

MN37230FT

6.0mm (type-1/3) CCD Area Image Sensor

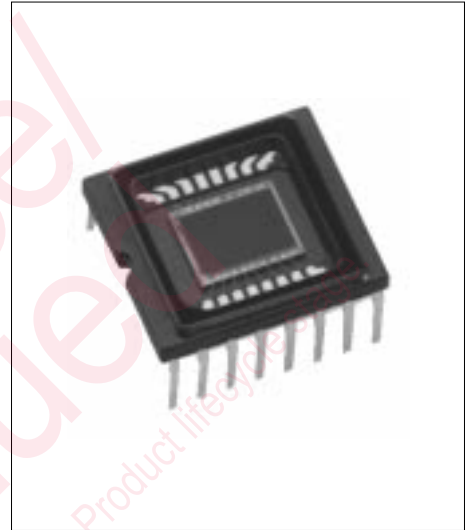
■ Overview

The MN37230FT is a 6.0mm (type-1/3) 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 661,024 pixels (908 horizontal × 728 vertical) and provides stable and clear images with a resolution of 430 horizontal TV-lines and 420 vertical TV-lines.

Part Number	Size	System	Color or B/W
MN37230FT	6.0mm(type-1/3)	PAL	Color



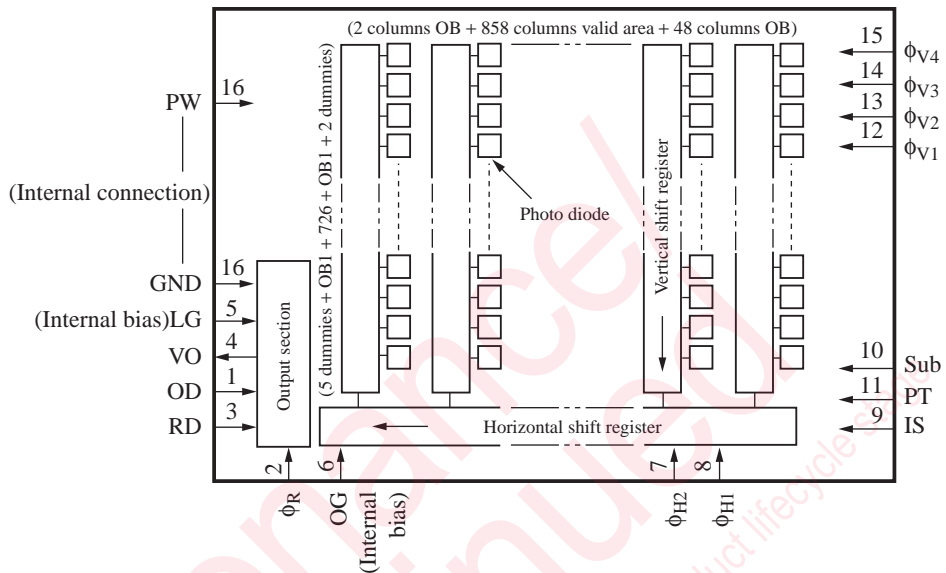
■ Features

- 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
- 16-pin plastic package

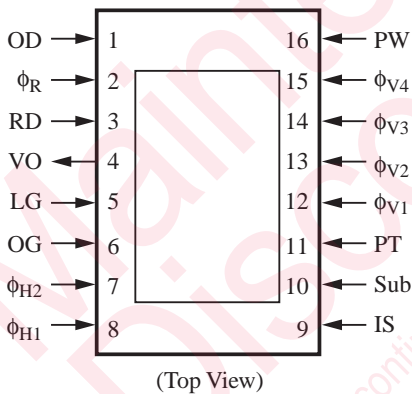
■ Applications

- 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	OD	Output drain	11	PT	P-well for protection circuit
2	ϕ_R	Reset pulse	12	ϕ_{V1}	Vertical shift register clock pulse 1
3	RD	Reset drain	13	ϕ_{V2}	Vertical shift register clock pulse2
4	VO	Video output			
5	LG	Output load transistor gate	14	ϕ_{V3}	Vertical shift register clock pulse 3
6	OG	Output gate			
7	ϕ_{H2}	Horizontal register clock pulse 2	15	ϕ_{V4}	Vertical shift register clock pulse 4
8	ϕ_{H1}	Horizontal register clock pulse 1			
9	IS	Horizontal CCD input source	16	PW	P-well
10	Sub	Substrate			

