



**福津光电**  
PHOTONSTREAM

Professional Manufacturer of  
Lensed Fiber & Optical Coating



**SHENZHEN  
PHOTONSTREAM LIMITED**



# COMPANY PROFILE

Photonstream Limited



PHOTONSTREAM Limited is a manufacturer of high quality optical fiber products for the medical, industrial and scientific applications.

Our core business is micro-fabrication of single mode, multimode, plastic-or hard polymer-clad silica, large core and special fibers, and base on the light transmission requirement, we design and deposit multiple optical dielectric thin films on the optics fiber end face to implement anti-reflection, band pass, high reflection or dichroic spectrum functions.

Success of clients serves as our mission. PHOTONSTREAM lays emphasis on "demand orientation and mutual sharing and growth". We hereby promise to satisfy market demands, and provide expected technical leadership and reliable high-quality products.







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Optical fiber micro-processing  
and thin film coating

## Micro-lensed Optical Fiber

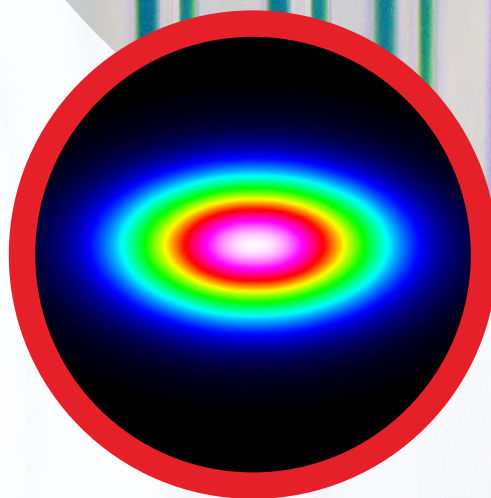
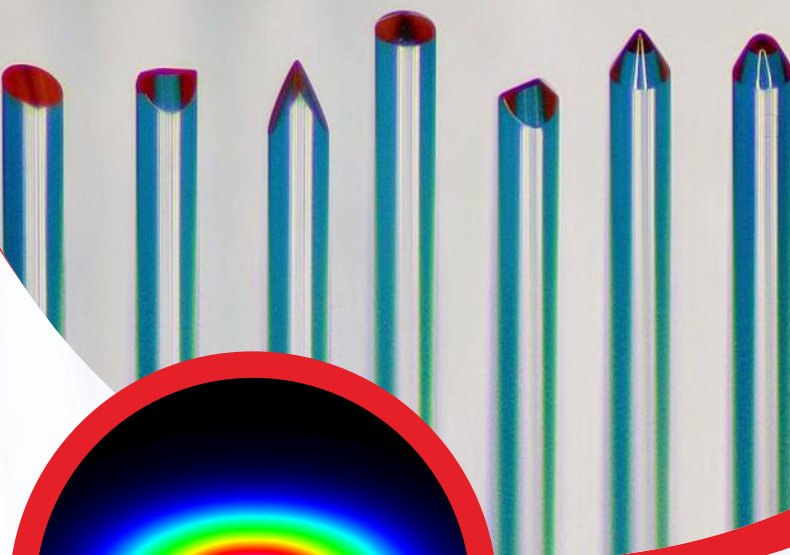
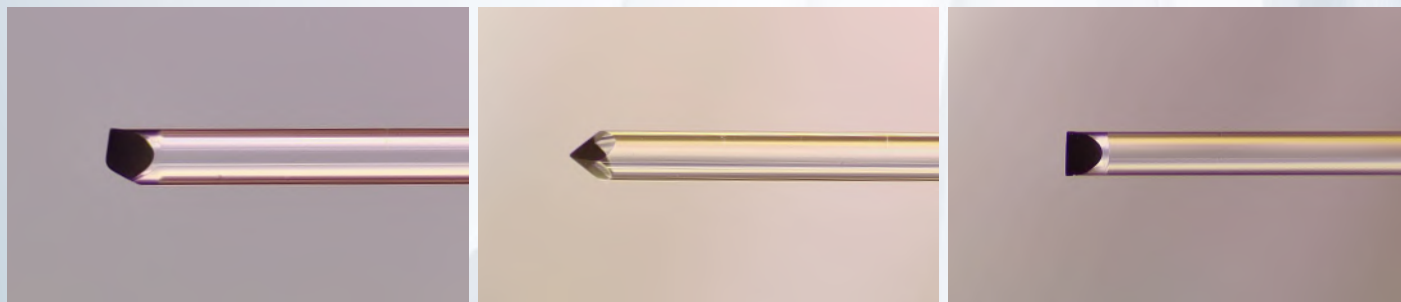
### ► INTRODUCTION

PHOTONSTREAM lensed fibers are manufactured by precisely grinding on the fiber tip to create the optimal light input/output for specific applications. An alternative technique has been incorporated to process the fiber tip to form a wedge or screw driver shape, and polishing a cylindrical or spherical lens on the fiber core to focus the beam in near field or expand the light NA in the far field.

### ► FEATURES

- ◆ Multiple fiber tip shape design for selection
- ◆ Spherical and cylindrical lens for different emitter coupling
- ◆ Available for different fiber core: SM fiber(80~125um cladding), MM fiber(125~1000um cladding )
- ◆ With output connector and loose tube is acceptable
- ◆ AR coated is required for high power laser

### ► PICTURES



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Tel: 0086-755-84166678

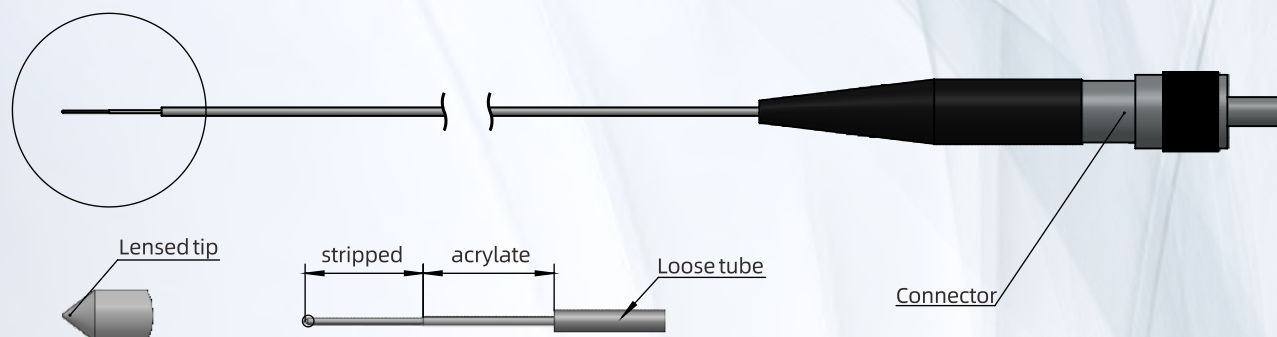
Fax: 0086-755-84560576

Web: [www.photonstream.com](http://www.photonstream.com)

