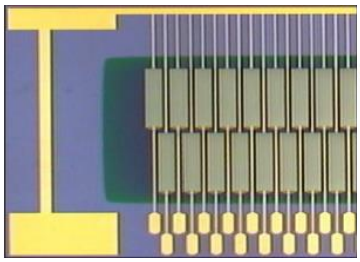
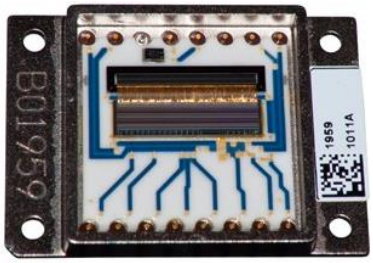
Thin Film Pyroelectric Linear 255 Element Line Sensor Array

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 *NO spectral gaps – all wavelengths captured!* 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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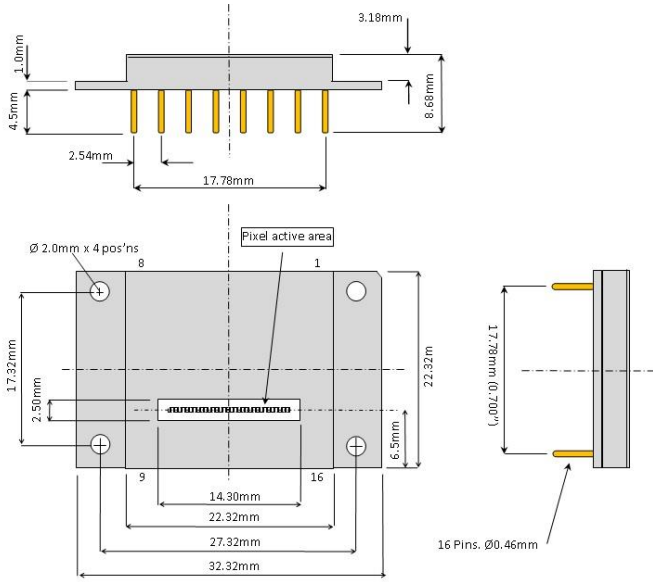
Package Information



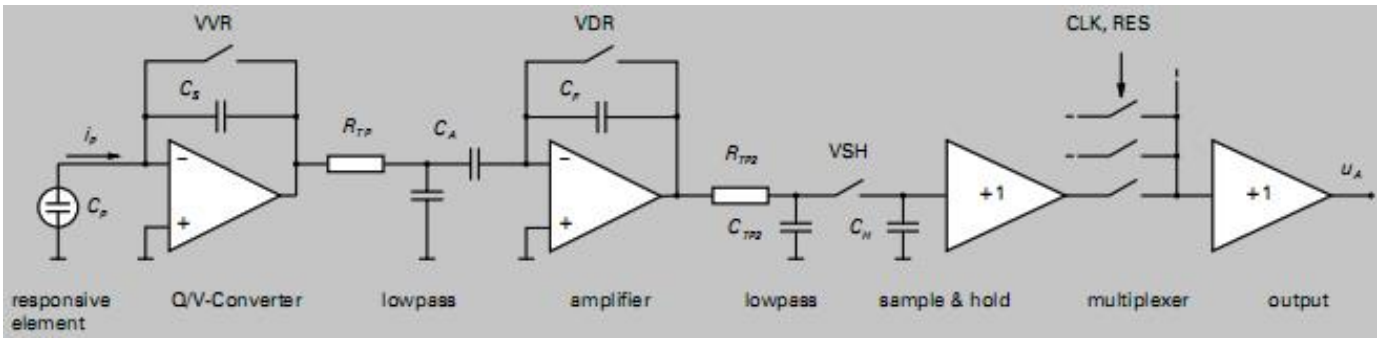
No.	*Name*	*Comment*
1.	**CLK**	Input clock CLK (trigger on rising edge)
2.	**RES**	Input clock RES (active low)
3.	**VVR**	Input clock VDR (active high)
4.	**VDR**	Input clock VDR (active high)
5.	**VSH**	Input clock VSH (active high)
6.	**VD2**	Operating voltage (+2.5 V)
7.	**AVDD**	Operating voltage (+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.

