

SEMI G23-0996 (Reapproved 0823) TEST METHOD FOR INDUCTANCE OF INTERNAL TRACES OF SEMICONDUCTOR PACKAGES

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NOTICE: Paragraphs entitled ‘NOTE:’ are not an official part of this Standard or Safety Guideline and are not intended to modify or supersede the official Standard or Safety Guideline. These have been supplied by the global technical committee to enhance the usage of the Standard or Safety Guideline.

1 Purpose

1.1 This Test Method describes the measurement method for the inductance of internal traces of semiconductor packages.

2 Scope

2.1 This Test Method is applicable for the measurement of package inductance that is greater than 0.5 nH.

2.2 This Test Method describes the measurement of a pin grid array, one of the package types, as a sample.

2.3 This Test Method is also applicable to other types of packages.

2.4 The inductance in this Standard is limited to that of internal traces only and does not contain the portions contributed by the exposed areas such as pins and wires.

2.5 This Standard uses SI units.

NOTICE: SEMI Standards and Safety Guidelines do not purport to address all safety issues associated with their use. It is the responsibility of the users of the Documents to establish appropriate safety and health practices, and determine the applicability of regulatory or other limitations prior to use.

3 Limitations

3.1 It is not practical to apply this Test Method for fine-pitch packages where traces or pads (point A of Figure 1) cannot be connected to with two probes.

4 Referenced Standards and Documents

4.1 None.

NOTICE: Unless otherwise indicated, all documents cited shall be the latest published versions.

5 Terminology

5.1 Definitions

5.1.1 *four-point probe* — the probe consists of four coaxial measuring terminals, H_c (current high), H_p (potential high), L_c (current low) and L_p (potential low), to measure impedance. Independent coaxial cables are used between the package being measured and the measurement instrument to minimize the effect caused by mutual inductance (between terminals) and/or interferences from the measured signals (refer to Figures 3 and 6).

5.1.2 *internal inductance (of packages)* — inductance of the circuit that comprises the signal path starts from the shoulder or in the center of the outside lead (point A of Figure 1) and ends at the end of the lead on the cavity side of the lead (point B of Figure 1). The return path is made by tying all other traces (except for the target trace in the same electric potential) together. The target trace is tied to the return path at the bonding finger (refer to Figure 2).

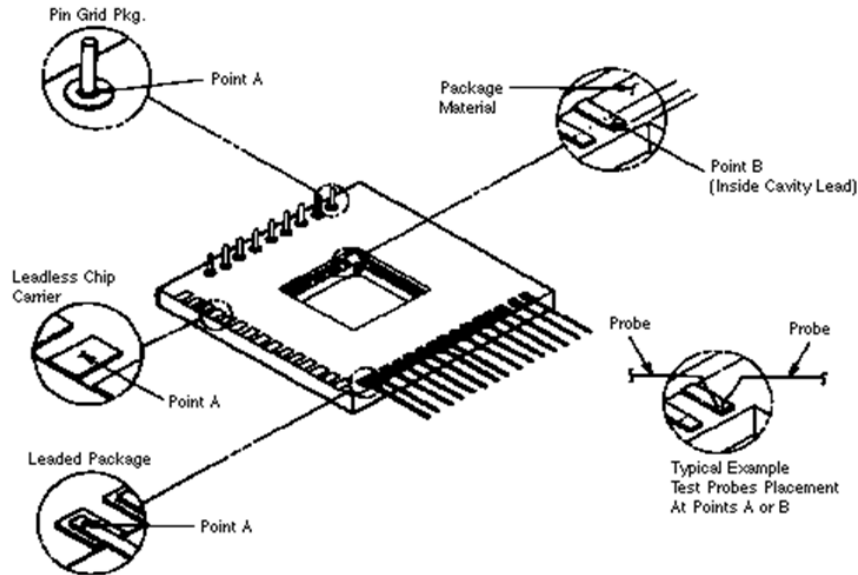


Figure 1
Internal Inductance Measurement

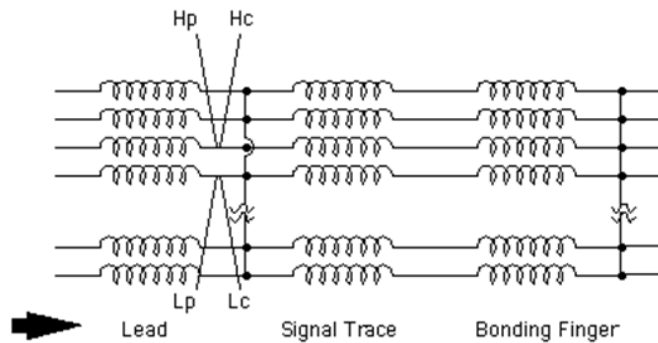


Figure 2
Concept of Internal Inductance

6 Summary of Method

6.1 Fabricate the package to be measured. Then measure the inductance of internal traces using the four terminal probe method.

7 Interference

7.1 It is desirable that an operator, who is familiar with the measuring system, measuring method, and principles, conduct the actual measurement to get the best result.

7.2 To get an accurate measurement, maintain equal probe angle and distance.

8 Apparatus

8.1 LCR Meter

8.1.1 Four terminal probe attachment capability.

8.1.2 Capable of measuring at the frequency of 10 MHz or higher.