

Preliminary

CMOS AREA IMAGE SENSOR

TCM5000D

1 / 4 INCH 330 k PIXEL CMOS B / W IMAGE SENSOR

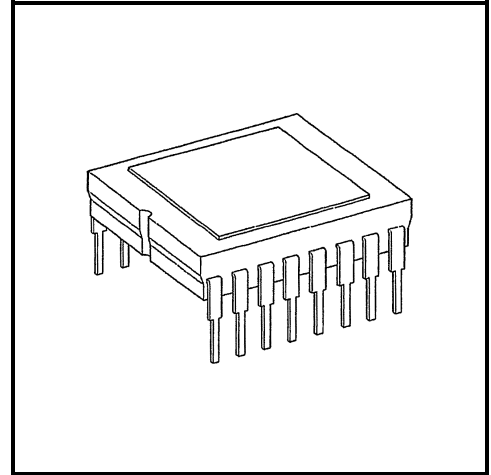
The TCM5000D is a CMOS B / W image sensor that meets with VGA format. It enables all pixel signals to be output in sequence each 1 / 30 s. (progressive scanning)

This element is equipped with 492 vertical and 659 horizontal signal pixels, and the image size meets with 1 / 4 inch optical format.

Use of the CMOS process enables low power-consumption operations with a single power voltage driving. And it is perfect for use as an image input device for surveillance cameras and other industrial use.

FEATURES

- Optical size : 1 / 4 inch optical format
- Total pixel numbers : 692 (H) × 504 (V)
- Signal pixel numbers : 659 (H) × 492 (V)
- Pixel pitch : 5.6 μm (H) × 5.6 μm (V) (square pixel)
- Image size : 3.6 mm (H) × 2.7 mm (V)
- Package : 16-pin DIP, cerdip
- Frame frequency : 30 Hz
- Power voltage : 3.3 V
- Additional functions : Variable electronic shutter (1 / 30 to 1 / 8000 s)
Monitoring operation (each next horizontal line)



Weight : 1.9g (Typ.)

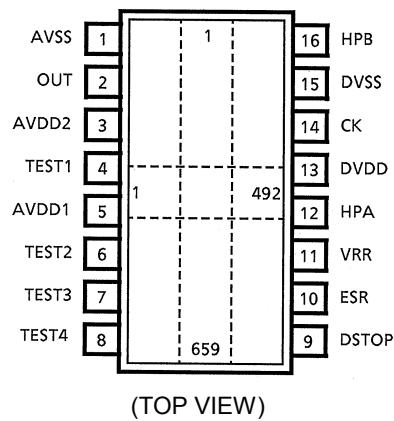
MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	RATING	UNIT
Power Supply Voltage	V_{DD}	-0.5~4.2	V
Input Voltage	V_{IN}	-0.5~ $V_{DD} + 0.5$	V
Input Protection Diode Current	I_{IN}	± 20	mA
Storage Temperature	T_{stg}	-30~85	$^{\circ}\text{C}$

