

# MN39217FH

## Diagonal 4.5 mm (type-1/4) 320k-pixel CCD Area Image Sensor

### ■ Overview

The MN39217FH is a 4.5 mm (type-1/4) interline transfer CCD (IT-CCD) solid state image sensor device.

This device uses photodiodes in the optoelectric conversion section and CCDs for signal readout. The electronic shutter function has made an exposure time of 1/10000 seconds possible. Further, this device has the features of high sensitivity, low noise, broad dynamic range, and low smear.

This device has a total of 320589 pixels (537 horizontal × 597 vertical) and provides stable and clear images with a resolution of 330 horizontal TV-lines and 420 vertical TV-lines.

Part Number	Size	System	Color or B/W
MN39217FH	4.5 mm (type-1/4)	PAL	Color

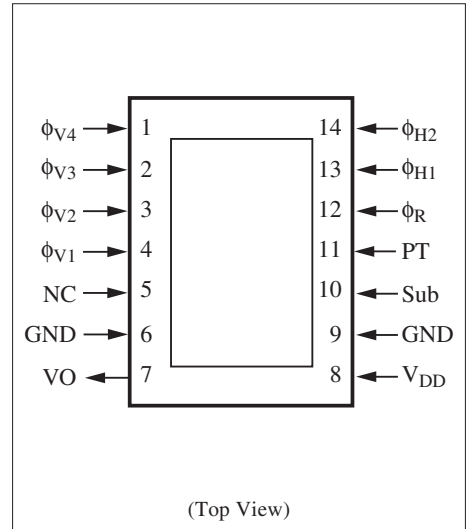
### ■ Features

- Effective pixel number 500 (horizontal) × 582 (vertical)
- High sensitivity
- Broad dynamic range
- Low smear
- Electronic shutter

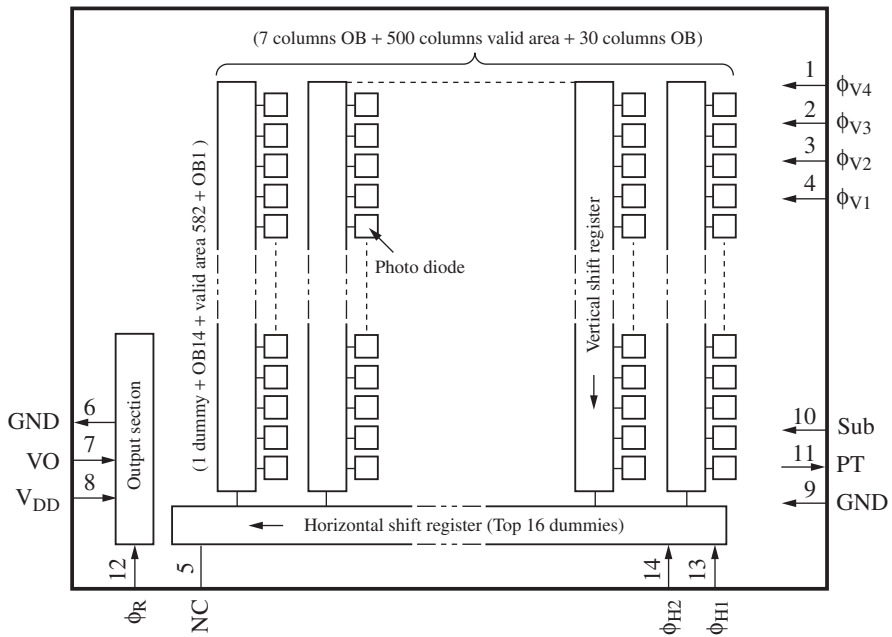
### ■ Applications

- Camcorders

### ■ Pin Assignments



■ Block Diagram



■ Pin Descriptions

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	$\phi_{V4}$	Vertical shift register clock pulse 4	8	$V_{DD}$	Power supply
2	$\phi_{V3}$	Vertical shift register clock pulse 3	9	GND	GND
3	$\phi_{V2}$	Vertical shift register clock pulse 2	10	Sub	Substrate
4	$\phi_{V1}$	Vertical shift register clock pulse 1	11	PT	P-well for protection circuit
5	NC	NC	12	$\phi_R$	Reset pulse (RG)
6	GND	GND	13	$\phi_{H1}$	Horizontal register clock pulse 1
7	VO	Video output	14	$\phi_{H2}$	Horizontal register clock pulse 2

■ Device Parameter (H × V)

Parameter	Value	Unit
Pixel number *	500 × 582	pixel
Image sensing block dimension	3.599 × 2.698	mm <sup>2</sup>
Pixel dimension	7.30 × 4.70	μm <sup>2</sup>

Note) \*: OB columns are not included.

