TGS 2612 - for the detection of Methane and LP Gas

Features:

* Low power consumption
* Similar sensitivity at same %LEL levels for both methane and LP gas
* Long life and low cost
* Uses simple electrical circuit

Applications:

* Residential LNG and LPG alarms
* Portable combustible gas leak detectors
* Detectors for LNG and LPG

The sensing element is comprised of a metal oxide semiconductor layer formed on an alumina substrate of a sensing chip together with an integrated heater. In the presence of a detectable gas, the sensor's conductivity increases depending on the gas concentration in the air. A simple electrical circuit can convert the change in conductivity to an output signal which corresponds to the gas concentration.

The TGS 2612 has high sensitivity to methane, propane and butane, making it ideal for LNG and LPG monitoring. Due to its low sensitivity to alcohol vapors (a typical interference gas in the residential environment), the sensor is ideal for consumer market gas alarms.

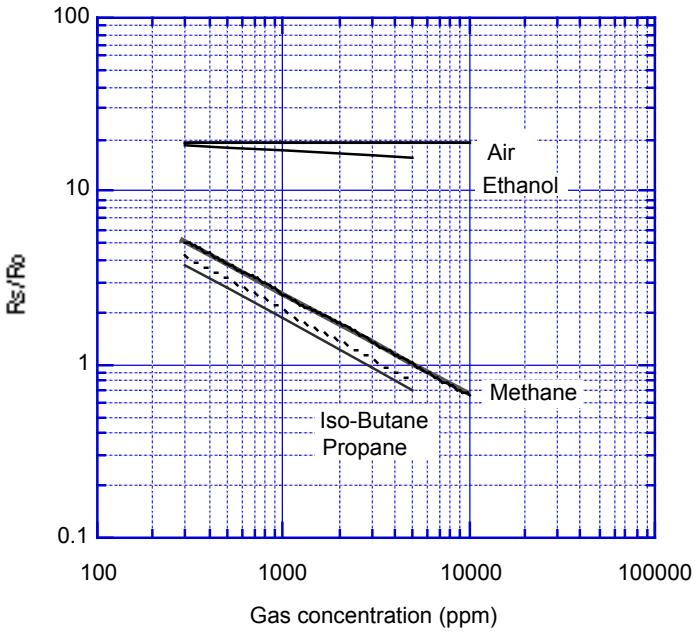
Due to miniaturization of the sensing chip, TGS 2612 requires a heater current of only 56mA and the device is housed in a standard TO-5 package.

The figure below represents typical sensitivity characteristics, all data having been gathered at standard test conditions (see reverse side of this sheet). The Y-axis is indicated as sensor resistance ratio (Rs/Ro) which is defined as follows:

Rs = Sensor resistance in displayed gases at various concentrations

Ro = Sensor resistance in 5000ppm of methane

Sensitivity Characteristics:

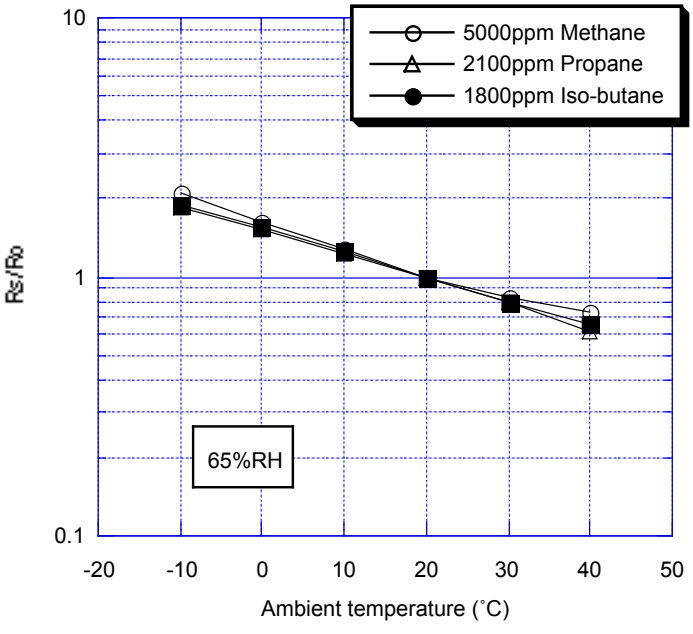


The figure below represents typical temperature and humidity dependency characteristics. Again, the Y-axis is indicated as sensor resistance ratio (Rs/Ro), defined as follows:

Rs = Sensor resistance at 10%LEL of each gas at various temperatures/65%RH

Ro = Sensor resistance at 10%LEL of each gas at 20°C and 65% R.H.

Temperature/Humidity Dependency:



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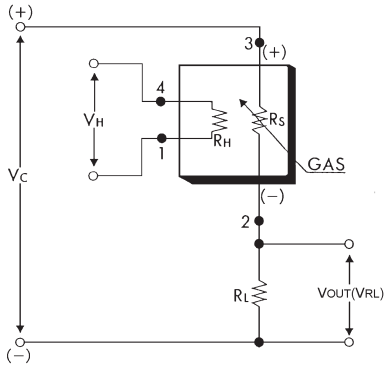
Basic Measuring Circuit:

The sensor requires two voltage inputs: heater voltage (V_H) and circuit voltage (V_C). The heater voltage (V_H) is applied to the integrated heater in order to maintain the sensing element at a specific temperature which is optimal for sensing. Circuit voltage (V_C) is applied to allow measurement of voltage V_{OUT}(V_{RL}) across a load resistor (R_L) which is connected in series with the sensor.

A common power supply circuit can be used for both V_C and V_H to fulfill the sensor's electrical requirements. The value of the load resistor (R_L) should be chosen to optimize the alarm threshold value, keeping power dissipation (P_S) of the semiconductor below a limit of 15mW. Power dissipation (P_S) will be highest when the value of Rs is equal to R_L on exposure to gas.



Specifications

Model number			TGS2612	
Sensing principle			MOS type	
Standard package			TO-5 metal can	
Target gases			Methane, propane, iso-butane	
Typical detection range			1 ~ 25%LEL of each gas	
Standard circuit conditions	Heater voltage	V_H	5.0±0.2V AC/DC	
	Circuit voltage	V_C	5.0±0.2V DC/AC	Ps≤15mW
	Load resistance	R_L	variable	0.45kΩ min.
Electrical characteristics under standard test conditions	Heater resistance	R_H	approx 59Ω at room temp.	
	Heater current	I_H	56±5mA	
	Heater power consumption	P_H	280mW	V_H=5.0V DC
	Sensor resistance	R_S	1.0 ~ 10.0kΩ in 5000ppm methane	
	Sensitivity (change ratio of Rs)		0.50~0.65 in methane	$\frac{Rs\ (9000ppm)}{Rs\ (3000ppm)}$
Standard test conditions	Test gas conditions		Methane, propane, iso-butane in air at 20±2°C, 65±5%RH	
	Circuit conditions		Vc = 5.0±0.01V DC V_H = 5.0±0.05V DC	
	Conditioning period before test		7 days	

The value of power dissipation (P_S) can be calculated by utilizing the following formula:

$$P_S = \frac{(V_C - V_{RL})^2}{R_S}$$

Sensor resistance (Rs) is calculated with a measured value of V_{OUT}(V_{RL}) by using the following formula:

$$R_S = \left(\frac{V_C}{V_{RL}} - 1\right) \times R_L$$

Structure and Dimensions: