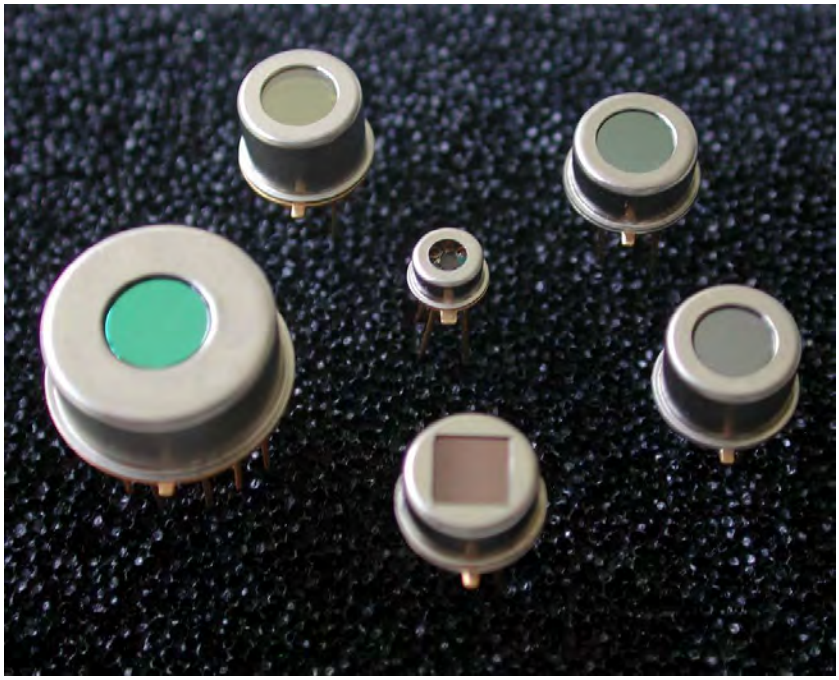
Boston Electronics

Pyroelectric infrared detectors
D* up to $1x10^9$ at 10 Hz



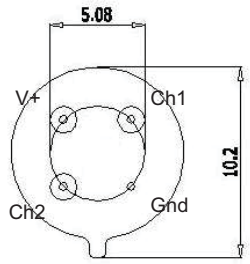
HEIMANN Sensor

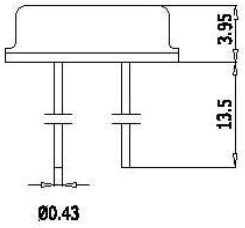
91 Boylston Street, Brookline, MA 02445
Tel: 800-347-5445/617-566-3821 Fax: 617-731-0935
www.Boselec.com Heimann@Boselec.com

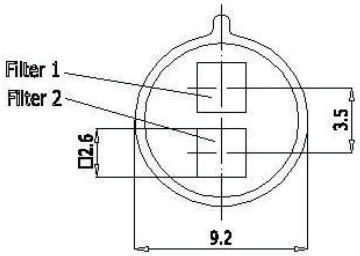
HPS DUAL CHANNEL

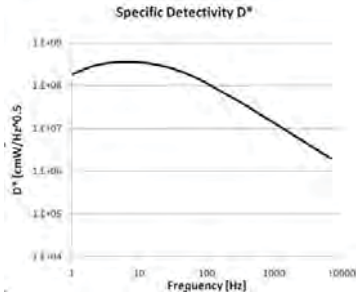
PYROELECTRIC Sensor for Gas Analysis

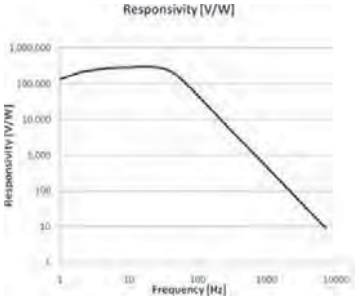
Heimann Sensor thin film pyroelectric gas sensors combine very high responsivity and specific detectivity with low microphonic effect in a small, TO-5 type package. Various different narrow band filters can adapt the sensor to a wide variety of different environmental gases. Using a compensation channel, the sensor can be made insensitive to both ambient temperature and long term drift effects. On request our application team will offer you a suitable IR radiation source for your special gas application.

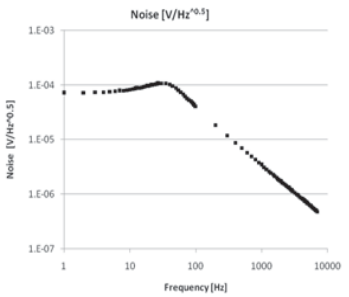






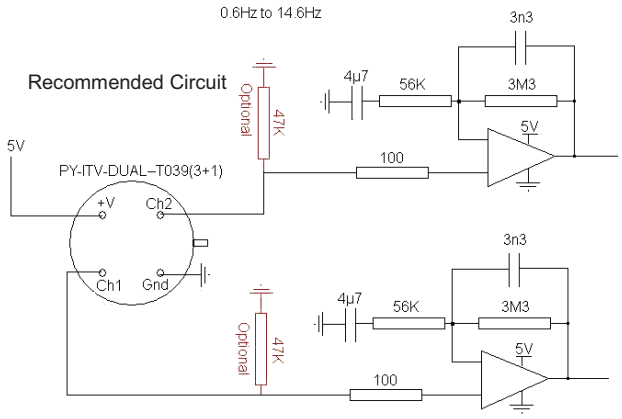


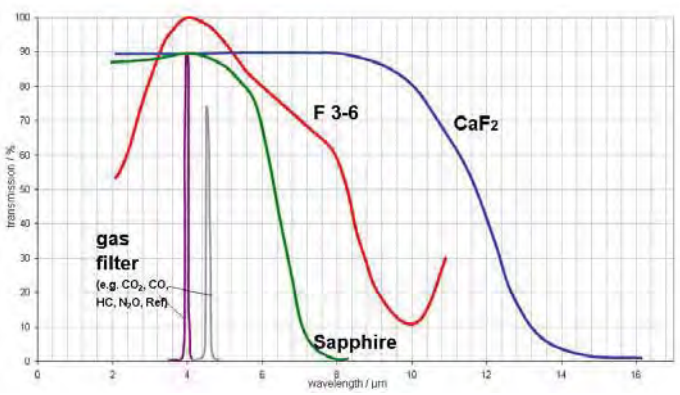




element size	1.0²	mm²
filter aperture	2.6²	mm²
filter	Various standard and customized filters on demand	
resposivity[1]	150000	V/W
noise[1,2]	60	µV/Hz$^{1/2}$
specific detectivity[1,2]	3.5 x 10^8	cm Hz^{½}/ W
time constant[2]	~ 12	ms
max. voltage[2]	8.0	V
min. voltage[2]	2.7	V
microphonics[3]	~ 2	µV/g at 10 Hz
housing	TO 39	
operating temperature	-20 to 70	°C
storage temperature	-20 to 110	°C
IR Filter	**CO_2**	**Ref.**
Centre wave length	4.26µm	3.91µm
Responsivity V/W (500K, 10Hz)	~ 7500	~ 3900
Noise 10Hz µV√Hz	~ 60	~ 60

1) 10 Hz normalized without windows and optics
2) Op amp with 10 GOhm feedback resistor
3) Output Voltage Normalised around mid rail





Mod f cat ons reserved Rev.01/ 23.08.2010

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D-01109 Dresden, Germany

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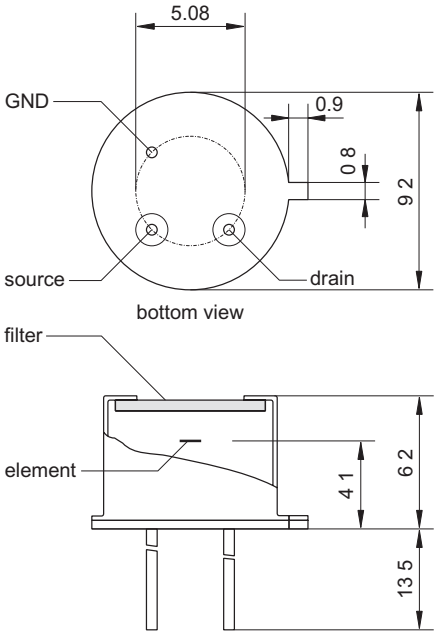
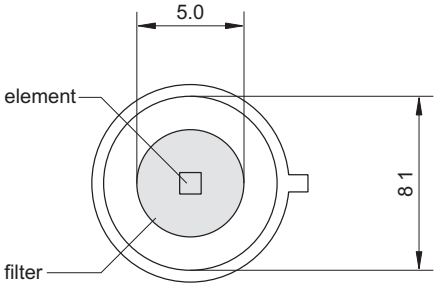
HPS A01B

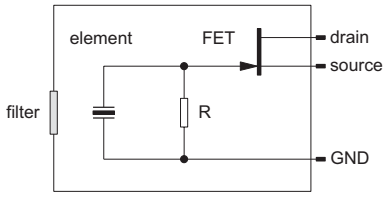
Pyroelectric Single Element Detector for Measurement Applications

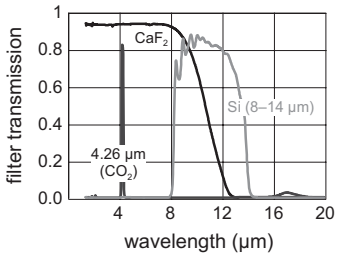


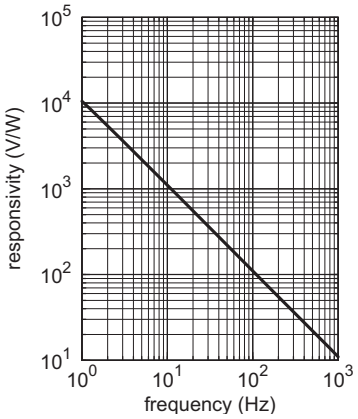
element size	1 mm × 1 mm
aperture	5.0 mm
filter[3]	custom-designed
responsivity[1,2]	>1100 V/W
noise[1]	<500 nV/√Hz
specific detectivity[1,2]	>2·10^8 cm √Hz / W
offset voltage	0.4 to 1.5 V
operating voltage	2 to 18 V
housing	TO 39
operating temperature	–20 to 70 °C
storage temperature	–20 to 70 °C

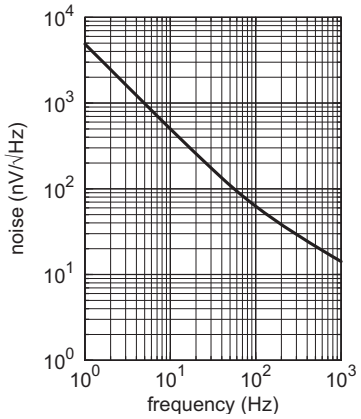
1) frequency: 10 Hz, detector temperature: 25 °C
2) black body source temperature: 500 K, filter transmission: 100 %
3) other filters on request

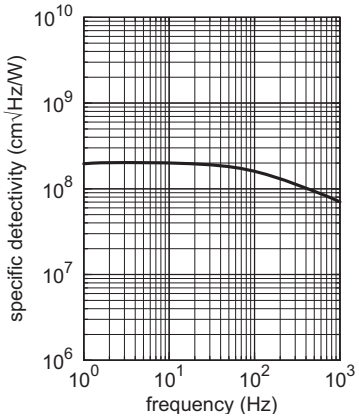












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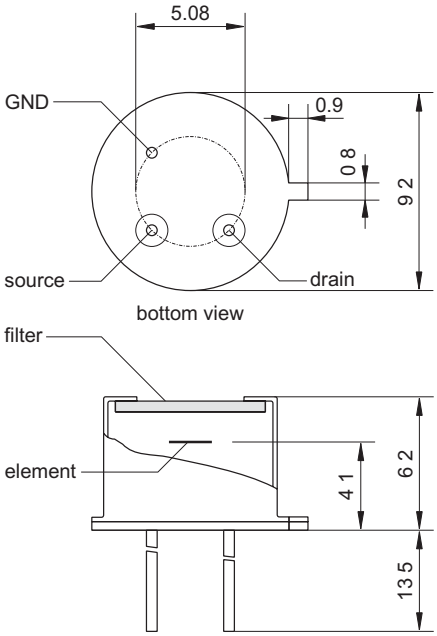
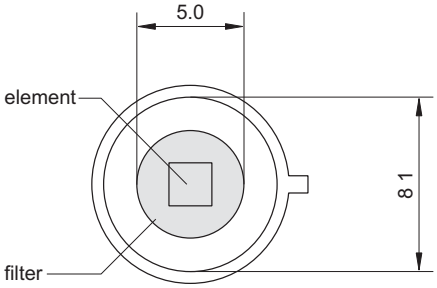
HPS A01E

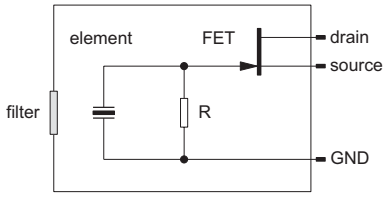
Pyroelectric Single Element Detector for Measurement Applications

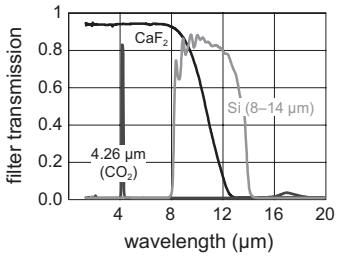


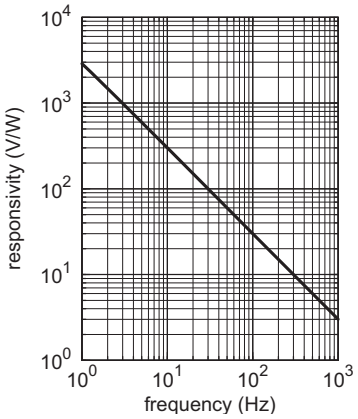
element size	2 mm × 2 mm
aperture	5.0 mm
filter[3]	custom-designed
responsivity[1,2]	>300 V/W
noise[1]	<150 nV/√Hz
specific detectivity[1,2]	>4·10^8 cm √Hz / W
offset voltage	0.4 to 1.5 V
operating voltage	2 to 18 V
housing	TO 39
operating temperature	–20 to 70 °C
storage temperature	–20 to 70 °C

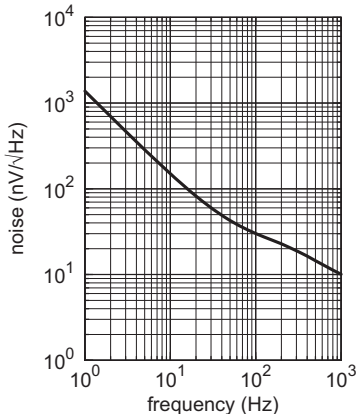
1) frequency: 10 Hz, detector temperature: 25 °C
2) black body source temperature: 500 K, filter transmission: 100 %
3) other filters on request

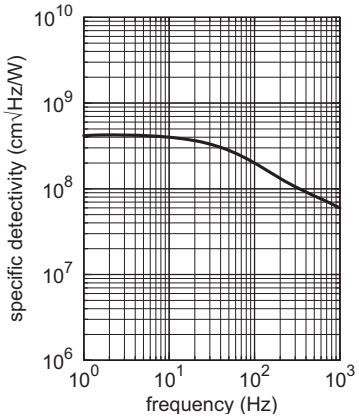












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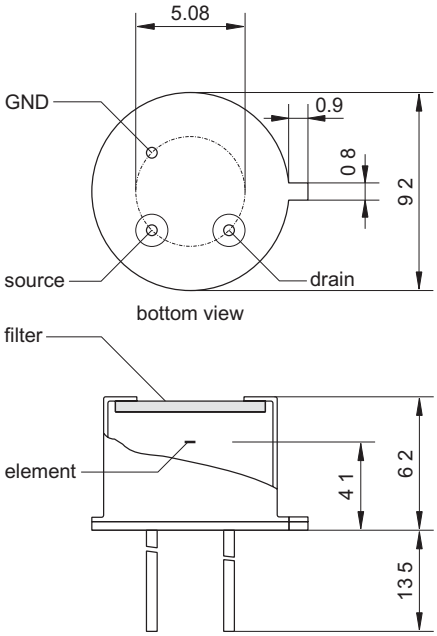
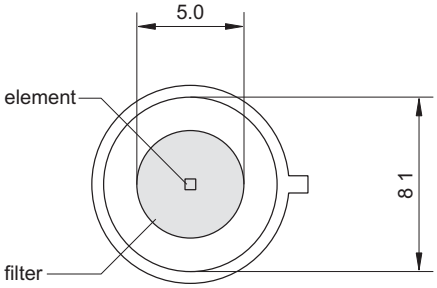
HPS A02A

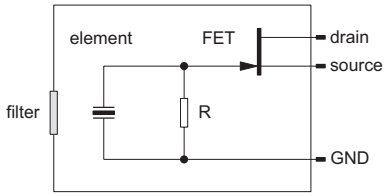
Pyroelectric Single Element Detector for Measurement Applications

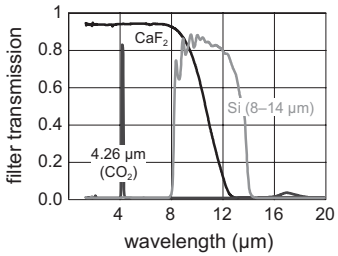


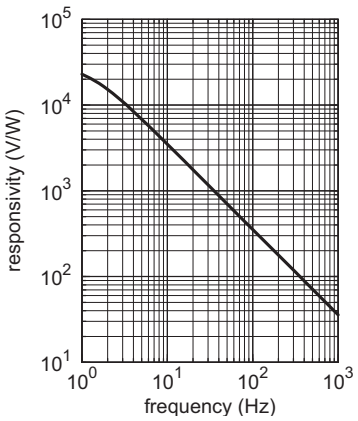
element size	0.5 mm × 0.5 mm
aperture	5.0 mm
filter[3]	custom-designed
responsivity[1,2]	>3500 V/W
noise[1]	<500 nV/√Hz
specific detectivity[1,2]	>3·10^8 cm √Hz / W
offset voltage	0.4 to 1.5 V
operating voltage	2 to 18 V
housing	TO 39
operating temperature	–20 to 70 °C
storage temperature	–20 to 70 °C

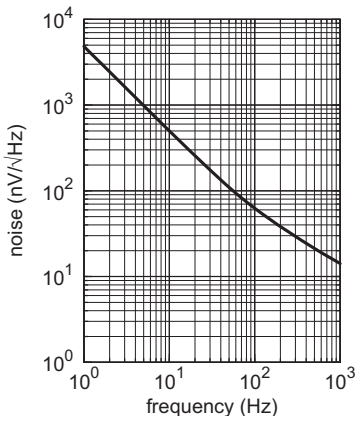
1) frequency: 10 Hz, detector temperature: 25 °C
2) black body source temperature: 500 K, filter transmission: 100 %
3) other filters on request

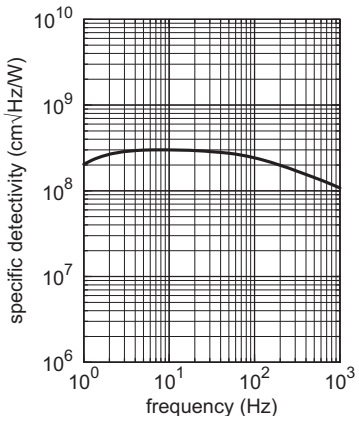












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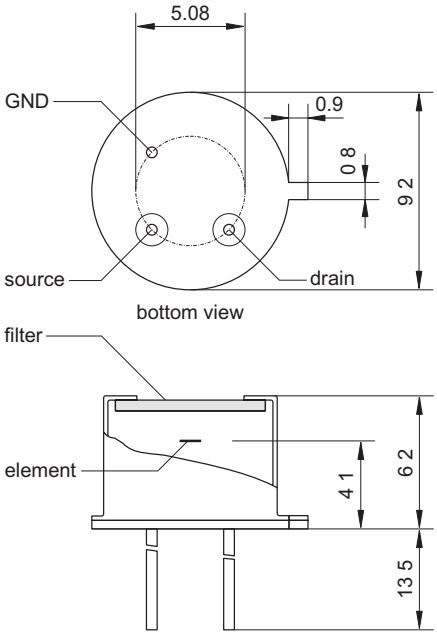
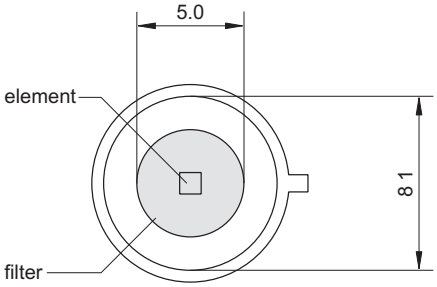
HPS A02B

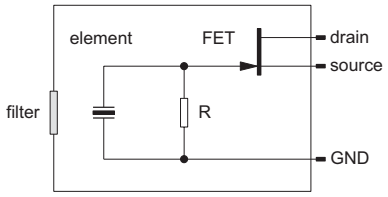
Pyroelectric Single Element Detector for Measurement Applications

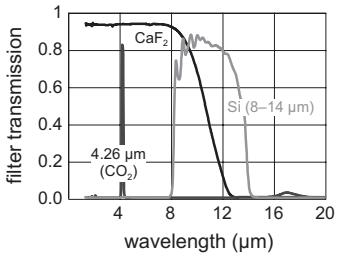


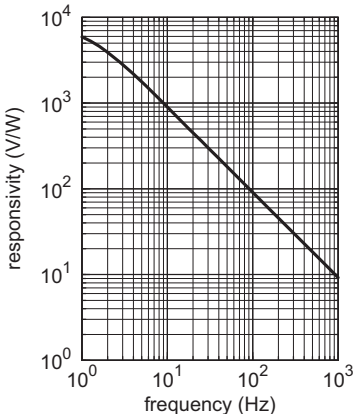
element size	1 mm × 1 mm
aperture	5.0 mm
filter[3]	custom-designed
responsivity[1,2]	>900 V/W
noise[1]	<160 nV/√Hz
specific detectivity[1,2]	>6·10^8 cm √Hz / W
offset voltage	0.4 to 1.5 V
operating voltage	2 to 18 V
housing	TO 39
operating temperature	–20 to 70 °C
storage temperature	–20 to 70 °C

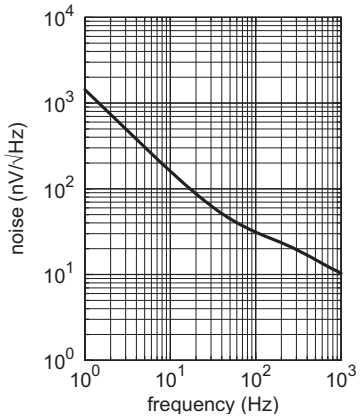
1) frequency: 10 Hz, detector temperature: 25 °C
2) black body source temperature: 500 K, filter transmission: 100 %
3) other filters on request

