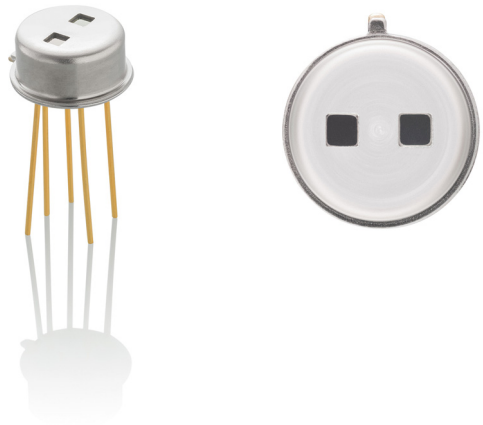
RTD60D

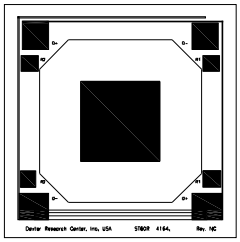
Silicon-Based Thermopile Detector 60 Dual

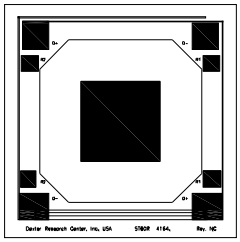
The RTD60D is a two-channel silicon-based thermopile detector in a TO-5 package. The device offers a low-cost solution, with a small active area and fast response, with a time constant of 18ms with Nitrogen encapsulation gas.

Image Diagram



Detector Circuit Overlay





Applications

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

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 0.61 × 0.61 mm
- Delivers a time constant of 18ms 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 and small active area

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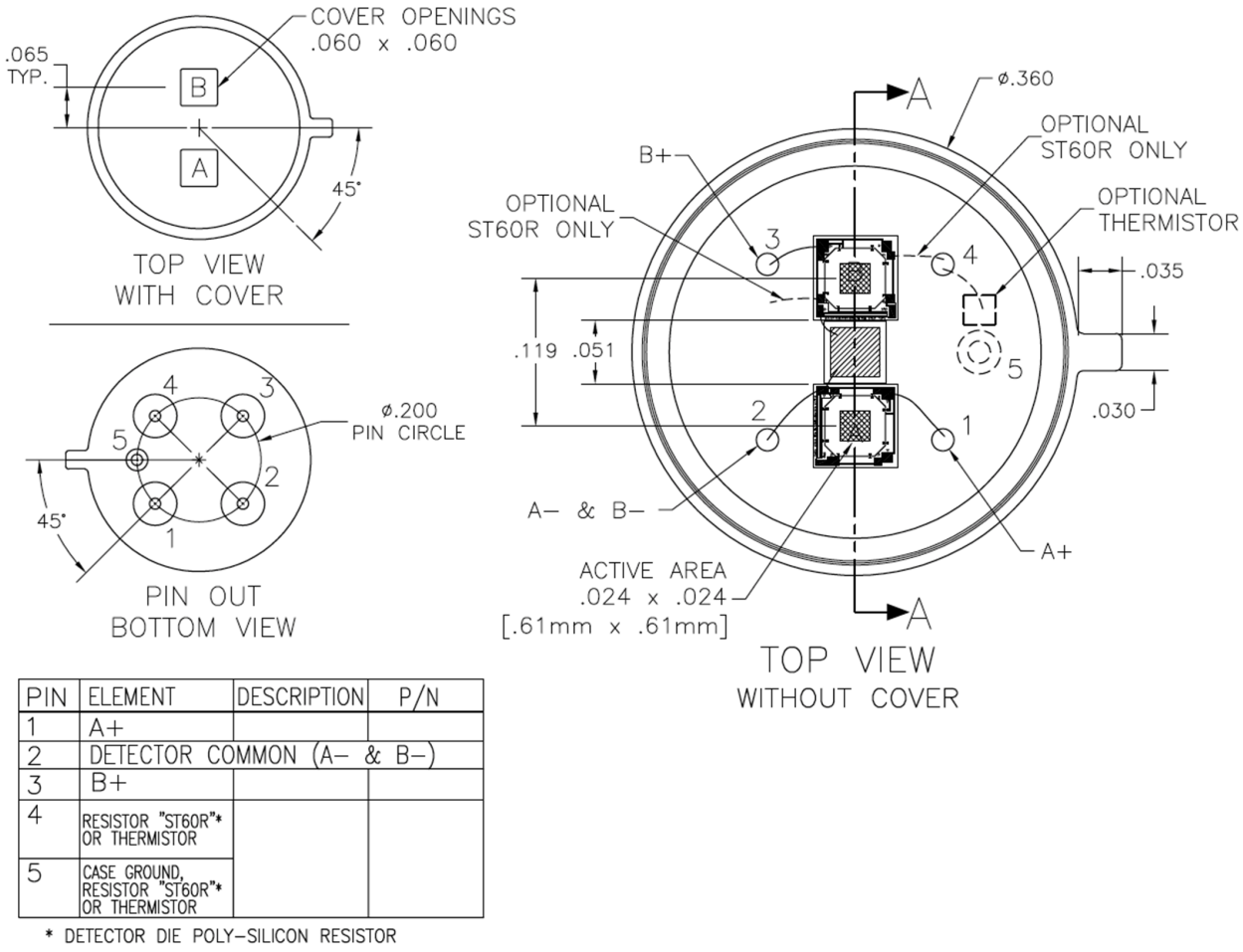
1. Specifications

