

MW3746CKH

11mm (2/3 inch) 768H CCD Area Image Sensor

■ Overview

The MW3746CKH is a 11mm (2/3 inch) Interline Transfer CCD (IT-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.

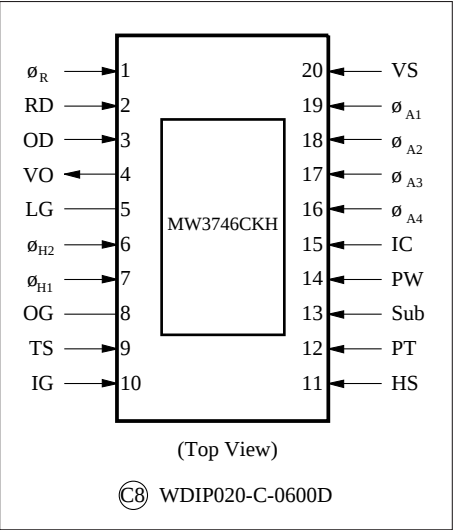
This device has a total of 480K pixels (813 horizontal × 590 vertical) and provides stable and clear images with a resolution of 560 horizontal TV-lines and 420 vertical TV-lines.

Type No.	Size	System	Color or B/W
MW3746CKH	11mm (2/3 inch)	(PAL)	B/W

■ Features

- Total number of pixels: 813 (horizontal) × 590 (vertical)
- High sensitivity
- Low noise
- Broad dynamic range
- Low smear
- Low image lag
- Electronic shutter function present
- No image distortion
- Small size enables design of compact equipment
- High reliability
- 20 Pin DIL ceramic package

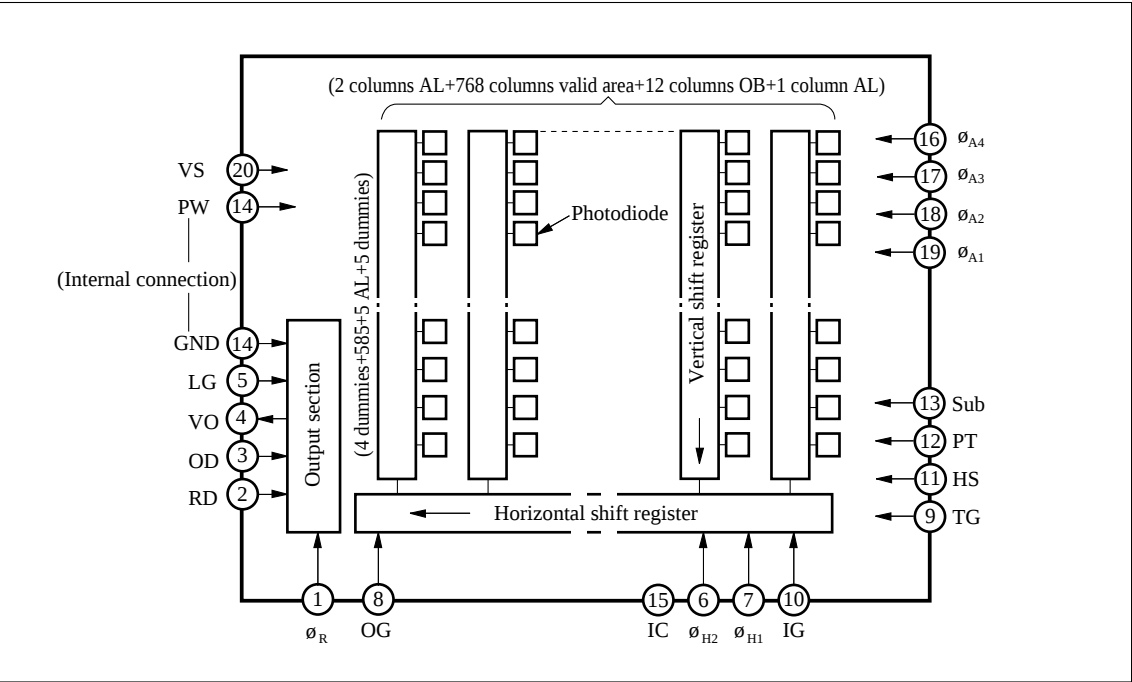
■ Pin Assignments



■ Applications

- Cameras for commercial use

■ Block Diagram



■ Pin Descriptions

Pin No.	Symbol	Descriptions	Pin No.	Symbol	Descriptions
1	ϕ_R	Reset pulse	11	HS	Horizontal CCD input source
2	RD	Reset drain	12	PT	P-well for protection circuit
3	OD	Output drain	13	Sub	Substrate
4	VO	Video output	14	PW	P-well
5	LG	Load gate bias	15	IC	Inter-connection
6	ϕ_{H2}	Horizontal register clock pulse (2)	16	ϕ_{A4}	Vertical clock pulse (A4)
7	ϕ_{H1}	Horizontal register clock pulse (1)	17	ϕ_{A3}	Vertical clock pulse (A3)
8	OG	Output gate	18	ϕ_{A2}	Vertical clock pulse (A2)
9	TS	Test pin	19	ϕ_{A1}	Vertical clock pulse (A1)
10	IG	Horizontal CCD input gate	20	VS	Vertical CCD input source

