



*The Institute for
Interconnecting
and Packaging
Electronic Circuits*

IPC-HM-860

Specification for Multilayer Hybrid Circuits

ANSI/IPC-HM-860

Original Publication
January 1987

A standard developed by the Institute for Interconnecting
and Packaging Electronic Circuits

2215 Sanders Road
Northbrook, Illinois
60062-6135

Tel 847 509.9700
Fax 847 509.9798
URL: <http://www.ipc.org>

Specification for Multilayer Hybrid Circuits

1.0 SCOPE

1.1 Scope This specification covers the qualification and performance requirements of multilayer circuits used in hybrid packaging. These circuits consist of three or more layers of conductor patterns separated from each other by insulating materials and interconnected by a continuous metallic interlayer connection. The substrate structure may include passive elements.

1.2 Purpose The purpose of this specification is to provide qualification and acceptance requirements for commercial and government procurement of multilayer circuits used in hybrid packaging.

1.3 Classifications This specification recognizes that a multilayer hybrid circuit assembly will be subject to classifications by intended end item use. Toward this end, three general classes of assemblies have been established. It should also be recognized that there may be an overlap of equipment between classes. The user has the responsibility to determine the class into which the product belongs. The three classes are:

Class 1—Consumer Products

(Includes TV sets, toys, entertainment electronics, personal computers, and non-critical consumer or industrial control devices.) Circuits in this class are suitable for applications where cosmetic defects are not important and the only requirement is function of the completed circuit. These circuits represent a low cost alternative due to the lack of required inspection and testing.

Class 2—General Industry

(Includes computers, communication equipment, sophisticated business machines, instruments and certain non-critical military application.) Circuits in this class are suitable for use where circuit design, process yield, and specification conformance requirements allow localized areas to be defective. These circuits have minimal inspection, testing, and application requirements.

Class 3—High Reliability

(Includes those equipments where continued performance is critical, equipment downtime cannot be tolerated or the equipment is a life support item.) Circuits in this class are suitable for applications where high levels of assurance are required. Major difference is improved surface condition and a higher level of inspection, testing, and certification.

Requirements in this specification have been separated so that the performance of the multilayer products may be tested to any one of the three classes. The use of one class for a specific attribute does not mean that all other attributes must meet that same class. Selection should be based on minimum need. However, cross-over between classes requires complete definition of test requirements in the procurement document.

1.3.1 Circuit Type This specification includes the following types:

TYPE I Co-Fired Ceramic

- a) Refractory Metal
- b) Non-Refractory Metal

TYPE II Inorganic

- a) Thick Film
- b) Thin Film

1.4 Dimensions and Tolerances All dimensions and tolerances specified herein are applicable only to the end product. Dimensions are expressed in millimeters. Inches, shown in brackets [], are not direct conversions in order to provide usable numbers. Users are cautioned to employ a single system and not intermix metric and inch-based equivalents. Reference information is shown in parentheses ().

2.0 APPLICABLE DOCUMENTS

The following documents, the issues in effect on the date of issuance of this specification, form a part of this specification to the extent specified herein. Subsequent issues of or amendments to these documents shall become part of this specification unless otherwise stated.

2.1 IPC¹

IPC-T-50 Terms and Definitions

IPC-D-325 Documentation Requirements for Printed Boards

IPC-TM-650 Test Method Manual²

- 2.1.1.1 Microsectioning, Ceramic Substrates
- 2.3.38 Inspection Test for Organic Contaminants on Printed Wiring Boards and Assembly Surfaces

1. Institute for Interconnecting and Packaging Electronic Circuits, 2215 Sanders Rd., Northbrook Illinois 60062-6135.

2. For convenience, all IPC-TM-650 Test Methods referenced herein are re-printed at the end of this standard.