

Thermal EMF for Low Ohmic Value Resistors

The Vishay Dale WSL Power Metal Strip® resistor technology produces a resistor with a very low thermal EMF. A thermal EMF is a very small voltage in the microvolt range (μV) which is produced due to temperature variations across the resistor. Thermal EMF is an important consideration in the low ohmic value resistors used in DC circuits and in particular current sense resistors. Thermal EMF has no importance in AC circuitry. In particular, the importance is found in current sense resistors since the thermal EMF voltage could be larger than the desired sensing voltage.

The WSL and WSR resistors offer a low thermal EMF ($< 3 \mu\text{V}/^\circ\text{C}$) as one of the many performance benefits of the Power Metal Strip resistor technology.

The figure 1 shows the thermal EMF characteristics of the 50 m Ω WSL2512 Power Metal Strip resistor in comparison with other resistor technologies. Two of the resistors are metal strip technologies offered by a competitor and the third is from a low-value thick film resistor. All the resistors have 50 m Ω as a nominal resistance value.

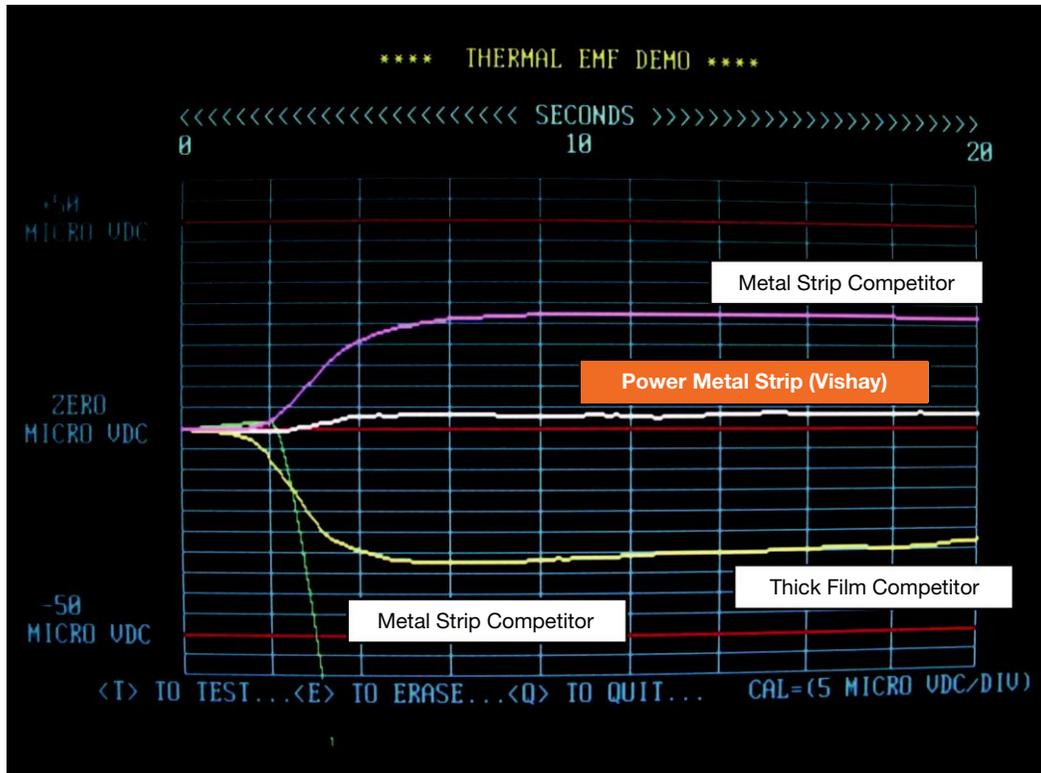


Fig. 1

This test is performed at room temperature. A small temperature change (approximately 8 $^\circ\text{C}$ which is the difference between room temperature and skin of the finger temperature) is made to one of the resistor to copper

terminal junctions by resting a finger on the copper trace leading to the resistor. The figure shows the WSL resistor with a thermal EMF less than + 3 $\mu\text{V}/^\circ\text{C}$ while the competitor products exhibit a thermal EMF greater than $\pm 25 \mu\text{V}$.