Absolute Maximum Ratings and Operating Conditions

Parameter	Symbol	Rating ^{Note 2)}		Operating condition ^{Note 1)}			Unit
		min	max	min	typ	max	
Reset pulse voltage	(H) $V_{\theta R (H)}$	0	20	15.5	16.0	16.5	V
	(L) $V_{\theta R (L)}$	0.2	—	2.5	3.0	3.5	V
Reset drain voltage	V_{RD}	0	20	15.7	16.0	16.3	V
Output drain voltage	V_{OD}	0	20	15.7	16.0	16.3	V
Video output voltage	V_{VO}	—	—	—	(9)	—	V
Load gate bias voltage	V_{LG}	0	12	2.7	3.0	3.3	V
Horizontal clock pulse voltage (2)	(H) $V_{\theta H2 (H)}$	0	16	4.7	5.0	5.3	V
	(L) $V_{\theta H2 (L)}$	0	—	−0.3	0	0.3	V
Horizontal clock pulse voltage (1)	(H) $V_{\theta H1 (H)}$	0	16	4.7	5.0	5.3	V
	(L) $V_{\theta H1 (L)}$	0	—	−0.3	0	0.3	V
Output gate voltage	V_{OG}	0	12	5.7	6.0	6.3	V
Test pin voltage	V_{TS}	0	20	−0.3	0	0.3	V
Horizontal CCD input gate voltage	V_{IG}	0	20	−0.3	0	0.3	V
Horizontal CCD input source voltage	V_{HS}	0	20	15.7	16.0	16.3	V
Protection P well voltage	V_{PT}	13.2	$\emptyset_{VL}$	$\emptyset_{VL}$ −1.2	$\emptyset_{VL}$ −1.0	$\emptyset_{VL}$ −0.7	V
Substrate voltage	$V_{Sub (1)}$	0	18	3.0	adj	14.5	V
	$V_{Sub (2)}^{*2}$	0	50	26.7	27.0	27.3	V
P well voltage	V_{PW}	Reference voltage		—	0	—	V
Inter-connection voltage	V_{IC}	—	—	—	—	—	V
Vertical clock pulse (A4) voltage	(M) $V_{\theta A4 (M)}^{*1}$	—	20	2.7	3.0	3.3	V
	(L) $V_{\theta A4 (L)}^{*1}$	−12	—	−9.3	−9.0	−8.7	V
Vertical clock pulse (A3) voltage	(H) $V_{\theta VA3 (H)}^{*1}$	—	20	15.5	16.0	16.5	V
	(M) $V_{\theta VA3 (M)}^{*1}$	—	20	−0.3	0	0.3	V
	(L) $V_{\theta VA3 (L)}^{*1}$	−12	—	−9.3	−9.0	−8.7	V
Vertical clock pulse (A2) voltage	(M) $V_{\theta VA2 (M)}^{*1}$	—	20	2.7	3.0	3.3	V
	(L) $V_{\theta VA2 (L)}^{*1}$	−12	—	−9.3	−9.0	−8.7	V
Vertical clock pulse (A1) voltage	(H) $V_{\theta VA1 (H)}^{*1}$	—	20	15.5	16.0	16.5	V
	(M) $V_{\theta VA1 (M)}^{*1}$	—	20	−0.3	0	0.3	V
	(L) $V_{\theta VA1 (L)}^{*1}$	−12	—	−9.3	−9.0	−8.7	V
Vertical CCD input source	V_{VS}	—	18	15.7	16.0	16.3	V
Operating temperature	T_{opr}	−10	60	—	25	—	°C
Storage temperaure	T_{stg}	−30	70	—	—	—	°C

Note 1) The initial setting of V_{Sub} shall be 3.0V and shall be adjusted to the minimum voltage at which no blooming or no overflow charge is caused at a light input of 100 times the standard value. 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 1050nt, and placing a color temperature conversion filter LB-40 (Hoya) and an IR cutting filter CAW-500S ($t=2.5\text{mm}$) in the light path.

Note 2) $V_{Sub(1)}$ is the DC component during normal operation.

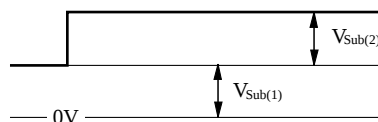
$V_{Sub(2)}$ is the amplitude of the pulse added to $V_{Sub(1)}$ during electronic shutter operation.

The operation should be made with $(V_{Sub(1)} + V_{Sub(2)})$ less than or equal to 40V.

Also, the power supply impedance of V_{Sub} should be 100Ω or less.

* 1 This voltage may be adjusted or altered.

* 2



■ 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. (dB)	Image lag typ. (%)	Horizontal resolution typ. (TV-lines)	Vertical resolution typ. (TV-lines)
		H	V							
MW3746CKH	B/W	768	585	60	1,100	520	-100	0	560	420

■ Graphs of Characteristics

