

MN37242FT

4.5mm (type-1/4) CCD Area Image Sensor

Overview

The MN37242FT is a 4.5mm (type-1/4) 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 an exposure time of 1/10000 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 557,295 pixels and provides stable and clear images with a resolution of 480 horizontal TV-lines and 420 vertical TV-lines.

Part Number	Size	System	Color or B/W
MN37242FT	4.5mm(type-1/4)	PAL	Color



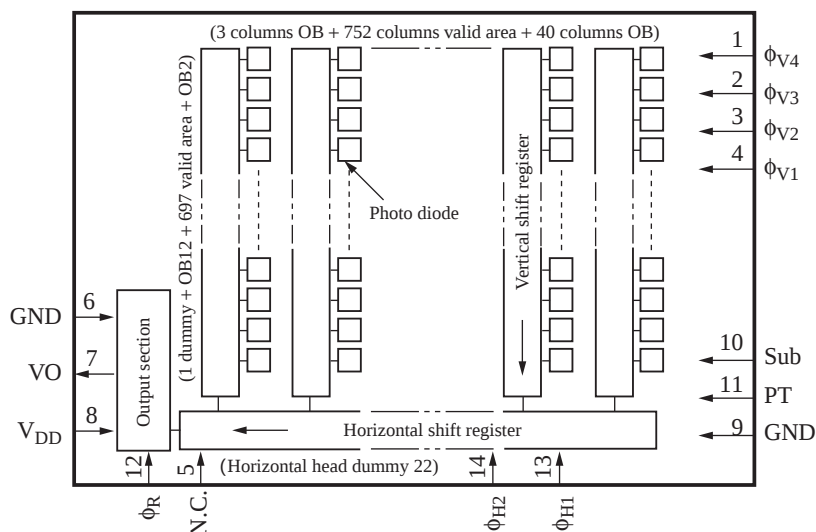
Features

- High sensitivity
- Low noise
- Broad dynamic range
- Low smear
- Low image lag
- Electronic shutter
- No image distortion
- Small size enables design of compact equipment
- High reliability
- 14-pin plastic package

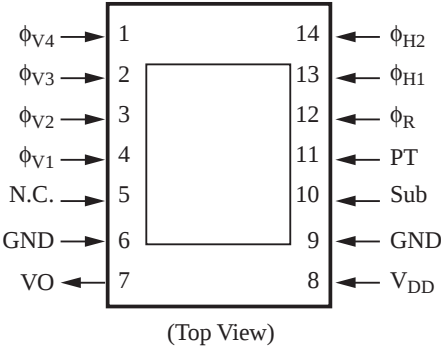
Applications

- Compact lightweight camcorders. Cameras for surveillance, measurement, and medical use

Block Diagram



Pin Assignments



Pin Descriptions

Pin No.	Symbol	Descriptions	Pin No.	Symbol	Descriptions
1	ϕ_{V4}	Vertical shift register clock pulse 4	6	GND	GND
			7	VO	Video Output
2	ϕ_{V3}	Vertical shift register clock pulse 3	8	V_{DD}	Power supply
			9	GND	GND
3	ϕ_{V2}	Vertical shift register clock pulse 2	10	Sub	Substrate
			11	PT	P-well for protection circuit
4	ϕ_{V1}	Vertical shift register clock pulse 1	12	ϕ_R	Reset pulse (RG)
			13	ϕ_{H1}	Horizontal register clock pulse 1
5	N.C.	N.C.	14	ϕ_{H2}	Horizontal register clock pulse 2

Absolute Maximum Ratings and Operating Conditions

Parameter		Symbol	Rating		Operating condition			Unit
			min	max	min	typ	max	
Power supply voltage		V_{DD}	- 0.2	18.0	14.5	15.0	15.5	V
Protection P-well voltage		V_{PT}^{*2}	- 10.0	0.2	- 7.8	- 7.5	- 7.2	V
GND		GND	Reference voltage		—	0	—	V
Reset pulse voltage	H-L	$V_{\phi R(H-L)}$	—	18.0	3.0	3.3	5.5	V
	Bias	$V_{\phi R(Bias)}$	Supplied internally					V

