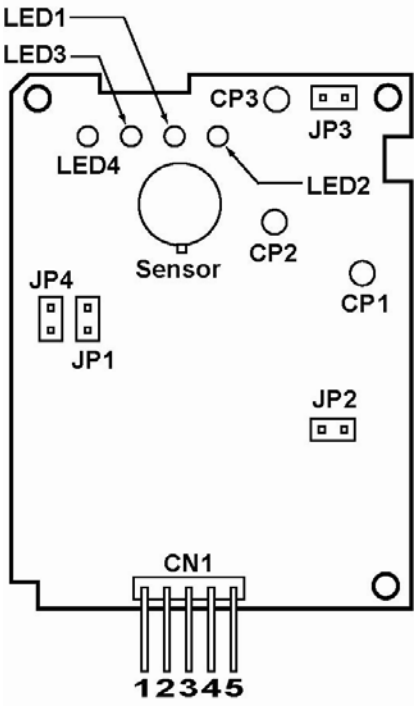
Evaluation Module for TGS3870 - EM3870

In order to simplify testing of the sensor, the output signal can be obtained continuously with this evaluation module. As the driving mode of TGS3870 is cyclic heater control and intermittent detection, the periodically sampled sensor response is converted into continuous output voltage of the same value through the software in the microprocessor.

A. Configuration



JP1	OPEN	SHORT
JP2	OPEN	SHORT
JP3	OPEN	SHORT
JP4	OPEN	SHORT

Please check jumper sockets as above.

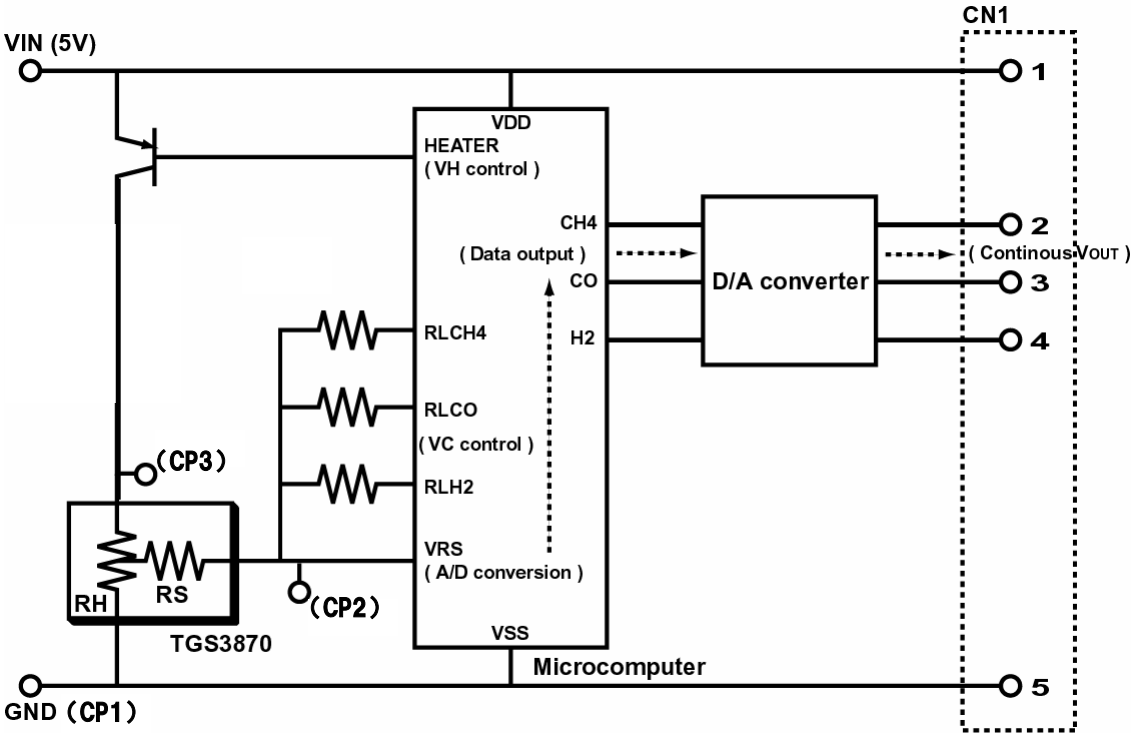
CN1 pin assignment

No.	Name	Description	Specification
1	VIN	Power supply input	DC 4.9 – 5.1 V
2	VOUT1	Sensor output for methane detection	
3	VOUT2	Sensor output for carbon monoxide detection	
4	VOUT3	Sensor output for hydrogen detection	
5	GND	Ground	

