

# MW3795H, MW3795S

11mm (2/3 inch) CCD Area Image Sensors for HDTV

## ■ Overview

The MW3795H and MW3795S are 11mm (2/3 inch) Frame Interline Transfer CCD (FIT-CCD) solid state image sensor device.

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

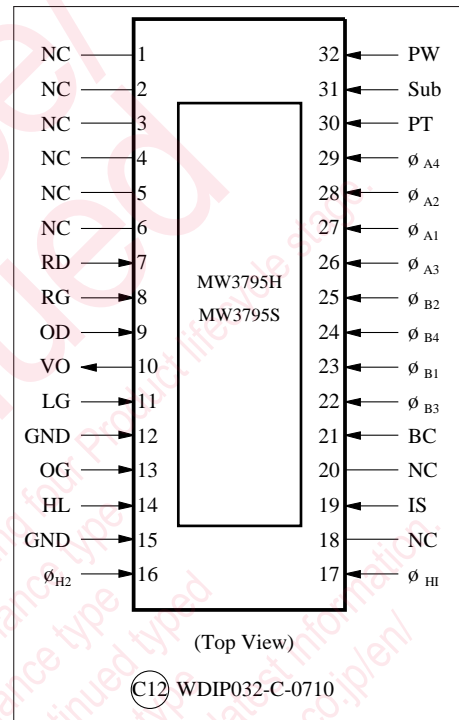
This device has a total of 1410K pixels (1326 horizontal × 1045 vertical) and provides stable and clear images with a resolution of 900 horizontal TV-lines and 730 vertical TV-lines.

Type No.	Size	System	Color or B/W
MW3795H	11mm (2/3 inch)	HDTV	B/W
MW3795S		HDTV	B/W

## ■ Features

- Total number of pixels: 1326 (horizontal) × 1045 (vertical)
- High sensitivity
- Low noise
- Broad dynamic range
- Low smear
- Low image lag
- Electronic shutter function present
- No image distortion
- High reliability
- 32 Pin DIL ceramic package

