

## **Focuslight Corporate Overview**

© Focuslight Technologies Inc.

## **Focuslight Overview**



- Founded in 2007 by Dr. Victor X. Liu, headquartered in Xi'an, China.
- A fast-growing company that develops and manufactures:
  - High-power diode laser components and materials (Photon Generation)
  - Laser optics components (Photon Control)
  - Photonics module and system solutions (Application Solutions) focusing on optical communication, automotive, pan-semiconductor, and medical and health applications.
- A **global photonics foundry** offering process development and manufacturing services to the global photonics community.
- Publicly listed in the Shanghai Stock Exchange (Ticker Symbol: 688167).











### **Milestones**







2023

Line Beam LiDAR Transmitter Module awarded nomination from **European Tier 1** 



2024

Acquisition of ams OSRAM's optical component assets;

Adopt Heptagon brand for global photonics foundry services



2019

**Automotive LiDAR** transmitter project awarded from

international Tier 1

**IPO** 

Acquisition of 2021 SUSS MicroOptics

**SUSS** MicroOptics

2024

Successful IPO at Shanghai Stock Market



2019

2019

Production of micro-

optics on world's

(300 x 300 mm<sup>2</sup>)

largest glass wafer

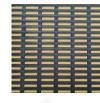
Global branding identity upgrade



**FOCUSLIGHT** 

2013

World's first monograph on packaging of **HPDL** published



2017

won Prism Award Technology breakthrough of goldtin film deposition



2018

and high-volume officially in operation



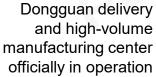
2018

**UV-L750 Ultraviolet** 

Line Laser System

Acquisition of LIMO;

Started providing photon control and photonics application solutions

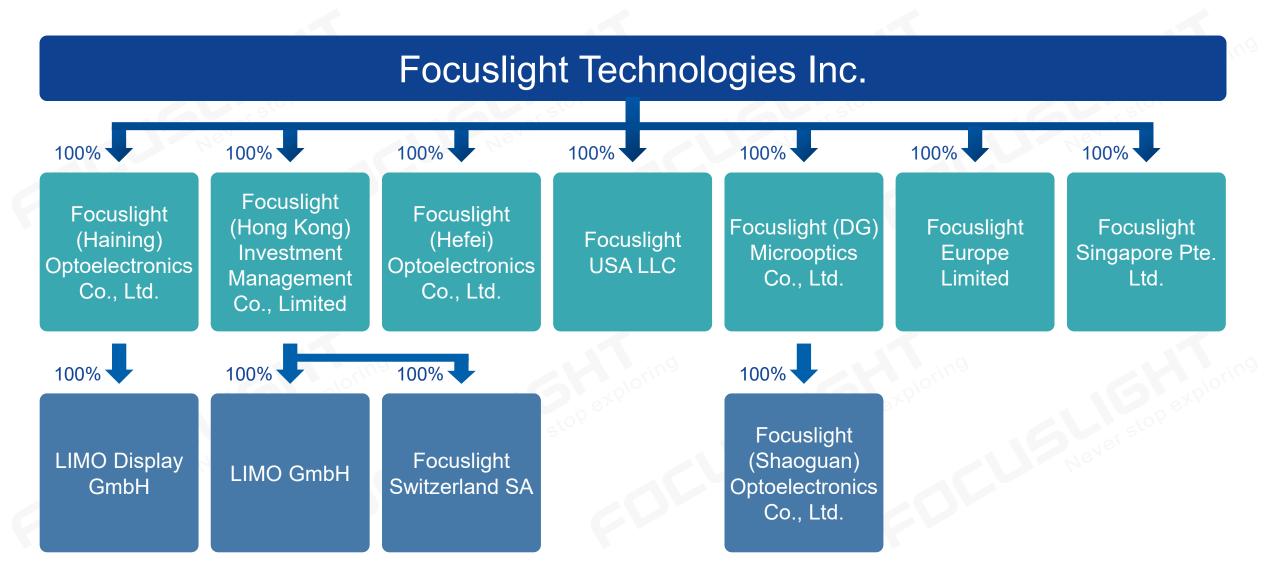


2007

Founding of Focuslight

## **Focuslight Corporate and Subsidiaries**





## **Focuslight Global Operations System**



Leverage the strengths and capabilities of each location to cater to specific customer demands and optimize operational efficiency.

Through centralized decision-making, integrated operations, and lean management, a high-efficiency, low-cost global operations system is established.