Add: 2F,BLDG 6,#168,ChangshanIZ,

Liulian,Pingdi,Longgang District,Shenzhen,China

## DRAWING

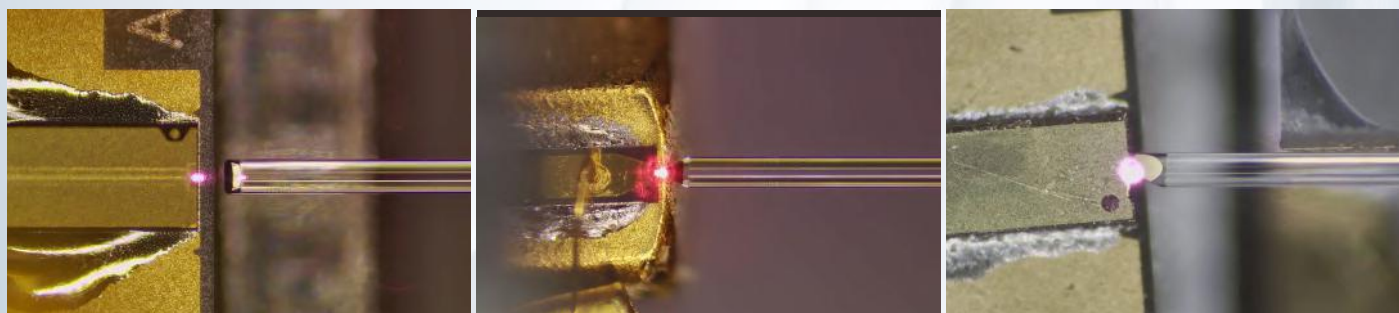


**Note:** The drawing here is only for reference, for real order please provide more detail information.

## LEN SHAPE FOR REFERENCE

1.Wedge	2.Angle wedge	3.Conical	4.PM fiber mark	5.Biconical
6.Tapered cone	7.Flat	8.Angle	9.Ball	10.Angle ball

## APPLICATION



Coupling to hi-power laser diode

Coupling to TO-CAN laser

Coupling to single mode laser diode

Optical fiber micro-processing  
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## Optical Fiber End Caps

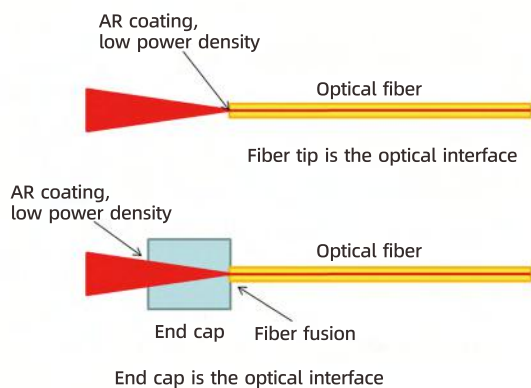
### INTRODUCTION

The end cap is a small piece of coreless quartz, which was spliced to the fiber tip to reduce the light intensity at the air-to-glass interface. But there is another design to fuse the graded-index (GRIN) fiber to the single mode fiber to obtain the collimated or focused light in the probe application.

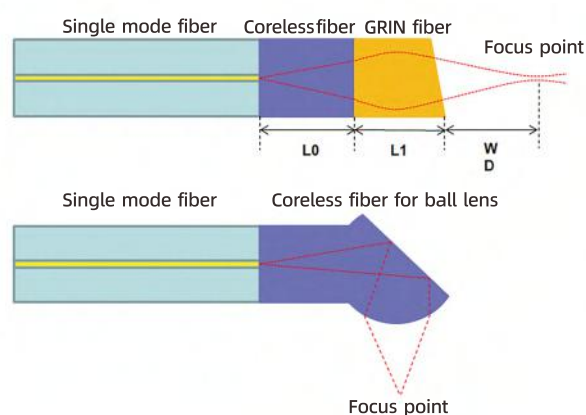
### FEATURES

- ◆ The fiber and end cap type can be custom define
- ◆ The end cap tolerance was precision control
- ◆ Excellent fusion quality with CO2 laser
- ◆ Multi segment end caps continuous splicing is accepted
- ◆ The end cap facet can be plane or angle polishing
- ◆ AR coated is optional

### OPTICAL ROAD MAP



High Power Laser End Cap



Optical Fiber Probe End Cap



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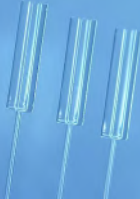

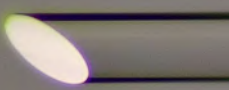
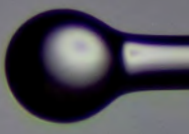

Liulian,Pingdi,Longgang District,Shenzhen,China

## ► SPECIFICATION



End cap type	QBH end cap/Laser coupling/Optical probe
Splice points	Less than 5 points
End cap material	Fused silicon quartz / Coreless fiber / GRIN fiber
End cap size	Custom define
Optical fiber type	SMF-28E/SM-Hi1060/MM-200-220-22NA/Other
Total length and stripped size	Custom define
AR coating design	$R < 0.2\%$ @ $CW \pm 25nm$ / custom define

**Note:** The specification here is only for reference, for each customized order, please provide more detail information.

## ► END CAP SHAPE FOR REFERENCE

End cap for QBH	End cap for laser source coupling	End cap with glass tube assembly
		
SMF+NCF+GRIN+Angle Polish	SMF+NCF + Ball Lens	SMF+NCF+ Angle Ball
		

## ► APPLICATION

		
QBH fiber connector	Hi-Power Laser Fiber Coupling	Ultra-small Optical Fiber Probe

Optical fiber micro-processing  
and thin film coating





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## High Power Laser Optics Fiber Tail

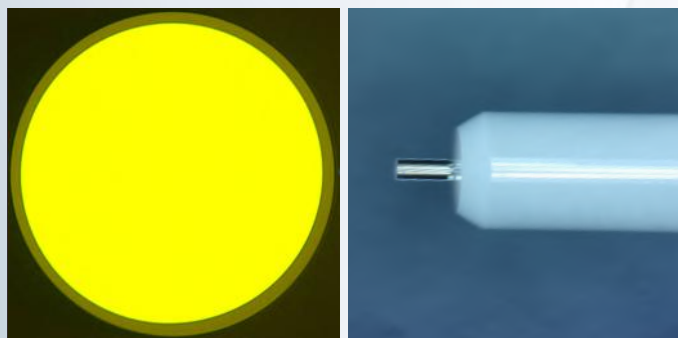
### ► INTRODUCTION

PHOTONSTREAM have developed special protruding optical fiber tail for high power laser product for 10 years, base on our super cleaning polishing and high reliability of AR coating technology, this fiber tail is competent for coupling hundreds watt of 9xxnm laser, which is the high brightness pump source for industrial fiberlaser.

