



Chunghwa Picture Tubes, Ltd.

Product Specification

To :

Date :

TFT LCD
CLAB070MA0ACW

ACCEPTED BY : (V0.0)

Tentative

APPROVED BY	CHECKED BY	PREPARED BY

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1. OVERVIEW

CLAB070MA0ACW is 7" color TFT-LCD (Thin Film Transistor Liquid Crystal Display). The 7" screen produces 800×RGB×600 resolution image.

General specification are summarized in the following table:

ITEM	SECIFICATION
Display Area (mm)	141.6(H)*106.2(V)
Number of Pixels	800(H) × 3(RGB) ×600(V)
Pixel Pitch (mm)	0.177 (H) × 0.177 (V)
Color Pixel Arrangement	RGB vertical stripe
Display Mode	Normally white, TN
Number of color	16M
Viewing Direction	6 o'clock
Response Time (Tr+Tf)	20 ms (typ)
Panel Transmittance	5.6%(typ.)
Electrical Interface	TTL
Power Consumption (W)	0.22 W(typ.)
Surface Treatment	Anti-Glare Surface hardness: 3H

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2. ABSOLUTE MAXIMUM RATINGS

The following values are maximum operation conditions. If exceeded, it may cause faulty operation or damage.

ITEM	SYMBOL	MIN.	MAX.	UNIT	NOTE
Digital Power Supply Voltage	VCC	-0.3	5	V	
Analog Power Supply Voltage	AVDD	-0.5	15	V	
Gate On Voltage	VGH	-0.3	40	V	
Gate Off Voltage	VGL	-20	0.3	V	
Gate on-Gate off Voltage	VGH-VGL	-0.3	40	V	
Operation temperature	T _{op}	-20	70	°C	
Storage temperature	T _{stg}	-30	80	°C	

3. ELECTRICAL CHARACTERISTICS

3.1 TFT-LCD Power Supply Voltage

Ta=25°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
Digital Power Supply Voltage	VCC	3	3.3	3.6	V	
Analog Power Supply Voltage	AVDD	9.4	9.6	9.8	V	
Gate On Power Supply Voltage	VGH	17	18	19	V	
Gate Off Power Supply Voltage	VGL	-6.6	-6	-5.4	V	
Common Power Supply Voltage	VCOM	3	3.2	3.4	V	Note1
Gamma Voltage	V1	-	8.5	-	V	
	V2	-	7.3	-	V	
	V3	-	6.96	-	V	
	V4	-	6.7	-	V	
	V5	-	5.87	-	V	
	V6	-	4.67	-	V	
	V7	-	3.43	-	V	
	V8	-	2.97	-	V	
	V9	-	2.47	-	V	
	V10	-	0.7	-	V	
Input Signal Voltage	VIH	0.7VCC	-	VCC	V	
	VIL	GND	-	0.3VCC	V	

【Note】 : *1) Please adjust VCOM to make the flicker level be minimum.

3.2 TFT-LCD Current Consumption

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Gate on Power Supply Current	IVGH	VGH =18V		0.5	1	mA	【Note1】
Gate off Power Supply Current	IVGL	VGL= -6V		0.5	1	mA	【Note1】
Digital Power Supply Current	IVCC	VCC = 3.3V		5	10	mA	【Note1】
Analog Power Supply Current	IAVDD	AVDD = 9.6V		20	25	mA	【Note1】
Total Power Consumption	PC			220.5	297	mW	【Note1】

