

Panasonic

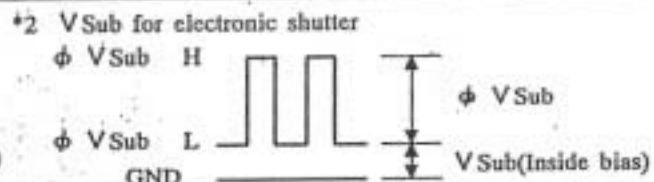
Product Specifications

MN39117FT

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Type	4.5mm Size 270K-pixel CCD Area Image Sensor												
Application	NTSC-color video camera												
System	Field Integration Mode												
Outline	Dimensions of image pickup unit(H×V)3.596×2.692 mm ² See the diagram for others.												
	Absolute max. rating(Note 4)		Operating conditions			(Note 3)	Absolute max. rating		Operating conditions				
	Upper limit	Lower limit	Max.	Typ.	Min.		Upper limit	Lower limit	Max.	Typ.	Min.		
VDD (V)	18.0	-0.2	15.5	15.0	14.5	VSub(V) *2	(Note 2)	(Inside Bias)			-		
VPT (V) (Note 5)	0.2	-10.0	-7.7	-8.0	-8.3	φ VSub(V) *2	45.0	-0.2	24.0	23.0	21.5		
GND(V)	GND		-	0	-	Operating temperature(°C)	60	-10	-	25	-		
						Storage temperature(°C)	-80	-30	-	-	-		
(Note 3)	Absolute max. rating		Operating conditions			(Note 3)	Absolute max. rating		Operating conditions				
	Upper limit	Lower limit	Max.	Typ.	Min.		Upper limit	Lower limit	Max.	Typ.	Min.		
VφR *1	H(V)	8.0	-	3.6	3.3	3.0	VφV1	H(V)	18.0	-	15.5	15.0	14.5
	L(V)	(Inside Bias)						M(V)	-	-	0.05	0	-0.05
VφH	H(V)	8.0	-	3.6	3.3	3.0	VφV2	L(V)	-	-9.0	-7.5	-8.0	-8.5
	L(V)	-	-0.3	0.2	0	-0.2		M(V)	15.0	-	0.05	0	-0.05
VφE	H(V)	8.0	-	3.6	3.3	3.0	VφV3	L(V)	-	-9.0	-7.5	-8.0	-8.5
	L(V)	-	-0.3	0.2	0	-0.2		M(V)	18.0	-	15.5	15.0	14.5
							VφV4	L(V)	-	-9.0	-7.5	-8.0	-8.5
								M(V)	15.0	-	0.05	0	-0.05
								L(V)	-	-9.0	-7.5	-8.0	-8.5



Date

Aug.10,2000

Signature

Test Specification T=25 °C

Item	Symbol	Measu. method	Condition	Test Point	Typ.	Limits		Unit	
						Min.	Max.		
SN ratio(dark)	S/N	Note6	Dark signal level	Video output	60	57	—	dB	
Sensitivity	So	Note7	J chart F:8	Device output	400	300	—	mV	
Carrier saturation voltage	Sc	Note8	At maximum carrier	"	600	550	—	mV	
Vertical smear	Sm	Note9	1/10V chart F1.4	Y _R signal	0.003	—	0.005	%	
Picture blemish	PB	Note10	F:11	"	Refer to the picture blemish specifications			%	
Color shading	SU	Note11	Surrounding 5%cut chart	Video output (BPF)	—	—	75	mV	
Temperature dark signal Non-Uniformity		Note12	Dark, T=60 °C	Y _R signal	—	—	0.2	%	
Temperature dark white point defect		Note13	Dark, T=60 °C	Device output	Refer to the temperature dark white point defect specifications			mV	
Color flicker	R	Amplitude	Note14	F:8 flicker chart	Vector scope	—	—	3	%
		Angle	"	"	"	—	—	3	"
	Ye	Amplitude	"	"	"	—	—	5	%
		Angle	"	"	"	—	—	5	"
	Cy	Amplitude	"	"	"	—	—	5	%
		Angle	"	"	"	—	—	5	"

Measurement condition(Note 1)

Lens	:FUJINON CF-25L, F0.85, f=25mm
IR cut filter	:CAW-500, t=2.5mm(HOYO)
Color temperature conversion filter	:LB-40, t=2.5mm(HOYA)
Color temperature of light source	:2856K halogen lamp
Brightness of light source	:1050nt

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(Note 1) The standard light quantity means the level with image pickup by diaphragm F8 with IR cut filter CAW-500(HOYA) $t=2.5\text{mm}$ and color temperature transformer filter LB-40(HOYA) in the ray route by using a light source of 2856K,1050nl.

(Note 2) V_{Sub} Inside bias

The internally setting V_{sub} voltage is a voltage at which no blooming is caused at the light quantity 1000 times brighter than the standard one.

(Note 3) For pulse timing, refer to the output pulse timing of the driver LSI (MN5241)

(Note 4) Absolute maximum rating

$$-0.2 < V_{\text{Sub}} - V_{\text{PT}} < +45.0 \text{ (V)}$$

$$-0.2 < V_{\phi V} - V_{\text{PT}} < +24.5 \text{ (V)}$$

(Note 5) V_{PT}

Set the voltage of V_{PT} as followings: $V_{\text{PT}} \leq V_{\text{L}}$

where V_{L} is the lowest voltage of vet cal transfer clock $\phi V1 \sim 4$.

(Note 6) Signal to noise ratio (dark condition)

Noise meter is attached to the Video output without color signal under no light exposure.

Condition of noise meter

(Shibasoku NTSC:925R/1 PAL:925D/2 or equivalent)

Low pass filter.....NTSC:4.2MHZ,PAL:5.0MHZ

High pass filter.....100kHz

S.C. trap.....used

(Note 7) Sensitivity(1)

The device output signal of sensors is measured at F:8 using EIAJ-J chart.

(Note 8) Carrier saturation output voltage

Device output signal of sensors is measured, when the color carrier is saturated by changing the F stop using EIAJ-J chart.