Neuchâtel, Switzerland Operations Center



Dortmund, Germany
Operations Center



Xi'an, China Focuslight HQ, Operations Center



Silicon Valley, USA Innovation Lab



Zurich, Switzerland R&D Office

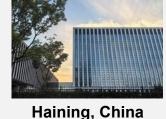


Ang Mo Kio (AMK), Singapore
Operations Center
Business Center

Other Southeast Asian regions (to be decided)
Photonics Foundry



Shaoguan, China Operations Center



Haining, China
Hefei, China
Operations Center
(being constructed)



Dongguan, China Operations Center

## **Key Facts & Figures**





**Employees** 

>900



Yearly Revenue Proportion Invested into R&D

~16%



Last Year (2023) Revenue

**561M** RMB



Patents Valid Worldwide

>610



**Facility Worldwide** 

>48,000m<sup>2</sup>

Clean Room Worldwide

>14,000m<sup>2</sup>



ISO 9001

ISO 14001

ISO 45001

IATF 16949

Certified

## **Corporate Management Team**





Dr. Xingsheng Liu (Victor) Chairman, CEO

Research and management experience in the US, with 100+ publications, 300+ patents, 30+ invited papers internationally

Committee Member of SPIE and IEEE



Dr. Chung-En Zah CTO

30+ years of research experience in the US, with 300+ publications, 50+ patents in optoelectronics and telecommunication

IEEE Fellow, OSA Fellow, 2x R&D 100 award winner



Dr. Reinhard Voelkel **Chief Strategy Officer** 

35+ years of professional experience in the field of micro-optics, with expertise in strategic leadership, business development, and innovation





















Mr. Sinclair Vass

Corporate SVP of International Sales & Business Development

CORNING \*COHERENT n L I G H T

35+ years experience in international photonics markets, having held technical, commercial and general management leadership roles at major multinational companies













Mr. Guowei Zhu (Gavin)

Corporate VP of Quality, President of Automotive BU

20+ years in international automotive companies, rich experience in IATF QMS and plant operations management by World Class Manufacturing (WCM) & Lean manufacturing









Mr. Tan Chee Huo (Michael) Corporate SVP of Business Process

and IT

25+ years in IT leadership, specializes in digital business transformation, global project management, multicultural team leadership in fast-paced international industries, and strategic decision-making



ThermoFisher Tupperware EVIDENT



Mr. Ye Dai (Robert)

Corporate VP of Global Sales

Excellent track record in worldwide sales. product line and business unit management leadership roles

20+ patents granted



Ms. Yiping Ye (Alison) Board Director, CFO

Over 15 years management experience and multi-field business practices

In-depth understanding in LTC, IPD, intercultural cooperation and rich operational experience in market development, project operation and business management







Mr. Qichuan Yu

Chief Product/Process Officer

Over 25 years of experience in wafer-level optics, optical sensor and camera packaging, SAW/BAW filter R&D, and NPD execution, with a strong focus on mastering, tooling, and wafer-level processes















BU: Business Unit

## **Corporate Management Team**





Ms. Xuefeng Zhang (Jennifer)

Board Secretary, Marketing Director

14 years photonics industry international business experience

In-depth understanding and rich experience in sales, marketing and business development



Mr. Jian Zhang (Lucas) **Director of Global Operations Centers** 

20 years of global supply chain management experience at multiple Fortune 500 companies, with strong expertise in in supply chain planning and management within the consumer electronics industry









Mr. Jinchao Qu

President of Diode Laser BU, President of Medical & Health BU

Extensive years of product marketing and sales management experience

Outstanding track record in previous roles as Asia Sales Director and Head of the Application Systems Special Task Force



Mr. Dirk Walter Bogs President of Laser Optics BU

Over 25 years' experience in ultra-precision tooling, optic manufacturing, engineering & project management, and operational management Very deep knowledge of technology development and optimization

LIMO



VP of Laser Optics BU

20+ years of operation & R&D management, very deep knowledge with organic optical materials and optical coating technology, published SCI articles and owns patented technologies

Experienced in Lean Manufacturing & Industry 4.0



### Mr. Weiyi Gu

President of Pan-Semiconductor Solutions BU

12 years experience in photonics R&D and product management, with rich track records of leaderships in developing and delivering system solutions for pan-semiconductor and industrial applications





Vice President of Strategic Growth Division

15+ years of experience in micro-optical component development for the consumer market. Expert in design for manufacturing and process development, with a strong focus on high-volume production and yield improvement



### Mr. Hongyuan Liu (Tom)

President of Global Photonics Foundry BU

20+ years in R&D and operations management, specializing in optical imaging and non-imaging system design, WLO process & integration, and optical component manufacturing. Proven track record in new product development and scaling high-volume production







ALSTOM SIEMENS



am osram

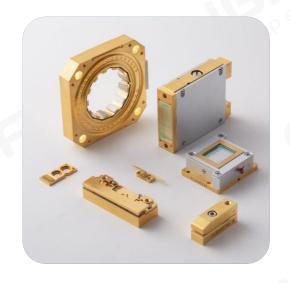
UNISTEEL • flex



BU: Business Unit

### **Products and Businesses**











Photon Generation



Photon Control



Photonics
Application
Solutions



Global Photonics Foundry

### **Markets**





<sup>\*</sup> Based on accumulated revenue data from 2024 Q1 - Q3

## **Value Proposition**



### Total Solution and Service in Full Value Chain

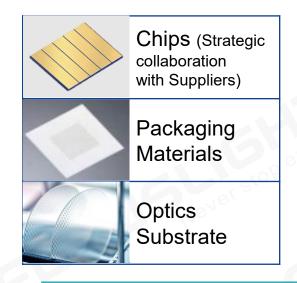
Raw Materials

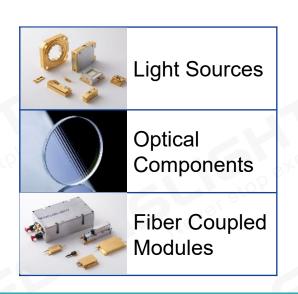
Components, Devices

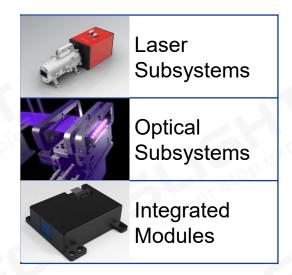
Modules, Subsystems, Application Systems

