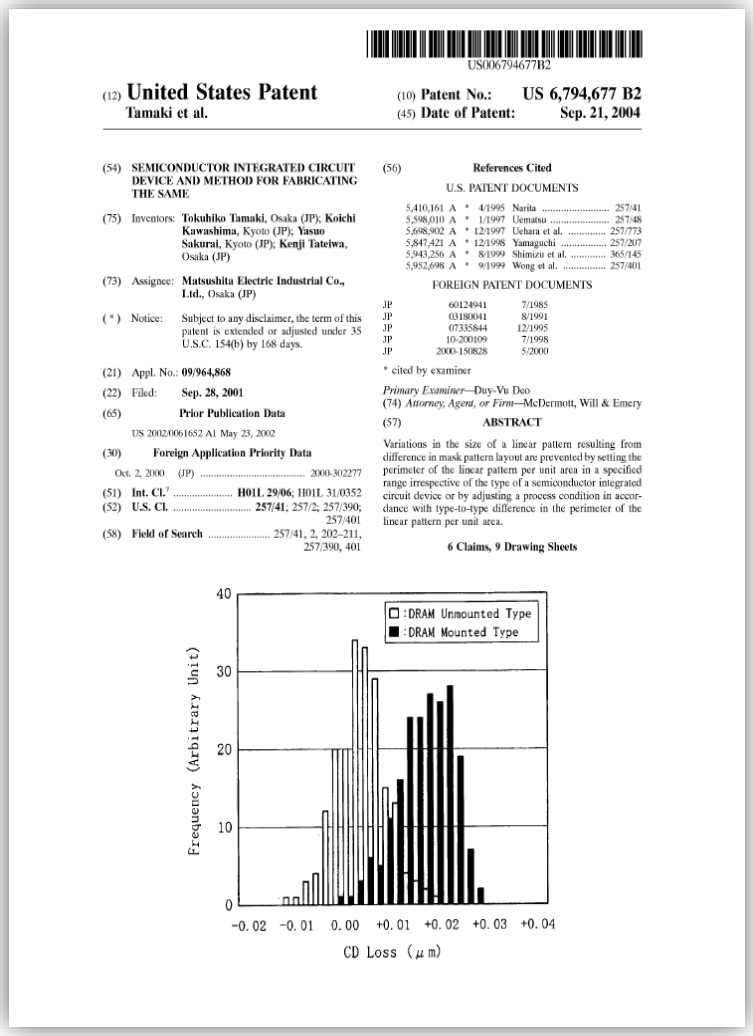
EXHIBIT A



US006794677B2

(12) **United States Patent**
Tamaki et al.

(10) **Patent No.: US 6,794,677 B2**
(45) **Date of Patent: Sep. 21, 2004**

(54) **SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE AND METHOD FOR FABRICATING THE SAME**

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(73) Assignee: **Matsushita Electric Industrial Co., Ltd.**, Osaka (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 168 days.

(21) Appl. No.: **09/964,868**

(22) Filed: **Sep. 28, 2001**

(65) **Prior Publication Data**

US 2002/0061652 A1 May 23, 2002

(30) **Foreign Application Priority Data**

Oct. 2, 2000 (JP) 2000-302277

(51) **Int. Cl.**[7] **H01L 29/06**; H01L 31/0352

(52) **U.S. Cl.** **257/41**; 257/2; 257/390; 257/401

(58) **Field of Search** 257/41, 2, 202–211, 257/390, 401

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,410,161	A *	4/1995	Narita	257/41
5,598,010	A *	1/1997	Uematsu	257/48
5,698,902	A *	12/1997	Uehara et al.	257/773
5,847,421	A *	12/1998	Yamaguchi	257/207
5,943,256	A *	8/1999	Shimizu et al.	365/145
5,952,698	A *	9/1999	Wong et al.	257/401

FOREIGN PATENT DOCUMENTS

JP	60124941	7/1985
JP	03180041	8/1991
JP	07335844	12/1995
JP	10-200109	7/1998
JP	2000-150828	5/2000

* cited by examiner

Primary Examiner—Duy-Vu Deo
(74) *Attorney, Agent, or Firm*—McDermott, Will & Emery

(57) **ABSTRACT**

Variations in the size of a linear pattern resulting from difference in mask pattern layout are prevented by setting the perimeter of the linear pattern per unit area in a specified range irrespective of the type of a semiconductor integrated circuit device or by adjusting a process condition in accordance with type-to-type difference in the perimeter of the linear pattern per unit area.