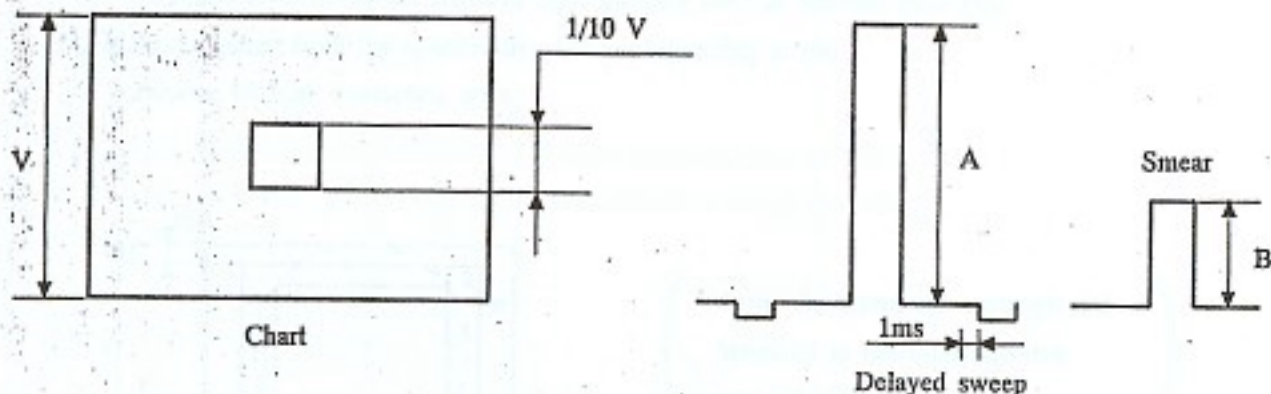
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(Note 9) Smear

The test chart is 1/10 V window chart.(See Fig.1)

The smear signal is read by using delayed sweep function of oscilloscope.



(Fig.1)

The smear value is calculated from the following expression.

$$\text{Smear} = B/A \times 100 \%$$

Note: To measure intrinsic smear, read out pulse is cut-off condition.

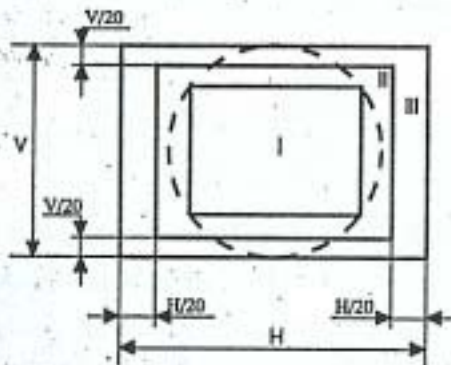
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(Note 10) Specification for Picture blemish

1. Test conditions

- (1) Check if there is any white or black blemish under dark state and at 1/2 light quantity of the standard level.
- (2) Measure the blemish signal level(amplitude) by YH signal output.
- (3) Obtain the retie of the above-mentioned blemish signal level against YH signal level under the standard light quantity level as contrast ratio (%).
- (4) Make judgment from the specification list corresponding to the following blemish evaluation zone.



(Area I means the rectangle 4:3 inscribed to the total effective area (H × V))

2. Specification for white/black blemish

Contrast ratio (%)	White blemish			Black blemish		
	Zone I	Zone II	Zone III	Zone I	Zone II	Zone III
$12.0 \leq x$	0	0	0	0	0	0
$4.0 \leq x < 12.0$	0	1	1 ^{*)}	0	1	1
$3.0 \leq x < 4.0$	0	1	3	1	2	3
$1.0 \leq x < 3.0$	1	3	3	4		5
Max. allowance pcs.	3			5		

- (1) When there are blemish more then the above listed allowance, it shall be regarded as NG.
- (2) At each zone, even if there are blemish more than the above mentioned allowance, counting can be made by including the exceeding amount to the allowance of the higher contrast.

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- (3) Linear blemish/smear shall be less than 1% of contrast ratio.
- (4) OB blemish causing a clamp error shall be regarded as NG.
- (5) Apply the specification for blemish at time of electronic shutter mode
..... normal mode.
- (6) The case of blemish's with contrast ratio over 1% nearing at the scanning less than 16TV lines shall be regarded as NG.

3. Specification for dust evaluation

It shall be applied to those showing the symptoms with change of size or contrast by the focus depth of lens among the defects of image generated in the effective frame.

Test condition:

By using the standard light box as a light source, evaluation is made by standard lens stop F11.

Whereas, light source may be elevated at poor S/N of the observation signal, but, the lens stop shall be kept at F11.

Specification:

- Specification for blemish shall be applied.
- Calculation of contrast ratio shall be based on the definition of specification for blemish.

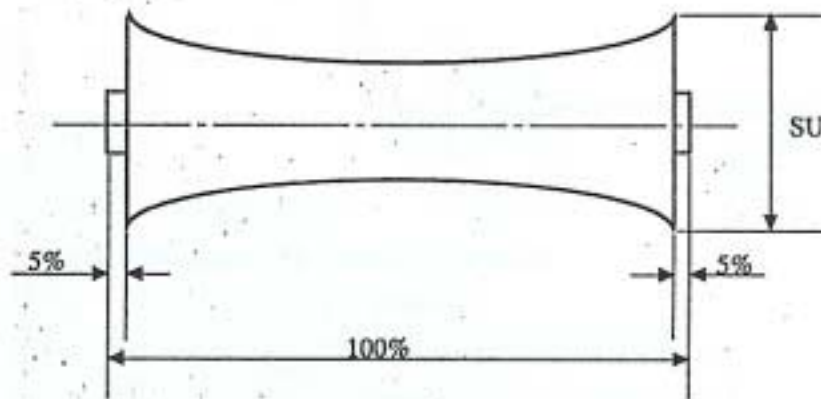
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(Note 11) Color shading

