Product Specification

GPON Stick (GPON SFP ONU)

FTGN2117P2xxN

PRODUCT FEATURES

- GPON ONU in MSA SFP footprint
- Compliance with ITU-T G.984/G.988
- Configurable ToD/1PPS output
- Configurable Dying Gasp Trigger input
- Configurable 1G or 2.5G UNI
- Built-in digital diagnostics functions
- Low power consumption: < 2W
- C-temp and I-temp available
- Single fiber bi-directional SC receptacle
- Certified for BBF247 Interoperability test

APPLICATIONS

- Providing pluggable GPON ONU interface for Ethernet switches, routers, DSLAMs, home gateway and other customer premises equipment
- FTTx and wireless backhaul

Finisar's GPON Sticks are SFP transceivers with built-in GPON ONU functions. They comply with ITU-T G.984/G.988 GPON standard. Digital diagnostics functions are available via the 2-wire serial bus specified in the SFP MSA.

The optical transceiver is compliant per the RoHS Directive 2011/65/EU. See Finisar Application Note AN-2038 for more details.

I. Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Power Supply Voltage	Vcc-Vee	-0.2		+3.6	V	
Storage Temperature	T_S	-40		85	°C	

II. Operating Environment

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Power Supply Voltage	Vcc	+3.15		+3.45	V	
Operating Case Temperature	T_{OP}	-20		70	°C	FTGN2117P2CxN
		-40		85		FTGN2117P2TxN
Relative Humidity (Non-Condensing)	RH	5		85	%	

III. Electrical Characteristics (Top, VCC = 3.15 to 3.45 Volts)

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Supply Voltage	Vcc	3.15	3.3	3.45	V	
Supply Current	Icc		450	640	mA	Note 1
Transmitter						
Input Differential Impedance	R_{in}		100		□	Note 2
Differential Data Input Voltage		200		1600	mV	
Transmit Disable Voltage		2.0		Vcc	V	
Transmit Enable Voltage		0		0.8	V	
Receiver						
Differential Data Output Voltage		370		1000	mV	
LOS Low	-	0		0.8	V	
LOS High	-	2.0		Vcc	V	

IV. Optical Characteristics (Top, VCC = 3.15 to 3.45 Volts)

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Cross-talk 1310nm Tx to 1490nm Rx				-40	dB	
Transmitter						
Data Rate (Continuous Wave)	BR		1244.16		Mb/s	
Center Wavelength (CW)	□	1290		1330	nm	
Spectral Width (-20dB)	□			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Output Optical Power	P_{OUT}	0.5		5	dBm	Note 3
Optical Burst on/off Time				16	bits	
Average launch power of OFF transmitter	P_{OFF}			-39	dBm	
Transmitter eye		Compliant with ITU-T G.984.2				
Optical Extinction Ratio	ER	10			dB	

Receiver						
Data Rate	BR		2488.32		Mb/s	
Optical Center Wavelength	λ_C	1480		1500	nm	
Average Rx Sensitivity	R_{SENS}			-27	dBm	Note 4
Receiver Overload	P_{OVR}	-8			dBm	Note 4
Receiver reflectance				-20	dB	
SD Asserted/Link level	-			-27	dBm	

Notes:
Note 1: Typical current measured under 0.5GBit upstream/0.5GBit downstream with randrom packet size at ambient 25 °C
Note 2: Internally AC coupled;
Note 3: Measurement is made through a short patch cable;
Note 4: Measured with FEC off, OLT Tx ER=10dB, at BER≤1×10^{-10};

V. ToD/1PPS and Dying gasp

Finisar GPON Sticks support ToD/1PPS output. Based on SFP MSA, ToD output share the PIN2 with TxFault and 1PPS output share the PIN8 with LOS. Either TxFault/LOS or ToD/1PPS can be selected and two functions are also switchable via software configuration.

Finisar GPON sticks also support Dying gasp with shared PIN7 as input pin which is defined as Rate Select in MSA. Dying gasp is disabled by default but can be enabled via software configuration.

VI. Digital Diagnostic Functions

Finisar GPON Stick support the 2-wire serial communication protocol as defined in the SFP MSA[3].

Additionally, Finisar GPON Stick (SFP-ONU) provide a unique enhanced digital diagnostic monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage. It also defines a sophisticated system of alarm and warning flags, which alerts end-users when particular operating parameters are outside of a factory-set normal range.

