MN39470PT

Diagonal 6.63 mm (type-1/2.72) 2.11M-pixel CCD Area Image Sensor

■ Overview

The MN39470PT is a super high resolution CCD area image sensor which includes 2.11M pixels in type-1/2.72 image format size.

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

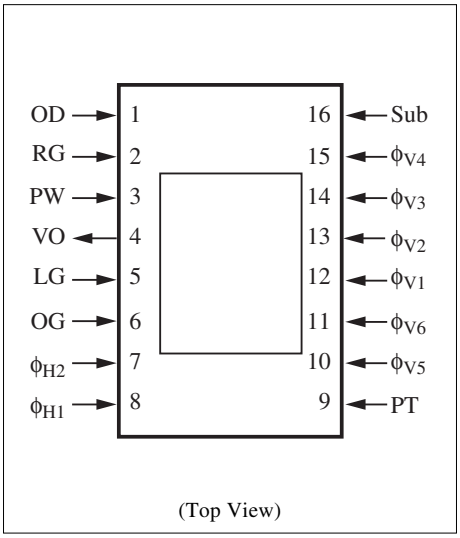
This device can perform a monitor mode readout by 1/4 skipping readout.

So, this device allows for application for a compact and high picture quality digital still camera.

Part Number	Size	Scanning mode	Color or B/W
MN39470PT	6.63 mm (type-1/2.72)	IS *	Color

Note) Interlace scan

■ Pin Assignments



(Top View)

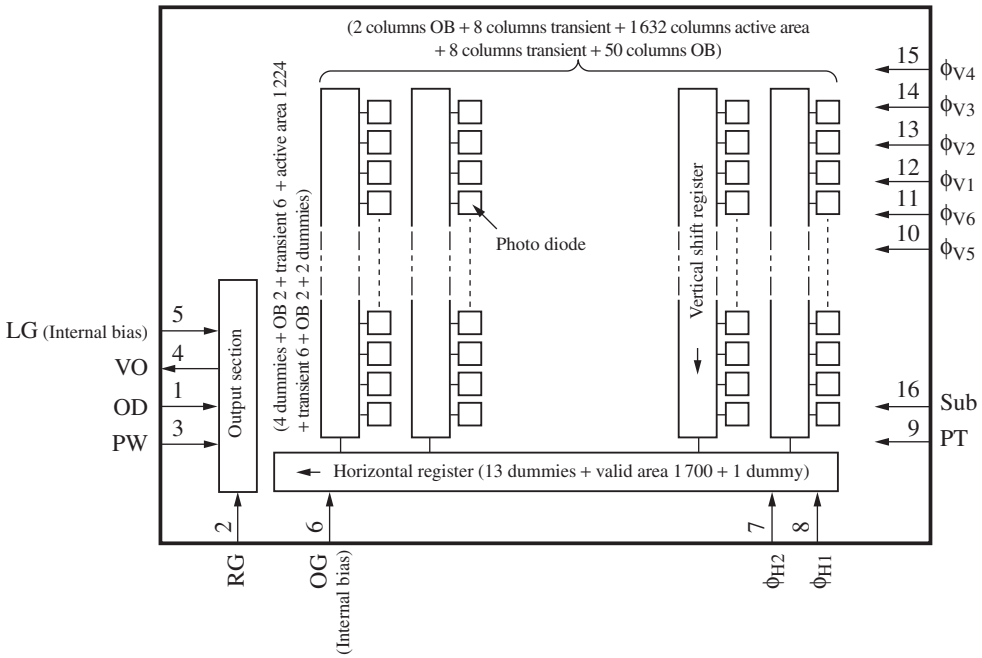
■ Features

- High sensitivity
- Low smear
- Low noise and broad dynamic range
- 3.3 V for horizontal CCDs and low power consumption
- High resolution

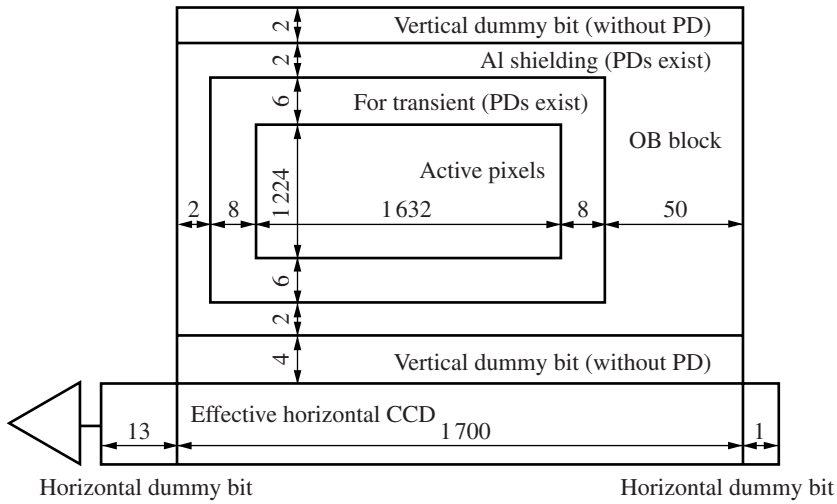
■ Applications

- Digital still camera
- FA, OA cameras

■ Block Diagram



■ Element Construction



■ Pin Descriptions

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

■ Device Parameter (H × V)