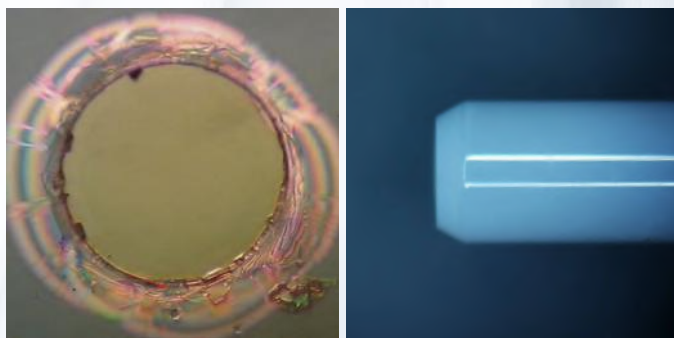
### ► FEATURES

- ◆ Fiber tip protruding design: no epoxy ring around the fiber tip; no multiple CTE substrate under the AR coating layer; no contamination float from ferrule area
- ◆ Special design for high power laser, high laser damage threshold of AR coating, lower absorption
- ◆ Super cleaning surface quality, compliance with MIL13830B the highest standard
- ◆ Output Connector: bare tip, standard FC, LC, ST or SMA905 and with loose tube is acceptable
- ◆ Multiple material of ferrule for selection: Ceramic, glass, kovar and copper ferrule

### ► PICTURES



Hi-reliability of protruding fiber tip



Epoxy ring in flat tip is easy burning and crack



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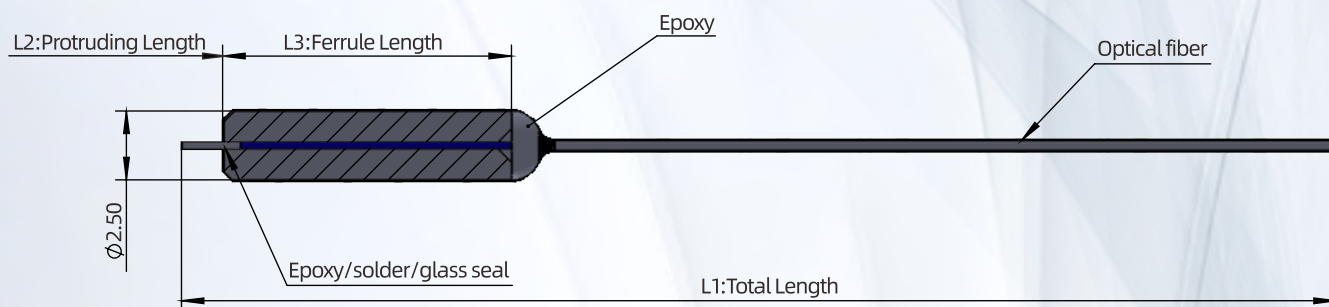
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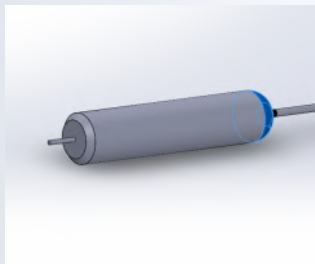
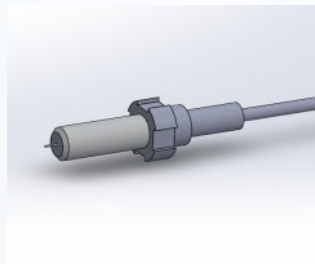



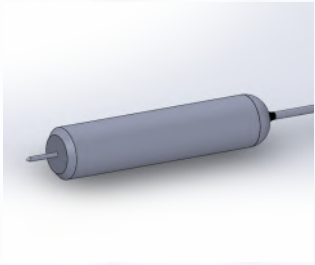
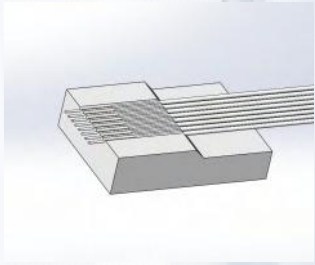
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## DRAWING



## HI-POWER FIBER TAIL DESIGN MODEL

Ceramic Ferrule	Ceramic Ferrules with Flange	Glass Ferrules	Kovar Tube with Metallized Fiber
			
End Cap	With Cladding Light Stripper	Lensed Fiber Assembly	Protruding Fiber Array
			

**Note:** (1)The drawing and parameters here is only for reference, the customer was required to provide detail drawing  
(2)AR coating for fiber tip or endcap is mandatory for high power

## APPLICATION



Optical fiber micro-processing  
and thin film coating





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## D80 Optical Fiber Cable

### ► INTRODUCTION

PHOTONATREAM produce high quality D80 cable in different fiber-core diameters from 200 microns to 1000 microns for high-power laser delivery, with our super precisely polished fiber end face and none epoxy surrounded design, the free standing fiber tip with good- heat-conducting copper ferrule assembly allows for hundred-watt of laser beam optical power coupling to a single core flexible D80 patch cable.

### ► FEATURES

- ◆ Free-standing fiber tip minimizes damage by uncoupled light, end-cap and sapphire design is for options
- ◆ High quality surface: visual inspection under 200X microscope.
- ◆ Copper ferrule with good heat-conducting
- ◆ AR coating is option for high power laser transition
- ◆ Compatible for other brands like Mitsubishi, Miyachi, Han's Laser

### ► PICTURES



Armored cable assembly



Fiber tip surface quality



Epoxy free design



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## ► D80 FIBER CABLE SPECIFICATION

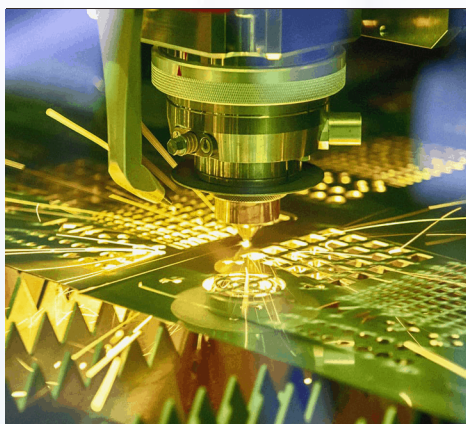
Fiber Core Diameter (μm)	200, 300, 400, 600, 800, 1000
Fiber Core Material	High purity fused silica (Low-OH)
Fiber Tip Design	Air gap as standard, sapphire and end-cap is option
Fiber Type	Step-index fiber as standard; Graded-index on request
Numerical Aperture (NA)	0.22 as standard, others on request
Operating Wavelength(nm)	400-2400
Protection Tube Diameter (mm)	8
Tube Color	Green/Yellow
Cable Lengths (m)	3, 5, 10, 20, etc. (customizable)
Anti-reflection Coating	R<0.2% @ CW ± 25nm or others on request

**Note:** The specification here is only for reference, for each customized order, please provide more detail information.

