

## Description

### Background of the Invention

#### 1. Field of the Invention

This invention relates to an improved carrier which provides both mechanical and static shielding protection for dual in-line package (DIP) integrated circuit components or devices and in one aspect to a carrier to accommodate a single 7.62mm, 10.16mm or 15.24mm (300, 400 or 600 mil) DIP.

#### 2. Description of the Prior Art

The integrated circuit devices must be shipped from the manufacturer to the user; and at the user's plant, the integrated circuit devices are stored for use and supplied as needed. Since the integrated circuit devices comprise pins which extend from the sides of the devices for attachment to printed circuit boards, it is advantageous that such pins not be bent or displaced. The pins are generally formed to extend from parallel sides; and when extending from just two sides, the components are referred to as dual in-line package (DIP) integrated circuit components or devices. The spacing between the pins is measured in thousandth of an inch or mils and the DIP components are thus identified as the 7.62mm, 10.16mm and 15.24mm (300, 400, and 600, etc. mil) etc, DIP.

Prior to this invention individual DIP components were shipped on foam carriers, offering limited mechanical protection, in shielded bags offering no mechanical protection, or in blister packaging which offered both mechanical and static shielding protection but at a high unit cost.

The foam carriers and bags offered a universal package for all of the popular sizes of components but they are bulky and not entirely satisfactory. They do not offer the desired degree of mechanical and static shielding protection to protect the integrated circuit and to protect the pins from undesirable displacement. The existing blister packages do not afford universal packaging and inventory of sizes and the cost make them undesirable.

United States patent No. 4,585,121 discloses a container formed of an electrically conductive, high temperature resistant carbon plastic for storing and handling multichip hybrid packages, which container comprises a receptacle having dividers partitioning the receptacle into three compartments. The dividers support the leads extending from the sides of the packages and the cover has ledges for clamping the leads against the dividers.

The prior art containers are not designed to accommodate dual in-line packages of various

sizes and offer sufficient mechanical and static shielding protection to the DIP's.

### Summary of the Invention

The carrier of the present invention comprises a box-like shell and cover which are hinged together. The shell comprises a rectangular bottom wall and side walls forming a receptacle. Projecting from the bottom wall and into the shell are spaced walls adapted to fit between the dual rows of pins on the DIP integrated circuit components. The walls in the carrier of the present invention are so spaced to support a single DIP, 7.62mm, 10.16mm or 15.24mm (300, 400 or 600 mil DIP) to offer mechanical and static shielding protection by walls in the shell comprising a first pair of parallel walls having surfaces spaced 0.71 cm, a second pair of parallel walls having surfaces spaced 0.97 cm and at least one third pair of parallel walls positioned perpendicular to said first and second pairs of walls having surfaces spaced 1.5 cm for supporting a single dual in-line packaged integrated circuit device of 7.62mm and 10.16mm (300 mils and 400 mils) and alternatively a single dual in-line packaged integrated circuit device of 15.24mm (600 mils). The cover is then placed over the shell to enclose the component.

### Brief Description of the Drawing

The present invention will be more fully described with reference to the accompanying drawing wherein:

Figure 1 is a perspective view of the present invention;

Figure 2 is a bottom plan view of a series of carriers formed according to the present invention;

Figure 3 is a top plan view of a carrier according to the present invention; and

Figure 4 is an end view of a carrier, partly in section to show interior details.

### Detailed Description of the Preferred Embodiment

Referring to the accompanying drawing there is illustrated a single component carrier generally designated 10 which is preferably formed in a chain of such devices as shown in Figure 2.

The carriers 10 are joined by frangible tabs or webs 11 of a semicircular shape joined tangentially to a similar tab 11 on a second carrier. The tabs 11 have a reduced thickness where they meet a tab from an adjacent, second carrier and are thus easily cut or broken along the tangential edge.

The carrier 10 comprises a box-like shell 12 and a cover 13. The cover 13 is joined along one

edge to one side wall of the shell 12 by an integral hinge defined by a reduced thickness molded web 14.

The carrier 10 is molded from an electrically conductive polymeric composition preferably a conductive polyolefin having a volume resistivity of less than  $10^5$  ohm cms. A suitable composition is preferably fabricated from a polyallomer loaded with carbon particles the latter rendering the material conductive. To provide the material with adequate electrically conductive characteristics, conductive carbon particles in the range of 10-40% by weight were added to the polyallomer. The preferred percentage of carbon particles was found to be about 25%.