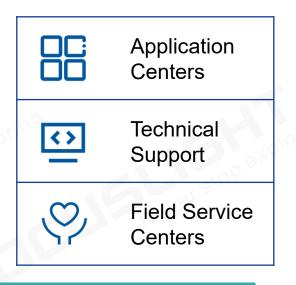
Systems

Solution, Support, Service









Industry Leader + Strong Financial Backing + Healthy Stable Company + Invest in the Future

## **Value Proposition**





Do what we do best

Offer the best value

Optimize to the extreme

Achieve the best performance / quality-to-price ratio

### **Commitment to Customers**

- Lowest cost manufacturing for high volume products
- Willing to take technical risk, but need customer to commit market
- Willing to take investment risk in R&D and capital including M&A for customer on the condition of customer commitment of market share
- Collaboration transparency, fast response, IP protection and longterm partnership



What we don't do

Take high market risk

Being greedy

Being too aggressive

Compete against customers



### **Mission**





Be the global trusted photonics solution provider through innovation, manufacturing excellence and fast response

## **Branding**





All Focuslight-designed products and business lines will be marketed globally under the Focuslight brand to streamline operations and create synergies.



Foundry services that convert customers' ideas and designs into their own products and solutions will be marketed under the Heptagon brand.

## **Company Organization**



### **Focuslight Technologies**

**Diode Laser Business Unit** 

Laser Optics Business Unit

**Automotive Business Unit** 

Pan-Semiconductor Solutions Business Unit

Medical & Health Business Unit

Strategic Growth Division

Global Photonics Foundry Business Unit

Centralized Corporate Functions + Shared Service Center

## **Products - Diode Laser Components**

FOCUSLIGHT

Never stop exploring

**Under Focuslight Brand** 



#### **Advanced Materials**

- AuSn Pre-Deposited AlN Ceramic Submounts
- AuSn Pre-Deposited CuW Submounts
- Thin Film Metallization Service



### **Active Devices**

- Single Emitter Components
- Single Bar Components
- Micro-Channel Cooled Stacks
- Conduction Cooled Stacks
- Pumped Modules



### **Fiber Coupled Modules**

- Emitter-Based FCM
- Bar-Based FCM



## **Professional Medical Application Components**

Laser Hair Removal Engines

## **Products - Laser Optics Components**



**Under Focuslight Brand** 

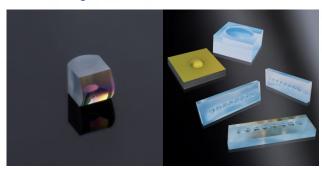
### **Single Lenses and Linear Lens Arrays**

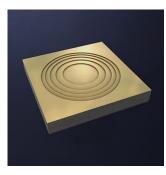












FAC

SAC

SAC array

**BTS** 

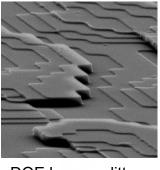
Fiber coupler and collimator

Collimating DOE

### **Area Lens Arrays**



Homogenizer and diffuser



DOE beam splitter, dot or line generator



Shack-Hartmann array

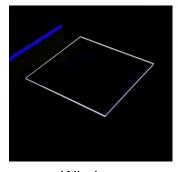


Pinhole array

### **Plano Optics and Coatings**







Window

## **Products - Automotive Application Solutions**



**Under Focuslight Brand** 

#### Flash LiDAR Transmitter Modules

**AX02 Pro** (Engineering Sample)



VCSEL Flash Transmitter 700W

#### **Line Beam LiDAR Transmitter Modules**

**LE02 Pro** (Engineering Sample)



905nm 700W EEL Line Beam Transmitter

**LX02** (Engineering Sample)



VCSEL Line Transmitter 1000W

### **Optical Components and Assemblies for Automotive**

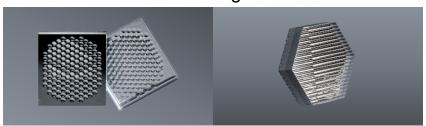
**EEL FAC Collimators** 



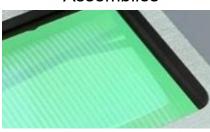
Auto-grade Diffusers and Homogenizers



Optics for Automotive Projected Lighting and Headlight



Customized Optical
Assemblies



## **Products - Pan-Semiconductor Application Solutions**



**Under Focuslight Brand** 

Solid-State Laser Lift-Off (LLO) System

### **Advanced Display Manufacturing Solutions**



Solid-State Laser Annealing (SLA) System



Variable Beam Laser System (Mini and Micro LED Processing)

