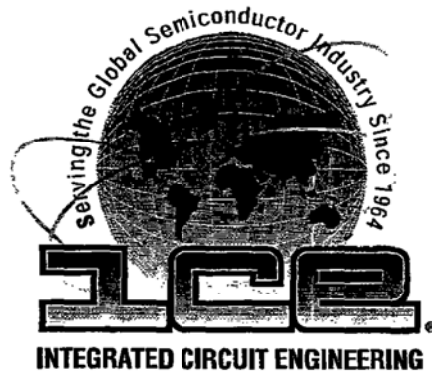


EXHIBIT C

Construction Analysis

Samsung KM44C4000J-7 16 Megabit DRAM

Report Number: SCA 9311-300I



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INTRODUCTION

This report describes a construction analysis of the Samsung KM44C4000J-7 16-megabit CMOS Dynamic RAM. Four samples molded in 24-pin plastic SOJ packages and date coded 9313 were supplied for the analysis. Analysis of the packaging and assembly is included.

MAJOR FINDINGS

Questionable Items:¹

- Silicon nodules occupied up to 75 percent² of metal 2 line widths (Figure 16).

Special Features:

- Twin-well process with sub-micron geometries (0.3 micron poly 1 and 0.5 micron metal 1).
- Two levels of metal, four levels of poly.
- Metal 1 contacts were completely filled with aluminum (aluminum reflow).

¹These items present possible quality or reliability concerns. They should be discussed with the manufacturer to determine their possible impact on the intended application.

²The seriousness depends on design margins.

TECHNOLOGY DESCRIPTION

Assembly:

- 24-pin (28 pin format) plastic small-outline J-lead package (SOJ).
- Iron-nickel (FeNi) leadframe.
- External leads were coated with tin-lead (SnPb) solder.
- Internal leadframe plating consisted of spot-plated silver (Ag) over a thin copper (Cu) flash. No plating was present on top of the header.
- Lead-locking provisions (anchors) were present at all pins.
- A dimpled header was employed.
- All pins were connected.
- Die attach was by silver (Ag)-epoxy.
- Dicing was by the sawn method.
- Wirebonding was by the thermosonic ball bond method using 1.3 mil O.D. gold wire.

Die Process and Design:

- Fabrication process: Selective oxidation CMOS process with twin wells in a P(?) substrate.
- Die coat: A patterned (to clear bond pads) polyimide die coat was present to protect against alpha particle-induced leakage.
- Overlay passivation: A layer of silicon-nitride over two layers of silicon-dioxide. The second layer of silicon-dioxide was multilayered.

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