【Note】 : *1) Typical : Under 64 gray pattern , Maximum : Under black pattern °



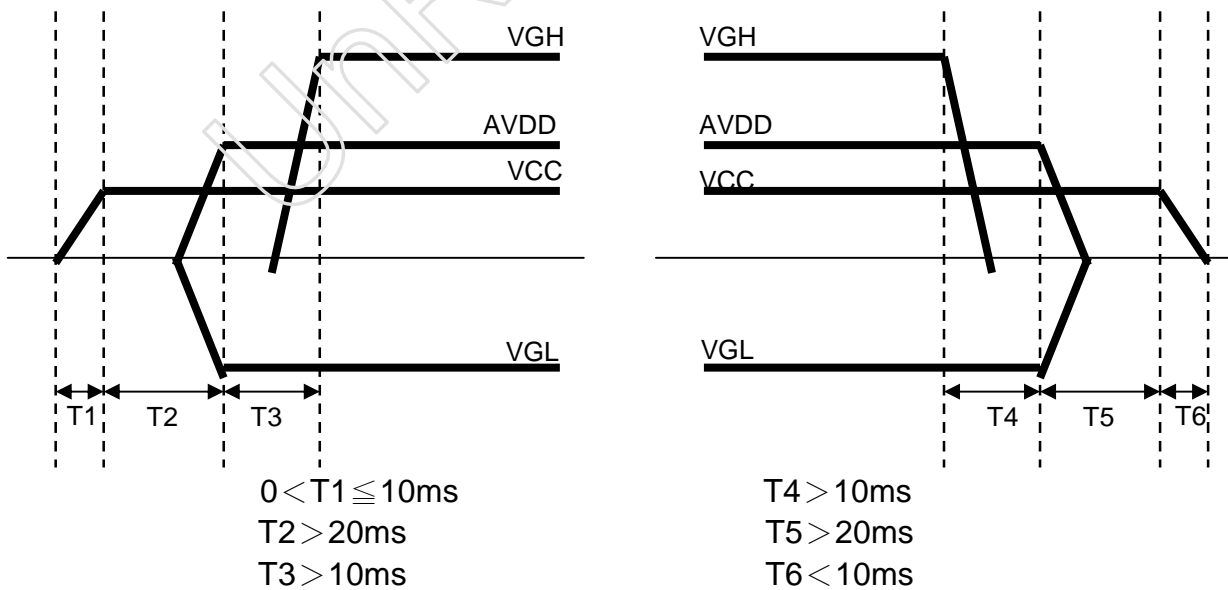
(a) 64 Gray Pattern



(b) Black Pattern

3.3 Power 、 Signal Sequence

Power On : VCC→AVDD/VGL→VGH
 Power Off : VGH→AVDD/VGL→VCC



4. INTERFACE CONNECTION

4.1 CN1

Pin NO.	SYMBOL	DESCRIPTION
1	AGND	Analog Ground
2	AVDD	Analog Power
3	VCC	Digital Power
4	R0	Data Input(LSB)
5	R1	Data Input
6	R2	Data Input
7	R3	Data Input
8	R4	Data Input
9	R5	Data Input
10	R6	Data Input
11	R7	Data Input(MSB)
12	G0	Data Input(LSB)
13	G1	Data Input
14	G2	Data Input
15	G3	Data Input
16	G4	Data Input
17	G5	Data Input
18	G6	Data Input
19	G7	Data Input(MSB)
20	B0	Data Input(LSB)
21	B1	Data Input
22	B2	Data Input
23	B3	Data Input
24	B4	Data Input
25	B5	Data Input
26	B6	Data Input
27	B7	Data Input(MSB)
28	DCLK	Clock input
29	DE	Data Enable signal. Active High to enable the data input bus
30	HSD	Horizontal sync input. Negative polarity
31	VSD	Vertical sync input. Negative polarity
32	MODE	DE/SYNC mode select. Normally pull high H: DE mode, L: HSD/VSD mode
33	RSTB	Global reset pin. Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability. Normally pull high.(R=47K Ω , C=1 μ F)
34	STBY	Standby mode, normally pull high STBYB="1", normal operation STBYB="0", timing control, source driver will turn off, all output are high-Z
35	SHLR	Left or Right Display Control
36	VCC	Digital Power
37	UPDN	Up / Down Display Control
38	GND	Digital Ground
39	AGND	Analog Ground
40	AVDD	Analog Power
41	VCOM	Common Voltage
42	DITH	Dithering function enable control. Normally pull high DITHB = "1", Disable internal dithering function DITHB = "0", Enable internal dithering function, LSB0 and LSB1 connect to ground.
43	NC	Not connect
44	NC	Not connect
45	V10	Gamma correction voltage reference
46	V9	Gamma correction voltage reference
47	V8	Gamma correction voltage reference
48	V7	Gamma correction voltage reference

