

# FASTPULSE TECHNOLOGY, INC.

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Q1059P SERIES POCKELS CELL

Q-SWITCHES / MODULATORS

- 10 mm & 12 mm Apertures
- Sol Gel AR Coatings on Crystal
- Highest Extinction Ratio
- Lowest Insertion Loss
- Highest Damage Threshold



Lasermetrics Q1059P E-O Modulator/Q-switches are electro-optic devices used in many laser systems world-wide. The 1059P Series originated in 1970 and have been continuously upgraded and improved. They will accommodate the most demanding high peak power laser applications. All models within the series utilize an enhanced internal crystal support and superior sealing system. The devices incorporate highest quality crystals, fused quartz windows and high damage threshold antireflection coatings.

E-O performance of the Q1059P Series is based on highly deuterated (98+ %D, Potassium Dideuterium Phosphate (known as DKDP or KD\*P) crystals, selected for absence of strain and stria, lowest residual birefringence and wave front distortion. A cylindrical ring electrode-crystal configuration produces the most uniform retardation field currently available. Crystals are mounted in durable and mechanically stable thermoplastic housings. Stainless steel or Ceramic aperture plates are used in all models. Windows are bubble and strain-free fused quartz with high efficiency antireflection coatings.

Sol Gel antireflection coatings are applied to the crystal for highest peak and average power applications. Sol Gel coatings are extremely efficient, having reflectance losses of about 0.05%. Damage threshold for Sol Gel coatings is at least as high as for the KD\*P crystal material

While Sol Gel crystal coatings have largely replaced Index Matching Fluid (IMF) for the visible through Near IR, these coatings are not efficient in the UV range below 400 nm. For UV applications, when IMF is required to minimize reflection losses at the window-crystal interfaces, we recommend our Series 1040 – which includes models with apertures from 10 to 20 mm.

A variety of antireflection coatings options are available. A key feature of the Q1059P Series is the user's ability to adjust the alignment of the fused quartz windows. This may be done while the device is in position in the laser optical train. Simple hex wrench adjustments can tilt each window to be precisely on or off-axis by as much as 2 degrees. The Q1059P model can be specified with wedged or parallel window surfaces and with the crystal cut at a desired off-axis or surface wedge angle.

In very fast pulse gating applications, with laser pulses widths less than 100 picoseconds, the Q1059P Series has a nominal damage threshold of 20 Gigawatts/cm<sup>2</sup>. In Q-switching the devices will tolerate in excess of 850 Megawatts/cm<sup>2</sup> at less than 10 nanoseconds pulse width.

Lasermetrics Q-switch drivers 5055, 5056, 5046ER & 5046SC Laser Pulse Gating/ Extraction / Chopping Systems and 8025RS HV Pulse Amplifiers are compatible with all Q1059P models within the series.

Q1059P Series devices are guaranteed against defects in materials and workmanship for one year.

#### NOTES:

1. A 12 mm aperture unit with same outer dimensions as 10 mm aperture model is available as Model Q1059P12SG
2. Ceramic aperture plates (stops) are used in 10 and 12 mm aperture models (Type A aperture plate).
3. Terminals: Removable pin terminals with either 4-40 thread and nuts or solder cups may be specified.

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## Q1059P SERIES - NOMINAL SPECIFICATIONS

Aperture Diameter	10 mm diameter *(12 mm in Model Q1059P12)
Crystal Material	> 98.5 + % Deuterated DKDP (KD*P)
Peak Optical Power	850 Megawatts/cm <sup>2</sup> for pulses < 10 nsec wide
Density Capability	10 Gigawatts/cm <sup>2</sup> for pulses < 500 psec wide
(Uniform Beam, no Hot Spots)	20 Gigawatts/cm <sup>2</sup> for pulses < 100 psec wide
Range for Peak Power Density	400-1100 nanometers
Transmission, with "V" AR coatings	> 98% from 400 nm to 1064 nm
Quarter Wave Retardation Voltage	@ 694 nm: 2.1 kilovolts DC @ 1064 nm: 3.2 kilovolts DC
Extinction Ratio (Contrast Ratio) with Full Aperture Beam	> 1000:1 at 633 nm
Intrinsic Rise Time	< 350 picoseconds
Capacitance*	< 6 picofarads
Weight (approximate)	90 grams

Ordering Information Examples: Q1059PSG-1064-A – for 10 mm aperture, AR coatings for 1064 nm with Type A aperture plate and ceramic aperture stop.

For 12 mm aperture unit: Q1059P12SG-694-B – for 12 mm aperture, AR coatings for 694 nm with Type B aperture plate.

Electrical Connection: 2 mm pin terminals: Terminals are removable with multiple spring compression contacts in the female connector. Unless otherwise specified, type S is supplied.

Solder Cup Terminal: This is the standard terminal; specify "S" type terminals.

Threaded Post Terminal: supplied with 4-40 screw thread, nuts and washers. Specify "T" terminals.

