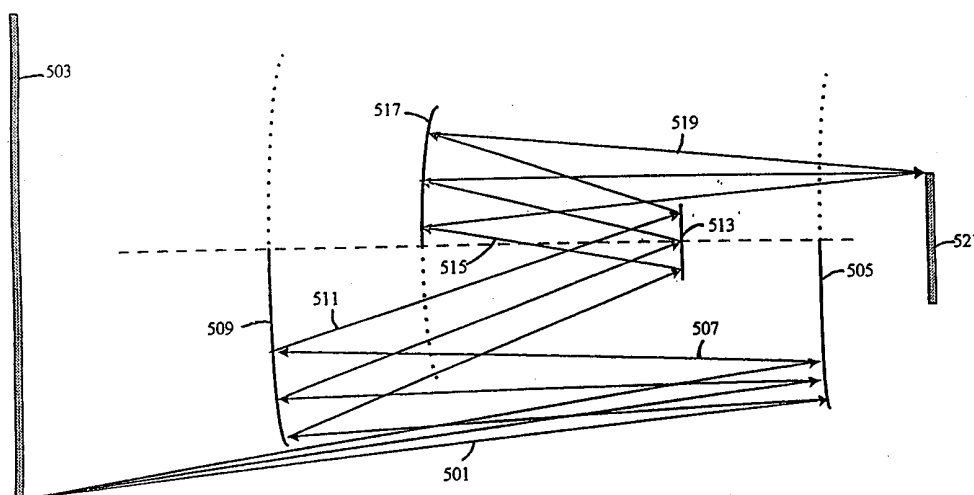




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(21) International Application Number: PCT/US99/03767 (22) International Filing Date: 19 February 1999 (19.02.99) (30) Priority Data: 09/027,281 20 February 1998 (20.02.98) US 09/094,420 9 June 1998 (09.06.98) US (71) Applicant: THE REGENTS OF THE UNIVERSITY OF CALIFORNIA [US/US]; 1111 Franklin Street, Oakland, CA 94607-5200 (US). (72) Inventors: CHAPMAN, Henry, N.; 2417 Kilcare Road, Sunol, CA 94586 (US). HUDYMA, Russell, M.; 218 Eastridge Drive, San Ramon, CA 94583 (US). SHAFER, David, R.; 56 Drake Lane, Fairfield, CT 06430 (US). SWEENEY, Donald, W.; 5020 Canyon Crest Drive, San Ramon, CA 94583 (US). (74) Agents: PALMER, John et al.; Ladas & Parry, Suite 2100, 5670 Wilshire Boulevard, Los Angeles, CA 90036-5679 (US).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, 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, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, 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), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> (88) Date of publication of the international search report: 14 October 1999 (14.10.99)	

(54) Title: REFLECTIVE OPTICAL IMAGING SYSTEMS WITH BALANCED DISTORTION



(57) Abstract

Optical systems compatible with extreme ultraviolet radiation (501) comprising four reflective elements (505, 509, 513, 517) for projecting a mask image onto a substrate are described. The four optical elements comprise, in order from object (503) to image (521), convex, concave, convex and concave mirrors. The optical systems are particularly suited for step and scan lithography methods. The invention enables the use of larger slit dimensions associated with ring field scanning optics, improves wafer throughput, and allows higher semiconductor device density. The inventive optical systems are characterized by reduced dynamic distortion because the static distortion is balanced across the slit width.

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INTERNATIONAL SEARCH REPORT

International Application No

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A. CLASSIFICATION OF SUBJECT MATTER
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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 6 G03F G02B

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 257 139 A (HIGUCHI AKIRA) 26 October 1993 (1993-10-26) column 1, line 6 - line 13 column 2, line 15 - line 20 column 7, line 11 - column 8, line 2 figures 1,6	42-44
A	---	1, 11, 22, 33
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INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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