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JEDEC DESIGN STANDARD

**DESIGN REQUIREMENTS FOR OUTLINES OF
SOLID STATE AND RELATED PRODUCTS**

JEDEC STANDARD

NO. 95-1

SECTION 4

QUAD FLATPACK

JEDEC
Solid State Products Engineering Council

4 QUAD FLAT PACK

4.1 Illustrations

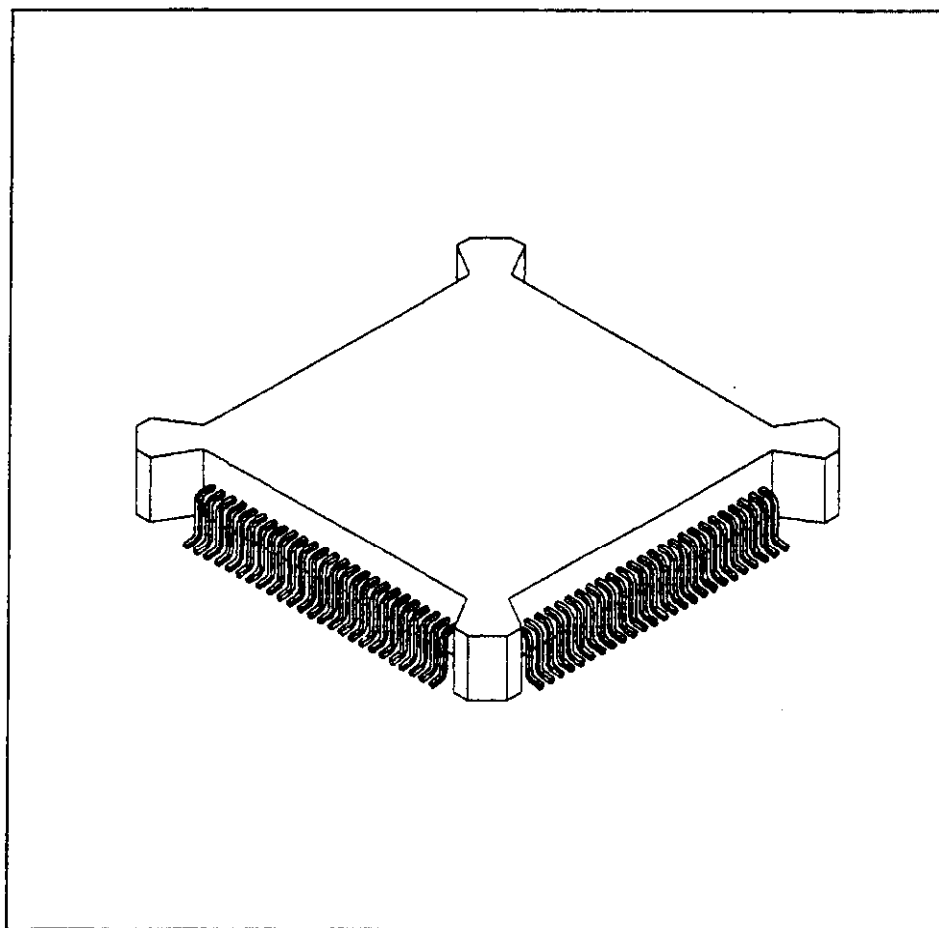


Figure 4-1
Quad Flatpack
with
Bumpers

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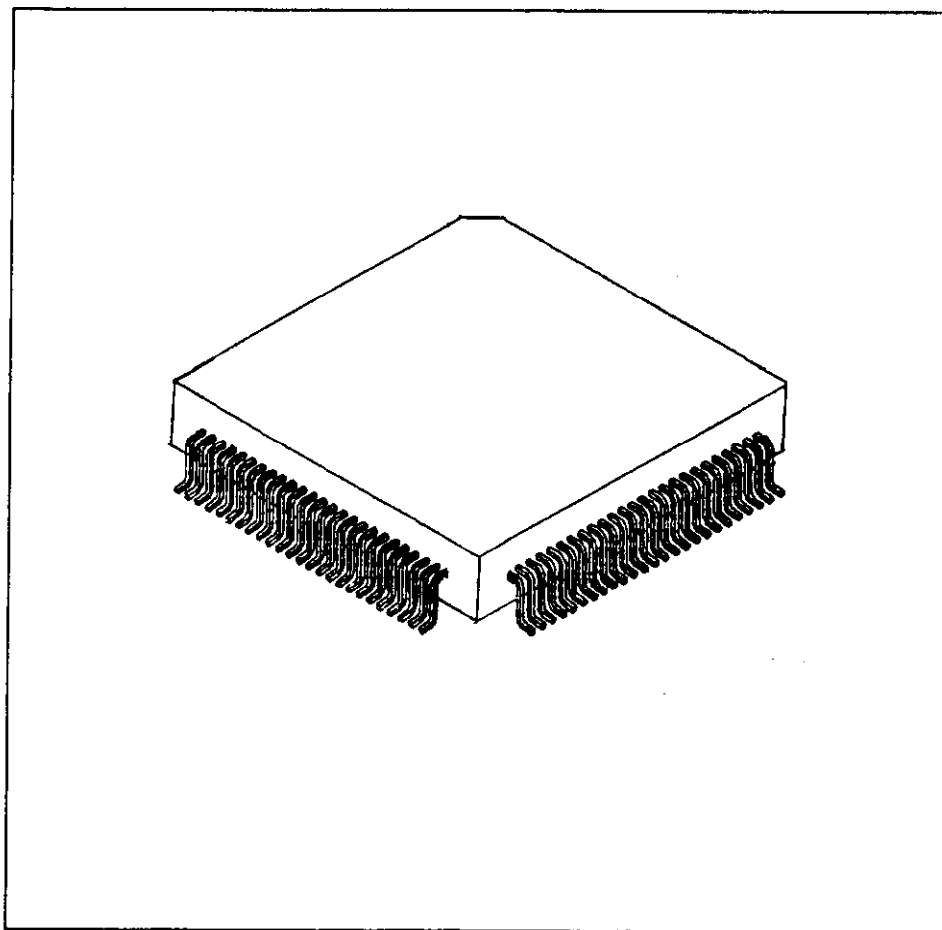


Figure 4-2
Quad Flatpack

4.2 Quad Flatpack (QFP)

A Quad Flatpack is a rectangular or square package with leads extending from each side of the package. The true position centerlines of the leads lie in planes that are established by the datum reference frame "A-B", "D", "C" (see Figure 4-3).

This section deals with outline drawing and dimensions that are to be specified for QFP. The principles outlined in Section 2 and ANSI Y14.5M are to be followed in establishing dimensions and tolerances. Note that it is important to consider the effect of dimensions and tolerances on the system as a whole. These include the interaction with handling and test systems, sockets and mounting on PC boards.

4.2.1 Terms and Definitions

Numbers in triangles of the following paragraphs correspond to the numbers in triangles of **Figures 4-3, 4-4, 4-5, 4-6, 4-7, 4-8, 4-9, 4-10 and 4-11.**

1 Seating Plane, Datum -C- The plane established by the contact points of three or more leads that support the device when it is placed on top of a horizontal planar surface (see Figure 4-3).

