

MN3752MAE

8mm (1/2 inch) 710H CCD Area Image Sensor

■ Overview

The MN3752MAE is a 8mm (1/2 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.

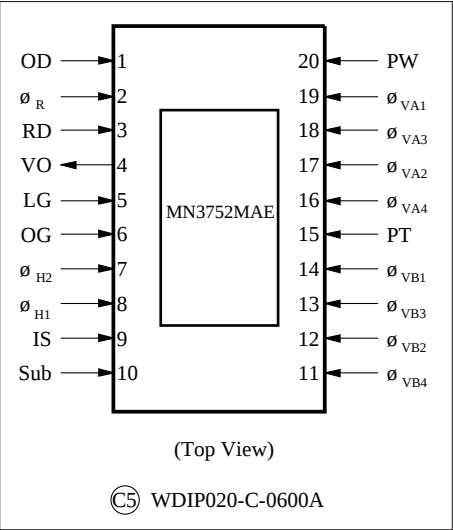
This device has a total of 390K pixels (768 horizontal × 495 vertical) and provides stable and clear images with a resolution of 530 horizontal TV-lines and 350 vertical TV-lines.

Type No.	Size	System	Color or B/W
MN3752MAE	8mm (1/2 inch)	E I A	B/W

■ Features

- Total number of pixels: 768 (horizontal) × 495 (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

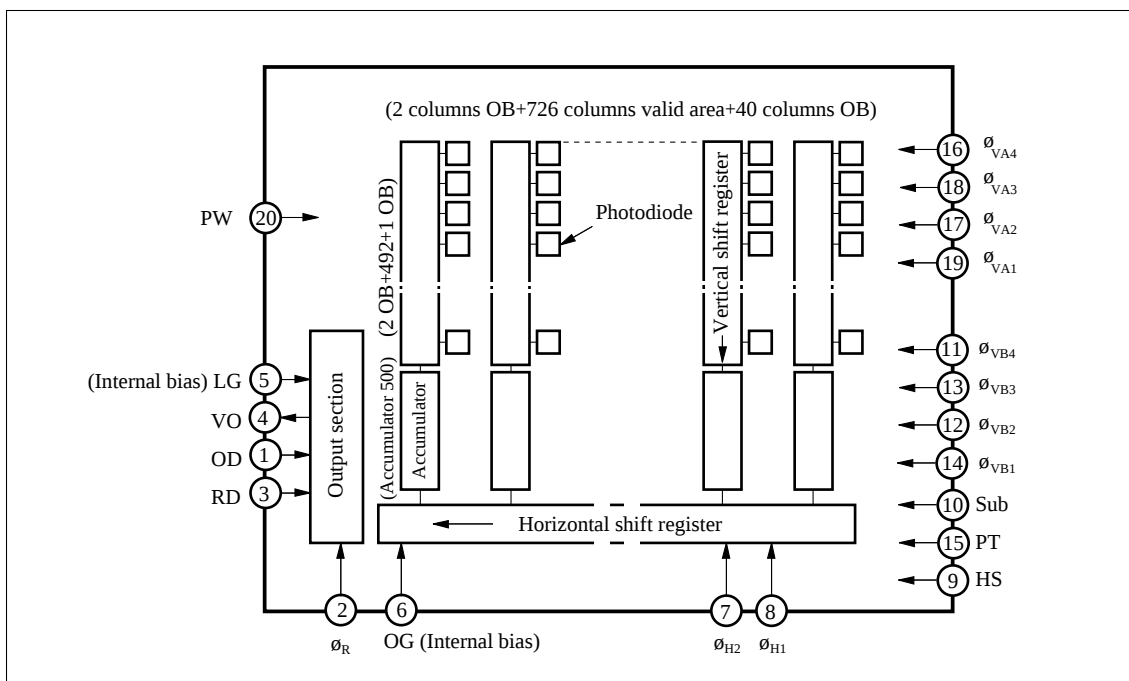
■ Pin Assignments



■ Applications

- Cameras for broadcasting
- Cameras for commercial use

■ Block Diagram



■ Pin Descriptions

Pin No.	Symbol	Descriptions	Pin No.	Symbol	Descriptions
1	OD	Output drain	11	ϕ_{VB4}	Vertical shift register clock pulse (B4)
2	ϕ_R	Reset pulse	12	ϕ_{VB2}	Vertical shift register clock pulse (B2)
3	RD	Reset drain	13	ϕ_{VB3}	Vertical shift register clock pulse (B3)
4	VO	Video output	14	ϕ_{VB1}	Vertical shift register clock pulse (B1)
5	LG	Output load transistor gate	15	PT	P-well for protection circuit
6	OG	Output gate	16	ϕ_{VA4}	Vertical shift register clock pulse (A4)
7	ϕ_{H2}	Horizontal register clock pulse (2)	17	ϕ_{VA2}	Vertical shift register clock pulse (A2)
8	ϕ_{H1}	Horizontal register clock pulse (1)	18	ϕ_{VA3}	Vertical shift register clock pulse (A3)
9	IS	Input source	19	ϕ_{VA1}	Vertical shift register clock pulse (A1)
10	Sub	Substrate	20	PW	P-well

