

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
13 November 2003 (13.11.2003)

PCT

(10) International Publication Number
WO 03/093760 A1

(51) International Patent Classification⁷: G01B 11/16,
G01R 31/316, 31/311

Wei [CN/SG]; Block 520, Jurong West St 52, #04-199,
Singapore 640520 (SG).

(21) International Application Number: PCT/SG02/00058

(74) Agent: ALBAN TAY MAHTANI & DE SILVA; 39
Robinson Road, #07-01, Robinson Point, Singapore
068911 (SG).

(22) International Filing Date: 11 April 2002 (11.04.2002)

(25) Filing Language: English

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG,
SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,
VN, YU, ZA, ZM, ZW.

(26) Publication Language: English

(71) Applicant (*for all designated States except US*): GINTIC
INSTITUTE OF MANUFACTURING TECHNOL-
OGY [SG/SG]; 71, Nanyang Drive, Singapore 638075
(SG).

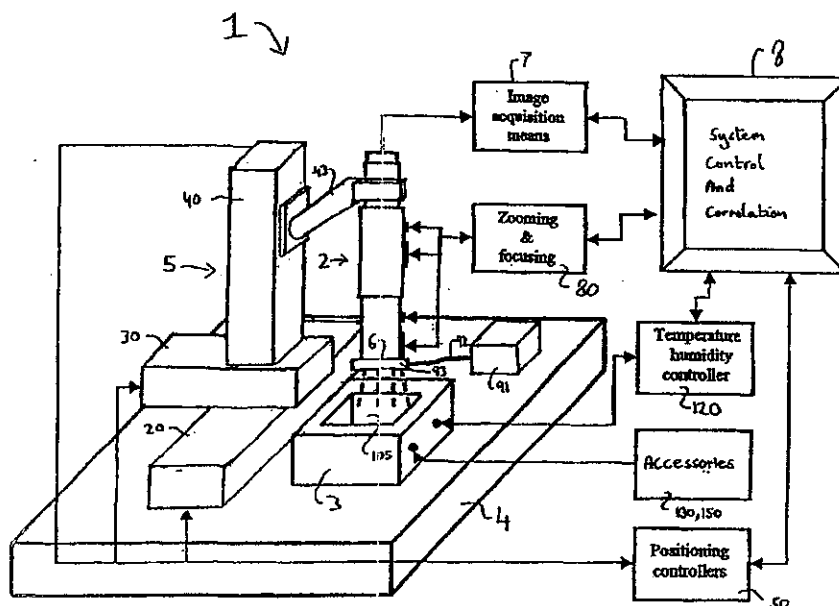
(72) Inventors; and

(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR,
GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent
(BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,
NE, SN, TD, TG).

(75) Inventors/Applicants (*for US only*): SHI, Xunqing
[CN/SG]; Block 854, Jurong West, Street 81, #08-516,
Singapore 640854 (SG). WANG, Zhiping [CN/SG];
Block 336, Bukit Batok St 32, #06-311, Singapore 650336
(SG). PICKERING, Jason, P. [US/SG]; 5 Jurong East St
32, The Mayfair, #15-02, Singapore 609479 (SG). FAN,

[Continued on next page]

(54) Title: SYSTEMS AND METHODS FOR DEFORMATION MEASUREMENT



(57) Abstract: A system for the real-time and in-situ macro and micro measurement of in-plane deformations of a microelectronic package or the like comprises a closed environmental chamber (3) within which a test sample may be subjected to thermal cycle loading and/or humidity loading, an incoherent white light source (6) for illuminating the sample, a long-working-distance microscope (2) and image acquisition means (7) for capturing speckle patterns from the surface of the sample during loading, and a control (8) for automating the co-ordination of the various components and for analysing the speckle images using digital image speckle correlation.

**Declarations under Rule 4.17:**

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent

(AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG) of inventorship (Rule 4.17(iv)) for US only

Published:

- with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.