Parameter	Value	Unit
Total pixel number	1 700 × 1 240	pixel
Effective pixel number	1 648 × 1 236	pixel
Active pixel number	1 632 × 1 224	pixel
Image sensing block dimension	5.304 × 3.978	mm^2
Pixel dimension	3.25 × 3.25	μm^2

■ Absolute Maximum Ratings and Operating Conditions

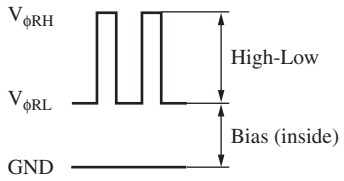
Parameter		Absolute maximum rating		Operating condition			Unit
		Lower limit	Upper limit	Min	Typ	Max	
V_{OD}		– 0.2	18.0	15.0	15.5	16.0	V
V_{PT} *5, 7		–10.0	0.2	–8.5	–8.0	–7.5	V
GND		(Reference voltage)		—	0	—	V
V_{LG} *6		(Supplied internally)					V
V_{OG} *6		(Supplied internally)					V
$V_{\phi R}$ *1	High-Low	—	8.0	3.0	3.3	3.6	V
	Bias	– 0.5	—	(Supplied internally)			V
$V_{\phi H1}$ *3	High	—	8.0	3.0	3.3	3.6	V
	Low	– 0.2	—	– 0.2	0	0.2	V
$V_{\phi H2}$ *3	High	—	8.0	3.0	3.3	3.6	V
	Low	– 0.2	—	– 0.2	0	0.2	V
V_{Sub} *2		—	—	(Supplied internally)			V
ϕV_{Sub} *2		– 0.2	32.0	22.5	23.5	24.5	V
$V_{\phi V1}$ *4, 5, 7	High	—	18.0	15.0	15.5	16.0	V
	Middle	—	—	– 0.2	0	0.2	V
	Low	–10.0	—	–8.5	–8.0	–7.5	V
$V_{\phi V2}$ *4, 5, 7	Middle	—	15.0	– 0.2	0	0.2	V
	Low	–10.0	—	–8.5	–8.0	–7.5	V
$V_{\phi V3}$ *4, 5, 7	High	—	18.0	15.0	15.5	16.0	V
	Middle	—	—	– 0.2	0	0.2	V
	Low	–10.0	—	–8.5	–8.0	–7.5	V
$V_{\phi V4}$ *4, 5, 7	Middle	—	15.0	– 0.2	0	0.2	V
	Low	–10.0	—	–8.5	–8.0	–7.5	V
$V_{\phi V5}$ *4, 5, 7	High	—	18.0	15.0	15.5	16.0	V
	Middle	—	—	– 0.2	0	0.2	V
	Low	–10.0	—	–8.5	–8.0	–7.5	V
$V_{\phi V6}$ *4, 5, 7	High	—	18.0	15.0	15.5	16.0	V
	Middle	—	—	– 0.2	0	0.2	V
	Low	–10.0	—	–8.5	–8.0	–7.5	V
Operating temperature		–10	60	—	25	—	°C
Storage temperature		–30	70	—	—	—	°C

■ Absolute Maximum Ratings and Operating Conditions (continued)

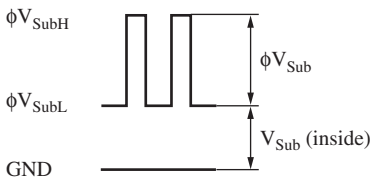
Note) 1. Standard photo detecting condition

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.

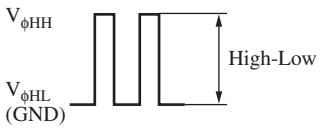
2. ∗1: Reset



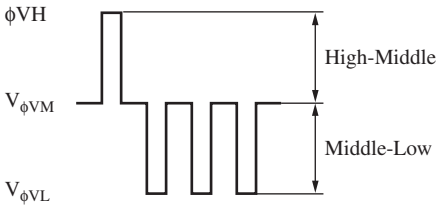
∗2: V_{Sub} for electronic shutter



∗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

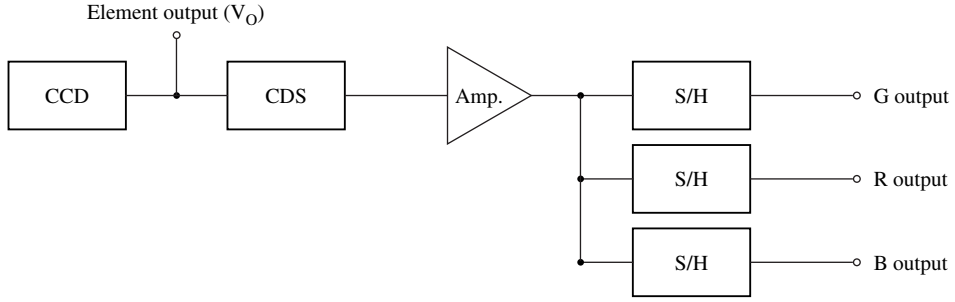
Ground LG and OG pin with each capacitor of 0.047 µF or more.

