

# Mechanical Differences Between the 196-pin MAP-BGA and 196-pin PBGA Packages

This document describes the differences between the 196-pin Mold Array Process-Ball Grid Array (MAP-BGA) and the 196-pin Plastic Ball Grid Array (PBGA) packages. The MAP - BGA is an identical pinout and drops into a board laid out for PBGA. Many members of the DSP56300 family of Digital Signal Processors will be available in MAP-BGA in 2001. This document provides the information required to simplify the transition to the 196-pin MAP-BGA package.

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# 1 Summary of Differences

The 196-pin MAP-BGA will be Motorola's production ball grid array (BGA) package and will eventually replace the 196-pin plastic ball grid array (PBGA) on selected member of the DSP56300 family. **Table 1** summarizes the differences between these two packages.

**Table 1.** Differences Between 196-Pin MAP-BGA and PBGA

	196-pin MAP-BGA	196-pin PBGA	Difference
X-Y Dimensions	15 x 15 mm	15x 15 mm	N/A
Ball Pitch	1.0 mm	1.0mm	N/A
Pinout			N/A
Electrical Performance			N/A
Package Height	1.60 mm max	1.75mm max	MAP-BGA has lower maximum profile
$Q_{JA}$	50 (no airflow)	50 (no airflow)	N/A
Moisture Sensitivity	MSL3 capable	MSL3 capable	N/A
Coplanarity Specification	0.10 mm	0.15 mm	MAP-BGA has a tighter spec.
Encapsulant Method	Transfer Molding	Liquid dispensing	Different
Tg	175 deg. C	159 deg C	Map-BGA superior
Singulation	Saw cutting	Punch shear	Different process but no mechanical differences
Flammability Rating	VO	HB	MAP-BGA is superior
Package Identifier	VF	GC	Different
Packing Trays/ Tape and Reel			N/A
Solder Balls			N/A

## 2 Pinout and Electrical Performance

Pinout and electrical performance is identical for a given device on both MAP-BGA and PBGA packages. For details on pinout and electrical performance, refer to the data sheet of the particular device.

## 3 Dimensions

Mechanical drawings of each package are shown in **Figure 1** through **Figure 4**.

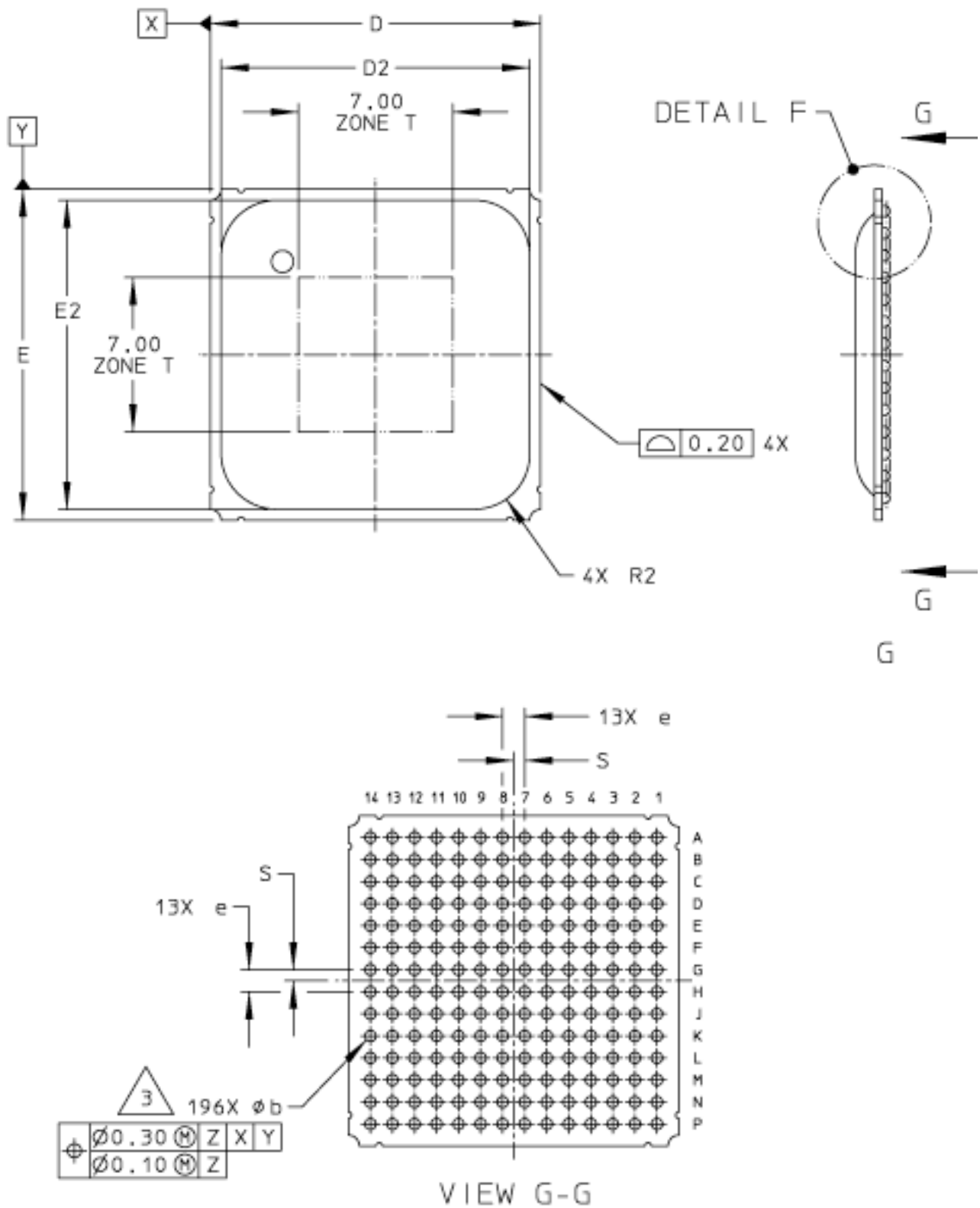
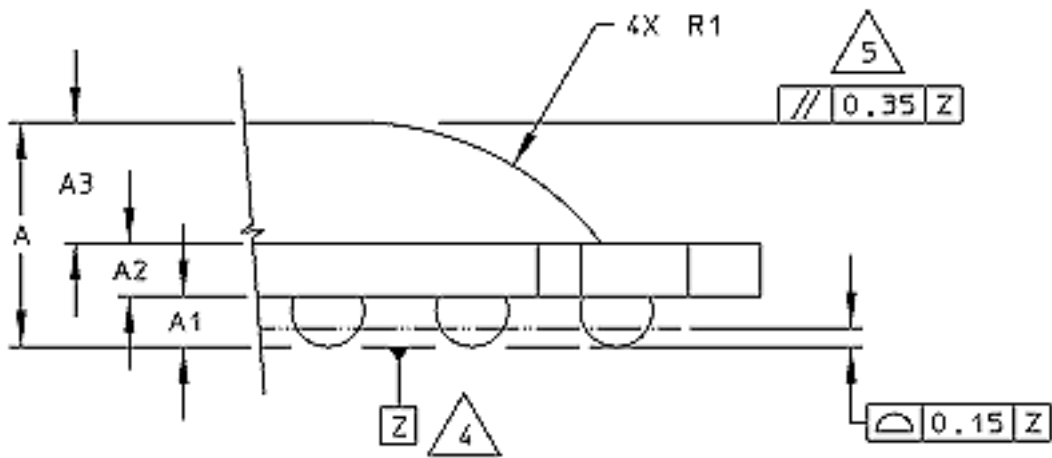