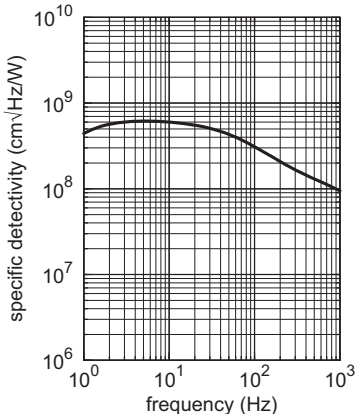












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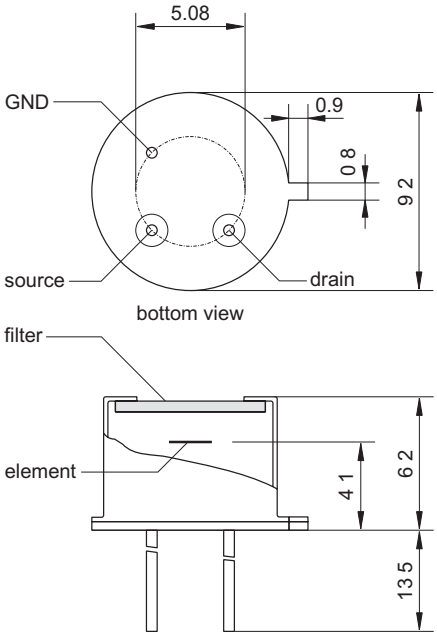
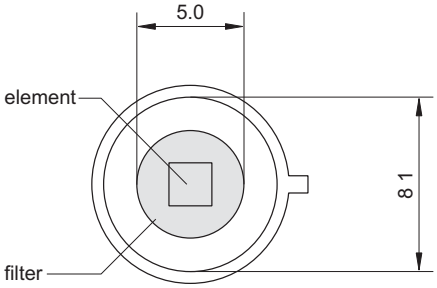
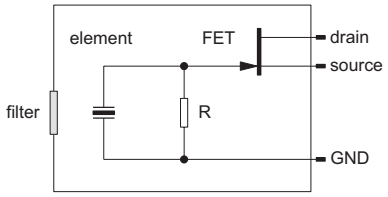
Pyroelectric Single Element Detector for Measurement Applications

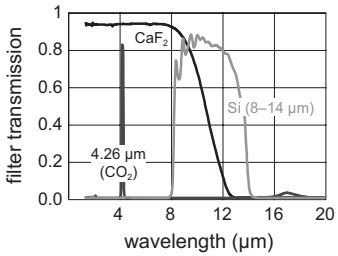


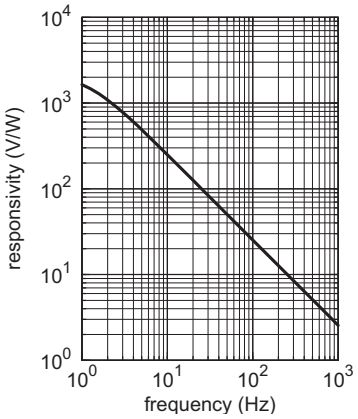
element size	2 mm × 2 mm
aperture	5.0 mm
filter[3]	custom-designed
responsivity[1,2]	>250 V/W
noise[1]	<80 nV/√Hz
specific detectivity[1,2]	>8·10^8 cm √Hz / W
offset voltage	0.4 to 1.5 V
operating voltage	2 to 18 V
housing	TO 39
operating temperature	–20 to 70 °C
storage temperature	–20 to 70 °C

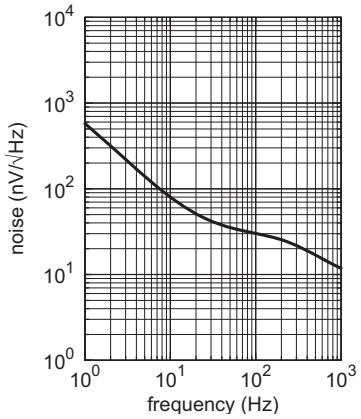
1) frequency: 10 Hz, detector temperature: 25 °C
2) black body source temperature: 500 K, filter transmission: 100 %
3) other filters on request

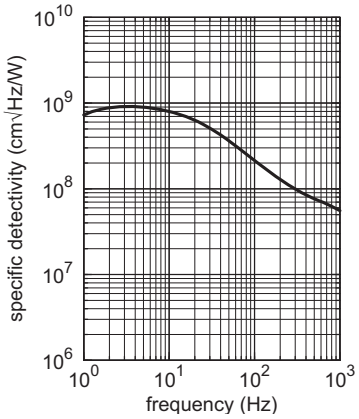












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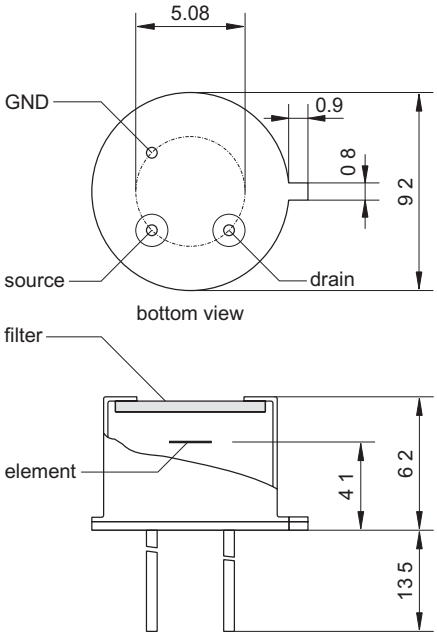
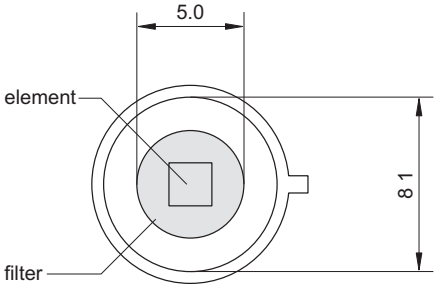
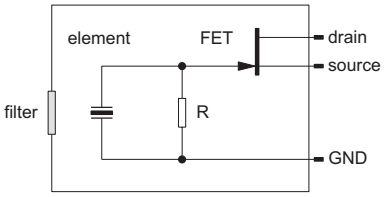
Pyroelectric Single Element Detector for Measurement Applications

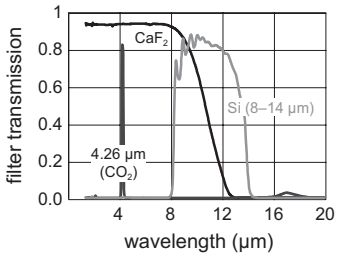


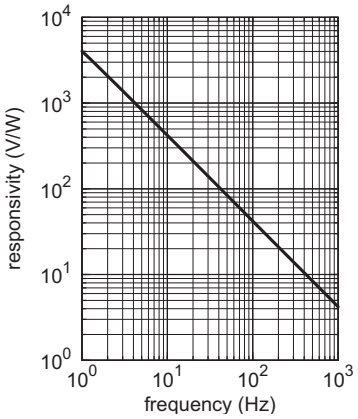
element size	2 mm × 2 mm
aperture	5.0 mm
filter[3]	custom-designed
responsivity[1,2]	>420 V/W
noise[1]	<150 nV/√Hz
specific detectivity[1,2]	>5·10^8 cm √Hz / W
offset voltage	0.4 to 1.5 V
operating voltage	2 to 18 V
housing	TO 39
operating temperature	–20 to 60 °C
storage temperature	–20 to 60 °C

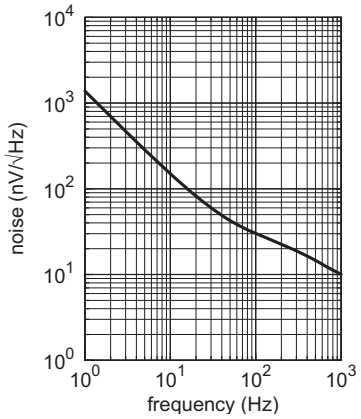
1) frequency: 10 Hz, detector temperature: 25 °C
2) black body source temperature: 500 K, filter transmission: 100 %
3) other filters on request

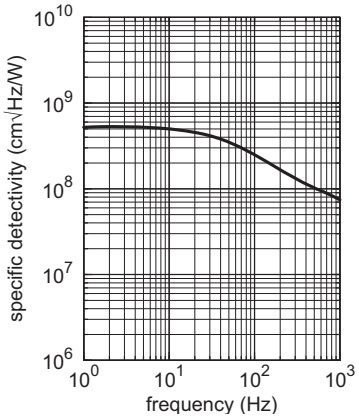












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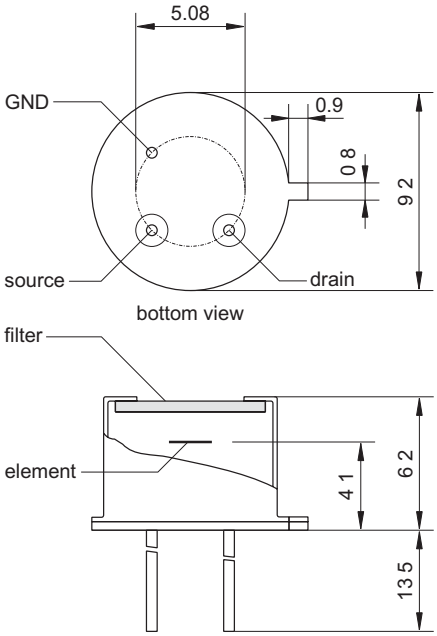
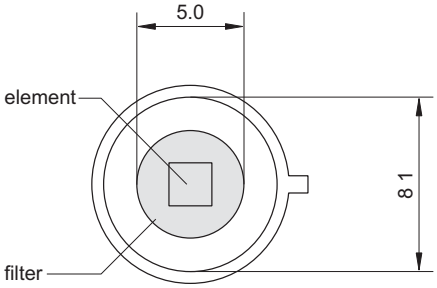
HPS A04E

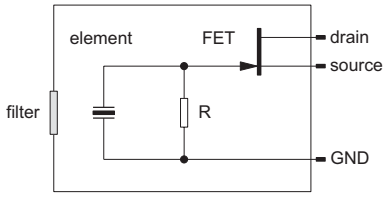
Pyroelectric Single Element Detector for Measurement Applications

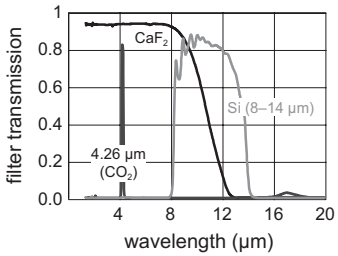


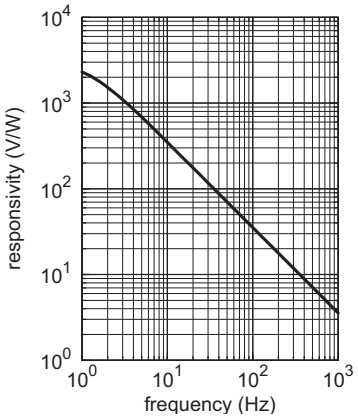
element size	2 mm × 2 mm
aperture	5.0 mm
filter[3]	custom-designed
responsivity[1,2]	>350 V/W
noise[1]	<80 nV/√Hz
specific detectivity[1,2]	>9·10^8 cm √Hz / W
offset voltage	0.4 to 1.5 V
operating voltage	2 to 18 V
housing	TO 39
operating temperature	–20 to 60 °C
storage temperature	–20 to 60 °C

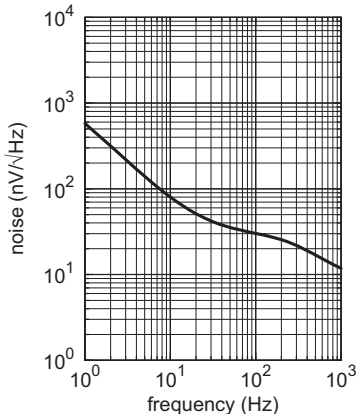
1) frequency: 10 Hz, detector temperature: 25 °C
2) black body source temperature: 500 K, filter transmission: 100 %
3) other filters on request

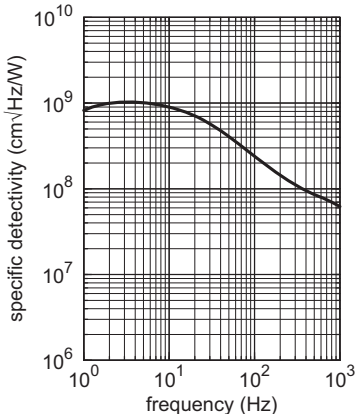












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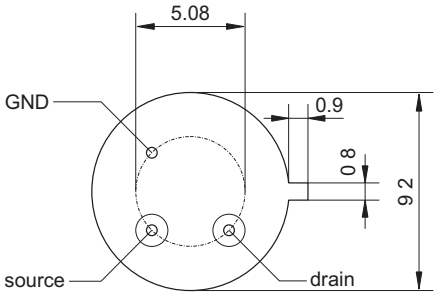
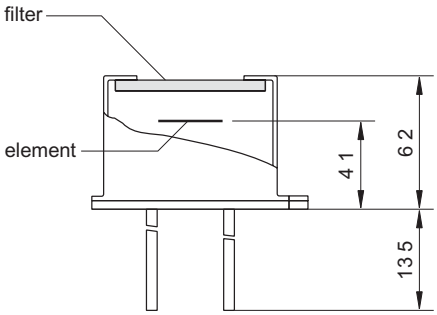
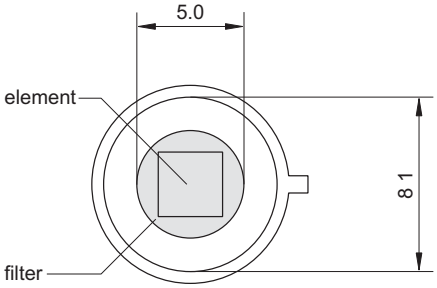
HPS A04G

Pyroelectric Single Element Detector for Measurement Applications

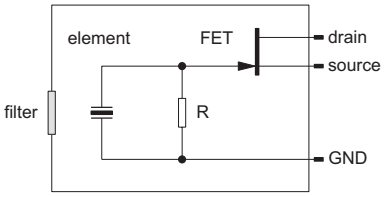


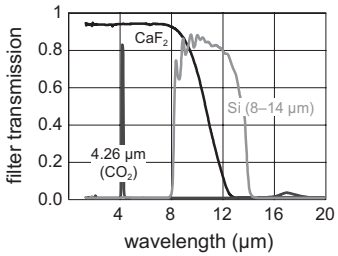


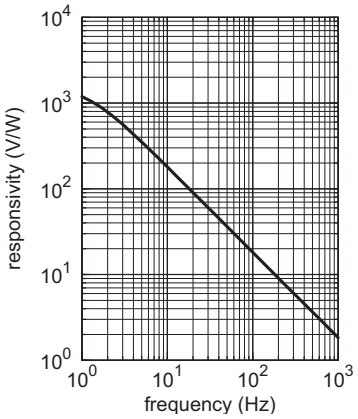


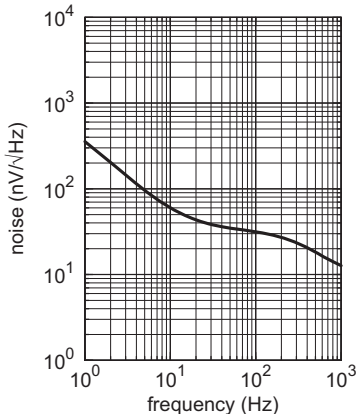
element size	3 mm × 3 mm
aperture	5.0 mm
filter[3]	custom-designed
responsivity[1,2]	>180 V/W
noise[1]	<60 nV/√Hz
specific detectivity[1,2]	>10·10^8 cm √Hz / W
offset voltage	0.4 to 1.5 V
operating voltage	2 to 18 V
housing	TO 39
operating temperature	–20 to 60 °C
storage temperature	–20 to 60 °C

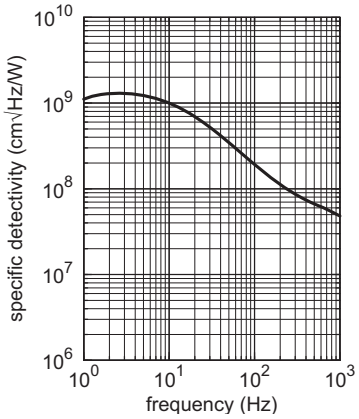
1) frequency: 10 Hz, detector temperature: 25 °C
2) black body source temperature: 500 K, filter transmission: 100 %
3) other filters on request











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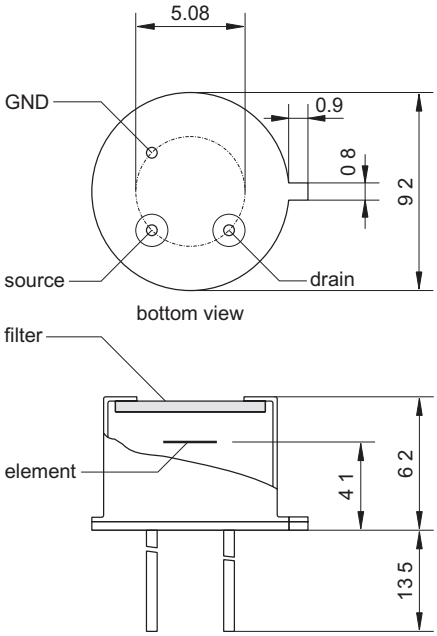
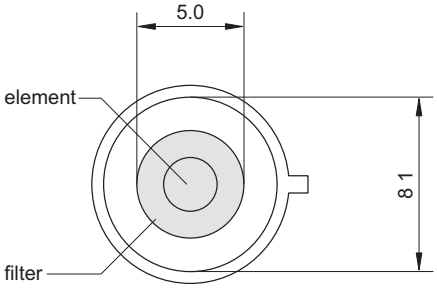
HPS A05F

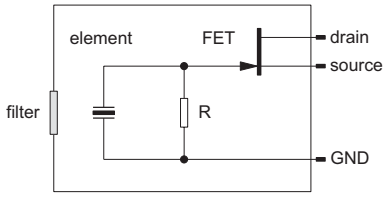
Pyroelectric Single Element Detector for Measurement Applications

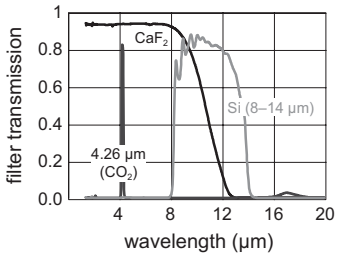


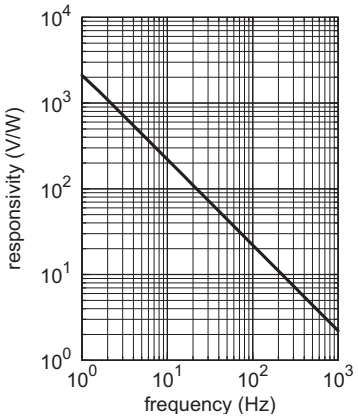
element size	∅ 2.5 mm
aperture	5.0 mm
filter[3]	custom-designed
responsivity[1,2]	>220 V/W
noise[1]	<140 nV/√Hz
specific detectivity[1,2]	>4·10^8 cm √Hz / W
offset voltage	0.4 to 1.5 V
operating voltage	2 to 18 V
housing	TO 39
operating temperature	–20 to 70 °C
storage temperature	–20 to 70 °C

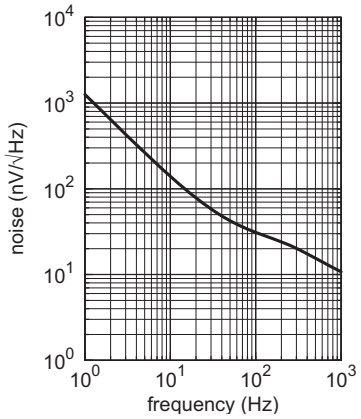
1) frequency: 10 Hz, detector temperature: 25 °C
2) black body source temperature: 500 K, filter transmission: 100 %
3) other filters on request

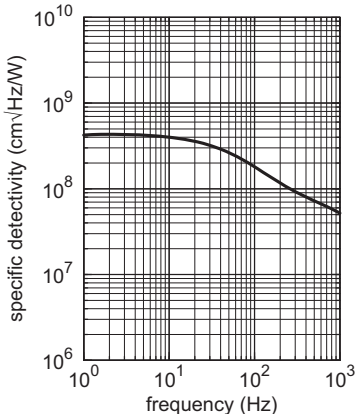












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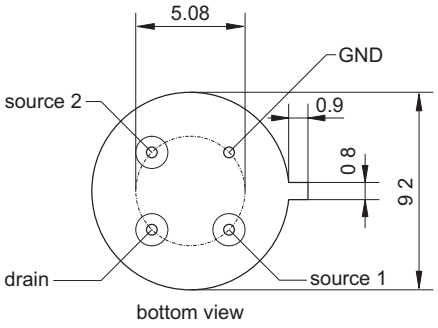
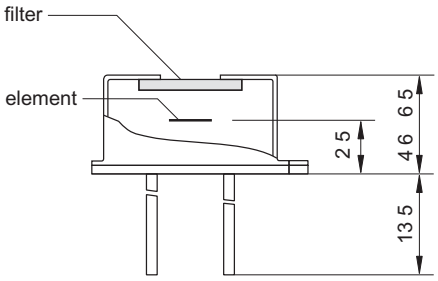
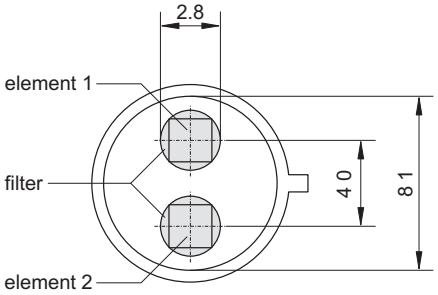
HPS D10E

Pyroelectric Dual Channel Detector for Measurement Applications

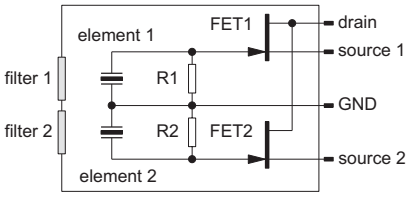


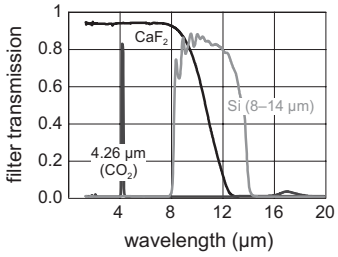


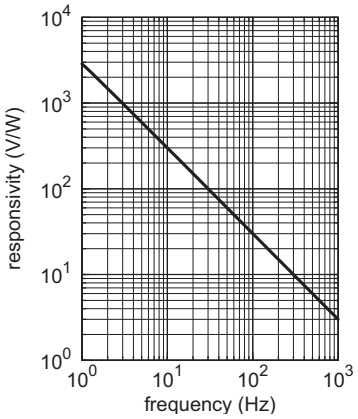


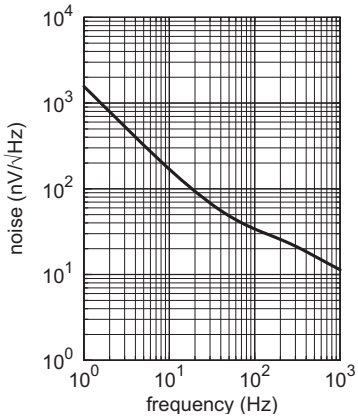
element size	2 mm × 2 mm
aperture	2.8 mm
filter[3]	custom-designed
responsivity[1,2]	>300 V/W
noise[1]	<170 nV/√Hz
specific detectivity[1,2]	>3.4·10^8 cm √Hz / W
offset voltage	0.4 to 1.5 V
operating voltage	2 to 18 V
housing	TO 39
operating temperature	–20 to 70 °C
storage temperature	–20 to 70 °C

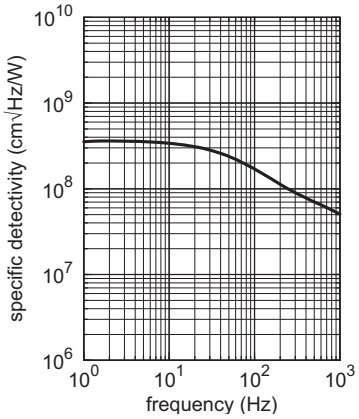
1) frequency: 10 Hz, detector temperature: 25 °C
2) black body source temperature: 500 K, filter transmission: 100 %
3) other filters on request