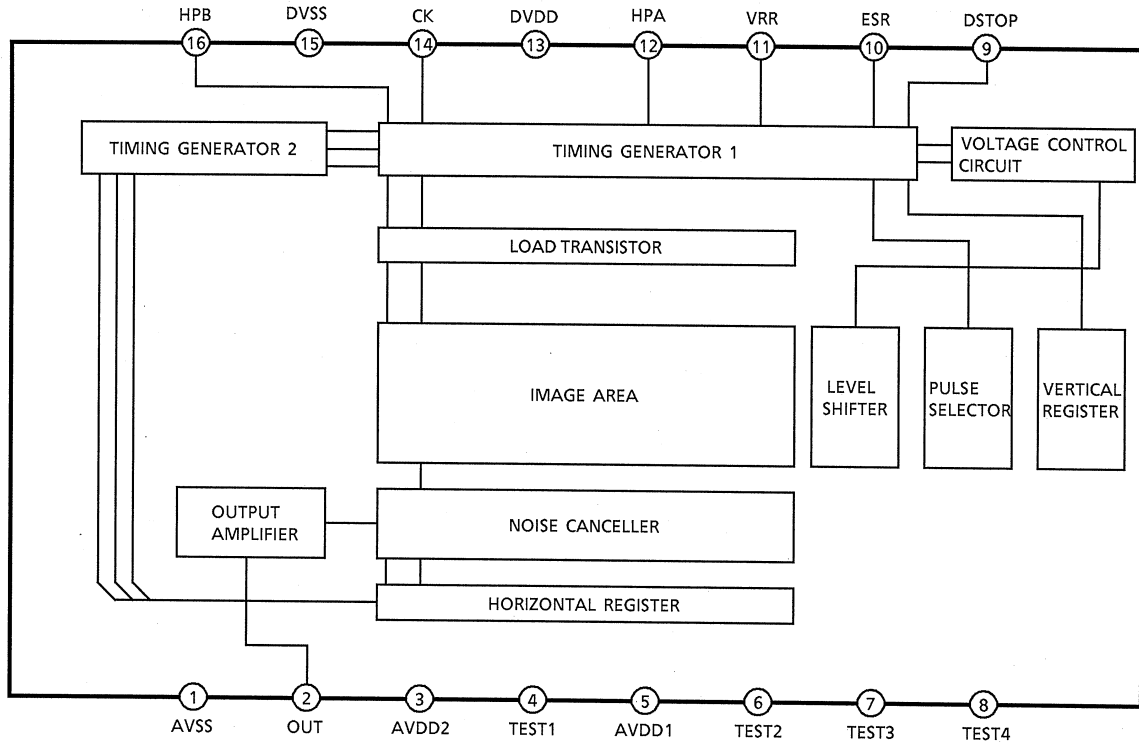
RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	RATING	UNIT
Power Supply Voltage	V_{AVDD} V_{DVDD}	3.0~3.6	V
Input Voltage	V_{IN}	0~ V_{DVDD}	V
Operating Temperature	T_{opr}	-20~60	$^{\circ}\text{C}$

PIN CONNECTION



CIRCUIT DIAGRAM



PIN FUNCTIONS

PIN No.	SYMBOL	I / O	FUNCTION
1	AVSS	—	Analog GND
2	OUT	O	Signal output
3	AVDD2	—	Analog power supply 2
4	TEST1	I	Test pin. Normally connected to GND through a capacitor (4.7~10 μ F)
5	AVDD1	—	Analog power supply 1
6	TEST2	I	Test pin 2. Normally connected to GND through a capacitor (4.7~10 μ F)
7	TEST3	I	Test pin 3. Normally connected to GND through a capacitor (4.7~10 μ F)
8	TEST4	—	Test pin 4. Normally H level inputs.
9	DSTOP	I	Operations suspension control pin. H : Normal operations, L : Operations suspended
10	ESR	I	Electrical shutter start pulse input
11	VRR	I	Vertical timing start pulse input
12	HPA	I	Horizontal timing start pulse input
13	DVDD	—	Digital power supply
14	CK	I	Clock pulse input. Double the frequency of signal output.
15	DVSS	—	Digital GND
16	HPB	I	Reading mode switching pin. L : Normal operation (1 V = 525 H, 30 Hz) HPB pulse : Monitoring operation (each next horizontal line, 1 V = 262.5 H, 60 Hz)

