

SEMI G65-0318

TEST METHOD FOR EVALUATION OF LEADFRAME MATERIALS USED FOR L-LEADED (GULL WING TYPE) PACKAGES

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1 Purpose

1.1 This Test Method describes an evaluation method for bending characteristics of leadframe materials used for L-leaded packages.

NOTE 1: The lead fatigue test described in MIL-STD-883/2004 is not suitable for evaluating the bending characteristics of fine pitch leadframes or leadframes used for L-leaded packages because the method is based on reforming the leads.

2 Scope

2.1 This Test Method may be applied to leadframes for L-leaded packages such as QFP, SOP, TSOP, etc.

2.2 This Test Method may also be applied to any leadframe materials with thickness ≤ 0.15 mm.

2.3 This Test Method may be used in trim and form tool suppliers, leadframe material suppliers, leadframe manufacturers, and package engineers.

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3 Referenced Standards and Documents

3.1 *United States Military Standards*¹

MIL-STD-983 — Substitution List for Microcircuits (Method 2004, Lead Integrity)

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

4 Terminology

4.1 *Definitions*

4.1.1 *crack (of leadframe)* — micro cleavage or fracture on surface of outside of lead which is caused by bending (refer to Figure 1).

¹ United States Military Standards, Available through the Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120-5099, USA; Telephone: +1.215.697.3321.

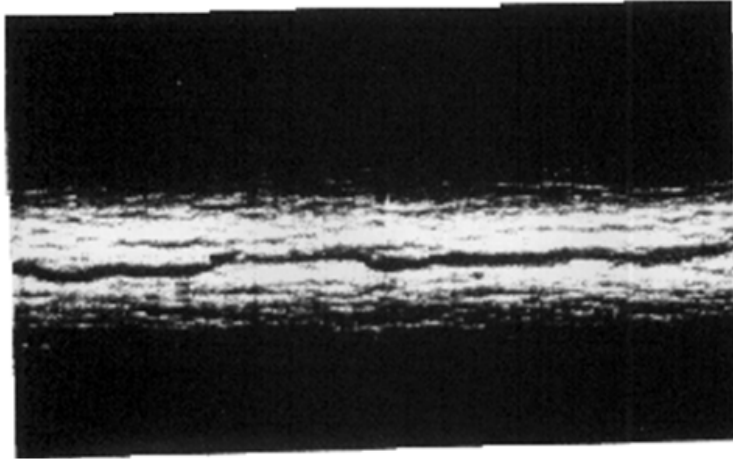


Figure 1
Crack

4.1.2 *orange peel (of leadframe)* — micro roughness on surface of outside of lead caused by bending (refer to Figure 2).

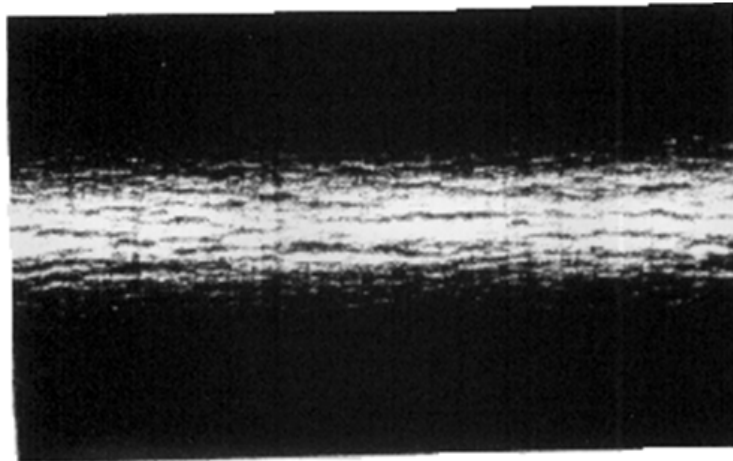


Figure 2
Orange Peel

4.1.3 *spring back* — difference between designed angle of forming tool and actual lead form angle.

NOTE 2: In this method, the angle of forming tool is 90°. The value is defined by: Actual lead bend angle 90°.

5 Summary of Test Method

5.1 The leadframe samples (etched using a standard mask agreed between user and supplier) will be formed using a 'W' forming tool. The resulting form angle is to be measured and surface characteristics such as cracking and orange peel are to be visible for compliance to the agreed upon specification.