### ■ Absolute Maximum Ratings and Operating Conditions

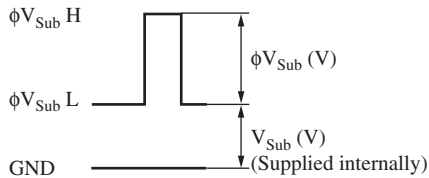
Parameter		Absolute maximum rating		Operating condition			Unit
		Lower limit	Upper limit	Min	Typ	Max	
$V_{DD}$		-0.2	18.0	14.5	15.0	15.5	V
$V_{PT}^{*3,4}$		-10.0	0.2	-8.3	-8.0	-7.7	V
GND		(Reference voltage)		—	0	—	V
$V_{\phi R}$	High-Low	—	8.0	3.0	3.3	3.6	V
	Bias	(Supplied internally)					V
$V_{\phi H1}$	High	—	8.0	3.0	3.3	3.6	V
	Low	-0.2	—	-0.05	0	0.05	V
$V_{\phi H2}$	High	—	8.0	3.0	3.3	3.6	V
	Low	-0.2	—	-0.05	0	0.05	V
$V_{Sub}^{*2}$		(Supplied internally)					V
$\phi V_{Sub}^{*1}$		-0.2	45.0	22.0	23.0	24.0	V
$V_{\phi V1}^{*3,4}$	High	—	18.0	14.5	15.0	15.5	V
	Middle	—	—	-0.2	0	0.2	V
	Low	-9.0	—	-8.3	-8.0	-7.7	V
$V_{\phi V2}^{*3,4}$	Middle	—	15.0	-0.2	0	0.2	V
	Low	-9.0	—	-8.3	-8.0	-7.7	V
$V_{\phi V3}^{*3,4}$	High	—	18.0	14.5	15.0	15.5	V
	Middle	—	—	-0.2	0	0.2	V
	Low	-9.0	—	-8.3	-8.0	-7.7	V
$V_{\phi V4}^{*3,4}$	Middle	—	15.0	-0.2	0	0.2	V
	Low	-9.0	—	-8.3	-8.0	-7.7	V
Operating temperature		-10	60	—	25	—	°C
Storage temperature		-30	80	—	—	—	°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 2856K, luminance of 1 050 cd/m<sup>2</sup>, 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:  $V_{Sub}$  when using electronic shutter function



\*  $\phi Sub$  pulse generates once every 1 V period.

\*2:  $V_{Sub}$  supplied internally is the voltage suppressing the blooming generation at  $\times 1\ 000$  light quantity relative to the standard light quantity.

