PHOTONICS NEWS

Company Newsletter of LASER COMPONENTS (UK) LTD

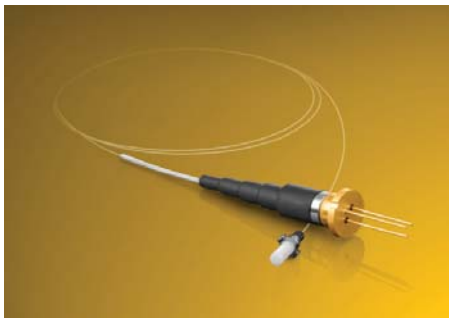
June 2015
Issue 50

Precise and Robust Fibre-Coupled APDs and Pulsed Laser Diodes

Fibre-coupled avalanche photodiodes (APDs) and pulsed laser diodes (PLDs) are engineered and produced by LASER COMPONENTS. The robust, hermetic assembly is ideal for many applications. For example, high-power PLDs (as the laser source) and suitable low-noise InGaAs APDs are used for distributed temperature sensing (DTS) applications, and Si Geiger-mode APDs are used for photon counting.

The fibres are aligned and fixed with high positional accuracy and close to the detector active area, or laser source, making the fibre-coupled devices especially ideal for sensing applications.

Flexible assembly technology allows almost every combination of optical fibre and APD – Si or InGaAs. In principle, all PLDs can also be supplied with a fibre connection – no matter which wavelength is required: 850nm, 905nm and 1550nm.



All fibres with Ø400µm core can be coupled.

The devices can also be terminated with FC/PC or SMA connectors upon request. To optimise coupling efficiency, the fibre end faces can be finished with an AR coating. These robust components can be used across a wide temperature range; their design goes far beyond the requirements of the Telecordia GR468 directive.

Have a look at our accessories as well: whether you need suitable driver electronics for a PLD or a high voltage supply for APDs, you obtain everything from one source.

Webcode: UK50-0350

InGaAs or Silicon Photodiodes for Visible Laser Detection?

Classically, this is an application that would only be suited to Si photodiodes; but if you find yourself looking for a device with greater temperature stability as an alternative to Si then look no further than our panchromatic InGaAs photodiodes.

Our range of IG17, IG22 and IG26 InGaAs photodiodes are not only an excellent choice for IR measurements, but their ability to detect from 400nm and excellent temperature stability means they are also a great choice as a replacement for Silicon photodiodes in laser applications, especially for measurements above 900nm where Silicon's temperature dependence starts to deviate from the ideal <0.1%/K value.

In this situation InGaAs is an attractive option providing a constant temperature coefficient of <0.1%/K across a broad range of wavelengths. In our measurements the IG22 series is recorded as having a coefficient of 0.002%/K.

Webcode: UK50-0280

PPM-1 Rotation Mount

Retardation plates are thin and thus difficult to handle, however handling is made easy with our 360° rotation mount!

The black anodised aluminium housing offers optimum stability for all kinds of thin optics, including Ø1" ring mounted assemblies due to its integrated threaded ring with nylon protection.

Two measurement scales guarantee extremely precise angles of incidence. The integrated M6 standard thread makes the PPM-1 compatible with most existing laboratory equipment.

Webcode: UK50-0940

Dear colleagues

As reported in our last newsletter PN49 we have seen a huge interest in our IR detector products in particular with pyro and lead salt detectors. This issue we feature our IG InGaAs photodiode series as well as a customer feedback section on page three's column article.

Following much demand we now have a 488nm laser diode source and a fibre optic collimator. Per requests, we aim to introduce new products to our range of standard photonic components as well as customise certain parameters to provide your instrument with leading edge performance. Please do not hesitate to ask about ways to enhance your next upgrade.

Chris Varney
Managing Director

Visible Blue and Green Laser Diodes

Laser diodes from OSRAM Opto Semiconductors, which emit in the visible range, are now available from LASER COMPONENTS.

These powerful laser diodes in the blue and green spectral ranges are used in laser projection, laser shows, stage lighting, biomedical and medical technology (targeting a widely used fluorescence excitation band at 488nm), measurement technology, and holography.

