QDC Pyroelectric Infrared Food, General IR Spectroscopy & Oil Monitoring Sensors, Analog

Overview

KEMET's QDC thin film pyroelectric food sensors can be reduced in physical size and still provide high sensitivity with fast frequency operation, enabling this highly stable 2 element sensor in a TO39 package.

The sensor element is built into a low noise circuit that has an internal CMOS operational amplifier with a 10 GΩ feedback resistor outputting a voltage signal centered around half the supply rail.

For additional sources of information, please refer to the Environmental Sensors page on KEMET.com

Applications

- Food (nutritional value, adulteration, decay)
- Breath (medical, automotive, consumer)

Benefits

- Fast, stable response over a wide operating frequency range
- 2 sensor elements in one package
- TO39 package
- Analog output
- Integrated operational amplifier



Ordering Information

USE	QDC	D	A	FAT1	0	0
Product Family	Series	Sensor Type	Mounting Type	Specification	Packaging	Version
Sensors	QDC = TO39 IR Food, General IR Spectroscopy and Oil Monitoring Sensors	D = Dual	A = Sensor only	FAT1 = Fat LAC1 = Lactose PAL1 = Protein and Lactose PRT1 = Protein SUG1 = Sugar, Ethanol	0 = Bulk	0

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Environmental Compliance

All KEMET Food Sensors are RoHS and REACH Compliant.



Article 33(1) of the REACH Regulation states that manufacturers and importers of articles (products) are required to notify their customers of the presence of any Substances of Very High Concern (SVHC) in their products exceeding 0.1% by weight and provide instructions on safe use of the product.

KEMET Corporation reports regarding the Article 33(1) of REACH Regulation as follows:

1. Applicable Product: Food Sensors (QFC & QFS series)

2. Report for the content of REACH SVHC list:
The product(s) above contains a substance by more than 0.1wt% per product weight that was published in the 8th update of the REACH SVHC substances (December 19, 2012).

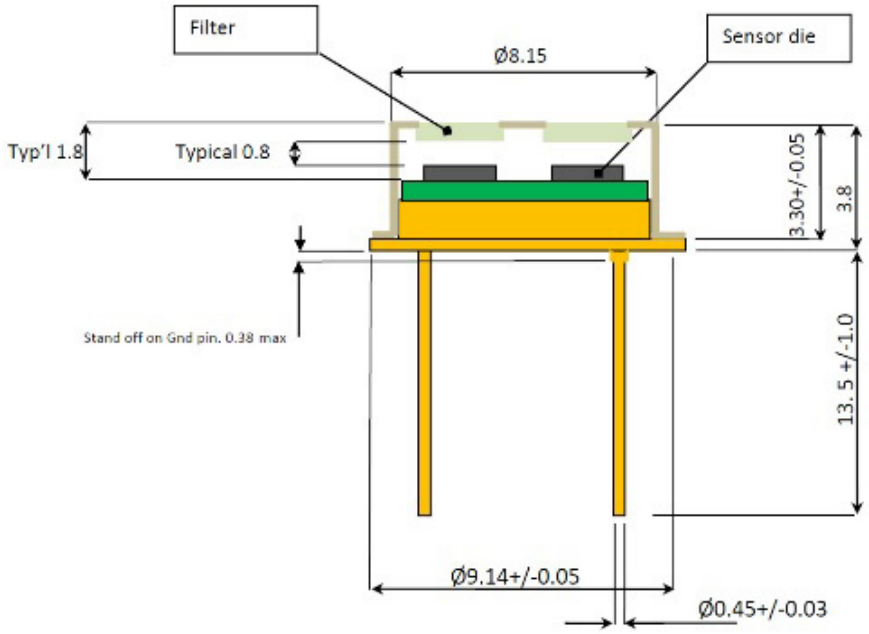
3. Regarding the safety of the food sensors (Piezoceramic products):
The Piezoceramic that is used in this product becomes ceramic by sintering powder containing PZT as the main ingredient. It is chemically stable, with minimum risks toward the human body or environment within the intended use of the product. Please note that risks could occur in the case of inhalation or accidental oral uptake of powder ceramics.

