MN39471PT

Diagonal 6.9 mm (type-1/3) 1 800 H CCD Area Image Sensor

■ Overview

The MN39471PT is a super high resolution CCD area image sensor which includes 2 310 k pixels in type-1/3 image format size.

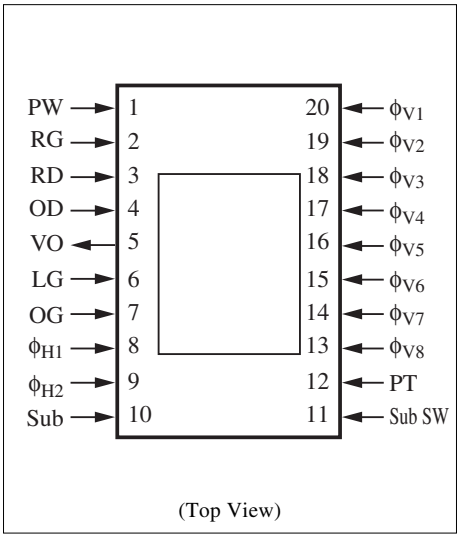
Adopting RGB Bayer arrangement in primary color filter array on chip provides excellent color reproduction.

As the aspect ratio of image area is 3:2 which is the same as that of 35mm film, pictures can be taken in similar framing manner to use of a usual film camera.

As The MN39471PT has also a skipping readout mode for image monitoring by LCD panel,you can fix the composition in real time.

Part Number	Size	Scanning mode	Color or B/W
MN39471PT	6.9 mm (type-1/3)	IS *	Color

Note) Interlace scan



(Top View)

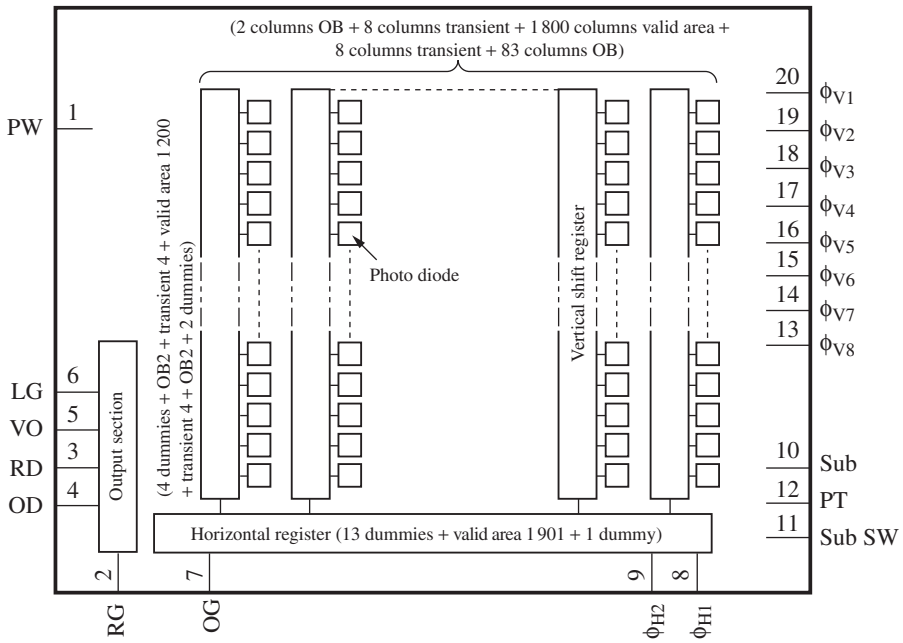
■ Features

- Photographic grade super high resolution by 2 310 k pixels in type-1/3 format
- Responds to 5 : 1 skipping readout mode for LCD monitoring
- The same aspect ratio of 3 : 2 as a 35 mm film
- Newly developed small plastic package

