

MW39580AE

Diagonal 11 mm (type-2/3) IT CCD Area Image Sensor

■ Overview

The MW39580AE is a type-2/3 2.2M-pixel CCD solid state image sensor.

This device uses photodiodes in the opto-electric conversion section and CCDs for signal read-out. The electronic shutter function allows for an exposure time of 1/10000 seconds. Further, it features high sensitivity, low noise, broad dynamic range and low smear level.

The device has a total of 2 182 860 pixels (2010 horizontal × 1 086 vertical) and provides stable and clear images with a resolution of 1 100 horizontal and 730 vertical TV lines.

Part Number	CCD size	System	Color or B/W
MW39580AE	11 mm (type-2/3)	HDTV	B/W

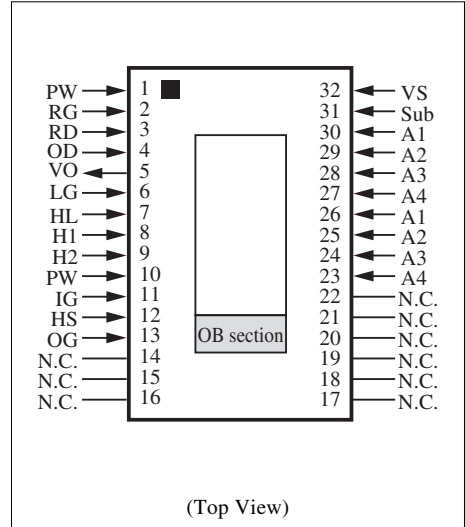
■ Features

- Effective pixel number: 1936 (horizontal) × 1086 (vertical)
- High sensitivity
- High resolution
- Low smear level
- Continuously variable-speed electronic shutter function

■ Applications

- Broadcasting and professional use camera
- Front-edge surveillance camera

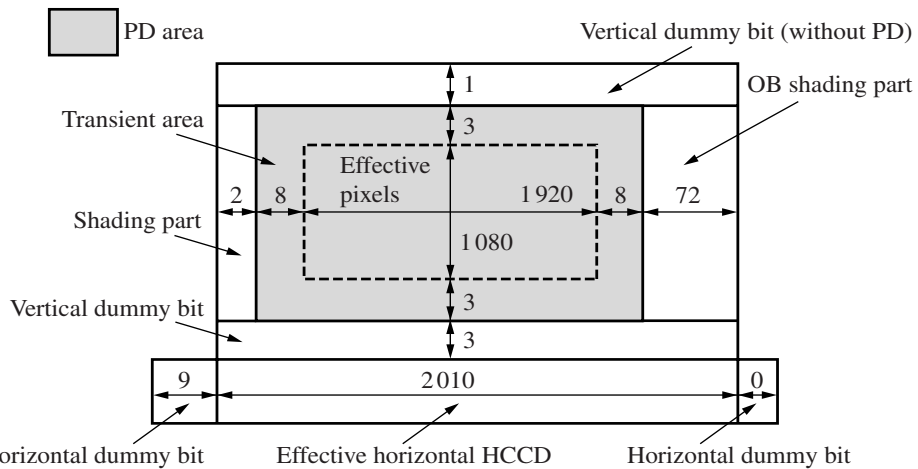
■ Pin Assignments



■ Device Configuration

Parameter	Value	Unit
Horizontal drive frequency	$f_{CK} = 2200 f_H = 74.25$	MHz
Total pixel number	2010 (H) × 1086 (V)	Pixel
Effective pixel number (including transient ones)	1936 (H) × 1086 (V)	Pixel
Effective pixel number	1920 (H) × 1080 (V)	Pixel
Pixel size	5.0 (H) × 5.0 (V)	μm^2
Effective image sensor size	9.6 (H) × 5.4 (V)	mm^2
Aspect ratio	16 : 9	H : V
Aspect ratio error	0.0	%

• Element Construction



Note) The horizontal dummy bit is based on 2 gates = 1 unit.