Test conditions

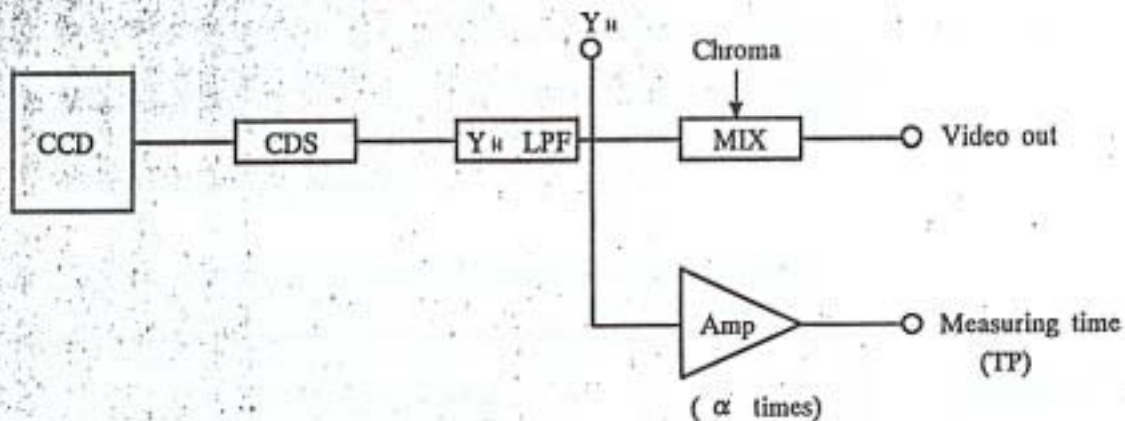
- (1) Pick up an image of the 5% cut chart in the standard condition(F:8).
- (2) Adjust white balance to the vector center.
- (3) Video output, measure P-P of a signal after BPF through the oscilloscope(H,V rate)



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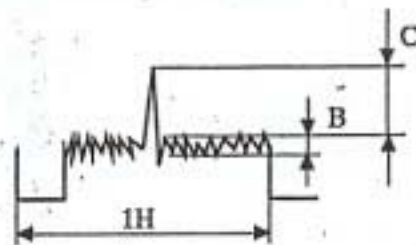
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(Note 13) Measuring method of dark signal non-uniformity and dark white point defect at high temperature.



- YH output under the standard light quantity at normal temperature.
 - ... A (250mV)
- TP output at dark state at 60°C
 - ... B (see the diagram below)
- Amplitude of TP Amp
 - ... α times (usually, 10 times Amp)

B-output waveform



(For the dark signal non-uniformity at high temperature, use the averaging of oscilloscope and frame center line select. Incidental peak shall be excluded.)

$$\text{Temperature dark signal non-uniformity} = \frac{B}{\alpha \times A} \times 100(\%)$$

$$\text{Temperature dark White point defect} = \frac{C}{\alpha \times A} \times 100(\%)$$

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Specification for Dark White point defect at High Temperature

1. Test condition See Note 13.

- (1) Under the standard light quantity at normal temperature, TP-signal output shall be 2500 mV (10 times higher than Y_u signal output).
 (2) Under the dark signal level at 60°C, point defect signal level (amplitude) shall be measured.

2. Specification for Dark White point defect at high temperature

Zone class Contrast ratio (%)	I	II	III
4.0 < x	0	0	0
3.0 < x ≤ 4.0	0	1	3
2.0 < x ≤ 3.0	1	2	3
Max.allowance pcs.	6		

(Unit:pieces)

- (1) Less than 1.0% level point defect shall not be counted.
 (2) At each zone, when there are point defect more than the above listed allowance, it shall be regarded as NG.
 (3) At each zone, even if there are point defect more than the above listed allowance, when there is a margin in the allowance of the above contrast, its amount may be added.

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(Note 14) Color flicker

Test conditions

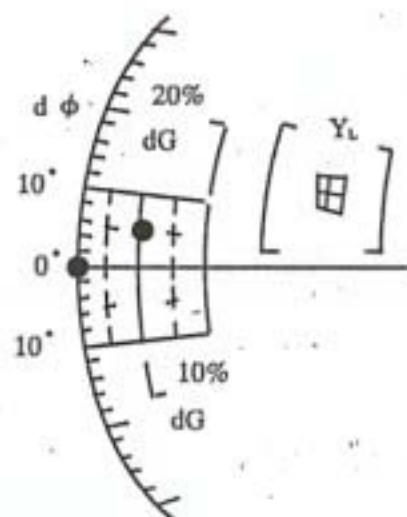
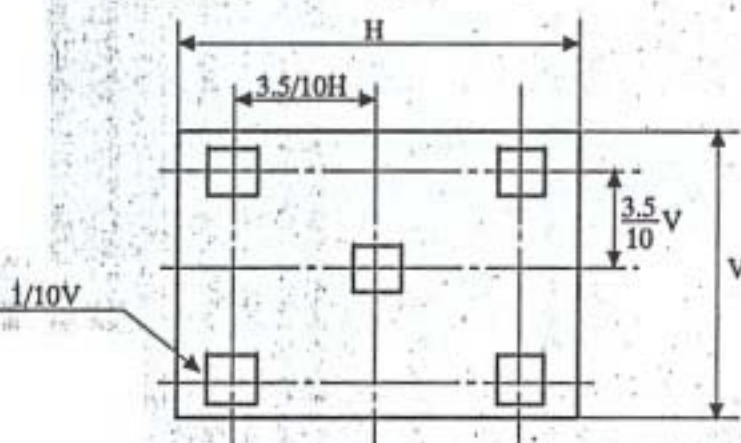
- (1) Pick up an image of the flicker chart in the standard condition of F8.
- (2) Insert R, Yc, and Cy filters into 5 places in the screen, use the vector scope to observe partings of the amplitude and angle directions of the respective vectors. (Set the vector with larger amplitude to an outer circumferential position of 0 on the vector scope's scale to indicate a parted vector in terms of relative value.)
- (3) Measure the worst point of the 5 points.

*1) R, Yc, and Cy filters.

Use color glass filters.

Same characteristics as the DNP color bar chart.

