AMD Geode™ GX Processors BGU and BGD Package Differences

1.0 Scope

The purpose of this document is to summarize the differences between the BGU (Ball Grid Array Cavity Up) and BGD (Ball Grid Array Cavity Down) packages of the AMD Geode™ GX processors (i.e., Geode GX 533@1.1W processor*, Geode GX 500@1.0W processor*, and Geode GX 466@0.9W processor*). Hence, providing the system designer with the necessary information to make the right choice for their application. Each difference notes if there are any hardware or software implications specifically related to one choice over the other.

2.0 Discussion

The following subsections summarize the functional and mechanical differences between the BGU (plastic) and BGD (metal top) packages. For a complete description of the ball assignments, thermal specifications, part number order information, and mechanical package outlines refer to the *AMD Geode™ GX Processors Data Book* (publication #31505).

2.1 Display Options

The BGD package has two functionally different SKUs: CRT version and TFT version. Therefore, the choice of display dictates the SKU to select. Software can read the DM (Display Mode) bits of the Video Processor module's GeodeLink™ Device Master Configuration Model Specific Register (GLD_MSR_CONFIG, MSR C0002001h[7:6]) to determine the SKU.

The BGU package has only one SKU and it supports either CRT or TFT. FP/CRT# (ball U24) selects the display output. The selection can only be made at device reset and cannot change during operation; consequently, simultaneous operation is not supported. This signal does not exist on the BGD package. Like the BGU package, software can read from the DM bits to determine which display option has been selected. Table 2-1 gives a description for the DM bits.

Table 2-1. Display Mode Bits Description

Bit	Name	Description
7:6	DM (RO)	**Display Mode (Read Only).** Affects reset value. 00: CRT. 01: Flat Panel. 10: Reserved. 11: Reserved. **Note:** For the BGD package, these bits identify which BGD device is in the system (i.e., CRT or TFT). With respect to the BGU package, these bits are set by the FP/CRT# signal (ball U24)

2.2 Ball Assignment

The same die is used in both packages. In the case of the BGD the die is facing down, and for the BGU it is facing up. However, the ball assignments are different. This means that each package requires a unique layout. A common layout that can accept either package is not feasible.

2.3 Thermal Specification

While the thermal characteristics are different for the two packages, the case temperature specification is the same. AMD guarantees 0° to 85° operation.

2.4 Board Assembly

Both packages are available with lead-free or eutectic balls. (When ordering, the proper part number should be specified.) Reflow profiles should be developed consistent with JEDEC J-STD-020.

*The AMD Geode GX 533@1.1W processor operates at 400 MHz, the AMD Geode GX 500@1.0W processor operates at 366 MHz, and the AMD Geode GX 466@0.9W processor operates at 333 MHz. Model numbers reflect performance as described here: http://www.amd.com/connectivitysolutions/geodegxbenchmark.

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