



Heart Rate Monitoring in Wearables and Medical Devices

OS IR | April 2016
Light is OSRAM

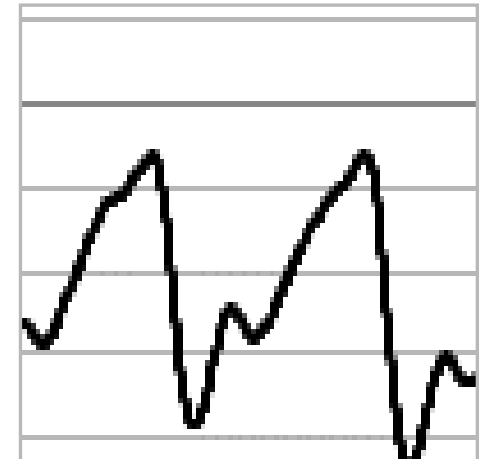
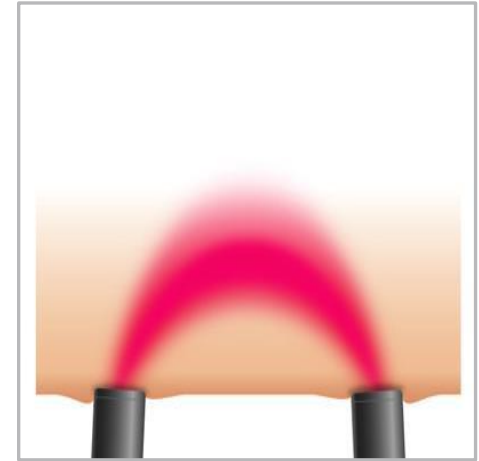
OSRAM
Opto Semiconductors

Optical Solutions for Heart Rate Monitoring in Wearables and Medical Devices



Optical heart rate monitoring

Photo Plethysmography (PPG): Varying light absorption by expanding and contracting blood vessels with each heart beat. Transmissive or reflective measurement.



Recommended products – Optical Sensor Frontend

Discrete solution



Product:
Green LED + large area photo diode
with IR cut filter

Example:
LT PWSG + SFH 2440



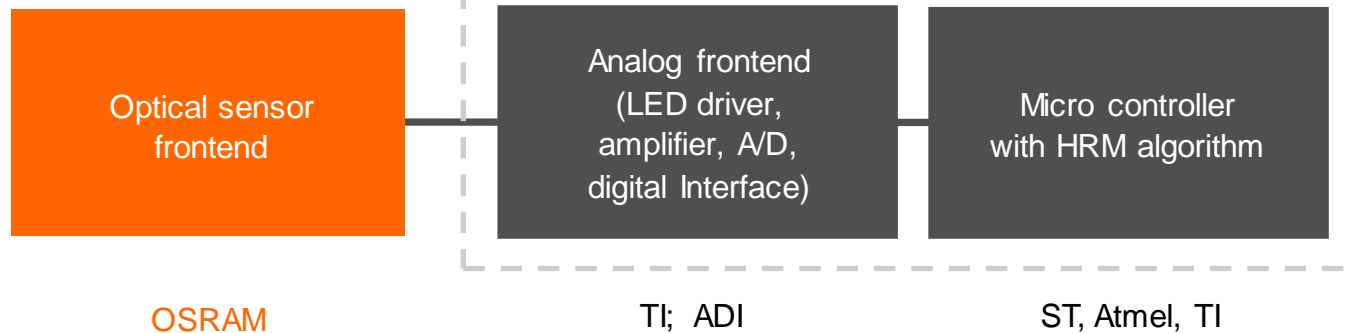
Integrated solution



Product:
BIOFY® Sensor (emitter + photo diode)

Example:
SFH 7060

Building Blocks



Recommended products – Benefits and more

Customer Benefit

Discrete Components (emitter + photo diode)

- Flexible solution for highest performance
- Highly efficient Thinfilm emitters using the newest UX:3 technology
- Fast, sensitive photo diode with high linearity and large sensitive area
- Integrated optical filters on photo diode to improve signal quality

BIOFY® Sensor

- Integrated optical frontend with compact dimensions
- Optical barrier to ensure good signal to noise ratio
- Options with IR/Red emitters for SpO2 measurement based on Pulse Oximetry



CHIPLED



SMT DIL



BIOFY®

Decision criteria






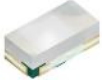


- Discrete components for highest flexibility to optimize performance by the optical design and specific components
- BIOFY® sensor as a ready optical solution with compact size and good signal quality

Tools

- Application note: [Photoplethysmography](#)
- [Sensor](#) Cross reference list
- Reference design from TI ([AFE 4404](#)): All OSRAM BIOFY® sensors available as auxiliary board solution

Optical Heart Rate Measurement (HRM)

Products at a glance

Device	Part number	Centroid wavelength (nm)	Forward voltage (V @ 20 mA)	Radiant sensitive Area (mm ²)	Capacitance (pF)	Spectral Range (nm)	Dimensions (mm ³)	
Multi-wavelength BIOFY® sensor	<u>SFH 7050</u>	530 / 655 / 940	3.4 / 2.1 / 1.3	1.4 x 1.4	5	400 – 1100	4.7 x 2.5 x 0.9	
BIOFY® sensor	<u>SFH 7051</u>	535	3.2	1.4 x 1.4	5	400 – 1100	4.7 x 2.5 x 0.9	
Multi-wavelength BIOFY® sensor	<u>SFH 7060</u>	535 / 655 / 940	3.4 / 2.1 / 1.3	1.4 x 1.4	5	400 – 1100	7.2 x 2.5 x 0.9	
Photo Diode SMT DIL	<u>BP 104S</u>			2.65 x 2.65	48	400 – 1100	6.5 x 3.9 x 1.15	
Photo Diode SMT DIL	<u>BPW 34S</u>			2.65 x 2.65	72	400 – 1100	6.5 x 3.9 x 1,15	
ChipLED (0402)	<u>LT QH9G</u>	530	2.85				0.4 x 0.6 x 0.4	
ChipLED (0603)	<u>LT Q39G</u>	530	2.85				0.8 x 1.6 x 0.4	
PointLED	<u>LT P4SG</u>	528	3.2				1.9 x 3.5 x 0.875	

If software support is needed please contact your Osram OS Account Manager

Recommended products, for further options please check [web site](#)