\*3: Relation between  $V_{PT}$  and  $V_{\phi VL}$

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

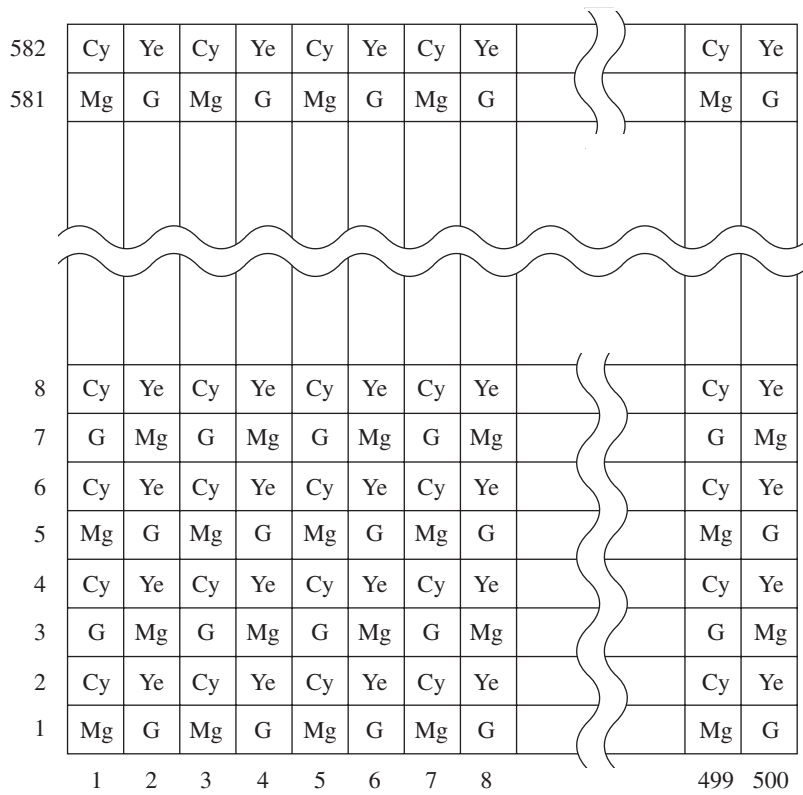
$$V_{PT} \leq VL (V_{\phi V1L} \text{ to } V_{\phi V4L})$$

\*4: Absolute maximum ratings  
 $- 0.2 < V_{Sub} - V_{PT} < 55 (V)$   
 $- 0.2 < V_{\phi V} - V_{PT} < 24.5 (V)$

■ Optical Characteristics

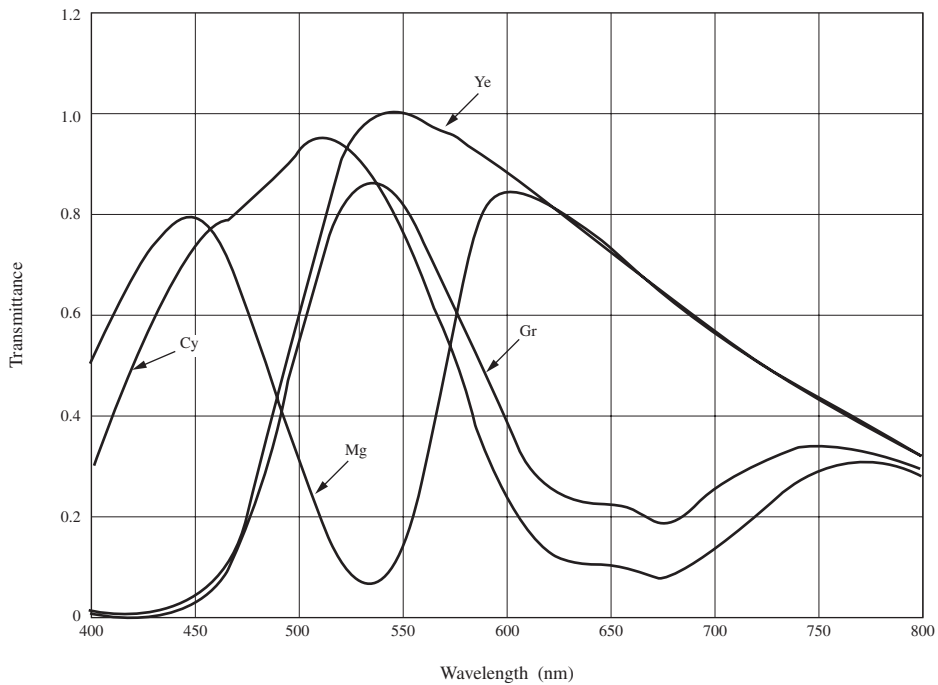
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
S/N ratio (dark)	S/Nd	Dark condition	57	60	—	dB
Sensitivity	So	J chart F8	340	380	—	mV
	So	J chart F1.4	220	250	—	mV
Carrier saturation output	Sc	Carrier maximum output	550	600	—	mV
Vertical smear	Sm	1/10 V chart, F1.4	—	—	0.01	%