### **IC Manufacturing Processing**



IC Wafer Annealing System



Variable Beam Laser System (Advanced Chip Packaging)

### **Industrial Solutions**



IR Line System



Industrial Laser Module

## **Products - Medical and Health Application Solutions**



**Under Focuslight Brand** 

Laser Hair Removal Modules



Laser Skin Rejuvenation Modules



Laser Body Sculpting Modules



**Diode Laser Drivers** 



## **Global Photonics Foundry Services**

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Under Heptagon Brand



### DFM\* Stage

Outcome: Fullfleshed Design for WLO-Technology, Manufacturability and Risk Analysis

\*DFM: Design For Manufacturing

## Product Validation & Qualification Q

Outcome: 2<sup>nd</sup> or x<sup>th</sup> Gen working samples, Creation of Product Documentation (e.g. delivery req. specifications, drawings, technical datasheets etc.), cost analysis

#### **Mass Production**

WLO Components fully compliant according to Product Requirements and Test Specs.

## Design Feasibility Study

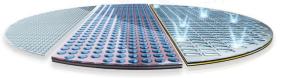
Outcome: Concept & prelim. Design (fulfilling requirements, dimensions, est. cost),

### Design Verification / POC Stage

Outcome: 1st Gen Working Samples manufactured, testing data results for e.g. yield analysis

### Ramp-Up

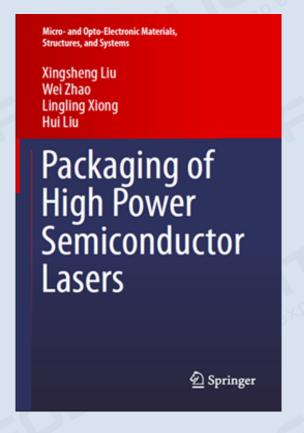
Wafer Level Optics (WLO)



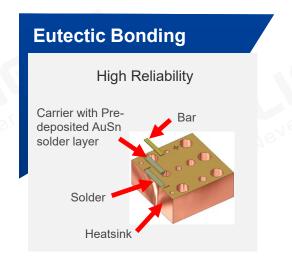
Work with Us – From Concept to Mass Production

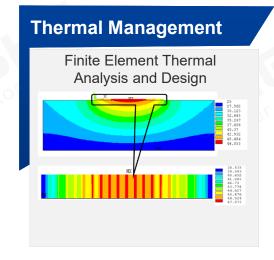


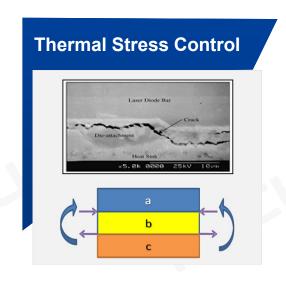
Diode Laser

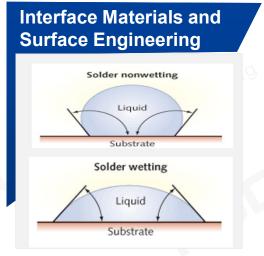


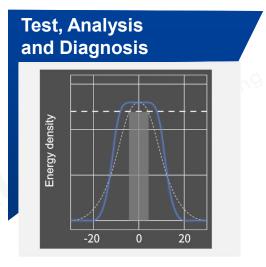






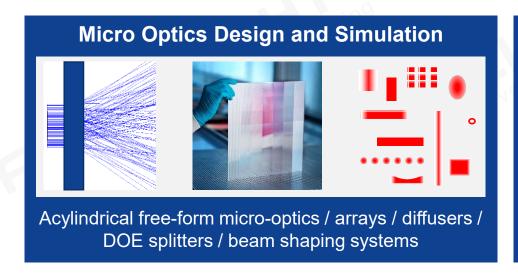


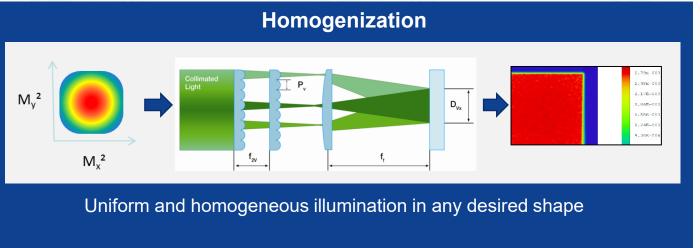


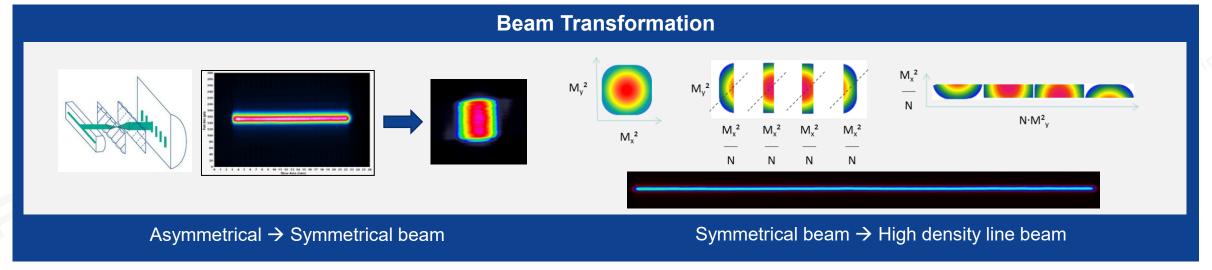




Beam Shaping – The Right Photon at the Right Place and Time!