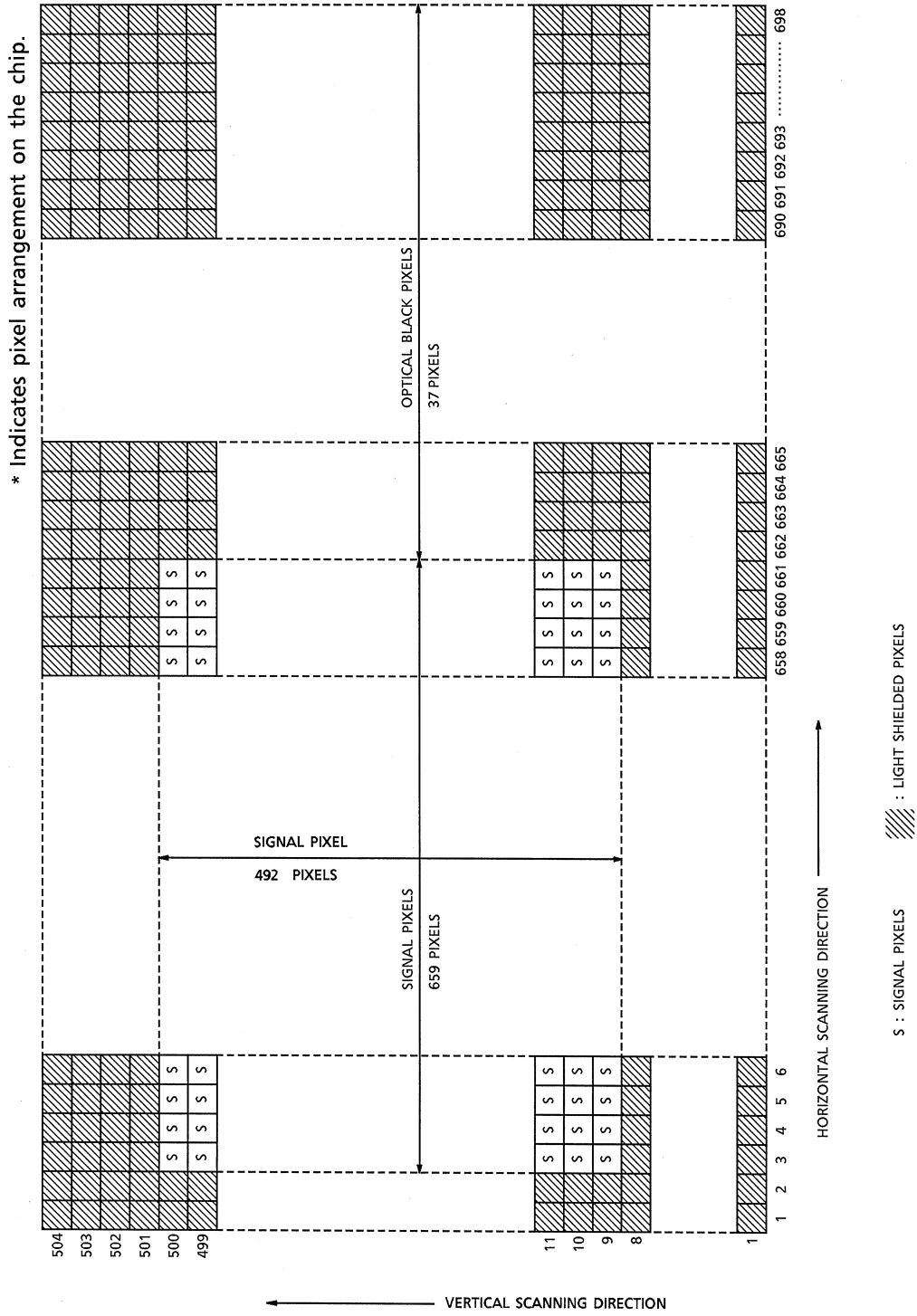
OPTICAL AND ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Sensitivity	R	Standard conditions (* 1)	250	300	—	mV
Saturation Voltage	V _{SAT}		500	600	—	mV
Dark Signal Voltage	V _{DRK}	Ta = 60°C, Dark condition	—	1.0	2.0	mV
Blooming Margin	BLM	Standard light condition	500	—	—	times
S / N (dark)	S / N	Dark condition	55	57	—	dB
Smearing	SMR	1 / 10 V	—	—	-140	dB
Lag	LAG	G output signal : 20 mV, 1 st field	—	0	1	mV
Power Supply Current	I _{DD}	V _{DD} = 3.3 V	—	15	20	mA