NOTE: This is the plane on which the package may be mounted on printed wiring board, in a socket, etc. The feet of the leads are datum features that, when used with suitable tooling, establish the datum plane -C-. If multiple seating planes exist, i.e., the device can rock on the seating plane, then all must be considered. The most stable plane shall be used for all measurements.

2 Datum Plane -H- The plane coincident with the bottom surface of those leads that establish datums -A-B- and -D-, as they exit the body. See **Figures 4-3 and 4-5.** The bottom of the leads are datum features that, when used with suitable inspection equipment, establish datum plane -H-

3 Base Plane The plane, parallel to the seating plane, established by the lowest point of the package body.

4 Datums -A-B- and -D- The datum planes established by the centers of the center leads (for an odd number of leads per side) and the center space between leads (for an even number of leads per side; see item "37" and Figure 4-10) where they exit the body. These two datum planes are mutually perpendicular to each other and to datum plane -C-. They form a Datum Reference Frame. This reference frame exists in theory only and not on the part. Suitable tooling or inspection equipment must be used to establish the datum reference frame. An overlay can be used to establish datums -A-B- and -D-. Datums -A-B- and -D- do not necessarily coincide with the centerlines of the body.

5 Dimensions "D1" and "E1" The body dimensions measured in a plane (at Datum -H-) parallel to the seating plane. These dimensions do not include allowable protrusions or flash, but do

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include offset between top and bottom halves of the body. Offset is the displacement of the centerline of the upper half of the body with respect to the centerline of the lower half of the body.

