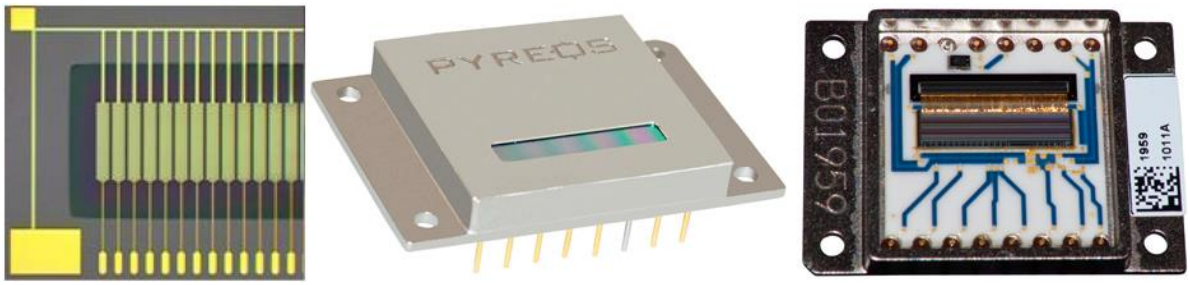
# Thin Film Pyroelectric Linear 128 Element Line Sensor Array

With Integrated Read-Out Electronics

## Introduction

The Pyreos line sensor array utilises our unique thin-film pyroelectric PZT material to offer class leading resolution and performance across a wide wavelength range at a very affordable price. The ASIC readout electronics output is a multiplexed, amplified and filtered analogue signal for each sensor element. The sensor is housed in a low profile hermetic metal package along with a temperature sensor, and is fitted with a linear variable filter or a broadband filter.




| Product Features | |
|---|---|
| Wavelength range | 0.1 to 100 µm [1] |
| Operating temperature | Un-cooled operation |
| Number of pixels | 128 sensor elements |
| Pixel sizes | 60 µm x 500 µm; 100 µm pitch |
| Pixel operability | 96% with no more than 2 bad in any 10 |
| Dynamic range | >75 dB |
| Scan speed | 10-1000 Hz |

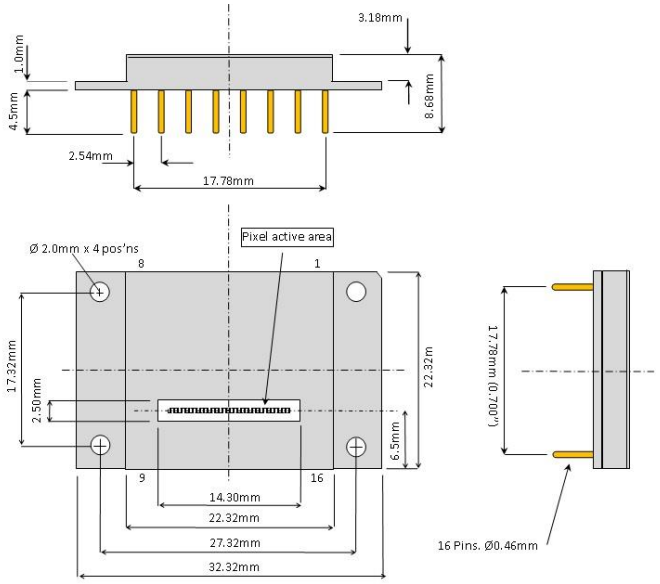
| Applications | |
|---|---|
| General IR spectroscopy | Portable, robust spectral engines |
| Lubricating oil monitoring | Quality, wear, adulteration, |
| Foodstuffs | Constitution, adulteration |
| Process monitoring | Wind turbine, petrochemical, pharmaceutical |
| Temperature measurement | Non-contact line scanning measurement |
| Imaging | Line scanning |

