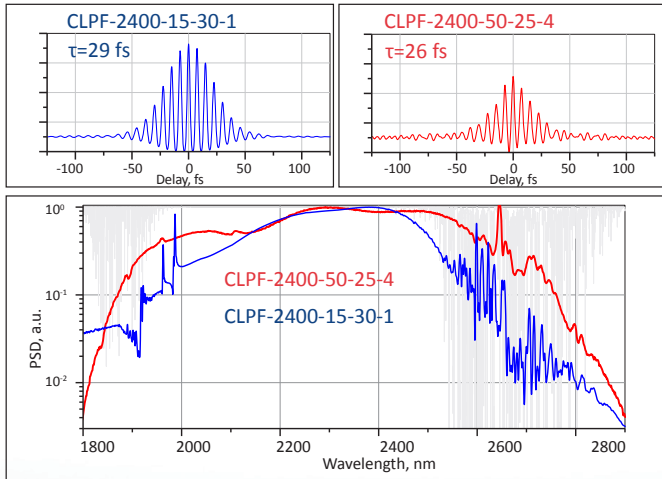


# CLPF & CLPFT SERIES

## Femtosecond Cr:ZnSe/S Mid-IR Lasers



Emission Spectra and Autocorrelations of CLPF Lasers



**CLPF Cr:ZnSe/S** ultrafast mid-IR lasers address a wide range of scientific, industrial and biomedical applications. CLPF lasers are pumped by IPG efficient and reliable CW erbium fiber lasers and provide femtosecond pulses in the spectral range of 2-3  $\mu\text{m}$  with average output powers of one to several Watts and with pulse energies in the range of tens nanojoules to millijoules. Both fixed wavelength and wavelength tunable models are available.

CLPF lasers can be configured as fully referenced mid-IR optical frequency combs with 2-cycle pulses and an octave spanning spectra. CLPF lasers and frequency combs can be equipped with extension modules converting CLPF radiation to the long wave IR continuum with Watt-level power and the spectrum spanning 2-20  $\mu\text{m}$ .

CLPF Series models with extended average power up to 20 W and custom repetition rates up to 500 MHz can be offered upon request. Please discuss your needs with IPG Photonics representative.



### FEATURES

- ▶ Custom Fixed Central Wavelength
- ▶ Wavelength Tuning Option
- ▶ Pulse Duration Down to Two Optical Cycles
- ▶ Output Power up to 20 W
- ▶ SHG Option, up to 0.5 W
- ▶ Power and Energy Amplifiers
- ▶ RF Output Monitoring Option
- ▶ Frequency Combs with Various Synchronization Options
- ▶ Beam Quality  $M^2 < 1.2$



### APPLICATIONS

- ▶ Spectroscopy
- ▶ Supercontinuum Generation
- ▶ Mid-IR Frequency Combs
- ▶ Multi-photon Imaging
- ▶ Metrology
- ▶ Biomedical Applications
- ▶ High-harmonic Generation
- ▶ Extreme nonlinear optics

# CLPF & CLPFT SERIES

## Femtosecond Cr:ZnSe/S Mid-IR Lasers

Optical Characteristics	CLPF-2400-15-30-1	CLPF-2400-50-25-4*	CLPF-2400-EA
Central Wavelength Range*, nm	2200-2600, typ. 2400		
Spectral Bandwidth FWHM, nm	300	600	60
Average Power, W	>1	>4***	0.01-4****
Pulse Energy, nJ	15	>50	10 <sup>4</sup> -10 <sup>6</sup>
Repetition Rate***, MHz	80		0.001-0.5
Pulse Duration, fs	30	25	100
Long Term Power Stability****, %	1		
Polarization	Linear		
Output Beam Mode, M <sup>2</sup>	≤1.2		
Beam Diameter (FW, 1/e <sup>2</sup> ), mm	1.5 ±0.5	2.0 ±0.5	2.0 -10
Beam Divergence, mrad	<0.5		
Warm-up Time, min	15-60		

\* Also available as a fully referenced optical frequency comb

\*\* Standard models operate at 2400±50 nm central wavelength.

Customer selected fixed central wavelength and wavelength tuning option are available upon request.

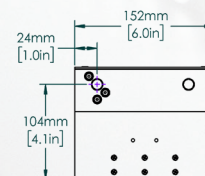
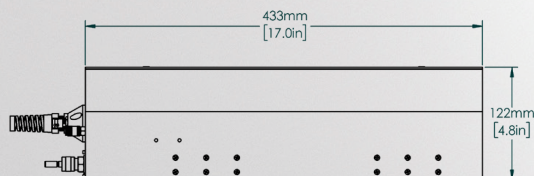
\*\*\* Average power up to 20 W is available upon request.

\*\*\*\* Custom repetition rates up to 0.5 GHz are available upon request.

\*\*\*\*\* After 1 hour warm up, over 2 hours, ambient T ±2°C

### General Characteristics

Integrated Pump Laser	IPG Photonics Erbium CW Fiber Laser
Pump Laser Dimensions (W × D × H), mm	448 × 403 × 132
Optical Head Dimensions (W × D × H), mm	152 × 433 × 122
Supply Voltage 50-60 Hz, VAC	110-240
Power Consumption, W	200 typ.



CLPF oscillators

CLPF-EA energy amplifiers



[IPGPhotonics.com/contact](http://IPGPhotonics.com/contact)  
[www.ipgphotonics.com](http://www.ipgphotonics.com)

MAX. AVERAGE OUTPUT POWER: 40 W  
 MAX. PEAK OUTPUT POWER: 25 MW  
 PULSE DURATION: 20 fs  
 PULSE REPETITION RATE: <500 MHz  
 WAVELENGTH RANGE: 1600-3200 nm

MAX. AVERAGE OUTPUT POWER: 10 W  
 MAX. PEAK OUTPUT POWER: 10 GW  
 PULSE DURATION: 100 fs  
 PULSE REPETITION RATE: <500 kHz  
 WAVELENGTH RANGE: 2000-3000 nm

**DANGER - INVISIBLE LASER  
 RADIATION AVOID EYE OR SKIN  
 EXPOSURE TO DIRECT OR  
 SCATTERED RADIATION  
 CLASS 4 LASER PRODUCT**  
 IEC 60825-1:2014

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