
EXHIBIT D

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

(10) **Patent No.:** **US 8,084,796 B2**
(45) **Date of Patent:** **Dec. 27, 2011**

(54) **SOLID STATE IMAGING APPARATUS,
METHOD FOR DRIVING THE SAME AND
CAMERA USING THE SAME**

6,160,281 A * 12/2000 Guidash 257/292
6,310,366 B1 10/2001 Rhodes et al.
6,352,869 B1 3/2002 Guidash
6,541,794 B1 4/2003 Patterson et al.

(75) Inventors: **Mitsuyoshi Mori**, Kyoto (JP); **Takumi Yamaguchi**, Kyoto (JP); **Takahiko Murata**, Osaka (JP)

(Continued)

FOREIGN PATENT DOCUMENTS

EP 0 845 900 A1 6/1998

(Continued)

(73) Assignee: **Panasonic Corporation**, Osaka (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 465 days.

OTHER PUBLICATIONS

Japanese Decision of Rejection, with partial English translation, issued in Japanese Patent Application No. 2006-343810, mailed Mar. 9, 2010.

(21) Appl. No.: **12/202,804**

(22) Filed: **Sep. 2, 2008**

(Continued)

(65) **Prior Publication Data**

US 2009/0002538 A1 Jan. 1, 2009

Primary Examiner — Wael Fahmy

Assistant Examiner — John C Ingham

Related U.S. Application Data

(63) Continuation of application No. 10/706,918, filed on Nov. 14, 2003, now Pat. No. 7,436,010.

(74) *Attorney, Agent, or Firm* — McDermott Will & Emery LLP

(30) **Foreign Application Priority Data**

Feb. 13, 2003 (JP) 2003-034692

(57) **ABSTRACT**

A solid state imaging apparatus includes: a plurality of photoelectric conversion cells each including a plurality of photoelectric sections arranged in an array of at least two rows and two columns; a plurality of floating diffusion sections each being connected to each of ones of the photoelectric sections which are included in the same row of each said photoelectric conversion cell via each of a plurality of transfer transistors, and being shared by said ones of the photoelectric sections; a plurality of read-out lines each being selectively connected to at least two of the transfer transistors; and a plurality of pixel amplifier transistors each detecting and outputting the potential of each said the floating diffusion section. Charges of the photoelectric conversion sections each being connected to one of the read-out lines and being read out by the transfer transistors are read out by different floating diffusion sections.

(51) **Int. Cl.**

H01L 31/062 (2006.01)

(52) **U.S. Cl.** .. **257/292; 257/223; 257/445; 257/E27.139**

(58) **Field of Classification Search** 257/223, 257/258, 291, 292, 443-445

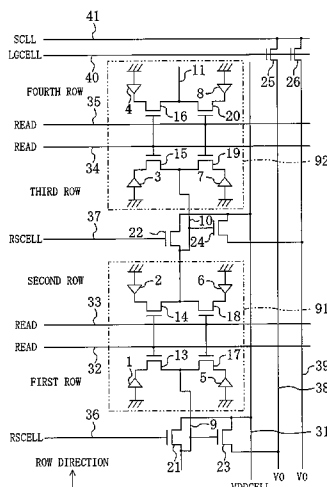
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,708,263 A 1/1998 Wong
5,955,753 A * 9/1999 Takahashi 257/292
6,091,449 A 7/2000 Matsunaga et al.

4 Claims, 10 Drawing Sheets



US 8,084,796 B2

Page 2

U.S. PATENT DOCUMENTS

6,552,323 B2 4/2003 Guidash et al.
 6,657,665 B1 12/2003 Guidash
 6,977,684 B1* 12/2005 Hashimoto et al. 348/294
 2001/0052941 A1 12/2001 Matsunaga et al.
 2002/0018131 A1 2/2002 Kochi
 2002/0024068 A1 2/2002 Shinohara
 2002/0145582 A1 10/2002 Yamazaki et al.
 2006/0001751 A1 1/2006 Abe et al.

FOREIGN PATENT DOCUMENTS

EP 0 926 738 A2 6/1999
 EP 0 954 032 A2 11/1999
 JP 09-046596 2/1997
 JP 11-097662 4/1999
 JP 11-195776 7/1999
 JP 11-312800 11/1999
 JP 2000-12821 A 1/2000
 JP 2000-059697 2/2000
 JP 2000-78475 A 3/2000
 JP 2000-152086 5/2000
 JP 2000-224482 8/2000
 JP 2000-224482 A 8/2000
 JP 2001-298177 A 10/2001
 JP 2001-326856 A 11/2001
 JP 2002-077731 3/2002

JP 2004-172950 6/2004
 KR 2000-0052598 8/2000
 WO 97/07630 2/1997

OTHER PUBLICATIONS

Japanese Decision to Dismiss the Amendment, with partial English translation, issued in Japanese Patent Application No. 2006-343810, mailed Mar. 9, 2010.

