Title (en)

LEAD-FREE ALLOYS WITH IMPROVED WETTING PROPERTIES

Title (de)

BLEIFREIE LEGIERUNGEN MIT VERBESSERTEM VERNETZUNGSVERHALTEN

Title (fr)

ALLIAGES SANS PLOMB A PROPRIETES D'AGENT MOUILLANT AMELIOREES

Publication

EP 1309447 A4 20051109 (EN)

Application

EP 01984406 A 20010718

Priority

- US 0122778 W 20010718
- US 22182000 P 20000731

Abstract (en)

[origin: WO0209936A1] An electronic device has a die that is attached to a metallic contact of a substrate via a coupling layer. The coupling layer comprises an alloy of at least two metals selected from the group consisting of Zn, Al, Mg, and Ga, and further comprises at least one sacrificial chemical element other than Zn, Al, Mg, and Ga at a concentration of 10-1000ppm with an oxygen affinity higher than the alloy. Alternative alloys comprise at least two metals selected from the group consisting of Sn, Ag, Bi, Zn, and Cu, and at least one sacrificial chemical element other than Sn, Ag, Bi, Zn, and Cu. Still further contemplated alloys comprise at least two metals selected from the group consisting of Sn, Ag, Bi, and Sb, and at least one sacrificial chemical element other than Sn, Ag, Bi, and Sb. These Pb free alloys demonstrate improved wetting characteristics and can be used for high reliability soldering process for microelectronics applications.

IPC 1-7

B32B 15/20; H01L 29/02; C22C 13/02; C22C 18/04; B23K 35/26; B23K 35/28; H01L 23/488; H05K 3/34

IPC 8 full level

B23K 35/26 (2006.01); **B23K 35/28** (2006.01); **B32B 15/20** (2006.01); **C22C 13/00** (2006.01); **C22C 18/04** (2006.01); **H01L 21/52** (2006.01); **H01L 23/488** (2006.01); **H05K 3/34** (2006.01)

CPC (source: EP)

B32B 15/20 (2013.01); **H01L 23/488** (2013.01); **H01L 24/29** (2013.01); H01L 2924/01322 (2013.01); H01L 2924/14 (2013.01)

Citation (search report)

- [X] EP 0976489 A1 20000202 - SONY CHEMICALS CORP [JP]
- [XA] DE 19816671 A1 19981022 - FUJI ELECTRIC CO LTD [JP]
- [X] US 5019336 A 19910528 - LIEBERMANN HOWARD H [US], et al
- [X] EP 0988920 A1 20000329 - MURATA MANUFACTURING CO [JP]
- [A] DE 19904765 A1 19990812 - FUJI ELECTRIC CO LTD [JP]
- [A] EP 0855242 A1 19980729 - MATSUSHITA ELECTRIC IND CO LTD [JP], et al
- [Y] SHIMIZU T; ISHIKAWA H; OHNUMA I; ISHIDA K: "Zn-Al-Mg-Ga alloys as Pb-free solder for die-attaching use", JOURNAL OF ELECTRONIC MATERIALS TMS USA, vol. 28, no. 11, November 1999 (1999-11-01), pages 1172 - 1175, XP009053240, ISSN: 0361-5235
- [Y] CSANADY A ET AL: "The influence of some alloying additions (Cr, Cu and Li) on the thermal oxidation of Al-Zn-Mg alloys", CORROSION SCIENCE UK, vol. 22, no. 7, 1982, pages 689 - 713, XP002343390, ISSN: 0010-938X
- [A] PATENT ABSTRACTS OF JAPAN vol. 2000, no. 05 14 September 2000 (2000-09-14)
- [X] PATENT ABSTRACTS OF JAPAN vol. 2000, no. 07 29 September 2000 (2000-09-29)
- See references of WO 0209936A1

Designated contracting state (EPC)

AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR

DOCDB simple family (publication)

WO 0209936 A1 20020207; AU 2748902 A 20020213; EP 1309447 A1 20030514; EP 1309447 A4 20051109; JP 2004514559 A 20040520

DOCDB simple family (application)

US 0122778 W 20010718; AU 2748902 A 20010718; EP 01984406 A 20010718; JP 2002516089 A 20010718