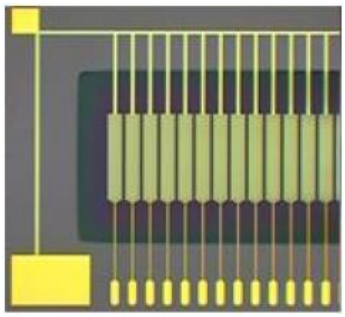
Thin Film Pyroelectric Linear 128+1 Element Line Sensor Array

With Integrated Read-Out Electronics

Introduction

The Pyreos line sensor array (Linear Array) utilises our unique thin-film pyroelectric PZT material to offer class leading resolution and performance across a wide infrared 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 the customer's choice of filter window. An additional "+1" sensor element provides higher sensitivity on a discrete wavelength, e.g. for lubrication oil or foodstuffs. The +1 sensor is located for ATR and transmission use.



Product Features	
Wavelength range	0.1 to 100 µm [1]
Operating temperature	Un-cooled operation
Number of pixels	128 sensor elements +1 sensor element
128 Pixel array dimensions	60 µm x 500 µm; 100 µm pitch
+1 sensor area	1 mm^2 (33x larger than array pixels)
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

128 Element Array:

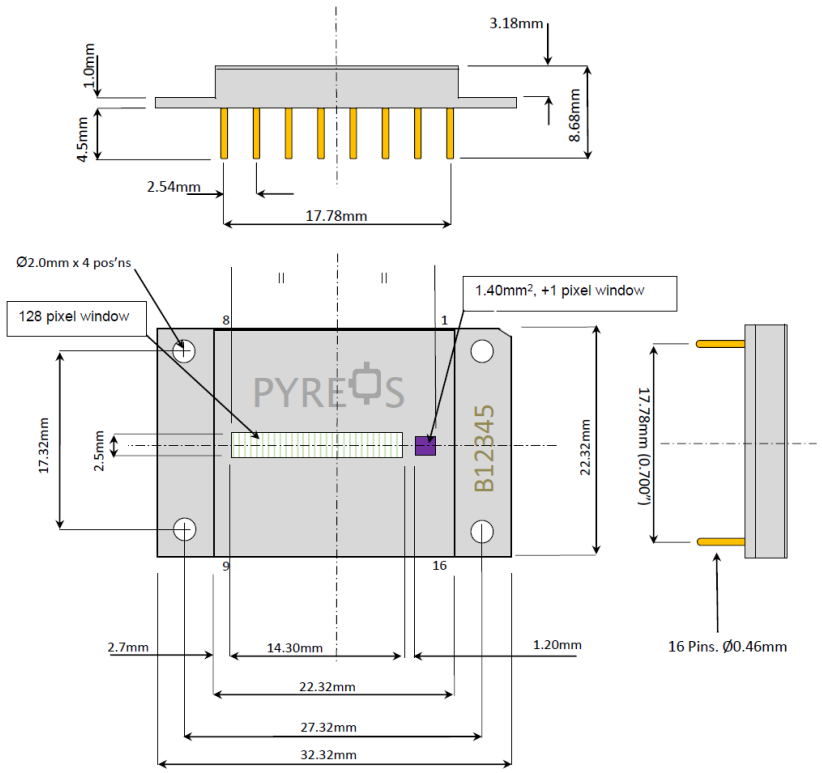
- Linear Variable Filters, ranges: 2.5 to 5.0 µm, 5.5 to 11.0 µm
- Broadband Filters: AR Si

+1 Element: – Discrete wavelength either within or extending beyond the Linear Variable Filter range.

- 2.90um / 300nm for water content (PY2004, includes 5.5-11 µm array)
- 5.75um / 100nm for fat "A" content (PY2075, includes 5.5-11 µm array)

Please inquire for further options.