*2) Flicker chart



Example

Amplitude difference: 10%
Angle difference: 5°

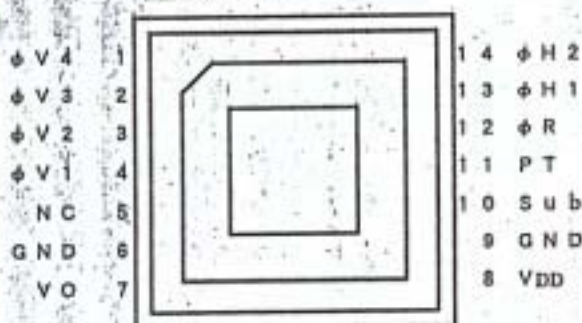
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Pin capacitance

(Typ value at 25 °C in application of 10 V)

Pin No.	Symbol	Pin description	Pin capacitance (pF)
1	$\phi V 4$	Vertical shift register clock pulse (4)	820
2	$\phi V 3$	Vertical shift register clock pulse (3)	1260
3	$\phi V 2$	Vertical shift register clock pulse (2)	820
4	$\phi V 1$	Vertical shift register clock pulse (1)	1260
5	N C	Non connection	—
6	GND	Ground	—
7	V O	Video output	—
8	VDD	Power supply	—
9	GND	Ground	—
10	S u b	Substrate	290
11	P T	Protecting P well	35
12	ϕR	Reset pulse	4
13	$\phi H 1$	Horizontal register clock pulse (1)	75
14	$\phi H 2$	Horizontal register clock pulse (2)	85

Pin nameDevice parameter (H × V)

(Top View)

Item	Value	Unit
*Number of pixels	510 × 492	Pixel
Dimension of image pickup unit	3.596 × 2.692	mm ²
Dimension of pixel	7.15 × 5.55	μm ²

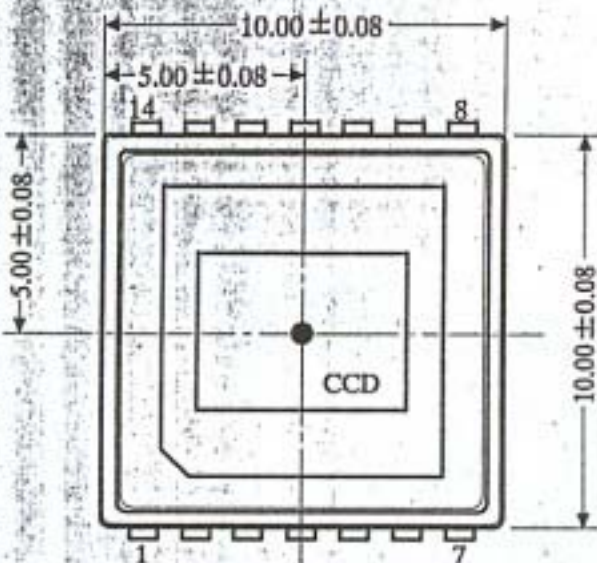
(* OB-line is not included.)

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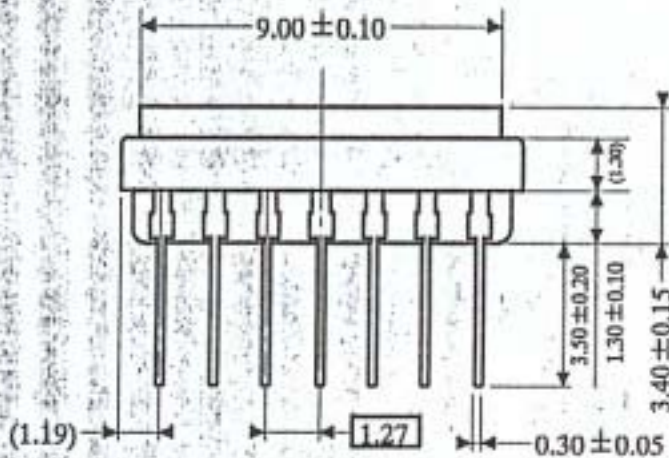
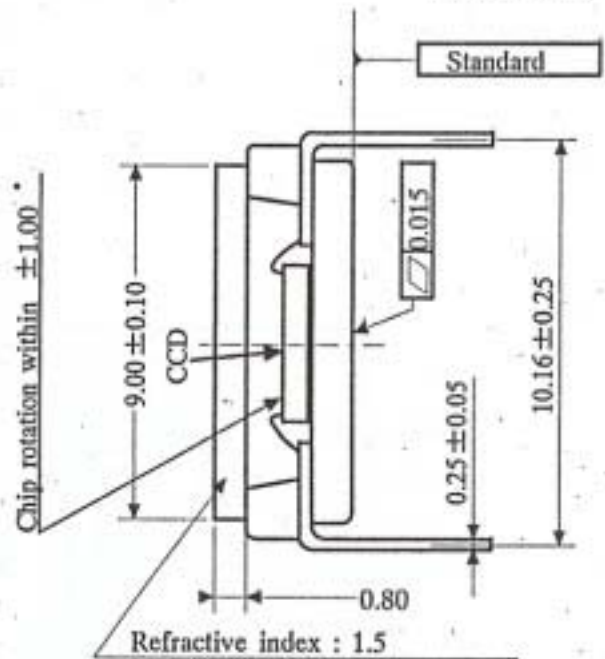
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Package outline dimensions

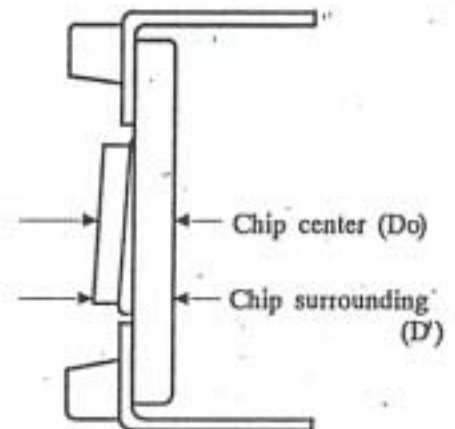
(Unit : mm)



(The center of package is coincided with the center of image area.)