## ► APPLICATION



Laser welding



Laser cutting



High power laser transmission

Optical fiber micro-processing  
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## SMA905 Optical Fiber Cable

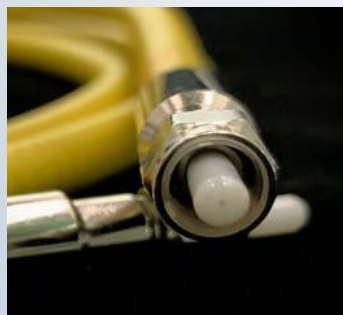
### ► INTRODUCTION

SMA905 optical fiber cable is terminal with standard flat or hi-power air gap ferrule connector. Assembly with large core energy optical fiber, this kind of SMA905 patch cord can connect to the semiconductor laser and solid laser. For different applications, Photonstream can provide various types of connectors ferrule and jacket protection, additionally we do the AR coating on the fiber tip for special request.

### ► FEATURES

- ◆ Various ferrule type and cable for selection
- ◆ Epoxy, air gap or sapphire protection are for different designs
- ◆ Precisely polished fiber end face
- ◆ Wide range of fiber core for selection(100um to 1000um), 0.22NA as Standard,others on request
- ◆ AR coating is optional

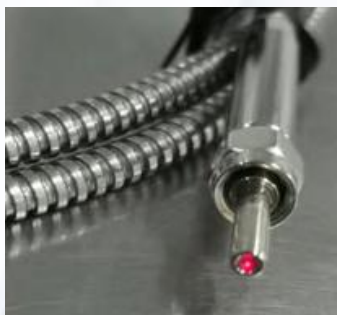
### ► PICTURES



Ceramic standardtip



Stainless standard tip



Cupronickel for air gap



Red copper with sapphire



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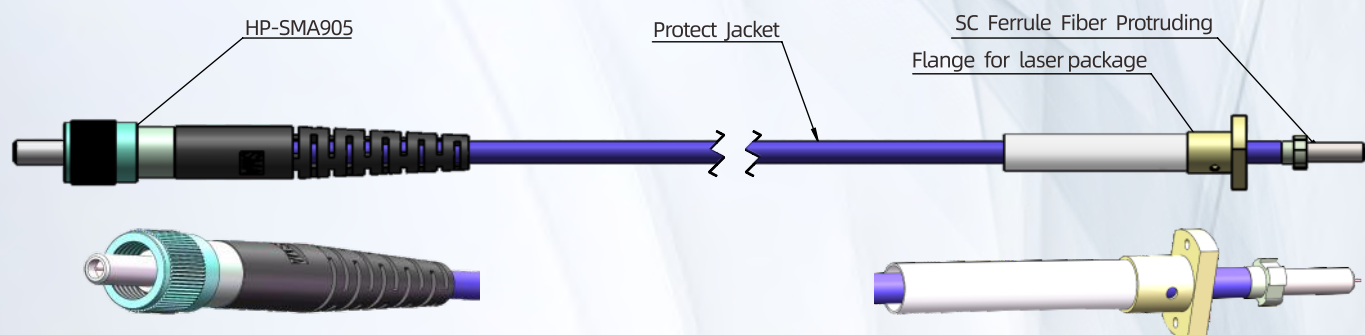
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## ► CUSTOM DESIGN DRAWING(HP-SMA905 TO FC-PROTRUDING)



## ► SMA905 CABLES SPECIFICATIONS

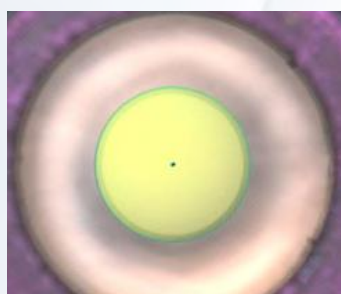
Fiber Core/Cladding Diameter (μm)	50/125 ~ 1000/1100um
SMA905 Connector Ferrule	Ceramic, Stainless Steel, Cupronicket , Red Copper
Fiber Tip Design	Air gap cantilever design (no epoxy surround design for high power) Telecom Standard flat design(epoxy surround)
Fiber Type	Step-index fiber as standard; Graded-index fiber on request
Protect Jacket	0.9~2mm Loose tube 3mm Kevlar tube / Stainless Armor 5~7mm Stainless Armor with PVC cover
Locking Nut	Knurled or Hex Locking Nut Connectors
Operating Wavelength (nm)	400-2400
Tube Color	Green/Yellow/Red/Black
Cable Lengths (m)	3, 5, 10, 20, etc. (customizable)
Anti-reflection Coating	R<0.2% @ CW±25nm or others on request

**Note:** The drawing here is only for reference, for each customized order, please provide more detail information.

## ► PICTURES OF HP-SMA905



Excellent Cleanness



Good concentricity



AR coating



Coupling to high power laser

Optical fiber micro-processing  
and thin film coating





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## Thin Film Coating for Optics Fiber

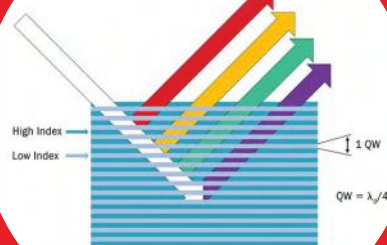
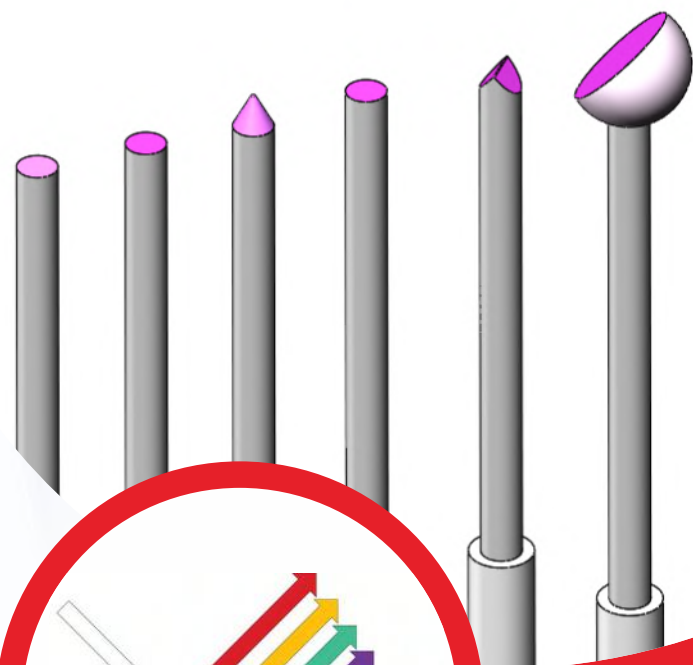
### ► INTRODUCTION

Like most of the optical elements, optical thin film deposition is necessary and applied on the glass substrate fiber tip. With different thickness and layer number design, we can obtain variety kinds of optical spectrum function like Anti-Reflection, Band Pass, High Reflection or Dichroic Mirror. With more than 10 years experience of optical fiber thin film coating, PHOTONSTREAM has develop state-of-the-art, the in-house Ion-Beam Assisted Deposition (IAD) process for precision, super cleaning surface quality and high damage threshold for mass optics fiber product with moderate costs.

