

Packaging Piece, Based on Framework and Adopting Bonding Wire Connecting Technology, and Manufacturing Technology Thereof

Field of the Invention

The invention relates to the technology field of integrated circuit packaging, in particular to the packaging piece, based on the framework and adopting the bonding wire connecting technology, and the manufacturing technology of the packaging piece.

Background Art

Flat no-pin packaging of the integrated circuit has been developed along with communication and production of portable mini-type digital electronic products (digital cameras, mobile phones, PC and MP3) in recent years. The flat no-pin packaging of the integrated circuit is suitable for packaging small-scale and medium-scale integrated circuits with electrical requirements such as high frequency, broadband, low noise, high thermal conductivity, small volume and high speed. The flat no-pin packaging of the integrated circuit has the advantages of effectively utilizing the packaging space of terminal pins, thereby drastically improving efficiency of packaging. The size of CPU is dwindled 30% to 50% due to the fact that leads are short, the size of the plastic package body is small and a packaging body is thin. Therefore, distinguished electrical property and excellent heat dispersion are provided.

Shortcomings of the common flat no-pin packaging of the integrated circuit mainly include that the graphic of the framework must be designed according to the size of the chips and communication of the circuit for the products of the flat no-pin packaging of the integrated circuit of the framework supports, and then the framework is manufactured to be the designed graphic through a corrosion

method and the like, the design cycle and the manufacturing cycle are long, and cost is higher. The packaging piece of the existing flat no-pin packaging series of the integrated circuit is limited by the design of the framework and manufacturing technology of the framework on configuration of the protruding points and intensive degree of the I/ O.

Summary of the Invention

In order to solve the problems existing in the prior art, the invention provides the packaging piece, based on the framework and adopting the bonding wire connecting technology, and the manufacturing technology of the packaging piece. The design of a framework graphic is completed in the period of manufacturing the framework due to the fact that bonding is directly conducted on the formed metal protruding points after electro silvering or wire bond is directly conducted after the electro silvering. Manufacturing cycle is shortened. Interconnection of the chips and supports is preferably achieved. I/ O is more intensive. Cost is lower.

The packaging piece based on the framework and adopting the bonding wire connecting technology is comprised the chips, the plastic package body, the silver coatings and the bonding wires. The silver coatings are mutually independent silver coating sections, and the chips are arranged on part of the silver coatings. The chips and part of the silver coatings without the chips are connected through the bonding wires. The plastic package body encircles the chips, the silver coatings and the bonding wires, and the chips, the silver coatings and the bonding wires form the power supply of the circuit and the signal paths.

The packaging piece based on the framework and adopting the bonding wire connecting technology is further comprised the metal protruding points which

are arranged on part of the silver coatings. The chips are connected with the metal protruding points through the bonding wires. The plastic package body encircles the metal protruding points, the chips, the silver coatings and the bonding wires, and the metal protruding points, the chips, the silver coatings and the bonding wires form the power supply of the circuit and the signal paths.

The technological process of the packaging piece based on the framework and adopting the bonding wire connecting technology includes the following steps: framework silvering, wafer thinning, scribing, arrangement of the chips, metal protruding point forming, bonding, plastic package, framework corrosion, incision and packaging.

The technological process of forming the metal protruding points can be omitted.

Brief Description of the Drawings

Figure 1 is a profile map of the lead frame

Figure 2 is a profile map of the lead frame after silvering

Figure 3 is a profile map of a product after the chips are arranged

Figure 4 is a profile map of the framework after the metal protruding points are formed

Figure 5 is a profile map of the product after bonding

Figure 6 is a profile map of the product after plastic package

Figure 7 is a profile map of the product after the framework is corroded

Figure 8 is a profile map of a finished product

Figure 9 is a profile map of the product without the metal protruding points after bonding

Figure 10 is a profile map of the product without the metal protruding points after plastic package

Figure 11 is a profile map of the product without the metal protruding points after the framework is corroded

Figure 12 is a profile map of a finished product of the product without the metal protruding points

In the figures, the number 1 is on behalf of the lead frame, the number 2 is on behalf of the metal protruding points, the number 3 is on behalf of the chips, the number 4 is on behalf of the plastic package body, the number 5 is on behalf of the silver coatings, and the number 6 is on behalf of the bonding wires.

Detailed Description of Embodiments

The invention is further explained combining with description of the figures.

As shown in figure 12, the packaging piece based on the framework and adopting the bonding wire connecting technology comprises the chips (3), the plastic package body (4), the silver coatings (5) and the bonding wires (6). The silver coatings (5) are mutually independent silver coating sections, and the chips (3) are arranged on part of the silver coatings (5). The chips (3) and part of the silver coatings (5) without the chips (3) are connected through the bonding wires (6). The plastic package body (4) encircles the chips (3), the silver coatings (5) and the bonding wires (6), and the chips (3), the silver coatings (5) and the bonding wires (6) form the power supply of the circuit and the signal paths.

As shown in figure 8, the packaging piece based on the framework and adopting the bonding wire connecting technology further comprises the metal protruding points (2). The silver coatings (5) are mutually independent silver coating sections. The chips (3) are arranged on part of the silver coatings (5). The metal protruding points (2) are arranged on part of the silver coatings (5). The chips (3) are connected with the metal protruding points (2) through the bonding wires (6).

The plastic package body (4) encircles the metal protruding points (2), the chips (3), the silver coatings (5) and the bonding wires (6), and the metal protruding points (2), the chips (3), the silver coatings (5) and the bonding wires (6) form the power supply of the circuit and the signal paths.

