

MN3718FT, MN3718AT

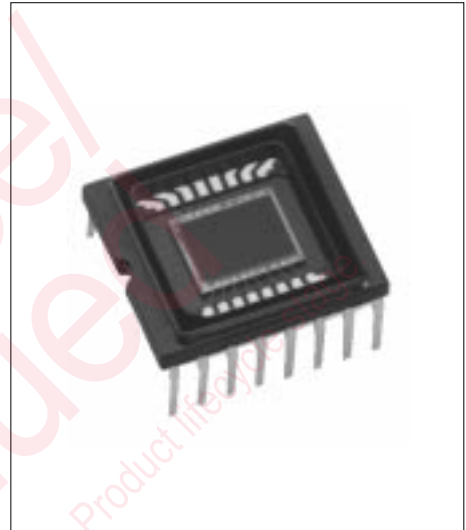
6.0mm (type-1/3) 768H CCD Area Image Sensors

■ Overview

The MN3718FT and MN3718AT are 6.0mm (type-1/3) interline transfer CCD (IT-CCD) solid state image sensor devices.

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 400,634 pixels (811 horizontal × 494 vertical) and provides stable and clear images with a resolution of 550 horizontal TV-lines and 350 vertical TV-lines.



Part Number	Size	System	Color or B/W
MN3718FT	6.0mm(type-1/3)	NTSC	Color
MN3718AT		EIA	B/W

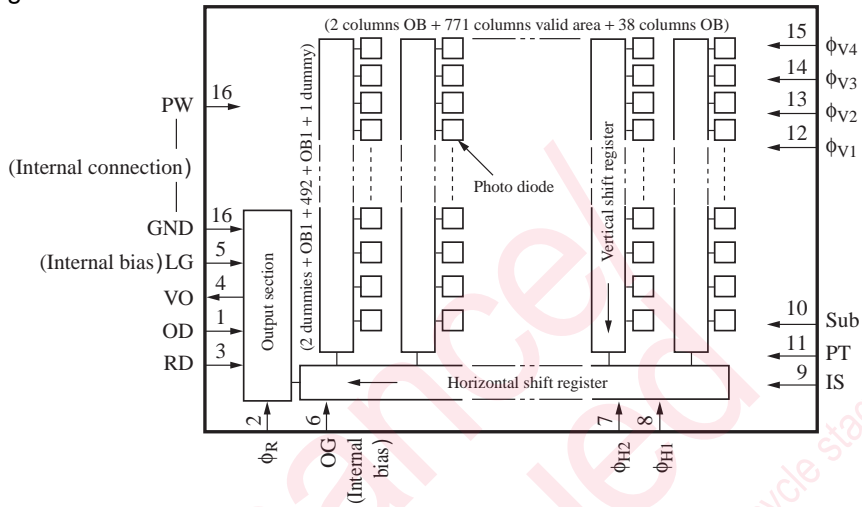
■ Features

- Total number of pixels: 811 (horizontal) × 494 (vertical)
- 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 DIL plastic package

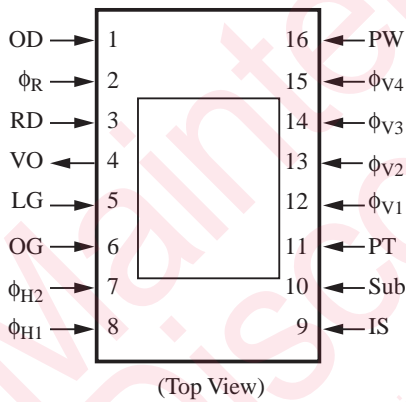
■ Applications

- 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	phi_R	Reset pulse	12	phi_V1	Vertical shift register clock pulse 1
3	RD	Reset drain	13	phi_V2	Vertical shift register clock pulse 2
4	VO	Video output			
5	LG	Output load transistor gate	14	phi_V3	Vertical shift register clock pulse 3
6	OG	Output gate			
7	phi_H2	Horizontal register clock pulse 2			
8	phi_H1	Horizontal register clock pulse 1	15	phi_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