■ Pin Descriptions

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	PW	P-well	13	OG	Output gate
2	RG	Reset gate	14	N.C.	Non Connection
3	RD	Reset drain	15	N.C.	Non Connection
4	OD	Output drain	16	N.C.	Non Connection
5	VO	Video output	17	N.C.	Non Connection
6	LG	Output load transistor gate	18	N.C.	Non Connection
7	HL	Horizontal CCD final gate	19	N.C.	Non Connection
8	H1	Horizontal CCD 1	20	N.C.	Non Connection
9	H2	Horizontal CCD 2	21	N.C.	Non Connection
10	PW	P-well	22	N.C.	Non Connection
11	IG	Horizontal input gate	23	A4	Vertical CCD gate 4
12	HS	Horizontal input source	24	A3	Vertical CCD gate 3

■ Pin Descriptions (continued)

Pin No.	Symbol	Description	Pin No.	Symbol	Description
25	A2	Vertical CCD gate 2	29	A2	Vertical CCD gate 2
26	A1	Vertical CCD gate 1	30	A1	Vertical CCD gate 1
27	A4	Vertical CCD gate 4	31	Sub	Substrate
28	A3	Vertical CCD gate 3	32	VS	Vertical input source

■ Absolute Maximum Ratings and Operating Conditions

Pin No.	Parameter		Absolute maximum rating		Operating condition			Unit
			Lower limit	Upper limit	Min	Typ	Max	
1	PW		Reference voltage		—	0.0	—	V
2	RG	Amplitude	0	9.0	4.7	5.0	5.3	V
		Low	0	—	5.5	adj.	7.0	V
3	RD		0	18	15.7	16.0	16.3	V
4	OD		0	18	15.7	16.0	16.3	V
5	VO		—	—	—	—	—	V
6	LG		0	6	2.7	3.0	3.3	V
7	ϕ_{HL}	High	—	10	2.7	3.0	3.3	V
		Low	0	—	0.0	0.0	0.3	V
8	ϕ_{H1}	High	—	10	2.7	3.0	3.3	V
		Low	0	—	0.0	0.0	0.3	V
9	ϕ_{H2}	High	—	10	2.7	3.0	3.3	V
		Low	0	—	0.0	0.0	0.3	V
10	PW		Reference voltage		—	0.0	—	V
11	IG		0	5	—	0.0	—	V
12	HS		0	18	15.7	16.0	16.3	V
13	OG		0	5	0.0	0.0	0.3	V
14	N.C.		—	—	—	—	—	—
15	N.C.		—	—	—	—	—	—
16	N.C.		—	—	—	—	—	—
17	N.C.		—	—	—	—	—	—
18	N.C.		—	—	—	—	—	—
19	N.C.		—	—	—	—	—	—
20	N.C.		—	—	—	—	—	—
21	N.C.		—	—	—	—	—	—
22	N.C.		—	—	—	—	—	—
23	ϕ_{A4}	Middle	—	18	0.7	1.0	1.3	V
		Low	-12	—	-9.3	-9.0	-8.7	V

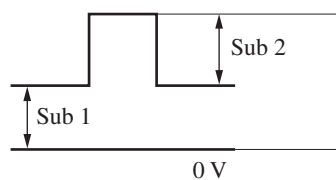
■ Absolute Maximum Ratings and Operating Conditions (continued)

Pin No.	Parameter		Absolute maximum rating		Operating condition			Unit
			Lower limit	Upper limit	Min	Typ	Max	
24	ϕ_{A3}	High	—	18	15.7	16.0	16.3	V
		Middle	—	18	-0.3	0.0	0.3	V
		Low	-12	—	-9.3	-9.0	-8.7	V
25	ϕ_{A2}	Middle	—	18	0.7	1.0	1.3	V
		Low	-12	—	-9.3	-9.0	-8.7	V
26	ϕ_{A1}	High	—	18	15.7	16.0	16.3	V
		Middle	—	18	-0.3	0.0	0.3	V
		Low	-12	—	-9.3	-9.0	-8.7	V
27	ϕ_{A4}	Middle	—	18	0.7	1.0	1.3	V
		Low	-12	—	-9.3	-9.0	-8.7	V
28	ϕ_{A3}	High	—	18	15.7	16.0	16.3	V
		Middle	—	18	-0.3	0.0	0.3	V
		Low	-12	—	-9.3	-9.0	-8.7	V
29	ϕ_{A2}	Middle	—	18	0.7	1.0	1.3	V
		Low	-12	—	-9.3	-9.0	-8.7	V
30	ϕ_{A1}	High	—	18	15.7	16.0	16.3	V
		Middle	—	18	-0.3	0.0	0.3	V
		Low	-12	—	-9.3	-9.0	-8.7	V
31	Sub ^{*1}	1	0	40 ^{*2}	3.0	adj.	14.0	V
		2	0		24.0	25.0	26.0	V
32	VS		0	18	15.7	16.0	16.3	V
Operating temperature			-10	60	—	25	—	°C
Storage temperature			-30	70	—	—	—	°C

