



VQ3 Series Combustible Gas Detector Elements

To be read in conjunction with "Introduction to Pellistor Gas Sensors" and Pellistor Application Notes 1, 2, 3, 4, 6 and 7.

INTRODUCTION

The VQ3 is a catalytic flammable gas sensor (also called a pellistor) which consists of two matched elements. It may be used for the detection of a wide variety of combustible gases in air, at concentrations between 0% and 100% of the Lower Explosive Limit (LEL) of a given flammable gas. The principles of operation of pellistor-type gas sensors are described in the e2v technologies Gas Sensors brochure. The VQ3, in particular, is a very well established sensor for general purpose use in fixed gas detection systems where low cost and stability are the primary considerations. A wide range of other pellistor type gas sensors is available from e2v technologies.

GENERAL CHARACTERISTICS

The information given below relates to the VQ3 operating in the recommended circuit shown in Fig. 1. The instrument designer should always be aware that the mounting arrangement and circuitry employed within an instrument design will often profoundly modify the performance of any gas sensor.

Operation	suitable for continuous or intermittent operation
Bridge supply	2.5 ± 0.1 V
Typical bridge current	330 mA
Minimum sensitivity	21 mV/% methane
Linearity (see note 1)	linear within 5% of reading up to 60% LEL (methane)
Repeatability	2% LEL (methane)
Response time (T ₅₀ , measured at 50% LEL methane)	2 seconds
Maximum methane concentration (see note 2)	10%
Typical long term drift (see note 3):	
zero	0.5 mV/month
span	2% signal/month
Outline	see page 2
Shock test	250 g, 5 blows in each plane
Vibration test	20 g, 24 cycles from 100 to 3200 Hz

MARKING

The active (detector) device may be identified by the bead itself being dark in colour and it has a red serial number written on its metal can. The compensator's bead is white and carries a black serial number written on its metal can.

NOTES

1. Further details of the linearity of pellistor-based gas sensors may be found in e2v technologies Pellistor Application Note 4, "Linearity corrections to Pellistor responses at high gas levels".
2. If the VQ3 is exposed to greater than 100% LEL concentration of a flammable gas whilst operating, the calibration of the instrument should be checked.
3. Some flammable gases and vapours, in particular silicones, some fuel additives and some sulphur-bearing compounds, can damage or 'poison' pellistors. The long-term drift data expressed above assumes that the sensor is not exposed to chemicals known to poison them. For more guidance, please refer to e2v technologies Pellistor Application Note 6, "Pellistor Poisoning".
4. The choice of 1 kΩ as the value for the balancing resistors in the bridge circuit shown in Fig. 1 is arbitrary, and assumes that the measuring device imposes a high impedance load across the signal terminals. The use of a measuring device imposing a lower impedance load across the output stage (for example a moving coil voltmeter), may require a lower value of balancing resistor to be fitted.
5. The elements are supplied as a matched pair, complete with a trimming resistor of the correct value which is not less than 39 Ω. The trimming resistor should be connected across the compensator element as shown in Fig. 1.

OPTIONS AVAILABLE

- VQ3 - Standard device, with stranded flexible leads.
- VQ3AA - Optimised for use with constant current circuitry operating at 300 mA.
- VQ3B - Supplied with pcb compatible leads.
- VQ3BJ - As VQ3B but supplied with size 1206 chip resistor instead of the standard wire ended resistor.

WARNING

To ensure safe operation, to satisfy regulatory bodies and to comply with the requirements of approval authorities, e2v technologies recommends that a suitable flame arrestor be used with the device.

