

SEMI G64-96 (Reapproved 0811) SPECIFICATION FOR FULL-PLATED INTEGRATED CIRCUIT LEADFRAMES (Au, Ag, Cu, Ni, Pd/Ni, Pd)

This Standard was technically approved by the global Assembly & Packaging Technical Committee. This edition was approved for publication by the global Audits and Reviews Subcommittee on July 1, 2011. Available at www.semiviews.org and www.semi.org in August 2011; originally published in 1996; previously published November 2004.

NOTICE: This Document was reapproved with minor editorial changes.

1 Purpose

1.1 This Specification is intended as a guideline for evaluating plating layer characteristics required by users of full-plated leadframes for plastic semiconductor packages.

1.2 *Background* — Full-plated leadframes have received attention in recent years as a possible solution to challenges and restrictions resulting from the effects of Pb on the environment, package reliability improvement due to the P.P.F. process, lead coplanarity on fine-pitched leadframes, and lead bridges with solder plating.

2 Scope

2.1 The specification and test procedures detailed in this Document apply to full-plated leadframes.

2.2 *Units* — SI units are used in this Document.

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 Referenced Standards and Documents

3.1 SEMI Standards and Safety Guidelines

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

SEMI G18 — Standard for Integrated Circuit Leadframe Material Used in the Production of Etched Leadframes

SEMI G21 — Specification for Plating Integrated Circuit Leadframes

SEMI G52 — Standard Test Method for Measurement of Ionic Contamination on Semiconductor Leadframes (Proposed)

SEMI G55 — Test Method for Measurement of Silver Plating Brightness

SEMI G56 — Test Method for Measurement of Silver Plating Thickness

3.2 ISO Standards¹

ISO 3497 — Metallic Coatings – Measurement of Coating Thickness – X-Ray Spectrometric Method

ISO 9227 — Corrosion Tests in Artificial Atmospheres – Salt Spray Tests

3.3 JIS Standards²

JIS C 0053 — Solderability Testing by the Wetting Balance Method

¹ International Organization for Standardization, ISO Central Secretariat, 1 rue de Varembé, Case postale 56, CH-1211 Geneva 20, Switzerland; Telephone: 41.22.749.01.11, Fax: 41.22.733.34.30, <http://www.iso.ch>

² Available through the Japanese Standards Association, 4-1-24 Akasaka, Minato-ku, Tokyo 107-8440, Japan; Telephone: 81.3.3583.8005, Fax: 81.3.3586.2014, <http://www.jsa.or.jp>

3.4 Military and Federal Standards³

MIL-C-14550 — Copper Plating, Electrodeposited

MIL-F-14256 — Flux, Soldering, Liquid, Paste Flux, Solder Paste, and Solder Paste Flux

MIL-G-45204 — Gold Plating, Electrodeposited

■ MIL-STD-883D — Test Methods and Procedures for Microelectronics (Method 2003.7, Solderability)

QQ-N-290 — Nickel Plating; Electrodeposited

■ QQ-S-365 — Silver Plating; Electrodeposited – General Requirements

■ QQ-S-571 — Solder, Electronic

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

4 Terminology

4.1 Definitions

4.1.1 *finish plating* — final plating layer whose electrodeposits fulfill the main purpose of the required characteristic.

4.1.2 *solderability* — an index of the wettability and coverage with solder of lead surface.

4.1.3 *underplating* — plating layers that complete the required characteristics of the final plating layer and lies between the base material and final plating layer.

5 Ordering Information

5.1 Priority

5.1.1 To avoid confusion, the order of precedence when ordering leadframes shall be as follows:

1. Purchase Order (agreed between user and supplier),
2. This Specification,
- 3. Referenced Standards and Documents.

6 Materials

6.1 *Base Material* — Cu alloys or Fe/Ni alloys.

6.2 *Plating Material* — Underplating and Finish plating are shown in Table 1.

Table 1 Underplating and Finish Plating

<i>Finish Plating</i>	<i>Underplating</i>	<i>Base Material</i>	
		<i>Cu-Alloys</i>	<i>Fe, Ni-Alloys</i>
Au (MIL-G-45204)	-	N/A	X
	Ni	X	X
Ag (QQS-365)	-	X	N/A
	Cu	X	X
Cu (MIL-C-14550)	-	X	X
	Ni	X	X
Ni (QQN-290)	-	X	X
	Cu	X	X

³ United States Military Standards, Available through the Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120-5099, USA; Telephone: 215.697.3321.