SIEMENS

High Power Laser Diodes

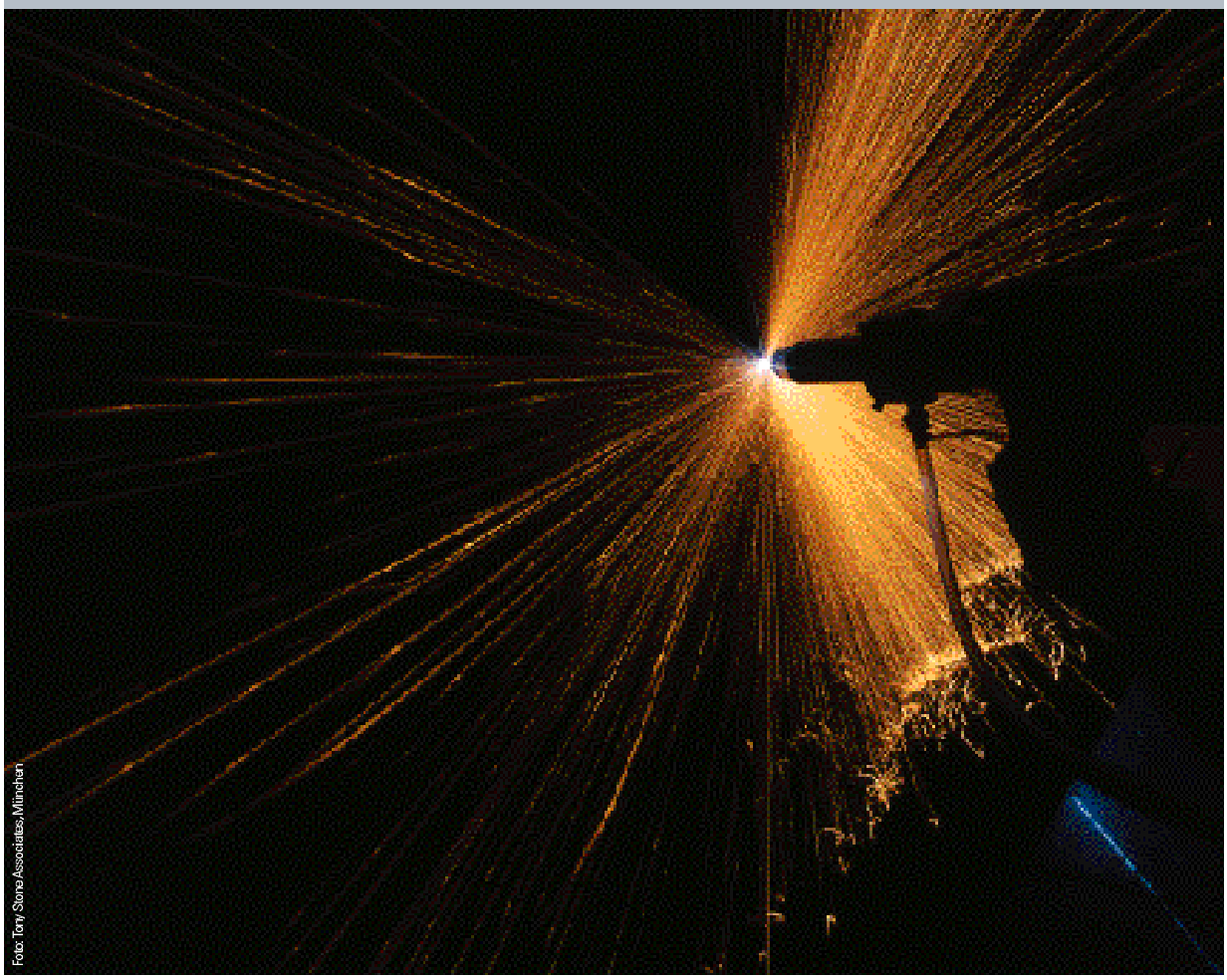


Foto: Tony Stone Associates, München

Power your application with a Siemens Laser Diode!

All high power laser diodes manufactured at Siemens are based on InGa(Al) as double quantum well second confinement heterostructures (DQW-SCH), which are grown by metalorganic chemical vapor deposition (MOCVD) on GaAs substrates. The quantum well material assures an increased catastrophic optical damage (COD) level compared to classical double heterostructures. By introducing an appropriate Indium concentration it is possible to almost completely eliminate early spontaneous failure of the diodes by pinning the crystal defects responsible for the dreaded dark line defects. As a consequence, the typical aging process today is a slow, continuous degradation with operation time (average lifetime, defined as 20% current increase for specified optical output power, is 10-15khrs at 808nm, and over 50khrs at 940nm). Such high reliability reduces down time and maintenance cost of the end product. A recent improvement makes use of large optical cavities (LOC) providing better beam quality and a higher damage threshold. This material allows to double the typical 1W cw output of a 200µm wide emitter. High power laser diodes products for cw and pulsed applications can be selected from a variety of standard wavelengths in the range from 780nm to 980nm or produced on request.