Figure 1. PBGA Mechanical Outline 1



DETAIL F  
VIEW ROTATED 90° CLOCKWISE

MIN	MAX	NOTES
---	1.75	1. DIMENSIONS AND TOLERANCES PER ASME Y14.5M-1994. 2. DIMENSIONS ARE IN MILLIMETERS. 3. DIMENSION b IS THE MAXIMUM SOLDER BALL DIAMETER MEASURED PARALLEL TO DATUM C. 4. DATUM C (SEATING PLANE) IS DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS. 5. PARALLELISM REQUIREMENT APPLIES WITHIN ZONE T ONLY. PARALLELISM REQUIREMENT SHALL EXCLUDE ANY EFFECT OF THE MARKING ON TOP SURFACE OF PACKAGE.
0.27	0.47	
0.36	REF	
0.70	1.00	
0.35	0.65	
15.00	BSC	
12.00	15.00	
15.00	BSC	
12.00	15.00	
1.00	BSC	
2.50	REF	
0.40	2.50	
0.50	BSC	

Figure 2. PBGA Mechanical Outline 2

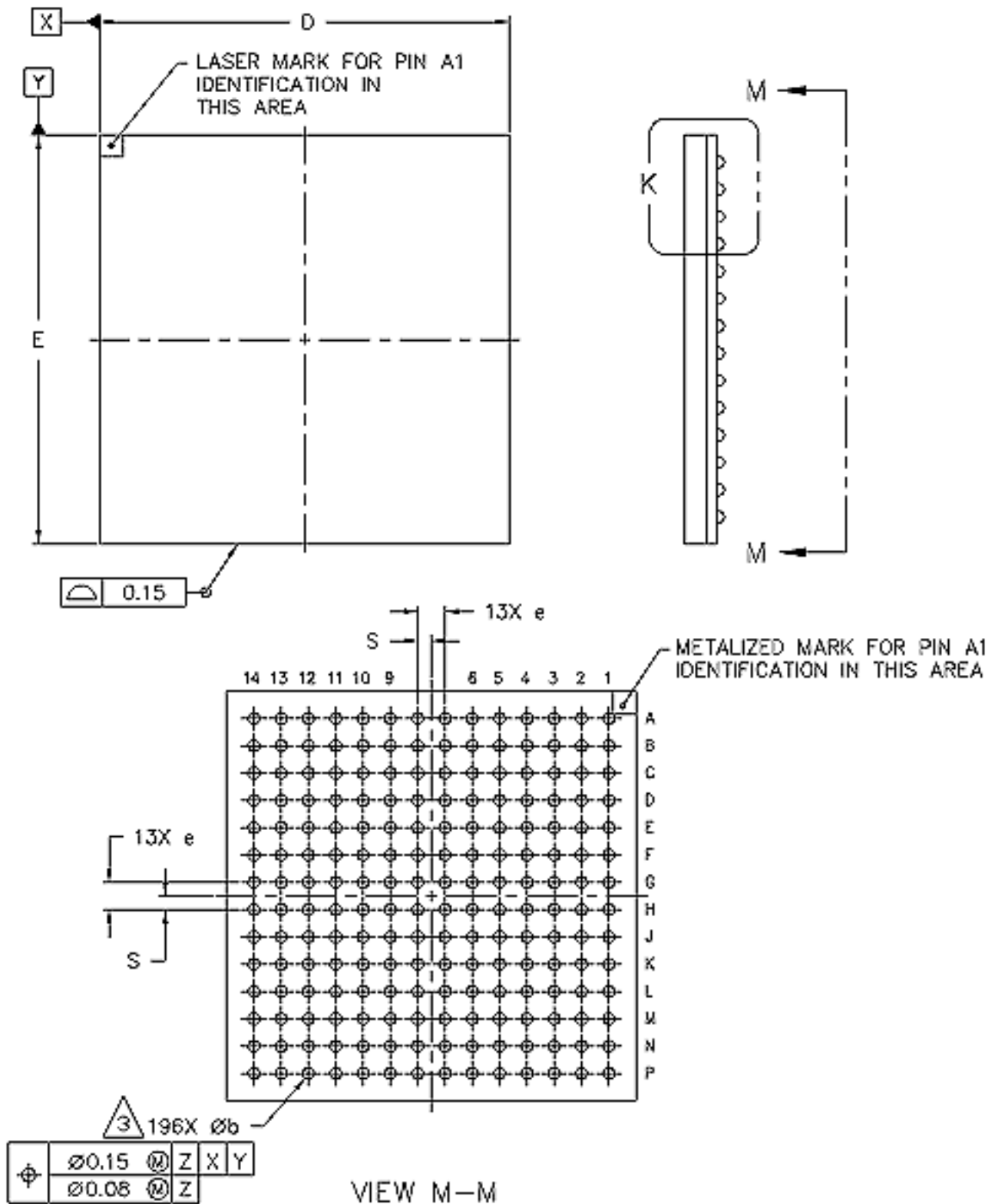
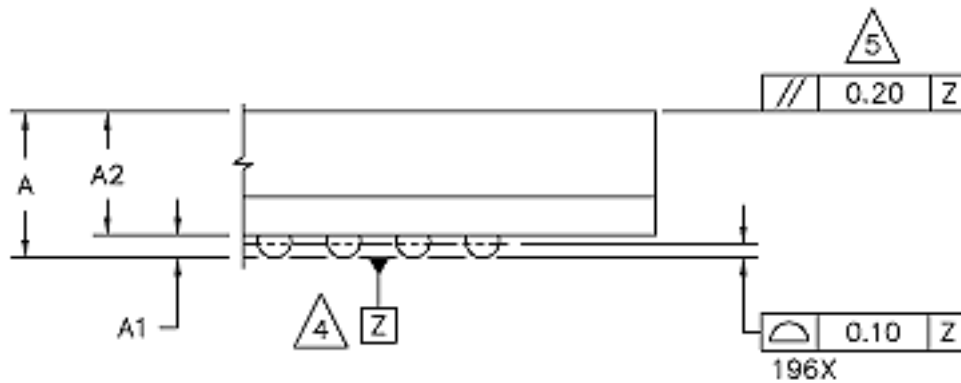


Figure 3. MAP Mechanical Outline 3



DETAIL K  
ROTATED 90° CLOCKWISE

DIM	MIN	MAX	NOTES
A	1.25	1.60	1. DIMENSIONS ARE IN MILLIMETERS.
A1	0.27	0.47	2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M-1994.
A2	1.16	REF	
b	0.45	0.55	3. DIMENSION b IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO DATUM PLANE Z.
D	15.00	BSC	
E	15.00	BSC	4. DATUM Z (SEATING PLANE) IS DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.
e	1.00	BSC	
S	0.50	BSC	5. PARALLELISM MEASUREMENT SHALL EXCLUDE ANY EFFECT OF MARK ON TOP SURFACE OF PACKAGE.

Figure 4. MAP Mechanical Outline 4

## 4 Die Changes

There are no changes to the die used in the MAP-BGA package. Identical wafers are used for both MAP-BGA and PBGA packages.

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