4. Technical product information on the food sensors (Piezoceramic products):
The manufacturing technique of the "piezoceramic products" whose main ingredient is Lead Titanium Zirconium Oxide (PZT) has been established, and there is no alternative material that can exhibit superior performance than PZT at this moment. Please note that the piezoceramic is listed as an exempt on RoHS (2011/65/EU) AnnexIII (7c.1).

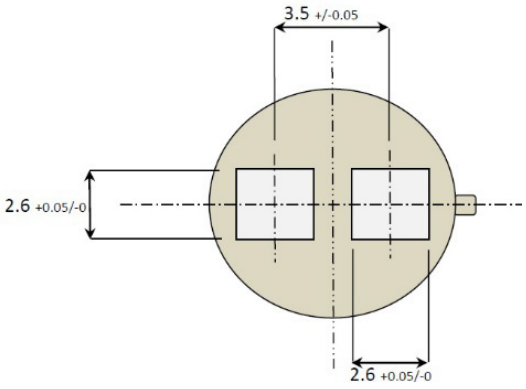
5. The responsibility of piezoceramic manufacturers:
Piezoceramic manufacturers report information regarding PZT containment in their products to the customers to obey the article 33 of the REACH regulation.

Dimensions – Millimeters

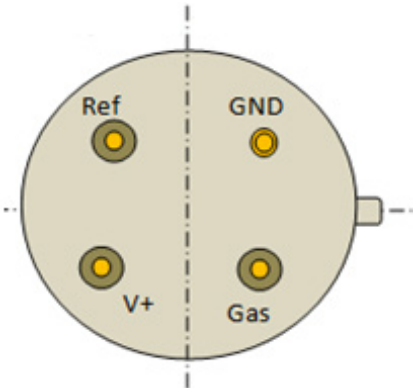
Cross Section View



Top View

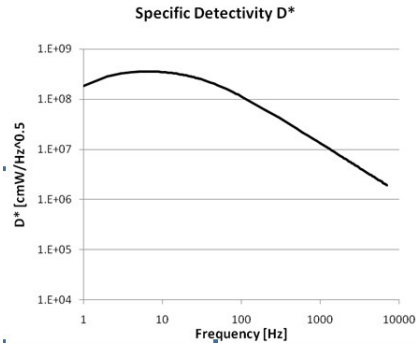


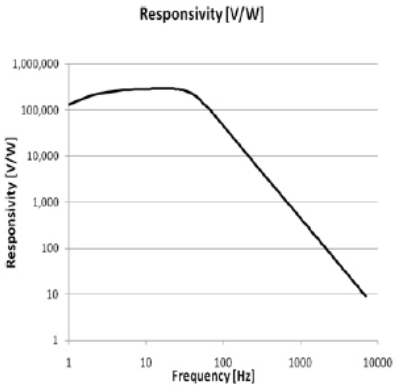
Bottom View

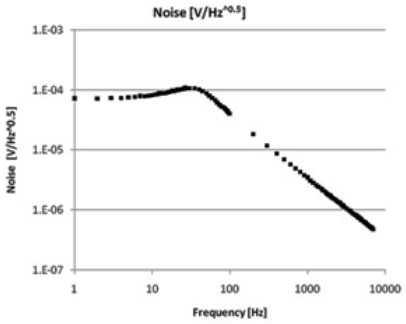


Performance Characteristics

Frequency Characteristics







Part Number Specifications

Sensor Characteristics

Filter Aperture (mm)	Element Size (µm)	Package	Responsivity[1] (V/W)	D*[1] (cm√Hz/W)	Noise[1] (µV√Hz)
2.6 x 2.6	1,000 x 1,000	TO39	150,000	3.5 x 10^8	Mean 70

[1] 10 Hz, 500 K, room temperature, without window and optics.

