MEMS Emitter Combines High Signal with Fast Pulses

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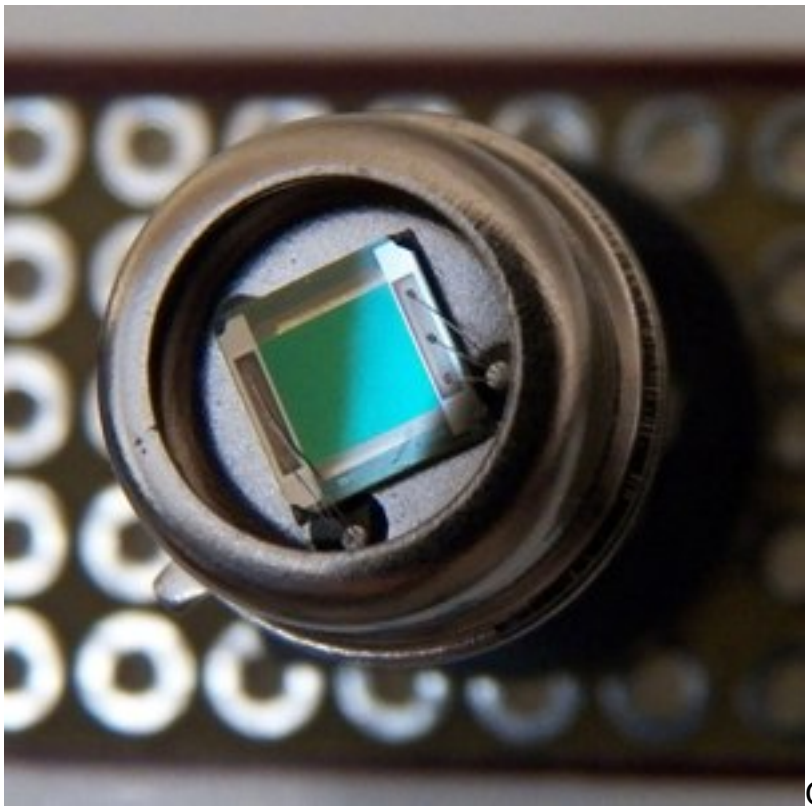

Cal Sensors announces the global launch of a new MEMs Pulsed Emitter (MPE), a broadband source of quasi-black body pulsed light that operates over the 1 to 20 micron infrared (IR) spectrum. Designed with patented, thin-membrane, thermo-resistive material, the MPE combines excellent quality with high signal, fast pulses and long life.

With its broadband emission and low input power requirements, the MPE is well-suited to a wide variety of portable and traditional medical applications including but not limited to respiratory measurements, capnography applications and glucose monitoring.

The MPE promotes optimizing measurement dynamic range thanks to a combination of attributes that maximize signal output while minimizing 1/f noise. This is possible due to the emitter’s high pulse speed, low thermal mass, fast response and superior high temperature capabilities. When paired with high performance detector technology, high measurement sensitivity and signal to noise ratio are achieved, allowing the detection of trace gases with very low parts per million.

The MPE provides high pulse rates (up to 100 Hz) and modulation depth with very repeatable results. Superior signal to noise measurements can be achieved since the fast pulses maximize the sensitivity of the accompanying detector while

minimizing the 1/f noise. With a pulsing speed up to10 times faster than alternative technologies, the MPE expands the potential measurement dynamic range and resolution for trace gases with very low parts per million.

The MPE offers high speed pulsing without the need for a mechanical chopper. Mechanical choppers increase system costs and increase the potential for system failures.

Traditional infrared emitters, such as a miniature vacuum filament lamps, are slow to warm up and need time to stabilize. Subsequently, although a measurement may only be required periodically (such as every 30 seconds), conventional emitters often have to remain on 24/7 to achieve the required measurement stability. Not only is this impractical for portable equipment and wasteful, but it also may cause degradation in the measurement by heating up the entire sensor (measurement system) and degrading the performance of the detector.

The thin-membrane thermo-resistive design of the MPE offers low thermal mass and a low thermal time constant, allowing the emitter to rapidly heat up and cool down, thus turn on and stabilize for measurements very quickly. Consequently, the thermal conduction losses are smaller and radiation efficiency is maximized.

The fast ramp up and near instantaneous stabilization not only reduce costs and power consumption, but also can extend the life of the emitter. The emitter is expected to exceed 150,000 hrs average lifetime (at 10Hz, 50% duty cycle and 800 mW) - accelerated life testing is still ongoing.

The signal performance is further enhanced by the high operating temperature capabilities of the MPE. It supports temperatures up to 750°C which deliver higher energy across the operating spectrum and up to double the signal in the MWIR versus 600°C, without significant increases in noise.

The MPE has significantly lower power requirements than traditional emitter technologies. These low input power requirements (up to 1.1W peak) promote lower system costs and portable instrumentation.

The MPE is available in an industry standard TO-5 package and includes optional window. The element measures 2.3mm by 2.4mm. Lead times can be as quick as 12 weeks.

For more information, visit www.calsensors.com [1].

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[1] http://www.calsensors.com/