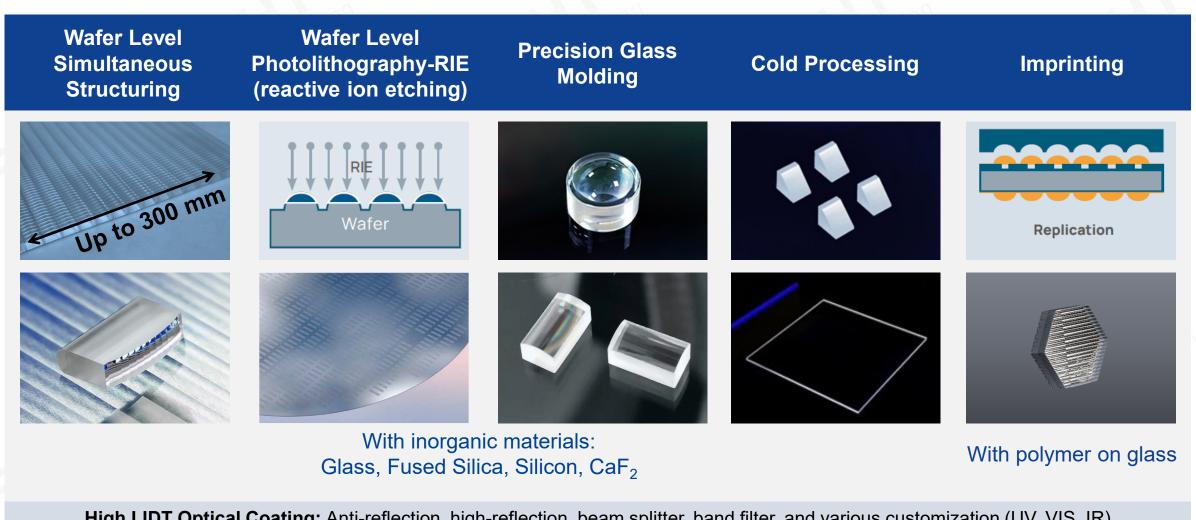








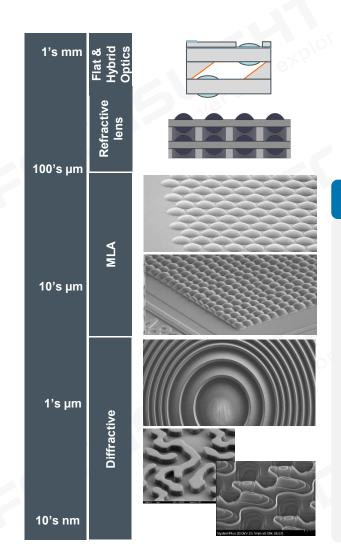
**Optics Manufacturing** 



High LIDT Optical Coating: Anti-reflection, high-reflection, beam splitter, band filter, and various customization (UV, VIS, IR)

**FOCUSLIGHT** 

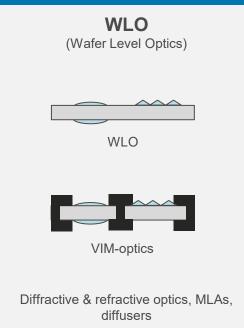
Wafer Level Optics and Stacking

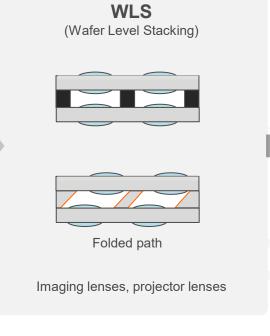


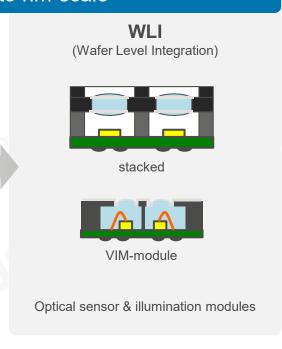
## Wafer-Level Optics, Electronics, Packaging, Integration, Testing and Processing



