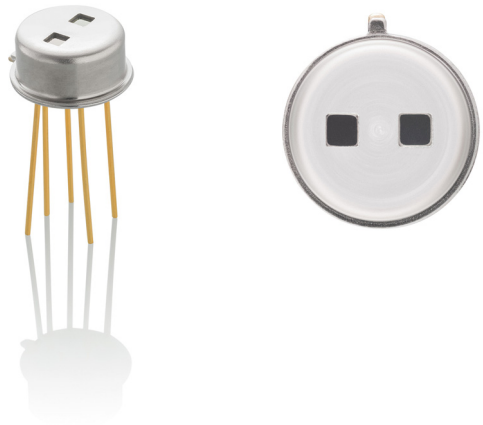
# RTD60D

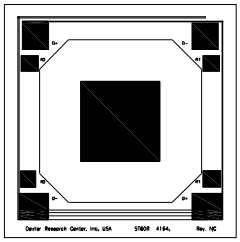
Silicon-Based Thermopile Detector 60 Dual

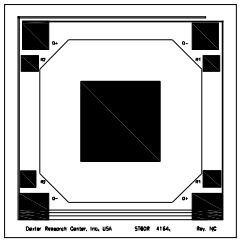
The RTD60D is a two-channel silicon-based thermopile detector in a TO-5 package. The device offers a low-cost solution, with a small active area and fast response, with a time constant of 18ms with Nitrogen encapsulation gas.

