

Opposing corner 7.17mm(1/2.5type) 3.34 million pixels

## CCD Area Image Sensor MN39592PJ

### ■ Overview

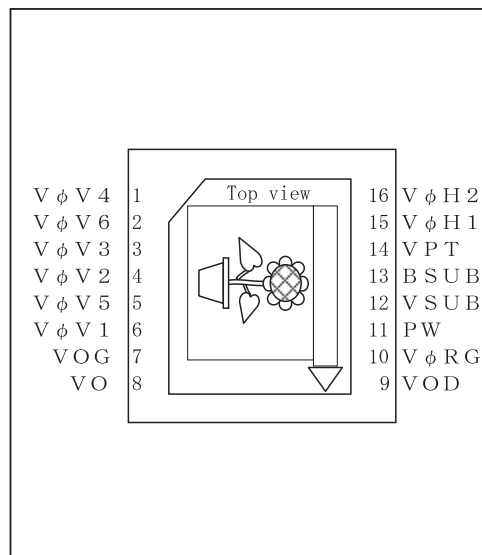
MN39592PJ is a CCD 1/2.5 3.34 million pixels area image sensor suits high-quality digital still camera. On-chip color filter presents excellent color repeatability by adopting RGB bayer. It also keeps 3.34 million total number of pixels (Horizontally: 2,140 × Vertically: 1,560) to hold stable and high-quality pictures.

### ■ Features

- Available pixel number 2,088 (horizontal), 1,550 (vertical)
- Supersensitivity
- Low-smear
- Square pixel alignment
- Lower power consumption by adopting horizontal CCD, 3.3V
- 16-pin plastic package

