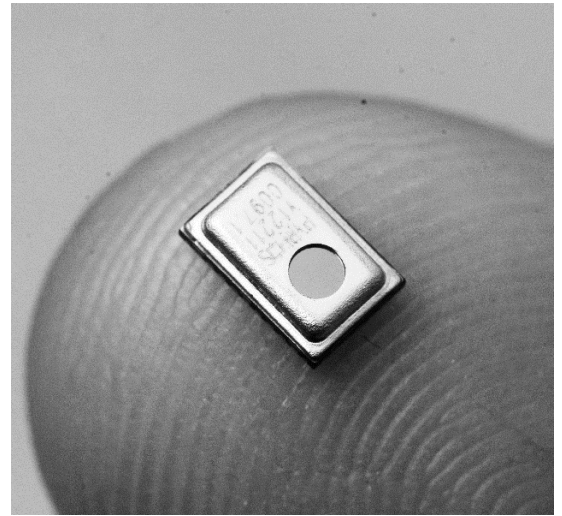


# ezPyro™ I<sup>2</sup>C Pyroelectric Infrared Flame Sensor (SMD)

## Introduction

The ezPyro range of thin film digital pyroelectric IR sensors for flame detection combines high quality sensors with a high level of configurable electronic integration in a small SMD package. High sensitivity combined with fast response times ensure rapid and accurate flame detection. The high dynamic range allows detection of small and large flames, nearby or over larger distances. These sensors integrate a digital, current mode read-out offering high responsivity over the full frequency range of flame flicker (3-30 Hz). Programmable gain and filtering offer maximum flexibility in system design. Industry standard I<sup>2</sup>C communication enables plug-and-play connectivity to microcontrollers and allows easy tuning and calibration. ezPyro sensors are very stable over time ensuring a long and maintenance-free operational lifespan. Various optical filter options are available. These sensors can also be daisy-chained to allow synchronized sampling across devices and offer various low power modes.



### Sensor Characteristics

Filter aperture	d = 1.65 mm
Element size	0.64 x 0.64 mm <sup>2</sup>
SMD Package	5.65 x 3.7 x 1.55 mm
D* (typ.) <sup>1</sup>	2.5 x 10 <sup>8</sup> cm <sup>√</sup> Hz/ W
NEP (typ.) <sup>1</sup>	2.7 x 10 <sup>-10</sup> W/√Hz
Time Constant	~10ms (10-20 Hz peak)
Field of View	~90°

### Electrical Characteristics

Supply voltage	1.75 to 3.6 V
Supply current (typ.)	1 to 23 μA
Digital I/O	I <sup>2</sup> C (FM+ compatible)
ADC	15bit ΔΣ ADC @1ksp
Operating Temperature	-40 to +85 °C
Storage Temperature	-40 to +110 °C
Sensor read-out	Current mode Gain / digital filtering / sampling rate / power modes
Configurable	