### ► FEATURES

- ◆ Professional coating layer design
- ◆ Wide band for different wavelength
- ◆ High cleanness quality of fiber tip end face
- ◆ High laser damage threshold
- ◆ Suitable for different core of optics fiber
- ◆ AR coating is applicable for Lensed fiber, Fiber pigtail, cable and patch cord

### ► THE COATED FIBER SURFACE PICTURE



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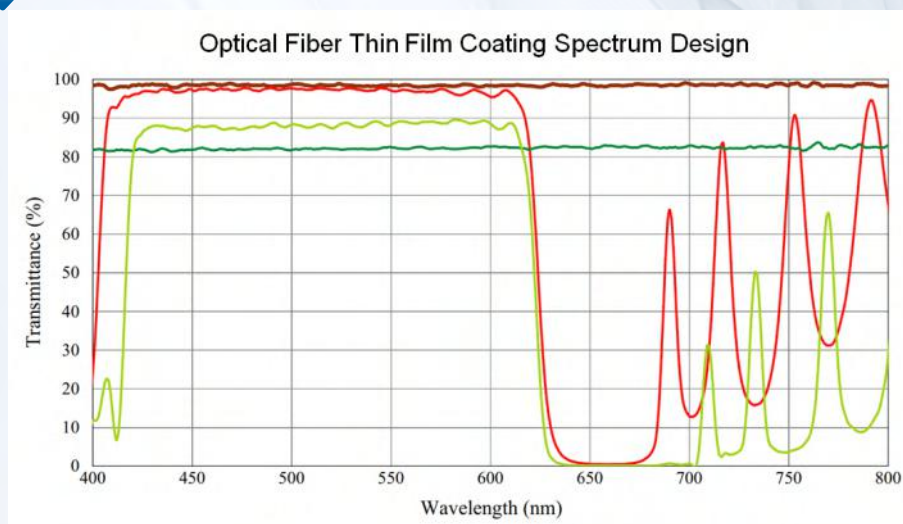
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## SPECIFICATIONS OF OPTICS FIBER THIN FILM COATING

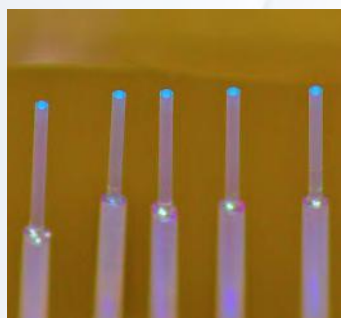
Parameter	Example
Optical coating specification	1.AR Coating: $R < 0.2\%$ @ $\lambda_1 \sim \lambda_2$ 2.HR Coating: $R > 99.9\%$ @ $\lambda_1 \sim \lambda_2$ 3.DR Coating: $R < 0.2\%$ @ $CW \pm 20nm$ , $R > 99.5\%$ @ $\lambda_1 \sim \lambda_2$ 4.Custom design
Optical fiber type	Bare fiber/pigtail/Patch cord
Operation WL	$CW \pm 20nm$
Length of cable	$X.X \pm 0.1meter$
Protect jacket or loose tube diameter	x.x mm Stainless Armor with PVC cover
Coating on single or both terminal	Both
Max temperature of cable	80°C
Max bending radius	<10cm
Other information	High vacuum impact

**Note:** The specification here is only for reference, for each customized order, please provide more detail information.

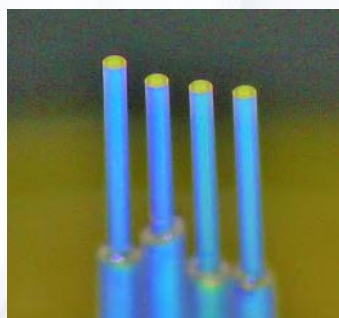
## OPTICS FIBER POST COATING SAMPLE



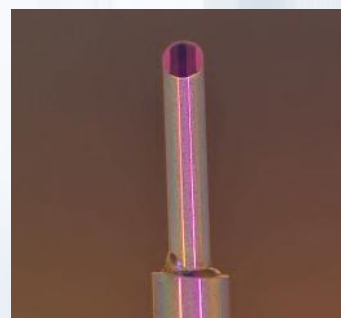
AR coating



Band Passcoating



Dicroic Coating



Hi-reflection coating





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## To-Can Laser + Lensed Fiber

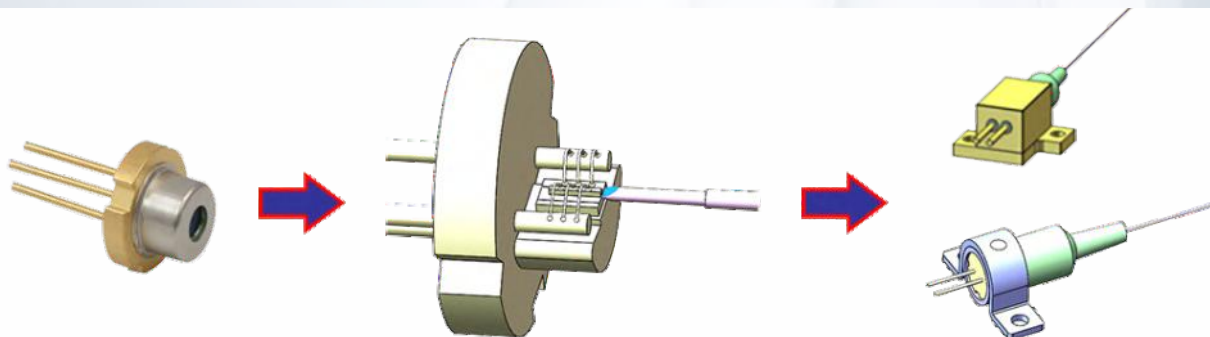
### ► INTRODUCTION

Photonstream offers a lensed fiber coupling to TO-Can diodes laser solution, base on this design we can align the lensed tip to the emitter directly without additional collimator and focus lens, for most TO5.6 and TO9.0, we can reform it to a fiber-coupled coaxial enclosure or planar package Laser.

