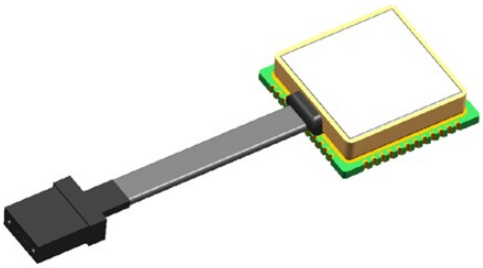
HTA8525-MD+003YY Optical Transceiver

10.3125Gb/s, 850nm

1、Product Description

HTA8525 Parallel Fiber Optical Transmitter is optimized for short distance high-data rate optical communications parallel optoelectronic Transceiver, every channel could provide up to 10.3125Gbps with multimode ribbon fiber. They are based on independent protocol and can be applied to Gigabit Ethernet, Fiber Channel, Infiniband, Backplane Connection, High Performance Numerical Video transmission or any specific communication application. The module integrate state-of-the art 850-nm VCSEL arrays and are 3.3V signal supplied for low power consumption. The module dimensions are 16.4×16.4×4mm in the LCC package format. They pluggable each fitted with an industry standard MT/MPO connector and are offered in the industrial（-55 ºC to +85 ºC）temperature range. They are reliability assurance based on Telcordia GR-468-CORE and compliant RoHS.



2、Features

- Single 3.3V DC supply
- 850nm VCSEL array, Multimode Fiber Transmit
- MT/MPO interface
- Operating Temperature Range：-55～+85ºC
- IIC Communication Functions
- 10.3125Gbps Data Rate
- Transmission distance 100m
- LCC48 packaging
- Power consumption is less than 0.8W

3、Ordering Information

Ordering Information				
Part Number	**Latch Type (X)**		**Temperature Range (Y)**	
HTA8525-XY	**M**	MT	**D**	-55 to 85ºC
	P	MPO		

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4、Product performance indicators

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Units	Notes
Module Supply Voltage	VCC	0	3.6	V	
Differential input amplitude	$V_{diff-se}$	0	1400	mV	Single-end
Control signal Input Voltage	Vctr-in	0	VCC+0.3	V	
ESD Resistance voltage	ESD	0	1	KV	
Storage Ambient Temperature	Tstg	-55	100	℃	
Soldering Temperature	T_{sold}	-	260	℃	
Soldering Time	t_{sold}	1	3	S	
Soldering Num	N_{sold}	0	2		
Relative Humidity-Operating	R_{HO}	5	95	%	
Exceeding the maximum ratings may cause damage to this product or lead to a reduction in reliability.					

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Units	Notes
Module Supply Voltage	VCC	3.14	3.3	3.46	V	
Working current	ICC	-	220	570	mA	
Module Supply Voltage Noise	V_{SND}	-	-	100	mV/Hz	
Operating Tempera-ture	T_{case}	-55	25	+85	℃	
Storage Tempera-ture	Tstg	-55	25	+100	℃	
Date Rate	S	1	-	10.3125	Gbps	

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Transmitter Elec-Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Units	Notes
Differential Input Impedance	Z_{in}	-	100	-	Ohms	
Differential Input voltage	$V_{diff-in}$	200	-	1600	mV	Peak to peak
Average transmitted optical power	P_o	-5	-	3	dBm	Full tem-perature zone
Optical Center Wave-length	λ	840	850	860	nm	
RMS Spectral Width	Δλ	-	-	0.65	nm	
Extingction Ratio	ER	3	4	-	dB	Full tem-perature zone
Optical Rise and Fall Time	tr/tf	-	-	60	ps	20%-80%

Receiver Elec-Optical Characteristics

Description	Symbol	Min	Typ	Max	Units	Notes
Differential Output Impedance	Z_{out}	-	100	-	Ohms	
Differential Output voltage	$V_{diff-out}$	-	440	-	mV	Peak to peak
Optical sensitivity	P_{sen}	-	-	-8	dBm	Full tem-perature zone
Receiver Power Overload	P_{OL}	3	-	-	dBm	
Optical Center Wave-length	λ	840	850	860	nm	