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Clock Parameters

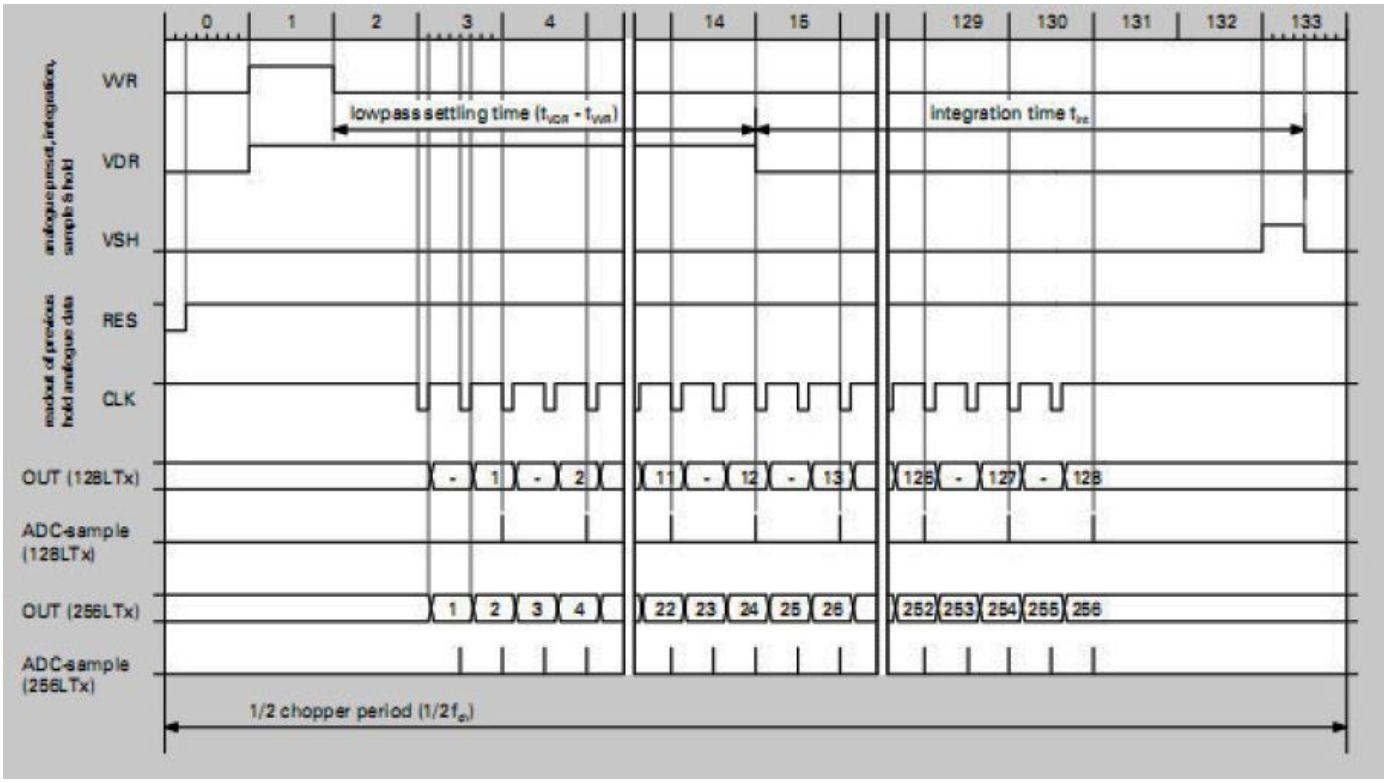
Similar to all pyroelectric sensors, the Pyreos thin-film pyroelectric line sensor array responds to and detects a change in infrared radiation intensity. It therefore requires a pulsed source of infrared radiation for measurement purposes.

Parameter[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

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

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