49	V6	Gamma correction voltage reference
50	V5	Gamma correction voltage reference
51	V4	Gamma correction voltage reference
52	V3	Gamma correction voltage reference
53	V2	Gamma correction voltage reference
54	V1	Gamma correction voltage reference
55	NC	Not connect
56	VGH	Positive Power for TFT
57	VCC	Digital Power
58	VGL	Negative Power for TFT
59	GND	Digital Ground
60	NC	Not connect

【Note】 : *1) Function is controled by UPDN and SHLR.

UPDN	SHLR	FUNCTION
0	1	Normal Display
0	0	Left / Right Contrary
1	1	Up / Down Reverse
1	0	Left / Right Contrary , Up / Down Reverse
2	CTL	VBL(Low Voltage)

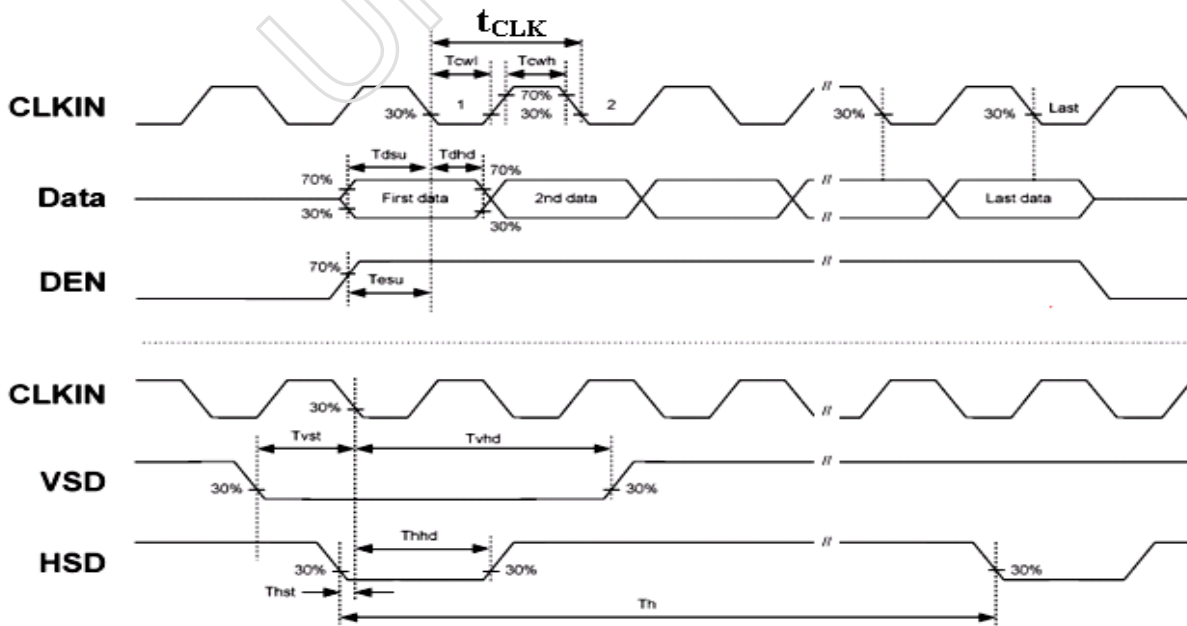
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5. INPUT SIGNAL

