

Datasheet Integrated Sensor

Type HIS Ax2 Fxxx Gxxx



Features and Benefits

- Small size, low cost, integrated ASIC with analog outputs
- 4-pin metal housing TO39
- Operating range 2.7V to 5.5V , -40°C to 120°C
- Sensor gain preset to 4300 or 2150
- Integrated linear temperature reference with a sensitivity of typical 16mV/°C
- Large variety of available filter types for different application

Ordering Information

HIS -> Heimann thermopile sensor and ASIC in a TO39 housing
 Ax2 -> „A“ standard cap TO39 ; „x“ sensor chip (list) ; „2“ ASIC STP1
 Fxxx -> application-specific filter type (list)
 Gxxx -> sensor gain preset G2150 or G4300

Sensor Chip Selection			
<i>Parameter</i>	<i>Sensor chip "1"</i>	<i>Sensor chip "2"</i>	<i>Sensor chip "3"</i>
Absorbing area	0.61x 0.61mm ²	1.2 x 1.2mm ²	2.1 x 2.1mm ²
Sensitivity	50 V/W	38 V/W	22 V/W
Voltage response	19 Vmm ² /W	55 Vmm ² /W	97 Vmm ² /W
Resistance	85 kOhm	85 kOhms	85 kOhm
Time constant	5ms	8ms	15ms
Filter Selection			
<i>Filter Type</i>	<i>Application</i>	<i>Specification</i>	
F4.26-180	CO ₂ gas detection	NBP CWL 4.26µm HPB 180nm	
F4.27-90	CO ₂ gas detection	NBP CWL 4.27µm HPB 90nm	
F4.43-60	CO ₂ gas detection	NBP CWL 4.43µm HPB 60nm	
F4.64-180	CO gas detection	NBP CWL 4.64µm HPB 180nm	
F3.30-160	HC gas detection	NBP CWL 3.30µm HPB 160nm	
F3.37-190	HC gas detection	NBP CWL 3.375µm HPB 190nm	
F3.91-90	gas reference	NBP CWL 3.91µm HPB 90nm	
F5.5	temperature detection	LWP Cut On 5.5µm	
F8-14	temperature detection	BP HPP 8µm to 14µm	

Please contact Heimann customer service for special filter requirements.

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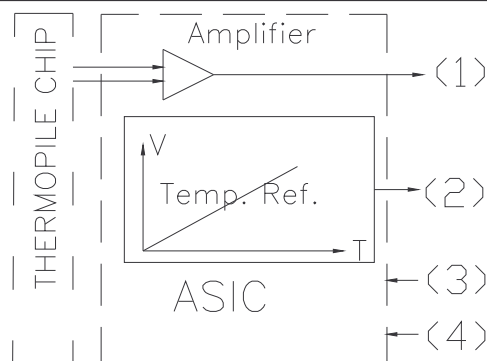
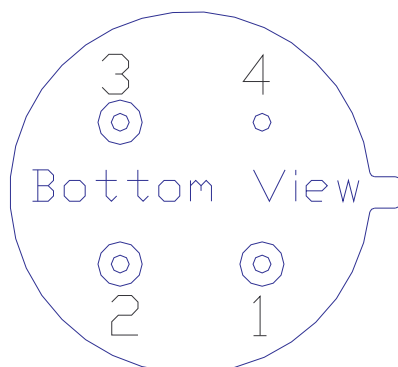
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Operating Conditions

Parameter	Typical Value	Unit	Condition
Supply voltage VDD	(2.7).. 3 .. 5..(5.5)	V	+Vs
Supply voltage VSS	0	V	-Vs , Ground
Supply current	1	mA	Without load
Open loop gain	90	dB	
Low pass frequency	240	Hz	ASIC
PSRR	>40	dB	
Output voltage range	0.15 .. (VDD-0.15)	V	
Start up time after POR	Max. 0.5	sec	Electrical start up
Noise voltage input related	45	nV/ $\sqrt{\text{Hz}}$	Output TPO; Sensor + ASIC
Zero input sensor signal	1.25	V	Output TPO
Sensor gain preset	4300 or 2150	V/V	Output TPO ; optional
Temp. ref. voltage at 25°C	1.45	V	Output TRO
Sensitivity temp. reference	16	mV/°C	Linear ; Output TRO
Field of view	70	degree	Sensor chip TP1
Operating temperature	-40.. 120	°C	