*[1]Choice of filter windows available*

## Filters Available

| Part Number | PY0722 | PY0738 | PY1499 |
|---|---|---|---|
| Filter Material | Silicon | LVF | LVF |
| Filter type | Broadband | Linear Variable filter | Linear Variable Filter |
| Transmission wavelength (µm) | - | 5.5 to 11 (CWL 2%) | 2.5 to 5 (CWL 2%) |
| Transmission wavenumbers ($cm^{-1}$) | - | 1818 to 909 | 4000 to 2000 |

## Package Information

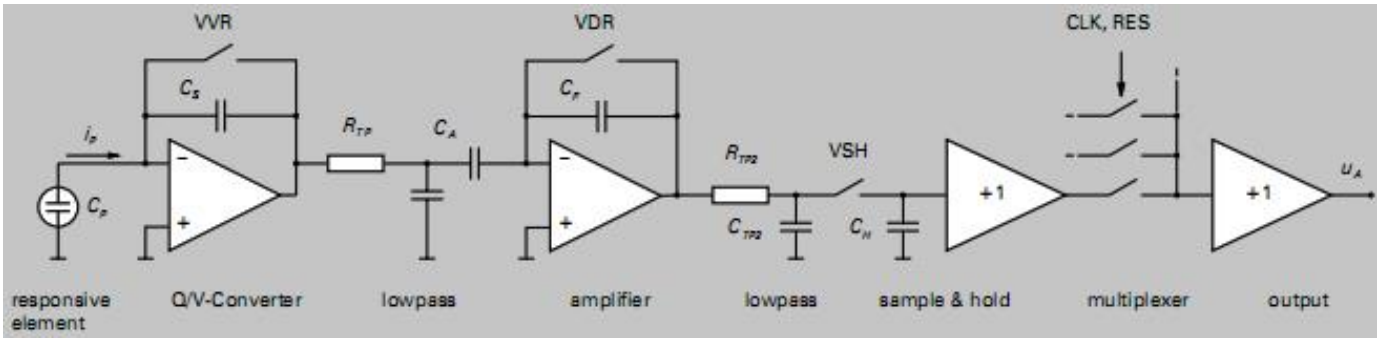



| *No.* | *Name* | *Comment* |
|---|---|---|
| 1. | **CLK** | Input clock CLK (trigger on rising edge) |
| 2. | **RES** | Input clock RES (active low) |
| 3. | **VVR** | Input clock VDR (active high) |
| 4. | **VDR** | Input clock VDR (active high) |
| 5. | **VSH** | Input clock VSH (active high) |
| 6. | **VD2** | Operating voltage (+2.5 V) |
| 7. | **AVDD** | Operating voltage (+5 V) |
| 8. | **VD2** | Operating voltage (+2.5 V) |
| 9. | **OUT** | Analogue signal output |
| 10. | **AGND** | Ground |
| 11. | **n.c.** | Not connected |
| 12. | **T+** | Temperature sensor |
| 13. | **T-** | Temperature sensor |
| 14. | **case** | Case |
| 15. | **DGND** | Ground |
| 16. | **DVDD** | Operating voltage (+5 V) |

Note: Pixel 1 is nearest pin 1 of the device.

## Circuit Diagram

The amplification circuit consists of low-noise preamplifiers for each individual sensor elements, analogue switches and an output amplifier. The pre-amplifiers transform the signal charges measured at each sensor element into a conditioned voltage. The amplified signal is then passed to sample and hold, multiplexer output buffer for the read-out process. The digital inputs are CMOS compatible. A 10k NTC thermistor is integrated within the package to monitor the line sensor temperature.




Thermistor is NTC, 1%. For more details check ERTJZEG103FA Datasheet on Industrial Panasonic website.

