

FREQUENTLY ASKED QUESTIONS

Advanced Single Channel Voltage Mode Pyroelectric Detectors

ALT/ALUT31 Series

What are the main use cases for the ALT / ALUT detectors?

Typical use cases are for spectroscopic applications in FTIR instruments, and for THz radiation detection. However, more exotic use cases can be observed, such as the measurement and monitoring of laser power at long wavelengths.

What wavelength range can the detectors measure?

The ALT / ALUT detectors can be provided with a variety of infrared transmitting windows. Prominently used within the industry, the KBr window transmits out to 30 μm and is also available with a parylene moisture protective coating. BaF₂, CaF₂, CsI, CVD diamond, silicon, and ZnSe are some of the other IR windows available. For THz wavelengths the HDPE window transmits significantly past 60 μm . The complete list of IR windows available and their properties are described on the LASER COMPONENTS website:

<https://www.lasercomponents.com/de-en/product/choice-of-filters-for-pyroelectric-detectors/>

What is the detection speed?

The ALT / ALUT detectors are factory calibrated at 1 kHz and can be used out to approximately 10 kHz. The detectors have demonstrated a fast response to IR flux change which is a requirement for IR detectors used in FTIRs.

Do the detectors need to be cooled?

No. The ALT / ALUT detectors are fabricated using lithium tantalate (LTO) pyroelectric material. LTO based detectors do not require temperature stabilization and cooling does not improve their performance.

What is the operating temperature and environment of these detectors?

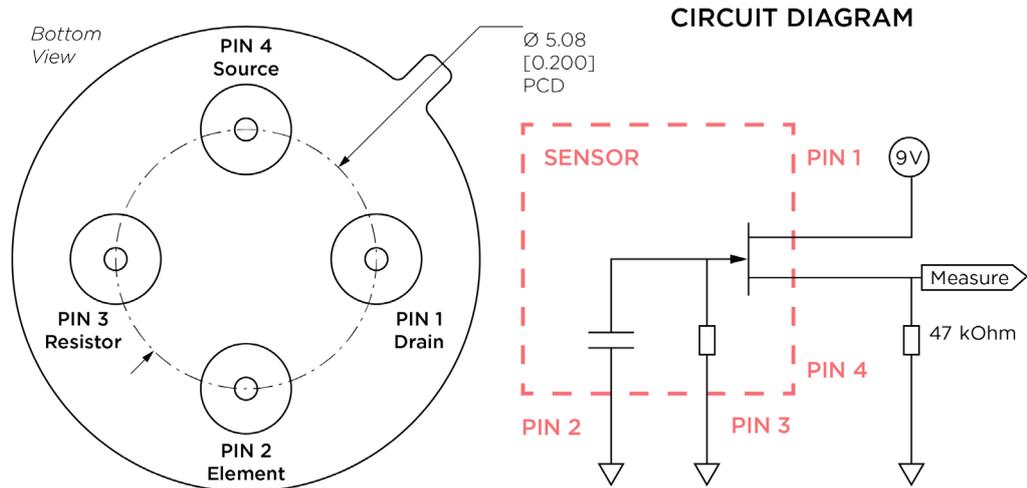
The operating temperature is -20 to +55 °C. For applications where temperatures go beyond this range, LASER COMPONENTS can provide additional qualification testing to ensure reliable performance.

As with all optical elements, it is important to keep the detector in non-condensing environments. Some of the IR transmitting windows such as KBr and CsI are hygroscopic and high humidity exposure should be avoided.

/ **Germany and Other Countries** LASER COMPONENTS Germany GmbH Tel +49 8142 2864 – 0 info@lasercomponents.com
/ **France** LASER COMPONENTS S.A.S. Tel +33 1 39 59 52 25 info@lasercomponents.fr
/ **United Kingdom** LASER COMPONENTS (UK), Ltd. Tel +44 1245 491 499 info@lasercomponents.co.uk
/ **Nordic Countries** LASER COMPONENTS Nordic AB Tel +46 31 703 71 73 info@lasercomponents.se
/ **USA** LASER COMPONENTS USA, Inc. Tel +1 603 821 – 7040 info@laser-components.com

What bias circuit is required for setting up the detector?

The suggested circuit for using these detectors is shown below.



What is the output signal of the detector?

The output signal is an analog voltage as shown in the bias circuit. The detector responds to changing incident IR flux and the response voltage rides on top of a DC offset voltage.

What are the advantages of ALT / ALUT detectors compared to other IR detectors?

There are several advantages. As mentioned above these detectors do not require temperature stabilization or cooling. Additionally, the LTO based pyroelectric element has a high Curie temperature of about 610 °C and does not de-pole under high IR flux. The detectors have demonstrated excellent linearity in qualification tests with high optical power FTIRs; the linearity of the detector response under changing IR illumination is a key requirement for accuracy of the Fourier Transform mathematical operation. The ALT / ALUT detectors have large active detection areas compared to some quantum detectors that use immersion lenses.