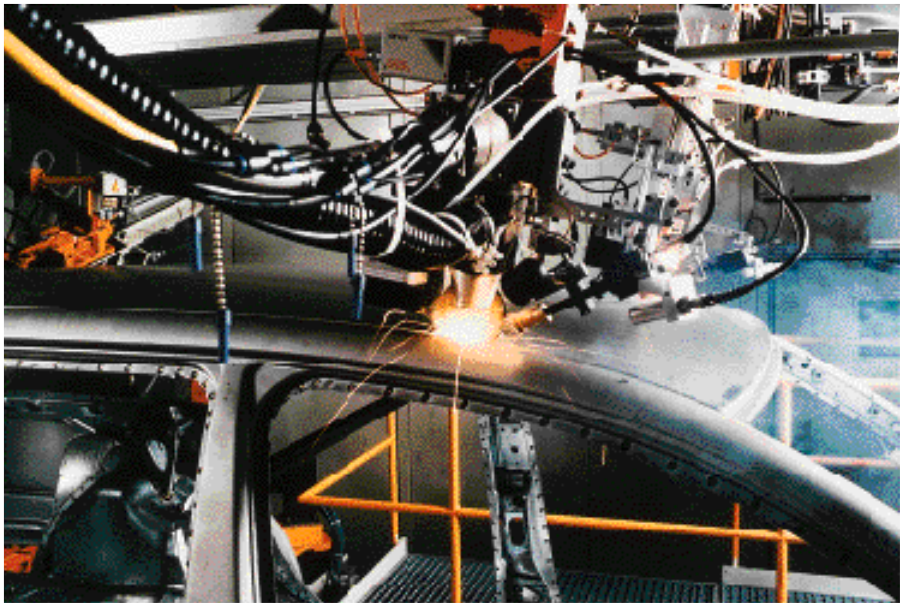
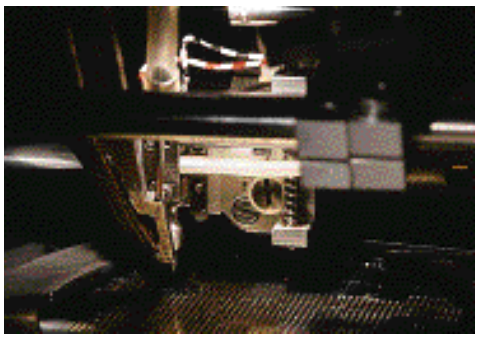


Foto: IVB-Report

In Focus: Siemens High Power Laser Diodes

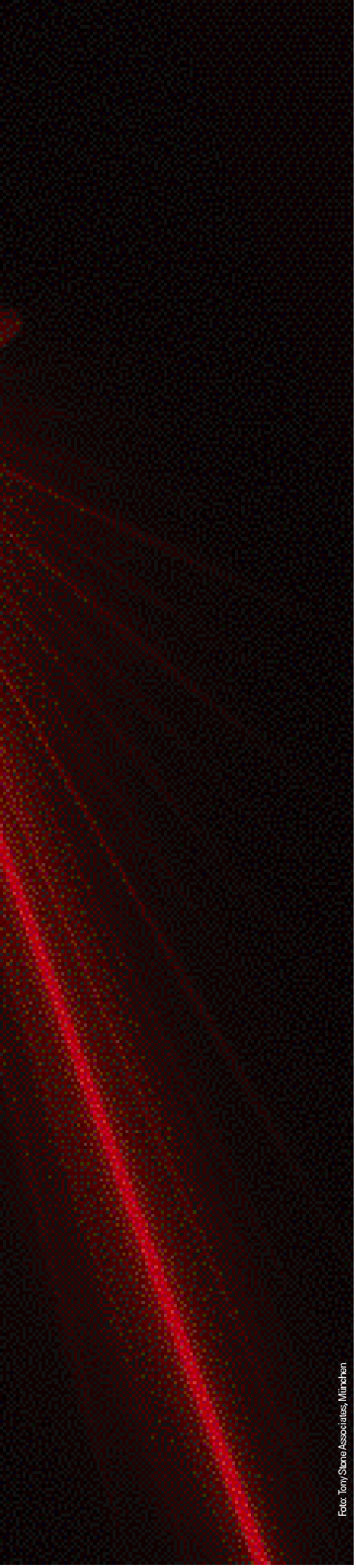
Usage of high power semiconductor lasers in the industrial and automotive markets are growing rapidly. The primary application is for pumping solid state lasers (i.e. Nd:YAG at 808nm, and Yb:YAG at 940nm) where laser diodes allow for higher overall efficiency, better beam quality and more flexible design compared to traditionally used flashlamps. In addition to pumping applications, the immense optical power density at their output mirror can be utilized directly for a variety of industrial applications in material processing and surface treatment. Noteworthy applications for continuous-wave operation are laser soldering, printing and marking, medical and dental treatment, optical power delivery, as well as measurement and sensing. As an example, fiber-coupled diode lasers are used to solder optoelectronic chips at the fabrication facility in Regensburg. Pulsed laser diodes, on the other hand, find application in range finding, surveillance and safety, for the automotive, industrial and military markets.

