achieved as well as a method for obtaining such contact-distance transformers (space transformers) and testing devices.

This object is achieved by a contact-distance transformer of an electric testing device for testing an electric specimen, in particular a wafer, wherein said contact-distance transformer is used to reduce the distance between neighboring electric contacts, and is provided with an non-electrically conductive supporting structure, which is provided with a first and a second side, wherein on the first side first electric contacts are positioned at a contact distance to each other and on the second side second electric contacts are positioned, which have a contact distance to each other which is smaller than the first contacts on the first side, wherein the first contacts are connected to the second contacts by means of the electric connections, which pass through the support structure and/or which are positioned on the support structure, wherein both the supporting structure and the electric connections are formed as 3D-printed components. As a consequence, the supporting structure and the electric connections are produced by a 3D-printer-joining method. Since the supporting structure is electrically non-conductive, electric insulating printing material is used for the 3D-printing. For the electric connections, therefore, during the 3D-printing, electrically conductive printing material is used. During the 3D-printing, said printing materials are preferably applied with corresponding dosing heads. As in a 3D-printer, the dosing heads, in which the corresponding joining material (printing material) is placed, move to corresponding positions and at the same time/afterwards the printing material is expelled, so that it constructs – in a solidified form – corresponding parts of the supporting structure or of the electric

Claims

1. A contact-distance transformer of an electric testing device for testing an electric specimen, in particular a wafer, wherein said contact-distance transformer is used to reduce the distance between neighboring electric contacts, and is provided with an non-electrically conductive supporting structure, which is provided with a first side and a second side, wherein on the first side first electric contacts are positioned at a contact distance to each other, and on the second side second electric contacts are positioned, which have a contact distance to each other which is smaller than the first contacts on the first side, wherein the first contacts are connected to the second contacts by means of electric connections which pass through the support structure and/or which are positioned on the support structure, wherein both the support structure and the electric connections are formed as 3D-printed components.

2. The contact-distance transformer according to claim 1, wherein the first and/or second contacts are also formed as 3D-printed components.

3. The contact-distance transformer according to any of the preceding claims, wherein at least a first and/or at least a second contact are formed by the front surface of at least one of the electric connections.

4. The contact-distance transformer according to any of the preceding claims, wherein it is only comprised of 3D-printed components.

5. The contact-distance transformer according to any of the preceding claims, wherein it is provided with at least one electric component, in particular a resistor, a coil (L) and/or a capacitor (C), wherein the component is also formed as a 3D-printed component.

6. The contact-distance transformer according to any of the preceding claims, wherein the at least one electric component is electrically connected to at least one of the first contacts, one of the second contacts and/or one of the connections by means of an electrically conductive 3D-printed contact point.

7. The contact-distance transformer according to any of the preceding claims, wherein on the first side and/or on the second side a terminal element, in particular a terminal plate, preferably a ceramic plate, is positioned, in particular attached, wherein the terminal element is not a 3D-printed component.

8. The contact-distance transformer according to any of the preceding claims, wherein the terminal element is provided with through contacts, in particular pass-through contacts, which are electrically connected to the first or second contacts.

9. An electric testing device for testing an electric specimen, in particular a wafer, wherein there is provided a contact-distance transformer, in particular according to one or more of preceding claims.

10. The electric testing device according to claim 9, with a conductive substrate, which is provided with contact surfaces, which are electrically connected, preferably through an electric physical connection, directly or through an electric connection component to the first contacts of the contact-distance transformer.

11. The electric testing device according to any of the preceding claims, wherein the connection component is a film provided with contact springs.

12. The electric testing device according to any of the preceding claims, wherein a contact head is provided with contact components for an electric physical contacting of the specimen.

13. The electric testing device according to any of the preceding claims, wherein the contact components are provided as bending contact needles, spring contact pins, pogos or the like.

14. The electric testing device according to any of the preceding claims, wherein the contact head is provided with at least two mutually distanced guiding plates, which are provided with guiding holes, wherein in the guiding holes the contact components, in particular the bending contact needles, are positioned for an electric physical contact with the specimen.

15. The electric testing device according to any of the preceding claims, wherein the contact components, in particular the one ends of the bending contact needles, physically contact the two contacts of the contact-distance transformer.

16. The electric testing device according to any of the preceding claims, wherein the 3D-printed contact-distance transformer contributes to forming the 3D-printed conductive substrate.

17. The electric testing device according to any of the preceding claims, wherein the second contacts of the contact-distance transformer are 3D-printed contact elements, in particular raised-printed contact elements for direct physical contact of the specimen

18. The electric testing device according to any of the preceding claims, wherein the contact elements are formed as point-like contacts, pin-like contacts directed in the direction of physical contact or contacts that predominantly extend transversely with respect to the direction of physical contact, in particular cantilever contacts.

19. A method for producing a contact-distance transformer of an electric testing device for testing an electric specimen, in particular a wafer, wherein the contact-distance transformer is

provided in particular according to one or more of the preceding claims, with following steps:

- 3D-printing, in particular layer-by-layer 3D-printing, of a supporting structure of electric insulating printing material, and

- 3D-printing, in particular layer-by-layer 3D-printing, of electric connections, which pass through the supporting structure and/or are positioned on the supporting structure, which are made of electrically conductive printing material.

20. The method according to claim 19, wherein there is provided 3D-printing, in particular layer-by-layer 3D-printing, of first and/or second contacts made of electrically conductive printing material, wherein the first and/or second contacts are positioned on at least one of the ends of the electric connections.

21. The method according to any of the preceding claims, wherein there is provided 3D-printing, in particular layer-by-layer 3D-printing of electrically conductive printing material on previously 3D-printed electrically insulating printing material, in particular for producing electric transverse connections.

22. The method according to any of the preceding claims, wherein there is provided 3D-printing, in particular layer-by-layer 3D-printing, of electrically less conductive printing material for producing at least one electric resistor (R).

23. The method according to any of the preceding claims, wherein there is provided 3D-printing, in particular layer-by-layer 3D-printing, of mutually opposed electrodes made of electrically conductive printing material for producing a capacitor (C), wherein preferably a 3D-printing of dielectric material takes place between the electrodes.

24. The method according to any of the preceding claims, wherein there is provided 3D-printing, in particular layer-by-layer 3D-printing, of spiral and/or helical conductors made of electrically conductive material, for producing at least one coil (L).

25. The method according to any of the preceding claims, wherein there is provided 3D-printing, in particular layer-by-layer 3D-printing, of liquid insulating liquid, which diffuses by gravity and then hardens, for producing electric insulating areas, in particular insulating layers, preferably of areas of the supporting structure.