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

Symbol	Parameter	Min	Typ.	Max.	Unit	Comments[1]
AA	Active Area size		0.61 × 0.61		mm	Hot junction size, per element.
A	Element Area		.37		mm^2	
	Number of Junctions		80			Per element.
	Number of Channels		2			Per detector package.
V_s	Output Voltage	78	93	108	µV	DC, H = 330µW/cm^2 [2]
SNR	Signal-to-Noise Ratio	2305	2969	3981	√Hz	DC, SNR = V_s/V_n
R	Responsivity	63.5	75.7	88.0	V/W	DC, $\Re = V_s/HA$ [3]
R	Resistance	45	60	70	kΩ	Detector element
	Temperature Coefficient of $\Re$		-0.04		%/°C	Best linear fit, 0° to 85°C [4]
	Temperature Coefficient of R		0.11		%/°C	Best fit, 0° to 85°C [4]
V_n	Noise Voltage	27.1	31.3	33.8	nV/√Hz	$V_n^2 = 4kTR$
NEP	Noise Equivalent Power	0.31	0.41	.53	nW/√Hz	DC, NEP = V_n HA/V_s [3]
D*	Detectivity	1.15	1.47	1.98	10^8cm√Hz/Ω	DC, D* = V_s/ V_n H√A [3]
T	Time Constant		18		ms	Chopped, -3dB point [4]
FOV	Field of View		24°/52°		Degrees	For FOV description, see Package Outline Drawings
M	Element Matching		5	10	%	$\mathcal{M} = \lvert V_A - V_B \rvert / V_B$ [3]
	Element Separation		3.02		mm	Center to center
	Package Type		TO-5			Standard package hole size: 0.060” × 0.060”
T_a	Operating Temperature	-50		+100	°C	
	Reference Filter, Central Wave Length		3.920		µm	Element A
	CO2 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.