Siemens has over 10 years of experience in designing and manufacturing high power laser diodes.



Our fabrication facility in Regensburg for III-V semiconductors is among the largest worldwide. The packaging is developed and performed at the same site. This backend is famous for the leading micro-technological concepts used for fiber optic components. The access to cutting edge technology and manufacturing processes as well as the local concentration assure cost efficient and flexible packaging solutions for standard devices and OEM designs.

Siemens is committed to high quality through its ISO9001 certification and its internal audit process.



High Power Laser Product Range

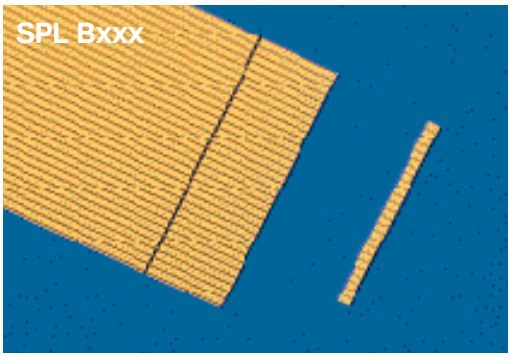
Unmounted laser diode bars

Features

- Output power range: 8, 15, 30Wcw, 50-100Wqcw
- Standard wavelengths: 808, 940, and 980nm
- Wavelength selection: ±3 nm; others on request
- Optimized QW structures with efficieny >35%
- Highly reliable strained InGa(Al)As material
- Solderable p- and n-side metalizations
- Standard size 10mm x 600µm x 115µm

Applications

- Pumping solid state lasers (Nd:YAG, Yb:YAG, Ho:YAG, Nd:Glass, Er:Glass, ..)
- Direct material processing (welding, soldering, annealing, drilling, prototyping)
- Printing, marking, and surface processing
- Medical and dental applications
- Illumination, heating
- Testing and measurement applications



Plastic pulse laser diodes

Features

- Low cost plastic package for large volumes
- Peak power 10 - 15W (100ns duration, 0.1% duty)
- Standard wavelengths 850, 905nm
- Single emitting area 200µm x 2µm
- Temperature range -20°C .. +85°C

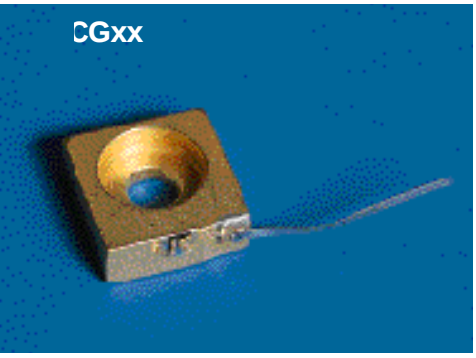
Applications

- Range finding
- Security, surveillance
- Illumination, ignition
- Testing and measurement

Mounted/Packaged cw laser diodes

Features
- Efficient sources for cw and pulsed operation
- Single emitting area 200µm x 1µm
- Standard wavelengths 808, 850, 940, and 980nm
- Fully tested and burned-in components

Applications
- Pumping solid state and fiber lasers
- Laser soldering, heating, illumination, ..
- Printing, marking, surface processing
- Medical and dental applications
- Measurement and security applications



