

# HTPA160x120dR1 BeamProfiler

Datasheet for Thermopile Array Sensor

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## Changelog

2025-04-17	Initial Release
2025-05-27	Revised drawing and adjusted external dimensions for updated housing

## 1 Important Handling Notice for the Internal Flash Memory

To ensure the stability and functionality of the flash memory, it is extremely important to read and follow the instructions below. **Failure to do so may result in the loss of memory content:**

- Absolutely **no hot plugging** – always plug the sensor into a de-energized socket!
- Do not unplug the sensor during communication!
- In case of voltage drop: Try to stop communication to the flash immediately, especially during a brown out.

## 2 Cleaning and Handling of Sensors with Optical Elements

### Cleaning of Filter with Isopropyl Alcohol or Acetone

This is the method most universally used for cleaning optical elements with or without coatings. Filters or lenses mounted in our sensors may be cleaned rubbing the surfaces lightly with a clean, soft, all-cotton cloth or cotton swab during immersion in solvent or simply moistened with the solvent. The parts are then immediately wiped dry with another clean, soft, all-cotton cloth or cotton swab.

### Cleaning with Detergent and Water

A very mild, non-abrasive detergent (one which does not contain additives) and water may also be used for cleaning optical elements. In general, a detergent and water mixture is an excellent method for removing fingerprints and other smudges. The liquid detergent is first mixed with deionized water (proportions recommended by the manufacturer should be followed). The element is then washed, rinsed, and immediately wiped dry. Use a clean, soft cloth when cleaning and drying. If the part is allowed to dry in air, a permanent stain may result.

Please note:

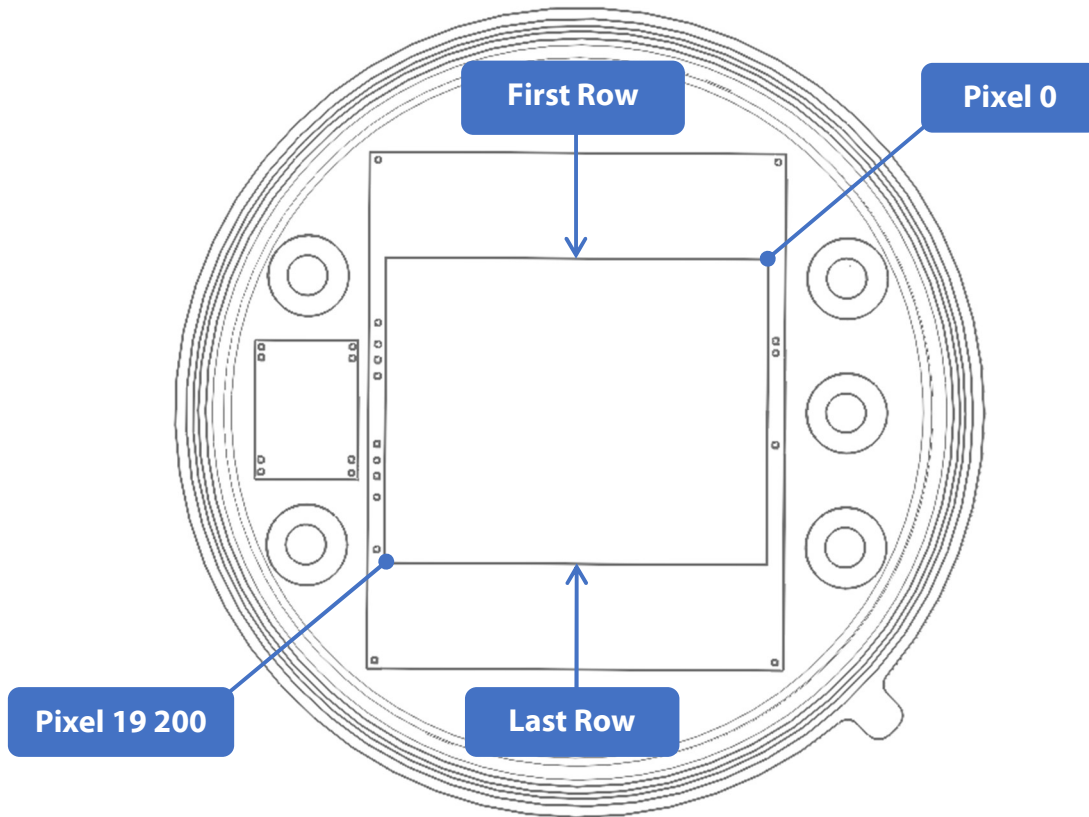
- Do not use isopropyl alcohol or acetone or detergent if the elements will be mounted in an assembly with a finish which may be soluble by these solvents.
- Please avoid glass isolation being moistened by solvent.
- If the part is allowed to dry in air, a permanent stain may result.

