

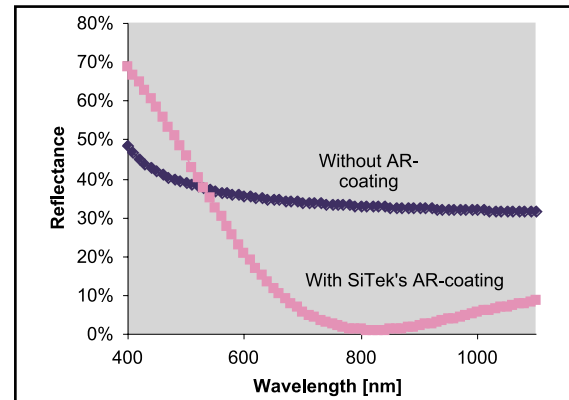
AR-coating

Introduction:

Whenever light hits the boundary between two media, some or all of the light may be reflected. The amount of light reflected depends on the reflective indices of the media and the wavelength of the light. The incident angle of the light also influences the reflection. To have a good responsivity of the PSD it is important that as much of the incident light as possible is transmitted into the detector and not reflected away from the surface. The fraction of reflection at a boundary between air and silicon is above 32%. Depositing an efficient anti-reflection (AR) coating on the PSD's surface can dramatically reduce this figure.

Basic principles of AR-coating:

The simplest anti-reflective coating consists of a thin layer (AR-layer) of some material that has a reflective index somewhere between air and the silicon. The incident light will then undergo reflections both in the air/AR boundary and the AR/silicon boundary. If the thickness of the AR-layer is properly chosen a destructive interference between the two reflected waves will occur which will cancel out the reflected wave. The interference in the AR-layer is governed by the Fresnel's equations which states that if the refractive index of the applied AR coating equals the product of the indexes for air and silicon, all of the reflection will be extinguished. It is often problematic to find an appropriate material for the AR-layer that fulfils this condition. Often two, three or more layers with different reflective indices are combined to get as near as possible to the ideal situation of zero reflected light.



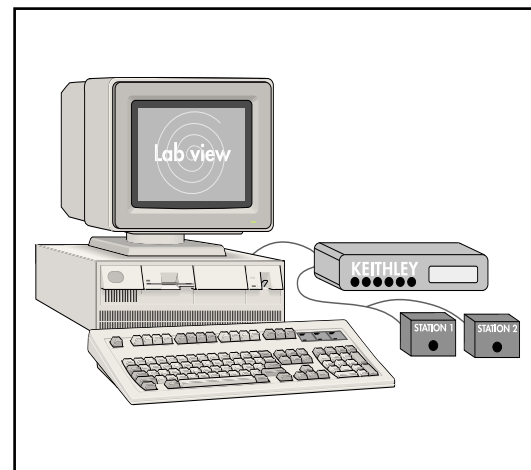
SiTek's AR-coating:

SiTek has a two-layer AR-coating that is optimised for wavelengths around 860 nm. Thanks to this the reflectance is decreased from 32% to less than 2% for the selected region. This is pictured in the chart above. The wavelength for which the minimum reflection occurs can be selected by adjusting the thickness of the AR-coating layers. If the detectors are going to be used in applications where the incident angle of the light is not normal to the surface this has to be taken into consideration when developing the optimal AR-coating. For applications where the responsivity is a limiting factor, it is of course of paramount interest to do an optimisation of the AR-coating.

The LBRN system -

The most precise instrument for characterising a PSD

In order to speed up production and to meet the ever-changing requirements of today's customers we have upgraded our production control measurement system for dark current, resistance and noise. The automated new system, built around a Keithley source measure unit and programmed in Lab view, assures fast uncompromising accuracy and reliable performance. It allows for an up to four times higher throughput. The components are checked for leakage current (dark current), noise current, and inter-electrode resistance. Also, testing how much reverse voltage the component can withstand (breakdown voltage) gives information on the quality of the pn-junction. It measures noise free and in the nA range. All measured data is collected and stored in our database and used for statistical analysis in our continuous efforts to improving our components.



SiTek photographer: Steve Swift

Seeking the heat

Thermal imaging is a powerful tool utilized by progressive companies and organizations across a wide range of industries and applications ranging from steel production and automotive quality control to medical diagnosis of certain diseases and life saving rescue operations.

