

SEMI S9-95

ELECTRICAL TEST METHODS FOR SEMICONDUCTOR MANUFACTURING EQUIPMENT

NOTICE: These test methods do not purport to address all of the safety issues associated with their use. It is the responsibility of the user of these test methods to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

NOTICE: The tests described in this document involve specialized tasks and may expose person(s) to certain hazards. Therefore, testing should be performed only by qualified personnel.

1 Purpose

The purpose of this document is to identify a list of electrical tests and test methods which may be appropriate for semiconductor manufacturing equipment.

2 Scope

These test methods may be applied to equipment used for the manufacturing, measurement, assembly, and testing of semiconductor products.

Some of the tests noted within this document may be performed as part of a manufacturing production line test.

This document provides generic methods for the following tests:

- Starting Current Test
- Input Test
- Dielectric Test
- Leakage Current Test
- Grounding Continuity Test
- Strain Relief Test
- Transformer Output Short Circuit Test
- Power Supply/Controller Output Short Circuit Test
- Safety Circuit Function Test
- Connector/Lead Disconnect Test(EMO/Safety Interlock/Safety Sensor)
- Capacitor-Stored Energy Discharge Test
- Temperature Test

3 Limitations

The test methods included within this document are not inclusive nor are they meant to replace any test methods described within any other SEMI documents or nationally recognized standards.

4 Referenced Documents

NOTE: As listed or revised, all documents cited shall be the latest publications of adopted standards.

4.1 SEMI Document

SEMI S1 — Safety Guidelines for Visual Hazard Alerts

4.2 IEC Document¹

IEC 950 — Safety of Information Equipment Including Electrical Business Equipment

5 Terminology

5.1 *accessible* — Any point which may be contacted by an IEC articulate accessibility probe arranged in any of its specified positions. See Figure 1 for an illustration of the accessibility probe.

5.2 *electric shock hazard* — Any part with a potential between the part and earth ground or any other simultaneously accessible part exceeding 30 volts RMS or 42.4 volts peak and from which the continuous current flow, through a 1500 ohm impedance network, exceeds 3.5 mA.

5.3 *fail-safe* — A system so designed that a failure of any component in the system will stop the equipment and prevent unsafe operation of the equipment.

5.4 *hazardous energy* — Energy of 20 J or more, or an available continuous power level of 240 V*A or more, at a potential of 2 V or more (IEC 950).

5.5 *least favorable* — Condition which is most likely to result in a test failure.

5.6 *1500 ohm impedance network* — A network consisting of a 1500 ohm resistor shunted by a 0.15 mF capacitor.

5.7 *permanently connected* — Equipment which is intended for connection to building power supply wiring by screw terminals (IEC 950).

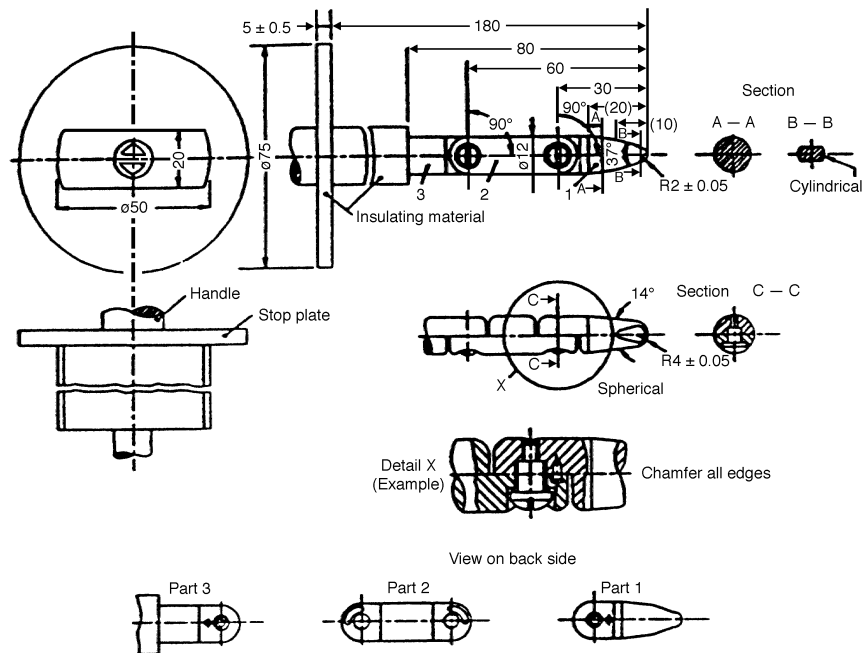
¹ International Electrotechnical Commission, 1 rue de Varembe, Geneva, Switzerland

5.8 *production line tests* — Tests which are performed on 100% of the products within a production line.

5.9 *safe* — Free of conditions that can cause occupational illness, injury, or death to personnel or damage to or loss of equipment or property or the environment.

5.10 *standby condition* — Condition in which equipment is energized and in its idle state.

5.11 *V*A* — Volt-ampere.



SM 471

Linear dimensions in mm

Tolerances on dimensions without specific tolerances:

on angles: 0
-10°

on linear dimensions:

up to 25 mm: 0
-0.05 mm
over 25 mm: ± 0.2 mm

Material of finger: for example heat-treated steel

Both joints of this finger may be bent through an angle of $90^\circ \begin{smallmatrix} +10^\circ \\ 0^\circ \end{smallmatrix}$ but in one and the same direction only.

NOTES

1. Using the pin and groove solution is only one of the possible approaches in order to limit the bending angle to 90° . For this reason, dimensions and tolerances of these details are not given in the drawing. The actual design must ensure a 90° bending angle with a 0 to $+10^\circ$ tolerance.

2. The test finger is taken from IEC 529.

Figure 1
IEC Accessibility Probe