

MN39243AT

Diagonal 6.0 mm (type-1/3) 480k-pixel CCD Area Image Sensor

■ Overview

The MN39243AT is a 6.0 mm (type-1/3) 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 1/10 000 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 466032 pixels (798 horizontal × 584 vertical) and provides stable and clear images with a resolution of 550 horizontal TV-lines and 420 vertical TV-lines.

| Part Number | Size | System | Color or B/W |
|-------------|------------------|--------|--------------|
| MN39243AT | 6.0mm (type-1/3) | CCIR | B/W |

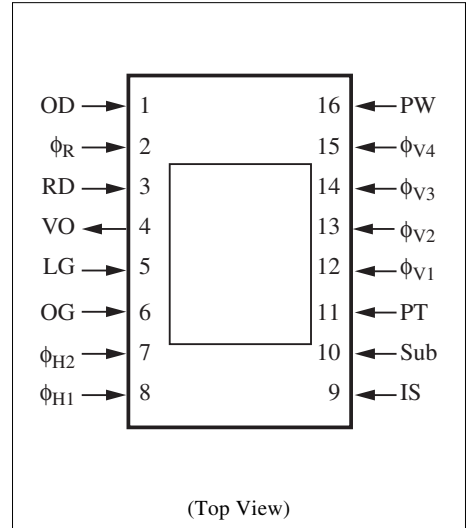
■ Features

- Effective pixel number: 753 (horizontal) × 582 (vertical)
- High sensitivity
- Broad dynamic range
- Low smear
- Electronic shutter

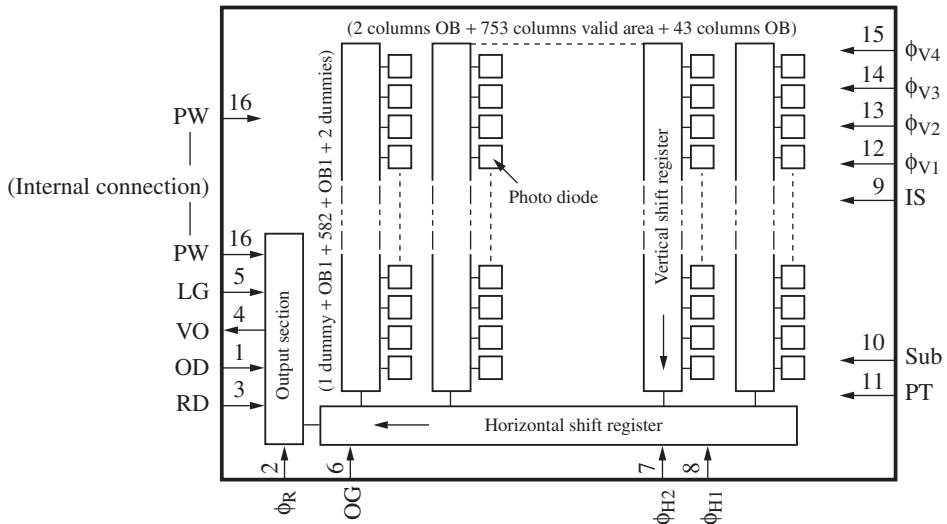
■ Applications

- Surveillance cameras
- FA, OA cameras

■ Pin Assignments



■ Block Diagram



■ Pin Descriptions

| Pin No. | Symbol | Description | Pin No. | Symbol | Description |
|---------|-------------|-----------------------------------|---------|-------------|---------------------------------------|
| 1 | OD | Output drain | 9 | IS | Horizontal CCD input source |
| 2 | ϕ_R | Reset pulse | 10 | Sub | Substrate |
| 3 | RD | Reset drain | 11 | PT | P-well for protection circuit |
| 4 | VO | Video 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 register clock pulse 2 | 15 | ϕ_{V4} | Vertical shift register clock pulse 4 |
| 8 | ϕ_{H1} | Horizontal register clock pulse 1 | 16 | PW | P-well |