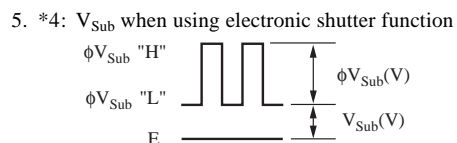
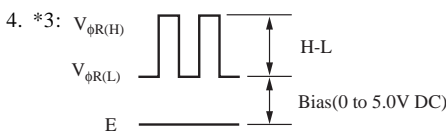
Parameter		Symbol	Rating		Operating condition			Unit
			min	max	min	typ	max	
Reset drain voltage		V_{RD}	-0.2	18.0	14.5	15.0	15.5	V
Output drain voltage		V_{OD}	-0.2	18.0	14.5	15.0	15.5	V
Output load transistor gate voltage		V_{LG}	Supplied internally					V
Output gate voltage		V_{OG}	Supplied internally					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	$V_{\phi R(H-L)}^{*3}$	—	18.0	4.7	5.0	5.3	V
	Bias	$V_{\phi R(Bias)}$	-0.2	—	0	Adjust	5.0	V
Horizontal register clock pulse voltage 1		$V_{\phi H1(H)}$	—	18.0	4.7	5.0	5.3	V
		$V_{\phi H1(L)}$	-0.2	—	0	0	0	
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	0.8	1.0	1.2	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	0.8	1.0	1.2	V
		$V_{\phi V4(L)}^{*2}$	-9.0	—	-7.3	-7.0	-6.7	
Substrate voltage		V_{Sub}^{*1}	-0.2	45.0	3.0	Adjust	14.5	V
		ϕV_{Sub}^{*4}			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.

$$V_{PT} \leq VL$$

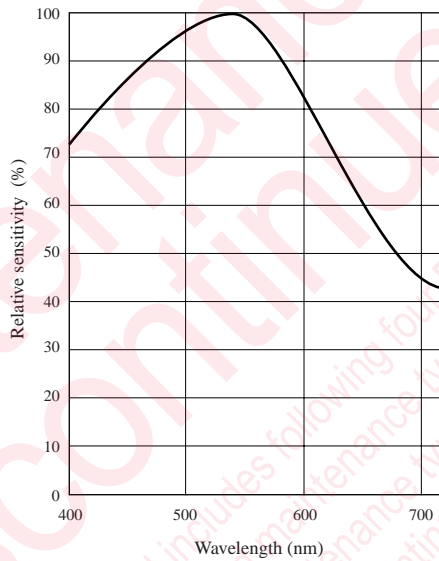


■ Optical Characteristics

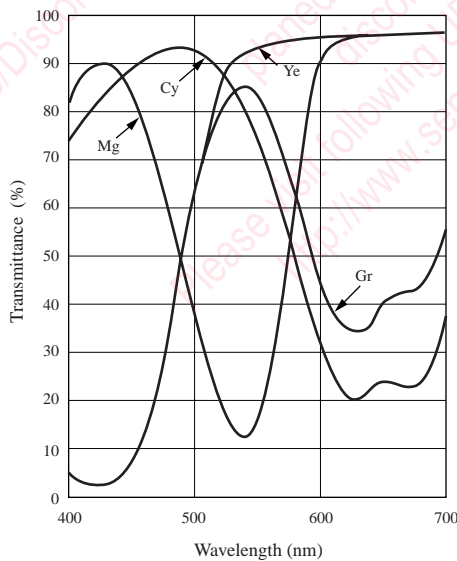
Part Number	Color or B/W	Effective pixels		S/N typ (dB)	Saturation output typ (mV)	Sensitivity F8 typ (mV)	Vertical smear Sm typ(%)	Image lag typ (%)	Horizontal resolution typ (TV-lines)	Vertical resolution typ (TV-lines)
		H	V							
MN3718FT	Color	771	492	—	700	300	0.01	—	480	350
MN3718AT	B/W	771	492	—	1,000	350	0.01	—	550	350

■ Graphs of Characteristics

CCD Spectral Characteristics (without color filter)



