High Precision Thin Film Chip Resistors for Low Current Noise/Distortion Circuit Applications

High precision, high stability and low current noise characteristics – RT series, 0201 ~ 2512

Yageo's thin film resistor RT series is a perfect solution for applications with high precision and high stability requirements. In thin film resistors, sputtering technology is used to form a nichrome (NiCr) resistive layer on the ceramic substrate. Compared to the printing process of thick film resistors, the metal resistive layer deposited by sputtering technology allows thin film resistors to have both low TCR (down to ±5ppm/°C) and tight tolerance (down to ±0.01%). In addition, because of the inherent differences between the compositions of thin film and thick film resistive layers, the current noise of thin film resistors is also lower than thick film resistors.

As shown in fig.1, from the micro-structure of the resistive layer of a thin film resistor, there are only metal granules stacked together to form a fine metal film. When the electrons move in the conductive metal layer, they can transfer from one or more conductive crystal lattices to another and form current flows without any hindrance, which helps to prevent noise generation.

In thick film resistors (fig.2), the material of the resistive layer is made of both metal and glass materials. The glass materials are non-conductive, so the electrons cannot pass through the glass granules. The direction of the current flow changes due to these glass granules and it becomes the source of current noise.

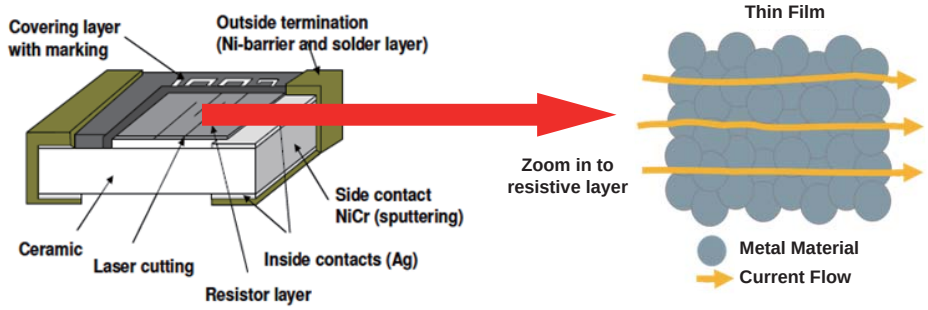

Fig.1

The thin film resistor structure and the micro-structure of its resistive layer. The resistive layer is deposited by conductive metal granules. Therefore the electrons can pass through one or more metal granules to another and form a straight current flow.

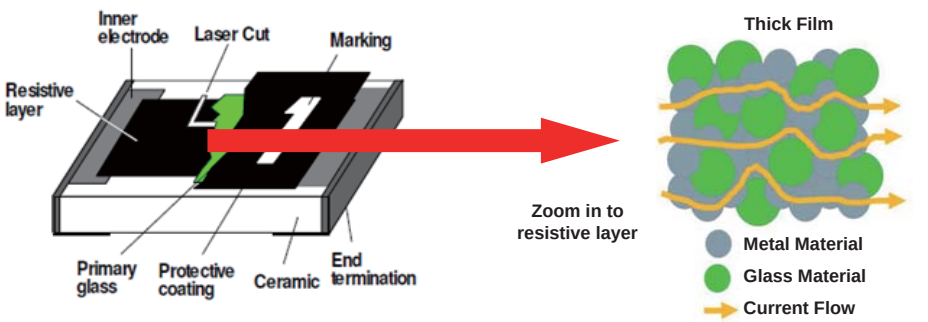

Fig.2

The thick film resistor structure and the micro-structure of its resistive layer. The resistive layer is made of both metal and glass materials. Since glass is non-conductive, the electrons cannot pass through glass granules. When electrons move in the resistive layer, they can only transfer through metal granules. Therefore the directions of the current flows keep changing and results in current noise.

Thin film, high precision, high stability chip resistor - RT Series

Fig.3(A) and (B) are the noise measurement results of a thin film resistor and a thick film resistor. The noise level of the thin film resistor in fig.3(A) is obviously consistent in different frequencies than the noise level of the thick film resistor under different frequencies shown in fig.3(B). The low current noise feature of thin film chip resistors is ideal for applications in audio amplification circuits which require low distortion to reach high acoustic quality.

Yageo provides high precision high stability thin film chip resistor RT series from 0201 to 2512 case sizes. The RT series introduces advanced sputtering technology to form a fine nichrome resistive layer which is able to avoid noise generation. Via manufacturing technology management, ultra low TCR (5ppm/°C) and tolerance (0.01%) can be achieved.

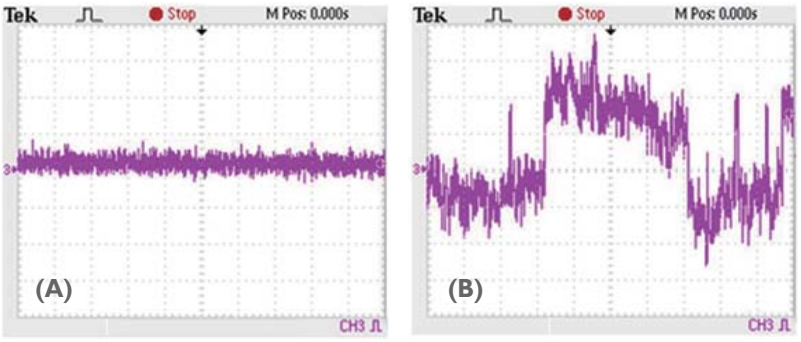

Fig. 3

Noise measurement results of (A) a thin film resistor and (B) a thick film resistor.

Features

- High precision and stability
- Low current noise
- Tight tolerance 0.01% and low TCR 5ppm/°C available
- Case sizes from 0201 to 2512

Benefits

- Low resistance drift by the influence of component self heating effect
- Perfect for applications in audio amplifiers, stereos, portable audios, low distortion/ noise DAC

Applications

- Power supply/Adapter
- Medical & Industrial equipment
- Server boards
- Telecommunications
- Consumer products
- In-Vehicle Infotainment system

Yageo's RT Series Application Map

Get More info. > Click here
Get Datasheet > Click here