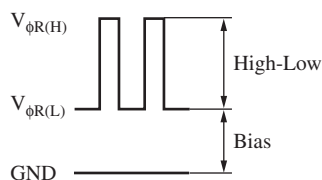
■ Device Parameter (H × V)

| Parameter | Value | Unit |
|-------------------------------|-------------|-----------------|
| Total pixel number | 798 × 584 | pixel |
| Effective pixel number | 753 × 582 | pixel |
| Active pixel number | 737 × 575 | pixel |
| Image sensing block dimension | 4.97 × 3.67 | mm ² |
| Pixel dimension | 6.60 × 6.30 | μm ² |

■ Absolute Maximum Ratings and Operating Conditions

| Parameter | Absolute maximum rating | | Operating condition | | | Unit | |
|-----------------------|-------------------------|-------------|-----------------------|-----------------------|------|------|---|
| | Lower limit | Upper limit | Min | Typ | Max | | |
| V_{RD} | -0.2 | 18.0 | 14.5 | 15.0 | 15.5 | V | |
| V_{OD} | -0.2 | 18.0 | 14.5 | 15.0 | 15.5 | V | |
| V_{IS} | -0.2 | 18.0 | 14.5 | 15.0 | 15.5 | V | |
| V_{LG} | (Internal bias) | | | | | V | |
| V_{OG} | (Internal bias) | | | | | V | |
| $V_{PT}^{*3,4}$ | -9.0 | 0.2 | -7.3 | -7.0 | -6.7 | V | |
| V_{PW} | (Reference voltage) | | — | 0 | — | V | |
| $V_{\phi R}^{*1}$ | High-Low | -0.2 | 5.0 | 3.0 | 3.3 | 3.6 | V |
| | Bias | -0.2 | 5.0 | (Supplied internally) | | | V |
| $V_{\phi H1}$ | High | -0.2 | 5.0 | 3.0 | 3.3 | 3.6 | V |
| | Low | -0.2 | 5.0 | -0.1 | 0 | 0.1 | V |
| $V_{\phi H2}$ | High | -0.2 | 5.0 | 3.0 | 3.3 | 3.6 | V |
| | Low | -0.2 | 5.0 | -0.1 | 0 | 0.1 | V |
| V_{Sub}^{*2} | -0.2 | 45.0 | (Supplied internally) | | | V | |
| ϕV_{Sub}^{*2} | -0.2 | 45.0 | 21.0 | 22.0 | 23.0 | V | |
| $V_{\phi V1}^{*3,4}$ | High | -9.0 | 18.0 | 14.5 | 15.0 | 15.5 | V |
| | Middle | -9.0 | 18.0 | -0.2 | 0 | 0.2 | V |
| | Low | -9.0 | 18.0 | -7.3 | -7.0 | -6.7 | V |
| $V_{\phi V2}^{*3,4}$ | Middle | -9.0 | 15.0 | -0.2 | 0 | 0.2 | V |
| | Low | -9.0 | 15.0 | -7.3 | -7.0 | -6.7 | V |
| $V_{\phi V3}^{*3,4}$ | High | -9.0 | 18.0 | 14.5 | 15.0 | 15.5 | V |
| | Middle | -9.0 | 18.0 | -0.2 | 0 | 0.2 | V |
| | Low | -9.0 | 18.0 | -7.3 | -7.0 | -6.7 | V |
| $V_{\phi V4}^{*3,4}$ | Middle | -9.0 | 15.0 | -0.2 | 0 | 0.2 | V |
| | Low | -9.0 | 15.0 | -7.3 | -7.0 | -6.7 | V |
| Operating temperature | -10 | 70 | — | 25 | — | °C | |
| Storage temperature | -30 | 80 | — | — | — | °C | |

Note) *1 : Reset



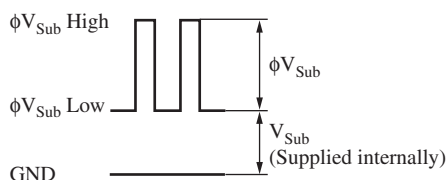
*3: Absolute maximum rating $-0.2 < V_{\phi V} - V_{PT} < 24.5$ (V)

*4: Relation between V_{PT} and $V_{\phi V(L)}$

Set V_{PT} that is to meet the following conditions for VL voltage of the vertical shift clock waveform.