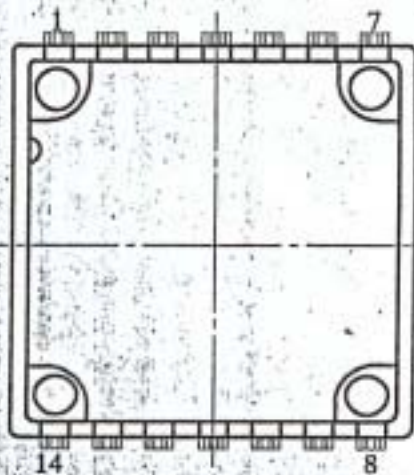


⊕ 0.3 ⊖



$D_o = (1.71 \pm 0.10 \text{ mm})$

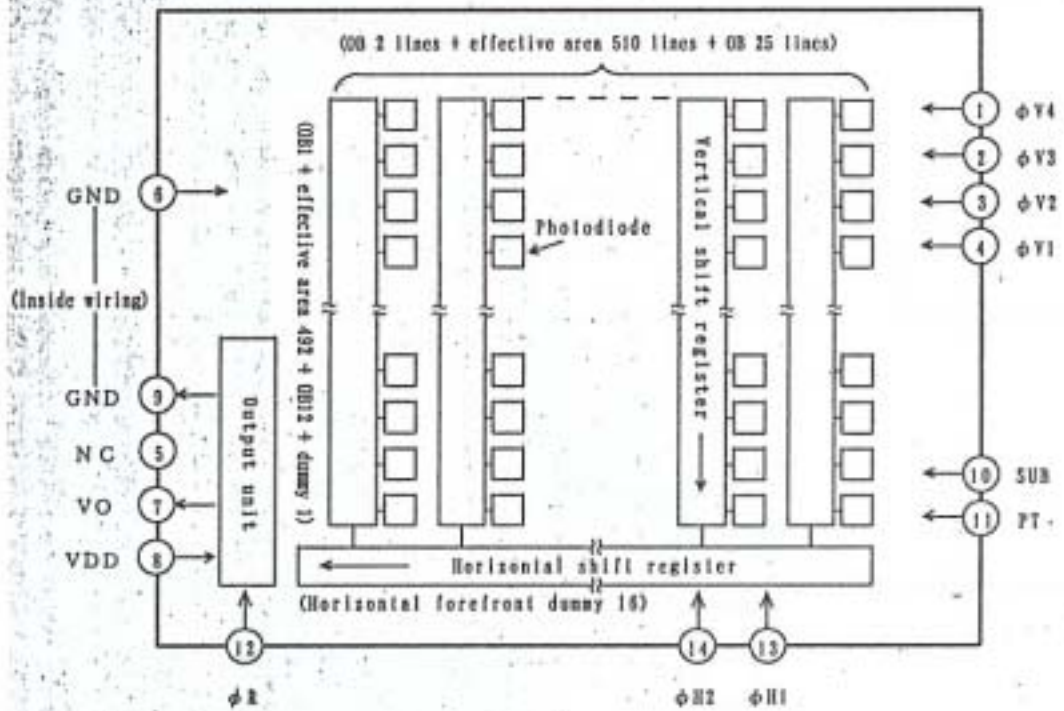
$D = (D_o \pm 25 \mu\text{m})$



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Block Diagram

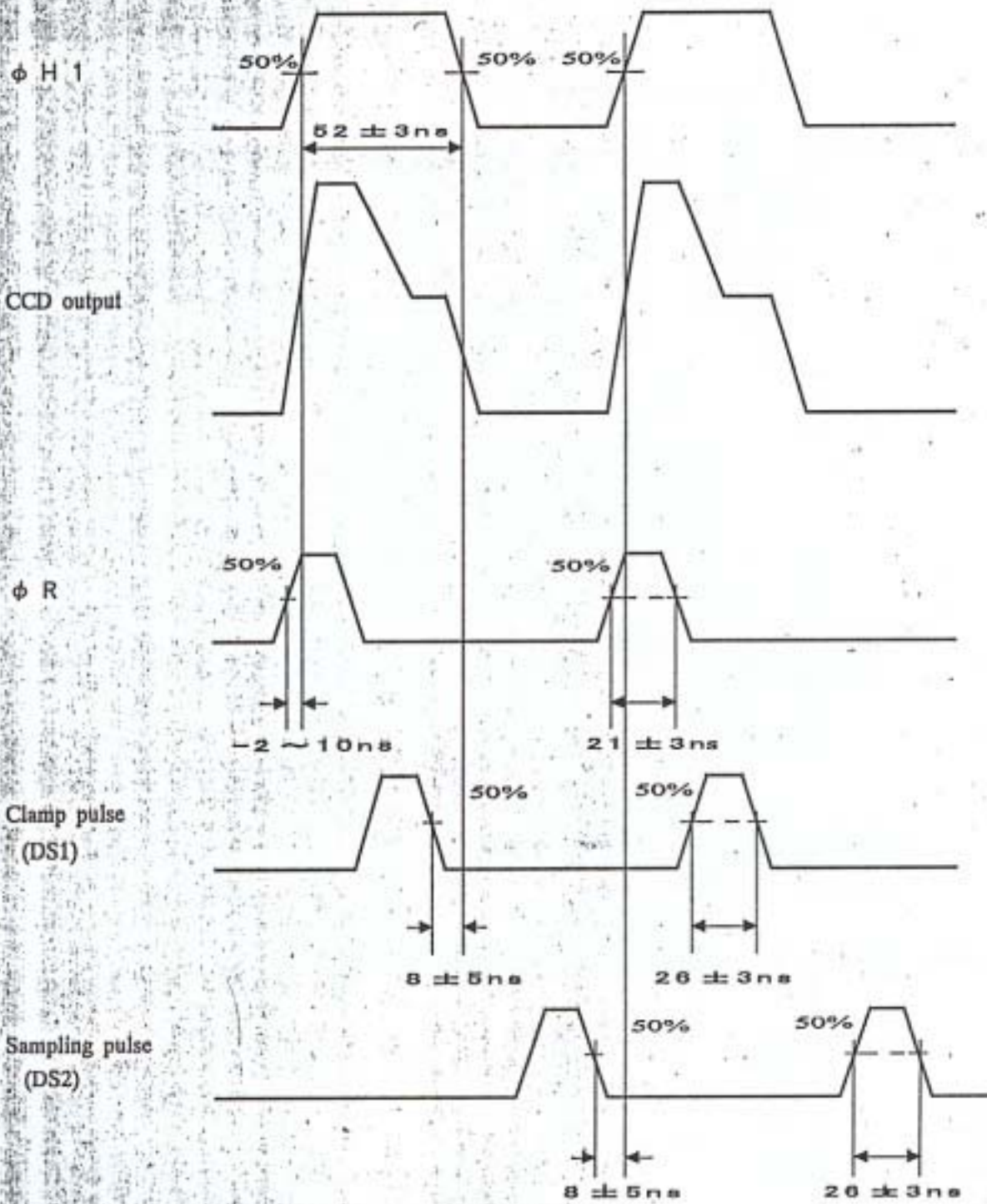


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CDS Pulse timing

CDS (corelated double sampling) circuit is to be attached to CCD output of CCD for better S/N characteristics.