### ■ Applications

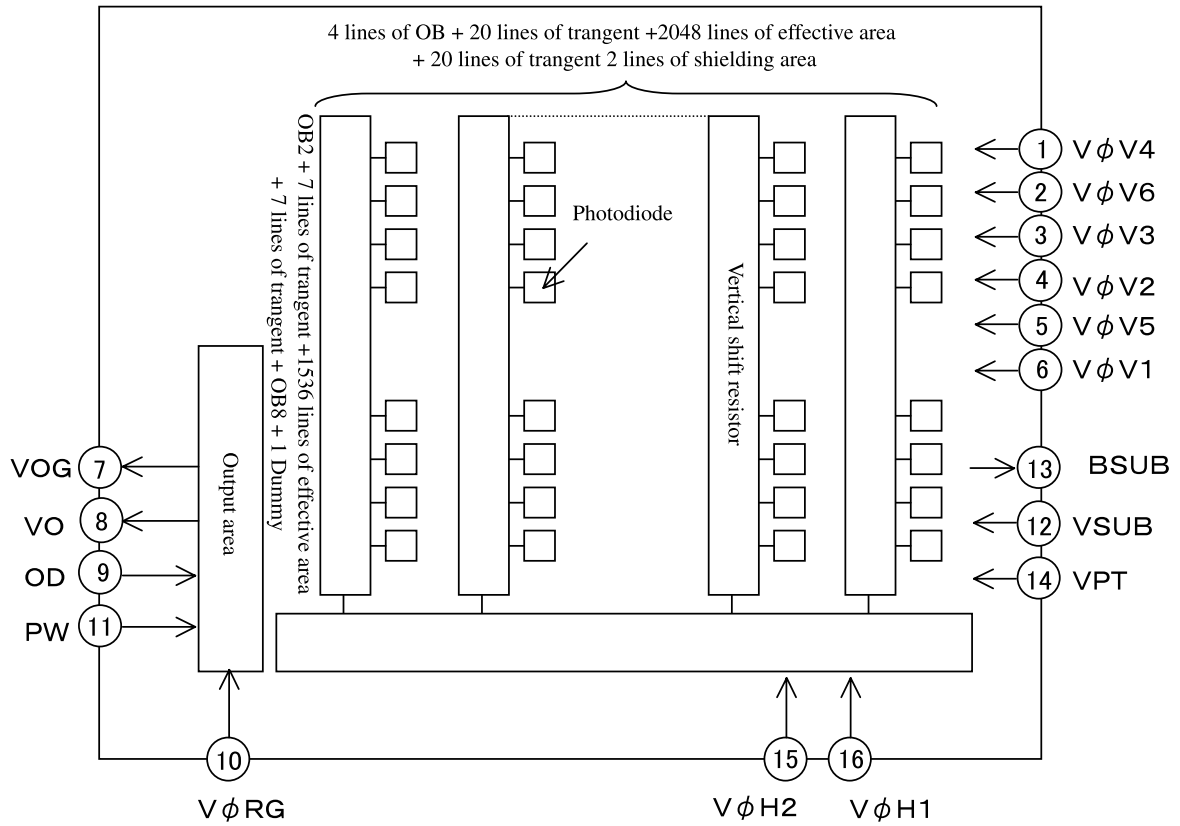
Digital still camera



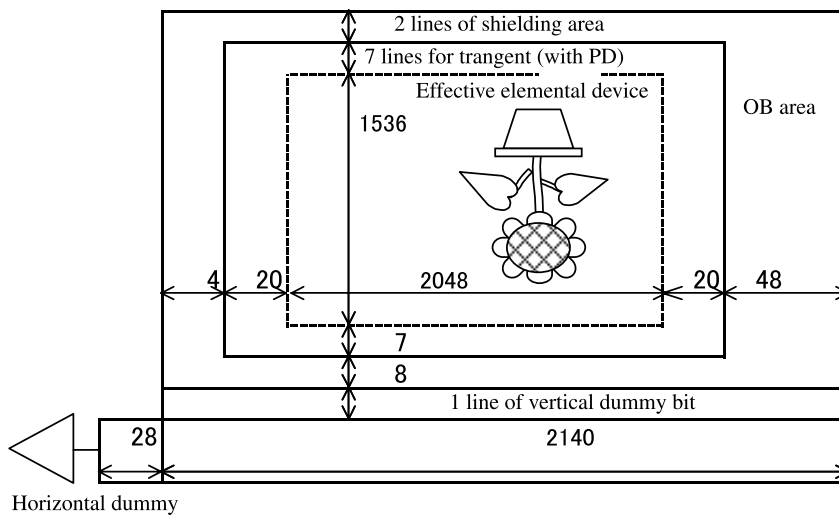
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■ Block Diagram



■ Elemental device structure

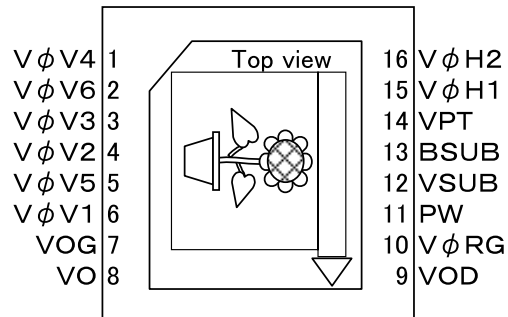


## ■ Terminal description

### 1. Terminal description

Terminal No	Name	Terminal description
1 pin	V $\phi$ V4	Vertical shift register clock pulse (4)
2 pin	V $\phi$ V6	Vertical shift register clock pulse (6)
3 pin	V $\phi$ V3	Vertical shift register clock pulse (3)
4 pin	V $\phi$ V2	Vertical shift register clock pulse (2)
5 pin	V $\phi$ V5	Vertical shift register clock pulse (5)
6 pin	V $\phi$ V1	Vertical shift register clock pulse (1)
7 pin	VOG	Output gate
8 pin	VO	CCD output
9 pin	VOD	Output drain
10 pin	V $\phi$ RG	Reset pulse
11 pin	PW	GND
12 pin	VSUB	Circuit board
13 pin	BSUB	Breeder SUB
14 pin	VPT	Protection P wel
15 pin	V $\phi$ H1	Horizontal shift resistor clock pulse (1)
16 pin	V $\phi$ H2	Horizontal shift resistor clock pulse (2)

### 2. Alignment of terminals



### 3. Device parameter

Parameter	Numeric value	Unit
Total pixel number	2,140(H) $\times$ 1,560(V) = 3,338,400	pcs
Available pixel number (including trangents)	2,088(H) $\times$ 1,550(V) = 3,236,400	pcs
Effective pixel numbers	2,048(H) $\times$ 1,536(V) = 3,145,728	pcs
Pixel size	2.8 $\times$ 2.8	$\mu\text{m}^2$
Effective picture size	5.7344(H) $\times$ 4.3008(V)	$\mu\text{m}^2$