The wavelength and powers that are available are:

- 450nm: 80mW and 1.6W
- 488nm: 60mW
- 510 - 530nm: 30mW - 120mW

Standard laser diodes are now available in stock in a TO-56 housing and with the option of having a monitor photodiode.

These diodes can be spectrally measured and selected at our facility upon request.

Webcode: UK50-0480

Superluminescence Diodes from Arima - New Product Line

A superluminescence light emitting diode (SLED) is equivalent to a laser diode without a resonator, offering the brightness of a laser diode with the low coherence of LEDs via amplified spontaneous emission.

Similar to edge-emitting laser diodes, SLEDs have a p-n junction and are operated under forward bias. Unlike edge emitters, SLEDs do not have a resonator; thus a standing wave cannot form. Without sufficient feedback, SLEDs are unable to achieve lasing action instead relying on a high single pass optical amplification for spontaneous emissions.

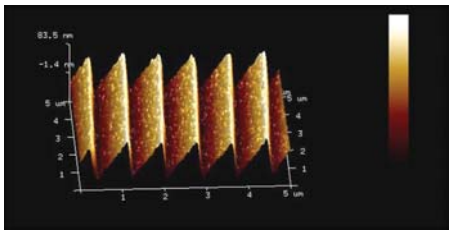
Arima Lasers now offers SLEDs at 670nm and 830nm with an output power of up to 10mW in 5.6mm TO packages.

Fields of Application
These diodes are successfully used in optical low coherence tomography, fibre sensor technology, and illumination for medical applications.

Webcode: UK50-0440

AFM Monitoring for Diffraction Gratings

LASER COMPONENTS' partner Optometrics Corporation recently added advanced scanning Atomic Force Microscopy (AFM) within their metrology capabilities, enabling new benchmarks for nano-scale measurement, characterisation, and manipulation for diffraction grating design optimisation.



AFM profile examination of an Optometrics 1,200 l/mm, UV blazed holographic diffraction grating

When diamond ruling or holographically recording a new master grating, inspection through advanced high resolution imaging tools provides confirmation that the shape and pattern of the microscopic groove has been optimised and produced as designed.

Diffraction efficiency and dynamic range are critical parameters in many spectroscopic instrument designs. Understanding why a particular diffraction grating may have a small yet necessary performance differentiation for instrument design success can be crucial.

For instance, many diffraction gratings are simply referred to by their original production method, groove frequency and blaze, such as Ruled 600 line/mm 400nm. Yet, not all ruled 600 line/mm 400nm gratings are alike. Similarly named "masters" may actually vary depending upon the potential size, shape, and location of unintended anomalies on the individual master diffraction grating groove facets. These nanometer scale differences may noticeably impact performance over narrow or broad spectral regions.

Webcode: UK50-0852

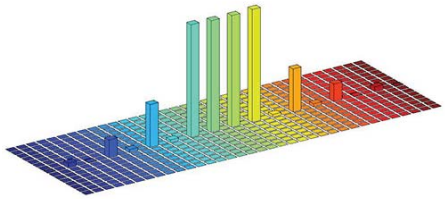
Diffractive Optical Elements Made of Plastic

If diffractive optical elements are used at low and medium laser power, it is not always necessary to use expensive fused silica elements because plastic elements may be sufficient.

Holo/OR offers plastic DOEs in different materials: polycarbonate, PMMA, Zeonex, and Zoner. They are produced in large quantities using an injection moulding process.

Custom Elements
Plastic DOEs are advantageous in systems that are mass produced. As most customers will require bespoke optics Holo/OR offers inexpensive tooling and low production costs - see for yourself!

Adaptation of Existing Designs
Do you already have a DOE design manufactured on a fused silica element? As long as it is physically possible, this design can be adapted to a plastic DOE design.



Standard Designs
Multi-spot DOEs and homogenisers are currently available as standard elements for the wavelengths 850nm and 532nm.

Your Own Beam Analysis
For evaluation purposes, Holo/OR uses software developed in-house, and so you will be able to obtain a data file for the DOE with your quotation. This file can then be integrated into your own software (Zemax or Lighttrans) for further simulations.