The SFP MSA defines a 256-byte memory map in EEPROM that is accessible over a 2-wire serial interface at the 8 bit address 1010000X (A0h). The digital diagnostic monitoring interface makes use of the 8 bit address 1010001X (A2h), A0h stores static information including product and vendor IDs while A2h contains real-time diagnostic data.

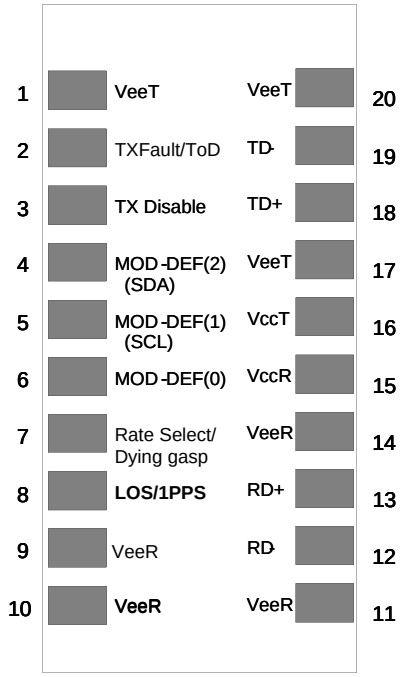
The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through a 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL) is generated by the host. The positive edge clocks data into the SFP transceiver into those segments of the EEPROM that are not write-protected. The negative edge clocks data from the SFP transceiver. The serial data signal (SDA) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.

For more information, please contact Finisar.

Digital diagnostics for the GPON Stick (SFP-ONU) are internally calibrated by default.

VII. Pin Descriptions

Pin	Symbol	Name/Description	Notes
1	VEET	Transmitter Ground (Common with Receiver Ground)	
2	TFAULT/ToD	Transmitter Fault/Time of Date	PIN2 can be software configured to ToD, Note 1
3	TDIS	Transmitter Disable.	Module disables on high or open, Note 2
4	MOD_DEF(2) (SDA)	Module Definition 2.	2 wire serial ID interface, Note 3
5	MOD_DEF(1) (SCL)	Module Definition 1.	2 wire serial ID interface, Note 3
6	MOD_DEF(0)	Module Definition 0.	Grounded within the Module, Note 3
7	Rate Select/ Dying gasp	Rate Select/Dying gasp	PIN 7 can be software configured to Dying gasp Trigger
8	LOS/1PPS	LOS of Signal/1PPS	PIN 8 can be software configured to 1PPS output
9	VEER	Receiver Ground (Common with Transmitter Ground)	Note 5
10	VEER	Receiver Ground (Common with Transmitter Ground)	Note 5
11	VEER	Receiver Ground (Common with Transmitter Ground)	Note 5
12	RD-	Receiver Inverted DATA out.	Note 6
13	RD+	Receiver Non-inverted DATA out.	Note 6
14	VEER	Receiver Ground (Common with Transmitter Ground)	Note 5
15	VCCR	Receiver Power Supply	Note 7, 3.3V±5%
16	VCCT	Transmitter Power Supply	Note 7, 3.3V±5%
17	VEET	Transmitter Ground (Common with Receiver Ground)	Note 5
18	TD+	Transmitter Non-Inverted DATA in.	Note 8
19	TD-	Transmitter Inverted DATA in.	Note 8
20	VEET	Transmitter Ground (Common with Receiver Ground)	Note 5



