

MN37130FT

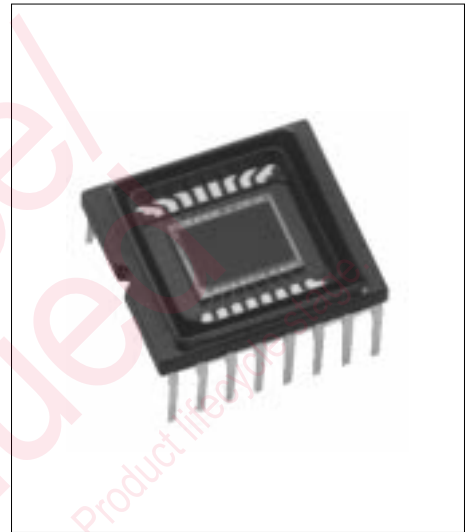
6.0mm (type-1/3) CCD Area Image Sensor

■ Overview

The MN37130FT 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 559,328 pixels (908 horizontal × 606 vertical) and provides stable and clear images with a resolution of 420 horizontal TV-lines and 350 vertical TV-lines.



Part Number	Size	System	Color or B/W
MN37130FT	6.0mm(type-1/3)	NTSC	Color

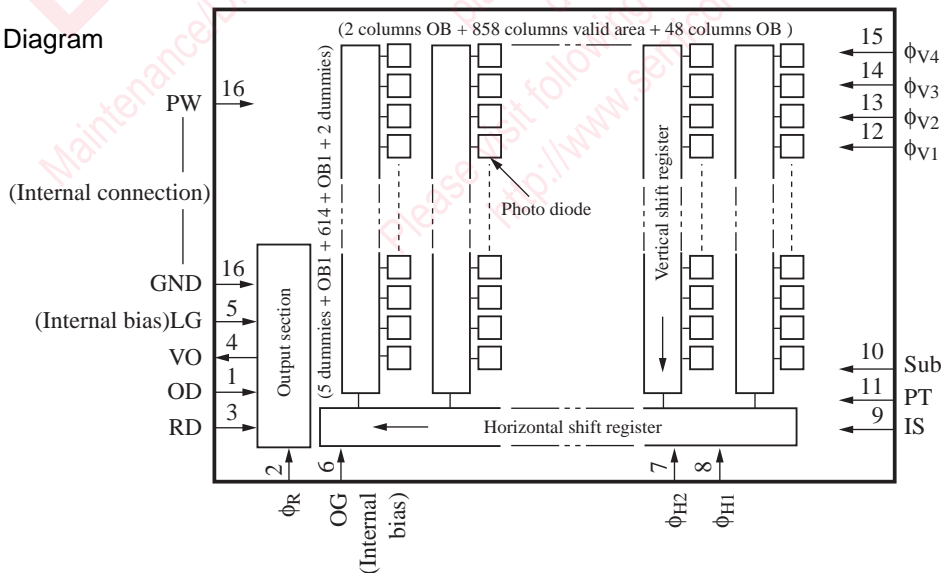
■ Features

- 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, 16-pin plastic package

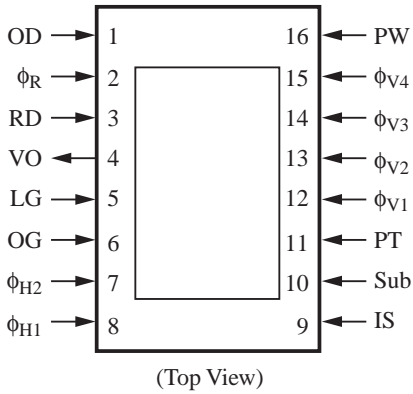
■ Applications

- Compact lightweight camcorders. Cameras for measurement, and digital still cameras

■ 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			
4	VO	Video output	13	ϕ_{V2}	Vertical shift register clock pulse 2
5	LG	Output load transistor gate			
6	OG	Output gate	14	ϕ_{V3}	Vertical shift register clock pulse 3
7	ϕ_{H2}	Horizontal register clock pulse 2			
8	ϕ_{H1}	Horizontal register clock pulse 1	15	ϕ_{V4}	Vertical shift register clock pulse 4
9	IS	Horizontal CCD input source			
10	Sub	Substrate	16	PW	P-well