### Wafer-level imprinted optics from mm down to nm-scale

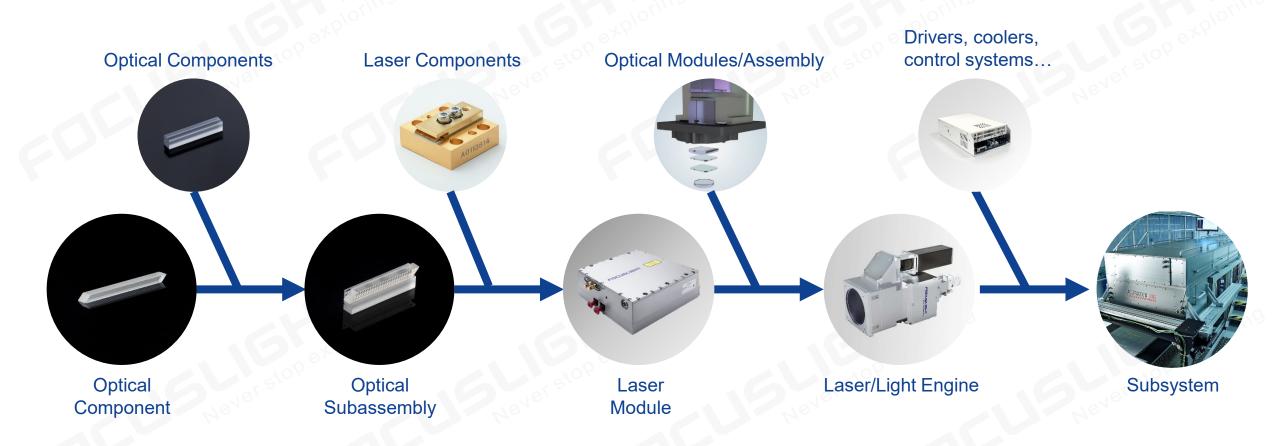








High Precision Optical Assembling Process and in-house Equipment: From Components to Subsystems



## A Unified QM System in the Corporate Ensures Reliable and Premium Products



ISO9001 Certified Quality Management System (QMS)

ISO14001 Certified Environmental Management System (EMS)

IATF16949 Certified Automotive Quality Management System

ISO45001 Certified Occupational Health and Safety Management System

Failure Mode and Effect Analysis (FMEA)

Statistical Process Control (SPC)

Production Traceability Database

Control Plan (CP)



## **Quality Assurance System**



Assurance of Design Quality	Design of the Optimal Design Quality to Meet Customer Needs	Assurance of Manufacturing Quality		Built-in C Design C	•
NPI / APQP		Mass Production		RMA / Warranty	
Planning	Research & Development  Production Eng	ineering			
	T Todastion Eng		Manufacture		

Promotion of Consistent Quality Assurance Activities							
Quality Control System of Design	Quality Control System of Manufacture		Quality Control Evaluation System				
<ul> <li>QFD</li> <li>Critical Characteristic, Special Characteristics</li> <li>Tolerance Chain Design</li> <li>FMEA, FTA</li> <li>Design Validation</li> <li>Design Review</li> </ul>	<ul> <li>Parameter design</li> <li>Process FMEA</li> <li>Process Capability Study</li> <li>Automatic Inspection,</li> <li>Poka Yoke / Error Proof</li> <li>Measurement System Analysis</li> </ul>	<ul> <li>QA Network</li> <li>Supplier Quality Management</li> <li>Production Validation</li> <li>Control Plan</li> <li>QC Circles</li> <li>Production Part Approval Process</li> </ul>	<ul> <li>QC diagnosis</li> <li>Quality assurance Meeting</li> <li>Quality Auditing Improvement Meeting</li> </ul>				

## Focuslight Manufacturing System (FLMS)



### **FLMS**

Continually exceed customer's increasing expectations

Manufacting Excellence in Safety, Quality, Cost and Delivery

Just-in-Time Production Adaptable to High Safety, Morale & Productivity Zero Defects Produced Demand Six Sigma Product Quality Lean Material Flow People Human Error **Andon Real Time Error Proofing** Pull Systems **Balanced Line Visual Control** "Poke-yoke" "Kanban" One Piece Flow Management Control **Production Levelling** Flexible Workforce **Build in Quality** Flow Flexible Recognition Process Capability **Total Productive** Standardized Multi Skill 6 Sigma Methods Systems Maintenance Work Layout Minimize Material Handling Manufacturing Training System **Automation** 

Gemba, Challenge, Continuous Improvement

**Leadership** Driving, Teamwork, Respect

Philosophy Absolute Customer Focus, Quality First, Zero Tolerance for Waste

## **Manufacturing Excellence**



- Apply the lean manufacturing practices to all production lines, including automotive, diode laser and laser optics business
- Absolute customer focus, zero tolerance of waste, and continuous improvement philosophy
- Significantly reduced cycle time, improved manufacturing efficiency, and lowered RMA yield and manufacturing cost.
- Adopting automation and advanced production management system
- SOP of the first LiDAR transmitter project with an international automotive tier 1 customer
- IATF 16949 certified and VDA 6.3 audited





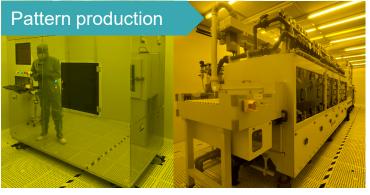
**Advanced Materials** 

### 10+ years high-volume manufacturing experiences + self-owned core technologies



















FOCUSLIGHT

Never stop exploring

**Diode Laser Components** 











Diode Laser Manufacturing Capacity > 500K pcs / year Burn-in Capacity 600K pcs / year

