Product Name	GAOTek High Speed 10gbps CWDM SFP+ Transceiver
Product SKU	GAOTek- SFPCWDM -105
Product URL	https://gaotek.com/product/gaotek-high-speed-10gbps-cwdm-sfp-transceiver/

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PRODUCT DESCRIPTION:

CWDM Transceiver is a "Limiting module", designed for 10GBASE-ER, and 2G/4G/ 8G/10G Fiber- Channel applications. The transceiver consists of two sections: The transmitter section incorporates an EML laser. And the receiver section consists of a PIN photodiode integrated with aTIA. All modules satisfy class I laser safety requirements. 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 opticalpower, received optical power, and transceiver supply voltage.

PRODUCT FEATURES:

- Up to 11.1Gbps Data Links
- Up to 40KM transmission on SMF
- Power dissipation <1.5W
- Uncooled CWDM EML Laser and PIN receiver
- Metal enclosure, for lower EMI
- 2-wire interface with integrated Digital Diagnostic monitoring
- Hot-pluggable SFP+ footprint
- Specifications compliant with SFF 8472
- Compliant with SFP+ MSA with LC connector
- Single 3.3V power supply
- Case operating temperature range:0°C to 70°C

PRODUCT APPLICATION:

- 10GBASE-ER/EW
- 10G Ethernet

PRODUCT STANDARD:

- Compliant to 802.3ae 10GBASE-ER/EW
- Compliant to SFF-8431
- RoHS Compliant.

PRODUCT SELECTION:

WAVELENGTH	XX	CLASP COLOR CODE	WAVELENGTH	XX	CLASP COLOR CODE
1470 nm	47	Gray	1550 nm	55	Yellow
1490 nm	49	Purple	1570 nm	57	Orange
1510 nm	51	Blue	1590 nm	59	Red
1530 nm	53	Green	1610 nm	61	Brown

ABSOLUTE MAXIMUM RATINGS:

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
Storage Temperature	T_S	-40	-	85	°C	
Relative Humidity	RH	5	-	95	%	
Power Supply Voltage	VCC	-0.3	-	4	V	
Signal Input Voltage		Vcc-0.3	-	Vcc+0.3	V	

RECOMMENDED OPERATING CONDITIONS:

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
Case Operating Temperature	T_{CASE}	0	-	70	°C	Without air flow
Power Supply Voltage	VCC	3.14	3.3	3.47	V	
Power Supply Current	ICC	-		450	mA	
Data Rate	BR		10.3125		Gbps	
Transmission Distance	TD		-	40	km	
Coupled fiber	Single-mode fiber					9/125um SMF

PRODUCT OPTICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
TRANSMITTER						
Output Opt. Pwr	POUT	-1		3	dBm	1
Optical Wavelength	λ	λ-6.5		λ+6.5	nm	2
Spectral Width (-20dB)	σ			1	nm	
Optical Extinction Ratio	ER	6			dB	
Transmitter and Dispersion Penalty	TDP			3	dB	
Side mode Suppression ratio	SMSR	30			dB	
RIN	RIN			-128	dB/Hz	
Output Eye Mask		Compliant with IEEE 802.3ae				
RECEIVER						
Receiver Sensitivity	P_{SEN}			-15.8	dBm	3
Input Saturation Power (Overload)	PSAT	0.5			dBm	
Input Optical Wavelength	λ_{IN}	1270		1610	nm	
LOS -Assert Power	PA			-17	dBm	
LOS -Deassert Power	PD	-30			dBm	
LOS –Hysteresis	PH_{YS}	0.5			dB	

Notes:

1. Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulations.
2. λ"is:1470,1490,1510,1530,1550,1570,1590,1610, please the "product selection".
3. Measured with a PRBS 231-1 test pattern, @ 10.325 GB/s, BER<10-12.

ELECTRICAL CHARACTERISTICS:

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Supply Voltage	V_{CC}	3.14	3.3	3.46	V	
Supply Current	I_{CC}			450	mA	
TRANSMITTER						
Input differential impedance	R_{IN}		100		Ω	1
Differential data input swing	Vin,pp	180		1200	mV	
Transmit Disable Voltage	VD	Vcc–1.3		Vcc	V	
Transmit Enable Voltage	VEN	Vee		Vee+ 0.8	V	2
Transmit Disable Assert Time				10	us	
RECEIVER						
Differential data output swing	Vout,pp	300		850	mV	3
Data output rise time	Tr	30			ps	4
Data output fall time	Tf	30			ps	4
LOS Fault	VLOS fault	Vcc–1.3		VccHOST	V	5
LOS Normal	VLOS norm	Vee		Vee+0.8	V	5
Power Supply Rejection	PSR	100			mVpp	6

Notes:

1. Connected directly to TX data input pins. AC coupled thereafter.
2. Or open circuit.
3. Input 100 ohms differential termination.
4. These are unfiltered 20-80% values
5. Loss of Signal is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
6. Receiver sensitivity complies with power supply sinusoidal modulation of 20 Hz to 1.5 MHz up to specified value applied through the recommended power supply filtering network.