■ Absolute Maximum Ratings and Operating Conditions

Parameter	Symbol	Rating		Operating condition			Unit	
		min	max	min	typ	max		
Reset drain voltage	V_{RD}	-0.2	18.0	14.5	15.0	15.5	V	
Output drain voltage	V_{OD}	-0.2	18.0	14.5	15.0	15.5	V	
Output load transistor gate voltage	V_{LG}	Supplied internally					V	
Output gate voltage	V_{OG}	Supplied internally					V	
Horizontal CCD input source voltage	V_{IS}	-0.2	18.0	14.5	15.0	15.5	V	
Protection P-well voltage	V_{PT}^{*2}	-10.0	0.2	$\phi_{V(L)} - 1.2$	$\phi_{V(L)} - 1.0$	$\phi_{V(L)} - 0.7$	V	
P-well voltage	V_{PW}	Reference voltage			—	0	—	V
Reset pulse voltage	H-L	$V_{\phi R(H-L)}$	—	18.0	4.7	5.0	5.3	V
	Bias	$V_{\phi R(Bias)}$	Supplied internally				V	
Horizontal register clock pulse voltage 1	$V_{\phi H1(H)}$	—	18.0	4.7	5.0	5.3	V	
	$V_{\phi H1(L)}$	-0.3	—	-0.2	0	0.2		
Horizontal register clock pulse voltage 2	$V_{\phi H2(H)}$	—	18.0	4.7	5.0	5.3	V	
	$V_{\phi H2(L)}$	-0.2	—	0	0	0		
Vertical shift register clock pulse voltage 1	$V_{\phi V1(H)}^{*2}$	—	18.0	14.5	15.0	15.5	V	
	$V_{\phi V1(M)}^{*2}$	—	—	-0.2	0	0.2		
	$V_{\phi V1(L)}^{*2}$	-9.0	—	-7.3	-7.0	-6.7		
Vertical shift register clock pulse voltage 2	$V_{\phi V2(M)}^{*2}$	—	15.0	-0.2	0	0.2	V	
	$V_{\phi V2(L)}^{*2}$	-9.0	—	-7.3	-7.0	-6.7		
Vertical shift register clock pulse voltage 3	$V_{\phi V3(H)}^{*2}$	—	18.0	14.5	15.0	15.5	V	
	$V_{\phi V3(M)}^{*2}$	—	—	-0.2	0	0.2		
	$V_{\phi V3(L)}^{*2}$	-9.0	—	-7.3	-7.0	-6.7		
Vertical shift register clock pulse voltage 4	$V_{\phi V4(M)}^{*2}$	—	15.0	-0.2	0	0.2	V	
	$V_{\phi V4(L)}^{*2}$	-9.0	—	-7.3	-7.0	-6.7		
Substrate voltage	V_{Sub}^{*1}	Supplied internally					V	
	ϕV_{Sub}^{*3}	-0.2	45.0	24.2	25.0	25.8		
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.

- *1: V_{Sub} internal settings guarantee blooming at 400 times light input of the standard light input.
- *2: V_{PT} is set so that the following conditions are set for VL of the vertical shift clock.

$$V_{PT} \leq VL$$

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

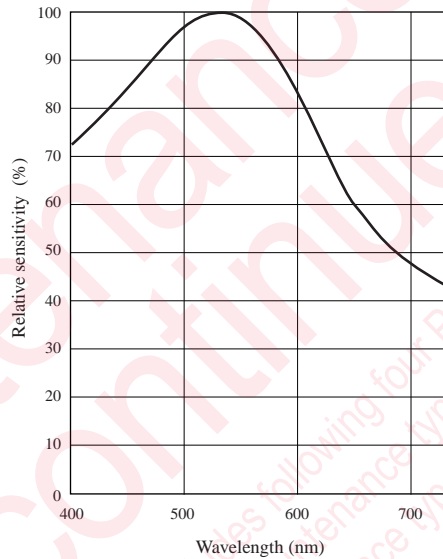


■ Optical Characteristics

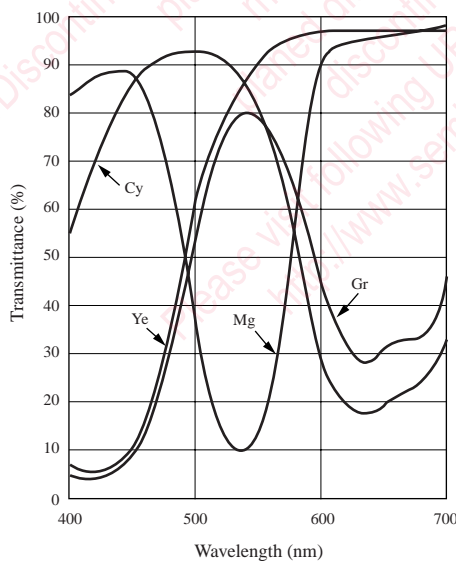
Part Number	Color or B/W	Effective pixels		S/N typ (dB)	Saturation output typ (mV)	Sensitivity F8 typ (mV)	Vertical smear Sm typ(%)	Image lag typ (%)	Horizontal resolution typ (TV-lines)	Vertical resolution typ (TV-lines)
		H	V							
MN37230FT	Color	858	726	60	500	180	0.02	—	430	420

■ Graphs of Characteristics

CCD Spectral Characteristics (without color filter)

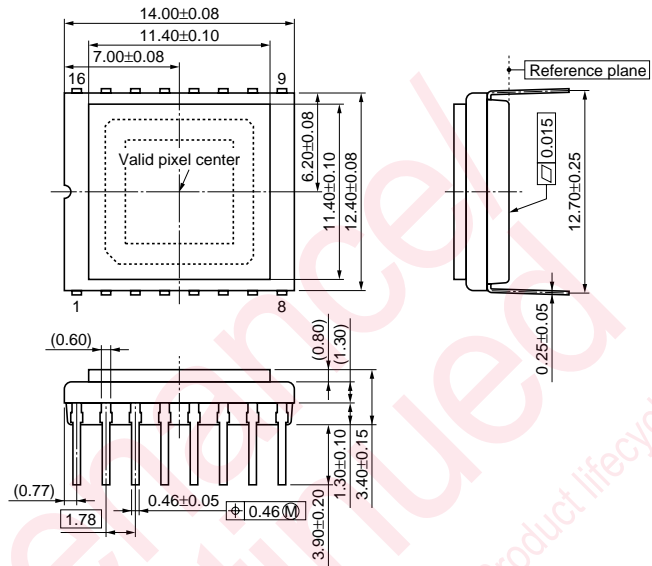


CCD On-Chip Filter Spectral Characteristics



■ Package Dimensions (Unit: mm)

- WDIP016-P-0500C



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 planned maintenance type
 maintenance type
 planned discontinued type
 discontinued type
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