GIGALIGHT 8.5Gbps Fiber Channel 40km SFP+ Optical Transceiver GPP-558G-ERC

Features

- Compliant with SFF-8431 and IEE802.3ae
- Data rate up to 8.5Gb/s
- Cooled EML transmitter and PIN receiver
- link length up to 40km
- Low Power Dissipation 1.5W Maximum
- -5ºC to 70ºC Operating Case Temperature
- Single 3.3V power supply
- Diagnostic Performance Monitoring of module temperature, supply Voltages, laser bias current, transmit optical power, receive optical power
- RoHS compliant and lead free

Applications

- Tri Rate 2.125/4.25/8.5Gbs Fiber Channel

Description

Gigalight SFP+ER Transceiver is designed for 8.5G Fiber- Channel applications. The transceiver consists of two sections: The transmitter section incorporates a colded EML laser. And the receiver section consists of a PIN photodiode integrated with a TIA. All modules satisfy class I laser safety requirements. Gigalight SFP+ER Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472, 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.

Absolute Maximum Ratings

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.

Parameters	Symbol	Min.	Max.	Unit
Supply Voltage	V_{CC}	0	+3.8	V
Storage Temperature	Tc	-40	+85	°C
Operating Case Temperature	Tc	-5	+70	°C
Relative Humidity	RH	0	85	%

Operating Conditions

Parameter	Symbol	Min.	Typical	Max	Unit
Supply Voltage	V_{CC}	3.0	3.3	3.6	V
Supply current	Icc		200	300	mA
Operating Case Temperature	T_C	-5	-	70	°C
Module Power Dissipation	Pm	-	1.2	1.5	W

Notes:
1. Supply current is shared between VCCTX and VCCRX.
2. In-rush is defined as current level above steady state current requirements.

Low Speed Characteristics

Parameter	Symbol	Min.	Typical	Max	Unit
Power Consumption				1	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

Parameter	Symbol	Min.	Typical	Max	Unit	Ref.
Transmitter						
Output Opt. Power,8.5 Gb/s	P_O	0	-	+3	dBm	1
Optical Wavelength	λ	1530		1565	nm	2
Side Mode Suppression Ratio	$SMSR_{min}$	30			dB	2
Optical Modulation Amplitude	OMA	290			uW	2,3
Transmitter and Dispersion Penalty, 8.5 Gb/s	TDP			3.2	dB	4
Receiver						
Unstressed Receiver OMA Sensitivity, 8.5 Gb/s	RSENSr			0.042	mW	5
Average Received Power	Rx_{MAX}			+0.5	dBm	
Optical Center Wavelength	λC	1530	-	1565	nm	
Return Loss		12			dB	
LOS De-Assert	LOS_D			-16	dBm	
LOS Assert	LOS_A	-25			dBm	
LOS Hysteresis		0.5			dB	

Notes:
1. High Bandwidth Mode. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.
2. Also specified to meet curves in FC-PI-4 Rev 8.001 Figures 21, 22, and 23, which allow trade-off between wavelength, spectral width and OMA.
3. Equivalent extinction ratio specification for Fiber Channel. Allows smaller ER at higher average power.
4. For 8.5Gb/s operation, Jitter values for gamma T and gamma R are controlled by TDP and stressed receiver sensitivity.
5. Measured with conformance signals defined in FC-PI-4 Rev. 8.00 specifications. Value in OMA. Measured with PRBS 27-1 at 10-12 BER.

Electrical characteristics

Parameter	Symbol	Min.	Typical	Max	Unit	Ref.
Supply Voltage	V_{CC}	3.00		3.60	V	1
Supply Voltage	I_{cc}		200	300	mA	1
Transmitter						
Input differential impedance	R_{in}		100		Ω	2
Single ended data input swing	$V_{in,pp}$	150		900	mV	
Transmit Disable Voltage	V_D	2		V_{CC}	V	
Transmit Enable Voltage	V_{EN}	Vee		Vee+0.8	V	3
Receiver						
Single ended data output swing	Vout,pp	300		800	mV	4
Data output rise/fall time,8.5 Gb/s	T_r,t_f			60	ps	5
LOS Fault	$V_{LOS\ fault}$	2		VCC_{HOST}	V	6
LOS Normal	$V_{LOS\ norm}$	Vee		Vee+0.8	V	6

Notes:
1. Module power consumption never exceeds 1W.
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.