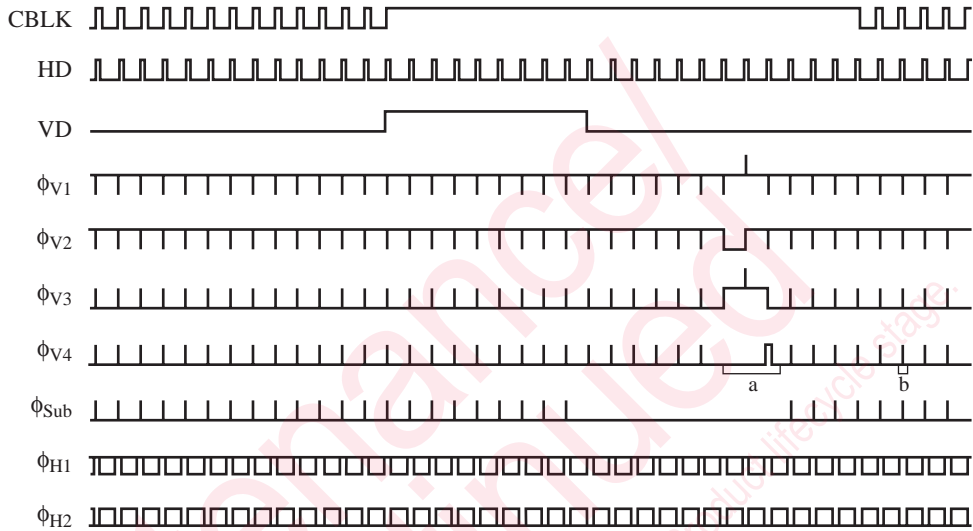
Color Filter Spectral Characteristics



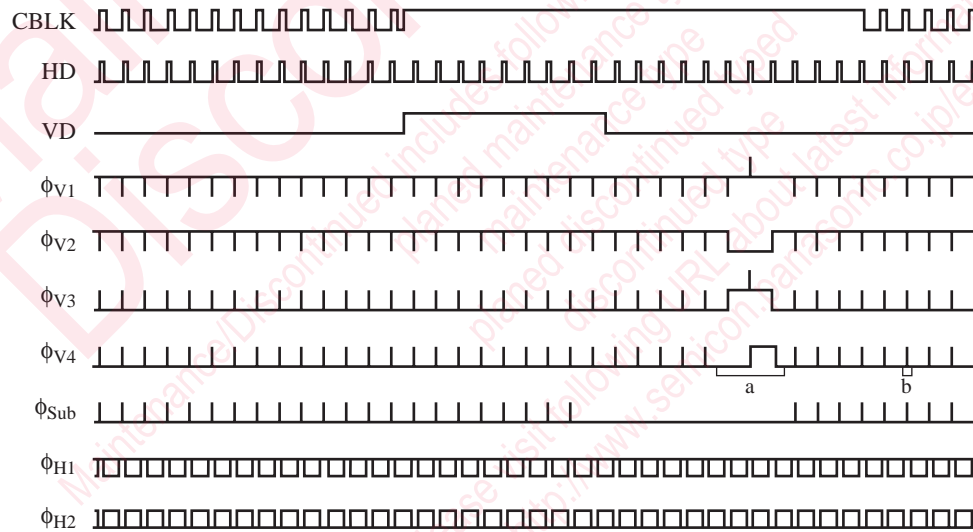
■ Timing Diagram

• V Rate timing

< Field A >

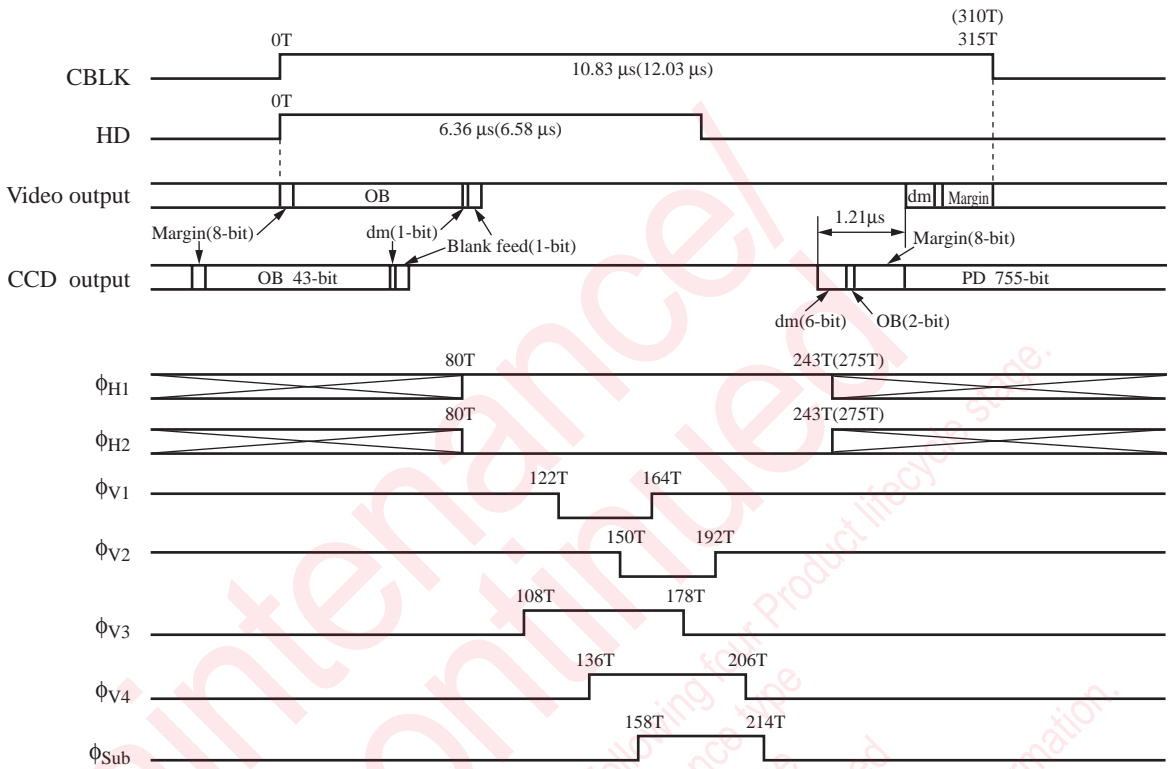


< Field B >

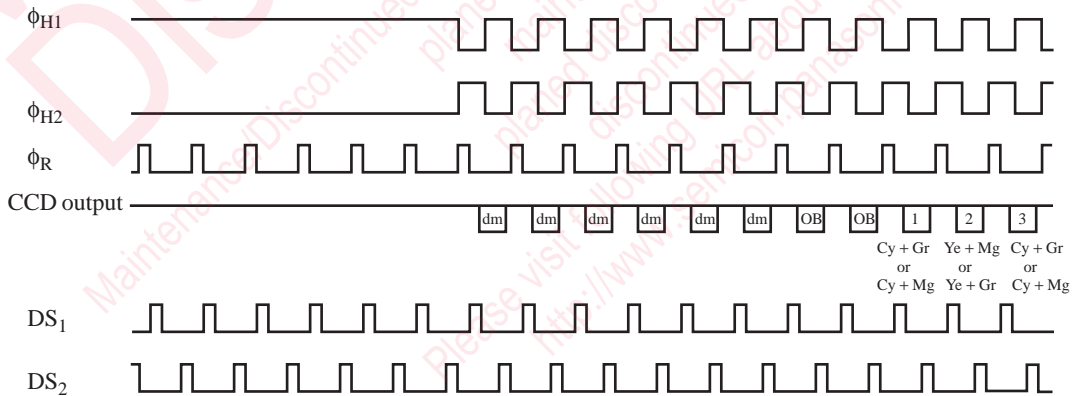


■ Timing Diagram (continued)

• H Rate timing



