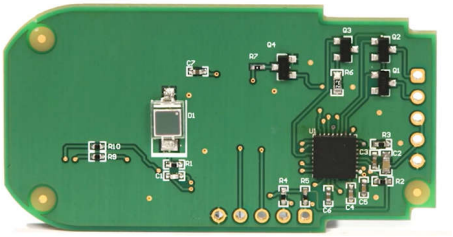
Product Overview

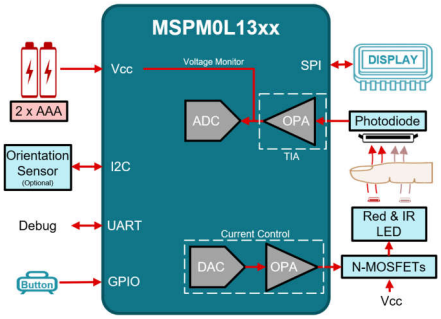
MSPM0-Based Low-Cost Single-Chip Pulse Oximeter Reference Design

Description

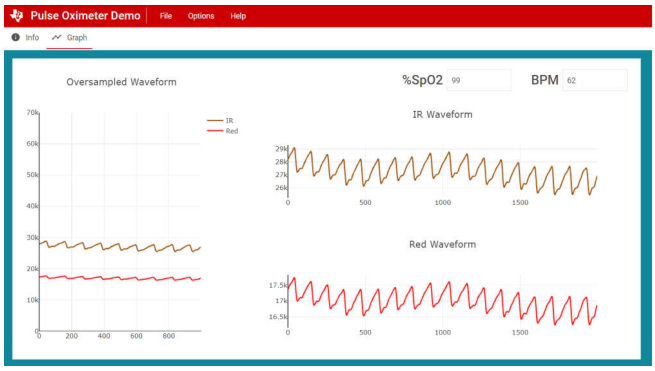
The pulse oximeter is a medical device which measures the oxygen level and heart rate of a person. TI's MSPM0 Arm® Cortex®-M0+ microcontrollers (MCUs) can help engineers optimize the design and performance of pulse oximeters. The MSPM0L1306 provides a low-cost, single-chip solution by integrating required components of the pulse oximeter signal chain. The operational amplifiers (OPAs) within the MSPM0L1306 serve as the trans-impedance amplifier (TIA) and current control driver with their zero-drift, low-noise capabilities. The integrated high-speed analog to digital convertor (ADC) allows oversampling to achieve high levels of dynamic range. This design features a graphical user interface (GUI) to visualize photoplethysmography (PPG) waveforms and measurements of heart rate and peripheral oxygen saturation (SpO_2).



Board



Block Diagram



GUI

Features

- Achievable heart rate and perfusion range of 30 – 240 BPM (beats per minute) and 0.1% – 20% perfusion index (PI) for wide variety of pulse strengths and greater reliability
- 90-dB dynamic range achievable from internal 12-bit ADC through oversampling
- Standard display resolution of 1 BPM and 1% SpO_2 for accurate vitals readings
- Longer battery life with ultra-low (< 83 nA) shutdown current during device off-time

Applications

- Clinical pulse oximeter
- Multiparameter patient monitor

Resources

- Texas Instruments, MSPM0L1306 product folder
- Texas Instruments, Low-cost pulse oximeter and blood pressure monitor with Arm® Cortex®-M0+ MCUs video
- Texas Instruments, *Simplifying Pulse Oximeter Designs With Low-Cost Highly Integrated MSPM0 MCUs* application brief

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