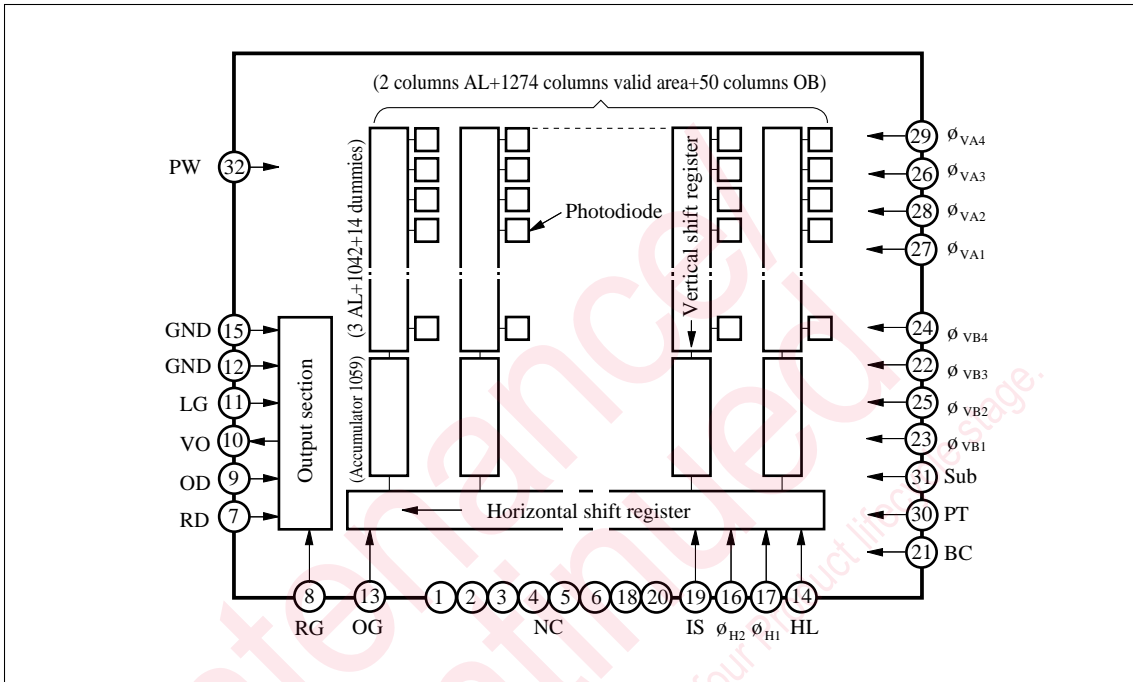
## ■ Pin Assignments



## ■ Applications

- Cameras for HDTV broadcasting (MW3795H)
- Cameras for commercial use HDTV (MW3795S)

■ Block Diagram



■ Pin Descriptions

Pin No.	Symbol	Descriptions	Pin No.	Symbol	Descriptions
1	NC	—	17	$\phi_{H1}$	Horizontal CCD gate (1)
2	NC	—	18	NC	—
3	NC	—	19	IS	Horizontal CCD input source
4	NC	—	20	NC	—
5	NC	—	21	BC	Vertical CCD final gate
6	NC	—	22	$\phi_{VB3}$	Accumulator vertical CCD gate (3)
7	RD	Reset drain	23	$\phi_{VB1}$	Accumulator vertical CCD gate (1)
8	RG	Reset gate	24	$\phi_{VB4}$	Accumulator vertical CCD gate (4)
9	OD	Output drain	25	$\phi_{VB2}$	Accumulator vertical CCD gate (2)
10	VO	Video output	26	$\phi_{VA3}$	Photo detector vertical CCD gate (3)
11	LG	Load gate	27	$\phi_{VA1}$	Photo detector vertical CCD gate (1)
12	GND	Ground	28	$\phi_{VA2}$	Photo detector vertical CCD gate (2)
13	OG	Output gate	29	$\phi_{VA4}$	Photo detector vertical CCD gate (4)
14	HL	Horizontal CCD final gate	30	PT	P-well for protection circuit
15	GND	Ground	31	Sub	Substrate
16	$\phi_{H2}$	Horizontal CCD gate (2)	32	PW	P-well

■ Absolute Maximum Ratings and Operating Conditions (Note 1)