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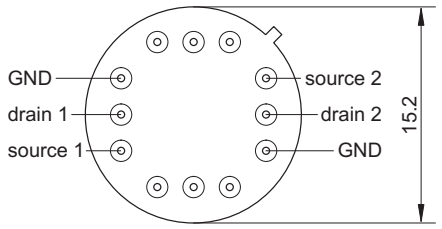
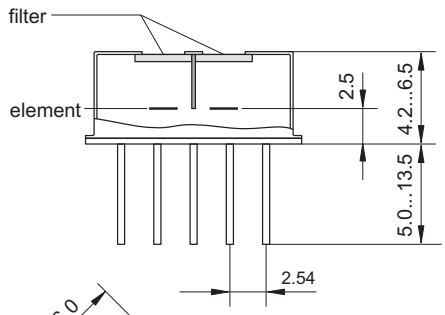
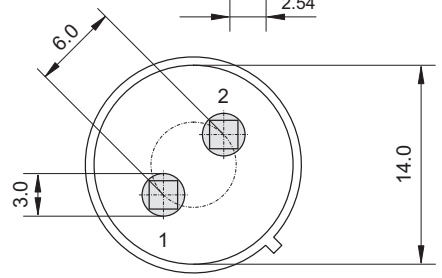
HPS DS10E

Pyroelectric Dual Channel Detector for Measurement Applications

bottom view

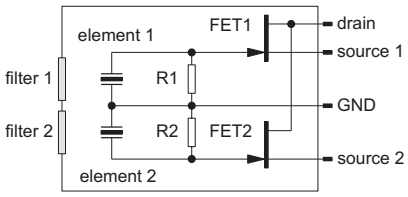


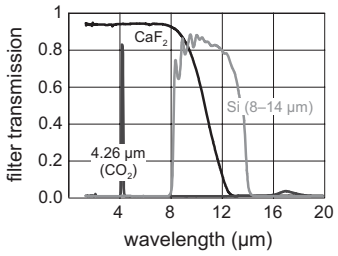


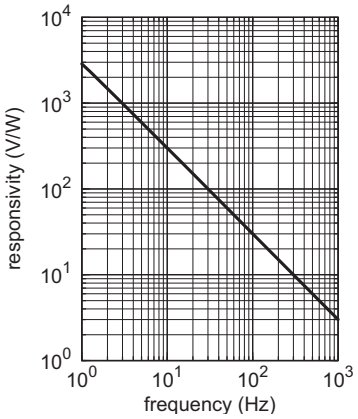


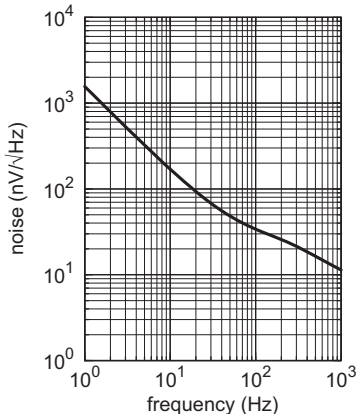
element size	2 mm × 2 mm
aperture	3.0 mm
filter[3]	custom-designed
responsivity[1,2]	>300 V/W
noise[1]	<170 nV/√Hz
specific detectivity[1,2]	>3.4·10^8 cm √Hz / W
offset voltage	0.4 to 1.5 V
operating voltage	2 V to 18 V
housing	TO 8
operating temperature	–20 to 70 °C
storage temperature	–20 to 70 °C

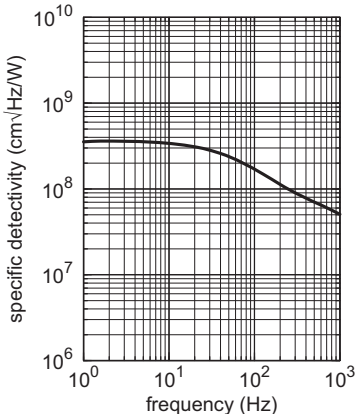
1) frequency: 10 Hz, detector temperature: 25 °C
2) black body source temperature: 500 K, filter transmission: 100 %
3) other filters on request











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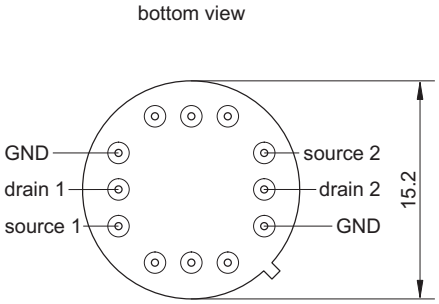
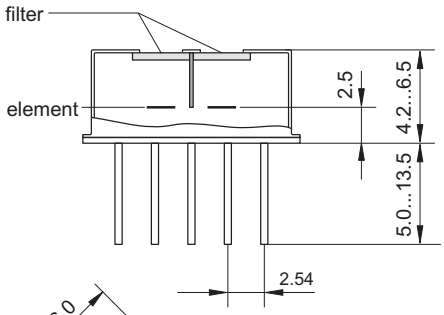
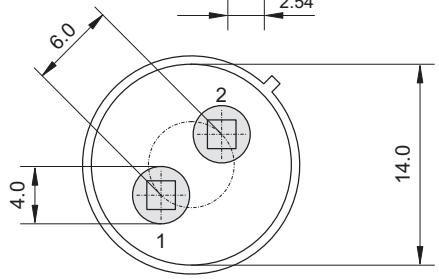
HPS D30E

Pyroelectric Dual Channel Detector for Measurement Applications

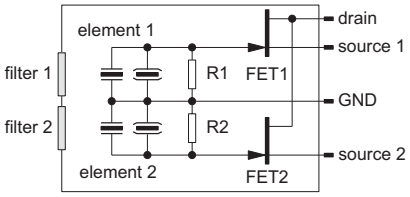


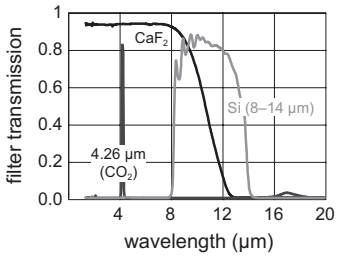


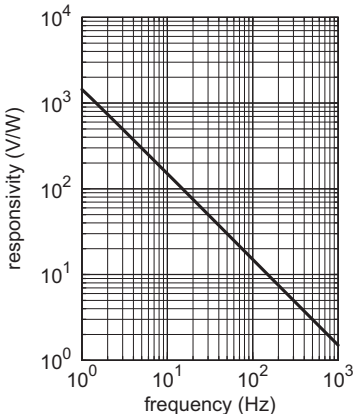


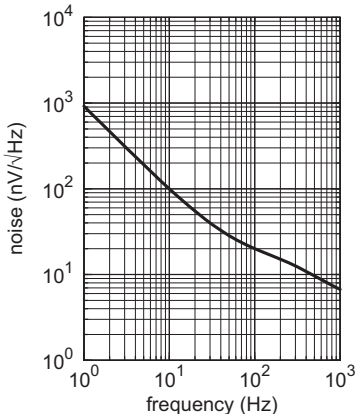
element size	2 mm × 2 mm
aperture	4.0 mm
filter[3]	custom-designed
responsivity[1,2]	>150 V/W
noise[1]	<100 nV/√Hz
specific detectivity[1,2]	>3·10[8] cm √Hz / W
thermal compensation	parallel
offset voltage	0.4 to 1.5 V
operating voltage	2 to 18 V
housing	TO 8
operating temperature	–20 to 70 °C
storage temperature	–20 to 70 °C

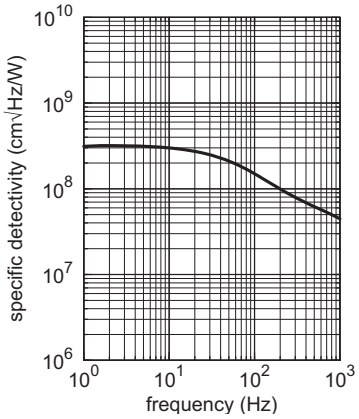
1) frequency: 10 Hz, detector temperature: 25 °C
2) black body source temperature: 500 K, filter transmission: 100 %
3) other filters on request











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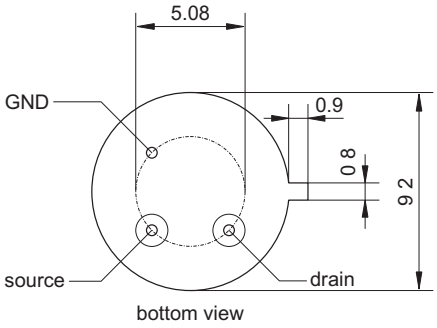
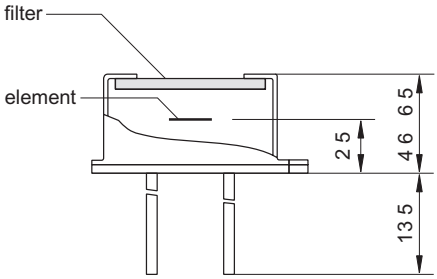
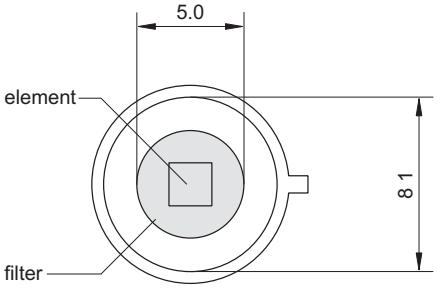
HPS E09E

Pyroelectric Single Element Detector for Measurement Applications

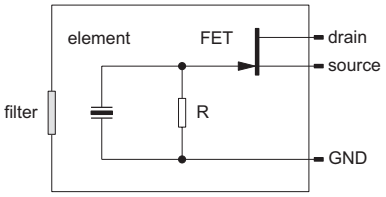


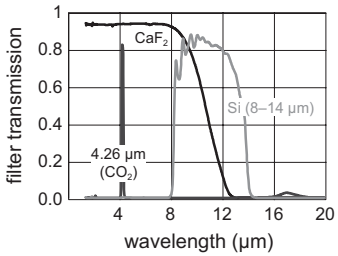


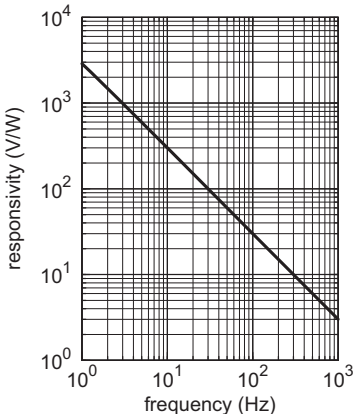


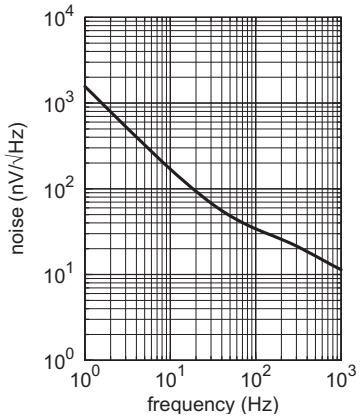
element size	2 mm × 2 mm
aperture	5.0 mm
filter[3]	custom-designed
responsivity[1,2]	>300 V/W
noise[1]	<170 nV/√Hz
specific detectivity[1,2]	>3.5·10^8 cm √Hz / W
offset voltage	0.4 to 1.5 V
operating voltage	2 to 18 V
housing	TO 39
operating temperature	–20 to 70 °C
storage temperature	–20 to 70 °C

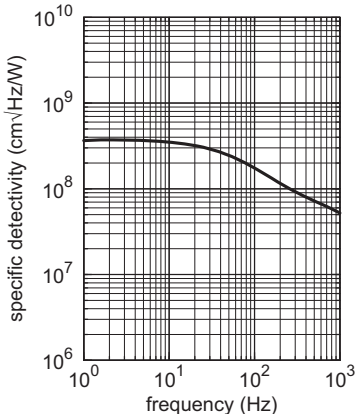
1) frequency: 10 Hz, detector temperature: 25 °C
2) black body source temperature: 500 K, filter transmission: 100 %
3) other filters on request











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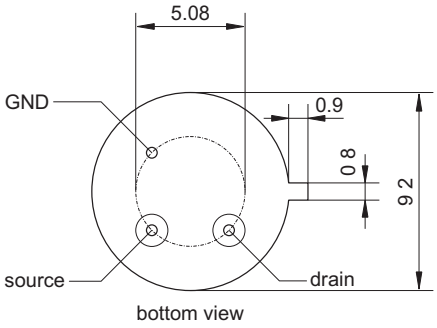
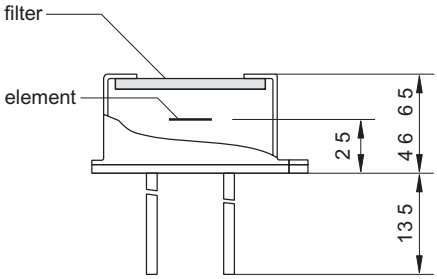
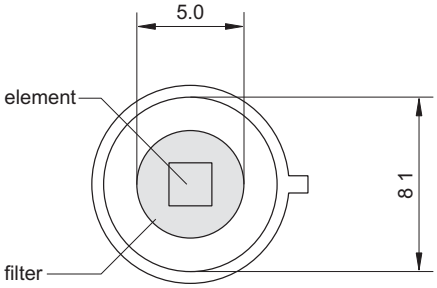
HPS E10E

Pyroelectric Single Element Detector for Measurement Applications

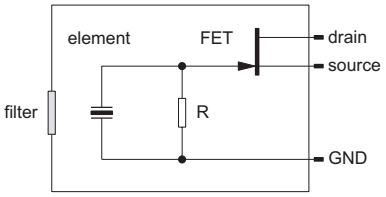


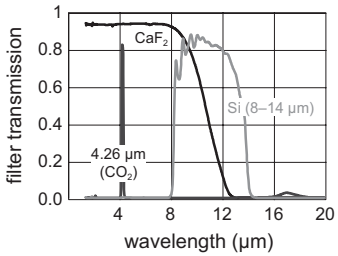


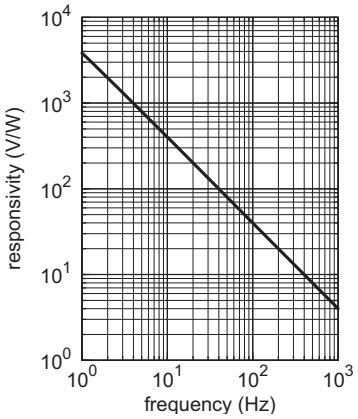


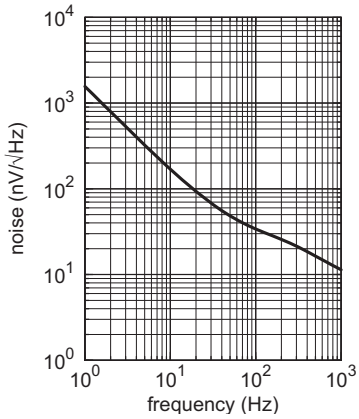
element size	2 mm × 2 mm
aperture	5.0 mm
filter[3]	custom-designed
responsivity[1,2]	>400 V/W
noise[1]	<170 nV/√Hz
specific detectivity[1,2]	>4.5·10^8 cm √Hz / W
offset voltage	0.4 to 1.5 V
operating voltage	2 to 18 V
housing	TO 39
operating temperature	–20 to 70 °C
storage temperature	–20 to 70 °C

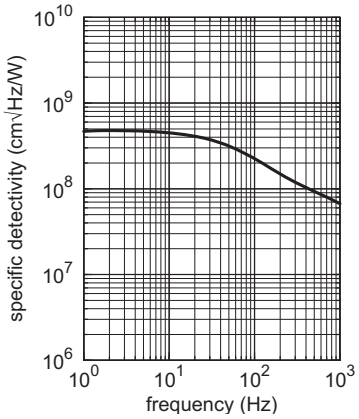
1) frequency: 10 Hz, detector temperature: 25 °C
2) black body source temperature: 500 K, filter transmission: 100 %
3) other filters on request











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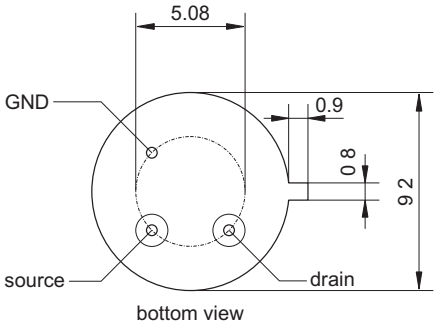
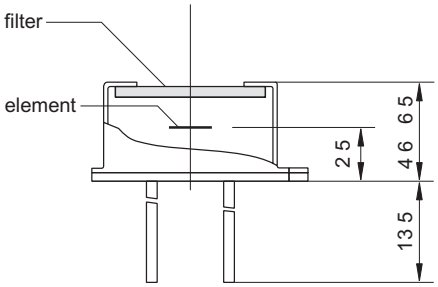
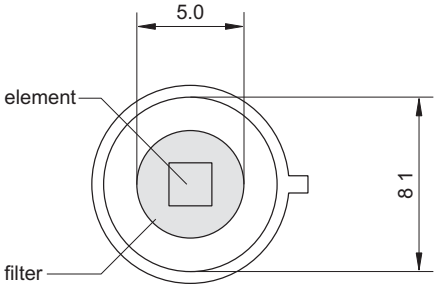
HPS E29E

Pyroelectric Single Element Detector for Measurement Applications

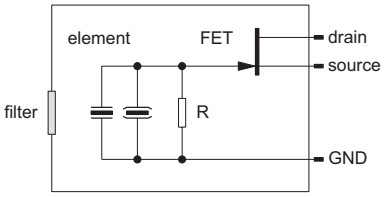


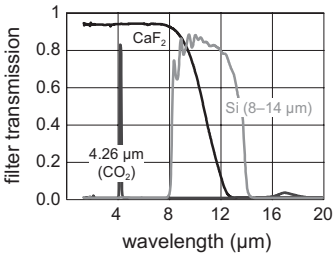


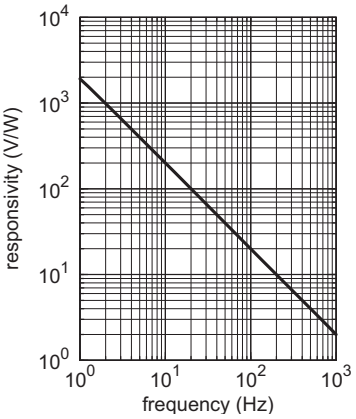


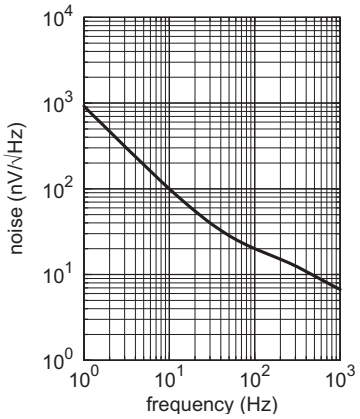
element size	2 mm × 2 mm
aperture	5.0 mm
filter[3]	custom-designed
responsivity[1,2]	>200 V/W
noise[1]	<100 nV/√Hz
specific detectivity[1,2]	>3.7·10^8 cm √Hz / W
thermal compensation	parallel
offset voltage	0.4 to 1.5 V
operating voltage	2 to 18 V
housing	TO 39
operating temperature	–20 to 70 °C
storage temperature	–20 to 70 °C

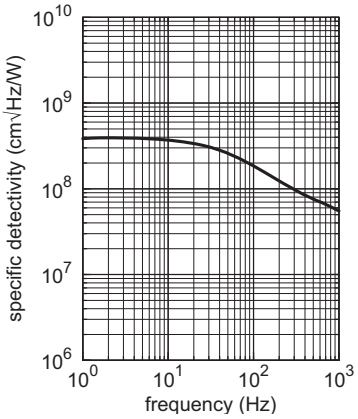
1) frequency: 10 Hz, detector temperature: 25 °C
2) black body source temperature: 500 K, filter transmission: 100 %
3) other filters on request











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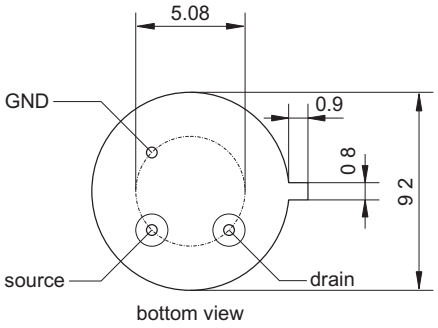
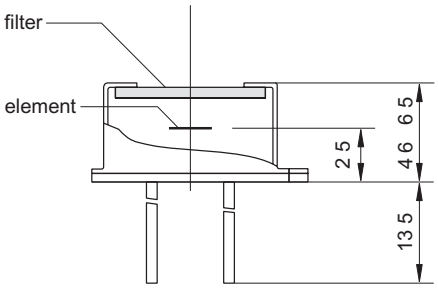
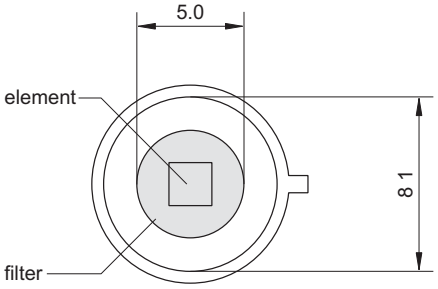
HPS E30E

Pyroelectric Single Element Detector for Measurement Applications

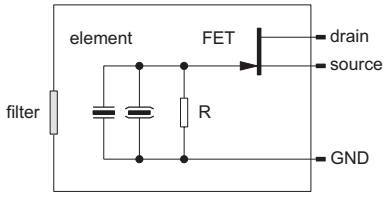


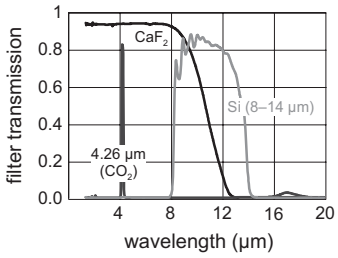


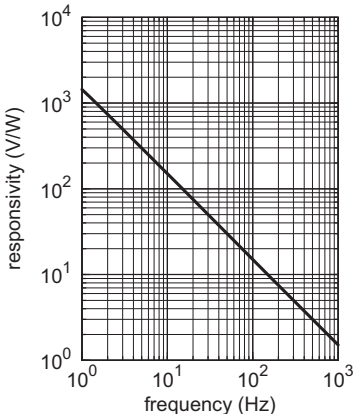


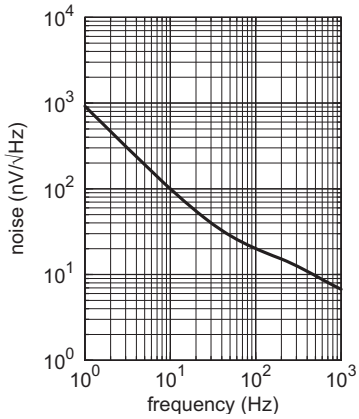
element size	2 mm × 2 mm
aperture	5.0 mm
filter[3]	custom-designed
responsivity[1,2]	>150 V/W
noise[1]	<100 nV/√Hz
specific detectivity[1,2]	>3·10^8 cm √Hz / W
thermal compensation	parallel
offset voltage	0.4 to 1.5 V
operating voltage	2 to 18 V
housing	TO 39
operating temperature	–20 to 70 °C
storage temperature	–20 to 70 °C

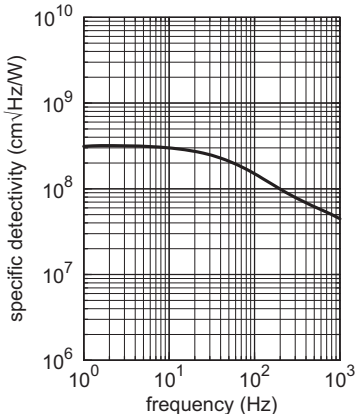
1) frequency: 10 Hz, detector temperature: 25 °C
2) black body source temperature: 500 K, filter transmission: 100 %
3) other filters on request











