

AFE General Purpose 1 ADC 8bit 30-Pin DSBGA T/R

Manufacturer: [Texas Instruments, Inc](#)**Package/Case:** DSBGA-30**Product Type:** Data Conversion ICs**RoHS:** RoHS Compliant/Lead free **Lifecycle:** Active

Images are for reference only

[Inquiry](#)**General Description**

The AFE4410 is an analog front-end for optical biosensing applications, such as heart rate monitoring (HRM). The device supports a maximum of four switching light-emitting diodes (LEDs) and a maximum of three photodiodes (PDs). The electrical current from the photodiode is converted into voltage by the transimpedance amplifier (TIA) and digitized using an analog-to-digital converter (ADC). The ADC code is stored in a 128-sample first-in, first-out block (FIFO) with programmable depth. The FIFO can be read out using either an I²C interface or a serial peripheral interface (SPI). The AFE also has a fully integrated LED driver with 8-bit current control. The device has high dynamic range transmit-and-receive circuitry offering a dynamic range of up to 100 dB that enables accurate heart rate sensing. The AFE achieves extremely low current levels by operating an ultralow power (ULP) mode set by using the ENABLE_ULP register bit.

Key Features

Accurate, Continuous Heart-Rate Monitoring:

Up to 100-dB Dynamic Range for Accurate Heart-Rate Detection

Low Current for Continuous Operation on a Wearable Device With a Typical Value:

Transmitter:

4 LEDs in Common Anode Configurations

Mode to Fire Two LEDs in Parallel

Programmable LED On-Time

Average Current of 30 μA Adequate for a Typical Heart-Rate Monitoring Scenario:

Receiver:

Supports 3 Time-Multiplexed PD Inputs

24-Bit Representation of Current Input From PD in Two's-Complement Format

Digital Ambient Subtraction at ADC Output

Transimpedance Gain: 10 k Ω to 2 M Ω

Receiver Operates at Approximately 1- $\mu\text{A}/\text{Hz}$ Sampling Rate (Example, 25 μA at 25 Hz)

Hardware Power-Down Mode: Approximately 0- μA Current

Clocking Via External Clock or Internal Oscillator

FIFO With 128-Sample Depth:

Programmable Partitioning Across Phases

Pin-Selectable I2C, SPI Interface

Operating Temperature Range: -20°C to $+70^{\circ}\text{C}$

2.6-mm \times 2.1-mm, 0.4-mm Pitch DSBGA Package

Supplies:

Tx: 3 V to 5.25 V

Rx: 1.8 V to 1.9 V (LDO Bypass),

IO: 1.7 V to Rx_SUP

Recommended For You