* 1: Standard conditions

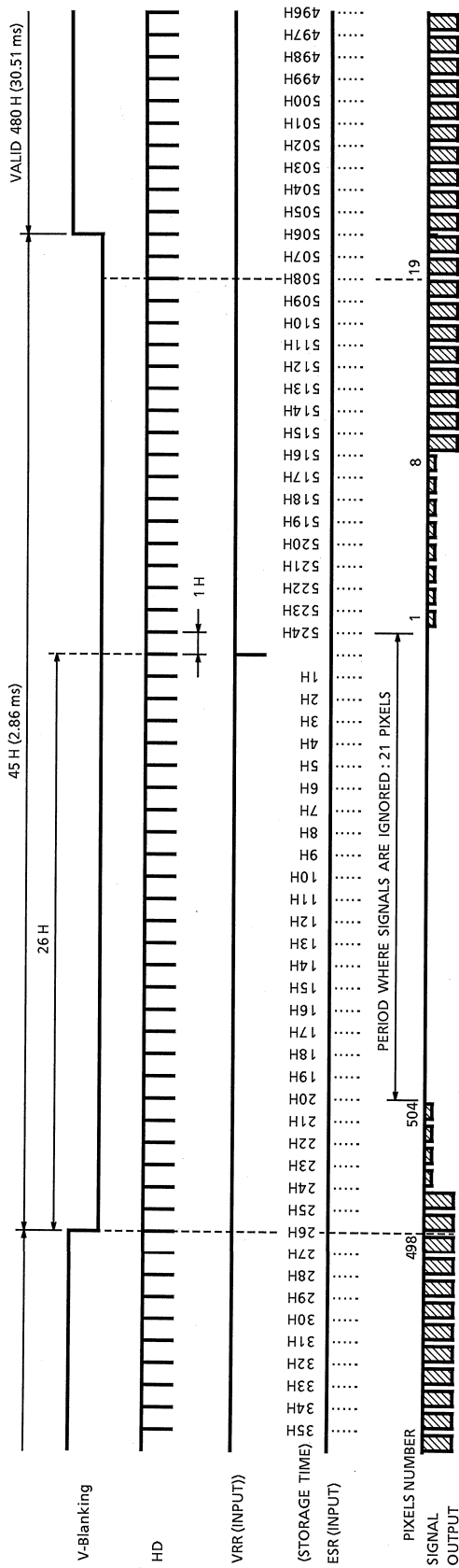
- Light conditions : Color temperature 3200 K halogen light box. Surface brightness: 100 nt of equal white light.
- IR cut filter
- Optical lens : f25 mm, F0.85 lens manufactured by Fujinon Lens Co., Ltd. Set to the F2.8.
- Frame-frequency : 30 Hz continual operations, electronic shutter off (storage time = 1 / 30 s).

PIXEL ARRANGEMENT

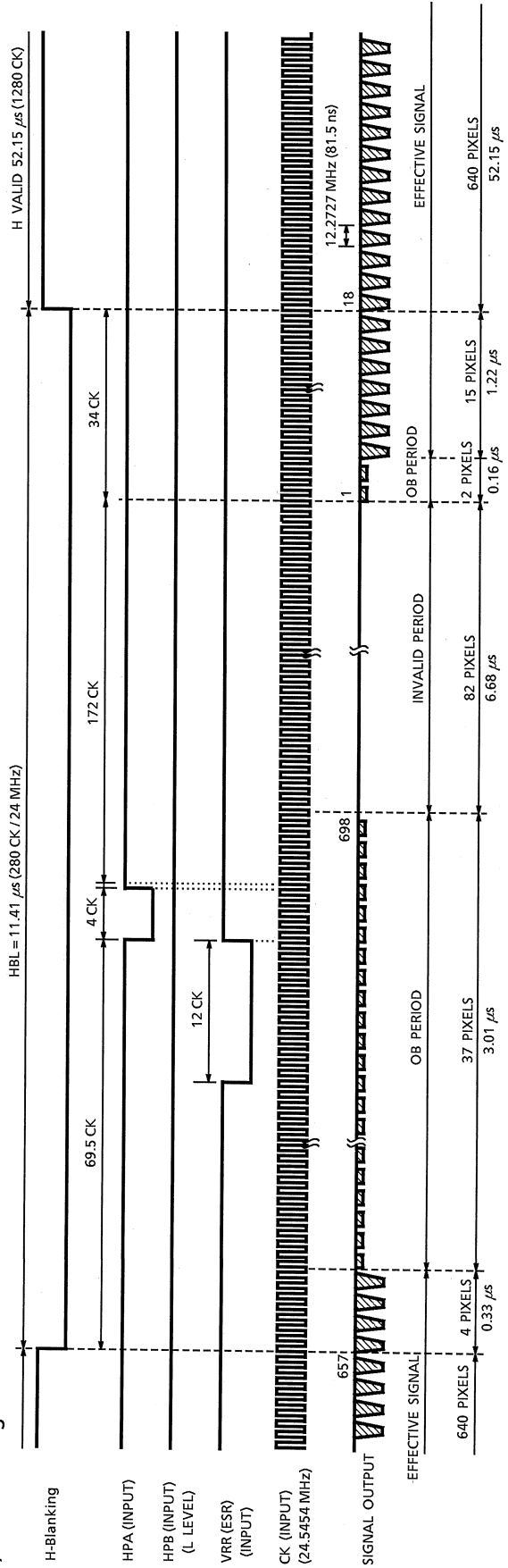


DRIVE TIMING DIAGRAM VGA progressive scanning mode (30Hz, 1V = 525H)