5.1 Timing Specification

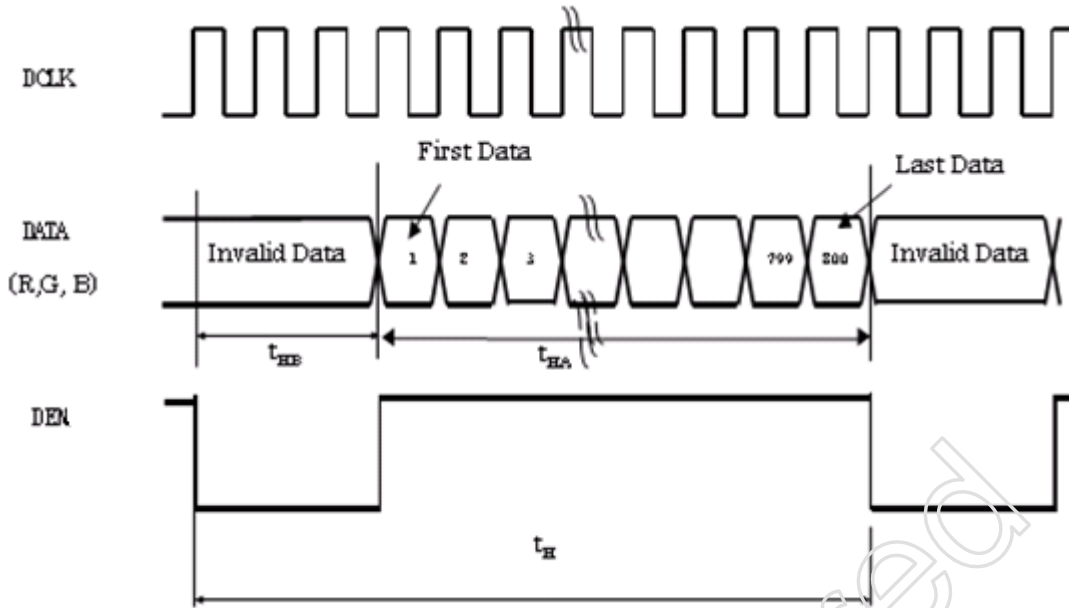
	ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
DCLK	Dot Clock	$1/t_{CLK}$	35	40	45	MHz	
	DCLK pulse duty	T_{cwh}	40	50	60	%	
DE	Setup Time	T_{esu}	8	-	-	ns	
	Hold time	T_{ehd}	8	-	-	ns	
	Horizontal Period	t_H	980	1000	1020	t_{CLK}	
	Horizontal Valid	t_{HA}	800				
	Horizontal Blank	t_{HB}	180	200	220	t_{CLK}	
	Vertical Period	t_V	650	660	670	t_H	
	Vertical Valid	t_{VA}	600				
	Vertical Blank	t_{VB}	50	60	70	t_H	
SYNC	HSYNC Setup Time	T_{hst}	8	-	-	ns	
	HSYNC Hold Time	T_{hhd}	8	-	-	ns	
	VSYSN Setup Time	T_{vst}	8	-	-	ns	
	VSYSN Hold Time	T_{vhd}	8	-	-	ns	
	Horizontal Period	t_h	980	1000	1020	t_{CLK}	
	Horizontal Pulse Width	t_{hpw}	-	40	-	t_{CLK}	$t_{hb} + t_{hpw} = 88DCLK$ is fixed
	Horizontal Back Porch	t_{hb}	-	48	-	t_{CLK}	
	Horizontal Front Porch	t_{hfp}	92	112	132	t_{CLK}	
	Horizontal Valid	t_{hd}	800				
	Vertical Period	t_v	650	660	670	t_h	
	Vertical Pulse Width	t_{vpw}	-	3	-	t_h	$t_{vpw} + t_{vb} = 39t_h$ is fixed
	Vertical Back Porch	t_{vb}	-	36	-	t_h	
	Vertical Front Porch	t_{vfp}	18	28	38	t_h	
	Vertical Valid	t_{vd}	600				
DATA	Setup Time	T_{dsu}	8	-	-	ns	
	Hold Time	T_{dhd}	8	-	-	ns	

