

# Thin Film Pyroelectric Linear 255 Element Line Sensor Array

With Integrated Read-Out Electronics

## Introduction

The Pyreos line sensor array (Linear Array) utilises our unique thin-film pyroelectric PZT material to offer performance with unbeatable resolution, with the potential to capture all wavelengths of light and performance across a wide wavelength range. 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 sealed metal package along with a temperature sensor and is fitted with the customer's choice of filter window.



## Product Features

|                       |  |
|-----------------------|--|
| Wavelength range      | 0.1 to 100 $\mu\text{m}$   |
| Operating temperature | Un-cooled operation  |
| Number of pixels      | 255 sensor elements  |
| Pixel sizes           | 50 $\mu\text{m}$ x 417.5 $\mu\text{m}$ pixels in 2 lines of 128 pixels<br><i>NO spectral gaps – all wavelengths captured!</i><br>Vertical separation between lines: 45 $\mu\text{m}$<br>In line pixel pitch: 100 $\mu\text{m}$ |
| Pixel operability     | 96% with no more than 2 bad pixels 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                               |

## Filters Available

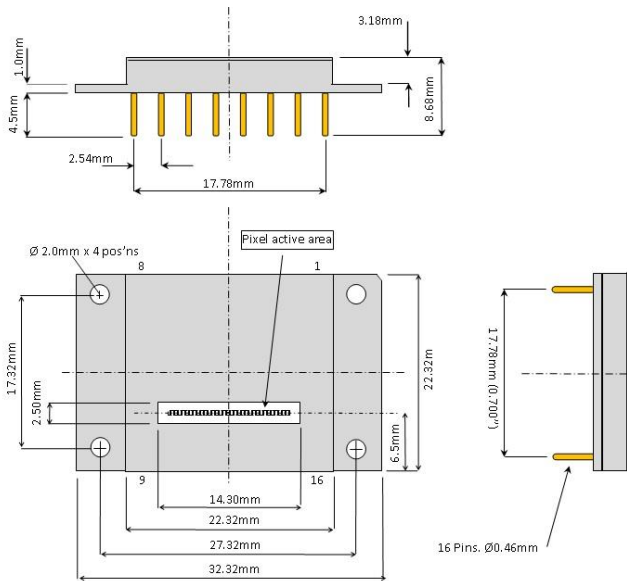
|                 |   |
|-----------------|---|
| Part Number     | PY0716                                  |
| Filter Material | Silicon                                 |
| Filter type     | Broadband Antireflection coated Silicon |

## Order Information

Please quote PY-LA-S-255 and your desired customizations of this product. Contact: [sales@pyreos.com](mailto:sales@pyreos.com)

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## Package Information



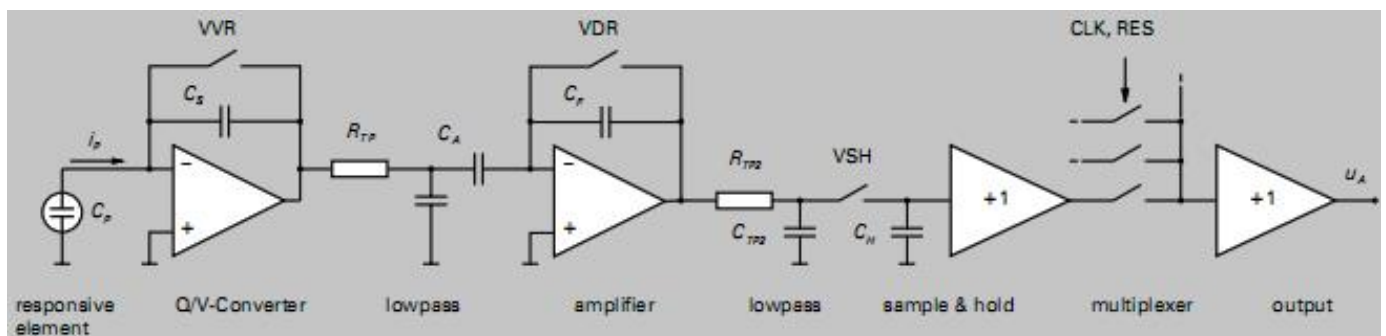
| No. | Name | Comment                                  |
|-----|------|--|
| 1.  | CLK  | Input clock CLK (trigger on rising edge) |
| 2.  | RES  | Input clock RES (active low)             |
| 3.  | VVR  | Input clock VDR (active high)            |
| 4.  | VDR  | Input clock VDR (active high)            |
| 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)                 |