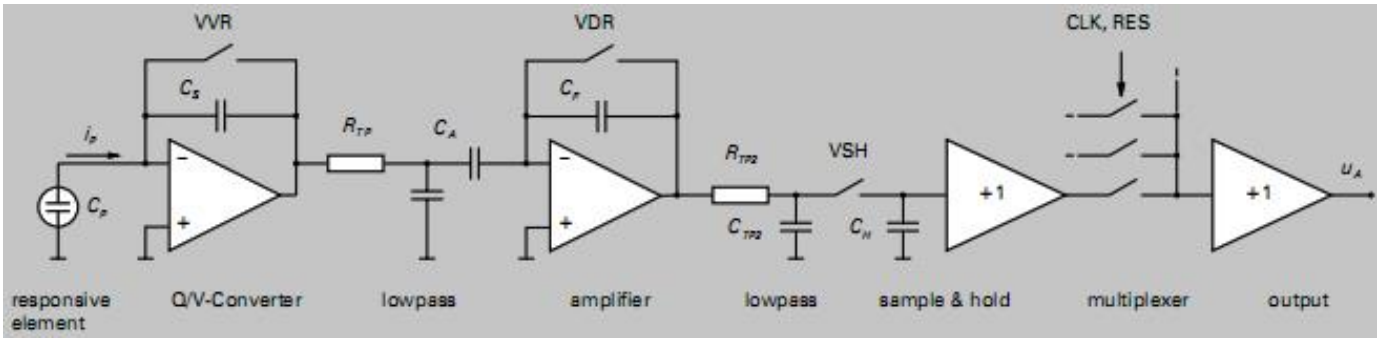
Package Information



No.	*Name*	*Comment*
1.	**CLK**	Input clock CLK (rising edge)
2.	**RES**	Input clock RES (active low)
3.	**VVR**	Input clock VVR (active high)
4.	**VDR**	Input clock VDR (active high)
5.	**VSH**	Input clock VSH (active high)
6.	**N/C**	Not Connected
7.	**AVDD**	Operating voltage (+5 V)
8.	**VD2**	Operating voltage (+2.5 V)
9.	**OUT**	Analogue output (128 array)
10.	**AGND**	Ground
11.	**OUT 1**	Analogue output (+1 element)
12.	**T+**	Temperature sensor
13.	**T-**	Temperature sensor
14.	**case**	Case
15.	**N/C**	Not Connected
16.	**DVDD**	Operating voltage (+5 V)

Circuit Diagram – 128 Array Readout

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

Contact: sales@pyreos.com Search terms: FPI Spectroscopy Etalon LVF FTIR Spectrometer-on-a-chip

Clock Parameters – 128 Array Readout

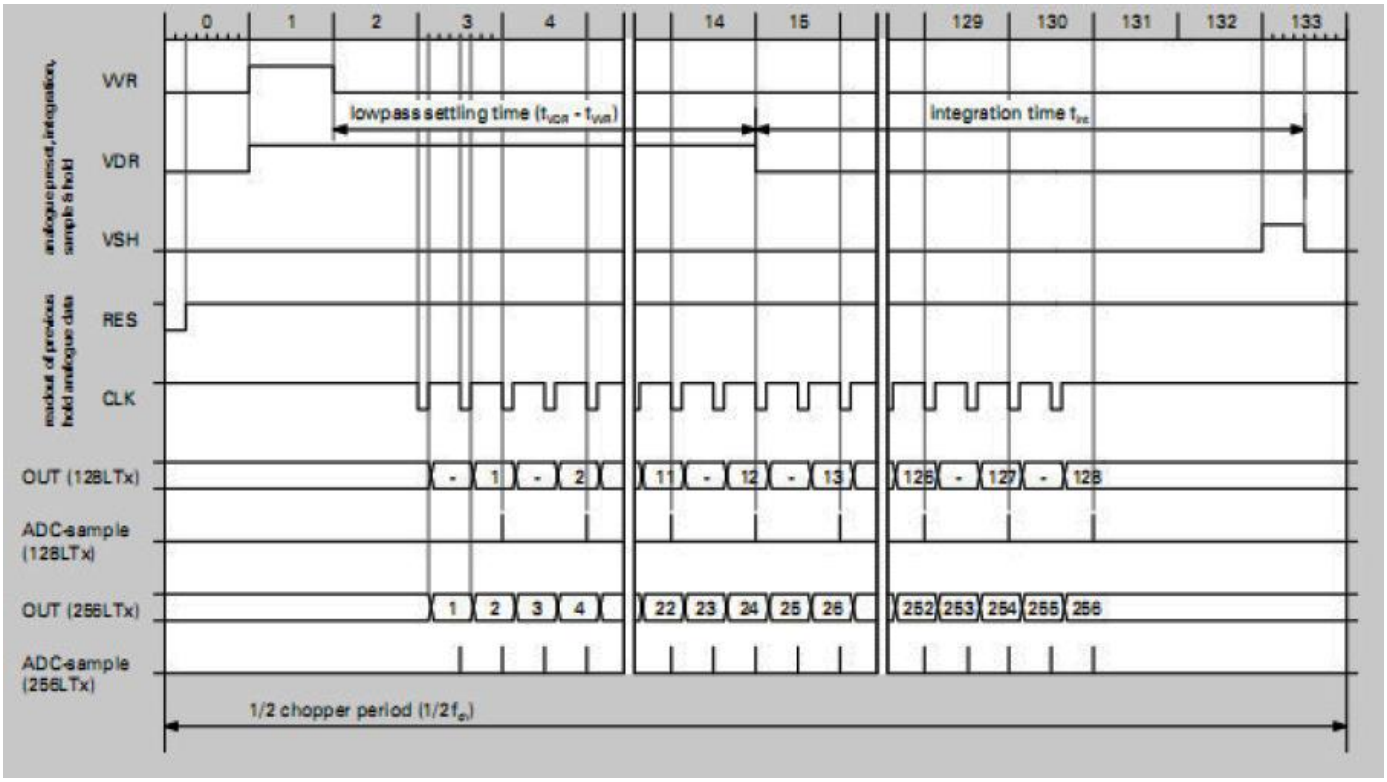
Similar to all pyroelectric sensors, the Pyreos thin-film pyroelectric line sensor array responds to and detects a change in infrared radiation intensity. It therefore requires a pulsed source of infrared radiation for measurement purposes.

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 – 128 Array Readout

Pixel 1 is nearest pin 1 of the device.



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