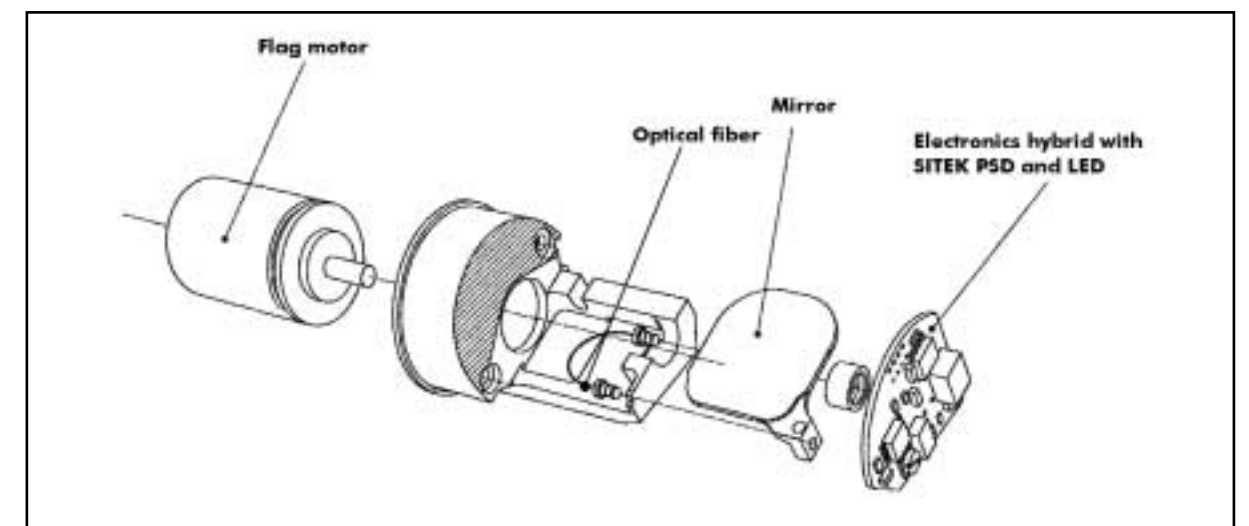
A recent example of the latter is when a heroic helicopter crew from the 36 Rescue flight out of Spokane, Washington, rescued an elderly woman with the help of a thermal imager. Reported missing for more than 10 hours, the 65-year-old with Alzheimer's disease wore only a thin fleece jacket, green slacks and tennis shoes. It was after midnight Friday and the temperature was a freezing -25 degrees. Fischer almost certainly would have died if she hadn't been found by Fairchild Air Force Base's Rescue Unit - 15 minutes before the unit's helicopter ran out of fuel.

FLIR Systems AB, the world leader in industrial, military, commercial, and paramilitary thermal imaging equipment has for many years used SiTek PSDs in their high resolution long wavelength surveillance camera systems Thermovision THV900 and Thermovision THV 1000. These systems are designed for rapid deployable, integrated systems that are used in critical applications where high-resolution imagery is required in total darkness or under adverse weather conditions. They provide cost-effective solutions for surveillance missions such as border- and coastal-surveillance force protection and reconnaissance. The thermal image is captured by an infrared lens-system and brought to a sensitive infrared detector by means of a mechanical scanning system. For the vertical scanning an aluminium mirror is used powered by a specially designed flag motor. The mirror makes a rotation of ± 7 deg. and follows the movement



Thermovision™ THV 1000

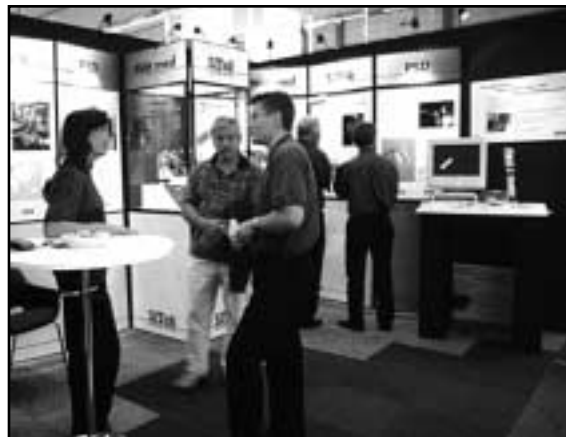
according to the vertical deflection of standard video system up to 60 Hz, i.e. a linear movement of about 14 ms and a fly back time of about 2,5 ms. The linearity of the movement must be very good to achieve an undistorted picture. As can be seen in the picture below, this system consists of four main parts excluding the motor servo (not described here). These are the flag motor, the aluminium mirror, an optical fiber and the sensor electronics hybrid with a high precision LED and a 5 mm one dimensional SiTek PSD. One end of the fiber is picking up light from the LED mounted on the rear of the electronics hybrid and the other end is attached to the mirror. This end makes a movement over the PSD during the mirror swing, which is replicated in the output signal from the PSD.



Report from the Components & Electronics Fair

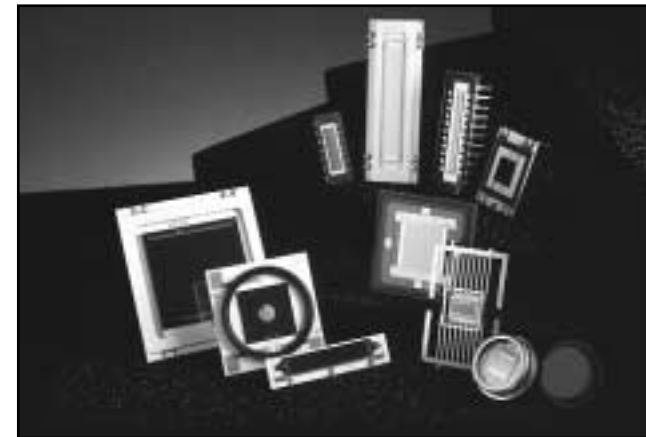
In the beginning of September SiTek exhibited at the Components and Electronics Production 2000 in Gothenburg's congress centre. The exhibition went on for four consecutive days and attracted 10 356 visitors. Out of the 380 exhibitors SiTek's stand was visited frequently. We showed our components and explained about their unique features as well as informing about SiTek as a company. We felt that the exhibition was a success and we got around 100 serious inquiries.

