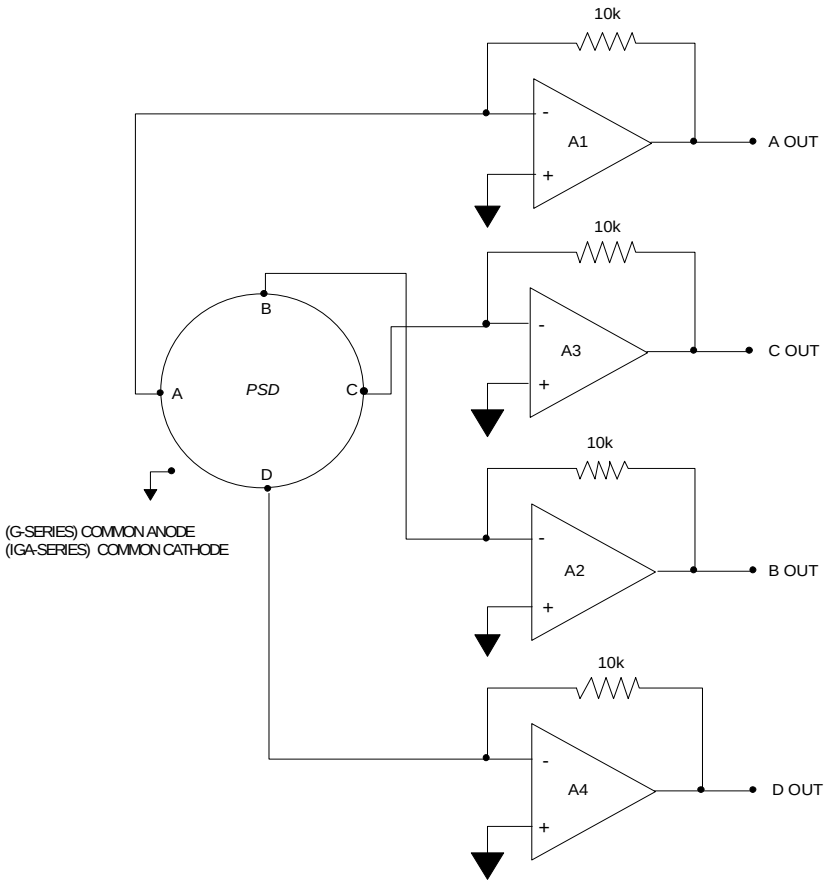
S-SERIES, G-SERIES AND IGA-SERIES PSDs

The S-series silicon, the G-series germanium and IGA-series InGaAs PSDs are a families of lateral effect photodiodes sensitive in the visible and near-IR region of the spectrum - from 300nm to 1700nm. They offer continuous position sensing capability over a selection of active sizes and are available as components or as integrated photodiode/preamplifier subassemblies. A typical operating configuration is as follows:

The devices are similar in operation to the more traditional silicon lateral-effect PSDs, with a few important differences in electrical characteristics - the shunt resistance and inter-electrode resistances. Basically they consist of a common anode and four separate cathodes as shown above (the S-series and IGA-series use a common cathode configuration). The relative magnitudes of the signals from the four top contacts are used to determine the beam position on the photodiode. They have good spatial linearity in the central



$$X = \frac{A - C}{A + C}$$

$$Y = \frac{B - D}{B + D}$$

portion of the active area and with calibration they offer extremely accurate and repeatable measurements. The resolution depends on the incident power level, typically in the 10uW to 1mW range.

All the units are designed for zero bias operation with a set of four individual transimpedance preamplifiers. Post-processing can be done with analog circuitry or directly with A/D conversion and computation in software. The transimpedance gain for each unit is determined primarily by the expected power level of the incident beam. The relatively low shunt resistances - especially of the large area G-series - control the DC-offset characteristics of the circuit. If used in the DC-mode, care must be taken to calibrate and remove DC errors for each unit. A preferred way to operate is with a modulated beam and synchronous detection, eliminating the DC errors. The inter-electrode resistances (a few hundred ohms) control the noise characteristics of the system. Essentially the input of each transimpedance amp sees the parallel combination of these resistances. This requires a very low voltage noise amplifier for optimum performance.

Options available include TE-cooling, integrated amplifiers, modular amplifiers, and ceramic sub-mount packaging. Call the factory for details.