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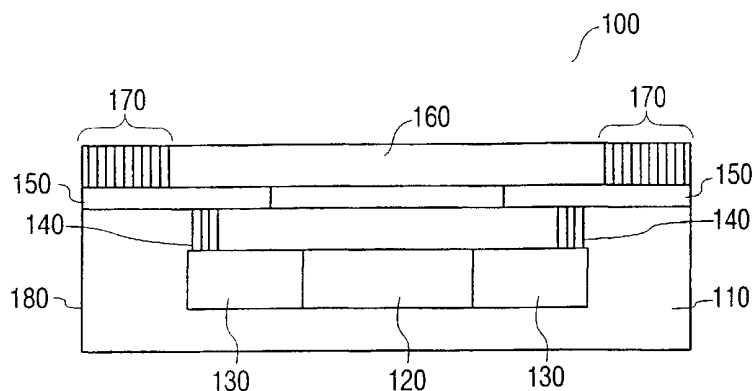
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(54) Title: SEMICONDUCTOR CHIP PACKAGE WITH EMBEDDED CAPACITORS



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(57) Abstract: A capacitor assembly having one or more capacitors (120) embedded in the core layer of a package having integrated circuits (ICs) mounted thereon. Each embedded capacitor has plural pairs of first and second electrodes (140) and the package core layer has plural sets of first and second vias (140) dispersed over the pairs of electrodes and being connected thereto. A metal layer (150) is provided on the core layer and includes a first portion having at least one metal strip and a second portion, electrically isolated from each strip. Each metal strip is positioned such that it is extended to overlie both the first electrode of a distinct pair of electrodes and the second electrode of an adjacent, succeeding pair of electrodes and effects a mutual electrical connection between them through first and second vias associated therewith, respectively. A wiring layer (160) which may be a dielectric interlevel connection layer, provided on the metal layer, has plural sets of third vias (170) that are disposed over the center of the capacitor such that adjacently disposed sets of third vias alternate between contacting the individual ones of the metal strips and contacting the second portion of the metal layer to provide interlayer electrical connections therethrough, respectively, to wirings or terminals in the package. The individual metal strips associated with the first portion of the metal layer are to be applied with one of the power and ground reference signals of the package assembly and the second portion thereof is to be applied with the other one of the power and ground voltages. These capacitors may be employed as bypass capacitors in a package assembly for integrated circuits.



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A. CLASSIFICATION OF SUBJECT MATTER IPC 7 H01L23/66 H01L23/50 H01L23/64 H01L23/498		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC 7 H01L H05K		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, PAJ		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X P,A	DE 100 19 229 A (MURATA MANUFACTURING CO) 23 November 2000 (2000-11-23) figures 12,13	1-4,6,7, 9-14 18-22, 24-29, 32,33, 39,41-43
A	EP 0 915 488 A (MURATA MANUFACTURING CO) 12 May 1999 (1999-05-12) column 4, line 12 - line 21 column 4, line 53 -column 5, line 1 column 7, line 48 - line 54 column 8, line 49 - line 58 column 15, line 50 -column 16, line 2 column 17, line 9 - line 35; figure 1	1-4,7, 15-21, 30-32, 35,39, 41,42
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<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
° Special categories of cited documents :		
A document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family		
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Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer Ahlstedt, M

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