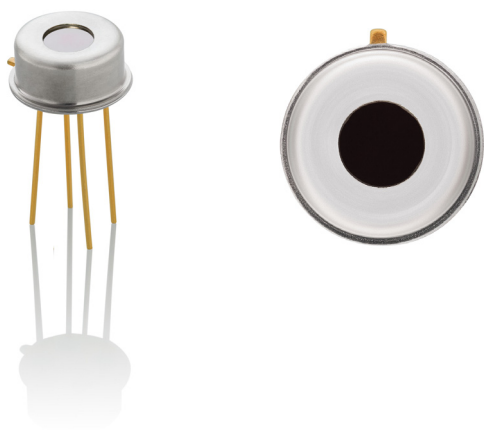


# RTD120

Silicon-Based Thermopile Detector 120

The RTD120 is a single-channel silicon-based thermopile detector in a TO-5 package. The device offers a low-cost solution with high output and fast response, with a time constant of 25ms with Nitrogen encapsulation gas.

## Image Diagram



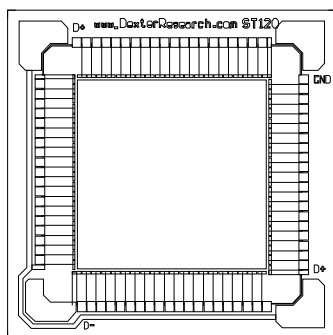
## Features

- A single-channel silicon-based thermopile detector in a TO-5 package
- Four pin, 9.22mm TO-5 package
- Active area size is 1.2 × 1.2 mm
- Delivers a time constant of 25ms with Nitrogen encapsulation gas
- Very low Temperature Coefficient of Responsivity of -0.04%/°C
- Very short thermal shock response to ambient temperature change
- Internal 5% NTC chip thermistor provides ambient package temperature measurement
- Internal aperture precisely defines active area for applications with FOV and/or spot size requirements

## Benefits

- Low cost with high sensitivity and high output

## Detector Circuit Overlay



## Applications

- Gas analysis
- Fire suppression
- Non-contact temperature sensors
- Horizon sensors
- Capnography

# 1. Specifications

Specifications apply at 23°C with KBr Window and Nitrogen encapsulating gas.

Symbol	Parameter	Min	Typ.	Max.	Unit	Comments <sup>[1]</sup>
AA	Active Area size	1.2 × 1.2			mm	Hot junction size, per element.
A	Element Area	1.44			mm <sup>2</sup>	
	Number of Junctions	80				Per element.
	Number of Channels	1				Per detector package.
V <sub>s</sub>	Output Voltage	150	190	230	μV	DC, H = 330μW/cm <sup>2</sup> [2]
SNR	Signal-to-Noise Ratio	3,459	4,953	6,359	√Hz	DC, SNR = V <sub>s</sub> /V <sub>n</sub>
R	Responsivity	31.6	37.9	48.4	V/W	DC, $\mathcal{R} = V_s/HA$ [3]
R	Resistance	80	90	115	kΩ	Detector element
	Temperature Coefficient of $\mathcal{R}$		-0.04		%/°C	Best linear fit, 0° to 85°C [4]
	Temperature Coefficient of R		0.02		%/°C	Best fit, 0° to 85°C [4]
V <sub>n</sub>	Noise Voltage	36.2	38.4	43.4	nV/√Hz	V <sub>n</sub> <sup>2</sup> = 4kTR
NEP	Noise Equivalent Power	0.75	1.04	1.37	nW/√Hz	DC, NEP = V <sub>n</sub> HA/V <sub>s</sub> [3]
D*	Detectivity	0.87	1.15	1.61	10 <sup>8</sup> cm√Hz/Ω	DC, D* = V <sub>s</sub> /V <sub>n</sub> H√A [3]
T	Time Constant		25		ms	Chopped, -3dB point [4]
FOV	Field of View	61°/97°			Degrees	For FOV description, see <a href="#">Package Outline Drawings</a>
	Package Type	TO-5				Standard package hole size: 0.060" × 0.060"
T <sub>a</sub>	Operating Temperature	-50		+125	°C	
	CO <sub>2</sub> Filter, Central Wave Length		4.260		μm	

1. General specifications: Flat spectral response from 100nm to > 100μm. Linear signal output from 10<sup>-6</sup> to 0.1W/cm<sup>2</sup>. Maximum incident radiance 0.1W/cm<sup>2</sup>, damage threshold ≥ .5W/cm<sup>2</sup>.
2. Test conditions: 500K Blackbody source; Detector active surface 10cm from 0.6513cm diameter Blackbody Aperture.
3. A is detector area in mm<sup>2</sup>.
4. Parameter is not 100% tested. 90% of all units meet these specifications.