(1) V Blanking

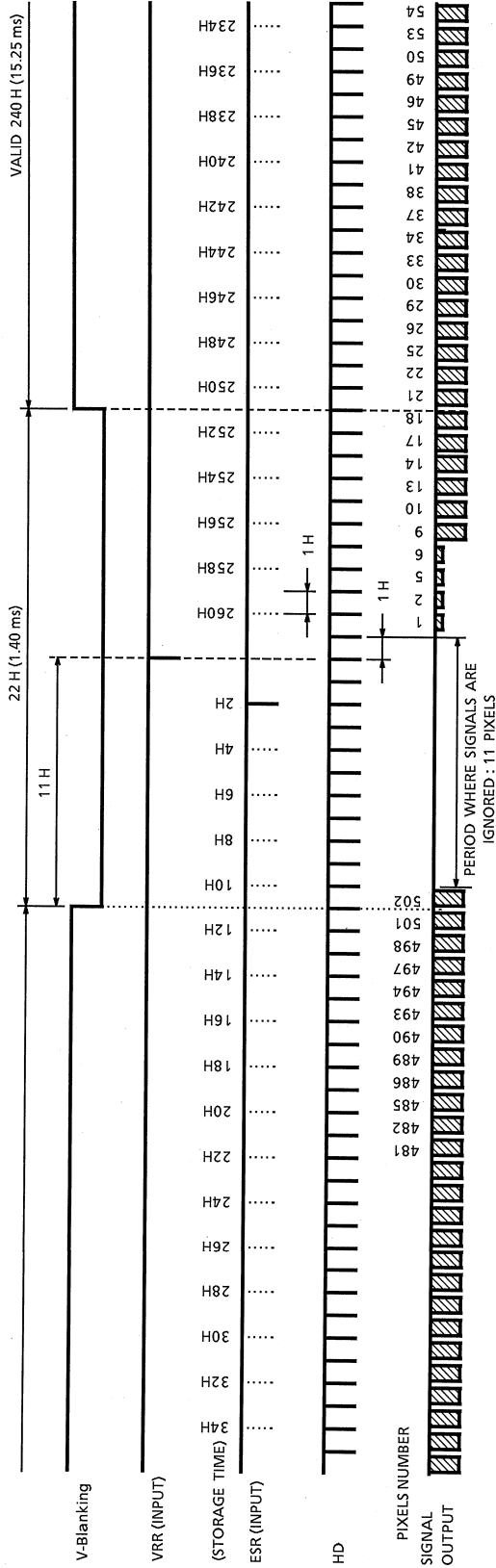


(2) H Blanking

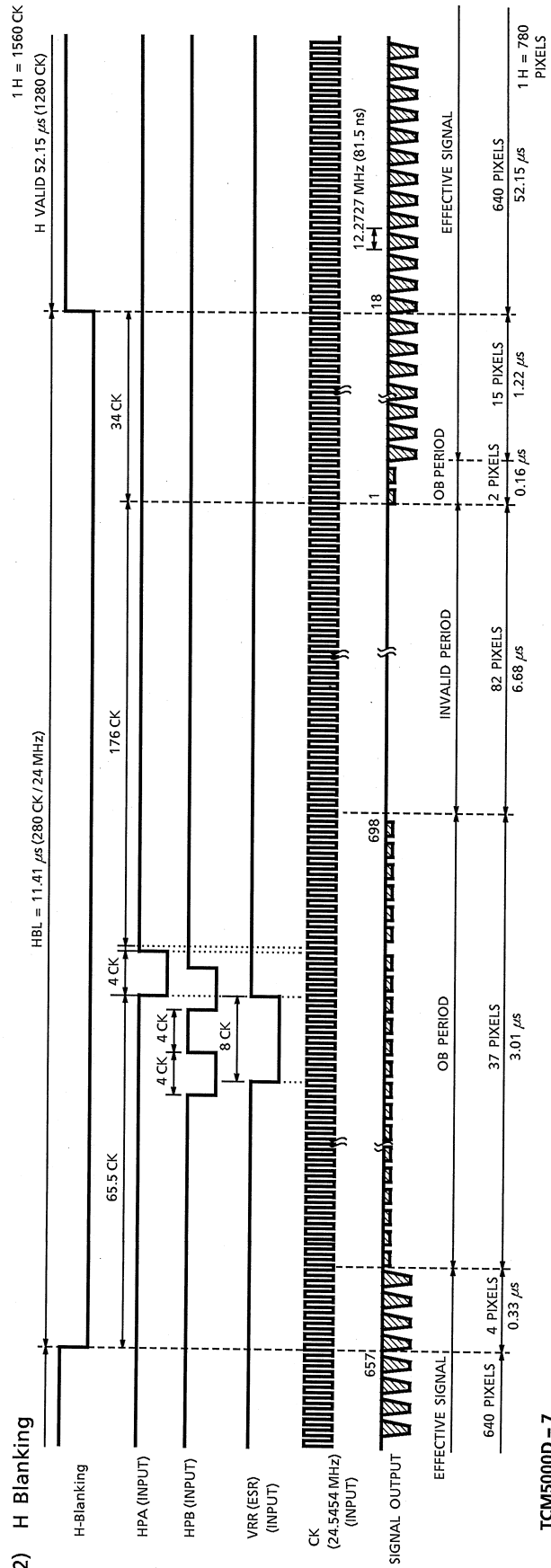


