16GFC SFP+ SW 100m Optical Transceiver
GPP-8514G-SRC

Features

- Optical interface compliant to IEEE 802.3ae
- Electrical interface compliant to SFF-8431
- Hot pluggable SFP+ footprint
- 850nm VCSEL transmitter, PIN photo-detector
- Built-in CDR with shut off control
- All-metal housing for superior EMI performance
- Advanced firmware allow customer system
- Cost effective SFP+ solution, enables higher port densities and greater bandwidth
- Operating case temperature: Standard : 0 to +70°C
- RoHS-6 compliant (lead free)

Applications

- 4G/8G/16G Fibre Channel
- Other optical links

Product description

The Gigalight GPP-8514G-SRC SFP+ transceiver is designed to transmit and receive optical data over 50/125μm or 62.5/125μm multimode optical fiber (Table 1).

Fiber type	Minimum modal band width@850nm (MHx.km)	Operating range(meters)
62.5μm MMF	160	2 to 26
	200	2 to 33
50μm MMF	400	2 to 66
	500	2 to 82
	2000	2 to 100

Table 1: SFP+ SR Operating Range for each Optical Fiber Type

The GPP-8514G-SRC module electrical interface is compliant to SFI electrical specifications. The transmitter inputand receiver output impedance is 100 Ohms differential. Data lines are internally AC coupled. The module provides differential termination and reduce differential to common mode conversion for quality signal termination and low EMI. SFI typically operates over 200 mm of improved FR4 material or up to about 150mmof standard FR4 with one connector.

The transmitter converts 14.025Gbit/s serial PECL or CML electrical data into serial optical data compliant with the FC standard.The receiver converts 14.025Gbit/s serial optical data into serial PECL/CML electrical data.

Absolute maximum rating

These values represent the damage threshold of the module. Stress in excess of any of the individual Absolute Maximum Ratings can cause immediate catastrophic damage to the module even if all other parameters are within Recommended Operating Conditions.

Parameter	Symbol	Min	Typical	Max	Unit
Power Supply Voltage	VCC	0	+3.3	+3.6	V
Storage Temperature	TC	-40	+25	+85	℃
Operating Case Temperature	TC	0	+25	+70	℃
Relative Humidity	RH	5	50	95	%
RX Input Average Power	Pmax	-	-	0	dBm

Recommended operating environment

Recommended Operating Environment specifies parameters for which the electrical and optical characteristics hold unless otherwise noted.

Parameter	Symbol	Min	Typical	Max	Unit
Power Supply Voltage	VCC	+3.135	+3.3	+3.465	V
Operating Case Temperature	TC	0	+25	+70	℃

Low Speed Characteristics

Parameter	Symbol	Min	Typical	Max	Unit
Power Consumption				1.2	W

TX_Fault,RX_LOS	VOL	0		0.4	V
	VOH	Host_VCC-0.5		Host_VCC+.0.3	V
TX_DIS	VIL	-0.3		0.8	V
	VIH	2.0		VCCT+0.3	V
RS0,RS1	VIL	-0.3		0.8	V
	VIH	2.0		VCCT+0.3	V

Optical characteristics

The following optical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter						
Center Wavelength	λt	840	850	860	nm	
RMS spectral width	Pm	-	-	Note1	nm	
Average Optical Power	Pavg	-6.5	-		dBm	2
Extinction Ratio	ER	3.5	-	-	dB	3
Transmitter Dispersion Penalty	TDP	-	-	3.9	dB	
Relative Intensity Noise	Rin	-	-	-128	dB/Hz	12dB reflection
Optical Return Loss Tolerance		-	-	12	dB	
Receiver						
Center Wavelength	λr	840	850	860	nm	
Receiver Sensitivity	Psens	-	-	-10.5	dBm	4
Stressed Sensitivity in OMA		-	-	-7.5	dBm	4
Los function	Los	-30	-	-12	dBm	
Overload	Pin	-	-	-1.0	dBm	4
Receiver Reflectance		-	-	-12	dB	

Note:
1. Trade-offs are available between spectral width, center wavelength and minimum OMA, as shown in table 6.
2. The optical power is launched into MMF
3. Measured with a PRBS 231-1 test pattern @14.025Gbps
4.Measured with a PRBS 231-1 test pattern @14.025Gbps,BER≤10-12.