Pin Assignment

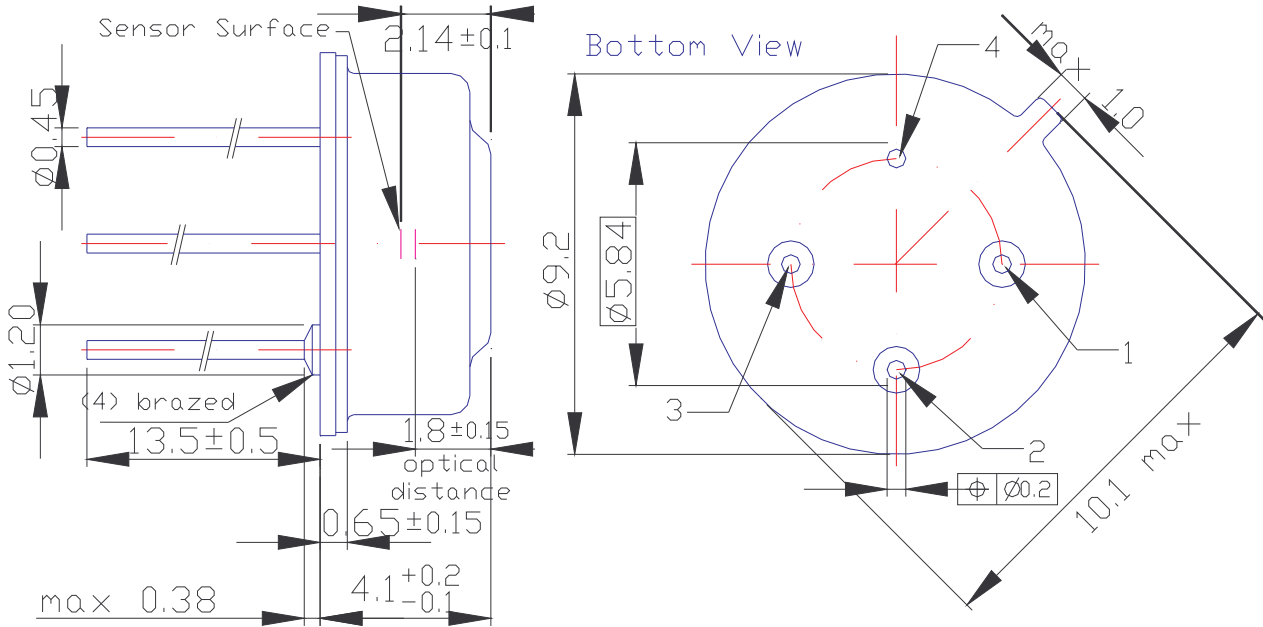
Pin No	Symbol	Description
1	TPO	Amplified analog sensor output voltage
2	TRO	Analog temperature reference output voltage
3	VDD	Positive supply voltage
4	VSS	Negative supply voltage / Ground (0V)