PIN DESCRIPTION:

Diagram of Host Board Connector Block Pin Numbers and Name

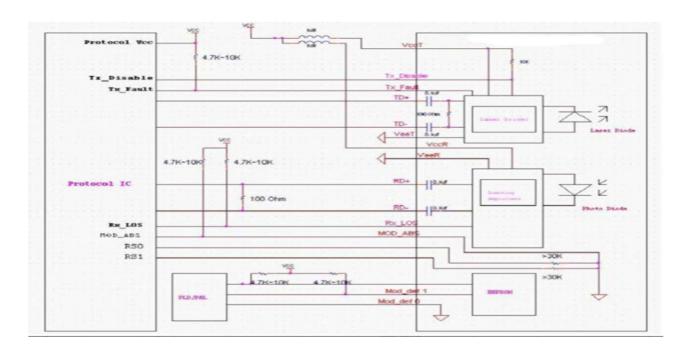| PIN	SYMBOL	NAME/DESCRIPTION	NOTE
1	V_{EET}	Transmitter Ground(Common with Receiver Ground)	1
2	T_{FAULT}	Transmitter Fault.	2
3	T_{DIS}	Transmitter Disable. Laser output disabled on high or open.	3
4	SDA	2-wire Serial Interface Data Line	4
5	SCL	2-wire Serial Interface Clock Line	4
6	MOD_ABS	Module Absent. Grounded within the module	4
7	RS0	Rate Select 0	5
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	6
9	RS1	No connection required	1
10	V_{EER}	Receiver Ground(Common with Transmitter Ground)	1
11	V_{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_{EER}	Receiver Ground(Common with Transmitter Ground)	1
15	V_{CCR}	Receiver Power Supply	
16	V_{CCT}	Transmitter Power Supply	
17	V_{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_{EET}	Transmitter Ground (Common with Receiver Ground)	1

Notes:

1. Circuit ground is internally isolated from chassis ground.
2. TFAULT is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0Vto Vcc + 0.3V.A high output indicates a transmitter fault caused by either the TX bias currentor the TX output power exceeding the preset alarm thresholds. A low output indicates normaloperation. In the low state, the output is pulled to <0.8V.
3. Laser output disabled on T_{DIS} >2.0V or open, enabled on T_{DIS} <0.8V.
4. Should be pulled up with 4.7kΩ- 10kΩ host board to a voltage between 2.0V and 3.6V. MOD_ABS pulls the line low to indicate the module is plugged in.
5. Internally pulled down per SFF-8431 Rev 4.1.
6. LOS is open collector output. It should be pulled up with 4.7kΩ – 10kΩ on the host board to a voltage between 2.0V and 3.6V.
7. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

DIGITAL DAIGNOSTIC FUNCTIONS:

These transceivers support the 2-wire serial communication protocol as defined in the SFP+MSA. The standard SFP serial ID provides access to identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information. Additionally, TAKFLY SFP+ transceivers provide a unique enhanced digital diagnostic monitoringinterface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, and 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), so the originally defined serial ID memory map remains unchanged. 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, Mod Def 1) is generated by the host. The positive edge clocks data into the SFP transceiver into those segments of the E2PROM that are not write-protected. The negative edge clocks data from the SFP transceiver. The serial data signal (SDA, Mod Def 2) is bi-directional forserial 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.
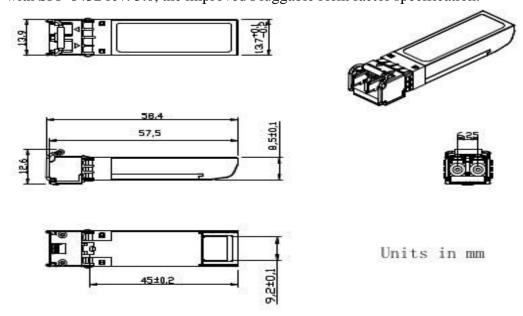
HOST - TRANSCEIVER INTERFACE BLOCK DIAGRAM:

OUTLINE DIMENSIONS:

Comply with SFF-8432 rev. 5.0, the improved Pluggable form factor specification.

Units in mm

REGULATORY COMPLIANCE:

FEATURE	REFERENCE	PERFORMANCE
Electrostatic discharge (ESD)	IEC/EN 61000-4-2	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN 55022Class B (CISPR 22A)	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10, 1040.11IEC/EN 60825-1, 2	Class 1 laser product
Component Recognition	IEC/EN 60950, UL	Compatible with standards
ROHS	2002/95/EC	Compatible with standards
EMC	EN61000-3	Compatible with standards