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

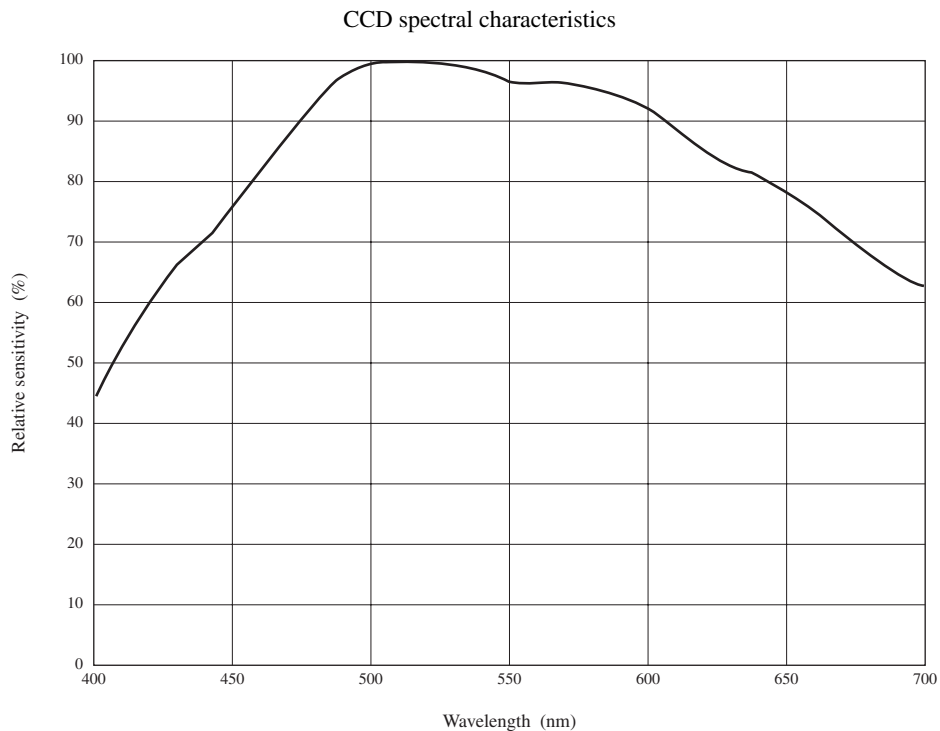
*2: V_{Sub} when using electronic shutter function



