SHARP

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To ;

REQUEST FOR CONFIRMATION

SPECIFICATIONS

Product Type Single chip drive IC (270K/320K pixels B/W CCD)

Model No. LZ9GG33M

※This specifications contains 58 pages including the cover and appendix.
If you have any objections, please contact us before issuing purchasing order.

CUSTOMERS ACCEPTANCE

DATE:

BY:

PRESENTED

BY: Y. Kusano

Y. KUSANO
Dept. General Manager

REVIEWED BY: A. Tokemo

PREPARED BY: S. Inoue

Engineering Dept. 3
Logic IC Engineering Center
Tenri Integrated Circuits Group
SHARP CORPORATION

OFFICIAL DATE
TENRI GROUP

LZ9GG33M

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  (1) The products covered herein are designed and manufactured for the following application areas. When using the products covered herein for the equipment listed in Paragraph (2), even for the following application areas, be sure to observe the precautions given in Paragraph (2). Never use the products for the equipment listed in Paragraph (3).
  - ·Office electronics
  - ·Instrumentation and measuring equipment
  - ·Machine tools
  - ·Audiovisual equipment
  - ·Home appliances
  - ·Communication equipment other than for trunk lines

  (2) Those contemplating using the products covered herein for the following equipment which demands high reliability, should first contact a sales representative of the company and then accept responsibility for incorporating into the design fail-safe operation, redundancy, and other appropriate measures for ensuring reliability and safety of the equipment and the overall system.
  - ·Control and safety devices for airplanes, trains, automobiles, and other transportation equipment
  - ·Mainframe computers
  - ·Traffic control systems
  - ·Gas leak detectors and automatic cutoff devices
  - ·Rescue and security equipment
  - ·Other safety devices and safety equipment, etc.

  (3) Do not use the products covered herein for the following equipment which demands extremely high performance in terms of functionality, reliability, or accuracy.
  - ·Aerospace equipment
  - ·Communications equipment for trunk lines
  - ·Control equipment for the nuclear power industry
  - ·Medical equipment related to life support, etc.

  (4) Please direct all queries and comments regarding the interpretation of the above three Paragraphs to a sales representative of the company.

- Please direct all queries regarding the products covered herein to a sales representative of the company.

CONTENTS

1. General

The LZ9GG33M is a CMOS gate array LSI. It generates timing pulses for driving a CCD area sensor which has 270,000 or 320,000 pixels, synchronous pulse for TV signals and processing for video signals.

1-1. Features

* The package material is plastic.
* A p-type silicon circuit board is used.
* The package type is 48-pin QFP (0.5mm pin-pitch).
* The process (structure) is CMOS.
* The delay time per 1 gate is 0.9ns.
* Not designed or rated as radiation hardened.

1-2. Functions

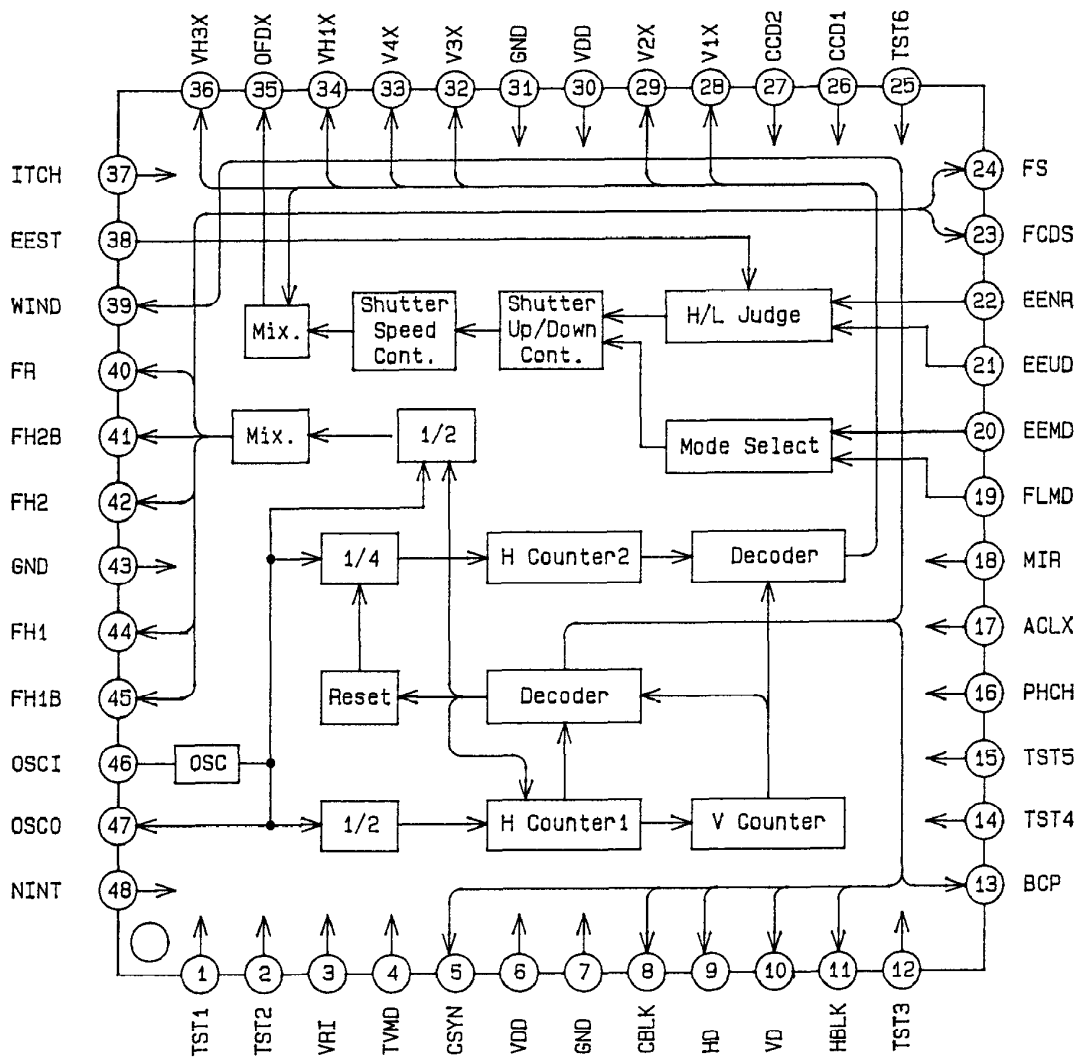
* Designed for CCD monochrome area sensor with 270,000 or 320,000 pixels.
* Switchable between EIA and CCIR mode.
* Single +5V power supply.
* Electronic shutter and EE control is possible.
* Mirror image control function is possible.
* Four-power supply operation CCD mode (TypeA, TypeB) and Two-power supply operation CCD mode is possible.
* Fild accumulation mode and Frame accumuration mode is possible in the Four-power supply operation CCD.
* To select the following max. shutter speed is possible in the Two-power supply operation CCD.
  about 1/100,000s , 1/56,000s , 1/32,000s and 1/11,000s

2. Pin Assignment

PIN NO.	I/O	SIGNAL	PIN NO.	I/O	SIGNAL
1	ICD	TST1	25	ICD	TST6
2	ICD	TST2	26	ICU	CCD1
3	ICSU	VRI	27	ICU	CCD2
4	ICU	TVMD	28	O6MA2	V1X
5	O	CSYN	29	O6MA2	V2X
6	–	VDD	30	–	VDD
7	–	GND	31	–	GND
8	O	CBLK	32	O6MA2	V3X
9	O	HD	33	O6MA2	V4X
10	O	VD	34	O	VH1X
11	O	HBLK	35	O	OFDX
12	ICD	TST3	36	O	VH3X
13	O	BCP	37	ICU	ITCH
14	ICD	TST4	38	ICU	EEST
15	ICD	TST5	39	ON	WIND
16	ICU	PHCH	40	O6MA3	FR
17	ICU	ACLX	41	O6MA2	FH2B
18	ICU	MIR	42	O6MA3	FH2
19	ICU	FLMD	43	–	GND
20	ICU	EEMD	44	O6MA3	FH1
21	IC	EEUD	45	O6MA2	FH1B
22	IC	EENR	46	OSCI	OSCI
23	O6MA2	FCDS	47	OSCO	OSCO
24	O6MA2	FS	48	ICD	NINT

IC : Input (CMOS level)
ICU : Input (CMOS level with pull-up resister)
ICSU : Input (CMOS schmitt-trigger level with pull-up resister)
ICD : Input (CMOS level with pull-down resister)
O : Output
O6MA2 : Output
O6MA3 : Output
ON : Output(N-ch open drain)
OSCI : Input pin for oscillation
OSCO : Output pin for oscillation

3. Block Diagram



4. Pin Description

4-1. Pin description

No.	Symbol	I/O	Pol.	Pin Name	Description
1	TST1	ICD	–	Test terminal 1	A test pin. Set open or to L level in the normal mode.
2	TET2	ICD	–	Test terminal 2	A test pin. Set open or to L level in the normal mode.
3	VRI	ICSU	–	Vertical reset input	An input pin for resetting internal Ver. counter. The input pulse is VSYNC. (negative Polarity)
4	TVMD	ICU	–	TV mode select	An input pin to select TV standards. L level ; NTSC mode H level or open : PAL mode
5	CSYN	O	⊓	Composite syncronizing pulse	Composite sync. signal output pin.
6	VDD	-	–	Power supply	Supply +5 V power.
7	GND	-	–	Ground	A grounding pin.
8	CBLK	O	⊓	Composite blanking pulse	Composite blanking pulse.
9	HD	O	⊓	Hor. drive pulse	The pulse occurs at the start of lines.
10	VD	O	⊓	Ver. drive pulse	The pulse occurs at the start of every fields.
11	HBLK	O	⊓	Hor. blanking pulse	A pulse that correspondes to the cease period of the Hor. transfer pulse.
12	TST3	ICD	–	Test terminal 3	A test pin. Set open or to L level in the normal mode.
13	BCP	O	⊓	Optical black clamp pulse	A pulse to clamp the optical black signal. This pulse stays low during the absence of effective pixels within the ver. blanking.
14	TST4	ICD	–	Test terminal 4	A test pin. Set open or to L level in the normal mode.
15	TST5	ICD	–	Test terminal 5	A test pin. Set open or to L level in the normal mode.
16	PHCH	ICU	–	Hor. drive pulse control input	An inout pin to control Hor. drive pulses FH1 (pin 44), FH1B(pin 45), FH2(pin42) and FH2B(pin41). H level or open : continuous pulse L level : discontinuous pulse
17	ACLX	ICU	–	All clear input	An input pin for resetting all internal circuit at power on.

<table>
<tr><th>No.</th><th>Symbol</th><th>I/O</th><th>Pol.</th><th>Pin Name</th><th>Description</th></tr>
<tr><td>18</td><td>MIR</td><td>ICU</td><td>−</td><td>Mirror mode select</td><td>An input pin to select Mirror mode or Normal mode.
L level : Normal drive mode
H level or open : Mirror drive mode
<table><tr><th>MIR</th><th>L
(Normal mode)</th><th>H or open
(Mirror mode)</th></tr><tr><td>FH1B</td><td>≒FH1</td><td>≒FH2</td></tr><tr><td>FH2B</td><td>≒FH2</td><td>≒FH1</td></tr></table></td></tr>
<tr><td>19</td><td>FLMD</td><td>ICU</td><td>−</td><td>Electronic Exposure and WIND pulse control 1</td><td rowspan="2">An input pin to control Electoronic Exposure mode, Flickerless mode and WIND(pin39) pulse output.
<table><tr><th>EEMD</th><th>FLMD</th><th>Elecioronic Shutter mode</th><th>WIND</th></tr><tr><td>L</td><td>L</td><td>1/ 60s (CCIR:1/ 50s)</td><td>WIND1</td></tr><tr><td>L</td><td>H</td><td>1/100s (CCIR:1/120s)</td><td>WIND1</td></tr><tr><td>H</td><td>L</td><td>Electoronic Exposure mode</td><td>WIND1</td></tr><tr><td>H</td><td>H</td><td>Electoronic Exposure mode</td><td>WIND2</td></tr></table>WIND1:Vertical pulse
WIND2:Composit pulse (Vertical and Horizontal)</td></tr>
<tr><td>20</td><td>EEMD</td><td>ICU</td><td>−</td><td>Electronic Exposure and WIND pulse control 2</td></tr>
<tr><td>21</td><td>EEUD</td><td>IC</td><td>−</td><td>Electronic Exposure control 1</td><td rowspan="2">An input pin to control Electronic Exposure.
<table><tr><th>EEUD</th><th>EENR</th><th>Shutter speed</th></tr><tr><td>H</td><td>L</td><td>up</td></tr><tr><td>H</td><td>H</td><td>control stopped</td></tr><tr><td>L</td><td>H</td><td>down</td></tr></table></td></tr>
<tr><td>22</td><td>EENR</td><td>IC</td><td>−</td><td>Electronic Exposure control 2</td></tr>
<tr><td>23</td><td>FCDS</td><td>06MA2</td><td>⎍</td><td>CDS pulse 1</td><td>A pulse to clamp the feed-through level from CCD.</td></tr>
<tr><td>24</td><td>FS</td><td>06MA2</td><td>⎍</td><td>CDS pulse 2</td><td>A pulse to sample-hold the signal from CCD.</td></tr>
<tr><td>25</td><td>TST6</td><td>ICD</td><td>−</td><td>Test terminal 6</td><td>A test pin. Set open or to L level in the normal mode.</td></tr>
<tr><td>26</td><td>CCD1</td><td>ICU</td><td>−</td><td rowspan="2">CCD select input</td><td rowspan="2">An input pin to select sensor type, accumulation mode and max. shutter speed, with using ITCH (pin 37). See 4-2-2.</td></tr>
<tr><td>27</td><td>CCD2</td><td>ICU</td><td>−</td></tr>
<tr><td>28</td><td>V1X</td><td>06MA2</td><td>⎎</td><td>Ver. transfer pulse 1</td><td rowspan="2">A vertical transfer pulse for CCD.
4-power CCD ; Connect to 1AX, 2AX pin of ver. driver IC.
2-power CCD ; connect to φV1, φV2 pin of CCD.</td></tr>
<tr><td>29</td><td>V2X</td><td>06MA2</td><td>⎎</td><td>Ver. transfer pulse 1</td></tr>
<tr><td>30</td><td>VDD</td><td>-</td><td>−</td><td>Power supply</td><td>Supply +5 V power.</td></tr>
<tr><td>31</td><td>GND</td><td>-</td><td>−</td><td>Ground</td><td>A grounding pin.</td></tr>
<tr><td>32</td><td>V3X</td><td>06MA2</td><td>⎍</td><td>Ver. transfer pulse 3</td><td rowspan="2">A vertical transfer pulse for CCD.
4-power CCD ; Connect to 3AX, 4AX pin of ver. driver IC.
2-power CCD ; Connect to φV3, φV4 pin of CCD.</td></tr>
<tr><td>33</td><td>V4X</td><td>06MA2</td><td>⎍</td><td>Ver. transfer pulse 4</td></tr>
</table>

※ 4-power CCD ; four-power supply operation CCD

※ 2-power CCD ; two-power supply operation CCD

No.	Symbol	I/O	Pol.	Pin Name	Description
34	VH1X	O	⊓	Read out pulse	A pulse that transfers the charge of the photo-diode to the vertical sift resister. 4-power CCD ; Connect to the 1BX pin of the Ver. driver. 2-power CCD ; Connect to the VTG pin of CCD through the invert and level sift circuit.
35	OFDX	O	⊓	OFG pulse output	A pulse that sweeps the charge of the photodiode for electrical shutter. Conect to OFD of CCD through the invert, level shift and DC offset circuit. Held at H level at normal mode.
36	VH3X	O	⊓	Read out pulse	A pulse that transfers the charge of the photo-diode to the vertical siftresister. 4-power CCD ; Connect to the 3BX pin of the Ver. driver. 2-power CCD ; Not use.
37	ITCH	ICU	–	Accumuration mode select	An input pin to select sensor type accumulation mode and max. shutter speed, with using CCD1 (pin 26) and CCD2 (pin 27).
38	EEST	ICU	–	Electronic Exposure control 3	An input pin to control Electronic Exposure, with using EEUD(pin 21) and EENR(pin 22). L level : Electronic Exposure is stopped. H level or open : Electronic Exposure is operated
39	WIND	ON N-ch Open Drain	⊓	Window pulse	A pulse for window pulse. EEMD / FLMD / WIND L / L / WIND1 (vertical pulse) L / H / WIND1 (vertical pulse) H / L / WIND1 (vertical pulse) H / H / WIND2 (composit pulse) WIND1 ; When conected to EEST(pin 38), the operation of Electronic Exposure can be stopped at the upper side of monitor. WIND2 ; A pulse that pick out the center of CCD output. At this time, set H level or open at EEST (pin 38). As the output circuit of WIND is N-ch open drain, connect to VDD with R(≧47kΩ).

※ 4-power CCD ; four-power supply operation CCD

※ 2-power CCD ; two-power supply operation CCD

No.	Symbol	I/O	Pol.	Pin Name	Description
40	FR	O6MA3	⎍	Reset pulse	A reset pulse for CCD. Connect to ϕR of CCD through the D.C. offset circuit.
41	FH2B	O6MA2	⎍	Hor. transfer pulse 2B	A horizontal transfer pulse for CCD. Connect to ϕH2B of CCD.
42	FH2	O6MA3	⎍	Hor. transfer pulse 2	A horizontal transfer pulse for CCD. Connect to ϕH2 of CCD.
43	GND	-	—	Ground	A grounding pin.
44	FH1	O6MA3	⎍	Hor. transfer pulse 1	A horizontal transfer pulse for CCD. Connect to ϕH1 of CCD.
45	FH1B	O6MA2	⎍	Hor. transfer pulse 1B	A horizontal transfer pulse for CCD. Connect to ϕH1B of CCD.
46	OSCI	OSCI	—	Clock input	An input pin for reference clock oscillation. Connect to OSCO(pin 47) with R. The frequencies are as follows : at EIA mode : 19.0699MHz (1212fH) at CCIR mode : 19.3125MHz (1236fH) fH=Hor. frequency
47	OSCO	OSCO	—	Clock output	An output pin for reference clock oscillation. The output is the inverse OSCI(pin 46).
48	NINT	ICD	—	Non-interlace select	An input pin to select non-interlace mode. L level : Interlace mode H level or open : Non-interlace mode Period of Field (at non-interlace mode)

TV mode	Field	number of line
EIA	ODD	262H
CCIR	1st	312H

4-2. Supplementary explanation

4-2-1. Shutter speed changes at Electronic Exposure control mode.

EIA			CCIR		
No.	Charge time	shutter speed	No.	Charge time	shutter speed
0	262H or 263H	≒1/ 60s	0	312H or 313H	≒1/ 50s
1	252H+α	1/ 62s	1	302H+β	1/ 52s
・	(by 10H step)		・	(by 10H step)	
19	72H+α	1/ 220s	24	72H+β	1/ 220s
・	(by 4H step)		・	(by 4H step)	
30	28H+α	1/ 555s	35	28H+β	1/ 550s
・	(by 2H step)		・	(by 2H step)	
37	14H+α	1/ 1,100s	42	14H+β	1/ 1,090s
・	(by 1H step)		・	(by 1H step)	
44	7H+α	1/ 2,140s	49	7H+β	1/ 2,125s
・	(by 0.5H step)		・	(by 0.5H step)	
50	4H+α	1/ 3,610s	55	4H+β	1/ 3,590s
・	(by 0.25H step)		・	(by 0.25H step)	
62	1H+α	1/ 11,570s	67	1H+β	1/ 11,550s
・	(by 0.125H step)		・	(by 0.125H step)	
69	0.125H+α	1/ 32,450s	74	0.125H+β	1/ 32,690s
70	0.280H	1/ 56,090s	75	0.275H	1/ 56,800s
71	0.155H	1/101,430s	76	0.152H	1/102.720s

α=0.360H β=0.353H

4-2-2. Select sensor type, accumulation mode, max. shutter speed.

CCD 1	CCD 2	ITCH	CCD type		accumuiation	max. shutter speed(s)			
pin 26	pin 27	pin 37			mode	No.	EIA	No.	CCIR
L	L	L	4 power CCD	A	Frame	71	≒1/101,430	76	≒1/102,720
L	L	H	4 power CCD	A	Field	71	≒1/101,430	76	≒1/102,720
H	L	L	4 power CCD	B	Frame	71	≒1/101,430	76	≒1/102,720
H	L	H	4 power CCD	B	Field	71	≒1/101,430	76	≒1/102,720
L	H	L	2 power CCD	−	Field	71	≒1/101,430	76	≒1/102,720
L	H	H	2 power CCD	−	Field	69	≒1/ 32,450	74	≒1/ 32,690
H	H	L	2 power CCD	−	Field	70	≒1/ 56,090	75	≒1/ 56,800
H	H	H	2 power CCD	−	Field	62	≒1/ 11,570	67	≒1/ 11,550

4 power CCD A type ; LZ2314J/LZ2324J, LZ23142J/LZ23242J
4 power CCD B type ; LZ2314HJ/LZ2324HJ, LZ2414AJ/LZ2424AJ
2 power CCD ; LZ2316J/LZ2326J

※ 4-power CCD ; four-power supply operation CCD
※ 2-power CCD ; two-power supply operation CCD

5. Electorical Characteristics

5-1. Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage	V_{DD}	−0.3 ~ 6.0	V
Input voltage	V_I	−0.3 ~ V_{DD}+0.3	V
Output voltage	V_O	−0.3 ~ V_{DD}+0.3	V
Operation temperature	T_{opr}	−30 ~ +70	℃
Storage tempetature	T_{stg}	−55 ~ +150	℃

5-2. DC Characteristics (V_{DD}=+5V±10%, T_{opr}=-30~+70℃)

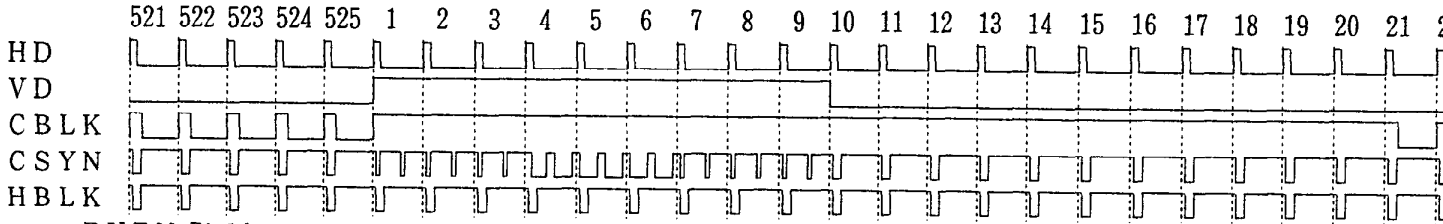
Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit	Note
Input "Low" voltage	V_{IL}				1.5	V	1
Input "High" voltage	V_{IH}		3.5			V	
Input "Low" voltage	V_{T+}				3.7	V	2
Input "High" voltage	V_{T-}		1.0			V	
Hysterisis voltage	$V_{T+}-V_{T-}$		0.2			V	
Input "Low" current	$\lvert I_{IL1} \rvert$	V_I = 0 V			2.0	μA	3
	$\lvert I_{IL2} \rvert$	V_I = 0 V	8.0		75	μA	4
Input "High" current	$\lvert I_{IH1} \rvert$	V_I = V_{DD}			2.0	μA	5
	$\lvert I_{IH2} \rvert$	V_I = V_{DD}	8.0		75	μA	6
Output "High" voltage	V_{OH1}	I_{OH} = −2mA	4.0			V	7
Output "Low" voltage	V_{OL1}	I_{OL} = 4mA			0.4	V	
Output "High" voltage	V_{OH2}	I_{OH} = −6mA	4.0			V	8
Output "Low" voltage	V_{OL2}	I_{OL} = 8mA			0.4	V	
Output "High" voltage	V_{OH3}	I_{OH} = −9mA	4.0			V	9
Output "Low" voltage	V_{OL3}	I_{OL} = 12mA			0.4	V	
Output "Low" voltage	V_{OL4}	I_{OL} = 4mA			0.4	V	10
Leak output current	$\lvert I_{OZ} \rvert$	High-Z			1.0	μA	

Note 1 : Applied to Inputs(IC, ICD, ICU, IBF0).
Note 2 : Applied to Input (ICSU)
Note 3 : Applied to Inputs(IC, ICD, IBF0).
Note 4 : Applied to Inputs(ICU, ICSU).
Note 5 : Applied to Inputs(IC, ICU, IBF0).
Note 6 : Applied to Input (ICD).
Note 7 : Applied to (0, OSC0).
(Output(OSC0) measures on conditions that input(OSCI) level is 0V or V_{DD}.)
Note 8 : Applied to Output(06MA2).
Note 9 : Applied to Output(06MA3).
Note 10 : Applied to Output(ON).

