New Product Info

Product Group: Vishay Foil Resistors / **January** 2009

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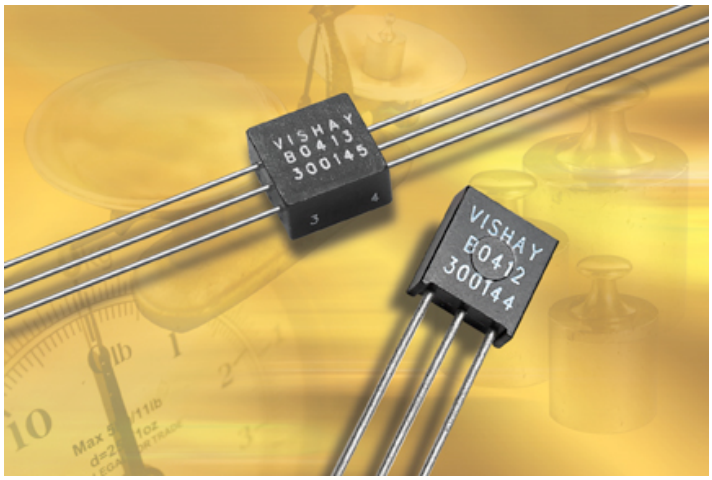
New 300144Z and 300145Z Ultra-High-Precision Z-Foil Voltage Divider Resistors

The Key Benefits:



- Feature a low typical TCR of ±0.2 ppm/°C from −55 °C to +125 °C, +25 ºC ref.
- TCR tracking to 0.1 ppm/°C
- Tolerance matching to ±0.005 % (50 ppm)
- Load-life stability ratio of ±0.005 % at +70 ºC for 2000 hours at rated power
- Almost instantaneous thermal stabilization time of < 1 second
- Offer power rating of 0.2 W at 70 ºC
- Maximum working voltage of 200 V
- Feature a resistance range from 100 Ω to 20 kΩ
  - Vishay Foil resistors are not restricted to standard values, and can be supplied with "as required" values and ratios (e.g. 1 kΩ vs. 1.2345 kΩ) at no extra cost or delivery time
- Offer PCR tracking ("ΔR due to self heating") of ±5 ppm at rated power
- Low voltage coefficient of < 0.1 PPM/V
- Current noise of < -40 dB
- Provide an almost immeasurable 1-ns rise time, effectively without ringing
- Non-inductive (< 0.08 µH), non-capacitive design
- Withstand electrostatic discharges up to 25 kV, for increased reliability

The Key Applications:

- Precision instrumentation amplifiers, bridge networks, and differential amplifiers in high-end medical, military, aerospace, automatic test, and down-hole drilling equipment where thermal stabilization, response time, and long-term stability are vital

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The News:

Vishay's New 300144Z and 300145Z Ultra-High-Precision Z-Foil Voltage Divider Resistors Combine TCR Tracking to 0.1 ppm/°C, Tolerance Matching to ±0.005 %, Thermal Stabilization Time of < 1 Second, and Load Life Stability of ±0.005 % After 2000 Hours

Vishay Intertechnology, Inc. (NYSE: VSH) introduces two new ultra-high-precision Z-Foil voltage divider resistors that feature a low typical TCR of ±0.2 ppm/°C from –55 °C to +125 °C, +25 ºC ref., TCR tracking to 0.1 ppm/°C, tolerance matching to ±0.005 % (50 ppm), and a load-life stability ratio of ±0.005 % at +70 ºC for 2000 hours at rated power. While other resistor technologies can take several seconds or even minutes to achieve a steady-state thermal stabilization, the 300144Z and 300145Z have an almost instantaneous thermal stabilization time of < 1 second.

- Offer a power rating of 0.2 W at 70 ºC, divided proportionally between the two elements, over a maximum working voltage of 200 V
- The 300145Z provides a pair of 300144Z elements back to back in a single molded package
- Allow designers to achieve much better performance by combining a range of high-precision specifications in a single device
- Available with standard tin/lead or lead-free terminations

Key Device Specifications:

- Typical TCR of ±0.2 ppm/°C from –55 °C to +125 °C, +25 ºC ref.
- TCR tracking to 0.1 ppm/°C
- Tolerance matching to ±0.005 % (50 ppm)
- Load-life stability ratio of ±0.005 % at +70 ºC for 2000 hours at rated power
- Thermal stabilization time of < 1 second
- Power rating of 0.2 W at 70 ºC
- Maximum working voltage of 200 V
- Resistance range from 100 Ω to 20 kΩ
- PCR tracking ("ΔR due to self heating") of ±5 ppm at rated power
- Voltage coefficient of < 0.1 PPM/V
- Current noise of < -40 dB
- 1-ns rise time, effectively without ringing
- ESD immunity up to 25 kV
- Standard tin/lead or lead-free terminations

The Perspective:

Vishay's new 300144Z and 300145Z ultra-high-precision Z-Foil voltage divider resistors allow designers to achieve much better performance by combining a range of high-precision specifications in a single device. While other resistor technologies can take several seconds or even minutes to achieve a steady-state thermal stabilization, the 300144Z and 300145Z have an almost instantaneous thermal stabilization time of < 1 second. The resistors

feature a resistance range from 100 Ω to 20 kΩ and are not restricted to standard values. The devices can be supplied with “as required” values and ratios (e.g. 1 kΩ vs. 1.2345 kΩ) at no extra cost or delivery time.

In spite of a low TCR tracking, a resistance ratio may change considerably based on the absolute TCR. To assure good ratio stability, designers should utilize resistors with the lowest absolute TCR possible. To achieve optimum TCR tracking between resistors, all factors that affect the TCR of each resistor must be uniform. Whatever their resistance range or wattage, the 300144Z and 300145Z resistors exhibit identical TCR, as they are made of the same alloy and of identical physical and electrical characteristics. This TCR uniformity in Vishay Foil resistors contrasts sharply with TCR tracking in conventional metal film, such as thick and thin film units, which offer quite variable and often unpredictable absolute TCR because their composition, film thickness, and deposition techniques are varied to meet different resistance range and wattage requirements.

The Foil element of the 300144Z and 300145Z consists of a special alloy chosen for its electrical, mechanical, and thermal characteristics. It is set on the substrate through a unique and proprietary process that does not subject the 300144Z and 300145Z to the metallurgical changes that occur during the winding of wire, or during the evaporative process used in other forms of precision resistors. Each step of the manufacturing process is rigidly controlled, with extensive quality control ensuring that the alloy is kept in its pure state.

Availability: Samples and production quantities of the 300144Z and 300145Z are available now, with lead times of 72 hours for samples, and five weeks for standard orders.

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