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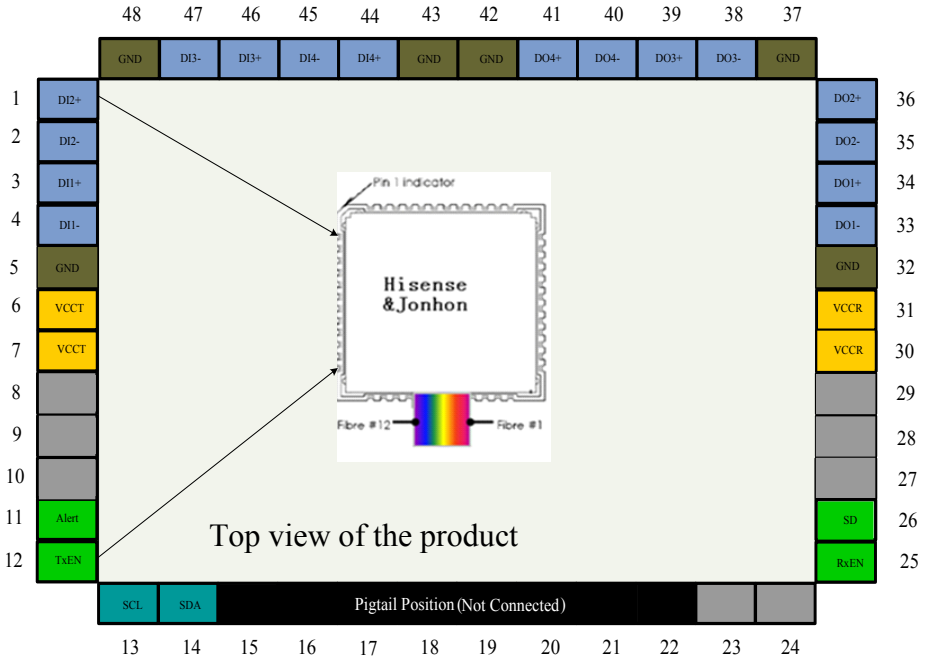
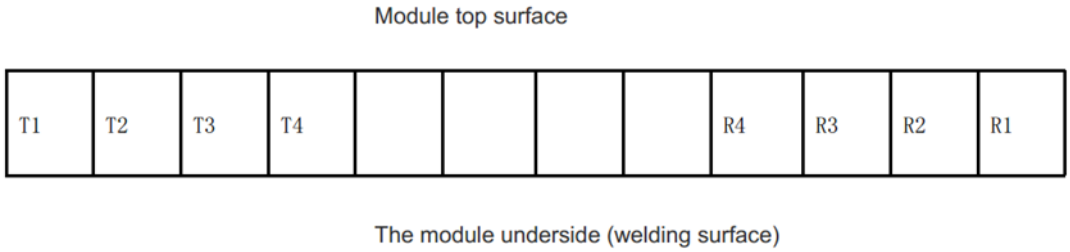
5、Interface definition



Optical interface definition



Optical interface(from left to right)：

T1、T2、T3、T4、NULL、NULL、NULL、NULL、R4、R3、R2、R1.

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PIN Description:

PIN	Symbol	Type	Description
6，7	VCCT	Power	Positive power supply for the transmitter.
31，30	VCCR	Power	Positive power supply for the receiver.
5，32，37，42，43，48	GND	Power	Ground
4	DI1-	CML	Signal 1 Negative Input
3	DI1+	CML	Signal 1 Positive Input
2	DI2-	CML	Signal 2 Negative Input
1	DI2+	CML	Signal 2 Positive Input
47	DI3-	CML	Signal 3 Negative Input
46	DI3+	CML	Signal 3 Positive Input
45	DI4-	CML	Signal 4 Negative Input
44	DI4+	CML	Signal 4 Positive Input
41	DO4+	CML	Signal 4 Positive Output
40	DO4-	CML	Signal 4 Negative Output
39	DO3+	CML	Signal 3 Positive Output
38	DO3-	CML	Signal 3 Negative Output
36	DO2+	CML	Signal 2 Positive Output
35	DO2-	CML	Signal 2 Negative Output
34	DO1+	CML	Signal 1 Positive Output
33	DO1-	CML	Signal 1 Negative Output
11	Alert	LVTTL	Output pin. Voltage alarm signal. Output high logical value in normal working hours. When the VCSEL voltage exceeds the tolerance range of VCSEL, this pin output low alarm.

