

Thin Film Pyroelectric Linear 255 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 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 hermetic metal package along with a temperature sensor and is fitted with the customer's choice of filter window.



Product Features

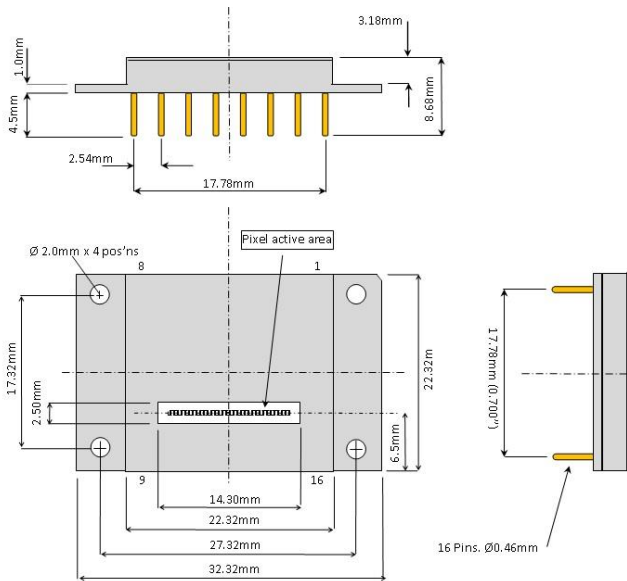
| | |
|-----------------------|--|
| Wavelength range | 0.1 to 100 μm |
| Operating temperature | Un-cooled operation |
| Number of pixels | 255 sensor elements |
| Pixel sizes | 50 μm x 417.5 μm pixels in 2 lines of 128 pixels <i>NO spectral gaps – all wavelengths captured!</i> Vertical separation between lines: 45 μm In line pixel pitch: 100 μm |
| Response uniformity | >+/-3% pixel to pixel of array signal mean |
| Pixel operability | 96% with no more than 2 bad pixels in any 10 |
| Dynamic range | >75 dB |
| Scan speed | 10-1000 Hz |

Applications

| | |
|------------------------|---|
| IR spectroscopy | Portable robust spectral engines |
| Medical diagnostics | Breath, blood and urine analysis |
| Laser line calibration | Temperature measurement |
| Process monitoring | Wind turbine, petrochemical, pharmaceutical |
| Terahertz imaging | Near IR InGaAs replacement |
| Security screening | Optical telecom channel monitoring |

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Package Information



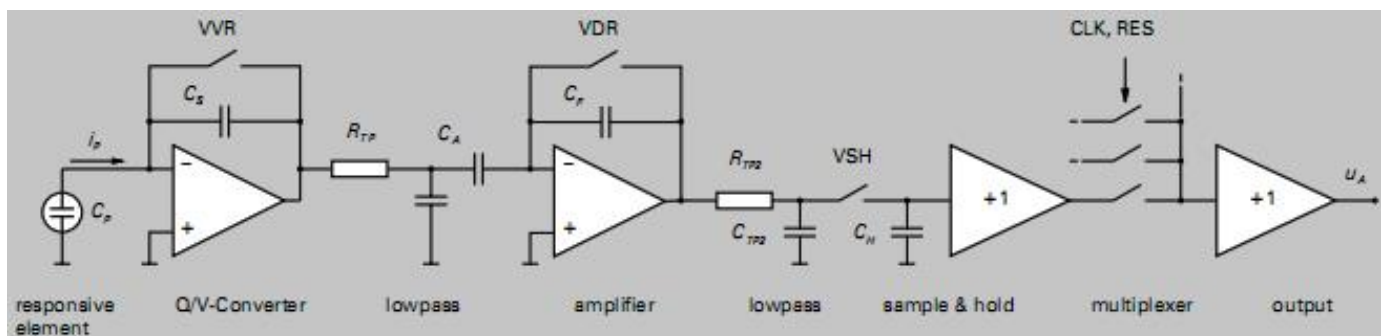
| No. | Name | Comment |
|-----|------|--|
| 1. | CLK | Input clock CLK (trigger on rising edge) |
| 2. | RES | Input clock RES (active low) |
| 3. | VVR | Input clock VDR (active high) |
| 4. | VDR | Input clock VDR (active high) |
| 5. | VSH | Input clock VSH (active high) |
| 6. | VD2 | Operating 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.