The technological process of the packaging piece based on the framework and adopting the bonding wire connecting technology includes the following steps: framework silvering, wafer thinning, scribing, arrangement of the chips, metal protruding point forming, bonding, plastic package, framework corrosion, incision and packaging.

The process of forming the metal protruding points can be omitted.

As shown in figure 1 to figure 12, the manufacturing technology of the packaging piece based on the framework and adopting the bonding wire connecting technology includes the following steps:

A first step of framework silvering: a layer of the silver coating (5) is plated on the graphic part of the lead frame (1), wherein the thickness of the silver coating (5) is from 3 micrometers to 20 micrometers. In the manufacturing process of a framework manufacturing manufacturer, the graphics of the framework is designed, and then silvering is conducted. Manufacturing of products is conducted by adoption of silvering of a common framework, a framework support does not need to be overmuch manufactured, and then communication of the circuit can be achieved. The cycle of design and the cycle of manufacturing are shortened. Cost is reduced.

A second steep of wafer thinning: the thinning thickness is from 50 micrometers to 200 micrometers, and the roughness Ra is from 0.01mm to 0.05mm.

A third step of scribing: the scribing technology of the common flat packaging

piece of the integrated circuit is adopted by the wafers, wherein the thickness of each wafer is more than 150 micrometers, and the double-blade scribing machine and the technology of the double-blade scribing machine are used for the wafers, wherein the thickness of each wafer is less than 150 micrometers.

A fourth step of arranging the chips: the chips (3) are communicated with the lead frame (1) through the silver coatings (5).

A fifth step of forming the metal protruding points and bonding: the metal protruding points (2) are formed on the lead frame (1) and part of the silver coatings (5), and then the bonding wires (6) are directly formed on the metal protruding points (2) in welding zones of the chips (3), the framework support does not need to be overmuch manufactured, and then communication of the circuit can be achieved.

Under the circumstance of omitting the fifth step, communication of the circuit is formed by bonding the bonding wires (6) from pressing zones of the chips (3) to the silver coatings (5) of the lead frame (1) after the chips are arranged on the products.

A sixth step of plastic package: the plastic package method is the same as the conventional method.

A seventh step of framework corrosion: the entire lead frame (1) is corroded by chemical solution after plastic package is conducted on the products, break over of the circuit can be achieved through the shown silver coatings (5), and thereby the cycle of design and the cycle of manufacturing are shortened. Cost is reduced.

A eighth step of incision and packaging: the method of the incision and the method of the packaging are the same as the conventional methods.

The premise is that protruding point configuration and I/ O number are not limited by the design and manufacturing of the framework. The design of the graphic of the framework is completed in the period of manufacturing the framework through the method of inverse arrangement of the chips after the electro silvering. The manufacturing cycle is shortened. Interconnection of the chips and the supports is preferably achieved. I/ O is more intensive. Cost is lower.

What is claimed is:

1. The packaging piece based on the framework and adopting the bonding wire connecting technology is characterized by comprising the chips (3), the plastic package body (4), the silver coatings (5) and the bonding wires (6). The silver coatings (5) are mutually independent silver coating sections, and the chips (3) are arranged on part of the silver coatings (5). The chips (3) and part of the silver coatings (5) without the chips (3) are connected through the bonding wires (6). The plastic package body (4) encircles the chips (3), the silver coatings (5) and the bonding wires (6), and the chips (3), the silver coatings (5) and the bonding wires (6) form the power supply of the circuit and the signal paths.

2. According to the claim one, the packaging piece based on the framework and adopting the bonding wire connecting technology is characterized by further comprising the metal protruding points (2) which are arranged on part of the silver coatings (5). The chips (3) are connected with the metal protruding points (2) through the bonding wires (6). The plastic package body (4) encircles the metal protruding points (2), the chips (3), the silver coatings (5) and the bonding wires (6), and the metal protruding points (2), the chips (3), the silver coatings (5) and the bonding wires (6) form the power supply of the circuit and the signal paths.

3. The manufacturing technology of the packaging piece based on a framework and adopting the bonding wire connecting technology is characterized by including the following steps:

A first step of framework silvering: a layer of the silver coating (5) is plated on a graphic part of a lead frame (1), wherein the thickness of the silver coating (5) is from 3 micrometers to 20 micrometers.

A second step of wafer thinning: the thinning thickness is from 50 micrometers

to 200 micrometers, and the roughness Ra is from 0.01mm to 0.05mm.

A third step of scribing: the scribing technology of a flat packaging piece of a common integrated circuit is adopted by wafers, wherein the thickness of each wafer is more than 150 micrometers, and a double-blade scribing machine and the technology of the double-blade scribing machine are used for the wafers, wherein the thickness of each wafer is less than 150 micrometers.

A fourth step of arranging the chips: the chips (3) are communicated with the lead frame (1) through the silver coatings (5).

A fifth step of forming the metal protruding points and bonding: the metal protruding points (2) are formed on the lead frame (1) and part of the silver coatings (5), and then the bonding wires (6) are directly formed on the metal protruding points (2) in welding zones of the chips (3).

A sixth step of plastic package: a plastic package method is the same as the conventional method.

A seventh step of framework corrosion: the entire lead frame (1) is corroded by chemical solution to enable the silver coatings (5) to be shown.

A eighth step of incision and packaging: a method of the incision and a method of the packaging are the same as the conventional methods.

4. According to the claim three, the manufacturing technology of the packaging piece based on a framework and adopting the bonding wire connecting technology is characterized by including the following steps:

A fifth step of bonding: the chips (3) are connected with part of the silver coatings (5) without the chips (3) through the bonding wires (6) in a bonding mode.