Parameter	Symbol	Rating		Operating condition <sup>Note 2)</sup>			Unit
		min	max	min	typ	max	
Reset drain voltage	$V_{RD}$	0	20	15.5	16.0	16.5	V
Reset gate voltage	(L) $V_{RG(L)}$	0	—	2.5	3.0	3.5	V
	(H) $V_{RG(H)}$	0	20	15.5	16.0	16.5	V
Output drain voltage	$V_{OD}$	0	20	15.5	16.0	16.5	V
Video output voltage	$V_{VO}$	—	—	—	—	—	V
Load gate voltage	$V_{LG}$	0	12	2.5	3.0	3.5	V
Ground voltage	$V_{GND}$	—	—	—	0	—	V
Output gate voltage	$V_{OG}$	0	12	2.0	Adjust	4.0	V
Horizontal CCD final stage gate voltage	$V_{HL}$	=H1					V
Ground voltage	$V_{GND}$	—	—	—	0	—	V
Horizontal CCD gate voltage (2)	(L) $V_{H2(L)}$	0	—	0	0	0.3	V
	(H) $V_{H2(H)}$	0	16	5.7	6.0	6.3	V
Horizontal CCD gate voltage (1)	(L) $V_{H1(L)}$	0	—	0	0	0.3	V
	(H) $V_{H1(H)}$	0	16	5.7	6.0	6.3	V
Horizontal CCD input source voltage	$V_{IS}$	0	20	15.5	16.0	16.5	V
Vertical CCD final stage gate voltage	(M) $V_{BC(M)}$	=B4					V
	(L) $V_{BC(L)}$						
Accumulator vertical CCD gate (B3) voltage	(M) $V_{B3(M)}$	—	20	4.7	5.0	5.3	V
	(L) $V_{B3(L)}$	-12	—	-9.3	-9.0	-8.7	V
Accumulator vertical CCD gate (B1) voltage	(M) $V_{B1(M)}$	—	20	4.7	5.0	5.3	V
	(L) $V_{B1(L)}$	-12	—	-9.3	-9.0	-8.7	V
Accumulator vertical CCD gate (B2) voltage	(M) $V_{B4(M)}$	—	20	4.7	5.0	5.3	V
	(L) $V_{B4(L)}$	-12	—	-9.3	-9.0	-8.7	V
Accumulator vertical CCD gate (B4) voltage	(M) $V_{B2(M)}$	—	20	4.7	5.0	5.3	V
	(L) $V_{B2(L)}$	-12	—	-9.3	-9.0	-8.7	V
Photo detector vertical CCD gate (A3) voltage	(H) $V_{A3(H)}$	—	20	17.7	18.0	18.3	V
	(M) $V_{A3(M)}$	—	20	-0.3	0	0.3	V
	(L) $V_{A3(L)}$	-12	—	-9.3	-9.0	-8.7	V
Photo detector vertical CCD gate (A1) voltage	(H) $V_{A1(H)}$	—	20	17.7	18.0	18.3	V
	(M) $V_{A1(M)}$	—	20	-0.3	0	0.3	V
	(L) $V_{A1(L)}$	-12	—	-9.3	-9.0	-8.7	V
Photo detector vertical CCD gate (A2) voltage	(M) $V_{A2(M)}$	—	20	3.7	4.0	4.3	V
	(L) $V_{A2(L)}$	-12	—	-9.3	-9.0	-8.7	V
Photo detector vertical CCD gate (A4) voltage	(M) $V_{A4(M)}$	—	20	3.7	4	4.3	V
	(L) $V_{A4(L)}$	-12	—	-9.3	-9.0	-8.7	V
Protection P well voltage	$V_{PT}$	-13	$\phi_{VL}$	$\phi_{VL}$ -1.3	$\phi_{VL}$ -1.0	$\phi_{VL}$ -0.7	V
Substrate voltage	(1) $V_{Sub(1)}$	0	18	3.0	Adjust	16.0	V
	(2) $V_{Sub(2)}^{*1}$	—	—	$V_{Sub(1)+2-3V}$			V
	(3) $V_{Sub(3)}^{*1}$	0	50	34.7	35.0	35.3	V
P well voltage	$V_{PW}$	—	—	—	0	—	V

Note 1) The standard light input is the one when the exposure is done at an aperture of F/11 using a light source of 2856K and 920nt, and placing a color temperature conversion filter LB-40 (t=2.5mm, Hoya) and an IR cutting filter CAW-500 (t=2.5mm, Hoya) in the light path.

Note 2)  $V_{Sub}$  shall be adjusted so that the smears appearing at the top and the bottom of the imaged area (the top and bottom smears) are equal when a target is imaged at the center of the screen with 3/10V of the specified exposure and the readout pulse is turned OFF.

\*1  $V_{Sub(2)}$  is the applied voltage during frame transfer.  
 $V_{Sub(3)}$  is the applied voltage during electronic shutter operation.

■ Optical Characteristics

Type No.	Color or B/W	Valid pixels		S/N typ. (dB)	Saturation output typ. (mV)	Sensitivity F8 typ. (mV)	Vertical smear Sm typ. (%)	Image lag typ. (%)	Horizontal resolution typ. (TV-lines)	Vertical resolution typ. (TV-lines)
		H	V							
MW3795H	B/W	1274	1042	55	600	220	-95	0	900	730
MW3795S	B/W	1274	1042	55	500	200	-95	0	900	730

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