■ Color Filter Arrays on CCD



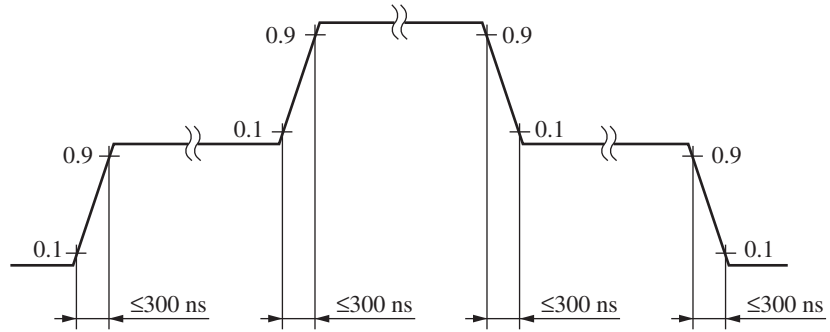
■ Graph of Characteristics

CCD on-chip color filter spectral characteristics

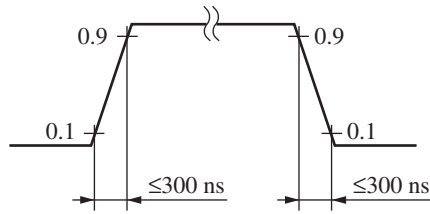


■ Timing Diagram

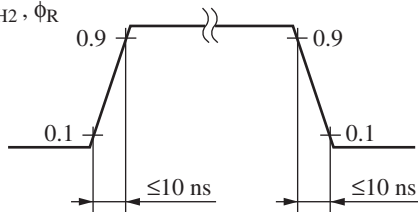
$\phi_{V1}, \phi_{V3}$



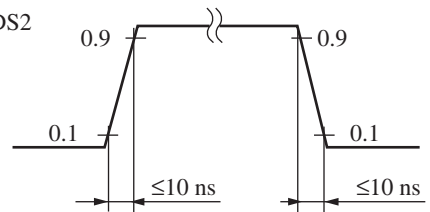
$\phi_{V2}, \phi_{V4}$



$\phi_{H1}, \phi_{H2}, \phi_R$

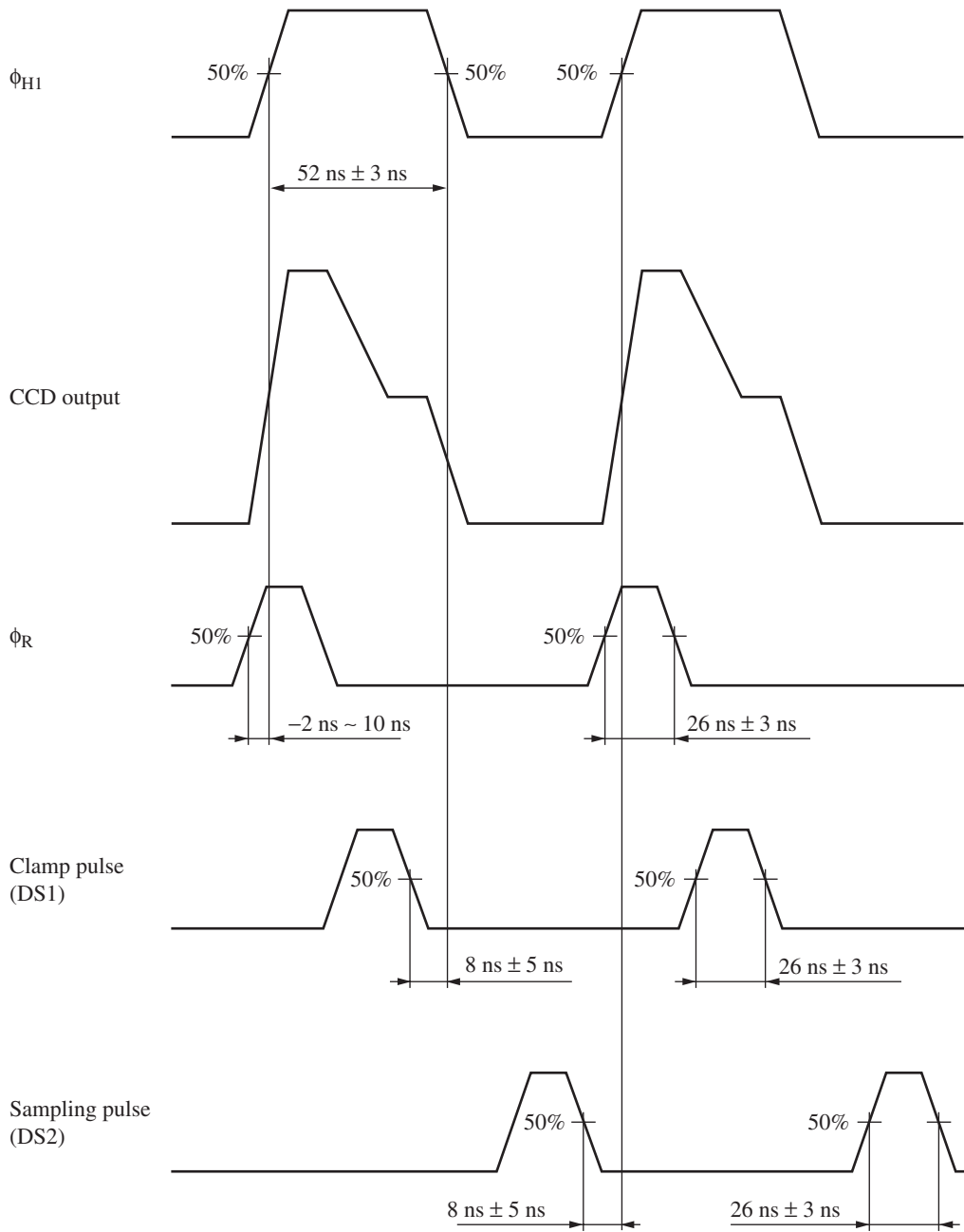


DS1, DS2



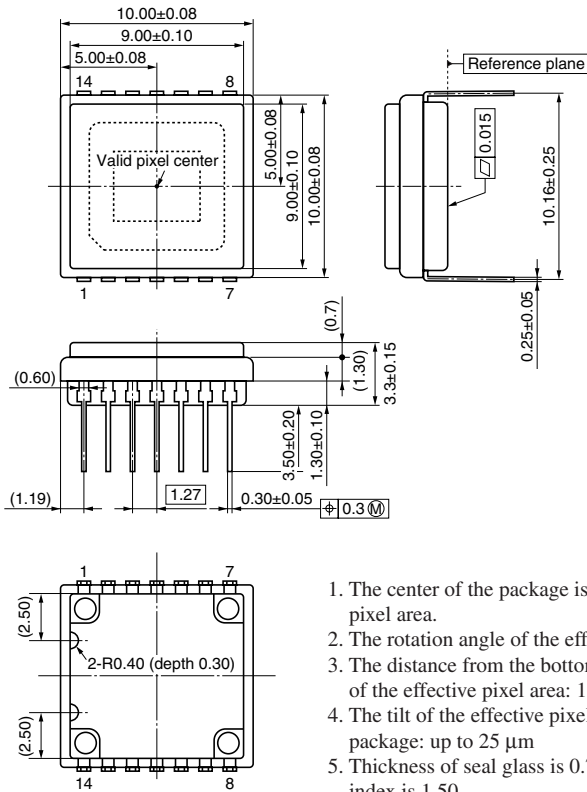
■ Timing Diagram (continued)

- CMOS pulse timing



■ Package Dimensions (unit: mm)

- WDIP014-P-0400H



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  $\pm 1.0$  degree
3. The distance from the bottom face of the package to the surface of the effective pixel area:  $1.41 \text{ mm} \pm 0.1 \text{ mm}$
4. The tilt of the effective pixel area for the bottom face of the package: up to  $25 \text{ }\mu\text{m}$
5. Thickness of seal glass is  $0.7 \text{ mm} \pm 0.1 \text{ mm}$ , and the refractive index is 1.50.
6. Package weight: 0.55 g (typ.)



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