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 |

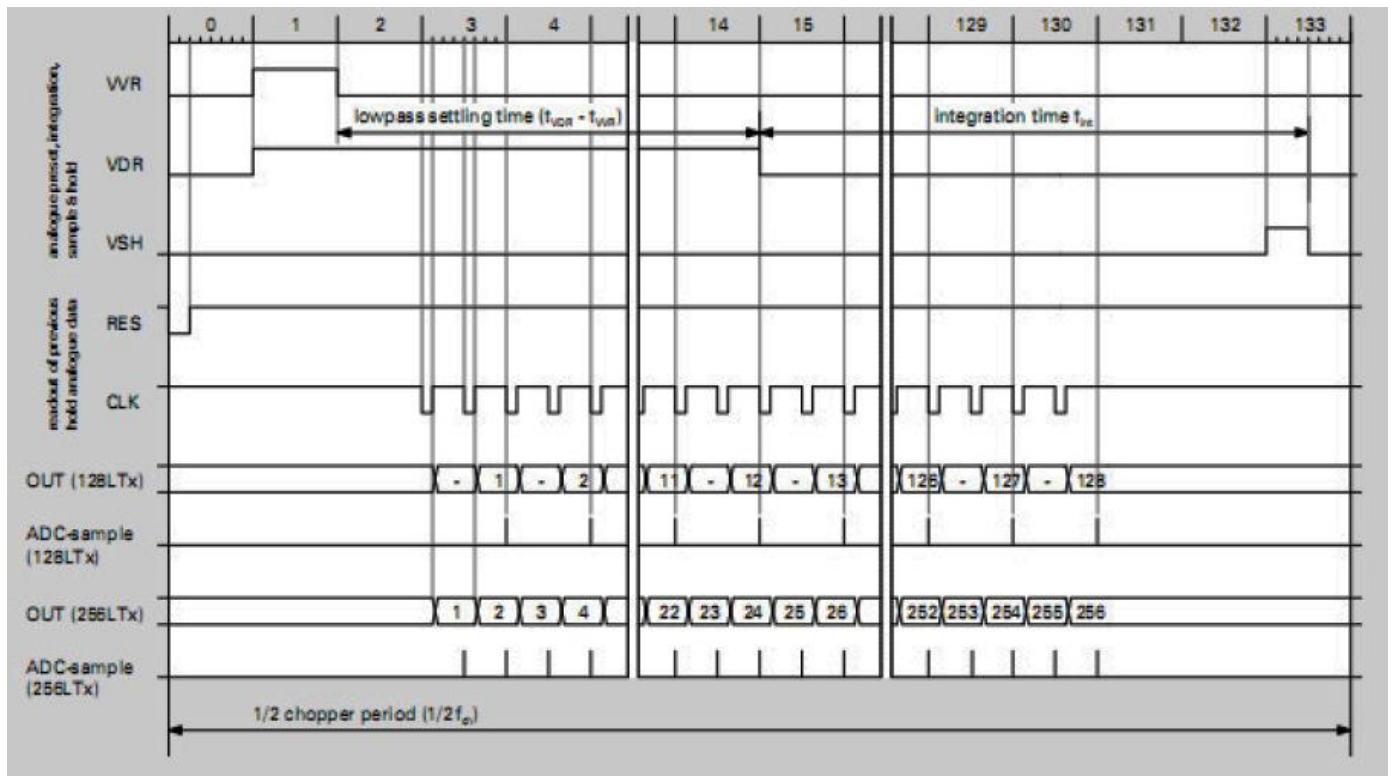
Maximum Settling Time at output t_{out} is 1 μ second

¹All values for VDD = 5 V, VD2 = 2.5V

² $t_{Ch low} = t_{Ch high}$

Clock Diagram

Pixel 1 is nearest pin 1 of the device.



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Filters Available

| Part Number | PY0312 | PY0716 | PY0725 | PY0739 | PY1500 |
|---|--------------------------|-------------------------------|-----------|------------------------|------------------------|
| Filter Material | AR-Germanium | Silicon | No filter | LVF | LVF |
| Filter type | Antireflection coated GE | Antireflection coated Silicon | - | Linear Variable filter | Linear Variable Filter |
| Transmission wavelength (μm) | - | - | All | 5.5 to 11 (CWL 2%) | 2.5 to 5 (CWL 2%) |
| Transmission wavenumbers (cm^{-1}) | - | - | All | 1818 to 909 | 4000 to 2000 |

Order Information

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