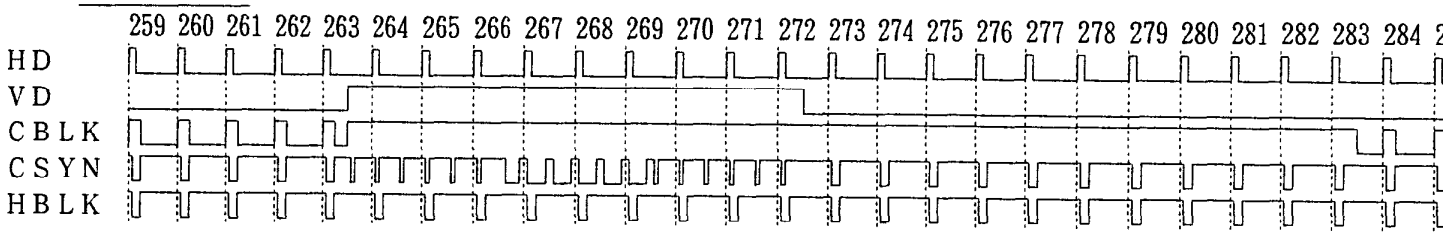
6. Pulse Timing

6-1. Syncronizing vertical pulse (1) NTSC

ODD Field

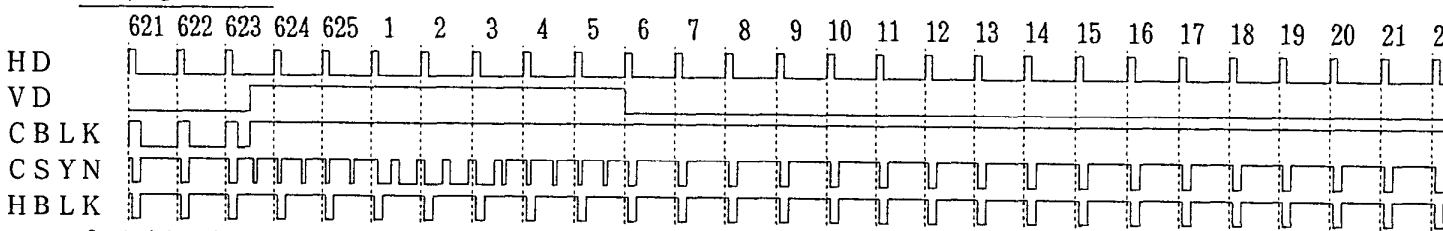


EVEN Field

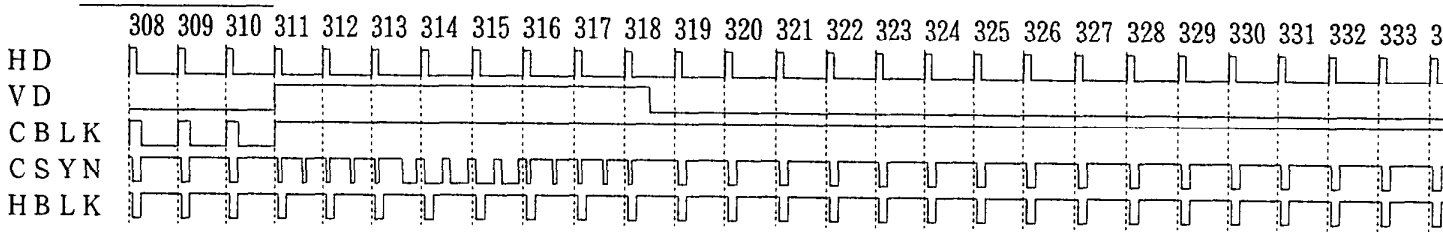


Syncronizing vertical pulse (2) PAL

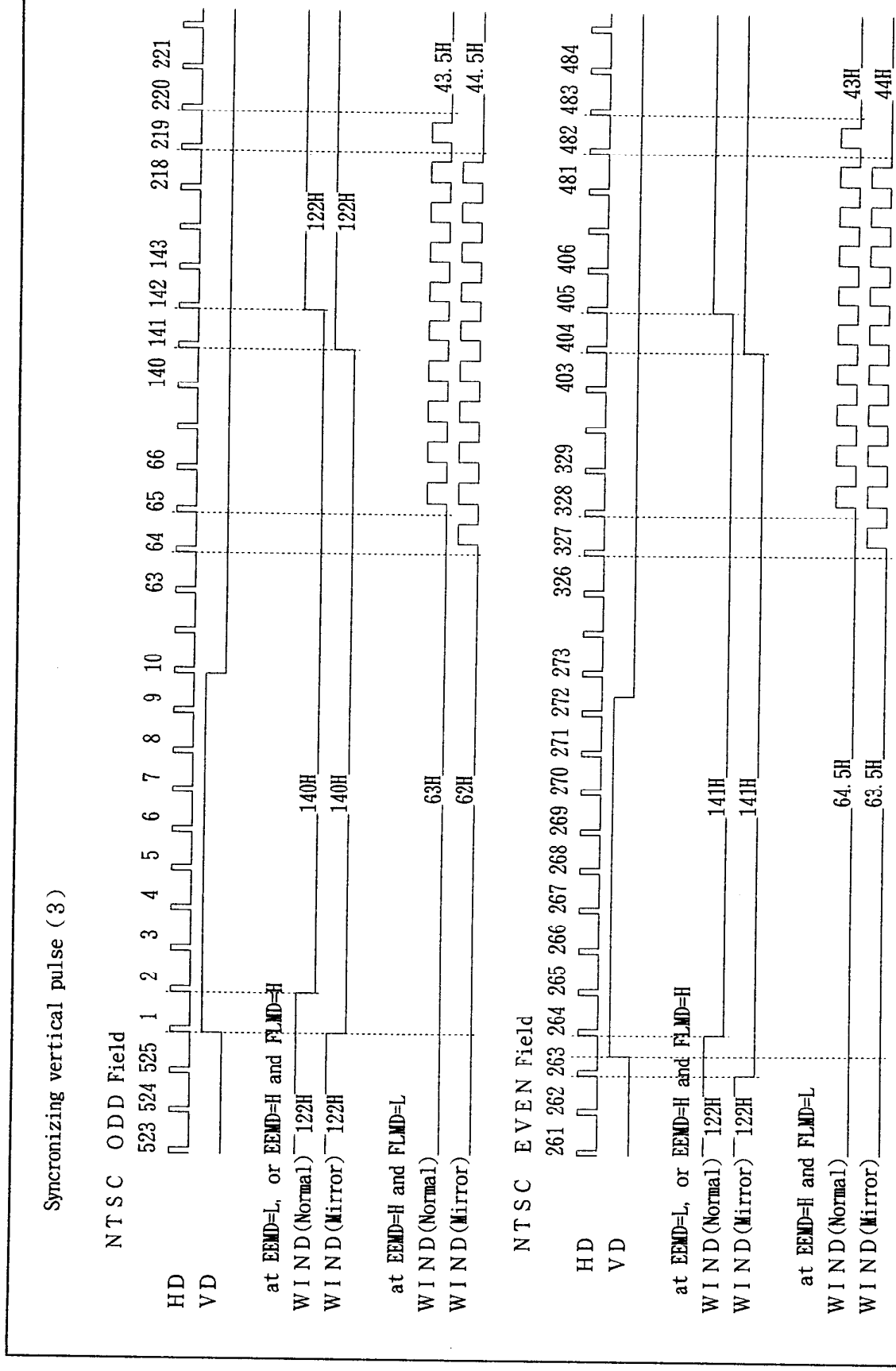
1st/3rd Field



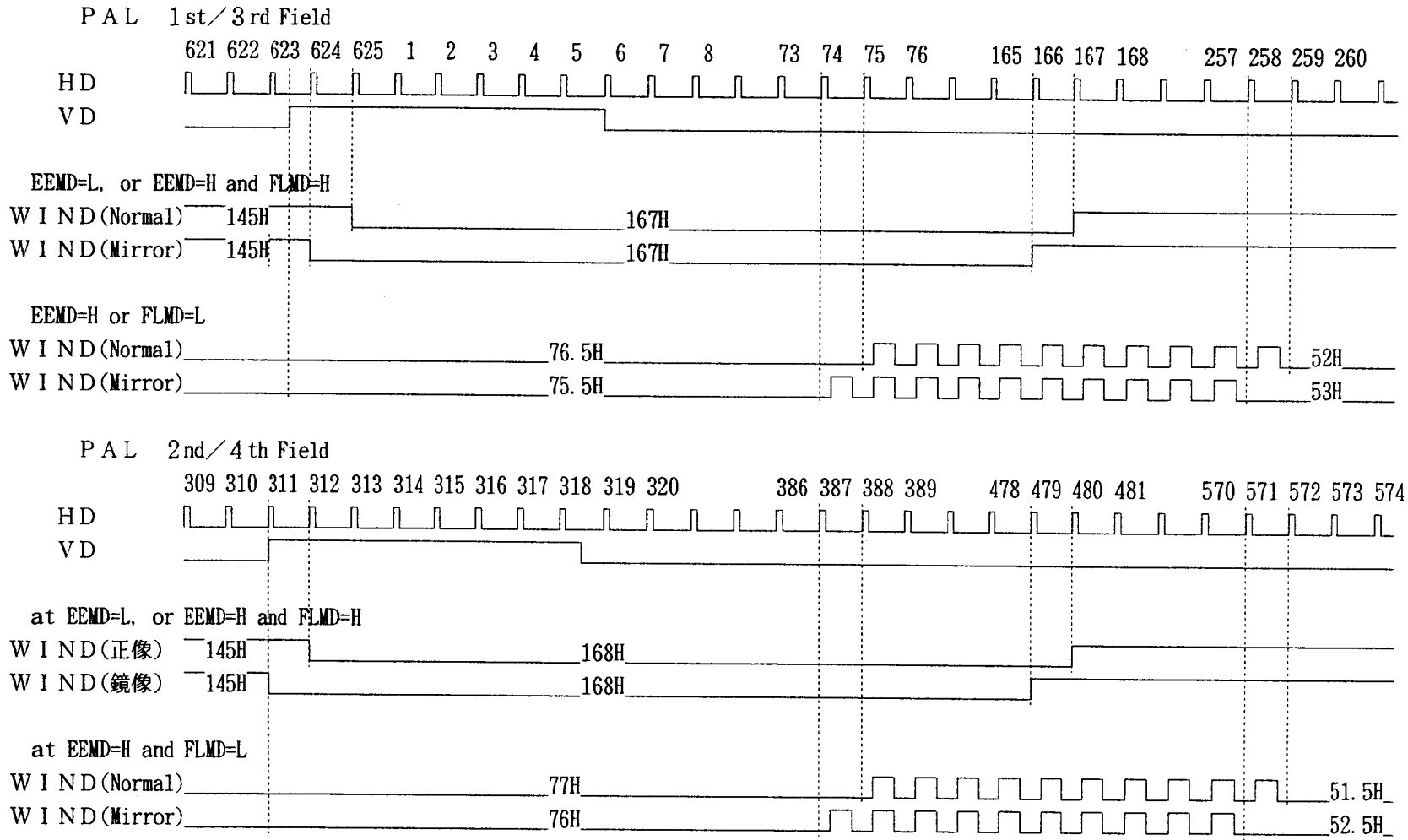
2nd/4th Field



Syncronizing vertical pulse (3)

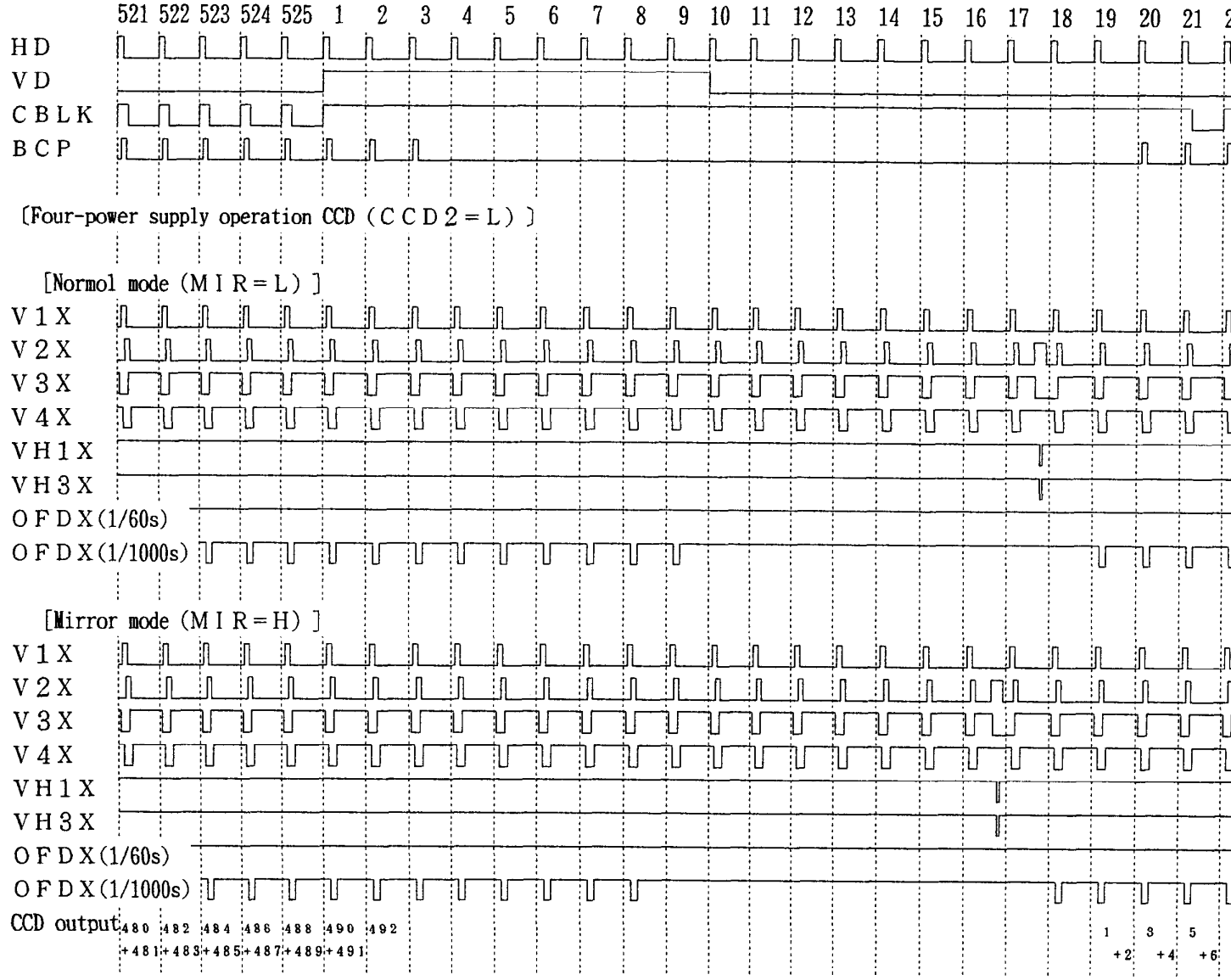


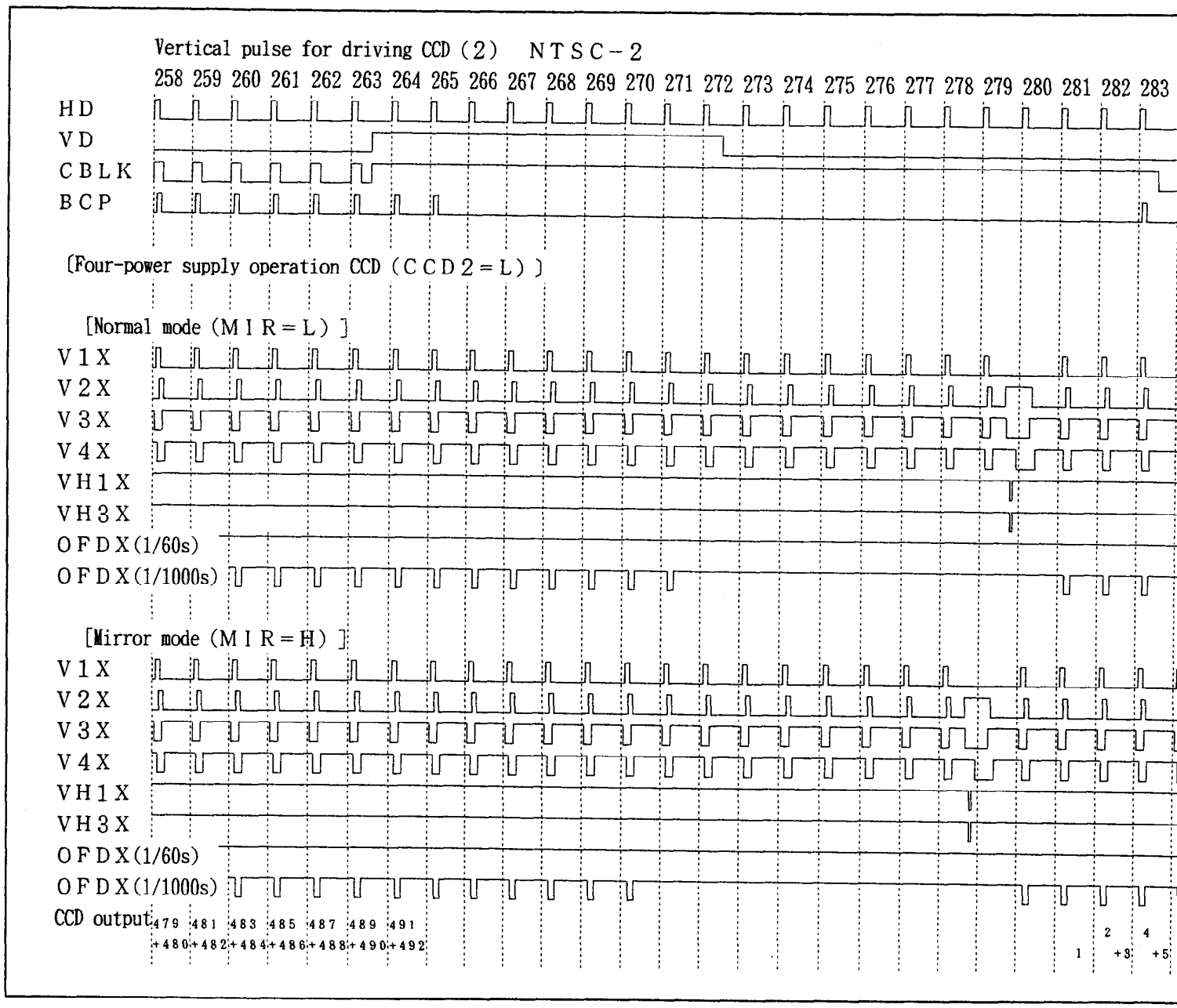
Syncronizing vertical pulse (4)

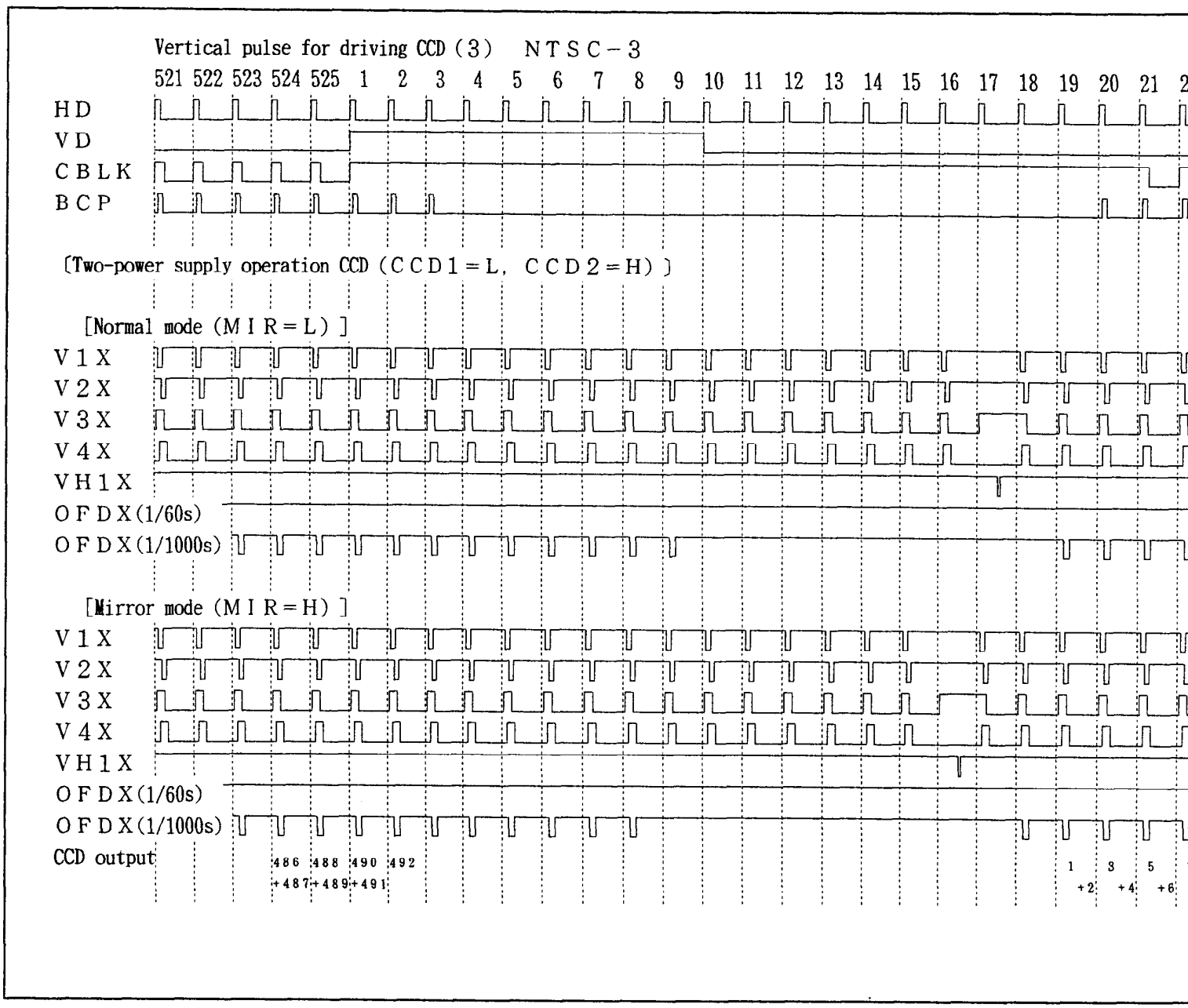


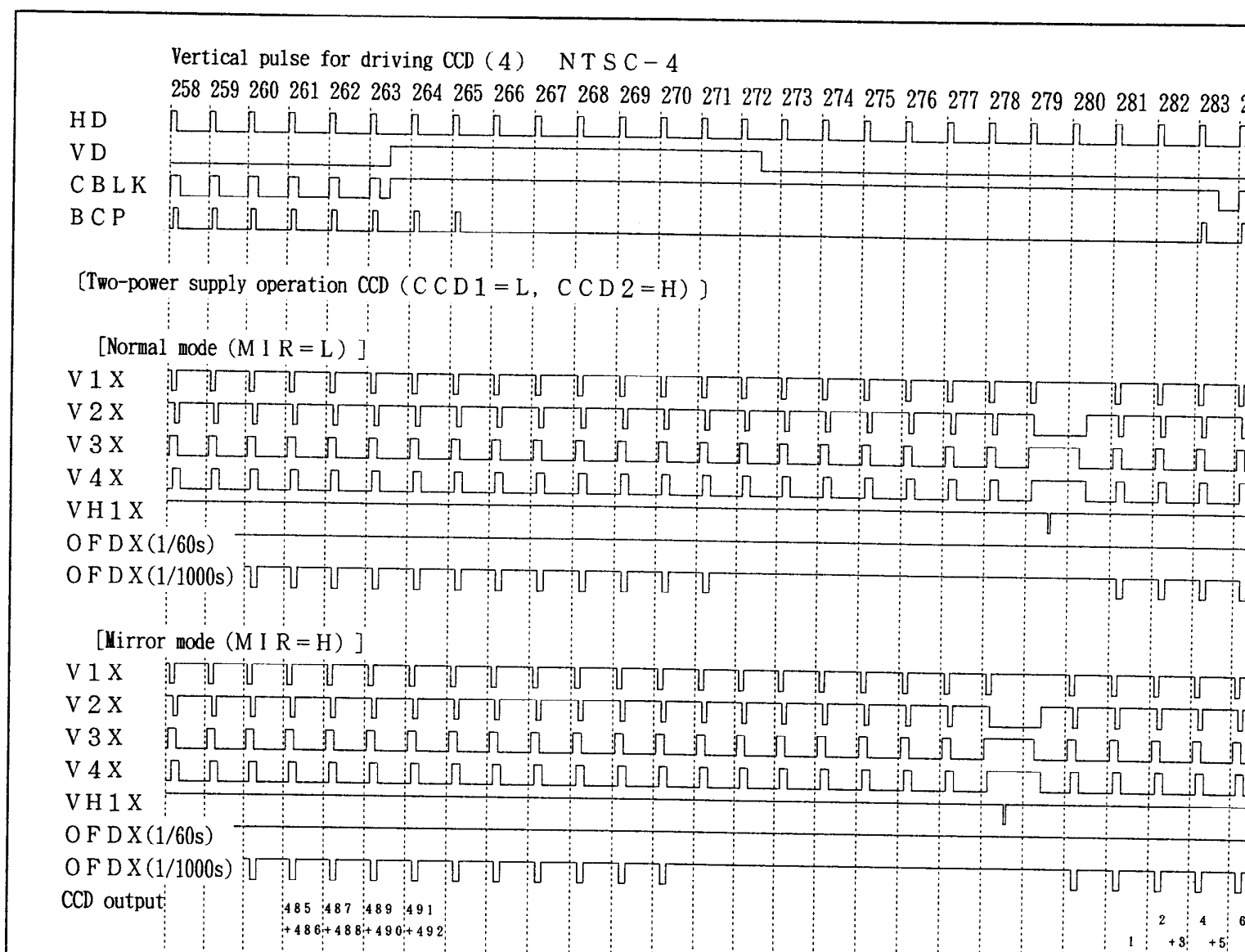
WIND ; N－ch open drain output

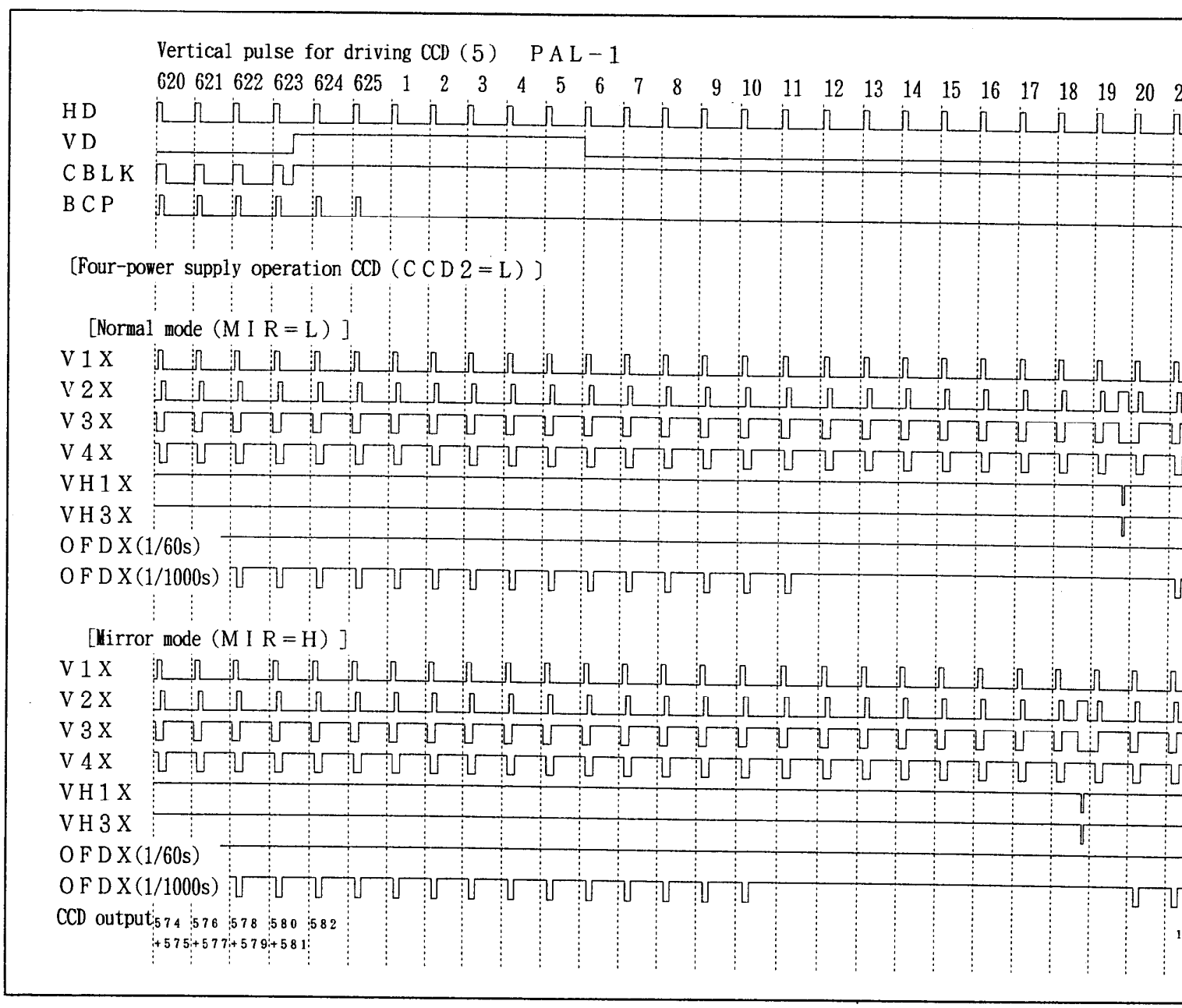
6-2. Vertical pulse for driving CCD (1)　NTSC-1

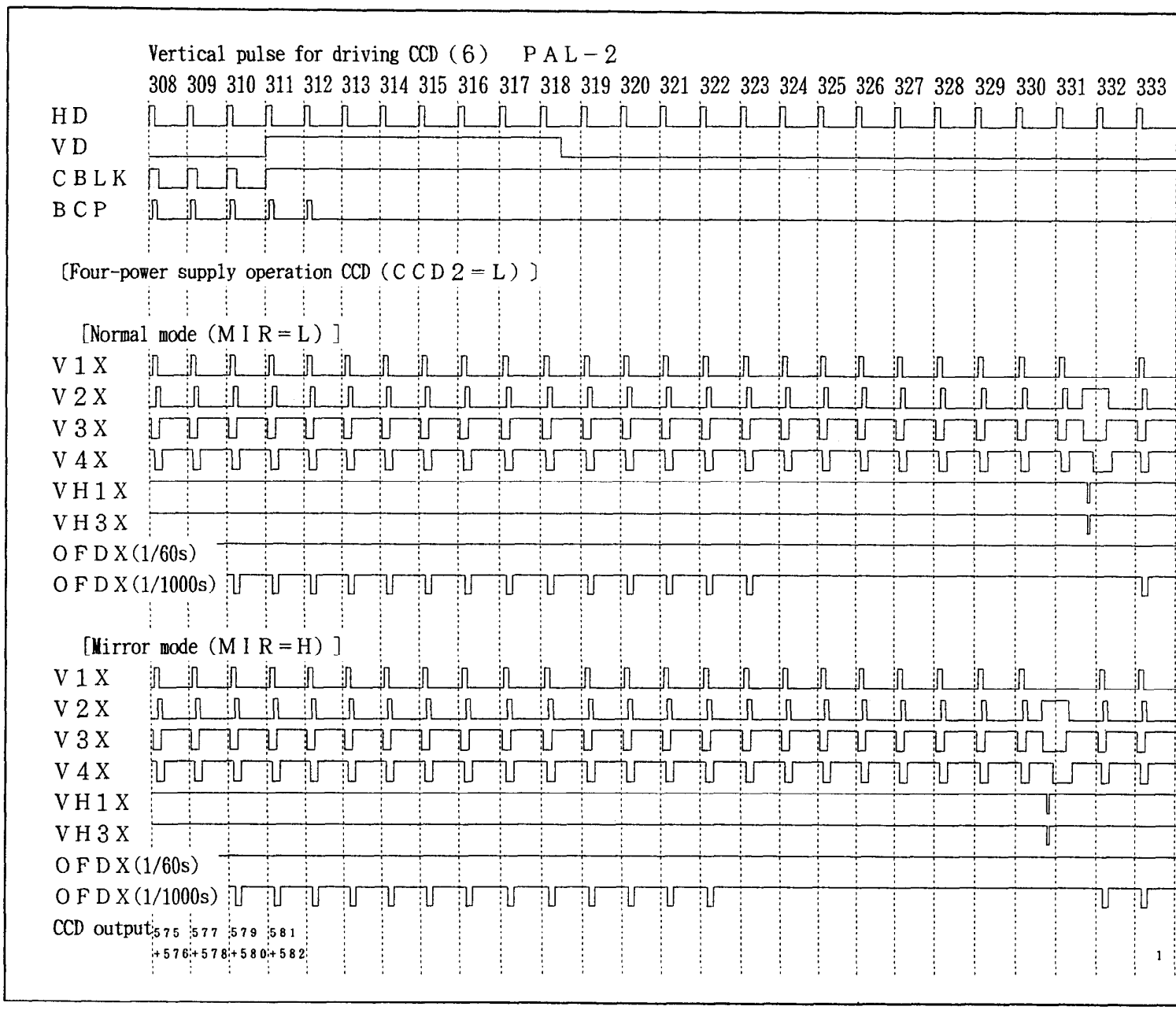


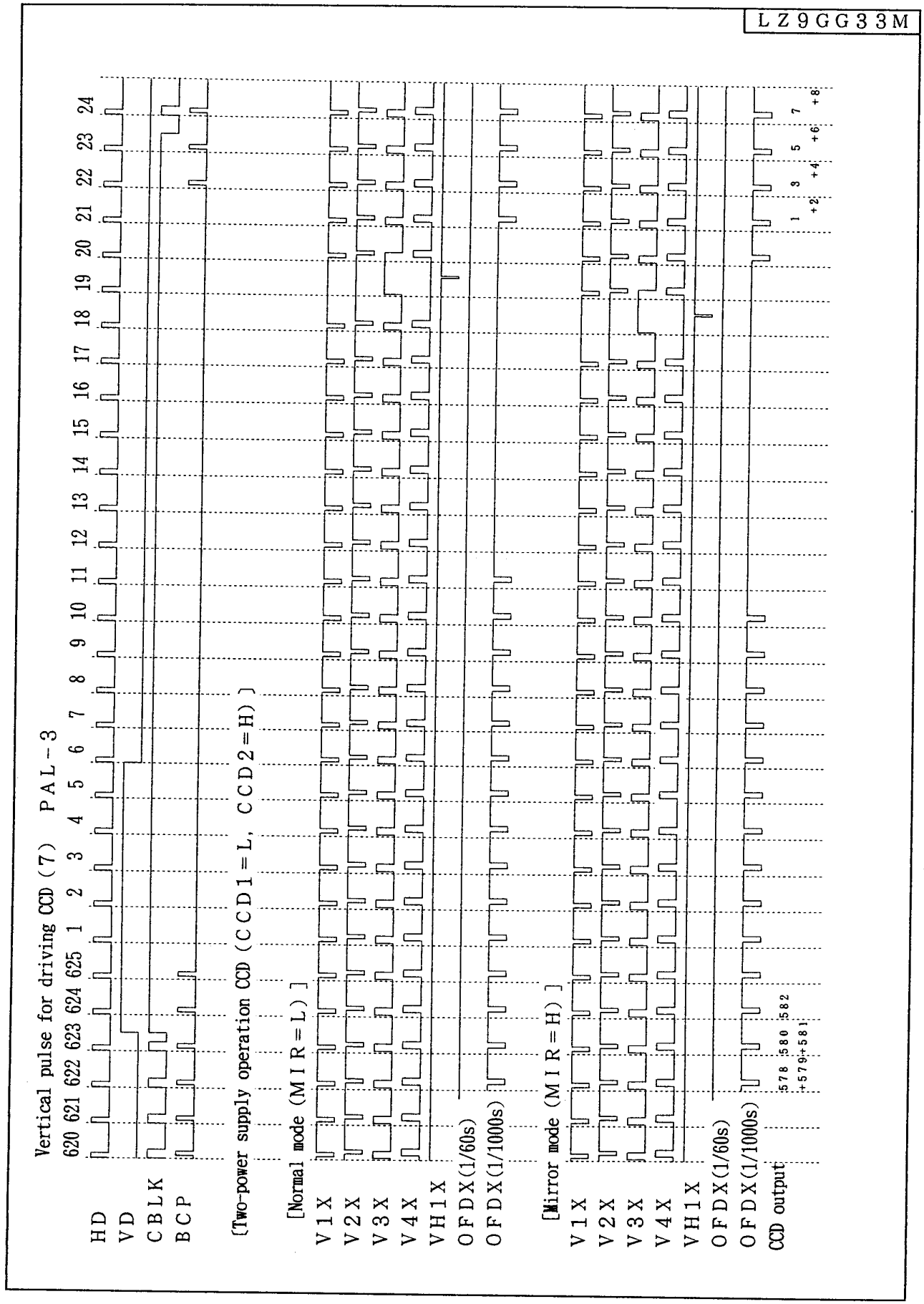

Vertical pulse for driving CCD (2) NTSC-2
258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283
HD
VD
CBLK
BCP
[Four-power supply operation CCD (CCD2=L)]
[Normal mode (MIR=L)]
V1X
V2X
V3X
V4X
VH1X
VH3X
OFDX(1/60s)
OFDX(1/1000s)
[Mirror mode (MIR=H)]
V1X
V2X
V3X
V4X
VH1X
VH3X
OFDX(1/60s)
OFDX(1/1000s)
CCD output
479 481 483 485 487 489 491
+480 +482 +484 +486 +488 +490 +492
1 2 4
+3 +5


Vertical pulse for driving CCD (3) NTSC-3
521 522 523 524 525 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
HD
VD
CBLK
BCP
[Two-power supply operation CCD (CCD1=L, CCD2=H)]
[Normal mode (MIR=L)]
V1X
V2X
V3X
V4X
VH1X
OFDX(1/60s)
OFDX(1/1000s)
[Mirror mode (MIR=H)]
V1X
V2X
V3X
V4X
VH1X
OFDX(1/60s)
OFDX(1/1000s)
CCD output
486 488 490 492
+487 +489 +491
1 3 5
+2 +4 +6

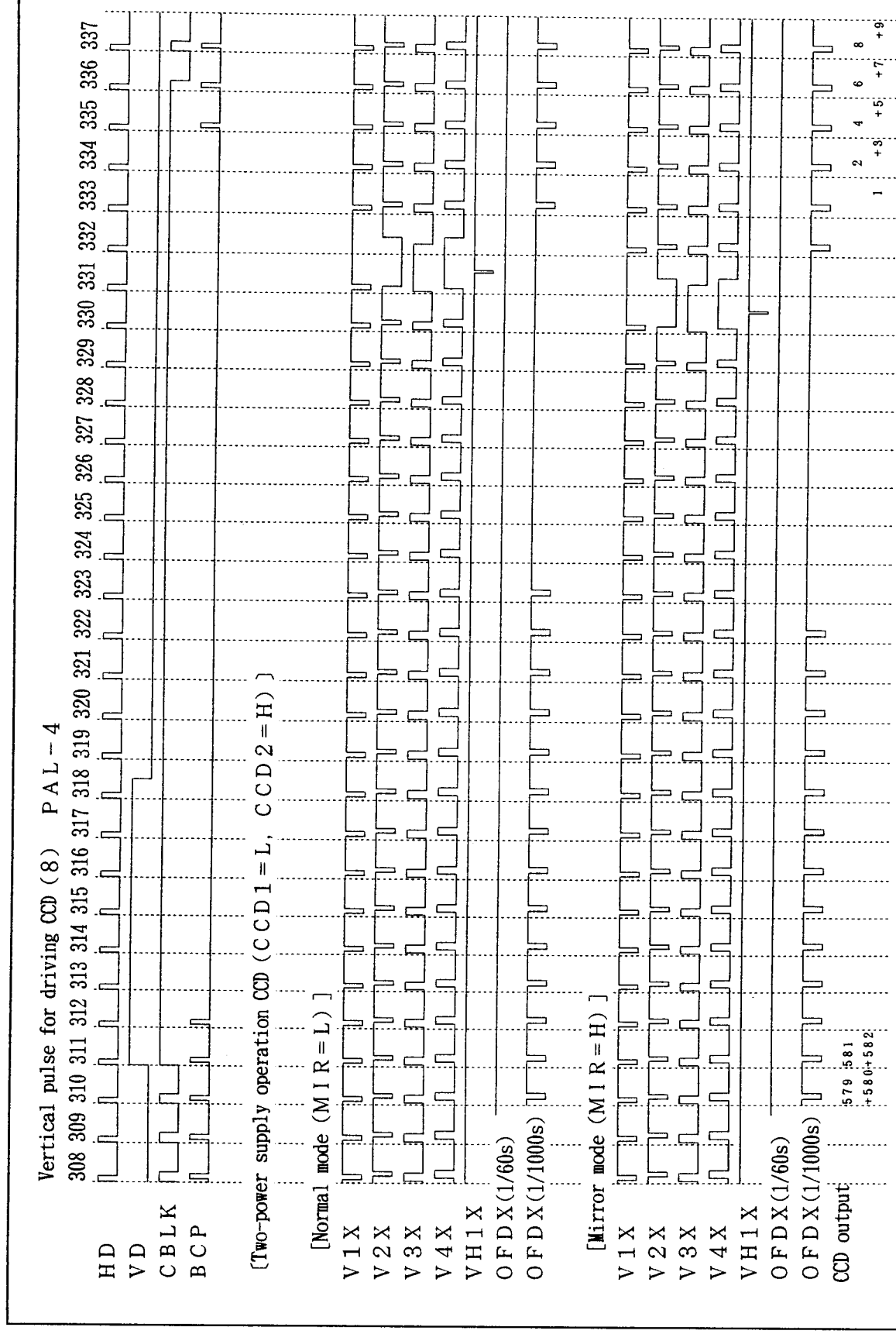

Vertical pulse for driving CCD (4) NTSC-4
258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283
HD
VD
CBLK
BCP
〔Two-power supply operation CCD (CCD1=L, CCD2=H)〕
[Normal mode (MIR=L)]
V1X
V2X
V3X
V4X
VH1X
OFDX(1/60s)
OFDX(1/1000s)
[Mirror mode (MIR=H)]
V1X
V2X
V3X
V4X
VH1X
OFDX(1/60s)
OFDX(1/1000s)
CCD output
485 487 489 491
+486+488+490+492
1 2 4 6
+3 +5


Vertical pulse for driving CCD (5) PAL-1
620 621 622 623 624 625 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
HD
VD
CBLK
BCP
[Four-power supply operation CCD (CCD2=L)]
[Normal mode (MIR=L)]
V1X
V2X
V3X
V4X
VH1X
VH3X
OFDX(1/60s)
OFDX(1/1000s)
[Mirror mode (MIR=H)]
V1X
V2X
V3X
V4X
VH1X
VH3X
OFDX(1/60s)
OFDX(1/1000s)
CCD output
574 576 578 580 582
+575 +577 +579 +581


Vertical pulse for driving CCD (6) PAL-2
308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333
HD
VD
CBLK
BCP
[Four-power supply operation CCD (CCD2=L)]
[Normal mode (MIR=L)]
V1X
V2X
V3X
V4X
VH1X
VH3X
OFDX(1/60s)
OFDX(1/1000s)
[Mirror mode (MIR=H)]
V1X
V2X
V3X
V4X
VH1X
VH3X
OFDX(1/60s)
OFDX(1/1000s)
CCD output
575 577 579 581
+576 +578 +580 +582

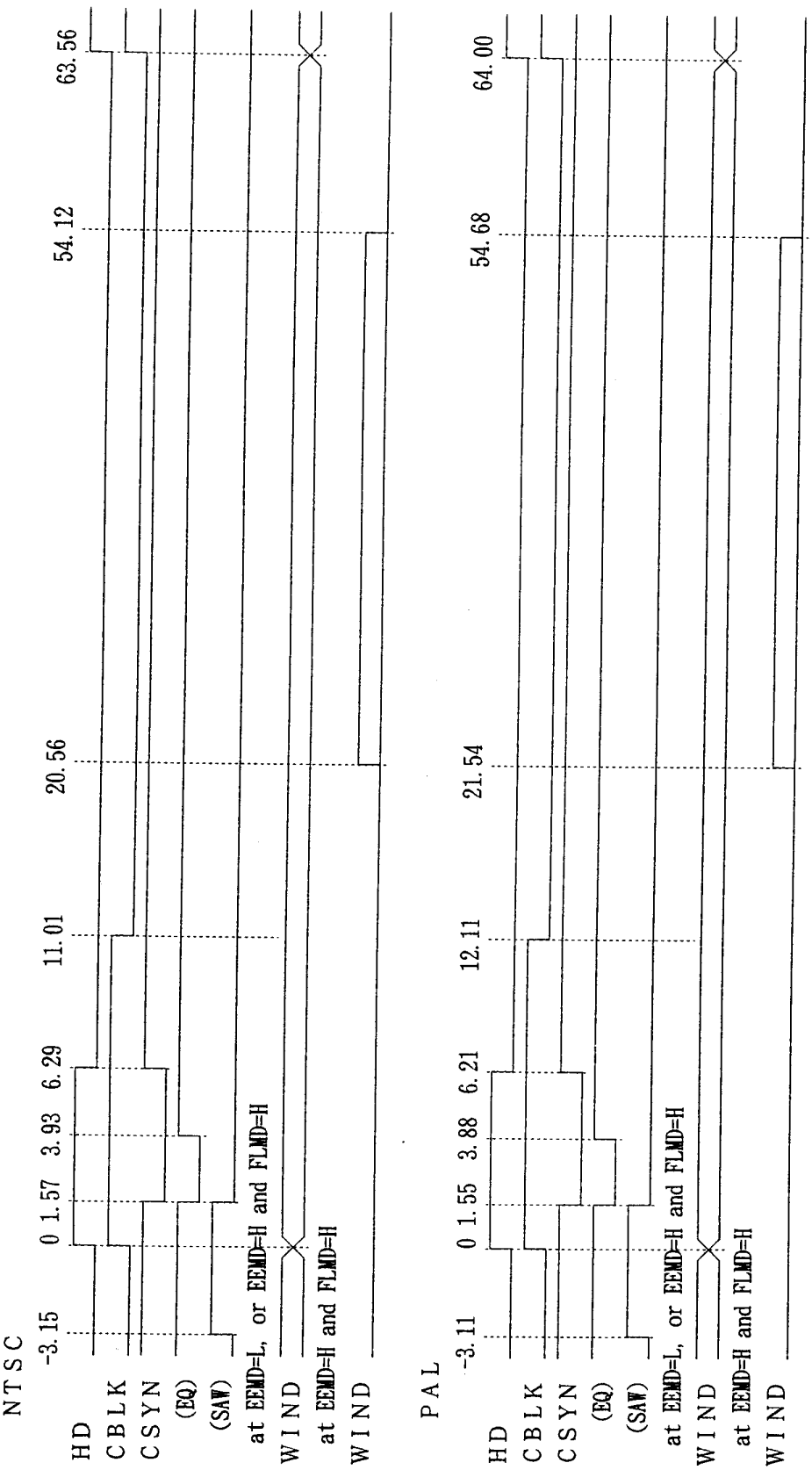

LZ9GG33M
Vertical pulse for driving CCD (7) PAL-3
620 621 622 623 624 625 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
HD
VD
CBLK
BCP
[Two-power supply operation CCD (CCD1=L, CCD2=H)]
[Normal mode (MIR=L)]
V1X
V2X
V3X
V4X
VH1X
OFDX(1/60s)
OFDX(1/1000s)
[Mirror mode (MIR=H)]
V1X
V2X
V3X
V4X
VH1X
OFDX(1/60s)
OFDX(1/1000s)
CCD output
578 580 582
+579+581
1 3 5 7
+2 +4 +6 +8

LZ9GG33M


Vertical pulse for driving CCD (8) PAL-4
308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337
HD
VD
CBLK
BCP
〔Two-power supply operation CCD (CCD1=L, CCD2=H)〕
〔Normal mode (MIR=L)〕
V1X
V2X
V3X
V4X
VH1X
OFDX(1/60s)
OFDX(1/1000s)
〔Mirror mode (MIR=H)〕
V1X
V2X
V3X
V4X
VH1X
OFDX(1/60s)
OFDX(1/1000s)
CCD output
579 581
+580 +582
1 2 4 6 8
+3 +5 +7 +9

6-3. Syncronizing horizontal pulse

Unit ; μs

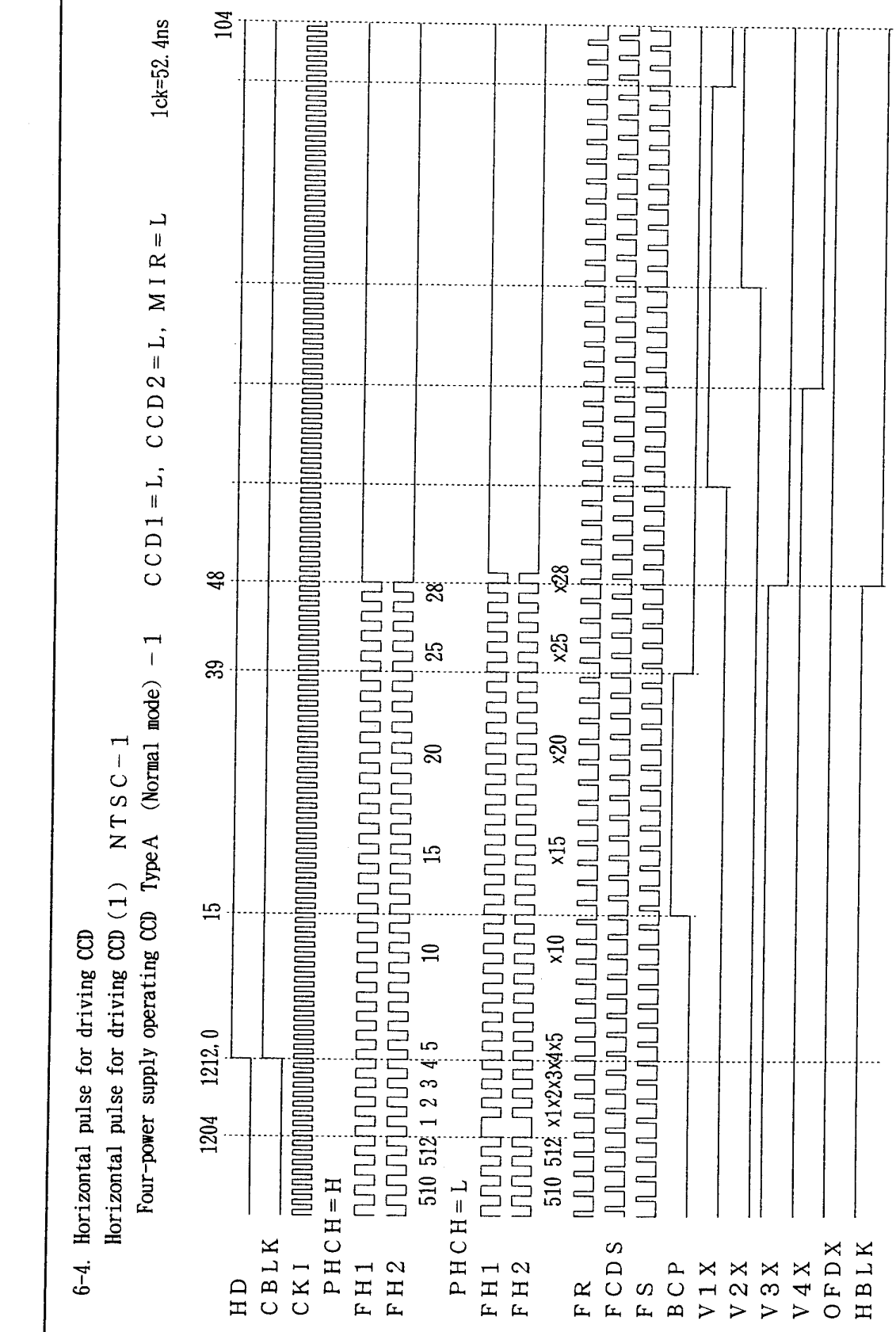


WIND ; N-ch open drain output

6-4. Horizontal pulse for driving CCD

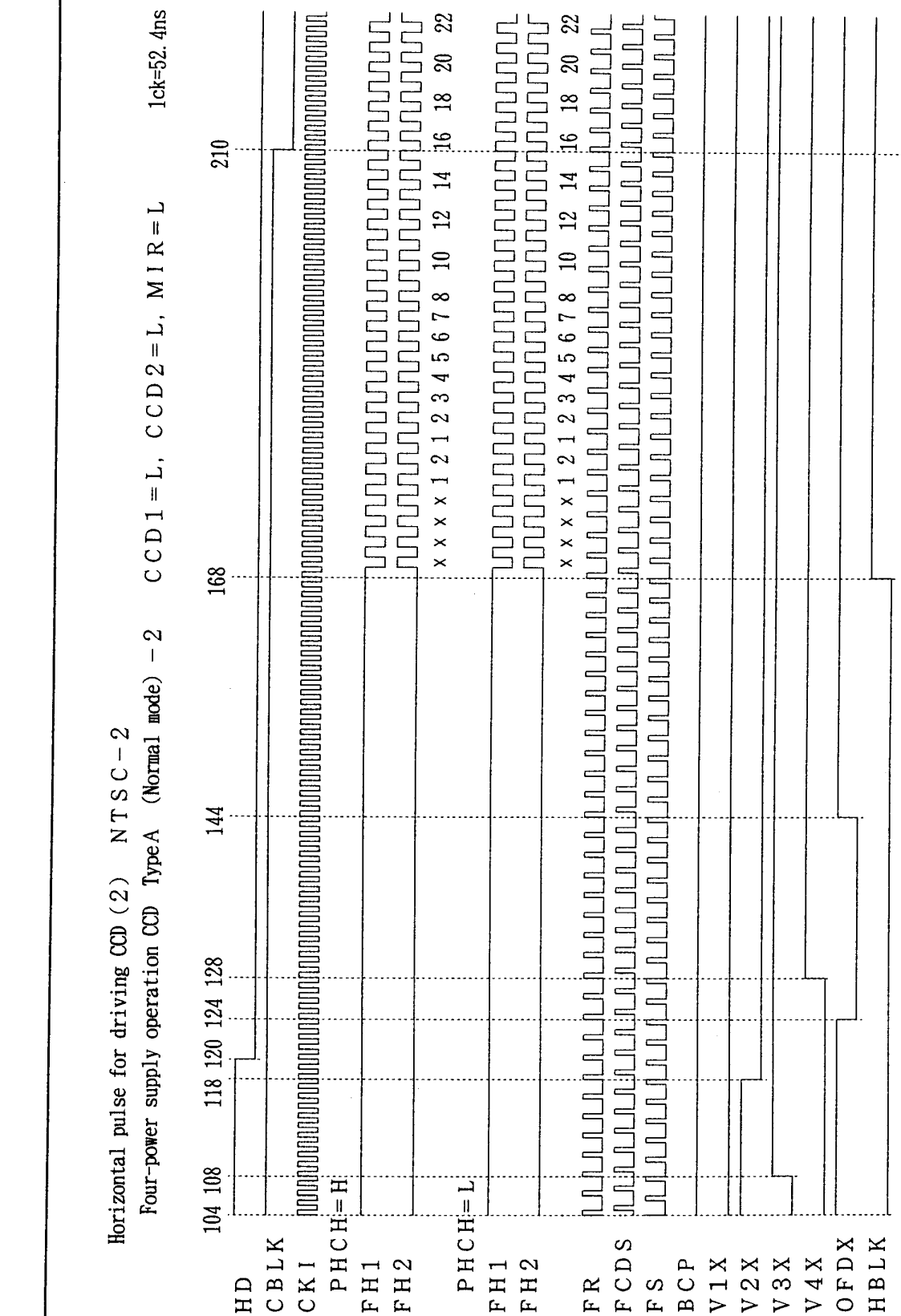
Horizontal pulse for driving CCD (1) NTSC-1

Four-power supply operating CCD TypeA (Normal mode) -1 CCD1=L, CCD2=L, MIR=L 1ck=52.4ns



Horizontal pulse for driving CCD (2) NTSC-2

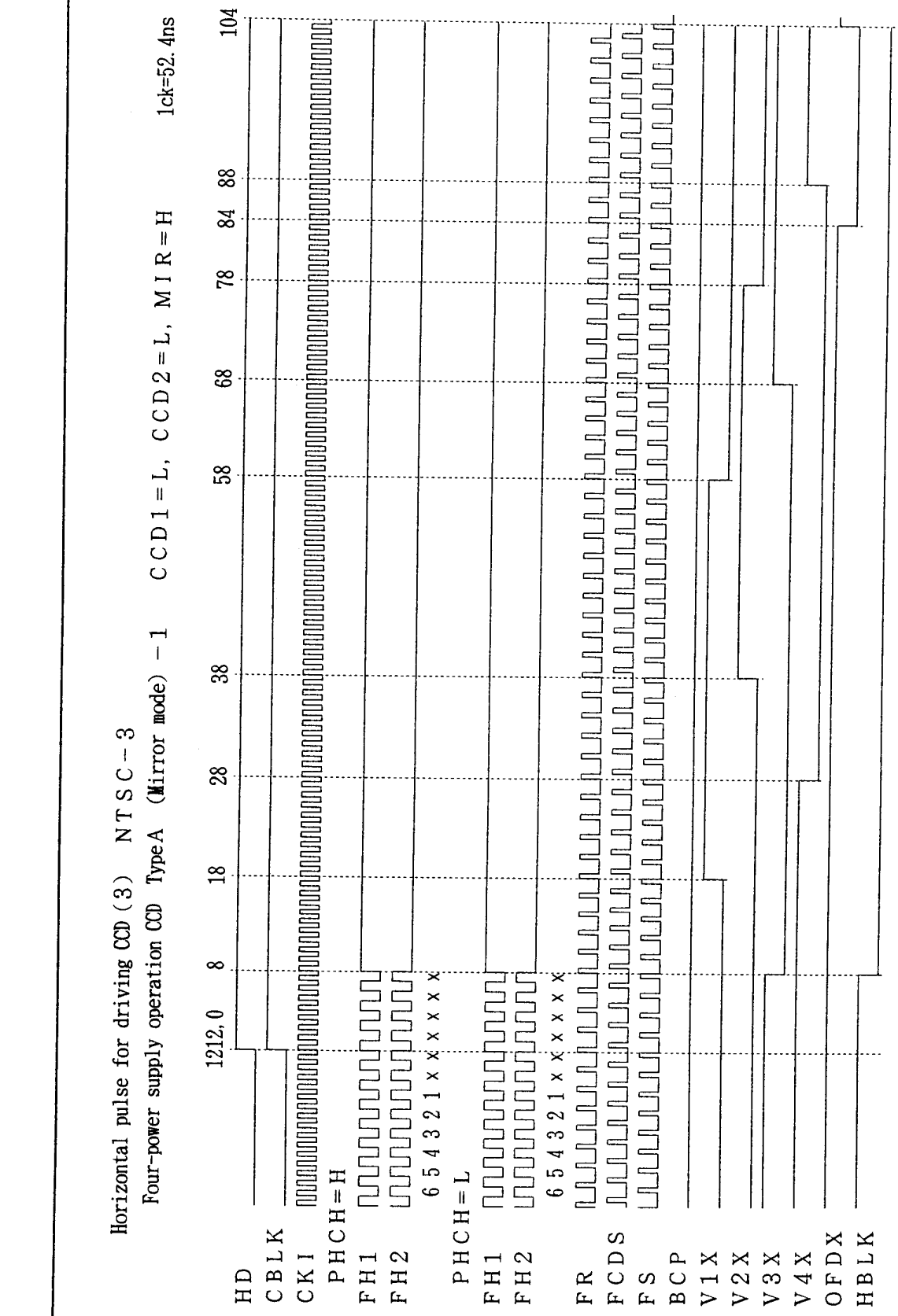
Four-power supply operation CCD TypeA (Normal mode) - 2 CCD1=L, CCD2=L, MIR=L 1ck=52.4ns



LZ9GG33M

Horizontal pulse for driving CCD (3) NTSC-3

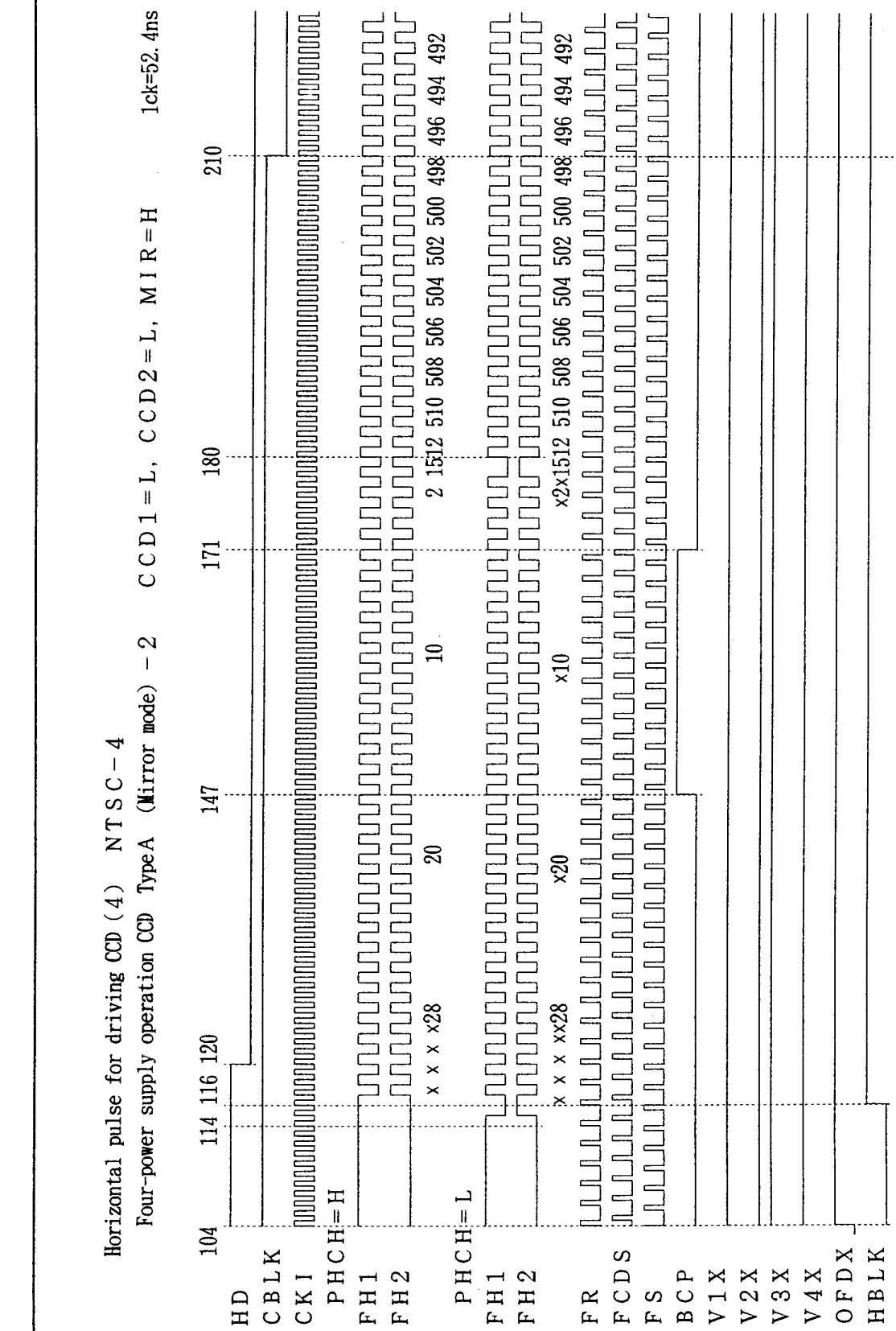
Four-power supply operation CCD TypeA (Mirror mode) -1 CCD1=L, CCD2=L, MIR=H 1ck=52.4ns



LZ9GG33M

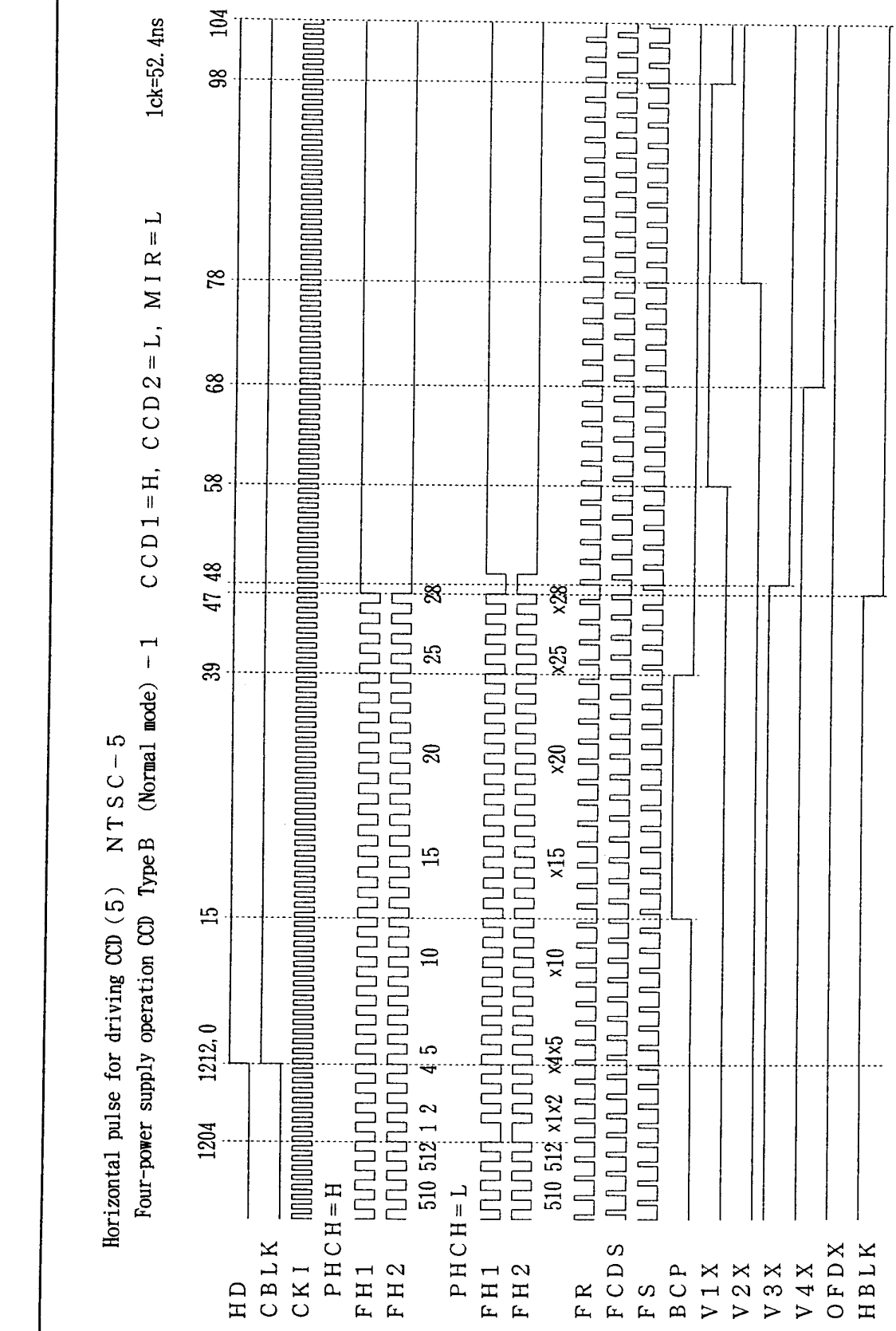
Horizontal pulse for driving CCD (4) NTSC-4

Four-power supply operation CCD TypeA (Mirror mode) - 2 CCD1=L, CCD2=L, MIR=H 1ck=52.4ns



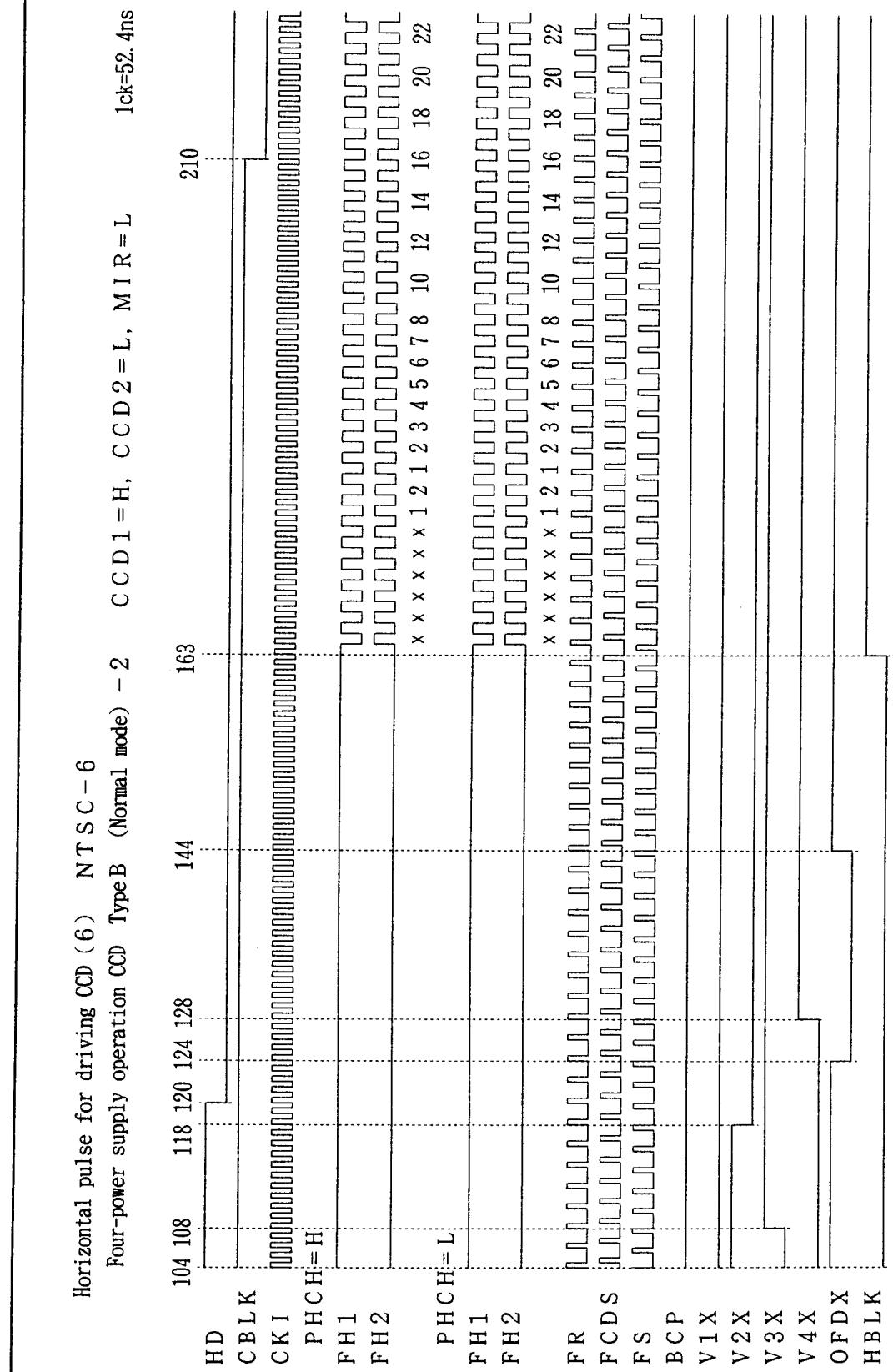
Horizontal pulse for driving CCD (5) NTSC-5

Four-power supply operation CCD TypeB (Normal mode) -1 CCD1=H, CCD2=L, MIR=L 1ck=52.4ns



Horizontal pulse for driving CCD (6) NTSC-6

Four-power supply operation CCD TypeB (Normal mode) - 2 CCD1=H, CCD2=L, MIR=L 1ck=52.4ns

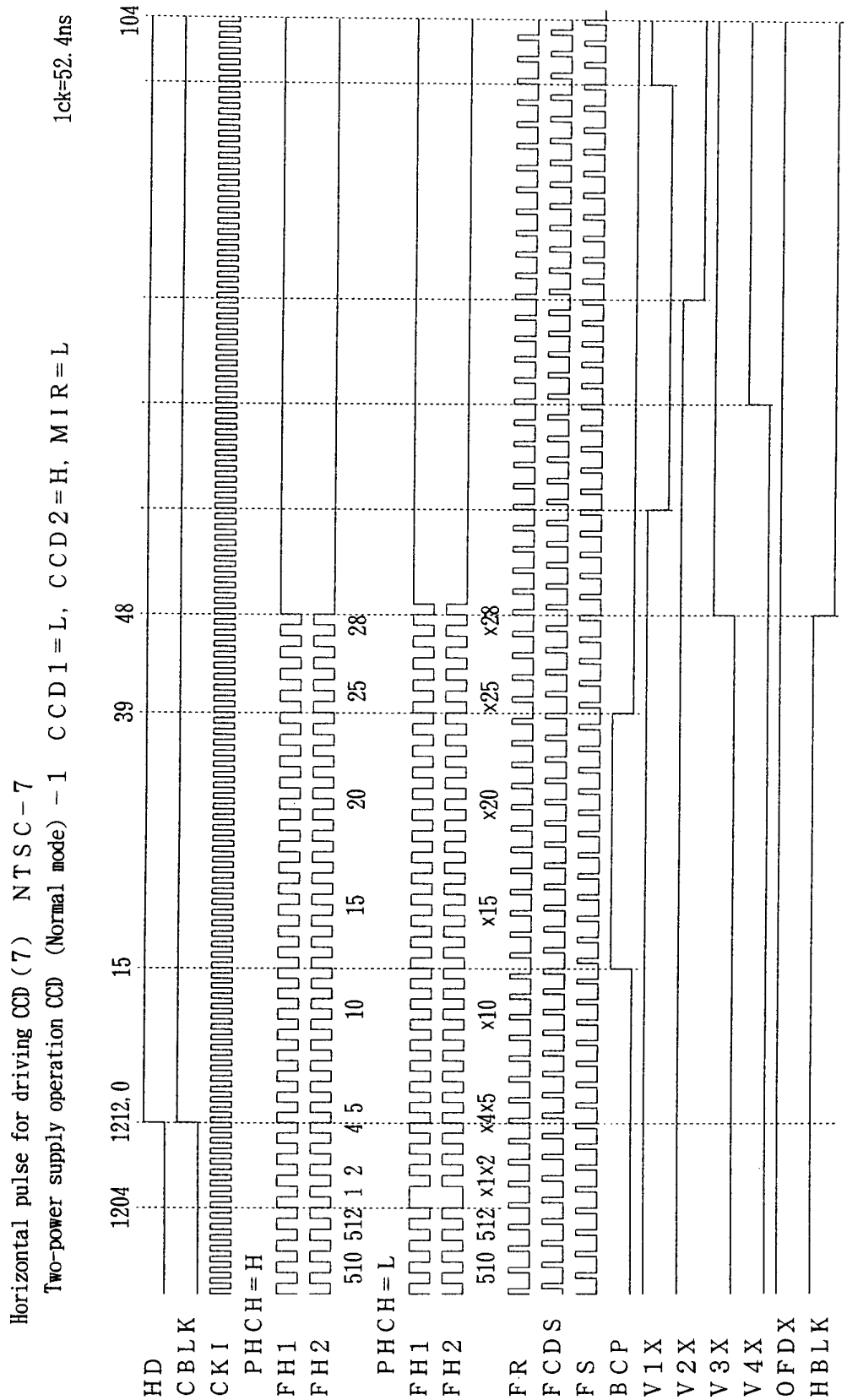


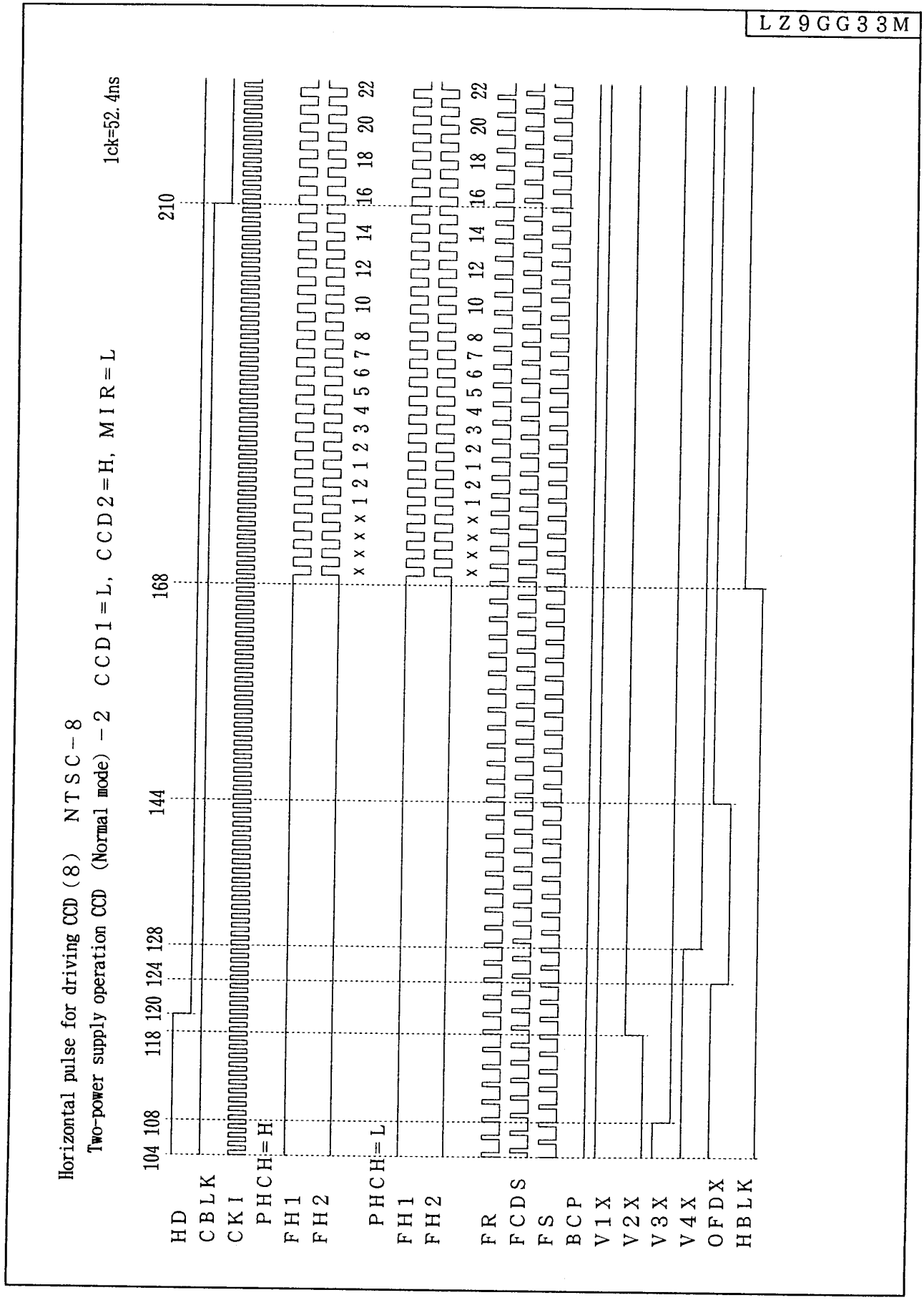
LZ9GG33M

Horizontal pulse for driving CCD (7) NTSC-7

Two-power supply operation CCD (Normal mode) -1 CCD1=L, CCD2=H, MIR=L

1ck=52.4ns

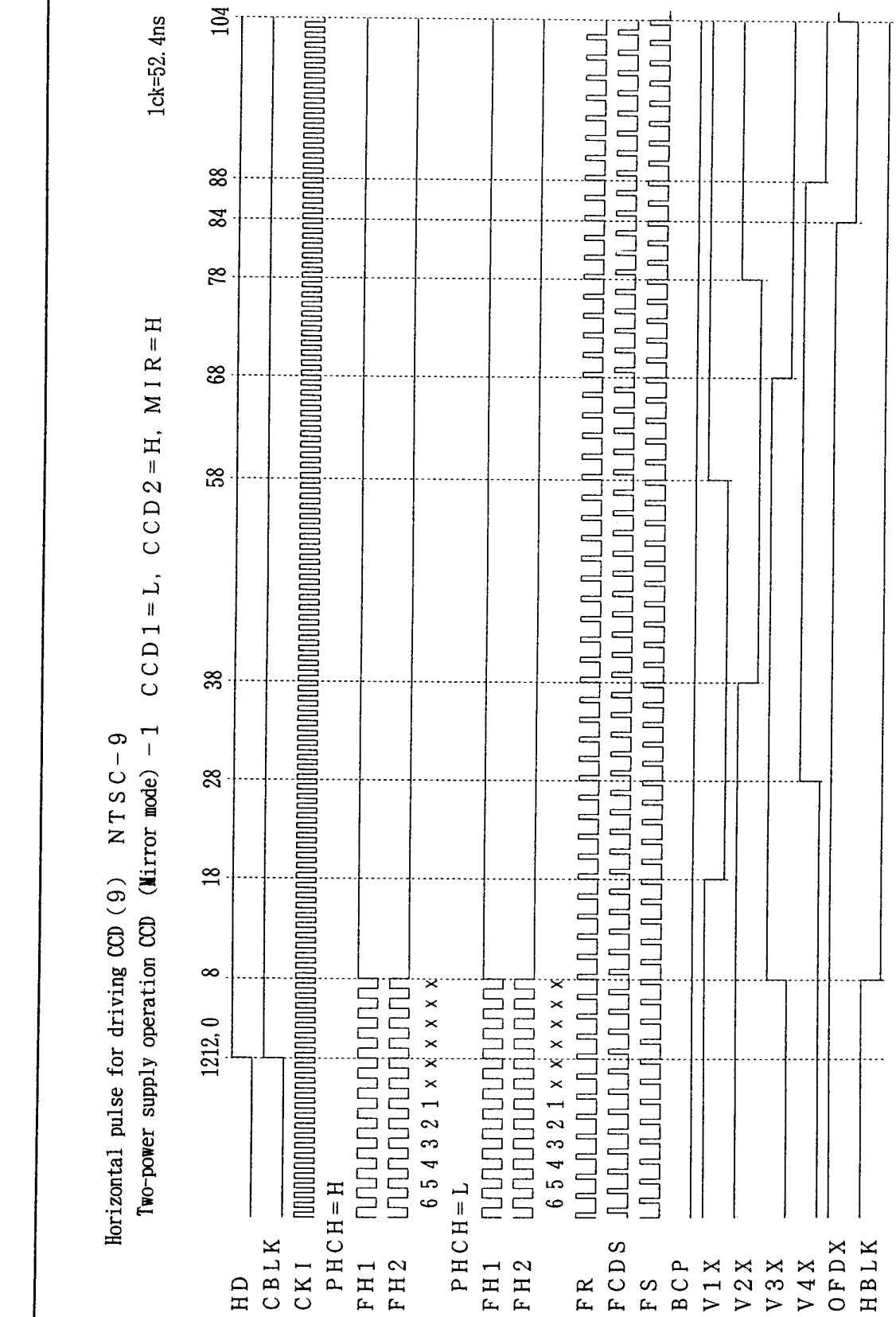



LZ9GG33M
Horizontal pulse for driving CCD (8) NTSC-8
Two-power supply operation CCD (Normal mode) -2 CCD1=L, CCD2=H, MIR=L
1ck=52.4ns
104 108 118 120 124 128 144 168 210
x x x 1 2 1 2 3 4 5 6 7 8 10 12 14 16 18 20 22
x x x 1 2 1 2 3 4 5 6 7 8 10 12 14 16 18 20 22
HD
CBLK
CKI
PHCH=H
FH1
FH2
PHCH=L
FH1
FH2
FR
FCDS
FS
BCP
V1X
V2X
V3X
V4X
OFDX
HBLK

Horizontal pulse for driving CCD (9) NTSC-9

Two-power supply operation CCD (Mirror mode) -1 CCD1=L, CCD2=H, MIR=H

1ck=52.4ns

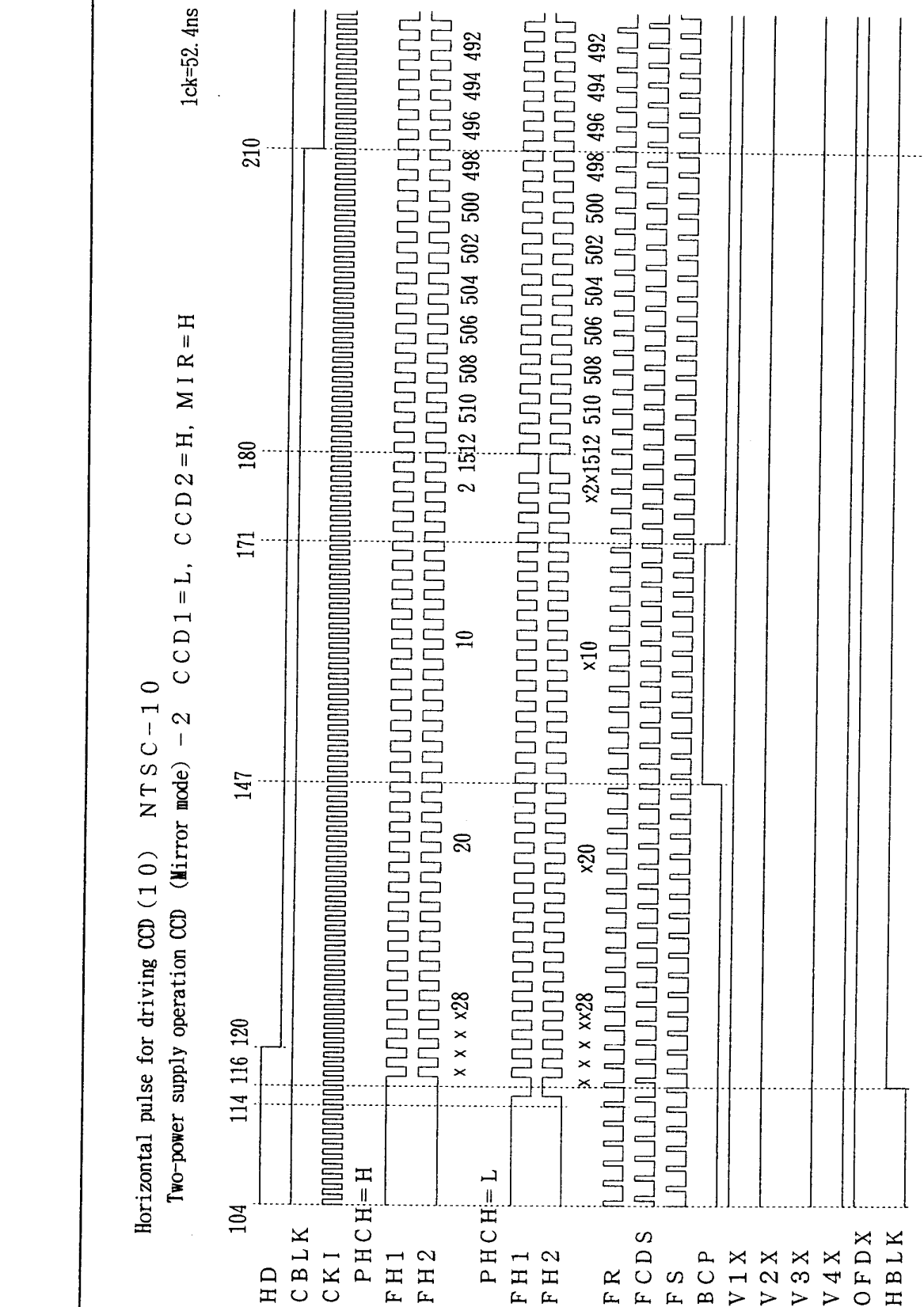


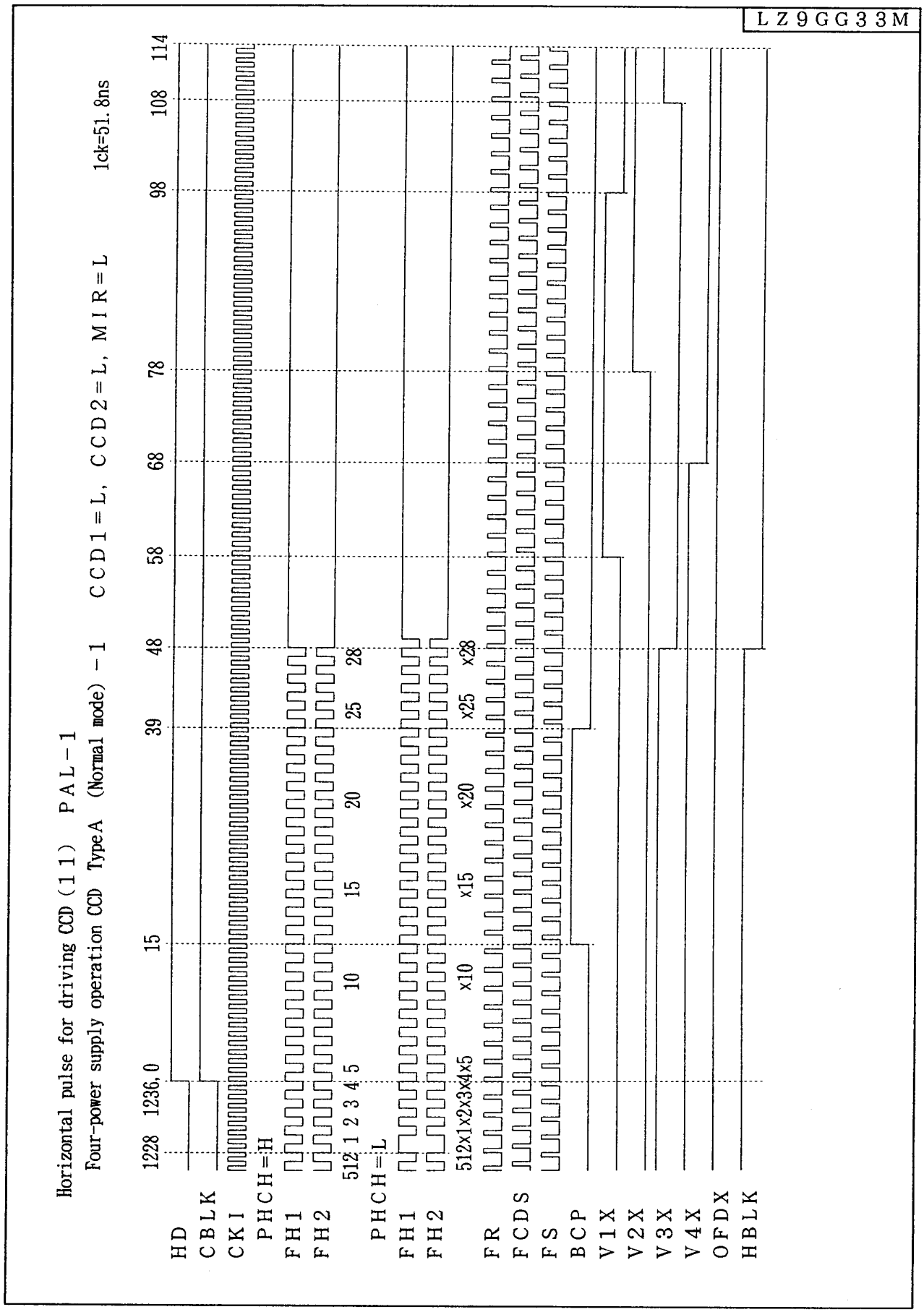
LZ9GG33M

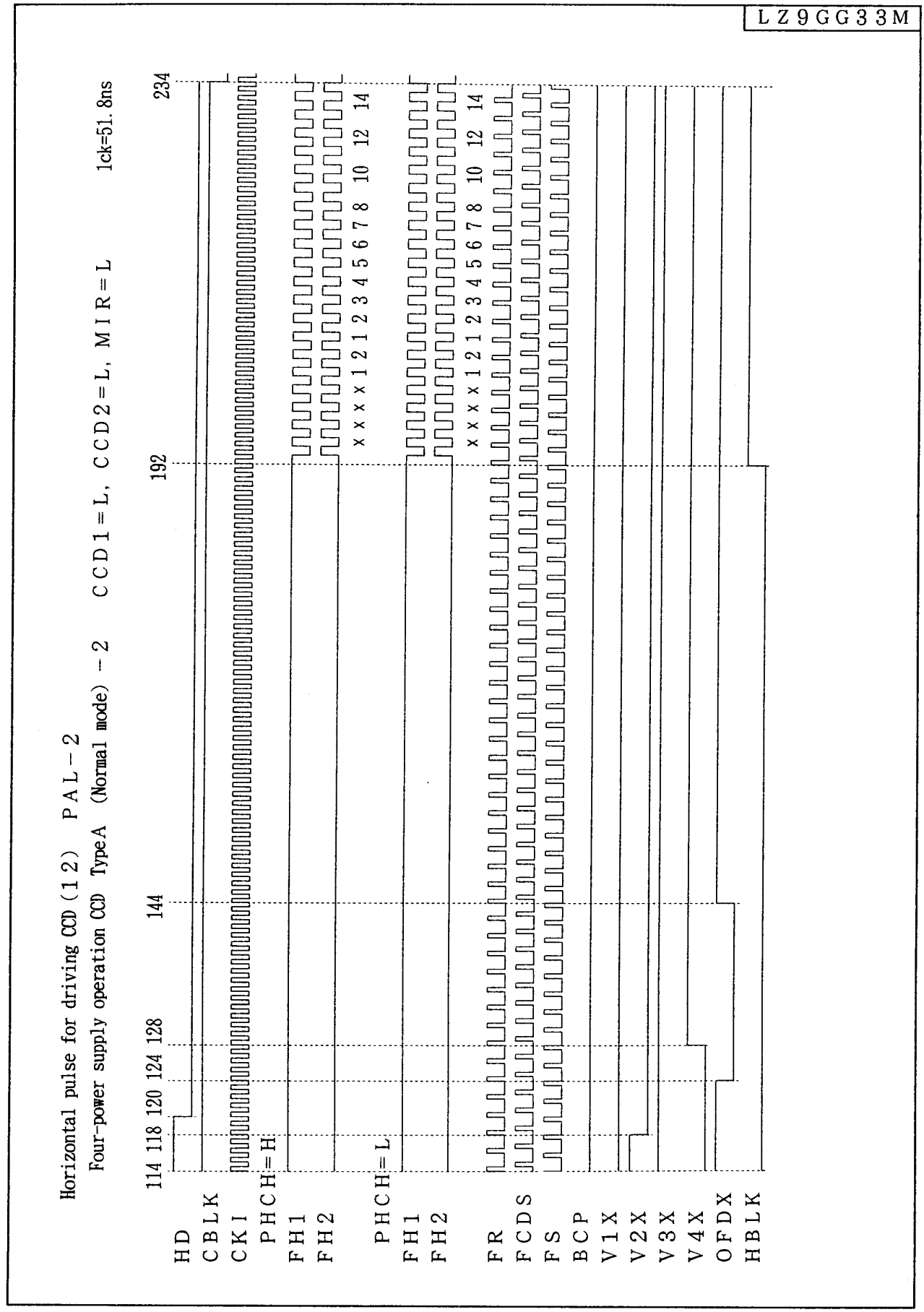
Horizontal pulse for driving CCD (10) NTSC-10

Two-power supply operation CCD (Mirror mode) -2 CCD1=L, CCD2=H, MIR=H

1ck=52.4ns

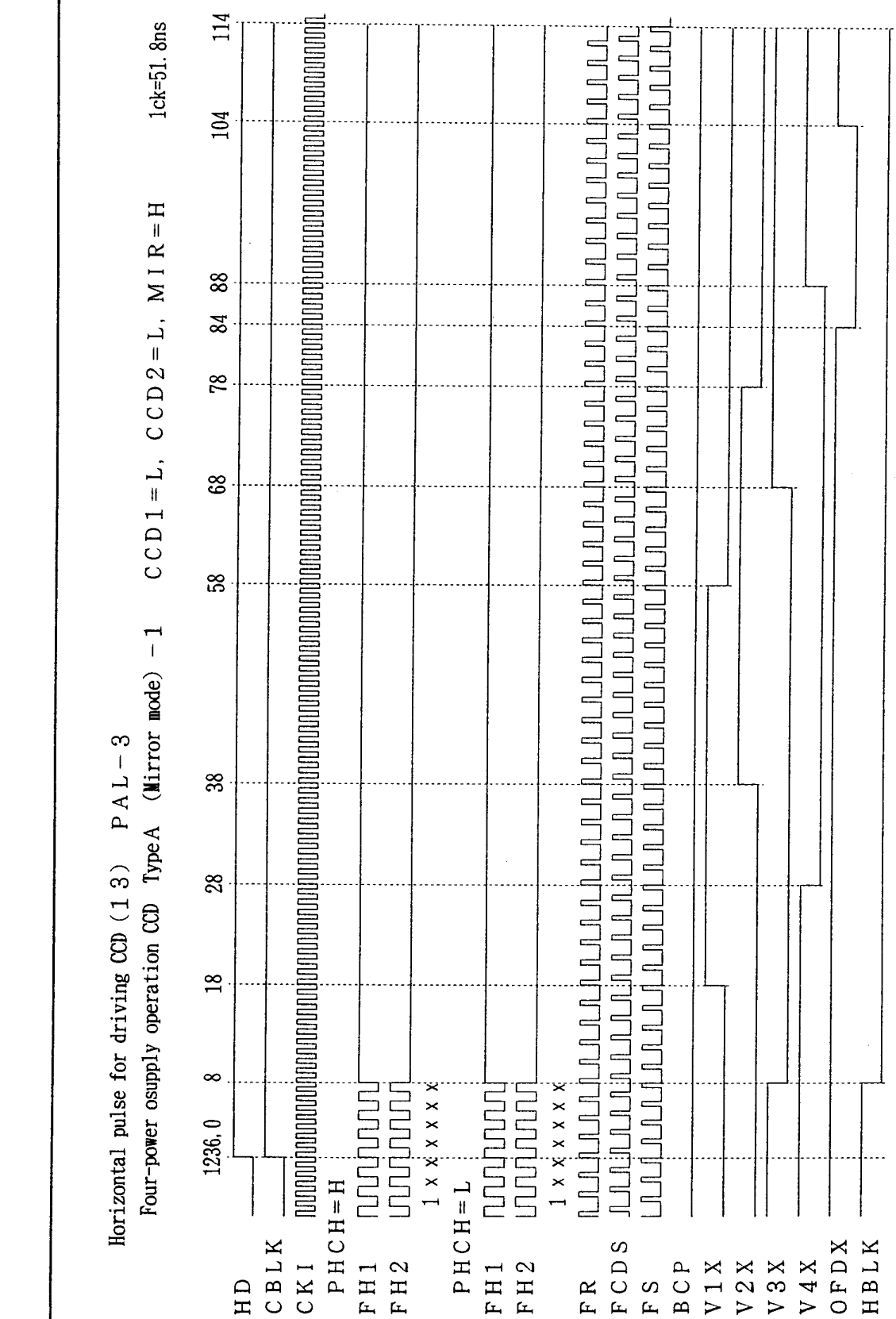


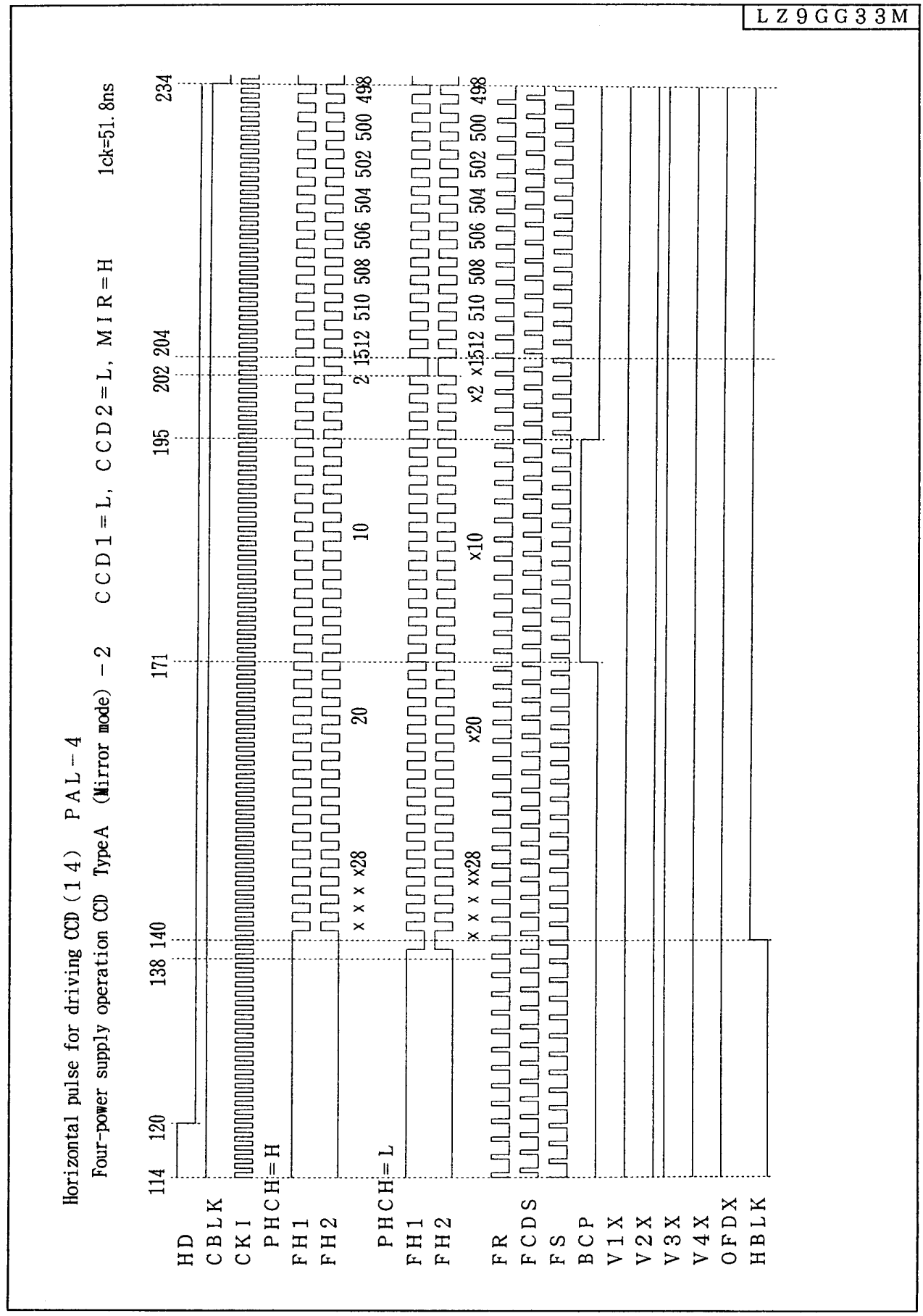

LZ9GG33M
Horizontal pulse for driving CCD (11) PAL-1
Four-power supply operation CCD TypeA (Normal mode) -1 CCD1=L, CCD2=L, MIR=L 1ck=51.8ns
1228 1236, 0 15 39 48 58 68 78 98 108 114
HD
CBLK
CKI
PHCH=H
FH1
FH2
512 1 2 3 4 5 10 15 20 25 28
PHCH=L
FH1
FH2
512x1x2x3x4x5 x10 x15 x20 x25 x28
FR
FCDS
FS
BCP
V1X
V2X
V3X
V4X
OFDX
HBLK

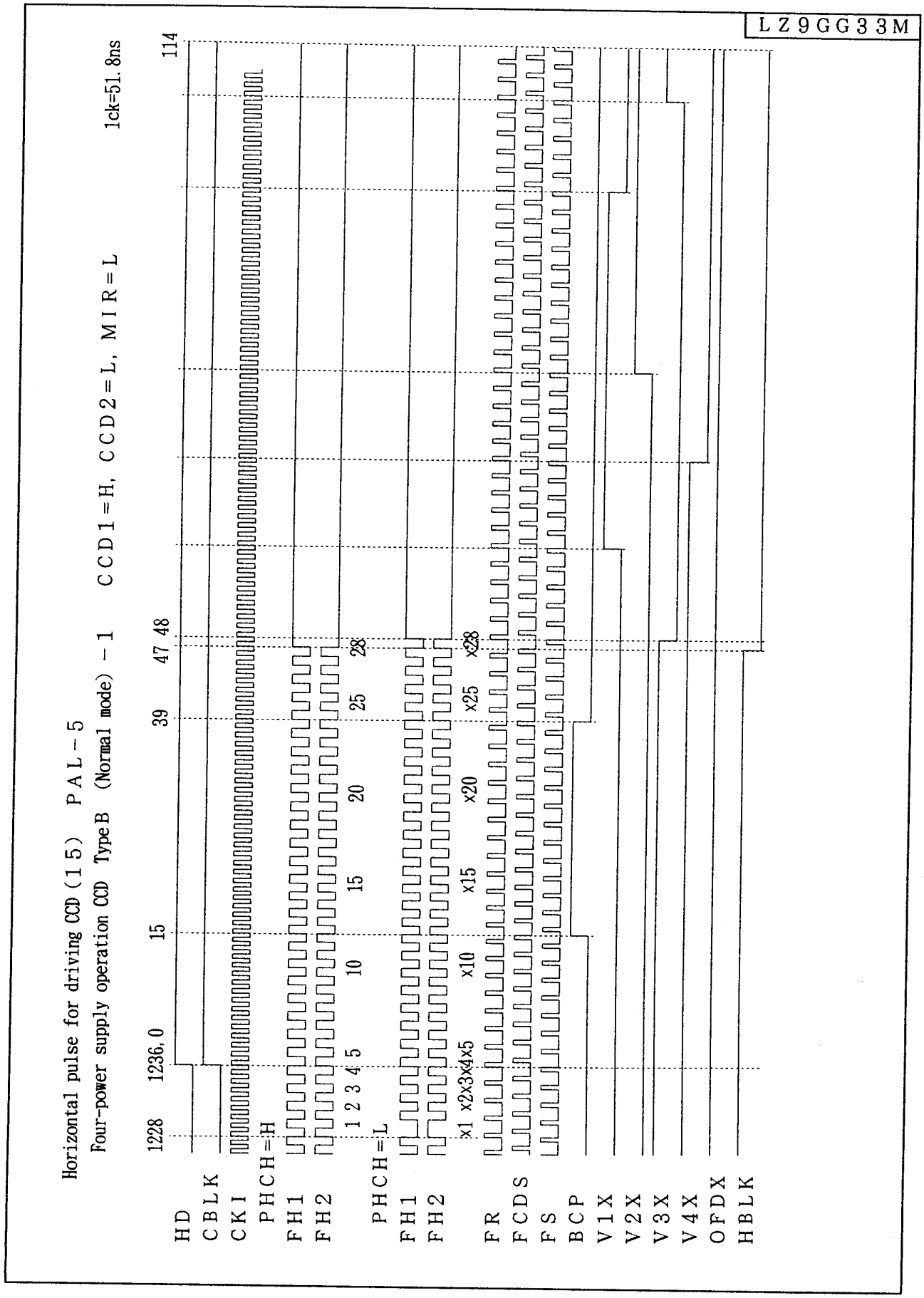

Horizontal pulse for driving CCD (12) PAL-2
Four-power supply operation CCD TypeA (Normal mode) - 2 CCD1=L, CCD2=L, MIR=L 1ck=51.8ns
114 118 120 124 128 144 192 234
HD
CBLK
CKI
PHCH=H
FH1
FH2
x x x 1 2 1 2 3 4 5 6 7 8 10 12 14
PHCH=L
FH1
FH2
x x x 1 2 1 2 3 4 5 6 7 8 10 12 14
FR
FCDS
FS
BCP
V1X
V2X
V3X
V4X
OFDX
HBLK

Horizontal pulse for driving CCD (13) PAL-3

Four-power osupply operation CCD TypeA (Mirror mode) - 1 CCD1=L, CCD2=L, MIR=H 1ck=51.8ns

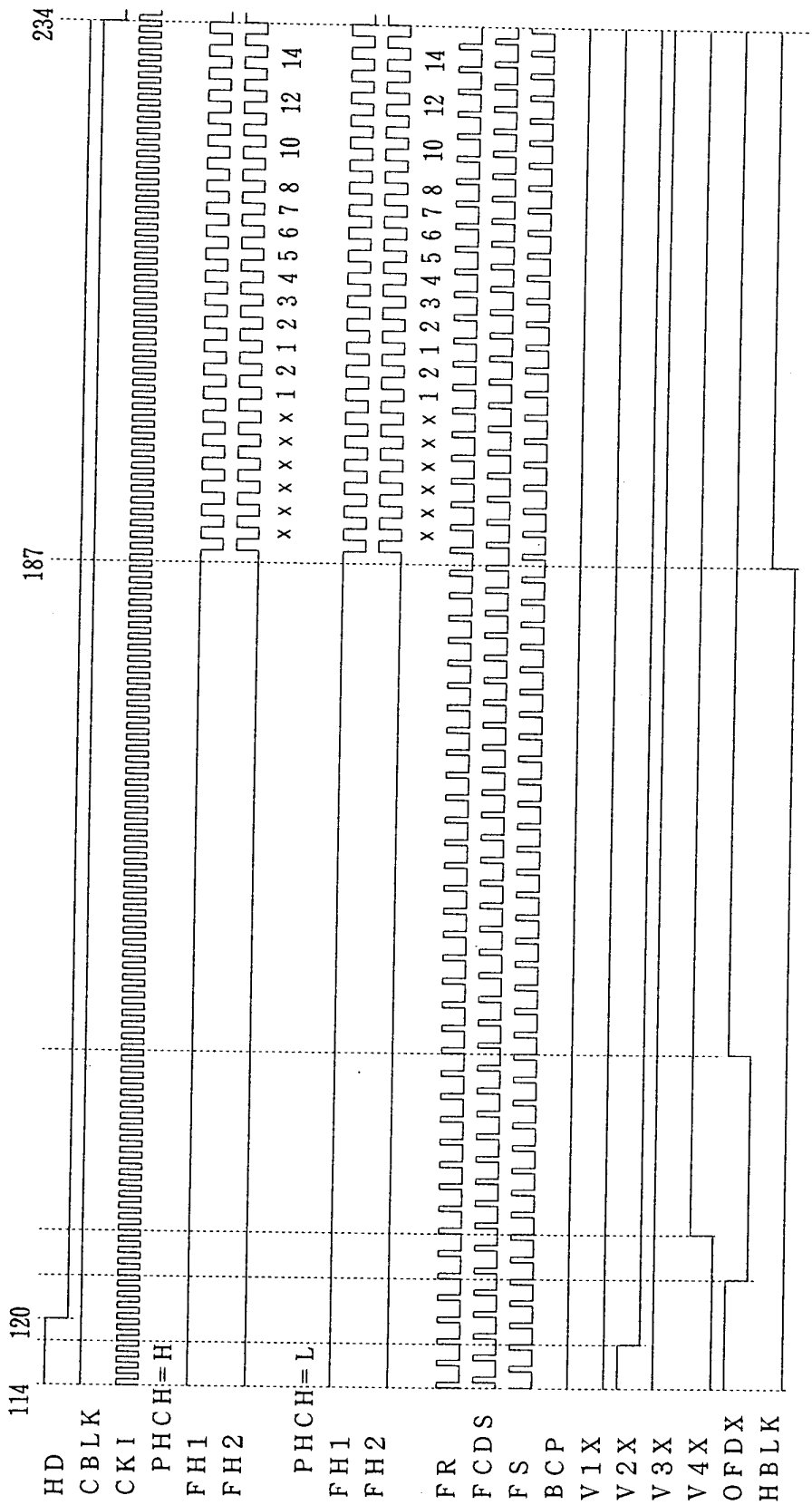


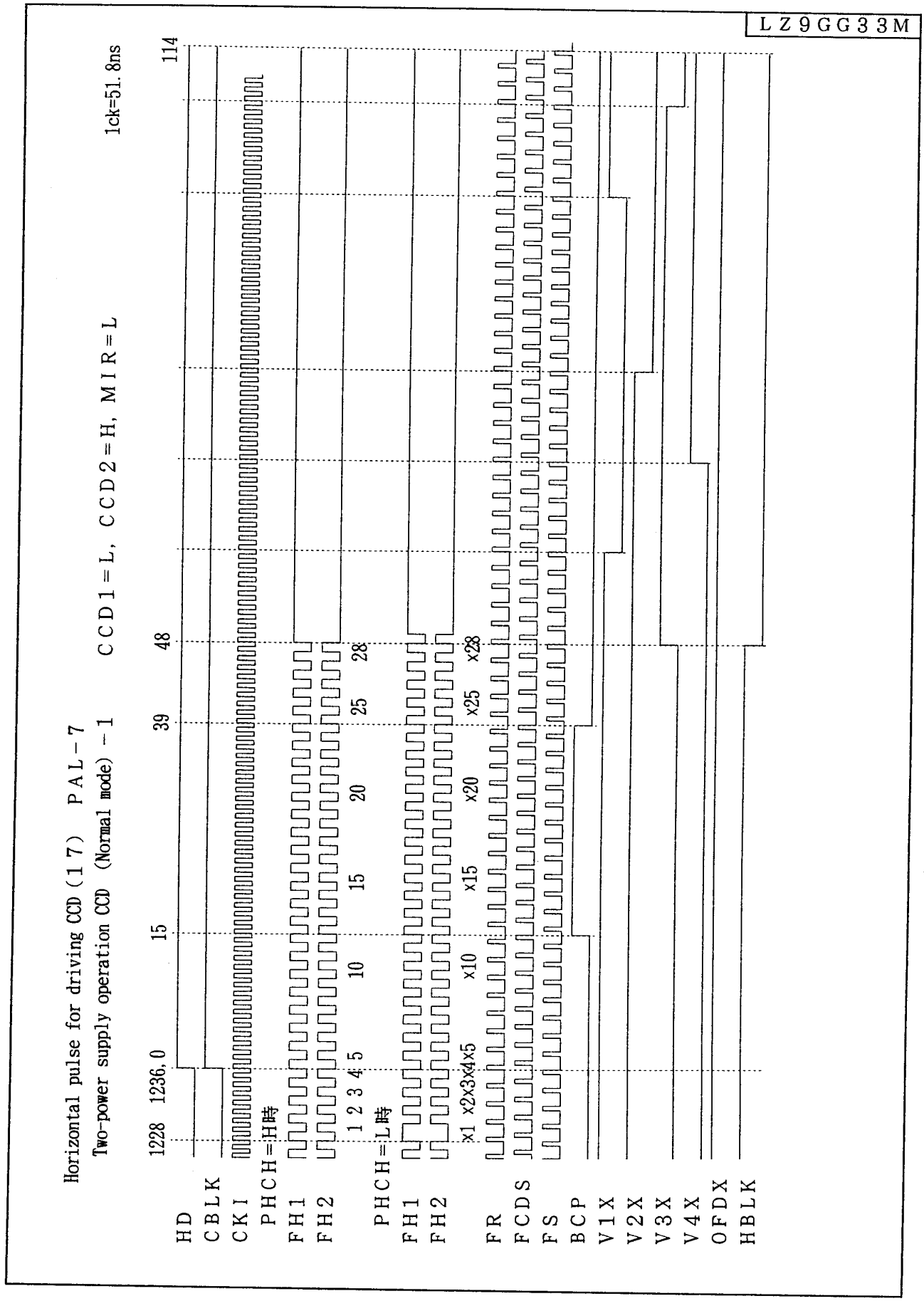

Horizontal pulse for driving CCD (14) PAL-4
Four-power supply operation CCD TypeA (Mirror mode) -2 CCD1=L, CCD2=L, MIR=H 1ck=51.8ns
114 120 138 140 171 195 202 204 234
HD
CBLK
CKI
PHCH=H
FH1
FH2
x x x x28 20 10 2 1512 510 508 506 504 502 500 498
PHCH=L
FH1
FH2
x x x xx28 x20 x10 x2 x1512 510 508 506 504 502 500 498
FR
FCDS
FS
BCP
V1X
V2X
V3X
V4X
OFDX
HBLK

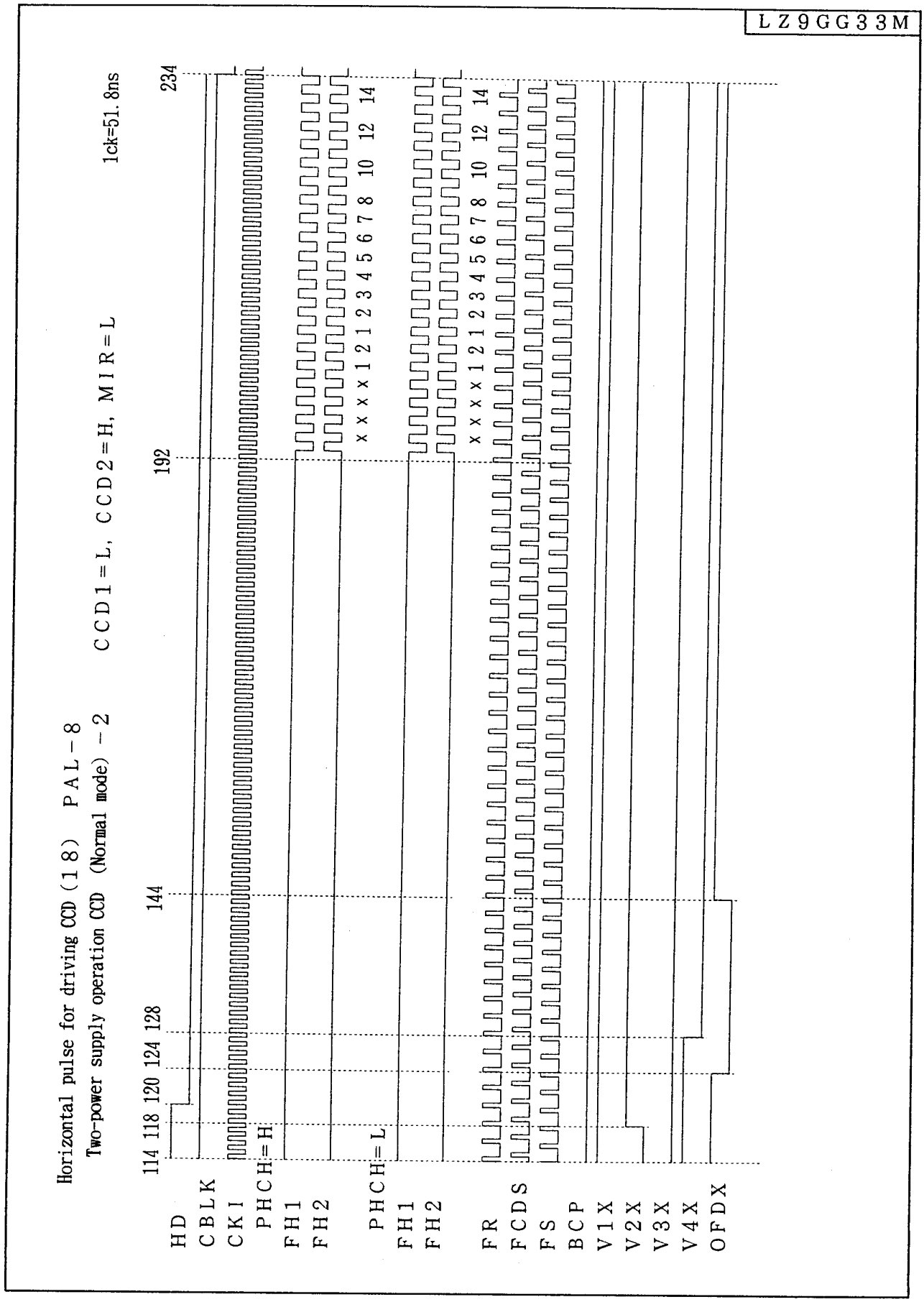

LZ9GG33M
Horizontal pulse for driving CCD (15) PAL-5
Four-power supply operation CCD TypeB (Normal mode) - 1 CCD1=H, CCD2=L, MIR=L
1ck=51.8ns
HD
CBLK
CKI
PHCH=H
FH1
FH2
PHCH=L
FH1
FH2
FR
FCDS
FS
BCP
V1X
V2X
V3X
V4X
OFDX
HBLK
1228
1236, 0
15
39
47 48
114
1 2 3 4 5
10
15
20
25
28
x1 x2x3x4x5
x10
x15
x20
x25
x28

Horizontal pulse for driving CCD (16) PAL-6

Four-power supply operation CCD Type B (Normal mode) -2 CCD1=H, CCD2=L, MIR=L 1ck=51.8ns




LZ9GG33M
Horizontal pulse for driving CCD (17) PAL-7
Two-power supply operation CCD (Normal mode) -1
CCD1=L, CCD2=H, MIR=L
1ck=51.8ns
1228 1236, 0 15 39 48 114
HD
CBLK
CKI
PHCH=H時
FH1
FH2
1 2 3 4 5 10 15 20 25 28
PHCH=L時
FH1
FH2
x1 x2 x3 x4 x5 x10 x15 x20 x25 x28
FR
FCDS
FS
BCP
V1X
V2X
V3X
V4X
OFDX
HBLK

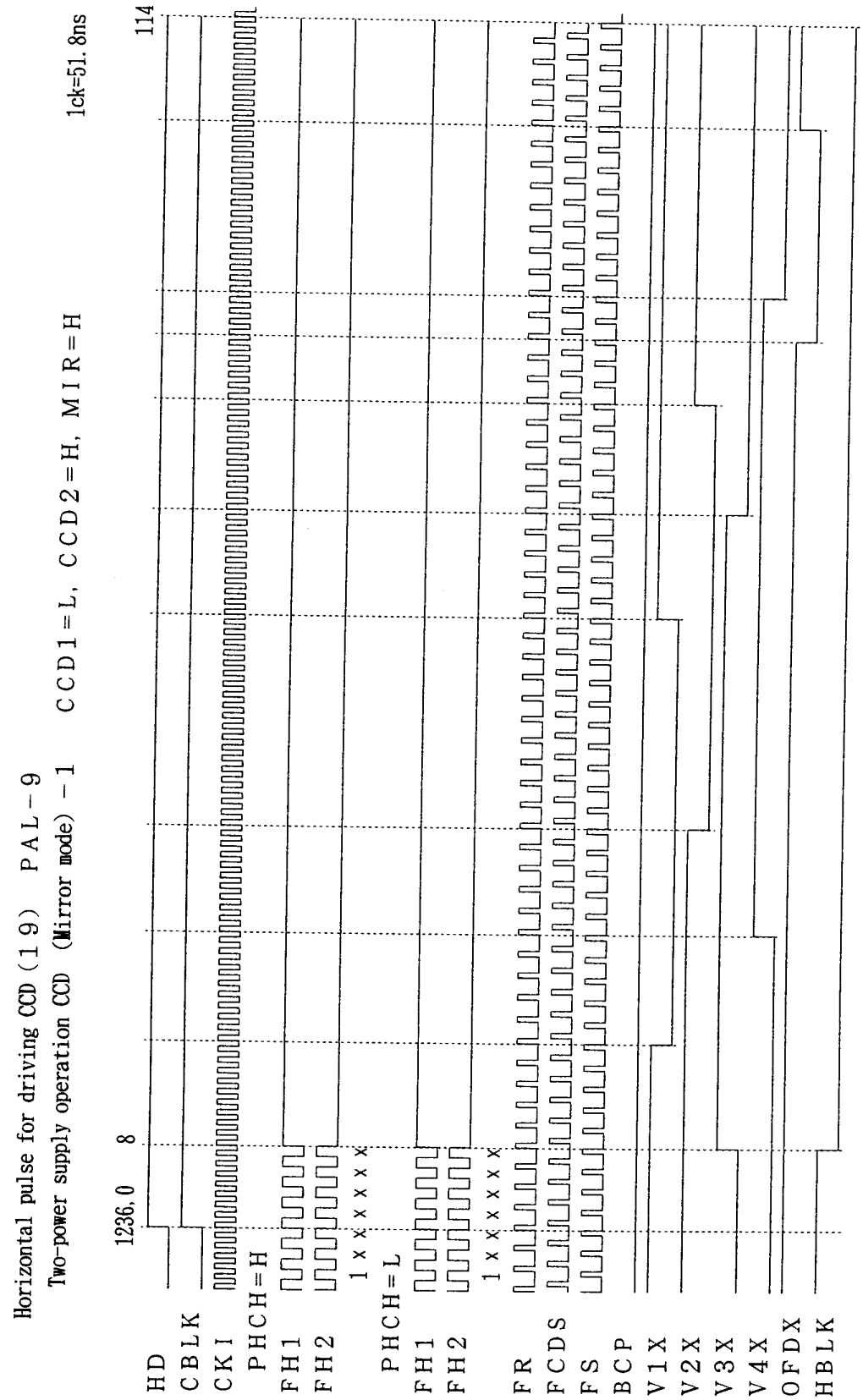

Horizontal pulse for driving CCD (18) PAL-8
Two-power supply operation CCD (Normal mode) - 2
CCD1=L, CCD2=H, MIR=L
1ck=51.8ns
114 118 120 124 128 144 192 234
HD
CBLK
CKI
PHCH=H
FH1
FH2
PHCH=L
FH1
FH2
FR
FCDS
FS
BCP
V1X
V2X
V3X
V4X
OFDX
x x x 1 2 1 2 3 4 5 6 7 8 10 12 14
x x x 1 2 1 2 3 4 5 6 7 8 10 12 14

LZ9GG33M

Horizontal pulse for driving CCD (19) PAL-9

Two-power supply operation CCD (Mirror mode) -1 CCD1=L, CCD2=H, MIR=H

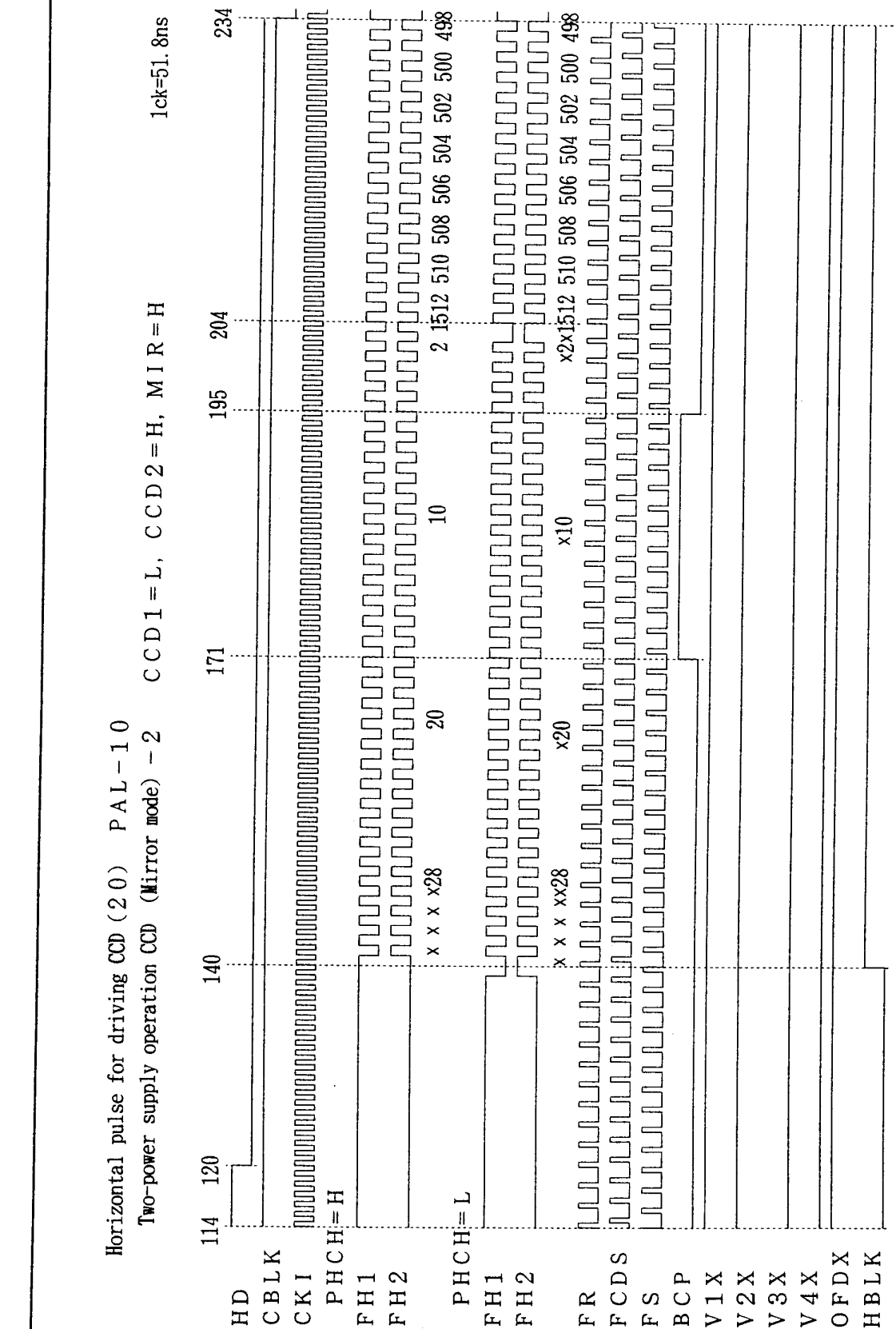
1ck=51.8ns



LZ9GG33M

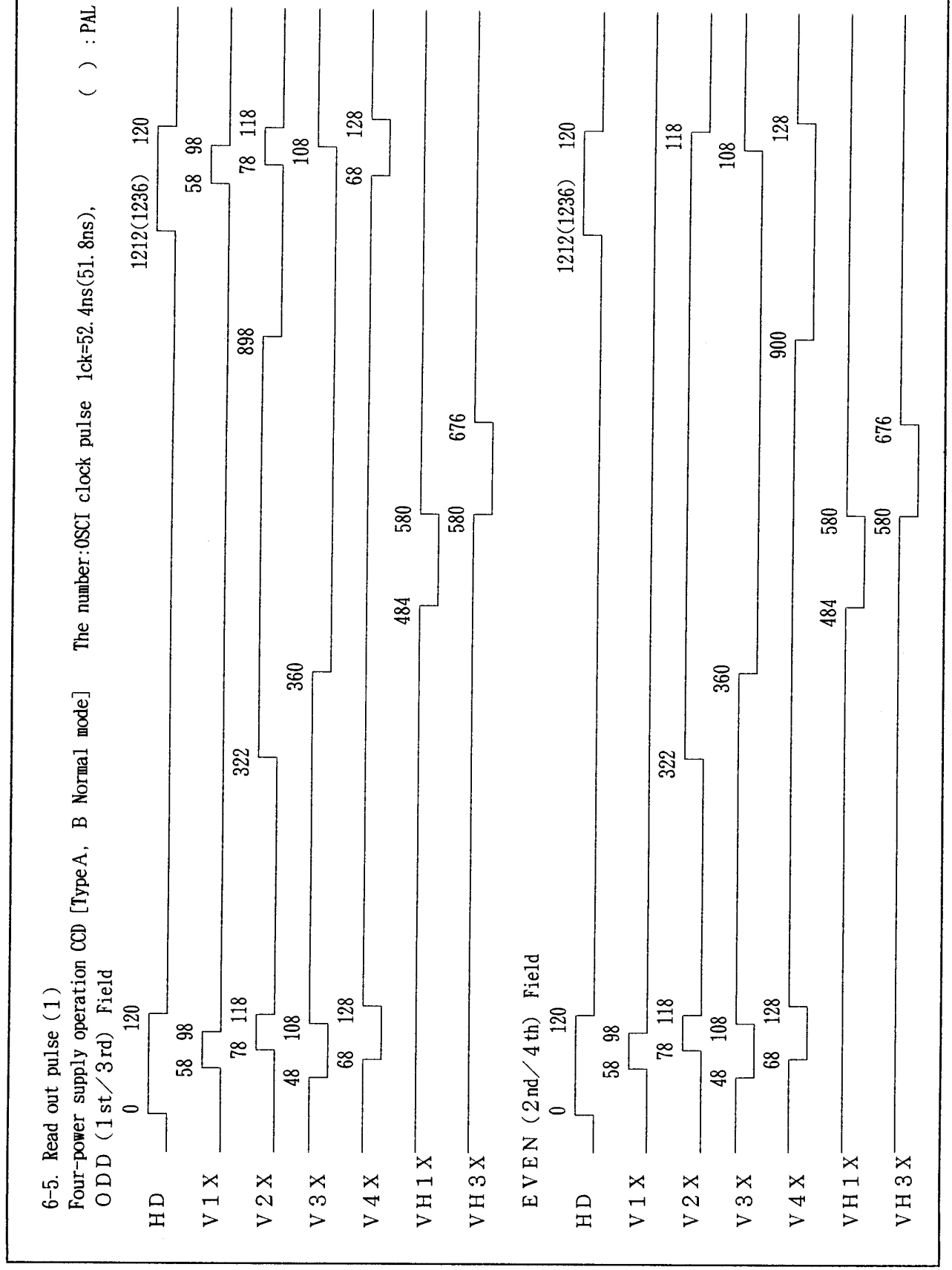
Horizontal pulse for driving CCD (20) PAL-10

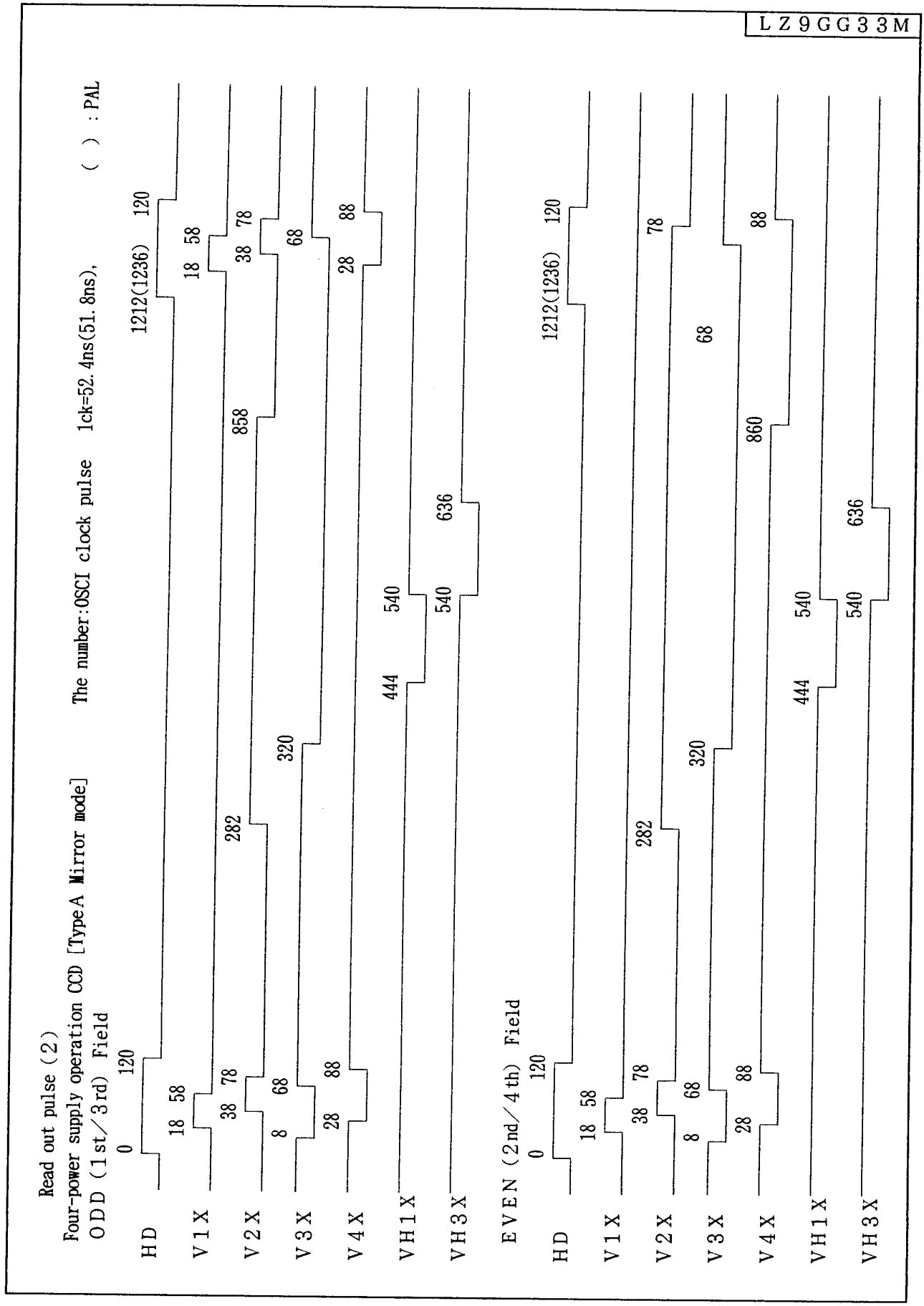
Two-power supply operation CCD (Mirror mode) -2 CCD1=L, CCD2=H, MIR=H 1ck=51.8ns

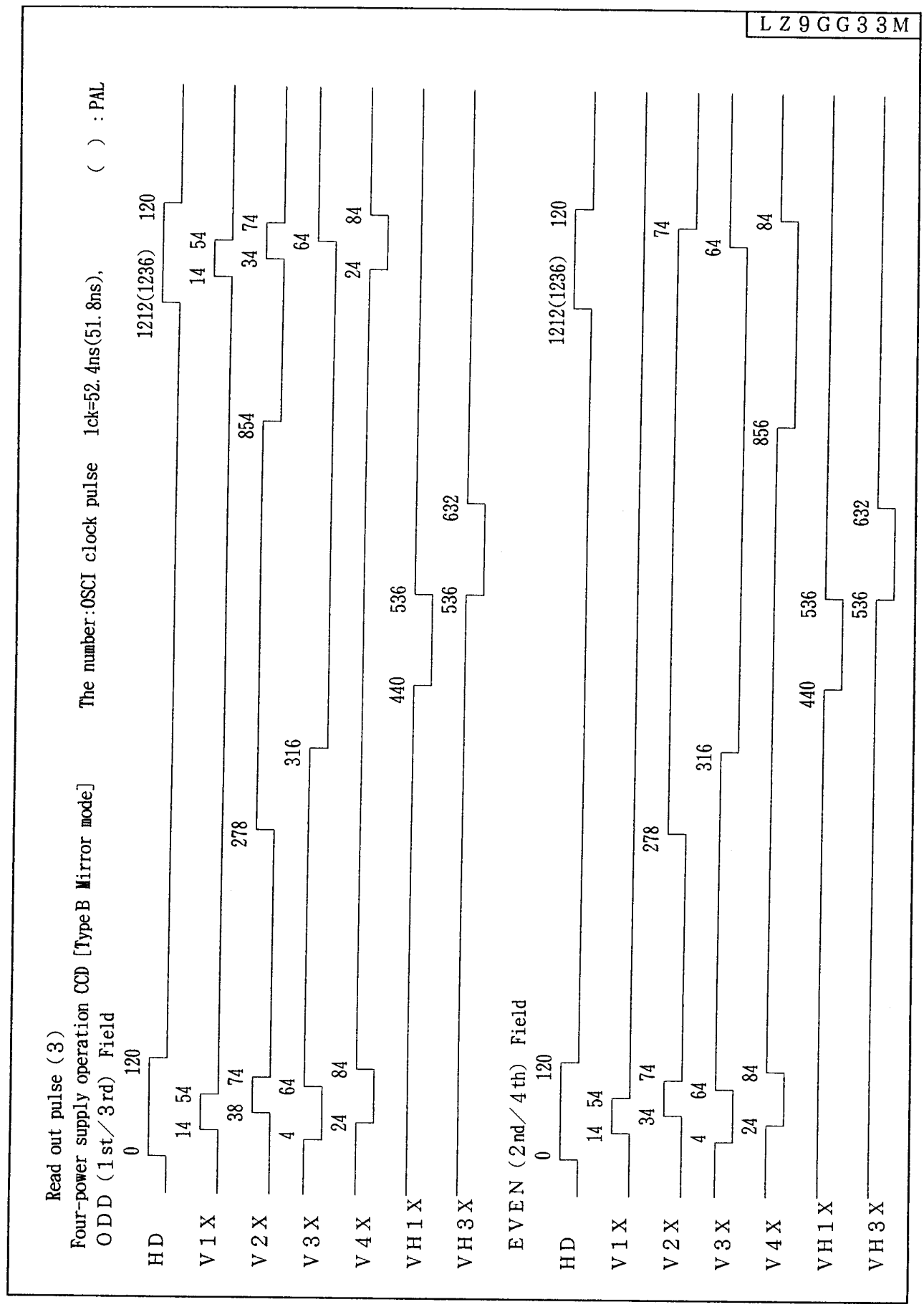


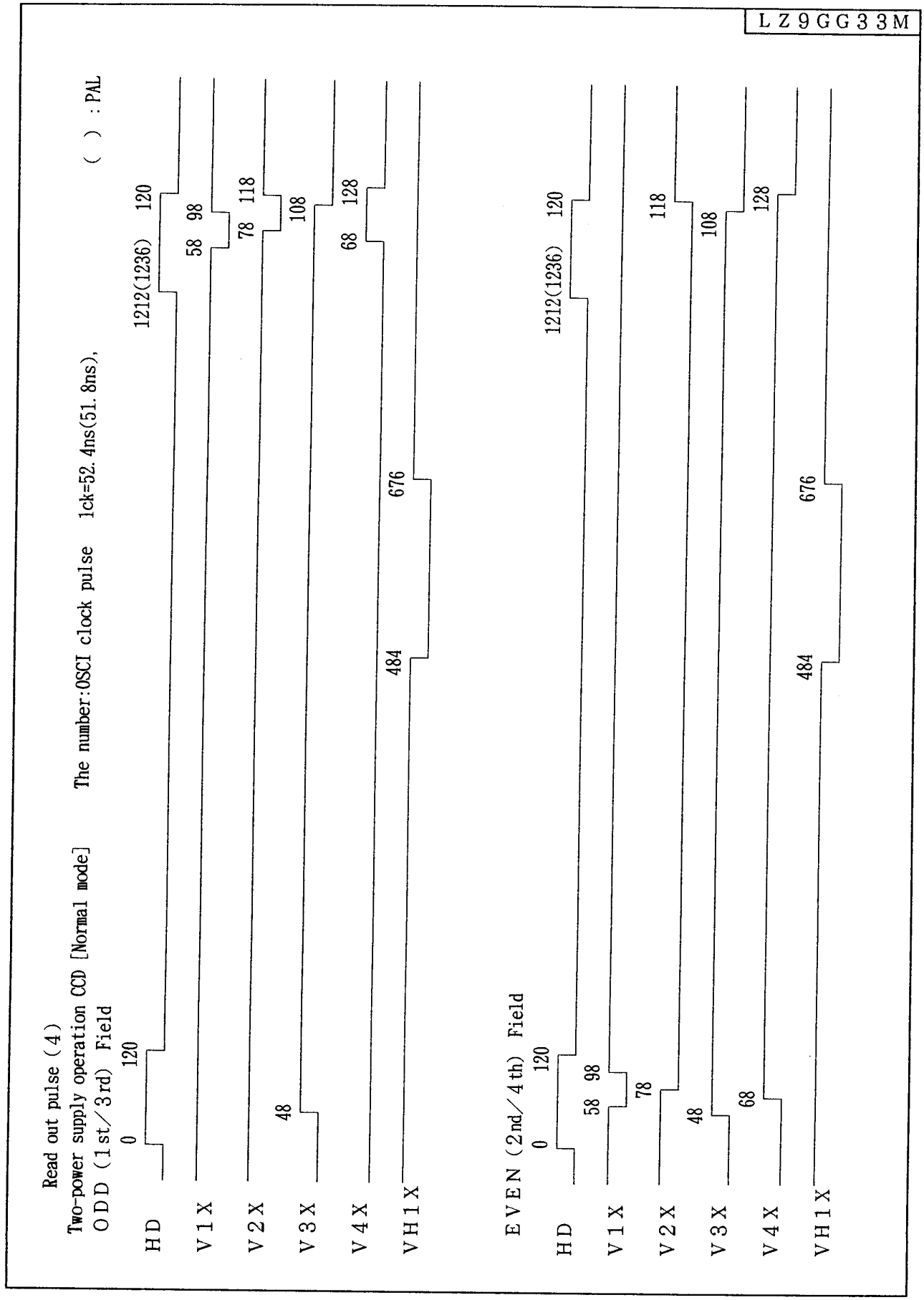
6-5. Read out pulse (1)

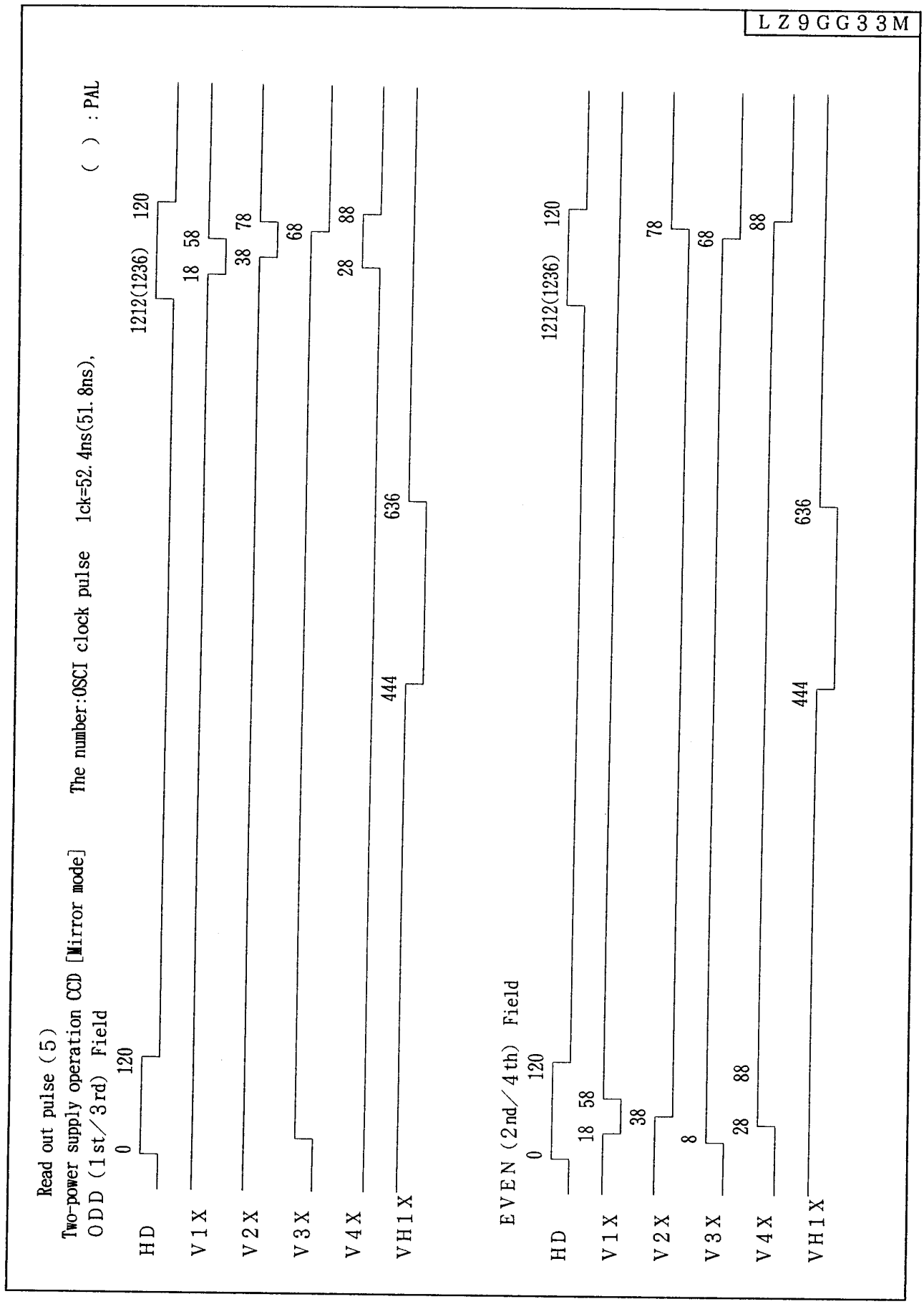
Four-power supply operation CCD [TypeA, B Normal mode] The number:OSCI clock pulse 1ck=52.4ns(51.8ns), ( ) : PAL

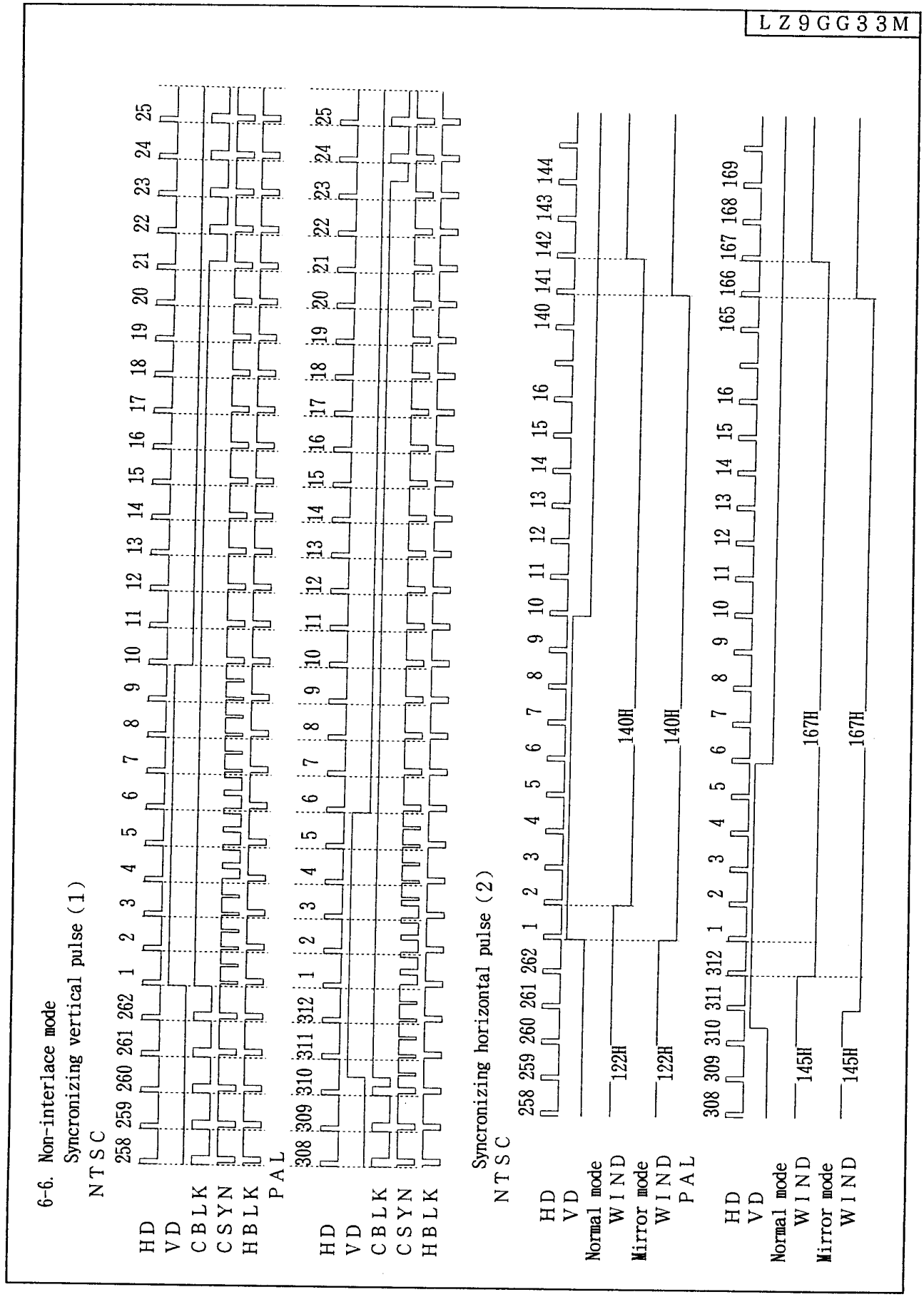


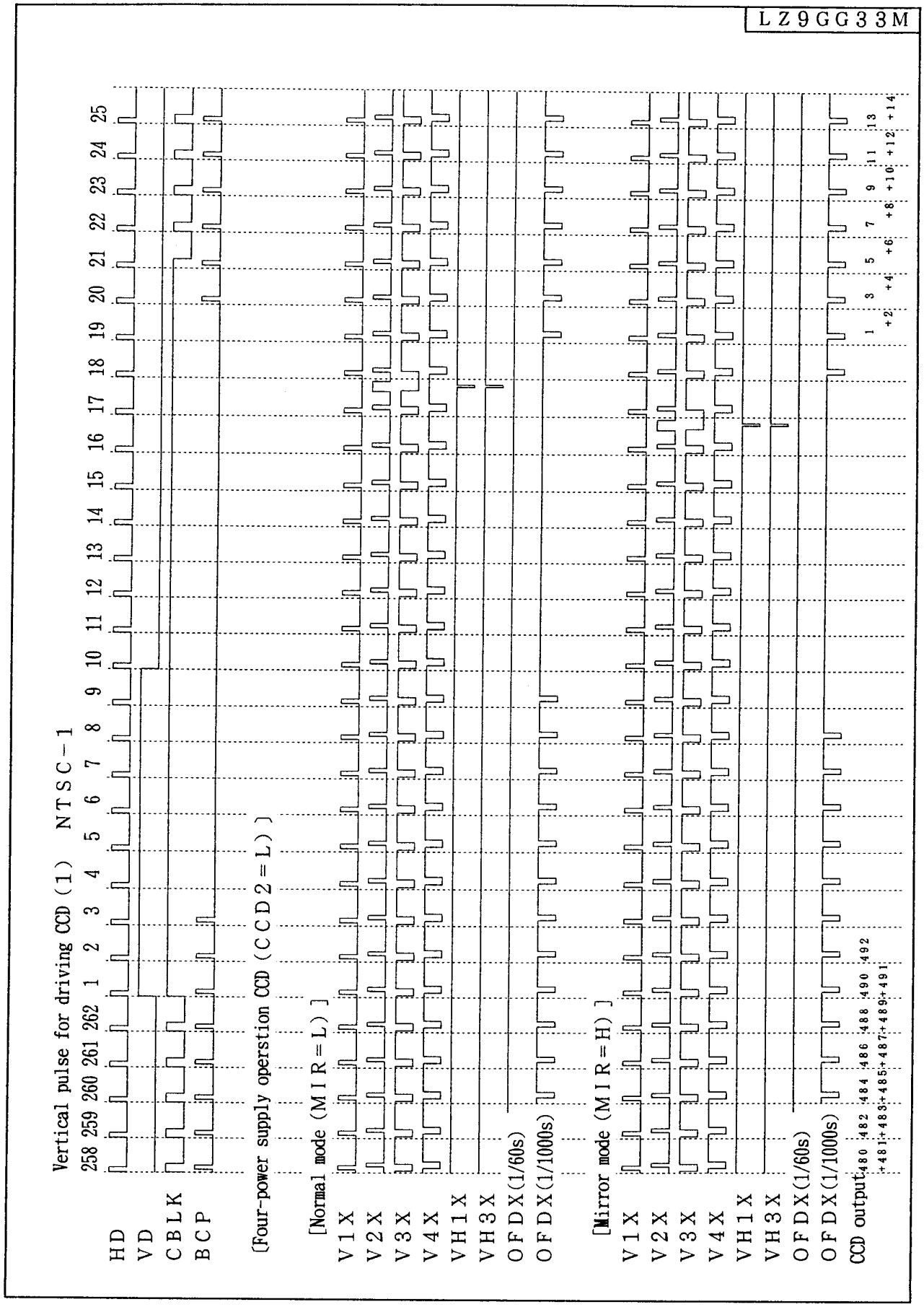

LZ9GG33M
Read out pulse (2)
Four-power supply operation CCD [Type A Mirror mode]
The number:OSCI clock pulse 1ck=52.4ns(51.8ns), ( ) : PAL
ODD (1st/3rd) Field
HD
V1X
V2X
V3X
V4X
VH1X
VH3X
0
120
1212(1236)
18 58
38 78
282
858
8 68
320
28 88
444
540
540
636
EVEN (2nd/4th) Field
HD
V1X
V2X
V3X
V4X
VH1X
VH3X
0
120
1212(1236)
18 58
38 78
282
8 68
320
28 88
444
540
540
636
860

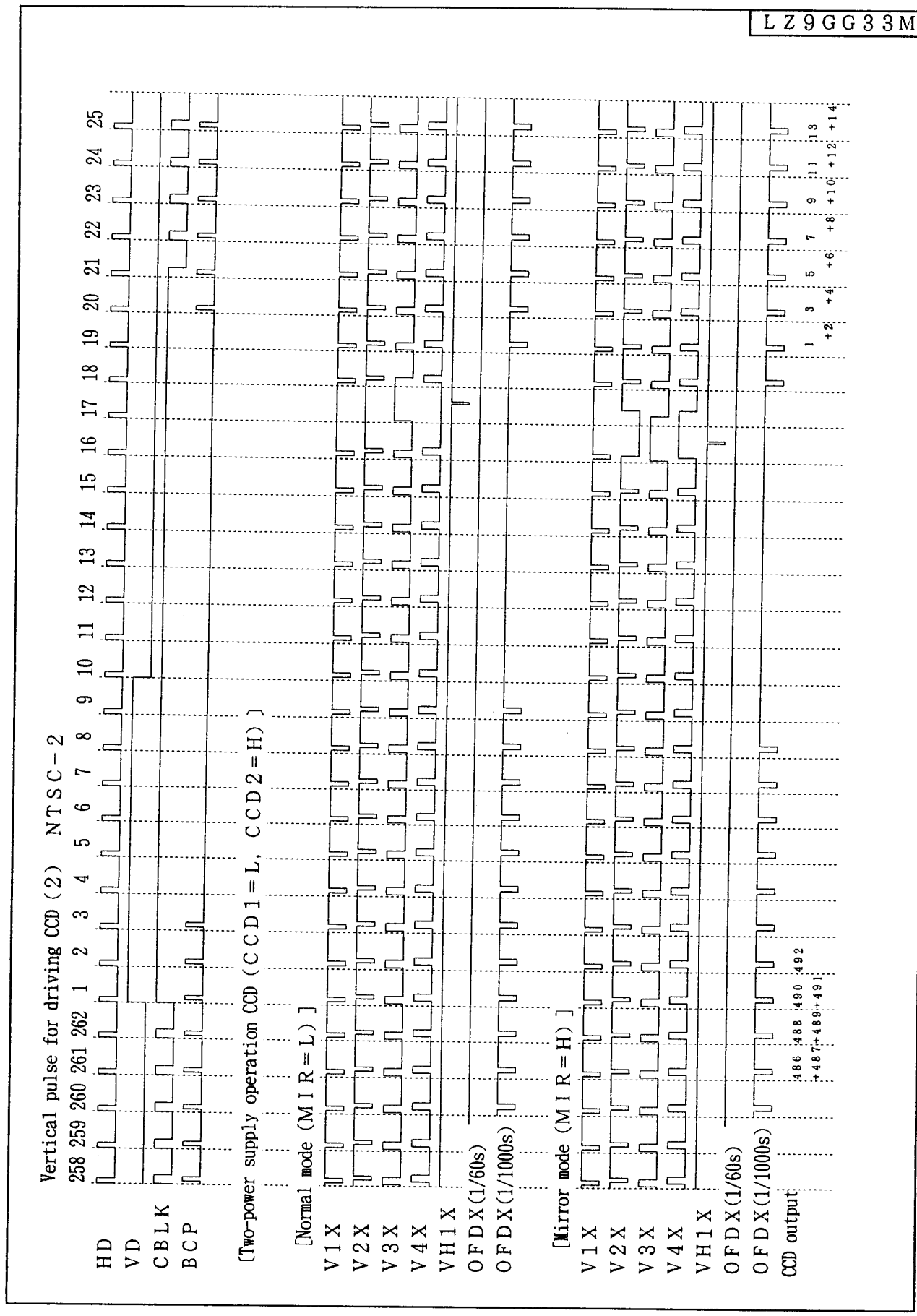

LZ9GG33M
Read out pulse (3)
Four-power supply operation CCD [Type B Mirror mode]
The number:OSCI clock pulse 1ck=52.4ns(51.8ns), ( ) : PAL
ODD (1st/3rd) Field
HD
V1X
V2X
V3X
V4X
VH1X
VH3X
0
120
1212(1236)
14
54
38
74
278
854
4
64
316
24
84
440
536
632
34
EVEN (2nd/4th) Field

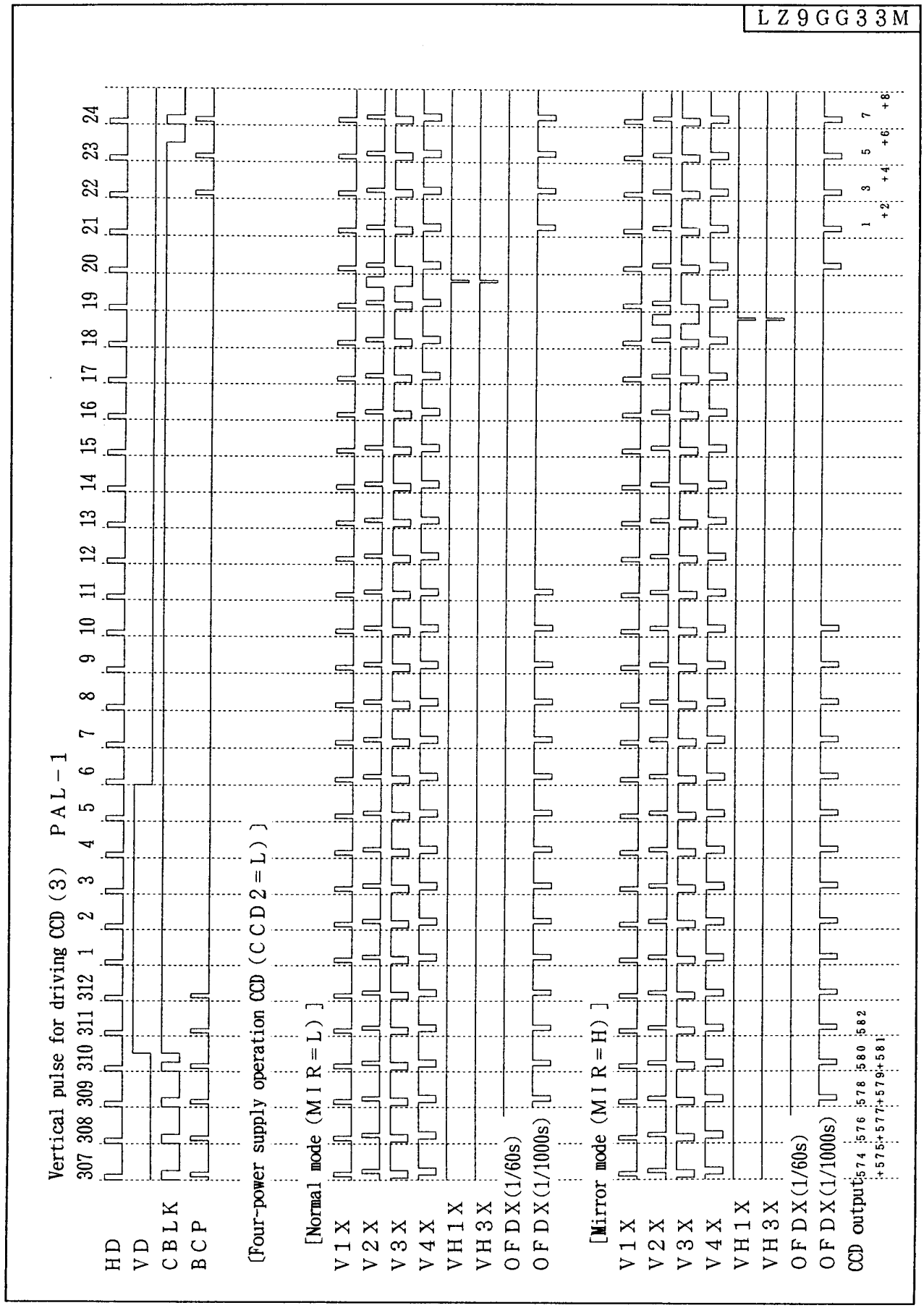

LZ9GG33M
Read out pulse (4)
Two-power supply operation CCD [Normal mode]
The number:OSCI clock pulse 1ck=52.4ns(51.8ns),
( ) : PAL
ODD (1st/3rd) Field
HD
V1X
V2X
V3X
V4X
VH1X
0
120
1212(1236)
58
98
78
118
48
108
68
128
484
676
EVEN (2nd/4th) Field
HD
V1X
V2X
V3X
V4X
VH1X
0
120
1212(1236)
58
98
78
118
48
108
68
128
484
676

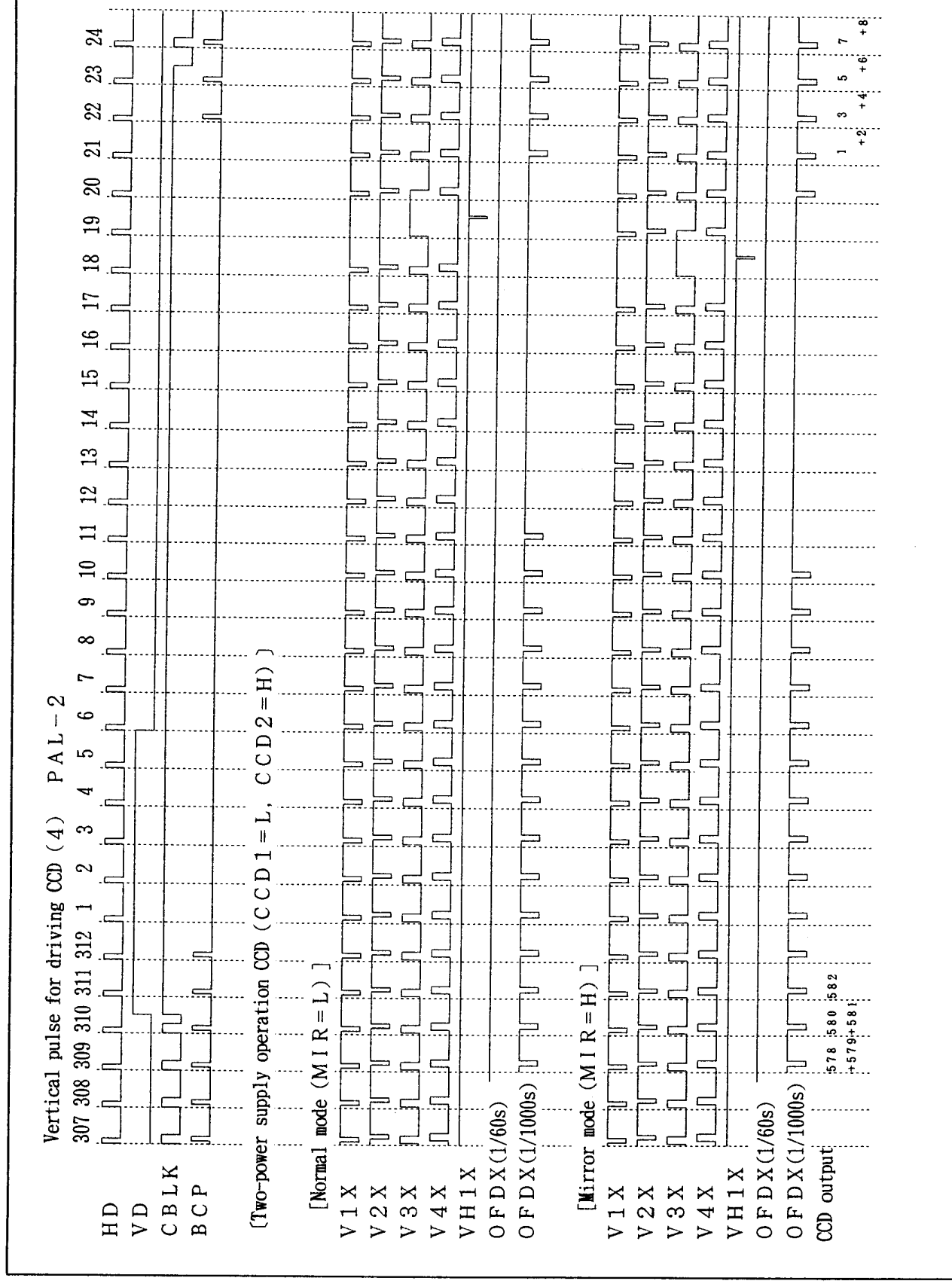

LZ9GG33M
Read out pulse (5)
Two-power supply operation CCD [Mirror mode]
The number:OSCI clock pulse 1ck=52.4ns(51.8ns),
( ) : PAL
ODD (1st/3rd) Field
HD
V1X
V2X
V3X
V4X
VH1X
0
120
1212(1236)
18
58
38
78
68
28
88
444
636
EVEN (2nd/4th) Field
8


LZ9GG33M
6-6. Non-interlace mode
Syncronizing vertical pulse (1)
NTSC
HD
VD
CBLK
CSYN
HBLK
PAL
Syncronizing horizontal pulse (2)
NTSC
Normal mode
WIND
Mirror mode
WIND
PAL
122H
140H
145H
167H


LZ9GG33M
Vertical pulse for driving CCD (1) NTSC-1
258 259 260 261 262 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
HD
VD
CBLK
BCP
[Four-power supply operstion CCD (CCD2=L)]
[Normal mode (MIR=L)]
V1X
V2X
V3X
V4X
VH1X
VH3X
OFDX(1/60s)
OFDX(1/1000s)
[Mirror mode (MIR=H)]
V1X
V2X
V3X
V4X
VH1X
VH3X
OFDX(1/60s)
OFDX(1/1000s)
CCD output
480 482 484 486 488 490 492
+481 +483 +485 +487 +489 +491
1 3 5 7 9 11 13
+2 +4 +6 +8 +10 +12 +14


Vertical pulse for driving CCD (2) NTSC-2
258 259 260 261 262 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
HD
VD
CBLK
BCP
[Two-power supply operation CCD (CCD1=L, CCD2=H)]
[Normal mode (MIR=L)]
V1X
V2X
V3X
V4X
VH1X
OFDX(1/60s)
OFDX(1/1000s)
[Mirror mode (MIR=H)]
V1X
V2X
V3X
V4X
VH1X
OFDX(1/60s)
OFDX(1/1000s)
CCD output
1 3 5 7 9 11 13
+2 +4 +6 +8 +10 +12 +14
486 488 490 492
+487 +489 +491


LZ9GG33M
Vertical pulse for driving CCD (3) PAL-1
307 308 309 310 311 312 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
HD
VD
CBLK
BCP
[Four-power supply operation CCD (CCD2=L)]
[Normal mode (MIR=L)]
V1X
V2X
V3X
V4X
VH1X
VH3X
OFDX(1/60s)
OFDX(1/1000s)
[Mirror mode (MIR=H)]
V1X
V2X
V3X
V4X
VH1X
VH3X
OFDX(1/60s)
OFDX(1/1000s)
CCD output
574 576 578 580 582
+575 +577 +579 +581
1 3 5 7
+2 +4 +6 +8


Vertical pulse for driving CCD (4) PAL-2
307 308 309 310 311 312 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
HD
VD
CBLK
BCP
〔Two-power supply operation CCD (CCD1=L, CCD2=H)〕
[Normal mode (MIR=L)]
V1X
V2X
V3X
V4X
VH1X
OFDX(1/60s)
OFDX(1/1000s)
[Mirror mode (MIR=H)]
V1X
V2X
V3X
V4X
VH1X
OFDX(1/60s)
OFDX(1/1000s)
CCD output
+578 +579 +580 +581 +582
1 +2 3 +4 5 +6 7 +8

7 Package and packing specification

1. Package Outline Specification

Refer to drawing No.AA1035

2. Markings

2−1. Marking contents

(1) Product name : LZ9GG33M

(2) Company name : SHARP

(3) Date code

(Example) YY WW ×

Indicates the product was manufactured in the WWth week of 19YY.

→ Denotes the production ref.code.

→ Denotes the production week. (01,02,03,・・・・・52,53)

→ Denotes the production year. (Lower two digits of the year.)

(4) The marking of "JAPAN" indicates the country of origin.

2−2. Marking layout

Refer to drawing No.AA1035

(This layout do not define the dimensions of marking character and marking position.)

3. Packing Specification

3−1. Packing materials

Material Name	Material Specification	Purpose
Tray	Conductive plastic (80devices/tray)	Fixing of device
Upper cover tray	Conductive plastic (1tray/case)	Fixing of device
Laminated aluminum bag	Aluminum polyethylene (1bag/case)	Drying of device
Desiccant	Silica gel	Drying of device
P P band	polypropylene (3 pcs/case)	Device tray fixing
Inner case	Card board (800devices/case)	Packaging of device
Label	Paper	Indicates part number, quantity and date of manufacture
Outer case	Cardboard	Outer packing of device case

(Devices shall be placed into a tray in the same direction.)

3−2. Outline dimension of tray

Refer to attached drawing

4. Precausion For Unpacking

(1) Unpacking should be done on the stand as well as human body treated with anti-ESD.

(2) Conductive treatment or anti-ESD treatment is given to a dray. Use the equivalent tray, if it is changed to another one.

5. Surface Mount Conditions

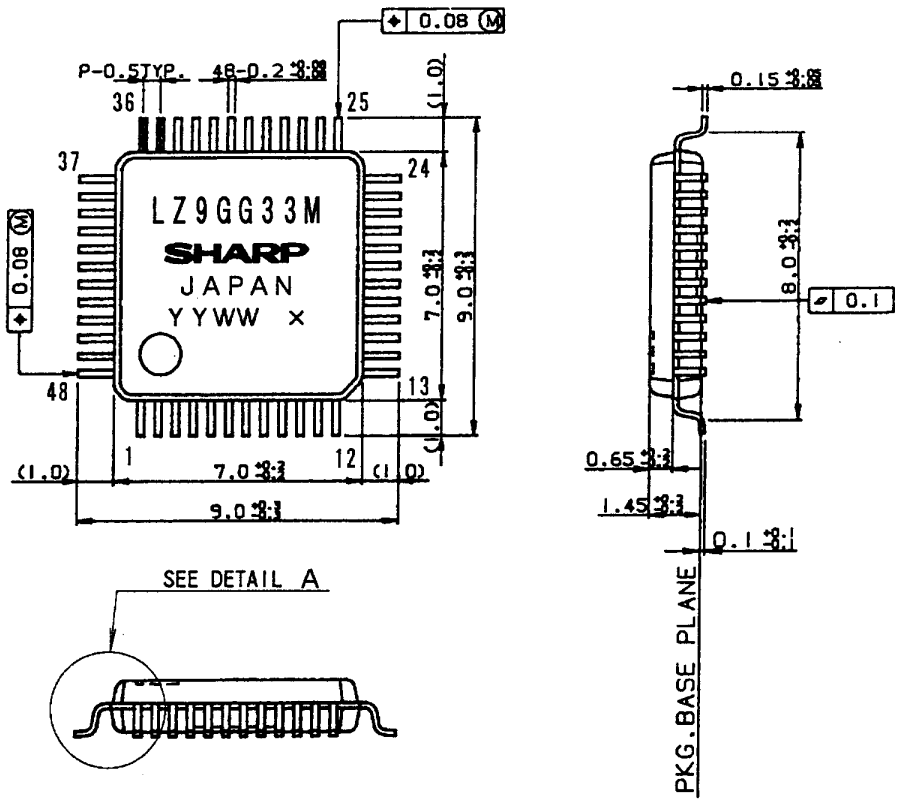
Please perform the following conditions when mounting ICs not to deteriorate IC quality.

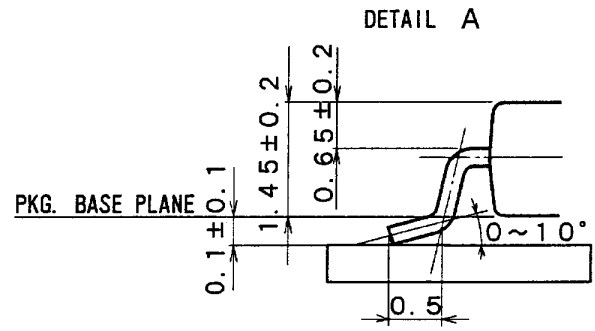
5－1.Soldering conditions(The following conditions are valid only for one time soldering.)

Mounting Method	Temperature and Duration	Measurement Point
Reflow soldering (air)	Peak temperature of 240℃, duration less than 15 seconds above 230℃, temperature increase rate of 1～4℃/second	IC surface
Vapor phase solderring	215℃ or less, duration less than 40 seconds above 200℃	Steam
Manual soldering (soldering iron)	260℃ or less, duration less than 10 seconds	IC outer lead surface

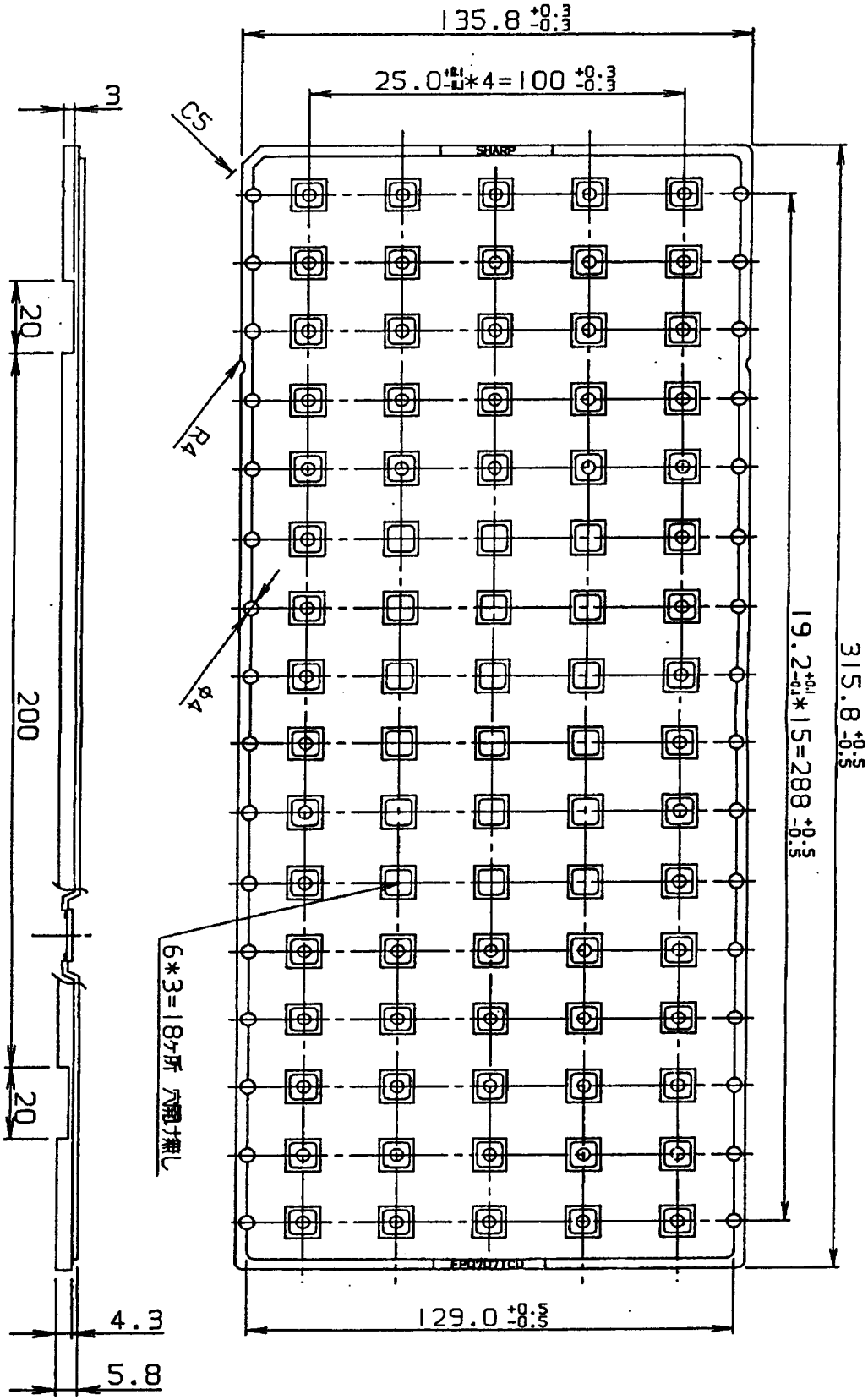
5－2. Conditions for removal of residual flux

(1) Ultrasonic washing power : 25 Watts/liter or less
(2) Washing time : Total 1 minute maximum
(3) Solvent temperature : 15～40℃





名称 NAME	QFP48-P-0707	リード仕上 LEAD FINISH	TIN-LEAD PLATING	備考 NOTE	プラスチックパッケージ外形寸法は、バリを含まないものとする。 Plastic body dimensions do not include burr of resin.
DRAWING NO.	AA1035	単位 UNIT	mm		



名称 NAME	FP0707TCD			備考 NOTE
DRAWING NO.	CV536	単位 UNIT	mm	