## 2. Package Outline Drawings

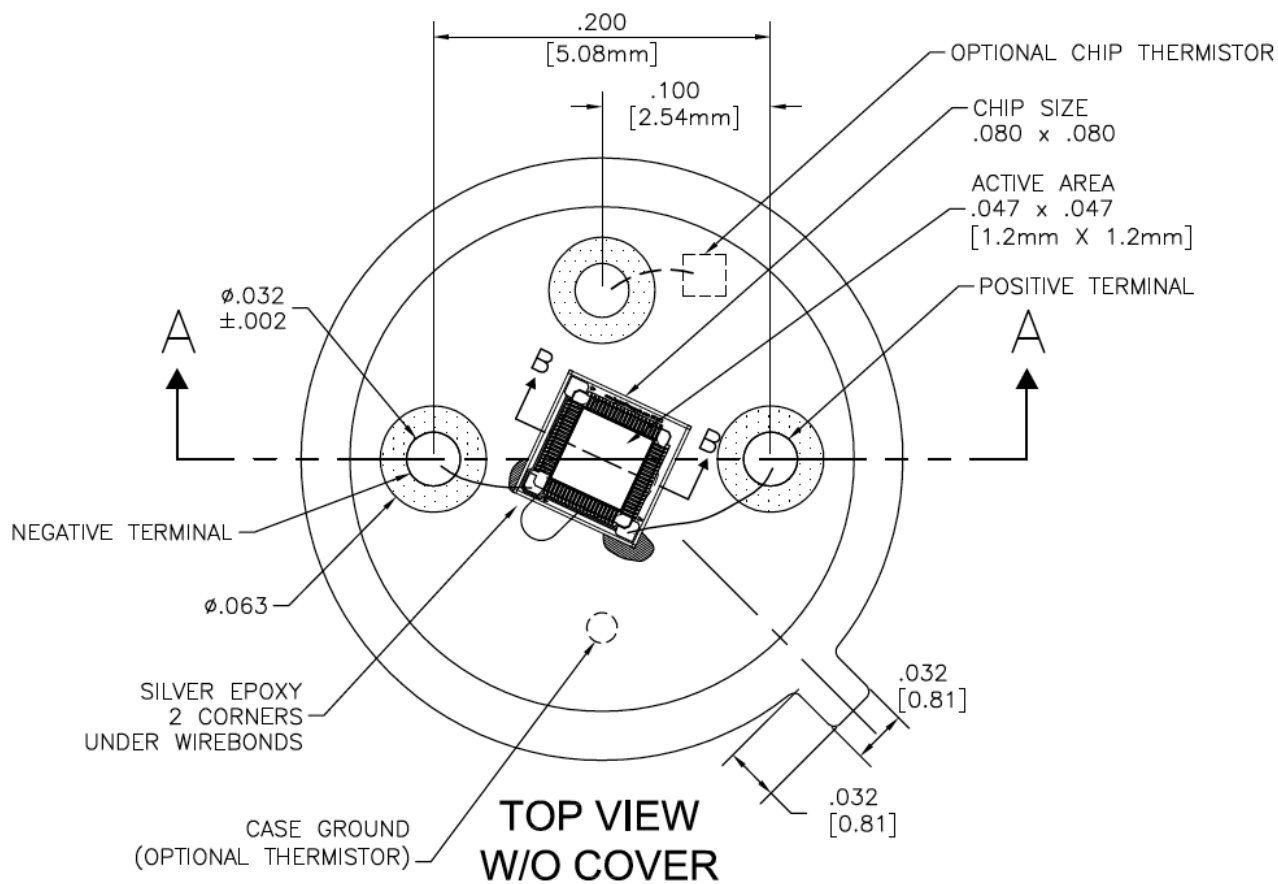


Figure 1. Package Outline Drawings – Top View

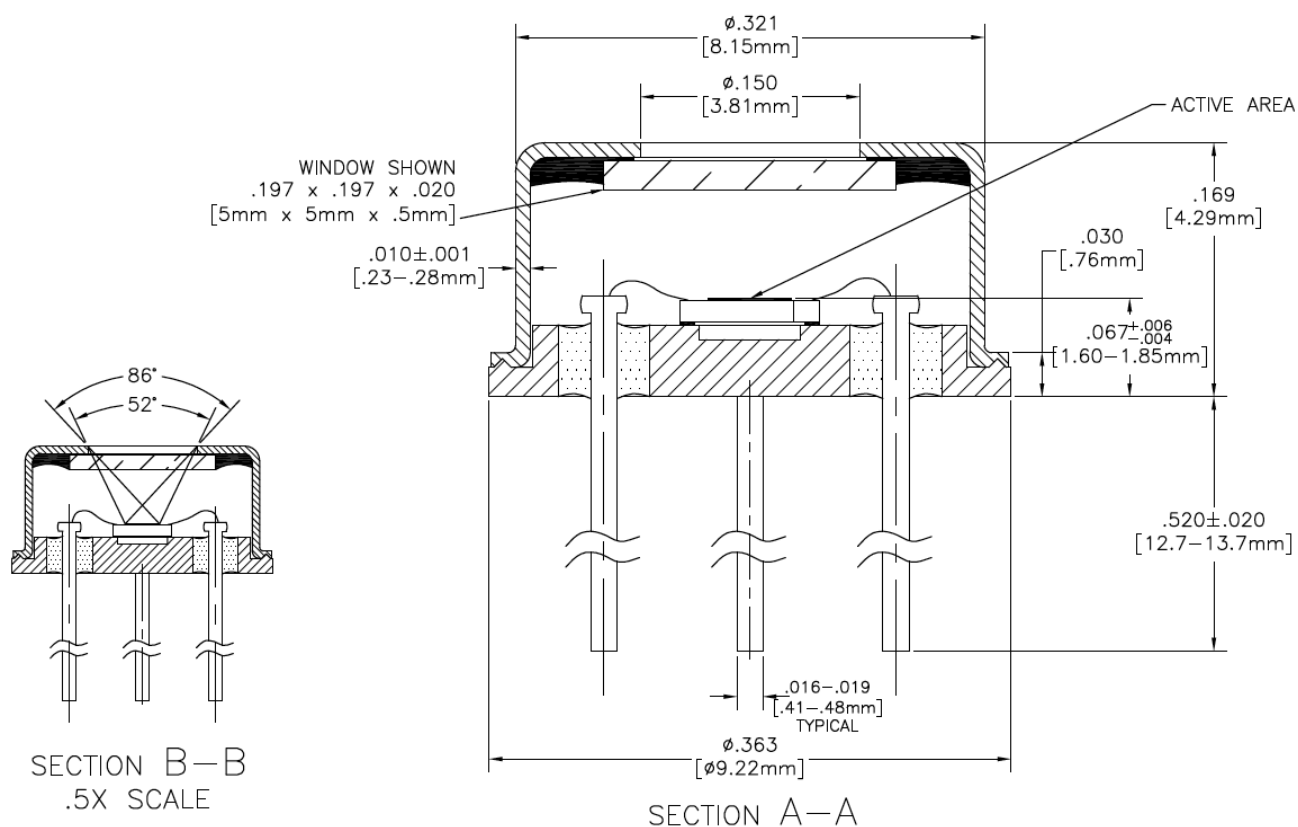


Figure 2. Package Outline Drawings – Side View

### 3. Ordering Information

Orderable Part Number	Package	Temperature	Carrier Type
RH5Z1210D20GZO#ADO	9.22mm TO-5 package	-50 to +125°C	Tray

### 4. Revision History

Revision	Date	Description
1.00	Aug 31, 2021	Initial release.

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