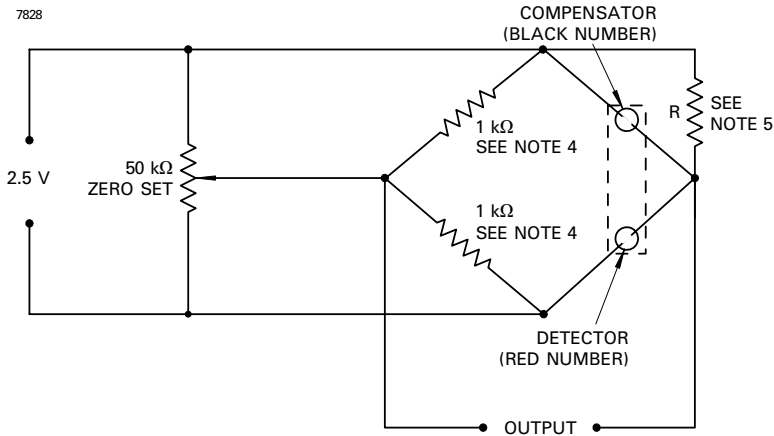
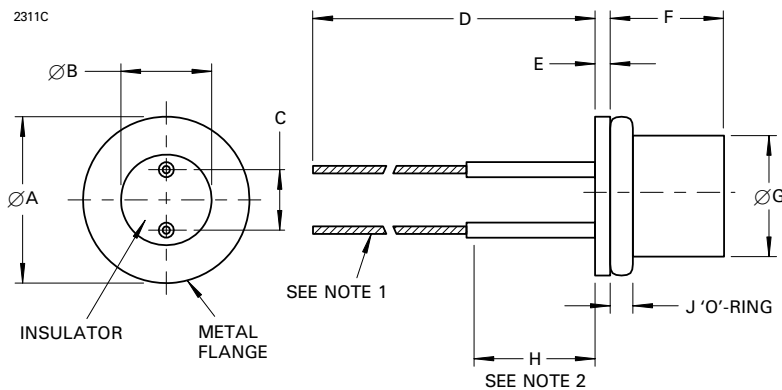


Fig. 1 Bridge Circuit

OUTLINE OF VQ3 AND VQ3AA (All dimensions without limits are nominal)



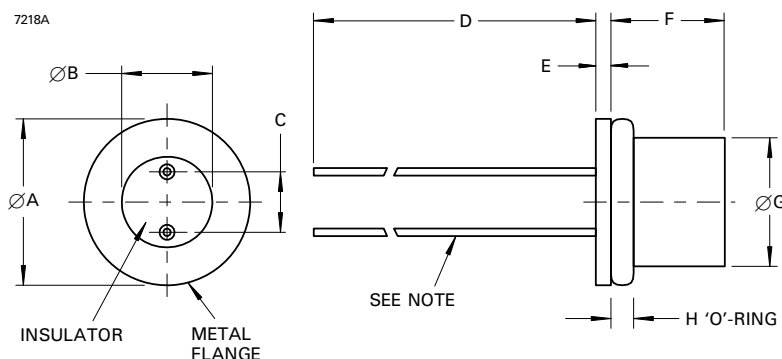
Ref	Millimetres	Inches
A	11.05 ± 0.25	0.435 ± 0.010
B	6.10 ± 0.25	0.240 ± 0.010
C	3.56 ± 0.13	0.140 ± 0.005
D	63.5 min	2.500 min
E	1.0	0.039
F	5.84 ± 0.51	0.230 ± 0.020
G	8.20 max	0.323 max
H	9.53	0.375
J	1.5	0.059

Inch dimensions have been derived from millimetres.

Outline Notes

1. The wire comprises 13 strands, each 0.2 mm across.
2. No bends may be made in this length.

OUTLINE OF VQ3B AND VQ3BJ (All dimensions without limits are nominal)



Ref	Millimetres	Inches
A	11.05 ± 0.25	0.435 ± 0.010
B	6.10 ± 0.25	0.240 ± 0.010
C	3.56 ± 0.13	0.140 ± 0.005
D	40.0	1.575
E	1.0	0.039
F	5.84 ± 0.51	0.230 ± 0.020
G	8.20 max	0.323 max
H	1.5	0.059

Inch dimensions have been derived from millimetres.

Outline Note

The wire comprises a single strand, 0.5 mm across.

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