General Specifications

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Data Rate	DR			8.5	Gb/sec	1
Bit Error Rate	BER			10^{-12}		2
Max. Supported Link Length on 9/125 μm SMF	L			40	Km	3

Notes:
1. 2x/4x/8x Fibre Channel compliant.
2. Tested with a PRBS 27-1 test pattern.
3. Distances are based on FC-PI-4 Rev. 8.00[1] and IEEE 802.3 standards.

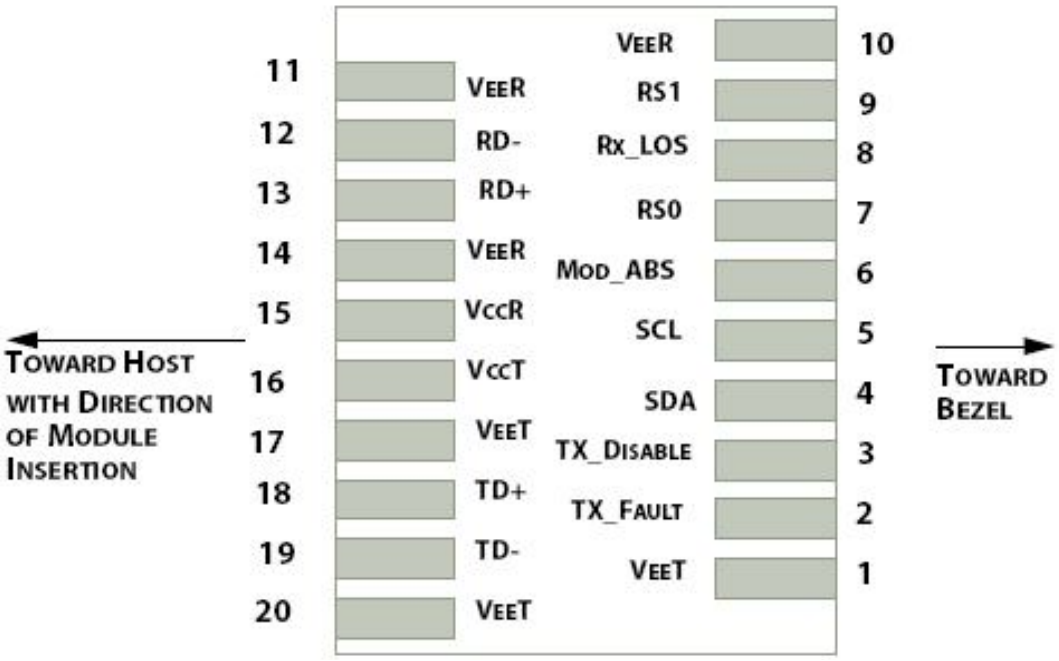

Figure 1: Interface to Host PCB

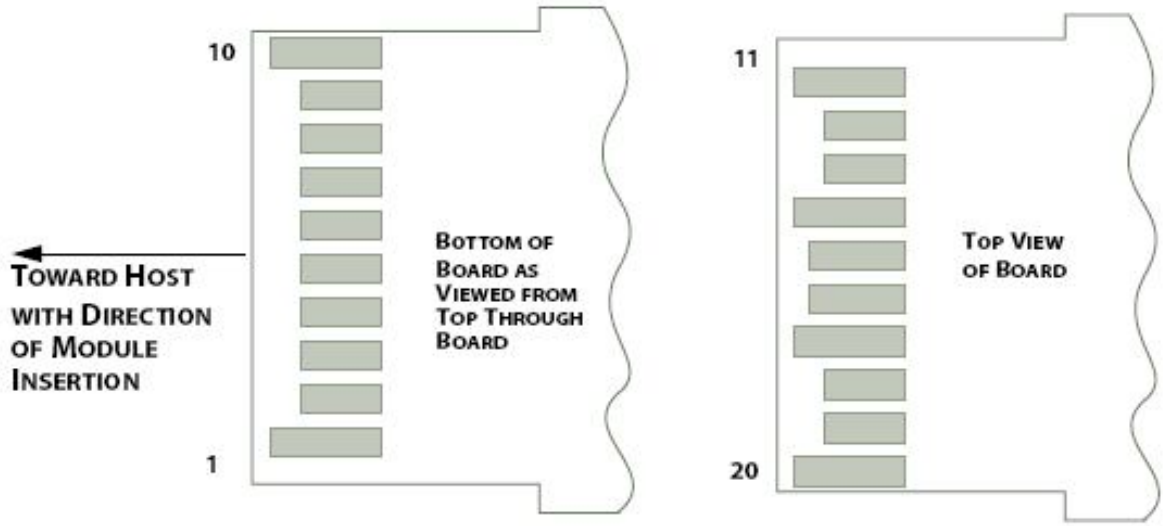

Figure 2: Module Contact Assignment

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.

