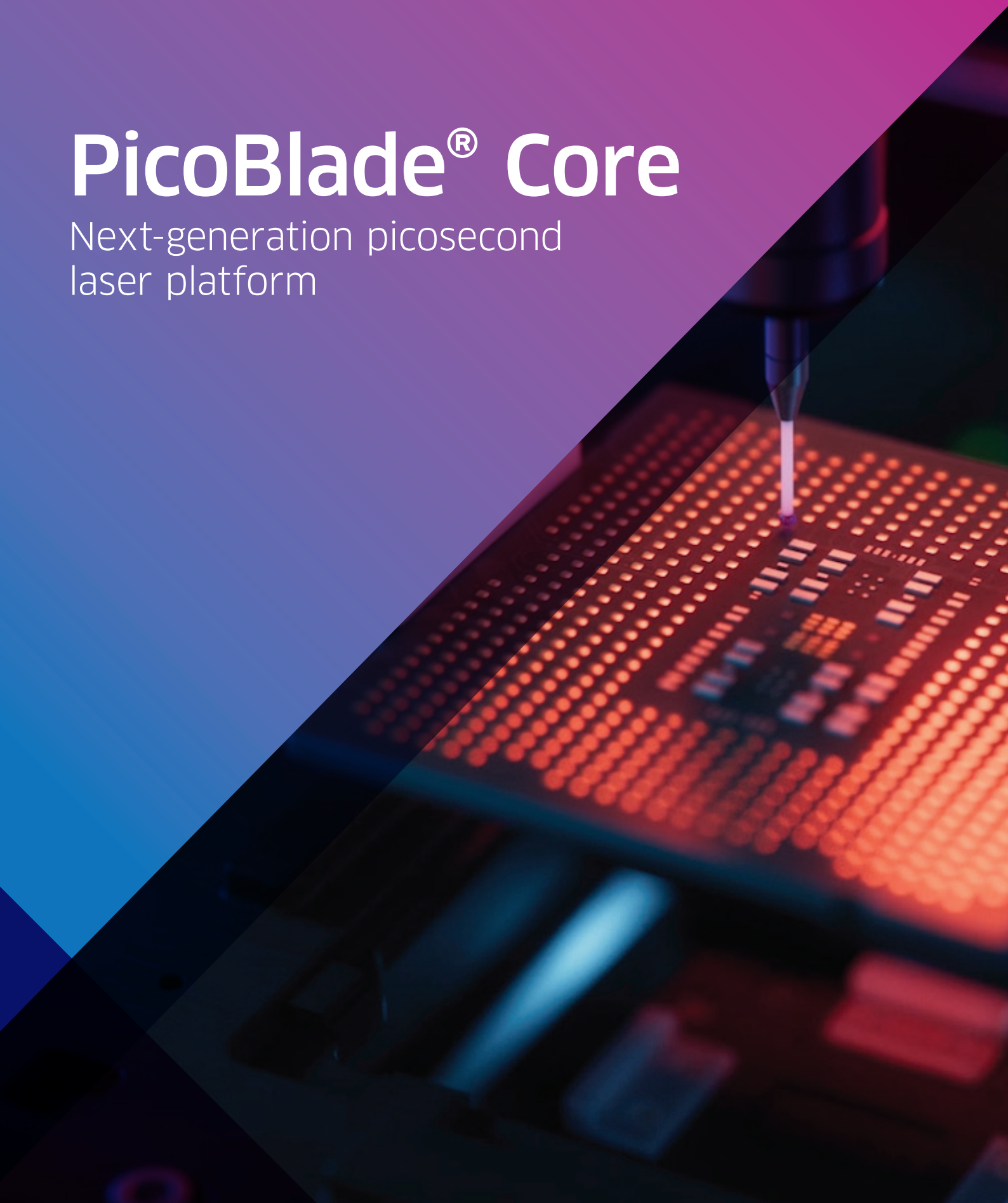