Electrical Characteristics

Maximum Voltage[1] (V)	Minimum Voltage (V)	Microphonics (µV/√Hz) at 10 Hz	Time Constant (ms)	Operating Temperature Range (°C)	Storage Temperature Range (°C)
8	2.7	S_{vib} ~2	~12	−40 to +85	−40 to +110

[1] Absolute maximum operating voltage.
Output voltage normalised around mid-rail.
Operational amplifier with 10 GΩ feedback resistor.

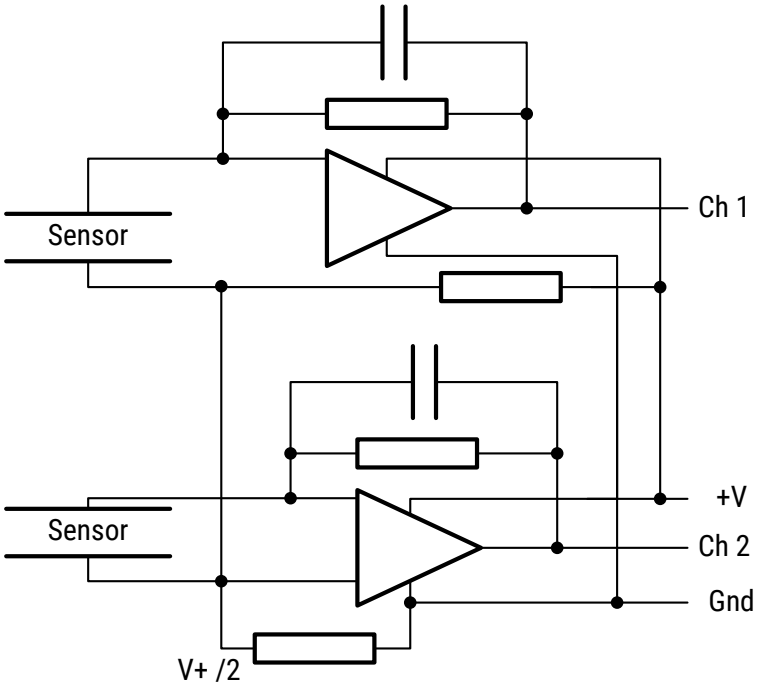
Part Number

Part Number	Filter - CWL µm/(HPB nm)		Use	Weight (gr)
	Channel 1	Channel 2		
USEQDCDAFAT100	Fat Reference - 5.60/(80)	Fat - 5.73/(80)	Fat	0.97
USEQDCDALAC100	Lactose Reference - 7.70/(140)	Lactose - 9.61/(150)	Lactose	0.97
USEQDCDAPAL100	Protein - 6.46/(130)	Lactose - 9.61/(150)	Protein and Lactose	0.97
USEQDCDAPRT100	Protein Reference - 6.70/(120)	Protein - 6.46/(130)	Protein	0.97
USEQDCDASUG100	Reference - 5.0 Long Pass	Sugar, Ethanol - 9.50/(400)	Sugar, Ethanol	0.97
USEQGCCAC82L00 [1]	CO_2 - 4.26/(180)	–	CO_2	0.93
USEQGCDAC82L00 [1]	Reference - 3.91/(90)	CO_2 - 4.26/(180)	CO_2	0.97
USEQGCDAC82M00 [1]	Reference - 3.70/(110)	CO_2 - 4.26/(180)	CO_2 (Medical)	0.97
USEQGCDAC82100 [1]	Reference - 4.90/(130)	CO_2 - 4.26/(180)	CO_2 (Medical)	0.97
USEQGCCAC82N00 [1]	CO_2 - 4.30/(110)	–	CO_2 (Narrow)	0.93
USEQGCDAC82N00 [1]	Reference - 3.91/(90)	CO_2 - 4.30/(110)	CO_2 (Narrow)	0.97
USEQGCCAC82S00 [1]	CO_2 - 4.43/(60)	–	CO_2 (Special)	0.93
USEQGCDAC82S00 [1]	Reference - 3.91/(90)	CO_2 - 4.43/(60)	CO_2 (Special)	0.97
USEQGCCA50L100 [1]	Broadband - 5.0 Long Pass	–	Broadband for bespoke filters	0.93
USEQGCDA50L100 [1]	Broadband - 5.0 Long Pass	Broadband - 5.0 Long Pass	Broadband for bespoke filters	0.97
USEQGCDASF6100 [1]	Reference - 3.91/(90)	SF_6, Ethylene - 10.6/(240)	SF_6, Ethylene	0.97