5.2 Timing Chart

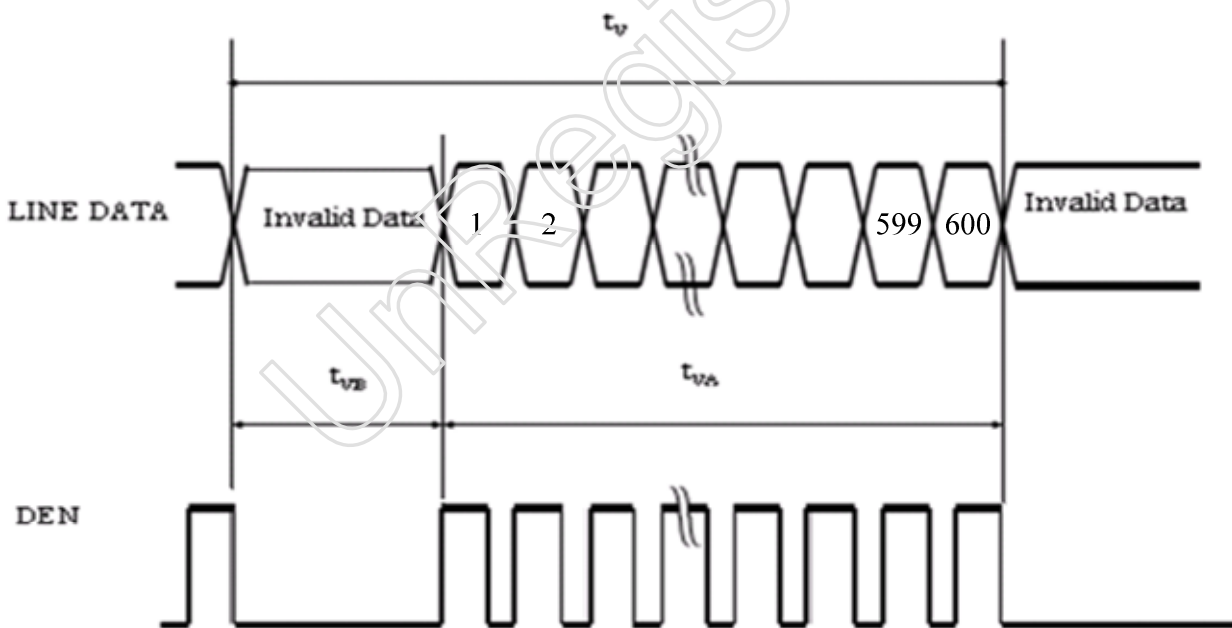


DE mode

(1)Horizontal Timing :