■ Absolute maximum ratings

Terminal name	PW		PT		SUB		Note	
	Unit	High	Low	High	Low	High		Low
VOD	V	15.0	-0.2	-		15.0	-25.0	Note 1,2
VPT	V	0.2	-10.0	Standard		0.2	-35.0	
PW	V	Standard		10.0	-0.2	0.2	-25.0	
Vsub	V	25.0	-0.2	35.0	-0.2	Standard		Note 1
BSUB	V	15.0	-0.2	-		15.0	-25.0	
VOG	V	5.0	-0.2	-		5.0	-25.0	
VφRG	V	5.0	-0.2	15.0	-0.2	5.0	-25.0	
VφH1	V	5.0	-0.2	15.0	-0.2	5.0	-25.0	
VφH2	V	5.0	-0.2	15.0	-0.2	5.0	-25.0	
VφV1, 5	V	15.0	-10.0	25.0	-0.2	15.0	-35.0	
VφV2	V	12.0	-10.0	22.0	-0.2	12.0	-35.0	
VφV3,6	V	15.0	-10.0	25.0	-0.2	15.0	-35.0	
VφV4	V	12.0	-10.0	22.0	-0.2	12.0	-35.0	
VO	V	15.0	-10.0	-		15.0	-35.0	Note 2

■ Absolute maximum ratings between gates

Terminal name	Unit	High	Low	Note
Horizontal clock input terminal (between VφV1 and VφV6)	V	12.0	-10.0	Note 3
Vertical clock input terminal (between VφV1 and VφV6)	V	5.0	-5.0	
VφH1-VφV4	V	12.0	-12.0	

■ Operation temperature

Parameter	Unit	High	Low	Note
Operation temperature	°C	60	-10.0	

Note 1. Always keep VOD-Vsub 10V.

Note 2. Always keep VOD-VO 5V.

Note 3. When clock width < 10μs, Duty<0.1%, 25V is guaranteed.

■ Imaging characteristics

Testing specification (Tentative)

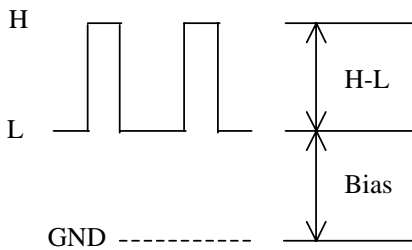
Parameter	Symbol	Condition	Test point	Min.	Standard	Max.	Unit	
Saturation power	Vsat	F1.4:J chart	Signal output	500	550		mV	
Sensitivity	(G)	SoG	F8:J chart (1/7.5 accumulated conversion value)	Signal output	200	235	285	mV
	(R)	SoR		Signal output	120	165	205	
	(B)	SoB		Signal output	90	110	140	
Sensitivity ratio	R/G	Sensitivity measurement conditions	Signal output	0.42	0.70	1.03		
	B/G		Signal output	0.31	0.47	0.70		
Smear	Frame monitors	Sm	1/10V	G signal output		-87	-81	dB
						-77	-71	
OB bump		60°C light shielding	Signal output	-0.6	0	0.6	mV	
Color shading (1)(2)		Standard light sensitivity	Average signal output		4.0	8.0	%	
Dark signal		Ta=60°C, 1/5.24 second accumulation shielding condition	Signal output		3.0	6.0	mV	
Dark signal shading (H, V)		Ta=60°C, 1/5.24 second accumulation shielding condition	Signal output		4.0	6.0	mV	
Blooming control circuit voltage	Vsub	1000 times more light than normal amount	Monitor	No blooming caused by the inner voltage of Vsub				
φ VH voltage reliability (Shutter with a scratch)		1/8 times more light than normal amount	Monitor	No scratches under the condition of φ VH voltage operation				
OB transmission		One hundred thousand times more light than normal amount	Signal output	Less than 10mV of OB signal output				

Note: above values are testing values only.