English translation of Japanese Office Action issued in Japanese Patent Application No. 2006-343810, mailed Oct. 13, 2009.

United States Office Action issued in U.S. Appl. No. 12/178,250 dated Feb. 14, 2011.

United States Office Action issued in U.S. Appl. No. 12/178,250 dated Sep. 17, 2010.

White et al., "Characterization of Surface Channel CCD Image Arrays at Low Light Levels", IEEE Journal of Solid State Circuits, vol. sc-9, No. 1, Feb. 1974, pp. 1-13.

Japanese Office Action issued in corresponding Japanese Patent Application No. JP 2004-034818, dated Oct. 24, 2006.

Chinese Office Action Issued in corresponding Chinese Patent Application No. CN 200380100976.6, dated Feb. 2, 2007.

United States Notice of Allowance issued in U.S. Appl. No. 12/178,250 dated Sep. 30, 2011.

* cited by examiner

FIG. 1

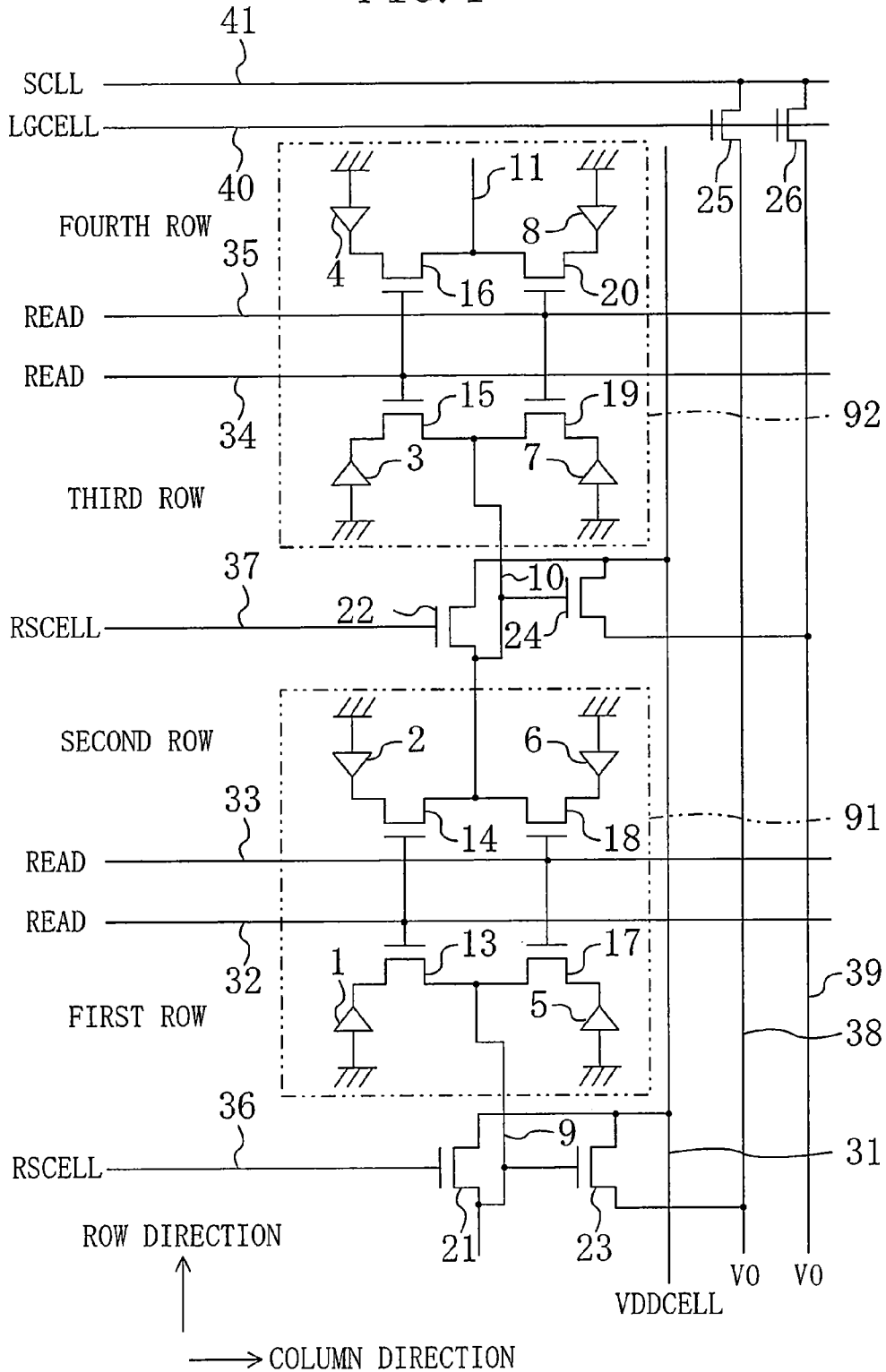
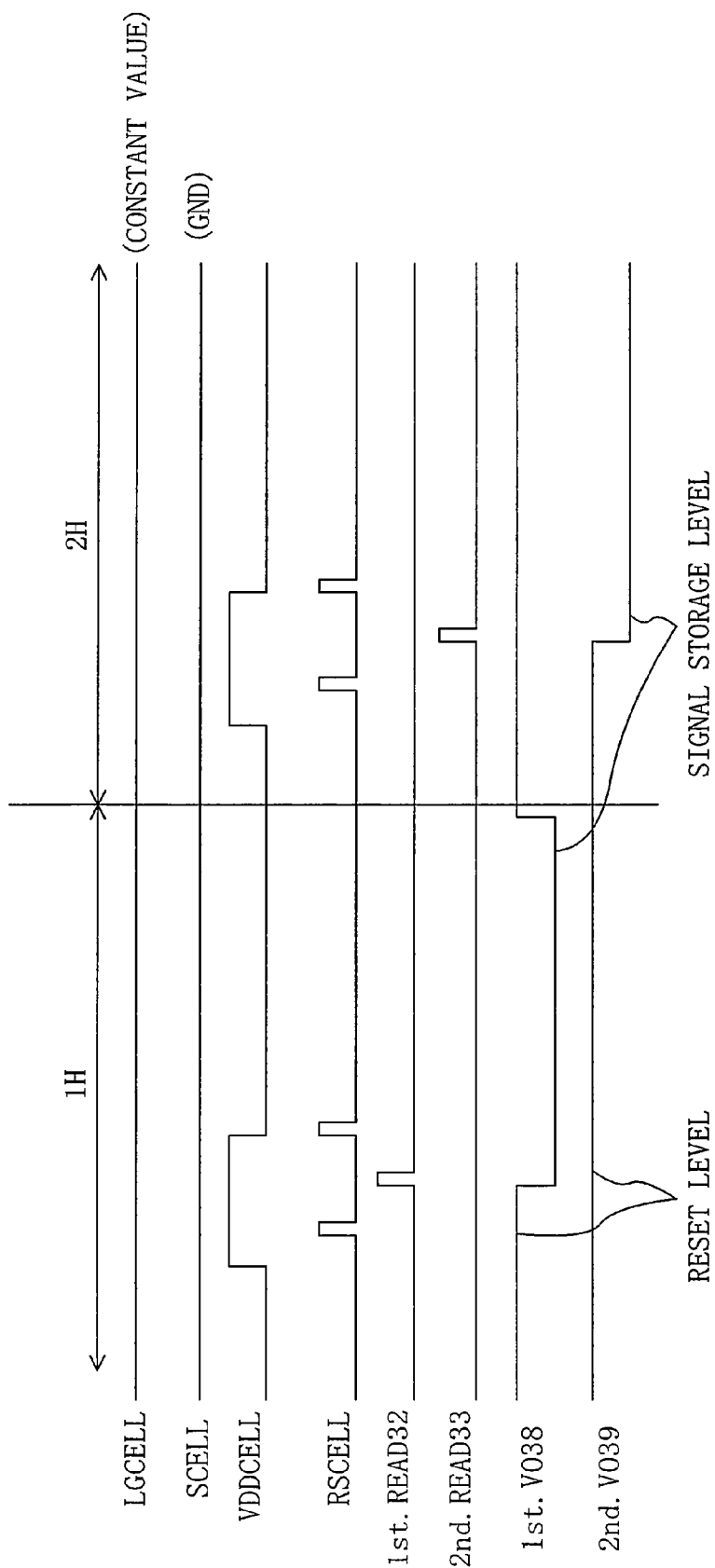


FIG. 2



Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.