MN37140FT

4.5 mm (type-1/4) 410k pixels CCD Area Image Sensor

■ Overview

The MN37140FT is a 4.5 mm (type-1/4) interline transfer CCD (IT-CCD) solid state image sensor device with a total of 411,988 pixels. It provides optimum pixels for use in video cameras and security cameras, providing high sensitivity, low noise, broad dynamic range and low smear.

Part Number	Size	System	Color or B/W
MN37140FT	4.5mm(type-1/4)	NTSC	Color

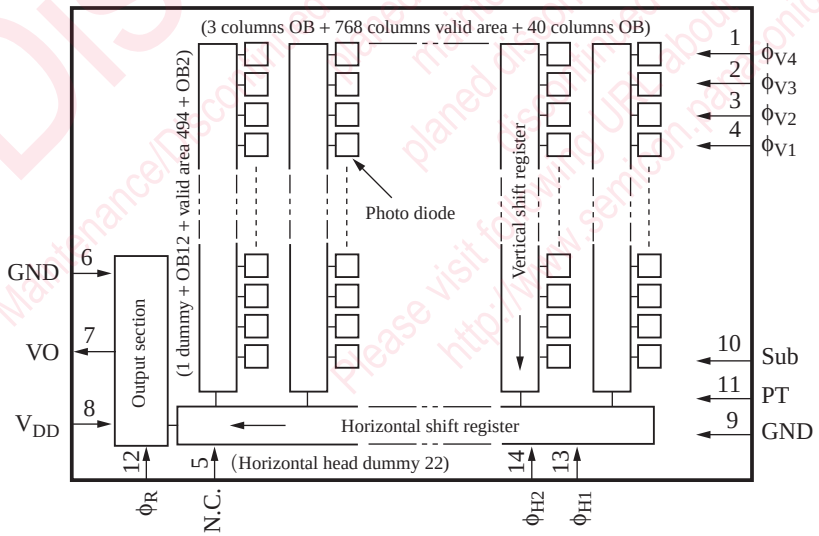
■ Features

- Total number of pixels : 811(horizontal) × 508(vertical)
- High sensitivity
- Low noise
- Non-adjusting (non-adjusting V_{Sub} reset voltage)
- Small size enables design of compact equipment

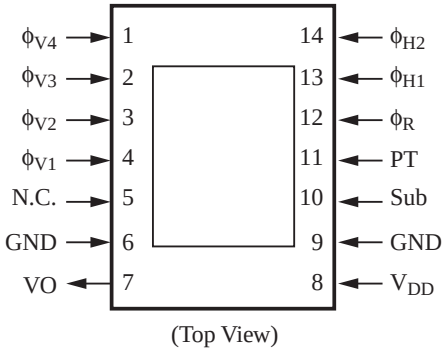
■ Applications

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

■ Block Diagram



■ Pin Assignments



(Top View)

■ 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

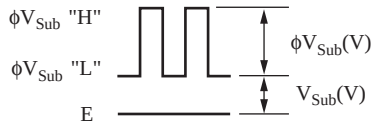
Parameter		Symbol	Rating		Operating condition			Unit
			min	max	min	typ	max	
Output drain voltage		V_{OD}	– 0.2	18.0	14.5	15.0	15.5	V
Protection P-well voltage		V_{PT} *2	– 10.0	0.2	– 7.3	– 7.0	– 6.7	V
GND		GND	Reference voltage		—	0	—	V
Reset	H-L	$V_{\phi R(H-L)}$	—	18.0	4.7	5.0	5.3	V
pulse voltage	Bias	$V_{\phi R(Bias)}$	Supplied internally					V
Horizontal register		$V_{\phi H1(H)}$	—	18.0	4.7	5.0	5.3	V
clock pulse voltage 1		$V_{\phi H1(L)}$	– 0.2	—	0	0	0	
Horizontal register		$V_{\phi H2(H)}$	—	18.0	4.7	5.0	5.3	V
clock pulse voltage 2		$V_{\phi H2(L)}$	– 0.2	—	0	0	0	
Vertical shift register		$V_{\phi V1(H)}$ *2	—	18.0	14.5	15.0	15.5	V
clock pulse voltage 1		$V_{\phi V1(M)}$ *2	—	—	– 0.2	0	0.2	
		$V_{\phi V1(L)}$ *2	– 9.0	—	– 7.3	– 7.0	– 6.7	
Vertical shift register		$V_{\phi V2(M)}$ *2	—	15.0	– 0.2	0	0.2	V
clock pulse voltage 2		$V_{\phi V2(L)}$ *2	– 9.0	—	– 7.3	– 7.0	– 6.7	
Vertical shift register		$V_{\phi V3(H)}$ *2	—	18.0	14.5	15.0	15.5	V
clock pulse voltage 3		$V_{\phi V3(M)}$ *2	—	—	– 0.2	0	0.2	
		$V_{\phi V3(L)}$ *2	– 9.0	—	– 7.3	– 7.0	– 6.7	
Vertical shift register		$V_{\phi V4(M)}$ *2	—	15.0	– 0.2	0	0.2	V
clock pulse voltage 4		$V_{\phi V4(L)}$ *2	– 9.0	—	– 7.3	– 7.0	– 6.7	
Substrate voltage		V_{Sub} *1	Supplied internally					V
		ϕV_{Sub} *3	– 0.2	45.0	24.5	25.0	25.5	
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.