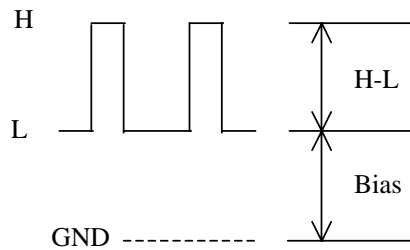
■ Clock power voltage conditions

Terminal name		Operating conditions			Note	
		Unit	Max.	Standard		Min.
VOD		V	12.0	12.0	-11.5	
VPT		V	-7.5	-8.0	-8.5	
PW		V	-	0	-	
VOG		V	Inside			
V $\phi$ RG	H-L		3.6	3.3	3.0	Note 1
	Bias	V	Inside			
V $\phi$ H1	H	V	3.6	3.3	3.0	Note 3
	L	V	0.2	0	-0.2	
V $\phi$ H2	H	V	3.6	3.3	3.0	
	L	V	0.2	0	-0.2	
Vsub	Bias	V	Inside			Note2
	$\phi$ Vsub	V	21.0	20.0	19.0	
V $\phi$ V1 V $\phi$ V5	H	V	12.5	12.0	11.5	Note 4
	M	V	0.2	0	-0.2	
	L	V	-7.5	-8.0	-8.5	
V $\phi$ V2	M	V	0.2	0	-0.2	
	L	V	-7.5	-8.0	-8.5	
V $\phi$ V3 V $\phi$ V6	H	V	12.5	12.0	11.5	
	M	V	0.2	0	-0.2	
	L	V	-7.5	-8.0	-8.5	
V $\phi$ V4	M	V	0.2	0	-0.2	
	L	V	-7.5	-8.0	-8.5	
IOD		mA		43		

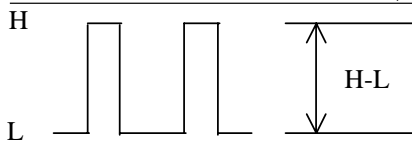
Note 1) Reset (V $\phi$ RG)



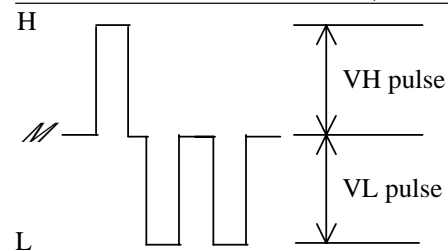
Note 2) Circuit board (V $\phi$ VSUB)



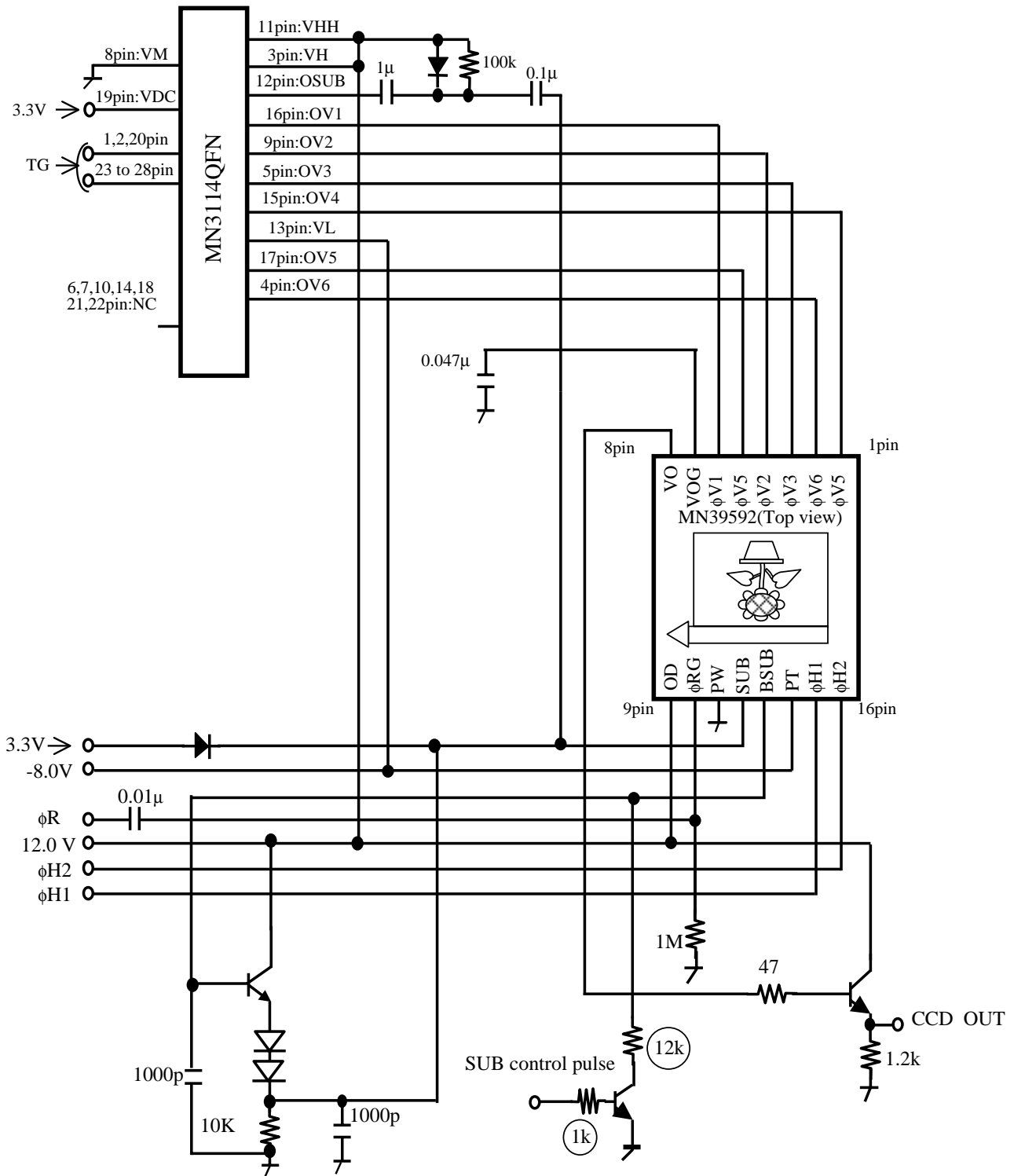
Note 3) Horizontal shift resistor (V $\phi$ H1, V $\phi$ H2)