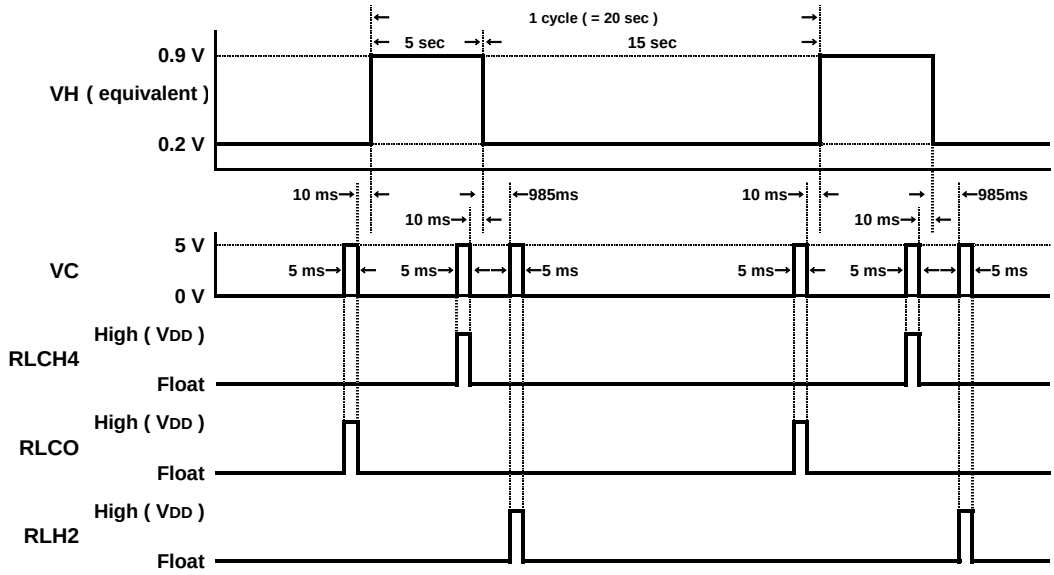
Note) In normal operating, green LED should be lighting on when power is applied to the module. But in malfunction of the module as a broken of heater wire and sensor wire, yelow LED should be flashing.

Trouble	LED flashing
Sensor breakage	Two times per sec.
Heater breakage	One time per sec.

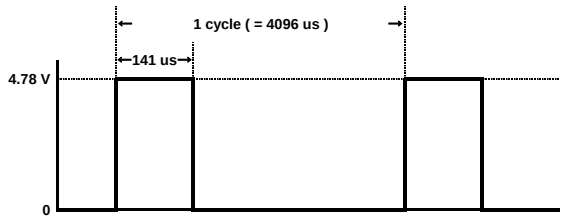
B. Basic circuit



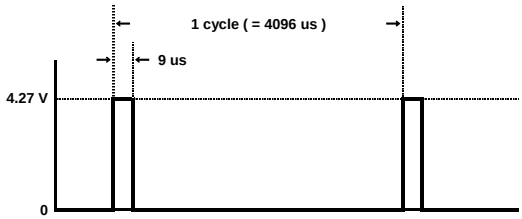
C. Timing chart



VH Contorol by PWM



VHH : equivalent to DC 0.9 V



VHL : equivalent to DC 0.2 V

D. Calculation from measured V_{OUT} to sensor resistance (RS)

$$RS = \frac{VC - V_{OUT}}{V_{OUT}} \times RL$$

Methane detection : $$RS = \frac{5.0 - V_{OUT1}}{V_{OUT1}} \times 1.00 \quad [\ k\Omega\ ]$$

Carbon monoxide detection : $$RS = \frac{5.0 - V_{OUT2}}{V_{OUT2}} \times 3.30 \quad [\ k\Omega\ ]$$

Hydrogen detection : $$RS = \frac{5.0 - V_{OUT3}}{V_{OUT3}} \times 1.00 \quad [\ k\Omega\ ]$$

RLCH4	1.00 kΩ
RLCO	3.30 kΩ
RLH2	1.00 kΩ

Note) The VOUTs can be obtained by measuring the voltage between CN1 #5pin and each pin (see "CN1 pin assignment"). The input impedance of the equipment connected to the CN1 must be more than 1 Mohm in order to make precise data acquisition. The VOUTs value update every 1 cycle (20 seconds).

E. Caution

a) Evaluation use only

Don't use this module except to evaluate TGS3870.

b) Power supply

Please apply correct voltage to #1 pin of the CN1. If much higher or negative voltage is applied, it probably causes malfunction of the module. Because this module doesn't have circuit to protect the ICs and the sensor.