

MW37381AE

11mm (type-2/3) Wide CCD Area Image Sensor

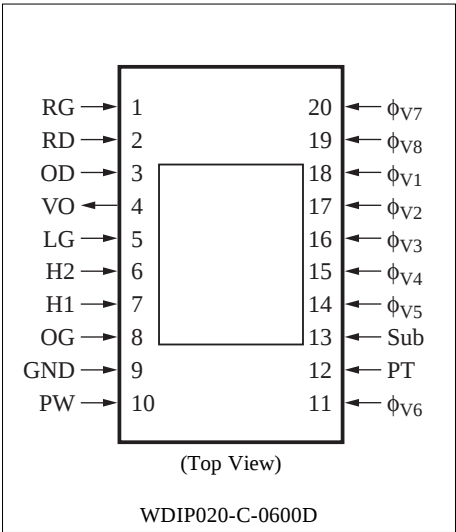
Overview

The MW37381AE is a 11mm (type-2/3) 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 515,100 pixels (1020 horizontal × 505 vertical) and provides stable and clear images with a resolution of 720 horizontal TV-lines and 350vertical TV-lines.

Part Number	Size	System	Color or B/W
MW37381AE	11mm(type-2/3)	NTSC	B/W



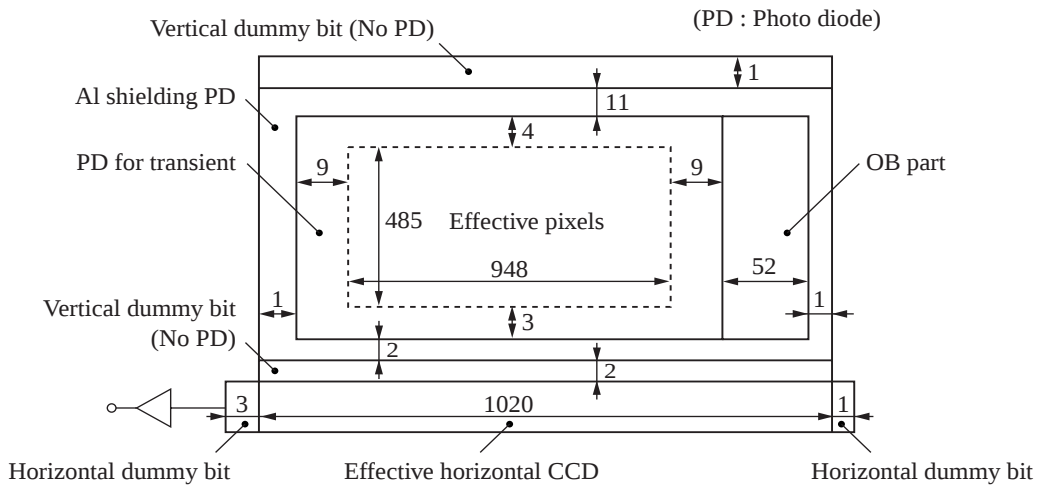
Features

- Total number of pixels: 1020 (horizontal) × 505 (vertical)
- High sensitivity
- Low noise
- Broad dynamic range
- Low smear
- Low image lag
- Electronic shutter
- No image distortion
- High reliability
- 20-pin DIL ceramic package

Applications

- Cameras for commercial use

Device Configuration Diagram (Unit : column)



■ Pin Descriptions

Pin No.	Symbol	Descriptions	Pin No.	Symbol	Descriptions
1	RG	Reset gate	11	ϕ_{V6}	Vertical CCD gate 6
2	RD	Reset drain	12	PT	P-well for protection circuit
3	OD	Output drain	13	Sub	Substrate
4	VO	Video output	14	ϕ_{V5}	Vertical CCD gate 5
5	LG	Load gate	15	ϕ_{V4}	Vertical CCD gate 4
6	H2	Horizontal CCD gate 2	16	ϕ_{V3}	Vertical CCD gate 3
7	H1	Horizontal CCD gate 1	17	ϕ_{V2}	Vertical CCD gate 2
8	OG	Output gate	18	ϕ_{V1}	Vertical CCD gate 1
9	GND	P-well	19	ϕ_{V8}	Vertical CCD gate 8
10	PW	P-well	20	ϕ_{V7}	Vertical CCD gate 7

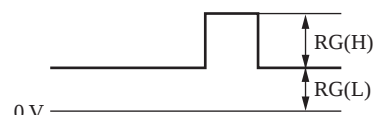
■ Absolute Maximum Ratings and Operating Conditions

Parameter	Symbol	Rating		Operating condition			Unit
		min	max	min	typ	max	
Reset gate voltage* ¹	RG(H)	0	18	4.7	5.0	5.3	V
	RG(L)			0	Adjust	6.0	
Reset drain voltage	RD	0	18	15.7	16.0	16.3	V
Output drain voltage	OD	0	18	15.7	16.0	16.3	V
Video output voltage	VO	—	—	—	—	—	—
Load gate voltage	LG	0	10	2.7	3.0	3.3	V
Horizontal CCD gate voltage 2	H2(H)	0	18	4.7	5.0	5.3	V
	H2(L)			0	0	0.3	
Horizontal CCD gate voltage 1	H1(H)	0	18	4.7	5.0	5.3	V
	H1(L)			0	0	0.3	
Output gate voltage	OG	0	10	0.7	Adjust	5.0	V
GND	GND	Reference voltage		—	0	—	V
P-well voltage	PW	Reference voltage		—	0	—	V
Vertical CCD gate voltage 6	$\phi_{V6(M)}$	-12	18	-0.3	0	0.3	V
	$\phi_{V6(L)}$			-9.3	-9.0	-8.7	
Protection P-well voltage	PT	-12	0	-10.3	-10.0	-9.7	V
Substrate voltage* ²	Sub(1)	0	18	3.0	Adjust	14.5	V
	Sub(2)	0	40	28.0	25.0+(1)	40.0	
Vertical CCD gate voltage 5	$\phi_{V5(H)}$	-12	18	15.7	16.0	16.3	V
	$\phi_{V5(M)}$			-0.3	0	0.3	
	$\phi_{V5(L)}$			-9.3	-9.0	-8.7	

■ Absolute Maximum Ratings and Operating Conditions(continued)

Parameter	Symbol	Rating		Operating condition			Unit
		min	max	min	typ	max	
Vertical CCD gate voltage 4	$\phi_{V4(M)}$	-12	18	-0.3	0	0.3	V
	$\phi_{V4(L)}$			-9.3	-9.0	-8.7	
Vertical CCD gate voltage 3	$\phi_{V3(H)}$	-12	18	—	—	—	V
	$\phi_{V3(M)}$			-0.3	0	0.3	
	$\phi_{AV(L)}$			-9.3	-9.0	-8.7	
Vertical CCD gate voltage 2	$\phi_{V2(M)}$	-12	18	-0.3	0	0.3	V
	$\phi_{V2(L)}$			-9.3	-9.0	-8.7	
Vertical CCD gate voltage 1	$\phi_{V1(H)}$	-12	18	15.7	16.0	16.3	V
	$\phi_{V1(M)}$			-0.3	0	0.3	
	$\phi_{V1(L)}$			-9.3	-9.0	-8.7	
Vertical CCD gate voltage 8	$\phi_{V8(M)}$	-12	18	-0.3	0	0.3	V
	$\phi_{V8(L)}$			-9.3	-9.0	-8.7	
Vertical CCD gate voltage 7	$\phi_{V7(H)}$	-12	18	—	—	—	V
	$\phi_{V7(M)}$			-0.3	0	0.3	
	$\phi_{V7(L)}$			-9.3	-9.0	-8.7	
Operating temperature	T_{opr}	-10	60	—	25	—	°C
Storage temperature	T_{stg}	-30	70	—	—	—	°C

Note)*1 : The RG settings are as shown in the diagram at the right.

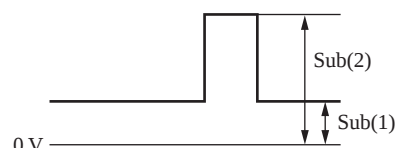


*2 : The Sub settings are as shown in the diagram at the right.

Sub(1) : DC component in normal operation

Sub(2) : Pulse voltage applied when electronic shutter operates
+Sub(1)

Sub(1) initial setting is 3.0 v, and is adjusted to the minimum voltage when blooming does not occur at 1600 times the light input of standard light input, or the minimum voltage when injection does not occur.



■ Image Characteristics

Part Number	Color or B/W	Effective pixels		S/N typ (-dB)	Saturation output typ (mV)	Standard output typ (mV)	Vertical smear typ (dB)	Image typ (%)
		H	V					
MW37381AE	B/W	948	485	60	1200	400	-115	0

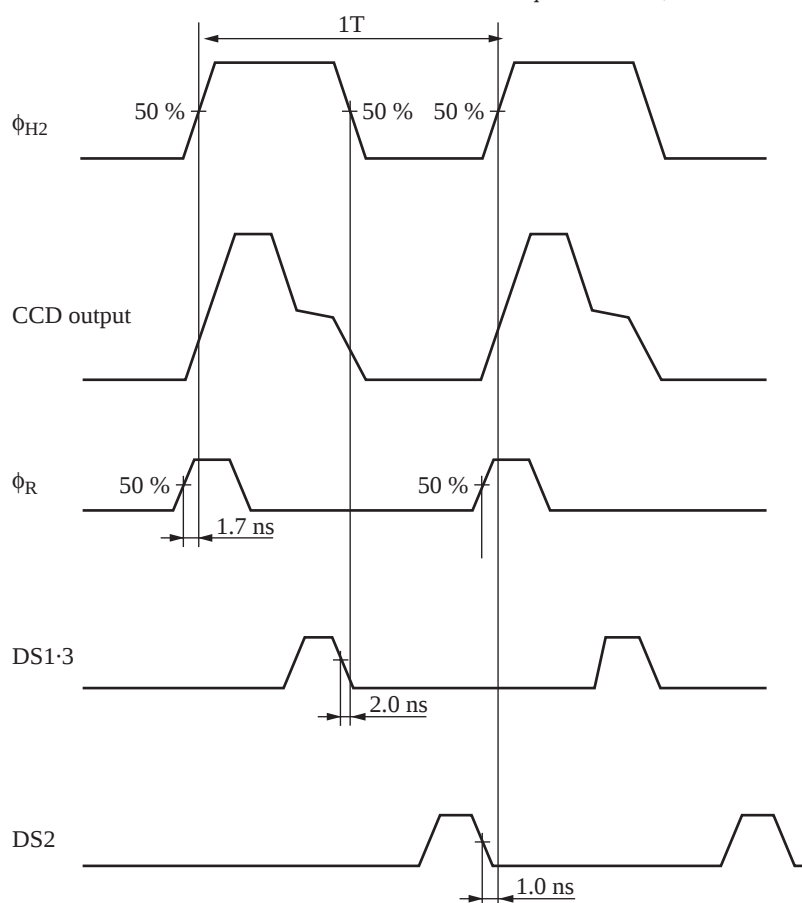
Note) Standard light input is the one when exposure is done at a lens (Fujinon CF25L) aperture of F11, using a light source (light box) of 2856 K and 920 nt, and placing a color temperature conversion filter LB-40 (HOYA) and an IR cutting filter CAW-500S (t = 2.5 mm) in the light path.

Standard light output is the CCD output (after conversion by the emitter follower) obtained under imaging conditions using standard light input.

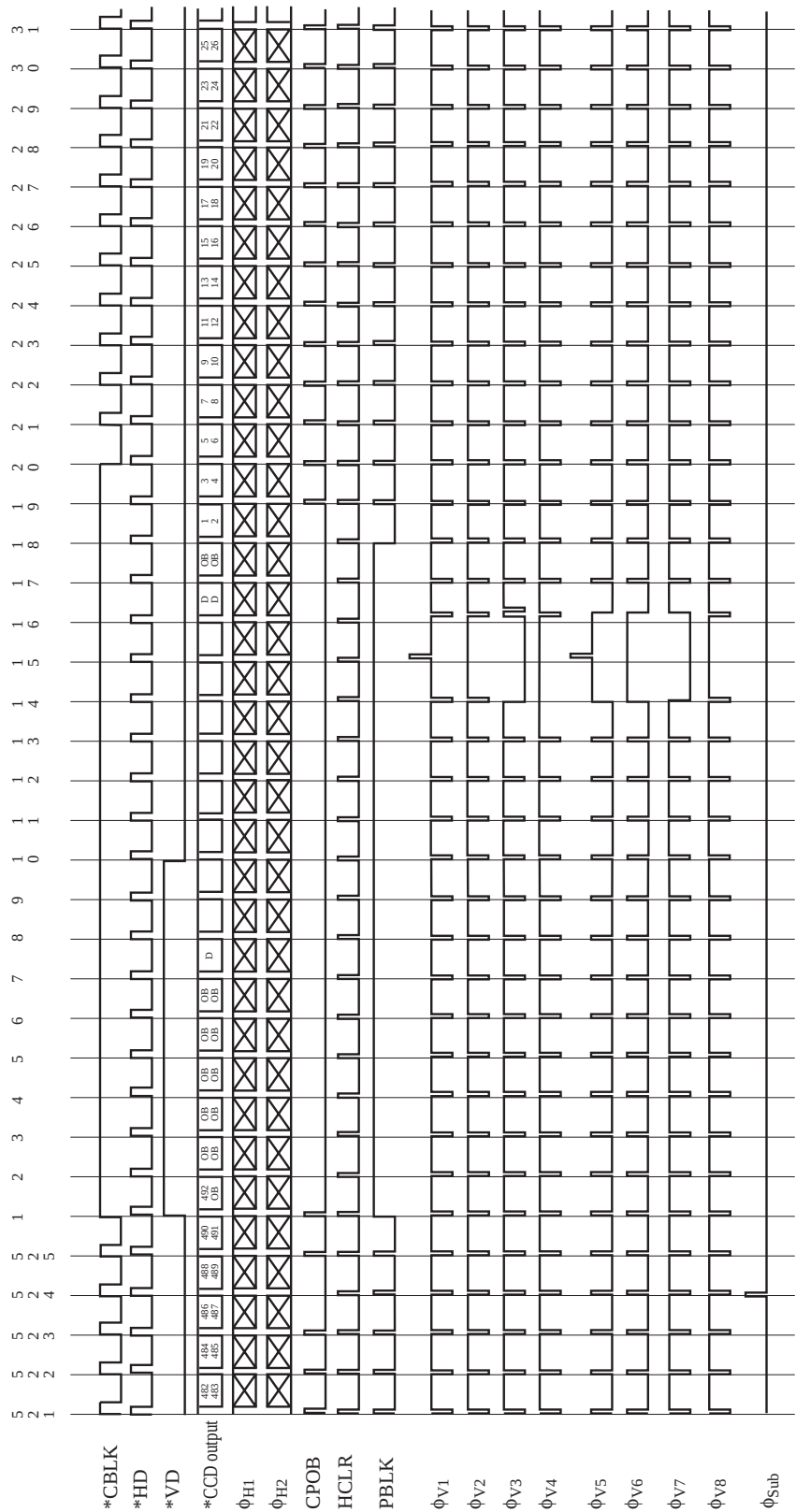
■ CDS Pulse Timing

- Based on high speed pulse timing of driving LSI MN5280.

Squeeze 16 : 9, 1T=55.56 ns



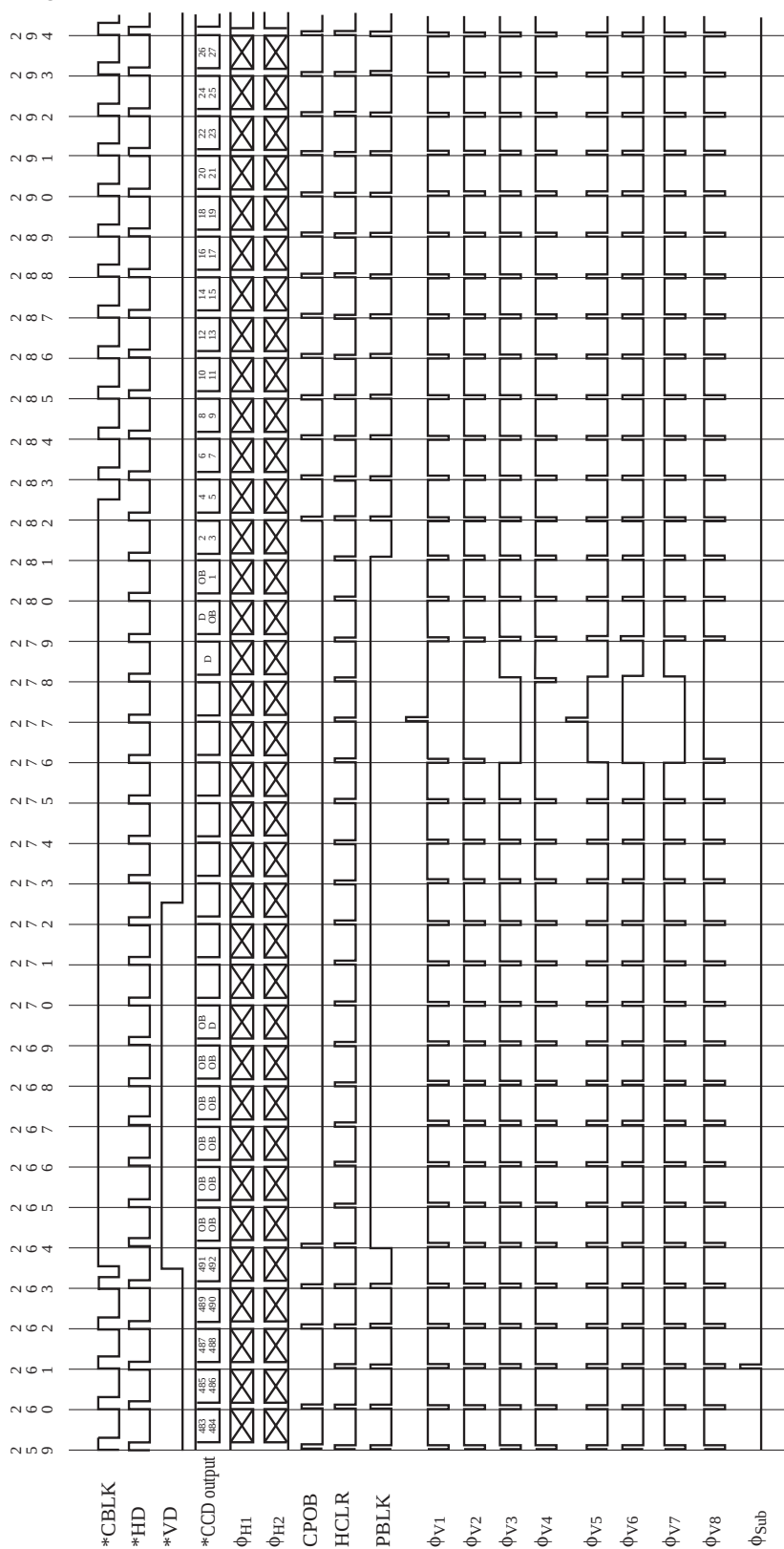
■ Timing Diagram (Squeeze16 : 9)
● Field A timing



Note) 1. Items marked with * are not output by this LSI.
2. Sub applies only for shutter setting

■ Timing Diagram (Squeeze 16 : 9)(continued)

- Field B timing



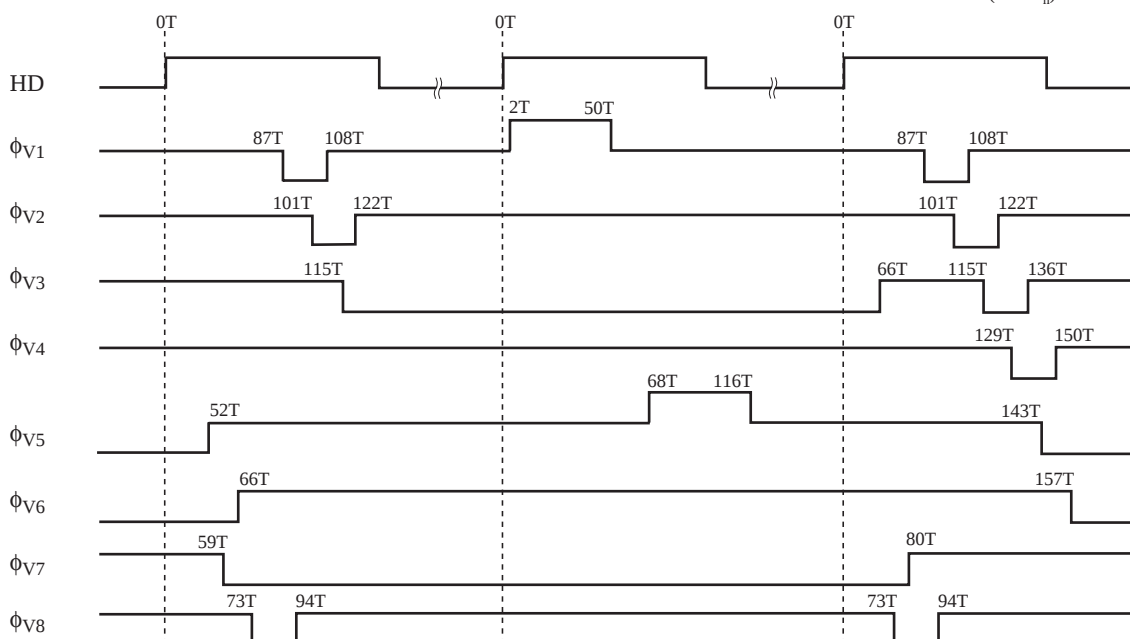
Note) 1. Items marked with * are not output by this LSI.
2. Sub applies only shutter setting

■ Timing Diagram (Squeeze 16 : 9)(continued)

● V Rate read out details

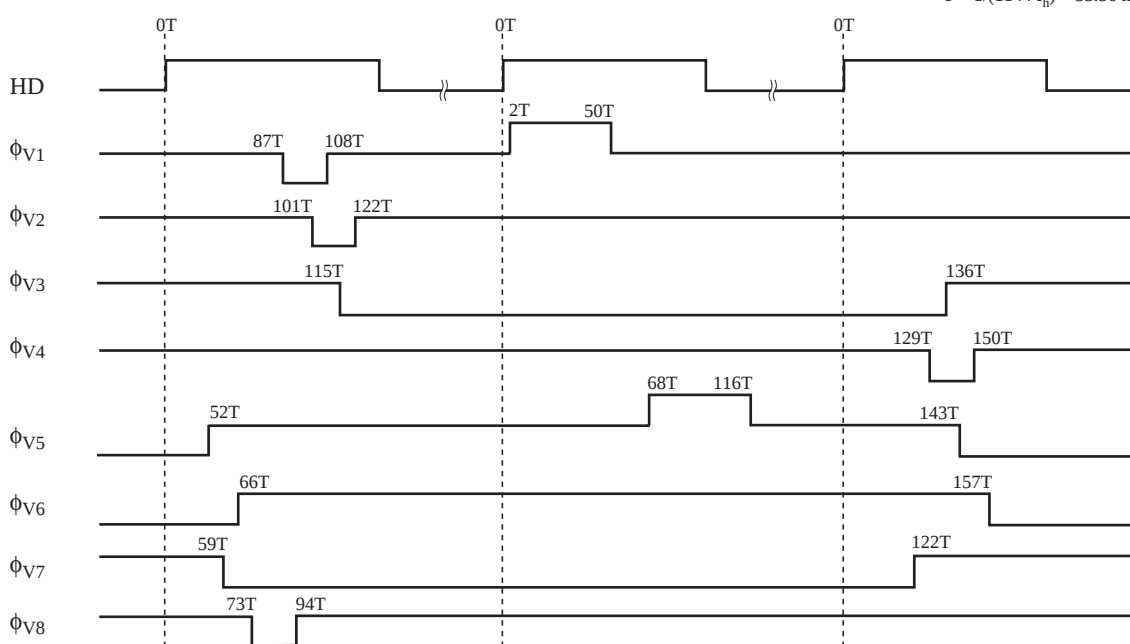
< Field A >

$$T = 1/(1144 f_h) = 55.56 \text{ ns}$$



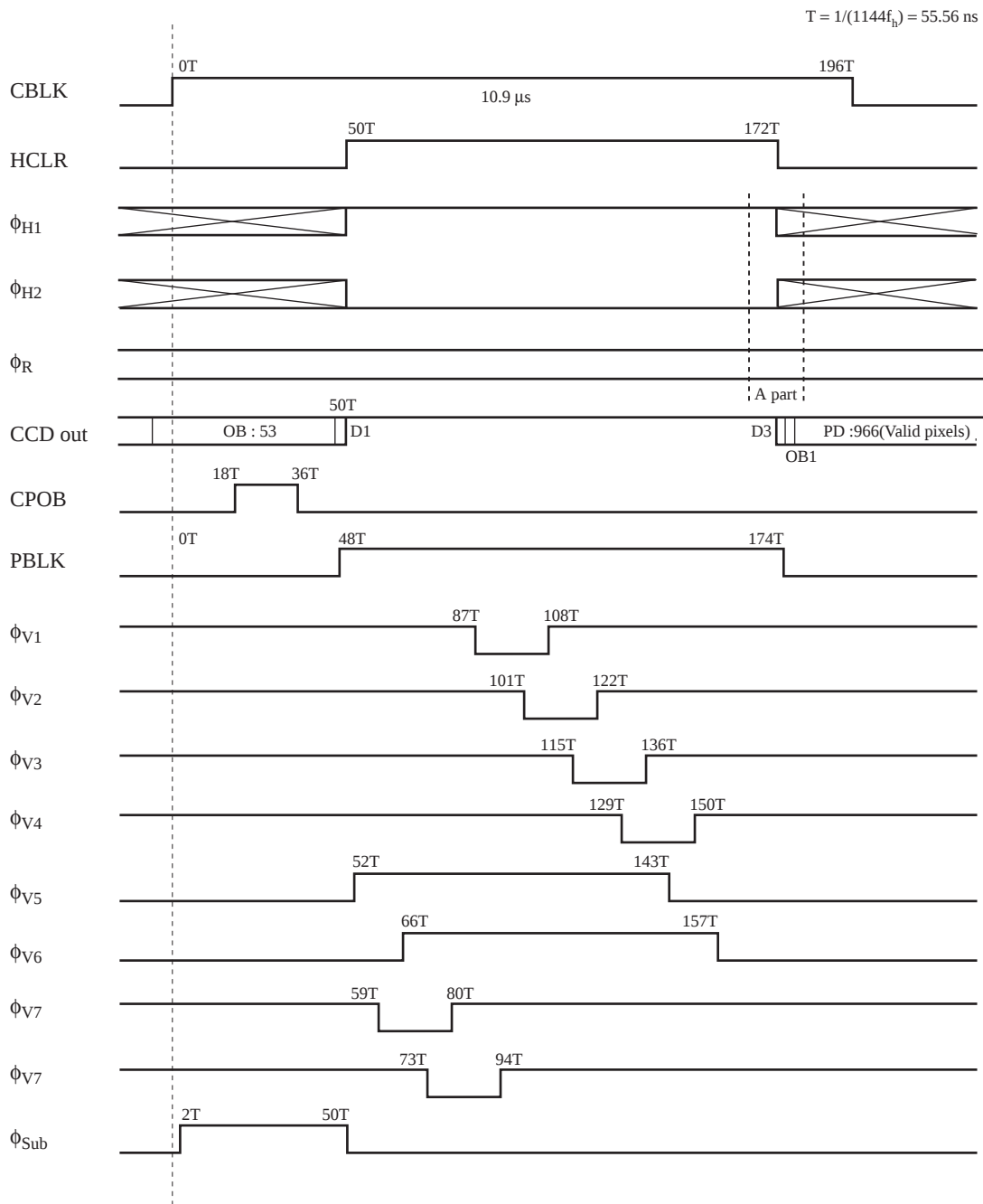
< Field B >

$$T = 1/(1144 f_h) = 55.56 \text{ ns}$$



