CLAIMS

Claim 1: A semiconductor device, comprising:

a substrate;

a bonding structure, located over the substrate;

an adjustment layer, located below a bonding pad of the bonding structure;

an interconnection structure, located between the substrate and the bonding structure;

a first cap layer, covering a dielectric layer and a topmost conductive layer of the interconnection structure, the topmost conductive layer being located in the dielectric layer; and

a second cap layer, covering the first cap layer and the adjustment layer,

wherein the bonding pad, the first cap layer, the adjustment layer, the second cap layer and the topmost conductive layer form a passive device or a dummy structure.

Claim 2: The semiconductor device according to claim 1, wherein the adjustment layer comprises a conductive layer, a semiconductor layer, an insulating layer or a combination thereof.

Claim 3: A semiconductor device, comprising:

a first die, comprising a first interconnection structure;

a second die, comprising a second interconnection structure;

a bonding structure, bonding the first die and the second die;

a first adjustment layer, located between a first bonding pad of the bonding structure and a first topmost conductive layer of the first interconnection structure;

a first cap layer, covering a first dielectric layer of the first interconnection structure and the first topmost conductive layer, the first topmost conductive layer being located in the first dielectric layer; and

a second cap layer, covering the first cap layer and the first adjustment layer,

wherein the first bonding pad, the first cap layer, the first adjustment layer, the second cap layer and the first topmost conductive layer form a first capacitor, a first resistor or a first dummy structure.

Claim 4: The semiconductor device according to claim 3, further comprising:

a second adjustment layer, located between a second bonding pad of the bonding structure and a second topmost conductive layer of the second interconnection structure.

Claim 5: The semiconductor device according to claim 4, further comprising:

a third cap layer, covering a second dielectric layer and a second topmost conductive layer of the second interconnection structure; and

a fourth cap layer, covering the third cap layer and the second adjustment layer.

Claim 6: The semiconductor device according to claim 5, wherein each of the first adjustment layer and the second adjustment layer comprises a conductive layer, a semiconductor layer, an insulating layer or a combination thereof.

Claim 7: The semiconductor device according to claim 6, wherein a material the first

adjustment layer is the same as a material of the second adjustment layer.

Claim 8: The semiconductor device according to claim 6, wherein a material of the first adjustment layer is different from a material of the second adjustment layer.

Claim 9: The semiconductor device according to claim 5, wherein the second bonding pad, the third cap layer, the second adjustment layer, the fourth cap layer and the second topmost conductive layer form a second capacitor, a second resistor or a second dummy structure.

Claim 10: A method of fabricating a semiconductor device, comprising:

forming a first die, wherein the first die comprises a first interconnection structure;

forming a second die, wherein the second die comprises a second interconnection structure;

bonding the first die and the second die through a bonding structure;

forming a first adjustment layer between a first bonding pad of the bonding structure and a first topmost conductive layer of the first interconnection structure;

forming a first cap layer, the first cap layer covering a first dielectric layer and a first topmost conductive layer of the first interconnection structure, the first topmost conductive layer being located in the first dielectric layer; and

forming a second cap layer, the second cap layer covering the first cap layer and the first adjustment layer,

wherein the first bonding pad, the first cap layer, the first adjustment layer,

the second cap layer and the first topmost conductive layer form a first passive device or a first dummy structure.

Claim 11: The method according to claim 10, further comprising:

forming a second adjustment layer, the second adjustment layer located between a second bonding pad of the bonding structure and a second topmost conductive layer of the second interconnection structure.

Claim 12: The method according to claim 11, further comprising:

forming a third cap layer, the third cap layer covering a second dielectric layer and a second topmost conductive layer of the second interconnection structure; and

forming a fourth cap layer, the fourth cap layer covering the third cap layer and the second adjustment layer.

Claim 13: The method according to claim 11, wherein each of the first adjustment layer and the second adjustment layer comprises a conductive layer, a semiconductor layer, an insulating layer or a combination thereof.

Claim 14: The method according to claim 12, wherein the second bonding pad, the third cap layer, the second adjustment layer, the fourth cap layer and the second topmost conductive layer form a second passive device or a second dummy structure.