

1350 nm Fiber Based Femtosecond Laser with Fiber Delivery



Applications

- Two-photon integrated circuit testing
- Telecom component testing
- Optical-beam-induced current microscopy
- Photodetector characterization
- Optical metrology
- Multiphoton microscopy
- Materials characterization

Features

- > 100 mW output at 1350 nm
- < 200 fs pulse widths
- Outstanding beam quality ($M^2 < 1.1$)
- Single mode PM fiber delivery
- All air-cooled, no chiller required
- Single rack mountable module
- Turn-key operation and full computer control
- Remote system diagnostics

The Carmel F-1350 represents the first in a new series of fiber-delivered, femtosecond fiber lasers with output powers of over 100 mW and pulse widths of less than 200 fs. The system utilizes the same building blocks used in the industry leading Carmel X-series but with the convenience of a fiber-delivered output. The Carmel F-1350 is the perfect source for two-photon transient current injection used in the testing and characterization of integrated circuits.

The system features a single rack mountable controller with a robust armored fiber-cable output, which facilitates its incorporation into OEM designs and provides for the direct delivery of high peak power optical pulses to test samples. A simple key switch interface provides for manual operation with full remote access through computer control. The system includes the capability of remote data logging, power monitoring and system diagnostics for OEM service support. The rugged, all-fiber architecture is designed for 24/7 operation.

The building block of the F-series is Calmar's renowned ultrafast fiber seed laser platform, which utilizes the proprietary Mendocino saturable absorber technology developed and perfected over a twenty-year period to deliver reproducible and reliable mode-locking at turn-on. The system has a standard repetition rate of 55 MHz to ensure excellent signal-to-noise for data averaging applications and a high peak power, low pedestal pulse of < 200 fs for efficient two-photon current creation in test devices. Single-mode fiber delivery ensures outstanding beam quality with high spatial resolution for the optical test probe. An RF synchronization output is also provided as a trigger signal.

The Carmel F-1350 is the first all fiber-based femtosecond source specifically designed for straight forward integration into OEM microscope and metrology systems used in the test and characterization of integrated circuits. The fiber-delivered output minimizes the need for delivery optics and provides for spatial flexibility and specificity for transient current generation.

If the performance parameters do not quite fit your application requirements, please contact us at sales@calmarlaser.com to discuss a customized solution.

Technical Specifications¹

Model Number	CFL-01OFF
OPTICAL	
Central Wavelength (nm)	1347 ± 10
Pulse Width ² (fs)	< 200
Average Power (mW)	> 100
Repetition Rate ³ (MHz)	55
Pulse Energy (nJ)	> 2
Spectrum Width (FWHM, nm)	40 - 60
Power Stability over 8 hours ⁴ (% , RMS)	< 3.0
Beam Quality, M ²	< 1.1
Polarization Extinction Ratio (dB)	> 20
Output	Single Mode PM fiber
Termination	FC/APC Connector
ELECTRICAL	
Electrical Synchronization (V)	~ 0.5, SMA connector
Supply Voltage	85 - 264 VAC at 47 – 63 Hz, autoranging
Power consumption (W)	200
MECHANICAL	
Operating Temperature (°C)	20 - 28
Storage Temperature (°C)	0 - 50
Output Armored Fiber Cable ⁵ (m)	1.5
Laser Dimensions (cm)	48.2(W) x 54.2(D) x 18.7(H); 19 inch 4U rack mountable
Laser Weight (kg)	~ 20 kg
Cooling	Air-cooled by low noise fan
Warm-up Time (min)	10 (typical)
I/O CONTROL	
Communication Interface	RS-232 Serial Port
Front Panel Control Interface	Power Switch, Laser Key Switch, Emergency Stop Button

1. Due to our continuous improvement philosophy, all product specifications are subject to change without prior notice. Please contact sales@calmarlaser.com for customized specifications.

2. A sech² pulse shape (deconvolution factor of 0.65) is used to determine the pulse width from the second harmonic autocorrelation trace.

