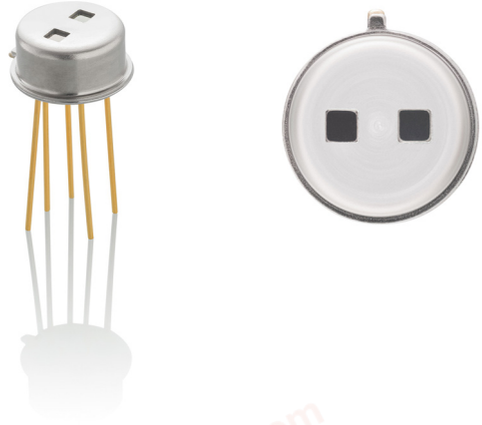
chanhvinh.com

RTD120D

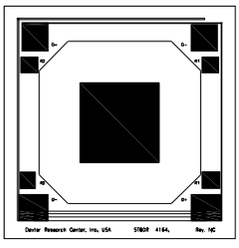
Silicon-Based Thermopile Detector 120 Dual

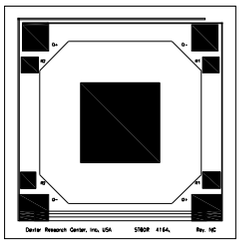
The RTD120D is a two-channel silicon-based thermopile detector in a TO-5 package. The device offers a low-cost solution with high output and fast response, with a time constant of 25ms with Nitrogen encapsulation gas.

Image Diagram



Detector Circuit Overlay





Features

- A two-channel silicon-based thermopile detector in a TO-5 package
- Five pin, 9.22mm TO-5 package
- Each small 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

Applications

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

Copyright © 2021

chanhvinh.com

1. Specifications

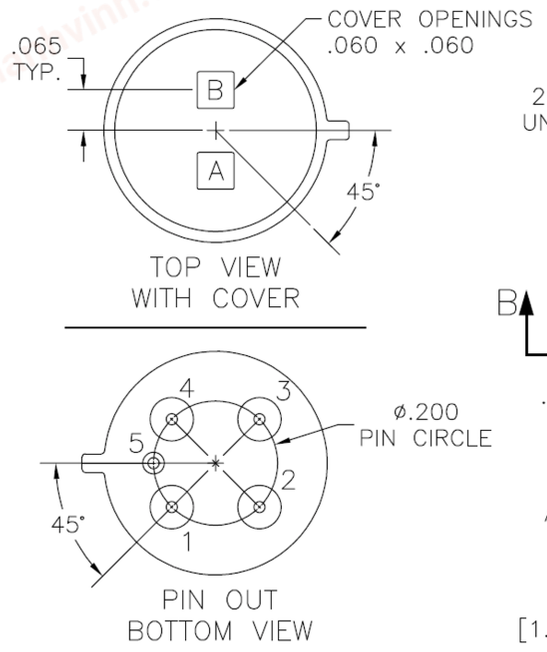
Specifications apply at 23°C with KBr Window and Nitrogen encapsulating gas.

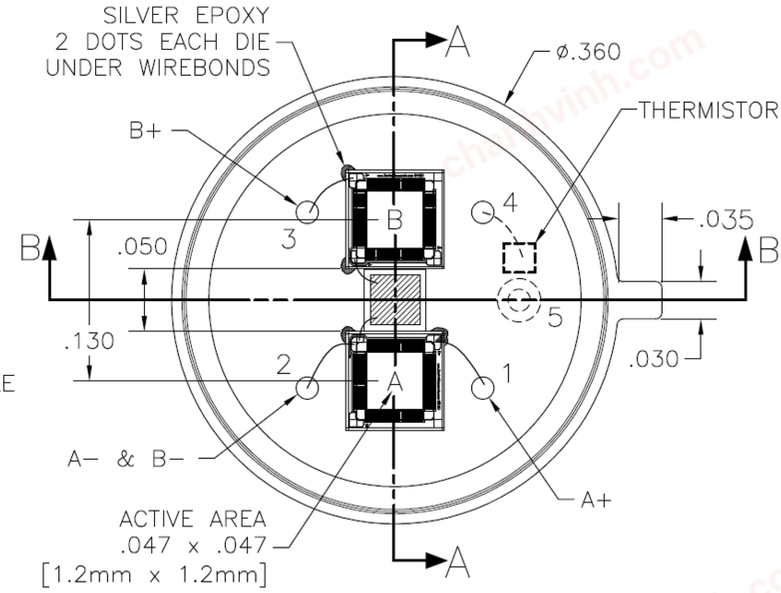
Symbol	Parameter	Min.	Typ.	Max.	Unit	Comments[1]
AA	Active Area size		1.2 × 1.2		mm	Hot junction size, per element.
A	Element Area		1.44		mm^2	
	Number of Junctions		80			Per element.
	Number of Channels		2			Per detector package.
V_s	Output Voltage	133	161	189	µV	DC, H = 330µW/cm^2 [2]
SNR	Signal-to-Noise Ratio	3,067	4,197	5,225	√Hz	DC, SNR = V_s/V_n
R	Responsivity	28.0	33.9	39.8	V/W	DC, $\Re = V_s/HA$ [3]
R	Resistance	80	90	115	kΩ	Detector element
	Temperature Coefficient of $\Re$		-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_n	Noise Voltage	36.2	38.4	43.4	nV/√Hz	$V_n^2 = 4kTR$
NEP	Noise Equivalent Power	0.91	1.13	1.55	nW/√Hz	DC, NEP = V_n HA/V_s [3]
D*	Detectivity	0.77	1.06	1.32	10^8cm√Hz/Ω	DC, D* = V_s/ V_n H√A [3]
T	Time Constant		25		ms	Chopped, -3dB point [4]
FOV	Field of View		8°/60°		Degrees	For FOV description, see Package Outline Drawings
	Package Type		TO-5			Standard package hole size: 0.060” × 0.060”
M	Element Matching		25		%	$\mathcal{M} = \lvert V_A - V_B \rvert / V_B$ [3]
	Element Separation		3.30		mm	Center to center
T_a	Operating Temperature	-50		+125	°C	
	Reference Filter, Central Wave Length		3.920		µm	Element A
	CO^2 Filter, Central Wave Length		4.260		µm	Element B