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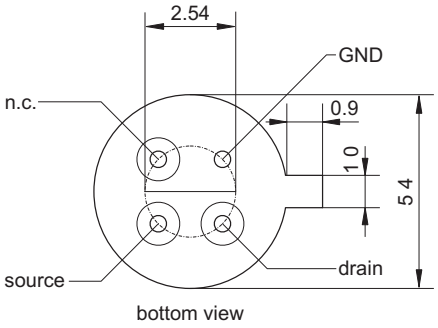
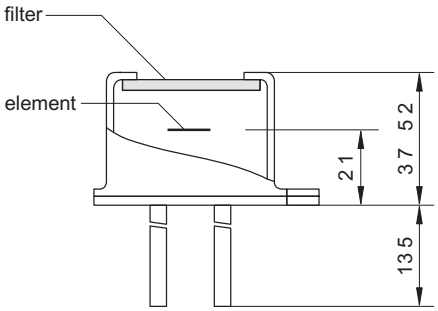
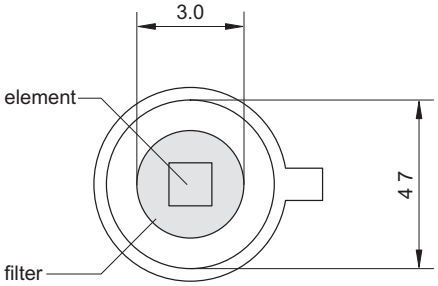
HPS K09C

Pyroelectric Single Element Detector for Measurement Applications

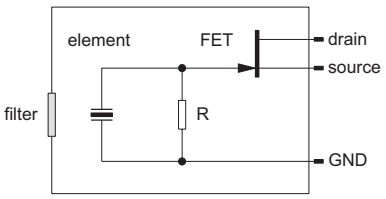


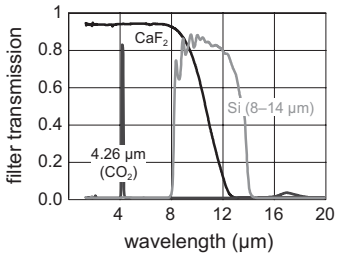


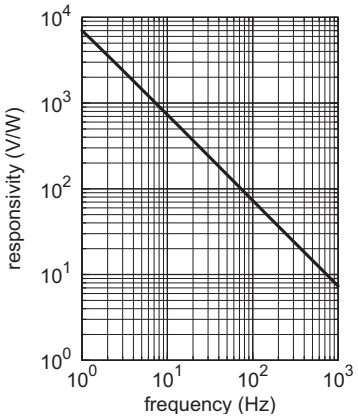


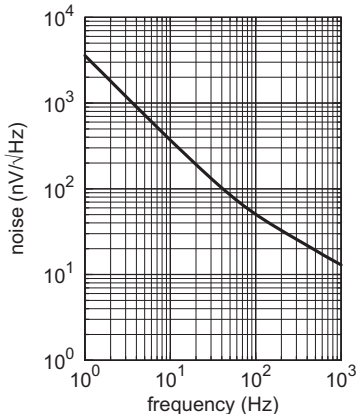
element size	1.2 mm × 1.2 mm
aperture	3.0 mm
filter[3]	custom-designed
responsivity[1,2]	>730 V/W
noise[1]	<370 nV/√Hz
specific detectivity[1,2]	>2.3·10^8 cm √Hz / W
offset voltage	0.4 to 1.5 V
operating voltage	2 to 18 V
housing	TO 18
operating temperature	–20 to 70 °C
storage temperature	–20 to 70 °C

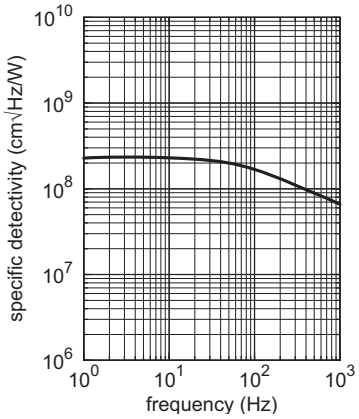
1) frequency: 10 Hz, detector temperature: 25 °C
2) black body source temperature: 500 K, filter transmission: 100 %
3) other filters on request











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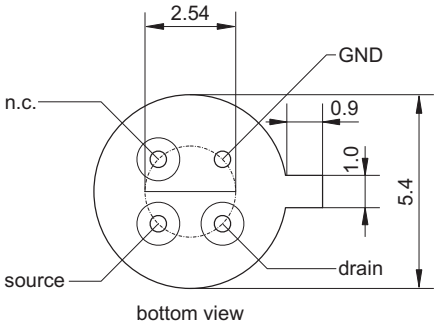
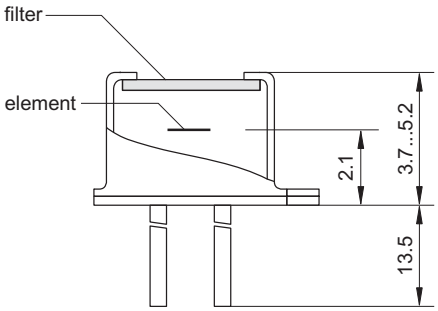
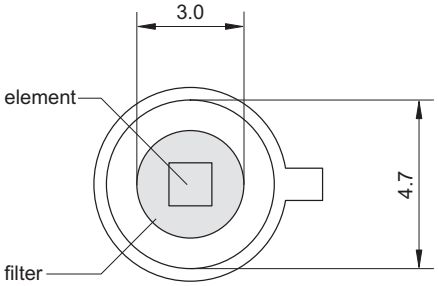
HPS K10C

Pyroelectric Single Element Detector for Measurement Applications

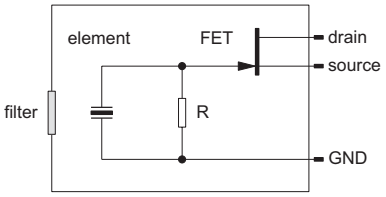


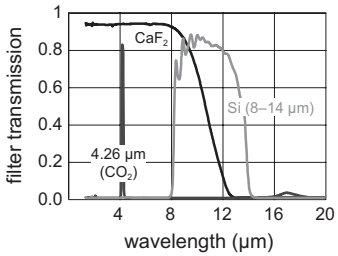


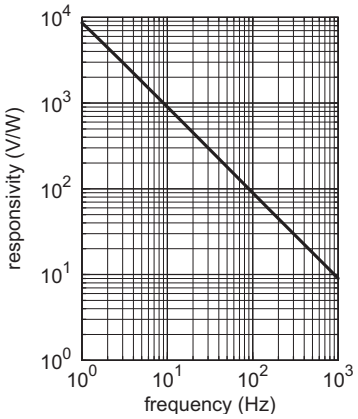


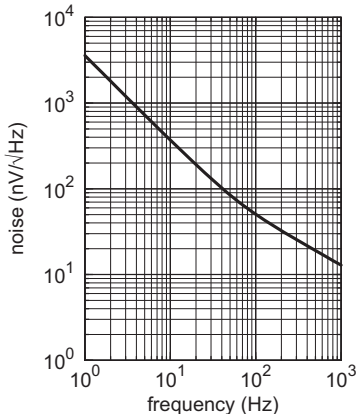
element size	1.2 mm × 1.2 mm
aperture	3.0 mm
filter[3]	custom-designed
responsivity[1,2]	>900 V/W
noise[1]	<370 nV/√Hz
specific detectivity[1,2]	>3·10^8 cm √Hz / W
offset voltage	0.4 to 1.5 V
operating voltage	2 to 18 V
housing	TO 18
operating temperature	–20 to 70 °C
storage temperature	–20 to 70 °C

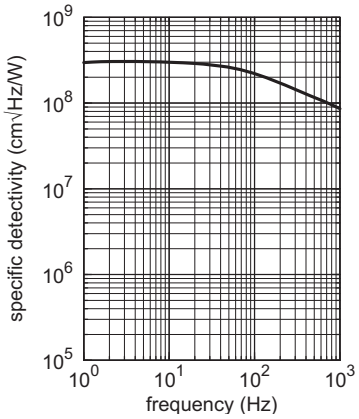
1) frequency: 10 Hz, detector temperature: 25 °C
2) black body source temperature: 500 K, filter transmission: 100 %
3) other filters on request











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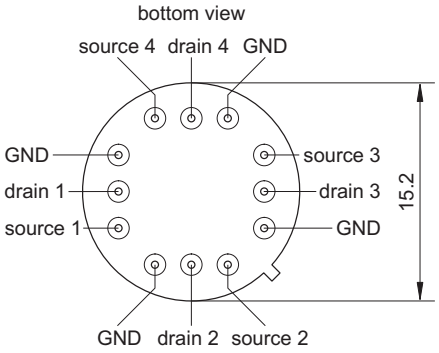
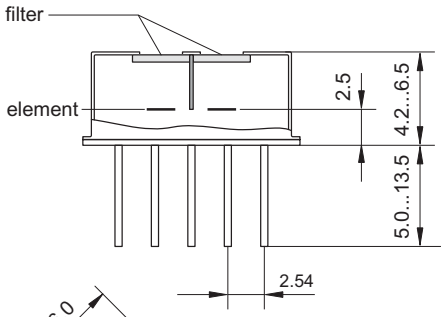
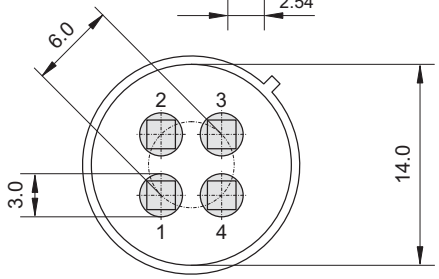
e-mail: Heimann@boselec.com www. boselec.com

HPS Q10E

Pyroelectric Four Channel Detector for Measurement Applications

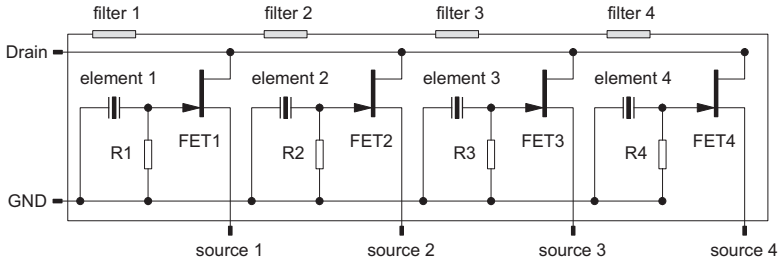


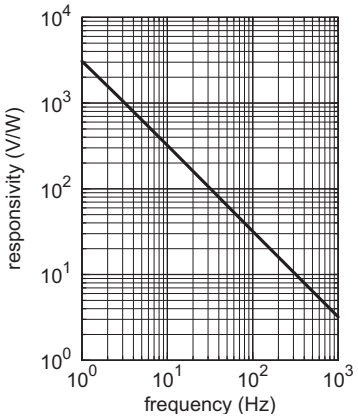


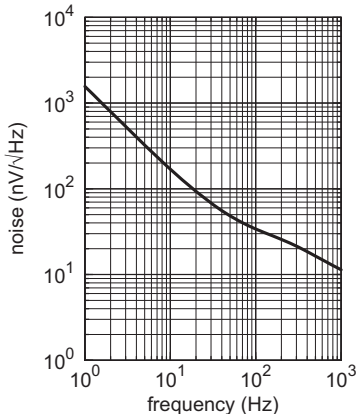


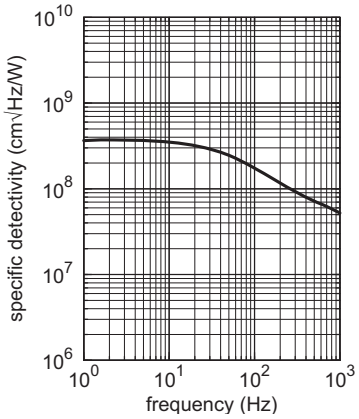
element size	2 mm × 2 mm
aperture	3.0 mm
filter[3]	custom-designed
responsivity[1,2]	>320 V/W
noise[1]	<170 nV/√Hz
specific detectivity[1,2]	>3.5·10^8 cm √Hz / W
offset voltage	0.4 to 1.5 V
operating voltage	2 to 18 V
housing	TO 8
operating temperature	–20 to 70 °C
storage temperature	–20 to 70 °C

1) frequency: 10 Hz, detector temperature: 25 °C
2) black body source temperature: 500 K, filter transmission: 100 %
3) other filters on request









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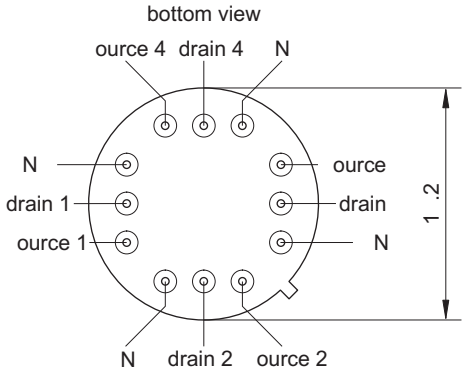
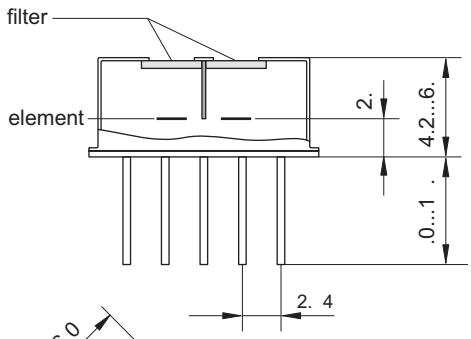
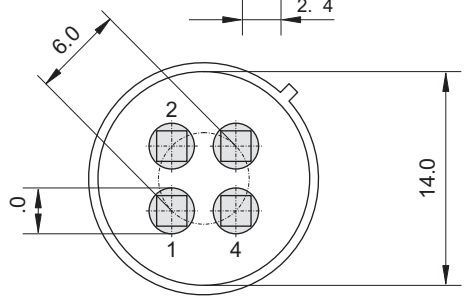
HPS Q30E

Temp Compensated Pyroelectric Four Channel Detector

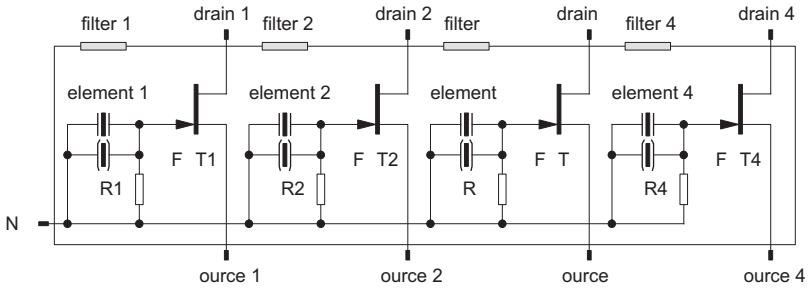


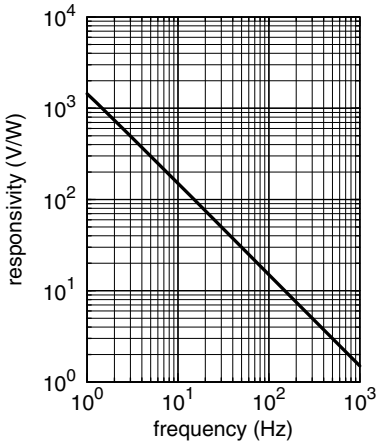


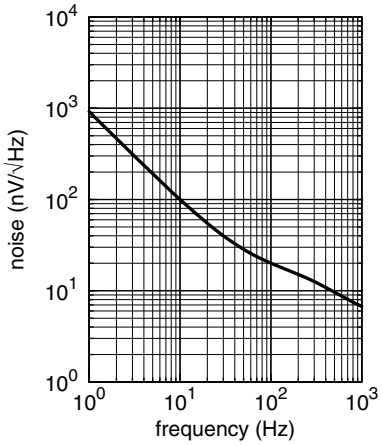


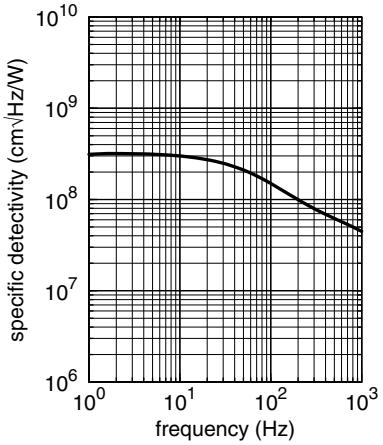
element size	2 mm × 2 mm
aperture	3.0 mm
filter[3]	custom-designed
responsivity[1,2]	>150 V/W
noise[1]	<100 nV/√Hz
specific detectivity[1,2]	>3·10^8 cm √Hz / W
thermal compensation	parallel
offset voltage	0.4 to 1.5 V
operating voltage	2 V to 18 V
housing	TO 8
operating temperature	–20 to 70 °C
storage temperature	–20 to 70 °C

1) frequency: 10 Hz, detector temperature: 25 °C
2) black body source temperature: 500 K, filter transmission: 100 %
3) other filters on request









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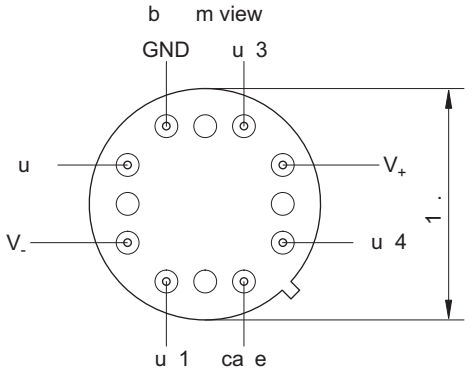
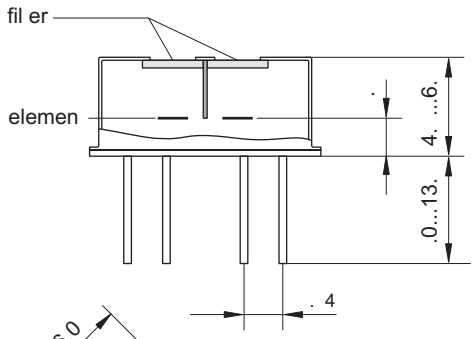
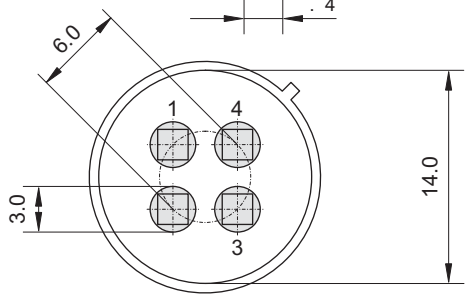
HPS Q50E

Pyroelectric Four Channel Detector with Op Amps

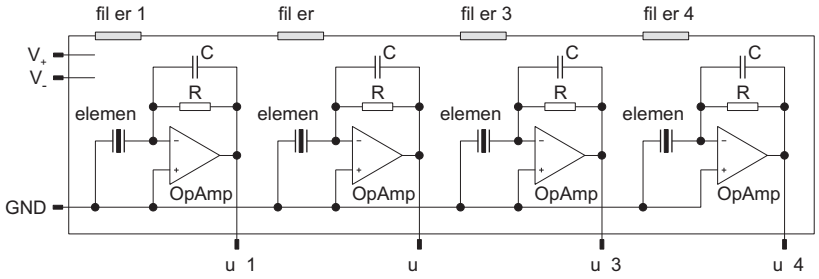


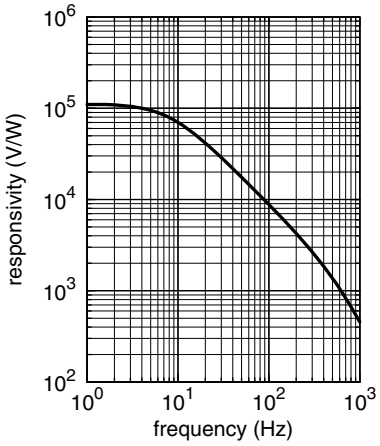


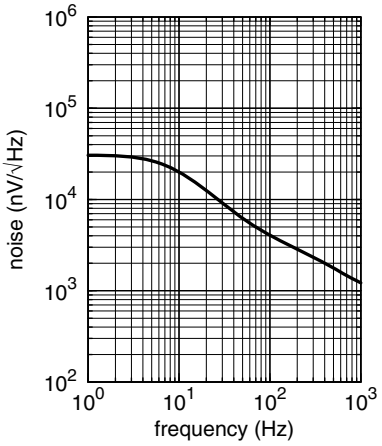


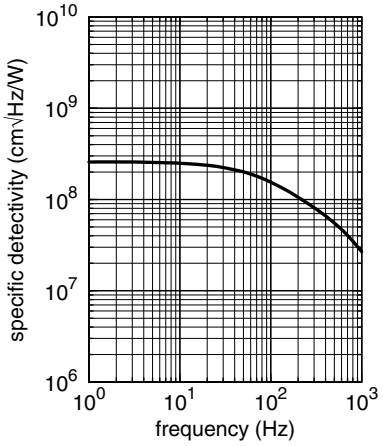
element size	2 mm × 2 mm
aperture	3.0 mm
filter[3]	custom-designed
responsivity[1,2]	>70000 V/W
noise[1]	<20000 nV/√Hz
specific detectivity[1,2]	>2.5·10^8 cm √Hz / W
offset voltage	<5 mV
operating voltage	±2.2 V to ±8 V
housing	TO 8
operating temperature	–20 to 70 °C
storage temperature	–20 to 70 °C

1) frequency: 10 Hz, detector temperature: 25 °C
2) black body source temperature: 500 K, filter transmission: 100 %
3) other filters on request









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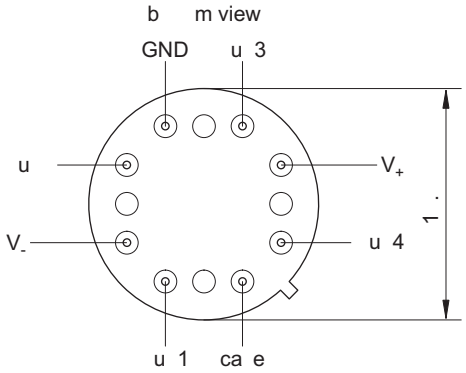
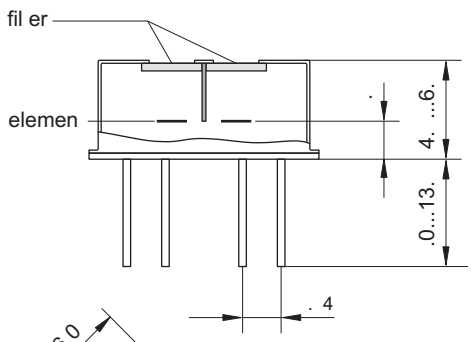
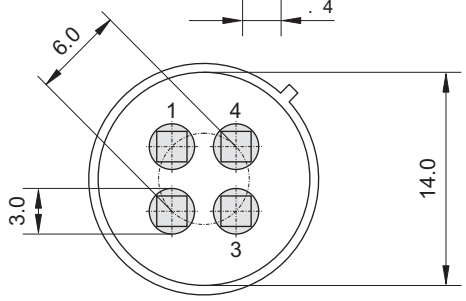
HPS Q70E

Temp Compensated Pyroelectric Four Channel Detector with Op Amps

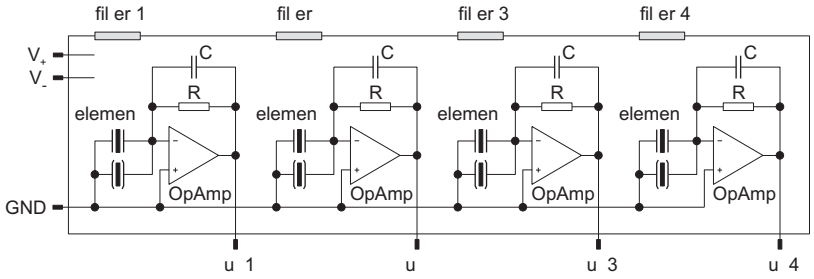


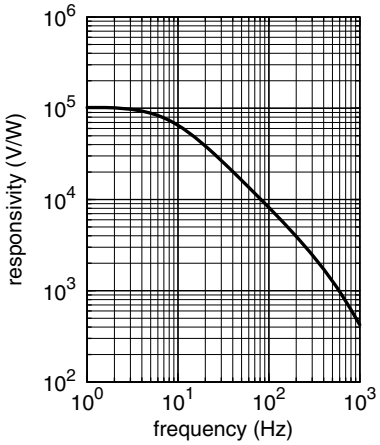


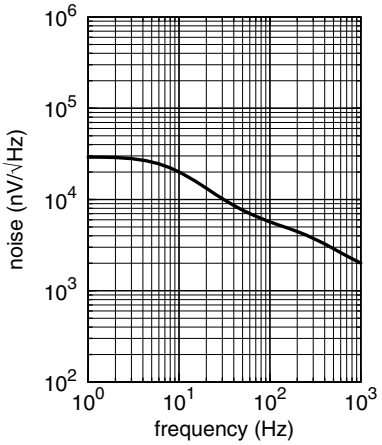


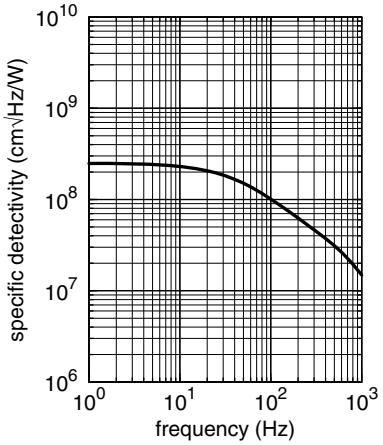
element size	2 mm × 2 mm
aperture	3.0 mm
filter[3]	custom-designed
responsivity[1,2]	>65000 V/W
noise[1]	<20000 nV/√Hz
specific detectivity[1,2]	>2.3·10^8 cm √Hz / W
thermal compensation	parallel
offset voltage	<5 mV
operating voltage	±2.2 V to ±8 V
housing	TO 8
operating temperature	–20 to 70 °C
storage temperature	–20 to 70 °C

1) frequency: 10 Hz, detector temperature: 25 °C
2) black body source temperature: 500 K, filter transmission: 100 %
3) other filters on request









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HPL256I-100

Hybrid pyroelectric linear array with 256 responsive elements and integrated CMOS multiplexer

Description

The pyroelectric linear array 256LTI is a hybrid detector with 256 responsive elements and an integrated CMOS multiplexer.