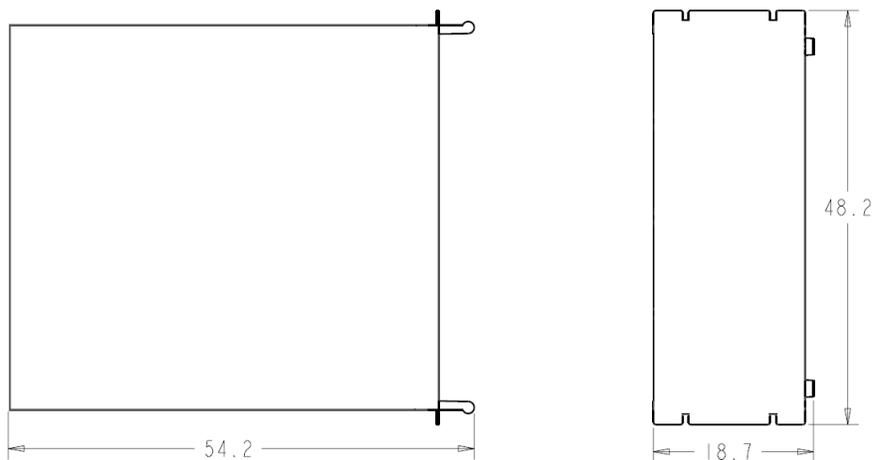
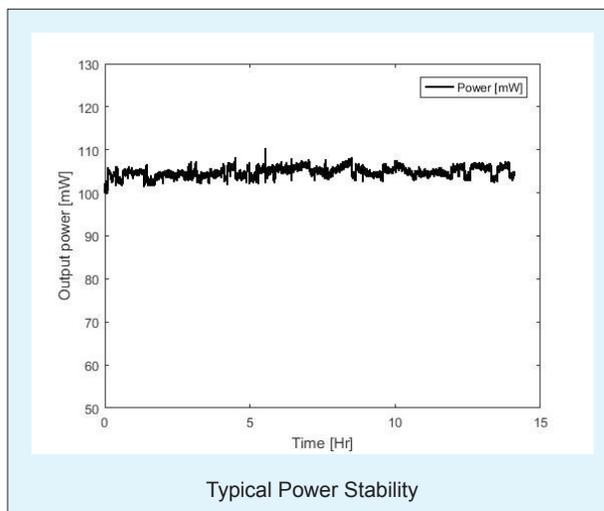
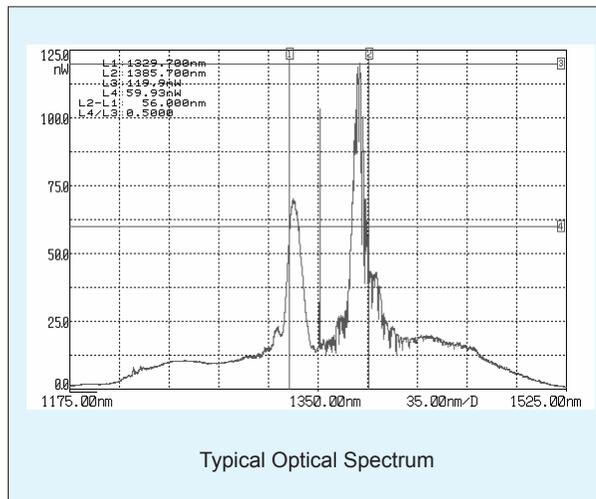
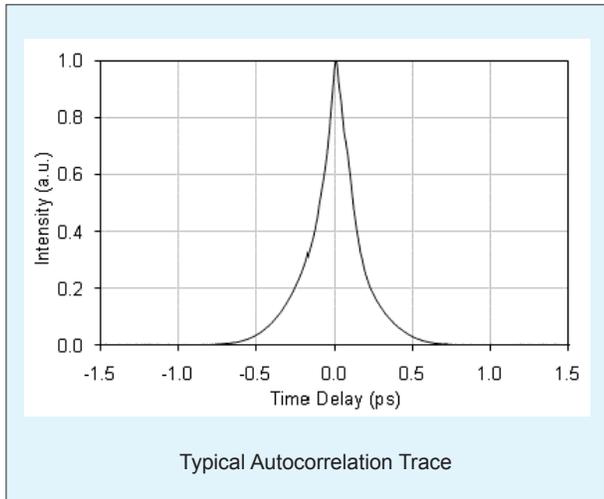
3. 55 MHz is standard. For other repetition rates, please contact sales@calmarlaser.com.

4. Requires an ambient temperature control of ± 0.5°C.

5. For other fiber cable length options, please contact sales@calmarlaser.com.



Optical Characterization



Dimensions of Laser (cm)

