



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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| <p>(51) International Patent Classification <sup>7</sup> :<br/><b>H05K 3/02, H01L 21/48</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>A1</b>                                                                                                                                                                                                                                                                                                                                                     | <p>(11) International Publication Number: <b>WO 00/21345</b></p> <p>(43) International Publication Date: <b>13 April 2000 (13.04.00)</b></p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                               |
| <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top; padding: 5px;"> <p>(21) International Application Number: <b>PCT/JP99/05531</b></p> <p>(22) International Filing Date: <b>7 October 1999 (07.10.99)</b></p> <p>(30) Priority Data:<br/><b>10/285246                      7 October 1998 (07.10.98)                      JP</b></p> <p>(71) Applicant (for all designated States except US): <b>MAT-SUSHITA ELECTRIC INDUSTRIAL CO., LTD. [JP/JP]; 1006, Oaza Kadoma, Kadoma-shi, Osaka 571-8501 (JP).</b></p> <p>(72) Inventors; and<br/>(75) Inventors/Applicants (for US only): <b>OCHI, Hiroshi [JP/JP]; 454-15, Hinokuchi, Saijo-shi, Ehime 793-0043 (JP). SEGAWA, Shigetoshi [JP/JP]; 2496-5, Hagyu, Ni-ihama-shi, Ehime 792-0050 (JP).</b></p> <p>(74) Agents: <b>IWAHASHI, Fumio et al.; Matsushita Electric Industrial Co., Ltd., 1006, Oaza Kadoma, Kadoma-shi, Osaka 571-8501 (JP).</b></p> </td> <td style="width: 50%; vertical-align: top; padding: 5px;"> <p>(81) Designated States: <b>CN, ID, KR, SG, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</b></p> <p><b>Published</b><br/><i>With international search report.<br/>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p> </td> </tr> </table> |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                              | <p>(21) International Application Number: <b>PCT/JP99/05531</b></p> <p>(22) International Filing Date: <b>7 October 1999 (07.10.99)</b></p> <p>(30) Priority Data:<br/><b>10/285246                      7 October 1998 (07.10.98)                      JP</b></p> <p>(71) Applicant (for all designated States except US): <b>MAT-SUSHITA ELECTRIC INDUSTRIAL CO., LTD. [JP/JP]; 1006, Oaza Kadoma, Kadoma-shi, Osaka 571-8501 (JP).</b></p> <p>(72) Inventors; and<br/>(75) Inventors/Applicants (for US only): <b>OCHI, Hiroshi [JP/JP]; 454-15, Hinokuchi, Saijo-shi, Ehime 793-0043 (JP). SEGAWA, Shigetoshi [JP/JP]; 2496-5, Hagyu, Ni-ihama-shi, Ehime 792-0050 (JP).</b></p> <p>(74) Agents: <b>IWAHASHI, Fumio et al.; Matsushita Electric Industrial Co., Ltd., 1006, Oaza Kadoma, Kadoma-shi, Osaka 571-8501 (JP).</b></p> | <p>(81) Designated States: <b>CN, ID, KR, SG, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</b></p> <p><b>Published</b><br/><i>With international search report.<br/>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p> |
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| <p>(54) Title: <b>MANUFACTURING METHOD OF WIRING CIRCUIT BOARD, AND WIRING CIRCUIT BOARD</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                               |
| <p>(57) Abstract</p> <p>Fine lines of line width of 40 μm or less are obtained stably without defect on a ceramic substrate, and hence a circuit board of high density and high precision is obtained. The method comprises the steps of: (a) fabricating a ceramic substrate (2), (b) polishing the surface (28) of the ceramic substrate (2) to surface roughness Ra of 0.5 μm or less, (c) forming a photosensitive conductor layer (3a) on the surface of the ceramic substrate (2a), and (d) processing the photosensitive conductor layer (3a) by photolithography, and forming a specified wiring pattern (38). Herein, supposing the roughness curve to be <math>Y = f(x)</math>, the extracting length of the roughness curve in the center line direction to be L, the central axis of the extracting portion to be X-axis, and the direction vertical to the X-axis to be Y-axis, Ra is the value calculated in the formula (I).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                               |
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| $(1/L) \int_0^L f(x) dx \quad (I)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                               |