### ► FEATURES

- ◆ Be available for all the TO5.6 and TO9.0 laser
- ◆ No wavelength limit
- ◆ Both applicable for single mode or multi-mode laser
- ◆ High power coupling efficiency >70%
- ◆ Cooper package, good heat dissipation
- ◆ Seal sealing for diode protection

### ► OPTICAL DESIGN CONCEPT



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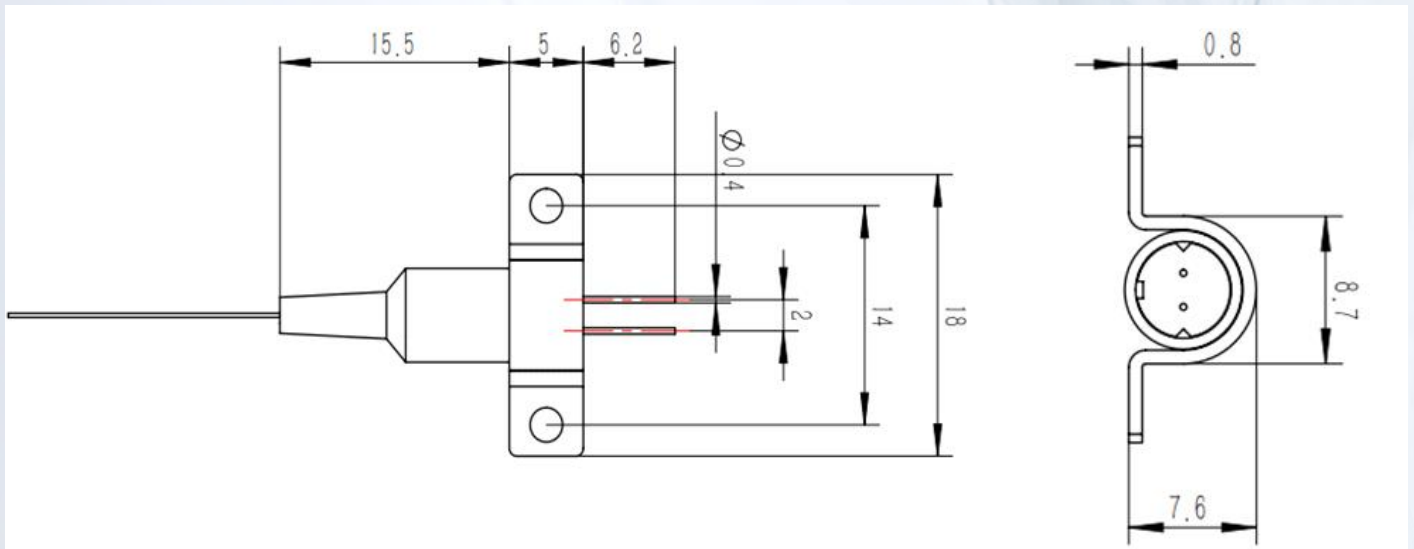
Add: 2F,BLDG 6,#168,ChangshanIZ,

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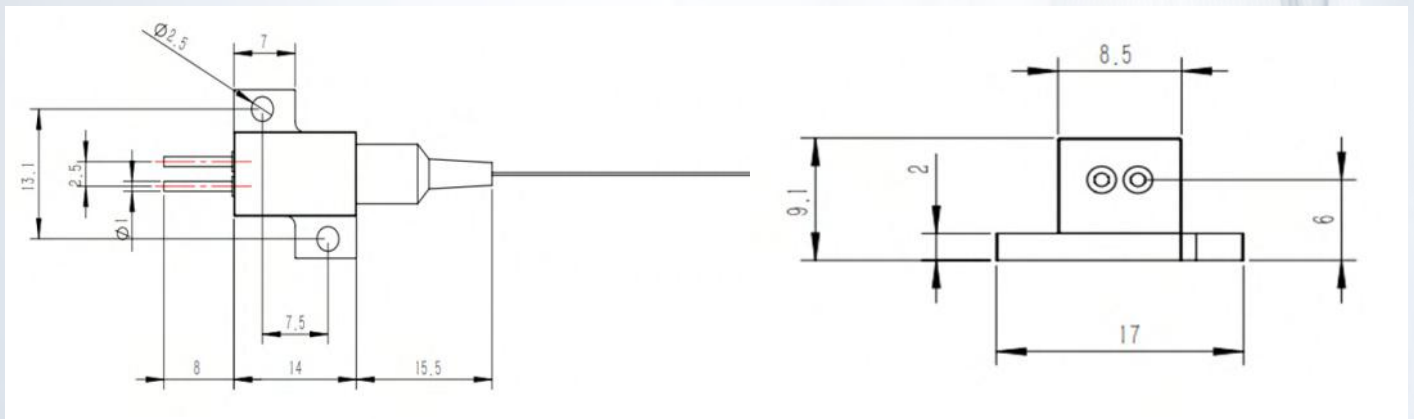


## ► PACKAGE DIMENSIONS

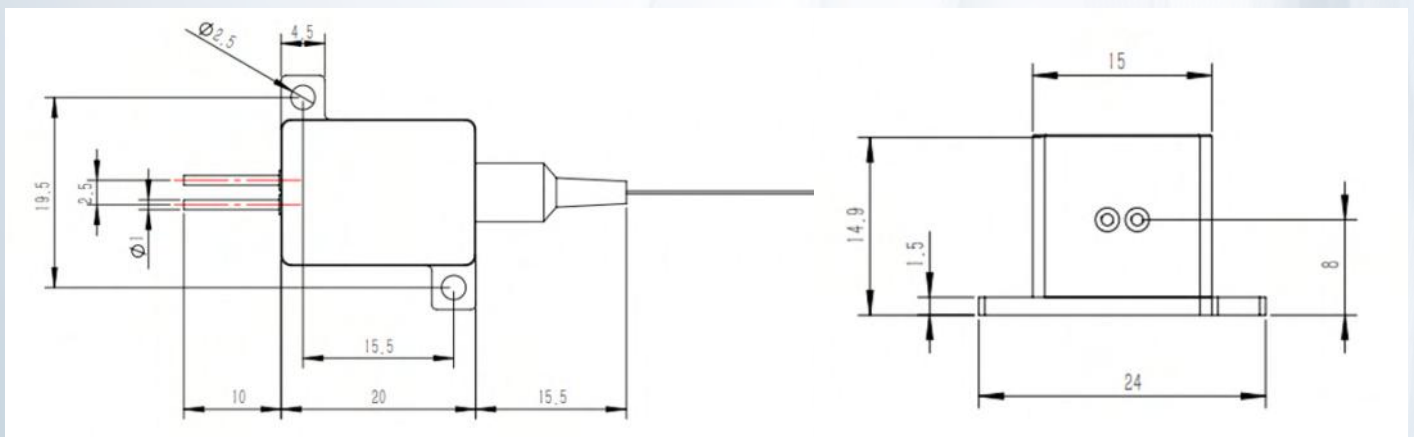
### 1. TO5.6 coaxial laser fiber coupling output package



### 2. TO-CAN 5.6 reform to planar package with fiber tail output



### 3. TO-CAN 9.0 reform to planar package with fiber tail output







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## Single COS Coupling to Fiber Tail

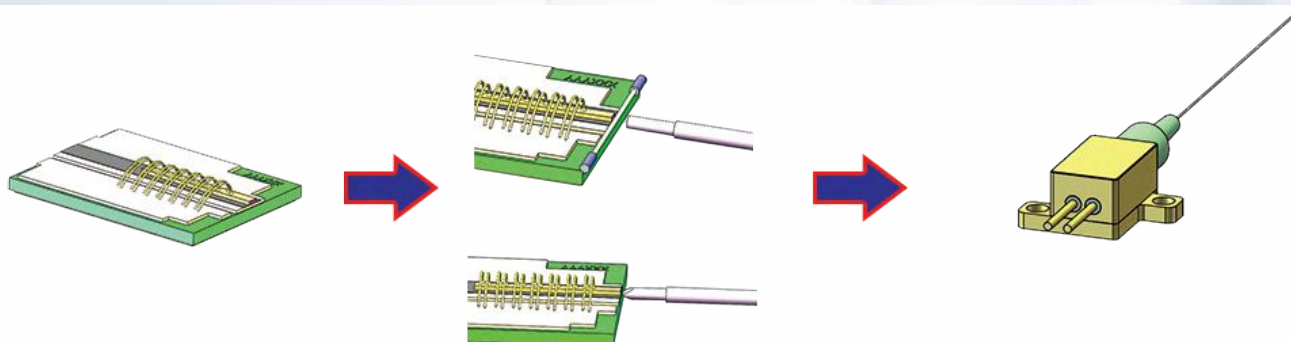
### ► INTRODUCTION

Photonstream offers the cost-effective fiber coupled single COS diode laser for medical telecom or LiDAR System. This single emitter coupling output is based on Photonstream in-house lensed fiber or fast axis collimator + AR coated fiber pigtail solution, this simplified design is cost effective and excellent reliability.