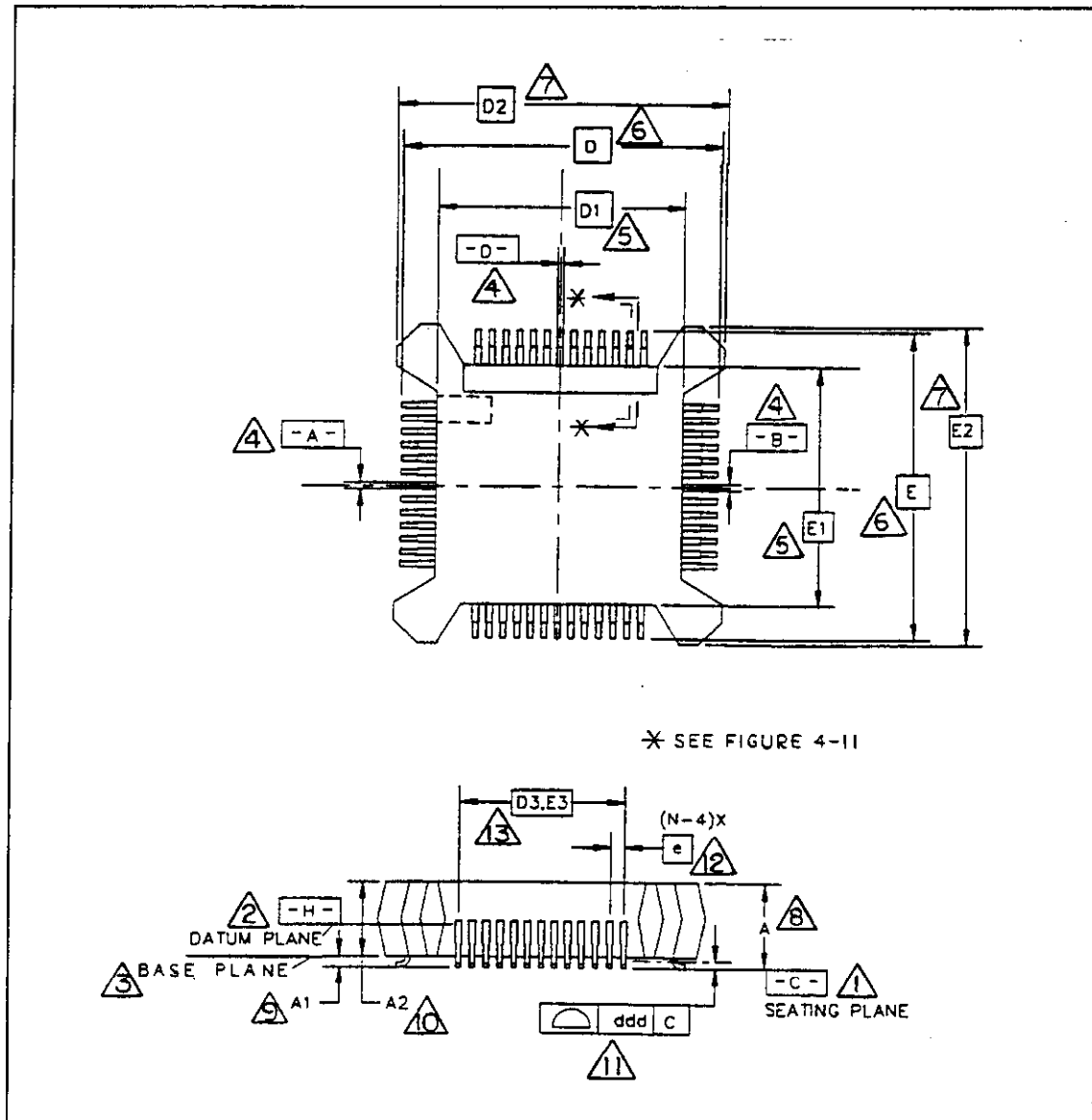


Figure 4-3
Principal Dimensions and Datums

Depending on the amount of offset and the difference in size between upper and lower body halves, the following may occur: an edge of the upper part may extend beyond the edge of the lower part; on the opposite side of the body, the reverse condition may exist. An appendix will be added in the future which will discuss protrusion; see also dimension "Z".

△6 Dimensions "D" and "E" Lead-tip to lead-tip dimensions measured parallel to D1 and E1.

△7 Dimensions "D2" and "E2" The dimensions that control the size of the bumpers, which are optional. When bumpers are used "D" and "E" must always be less than "D2" and "E2".

△8 Dimension "A" The distance from the seating plane to the highest point of the package.