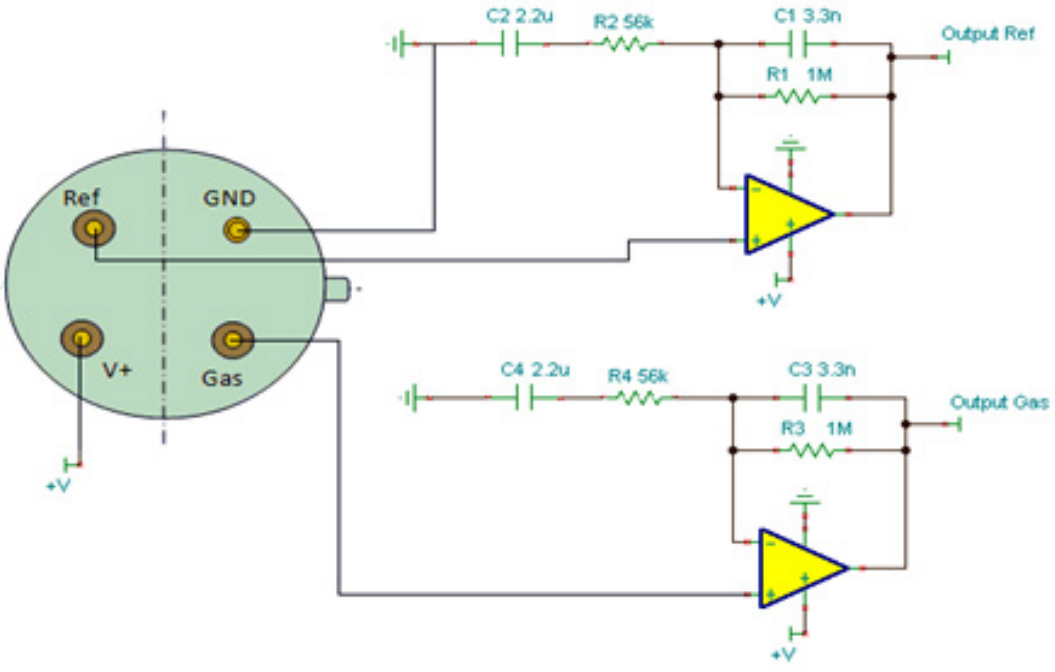
[1] From the QGC Gas Sensors series, used for gas and gas flues analysis.

Part Schematic

Internal Schematics



Recommended Circuit Diagram



Packaging

Series	Packaging Type	Pieces per Tube
QDC	Tube	50

Handling Precautions

Pyroelectric Infrared Sensors should be kept away from indirect and direct sunlight, the headlights of cars, wind, and exposure to strong vibration and strong shock.
Do not use in water, alcohol ETA, corrosive gas or under sea breeze.
Do not be expose to corrosive substances.
Do not drop or apply any mechanical stress.

The performance of this device can be affected by ESD. Precautions should be used when handling and installing the sensor. Precision devices such as this sensor can be damaged or caused not to meet published specification due to ESD. Please note that there is limited ESD protection built-in as the device is optimised for low power consumption and low noise operation. Human Body Model (HBM), per JS-001: 2,000 V.

Pyroelectric Infrared Sensors should be stored in normal working environments.
Solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long-term storage.

KEMET recommends that ambient storage conditions are < 30°C and < 60% relative humidity and that maximum storage temperature does not exceed 110°C. Atmospheres should be free of chlorine and sulfur-bearing compounds.
Temperature fluctuations should be minimized to avoid condensation on the parts.

For optimized solderability sensors stock should be used promptly, preferably within 24 months of receipt.

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