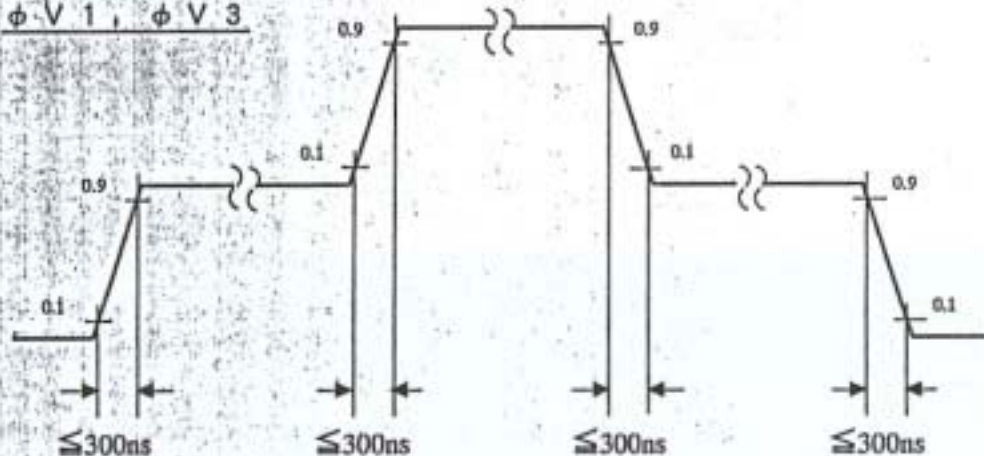


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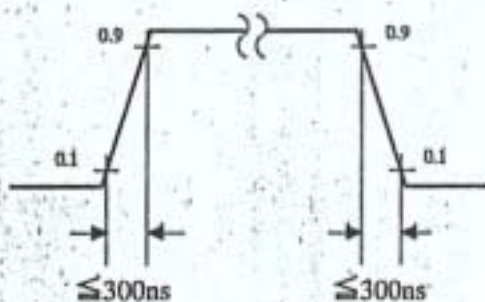
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Rising and falling time of each pulse