1) Measured without filter @ 500K, 10 Hz, room temperature

## Order Information

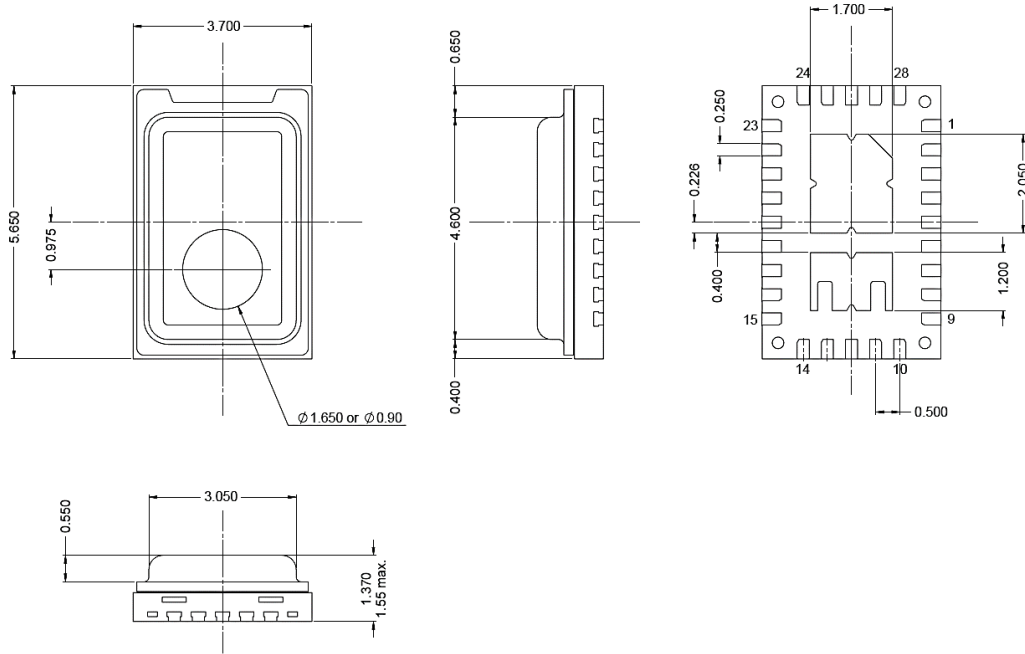
Part Number	Filter μm	Filter BW μm	Comment
ePY12111	5.00	Long Pass	Human motion rejection
ePY12211	3.91	90 nm	Rejection channel
ePY12241	4.64	180 nm	Flame channel (wide FoV)
ePY12251	4.48	620 nm	Flame channel (main detector)

Ordering Code	Description
ePYxxxx-R7	800 pcs on 7" tape and reel
ePYxxxx-R13	4000 pcs on 13" tape and reel
ePYxxxx	bulk
ePYxxxx-B1	Sensor on a breakout PCB

For more information contact: [sales@pyreos.com](mailto:sales@pyreos.com)

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## Package Information



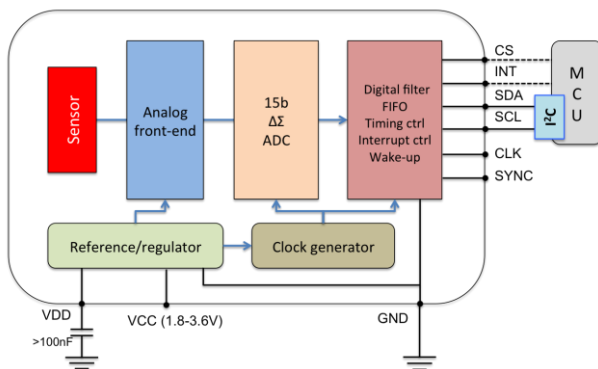
## Signal Filtering & Power Modes

Power Mode (base sample rate)	High Pass Filter – Analog (Hz)					Fixed Analog Low Pass Filter (Hz)	Fixed Digital Low Pass Filter (Hz)	Digital Low Pass Filter (Hz)				Max ADC Sampling Rate (sps)
	Off	1	2	4	8			180	90	45	22.5	
<b>Normal Power Mode</b>	Off	1	2	4	8	600	250	180	90	45	22.5	1000
<b>Low Power Mode</b>	Off	0.17	0.33	0.66	1.3	100	42	30	15	7.5	3.75	166