An electrically conductive material having a volume resistivity above  $10^5$  ohm cm and below  $10^9$  ohm cm is not currently known which is readily usable in injection molding equipment. The use of such electrically conductive material is sufficient to afford static shielding for some components. Therefore, such material, i.e., static dissipative materials are considered suitable for use in the present inventions. The electrically conductive material provides shielding to restrict deleterious to the component problems caused by static electricity.

The shell 12 comprises a rectangular bottom wall 15 and four side walls comprising opposed end walls 16 and 17, a front wall 18 and back wall 19. Projecting into the shell 12 from the bottom wall are spaced walls adapted to fit between the rows of pins on a dual in-line package (DIP) integrated circuit (IC) component. These walls are of sufficient height to hold the pins slightly spaced from the bottom wall and they are shorter than the side walls 16-19 to afford space for the body of the IC component in the shell 12 below the cover 13. A preferred height for the walls is 0.53 cm (0.21 inch).

Referring now to Figure 3, the position of the walls for supporting the components mechanically will be described. A first pair of walls are spaced such that the outside surfaces are separated by 0.71 cm (0.280 inch) to receive thereover a 7.62mm (300 mil) DIP. The first pair of walls comprises two parallel walls 20 and 21 positioned perpendicular to and spaced generally symmetrically between the front 18 and back wall 19. Additional wall segments 22, 23, 24, and 25 are aligned with the walls 20 and 21 and are spaced from said two walls and project from the bottom wall 15 and are joined to said front and back wall as illustrated.

A second pair of walls are spaced such that the outside surfaces are separated by 0.97 cm (0.380 inch) to fit between the pins of a 10.16mm (400 mil) DIP. The second pair of walls comprises two parallel spaced walls 27 and 28 positioned perpendicular to and spaced generally symmetrically

between the front 18 and back wall 19. Additional wall segments 29, 30, 31, and 32 are aligned with the walls 27 and 28 and are spaced therefrom. The wall segments 29-32 are joined to the front and back wall and project from the bottom wall 15.

A third pair of spaced parallel walls are formed to receive a 15.24mm (600 mil) DIP. These walls are separated by 1.5 cm (0.580 inch). The third pair of walls comprise two parallel walls 34 and 35 which are joined to the ends of the walls 27 and 28. The outside surfaces of these walls 34 and 35 support the 15.24mm (600 mil) DIP. The third pair further comprises additional wall segments 36 and 37, which are aligned with the walls 34 and 35 and joined to the ends of the walls 20 and 21. The spacing between the walls 34 and 36 and the ends of walls 22, 23, 29, and 30 are sufficient to receive the pins of a DIP component, e.g., 0.33 cm (0.13 inch) and the same is true for the spacing between the walls 35 and 37 and wall segments 24, 25, 31, and 32.

The overall length of the carrier is preferably 4.2 cm (1.65 inch) and the width of the shell 12 preferably does not exceed 2.8 cm (1.1 inch).

Thus a single IC component of one of the sizes 7.62mm, 10.16mm, 15.24mm (300, 400, 600 mil) DIP can be placed in the same carrier 10 and there is no need to stock three different sizes of IC carriers.

As shown in the drawing, the cover 13 is hinged along the top edge of the back wall 19. The cover 13 has a rectangular top and downwardly depending edge walls 39 to enclose the shell. Two openings or recesses 40 are formed at the juncture of the top and front edge wall to receive two detents 41 formed on the front outer edge of the front wall 18 to reasonably secure the cover to the shell and enclose a DIP component within the shell atop a pair of walls. A protrusion 42 is formed on the cover 13 and is spaced from the edge wall 39 a distance to receive the front wall 18 therebetween. Spaced bosses 44 and 45 are formed on the cover 13 to engage the body of a 7.62mm (300 mil) DIP to retain the same, but the bosses are spaced sufficiently to be placed on opposite sides of a 15.24mm (600 mil) DIP when placed over the walls 34, 35, 36, and 37.