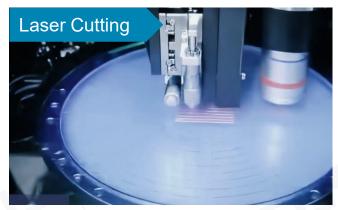


Laser Optics Components: Wafer-Level Simultaneous Structuring Processing









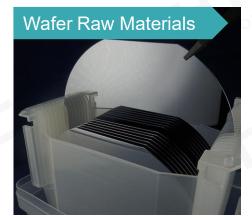




Wafer-Level Simultaneous Structuring Processing:
Manufacturing Capacity > 2K wafers / month or > 3.5M pcs lenses / month



Laser Optics Components: Photolithography-Reactive-Ion-Etching Processing













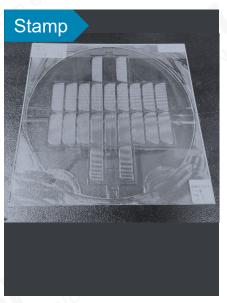
Photolithography-Reactive-Ion-Etching Processing: Manufacturing Capacity > 300 wafers / month

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Laser Optics Components: Imprinting Processing











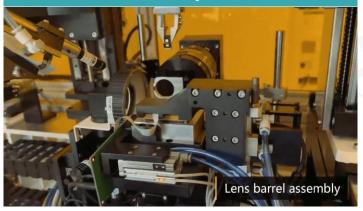
## **Automation Powered Manufacturing Excellence**



### **Automatic Optical Alignment**



### **Automatic Assembly**



### **Automated Optical Inspection**



### **Laser Optics Production Line**



### **LiDAR Transmitter Production Line**

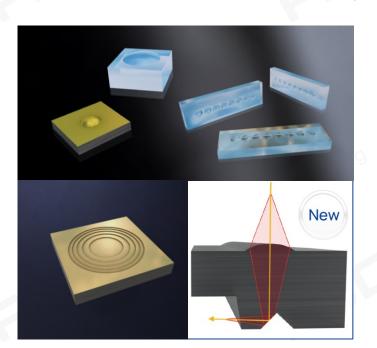


Video Link: <a href="https://www.focuslight.com/news-events/newslist/focuslight-autonomation-powered-manufacturing-excellence/">https://www.focuslight.com/news-events/newslist/focuslight-autonomation-powered-manufacturing-excellence/</a>

**Optical Communication** 

### **Diffractive and Refractive Optics**

- Focusing / collimating microlens
- Prism integrated microlens arrays
- Microlens arrays
- Silicon refractive microlens arrays



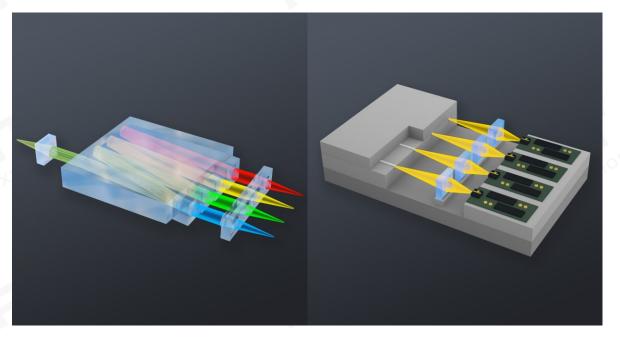




**Optical Switches** 

**Photonic Integrated Circuits (PICs)** 

**Fiber Connectors** 



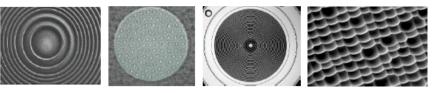
\* TROSA = Transmit & Receive Optical Sub Assembly, ROSA = Receiver Optical Sub Assembly, TOSA = Transmitter Optical Sub Assembly

## **FOCUSLIGHT**

### **Consumer Electronics**

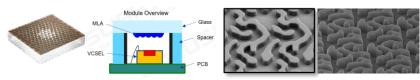


### **Tailored Diffusor Micro-Optics**

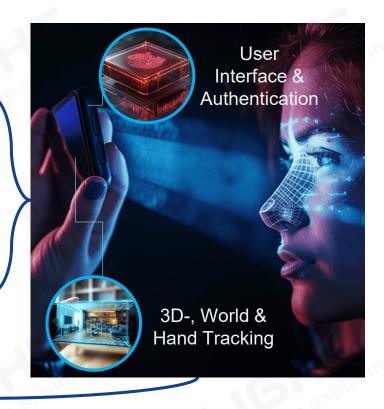


Fresnel lens, circular lens array, micro kinoform, irregular MLA for flood illum.