Chip on submount

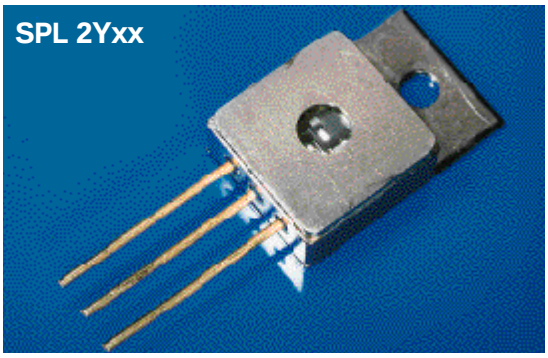
Features
- 1W cw uncollimated output (10W pulsed)
- C-type submount package for OEM designs

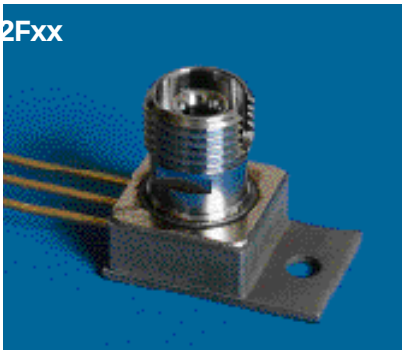
Applications
- Pumping small solid state lasers
- Material and surface processing

TO-220 package with window

Features
- 1W precollimated, near-spherical output (12°)
- Sealed metal package for efficient heat sinking
- Thermistor for temperature / wavelength control

Applications
- Medical and dental applications
- Free space communication

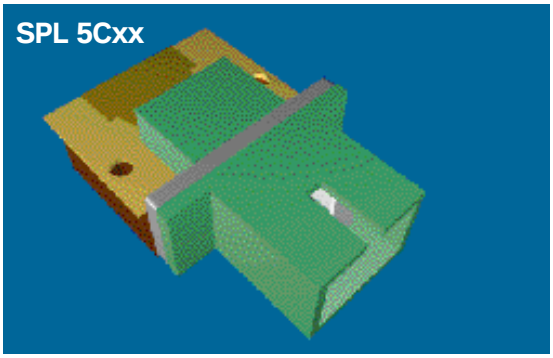




TO-220 package with FC-receptacle

Features
- 0.75W coupled efficiently into 125µm MM fiber
- FC-receptacle for a removable fiber connection
- Sealed TO-220 metal package incl. thermistor

Applications
- Laser soldering
- Energy transmission
- Testing and measuring applications



5W fiber coupled module (new product)

Features
- 5W cw coupled into 400µm fiber (NA = 0.22)
- SC receptacle for a removable fiber connection
- Robust metal socket for efficient heat sinking
- Thermistor for temperature and wavelength control

Applications
- Pumping solid state lasers
- Medical applications
- Material and surface processing (heating, annealing, soldering, welding plastics,...)

Outline	Type	Wavelength nm	Power W	Output θ_y x θ_x (FWHM)	Package
unmounted 10mm bars					
20-50W cw	SPL BG__ SPL BG81 SPL BG94 SPL BG98	780 ... 980 808 940 980	20-50 20-30 30-50 30-50	 45° x 12° 38° x 12° 38° x 12°	50% fill factor 25 emitters of 200µm on 400µm pitch
50-120W qcw	SPL BS__ SPL BS81 SPL BS94	780 ... 980 808 940	20-50 50-80 50-120	 45° x 12° 38° x 12°	80% fill factor 25 emitters of 200µm on 400µm pitch
1-5W modules					
C-mount	SPL CG__ SPL CG81 SPL CG85 SPL CG94_2	780 - 980 808 850 940	1 ... 2 1 1 2	45° x 12° 38° x 12°	Cu-block
TO-220 window	SPL 2Y__ SPL 2Y81 SPL 2Y85 SPL 2Y94_2	780 - 980 808 850 940	1 ... 2 1 1.5 2	12° x 12° 10° x 12°	hermetical TO-220 SiO_2-window thermistor
TO-220 fibercoupled	SPL 2F__ SPL 2F81 SPL 2F85 SPL 2F94_2	780 - 980 808 850 940	0.75 ... 1.5 0.75 1 1.5	ø 125µm, NA 0.35	hermetical TO-220 FC-receptacle thermistor
5W fibercoupled	SPL 5C__ SPL 5C81 SPL 5C94	780 - 980 808 940	5 5 5	ø 400µm, NA 0.22	passively cooled SC-receptacle thermistor
pulsed laser diodes					
Plastic housing	SPL PL__ SPL PL85 SPL PL90	780 ... 980 850 904	5 ... 10	38° x 10°	5mm LED type

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http://www.smi.siemens.com
http://www.siemens.de/Semiconductor/products/37/376.htm

Published by Semiconductor Group

Siemens Aktiengesellschaft

Ordering No. B143-H7010-G1-X-7600
Printed in Germany
TS12975.