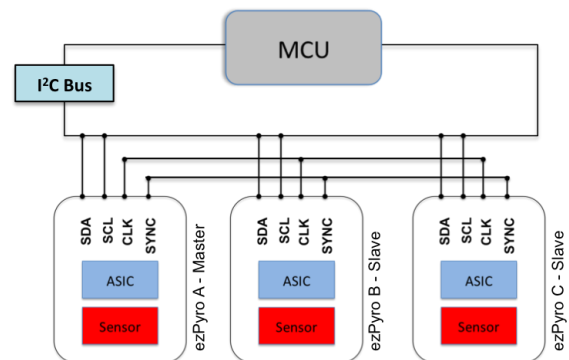
	Mode	Description	Typical Current Consumption (1.8 V, room temperature)
Power consumption	Normal Power Mode	Normal power consumption, 1 kHz max. sample rate	22 $\mu$ A
	Low Power Mode	Low power consumption, 166 Hz max. sample rate	3.5 $\mu$ A
Operational state	Normal Operation Mode	Sensor signal readout over I <sup>2</sup> C	22 $\mu$ A
	Sleep Mode	Hardware interrupt on infrared trigger	21 $\mu$ A (Normal), 3.5 $\mu$ A (Low)
	Power Down Mode	Sensor is disabled	1.1 $\mu$ A

## Circuit Diagrams

Single Device Block Diagram



Three Devices with Synchronised Sampling

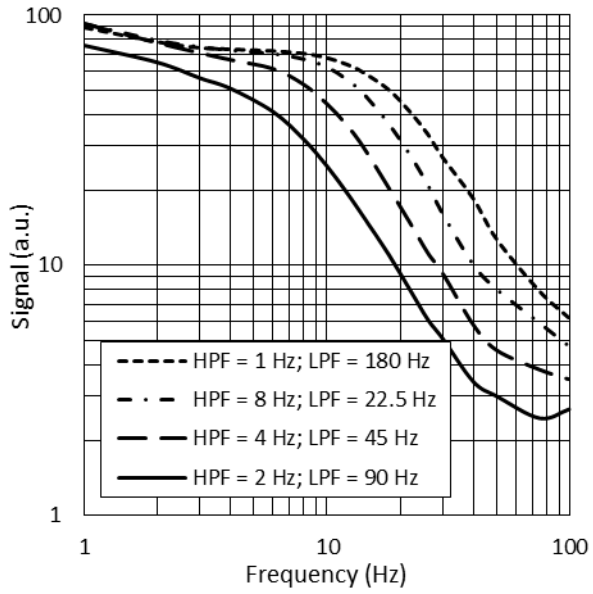


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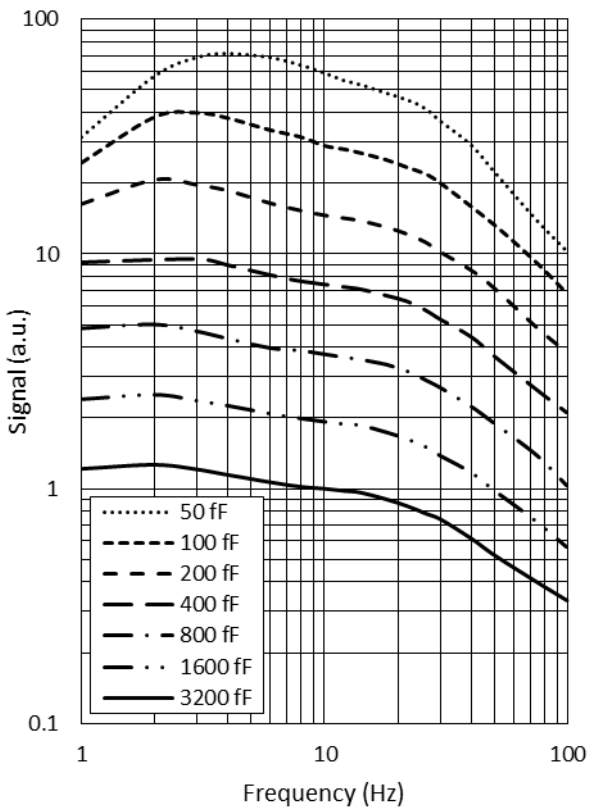
**Infrared Frequency Characteristics**



**Typical Frequency Response in Normal Power Mode**



**Typical Frequency Response in Low Power Mode**



**Typical Frequency Response at Different Gain Settings**

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