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

chanhvinh.com

2. Package Outline Drawings





PIN	ELEMENT	DESCRIPTION	P/N
1	A+		
2	DETECTOR COMMON (A– & B–)		
3	B+		
4	OPTIONAL THERMISTOR		
5	CASE GROUND, OPTIONAL THERMISTOR		

Figure 1. Package Outline Drawings – Top View

chanhvinh.com

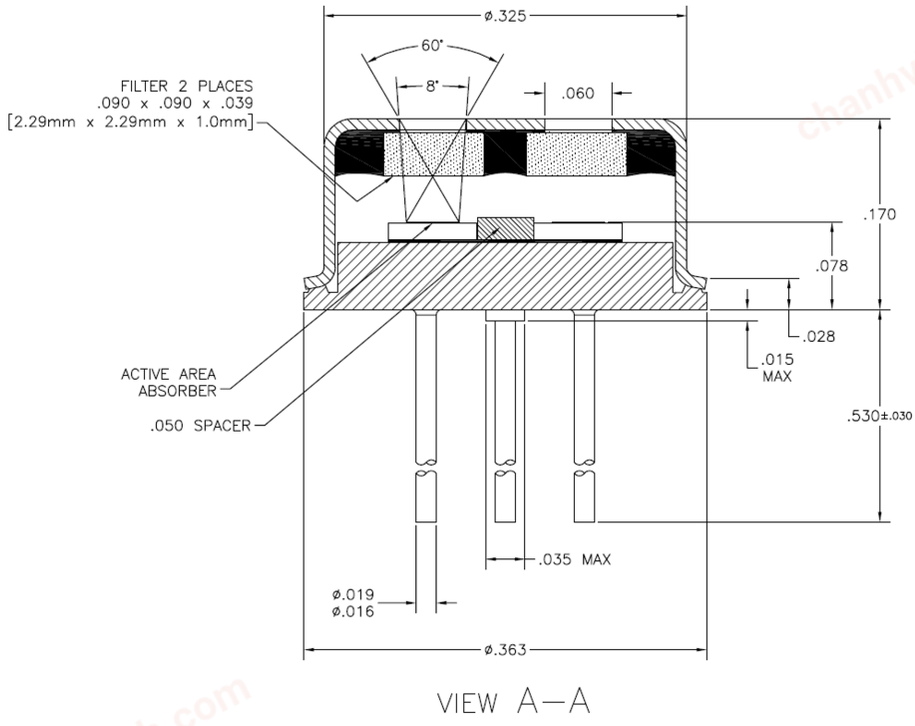


Figure 2. Package Outline Drawings – Side View

3. Ordering Information

Orderable Part Number	Package	Temperature	Carrier Type
RH5Z1222D20GZO#ADO	9.22mm TO-5 package	-50 to +125°C	Tray

4. Revision History

Revision	Date	Description
1.00	Aug 31, 2021	Initial release.

chanhvinh.com

IMPORTANT NOTICE AND DISCLAIMER

RENESAS ELECTRONICS CORPORATION AND ITS SUBSIDIARIES (“RENESAS”) PROVIDES TECHNICAL SPECIFICATIONS AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES “AS IS” AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for developers skilled in the art designing with Renesas products. You are solely responsible for (1) selecting the appropriate products for your application, (2) designing, validating, and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, or other requirements. These resources are subject to change without notice. Renesas grants you permission to use these resources only for development of an application that uses Renesas products. Other reproduction or use of these resources is strictly prohibited. No license is granted to any other Renesas intellectual property or to any third party intellectual property. Renesas disclaims responsibility for, and you will fully indemnify Renesas and its representatives against, any claims, damages, costs, losses, or liabilities arising out of your use of these resources. Renesas' products are provided only subject to Renesas' Terms and Conditions of Sale or other applicable terms agreed to in writing. No use of any Renesas resources expands or otherwise alters any applicable warranties or warranty disclaimers for these products.

(Rev.1.0 Mar 2020)

Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu,
Koto-ku, Tokyo 135-0061, Japan
www.renesas.com

Contact Information

For further information on a product, technology, the most up-to-date version of a document, or your nearest sales office, please visit:
www.renesas.com/contact/

Trademarks

Renesas and the Renesas logo are trademarks of Renesas Electronics Corporation. All trademarks and registered trademarks are the property of their respective owners.

© 2021 Renesas Electronics Corporation. All rights reserved.