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LIGHTWAVE® ELECTRONICS

Model 110 - 4 to 5ns Infrared Q- Switched Lasers



Applications: Memory Repair, Link Blowing, Thin Film,Trimming, Marking, Ranging

Features: Short pulse width, Superior energy stability, Single shot to 50 kHz, Pulse equalizer, Burst mode, Conduction cooled, Compact, Reliable.

Key Specifications:

Model	110-1047-050	110-1047-100
Wavelength(s)	1047 nm	1047 nm

(Specifications are subject to change without notice.)

Repetition Rate Range:

Internal Trigger	100Hz to 50kHz	100Hz to 50kHz
External Trigger	0 to 50 kHz	0 to 50 kHz
Spatial Mode	TEM_{00}	TEM_{00}
Energy per Pulse(kHz)	> 50 µJ	> 100 µJ
Pulse Width(1 kHz)	< 7 nse	<5nse

(Specifications are subject to change without notice.)

Model 110 diode-pumped lasers provide stable Q-switched output from a compact, efficient package. A high gain Nd:YLF (Yttrium Lithium Fluoride) crystal is used as the gain medium to provide short output pulses. Two versions are available: one has pulse energy > 50 µJ , while the other has >100 µJ pulses and slightly shorter pulses widths. The microprocessor controlled 110A power supply provides pulse equalization over a range of repetition rates, and burst mode output.

Model 110 lasers are ideal for applications which require a robust, long-lived, field-proven Q-switched laser. Applications include optical ranging, optical time domain reflectometry (OTDR), microelectronics processing, thin film trimming, component marking and general laboratory use. The lasers operate on standard single-phase AC voltages and are conduction cooled, eliminating the need for fans and water cooling systems.

Pulse Duration

The "fist-sized " laser head typically produces 6 nsec pulses (FWHM) at 1 kHz in a Gaussian, TEMoo beam. These short pulses are advantageous for applications requiring high peak power from a small, efficient package, or OTDR applications where resolution is determined by pulse duration. Pulse durations as short as 3 nsec, or as long as 50 nsec, are available on a special order basis.

Energy Stability

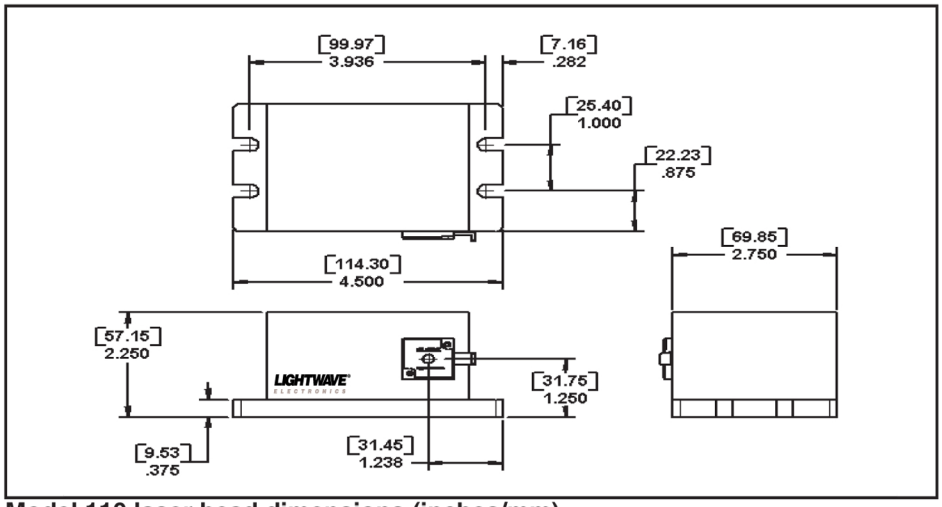
A highly stable laser system was created by rigidly coupling the pump diode relative to the laser cavity, soldering the optical components in place, and incorporating Brewster surfaces on the internal cavity elements. In addition, Model 110 lasers operate many times above the lasing threshold so a large number of longitudinal modes are present. As a result, significant averaging occurs which reduces spiking and improves stability. The Nd:YLF gain medium is also advantageous in this respect, since it has a broader emission bandwidth than Nd:YAG, thereby supporting more longitudinal modes. The net result is excellent energy stability, typically 0.3% rms for the 110-1047.

Reliability

Over the years since its introduction in 1988, the Model 110 has proven itself to be a reliable, robust, and long-lived laser. The optical components are soldered in place to produce a very solid, robust system and ensure long-term reliability. All lasers are shock tested prior to shipment to verify their robustness. The diode laser pump source is closely coupled with the laser cavity, resulting in a highly efficient design. Lightwave takes advantage of this efficiency and decreases the diode laser power, thus significantly lengthening its life. Diode lifetime in excess of 20,000 hours is typical, and many lasers in the field are running strong with well over 30,000 hours of use.

110 Specifications[1]

Parameter	110-1047-050	110-1047-100
Output Beam		
Wavelength	1047 nm	1047 nm
Spatial Mode	TEM_{00}	TEM_{00}
Repetition Rate Range, Externally Triggered	0 to 50 kHz	0 to 50 kHz
Internally Triggered	100 Hz to 50 kHz	100 Hz to 50 kHz
Performance @ 1 kHz, Energy per Pulse	>50 µJ	>100 µJ
Pulse Width	<7 nsec	<5 nsec
Energy Stability	<1% rms	<1% rms
Timing Stability w.r.t. Input Trigger Signal	±5 nsec @ 1 kHz	±5 nsec @ 1 kHz
Output Sync Signal	±1 nsec @ 1 kHz	±1 nsec @ 1 kHz
Polarization	>100:1, horizontal	>100:1, horizontal
Beam roundness	<10% elliptical	<10% elliptical
Waist Location, inside laser head, from window	1 cm nominal	1 cm nominal
Beam Diameter at Window, $1/e^2$	0.2 mm nominal	0.2 mm nominal
Beam Divergence, full angle	8 mrad nominal	8 mrad nominal
Warm-up Time, from cold start	<15 minutes	<15 minutes
from STANDBY	<1 minute	<1 minute
Input & Ambient Requirements		
Voltage	90 to 285 VAC	90 to 285 VAC
Frequency	47 to 63 Hz	47 to 63 Hz
Power, maximum	100 W	100 W
Operating Base Temperature	15° to 35°C	15° to 35°C
Relative Humidity, non-condensing	10% to 80%	10% to 80%
Dimensions		
Laser Head, w x h x d, mass	12 x 6 x 7 cm, 1.4 kg	12 x 6 x 7 cm, 1.4 kg
Power Supply, w x h x d, mass	26 x 11 x 27 cm, 3.5 kg	26 x 11 x 27 cm, 3.5 kg



Model 110 laser head dimensions (inches/mm).

Options

Series 110 lasers may be special ordered for alternative wavelengths, such as 1053 nm, 1321 nm, or 1343 nm, and may be configured for pulse widths from 3 nsec to 50 nsec. Consult Lightwave Electronics for additional information on these special versions.





Notes:
1. Specifications are at factory settings and subject to change without notice.

LIGHTWAVE® ELECTRONICS

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