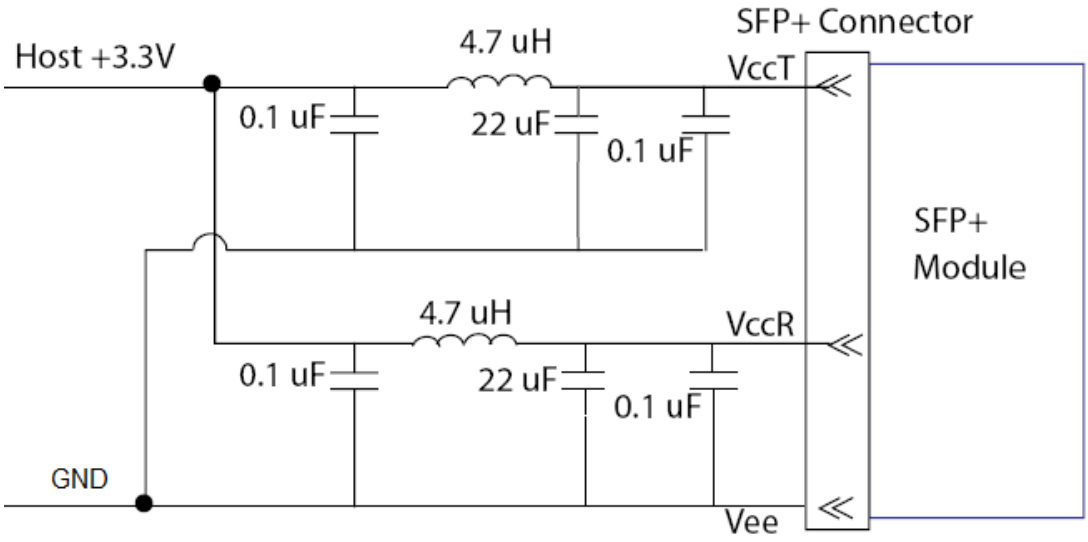

Figure2. Host Board Power Supply Filters Circuit

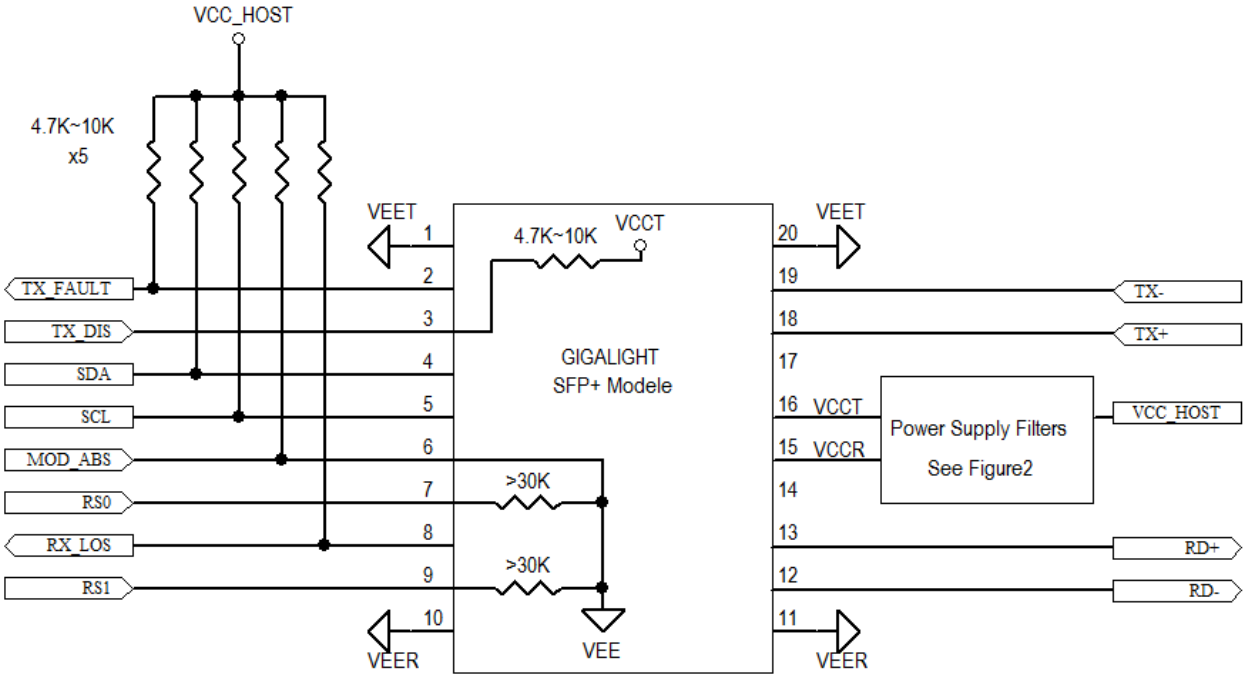

Figure3. Host-Module Interface

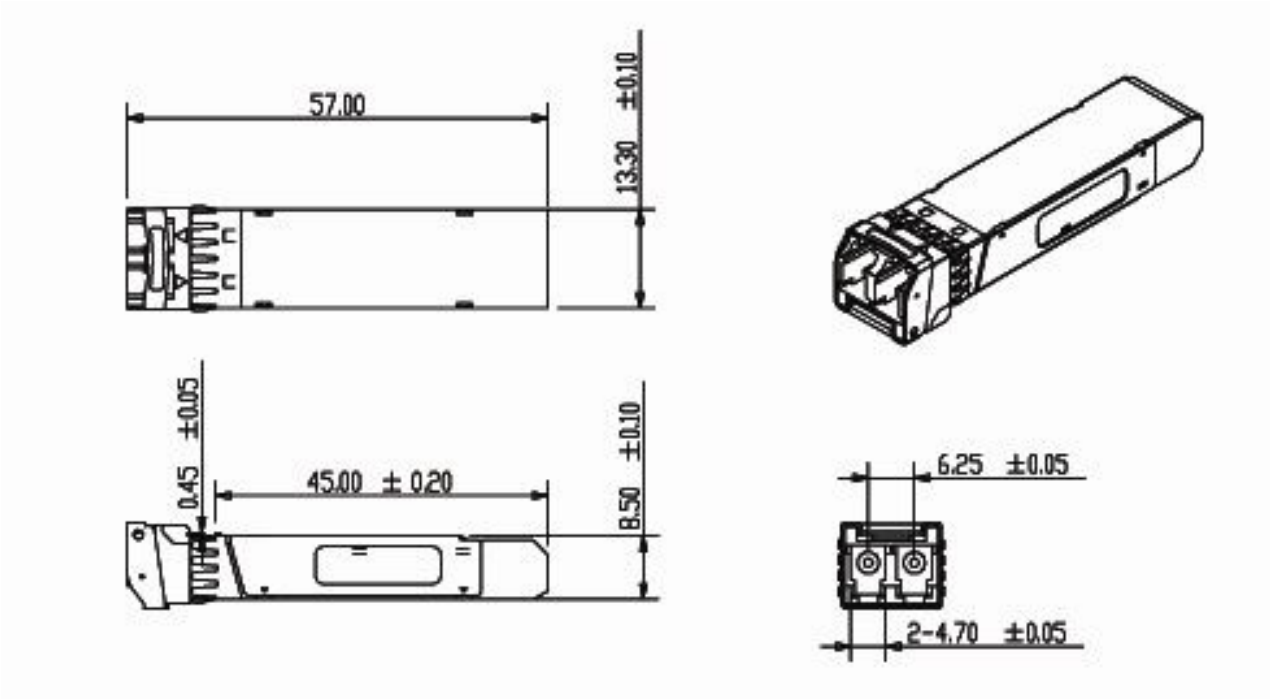

Figure4. Mechanical Specifications

Ordering information

Part Number	Product Description
GPP-558G-ERC	8.5Gbps, 1550nm SFP+ER 40km, -5ºC ~ +70ºC

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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