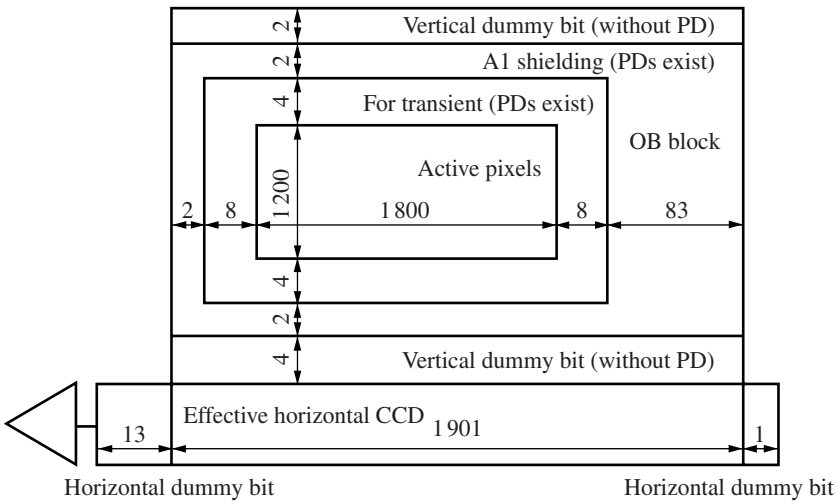
■ Applications

- Digital still camera
- FA, OA cameras

■ Block Diagram



■ Element Construction



■ Pin Descriptions

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	PW	P-well	11	SubSW	Substrate potential control
2	RG	Reset gate	12	PT	P-well for protection circuit
3	RD	Reset drain	13	ϕ_{V8}	Vertical shift register clock pulse 8
4	OD	Output drain	14	ϕ_{V7}	Vertical shift register clock pulse 7
5	VO	CCD output	15	ϕ_{V6}	Vertical shift register clock pulse 6
6	LG	Output load transistor gate	16	ϕ_{V5}	Vertical shift register clock pulse 5
7	OG	Output gate	17	ϕ_{V4}	Vertical shift register clock pulse 4
8	ϕ_{H1}	Horizontal shift register clock pulse 1	18	ϕ_{V3}	Vertical shift register clock pulse 3
9	ϕ_{H2}	Horizontal shift register clock pulse 2	19	ϕ_{V2}	Vertical shift register clock pulse 2
10	Sub	Substrate	20	ϕ_{V1}	Vertical shift register clock pulse 1

■ Device Parameter (H × V)

Parameter	Value	Unit
Total pixel number	1 901 × 1 212	pixel
Effective pixel number	1 816 × 1 208	pixel
Active pixel number	1 800 × 1 200	pixel
Image sensing block dimension	5.76 × 3.84	mm^2
Pixel dimension	3.2 × 3.2	μm^2

■ Absolute Maximum Ratings and Operating Conditions

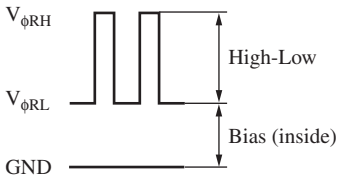
Parameter		Symbol	Rating		Operating condition			Unit
			min	max	min	typ	max	
Output drain voltage		V_{OD}	− 0.2	18.0	15.0	15.5	16.0	V
Reset drain voltage		V_{RD}	− 0.2	18.0	15.0	15.5	16.0	V
Protection P-well voltage *5, 7		V_{PT}	−10.0	0.2	−8.5	−8.0	−7.5	V
P-well voltage		V_{PW}	Reference voltage		—	0	—	V
Output load transistor gate voltage *6		V_{LG}	—	—	Supplied internally			V
Output gate voltage *6		V_{OG}	—	—	Supplied internally			V
Reset pulse voltage *1	High-Low	$V_{\phi R}$	—	8.0	3.0	3.3	3.6	V
	Bias		− 0.5	—	Supplied internally			
Horizontal register	High	$V_{\phi H1}$	—	8.0	3.0	3.3	3.6	V
clock pulse voltage 1 *3	Low		− 0.2	—	− 0.2	0	0.2	
Horizontal register	High	$V_{\phi H2}$	—	8.0	3.0	3.3	3.6	V
clock pulse voltage 2 *3	Low		− 0.2	—	− 0.2	0	0.2	
Substrate voltage *2		V_{Sub}	—	—	Supplied internally			V
		ϕV_{Sub}	− 0.2	35.5	25.0	26.0	27.0	
For electronic shutter	High	SubSW	—	8.0	3.0	3.3	3.6	V
substrate potential control voltage	Low		− 0.2	—	− 0.2	0	+ 0.2	
Vertical shift register	High	$V_{\phi V1}$,	—	18.0	15.0	15.5	16.0	V
clock pulse voltage 1, 5 *4, 5, 7	Middle	$V_{\phi V5}$	—	—	− 0.2	0	0.2	
	Low		−10.0	—	−8.5	−8.0	−7.5	
Vertical shift register	Middle	$V_{\phi V2}$,	—	15.0	− 0.2	0	0.2	V
clock pulse voltage 2, 6 *4, 5, 7	Low	$V_{\phi V6}$	−10.0	—	−8.5	−8.0	−7.5	
Vertical shift register	High	$V_{\phi V3}$,	—	18.0	15.0	15.5	16.0	V
clock pulse voltage 3, 7 *4, 5, 7	Middle	$V_{\phi V7}$	—	—	− 0.2	0	0.2	
	Low		−10.0	—	−8.5	−8.0	−7.5	
Vertical shift register	Middle	$V_{\phi V4}$,	—	15.0	− 0.2	0	0.2	V
clock pulse voltage 4, 8 *4, 5, 7	Low	$V_{\phi V8}$	−10.0	—	−8.5	−8.0	−7.5	
Operating temperature		T_{opr}	−10	60	—	25	—	°C
Storage temperature		T_{stg}	−30	70	—	—	—	°C