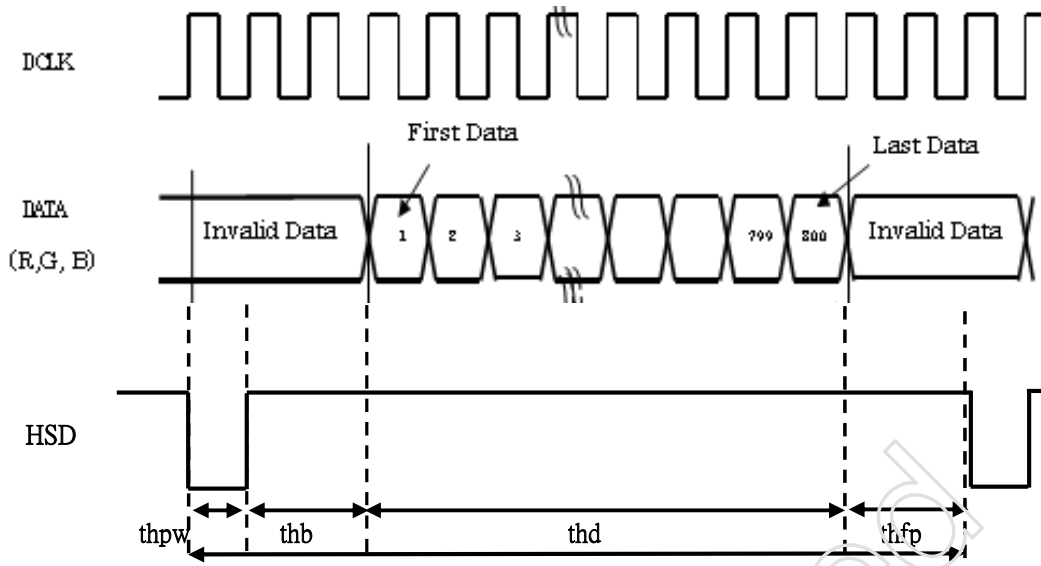


(2)Vertical Timing :

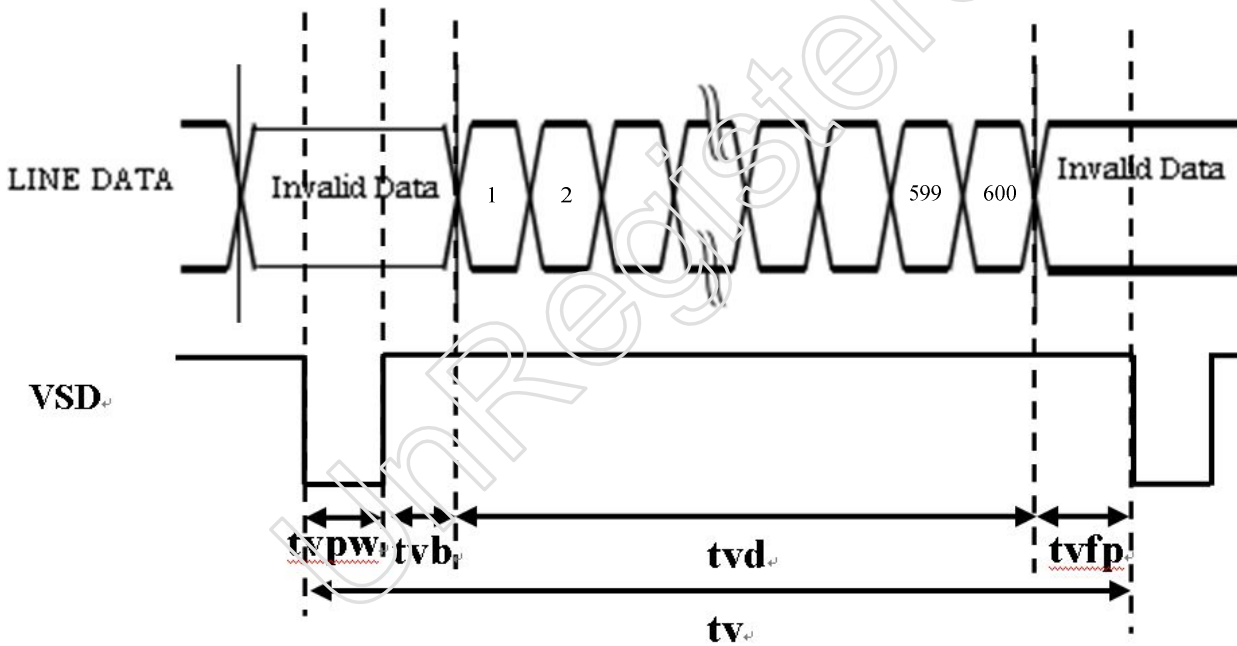


SYNC mode

(1)Horizontal Timing :