Note 4) Vertical shift resistor (V $\phi$ V1 to V6)

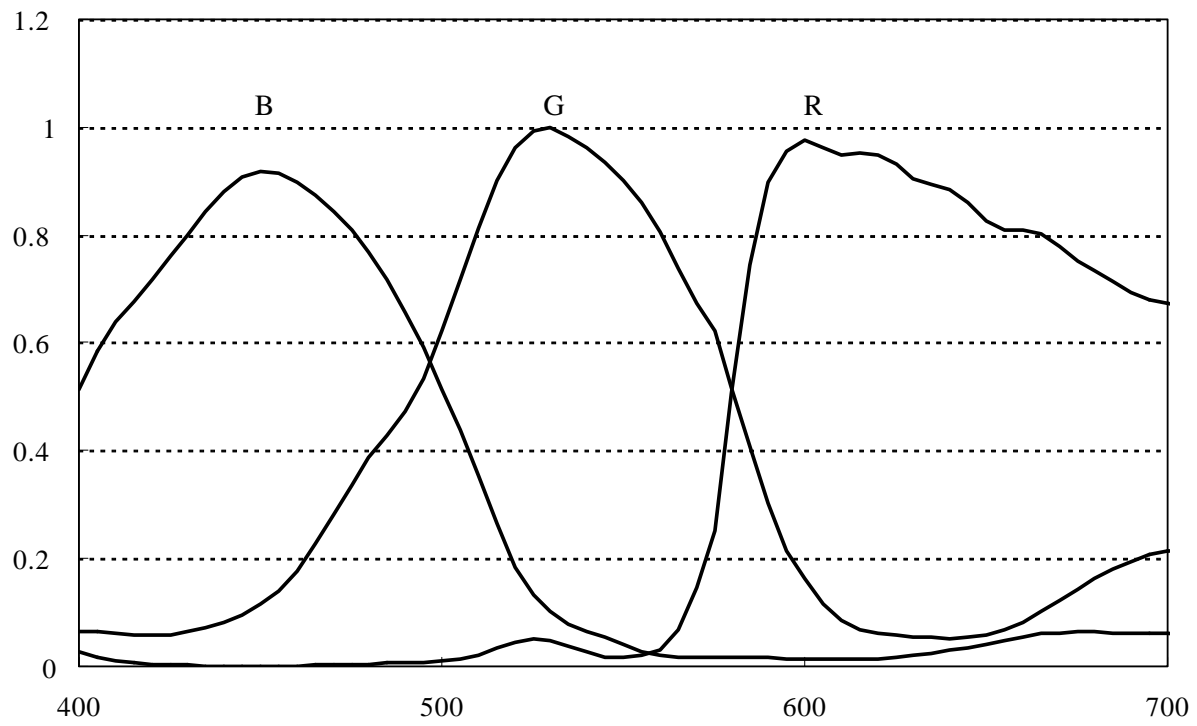


■ Recommended circuit example



Adjustment of Base resistance 1kΩ is required depending on the ability of current supply of SUB control pulse output circuit.

■ Characteristics of prismatic





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