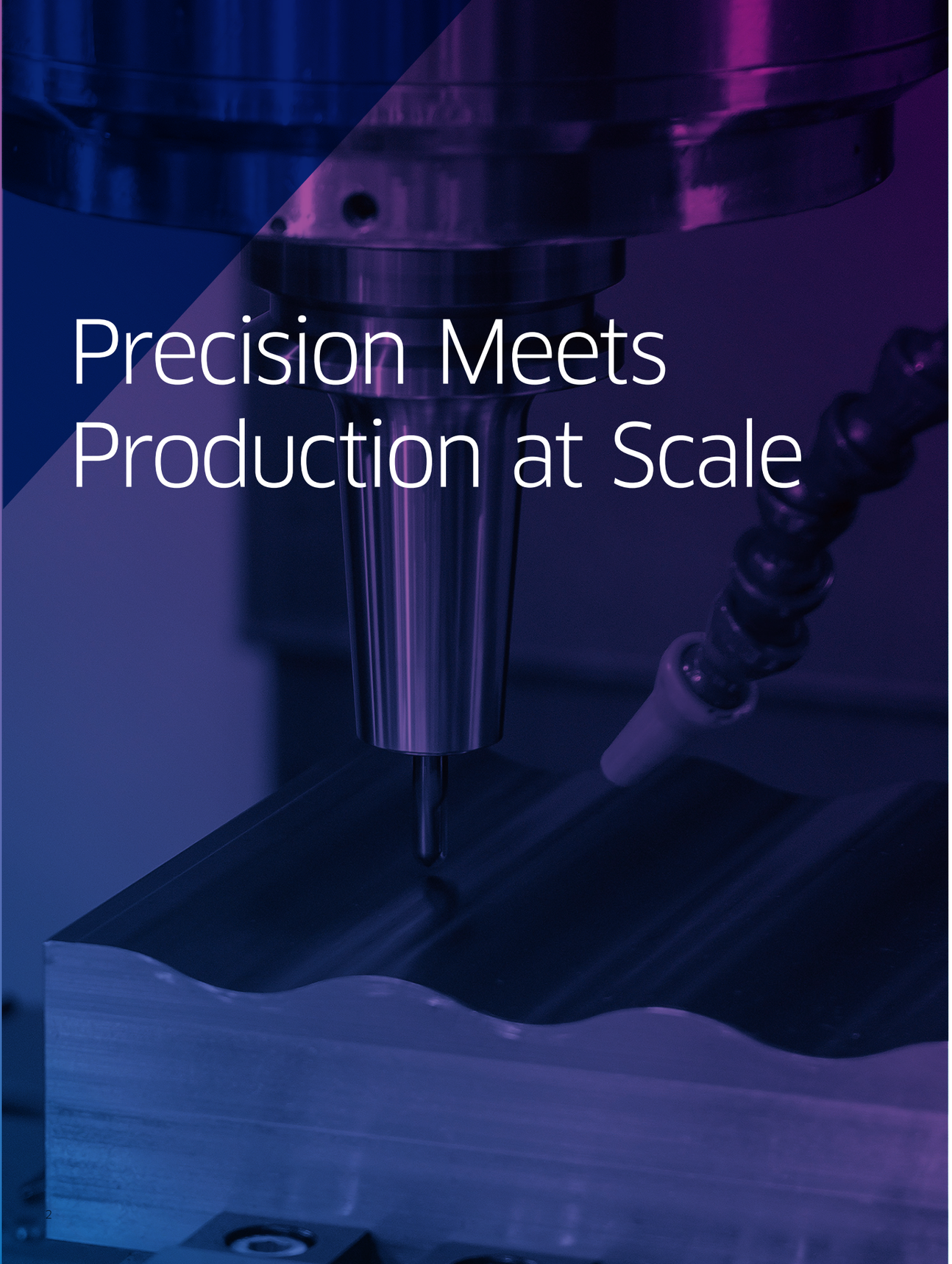
LUMENTUM