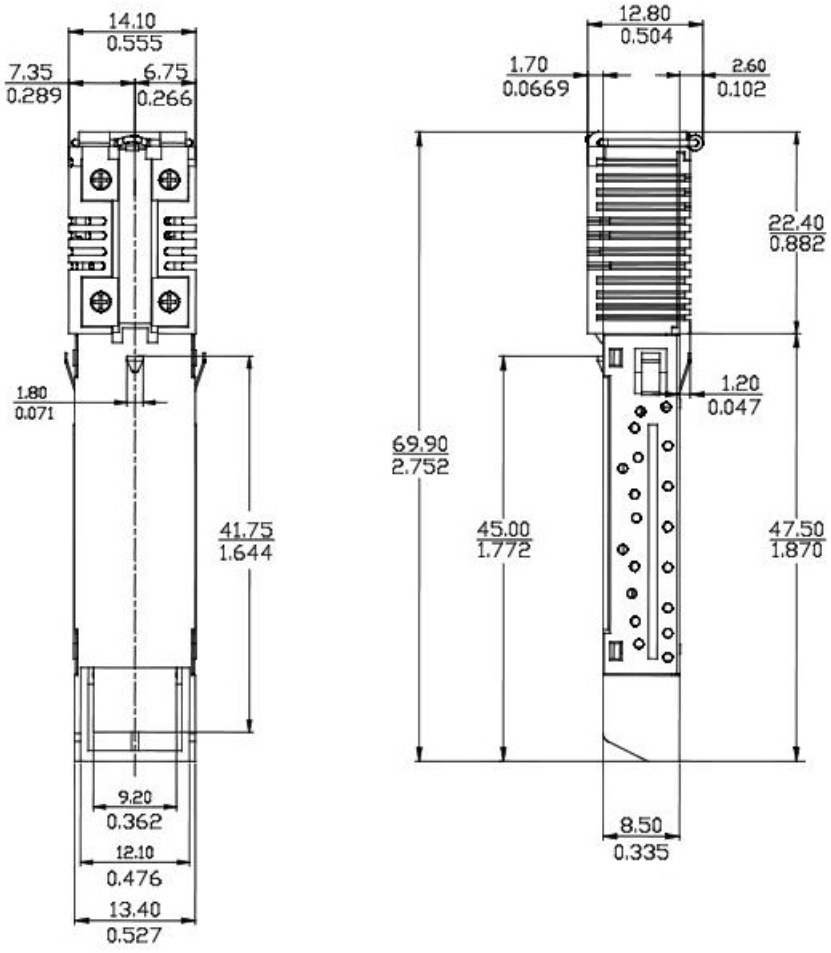
Pinout of Connector Block on Host equipment

Notes:

1. TX Fault is an open collector/drain output, which should be pulled up with a 4.7K–10KΩ resistor on the host board. Pull up voltage between 2.0V and VccT, R+0.3V. When high, output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.
2. TX disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7–10 KΩ resistor. Its states are:
   Low (0 – 0.8V): Transmitter on
   (>0.8, < 2.0V): Undefined
   High (2.0 – 3.465V): Transmitter Disabled
   Open: Transmitter Disabled.
3. Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7K – 10KΩ resistor on the host board. The pull-up voltage shall be VccT or VccR.
   Mod-Def 0 is grounded by the module to indicate that the module is present
   Mod-Def 1 is the clock line of two wire serial interface for serial ID
   Mod-Def 2 is the data line of two wire serial interface for serial ID.
4. LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K – 10KΩ resistor. Pull up voltage between 2.0V and VccT, R+0.3V. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.
5. VeeR and VeeT are internally connected within the SFP module.

6. RD-/+: These are the differential receiver outputs. They are AC coupled 100Ω differential lines which should be terminated with 100Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board.
7. VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V ±5% at the SFP connector pin. VccR and VccT are internally connected within the SFP transceiver module.
8. TD-/+: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board.

VIII. Mechanical Specifications (unit: mm)



IX. Regulatory Compliance

FTGN2117P2xxN modules meet the Class 1 eye safety requirements of EN (IEC) 60825 and the electrical safety requirements of EN (IEC) 60950.

These products are certified by TÜV and CSA and copies of certificates are available at Finisar Corporation upon request.

X. References

1. ITU-T G.984 Gigabit-capable Passive Optical Networks (GPON) General characteristics and Physical Media Dependent layer and Transmission convergence layer and ONT management and control interface specification.

2. ITU-T G.988 ONU management and control interface (OMCI) specification

3. Small Form Factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA), September 2000. Documentation is currently available at Finisar upon request.

4. Directive 2011/65/EU of the European Council Parliament and of the Council, "on the restriction of the use of certain hazardous substances in electrical and electronic equipment".

5. "Application Note AN-2038: Finisar Implementation of RoHS Compliant Transceivers"

XI. Ordering Information

Part Number	Link Budget	Receptacle Type	Case Temp Range
FTGN2117P2CUN	Class B+	SC/UPC	-20~70°C
FTGN2117P2TUN	Class B+	SC/UPC	-40~85°C
FTGN2117P2TAN	Class B+	SC/APC	-40~85°C

XII. For More Information

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