

Keywords: resistance monitor, isolation, noisy environment, quad voltage monitor

## APPLICATION NOTE 4518

# Circuit Transfers Resistance Value Through Isolation Barrier

 By: Leo Sahlsten  
 Nov 18, 2010

*Abstract: This circuit monitors a resistance value in a noisy or otherwise hostile environment. Connected across the secondary winding of an isolation transformer, the unknown resistance reflects to the primary where it forms a voltage divider with a 2.2kΩ resistor. The divider produces a reduced-amplitude clock signal that is capacitively coupled, rectified, and filtered to produce a dc output voltage corresponding to the monitored resistance.*

A similar version of this article appeared in the April 24, 2008 issue of *Electronic Design* magazine.

The circuit of **Figure 1** can monitor resistance in a noisy or otherwise hostile environment. Isolation and good common-mode rejection ratio (CMRR) are provided by the transformer (T1).

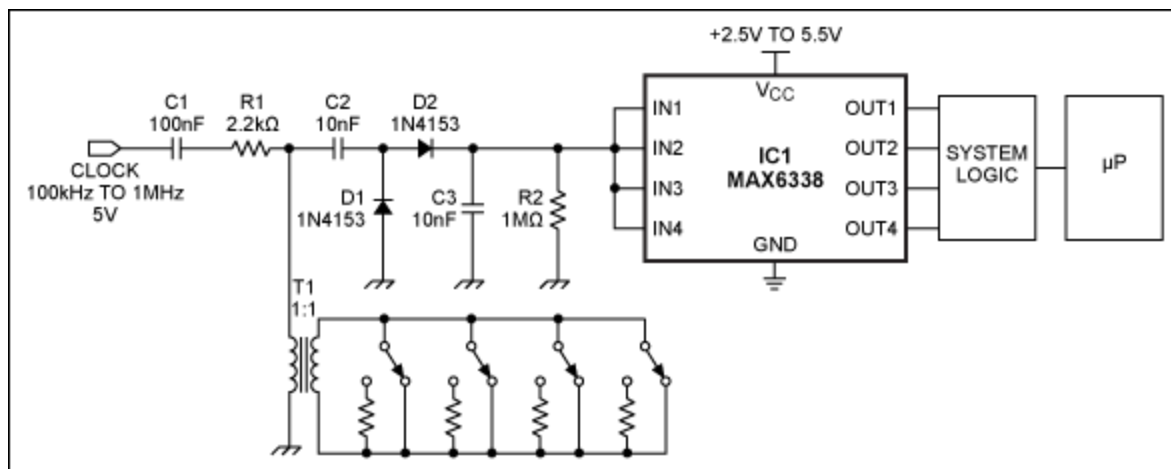


Figure 1. This circuit monitors the value of a galvanically isolated resistance.

Resistance across the secondary winding is reflected to the primary, where it forms a voltage divider with resistor R1. The divider produces a reduced-amplitude clock signal that is coupled through C2, rectified by D1 and D2, and filtered by C3 and R2. The result, at the inputs of the quad voltage monitor (IC1, MAX6338) is a dc voltage that varies with the monitored resistance as follows.

Secondary Resistance (kΩ)	VDC at IC1 Inputs (V)
---------------------------	-----------------------

0.5	1.40
1	1.90
2	3.00
3	3.60
4	4.00
5	4.30
6	4.50
7	4.65
8	4.80
9	4.90
10	5.05

The monitored resistance can be in the form of a single resistor, like an NTC resistor for measuring temperature, or a set of resistors and switches as shown. The slow response of the rectifier and filter helps to mask the effect of any switch bounce. The component values shown support a 5V, 0.1MHz-to-1MHz clock signal and resistance values from 0.5kΩ to 10kΩ. IC1's voltage-monitoring thresholds (1.8V, 2.5V, 3.3V, and 5V) are suitable for this application, and T1 can be any 1:1 pulse transformer with an approximate 0.5mH inductance value. You can decode the IC1 output with suitable discrete logic, or feed it to a microcontroller as required.

#### Related Parts

[MAX6338](#)

Quad Voltage Monitor with Four Outputs in  $\mu$ Max Package

[Free Samples](#)

#### More Information

For Technical Support: <http://www.maximintegrated.com/support>

For Samples: <http://www.maximintegrated.com/samples>

Other Questions and Comments: <http://www.maximintegrated.com/contact>

Application Note 4518: <http://www.maximintegrated.com/an4518>

APPLICATION NOTE 4518, AN4518, AN 4518, APP4518, Appnote4518, Appnote 4518

Copyright © by Maxim Integrated Products

Additional Legal Notices: <http://www.maximintegrated.com/legal>