The Institute for Interconnecting and Packaging Electronic Circuits
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IPC-TM-650
TEST METHODS MANUAL

Number	
2.5.28	
Subject	
Q Resonance, Flexible Printed Wiring Materials	
Date	Revision
4/88	**A**
Originating Task Group	

1 Scope This test method defines the procedure for determining the Q resonance of copper toil clad, rigid, and flexible dielectric material.

2 Applicable Documents

IPC-TM-650 Test Methods Manual

2.3.7.2 Alkaline Etching Method

3 Test Specimen

3.1 The test specimen shall consist of an etched conductor pattern in accordance with Figure 1. A minimum of three specimens shall be prepared for each frequency being tested.

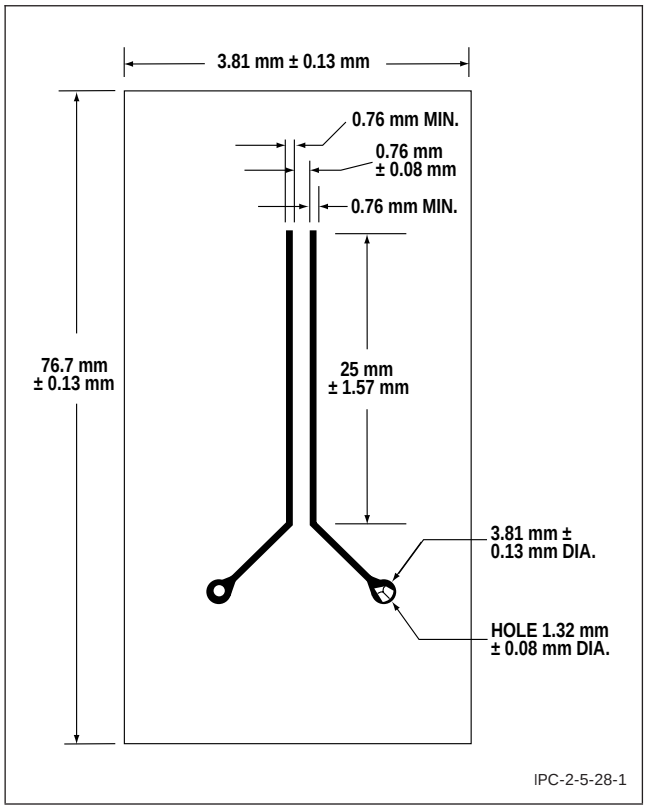

Figure 1 Q Resonance Test Pattern

4 Apparatus

4.1 Necessary equipment to produce printed wiring by the etched foil process using good commercial practices

4.2 Q meter (Hewlett Packard model #4342A or equivalent)

5 Procedure

5.1.1 Prepare the test patterns according to Figure 1 using good commercial practices or IPC-TM-650, Method 2.3.7.2.

5.1.2 Solder the tinned (22 gauge) wire leads to the land areas on the test pattern using a 25 to 40 watt soldering iron. The solder or rosin must not spread beyond the land area.

5.1.3 Thoroughly clean and dry the specimens as described in 5.1.3.1 through 5.1.3.5 and until completion of testing, handle them by the edges only.

5.1.3.1 Brush with a bristle brush under running tap water. The hardness of the tap water shall not exceed 175 ppm (expressed as calcium carbonate). Deionized water may be employed.

5.1.3.2 Dry with an oil-free, compressed air brush while submerged in isopropyl alcohol, removing all excess rosin.

5.1.3.3 Dip in fresh isopropyl alcohol and dry with an oil-free, compressed air brush.

5.1.3.4 Dry in an oven for a minimum of two hours at a temperature between 49°C and 6°C.

5.1.3.5 Remove from the oven, then condition for 24 hours prior to testing at 23°C ± 3°C and 50% ± 50% RH.

5.2 Test

5.2.1 Determine the Q of each test specimen at the required frequency (usually 1 MHz, 50 MHz, and 100 MHz) using the following procedure.

5.2.1.1 Using the resonance-rise method, resonate the Q meter without any test specimen.

5.2.1.2 Record the voltmeter reading as Q and the capacitance reading as C_1.

5.2.1.3 Resonate the Q meter with the test specimen connected in parallel to the Q circuit. It should be noted that the measurement leads should be of equal length and as short as practicable to reduce the lead inductance when performing these measurements.

5.2.1.4 Record the voltmeter reading as C_2.

5.2.1.5 Calculate the Q of the specimen as follows:

$$\frac{Q_1\, Q_2\, (C_2 - C_1)}{(Q_1 - Q_2)\, C_1} = Q_x$$

5.2.2 Determine the Q of each test specimen at the desired frequency using the procedure given in 5.2.1.1 through 5.2.1.5.

5.3 Evaluation

5.3.1 Report the Q value for each individual specimen at each test frequency