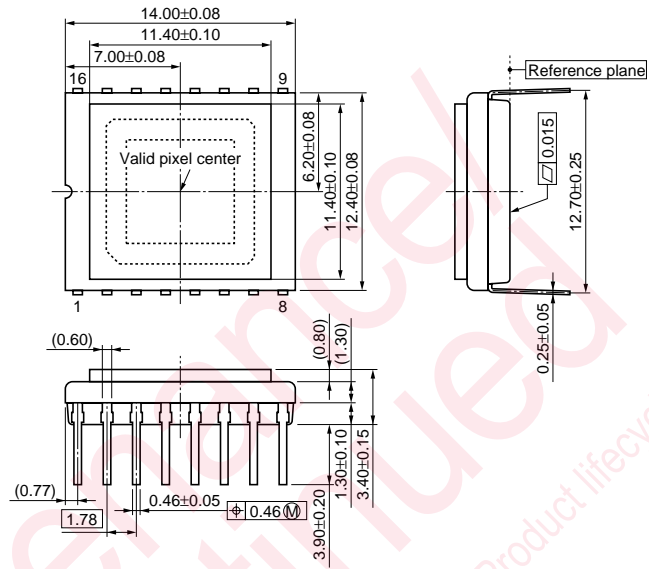
• High speed pulse timing



Note) dm : dummy

■ Package Dimensions (Unit: mm)

- WDIP016-P-0500C



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 maintenance type
 planned discontinued type
 discontinued type
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