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12	TxEN	LVTTL	Input pin(inner pull up). Module enable control side, high effective, when high, enable module; Low, all transmitter channels off.
25	RxEN	LVTTL	Input pin(inner pull up). Module enable control side, high effective, when high, enable module; Low, all receiver channels off.
26	SD	LVTTL	Output pin. Channel no light alert pin. When high, all channels normally receive the optical power; when low, at least one channel doesn't normally receive the optical power.
13	SCL	CMOS	I2C Serial Clock Interface. Input pin. Serial communi-cation clock input, must external pull-up 10K ohms.
14	SDA	CMOS	I2C Serial Data Interface. Input pin. Serial communica-tion data input, must external pull-up 10K ohms.
8，9,10,15,16,17,18,19,20,21,22,23,24,27,28,29	NC		Not Connect.

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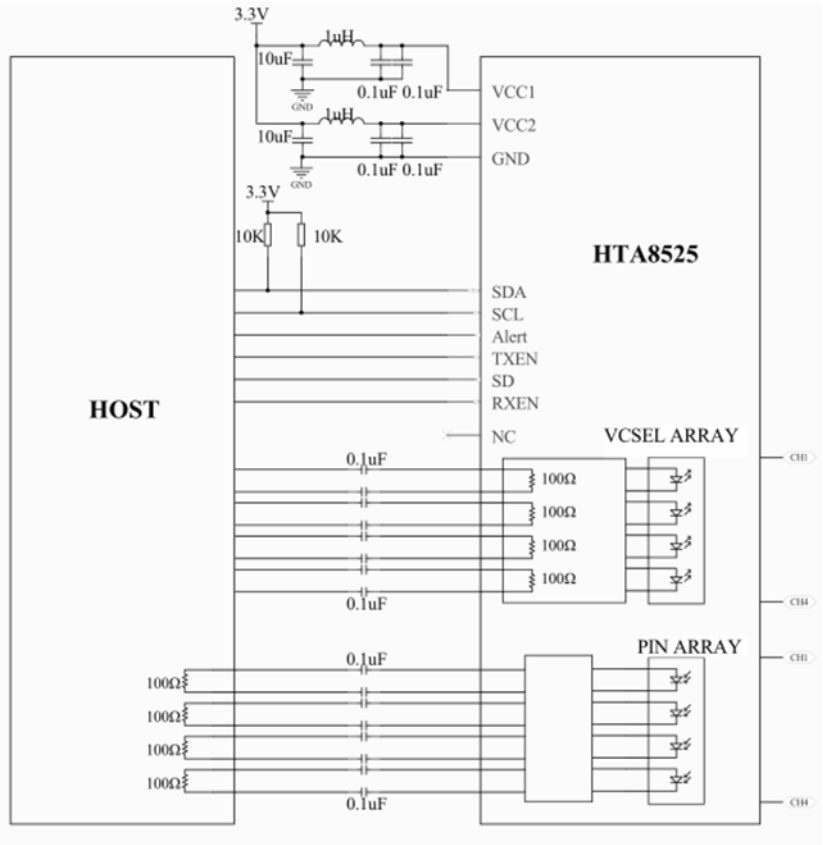
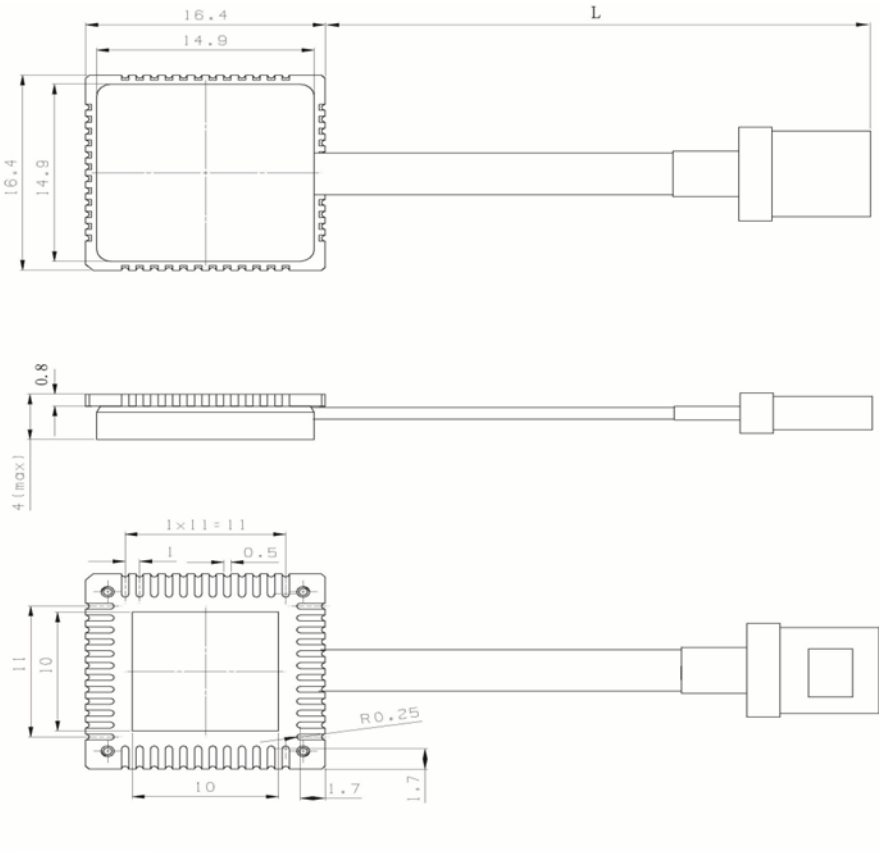
6、Reference design of peripheral