Center Wavelength (nm)	RMS Spectral width (nm)								
	Up to 0.05	0.05to 0.1	0.1 to 0.15	0.15 to 0.2	0.2 to 0.25	0.25 to 0.3	0.3 to 0.35	0.35 to 0.4	0.4 to 0.45
840 to 842	-4.2	-4.2	-4.1	-4.1	-3.9	-3.8	-3.5	-3.2	-2.8
842 to 844	-4.2	-4.2	-4.2	-4.1	-3.9	-3.8	-3.6	-3.3	-2.9
844 to 846	-4.2	-4.2	-4.2	-4.1	-4.0	-3.8	-3.6	-3.3	-2.9
846 to 848	-4.3	-4.2	-4.2	-4.1	-4.0	-3.8	-3.6	-3.3	-2.9
848 to 850	-4.3	-4.2	-4.2	-4.1	-4.0	-3.8	-3.6	-3.3	-3.0
850 to 852	-4.3	-4.2	-4.2	-4.1	-4.0	-3.8	-3.6	-3.4	-3.0
852 to 854	-4.3	-4.2	-4.2	-4.1	-4.0	-3.9	-3.7	-3.4	-3.1
854 to 856	-4.3	-4.3	-4.2	-4.1	-4.0	-3.9	-3.7	-3.4	-3.1
856 to 858	-4.3	-4.3	-4.2	-4.1	-4.0	-3.9	-3.7	-3.5	-3.1
858 to 860	-4.3	-4.3	-4.2	-4.2	-4.1	-3.9	-3.7	-3.5	-3.2

Electrical characteristics

The following electrical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Data Rate		-	-	8.5	Gbps	
Power Consumption		-	-	800	mW	
Transmitter						
Single Ended Output Voltage Tolerance		-0.3	-	4.0	V	
C common mode voltage tolerance		15	-	-	mV	
Tx Input Diff Voltage	VI	400		1600	mV	
Tx Fault	VoL	-0.3		0.4	V	At 0.7mA
Data Dependent Input Jitter	DDJ			0.10	UI	
Data Input Total Jitter	TJ			0.28	UI	
Receiver						
Single Ended Output Voltage Tolerance		-0.3	-	4.0	V	
Rx Output Diff Voltage	Vo	300		850	mV	
Rx Output Rise and Fall Time	Tr/Tf	30			ps	20% to 80%
Total Jitter	TJ			0.70	UI	
Deterministic Jitter	DJ			0.42	UI	

Rate Select Control

RX and TX rates can be independently controlled by hardware input pins RS0 and RS1. Module electrical input pins 7(RS0) and 9(RS1) are used to select RX and TX rate respectively.The flowing table shows the way how to select rate by RS0 and RS1.

RS0 Control Input	RX Operation	Rate Selected	RS1 Control Input	TX Operation	Rate Selected
1	RX CDR Enabled	14.025Gbps	1	TX CDR Enabled	14.025Gbps
0	RX CDR Disabled	8GFC, 4GFC	0	TX CDR Disabled	8GFC, 4GFC

