

SEMI G34-89

SPECIFICATION FOR CER-PACK PACKAGE CONSTRUCTIONS, INCLUDING LEADFRAMES, SUITABLE FOR AUTOMATED ASSEMBLY BY END USERS

1 Preface

This specification defines the standard requirements for Cer-Pack package construction intended for automated assembly to printed wiring boards. Acceptance criteria for package constructions, including leadframes, are included.

2 Applicable Documents¹

2.1 This document specifically refers to:

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

2.2 Related information may also be found in:

MIL-M-38510 — General Specification for Microcircuits

3 Selected Definitions

burr — A fragment of excess material or foreign particle adhering to the surface.

chip — Region of ceramic missing from the surface or edge of a package which does not go completely through the package. Chip size is given by its length, width, and depth from a projection of the design plan-form (see Figure 1).

crack — Cleavage or fracture that extends to the surface of a package. It may or may not pass through the entire thickness of the package.

critical seal area — The area bound by the shortest line from the cavity corners to the ceramic edge (see Figure 2).

critical seal path — The nominal design distance across the critical seal area from the die cavity to ceramic edge.

fin — A fine, feathery-edged projection on the edge or corner of the ceramic.

glass flow — Heated sufficiently to remove all screen mesh marks visible at 10× magnification.

non-critical seal area — Those portions of the sealing surface falling outside the critical area (see Figure 2).

overhang — Horizontal extension of glass from the ceramic (see Figure 3).

projection — Raised portion of the surface indigenous with the parent material.

pull back — Defines a dimension covering the linear distance between the edge of the ceramic and the first measurable glass interface (see Figures 3, 4, and 5).

rundown — Vertical extension of glass from the ceramic (see Figure 3).

seal area — A dimensional outline area designated for sealing the base and cap together to provide a hermetic seal (see Figure 5).

void — An absence of metallization or glass from a designated metallized or glassed area on the ceramic surface.

4 Ordering Information

Purchase order for Cer-Pack package devices furnished to this specification shall include the following items:

1. Drawing number and revision level
2. Type and color of ceramic
3. Type and thickness of glass
4. Type and thickness of metallization
5. Description
6. Certification by vendor
7. Method of test and measurements (see Section 9)
8. Lot acceptance procedures (see Section 8)
9. Packaging and marking (see Section 10)
10. Lead finish requirements (see Section 6.5)

5 Dimensions and Permissible Variations

Packaged device dimensions shall conform to JEDEC JC-11 registered outline dimensions for Cer-Packs for Automated Assembly.

6 Materials

6.1 Ceramic

- 6.1.1 Alumina content to be 90% minimum.

¹ Military Standards, Naval Publications and Form Center, 5801 Tabor Avenue, Philadelphia, PA 19120

6.1.2 *Color* — Black, dark brown, or dark violet.

6.2 *Sealing Material* — Solder glass designed to form a hermetic seal. Glass type and temperature/time profile shall be specified.

6.3 *Die Attach Pad* — Gold (or other suitable material).

6.4 *Leadframe* — Fully annealed Alloy 42.

6.5 *Lead Finish* — Unless otherwise specified, hot tin-lead solder dip, Type A, per MIL-M-38510, to within 0.030" of lead seal on plated leads, and 100% coverage if applied directly over base metal.

7 Defect Limits

7.1 Ceramic

7.1.1 *Cracks* — Cracks are not allowed.

7.1.2 *Chips* — See Figures 1 and 2.

7.1.2.1 *Corner Chips* — 0.762 mm (0.030") × 0.762 mm (0.030") × 25% of package element thickness.

7.1.2.2 *Edge Chips* — 2.54 mm (0.060") × 0.762 mm (0.030") × 25% of package element thickness.

7.1.2.3 *Critical Seal Area* — Chips cannot reduce the critical seal path to less than half the nominal design dimension at any point. No more than four chips are allowed in the critical seal area.

7.1.3 Burrs, Projections, and Fins

7.1.3.1 *Cap* — 0.127 mm (0.005") maximum.

7.1.3.2 *Base* — 0.076 mm (0.003") maximum.

7.1.3.3 *Die Attach Surface* — 0.025 mm (0.001") maximum above metallization excluding a 0.254 mm (0.010") perimeter.

7.1.4 *Camber* — 0.050 mm (0.002") camber permitted up to maximum of 0.004 inch/inch (mm/mm).

7.2 Glass

7.2.1 *Chips or Voids* — Chips in the glass or missing glass is allowed, provided the region of the chipped or missing glass meets the minimum specified glass thickness after melting the glass as specified.

7.2.2 *Glass Misalignment* — (after glass flow) (see Figure 3.)

7.2.2.1 *External Overhang* — 0.127 mm (0.005") maximum.

7.2.2.2 *External Rundown* — 30% of ceramic thickness maximum.

7.2.2.3 *Pullback* — See Table 1 and Figures 2, 3, and 4.

Table 1 Maximum Allowable Pullback

Side external (critical seal)	0.010" (2.54 mm)
Side external (other)	0.015" (0.381 mm)
End external	0.020" (0.508 mm)
Side cavity	0.010" (0.254 mm)
End cavity	0.010" (0.254 mm)

NOTE: Maximum allowable critical seal area reduction on any one side between side cavity and side external shall not reduce critical seal path to less than 0.635 mm (0.025").

8 Sampling

Sampling will be determined between supplier and purchaser.

9 Functional Test Methods

9.1 Die Attach Quality

9.1.1 Visually inspect preform wetout after die attach. Minimum fillet shall be 75% of the die perimeter.

9.1.2 Perform destructive die shear test post environmental testing per MIL-STD-883, Method 2019.

9.1.3 Inspect to reveal voids in the die attach eutectic alloy or approved silver-filled glass per MIL-STD-883, Method 2012.

9.2 *Lead Bond Quality* — Perform minimum pre-seal and post-seal bond strength test per MIL-STD-883, Method 2011, Test Condition D. Reject for bonds causing the metallization to lift from the leadframe post.

9.3 Hermetic Environmental Testing

9.3.1 The hermetic integrity of the package must be maintained after all environmental testing. Hermetic check shall comply with MIL-STD-883, Method 1014, Test Condition A, or B and C.

9.3.2 Environmental testing shall include, but not be limited to, the following:

9.3.2.1 Temperature Cycle per MIL-STD-883, Method 1010, Condition C.

9.3.2.2 Thermal Shock per MIL-STD-883, Method 1011, Condition B.

9.3.2.3 Centrifuge per MIL-STD-883, Method 2001, Condition D, Y axis only.

9.3.2.4 Moisture Resistance per MIL-STD-883, Method 1004.

9.4 *Die Attach Material Thickness* — Die attach material thickness shall be measured by standard cross-sectioning without smearing.