Absolute Maximum Ratings and Operating Conditions

Parameter	Symbol	Rating ^{Note 2)}		Operating condition ^{Note 1)}			Unit
		min	max	min	typ	max	
Reset drain voltage	V_{RD}	-0.2	18	14.5	15.0	15.5	V
Output drain voltage	V_{OD}	-0.2	18	14.5	15.0	15.5	V
Output load transistor gate voltage ^{Note 3)}	V_{LG}	(Supplied internally)					V
Output gate voltage ^{Note 3)}	V_{OG}	(Supplied internally)					V
Input source voltage	V_{IS}	-0.2	18	14.5	15.0	15.5	V
Protection P well voltage	V_{PT}	-10.0	0.2	$\emptyset V_{(L)}$ -1.2	$\emptyset V_{(L)}$ -1.0	$\emptyset V_{(L)}$ -0.7	V
P well voltage	V_{PW}	Reference voltage		—	0	—	V
Reset pulse voltage	H-L $V_{\emptyset R (H-L)}$ * 1	—	18	4.7	5.0	5.3	V
	Bias $V_{\emptyset R (Bias)}$ * 1	-0.2	—	0	Fixed* 3	5.0	V
Horizontal register clock pulse voltage 1	$V_{\emptyset H1 (H)}$	—	18	4.7	5.0	5.3	V
	$V_{\emptyset H1 (L)}$	-0.2	—	-0.2	0	0.3	V
Horizontal register clock pulse voltage 2	$V_{\emptyset H2 (H)}$	—	18	4.7	5.0	5.3	V
	$V_{\emptyset H2 (L)}$	-0.2	—	-0.2	0	0.3	V
Vertical shift register clock pulse voltage	$V_{\emptyset V1A, \emptyset V3A (H)}$	—	18	14.5	15.0	15.5	V
	$V_{\emptyset V1A, \emptyset V3A (M)}$	—	—	-0.1	0	0.1	V
	$V_{\emptyset V1A, \emptyset V3A (L)}$	-9	—	-7.3	-7.0	-6.7	V
Vertical shift register clock pulse voltage	$V_{\emptyset V2A, 4A (M)}$	—	15	1.7	2.0	2.3	V
	$V_{\emptyset V2A, 4A (L)}$	-9	—	-7.3	-7.0	-6.7	V
Vertical shift register clock pulse voltage	$V_{\emptyset V1B (H)}$	—	15	6.7	7.0	7.3	V
	$V_{\emptyset V1B (M)}$	—	—	-0.1	0	0.1	V
	$V_{\emptyset V1B (L)}$	-9	—	-7.3	-7.0	-6.7	V
Vertical shift register clock pulse voltage	$V_{\emptyset V3B (M)}$	—	15	-0.1	0	0.1	V
	$V_{\emptyset V3B (L)}$	-9	—	-7.3	-7.0	-6.7	V
Vertical shift register clock pulse voltage	$V_{\emptyset V2B, 4B (M)}$	—	15	1.7	2.0	2.3	V
	$V_{\emptyset V2B, 4B (L)}$	-9	—	-7.3	-7.0	-6.7	V
Substrate voltage	V_{sub} * 2	-0.2	45	0	Adjust	14.0	V
	$\emptyset V_{sub}$ * 2			24.2	25	25.8	V
Operating temperature	T_{opr}	-10	70	—	25	—	°C
Storage temperature	T_{sig}	-30	70	—	—	—	°C

Note 1) The initial setting of V_{sub} shall be 8.0V and shall be adjusted to the minimum voltage at which no blooming 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/8 using a light source of 2856K and 920nt, and placing a color temperature conversion filter LB-40 (Hoya) and an IR cutting filter CAW-500 ($t=2.5\text{mm}$) in the light path.

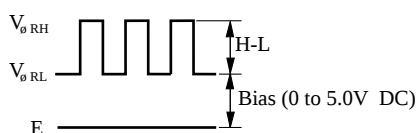
If any blooming is present at the minimum operating condition of V_{sub} , it should be adjusted to the minimum voltage at which there is no FPN picture.

Note 2) Absolute maximum ratings: $-0.2 < V_{sub} - V_{PT} < +55 \text{ (V)}$

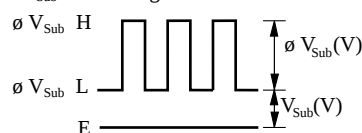
$-0.2 < V_{\emptyset V} - V_{PT} < +28 \text{ (V)}$

Note 3) The LG and OG pins should each be grounded via a capacitor of 0.047 μF or more.

