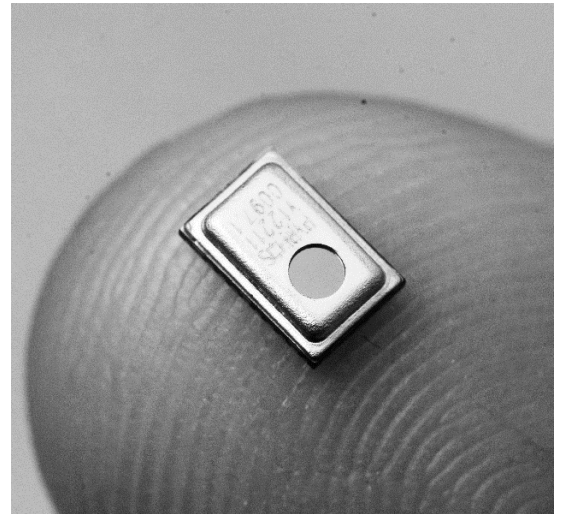


## ezPyro™ I<sup>2</sup>C Pyroelectric Infrared Gesture Sensor (SMD)

### 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 I<sup>2</sup>C 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 mm <sup>2</sup>                  |
| SMD Package             | 5.65 x 3.7 x 1.55 mm                         |
| D* (typ.) <sup>1</sup>  | 5.5 x 10 <sup>8</sup> cm <sup>√</sup> /Hz/ W |
| NEP (typ.) <sup>1</sup> | 0.4 x 10 <sup>-10</sup> 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           | 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                      |
| Configurable          | Gain / digital filtering /        |
|                       | sampling rate / power modes       |

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

### Order Information

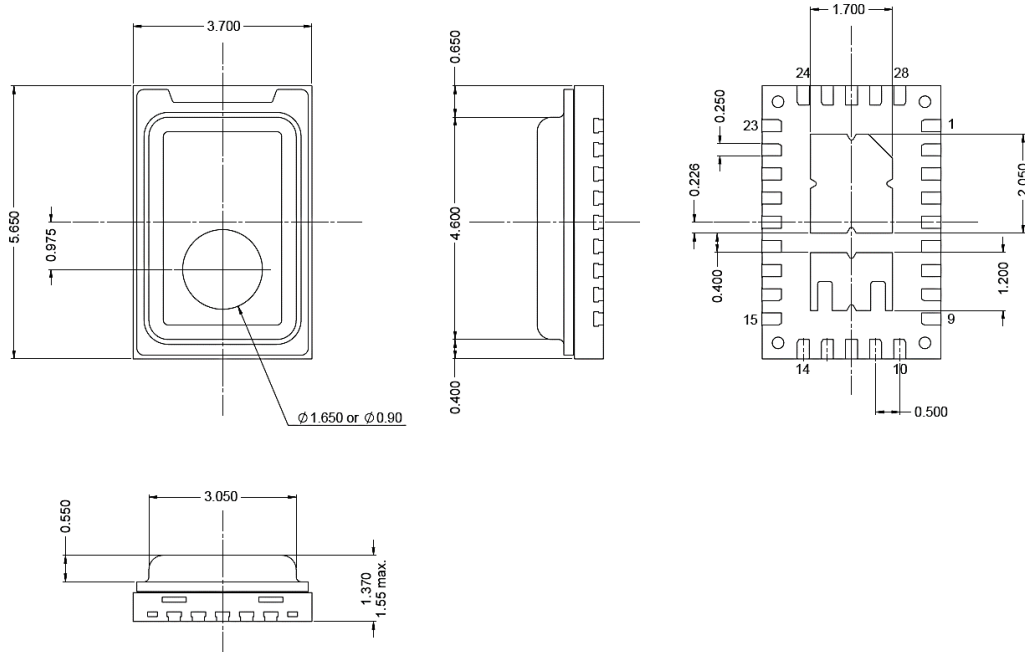
| Part Number | Pixels | Aperture | Filter μm     |
|-------------|--------|----------|---------------|
| ePY22114    | 2x2    | 1.65 mm  | 5.0 Long Pass |
| ePY21114    | 2x2    | 0.90 mm  | 5.0 Long Pass |

| Ordering Code | Description                   |
|---------------|-------------------------------|
| 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



