STD.IPC TM-650 2.5.17.2-ENGL 1998 🖿 4805440 0023080 680 🖿

The Institute for Interconnecting and Packaging Electronic Circuits 2215 Sanders Road • Northbrook, IL 60062



IPC-TM-650 TEST METHODS MANUAL

1 Scope This test method covers the two-wire resistance test for the determination of the volume resistivity of polymerbased conductive pastes and other conductive materials used in HDI. This test is valid for conductive materials with volume resistivity on the order of $10^{-5} \Omega$ -cm or higher. For measuring resistivity on highly conductive materials or any material that cannot be patterned into a circuit pattern, a four-wire (Kelvin Probe) test method, such as IPC-TM-650, Method 2.5.14, is recommended.

1.1 Definition Volume resistivity is a material property that can be utilized to calculate the resistance in a circuit design. For materials with high resistivity, a two-wire resistance test may be used to measure the volume resistivity.

The resistance in any sample (R in units of Ω) is related to the dimensions of the test circuit and the volume resistivity (p) inherent in the material (see Figure 1).

$$\mathsf{R} = \rho\left(\frac{\mathsf{L}}{\mathsf{tW}}\right)$$

L, W, and t are the length, width, and thickness respectively of the test circuit (in cm). The quantity L/W is called a square, (
). The volume resistivity can then be expressed as:

$$\rho = \frac{Rt}{\left(\frac{L}{W}\right)} = \frac{Rt}{\Box}$$

with units of ohms-cm (Ω -cm).

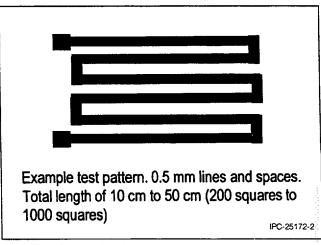
Number 2.5.17.2	
Subject	
Volume Resistivi	ty of Conductive Materials Used in erconnection (HDI) and Microvias, d
Date	Revision
11/98	

2 Applicable Documents

IPC-TM-650 Test Methods Manual

2.5.14 Resistivity of Copper Foil

3 Test Specimen The test specimen is a 0.5 mm wide serpentine circuit pattern (see Figure 2) with a length of between 200
and 1000
(length equal to 200 to 1000 times the width) prepared by screen printing or other methods. Specimens may be prepared by other methods, as long as they have measurable dimensions. If materials cannot be prepared in a circuit pattern, see 6.2.





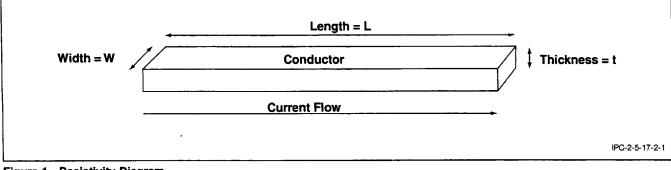


Figure 1 Resistivity Diagram

Material in this Test Methods Manual was voluntarily established by Technical Committees of the IPC. This material is advisory only and its use or adaptation is entirely voluntary. IPC disclaims all liability of any kind as to the use, application, or adaptation of this material. Users are also wholly responsible for protecting themselves against all claims or liabilities for patent infringement. Equinment referenced is for the convenience of the user and does not imply endorsement by the IPC. Copyright Association Connecting Electronics Industries Provided by IHS under license with IPC No reproduction or networking permitted without license from IHS Not for Resal

Page 1 of 3

Not for Resale