■ Absolute Maximum Ratings and Operating Conditions (continued)

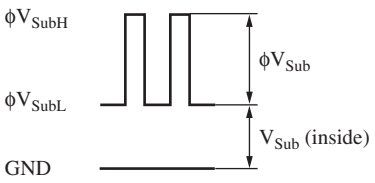
Note) 1. Standard photo detecting condition

Standard photo detecting condition stands for detecting image with a light source of color temperature of 2 856K, luminance of 1 050 cd/m^2, and using a color temperature conversion filter LB-40 (HOYA), infrared cut filter CAW-500S with thickness 2.5 mm for a light path and with F8 lens aperture. The quantity of the incidental light to a photo-detecting surface under the above condition is defined as the standard quantity of light.

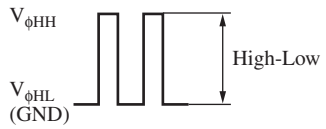
2. ∗1: Reset



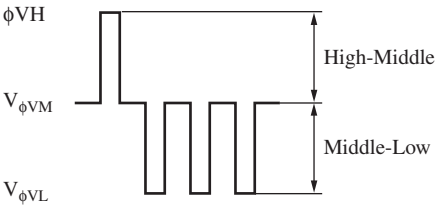
∗2: V_{Sub} for electronic shutter



∗3: Horizontal transfer pulse ($V_{\phi H}$)



∗4: Vertical transfer pulse (readout pulse)



∗5: Absolute maximum ratings $-0.2 < V_{\phi V} - V_{PT} < 28.0$ (V)

∗6: GND

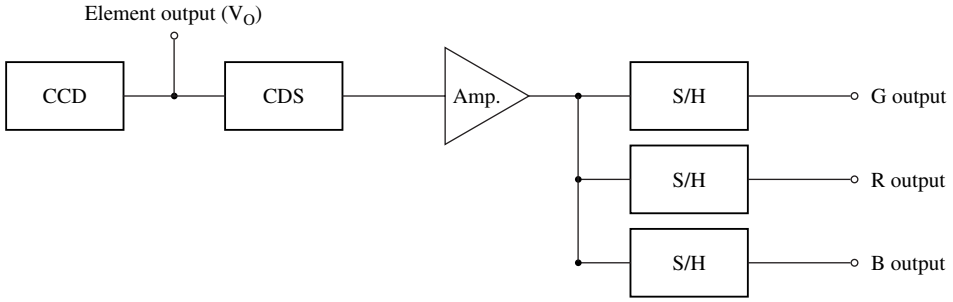
Ground LG and OG pin with each capacitor of 0.047 µF or more.

∗7: Relation between V_{PT} and $V_{\phi VL}$

Set V_{PT} under the following condition against VL of a vertical transfer clock waveform.

$V_{PT} \leq VL$ ($V_{\phi V1L}$ to $V_{\phi V8L}$)

