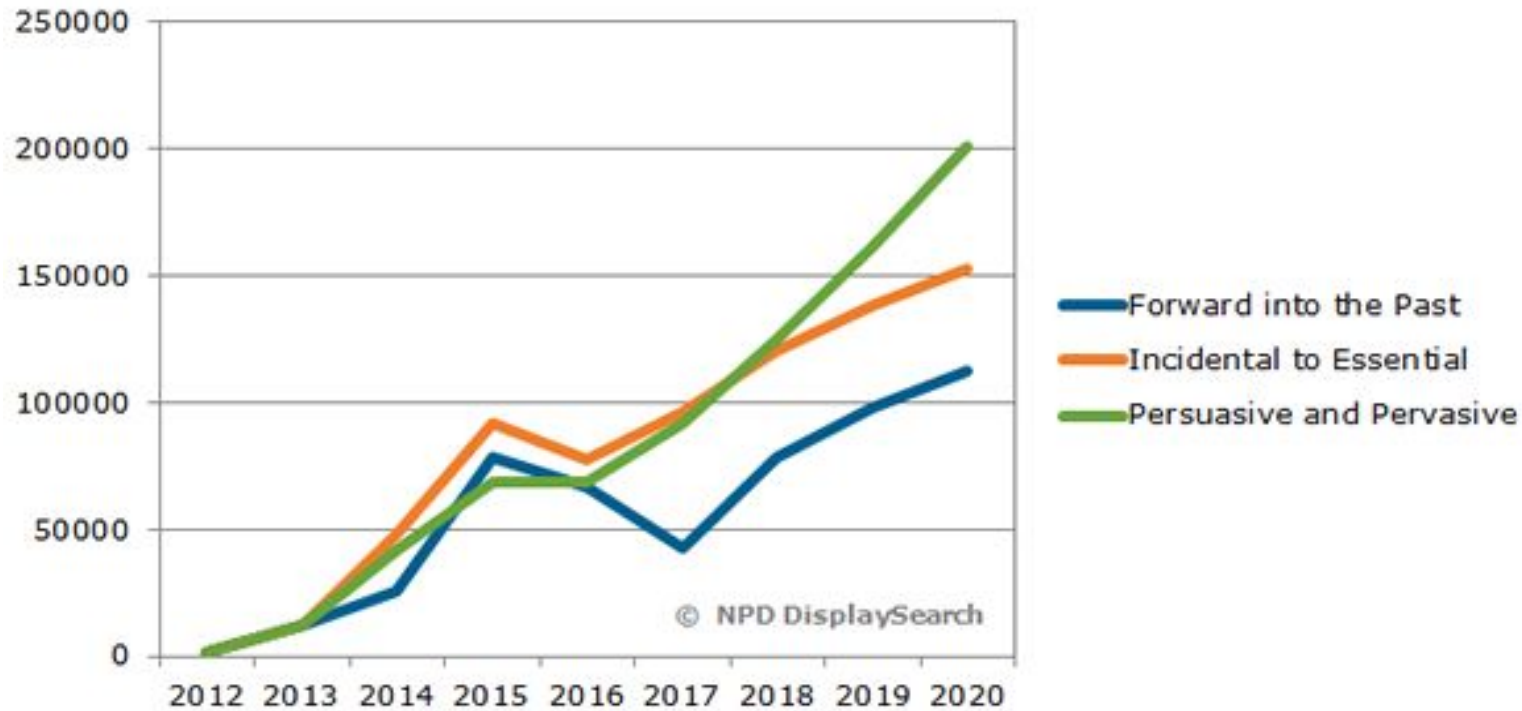


Wearable Market

可穿戴设备市场

NPD DisplaySearch Forecast Scenario (Total Shipments in Thousands)

全球可穿戴设备市场出货预测 (单位:千)



Source: NPD DisplaySearch Wearable Device Market and Forecast Report

Biomedical Sensors for Wearable Devices

用于可穿戴设备中的生物传感器

需要光学传感器的可穿戴设备的新趋势

New Trends for Wearable Devices requiring Optical Sensors

Trend Health Monitoring 健康监测

Wearable Devices like Smart watches use 智能手表等可穿戴设备

- Heart rate monitoring (HRM) 心率监测
- Blood oxygen content 血氧含量

传感器 Sensors

Requirements 要求

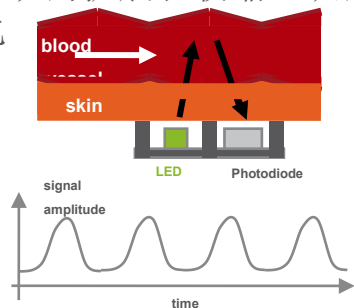
- Non invasive 非侵入式，无创伤
- Easy, fast, robust 方便、快捷、可靠
- Cost efficient 性价比高
- No need for very accurate measurements (like for medical applications)
测量结果不需要像医疗应用那么精确