Note: For best performance, bypass capacitors should be placed as possible to the VCC pin of the module.

7、Package Outline Drawing



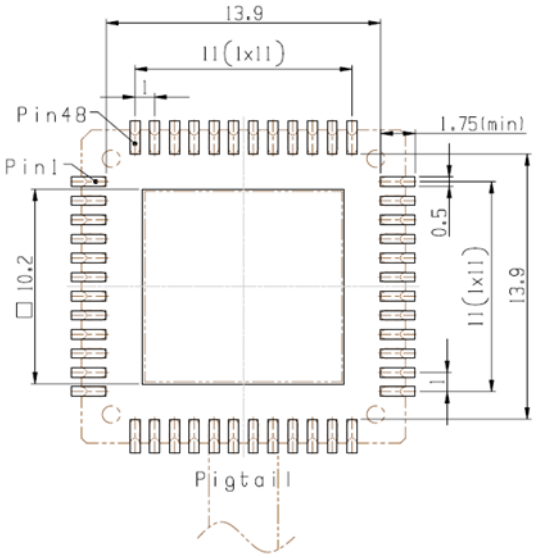
L Tolerances

L (mm)	T (mm)
0—100	+5 0
〉100—500	+15 0
〉500—1000	+30 0
〉1000	+50 0

Dimensions are mm

Tolerances ±0.2mm

8、Recommend Package PCB Layout Drawings



unit：mm

Note: Dotted line showed practical module shape and pad size.

Pad Heat Elimination Description：

The module underside pad is 10.0 ×10.0mm heat conduction pad. The pad is the mainly cooling channel connected to the module GND.

Recommend Motherboard Cooling Pad Design:

The recommend user motherboard pad design size is 10.2 ×10.2mm. The pad and mainboard both connected to the ground, the method of cooling design on the mainboard as follows:

(1) Added Thermal Holes: Users could custom a considerable amount of thermal holes on the mainboard. Recommend thermal holes design: Φ0.25mm hole, 10×10.

(2) Bare Copper Manage: Extended large areas of copper with no green oil covered. The area covered by copper.

Junction of Cooling Pad and mainboard:

Coat Silicon Grease: To ensure the better contact should add right amount of silicon grease between the module pad and mainboard.

Notice: Thermal silicon grease should apply to production in temperature range of –55~85℃.

9、Precautions for use

9.1、Static Protection

(1) Module antistatic grade requirements

Antistatic grade requirements

Type of STATIC	Illustration	Max	Units
ESD_{HB}	Human body model	1000	V
ESD_{MM}	Mechanical model	600	V

(2) Turnaround toolbox requires the use of anti-static box turnover module, or directly using the module box to turn.

