VISHAY
The DNA of tech.™

DID YOU KNOW?
BIOMETRICS WITH VEMD2704

Introducing our newly released Photodiode VEMD2704, expertly developed and optimized for a wide range of biometric measurements. This groundbreaking technology is particularly suited for two main applications in smart watches: Heart Rate Monitoring (HRM) and the recently trending Blood Oxygen Saturation (SpO_2) measurement.

For HRM, a green LED with a wavelength of around 530 nm is typically used. On the other hand, SpO_2 measurement necessitates two different wavelengths at around 660 nm and 940 nm. Therefore, the ideal photodiode for biometrics should cover all three wavelengths to provide a reliable and usable signal.

Photodiode Detectors

In Figure 1, you can observe various photodiode response curves with the three crucial wavelengths highlighted in red. The orange line represents a standard photodiode technology, which exhibits limited response in the important IR wavelength range required for blood oxygen measurement. However, our VEMD2704, represented by the blue line, employs a novel technology process that significantly enhances IR Sensitivity while maintaining the performance of a standard photodiode.

In addition to its cutting-edge technology, the VEMD2704 comes in a smaller package, measuring just 1.8 mm x 2.0 mm with a square chip. This compact design allows for more flexibility in incorporating multiple photodiodes in various biometric applications such as smartwatches, rings, or headphones.

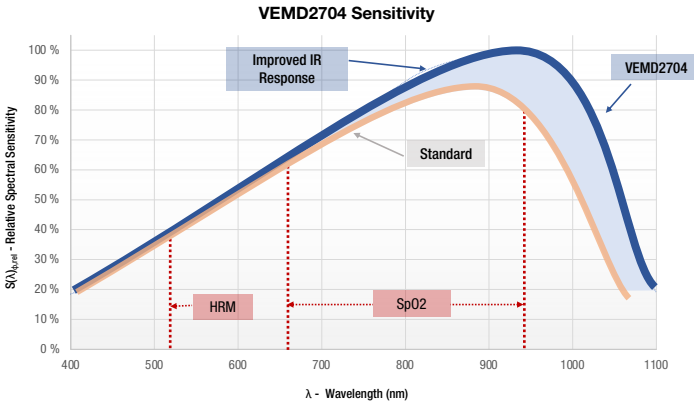

Figure 1. VEMD2704 Response

Choose VEMD2704 for reliable, precise, and versatile biometric measurements in the most innovative wearable devices.

Blood Oxygen Measurement

Optical SpO_2 measurement with 660 nm and 940 nm wavelengths relies on the different light absorption properties of oxygenated and deoxygenated hemoglobin to estimate the blood oxygen saturation level in a non-invasive and relatively simple manner.

Hemoglobin is a protein in red blood cells responsible for carrying oxygen throughout the body. It can exist in two states as can be seen in Figure 2 oxygenated (blue) and deoxygenated (red).

The selection of 660 nm (red) and 940 nm (infrared) wavelengths is based on the distinct absorption properties of hemoglobin. At 660 nm, oxygenated hemoglobin has a lower light absorption than deoxygenated hemoglobin, while at 940 nm, the absorption of oxygenated hemoglobin is higher. These differential absorption characteristics are crucial for accurately measuring blood oxygen saturation.

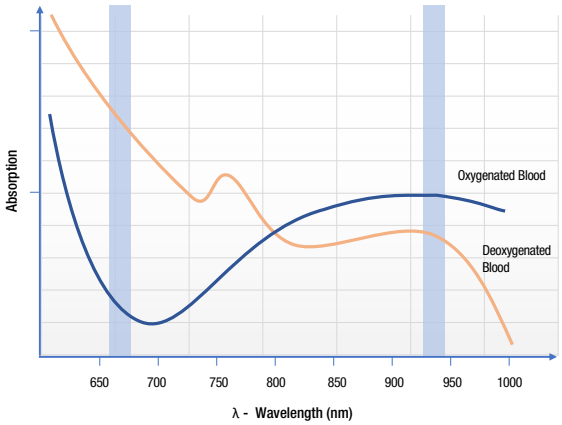

Figure 2. SpO2 Measurement

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