■ 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	14.7	15.0	15.3	V	
Output drain voltage	V _{OD}	-0.2	18.0	14.7	15.0	15.3	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	14.7	15.0	15.3	V	
Protection P-well voltage	V _{PT} *2	-8.0	0.2	-8.3	-8.0	-7.7	V	
P-well voltage	V _{PW}	Reference voltage		—	0	—	V	
Reset pulse voltage	H-L	V _{φR(H-L)}	—	18.0	4.7	5.0	5.3	V
	Bias	V _{φR(Bias)}	Supplied internally				V	
Horizontal register clock pulse voltage 1	V _{φH1(H)}	—	18.0	4.7	5.0	5.3	V	
	V _{φH1(L)}	-0.2	—	0	0	0		
Horizontal register clock pulse voltage 2	V _{φH2(H)}	—	18.0	4.7	5.0	5.3	V	
	V _{φH2(L)}	-0.2	—	0	0	0		
Vertical shift register clock pulse voltage 1	V _{φV1(H)} *2	—	18.0	14.7	15.0	15.3	V	
	V _{φV1(M)} *2	—	—	-0.2	0	0.2		
	V _{φV1(L)} *2	-9.0	—	-8.3	-8.0	-7.7		
Vertical shift register clock pulse voltage 2	V _{φV2(M)} *2	—	15.0	-0.2	0	0.2	V	
	V _{φV2(L)} *2	-9.0	—	-8.3	-8.0	-7.7		
Vertical shift register clock pulse voltage 3	V _{φV3(H)} *2	—	18.0	14.7	15.0	15.3	V	
	V _{φV3(M)} *2	—	—	-0.2	0	0.2		
	V _{φV3(L)} *2	-9.0	—	-8.3	-8.0	-7.7		
Vertical shift register clock pulse voltage 4	V _{φV4(M)} *2	—	15.0	-0.2	0	0.2	V	
	V _{φV4(L)} *2	-9.0	—	-8.3	-8.0	-7.7		
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	

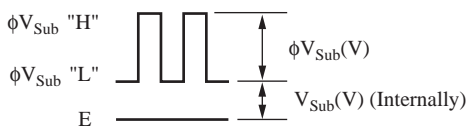
Note)1. Standard light input defines

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.

- 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.

$$V_{PT} \leq VL$$

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

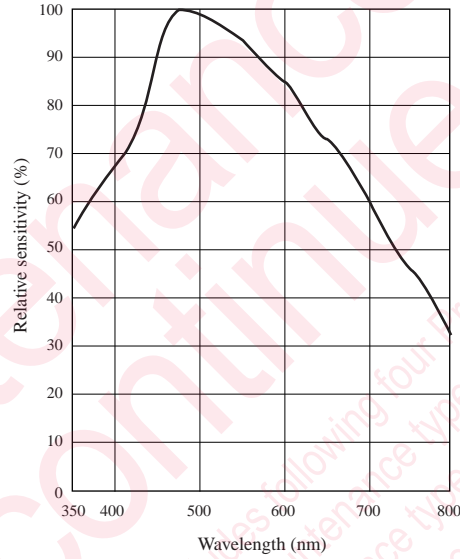


■ Optical Characteristics

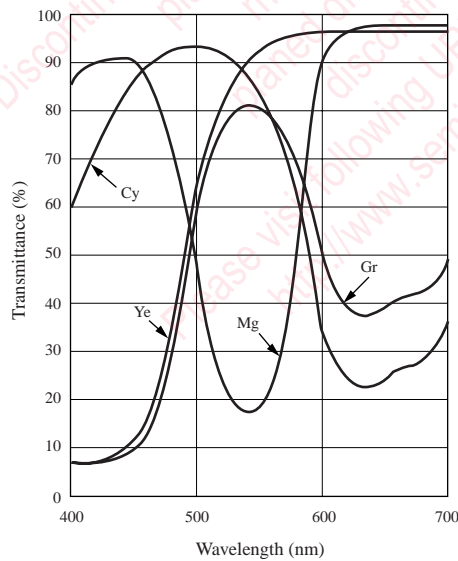
Part Number	Color or B/W	Effective pixels		S/N typ (dB)	Saturation output typ (mV)	Sensitivity F8 typ (mV)	Vertical smear Sm typ(%)	Image lag typ (%)	Horizontal resolution typ (TV-lines)	Vertical resolution typ (TV-lines)
		H	V							
MN37130FT	Color	858	614	60	550	200	0.02	—	420	350

■ Graphs of Characteristics

CCD Spectral Characteristics (without color filter)

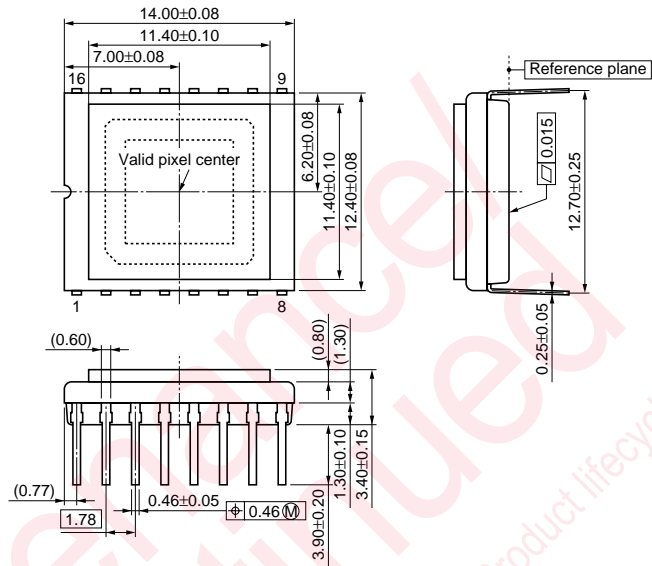


CCD On-Chip Filter Spectral Characteristics



■ Package Dimensions (Unit: mm)

- WDIP016-P-0500C



Maintenance/Discontinued includes following four Product lifecycle stage.
 planned maintenance type
 maintenance type
 planned discontinued type
 discontinued type
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