PicoBlade® Core

Next-generation picosecond laser platform





Precision Meets Production at Scale

Why Choose Lumentum's Pulsed Laser Solutions

Lumentum delivers differentiated value across four key pillars—making us the trusted partner for high-performance pulsed laser solutions.

Engineered for Excellence
Why Choose Lumentum's Pulsed Laser SolutionsLumentum delivers differentiated value across four key pillars—making us the trusted partner for high-performance pulsed laser solutions.

Scalable Manufacturing
155,000 sqm manufacturing facility in Thailand enables high-volume production and rapid global delivery

Unmatched Reliability
Over 10,000 pulsed laser systems and 500,000+ units shipped—proven performance in the world's most demanding industries

Strategic Solution Partner
Deep expertise across EV, semiconductor, and solar markets—powering 3D battery structuring and TSV/TGV drilling

10+
Countries Shipped to

20+
Markets

>10,000
Pulse Lasers Shipped

100+
Customers

Product Overview

PicoBlade Core is Lumentum's latest advancement in ultrafast laser technology, designed to deliver identical performance to the proven PicoBlade 3 in an optimized design for easy system integration. Leveraging the field-proven ultrafast platform, with over 1,000 units shipped globally, PicoBlade Core offers industry-leading reliability and precision for high-throughput micromachining applications.

Engineered for integration into industrial environments, it is optimized for tasks such as solar patterning, PCB drilling, glass cutting, semiconductor wafer processing, battery electrode structuring, and fine-feature machining in medical and display manufacturing.

With picosecond pulse durations, high repetition rates up to 8 MHz, and multi-wavelength flexibility (1064 nm, 532 nm, or 355 nm), PicoBlade Core with closed loop power control enables high quality, throughput and performance in micromachining.

Advanced features further enhance its versatility and precision – including AccuTrig™ for sub-micron pulse synchronization, FlexBurst and MegaBurst™ for tailored energy delivery, and beam shaper for dynamic beam profile control.



Key Features

Flexible PRF: Enables optimum power utilization and high efficiency across a wide range of applications

FlexBurst™: Programmable pulse bursts enable power scaling while preserving processing quality. Number of pulses in Flexburst is 1-40

Advanced pulse-on-demand (PoD) technology: Dynamic pulse control enhances material interaction and process optimization

Optional Features

AccuTrig (Up to 2 MHz): Patented, industry-leading trigger function increases throughput while improving precision and cut quality

MegaBurst (Up to 1.6 mJ): Enables access to full laser power at lower PRFs (<400 kHz), supporting energy-demanding applications such as filamentation-based glass cutting, deep drilling, and beam-splitting

Beam Shaper Option: Adjustable beam size with or without customized diffractive optical element (DOE)

Benefits

PicoBlade Core delivers the next evolution in picosecond laser performance—housed in a compact, industrially hardened platform. Engineered for high-throughput micromachining, it enables superior edge quality, minimal heat-affected zones, and consistent precision—without compromise.

Built on decades of ultrafast laser leadership and optimized for volume manufacturing, PicoBlade Core offers:

- Industry-leading sub-12 ps pulse duration
- Disruptive pricing model that reduces total cost of ownership by up to 40%
- Seamless multi-wavelength support (IR, Green, UV)
- Proven reliability with >10,000 hours of lifetime stability
- Compact design: 3x lighter and ~50% smaller than previous PicoBlade 3 product
- Flexible integration via AccuTrig, FlexBurst, MegaBurst, and beam shaper option

Specifications

	IR	Green	UV
Wavelength (nm)	1064	532	355
Average power (W) @400 kHz			
High power	150	100	50
Mid power	80	50	30
Low power	20	12.5	7.5
Pulse energy (µJ) @400 kHz			
High power	375	250	125
Mid power	200	125	75
Low power	50	31.5	18.7
Pulse width (ps)	<12	<12	<12
Repetition rate[1]	Single-shot to 8 MHz		
Beam size	5 mm ± 10%		
Beam quality (M^2)	<1.3	<1.2	<1.2
Circularity	>85%		
Pulse-to-pulse energy stability	<1% RMS		
Pointing stability	<50 µrad/°C		