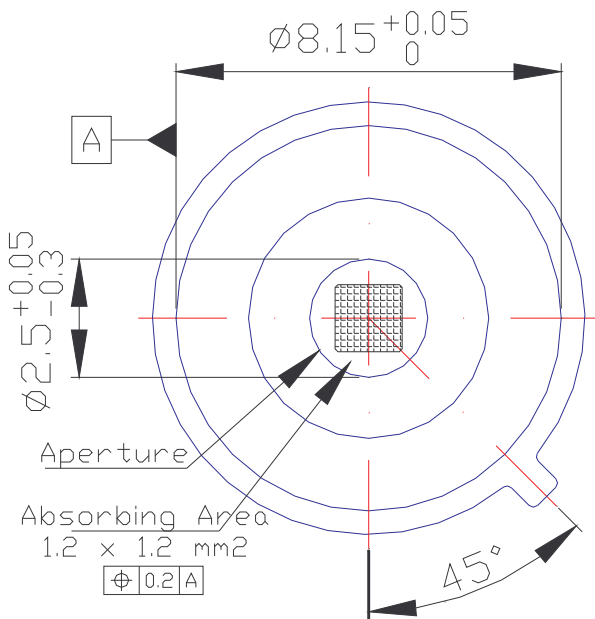
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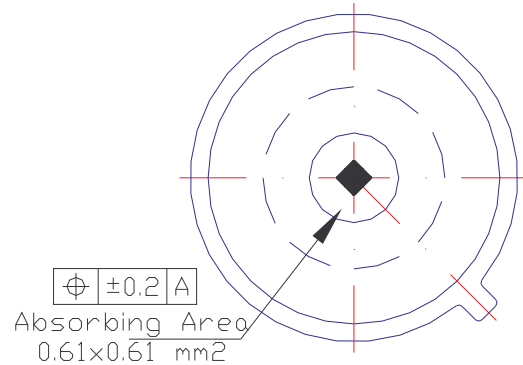
Dimensions



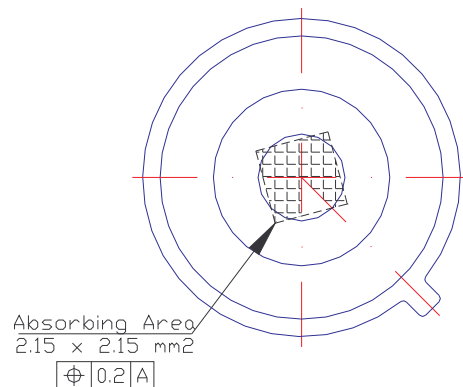
HIS A22 ..



HIS A12 ..



HIS A32 ..



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Application Hints

Heimann integrated sensors are used for non-contact temperature measurements. A thermopile sensor and a signal conditioning circuit (ASIC) are integrated in the same housing. The thermopile sensor converts the temperature radiation of an object surface to an electrical signal (voltage) by thermocouples (Seebeck effect). The sensor output voltage is related to the object temperature and object emissivity (radiation) as well as to the sensor chip temperature (housing temperature) and surrounding temperature (radiation) by the following equation :

$$VS = K * \varepsilon * (TO^n - TS^n) \quad \text{at } TA=TS$$

VS -> sensor output voltage ; K -> constant apparatus factor ; ε -> object emissivity ; TO -> object temperature ; TA -> ambient (surrounding) temperature ; TS -> sensor (housing) temperature ; n -> exponent to describe the temperature dependency of the signal voltage

The low noise amplifier of the ASIC transforms the sensor signal to a suitable voltage range. A temperature related voltage provided by the ASIC can be used to compensate ambient temperature drift effects.

A gas concentration can be measured by monitoring the absorption of an infrared light beam. The base equation for gas concentration measurement in the infrared way is Beer's law :

$$I=I(0)*\exp(-k*c*L)$$

I -> radiant flux at the point of measurement
I(0) -> base radiant flux of the test system without gas absorption
k -> constant (gas and filter specific)
L -> measuring distance
c -> gas concentration

The radiant flux is proportional to the output voltage of the sensor module :
 $U/U(0) \sim I/I(0)$.

A special infrared light source is used to generate the radiant heat. The infrared source needs to be pulsed to eliminate parasitic temperature influences. Don't hesitate to contact HEIMANN Sensor for support to use our long-time experience in infrared sensors and sensor modules.

Liability

Changes or modifications at the product which haven't influence to the performance and/or quality of the device haven't to be announced to the customers in advance. Customers are requested to consult with Heimann Sensor representatives before the use of Heimann Sensor products in special applications where failure or abnormal operation may directly affect human lives or cause physical injury or property damage. The company or their representatives will not be responsible for damage arising from such use without prior approval.