### ► FEATURES

- ◆ Simplified design for cost effective
- ◆ Applicable for most single diode package
- ◆ Small foot print and output connector is customizable
- ◆ Copper package, good heat dissipation and Seal sealing
- ◆ High reliability

### ► OPTICAL DESIGN



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## SPECIFICATION OF FIBER COUPLED LASER DIODE

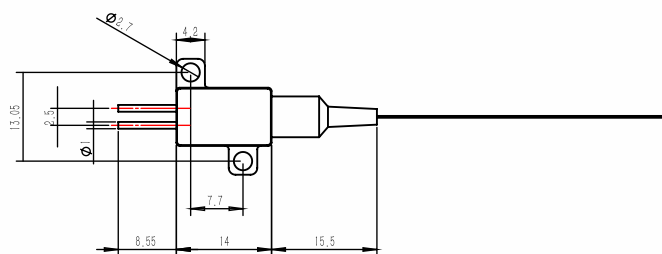
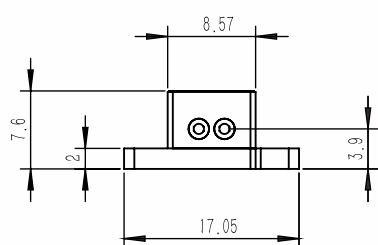
Specifications(25°C) (Take 940nm laser for model sample)		FX940-105C22NA-10.0W				
		Symbol	Unit	Min	Typical	Max
Optical Data(1)	Output Power	Po	W	10	-	-
	Center Wavelength	$\lambda_c$	nm	935	940	945
	Spectral Width(FWHM)	$\Delta\lambda$	nm	-	3.0	5.0
	Wave Length Shift with Temperature	$\Delta\lambda/\Delta T$	nm/°C	-	0.3	-
Electrical Data	Electrical-to-Optical Efficiency	PE	%	-	52	-
	Threshold Current	I <sub>th</sub>	A	-	1.2	-
	Operating Current	I <sub>op</sub>	a	-	12	13
	Operating Voltage	V <sub>op</sub>	V	-	1.6	1.8
	Slope Efficiency	$\eta$	W/A	-	0.9	-
Fiber Data	Core Diameter	D <sub>core</sub>	um	-	105	-
	Cladding Diameter	D <sub>clad</sub>	um	-	125	-
	Numeric Aperture	NA	-	-	0.22	-
	Fiber Length	-	m	-	1	-
	Loose Tube Diameter	-	mm	-	0.9	-
	Minimum Bending Radius	-	mm	50	-	-
	Output Fiber Termination	-	-	Bare tip or FC/APC Connector		
Feedback Isolation	Wavelength Range	-	nm	1500nm~1600nm		
	Isolation	I <sub>so</sub>	dB	-	30	-
Others	ESD(2)	V <sub>esd</sub>	V	-	-	500
	Storage Temperature(3)	T <sub>st</sub>	°C	-20	-	100
	Lead soldering Temp	T <sub>ls</sub>	°C	-	-	260
	Lead soldering Time	t	sec	-	-	10
	Operating Case Temperature	T <sub>op</sub>	-	0	-	75
	Relative Humidity	RH	%	15	-	85

(1) Data measured under operation output at 25°C

(2) A non-condensing environment is required for operation and storage.

(3) Operating temperature defined by the package case. Acceptable operating range is 15°C~35°C, but performance may vary.

## PACKAGE DIMENSIONS



Optical fiber micro-processing  
and thin film coating





**福津光电**  
PHOTONSTREAM

Optical fiber micro-processing  
and thin film coating

## Laser Diode Testing Board

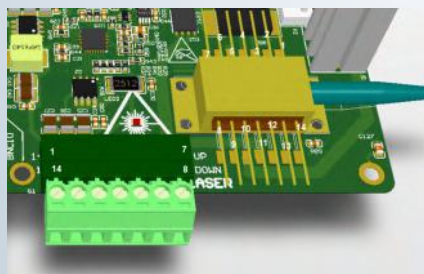
### INTRODUCTION

Photonstream develop a powerful laser diode testing board, this LDT-001B testing board is a combination of current source, temperature controller, and PD monitor. The current source provides a high stability output with a fully redundant current limit for laser protection features. The built-in temperature controller can work with 10K thermistor to deliver precise laser temperature control. In view of automation test, the LDT-001B integrated the Cypress advanced USB2.0 chips for the fast PC communication. For extension design, the LDT-001B provides multiple input and output ports for external synchronous acquisition.

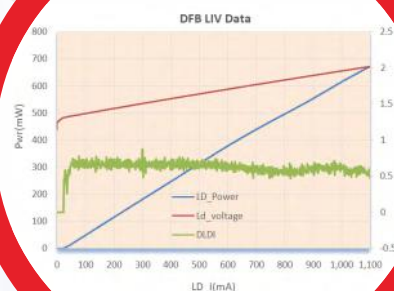
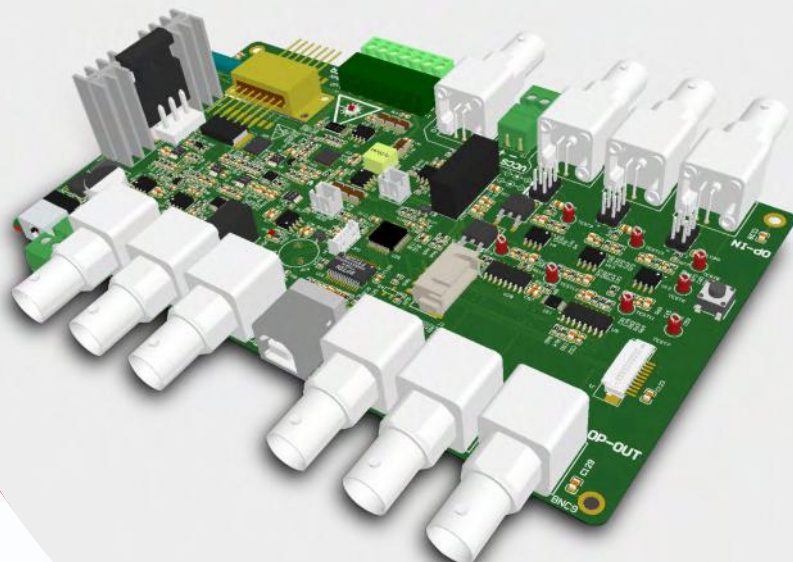
### FEATURES