■ Optical Characteristics

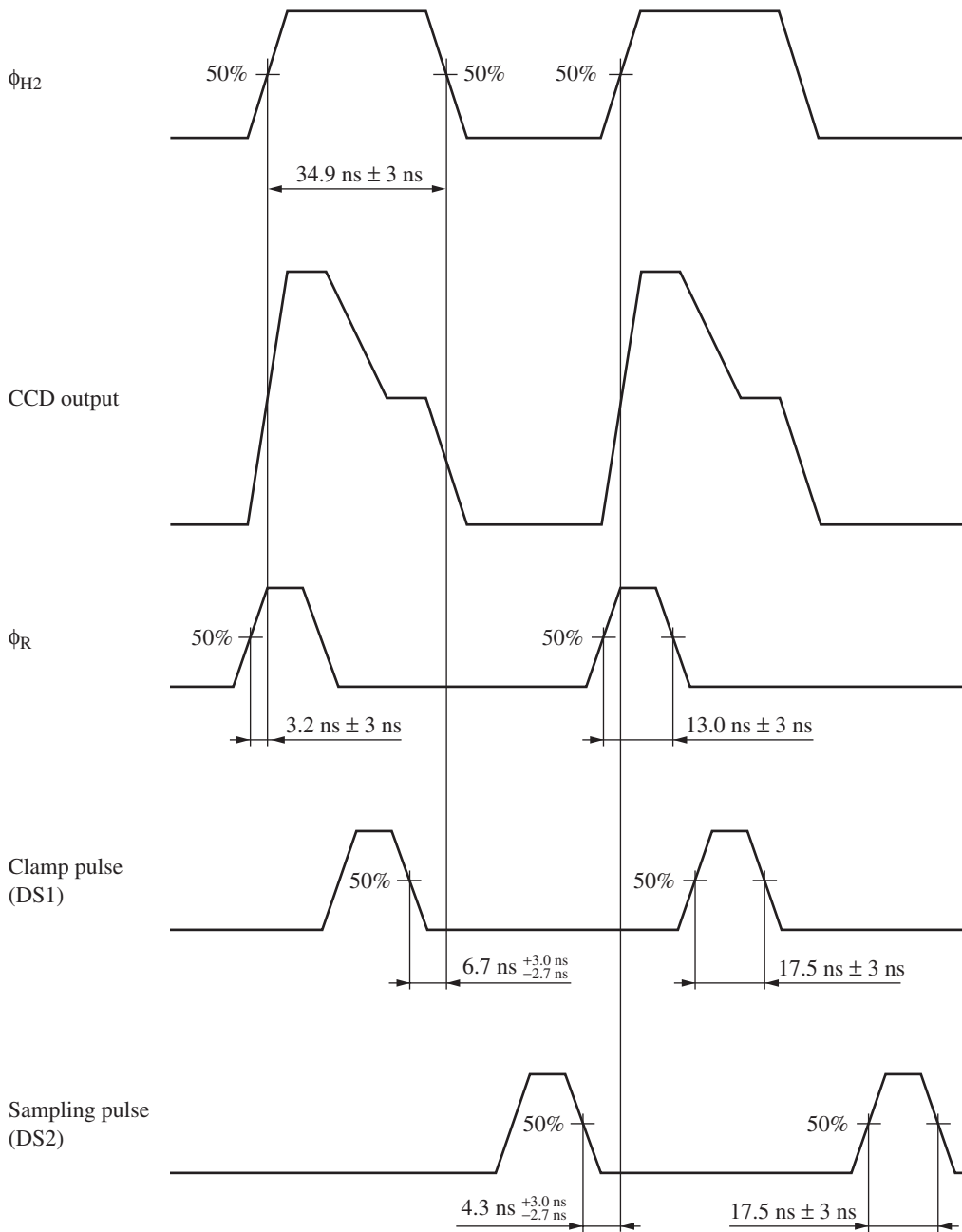
| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---------------------------|--------|------------------------------|-----|------|-----|------|
| S/N ratio (dark) | S/Nd | Dark condition | 57 | 60 | — | dB |
| Sensitivity | So | Standard condition (J chart) | | 750 | — | mV |
| Carrier saturation output | Sa | J chart | | 1400 | — | mV |
| Vertical smear | Sm | 1/10 V chart, F2.8 | — | -100 | -95 | dB |

