

Introduction

What are Cavity-Down BGAs?

Copper-based cavity down BGAs are high performance, low profile packages that offer superior electrical and thermal characteristics. This technology is especially applicable for high-speed, high-power semiconductors such as Xilinx's Virtex devices family.

Package Construction

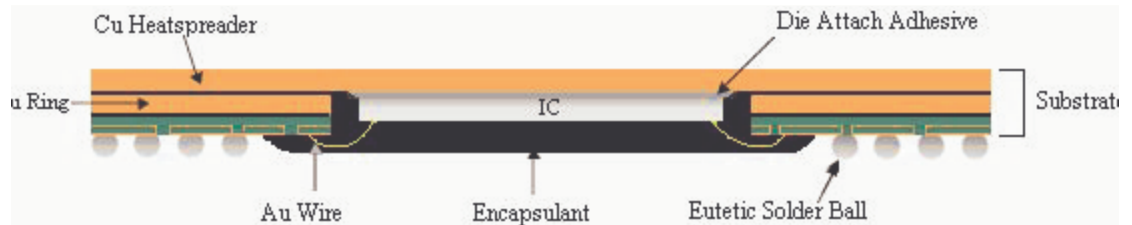


Figure 1: Cavity-Down BGA

The figure above depicts the cross-section of the Cavity-Down BGA package. The backside is attached directly to the copper heat spreader and conducts heat out of the package through an epoxy die attach adhesive. The larger the die size and the package body size, the better the thermal performance. The incorporation of the copper heat spreader also results in thermal resistance values that are lowest among the packages offered by Xilinx.

Attached to the heatspreader is a copper stiffener with cavity out to accommodate the die. Along with the heatspreader, this stiffener provides the mechanical flexural strength and warpage control for the package. On the exposed surface of the stiffener is a laminate or build-up structure that contains the circuit traces, the power and ground planes if any, and the sites for the connecting solder balls. The laminate is made of either a glass reinforced high glass-transition Temperature (Tg) Bismaleimide Triazine (BT) or Build up structure. Up to four layers may be used to implement a design that may contain power and ground planes.

This package has two different ball pitches (1.27 mm and 1.00 mm). The 1.00 mm pitch packages are part of the Fine Pitch BGA family. All cavity down BGA packages are qualified for Jedec Level 3 moisture level.

Key Attributes of Xilinx Cavity-Down BGA

- Lowest Thermal Resistance ($\theta_{ja} < 15^{\circ}\text{C/W}$)
- Superior Electrical Performance
- Low Profile and Light Weight Construction
- Pincount offered by Xilinx: 352 - 860, Package size: 35 mm to 42.5 mm.
- Fine die pad pitch support (to 60 microns)
- Passes Jedec L3 moisture level conditioning
- Passes 1000 Cycles of -40 to 125°C Temperature Cycling at 2nd level (board level)

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Table 1: Xilinx Cavity-Down BGA Offerings

Package Code	Ball Count	Body Size (mm x mm)	Ball Pitch (mm)	Ball Pattern
BG352	352	35 x 35	1.27	4 perimeter rows
BG432	432	40 x 40	1.27	4 perimeter rows
BG560	560	42.5 x 42.5	1.27	5 perimeter rows
FG680	680	40 x 40	1.00	5 perimeter rows
FG860	860	42.5 x 42.5	1.00	6 perimeter rows

[Package Drawings](#)

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