

SEMI G51-90 SPECIFICATION FOR PLASTIC MOLDED (METRIC) QUAD FLAT PACK LEADFRAMES

1 Preface

This specification defines the acceptance criteria for leadframes designed for assembly of JEDEC proposed registered Publication 95 Standard Outlines for the Metric Quad Flat Pack Family Packages. It is a design guideline for packaging engineers, leadframe stampers and etchers, and mold and trim/form tooling manufacturers. It has been developed to meet the requirements of assemblers using automatic and manual equipment.

2 Applicable Documents

2.1 *Order of Precedence* — To avoid conflicts, the order of precedence when ordering tooling shall be as follows:

Purchase Order

This Specification

Referenced Documents

2.2 Reference Documents

2.2.1 SEMI Specifications

SEMI G4 — Specification for Integrated Circuit Leadframe Materials Used in the Production of Stamped Frames

SEMI G10 — Standard Method Mechanical Measurement for Plastic Package Leadframes

SEMI G18 — Specification for Integrated Circuit Leadframe Material Used in the Production of Etched Frames

SEMI G21 — Specification, Plating Integrated Circuit Leadframes

2.2.2 ANSI Specification¹

S Y 14.5 M-1982 — Dimensioning and Tolerancing

2.2.3 JEDEC Specification²

Reg.Prop. 11-286 — Metric Quad Flat Pack Family (Gullwing)

2.2.4 Military Specification³

MIL-STD-105 — Sampling Procedures and Tables for Inspection by Attributes

3 Selected Definitions

burr — a fragment of excess material either horizontal or vertical attached to the leadframe.

camber — curvature of the leadframe strip edge (see Figure 1).

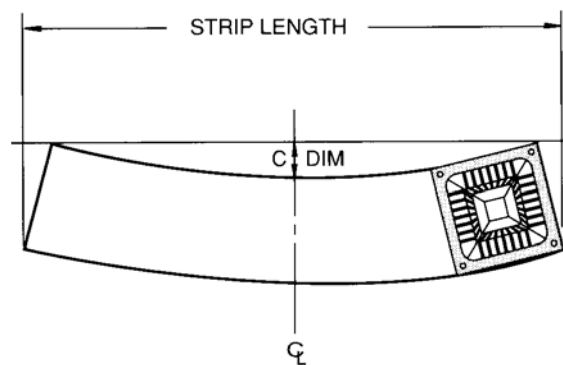


**Figure 1
Camber**

coil set — longitudinal bowing of the leadframe (see Figure 2).

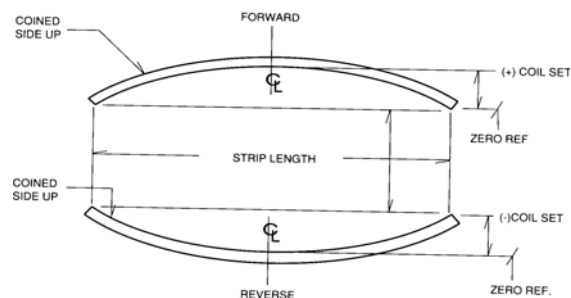


**Figure 2
Coil Set**

coined area — that area at the tip end of the bond fingers coined to produce a flattened area for functional use (see Figure 3).

¹ ANSI, 1430 Broadway, New York, NY 10018

² JEDEC, 2001 Eye Street N.W., Washington, D.C. 20006

³ Military Standards, Naval Publications and Form Center, 5801 Tabor Avenue, Philadelphia, PA 19120

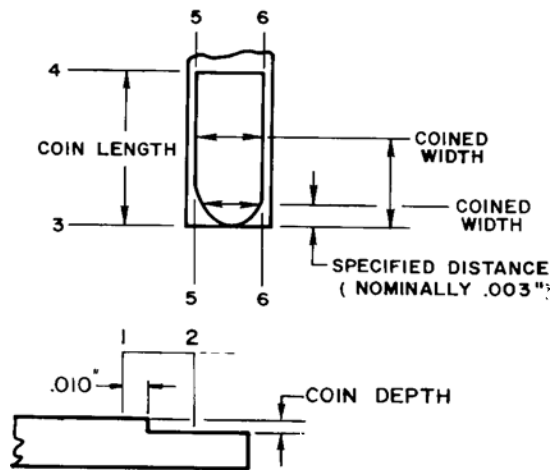


Figure 3
Coined Area

crossbow — Transverse bowing of the leadframe (see Figure 4).

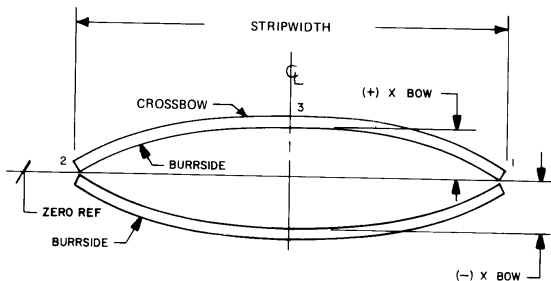


Figure 4
Crossbow

lead twist — Angular rotation of bonding fingers (see Figure 5).

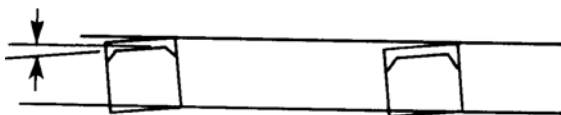


Figure 5
Lead Twist

pits — Shallow surface depressions or craters in the leadframe material.

true position circle — That circle with its center positioned at the center of the coined lead defines the design position of the lead tip.

4 Ordering Information

Purchasing orders for leadframes for plastic Molded Quad Flat Pack packages furnished to this specification shall include the following items:

- 4.1 Drawing number and revision level.
- 4.2 Material alloy specification.
- 4.3 Lead count, and confirming number of units per strip.
- 4.4 Requirement for material certification.
- 4.5 Leadframe plating specifications.

5 Dimensions

- 5.1 Tables I, II.
- 5.2 See Figure 6 and Detail A.

6 Defect Limits and Parameters

(To measure, see SEMI G10).

6.1 Lead Tip Width

6.1.1 *Minimum Lead Tip Width* — Shall be as agreed to between supplier and purchaser.

6.1.2 *Minimum Flat Wire Bonding Area* — 80% of nominal lead width and 0.635 mm (0.025") in length.

NOTE: This applies to stamped frames; percent of nominal lead width for etched frames must be determined between purchaser and supplier and is dependent on etch tolerances.

6.2 Coining and Metal Clearance

6.2.1 If coined, maximum depth = 30% material thickness. Minimum depth as agreed to between supplier and purchaser.

6.2.2 On stamped frames, dimensions shown on drawings are before coining.

6.2.3 *Metal-to-Metal Clearance* — Shall be as agreed to between supplier and purchaser.

6.3 *Lead Twist* — Shall not exceed 3.5 or 0.015 mm (0.0006") per 0.254 mm (0.010") of lead width.

6.4 *Burrs* — Shall be firmly attached and able to withstand a probe force of 10 grams. All burrs vertical and horizontal in any location shall not exceed 0.0254 mm (0.001").

6.5 *Die Pad Tilt and Flatness* — (See specification SEMI G10 for measurement method).

6.5.1 *Tilt* — 0.025 mm (0.001") maximum per 2.54 mm (0.100") of length or width in the undepressed state, and 0.051 mm (0.002") maximum per 4.06 mm (0.160") of length or width in the depressed state, when