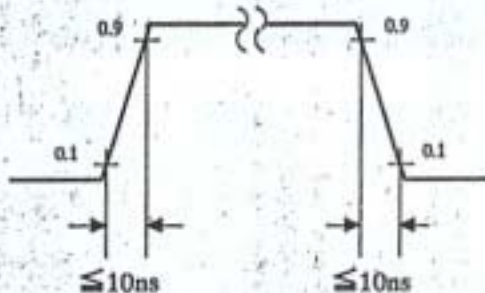
$\phi V 1, \phi V 3$



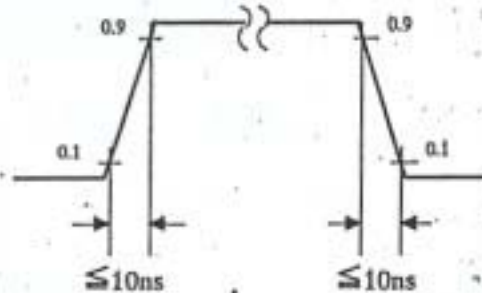
$\phi V 2, \phi V 4$



$\phi H 1, \phi H 2, \phi R$

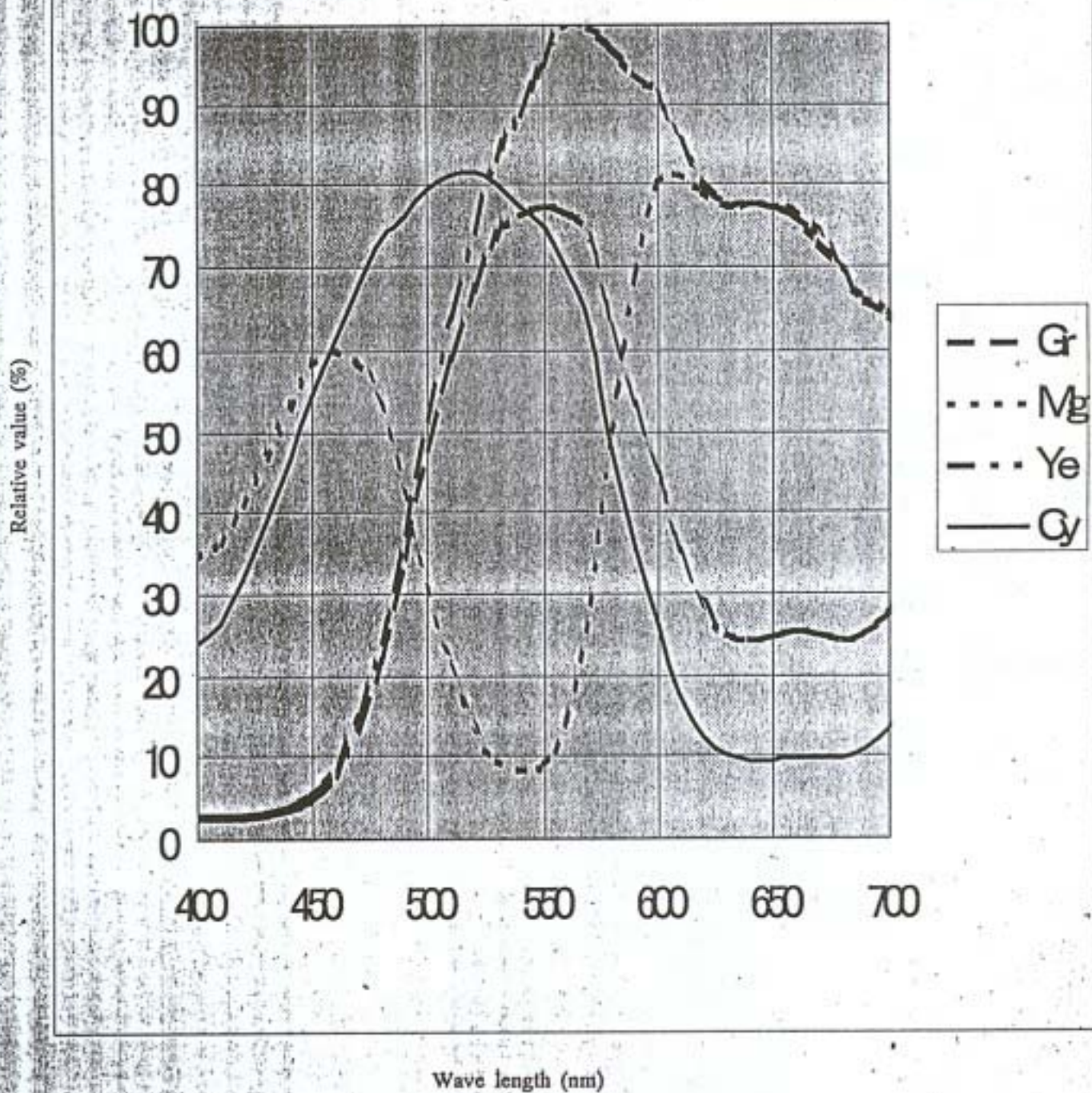


$DS 1, DS 2$



Date

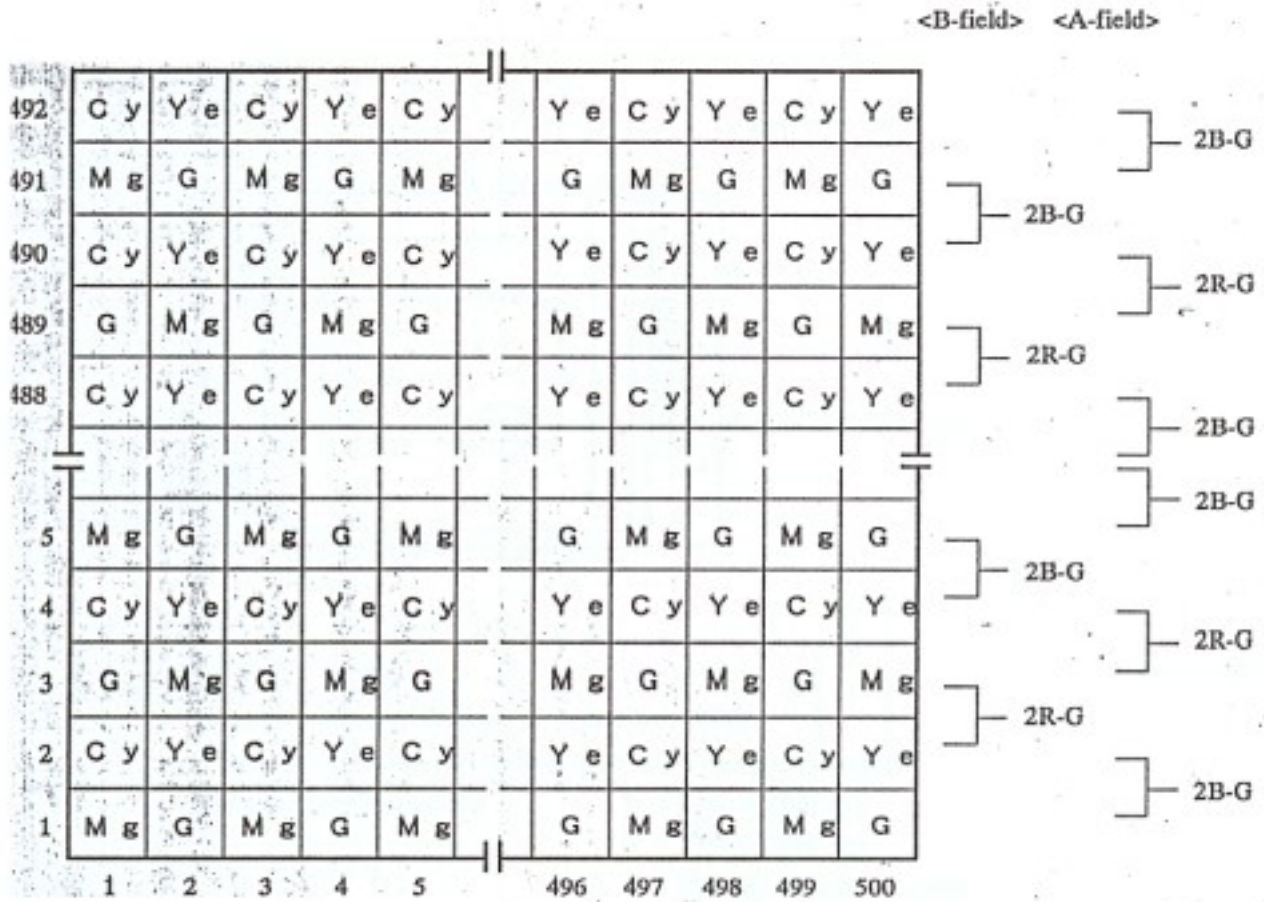
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Spectral response characteristics

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CCD Color filter diagram



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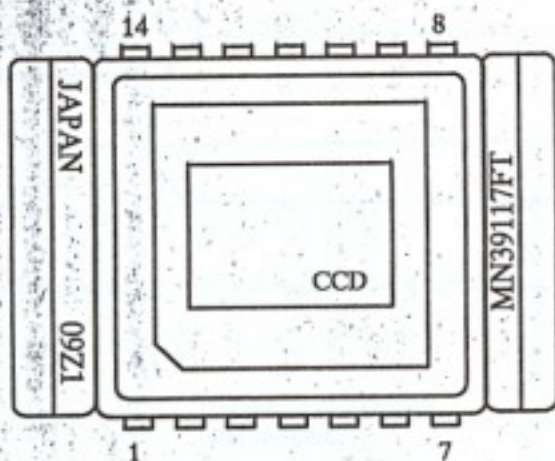
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Marking Specifications

1. Product Indication

Indicate a product type and shipment date on the side of the CCD

Upper column of side



M N 3 9 1 1 7 F T type

0 9

Shipment date (manufactured in September, 2000)

Z

Quality code...Alter the symbol upon improvement of quality

1

Shipment month divisions

1 : 1st to 10th day

2 : 11th to 20th day

3 : 21st day to end of month

J A P A N

Place of origin

2. Indication of Product Type on Package

Inner box and external package : M N 3 9 1 1 7 F T

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1. Regarding Sub-pin of CCD, please be careful not to be lower level than GND at power supply on.
Please see Fig1(Example of Drive Circuit Diagram).