2. Package Outline Drawings



PIN	ELEMENT	DESCRIPTION	P/N
1	A+		
2	DETECTOR COMMON (A– & B–)		
3	B+		
4	RESISTOR "ST60R"* OR THERMISTOR		
5	CASE GROUND, RESISTOR "ST60R"* OR THERMISTOR		

* DETECTOR DIE POLY–SILICON RESISTOR

Figure 1. Package Outline Drawings – Top View

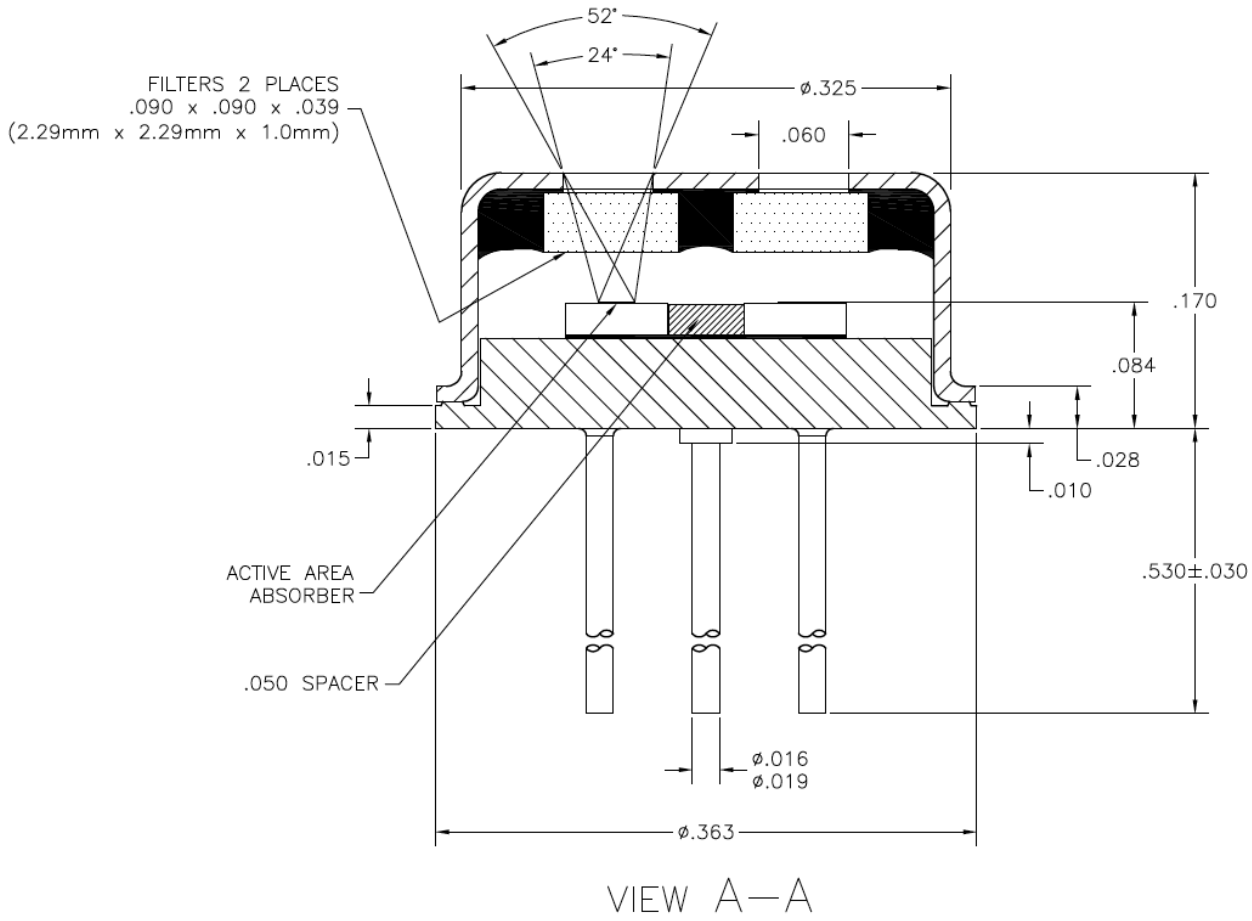


Figure 2. Package Outline Drawings – Side View

3. Ordering Information

Orderable Part Number	Package	Temperature	Carrier Type
RH5Z0622D20GZO#ADO	9.22mm TO-5 package	-50 to +100°C	Tray

4. Revision History

Revision	Date	Description
1.00	Aug 31, 2021	Initial release.

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