1. UV and green laser power can be optimized for preferred repetition rates..



Applications

Semiconductor

Drilling of vias in silicon and glass
- Sub-micron via drilling with high aspect ratios for TSV and TGV applications
- Damage-free ablation in silicon and glass using ultrashort pulses
- Compatible with evolving 3D integration and packaging trends

Wafer dicing
- High-speed, precision dicing of thin and brittle wafers
- Reduced chipping and debris vs. mechanical sawing
- Supports advanced materials: SiC, GaN, sapphire

Trenching and thin film ablation
- Selective trenching for low-k and dielectric layers
- Precise depth control without thermal damage
- Enables patterning of high-density interconnects

PCB and Electronics

PCB micro via drilling
- High-density interconnect (HDI) via drilling below 50 µm
- Clean hole profiles for multilayer boards
- UV/Green wavelengths enable polymer and copper selectivity

Glass and ceramic PCB machining
- Crack-free cutting and drilling of alumina, AlN, and borosilicate substrates
- Maintains electrical insulation integrity
- Ideal for high-frequency and RF applications

Surface texturing
- Functional texturing for thermal management or wettability
- Sub-micron precision across metals and ceramics
- Non-contact process reduces mechanical wear

Battery and Energy Storage

Anode/cathode structuring
- Microchannel drilling improves lithium-ion diffusion
- Uniform feature profiles enhance battery performance
- Compatible with graphite, silicon, and solid-state materials

Separator foil cutting
- Burr-free, debris-free cutting of polymer/ceramic separators
- Maintains edge stability at high throughput
- Applicable to PE, PP, PET-based multilayer films

Notching and coating removal
- Precise electrode notching for pouch and cylindrical cells
- Selective removal of active layers without damaging current collector
- Supports advanced battery designs and chemistries

Display and Glass Processing

Ultra-thin glass cutting
- Clean, precise separation down to <100 µm thickness
- Avoids microcracks through cold ablation
- High-speed scribing for foldable and flexible displays

Transparent material drilling
- Laser-induced breakdown for glass and sapphire drilling
- High aspect ratio microholes with minimal taper
- Suitable for cover glass and optical components

Optical lens micro-structuring
- Micron-scale surface modification for functional optics
- Enables lenslet array and diffractive structure creation
- High repeatability across curved or complex surfaces

Medical Devices Manufacturing

Stent micro-drilling
- Fine hole drilling in Nitinol, stainless steel, and CoCr alloys
- Eliminates recast layer and HAZ for biocompatibility
- Scalable to neurovascular and cardiovascular stents

Catheter & microfluidic cutting
- Non-contact micromachining of polymers and silicones
- Enables sharp features in tubing and channel networks
- Maintains clean internal diameters and structural integrity

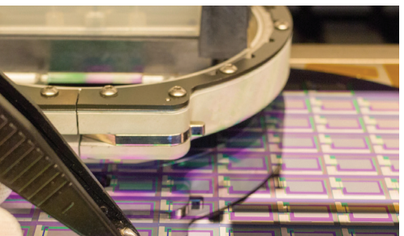
Surgical tool processing
- Precision edge shaping for scalpels, bone saws, micro-scissors
- Enhances sharpness and durability
- Corrosion-free finishes for stainless steel and titanium

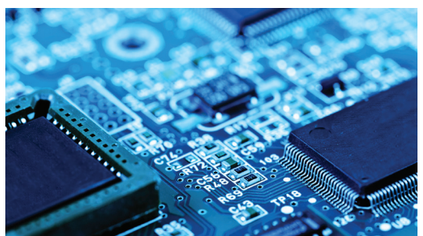
Solar and Photovoltaics

Perovskite scribing
- P1–P3 scribing with sub-micron accuracy
- Minimizes thermal stress on sensitive perovskite layers
- Supports tandem and flexible module manufacturing

