

## AFE General Purpose 1 ADC 24bit 3.3V/5V 15-Pin DSBGA T/R



Images are for reference only

[Inquiry](#)

**Manufacturer:** [Texas Instruments, Inc](#)

**Package/Case:** DSBGA15

**Product Type:** Data Conversion ICs

**RoHS:** RoHS Compliant/Lead free 

**Lifecycle:** Active

### General Description

The AFE4404 is an analog front-end (AFE) for optical bio-sensing applications, such as heart-rate monitoring (HRM) and saturation of peripheral capillary oxygen (SpO<sub>2</sub>). The device supports three switching light-emitting diodes (LEDs) and a single photodiode. The 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 can be read out using an I<sup>2</sup>C interface. The AFE also has a fully-integrated LED driver with a 6-bit current control. The device has a high dynamic range transmit and receive circuitry that helps with the sensing of very small signal levels.

## Key Features

### Transmitter:

Supports Common Anode LED Configuration

Dynamic Range: 100 dB

6-Bit Programmable LED Current to 50 mA (Extendable to 100 mA)

Programmable LED On-Time

Simultaneous Support of 3 LEDs for Optimized SPO<sub>2</sub>, HRM, or Multi-Wavelength HRM

### Receiver:

24-Bit Representation of the Current Input from a Photodiode in Twos Complement Format

Individual DC Offset Subtraction DAC at TIA Input for Each LED and Ambient Phase

Digital Ambient Subtraction at ADC Output

Programmable Transimpedance Gain: 10 k $\Omega$  to 2 M $\Omega$

Dynamic Range: 100 dB

Average Current Less Than 200  $\mu$ A for PPG Signal Acquisition

Pulse Frequency: 10 SPS to 1000 SPS

Flexible Pulse Sequencing and Timing Control

### Flexible Clock Options:

External Clocking: 4-MHz to 60-MHz Input Clock

Internal Clocking: 4-MHz Oscillator

I2C Interface

Operating Temperature Range: -20°C to 70°C

2.6-mm  $\times$  1.6-mm DSBGA Package, 0.5-mm Pitch

Supplies: Rx: 2 V to 3.6 V, Tx: 3 V to 5.25 V, IO: 1.8 V to 3.6 V

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## Recommended For You

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### AFE5807ZCF

Texas Instruments, Inc

BGA

### AFE1205E

Texas Instruments, Inc

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### AFE1104E

Texas Instruments, Inc

SSOP

**AFE2124E**

Texas Instruments, Inc  
SSOP48

**AFE4300PNR**

Texas Instruments, Inc  
LQFP80

**AFE1103E**

Texas Instruments, Inc  
SSOP

**AFE5818ZBV**

Texas Instruments, Inc  
BGA

**AFE4403YZPT**

Texas Instruments, Inc  
DSBGA36

**AFE4403YZPR**

Texas Instruments, Inc  
DSBGA36

**AFE4404YZPR**

Texas Instruments, Inc  
DSBGA15

**AFE4400RHAT**

Texas Instruments, Inc  
VQFN40

**AFE4490RHAT**

Texas Instruments, Inc  
QFN

**AFE4405YZR**

Texas Instruments, Inc  
DSBGA

**AFE5808AZCF**

Texas Instruments, Inc  
BGA

**AFE5812ZCF**

Texas Instruments, Inc  
BGA135