The pyroelectric chip consists of lithium tantalate ($LiTaO_3$). The size of the responsive elements is 42 µm × 100 µm with a pitch of 50 µm.

The multiplexer includes low-noise preamplifiers for each pixel, analogue switches and an output amplifier. The pre-amplifiers transform the signal charges of each pixel in a signal voltage, realize a band limiting and give the amplified signal to the sample&hold for the read-out process. The digital inputs are CMOS compatible.

For the measurement of the detector temperature a sensor (type AD 590) is integrated. It provides a temperature proportional current.

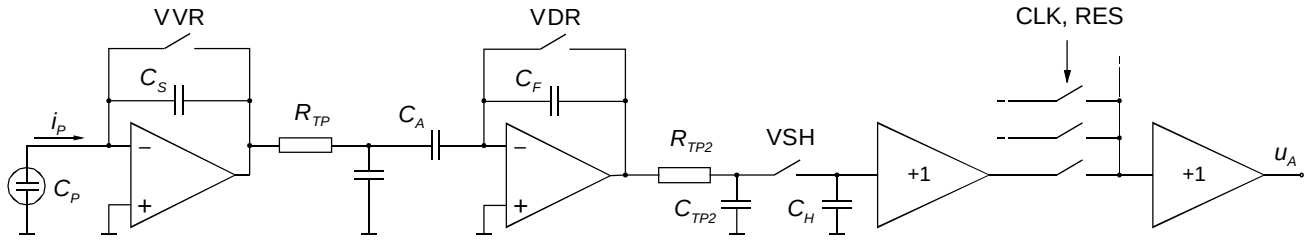
The pyroelectric chip and the read-out circuit are arranged in a metal hermetic package with an infrared window. It determines the spectral responsivity.

For the measurement of the infrared radiation it is necessary to chop the radiation flux.

Features

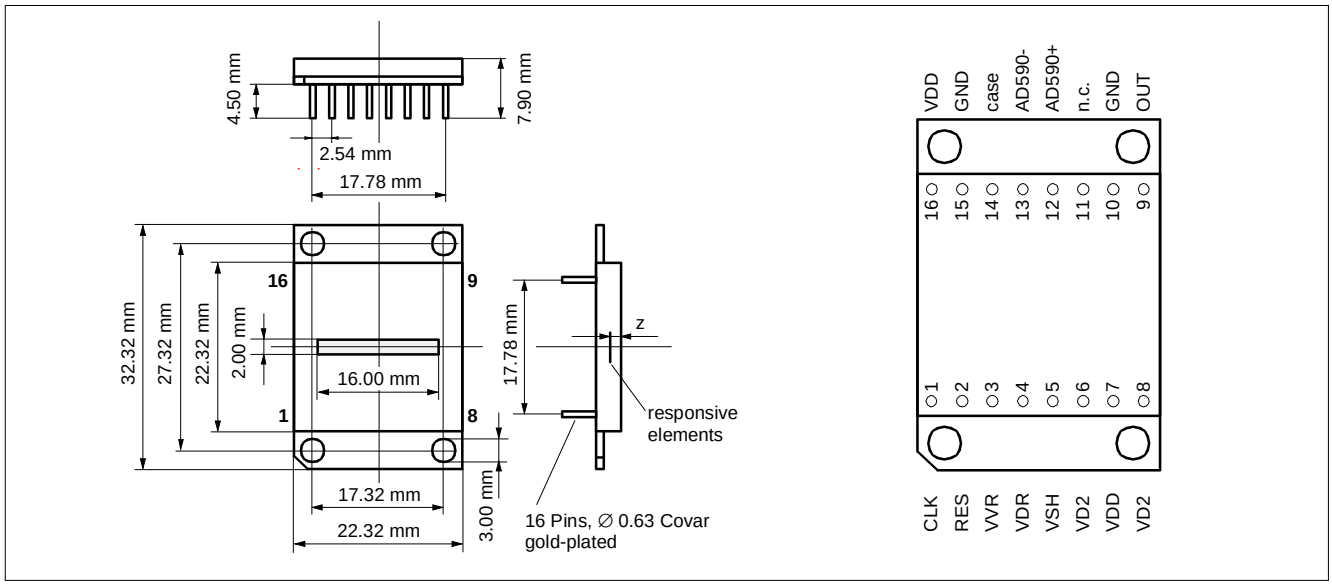
- 256 responsive elements arranged in a line
- Coated silicon as infrared window
- Broad band windows or special filters are possible on request
- NEP (128 Hz) = 1 nW (typical)
- Dynamic range > 75 dB
- Integrated CMOS multiplexer
- Good long-term stability
- Simple mode of operation
- Operation at ambient temperature
- Small package

Readout-circuit



Detector geometry and optical specification

Package and pins



Pins

Pin number	Pin name	Remark
1	CLK	Input clock CLK (trigger on 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	VD2	Operating voltage (+2.5 V)
7	VDD	Operating voltage (+5 V)
8	VD2	Operating voltage (+2.5 V)
9	OUT	Analog signal output
10	GND	Ground
11	n.c.	not connected
12	AD590+	Temperature sensor
13	AD590–	Temperature sensor
14	case	case
15	GND	Ground
16	VDD	Operating voltage (+5 V)

Connect Pin 6 to Pin 8 (VD2), Pin 7 to Pin 16 (VDD), Pin 10 to Pin 15 (GND)

Optical Specification

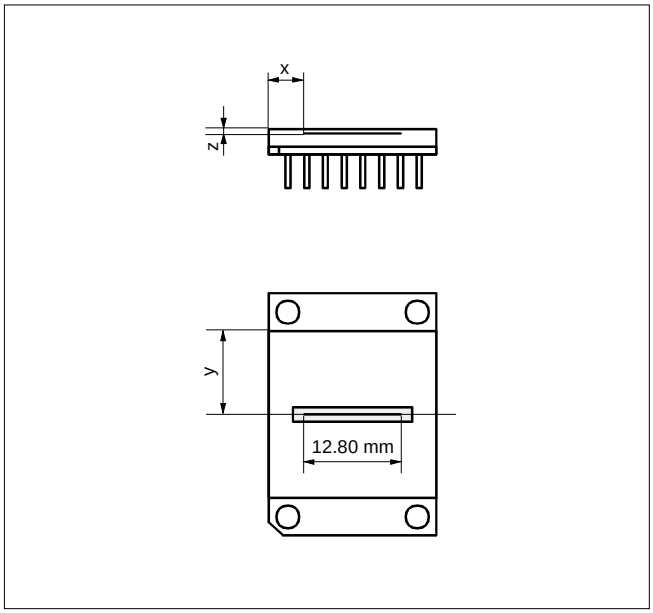
Geometry

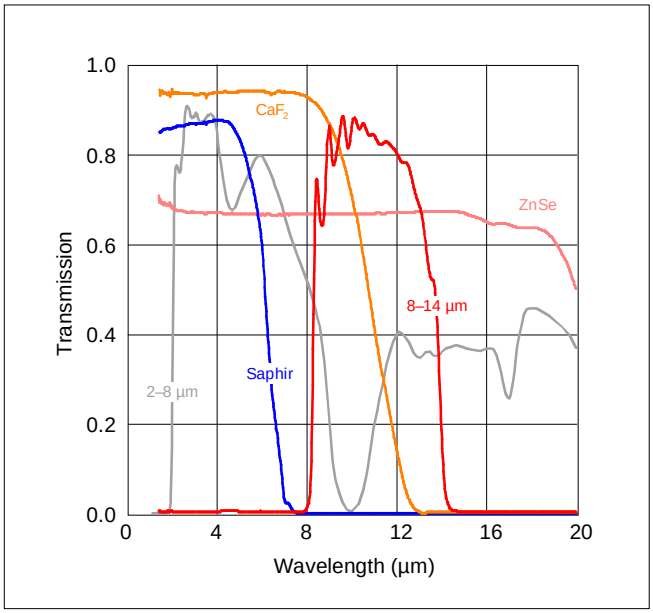
Parameter	Minimum value	Typical value	Maximum value	Unit
Field of view of each pixel[1]	90			°
Pixel width		42		µm
Pixel length		100		µm
Pitch		50		µm
Distance x	4.71	4.76	4.81	mm
Distance y	11.06	11.16	11.26	mm
Distance z	1.00	1.05	1.10	mm

[1] Perpendicular to the array

Position of the Pixels

Transmission of the window





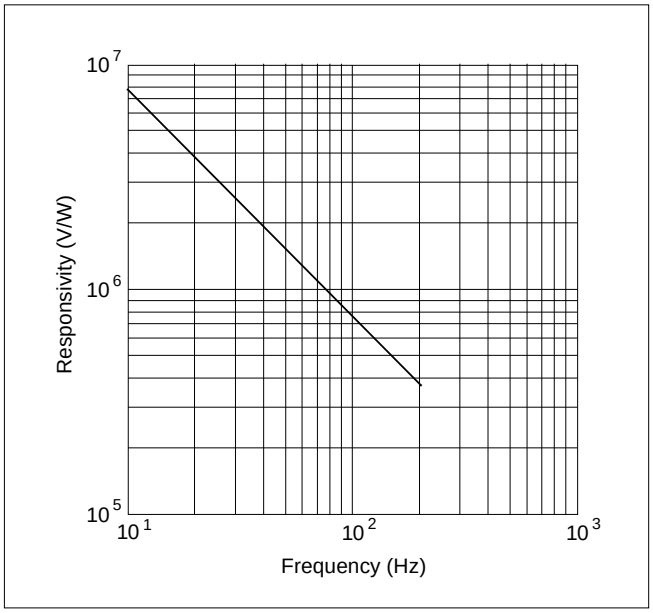
Electro-optical specification

Rectangular chopping with 128 Hz, array temperature 25 °C, black body source temperature 400 °C, filter transmission 100 %

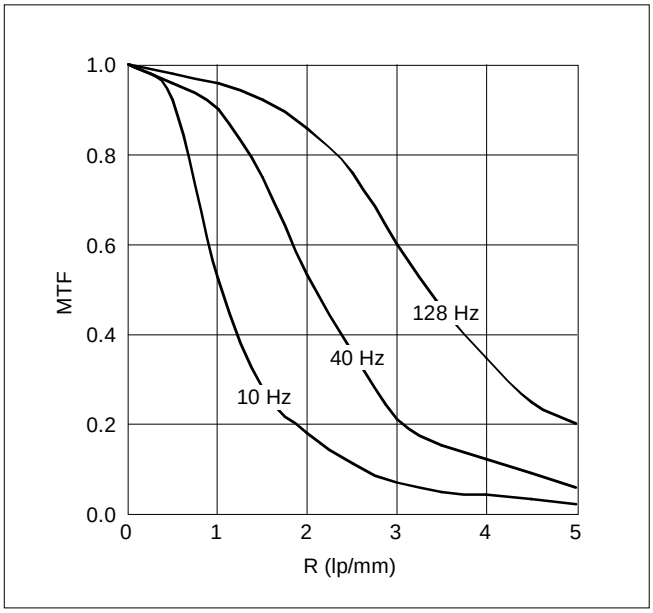
Parameter	Minimum value	Typical value	Maximum value	Unit
Responsivity S_V	529 000	619 000		V/W
Noise U_N		0.71	0.9	mV
NEP		1.1	1.6	nW
MTF (R = 3 lp/mm)	0.4	0.6		
Uniformity[1] S_V		2	5	%
Operating temperature	–15		70	°C

[1] No defective elements

Typical responsivity



Typical MTF



Electrical parameters

All values for VDD = 5 V, VD2 = 2.5 V

Parameter	Minimum value	Typical value	Maximum value	Unit
VDD	4.75	5.0	5.25	V
VD2	2.4	2.5	2.6	V
Digital inputs				
Low voltage	0		0.3 VDD	V
High voltage	0.7 VDD		VDD	V
Switching threshold		0.5 VDD		V
Leakage current			±1	µA
Current consumption *I*		8		mA
AD590 Operating voltage[1]	4		30	V

[1] See data sheet of Analog Devices

Maximum/minimum conditions

All voltages refer to ground (pin 10, 15)

Parameter	Maximum/minimum value	Unit
VDD, VD2	–0.3 to 7	V
Digital inputs CLK, RES, VVR, VDR, VSH	–0.3 to VDD 0.3	V
Chopping frequency f_{Ch}	10 to 512	Hz
AD590+ to AD590– [1]	–20 to 44	V
Analog output [2]	±5	mA
Maximum irradiance	50	mW/mm^2
Soldering temperature (10 s)	300	°C
Storage temperature	–20 to 80	°C

[1] Potential free to ground (Pin 15), [2] Not short resistent

Clock parameters

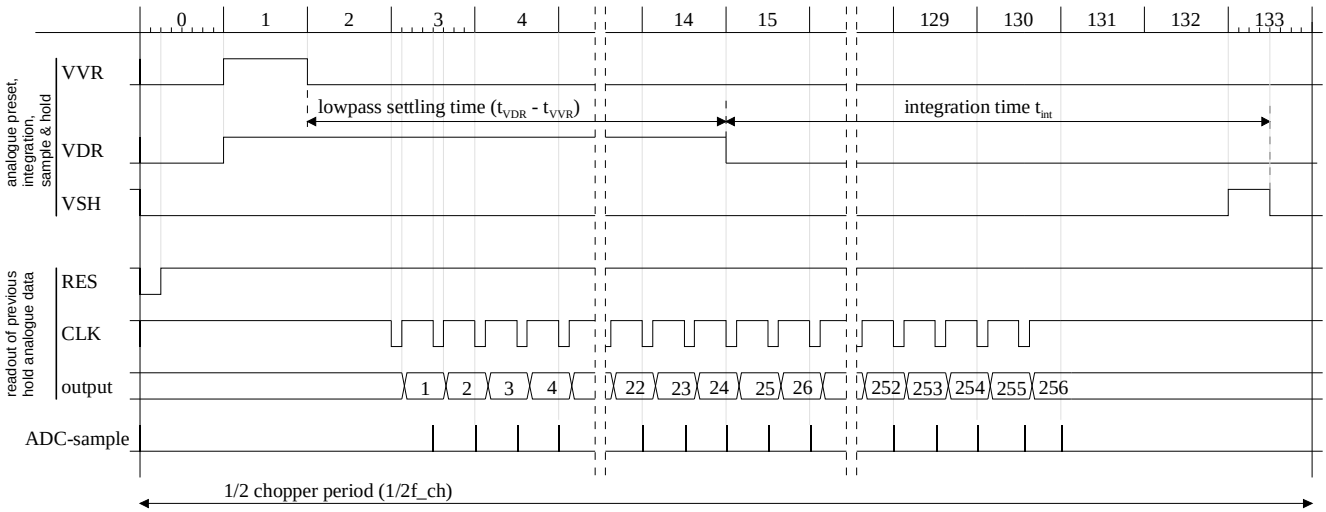
All values for VDD = 5 V, VD2 = 2.5 V

Parameter	Relative value	Minimum value	Typical value	Maximum value	Unit
Chopping frequency[1] f_{Ch}		10	128	512	Hz
Readout clock CLK $f_{CLK} = 2 \cdot f_{Ch} \cdot 268$	1 / t_{CLK}	0	69	300	kHz
Reset clock low-impulse duration t_{RES}	1/2 t_{CLK}	1.8	7.5		µs
Clock VVR high-impulse duration t_{VVR}	2 t_{CLK}	7.5	30		µs
Clock VDR high-impulse duration t_{VDR}	28 t_{CLK} [2]	200	400		µs
Clock VSH high-impulse duration t_{VSH}	1 t_{CLK}	3.5	15		µs
Settling time at the output t_{out}			1		µs

[1] $t_{Ch\ low} = t_{Ch\ high}$

[2] for f_{Ch} = 512 Hz t_{VDR} should be 56 · t_{CLK} = 200 µs

Clock diagram



HPS 128-LTI-S – Hybrid pyroelectric linear array with 128 responsive elements and integrated CMOS multiplexer

Description

The pyroelectric linear array 128-LTI-S is a hybrid detector with 128 responsive elements and an integrated CMOS multiplexer.

The pyroelectric chip consists of lithium tantalate ($LiTaO_3$). The size of the responsive elements is (90 x 500) µm^2 with a pitch of 100 µm (90 x 1000 µm² available on request).

The multiplexer includes low-noise preamplifiers for each pixel, analogue switches and an output amplifier. The preamplifiers transform the signal charges of each pixel in a signal voltage, realize a band limiting and give the amplified signal to the sample&hold for the read-out process. The digital inputs are CMOS compatible.

For the measurement of the detector temperature a sensor (type AD 590) is integrated. It provides a temperature proportional current.

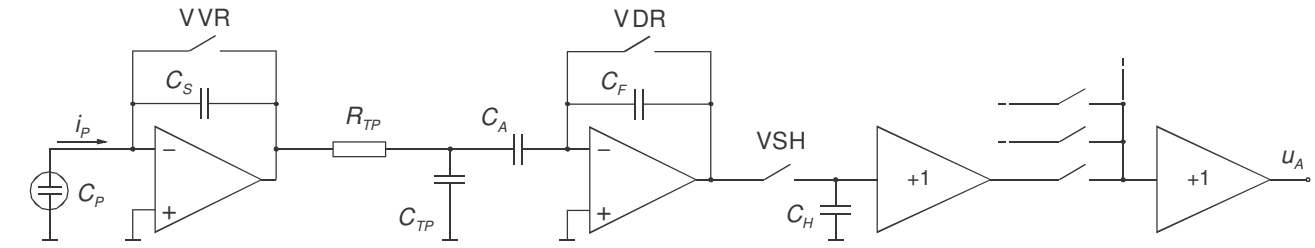
The pyroelectric chip and the read-out circuit are arranged in a metal hermetic package with an infrared window. It determines the spectral responsivity.

For the measurement of the infrared radiation it is necessary to chop the radiation flux.