Thin film removal
- Selective layer ablation on CIGS, CdTe, and TCO materials
- Controlled depth penetration with minimal substrate impact
- In-line process compatible with roll-to-roll and sheet-fed lines

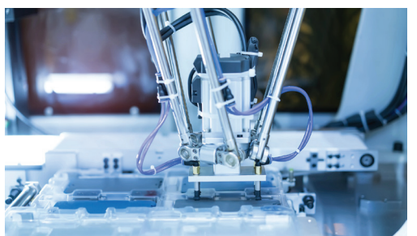
Edge isolation, xBC / IBC cell structuring
- Electrical isolation to prevent shunting and leakage
- Structuring for high-efficiency back-contact solar cells
- Enables interdigitated contact patterning with micron accuracy

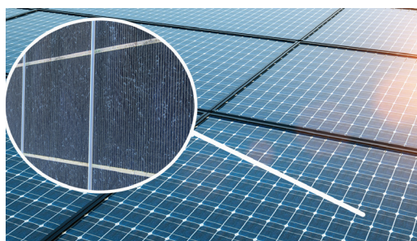






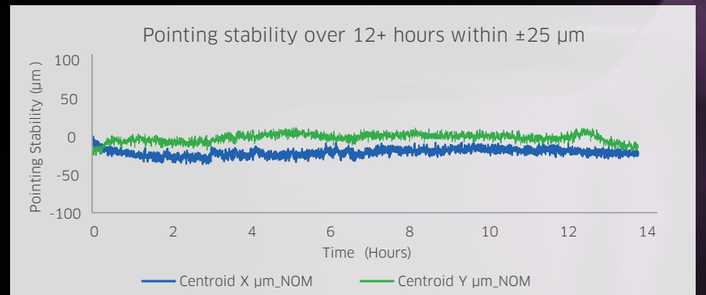




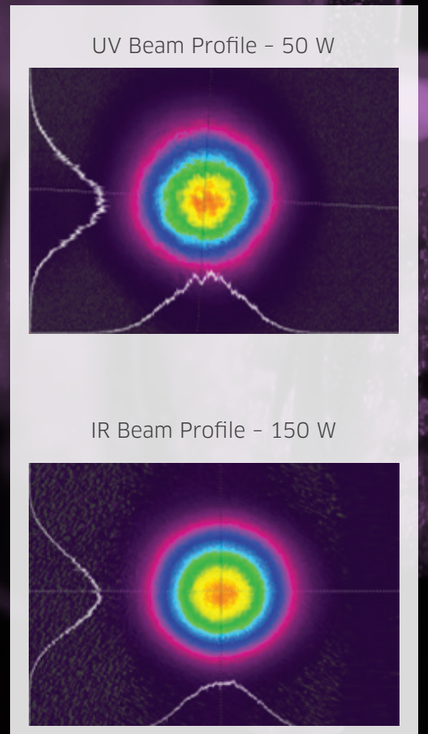


Performance

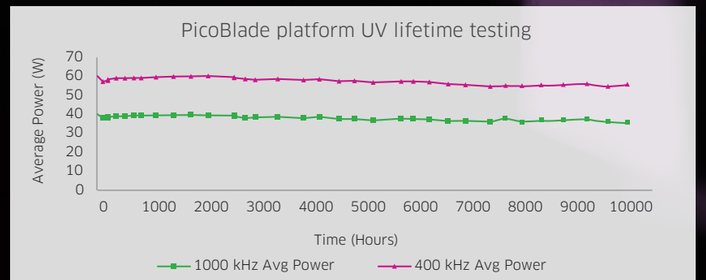
Minimal laser power variation



Stable beam parameters



Unchanged pulse energy

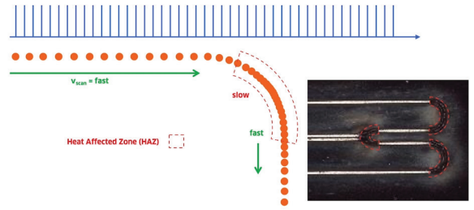


- No change in pulse energy and beam quality (M2X and M2Y) after 10, 000 hours
- Open loop, no change to pump diode during testing