(3)When operating the module, the operator is required to wear an antistatic wrist strap, finger cuff, and the wrist strap is well grounded.

9.2、 Module storage

(1) Module requires room temperature storage, relative humidity ≤ 85%, surrounded by no acidic, alkaline or other corrosive gases

(2) Storage Require anti-static measures, such as placing in an electrostatic foam or in an antistatic box

9.3、Module welding

9.3.1、Preparation before welding

(1) It is recommended to clean the pad before soldering (cleaning with ethanol, after the ethanol is completely volatilized);

(2) Using manual welding, the operator requires an anti-static wrist strap, an anti-static finger cuff or glove;

(3) Soldering requires the use of 63Sn / 37Pb solder;

(4) Before welding, it is recommended to use a cotton swab dipped in an appropriate amount of no-clean flux (recommended no-clean flux HL-99) to be welded to the bottom of the module area, as well as customer motherboard area to be brushed, and flux does not flow to the surface. It is advisable to carry out the welding operation before the flux is volatilized。

If the rosin flux is used, it is recommended only the bottom of the module to be welded area and the mother-board to be welded area brushing, brushing the amount of only to be welded to the welding area is appropriate. For excess flux, use a cotton swab to remove.

Note: The module is strictly prohibited in the flux soaking.

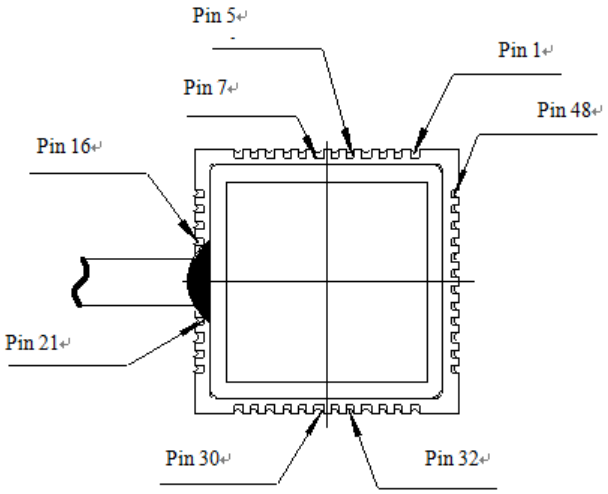
(4) When cleaning and welding, MT port must be capped.

9.3.2、Welding operation requirements

(1) During welding process, be sure to take anti-static protection, anti-static soldering iron (grounding resistance of less than 10 ohms); the operator with the requirements of anti-static wrist strap, anti-static level reached environmental S20.20 standard requirements Class I.

(2) A pointed solder tip is recommended, the tip temperature to ensure good heat transfer, requiring soldering (PCB pad in contact with the tip) solder point temperature at 1 ~ 3s kept within 260 ℃.

(3) The module need to be suppressed while welding, so that the module pin and the motherboard on the pad in full contact, to avoid rosin joint.



4-way parallel optical module pin diagram

(4) Recommended Soldering Sequence Requirements: 12-way optical module: Step 1: Solder the 7th to 10th pins in sequence; Step 2: Solder the 27th to 30th pins at once; Step 3: Re-solder the other pins.

4-way parallel optical module: Step 1: Solder the 5th to 7th pins in sequence; Step 2: Solder the 32nd to 30th

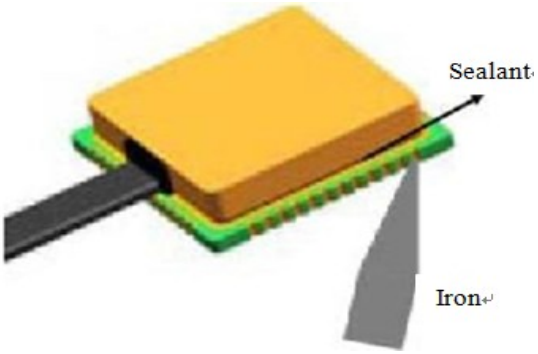
pins in turn; Step 3: Re-solder the other pins. Convenient for further anti-static protection be taken. (If customers use drag welding, be sure to ensure that anti-static, optical module location is accurate, to avoid even welding)

(5) The bottom of the pigtail 6 pads (16 to 21 pins) and the bottom of the large heat pad without welding;

(6) Single spot welding method is recommended, soldering iron each time try to lift the pad is less than 5s. If single point of welding is failed, 5s should be waited before next welding;

(7) Repeat the whole module no more than two times the number of welds, (allowing a chance Rework);

(8) When soldering, soldering iron tip along the LCC pin board and the board at the butt welding and iron tip is prohibited to touch the shell sealant, shell, fiber optic ribbon.