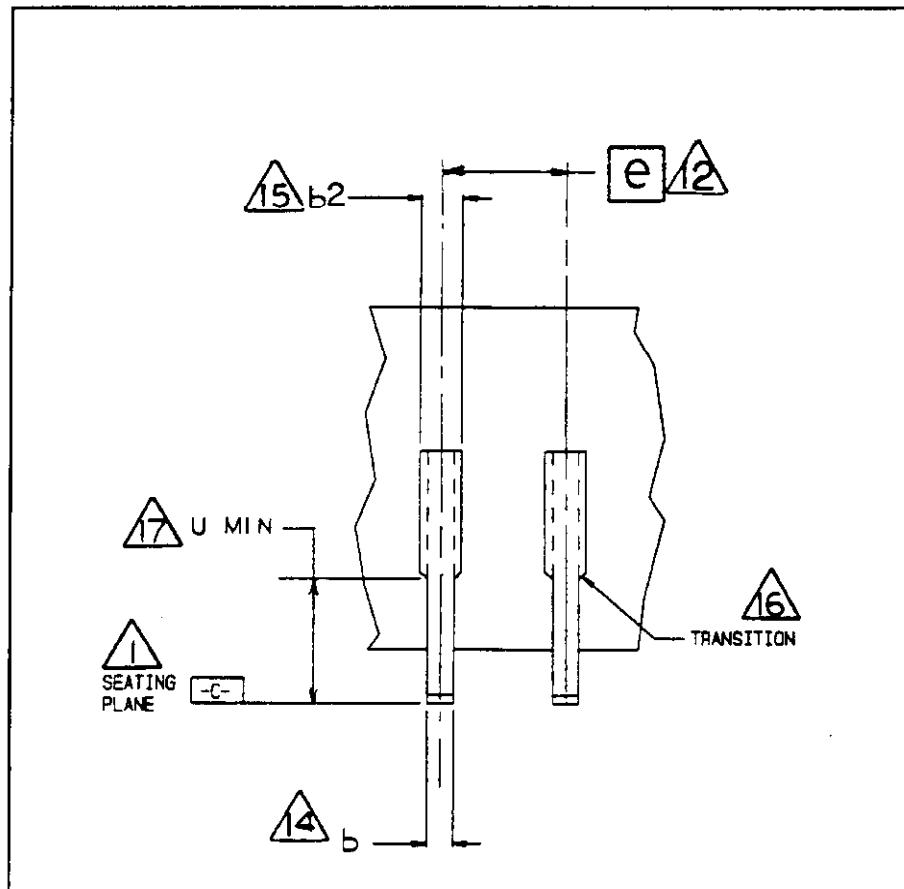


Figure 4-4
Terminal Front View

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9 **Dimension "A1"** The distance between the seating plane and the base plane.

10 **Dimension "A2"** The distance between the base plane and the highest point of the package.

11 **Coplanarity of Formed Leads "ddd"** The lead tips must lie within a specified tolerance zone. This tolerance zone is defined by two parallel planes. One plane is the seating plane, datum [-C-]; the other plane is at the specified distance from [-C-] in the direction indicated. See Appendix B for more details. If the device, when seated on a plane surface, can rock or assume more than one position, then all positions must meet the specified tolerance (see Figure 4-3).

12 **Dimension "e", Pitch** is the basic dimension that establishes the spacing between the true position of the centerlines of the leads. The specified positional tolerance establishes a tolerance zone into which the centerline of each lead must fall.

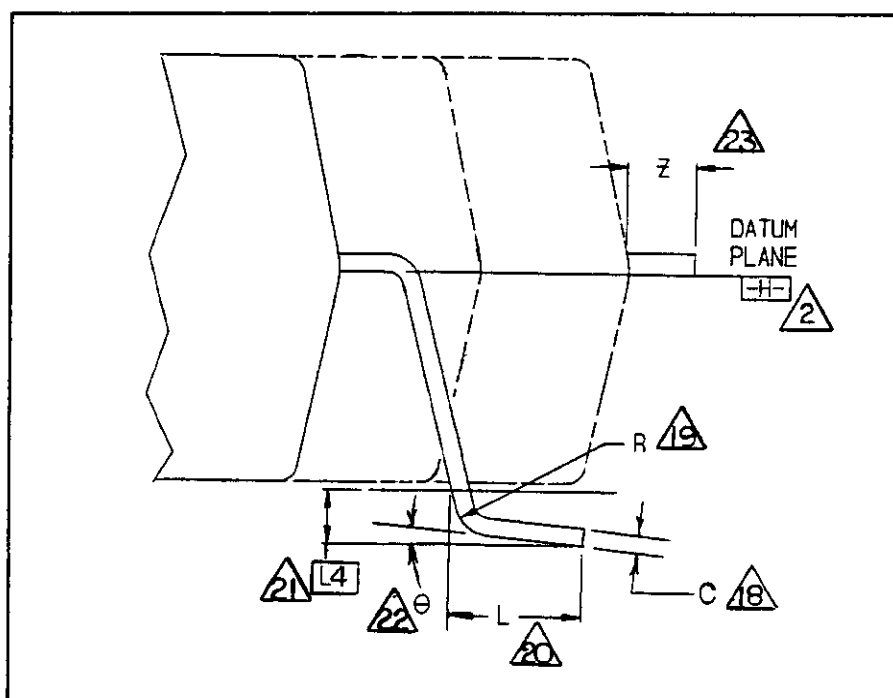


Figure 4-5
Terminal Side View

13 **Dimension "D3 and E3"** is the basic distance between centerlines of the first and last leads on a side of the package. This distance is equal to pitch multiplied by the number of leads, less one, per side. These dimensions are optional.