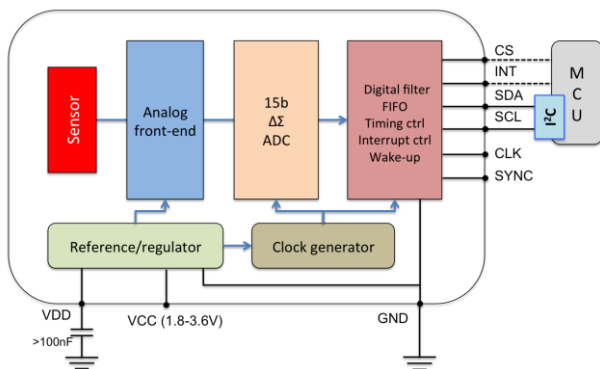
## Signal Filtering & Power Modes

| 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                         |

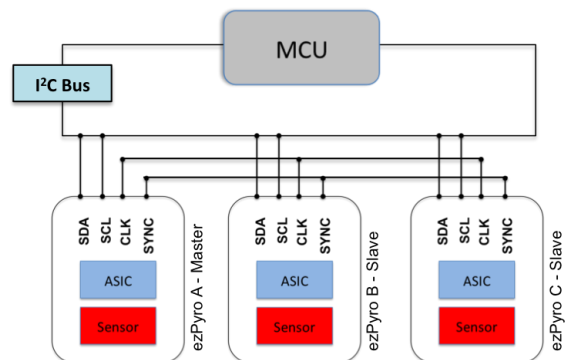
|                   | Mode                  | Description                                      | Typical Current Consumption (1.8 V, room temperature) |
|-------------------|-----------------------|--|---|
| Power consumption | Normal Power Mode     | Normal power consumption, 1 kHz max. sample rate | 61 $\mu$ A  |
|                   | Low Power Mode        | Low power consumption, 166 Hz max. sample rate   | 7.5 $\mu$ A   |
| Operational state | Normal Operation Mode | Sensor signal readout over I <sup>2</sup> C      | 61 $\mu$ 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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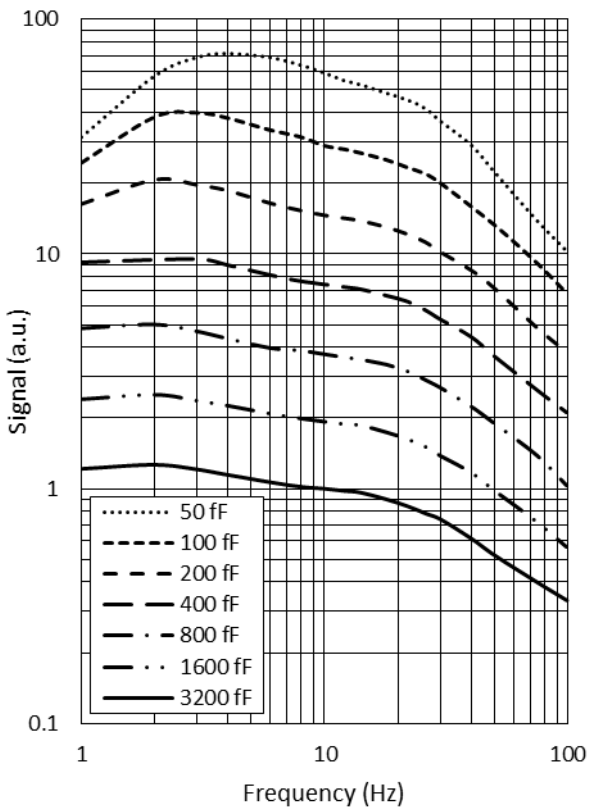
**Infrared Frequency Characteristics**



**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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