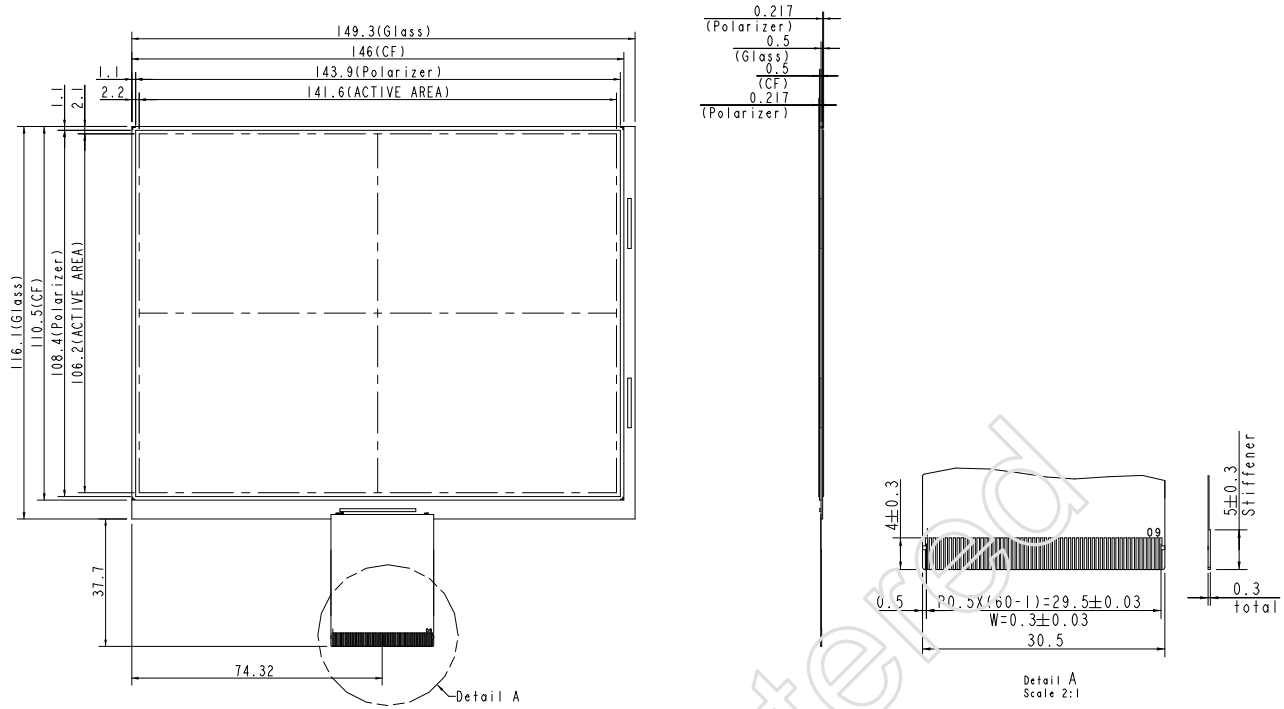


(2)Vertical Timing :