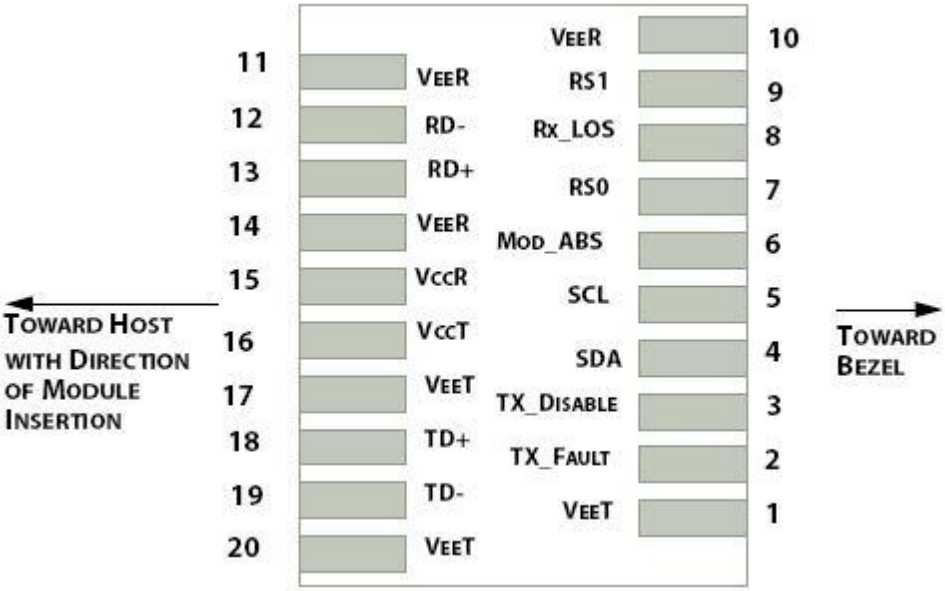

Figure 1: Interface to Host PCB

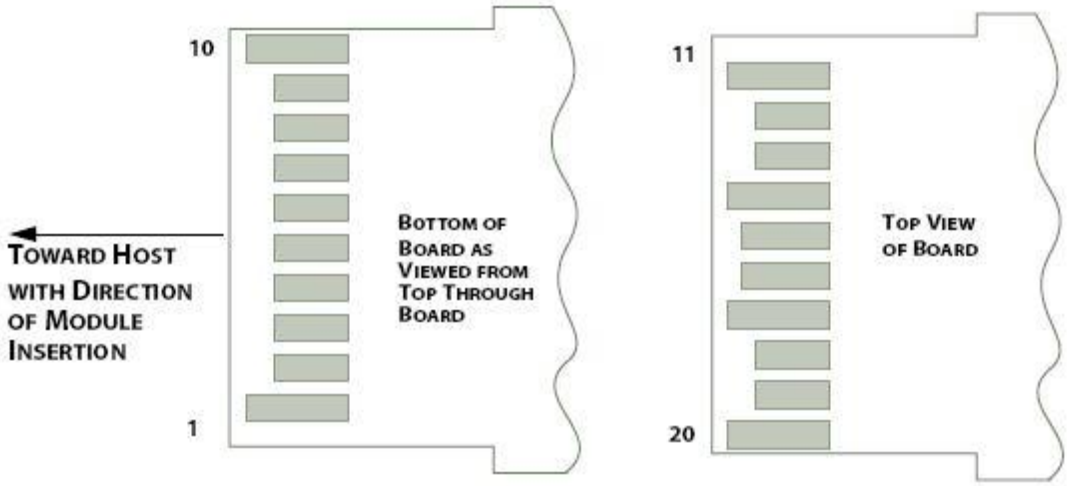

Figure 2: Module Contact Assignment

Pin definition

Pin	Symbol	Name/Description
1	VEET [1]	Transmitter Ground
2	Tx_FAULT [2]	Transmitter Fault
3	Tx_DIS [3]	Transmitter Disable. Laser output disabled on high or open
4	SDA [2]	2-wire Serial Interface Data Line
5	SCL [2]	2-wire Serial Interface Clock Line
6	MOD_ABS [4]	Module Absent. Grounded within the module
7	RS0 [5]	Rate Select 0
8	RX_LOS [2]	Loss of Signal indication. Logic 0 indicates normal operation
9	RS1 [5]	Rate Select 1
10	VEER [1]	Receiver Ground
11	VEER [1]	Receiver Ground
12	RD-	Receiver Inverted DATA out. AC Coupled
13	RD+	Receiver DATA out. AC Coupled
14	VEER [1]	Receiver Ground
15	VCCR	Receiver Power Supply
16	VCCT	Transmitter Power Supply
17	VEET [1]	Transmitter Ground
18	TD+	Transmitter DATA in. AC Coupled
19	TD-	Transmitter Inverted DATA in. AC Coupled
20	VEET [1]	Transmitter Ground

Notes:

[1] Module circuit ground is isolated from module chassis ground within the module.

[2].should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15Vand 3.6V.

[3]Tx_Disable is an input contact with a 4.7 kΩ to 10 kΩ pullup to VccT inside the module.

[4]Mod_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull this contact up to Vcc_Host with a resistor in the range 4.7 kΩ to10 kΩ.Mod_ABS is asserted “High” when the SFP+ module is physically absent from a host slot.

[5] RS0 and RS1 are module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.