* 1



* 2 V_{sub} when using electronic shutter function

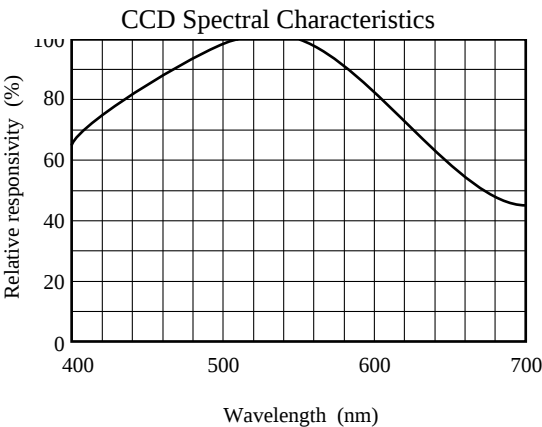


* 3 If there are any parameters not specified here but need to be stipulated, the decision will be made in consultation with the customer.

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							
MN3752MAE	B/W	726	492	60	1,200	450	0.001	0	530	350

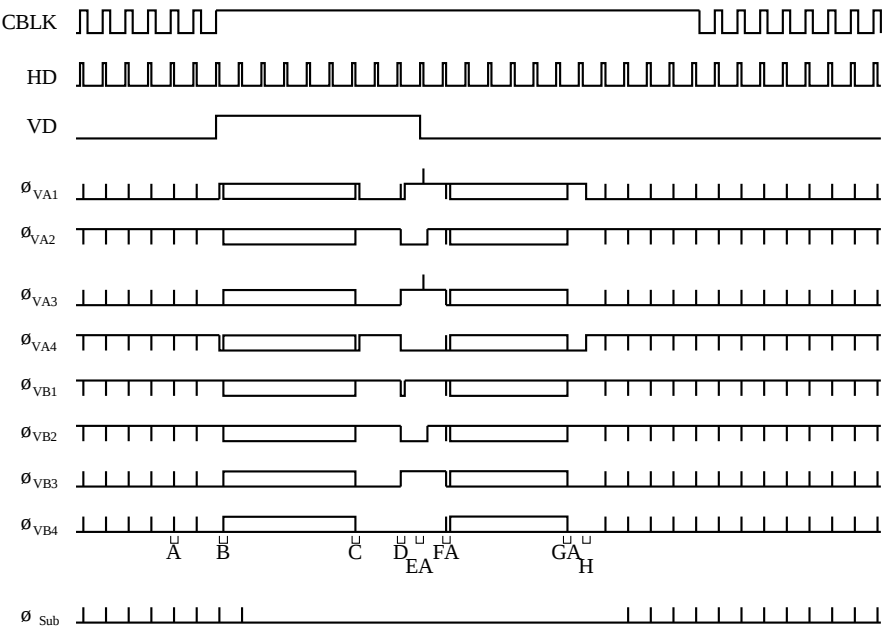
Graphs of Characteristics



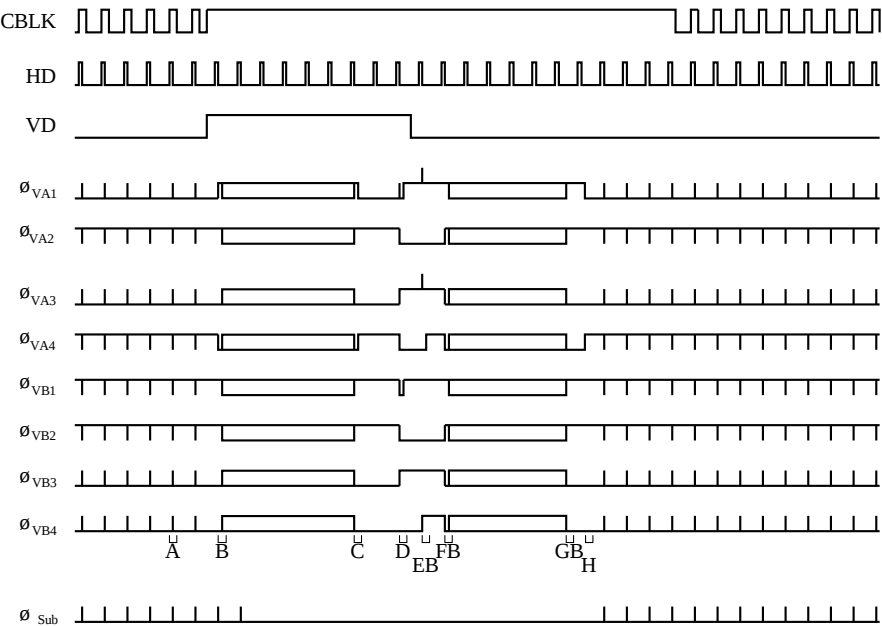
Example of Recommended Driving Pulses

- V Rate timing

< Field A >



< Field B >



• H Rate timing