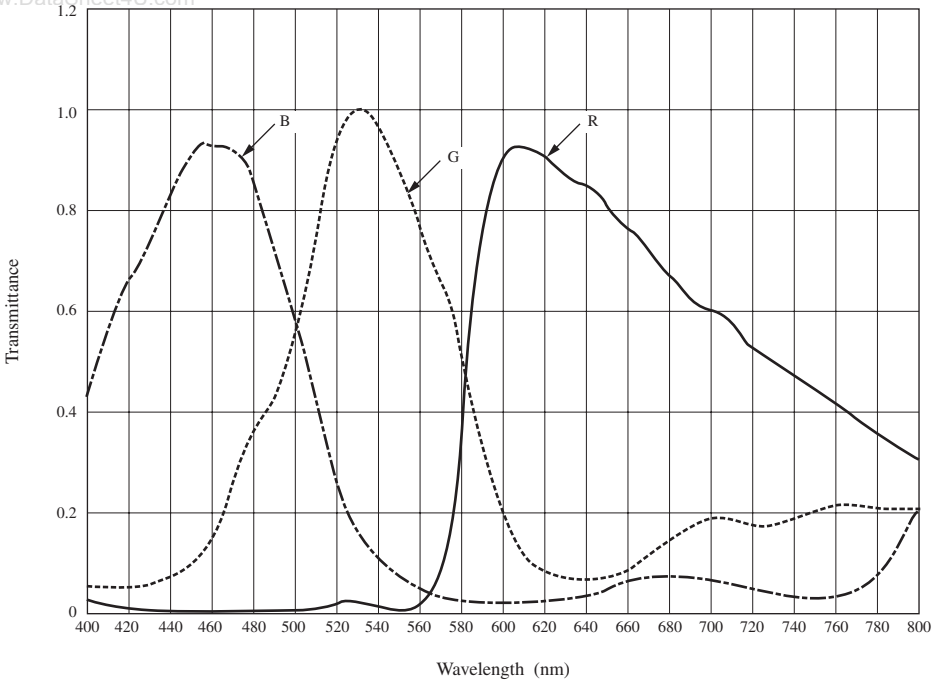
3. Measuring point



Adjust the amp. gain for 1 regarding V_O-G, V_O-R and V_O-B outputs.

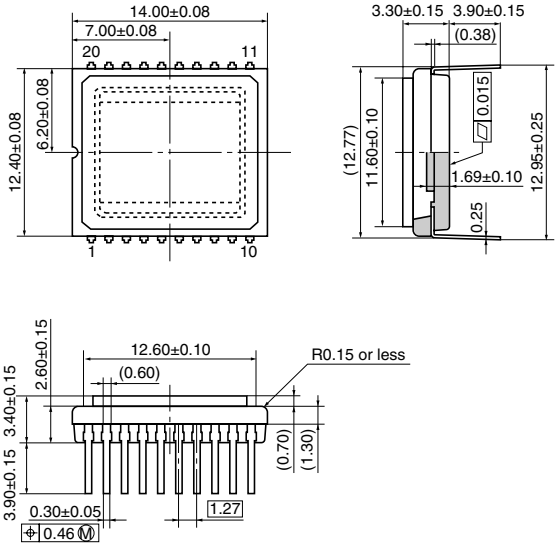
■ Graphs of Characteristics

CCD Color Filter Spectral Characteristics



■ Package Dimensions (Unit: mm)

• WDIP020-P-0500A



Request for your special attention and precautions in using the technical information and semiconductors described in this material

(1) An export permit needs to be obtained from the competent authorities of the Japanese Government if any of the products or technologies described in this material and controlled under the "Foreign Exchange and Foreign Trade Law" is to be exported or taken out of Japan.

(2) The technical information described in this material is limited to showing representative characteristics and applied circuit examples of the products. It does not constitute the warranting of industrial property, the granting of relative rights, or the granting of any license.

(3) The products described in this material are intended to be used for standard applications or general electronic equipment (such as office equipment, communications equipment, measuring instruments and household appliances).
Consult our sales staff in advance for information on the following applications:
- Special applications (such as for airplanes, aerospace, automobiles, traffic control equipment, combustion equipment, life support systems and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
- Any applications other than the standard applications intended.

(4) The products and product specifications described in this material are subject to change without notice for reasons of modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.

(5) When designing your equipment, comply with the guaranteed values, in particular those of maximum rating, the range of operating power supply voltage and heat radiation characteristics. Otherwise, we will not be liable for any defect which may arise later in your equipment.
Even when the products are used within the guaranteed values, redundant design is recommended, so that such equipment may not violate relevant laws or regulations because of the function of our products.

(6) When using products for which dry packing is required, observe the conditions (including shelf life and after-unpacking standby time) agreed upon when specification sheets are individually exchanged.

(7) No part of this material may be reprinted or reproduced by any means without written permission from our company.

Please read the following notes before using the datasheets

A. These materials are intended as a reference to assist customers with the selection of Panasonic semiconductor products best suited to their applications.
Due to modification or other reasons, any information contained in this material, such as available product types, technical data, and so on, is subject to change without notice.
Customers are advised to contact our semiconductor sales office and obtain the latest information before starting precise technical research and/or purchasing activities.

B. Panasonic is endeavoring to continually improve the quality and reliability of these materials but there is always the possibility that further rectifications will be required in the future. Therefore, Panasonic will not assume any liability for any damages arising from any errors etc. that may appear in this material.

C. These materials are solely intended for a customer's individual use.
Therefore, without the prior written approval of Panasonic, any other use such as reproducing, selling, or distributing this material to a third party, via the Internet or in any other way, is prohibited.