#### Claims

1. A static shielding carrier (10) affording mechanical support for a dual in-line packaged integrated circuit device, said carrier (10) comprising a box-like shell (12) formed of electrically conductive polymeric material having a bottom wall (15) of rectangular shape, side walls (16,17,18,19), and a cover (13) with hinge means joining said cover to one of said side

edge to one side wall of the shell 12 by an integral hinge defined by a reduced thickness molded web 14.

The carrier 10 is molded from an electrically conductive polymeric composition preferably a conductive polyolefin having a volume resistivity of less than  $10^5$  ohm cms. A suitable composition is preferably fabricated from a polyallomer loaded with carbon particles the latter rendering the material conductive. To provide the material with adequate electrically conductive characteristics, conductive carbon particles in the range of 10-40% by weight were added to the polyallomer. The preferred percentage of carbon particles was found to be about 25%.

An electrically conductive material having a volume resistivity above  $10^5$  ohm cm and below  $10^9$  ohm cm is not currently known which is readily usable in injection molding equipment. The use of such electrically conductive material is sufficient to afford static shielding for some components. Therefore, such material, i.e., static dissipative materials are considered suitable for use in the present inventions. The electrically conductive material provides shielding to restrict deleterious to the component problems caused by static electricity.

The shell 12 comprises a rectangular bottom wall 15 and four side walls comprising opposed end walls 16 and 17, a front wall 18 and back wall 19. Projecting into the shell 12 from the bottom wall are spaced walls adapted to fit between the rows of pins on a dual in-line package (DIP) integrated circuit (IC) component. These walls are of sufficient height to hold the pins slightly spaced from the bottom wall and they are shorter than the side walls 16-19 to afford space for the body of the IC component in the shell 12 below the cover 13. A preferred height for the walls is 0.53 cm (0.21 inch).

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A second pair of walls are spaced such that the outside surfaces are separated by 0.97 cm (0.380 inch) to fit between the pins of a 10.16mm (400 mil) DIP. The second pair of walls comprises two parallel spaced walls 27 and 28 positioned perpendicular to and spaced generally symmetrically

between the front 18 and back wall 19. Additional wall segments 29, 30, 31, and 32 are aligned with the walls 27 and 28 and are spaced therefrom. The wall segments 29-32 are joined to the front and back wall and project from the bottom wall 15.

A third pair of spaced parallel walls are formed to receive a 15.24mm (600 mil) DIP. These walls are separated by 1.5 cm (0.580 inch). The third pair of walls comprise two parallel walls 34 and 35 which are joined to the ends of the walls 27 and 28. The outside surfaces of these walls 34 and 35 support the 15.24mm (600 mil) DIP. The third pair further comprises additional wall segments 36 and 37, which are aligned with the walls 34 and 35 and joined to the ends of the walls 20 and 21. The spacing between the walls 34 and 36 and the ends of walls 22, 23, 29, and 30 are sufficient to receive the pins of a DIP component, e.g., 0.33 cm (0.13 inch) and the same is true for the spacing between the walls 35 and 37 and wall segments 24, 25, 31, and 32.

The overall length of the carrier is preferably 4.2 cm (1.65 inch) and the width of the shell 12 preferably does not exceed 2.8 cm (1.1 inch).

Thus a single IC component of one of the sizes 7.62mm, 10.16mm, 15.24mm (300, 400, 600 mil) DIP can be placed in the same carrier 10 and there is no need to stock three different sizes of IC carriers.

As shown in the drawing, the cover 13 is hinged along the top edge of the back wall 19. The cover 13 has a rectangular top and downwardly depending edge walls 39 to enclose the shell. Two openings or recesses 40 are formed at the juncture of the top and front edge wall to receive two detents 41 formed on the front outer edge of the front wall 18 to reasonably secure the cover to the shell and enclose a DIP component within the shell atop a pair of walls. A protrusion 42 is formed on the cover 13 and is spaced from the edge wall 39 a distance to receive the front wall 18 therebetween. Spaced bosses 44 and 45 are formed on the cover 13 to engage the body of a 7.62mm (300 mil) DIP to retain the same, but the bosses are spaced sufficiently to be placed on opposite sides of a 15.24mm (600 mil) DIP when placed over the walls 34, 35, 36, and 37.

