

VOC Sensor

Type P metal oxide sensor VOC-M

31 VOC-P31 VOC-A31



foreword

This sensor is a broadband total volatile organic compounds (Total VOC) detector. When considering PID costs, this sensor can be used to detect VOCs in the range of 10-50 ppb, depending on the type of VOC.

Unlike the common n-type sensor, this metal oxide sensor has a large dynamic range, repeatable response, is less affected by humidity, and increases in resistance to most VOCs.

The change in resistance is converted into an output voltage through a simple electrical circuit. Although the sensor can operate in constant temperature/constant pressure mode, it responds best when cycling between 400°C (induced temperature) to 525°C (reset temperature). See application notes for details.

function

scope	The isobutylene measurement limit that ensures	1~100
Sensor resistor (R_0)	product performance (ppkΩ (50% RH, 23(± 2)°C)	220 ±45
Sensor resistance ratio ($R_g/R_0 * 100\%$)	%; isobutylene @ 10ppm in air	285 ±30

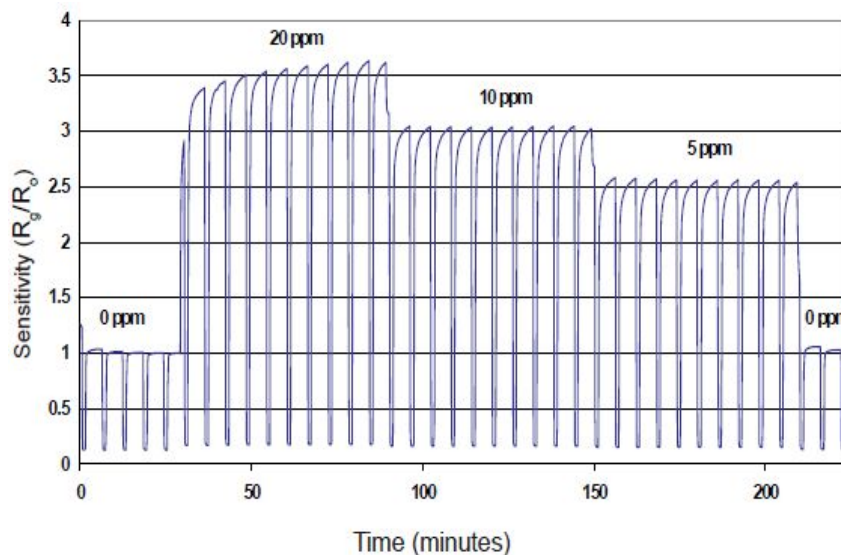
Gas response relation ($R_g/R_0 - 1 = \sum k_i \times \text{Concn}$)		0.5 +/- -10% (k for isobutene)
where K_i = constant for gas i; $n=1$ or 0.5		0.5 (n for isobutylene)

Heating resistor (RH @ RT)	Ω (23±1 °C)	10 ±1.5
Heating resistor (RH @ sensing temperature)	Ω (400±10 °C)	22 ±3
Heating resistor (RH @ reset temperature)	Ω (525±10 °C)	26 ±3
Typical heater power consumption (mW) at 5:1 cycle	$V_H = 2.7 \pm 0.2V$ (400°C)	340 ±30
	$3.7 \pm 0.3V$ (525°C)	530 ±50
operating temperature range	°C	-20~120

Sensitivity to other gases

EtOH sensitivity	Gas sensitivity percentage measured at 10	TBA
C ₃ H ₈ sensitivity	ppmEtOH and 500ppmC ₃ H ₈	TBA