6 Claims, 9 Drawing Sheets

Title

SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE AND METHOD FABRICATING THE DEVICE

Application Date

Sep. 28, 2001

Priority Date

Oct. 2, 2000

Patent Date

Sep. 21, 2004

Inventor

Tokuhiro Tamaki et al

Claims

1, 2, 4, 5

1. A semiconductor integrated circuit device comprising:
(A) a first circuit pattern having **(B) a first linear pattern** and placed in **(C) a region in which a group of elements l repetitive pattern are formed**; and
(D) a second circuit pattern having **(E) a second linear pattern** and placed in **(F) a region in which components oth group of elements are formed**,
(G) a dummy pattern being inserted in **(F) the region** in which **(D) the second circuit pattern** is placed such that a su of **(B) the first linear pattern**, **(E) the second linear pattern**, and **(G) the dummy pattern** per unit area is equal to or perimeter of **(B) the first linear pattern** per unit area.

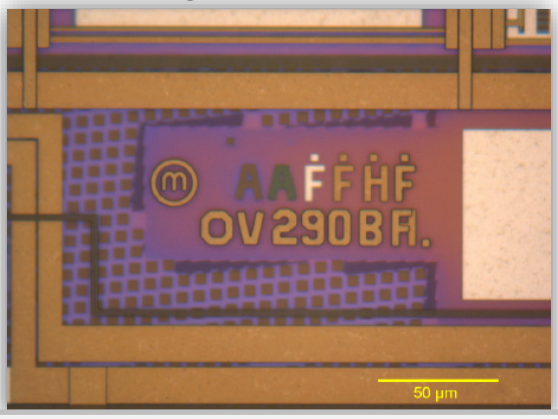
2. The semiconductor integrated circuit device of claim 1, wherein **(C) the group of elements** are **(H) memories**.

4. A semiconductor integrated circuit device comprising:
(A) a first circuit pattern having **(B) a first gate electrode pattern** and placed in **(C) a memory circuit region**; and
(D) a second circuit pattern having **(E) a second gate electrode pattern** and placed in **(F) a logic circuit region**,
(G) a dummy pattern being inserted in **(F) the logic region** in which **(D) the second circuit pattern** is placed such that a sum perimeter of **(B) the first gate electrode pattern**, **(E) the second gate electrode pattern**, and **(G) the d pattern** per unit area is equal to or less than a perimeter of **(B) the first gate electrode pattern** per unit area.

5. The semiconductor integrated circuit device of claim **4**,
wherein **(G) the dummy pattern** has **(H) a rectangular like shape**.

Camera Module

Die marking



CHIPWORKS

OmniVision
OV5650
5 Mp, 1.75 µm Pixel Pitch
Second Generation
Back Illuminated (BSI) CMOS
Image Sensor from Apple iPhone 4

Imager Process Review

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Manufacturer	OmniVision Technologies, Inc.
Foundry	TSMC
Part number	OV5650
Type	Back illuminated CMOS image sensor
Camera module size (length x width x height)	9.2 mm x 9.2 mm x 6.2 mm
Camera module pads	29
Date code	None
Die markings	(m) AAFFHF OV290BF
Die size (from die edge)	6.06 mm x 6.58 mm (39.9 mm^2)
Final die thickness (image sensor die + silicon chip carrier)	200 µm
Image sensor substrate thickness	2.1 µm
Available/connected die bond pads	64/43
Bond pad pitch	350 µm
Bond pad window	67 µm x 145 µm
Process type	CMOS
Number of metal layers	4
Number of poly layers	1
Minimum transistor gate length	0.12 µm
Minimum metal pitch (pixel array)	0.30 µm
Contacted gate pitch	0.36 µm
NAND cell size	1.6 µm by 4.3 µm (6.9 $µm^2$)
6T SRAM cell size	1.3 µm x 1.8 µm (2.3 $µm^2$)
Process generation	0.11 µm (TSMC half-node)
Feature measured to determine process generation	Contacted gate pitch, metal pitch

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