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(54) Title: PHASE CHANGE DEVICE

1200

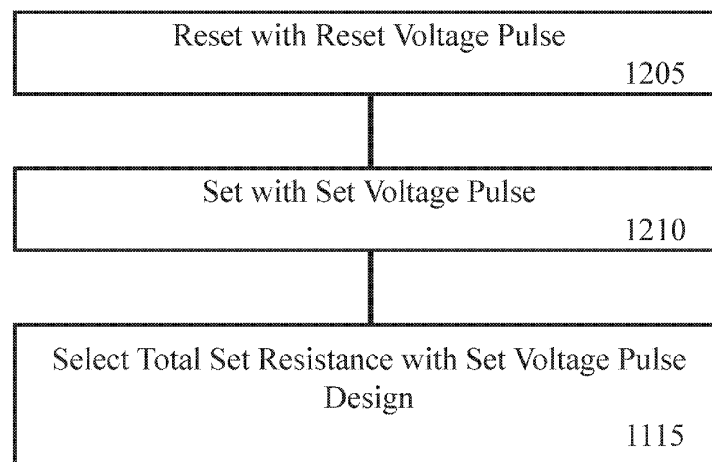


Figure 12

(57) Abstract: A phase change device (PCD) has a first and second semiconductor layer. The first semiconductor layer made of a first semiconductor material and has a first semiconductor thickness, a first interface surface, and a first electrode surface. The first interface surface and first electrode surface are on opposite sides of the first semiconductor layer. The first semiconductor material can transition between a first amorphous state and a first crystalline state at one or more first conditions. The second semiconductor layer is made of a second semiconductor material and has a second semiconductor thickness, a second interface surface, and a second electrode surface. The second interface surface and second electrode surface are on opposite sides of the second semiconductor layer. The first interface surface and the second interface surface are in electrical, physical, and chemical contact with one another at an interface. The second semiconductor material can transition between a second amorphous state and a second crystalline state at one or

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more second conditions. A first electrode in physical and electrical contact with the first electrode surface of the first semiconductor layer and a second electrode in physical and electrical contact with the second electrode surface of the second semiconductor layer. The first conditions and second conditions are different. Therefore, the first and second semiconductor materials can be in different amorphous and/or crystalline states. The layers can have split amorphous/crystalline states. By controlling how the layers are split, the PCD can be in different resistive states.