HRM / Pulse Oximetry Sensor

Application Principle 心率监测/脉搏血氧定量传感器应用原理

Heart Rate Monitoring 心率监测

Blood vessels expand and contract with each heartbeat → light absorption varies 血管随着每次心跳而扩展和收缩，从而导致光吸收率的变化



The frequency of the signal allows to derive the pulse rate → Green LED

由该信号频率可推导出脉搏率 → 绿色LED

Pulse Oximetry 脉搏血氧定量

Comparing signal at 660 nm (Red) and 950 nm (IR) allows measurement of oxygen content of blood 通过比较660nm (红) 和950nm (红外) 的不同信号来测量血氧含量

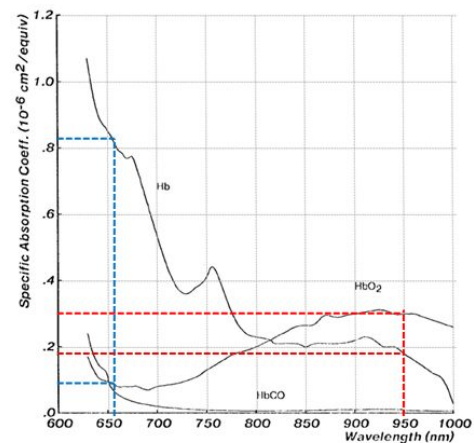
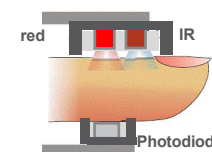


FIGURE 2. Absorption spectra of deoxyhemoglobin (Hb), oxyhemoglobin (HbO₂), and carboxyhemoglobin (HbCO) at wavelengths in the visible - near infrared region. Plotted values obtained from Van Assendelft (16).

• 660 nm (compared to 642 nm) has been established in clinical test and is preferred by the medical community 相比642nm, 660nm已建立临床试验数据, 为医学界首选



Two basic sensor principles 两种基本传感器原理

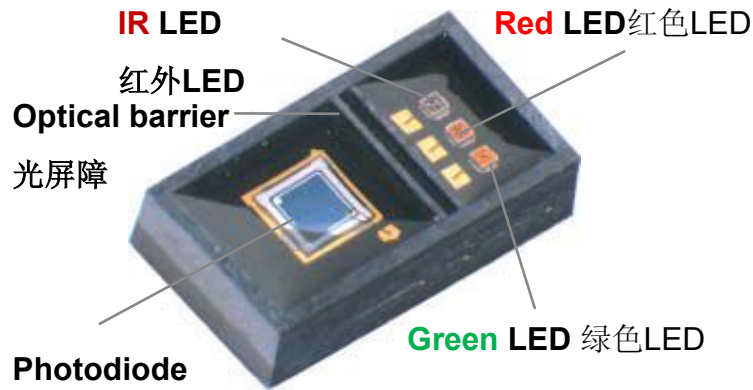
- Transmissive 透射式
- Reflective 反射式



Biomedical Sensor - SFH 7050

生物医学传感器 - SFH 7050

Features 特点



- Multi chip package featuring a IR/red/green LED and a 1 mm² photo diode 多芯片封装，包括红外/红色/绿色 LED 和一个1 mm²的光电二极管
- Small package 4.7 x 2.5 x 0.9 mm³ 体积较小，仅为4.7 x 2.5 x 0.9 mm³
- Light barrier to block optical crosstalk 内置光学屏障阻挡光学串扰

BioMon Sensor – SFH 7050

BioMon传感器-SFH 7050

Integrated optical sensor for heart rate monitoring and blood oxygen content 集成心率监测和血氧检测的光学传感器。

Target Markets: 目标市场:

- Smart watches 智能手表
- Consumer healthcare 消费者保健
- Medical equipment 医疗设备

Status: 状态:

- Alpha data sheet available 初步的规格书可用
- Samples available 样品可用
- SOP planned for Q3/2014 2014 第三季度开始生产供货