∗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 $V_{\phi V6L}$)

3. Measuring point



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

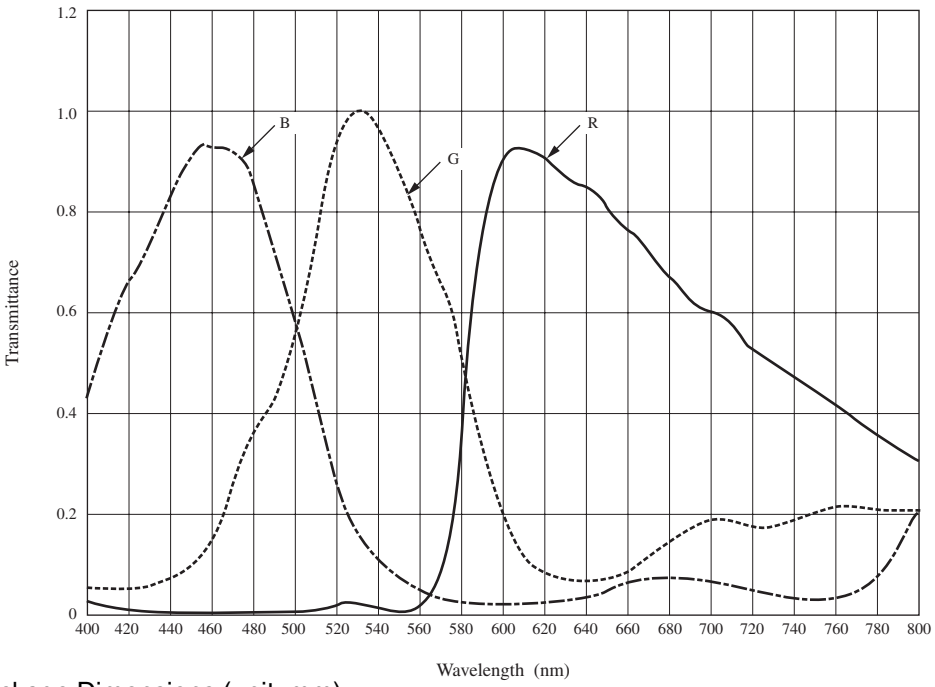
■ Optical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Sensitivity	SoG	J chart F8	—	260	—	mV
Saturation output	V_{sat}	J chart F1.4	—	420	—	mV
Vertical smear	Sm	Frame readout mode	—	−84	—	dB
		Monitor readout mode	—	−72	—	dB

Note) The above-mentioned characteristics are the values on 1/7.5 seconds frame rate.

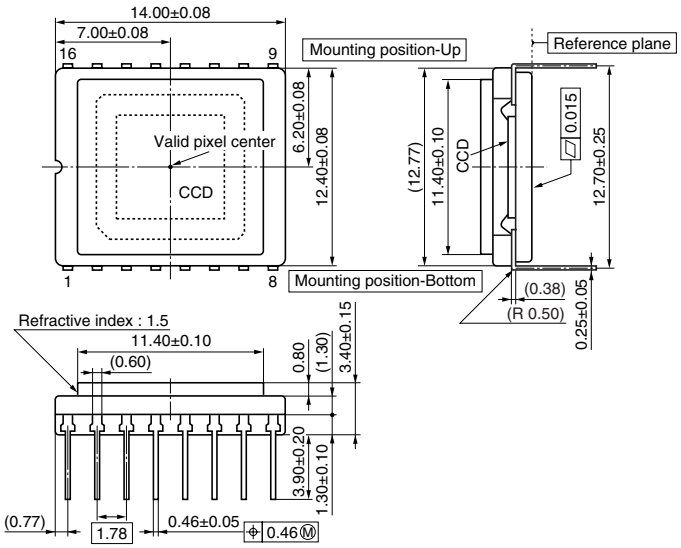
■ Graph of Characteristics

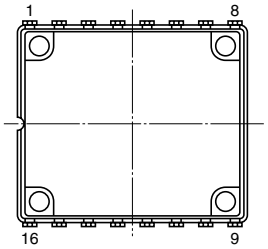
CCD color filter spectral characteristics



■ Package Dimensions (unit: mm)

• WDIP016-P-0500C





1. The center of the package is equal to the center of the effective pixel area.
2. The rotation angle of the effective pixel area: up to ±1.0 degree
3. The distance from the seal glass surface to the surface of the effective pixel area: 1.69 mm ± 0.10 mm
4. The tilt of the effective pixel area for the seal glass surface: up to 30 µm
5. Thickness of the seal glass: 0.8 mm ± 0.10 mm, and the refractive index: 1.50

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