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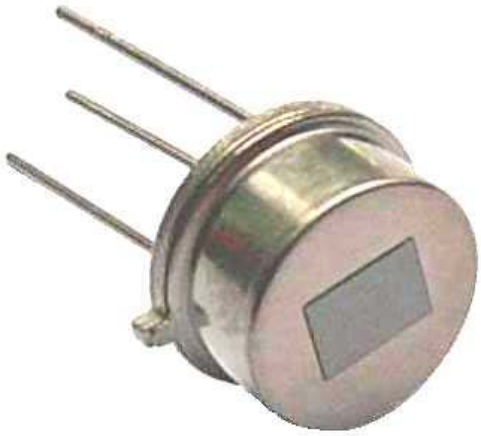
KUBE Electronics AG

KUBE AR172 Wideband Dual Pyroelectric Sensor

for flame detection and gas analysis applications in the 3 to 5 micron band.



Features:

- Two physically separated sensing elements (series opposed dual)
- Radiation falling on both active areas simultaneously is cancelled
- TO-5 style sealed metal housing
- Includes JFET and optical filter window
- Optical bandwidth 3 to 5 Microns fits most flame detection and gas analysis applications
- Excellent long term stability. Proven reliability under high humidity conditions
- Low cost due to high volume production
- RoHS conform

Remarks:

- One element can be covered to avoid signal cancellation (see drawing)
- Low noise / low false alarm rate
- A gas-specific optical narrow band filter can be mounted in front of the sensor (required size min 3 x 4 mm)

Characteristics	Value	Unit	Test Conditions
Element size (typ)	1.0 x 2.0	mm	nominal, each
Element spacing (typ)	1.0	mm	Nominal
Optical wavelength	1.5 ... 25	µm	3 … 5 µm ≥90% avg.
Responsivity (typ)	2700	V/W	3 … 5 µm @ 1Hz
Common mode rejection ratio (typ)	15:1 min 1:7		3 … 5 µm @ 1Hz
Noise (typ)	5.1	$\mu V/\sqrt{Hz}$	1.0 Hz rms, 1Hz
Operating voltage	2.2 ... 10	V_{dc}	V_D to Ground
Offset voltage	0.3 ... 1.2	V_{dc}	R_S = 100 kΩ
Operating drain current	0.2 … 10	µA	(recommended range)
Thermal breakpoint f_T (typ)	0.2	Hz	
Electrical breakpoint f_e (typ)	0.05	Hz	
Field of view (horizontal)	138	degrees	from center between sensing elements
Field of view (vertical)	~125	degrees	
Window Filter size	4.0 x 3.0	mm	
Operating temperature	-20 ... +50	°C	-30...+70° with precautions
Storage temperature	-40 ... +80	°C	change < 50°C / minute

Recommendations:

- A source resistor is needed to set the drain current and consequently the operating parameters of the internal JFET. A 47 kΩ or greater value resistor is recommended. For low power applications (0.2 µA), a source resistor of 3.3 MΩ can be used.
- The supply voltage must be stabilized (free of voltage steps and low frequency variations). This is best accomplished with a regulator or voltage reference chip, and RC filtering.
- Careful circuit board layout, short connections and shielding may be required for adequate RF immunity.
- For best quality, use well controlled hand soldering for pyroelectric sensors.
  Wave soldering is not recommended. Avoid mechanical stresses on the leads.
- If needed, clean window with alcohol to remove flux and fingerprints.
- Do not apply varnish, lacquer, silicone or other transparent coatings on window, as these materials will not transmit IR.
- Optical filter window transmission optimized from 3 to 5 Microns, see graph

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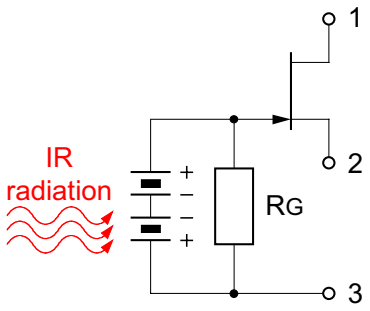
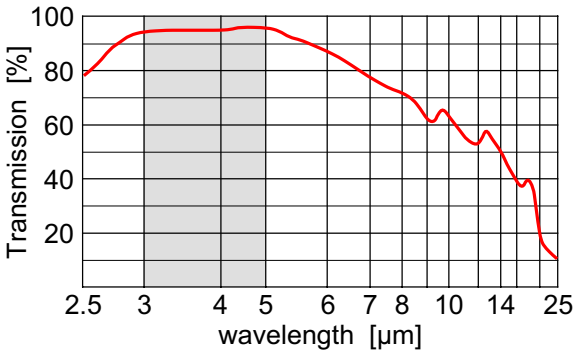
Internal circuit and pinout:

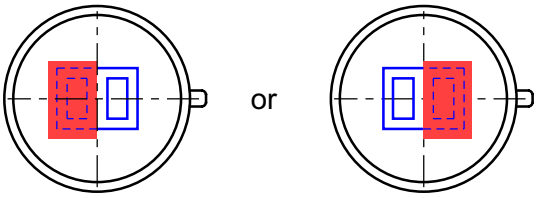


1 Drain (V_D)
2 Source
3 Ground

Spectral response

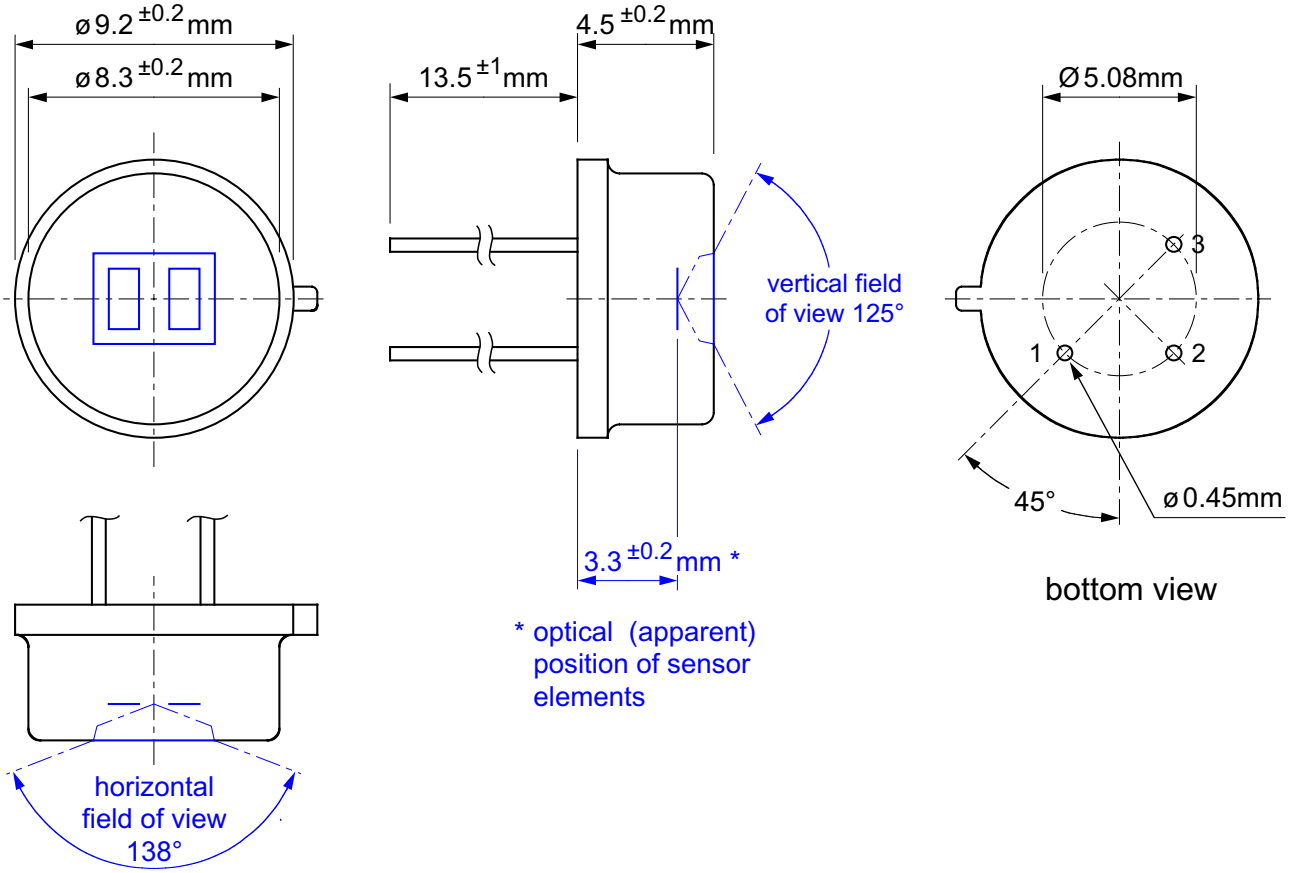


When AR172 is used for flame detection or gas analysis, one sensing element serves for temperature compensation only and must be covered to prevent from common mode cancelling.



(either side possible)

Drawing and Field of View:



* optical (apparent) position of sensor elements

bottom view