Webcode: UK50-0031

Lightweight IR Laser Safety Eyewear

Our new range of laser safety filters designed for use in the 1400-1550nm spectral band offer superior protection at a reduced weight thanks to their polycarbonate filters! With Optical Densities of 1400-1550nm OD4+ and 1410-1510nm OD5+ these filters offer a more cost effective and lighter option to heavy, expensive, glass filters. A polycarbonate filter which protects you in the 750-1120nm spectral range is also available! Boasting protective specifications such as 750-1120nm OD6+ and 800-1100nm OD7+ this cost effective filter is ideal for IR applications!

Webcode: UK50-0520

Hermetic Feedthroughs for Fibre Optics

Optical fibres used in pressure chambers or vacuum applications have to be guided from the outside then into the inner environment. Feedthroughs that can withstand high pressure and also feature high temperature stability are used for this purpose. We offer a new range of products for multi-mode, single-mode, and PM fibres that are suited for high-vacuum (HV), ultrahigh-vacuum (UHV), and high-pressure applications.

Direct Fibre Feedthroughs
Direct fibre feedthroughs without a connection option at the flange make it possible to achieve high packing densities at a good price/performance ratio. Two versions are available:

1. pressure-tight feedthroughs that are waterproof and airtight
2. HV and UHV-tight fibre feedthroughs

Connector-based Feedthroughs
These versions are particularly flexible since the fibres outside and inside the chamber are interchangeable which is particularly advantageous when using sensitive fibres, or during maintenance work inside the chamber where the connectors can be separated easily. This range of products consists of HV and UHV-suitable connector and coupler-based solutions.

Product Features
Our feedthroughs are available at different pressure levels from 10-5 to 10-12 mbar l/s and for different ISO flanges (e.g., KF and CF flanges). For baking-out purposes, temperatures of up to 180°C can be specified.

Custom assemblies can also be provided, in addition to standard flanges. The mechanical and optical design is customised to meet your requirements. A hermetic seal is also available for gases and liquids.

Webcode: UK50-0135

Fibre Optic Focusable Collimators - for Easy Laser Beam Guidance

Laser light can be delivered to any location with the use of fibre optics, however, one challenge is to efficiently couple the light into and out of the fibre. In general it is necessary to collimate the laser beam during output coupling.

To make this process as simple as possible, we have developed focusable fibre optic collimators, manufactured in Germany. Available in two diameters, Ø11.5mm and Ø19mm, these collimators are suitable for step-index fibres with 0.22 NA, with single-mode fibres, and CO2 fibres with Ø750µm or Ø1000µm core diameters.

These collimators consist of lens systems that are anti-reflection coated for different wavelength ranges. Choose any of the standard wavelengths 350-700nm, 650-1050nm, 1050-1060nm, or 10.6µm.

Furthermore, the focal length of the system can also be selected. Depending on the application, the beam diameter requirements are very different. The correlation between beam diameter and operating distance is shown on the product datasheet.

All collimators can include connectors, such as; SMA, FC wide key, FC small key, FC/APC wide key, and FC/APC small key. Other connectors are also available upon request.

Webcode: UK50-0115

Innovation, not Imitation

With the opening of our new production facilities for PbS/PbSe and pyroelectric detectors, LASER COMPONENTS is looking towards becoming a world leading manufacturer of IR components. We aren't looking to just provide the same components already on the market, but innovate and develop along with the technology that our customers produce. We are inviting you, the customer, to tell us:

- do your pyroelectric detectors require higher performance?
- what kinds of problems do existing detectors have on your product?
- do you have to forego certain applications because you do not have a suitable detector?
- what detector do you want to see available?

We will happily take a look at any request and confirm the feasibility; currently we manufacture: panchromatic InGaAs photodiodes, extended InGaAs photodiodes, InGaAs APDs, InGaAs line arrays PbS/e detectors and Lithium Tantalate and DLaTGS pyroelectric detectors.

Webcode: UK50-0330

quTAU Time-to-Digital Converter

The quTAU records the timestamps of electrical signals, which is extremely important in time-correlated single photon counting.