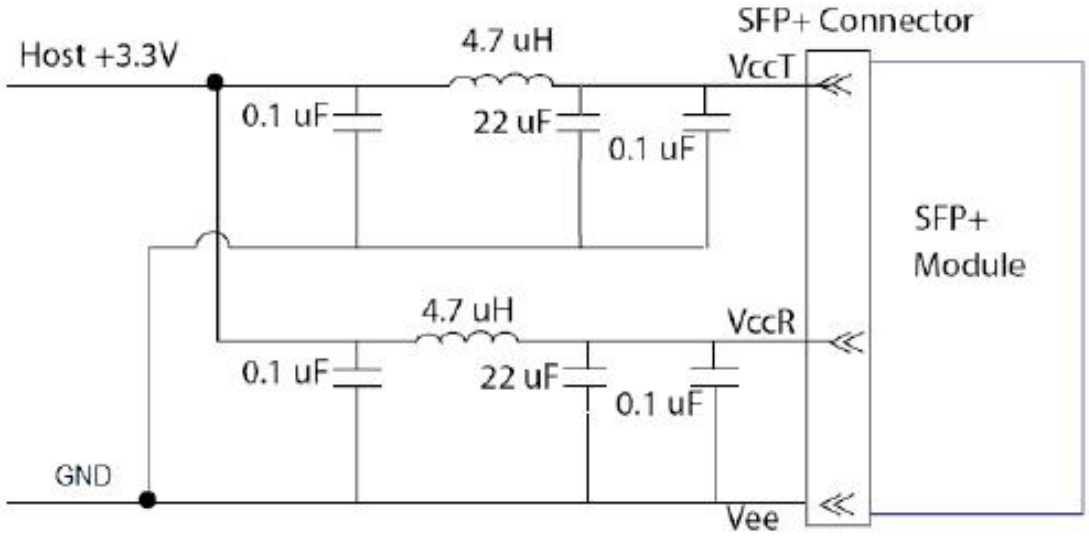

Figure3. Host Board Power Supply Filters Circuit

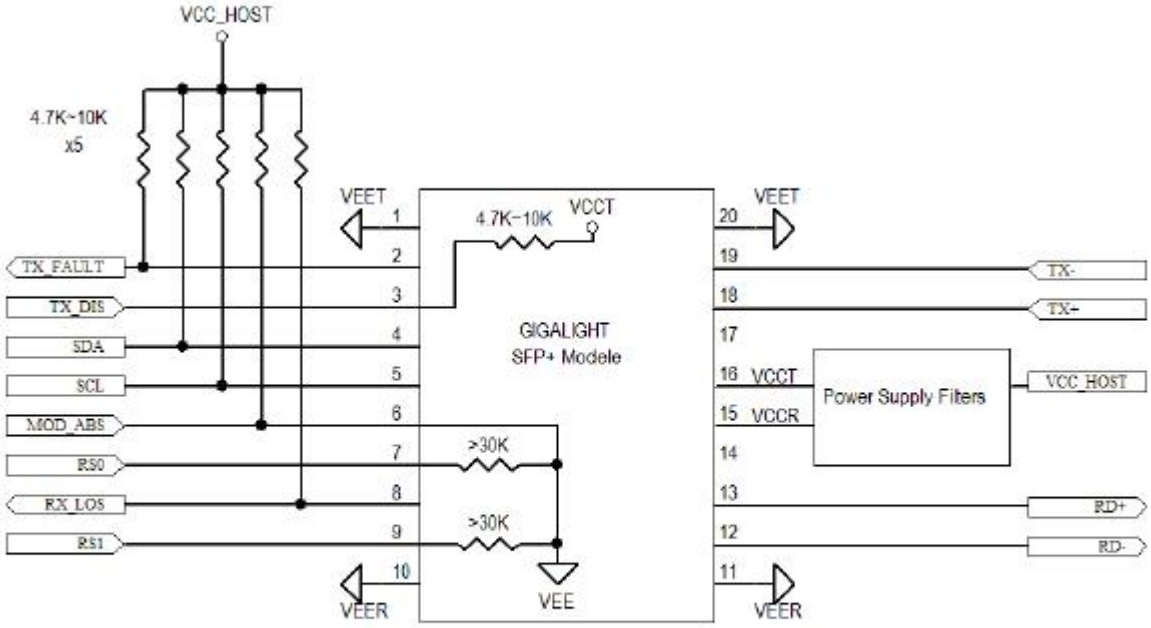

Figure4. Host-Module Interface

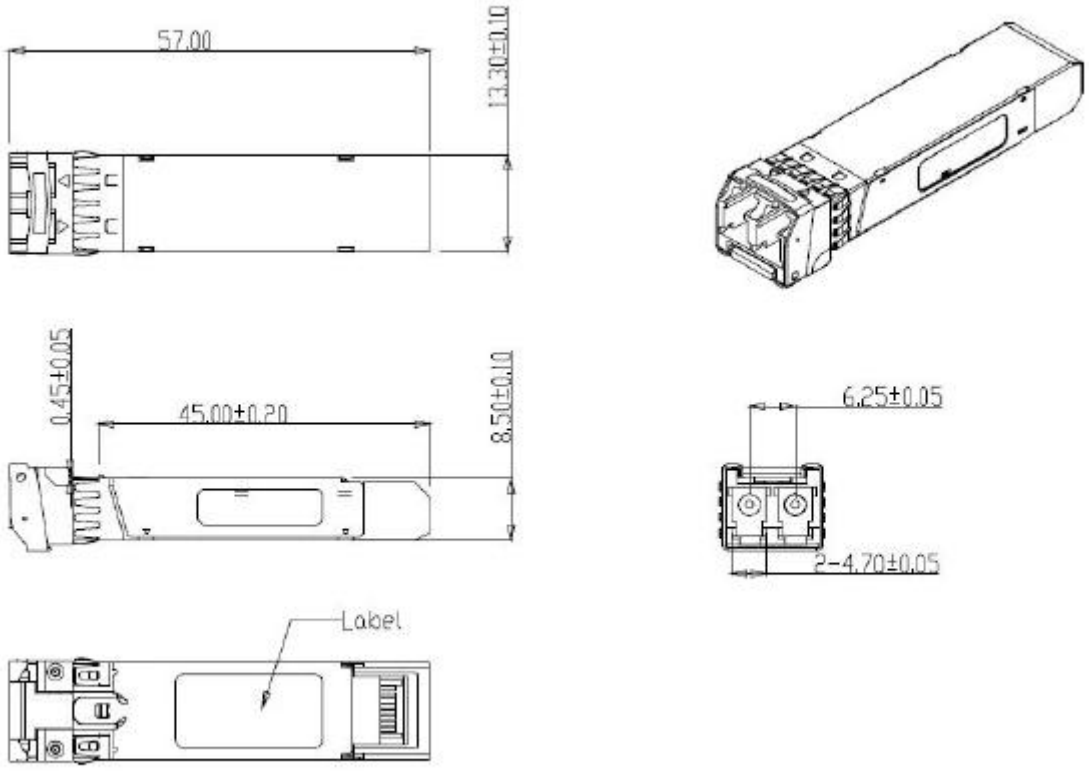

Figure5. Mechanical Specifications

Regulatory Compliance

GIGALIGHT SFP+ transceiver is designed to be Class I Laser safety compliant and is certified per the following standards:

Feature	Agency	Standard	Certificate / Comments
Laser Safety	FDA	CDRH 21 CFR 1040 annd Laser Notice No. 50	1120292-000
Product Safety	UL	UL and CUL EN60950-2:2007	E347511
Environmental protection	SGS	RoHS Directive 2002/95/EC	GZ1001008918/CHEM
EMC	WALTEK	EN 55022:2006+A1:2007 EN 55024:1998+A1+A2:2003	WT10093759-D-E-E

Ordering Information

Part Number	Product Description
GPP-8514G-SRC	SFP+, 16GFC SW, 14.025Gb/s, 850nm, 100m (OM3), MMF

References

1. "Specifications for Enhanced Small Form Factor Pluggable Module SFP+", SFF-8431, Rev 4.1, July 6, 2009.
2. "Improved Pluggable Formfactor",SFF-8432, Rev 4.2,Apr 18,2007
3. IEEE802.3ae–2002
4. "Diagnostic Monitoring Interface for Optical Transceivers" SFF-8472, Rev 10.3, Dec 1,2007

Important Notice

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