### Pattern-Generating Micro-Optics



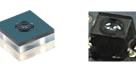
MLA-based dot projection Binary DOEs for beam fanout; 3D-depth sensor modules



### **Imaging and Projection Micro-Optics**



Multi-zone 3D-dToF sensors (~proximity sensors)











Multi-aperture WLO-lens for AR-µLED Display Engines

Microscopy

## FOCUSLIGHT Never stop exploring

### Medical and Health





Optical Components; Laser Components



Scanning

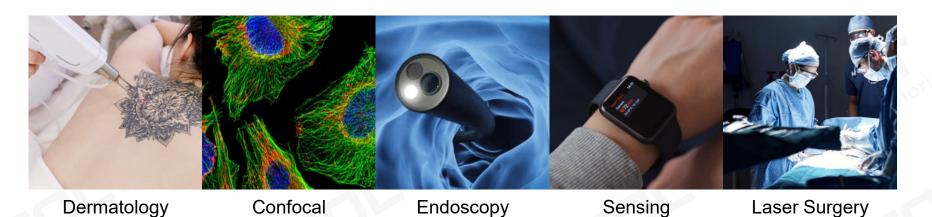
Optical Solutions; Laser+Optics Assembly; Application Handpiece



Contract Manufacturing Services



Focuslight does not produce medical or health equipment

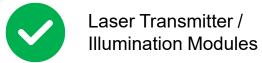


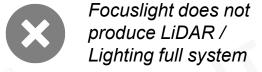
### Automotive





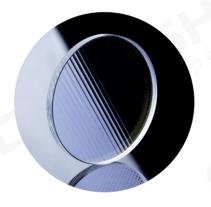






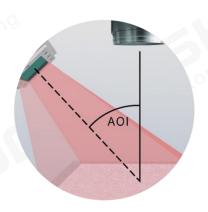
## FOCUSLIGHT Never stop exploring

### Semiconductor









- Beam homogenization technology powers the illumination system – key optical component in pansemiconductor systems
- > 15 years supply to the major manufacturer of semiconductor lithography tools
- Laser system solutions with high power density and different beam profiles, designed for various laserbased wafer annealing processes including IGBT backside annealing and SiC annealing
- Based on 976nm diode laser with adjustable beam output and >95% homogenization in energy distribution
- Ideal for advanced chip packaging processes, e.g. laser-assisted bonding
- Off-axis beam shaping technology powers laser surface treatment as well as surface inspection
- Typically used in solar cell industry

### Display





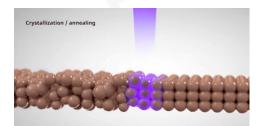




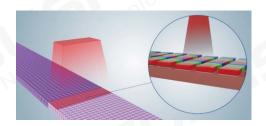


### Solid-State Laser Lift-Off (LLO) for Flexible Displays

- Several tens of beam shapers (plasma display pixel structuring)
- Several green 100 mm line beam systems (laser lift-off)
- > 600 mm UV line beam production system (laser lift-off)



### **Next-gen LTPS Solid-state Laser Annealing Process**

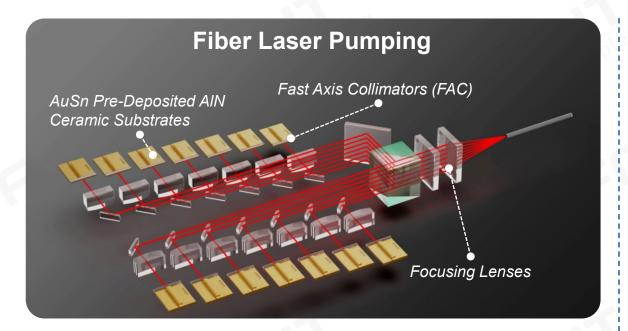




### Mini and Micro LED Processing

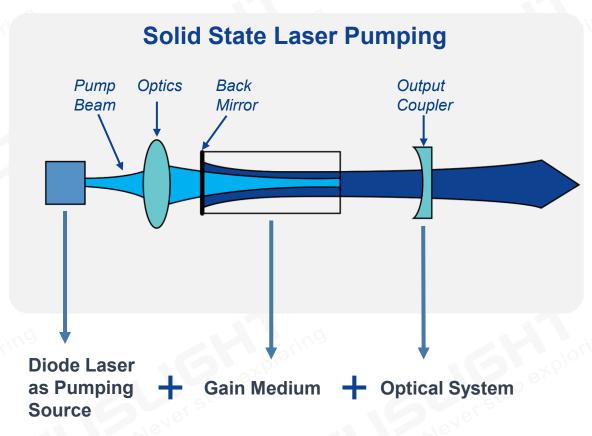
- Laser Mass Transfer and Laser Mass Soldering
- Laser Chip Repair

### Industrial



- AuSn pre-deposited ceramic substrates stable and reliable thanks to the high thermal conductivity and suitable thermal expansion coefficient;
- Fast axis collimators (FAC) fundamental and efficient solutions for shaping the beam emitted by the pumping sources;
- Focusing lenses coupling the collimated laser beam precisely into the output fiber;







### **Sales Network**





- Worldwide established distributors
- Direct sales offices in China, Switzerland and US
- Manufacturing site in Xi'an, Dortmund, Dongguan, Haining, Shaoguan, Neuchâtel, and Singapore

## Summary



# Your committed and reliable long-term partner in photonics components and solutions



Diode laser light source leader and beam shaping expert with strong IP position



One-stop-shop provider of micro-optics choosing from five process technologies best matching customer needs



Global photonics foundry that convert customers' ideas and designs into their own products and solutions



Total solution, versatile customization service and field service provider



Strong RDE capability, high volume production capacity and low-cost manufacturing



Financially healthy and strong financial backing from investors for long term growth

## THANK YOU