We thank you all for visiting our booth and also our customers LMI Selcom and Fixtur-Laser that lent us their products.

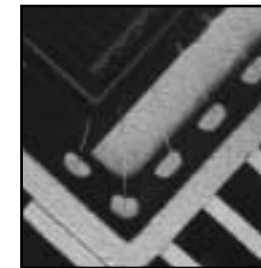


No limitations to what encapsulating SiTek can do !

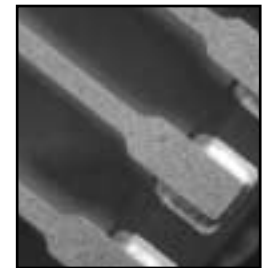
Not even the best sensor can function without a package. At SiTek we can offer a package optimised for every need. After 25 years in business we have a great deal of experience in chip packaging. In our standard designs there is a good selection of packages for different chip sizes and different needs but it doesn't stop there!



Alternatively we are happy to help you integrate our sensor into your design to reach a more effective production process. We can also customise substrates to accommodate other components.



Flat pack



Contacts

Kovar packages. Sometimes a stable metallic package is necessary. The metal that is most compatible with silicon and ceramic in terms of heat elongation is kovar. If your product is designed for a special package, we can of course mount our chip into any of your favourite packages.

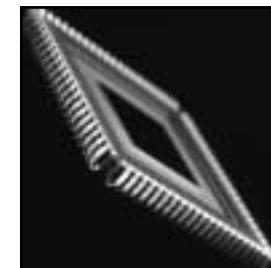
Packages

Ceramic package. They are available in a number of different sizes and shapes and are a cost effective package for smaller size chips. Choose between circular, square or rectangular packages, whatever fits your product best. Our standard substrate packaging is a cost effective package for all chip sizes. It is available with or without a filter/glass and is an attractive package for almost every application.



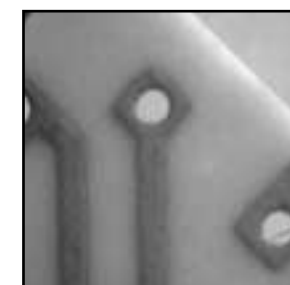
Ceramic package

SMD-packages These are available on request in several sizes and materials. This is the optimum package for effective assembling at your end.



SMD-package

Custom design. If you have special demands about the design and function of the package you should choose a custom designed substrate.



Custom design substrates

Filter and glass

Standard glass or custom filter! We supply our sensors with or without glass or filters depending on your requirements. We can for instance supply our sensor with glass and filters with various AR-coatings.



Grey filter

Other mechanics

Temperature control! Do you want to regulate the temperature of your sensor? We can do this by mounting a peltier element, heat sink and a fan depending on your application.



Mechanic with cables

Or do you want to fit the package into your own mechanic? Tell us about your specific requests, when it comes to packages, filters, mechanics or design,

there are no limitations to what SiTek can do.

New reinforcement at SiTek

My name is Erik Törnqvist and I have been working for SiTek since October 2000. I'm working as a production technologist and my task is to find ways to make our production line more effective.

I will also give the products a higher value to our customers by adding functionalities and offer a mechanical design integrated to our customers products. Previously I have been working with mechanical design and production technology for one of the major Swedish consulting engineering companies. It's a great big challenge for me taking part in bringing SiTek into the next phase of the companies growth and development. I am looking forward to meeting our suppliers and customers and developing a good relationship with them. I am 34 years old and have two young kids who demand that I spend most of my free time with them. I also enjoy rebuilding my house and going wind-surfing or sailing in summertime.



My name is Ewa Mörk, and I've been working at SiTek since the 22nd of November last year. I work at SiTek's administration department. I take care of SiTek's payments; salaries as well as suppliers payments.

If you make a telephone call to SiTek, it's probably me you'll hear on the phone. I'm 40 years old, and live with my husband and our four children in a small town called Mölnlycke, situated a little east from Gothenburg. My spare time, I try to spend with my children. I also enjoy a workout twice a week. Once a year my family and I go by car to Italy. We usually stay there for 14 days, enjoying the beautiful region of Tuscany. I finished my education, Master of Business Administration, just before I started to work at SiTek. It's a very interesting work, at a company with high quality products. It's my ambition to keep that high quality in the administration as well. I am very happy to be part of the SiTek team.



See us at the Laser 2001
Munich, June 18 - 22, 2001
Hall B1, Booth B1.463
At the stand of Laser Components
(our German distributor)