## Handling Advice

Sensors with optical elements deserve special consideration in their handling and care. Ordinarily, filters or lenses are cleaned and inspected prior to shipment. If proper care is exercised during handling cleaning should not be necessary prior to use.

- Wear gloves when handling a sensor or optical element. Lightweight nylon or cotton gloves which are relatively lint-free are recommended.
- Avoid touching the surface of filters and lenses.
- Protect devices from static discharge and static fields.
- Thermopile sensors are electrostatic sensitive devices. Sensors should be handled over an electrostatic protected work area.
- Precautions should be taken to avoid reverse polarity of power supply for sensors with integrated signal processing. Reversed polarity of power supply results in a destroyed unit.
- Sensors should rest preferably in a partitioned container where the mounted filters or lenses will be not coming into contact with other material.
- During storage optical surfaces should be covered to avoid contamination from the surrounding environment.
- A covered container can eliminate damage during transportation and storage.
- Sensors or optical elements should be stored in a restricted access area to eliminate handling.
- Do not expose the sensors to aggressive detergents such as freon, trichlorethylen, etc.
- Avoid rotating the sensors when they are soldered into a PCB or something similar.
- Shortening of the pins is not suggested. This may cause cracks in the glass of the pins and result in a leakage.
- If this is necessary, a tool for this is recommended. Please contact Heimann Sensor for further information.

### 3 Optical Orientation



## 4 Characteristics

### 4.1 Common Specifications

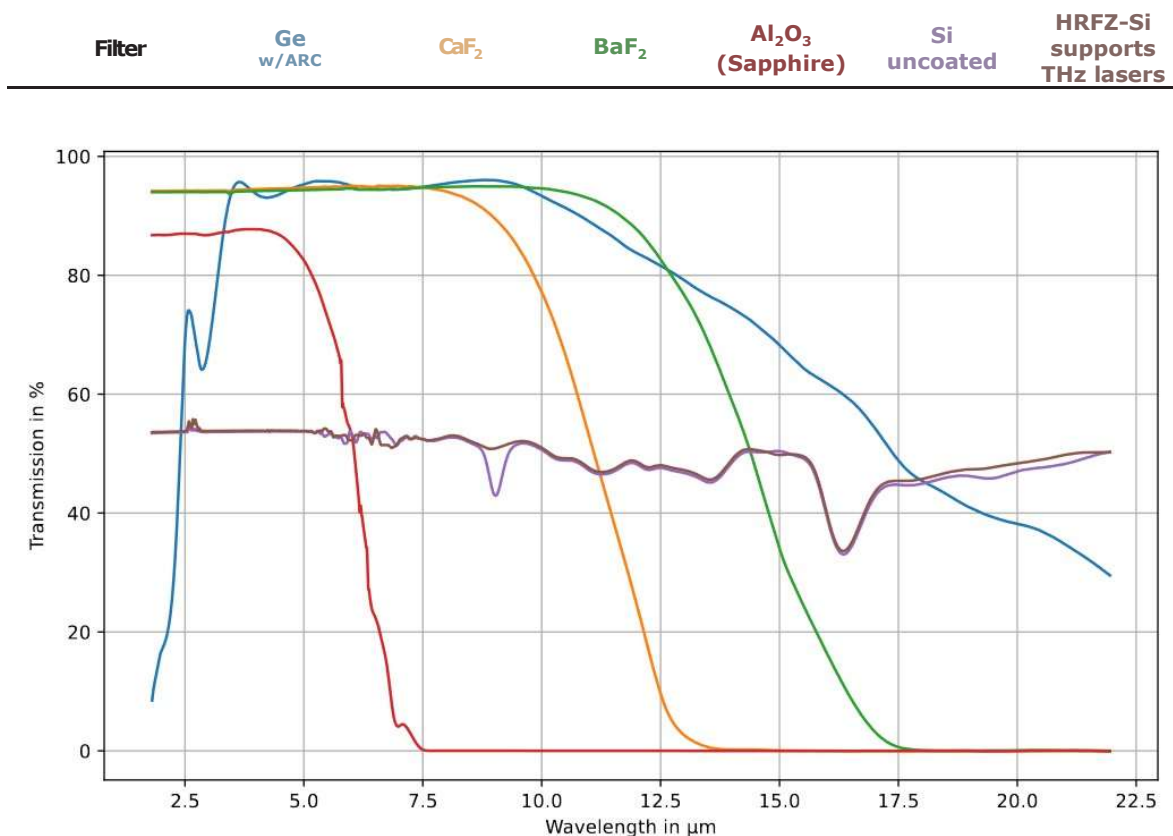
Technology:	n-poly/p-poly Si
Thermal pixel time constant:	TBD
Digital Interface:	SPI
Flash size:	2048 kByte