Features

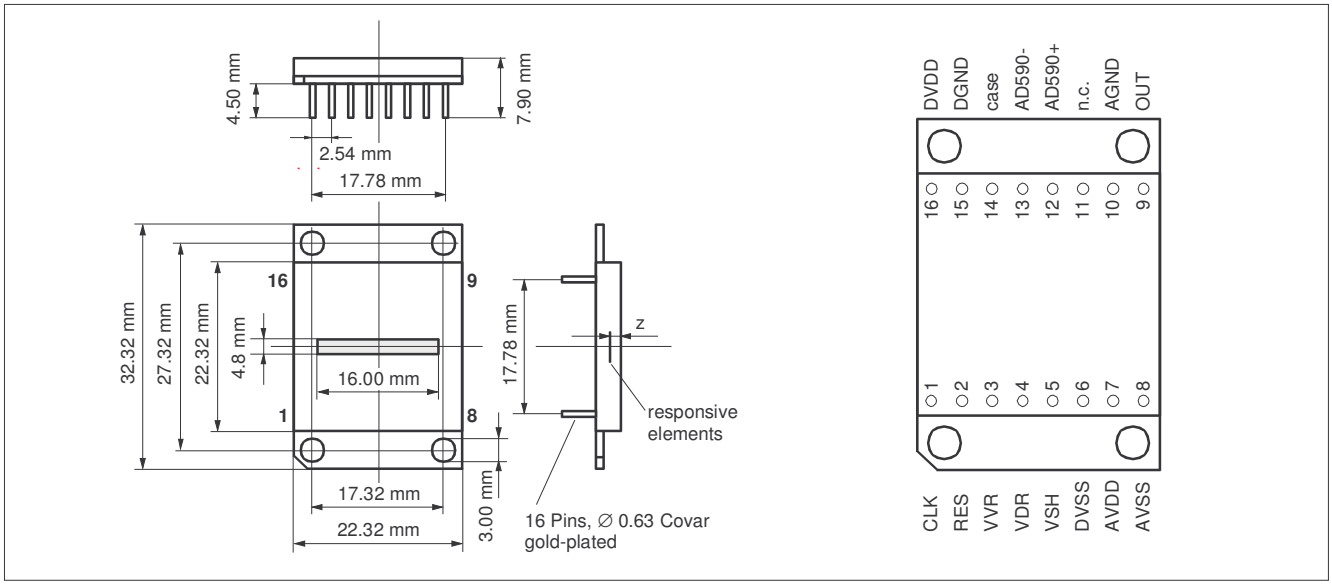
- 128 responsive elements arranged in a line
- Coated germanium or silicon as infrared window
- Broad band windows or special filters are possible on request
- NEP (128 Hz) = 4 nW (typical)
- Dynamic range > 75 dB
- Integrated CMOS multiplexed
- Good long-term stability
- Simple mode of operation
- Operation at ambient temperatures
- Small package

Readout-circuit



Detector geometry and optical specification

Package and pins



Pins

Pin number	Pin name	Remark
1	CLK	Input clock CLK
2	RES	Input clock RES
3	VVR	Input clock VVR
4	VDR	Input clock VDR
5	VSH	Input clock VSH
6	DVSS	Digital operating voltage DVSS (–5 V)
7	AVDD	Analog operating voltage AVDD (+5 V)
8	AVSS	Analog operating voltage AVSS (–5 V)
9	OUT	Analog signal output
10	AGND	Analog ground
11	n. c.	not connected
12	AD590+	Temperature sensor
13	AD590–	Temperature sensor
14	case	Case
15	DGND	Digital ground
16	DVDD	Digital operating voltage DVDD (+5 V)

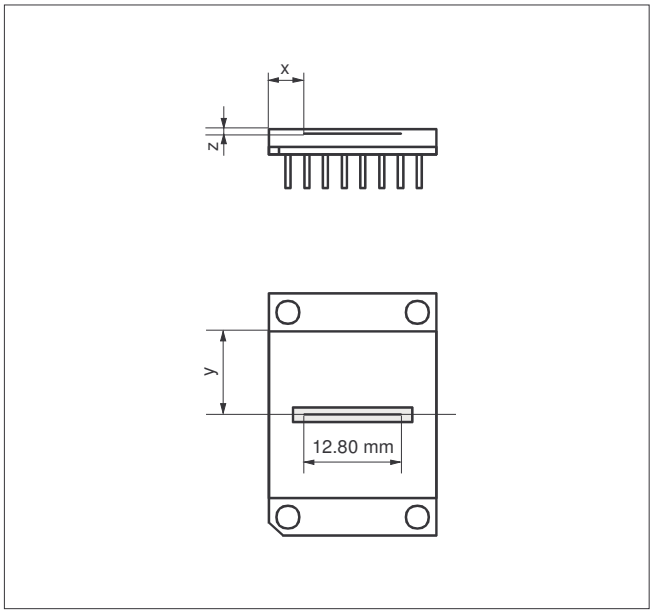
Optical Specification

Geometry

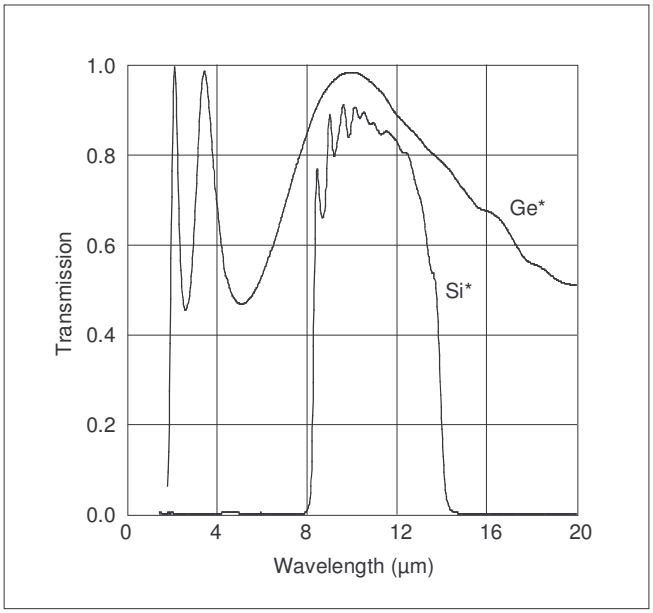
Parameter	Minimum value	Typical value	Maximum value	Unit
Field of view of each pixel[1]	90			°
Pixel width		90		µm
Pitch		100		µm
Pixel length		500		µm
Distance x	4.71	4.76	4.81	mm
Distance y	11.06	11.16	11.26	mm
Distance z	1.00	1.05	1.10	mm

[1] Perpendicular to the array

Position of the Pixels



Transmission of the germanium window



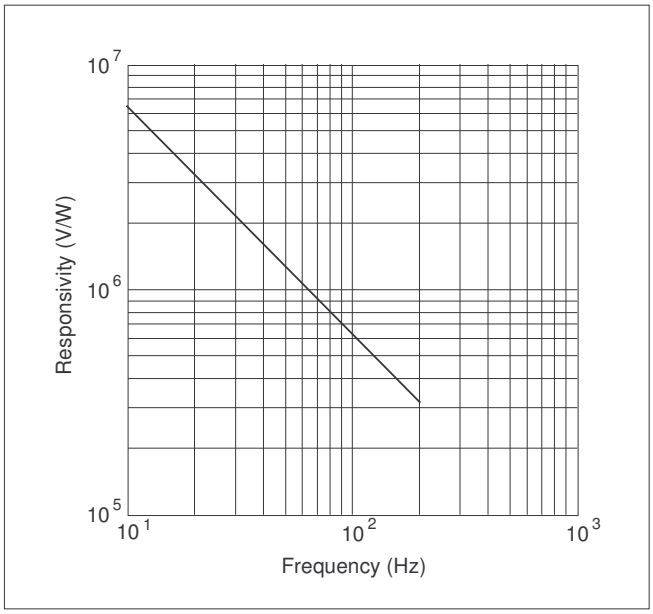
Electro-optical specification

Rectangular chopping with 128 Hz, array temperature 25 °C

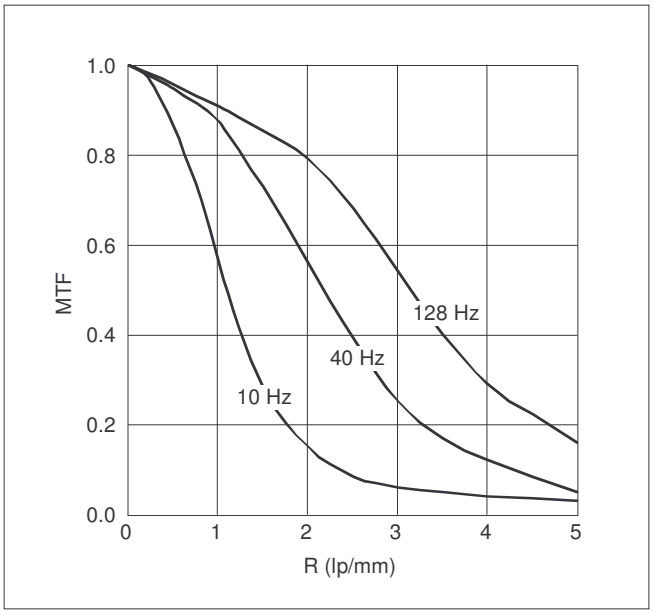
Parameter	Minimum value	Typical value	Maximum value	Unit
Responsivity S_V	350000	500000		V/W
Noise U_N		2	4	mV
NEP		4	8	nW
MTF (R = 3 lp/mm)	0.4	0.6		
Uniformity[1] S_V		2	5	%
Operating temperature	–15		70	°C

[1] No defective elements

Typical responsivity



Typical MTF



Electrical parameters

All values for DVDD = AVDD = 5 V, AVSS = DVSS = –5 V

Parameter	Minimum value	Typical value	Maximum value	Unit
AVDD, DVDD[1]	4.75	5.0	5.25	V
AVSS, DVSS[1]	–5.25	–5.0	–4.75	V
Digital inputs				
Low voltage	0		0.3 DVDD	V
High voltage	0.7 DVDD		DVDD	V
Switching threshold		0.5 DVDD		V
Leakage current			±1	µA
Current consumption I_{analog}		8		mA
Current consumption $I_{digital}$		30		µA
AD590 Operating voltage[2]	+4		+30	V

[1] AVDD and DVDD; AVSS and DVSS must be connect together direct at the detector, [2] See data sheet of Analog Devices

Maxiumum/minimum conditions

All voltages refer to ground (pin 15)

Parameter	Maximum/minimum value	Unit
DVDD, AVDD	–0.3 to +7	V
AVSS, DVSS	+0.3 to –7	V
Digital inputs CLK, RES, VVR, VDR, VSH	–0.3 to DVDD +0.3	V
Chopping frequency f_{Ch}	10 to 300	Hz
AD590+ to AD590– [1]	–20 to +44	V
Analog output [2]	±5	mA
Maximum irradiance	50	mW/mm^2
Soldering temperature (10 s)	300	°C
Storage temperature	–20 to 80	°C

[1] Potential free to ground (Pin 15), [2] Not short resistent

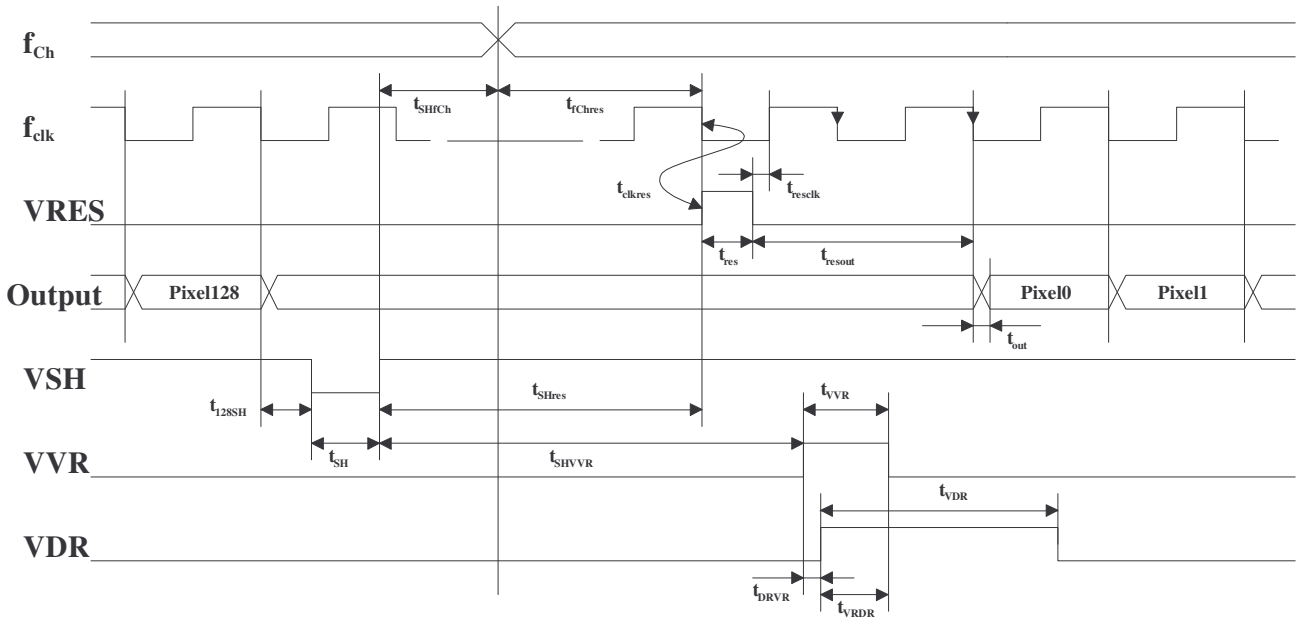
Clock parameters

All values for DVDD = AVDD = 5 V, AVSS = DVSS = –5 V

Parameter	Minimum value	Typical value	Maximum value	Unit
Chopping frequency[1] f_{Ch}	10	128	200	Hz
Ground clock[1] CLK f_{clk}	0	34.3	100	kHz
Reset clock high-impulse duration t_{res}	2.5	4		µs
Clock VVR high-impulse duration t_{VVR}	10	15		µs
Clock VDR high-impulse duration t_{VDR}	200	300		µs
Clock VSH low-impulse duration t_{SH}	10	15		µs
Settling time at the output t_{out}	3	5		µs
Setup time before clock t_{128SH}	10			µs
Time distance t_{SHres}	10			µs
Time distance t_{SHVVR}	10			µs
Time distance t_{SHfCh}	0			µs
Time distance t_{fChres}	0			µs
Time distance t_{clkres}	0			µs
Time distance t_{resclk}	1			µs
Time distance t_{resout}	1.5 t_{clk} + t_{resclk}			µs
Time distance t_{DRVR}	0			µs
Time distance t_{VRDR}	0			µs

[1] $t_{Ch\ low} = t_{Ch\ high}$

Clock diagram



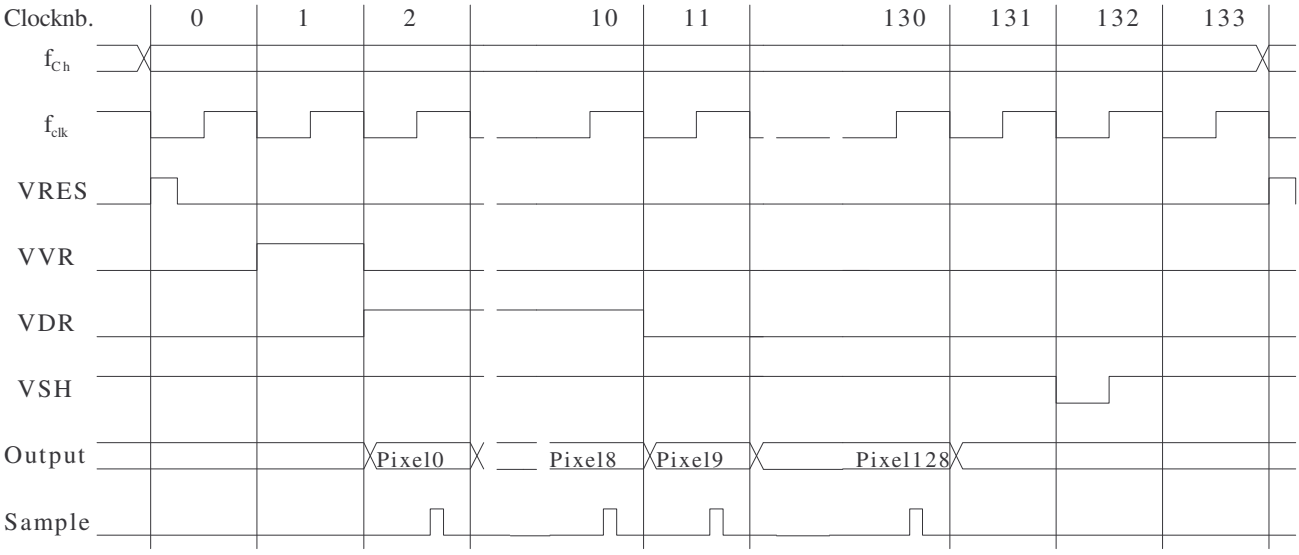
Remark: pixel 0 is an input without responsive element (dark signal)

Application remarks

Typical clock regime

Parameter	Relative value	Typical value	Unit
Chopping frequency f_{Ch}		128	Hz
Ground clock f_{clk}	$1/t_{clk}$	34 304	Hz
Reset clock high-impulse duration t_{res}	¼ t_{clk}	7.3	µs
Clock VVR high-impulse duration t_{VVR}	3 t_{clk}	29.2	µs
Clock VDR high-impulse duration t_{VDR}	10 t_{clk}	292	µs
Clock VSH low- impulse duration t_{SH}	½ t_{clk}	14.6	µs

Clock diagram



Remark: Clock 133 is for the compensation of jitter of the chopping frequency during the mechanical chopping

HPS128-LT-S – Hybrid pyroelectric linear array with 128 responsive elements and integrated CMOS multiplexer

Description

The pyroelectric linear array 128-LT is a hybrid detector with 128 responsive elements and an integrated CMOS multiplexer.

The pyroelectric chip consists of lithium tantalate ($LiTaO_3$). The size of the responsive elements is (90 x 500) µm^2 with a pitch of 100 µm (90 x 1000 µm² available on request).

The multiplexer includes low-noise preamplifiers for each pixel, analogue switches and an output amplifier. The preamplifiers transform the signal charges of each pixel in a signal voltage, realize a band limiting and give the amplified signal to the sample&hold for the read-out process. The digital inputs are CMOS compatible.

For the measurement of the detector temperature a sensor (type AD 590) is integrated. It provides a temperature proportional current.

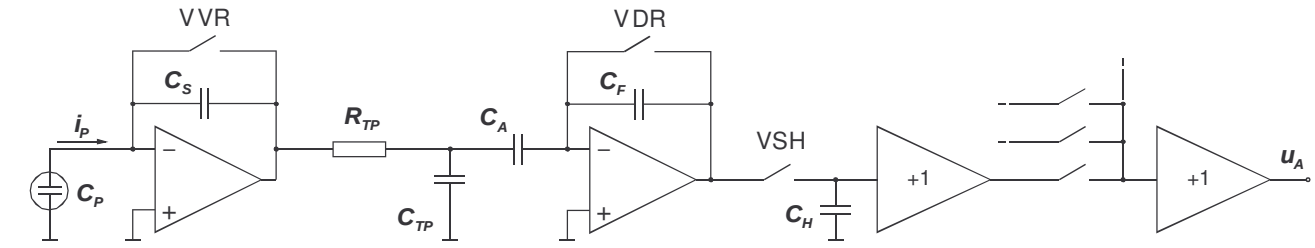
The pyroelectric chip and the read-out circuit are arranged in a metal hermetic package with an infrared window. It determines the spectral responsivity.

For the measurement of the infrared radiation it is necessary to chop the radiation flux.

Features

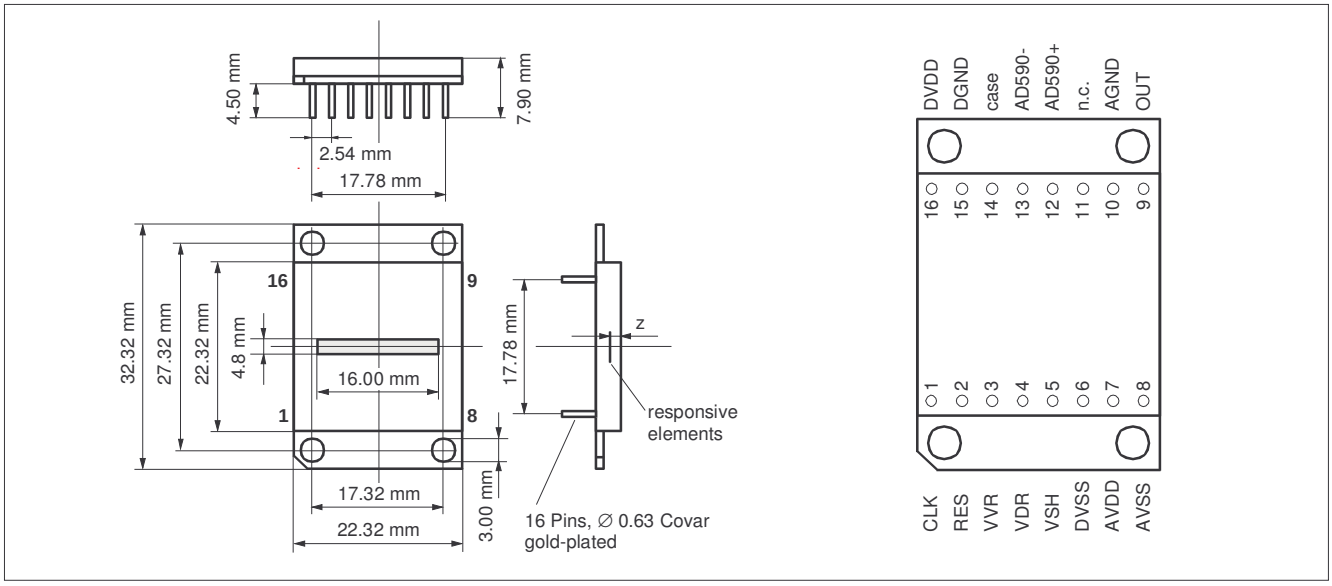
- 128 responsive elements arranged in a line
- Coated germanium or silicon as infrared window
- Broad band windows or special filters are possible on request
- NEP (128 Hz) = 7 nW (typical)
- Dynamic range > 75 dB
- Integrated CMOS multiplexed
- Good long-term stability
- Simple mode of operation
- Operation at ambient temperatures
- Small package

Readout-circuit



Detector geometry and optical specification

Package and pins



Pins

Pin number	Pin name	Remark
1	CLK	Input clock CLK
2	RES	Input clock RES
3	VVR	Input clock VVR
4	VDR	Input clock VDR
5	VSH	Input clock VSH
6	DVSS	Digital operating voltage DVSS (–5 V)
7	AVDD	Analog operating voltage AVDD (+5 V)
8	AVSS	Analog operating voltage AVSS (–5 V)
9	OUT	Analog signal output
10	AGND	Analog ground
11	n. c.	not connected
12	AD590+	Temperature sensor
13	AD590–	Temperature sensor
14	case	Case
15	DGND	Digital ground
16	DVDD	Digital operating voltage DVDD (+5 V)

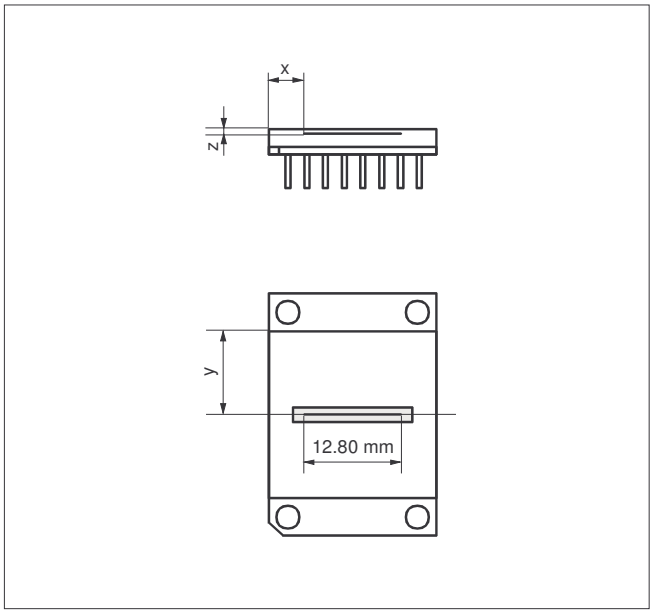
Optical Specification

Geometry

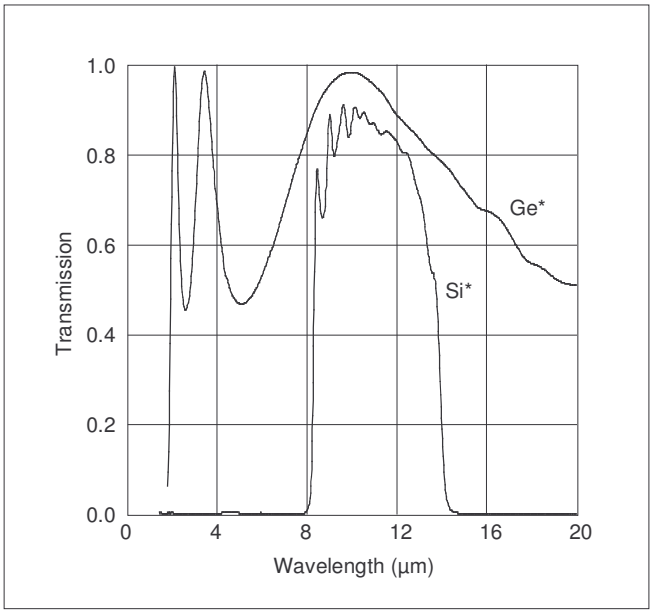
Parameter	Minimum value	Typical value	Maximum value	Unit
Field of view of each pixel[1]	90			°
Pixel width		90		µm
Pitch		100		µm
Pixel length		500		µm
Distance x	4.71	4.76	4.81	mm
Distance y	11.06	11.16	11.26	mm
Distance z	1.00	1.05	1.10	mm