Sensitivity at 10-20 Ppm Isobutylene

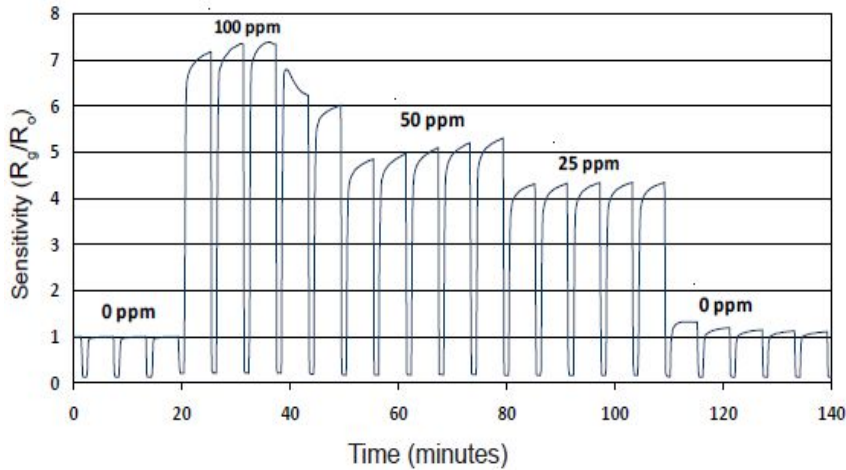


The left figure shows the sensor sensitivity at 20ppm, 10ppm and 5ppm at 50% RH. The sensor operates in two temperature modes: 400 °C Sustained 5min and 525°C sustained 1min (cyclical pulse)

VOC Sensor P-Type Metal Oxide Sensor Performance Data

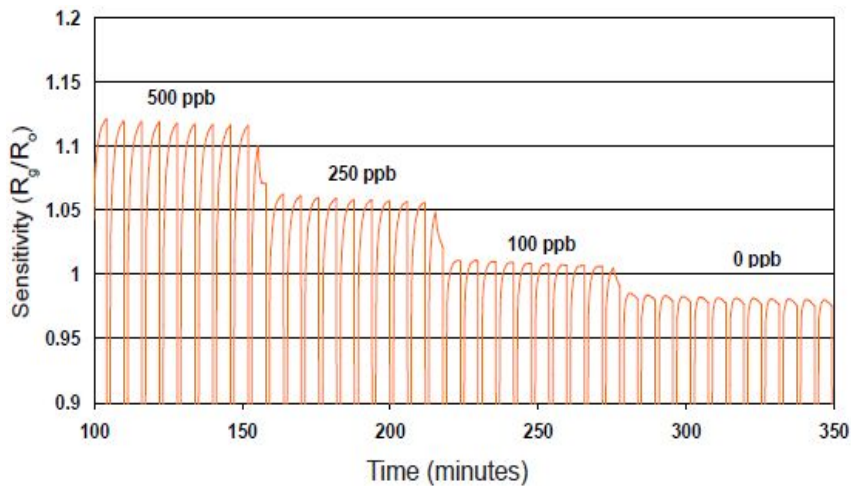


Figure 2. Sensitivity at 0~100ppm Ethanol



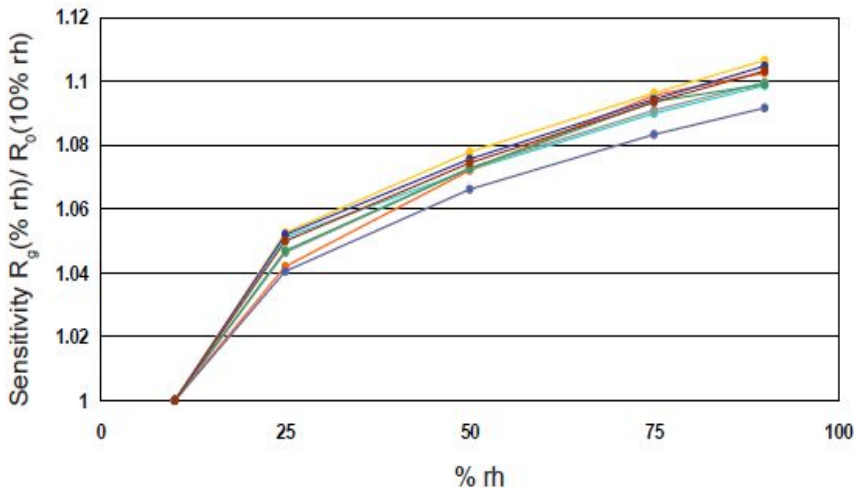
The left figure shows the sensor sensitivity at 100ppm, 50ppm and 25ppm at 50% RH. The sensor operates in two temperature modes: 400 °C 5min and 525°C 1min (cycling pulse)

Figure 3 Sensitivity at 0-500ppb Benzene



The left figure shows the sensor sensitivity at 500ppb, 250ppb and 100ppb at 50% RH. The sensor operates in two temperature modes: 400°C lasting 5 minutes and 525°C lasting 1 minute (cycling pulses).

Figure 4. Sensitivity at 23°C Humidity 10~90%



The left figure shows the sensitivity curve of the sensor in the range of 10%~90% RH. At this time, the sensor works in two temperature modes, and the ratio of induction (400°C) to reset (525°C) cycles is 5:1.

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