parameters in an attempt to improve the wire bond typically involves guesswork of the operator.

[0006] Thus, it would be desirable to provide improved methods of forming wire bonds in connection with the formation of wire loops or conductive bumps.

SUMMARY OF THE INVENTION

[0007] According to an aspect~~exemplary embodiment~~ of the present invention, a method of forming a wire bond using a wire bonding machine is provided. The method includes the steps of: (1) selecting at least one target bonding control value; (2) generating bonding parameters for forming a wire bond using an algorithm and the at least one selected target bonding control value; (3) forming a wire bond using the generated bonding parameters; (4) determining if the at least one selected target bonding control value of the formed wire bond is within a predetermined tolerance of the at least one selected target bonding control value; (5) adjusting at least one bonding adjustment value if the at least one selected target bonding control value of the formed wire bond is not within the predetermined tolerance; and (6) generating revised bonding parameters for forming a subsequent wire bond using an algorithm and the at least one adjusted bonding adjustment value.

[0007a] According to another aspect of the present invention, there is provided a method of forming a wire bond using a wire bonding machine, the method comprising the steps of: (1) selecting at least one target bonding control value, the at least one target bonding control value including a diameter of a bonded ball of a wire bond; (2) generating bonding parameters for forming a wire bond using an algorithm and the at least one selected target bonding control value; (3) forming a wire bond using the generated bonding parameters; (4) determining if the at least one selected target bonding control value of the formed wire bond is within a predetermined tolerance of the at least one selected target bonding control value; (5) adjusting at least one bonding adjustment value if the at least one selected target bonding control value of the formed wire bond is not within the predetermined tolerance; and (6) generating revised bonding parameters for forming a subsequent wire bond using an algorithm and the at least one adjusted bonding adjustment value.

[0007b] According to another aspect of the present invention, there is provided a method of forming a wire bond using a wire bonding machine, the method comprising the steps of: (1) selecting at least one target bonding control value, the at least one target bonding control value including a shear strength of a wire bond; (2) generating bonding parameters for forming a wire bond using an algorithm and the at least one selected target bonding control value; (3) forming a wire bond using the generated bonding parameters; (4) determining if the at least one selected target bonding control value of the formed wire bond is within a predetermined tolerance of the at least one selected target bonding control value; (5) adjusting at least one bonding adjustment value if the at least one selected target bonding control value of the formed wire bond is not within the predetermined tolerance; and (6) generating revised bonding parameters for forming a subsequent wire bond using an algorithm and the at least one adjusted bonding adjustment value.

[0007c] According to another aspect of the present invention, there is provided a method of forming a wire bond using a wire bonding machine, the method comprising the steps of: (1) selecting at least one target bonding control value; (2) generating bonding parameters for forming a wire bond using an algorithm and the at least one selected target bonding control value; (3) forming a wire bond using the generated bonding parameters; (4) determining if at least one selected wire bond characteristic of the formed wire bond is within a predetermined tolerance of the at least one selected wire bond characteristic; (5) adjusting at least one bonding adjustment value if the at least one selected wire bond characteristic of the formed wire bond is not within the predetermined tolerance; and (6) generating revised bonding parameters for forming a subsequent wire bond using an algorithm and the at least one adjusted bonding adjustment value.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The invention is best understood from the following detailed description when read in connection with the accompanying drawings. It is emphasized that, according to common practice, the various features of the drawings are not to scale. On the contrary, the dimensions of the various features are arbitrarily expanded or reduced for clarity. Included in the drawings are the following figures:

FIGS. 1A-1D are block diagram views of ball bonds useful in explaining methods of forming wire bonds in accordance with certain exemplary embodiments of the present invention;

FIGS. 2A-2C are block diagram screen shots of a wire bonding machine illustrating a method of forming a wire bond in accordance with an exemplary embodiment of the present invention; and

FIGS. 3-5 are flow diagrams illustrating methods of forming wire bonds in accordance with various exemplary embodiments of the present invention.