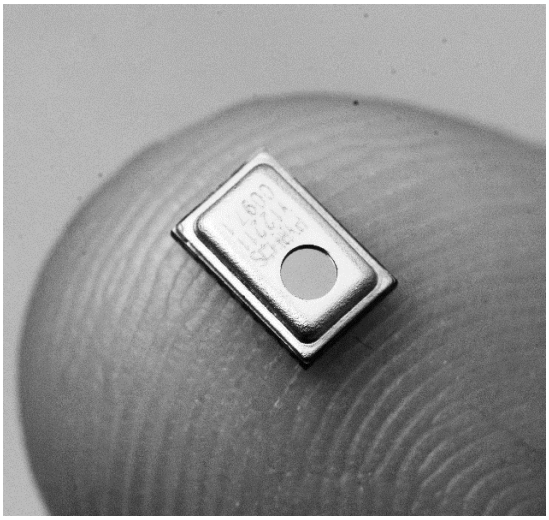
ezPyro™ I²C Pyroelectric Infrared Gesture Sensor (SMD)

Introduction

The ezPyro range of thin film digital pyroelectric IR sensors for gesture recognition 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 gesture detection. The detection range varies from 20 cm (no additional lens) to 80 cm (with plastic Fresnel lens). Programmable gain and filtering offer maximum flexibility in system design. Industry standard I²C communication enables plug-and-play connectivity to microcontrollers and allows easy tuning. These sensors offer various power saving modes, including a wake-up by gesture feature.



Sensor Characteristics	
Filter aperture	d = 1.65 or 0.90 mm
Element size	0.64 x 0.64 mm²
SMD Package	5.65 x 3.7 x 1.55 mm
D* (typ.) [1]	5.5 x 10^8 cm√Hz/ W
NEP (typ.) [1]	0.4 x 10^{-10} W/√Hz
Time Constant	~10ms (10-20 Hz peak)
Field of View	~90° (1.65 mm aperture)

Electrical Characteristics	
Supply voltage	1.75 to 3.6 V
Supply current (typ.)	1 to 65 µA
Digital I/O	I²C (FM+ compatible)
ADC	15bit ΔΣ ADC @1ksp
Operating Temperature	-40 to +85 °C
Storage Temperature	-40 to +110 °C
Sensor read-out	Current mode
Configurable	Gain / digital filtering / sampling rate / power modes

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

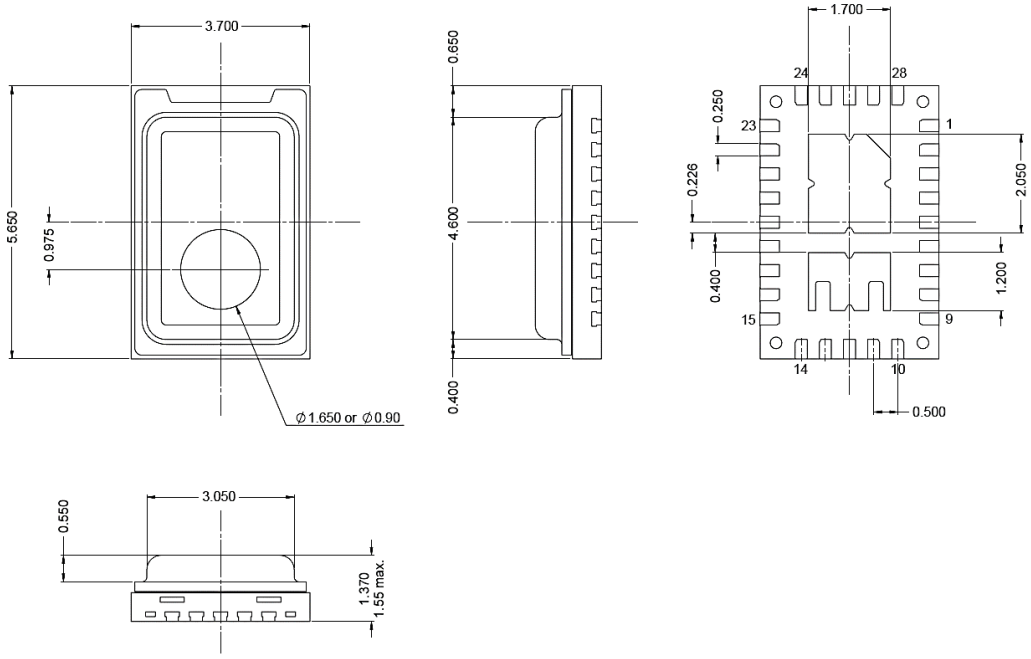
Order Information

Part Number	Pixels	Aperture	Filter µm
ePY22114	2x2	1.65 mm	5.0 Long Pass
ePY21114	2x2	0.90 mm	5.0 Long Pass

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

For more information contact: sales@pyreos.com

Package Information



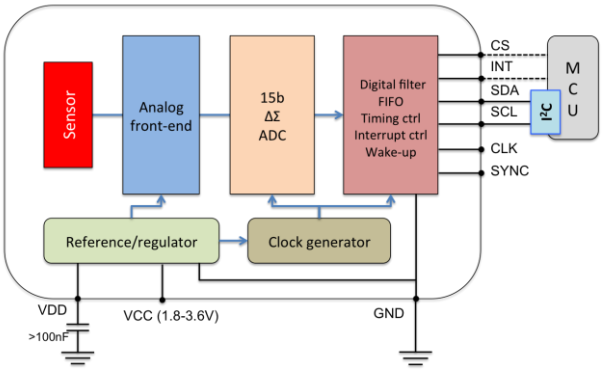
Signal Filtering & Power Modes

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)
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