[1] Perpendicular to the array

Position of the Pixels



Transmission of the germanium window



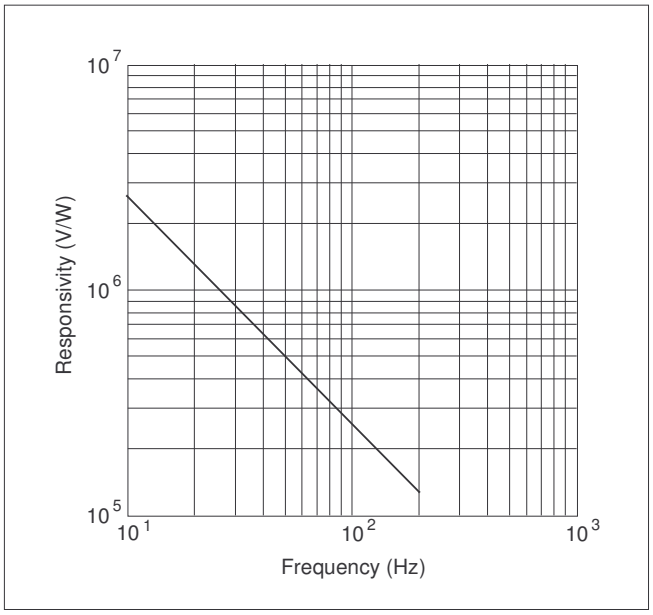
Electro-optical specification

Rectangular chopping with 128 Hz, array temperature 25 °C

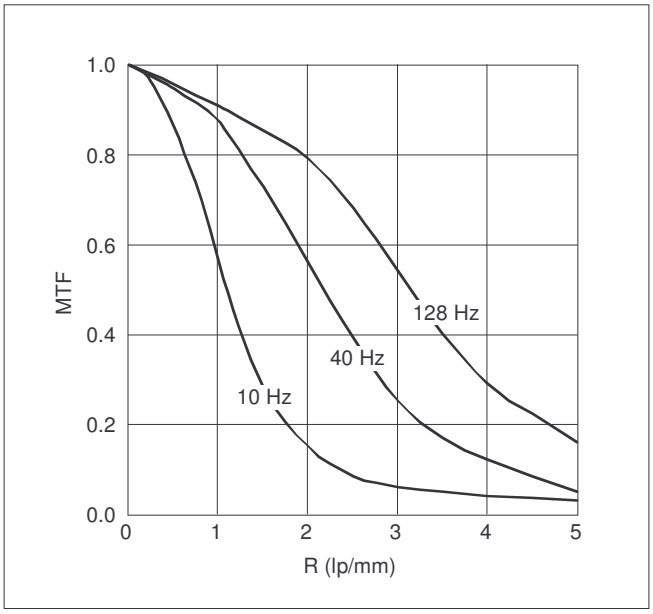
Parameter	Minimum value	Typical value	Maximum value	Unit
Responsivity S_V	140000	200000		V/W
Noise U_N		1.5	3	mV
NEP		7	15	nW
MTF (R = 3 lp/mm)	0.4	0.6		
Uniformity[1] S_V		1	3	%
Operating temperature	–15		70	°C

[1] No defective elements

Typical responsivity



Typical MTF



Electrical parameters

All values for DVDD = AVDD = 5 V, AVSS = DVSS = –5 V

Parameter	Minimum value	Typical value	Maximum value	Unit
AVDD, DVDD[1]	4.75	5.0	5.25	V
AVSS, DVSS[1]	–5.25	–5.0	–4.75	V
Digital inputs				
Low voltage	0		0.3 DVDD	V
High voltage	0.7 DVDD		DVDD	V
Switching threshold		0.5 DVDD		V
Leakage current			±1	µA
Current consumption I_{analog}		8		mA
Current consumption $I_{digital}$		30		µA
AD590 Operating voltage[2]	+4		+30	V

[1] AVDD and DVDD; AVSS and DVSS must be connect together direct at the detector, [2] See data sheet of Analog Devices

Maxiumum/minimum conditions

All voltages refer to ground (pin 15)

Parameter	Maximum/minimum value	Unit
DVDD, AVDD	–0.3 to +7	V
AVSS, DVSS	+0.3 to –7	V
Digital inputs CLK, RES, VVR, VDR, VSH	–0.3 to DVDD +0.3	V
Chopping frequency f_{Ch}	10 to 300	Hz
AD590+ to AD590– [1]	–20 to +44	V
Analog output [2]	±5	mA
Maximum irradiance	50	mW/mm^2
Soldering temperature (10 s)	300	°C
Storage temperature	–20 to 80	°C

[1] Potential free to ground (Pin 15), [2] Not short resistent

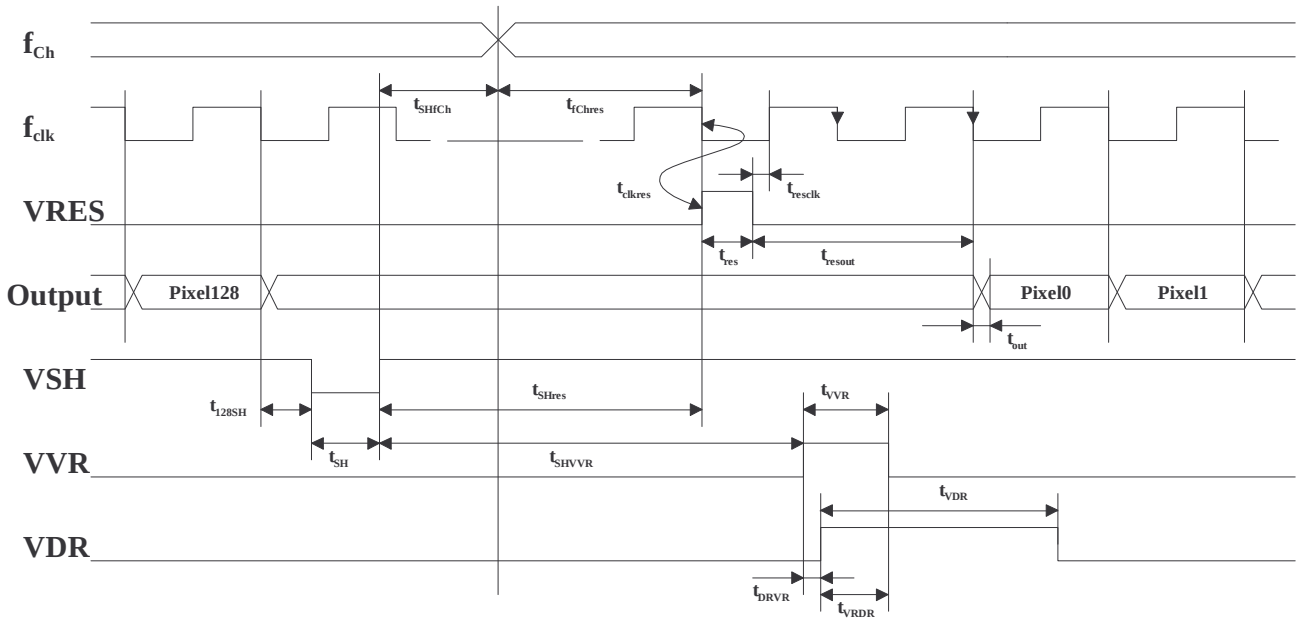
Clock parameters

All values for DVDD = AVDD = 5 V, AVSS = DVSS = –5 V

Parameter	Minimum value	Typical value	Maximum value	Unit
Chopping frequency[1] f_{Ch}	10	128	200	Hz
Ground clock[1] CLK f_{clk}	0	34.3	100	kHz
Reset clock high-impulse duration t_{res}	2.5	4		µs
Clock VVR high-impulse duration t_{VVR}	10	15		µs
Clock VDR high-impulse duration t_{VDR}	200	300		µs
Clock VSH low-impulse duration t_{SH}	10	15		µs
Settling time at the output t_{out}	3	5		µs
Setup time before clock t_{128SH}	10			µs
Time distance t_{SHres}	10			µs
Time distance t_{SHVVR}	10			µs
Time distance t_{SHfCh}	0			µs
Time distance t_{fChres}	0			µs
Time distance t_{clkres}	0			µs
Time distance t_{resclk}	1			µs
Time distance t_{resout}	1.5 t_{clk} + t_{resclk}			µs
Time distance t_{DRVR}	0			µs
Time distance t_{VRDR}	0			µs

[1] $t_{Ch\ low} = t_{Ch\ high}$

Clock diagram



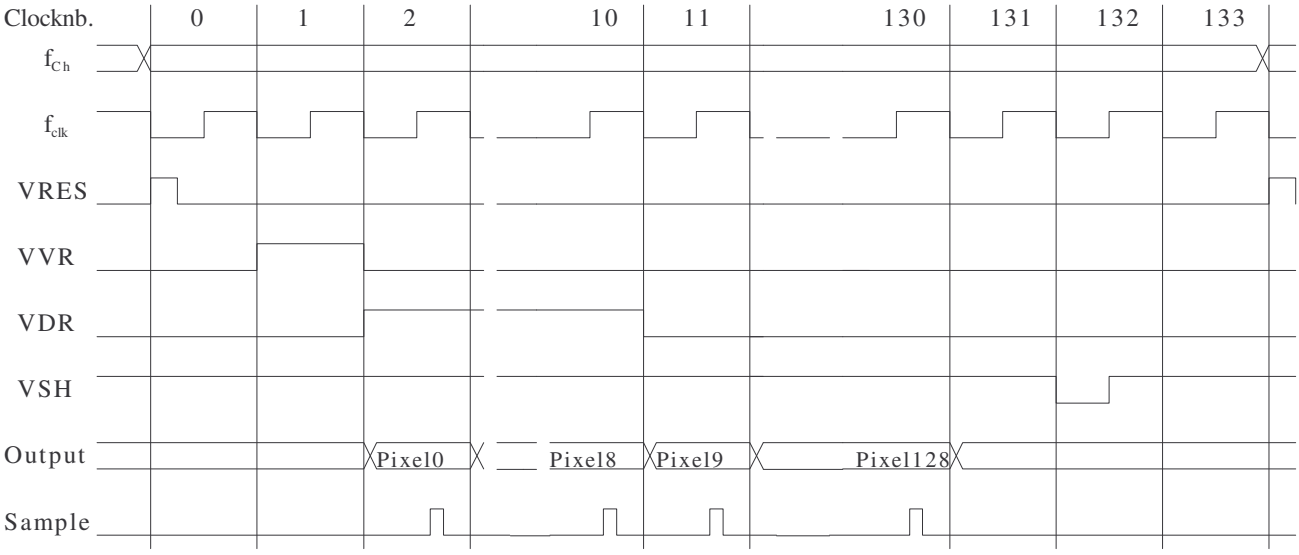
Remark: pixel 0 is an input without responsive element (dark signal)

Application remarks

Typical clock regime

Parameter	Relative value	Typical value	Unit
Chopping frequency f_{Ch}		128	Hz
Ground clock f_{clk}	$1/t_{clk}$	34 304	Hz
Reset clock high-impulse duration t_{res}	¼ t_{clk}	7.3	µs
Clock VVR high-impulse duration t_{VVR}	3 t_{clk}	29.2	µs
Clock VDR high-impulse duration t_{VDR}	10 t_{clk}	292	µs
Clock VSH low- impulse duration t_{SH}	½ t_{clk}	14.6	µs

Clock diagram



Remark: Clock 133 is for the compensation of jitter of the chopping frequency during the mechanical chopping

Evaluation Kit für PYROSENS Arrays 128/256/510-LT/LTI

Bedienungsanleitung
Manual

DIAS Infrared GmbH

Table of contents

CHAPTER 6

General information

We are pleased that you decided for an Evaluation Kit for PYROSENS arrays 128/256/510 LT/LTI.

Please read this manual carefully before beginning any operation with the Evalution Kit and keep it in a save place. It contains all the necessary information for set up and long term operation of the pyrometer.

If you have any questions to Evalution Kit, we would ask you to read this manual first.

Should you still have any open questions, notice any errors in this manual or wish to pass on any tips and suggestions for improvement, please inform your supplier or contact us directly:

DIAS Infrared GmbH
Pforzheimer Straße 21
D 01189 DRESDEN
Tel.: +49 351 896 74 0
Fax: +49 351 896 74 99
Email: info@dias infrared.de
www: http://www.dias infrared.de

This way, you help us to provide you with the best possible product and correct documentation.

CHAPTER 7

General advice and safety regulations

In this chapter

Intended usage

This Evalution Kit provides the necessary voltages and clock pulses for the above mentioned pyroelectric arrays and converts their output signal into digital values. If you use the Evalution Kit not compliant to the description in this user manual it may cause loss of all warranty claims against the manufacturer.

Use and maintenance

Use of the Evalution Kit is restricted to qualified personnel which has got instructions before initial operation and handling. Instructions should be given by a supervisor or optionally by DIAS Infrared GmbH customer service.

Modifications

It is strongly prohibited to do technical modifications of the Evalution Kit without permission of the manufacturer. Contraventions absolve the manufacturer from liability for any damages. It automatically causes loss of all warranty claims against the manufacturer.

Environmental protection

The unit may not be disposed of with normal waste, for disposal send the device back to DIAS Infrared GmbH, Pforzheimer Straße 21, 01189 Dresden, Germany.

Disposal (in accordance with RL2002/96/EC)

CHAPTER 8

Maintenance and warranty

In this chapter

Maintenance

The Evalution Kit does not need any maintenance.

Packing and storage

If the original packaging is not available, please use a shock proof package for shipment of the Evalution Kit. For overseas shipment or long term storage in rooms with high humidity the Evalution Kit should be heat sealed to protect it against humidity.

Warranty

DIAS Infrared GmbH will replace or repair defective parts, which result from design errors or manufacturing faults, within a period of two years from the date of sale. Special terms can be arranged, in writing, at the time of purchase of the equipment. Devices, for which the return under warranty has been approved, should be sent to DIAS Infrared GmbH.

The warranty is invalidated if the device is opened, disassembled, modified, or otherwise destroyed, without obtaining prior written approval from DIAS. The warranty is also invalidated if the device is improperly used, or if it is operated or stored under conditions which do not correspond to those defined in the technical specification.

DIAS Infrared GmbH does not accept liability for any damage or losses which might occur, including financial losses and consequential damages, as a result of use of the equipment, or which occurs as a result of defects in the design or manufacture of the device.

The seller does not give any warranty or assurances, that the equipment can be utilized for any special applications which the customer might have.

Declaration

Changes in the interests of technical progress or changes that go back to amended statutory provisions stay reserved during delivery time if the delivery item is not substantially changed and therefrom the serviceability is not touched, the value is preserved or increased and the changes are reasonable for the purchaser.

CHAPTER 9

Introduction and installation

In this chapter

Scope of delivery

- Evalution Board
- 9 V power supply
- USB cable
- Software

Please note: The PYROSENS array is not included in the scope of delivery. It has to be ordered seperately.

Application range

This Evalution Kit provides the necessary voltages and clock pulses for the above mentioned pyroelectrical arrays and converts their output signal into digital values.

These values can be displayed and saved in a software, that runs on a computer connected via USB. You can make parameter settings with this software, too and start/stop the operation of the Evalution Kit.

The power supply of the Evalution Kit is made alternatively via USB connection of the computer or with an external 9 V power supply.

This Evalution Kit provides an impulse for the synchronization of external electronics.

Circuit description

The pyroelectrical arrays need two supply voltages (5 V and 2.5 V) and five clocks (VCLK, VRES, VVR, VDR, VSH).

The analog output signals are read via one output (OUT1 for 128/256 LT/LTI) respectively via two outputs (OUT1/OUT2 for 510 LT/LTI).

There is a temperature detector “Analog Devices AD590” inside the arrays which represents a temperature controlled current source with 1 µA/K (output T Sen).

The power supply of the Evalution Kit is made either via the 5 V USB connection of the computer or via the external power supply that is connected with the DC plug socket X3. The external voltage is down regulated by IC U5 to 5V. The IC U6 with switches the 5 V supply of the module when a power supply is connected from USB 5 V to external voltage. The source of the 5 V supply is displayed by a green LED (supply via external power supply) respectively by a red LED (supply via USB).

Please note: The supply with an external power supply causes less failures in the output signals of the arrays.

The IC U2 generates the 2.5 V voltage for the arrays.

The analog signals are buffered by OPV U7 and are lead directly to the inputs, that are configured as A/D converter (pin 25, 26), of the microcontroller U1.

The microcontroller communicates via a serial interface (TXD/RXD on pin 21, 22) which is implemented with IC U3 to USB and is read out at plug connector X2.

The pin connector X4 provides at pin 3 a voltage of 5 V for the connection of additional components, ampacity max. 250 mA.

The Evalution Kit offers synchronously an impulse at pin connector X5/pin 1 for the read out of the array , with a level 0/5 V whose polarity, length and phase length can be adjusted and turned on/off via software.

Installation

- Install software on the computer
- Put the PYROSENS array in plug in socket on demoboard, please note alignment of pin 1 (mark "1" on conductor plate)
- Put USB cable in USB plug socket on demoboard,
  connect USB cable with free USB port to the computer,
  (device driver is installed automatically when using first),
  voltage display on demoboard blinks red,
- Connect 9 V power supply with power socket,
  put 9 V plug in DC external plug socket on demoboard,
  voltage display on demoboard changes into green
- Start software (please refer chapter Software, on page 32)

Parameters and limit values

Read out frequency:	128 LT(I):	1 … 150 lines/sec
	256 LT(I):	1 … 100 lines/sec
	510 LT(I):	1 … 50 lines/sec
Supply voltage on X3:	7 to 30 V	
Charging rate demoboard:	50 mA (at 9V)	

5V output on X4 pin3 (against GND X4 pin4):	
Ampacity I max	250 mA
Sync pulse on X5 Pin1 (against GND X5 pin2):	
level high/low	5 V/0 V
Ampacity source/drain	+ / 100 mA
Dimensions (length/width/height)	70 mm/25 mm/24 mm