Note) *1: Sub pulse at the electronic shutter

*2: Upper limit of Sub maximum rating:

$$\text{Sub 1} + \text{Sub 2} \leq 40 \text{ V}$$



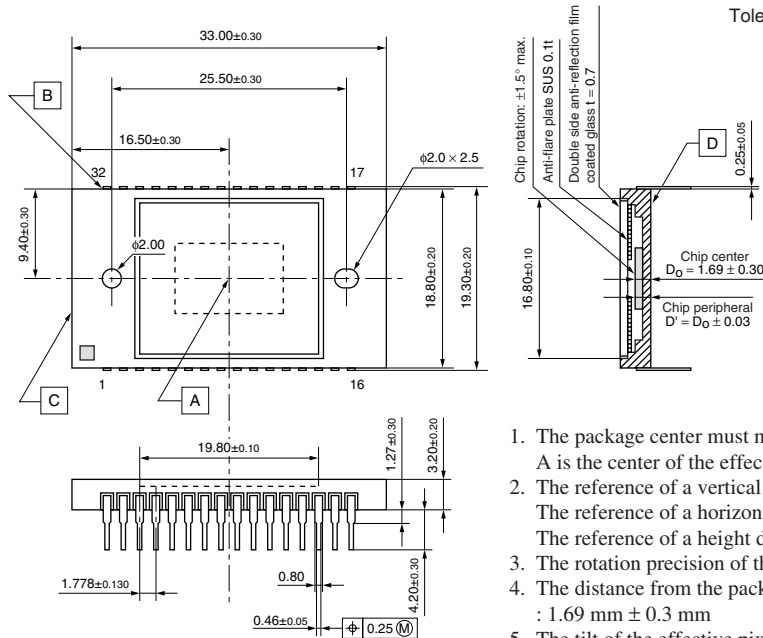
■ Image Sensor Characteristics $T_a = 25^\circ\text{C}$

Parameter	Conditions	Min	Typ	Max	Unit	Remarks
Saturation output	F value adjust	600	750	—	mV	at CCD out
Standard output	J chart, Standard light intensity	100	120	—	mV	at CCD out
Image lag	1/10 light intensity	—	0	—	%	Able to be swept out directly to substrate
Vertical smear	1/10 V	—	-102	-96	dB	Ratio to standard output
Transfer efficiency	H V	F11 + 1/32ND		Resolution should not be reduced.		
Electronic shutter	Specified driving	No abnormality within 1/100 to 1/2000 seconds				

- Note) 1. The substrate voltage (Sub 1) should be adjusted to the minimum voltage that would not cause blooming, overflow and injection at image sensor of light input of 1 600 times the standard light intensity.
 2. The standard light intensity is the one when the exposure is done at an aperture of F/11 using a light source of 2856K and 920 nt and placing a color temperature conversion filter LB-40 (HOYA) and an IR cutting filter CAW-500S ($t = 2.5$ mm) in the light path.

■ Package Dimensions (unit: mm)

- WDIP032-G-0750C (Lead-free package)



1. The package center must meet the center of the effective pixel area. A is the center of the effective pixel area.
2. The reference of a vertical direction(V) is the side B. The reference of a horizontal direction(H) is the side C. The reference of a height direction is the package bottom D.
3. The rotation precision of the effective pixel area: maximum $\pm 1.5^\circ$
4. The distance from the package bottom D to the effective pixel area : $1.69 \text{ mm} \pm 0.3 \text{ mm}$
5. The tilt of the effective pixel area toward the package bottom D : $D' = D_0 \pm \text{max. } 0.03 \text{ mm}$
6. The thickness of the seal glass: 0.7 mm, and the refractive index : 1.50

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