

Title (en)

Method of producing a through-hole and the use of said method to produce a silicon substrate having a through-hole or a device using such a substrate, method of producing an ink jet print head and use of said method for producing an ink jet print head

Title (de)

Verfahren zur Herstellung eines Durchgangslochs, Gebrauch dieses Verfahrens zur Herstellung eines Silikonsubstrates mit einem solchen Durchgangsloch oder eine Vorrichtung mit diesem Substrat, Verfahren zur Herstellung eines Tintenstrahl-Druckkopfes und Gebrauch dieses Verfahrens zur Herstellung eines Tintenstrahl-Druckkopfes

Title (fr)

Méthode de production d'un trou transversant et utilisation de cette méthode pour produire un substrat silicium avec un trou transversant ou un dispositif utilisant ce substrat, méthode de production d'une imprimante à jet d'encre et utilisation de cette méthode pour produire une imprimante à jet d'encre

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Application

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Abstract (en)

The invention provides a method of producing a through-hole, a substrate used to produce a through-hole, a substrate having a through-hole, and a device using such a through-hole or a substrate having such a through-hole, which are characterized in that: a through-hole can be produced only by etching a silicon substrate from its back side; the opening length d can be precisely controlled to a desired value regardless of the variations in the silicon wafer thickness, and the orientation flat angle, and also regardless of the type of a silicon crystal orientation-dependent anisotropic etchant employed; high productivity, high production reproducibility, and ease of production can be achieved; a high-liberality can be achieved in the shape of the opening end even if temperature treatment is performed at a high temperature for a long time; and a high-precision through-hole can be produced regardless of the shape of a device formed on the surface of a substrate. The method of producing a through-hole comprises the steps of: (a) forming a dummy layer on the principal surface of the substrate at a location where the through-hole will be formed, the dummy layer being capable of being selectively etched without etching the material of the substrate; (b) forming a passivation layer having resistance to an etching process on the substrate in such a manner that the dummy layer is covered with the passivation layer; (c) forming an etching mask layer on the back surface of the substrate, the etching mask layer having an opening corresponding to the dummy layer; (d) etching the substrate by means of a crystal orientation-dependent anisotropic etching process until the dummy layer is exposed via the opening; (e) removing the dummy layer by etching the dummy layer from the part which has been exposed in the step of etching the substrate; and (f) partially removing the passivation layer so as to form a through-hole. <IMAGE>

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Citation (applicant)

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