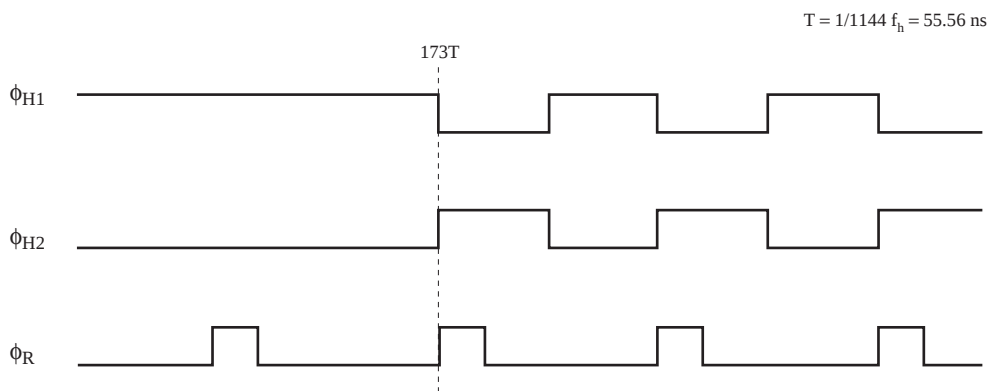
■ Timing Diagram (Squeeze 16 : 9)(continued)

- Horizontal timing chart



■ Timing Diagram (Squeeze 16 : 9)(continued)

- Horizontal timing chart A part details



■ Package Dimensions (Unit : mm)

- WDIP020-C-0600D