## Claims

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walls, said bottom wall having additional wall means projecting therefrom, characterized by the feature that said wall means comprises a first pair of parallel walls (20,21) having surfaces spaced 0.71 cm, a second pair of parallel walls (27,28) having surfaces spaced 0.97 cm and at least one third pair of parallel walls (34,35) positioned perpendicular to said first and second pairs of walls having surfaces spaced 1.5 cm for supporting a single dual in-line packaged integrated circuit device of 7.62mm and 10.16mm and alternatively a single dual in-line packaged integrated circuit device of 15.24mm.

2. A static shielding carrier according to claim 1 characterized in that each said pair of walls (20,21) comprises spaced aligned wall segments (22,23,24,25).

3. A static shielding carrier according to claim 1 characterized in that said first pair of parallel walls comprises two walls (20,21) having a length of 1.5 cm positioned generally centrally of the shell and aligned wall segments (22,23,24,25) extending from opposite side walls (18,19) toward said two walls;

said second pair of walls (27,28) comprises two walls 1.5 cm in length parallel to and spaced from said two walls of said first pair and aligned wall segments (29,30,31,32) extending from said opposite side walls (18,19); and

said third pair of walls (34,35), are joined to the ends of said two walls of said second pair of walls (27,28), and comprises aligned wall segments (36,37) joined to the ends of said two walls (20,21) of said first pair of walls.

4. A static shielding carrier according to claim 1 or 3 characterized in that said cover (13) is joined along an edge perpendicular to said hinge means (14) by frangible tabs (11) to an adjacent cover (13) of a second carrier (10).

5. A static shielding carrier according to claim 1, 3 or 4 characterized in that said overall length of said shell (12) parallel to said third pair of walls is not less than 4.2 cm and the width of said shell is at least 2.8 cm.

#### Patentansprüche

1. Eine Abschirmungshalterung (10), die eine mechanische Stützung für einen Doppelreihengehäusebaustein eines integrierten Schaltkreises bereitstellt, dadurch gekennzeichnet, daß die genannte Halterung (10) ein kastenähnliches

Gehäuse (12) umfaßt, welches aus einem elektrisch leitfähigen Polymerstoff hergestellt ist, und wobei das Gehäuse eine untere Wand (15) von rechteckiger Form aufweist, sowie Seitenwände (16, 17, 18, 19) und eine Abdeckung (13) mit einer Gelenkeinrichtung, welche die genannte Abdeckung mit einer der genannten Seitenwände verbindet, wobei die genannte untere Wand eine zusätzliche Wandeinrichtung aufweist, die von der unteren Wand vorsteht, dadurch gekennzeichnet, daß die genannte Wandeinrichtung ein erstes Paar von parallelen Wänden (20, 21) aufweist, welches Oberflächen aufweist, die mit einem Zwischenabstand von 0,71 cm angeordnet sind, sowie ein zweites Paar von parallelen Wänden (27, 28) mit Oberflächen, die mit einem Zwischenabstand von 0,97 cm angeordnet sind, und mit wenigstens einem dritten Paar von parallelen Wänden (34, 35), welches senkrecht zu dem genannten ersten und zweiten Paar von Wänden positioniert ist, mit Oberflächen, die mit einem Zwischenabstand von 1,5 cm angeordnet sind, um einen einzelnen Doppelreihengehäusebaustein eines integrierten Schaltkreises von 7,62 mm und 10,16 mm zu stützen, sowie alternativ einen einzelnen Doppelreihengehäusebaustein eines integrierten Schaltkreises von 15,24 mm.

2. Abschirmungshalterung nach Anspruch 1, dadurch gekennzeichnet, daß jedes der genannten Wandpaare (20, 21) mit Zwischenabstand angeordnete und ausgerichtete Wandsegmente (22, 23, 24, 25) aufweist.

3. Abschirmungshalterung nach Anspruch 1, dadurch gekennzeichnet, daß das genannte erste Paar von parallelen Wänden zwei Wände (20, 21) mit einer Länge von 1,5 cm aufweist, die allgemein in der Mitte des Gehäuses und der ausgerichteten Wandsegmente (22, 23, 24, 25) positioniert sind, die sich von entgegengesetzten Seitenwänden (18, 19) in Richtung der genannten zwei Wände erstrecken;

