

SEMI G21-0317

SPECIFICATION FOR PLATING INTEGRATED CIRCUIT LEADFRAMES

This Standard was technically approved by the Assembly & Packaging Global Technical Committee. This edition was approved for publication by the global Audits and Reviews Subcommittee on December 8, 2016. Available at www.semiviews.org and www.semi.org in March 2017; originally published in 1980; previously published in 1994.

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1 Purpose

1.1 This Standard specifies the requirements for plating layers on leadframes intended for use at the upcoming inspection.

2 Scope

2.1 The specifications and test procedures detailed in this Standard apply to the internal section of leadframes. External leadframe finishes are not included.

2.2 *Hierarchy of Documents* — To avoid conflicts, the order of precedence when ordering plated leadframes shall be as follows:

- Purchase Order
- Customer’s Leadframe Drawing
- This Specification
- Referenced Documents
- Related Documents

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 — Integrated Circuit Leadframe Materials used in the Production of Stamped Leadframes

SEMI G18 — Materials Used in the Production of Etched Leadframes for Semiconductor Devices

3.2 ASTM Standards¹

ASTM B487 — Standard Test Method for Measurement of Metal and Oxide Coating Thickness by Microscopical Examination of Cross Section

ASTM B567 — Standard Test Method for Measurement of Coating Thickness by the Beta Backscatter Method

¹ ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, USA; Telephone: +1.610.832.9585, Fax: +1.610.832.9555, <http://www.astm.org>

ASTM B568 — Standard Test Method for Measurement Coating Thickness by X-Ray Spectrometry

ASTM E384 — Standard Test Method for Microindentation Hardness of Materials

ASTM F1269 — Standard Test Methods for Destructive Shear Testing of Ball Bonds

3.3 Military and Federal Specifications²

MIL-C-14550 — Copper Plating, Electrodeposited

MIL-G-45204 — Gold Plating, Electrodeposited

MIL-T-10727 — Tin Plating, Electrodeposits or Hot Dipped, for Ferrous and Non-Ferrous Metals

MIL-STD-883 — Test Methods and Procedures for Microelectronics

QQ-N-290 — Nickel Plating, Electrodeposited

QQ-S-3651 — General Requirements for Electrodeposited Silver Plating

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

4 Terminology

4.1 Definitions

4.1.1 *finish (plating)* — the final plating layer.

4.1.2 *resin bleed-out (die attach)* — the surface creep of a resin used for die attach beyond the outer perimeter of the bulk of the resin (filler). For a given resin formulation, the resin creep may be exacerbated by the micro-structure and cleanliness of the die attach surface.

5 Ordering Information

5.1 Purchase orders for material furnished to this Specification shall include the following information:

5.1.1 Leadframe drawing showing the areas to be plated and tolerances for the location.

5.1.2 *Plating Metal, Type, and Grade* — Underplate and finish plate.

5.1.3 Plating(s) thickness and tolerance.

5.1.4 Certification or Test Report requirements.

5.1.5 Reference to this Specification.

5.1.6 Any additions to or variations from this Specification.

6 Requirements

6.1 *Base Material* — See SEMI G4 and SEMI G18 for leadframe base metal specifications.

6.2 *Underplates* — When underplates are specified, the materials specified in Table 1 shall be used.

Table 1 Underplates

<i>Platings</i>	<i>Type Grade</i>	<i>Specifications</i>	<i>Specifications</i>
Nickel			QQ-N-290
Copper			MIL-C-14550
Gold	III	A	MIL-G-45204
Silver	I, II, III	B	QQ-S-3651

² 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.