DRIVE TIMING DIAGRAM Monitoring mode

(1) V Blanking

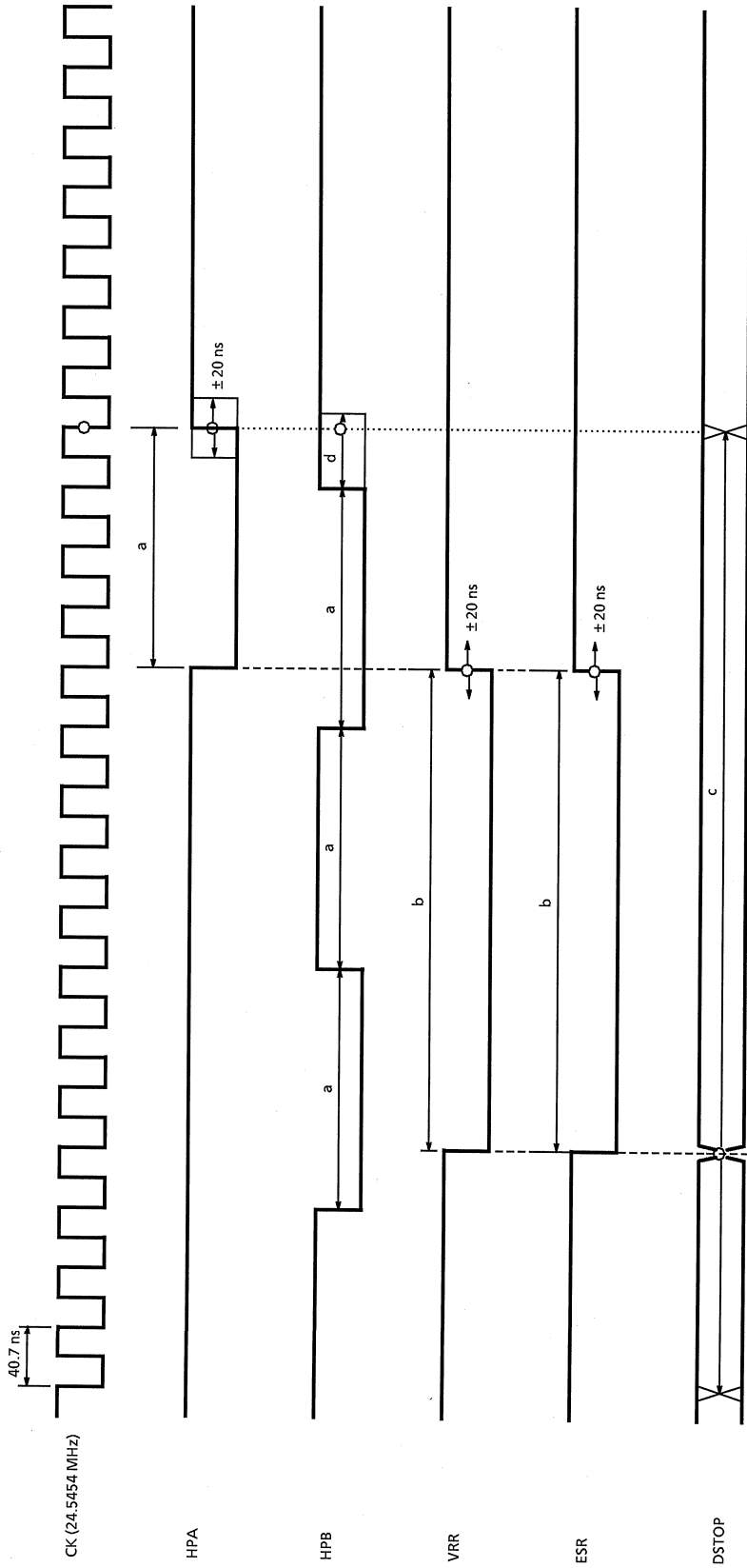


(2) H Blanking