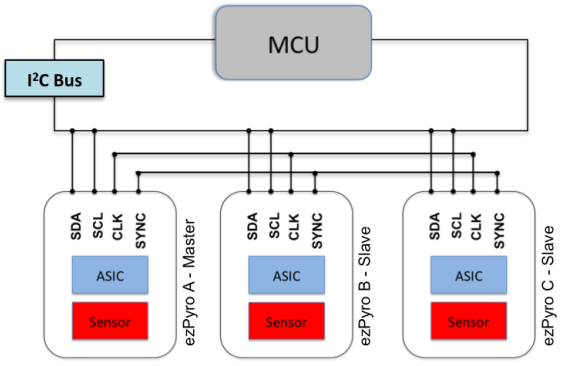
	Mode	Description	Typical Current Consumption (1.8 V, room temperature)
Power consumption	Normal Power Mode	Normal power consumption, 1 kHz max. sample rate	61 µA
	Low Power Mode	Low power consumption, 166 Hz max. sample rate	7.5 µA
Operational state	Normal Operation Mode	Sensor signal readout over I²C	61 µA
	Sleep Mode	Hardware interrupt on infrared trigger	21 µA (Normal), 3.5 µA (Low)
	Power Down Mode	Sensor is disabled	1.1 µA

Circuit Diagrams

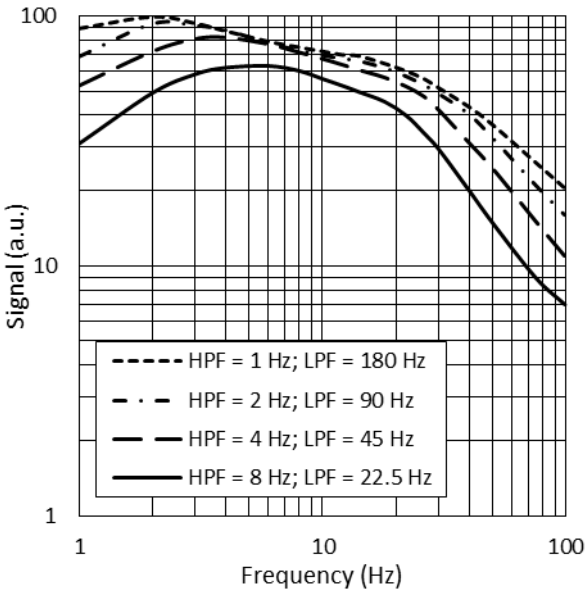
Single Device Block Diagram



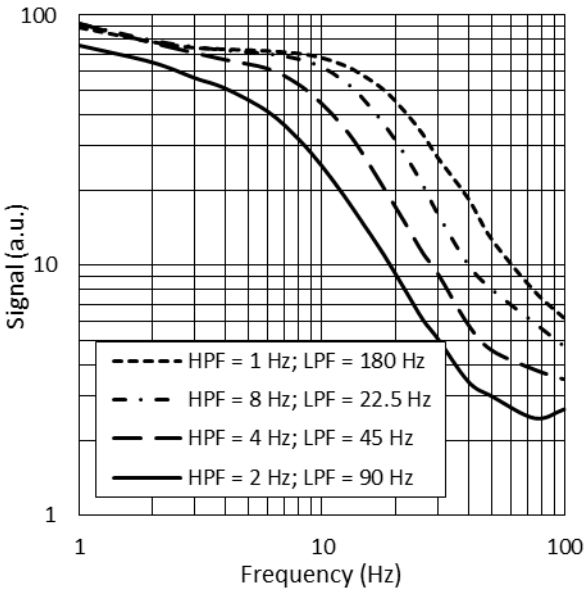
Three Devices with Synchronised Sampling



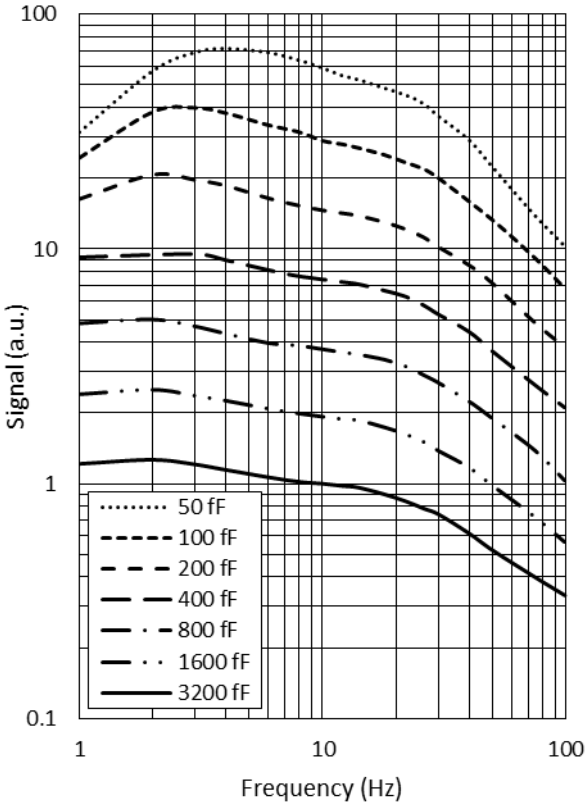
Infrared Frequency Characteristics



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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