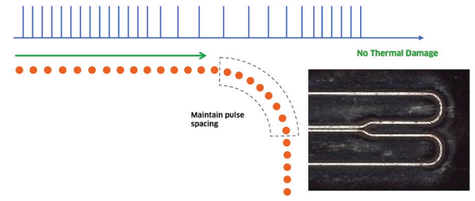
Optional Features

AccuTrig (Up to 2 MHz):
Patented, industry-leading trigger function increases throughput while improving precision and cut quality

- Dynamically adjusts PRF to match scan speed while maintaining consistent pulse spacing
- Prevents heat-affected zones (HAZ) by stabilizing energy distribution
- Maintains pulse energy regardless of speed variations,
- reducing defects and improving process quality



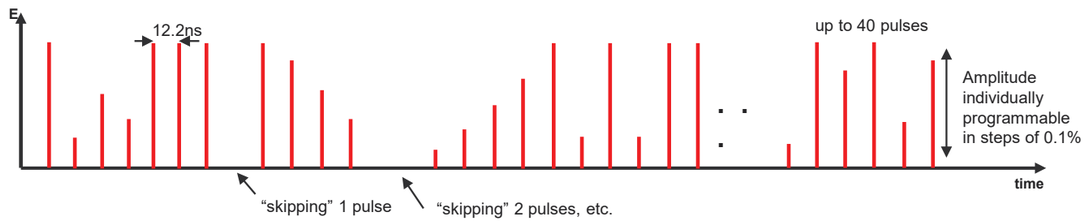
Without AccuTrig



With AccuTrig

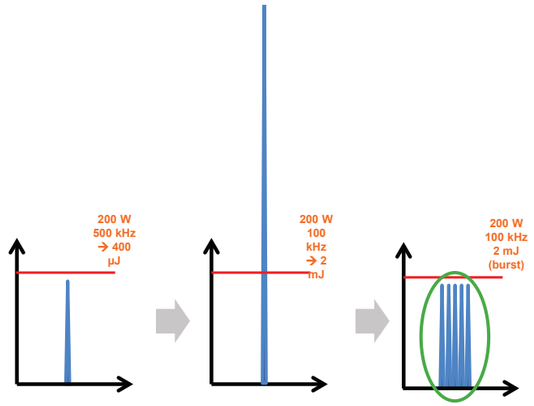
FlexBurst™:
A user-programmable burst technology that enables virtually infinite burst shapes with high precision.

- Allows up to 40 pulses per burst, with individually programmable amplitudes
- Intra-burst pulses can be spaced as low as 12.2 ns
- Enables precise control over pulse energy and pattern for optimized laser processing



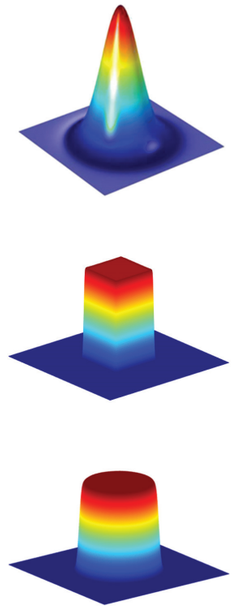
MegaBurst (Up to 1.6 mJ):
Enables access to full laser power at lower PRFs (<400 kHz), supporting energy-demanding applications such as filamentation-based glass cutting, deep drilling, and beam-splitting.