(9) After welding, cleaning.

9.3.3、Inspection processing after welding

(1) Welding quality requirements refer to IPC-A-610D;

(2) After soldering, check whether the power supply pin and ground pin are short-circuited before power-on.

9.4、Optical port clean, check before testing

(1) The optical interface requires cleaning with a cotton swab dipped in alcohol before testing. Wipe the method as follows:

Use a cleaned clean-cotton swab dipped in alcohol, wipe in one direction, rotate the cotton swab at the same time, cotton swab each wipe no more than 3 times. Plug after the alcohol volatile completely. Before plugging in, it is required to wipe the optical port of the connection jumper in the same way;

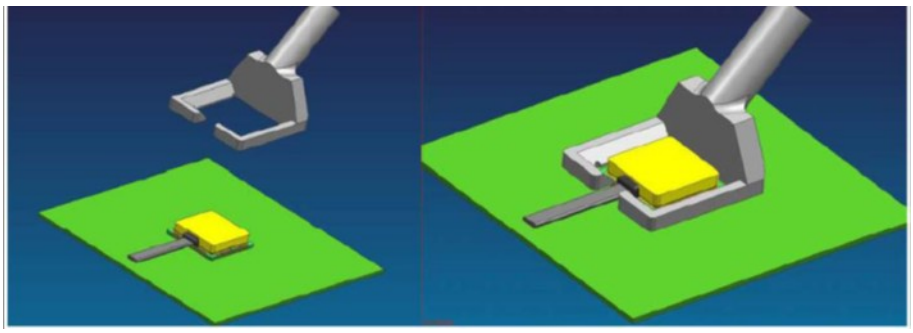
(2) Optical fiber inspection is recommended for inspection of the optical front: Fibkey 5600.

9.5、Removal of the module

(1) Removal of the module must be manual disassembly, the operator requires an antistatic wrist strap with an antistatic finger cuff or glove.

(2) During the disassembly, anti-static protection measures must be taken, anti-static tip (grounding resistance less than 10 ohms) must be used and environmental anti-static level requirements less than 100V;

(3) The square iron tip is used for disassembly, and the temperature of the soldering iron tip is good to ensure that the solder of the four welding faces of the module can be melted at the same time without damaging the optical fiber. The outline of the square tip is as follows:

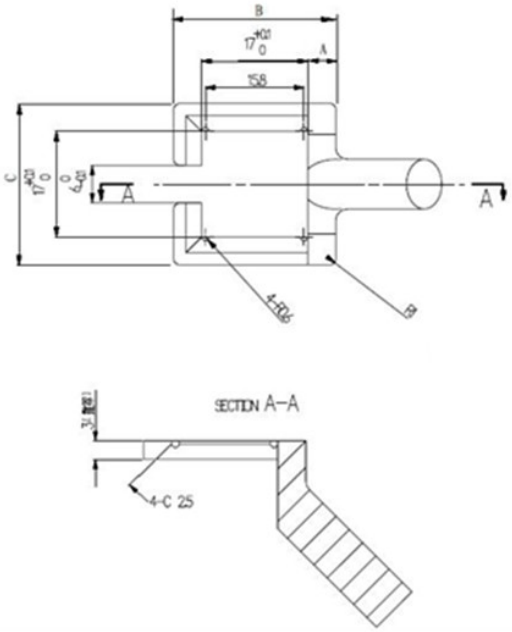


Demolition can be taken until the actual temperature of the soldering iron to reach the required temperature. It is recommended to set the disassembly temperature to 390 ° C and the actual temperature of the tip to be between 300 ° C and 320 ° C. If the actual temperature is not within this range, adjust the set temperature.