## Order Information

Please quote PYxxxx for your desired option of this product. Contact: sales@pyreos.com

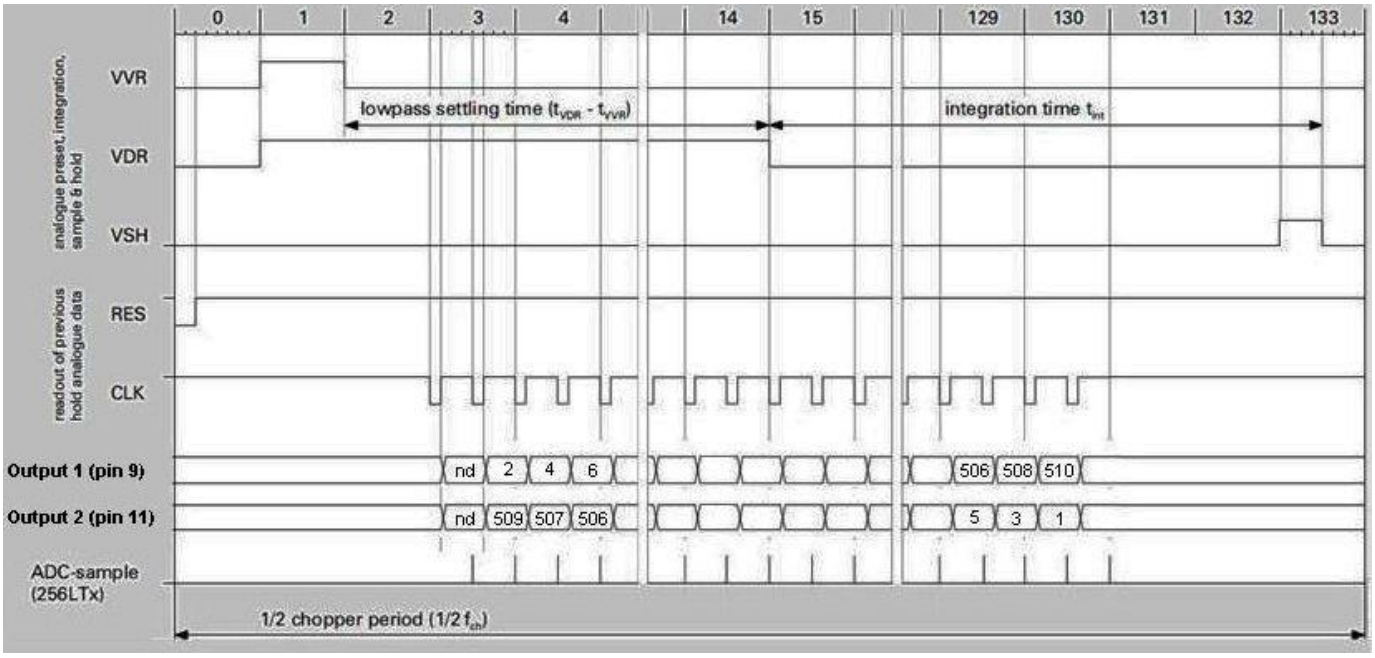
## Clock Parameters

Similar to all pyroelectric sensors, the Pyreos thin-film pyroelectric line sensor array responds to and detects a change in infrared radiation intensity. It therefore requires a pulsed source of infrared radiation for measurement purposes.

| Parameter[1] | Relative Value | Min. Values | Recommended Value |
|---|---|---|---|
| Chopping Frequency[2] $f_{Ch}$ | | 10 Hz | 128 Hz |
| Read-out Clock CLK $f_{CLK} = 2* f_{Ch}*268$ | $1/t_{CLK}$ | 5.36 KHz | 69 KHz |
| Reset clock low-impulse duration $t_{RES}$ | 1/2 $t_{CLK}$ | 1.8 µs | 7.5 µs |
| Clock VVR high-impulse duration $t_{VVR}$ | 2 $t_{CLK}$ | 7.5 µs | 30 µs |
| Clock VDR high-impulse duration $t_{VDR}$ | 28 $t_{CLK}$ | 200 µs | 400 µs |
| Clock VSH high-impulse duration $t_{VSH}$ | 1 $t_{CLK}$ | 3.5 µs | 15 µs |
| Maximum Settling Time at output $t_{out}$ is 1 µ second | | | |

*[1] All values for VDD = 5 V, VD2 = 2.5V*
*[2] $t_{Ch\ low} = t_{Ch\ high}$*

## Clock Diagram



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