6. MECHANICAL DIMENSION

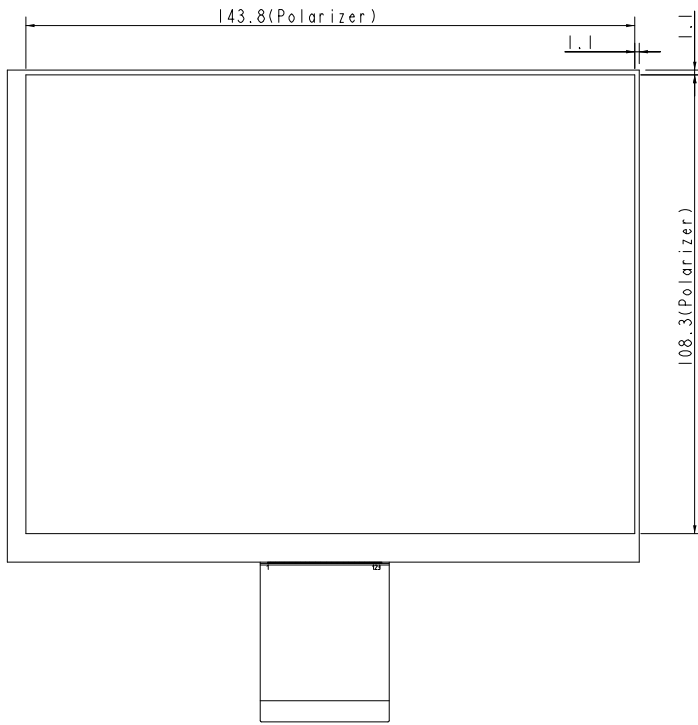
6.1 Front Side



[Unit : mm]

NOTE : General Tolerance = ±0.3 mm

6.2 Rear Side



NOTE : General Tolerance = ± 0.3 mm

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7. OPTICAL CHARACTERISTICS

Ta=25°C

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Panel Transmittance	T		5.1%	5.6%			
Contrast (CEN)	CR	Point-5	400	500	-	-	
Response Time (White - Black)	Tr +Tf	Point-5	-	20	35	ms	
View angle	Horizontal	CR ≥ 10 Point-5	120	140	-	°	
	Vertical		100	120	-	°	

【Note】 :

*1) Definition of contrast ratio :

$$\text{Contrast Ratio (CR)} = (\text{White}) \text{ Luminance of ON} \div (\text{Black}) \text{ Luminance of OFF}$$

*2) Definition of Viewing Angle(θ,ψ),refer to Fig.8-1 as below :

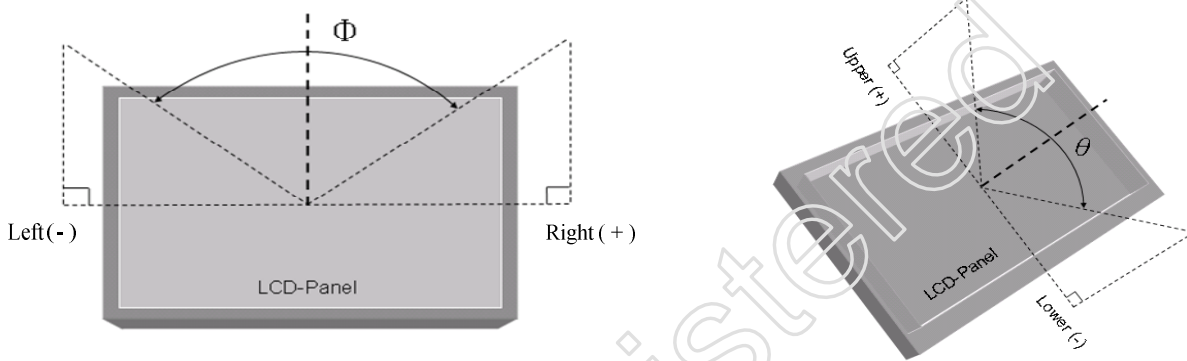


Fig.8-1 Definition of Viewing Angle

*3) Definition of Response Time.

The response time is defined as the time interval between the 10% and 90% amplitudes.Refer to Fig.8-2 as below.

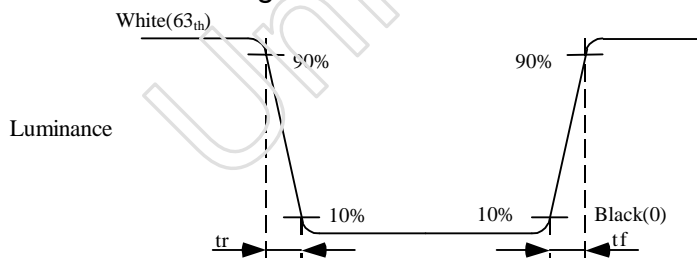


Fig.8-2 Definition of Response Time