   $V_{PT} \leqq VL$
4. *3: V_{Sub} when using electronic shutter function

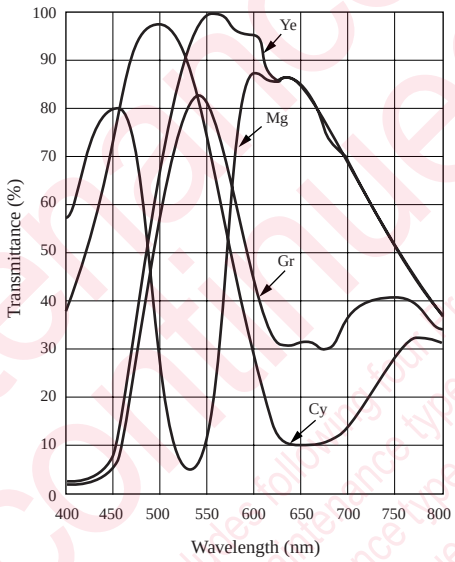


■ Optical Characteristics

Part Number	Color or B/W	Effective pixels H	Effective pixels V	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)
MN37140FT	Color	768	494	60	600	200	0.01	—	480	350

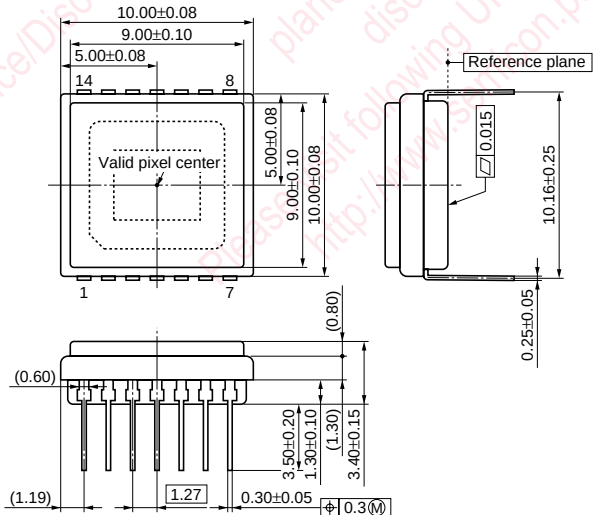
■ Graphs of Characteristics

CCD On-Chip Filter Spectral Responsive Characteristics



■ Package Dimensions (Unit : mm)

• WDIP014-P-0400F



Request for your special attention and precautions in using the technical information and semiconductors described in this book

(1) If any of the products or technical information described in this book is to be exported or provided to non-residents, the laws and regulations of the exporting country, especially, those with regard to security export control, must be observed.

(2) The technical information described in this book is intended only to show the main characteristics and application circuit examples of the products, and no license is granted under any intellectual property right or other right owned by our company or any other company. Therefore, no responsibility is assumed by our company as to the infringement upon any such right owned by any other company which may arise as a result of the use of technical information described in this book.

(3) The products described in this book are intended to be used for standard applications or general electronic equipment (such as office equipment, communications equipment, measuring instruments and household appliances).
Consult our sales staff in advance for information on the following applications:
- Special applications (such as for airplanes, aerospace, automobiles, traffic control equipment, combustion equipment, life support systems and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
- Any applications other than the standard applications intended.

(4) The products and product specifications described in this book are subject to change without notice for modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.

(5) When designing your equipment, comply with the range of absolute maximum rating and the guaranteed operating conditions (operating power supply voltage and operating environment etc.). Especially, please be careful not to exceed the range of absolute maximum rating on the transient state, such as power-on, power-off and mode-switching. Otherwise, we will not be liable for any defect which may arise later in your equipment.
 Even when the products are used within the guaranteed values, take into the consideration of incidence of break down and failure mode, possible to occur to semiconductor products. Measures on the systems such as redundant design, arresting the spread of fire or preventing glitch are recommended in order to prevent physical injury, fire, social damages, for example, by using the products.

(6) Comply with the instructions for use in order to prevent breakdown and characteristics change due to external factors (ESD, EOS, thermal stress and mechanical stress) at the time of handling, mounting or at customer's process. When using products for which damp-proof packing is required, satisfy the conditions, such as shelf life and the elapsed time since first opening the packages.