}			180	ps	Peak to peak, filtered
Transmitter Rise/Fall Time	Tr/Tf			210	ps	Unfiltered 20%-80%
Optical Input Wavelength	λ_{in}	770		860	nm	
Optical Receiver Sensitivity	R_{XSENS}			-19	dBm	BER < 10^{-12} w/ PRBS 2^7 - 1 test data pattern @ 1.25Gb/s
Average Received Power	R_{XMAX}			0	dBm	
Max Reflectivity				-14	dB	
Total Receiver Jitter	TJ_{RX}			180	ps	Peak to peak, filtered in loopback

Table 6. Optical parameters

VI. General Specifications

General						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes/Conditions**
Data Rate	BR		1.25, 1.0625		Gb/sec	Fibre Channel, IEEE 802.3 Compatible. Rate tolerance = ±100ppm
Fiber Length	L			550	m	50µm 500MHz-km Fiber
Fiber Length	L			275	m	62.5µm 200MHz-km Fiber

Table 7. General specifications

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VII. Environmental Specifications

Note that the GBIC Specification requires an ambient temperature range of 0 to 50°C. Finisar GBICs have an extended range from –10°C to +85°C case temperature as specified in Table 8.

Environment						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes/Conditions**
Operating Temp	T_{op}	-10		85	°C	Case Temperature
Relative Humidity	RH	0		85	%	Non Condensing
Storage Temp	T_{sto}	-40		85	°C	
Eye Safety	--					CDRH and IEC-825 Class 1 Laser Product

Table 8. Environmental Specifications

VIII. Serial Communication Protocol

All Finisar optical GBICs implement serial identification features described for 'Module Definition "4"' as outlined in Annex D of the GBIC Specification [1]. These GBICs use an Atmel AT24C01A 128 byte E^2PROM at address A0H. For details on interfacing with the E^2PROM, see the Atmel data sheet titled "AT24C01A/02/04/08/16 2-Wire Serial CMOS E^2PROM."[5]

I^2C Timing Requirements						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes/Conditions**
Atmel I^2C Clock Rate	C_{atmel}	0		100,000	Hz	Bus can be driven blind.

Table 9. I^2C timing requirements

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X. Mechanical Specifications

Finisar GBICs are compatible with the mechanical specifications outlined in the GBIC Specification Revision 5.5, Section 6[1].

Insertion, Extraction, and Retention Forces						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes/Conditions**
GBIC insertion	F_I	0		20	Newtons	~4.5 lbs
GBIC extraction	F_E	0		15	Newtons	~3.3 lbs
GBIC retention	F_R	130		N/A	Newtons	Straight out ~29.3 lbs

Table 10. Insertion, extraction, and retention forces

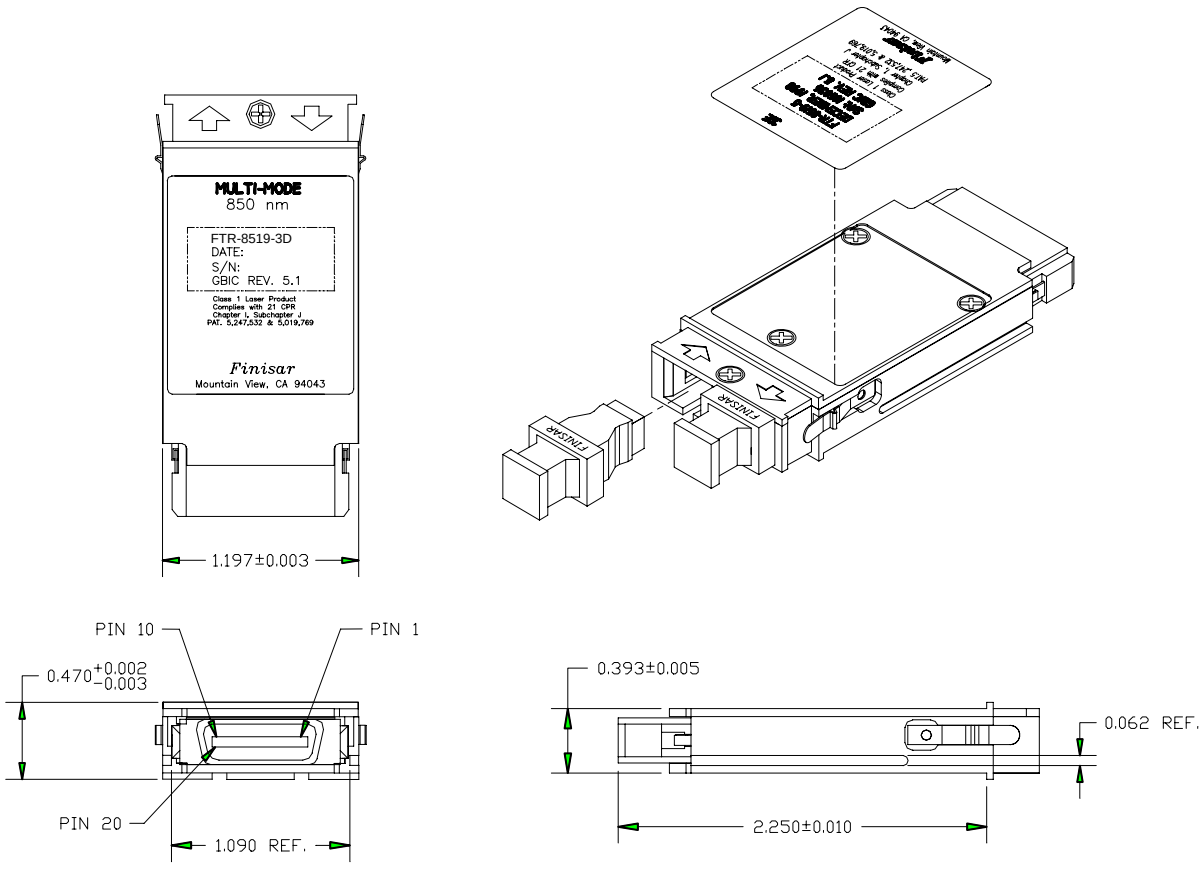


Figure 1. GBIC Outline Drawing

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XI. References

1. "Gigabit Interface Converter (GBIC) Revision 5.5". Sun Microsystems Computer Company et. al., September 27, 2000. http://playground.sun.com/pub/OEmod/

2. IEEE Std 802.3. IEEE Standards Department, 2002.

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 13.0). American National Standard for Information Systems.

5. "AT24C01A/02/04/08/16 2-Wire Serial CMOS E^2PROM". Atmel Corporation. www.Atmel.com

XI. For More Information

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