- Expands PRF from 100 to 500 kHz, maximizing power utilization
- Maintains consistent burst energy with AccuTrig technology
- Pre-programmed by Lumentum for high-power applications



Beam shaper option:
Adjustable beam size with or without customized diffractive optical element (DOE)

- To allow for customized beam size adjustments – externally adjustable telescope
- Diffractive optical element (DOE) can be added to form the beam (flat top, beamlets etc.) as required by application



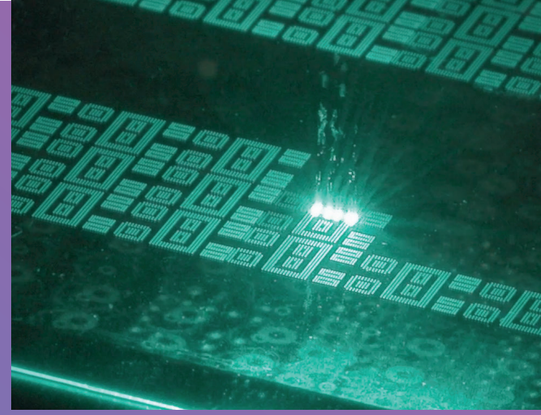
Cutting-edge manufacturing processes for precision and speed

Precision optics mounting
Ultra-stable glass mounting ensures unmatched stability

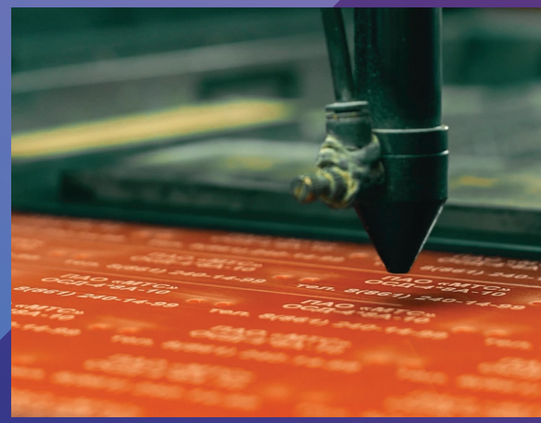
High-speed production
Parallel production lines to accelerate manufacturing timelines

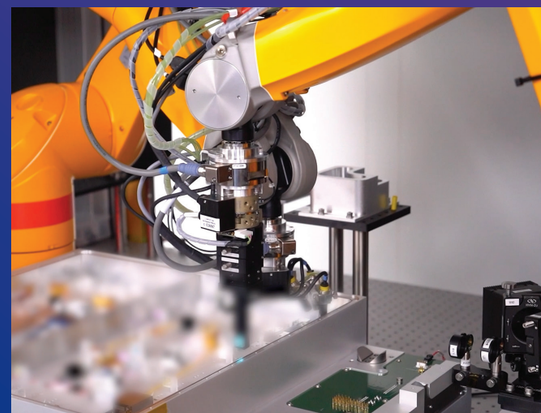
Automated process control
Advanced alignment technology to enhance precision

Vertical integration
Comprehensive in-house capabilities from pump diodes to amplifying fibers











Lumentum manufacturing excellence

State-of-the-art facility
155K sqm with 7,000 sqm clean room with parallel production lines for rapid delivery.

Advanced manufacturing
Precision-driven capabilities. Automatic alignment and kinematic module positioning.

Award-winning excellence
Thailand PM industry awards for Quality, Productivity, and Potential Industry(2020–2022).

Sustainability leadership
Net-zero GHG emissions by 2030. 25% reduction in FY23, and 61% renewable electricity.

SCIENCE BASED TARGETS
DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

Commitment to SBTi for emissionsSilver

Responsible Business Alliance

RBA Platinum statusfor Thailand siteCanadian

2024

siteCanadian National Capital Region'sTop Employers Listfor 8th consecutive year

LEED

Silver LEED certification at U.S. Corporate HQPlatinum

PLATINUM 2023 ecovadis Sustainability Rating
PLATINUM Top 1% ecovadis Sustainability Rating FEB 2024
PLATINUM Top 1% ecovadis Sustainability Rating MAR 2025

Platinum rating for three consecutive years from EcoVadisState

LUMENTUM

North America
Toll Free: 844 810 LITE (5483)

Outside North America
Toll Free: 800 000 LITE (5483)

China
Toll Free: 400 120 LITE (5483)

© 2025 Lumentum Operations LLC
Product specifications and descriptions in this document are subject to change without notice.

picobladecore-br-oc-ae 30179736 000 0525