Circuit diagram

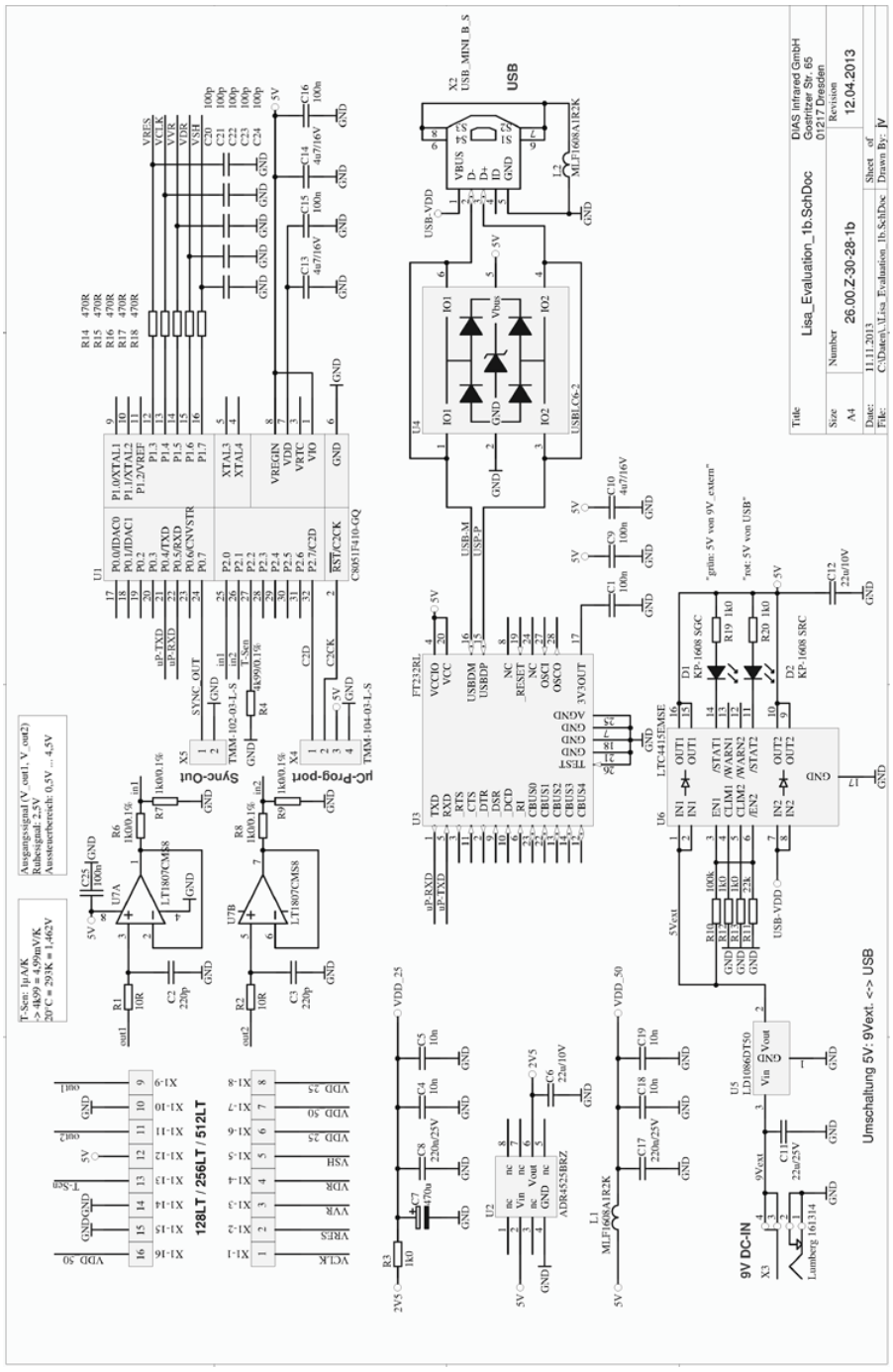


Figure 1: circuit diagram

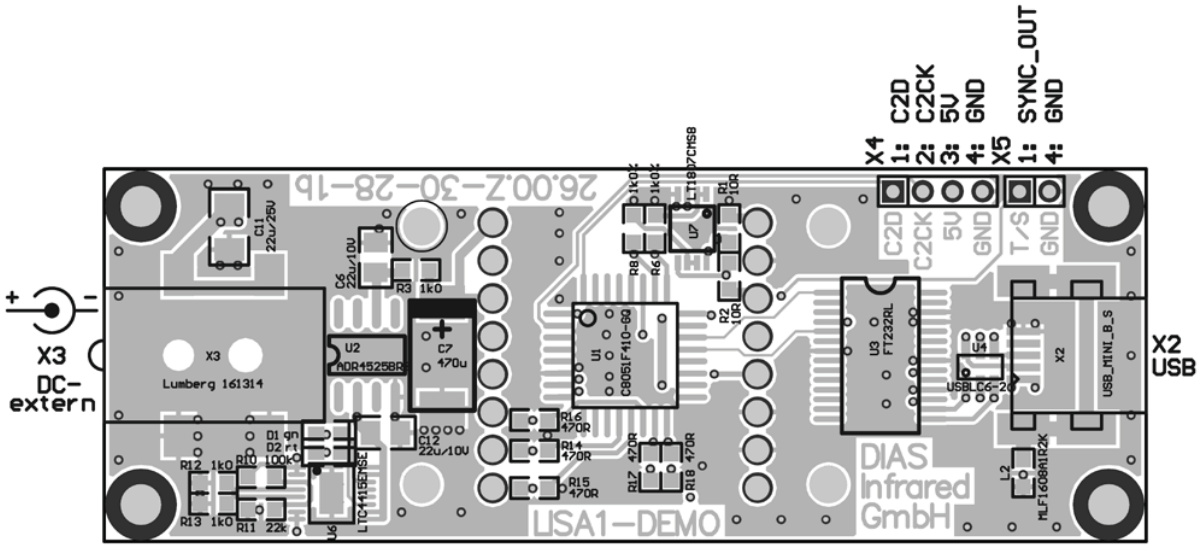


Figure 2: Detailed view conductor plate, circuit side

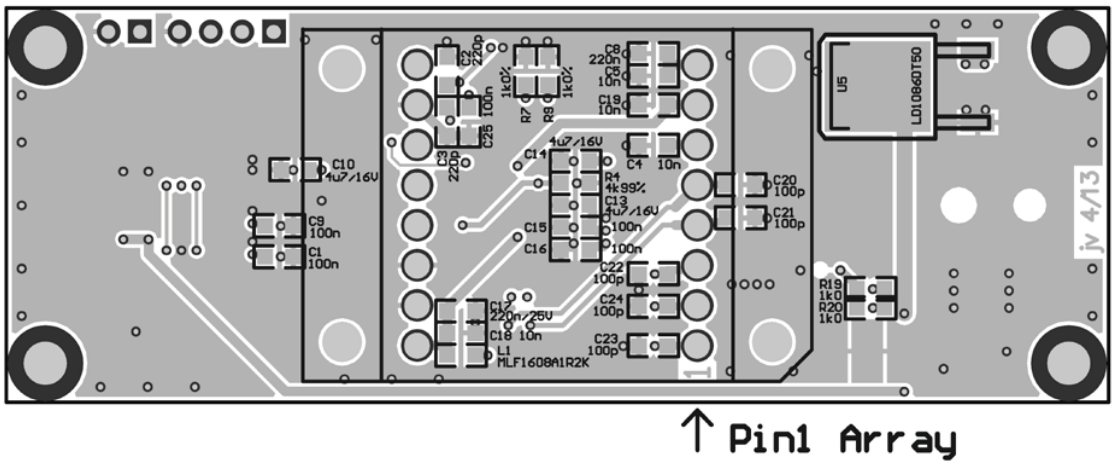


Figure 3: Detailed view conductor plate, detector side

Views and dimensions

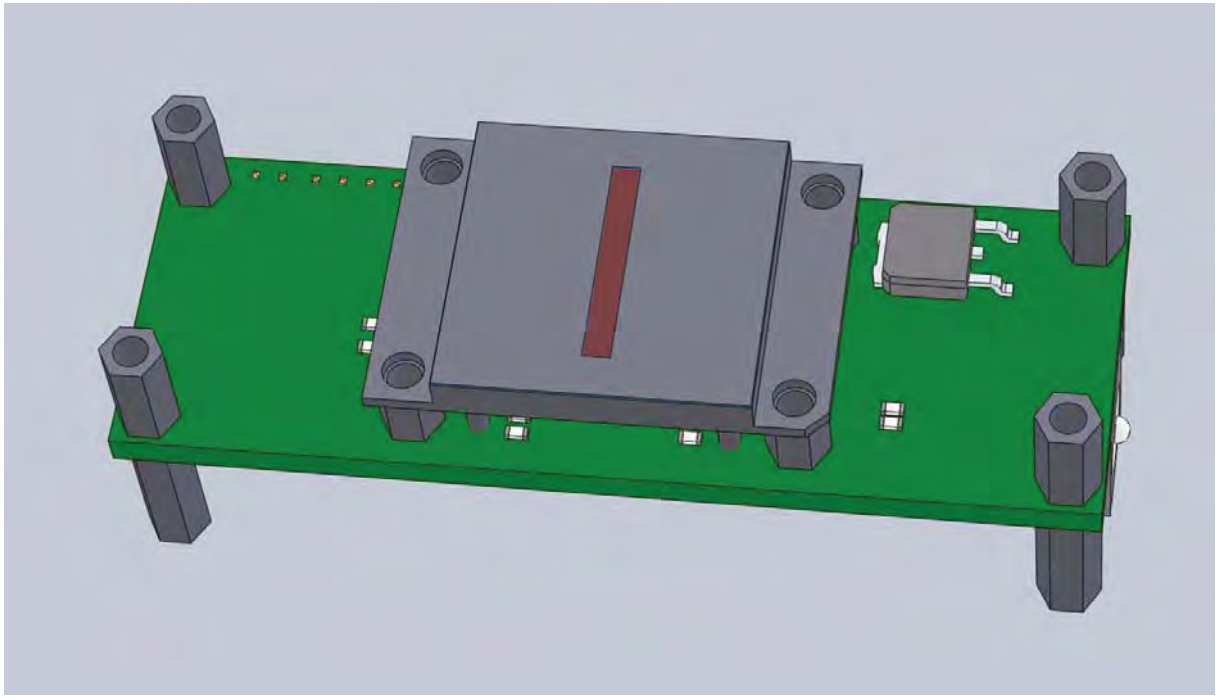


Figure 4: Conductor plate, detector side

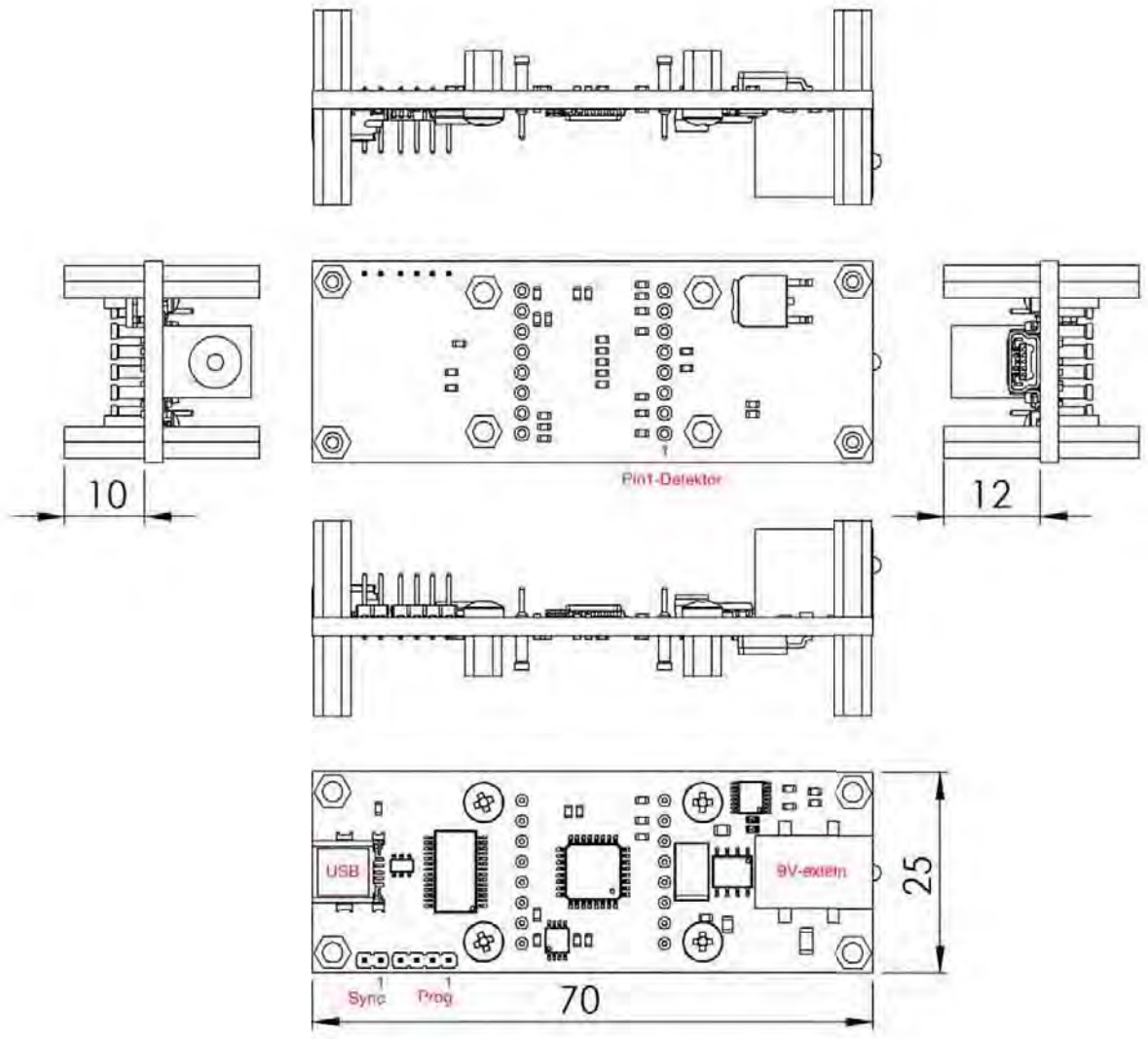


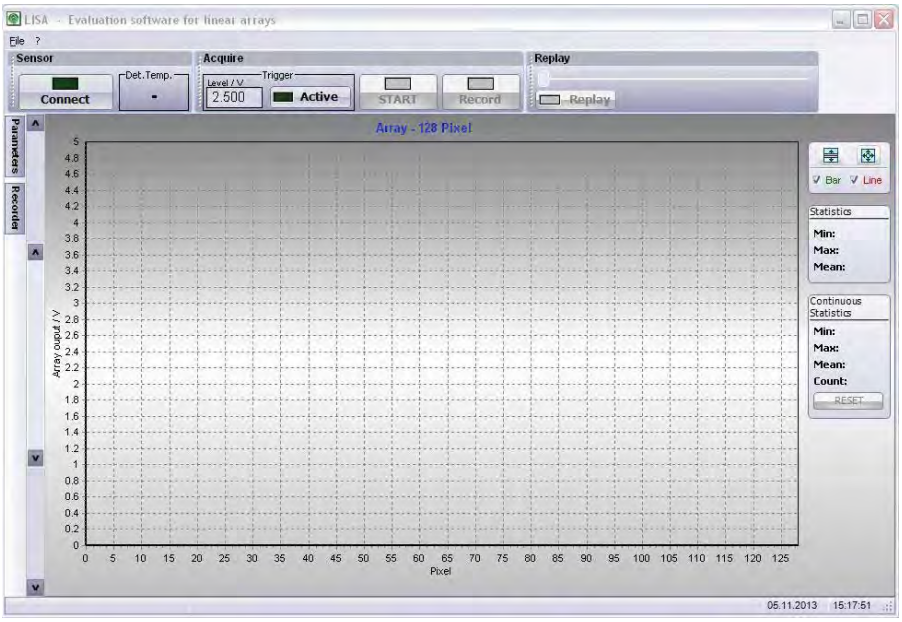
Figure 5: conductor plate, views and dimensions [mm]

CHAPTER 10

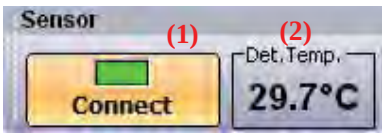
Software

In this chapter

Start of program



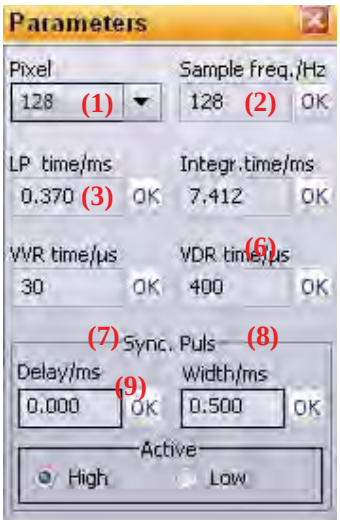
(1) Find connected evaluation board and connect
(2) Fade in detector parameter
(3) Fade in record function



(3) Connect/Disconnect
(4) Display detector temperature

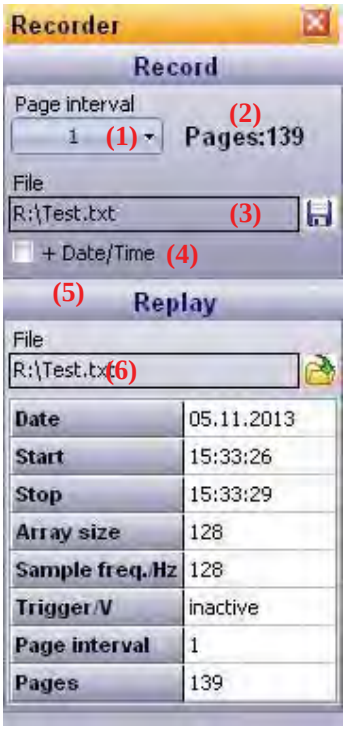
Parameters and functions

Detector parameters



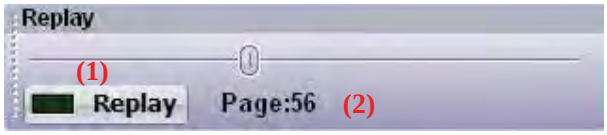
(1)	Adjust pixel amount of array (128, 256, 510) Please note: This value cannot be changed during measurement value acquisition!
(2)	Adjust frequency of sample cycle. The maximum frequency depends on the pixel amount. **Please note**: By changing this value the values of VVR and VCD times change too.
(3)	Response time of low pass. This value is generated by adjusting the VVR and VDR times. If necessary, the integration time (5) is changed.
(4)	Adjust integration time. This value is generated by adjusting the VVR and VDR times. If necessary, the response time (4) is adjusted.
(5)	Adjust VVR time. Response time and integration time change thereby.
(6)	Adjust VDR time. Response time and integration time change thereby.
(7)	Delay of sync impuls from the beginnung of sample loop (positive shoulder VVR respectively VDR impulse).
(8)	Puls width of sync impulse
(9)	Switching direction of sync impulse.

Recorder and replay function



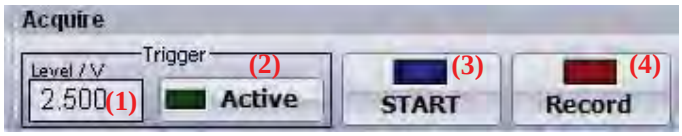
(1)	Adjust page interval. Specification is made by the number of pages (e.g. [1]: every page is recorded.; [10]: every tenth page is recorded. One page is the image of a detector array per sample intervall.
(2)	Number of recorded pages
(3)	File in which the record is made. If the file already exists, it gets overwritten.
(4)	By chosing this option, date and time are prepend for every record.
(5)	Chose file for replay
(6)	Information about the replay file

Replay



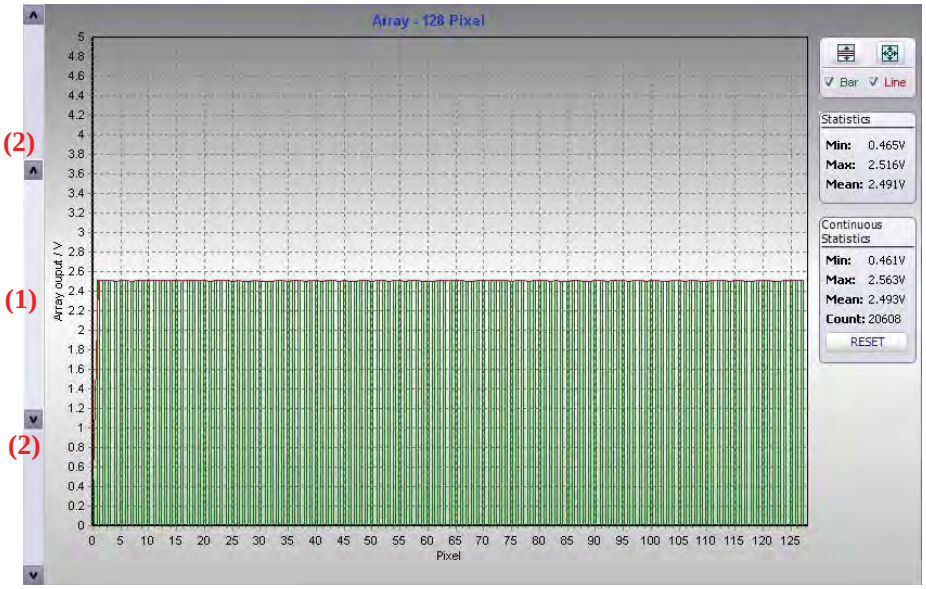
(1)	Replay a record
(2)	Select page. Every page equates to the image of the line array per sample period.

Data acquisition



(1)	Threshold measurement trigger
(2)	Activates measurement trigger. The display of the pixel values is only made when a pixel of the array content is above the value as specified in (2).
(3)	Starts/Stops measurement value acquisition
(4)	Release for record. When starting the measurement data acquisition, the record in a text file starts.

Pixel display



Every array alement equates to a bar in the diagram. Additionally, the pixel values are displayed as a line diagram.

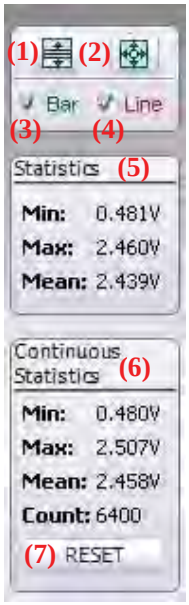
Move in diagram:

- Hold down the right mouse button in the diagram You can scroll the diagram now in any direction.
- Use the scroll bar (1) for the desired direction.

Select detail:

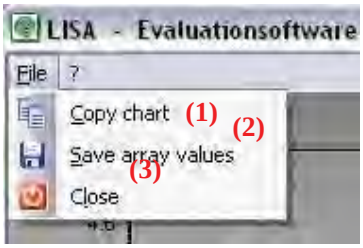
- Select an area in the diagram with the left mouse button. The display of this area gets zoomed in.
- Change the size of the scroll bar (1) with the arrow marks (2)

Diagram options



(1)	Adjust diagramm to pixel values
(2)	Reset diagram to default values
(3)	Fade in/out bar display
(4)	Fade in/out line display
(5)	Statistical values about all pixels of the current array content
(6)	Statistical values about all pixels since starting the data acquisition
(7)	Reset values in (6)

Menu bar



(1)	Copy diagram as bitmap into clip board
(2)	Save pixel values in a text file. Pixel number and pixel value are seperated by a semicolon.
(3)	Close program

Structure of record file

The record is saved as text file and can be viewed with every text editor.

Furthermore, the data are structured so that they can be read directly into Microsoft Excel®.

Date: 05.11.2013	Information about recorded data
Start time: 15:45:32	
Stop time: 15:45:34	
Array size: 128	
Sample freq/Hz: 128	
Trigger level: inactive	
Page interval: 1	
Page counter: 101	
Page: 1	Page number
1;1;2,510	Pixel value: [serial number];[pixel number];[meas.value]
1;2;2,502	
1;3;2,506	
.....	
.....	
Page: 2	
2;1;2,610	
2;2;2,510	

Handling Precautions for Pyroelectric Sensors

Protection from Electro-Static Discharges (ESD)

Caused by temperature changes during transportation or handling, pyroelectric detectors can generate a voltage of some hundreds of Volts.

By improper handling or storing, both the detectors themselves as well as the connected electronics can be destroyed.

For that reason we deliver all our detectors in boxes with conductive foam similar to the one depicted below.

Please observe the following instructions:

- transportation and storage of pyroelectric sensors only with electrically connected pins (resistance between the pins <10 MΩ)
- handling of pyroelectric sensors only in ESD protected areas
- temperature ramps exceeding a rate of 10 K/min must be avioded at the sensors

Cleaning Advise

Our sensors can be cleaned in isopropyl alcohol or ethanol or in water solutions of one of it. The sensors should not to be exposed to cleaning liquids longer than 10 min.

- for cleaning use only soft tools like brush, cotton wool or cellulose tissues
- avoid pressure to the window during cleaning procedure
- do not use ultrasonic cleaner
- do not use other cleansing agents than the above recommended ones

For some special filter materials the cleaning instructions can differ from these instructions. In such cases please watch the special cleaning instructions enclosed with the sensors in such cases.

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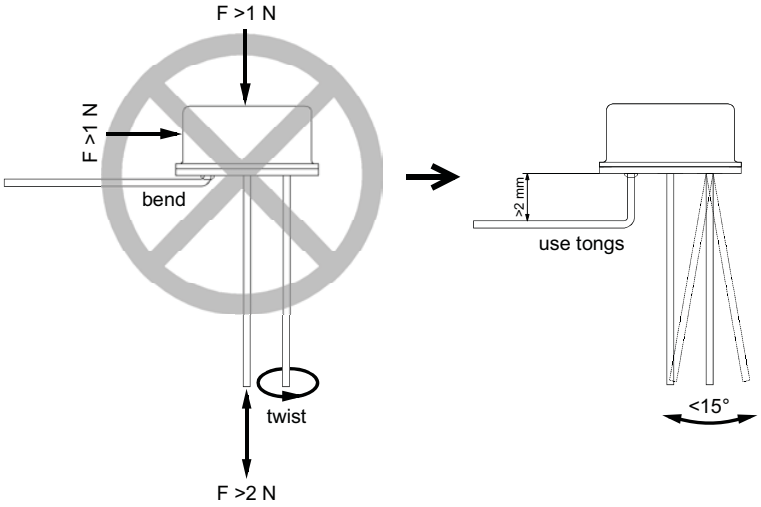
Limits of Mechanical Stress

Our pyroelectric sensors are hermetically sealed when shipped. Bending of the wires near glass pin feed throughs by more than 15° without suitable tools can lead to cracks in the glass seals.

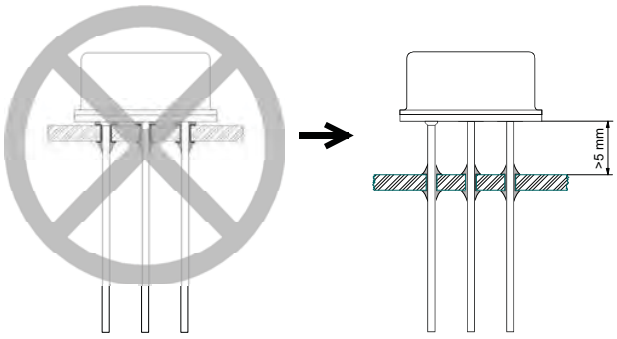
Mechanical strain to the sensor may cause cracks in the filter window sealing. In all that cases the sensor becomes leaky and therefore, it doesn't reach the promised properties.



Soldering instructions

Overheating and inadequate heat sinking during soldering can damage the sensor!

- Use only manual soldering considering the instructions belo.
- Do not use soldering irons with a power of more than 25 W.
- Use heat sinking and minimum soldering temperature and time respectively (at maximum 3 s at 280 °C or 5 s at 240 °C).
- The minimum distance between TO39 header and PCB is 5 mm. Do not use shorter lead wires!



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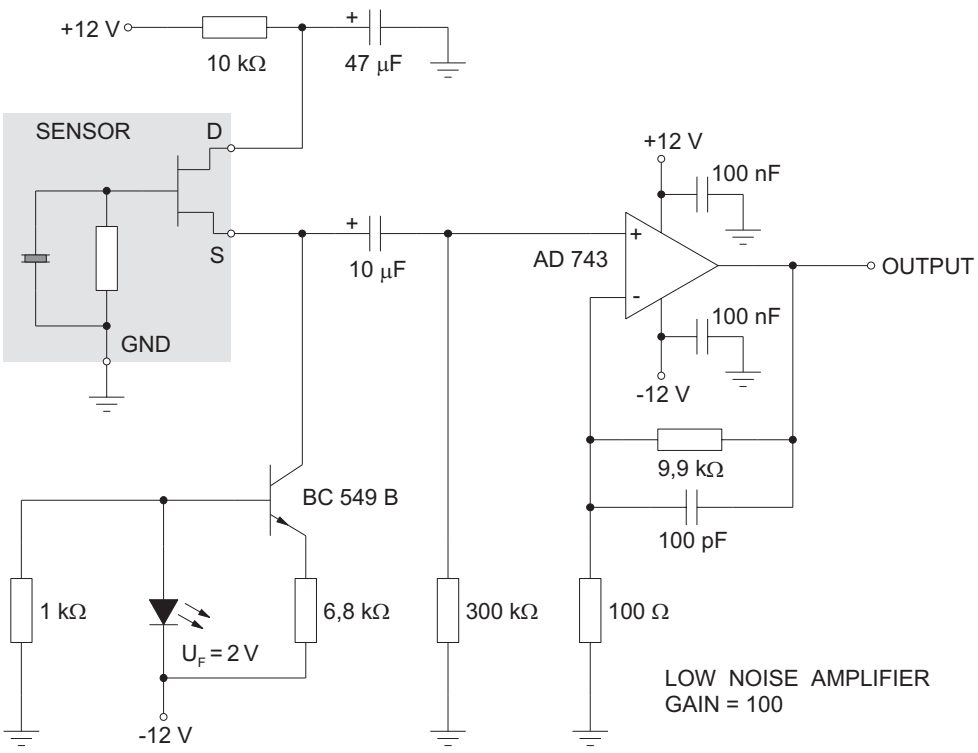
+12 V
10 kΩ
+
47 µF
SENSOR
D
S
GND
+12 V
100 nF
+
10 µF
AD 743
+
-
OUTPUT
100 nF
-12 V
9,9 kΩ
BC 549 B
100 pF
1 kΩ
6,8 kΩ
300 kΩ
100 Ω
U_F = 2 V
-12 V
LOW NOISE AMPLIFIER
GAIN = 100