dadurch gekennzeichnet, daß das genannte zweite Paar von Wänden (27, 28) zwei Wände mit einer Länge von 1,5 cm aufweist, die parallel zu und mit Zwischenabstand von den zwei Wänden des genannten ersten Paares angeordnet sind, sowie ausgerichtete Wandsegmente (29, 30, 31, 32), die sich von den genannten entgegengesetzten Seitenwänden (18, 19) erstrecken; und

dadurch gekennzeichnet, daß das genannte dritte Paar von Wänden (34, 35) mit den Enden der genannten zwei Wände des genannten zweiten Wandpaares (27, 28) verbunden ist, und daß, es ausgerichtete Wandseg-



mente (36, 37) aufweist, die mit den Enden der genannten zwei Wände (20, 21) des genannten ersten Wandpaars verbunden sind.

4. Abschirmungshalterung nach Anspruch 1 oder 3, dadurch gekennzeichnet, daß, die genannte Abdeckung (13) entlang einer zu der genannten Gelenkeinrichtung (14) senkrechten Kante, durch zerbrechliche Streifen (11) mit einer angrenzenden Abdeckung (13) einer zweiten Halterung (10) verbunden ist.
5. Abschirmungshalterung nach Anspruch 1, 3 oder 4, dadurch gekennzeichnet, daß die genannte Gesamtlänge des Gehäuses (12) parallel zu dem genannten dritten Wandpaar nicht kleiner ist als 4,2 cm, und daß die Breite des Gehäuses mindestens 2,8 cm beträgt.

#### Revendications

1. Emballage antistatique (10) procurant un support mécanique à un dispositif de circuit intégré à boîtier à double rangée de connexions, ledit emballage (10) comprenant une enveloppe en forme de boîte (12) en polymère électriquement conducteur qui comporte une paroi inférieure (15) de forme rectangulaire, des parois latérales (16,17,18,19) et un couvercle (13) muni d'une charnière reliant ledit couvercle à une desdites parois latérales, ladite paroi inférieure ayant des éléments de paroi supplémentaires faisant saillie à partir d'elle-même, caractérisé en ce que lesdits éléments de paroi comprennent une première paire de parois parallèles (20, 21) ayant des surfaces mutuellement espacées de 0,71 cm, une deuxième paire de parois parallèles (27,28) ayant des surfaces mutuellement espacées de 0,97 cm, et au moins une troisième paire de parois parallèles (34,35) perpendiculaires auxdites première et deuxième paires de parois et ayant des surfaces mutuellement espacées de 1,5 cm pour supporter un seul dispositif de circuit intégré à boîtier à double rangée de connexions de 7,62 mm et 10,16 mm, et en variante un seul dispositif de circuit intégré en boîtier à double rangée de connexions de 15,24 mm.
2. Emballage antistatique suivant la revendication 1, caractérisé en ce que chaque dite paire de parois (20,21) comprend des segments de paroi alignés espacés (22,23,24,25).
3. Emballage antistatique suivant la revendication 1, caractérisé en ce que ladite première paire de parois parallèles comprend deux parois

(20,21) ayant une longueur de 1,5 cm, situées sensiblement au centre de l'enveloppe, et des segments de paroi alignés (22,23,24,25) s'étendant à partir de parois latérales opposées (18,19) vers lesdites deux parois ;

ladite deuxième paire de parois (27,28) comprend deux parois de 1,5 cm de long, parallèles auxdites deux parois de ladite première paire et espacées de celles-ci, et des segments de paroi alignés (29,30,31,32) s'étendant à partir desdites parois latérales opposées (18,19) ; et

les deux parois de ladite troisième paire de parois (34,35) sont reliées aux extrémités desdites deux parois de ladite deuxième paire de parois (27,28) et comprennent des segments de paroi alignés (36,37) reliés aux extrémités desdites deux parois (20,21) de ladite première paire de parois.

4. Emballage antistatique suivant la revendication 1 ou 3, caractérisé en ce que ledit couvercle (13) est relié, le long d'un bord perpendiculaire à la dite charnière (14), par des pattes cassables (11) à un couvercle adjacent (13) d'un deuxième emballage (10).
5. Emballage antistatique suivant la revendication 1, 3 ou 4, caractérisé en ce que ladite longueur totale de ladite enveloppe (12), parallèlement à ladite troisième paire de parois, n'est pas inférieure à 4,2 cm et la largeur de ladite enveloppe est au moins de 2,8 cm.