Connect pin 6 to pin 8

**Please remember to take ESD precautions when handling components**

## 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.

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## 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 <sup>1</sup>                          | Relative Value | Min. Values | Recommended Value |
|---|----------------|-------------|-------------------|
| Chopping Frequency <sup>2</sup> $f_{Ch}$        |                | 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 $\mu s$ | 7.5 $\mu s$       |
| Clock VVR high-impulse duration $t_{VVR}$       | $2 t_{CLK}$    | 7.5 $\mu s$ | 30 $\mu s$        |
| Clock VDR high-impulse duration $t_{VDR}$       | $28 t_{CLK}$   | 200 $\mu s$ | 400 $\mu s$       |
| Clock VSH high-impulse duration $t_{VSH}$       | $1 t_{CLK}$    | 3.5 $\mu s$ | 15 $\mu s$        |

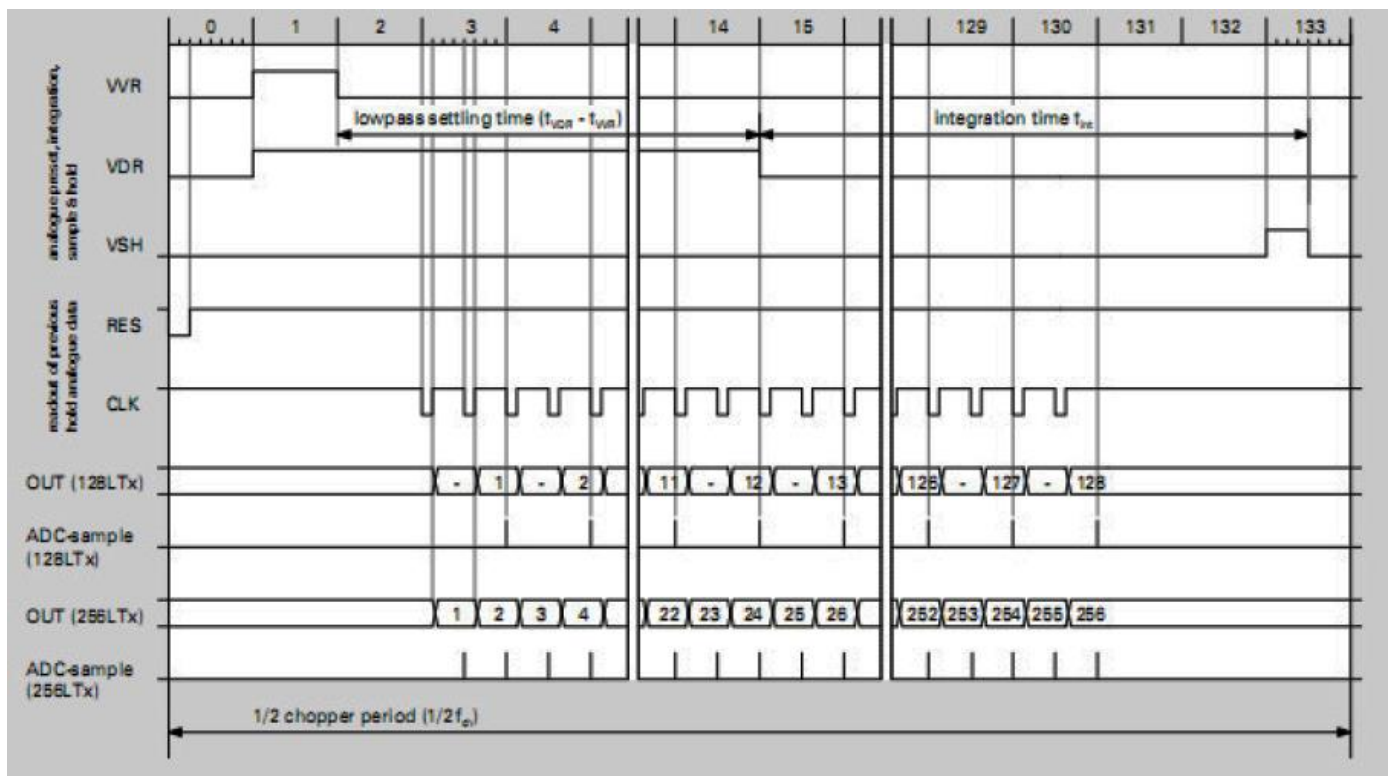
Maximum Settling Time at output  $t_{out}$  is 1  $\mu$  second

<sup>1</sup>All values for VDD = 5 V, VD2 = 2.5V

<sup>2</sup> $t_{Ch low} = t_{Ch high}$

## Clock Diagram

Pixel 1 is nearest pin 1 of the device.



**Search terms: FPI Spectroscopy Etalon LVF FTIR Spectrometer-on-a-chip Mid Infrared**

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