## **PYRE**

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

### 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



modes

allow synchronized sampling across devices and offer various low power modes.

Sensor Charact	teristics	Electrical Characteristics					
Filter aperture	d = 1.65 mm	Supply voltage	1.75 to 3.6 V				
Element size	0.64 x 0.64 mm <sup>2</sup>	Supply current (typ.)	1 to 23 µA				
SMD Package	5.65 x 3.7 x 1.55 mm	Digital I/O	I <sup>2</sup> C (FM+ compatible)				
D* (typ.) <sup>1</sup>	2.5 x 10 <sup>8</sup> cm√Hz/ W	ADC	15bit ΔΣ ADC @1ksp				
NEP (typ.) <sup>1</sup>	2.7 x 10⁻¹º W/√Hz	Operating Temperature	-40 to +85 °C				
Time Constant	~10ms (10-20 Hz peak)	Storage Temperature	-40 to +110 °C				
Field of View	~90°	Sensor read-out	Current mode				
		Configurable	Gain / digital filtering / sampling rate / power				

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

### **Order Information**

Part Number	Marking	Filter µm	Filter BW µm	Comment	
ePY12111	Y12111	5.00	Long Pass	Human motion rejection	
ePY12211	Y12211	3.91	90 nm	Rejection channel	
ePY12241	Y12241	4.64	180 nm	Flame channel (wide FoV)	
ePY12251	Y12251	4.48	620 nm	Flame channel (main)	

#### For more information contact: <a href="mailto:sales@pyreos.com">sales@pyreos.com</a>

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### **Package Information**









## **Signal Filtering & Power Modes**

Power Mode (base sample rate)	High	Pass	Filter –	Analog	ı (Hz)	Fixed Analog Low Pass Filter (Hz)	Fixed Digital Low Pass Filter (Hz)	Digital Low Pass Filter (Hz)			Max ADC Sampling Rate (sps)	
Normal Power Mode	Off	1	2	4	8	600	250	180	90	45	22.5	1000
Low Power Mode	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	Normal Power Mode	Normal power consumption, 1 kHz max. sample rate	22 μΑ	
consumption	Low Power Mode	Low power consumption, 166 Hz max. sample rate	3.5 μΑ	
Operational state	Normal Operation Mode	Sensor signal readout over I <sup>2</sup> C	22 μΑ	
	Sleep Mode	Hardware interrupt on infrared trigger	21 μA (Normal), 3.5 μA (Low)	
	Power Down Mode	Sensor is disabled	1.1 μΑ	

#### **Circuit Diagrams**





#### 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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