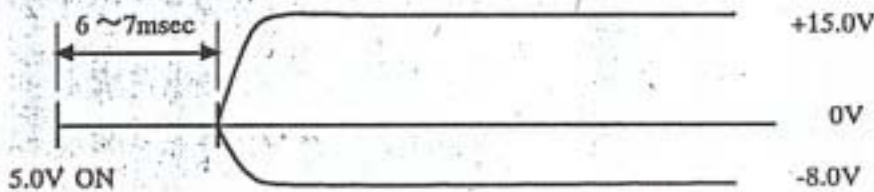
2. Power supply sequence.

(1) Regarding power supply of Vertical driver(V_{HH},V_H,V_L) and power supply of CCD(V_{DD},P_T), please turn ON,turn OFF at the same time.

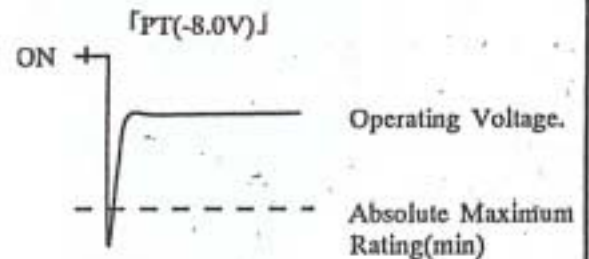
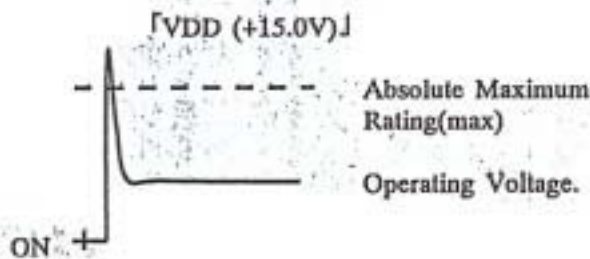
If only power supply of Vertical driver is turned on,it may happen latch-up.

(2) Regarding V_{HH},V_H,V_{DD}(+15.0V) and V_L,P_T(-8.0V),it does not matter to turn on simultaneously,however,please do not turn on suddenly.

(3) If it takes 6~7msec to turn on +15.0V and -8.0V,after 5.0V is turned on,there is no problem.



3. Please be careful that voltage will not exceed the level of Max.and Min.at power supply ON.

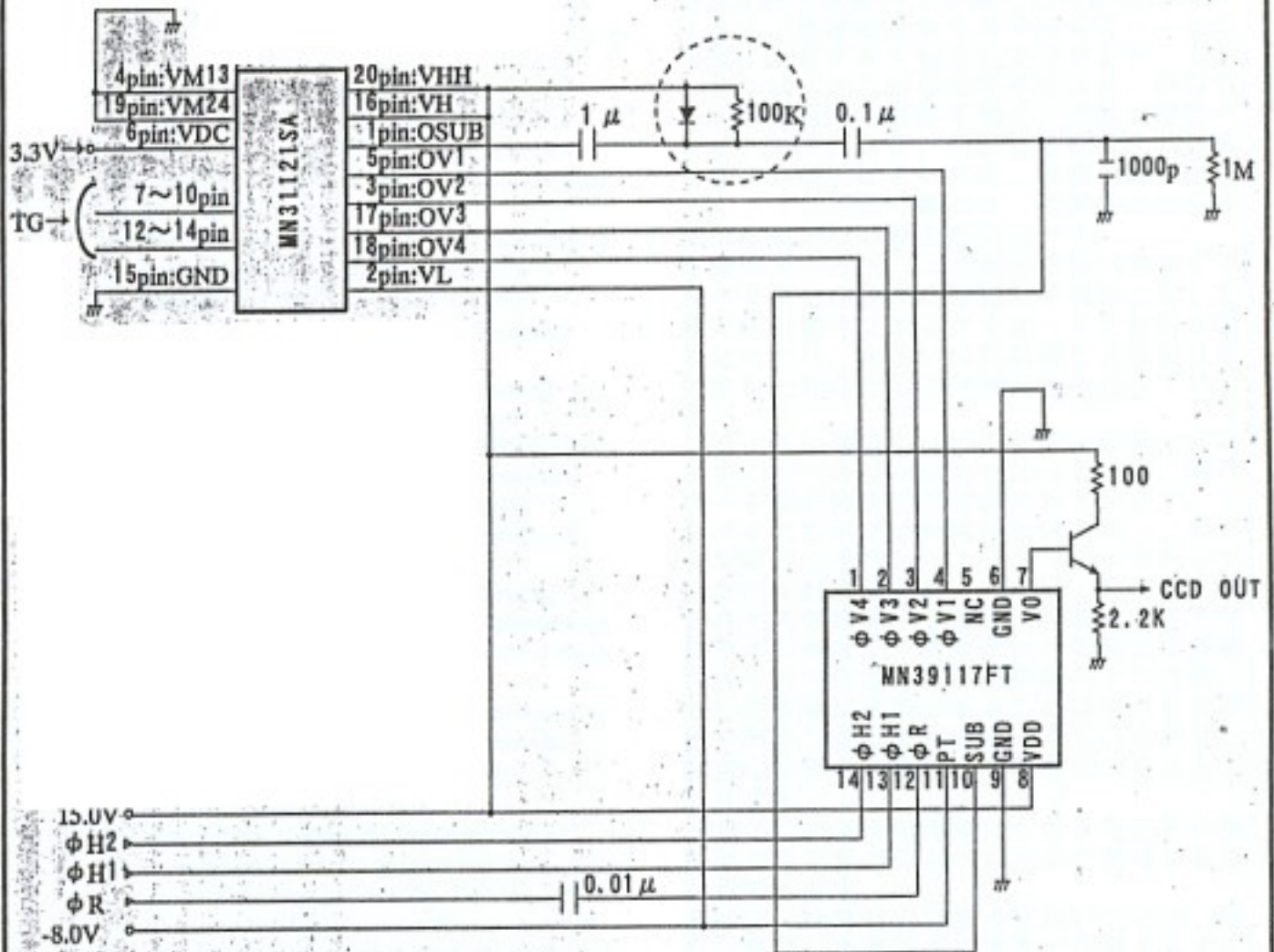


4. Please don't pull and put CCD at power supply ON.

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Fig1.(Example of Drive Circuit Diagram).



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