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DRIVE TIMING DIAGRAM



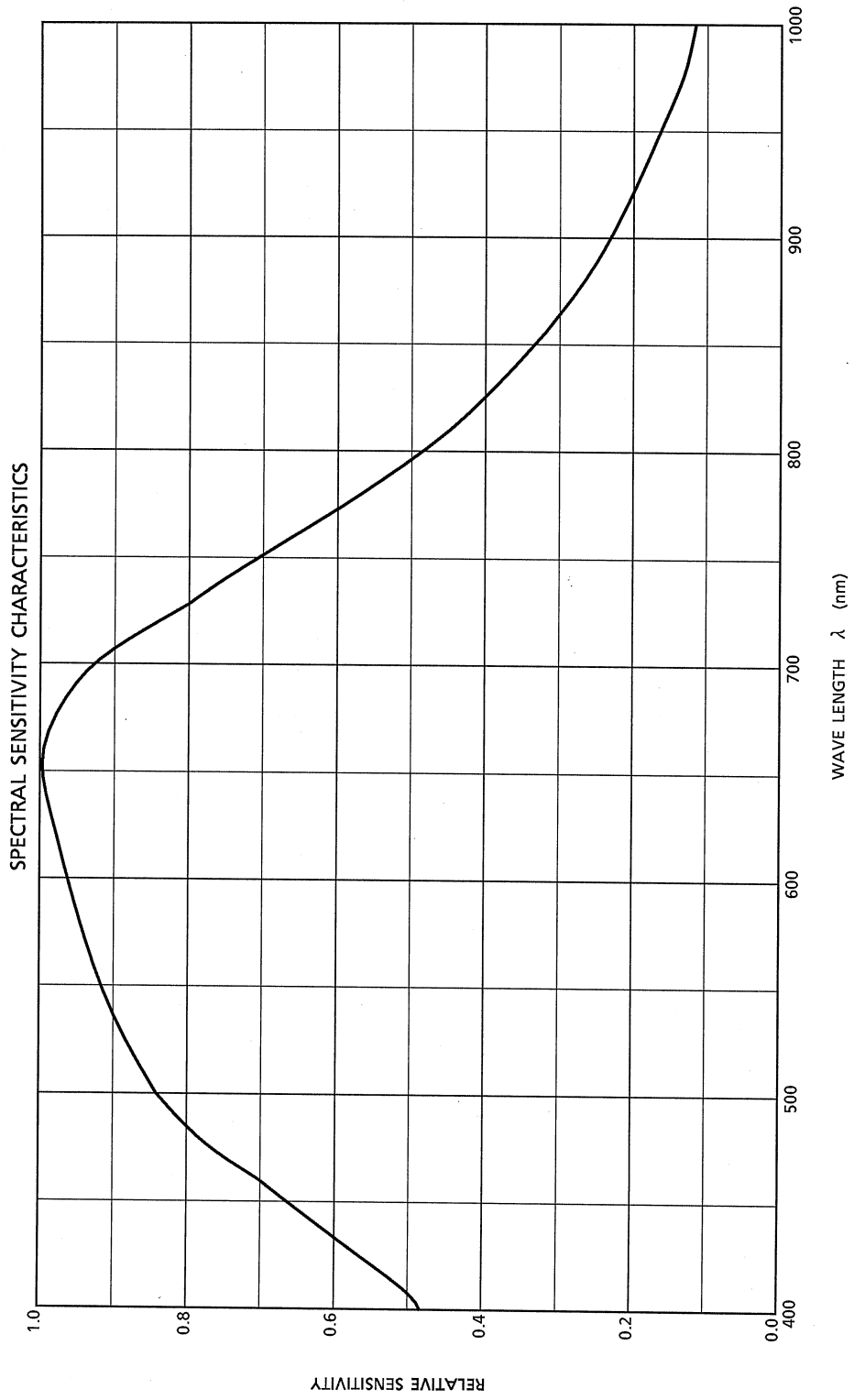
Timing Margin (ns)