When welding, if the amount of solder is small, you need to solder the tip of the tip of the PCB with the inside of the module PCB to ensure that the tip of the soldering iron fully contacts with the solder joints. And the solder cannot overflow, stick on the cap.

(4) After the solder joints are melted, use tweezers to carefully clip the pigtail closure cap and remove the module.

(5) After cleaning the solder pad on the module to ensure that there is no short circuit between the pads and pads are flat.



Dimensional figure of square tip

Notes: The A B C size is determined by the user's layout space.

10、 Module Protection Requirements

10. 1 、Optical Interface Protection Requirements

(1) When the module is not in use, the optical interface requires wearing a dust cap;

(2) Before the test, the optical interface requires cleaning with a cotton swab dipped in alcohol.

(3) If the module that after welding need to spray three anti-paint modules, recommended using of non-volatile three anti-paints. Before spraying need to do further processing for the optical port, as follows: 3M high-temperature tape will pigtail MT/MPO side of the protective cap for secondary protection, the tape wrapped around the protective cap and pigtail position to form a seal.

10.2 、Electrical interface protection requirements

(1) The module required within 24 hours to complete the welding after demolition;

(2) The electrical interface of module prohibits hard scratches welding.

10.3 、Optical fiber ribbon and optical fiber connector

(1) Please do not look directly at the fiber optic ribbon outlet with eyes to prevent laser damage to the human eye;

(2) When connecting the pigtail, the pigtail naturally stretched, and can not be arbitrarily twisted pigtail;

(3) At low temperatures, the pigtail is brittle, not free to shake up and down, not twist the pigtail;

(4) At high temperatures, the pigtail will soften, not squeeze, pull, to prevent the pigtail deformation;

(5) The minimum bending radius of optical fiber is 20 times to 25 times the fiber diameter, generally no heat-shrinkable tube Ribbon fiber bending radius of 10mm ~ 15mm, with heat-shrinkable ribbon fiber bending radius of 20mm ~ 25mm, to avoid fiber bending and crimping.

(6) Pay attention to the protection of optical fiber connectors, when not in use, timely cover dust cover. In the process of assembly and use, strictly prohibited by hand or other sharp, unclean items touch fiber end face, in order to prevent the fiber end face dirty or scratched, thus affecting product performance.

11、 Common Fault Handling

Parallel optical transceiver module common failure modes and solutions are as follows:

Module	Failure phenomenon	Possible Causes	solution
Transmitter	No light output	1.Module power supply error 2.Fiber optic ribbon damage or light end block 3.Not enabled	a. Check the power supply of the module b. Red light and fiber end detection optical port c. Check the module enable control signal level
	Output optical power is out of range	Light end face contaminated	a. Using absorbent cotton swab plus absolute ethanol cleaning mouth b. Clean the mouth with clean paper
	Light output, but no eye output	Modulation signal loading exception	a. Check whether the modulation signal of the incoming optical module is normal or not b. Input signal level configuration is normal or not
	Alert alarm	The laser power supply or load signal is abnormal	
	IIC communication error	1.The level configuration is abnormal 2.Host computer BUG	a. Configuring the interface circuit according to a typical circuit b. PC software DEBUG

Receiver	Can not receive light	1.Module power supply error 2.Fiber optic ribbon damage or light end block	a. Check the power supply of the module b. Red light and fiber end detection optical port
	Receive sensitivity out of range	Light end face contaminated	a. Using absorbent cotton swab plus absolute ethanol cleaning mouth b. Clean the mouth with clean paper
	The output signal is abnormal	1.The received input signal is abnormal 2.Not enabled	a. Ensures the quality of the input signal entering the receiver b. Ensure that the module enable control signal level is correct
	RSSI No signal output	1.Fiber optic ribbon damage or light end block 2.Receiver Detector is damaged 3.Receiver chip or bond wire is abnormal	a. Red light and fiber end detection optical port b. It is strictly forbidden that the input optical power of the receiving end is too high, so as not to damage the detector
	SD Output level is abnormal	1.The received input signal is abnormal 2.SD signal pin damage	a. Ensures the quality of the input signal entering the receiver b. Configuring the interface circuit according to a typical circuit

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