6 Interference

6.1 If the forming tool does not meet the specification, lead movement during forming may result in poor repeatability.

7 Significance

7.1 Devices manufactured with leadframes of different spring back characteristics may cause board assembly problems, due to lead positional differences.

7.2 Crack in the leadframe may cause poor contact reliability with board.

8 Equipment

8.1 *Tensile Tester* — With minimum 9800 N force and 1% accuracy.

8.2 *'W' Forming Tool* — With $R = 0, 0.1$ and 0.2 and form angle of 90° . The dimension and configuration are shown in Figures 3 through 7.

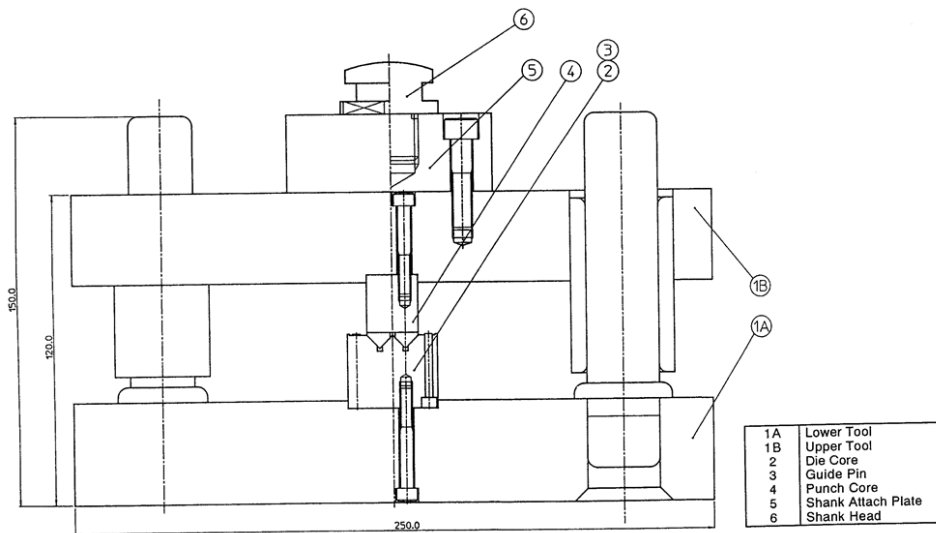


Figure 3
W-Bending Test Tool

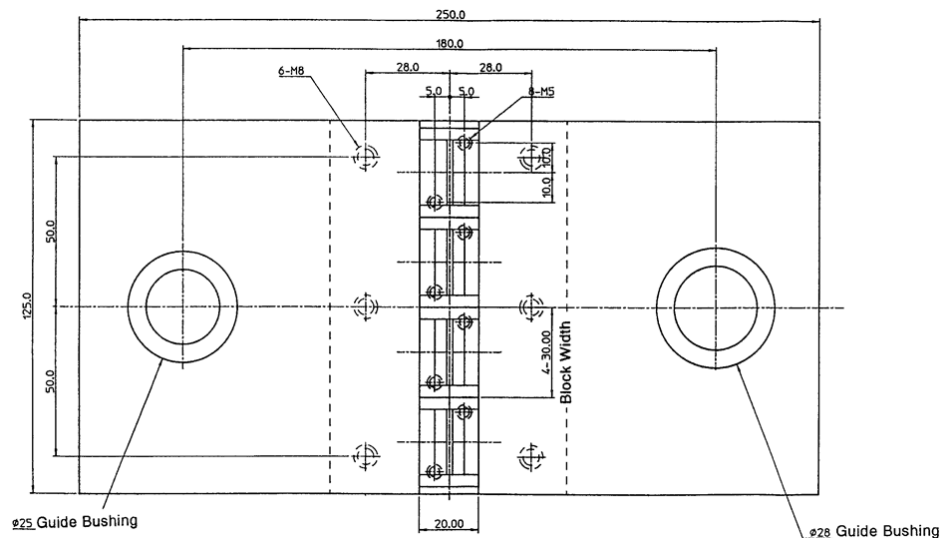


Figure 4
Upper Tool Detail