Absolute Maximum Ratings and Operating Conditions (continued)

Parameter	Symbol	Rating		Operating condition			Unit
		min	max	min	typ	max	
Horizontal register clock pulse voltage 1	$V_{\phi H1(H)}$	—	18.0	3.0	3.3	3.6	V
	$V_{\phi H1(L)}$	− 0.2	—	− 0.05	0	0.05	
Horizontal register clock pulse voltage 2	$V_{\phi H2(H)}$	—	18.0	3.0	3.3	—	V
	$V_{\phi H2(L)}$	− 0.2	—	− 0.05	0	0.05	
Vertical shift register clock pulse voltage 1	$V_{\phi V1(H)}^{*2}$	—	18.0	14.5	15.0	15.5	V
	$V_{\phi V1(M)}^{*2}$	—	—	− 0.05	0	0.05	
	$V_{\phi V1(L)}^{*2}$	− 9.0	—	− 7.8	− 7.5	− 7.2	
Vertical shift register clock pulse voltage 2	$V_{\phi V2(M)}^{*2}$	—	15.0	− 0.05	0	0.05	V
	$V_{\phi V2(L)}^{*2}$	− 9.0	—	− 7.8	− 7.5	− 7.2	
Vertical shift register clock pulse voltage 3	$V_{\phi V3(H)}^{*2}$	—	18.0	14.5	15.0	15.5	V
	$V_{\phi V3(M)}^{*2}$	—	—	− 0.05	0	0.05	
	$V_{\phi V3(L)}^{*2}$	− 9.0	—	− 7.8	− 7.5	− 7.2	
Vertical shift register clock pulse voltage 4	$V_{\phi V4(M)}^{*2}$	—	15.0	− 0.05	0	0.05	V
	$V_{\phi V4(L)}^{*2}$	− 9.0	—	− 7.8	− 7.5	− 7.2	
Substrate voltage	V_{Sub}^{*1}	Supplied internally					V
	ΔV_{Sub}^{*3}	− 0.2	45.0	22.0	22.5	23.0	
Operating temperature	T_{opr}	− 10	70	—	25	—	°C
Storage temperature	T_{stg}	− 30	80	—	—	—	°C

Note)1. Standard light input defines

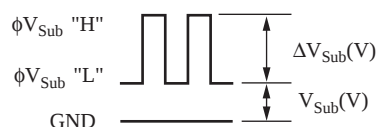
Standard light input is the one when the exposure is done at a lens aperture of F8, using a light source of 2856 K and 1050 nt, and placing a color temperature conversion filter LB-40 (HOYA) and an IR cutting filter CAW-500 ($t = 2.5$ mm) in the light path.

2. *1: V_{Sub} internal settings guarantee blooming at 400 times light input of the standard light input.

3. *2: V_{PT} is set so that the following conditions are set for VL of the vertical shift clock.

$$V_{PT} \leq V_L$$

4. *3: V_{Sub} when using electronic shutter function

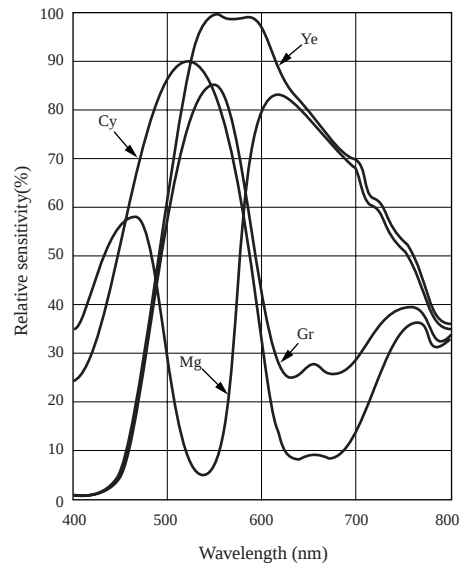


Optical Characteristics

Part Number	Color or B/W	Effective 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							
MN37242FT	Color	752	697	—	500	160	0.03	—	480	420

■ Graphs of Characteristics

CCD Spectral Responsive Characteristics



■ Package Dimensions (Unit:mm)

- WDIP014-P-0400F

