

## Description

The SGAS706 is a solid-state chemiresistor sensor designed to detect nitrogen oxides in air. The sensor uses an integrated heater with highly sensitive MOx material tailored for detection of nitrogen oxides.

## SGAGS706 Sensor



# Features

- Sensor detects very low NO<sub>x</sub> concentrations (<0.5 to 10 ppm)</li>
- Larger dynamic range available (5 to 100 ppm with modified heater input)
- Environmental temperature range of -20°C to 50°C
- Environmental humidity range of 0% to 90% RH, noncondensing
- Low dependence on flow rate

## **Applications**

- Outdoor Air Quality
- Breath Detection

## **Sensor Response Characteristics**

#### Figure 1. Typical Response Data for Sensors Operated in Clean, Dry Gas



The NO<sub>x</sub> sensor responds to most potential interferent vapors in the opposite direction from the NO<sub>x</sub> response. This includes carbon monoxide and VOCs. The sensor exhibits a small response to ozone in the same direction as NO<sub>x</sub>. The response to 0.1ppm ozone is less than the response to 0.1ppm NO<sub>2</sub>.



#### Figure 2. Sensitivity and Selectivity

# **Typical NO<sub>X</sub> Sensor Selectivity**

#### Table 1. Typical NO<sub>x</sub> Sensor Selectivity

Challenge Gas	Concentration	$R_g/R_a$ or $-R_a/R_g$
NO <sub>2</sub>	10ppm	200
NOx	10ppm	45
H <sub>2</sub>	100pm	-2.2
NH <sub>3</sub>	25ppm	-1.1
CO <sub>2</sub>	5%	No response
SO <sub>2</sub>	5ppm	No response
CH <sub>4</sub>	1%	No response

## **Pin Assignments**

#### Figure 3. Pin Assignments for SGAS706 Header – Top View



#### Table 2. Pin Descriptions

Pin Number	Name	Description	
1	Heater +	Positive input for $V_H$ heater voltage supply	
2	Sensor +	High-side of resistive sensor element; positive input for sensing voltage $V_C$	
3	Heater –	Negative (ground) input for $V_H$ heater voltage supply	
4	Sensor –	Low-side of resistive sensor element; connects to middle of resistor divider circuit and produces sensing voltage output ( $V_{OUT}$ )	

## **Electrical Characteristics**

Note: The specifications in Table 1 are typical values for NOx sensors. If the actual values differ, the customer will be notified with the shipment.

Note: All measurements were made in dry gas at room temperature. Specifications are subject to change.

 Table 3.
 DC Electrical Characteristics

Symbol	Parameter	Conditions	Minimum	Typical	Maximum	Units
Рн	Heater power consumption	V <sub>H</sub> = 4.7		500		mW
V <sub>H</sub>	Recommended heater voltage	T <sub>sensor</sub> = 200°C		4.7		VDC
R <sub>H</sub>	Heater resistance	At room temperature	28	30	32	Ω
Vc	Recommended sensing voltage	Recommended	2.5		5.0	VDC
Ra	Resistance in air		0.020		20	MΩ
R <sub>10</sub>	Resistance in 10 ppm NO <sub>2</sub>		0.002		10	GΩ
R <sub>10</sub> / R <sub>a</sub>	Sensitivity		100			

## **Basic Measurement Circuit**

The sensor can be operated using a simple voltage divider. This requires two voltage supplies: heater voltage ( $V_H$ ) and circuit voltage ( $V_C$ ).  $V_H$  is applied to the heater in order to maintain a constant, elevated temperature for optimum sensing.  $V_C$  is applied to allow a measurement of the output voltage ( $V_{OUT}$ ) across a load resistor ( $R_L$ ).

#### Figure 4. Basic Measurement Circuit



Pins 1 and 3 are attached to the heater. Apply  $V_H$  across these pins.

Pins 2 and 4 are attached to the resistive sensor element. Connect these pins in the measuring circuit. IDT supplies basic measurement circuitry for many of our sensors. Contact your local sales representative for more information.

## **Sensor Resistance Calculation**

Sensor resistance (R<sub>S</sub>) is calculated using the following formula (see Figure 4):

$$R_S = \frac{V_C - V_{OUT}}{V_{OUT}} \times R_L$$

## **Package Drawing**

#### Figure 5. Package Outline Drawing and Dimensions



### **Ordering Information**

Orderable Part Number	Package	Shipping Packaging	Temperature
SGAS706	TO-39	Box	-20°C to +50°C

## **Revision History**

<b>Revision Date</b>	Description of Change	
November 9, 2016	Initial release with IDT branding.	



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