The compact counter transmits the time an event occurs and the count rates of eight individual input channels via USB to a PC. In addition, the quTAU exhibits a temporal resolution of 81ps. The arrival times of the TTL incoming pulses are stored digitally and can be transferred to a PC using USB 2.0. The quTAU not only counts and stores individual events but coincidences between two or more channels as well. The coincidence time window can be easily set by the user. All of the features have been designed with applications such as quantum optics, fluorescence microscopy, and high-energy physics in mind.

The system comes with example software for LabViewTM and C/C++ and can be operated on Windows® and Linux PCs.

Webcode: UK50-0290

Precision Laser Modules for High Accuracy Alignment

LT-PLM Precision Laser Modules are precisely aligned and adjusted dot lasers built for high accuracy alignment tasks. The circular shaped laser beam deviates by no more than 1mm over 20m with respect to the mechanical axis of the housing, allowing

for precise alignment over large distances. Three variants are available, including a standard cylindrical module with an M12 connector, a larger cylindrical version with an integrated rechargeable battery, and a square model designed for easy mounting featuring an M12 connector. The LT-PLM series is available with a red 635nm 1mW beam to maintain an eye safe environment.

Webcode: UK50-0740

488nm FLEXPOINT® Laser Modules

The FLEXPOINT® laser module series now includes dot and line lasers at 488nm. Therefore, in addition to 405nm and 450nm, a third wavelength is available in the blue spectral range, replacing large Ar+ gas lasers.

Depending on the beam profile, the output power up to 40mW is possible. Due to the narrow-banded emission of 488nm ±2 nm, these laser modules are ideally suited for fluorescence applications, spectroscopic applications, and particle measurements. Further applications include biomedical and medical technology.

If our standard modules do not completely suit your application, we can work with you to develop an appropriate laser module.

Webcode: UK50-1740

UVA LEDs in Industrial Applications

It is a well-known fact that LEDs are used in smartphones and tablets, as well as different types of displays and sensors, but they are also widely used behind the scenes. In manufacturing processes, UVA LEDs from LG Innotek offer wavelengths from 365nm to 405nm and so are particularly useful.

UV LEDs Used to Cure Touchscreens

UVA LEDs are used to cure adhesives; for example, touch-sensitive screens are assembled by bonding together the display glass, touchscreens, and LCD displays across the entire surface. When smartphones first came out, the touchscreen and display were stacked on top of each other without a surface adhesive - air was sealed between the layers. As the screens got larger, framing and pressure distribution became more difficult. Full-surface adhesion became an integral part of production. This has made it possible to produce flatter and flatter smartphones, as well as to produce and assemble them more quickly and easily.

Curing of Other Adhesives

UVA LEDs are also used to cure DVDs, automotive electronics, and cabin equipment in aeroplanes. Another popular application is the curing of laminate flooring.

Also Ideal for Varnishes and Printing Inks

Varnishes and printing inks also need to be cured, in addition to adhesives. These substances start out as a liquid and are solidified via a chemical reaction within a matter of seconds by the high-energy radiation of UVA LEDs. UVA LEDs are also used in the dental industry to cure composite fillings in teeth. Activating an initiator at a wavelength of from 300nm to 450nm triggers the polymerisation of the composite and the curing of the filling.

UV LEDs in place of UV Lamps – The Advantages:

LEDs continue to replace UV lamps and flash lamps in these applications, as:

1. UVA LEDs have a longer lifetime, typically >10,000 hours
2. LEDs feature short switching times because they do not need to warm up
3. LEDs require very little space
4. the heat radiation of UV LEDs is minimal

Webcode: UK50-0810

See us at
Photonex Scotland Roadshow
June 03, 2015, University of Strathclyde
Booth S1

Photonex SCOTLAND
Photonics Technology Roadshow
3rd June 2015 · University of Strathclyde

See us at
Photonex, October 14 - 15, 2015
Ricoh Arena, Coventry
Booth D15

Photonex®
14th & 15th October 2015
Ricoh Arena Coventry

LASER COMPONENTS

LASER COMPONENTS (UK) LTD
Goldlay House
114 Parkway
Chelmsford
Essex CM2 7PR

Tel: 01245 491499
Fax: 01245 491801

Managing Director: Chris Varney
Registered Company 2835714

Editor: Kay Cable