	Min.	Typ.	Max.
a	40	163	
b	81	326	
c	-160	0	a + b
d	-81	40	2

(Note 1) : ○ is basic point.

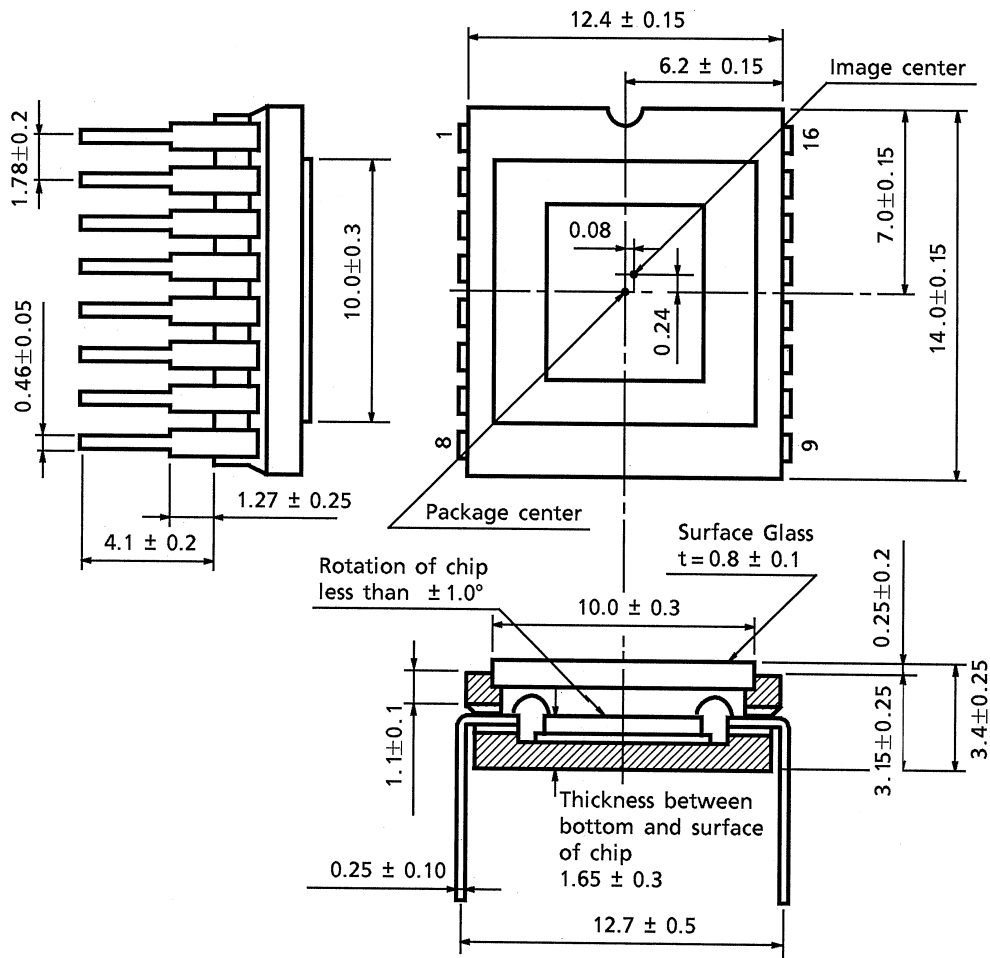
(Note 2) : DSTOP should be changed after VRR (ESR).

(Note 3) : When electronic shutter is not used, H level should be put into ESR terminal once after VDD and CK input.



PACKAGE DIMENSIONS

Unit : mm



Weight : 1.9 g (Typ.)

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000707EBA

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