Pitch:	45 $\mu\text{m}$
Absorber size:	40 $\mu\text{m}$
Framerate (full frame):	16 Hz
Framerate (12 <sup>th</sup> part of array):	168 Hz

19020 sensitive elements

### 4.2 Filter Characteristics

Typical filter transmissions by 1 mm thickness:



## 5 Electric Specifications

Table 1: Operating Conditions for the USB AppSet

Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Supply Voltage	$V_{DD}$		4.5	5.0	5.5	V
Operation Temperature	$T_A$		0		85	Deg. C

Table 2: Electrical Characteristics for the Sensor

Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit
<b>Digital Input</b>						
Internal Clock frequency	$F_{CLK}$		0.5	2.5	5.5	MHz
BIAS current	$I_{BIAS}$		1	5	13	$\mu A$
Input voltage high	$V_{IH}$		0.7x $V_{DD}$			V
Input voltage low	$V_{IL}$				0.3x $V_{DD}$	V
<b>PTAT</b>						
Temperature range			TBD	TBD	TBD	Deg. C
PTAT gradient			TBD	TBD	TBD	K/V
Operation Temperature	$T_A$		0		85	Deg. C

Table 3: Preamplifier / ADC

Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Chopper frequency	$F_{CHP}$			40		kHz
Preamplifier Noise	$N_{PA}$	at 20 kHz		75		$nV/Hz^{1/2}$
Frame rate (Full Array)	FR1		6	9	16	Hz
Frame rate (Twelfth part Array)	FR12		72	108	168	Hz
ADC pos. Reference	$V_{REFP}$	REF_CAL 00		1.664		V
		REF_CAL 01		1.566		
		REF_CAL 10		1.469		
		REF_CAL 11		1.371		
ADC neg. Reference	$V_{REFN}$	REF_CAL 00		0.881		V
		REF_CAL 01		0.979		
		REF_CAL 10		1.077		
		REF_CAL 11		1.175		
ADC resolution	$ADC_{LSB}$	at 16 Bit	5.8		24.1	$\mu V$

## 6 Order Code Chart

HTPA160x120d	R1	Beam Profiler	(USB)	<b>[Ge]</b>
HTPA160x120d	R1	Beam Profiler	(USB)	<b>[CaF<sub>2</sub>]</b>
HTPA160x120d	R1	Beam Profiler	(USB)	<b>[BaF<sub>2</sub>]</b>
HTPA160x120d	R1	Beam Profiler	(USB)	<b>[FZSi]</b>
HTPA160x120d	R1	Beam Profiler	(USB)	<b>[Si]</b>
HTPA160x120d	R1	Beam Profiler	(USB)	<b>[Al<sub>2</sub>O<sub>3</sub>]</b>

**Bold: Selectable options**

Regular: Fixed/Not selectable