- Precise current source control(0~2000mA, 1mA resolution )
- Laser voltage is compliance to LD current set(max to 5V)
- Wide range of temperature set point(15°C~45°C)
- Max TEC IV(3.0A, 5.0V)
- Current set point is via command setting or external analog modulation
- 6 channels for LD\_I, LD\_V, MPD, Power1, Power2 and Power3 for external acquisition
- Three optical power signal channels design for COS(Chip on Sub-mount) testing(Power, Far Field Scan)
- Each power measurement channel with 4 ranges
- USB2.0 for fast communication for acquisition
- Max TEC IV(3.0A, 5.0V)

### LASER PINS DEFINITION



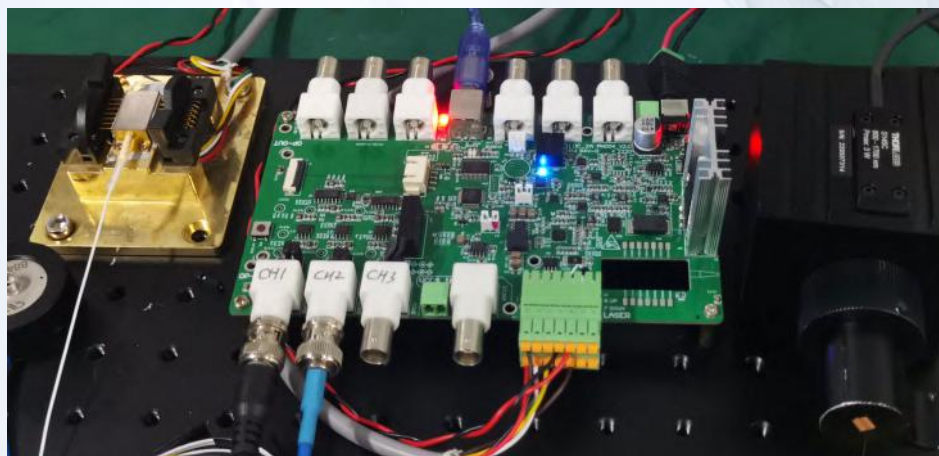
Pin#	1	2	3	4	5	6	7
Description	TEC+	Thermistor+	Monitor PD Anode	Monitor PD Cathode	Thermistor-	N/C	N/C
Pin#	8	9	10	11	12	13	14
Description	N/C	N/C	Laser Anode	Laser Cathode	N/C	N/C	TEC-



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## ▶ 980NM DFB BUTTERFLY LASER TEST PICTURE



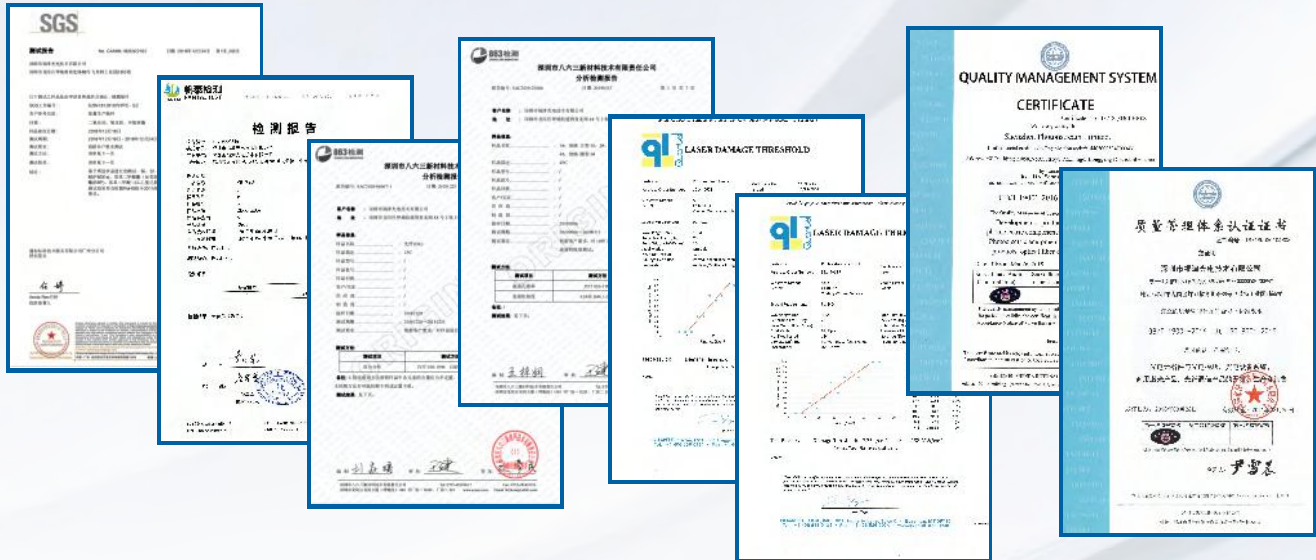
## ▶ COMMAND LIST

Command Set	Return String/Setting Instance	Function
IDN?	PUMP TESTER	Read product identify
LAS:OFF	LAS:OFF	turn laser off
LAS:ON	LAS:ON	turn laser on
LAS:LIM XXXX	LAS:LIM 2000	Set laser current limit (mA)
LAS:LDI XXXX	LAS:LDI 0100	Set laser current (mA)
LAS:LDI?	0100	Read laser current (mA)
LAS:LDV?	2052	Read laser voltage (mV)
LAS:MPD?	0011	Read MPD current(uA)
TEC:OFF	TEC:OFF	Dis-Enable TEC
TEC:ON	TEC:ON	Enable TEC
SET T XX	SET T 20	Input Temperature set point (°C)
TEC:T?	0025	Read Temperature (°C)
TEC:I?	+0052	Read TEC current (mA)
TEC:V?	-0068	Read TEC voltage (mV)
CH 1 RAW?	00123	Read Channel_1 data,123mW
CH 2 RAW?	00121	Read Channel_2 data,121mW
CH 3 RAW?	00120	Read Channel_3 data,120mW
CH X RNG X	CH 1 RNG 0	Set first range for channel one
CH 1 RNG?	3	Read Channel_1 range number
CH 2 RNG?	2	Read Channel_2 range number
CH 3 RNG?	1	Read Channel_3 range number
VCCS ON	VCCS ON	Turn On VCC (only for firmware debug)
VCCS OFF	VCCS OFF	Turn OFF VCC (default setting)
LAS:DATA?	0308;2256;00123;0011;0024	Return data of LDI; LDV; CH1 RAW; MPD; TEC:T. Data separated by comma





# CERTIFICATIONS





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