■ Graph of Characteristics



■ Timing Diagram

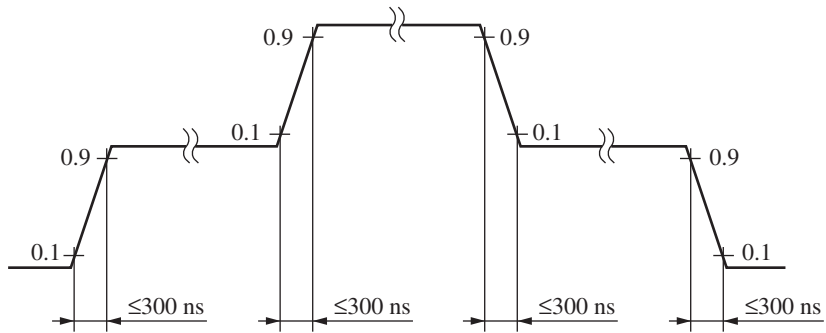
- High speed pulse timing



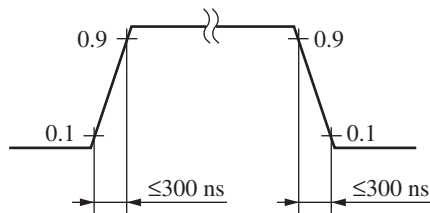
■ Timing Diagram (continued)

- Rise time and fall time of each pulse

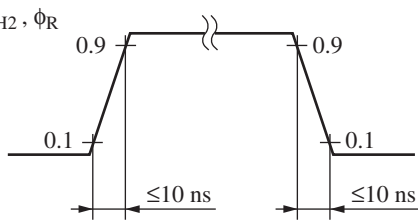
ϕ_{V1}, ϕ_{V3}



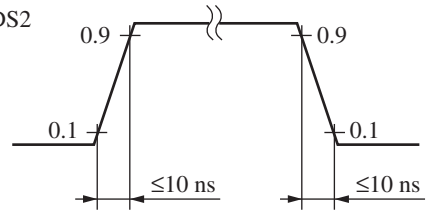
ϕ_{V2}, ϕ_{V4}



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

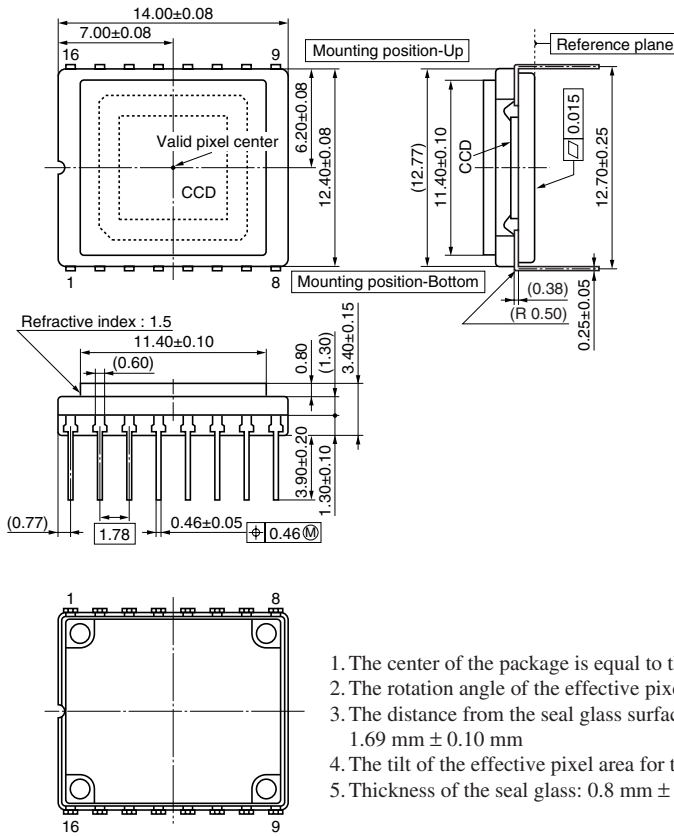


DS1, DS2



■ 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: $1.69 \text{ mm} \pm 0.10 \text{ mm}$
4. The tilt of the effective pixel area for the seal glass surface: up to $30 \mu\text{m}$
5. Thickness of the seal glass: $0.8 \text{ mm} \pm 0.10 \text{ mm}$, and the refractive index: 1.50

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.