

FASTPULSE TECHNOLOGY, INC.

LASERMETRICS® Division

220 Midland Avenue • Saddle Brook, NJ 07663

Tel: (973)478-5757 • Fax: (973)478-6115

WebSite • www.fastpulse.com

5046SC SYSTEMS

FOR LASER PULSE
EXTRACTION, GATING & CHOPPING

- ≤ 3.5 Nanosecond Rise & Fall Times
- Fully Adjustable HV Pulse Amplitude
- Up to 2.5 kHz Selection/Gating Rates
- Self-contained HV Power Supplies
- Internal Gimbal Mounted Pockels Cell
- KD*P, RTP or BBO Pockels Cells
- No Exposed High Voltage
- RoHS2 Compatible
- Meets U.S. & CE EMC Requirements

The Series 5046SC system incorporates high voltage supplies, an electro-optic light modulator and high speed switching drivers in a single, EMI/RFI shielded enclosure. Only +24 Volts DC and two externally generated trigger signals are required for operation. The systems are highly reliable, completely solid state and meet all requirements of U.S. and European EMC standards.

5046SC systems can operate over a wide range of voltages. They are capable of producing quarter and halfwave retardation voltages over an optical spectrum of 300 nm to more than 2000 nm with appropriate light modulators. Output pulse amplitude is adjustable by a front panel potentiometer from about 1.0 kV to 10 kV.

Exhibiting optical rise and fall times as fast as 3 nanoseconds, 5046SC Systems are exceptionally useful for regenerative amplifier switch-out, laser pulse slicing, mode locked pulse gating, cavity dumping and Q-switching. The systems are valuable for both intracavity and extracavity applications and offer the latest technology in reliable, solid state, high voltage switching design with negligible EMI/RFI. They are used by several OEM laser manufacturers in their regenerative laser systems.

Series 5046SC Systems can be configured for a variety of applications. An extensive selection of components and operating parameters are available. Optical switching is accomplished by Series 1000 and 1145 KD*P, or Series 1147 RTP



Pockels cells, designed to match the electrical characteristics of the 5046 High Voltage Driver. Maximum system repetition rate is determined by the Pockels cell capacitance and maximum power supply high voltage. For a Series 1059 Pockels cell (KD*P crystal, 5 pf) and nominal 7 kV voltage setting, the repetition rate is limited to about 2.5 kHz. At shorter wavelengths and lower operating voltages, repetition rates of 5 kHz are attainable. Higher repetition rates are possible under certain conditions. Our engineering staff will work with you to optimize a system for your particular application.

KD*P Pockels cells with sol gel AR crystal coatings exhibit a damage threshold in the range of 20 GW/cm² with laser pulse widths less than 100 psec. RTP (rubidium titanyl phosphate) devices operate at voltages significantly lower than KD*P, exhibiting negligible piezoelectric resonances. RTP has damage thresholds of the same order as deuterated KD*P: approximately 750 MW/cm² for a 10 nanoseconds wide Q-switched pulse at 1064 nm. In gating, slicing and pulse picking applications with laser pulses < 100 picoseconds, the damage threshold is in the 20 GW/cm² range.

Pulse widths less than 2 ns can be attained with RTP Series 1147 and DKDP Series 1042 by switching the HV output pulses from zero to full wave retardation voltage. This technique can be used to generate double pulse gating, i.e., two gating pulses for each triggering of the 5046ER PS/TG separated in time by setting the front panel Pulse Width control.

CONTINUED - OVER

SERIES 5046SC SYSTEMS

5046SC Systems are self-contained with the Optical Head Assembly packaged in a shielded enclosure. Unshielded, open configurations for end user packaging are also available. A typical shielded system consists of the following elements:

5046SC HV-PFN Module with internal HV Power Supplies
Q1059P Series KD*P, or 1147 Series RTP Pockels Cell with AR coatings
MG-145 Precision Pitch & Azimuth Gimbal (with Pockels cell mounted)
Cover & Cable Set
Optional Glan-Air or Dielectric Film Polarizers are available

Contact our Engineering Sales Group for alternatives and options to match your application

NOMINAL SPECIFICATIONS

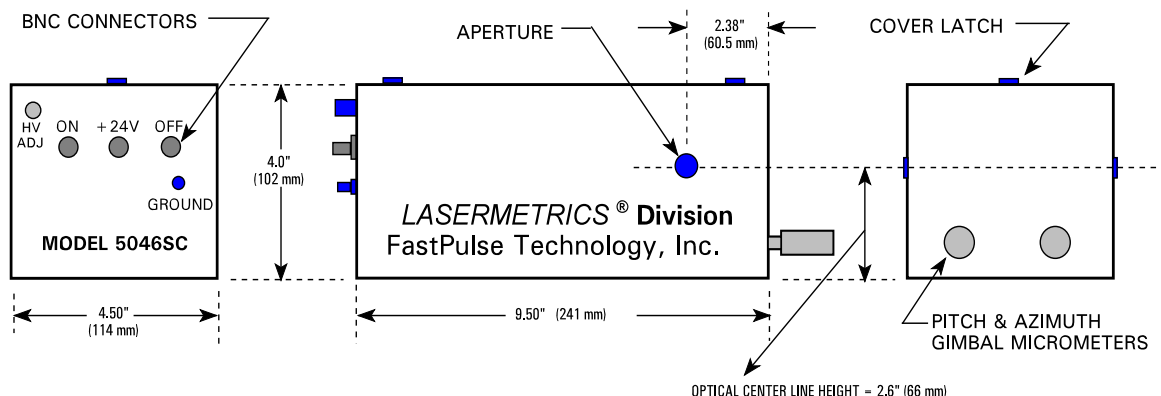
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|--|---|
| Useful Optical Wavelength Range ¹ : | 300 to 2200 nm |
| Optical Rise and Fall Times ² (10 to 90%) | 3 to 4 ns (Q1059P Series Pockels cells) |
| Optical Pulse Width: | < 10 nsec to 1 μ sec |
| Repetition Rate ³ , single shot to: | 2 kHz ($\frac{1}{2}$ wave retardation with a Q1059P modulator at 1064 nm) |
| Jitter, System Input to Output: | < 1 nsec |
| Input-Output Propagation Delay Time: | < 50 nsec |
| Trigger Input Impedance: | 50 ohms |
| Trigger Input Pulse Voltage (ON & OFF): | 2 to 5 Volts |
| Trigger Input Pulse Width (ON & OFF): | 50 nsec to 500 nsec |
| Voltage & Power Required | + 24 VDC @ up to 1.5 amperes |
| Dimensions ⁴ : | 4H X 4.5W X 9.5L, inches |

1. Wavelength range is dependent on choice of electro-optic modulator and crystal material. For instance, for operation at 1064 nm with 20 watts average power and with peak power densities of less than 750 MW/cm², the Series 1147 RTP modulators would be likely candidates. At average power \leq 15 watts and peak power densities up to 750 MW/cm² in a 10 ns pulse, a Series 1059 modulator (Q1059PSG-1064) would be a good choice.

2. Optical rise and fall times are independent of the output pulse amplitude. The HV Adjust control provides adjustment of the pulse amplitude between \approx 1.0 kV up to the maximum level.

3. Higher repetition rates are possible with lower voltage RTP or dual crystal KD*P Pockels cells (Series 1040 or 1147) and/or with shorter operating wavelengths, which require lower operating voltages.

4. A Model with 2.0 inch optical center line height is available. Contact the factory for details.



5046SC SYSTEM — DRIVER MODULE / OPTICAL HEAD ASSEMBLY

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