## 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

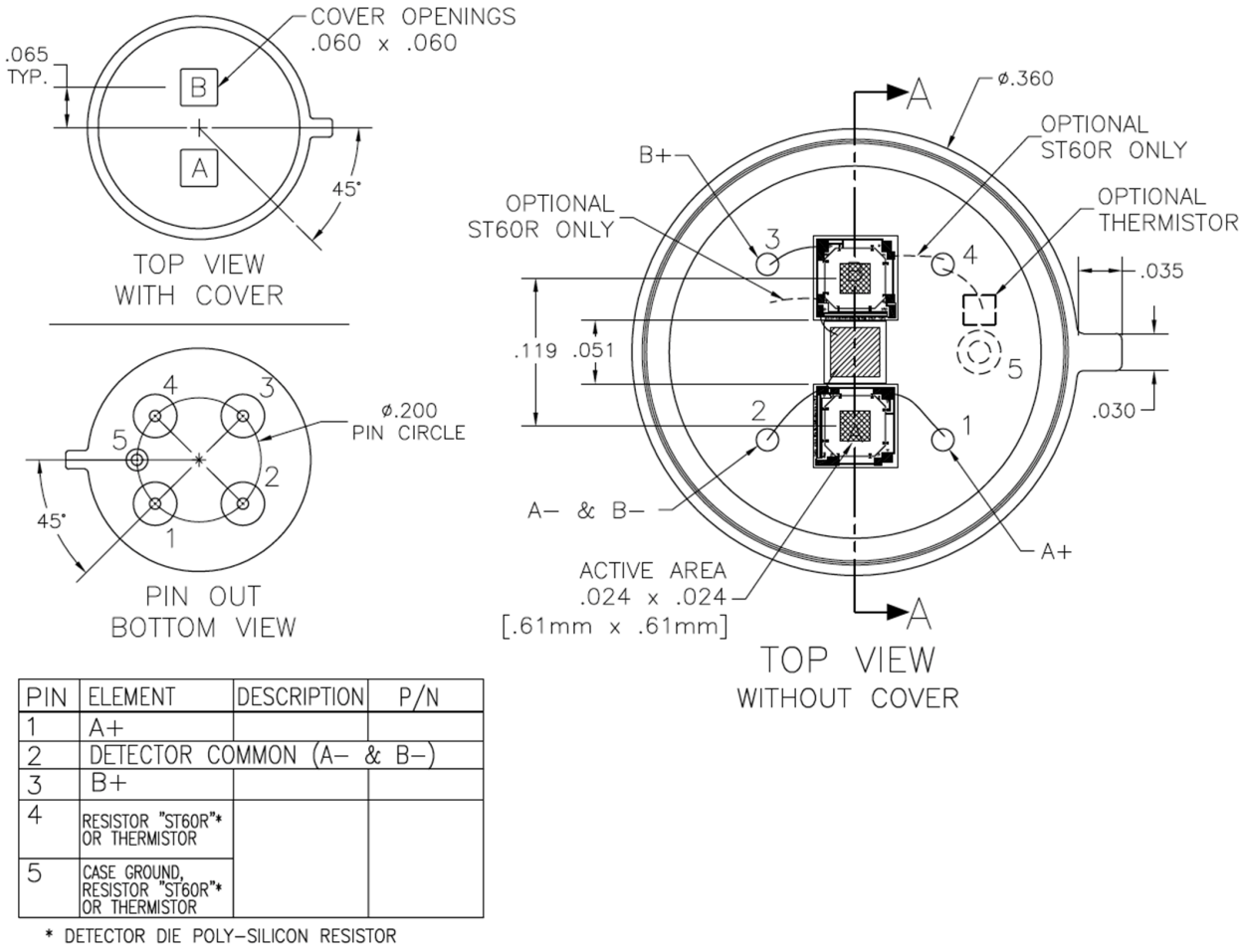
# 1. Specifications

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 | $10^8$cm√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**

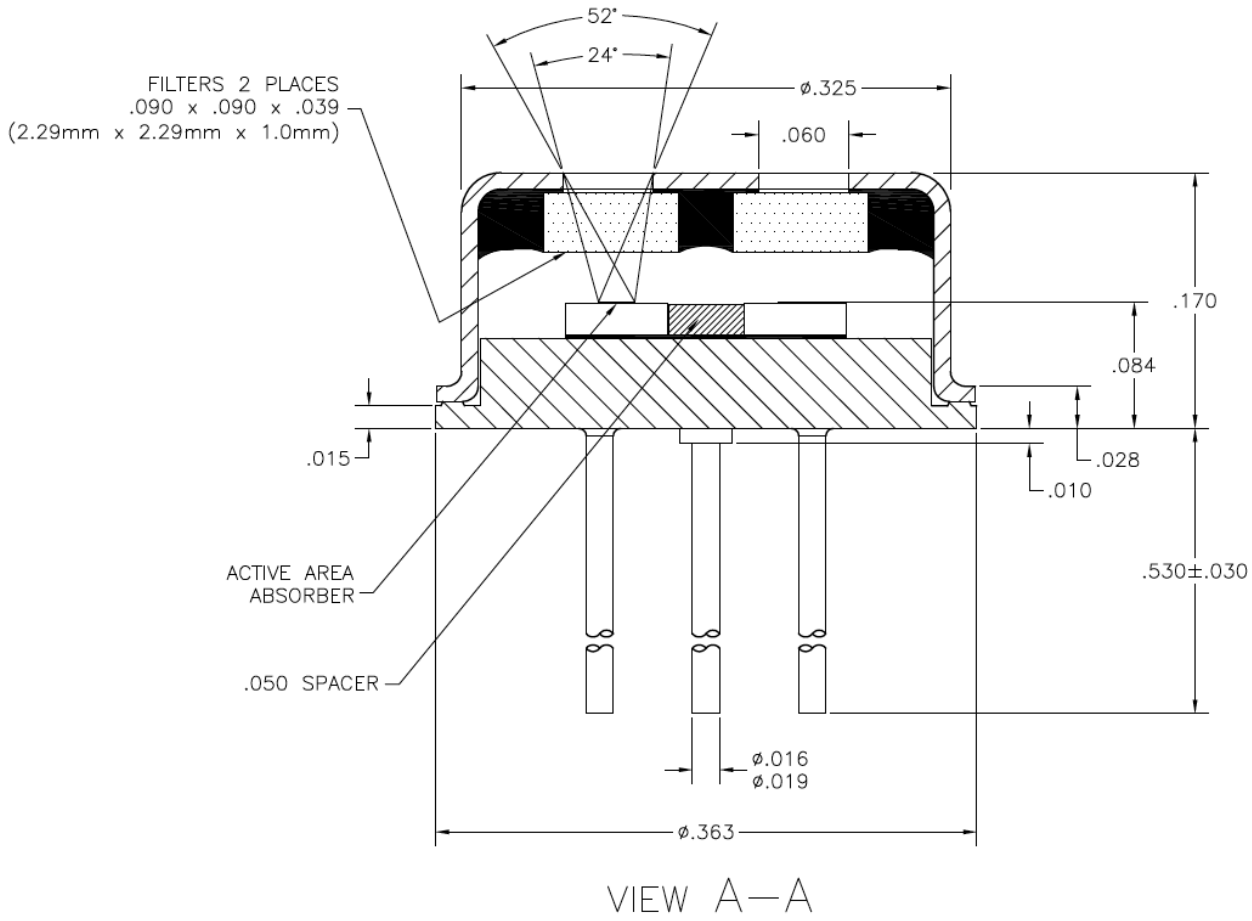



**Figure 2. Package Outline Drawings – Side View**

# 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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### Corporate Headquarters

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


### Contact Information

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