PicoSpark™: fiber amplified, picosecond microchip lasers

teem photonics™

Features & benefits

Ultrashort pulses that stay constant while varying rep rate or pulse energy
As low as 600ps duration at 532nm, 900ps at 1064nm

High peak power
125kW per pulse, with 550GW/cm2 irradiance, at 532nm; 250kW per pulse, with 700GW/cm2 irradiance, at 1064nm

Variable Repetition rate
Adjustable from 20kHz to 40kHz

Adjustable pulse energy
Pulse energy turned on in <300µs, turned off in <600µs

Excellent beam quality
Gaussian, TEM00, $M^2 \leq 1.4$

Efficient, air cooled
Typically consumes <350W

Licensed Technology
Exclusive license on Passively Q-switched pico-second microchip lasers: US Patent 5394413

License on fiber lasers and amplifiers: US Patent 5818630

CDRH compliant

Optional features

Increased pulse energy by relaxing M^2 or, at 1064nm, by removing isolator

1064nm & 532nm Passively Q-Switched Nd:YAG lasers: high irradiance, multiwatt

PicoSpark™ brings together Passively Q-Switched (PQS) microchip laser technology with fiber amplification, resulting in a multiwatt laser that generates pulses with hundreds of kilowatt peak power and hundreds of gigawatt per square centimeter irradiance.

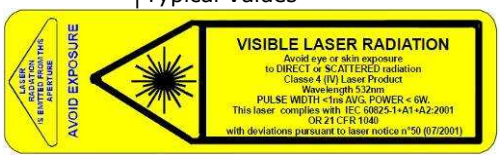
A PQS microchip laser is the seed of PicoSpark™ and sets the pulse width in the hundreds of picoseconds; a fiber amplifier provides the gain, compactly and efficiently. This Master Oscillator Fiber Amplifier (MOFA) architecture enables a constant pulse width, while allowing the user to vary the pulse energy (or peak power) and the repetition rate independently of each other. The output is free-space coupled, preserving peak power and beam quality.

The Picospark™ HNP series emits 5.5W at 1064nm; the HNG series emits 3.5W at 532nm, generated by harmonic conversion, both with an M^2 of 1.4 or lower.

PicoSpark™ HNx lasers

Model	HNP-05P-100	HNG-03P-100
Wavelength (nm)	1064	532
M^2	1.3	1.3
Energy/Pulse (µJ)	200	100
Pulse Width (ps)	900	600
Peak Power (kW)	220	170
Repetition rate (kHz)	20-40	20-40
Average Power (W)	5.5	3

Typical Values



Applications

- Micromachining
  - Scribing silicon and sapphire
  - Edge isolation
  - Drilling in steel
  - Ablation of copper
  - Cutting of tungsten
- Marking
  - Glass inscribing
  - Diamond graphitization
- Instrumentation
  - Laser Induced Breakdown Spectroscopy
  - Raman spectroscopy Supercontinuum generation
  - Ranging
  - Differential absorption LIDAR
- Biophotonics
  - Microsurgery
  - Dense tissue ablation
  - Tattoo removal