lamination direction of metal films and therefore it is difficult to make the width smaller than 10 μm. As a result, there is a problem that it is also difficult to form a finer-sized probe and a tip shape of a sharp contact portion thereof.

[0007] The present disclosure has been made to solve the above problem, and an object of the present disclosure is to provide a probe, a probe card, and a probe manufacturing method that can achieve a finer probe size, maintain a sharpened tip shape even after repetition of contact with an electrode of a semiconductor device, and achieve high contact performance and high durability.

MEANS TO SOLVE THE PROBLEM

[0008] A probe according to the present disclosure includes: a first metal portion made of first metal having conductivity; and a plate-shaped second metal portion made of second metal having conductivity and harder than the first metal portion, the second metal portion being buried in the first metal portion and protruding from a tip of the first metal portion so as to have a contact portion to contact with an inspection target. The contact portion has such a flattened and sharpened tongue shape that a contour of a tip portion in a first cross-section along a protruding direction of the second metal portion has a first parabolic shape and a contour of the tip portion in a second cross-section along

the protruding direction and perpendicular to the first cross-section has a second parabolic shape different from the first parabolic shape.

A probe card according to the present disclosure includes a plurality of the above probes.

A probe manufacturing method according to the present disclosure includes: a probe intermediate body formation step of forming a probe intermediate body in which, on one end side of a first metal portion made of a first metal having conductivity, a second metal portion made of second metal having conductivity and harder than the first metal portion is buried in a plate shape; and a polishing step of thrusting the one end side of the first metal portion of the probe intermediate body into an abrasive, to perform polishing so that the second metal portion protrudes from the first metal portion and a protruding tip has such a flattened and sharpened tongue shape that a contour of a tip portion in a first cross-section along a protruding direction of the second metal portion has a first parabolic shape and a contour of a tip portion in a second cross-section along the protruding direction and perpendicular to the first cross-section has a second parabolic shape different from the first parabolic shape.

EFFECT OF THE INVENTION

CLAIMS

[Claim 1] A probe comprising:

a first metal portion made of first metal having conductivity; and

a plate-shaped second metal portion made of second metal having conductivity and harder than the first metal portion, the second metal portion being buried in the first metal portion and protruding from a tip of the first metal portion so as to have a contact portion to contact with an inspection target, wherein

the contact portion has such a flattened and sharpened tongue shape that a contour of a tip portion in a first cross-section along a protruding direction of the second metal portion has a first parabolic shape and a contour of the tip portion in a second cross-section along the protruding direction and perpendicular to the first cross-section has a second parabolic shape different from the first parabolic.

[Claim 2] The probe according to claim 1, wherein

a contour of a cross-section perpendicular to the protruding direction at an end of the second metal portion buried in the first metal portion has a rectangular shape.

[Claim 3] The probe according to claim 2, wherein

a long side of the rectangular shape is not greater than 10 μm and a short side thereof is not greater than 5 μm.

[Claim 4] The probe according to claim 1, wherein

a first radius R2 of curvature at a vertex of the first parabolic shape of the contact portion is greater than a second radius R1 of curvature at a vertex of the second parabolic shape of the contact portion.

[Claim 5] The probe according to claim 4, wherein

a ratio of the second radius R1 of curvature and the first radius R2 of curvature is 1:2 to 1:4.

[Claim 6] A probe card comprising a plurality of the probes according to any one of claims 1 to 5.

[Claim 7] The probe card according to claim 6, wherein

a width direction of the first cross-section is a predetermined buckling direction of each probe.

[Claim 8] A probe manufacturing method comprising:

a probe intermediate body formation step of forming a probe intermediate body in which, on one end side of a first metal portion made of a first metal having

conductivity, a second metal portion made of second metal having conductivity and harder than the first metal portion is buried in a plate shape; and

a polishing step of thrusting the one end side of the first metal portion of the probe intermediate body into an abrasive, to perform polishing so that the second metal portion protrudes from the first metal portion and a protruding tip has such a flattened and sharpened tongue shape that a contour of a tip portion in a first cross-section along a protruding direction of the second metal portion has a first parabolic shape and a contour of a tip portion in a second cross-section along the protruding direction and perpendicular to the first cross-section has a second parabolic shape different from the first parabolic shape.