

EXAMINED BY :	EMERGING DISPLAY TECHNOLOGIES CORPORATION	FILE NO . CAS-10360
<i>Vincent Uh</i>		ISSUE : JUN.25,2004
APPROVED BY:		TOTAL PAGE : 15
<i>Eric Le</i>		VERSION : 2

CUSTOMER	ACCEPTANCE	SPECIFICATIONS
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MODEL NO. :

ER057000(CCFL TYPES)

FOR MESSRS :

CUSTOMER'S APPROVAL

DATE :

BY :

EMERGING DISPLAY
TECHNOLOGIES CORPORATION

MODEL NO . ER057000(CCFL TYPES)	VERSION 2	PAGE 0-1
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RECORDS OF REVISION	DOC . FIRST ISSUE JUN.18,2004
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DATE	REVISED DRAWING NO.	SUMMARY
JUN.25,2004	10	7. OUTLINE DIMENSIONS IF2 CONNECTOR : MOLEX 53261-1510 → IF1 CONNECTOR : MOLEX 53261-1590 ADD DIMENSIONS 73 , 81±0.3 , 16.9 , NOTE
	14	10. INTERFACE SIGNALS CN1 : 53261-1510(MOLEX) → CN1 : 53261-1590(MOLEX)

NUMBERING SYSTEM

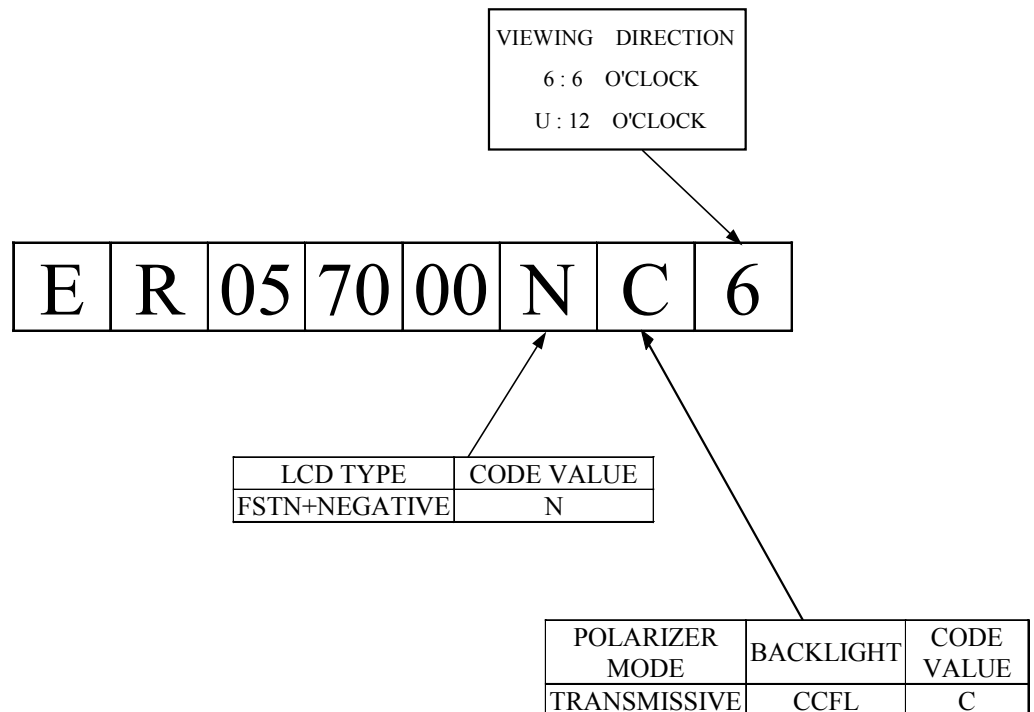


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1. GENERAL SPECIFICATIONS

1.1 GENERAL SPECIFICATIONS

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

EU - 002 A

1.2 THIS INDIVIDUAL SPECIFICATION IS PRIOR TO GENERAL SPECIFICATIONS .

2. MECHANICAL SPECIFICATION

- (1) DISPLAY SIZE ----- 5.7 inches
- (2) NUMBER OF DOTS ----- 320W * (RGB) * 240H pixels
- (3) MODULE SIZE ----- 154.6W * 114.8H * 8.5D mm
- (4) VIEWING AREA ----- 118.18W * 89.38H mm
- (5) ACTIVE AREA ----- 115.17W * 86.37H mm
- (6) PIXEL SIZE ----- 0.09Wmm * 0.33H mm
- (7) PIXEL PITCH ----- 0.12Wmm * 0.36H mm
- (8) LCD TYPE *
- (9) DRIVING METHOD ----- 1 / 240 DUTY MULTIPLEX DRIVE
- (10) BACKLIGHT*
- (11) VIEWING DIRECTION *

* PLEASE REFER TO NUMBERING SYSTEM

3. ABSOLUTE MAXIMUM RATINGS

3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS . (AT Ta=25°C)

PARAMETER	SYMBOL	MIN .	MAX .	UNIT	REMARK
POWER SUPPLY FOR LOGIC	VDD – VSS	-0.3	7.0	V	
POWER SUPPLY FOR LCD DRIVING	VLCD – VSS	-0.3	45.0	V	
INPUT VOLTAGE	VI	-0.3	VDD+0.3	V	
STATIC ELECTRICITY	—	—	100	V	NOTE (1)

NOTE (1) : TEST METHOD AND CONDITIONS :
AFTER CHARGING UP 200 PF CAPACITOR BY STATED VOLTAGE ,
THE CAPACITOR IS CONNECTED WITH INTERFACE PINS OF THE
MODULE .

3.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS .

I T E M	OPERATING		STORAGE		REMARK
	MIN .	MAX .	MIN .	MAX .	
AMBIENT TEMPERATURE	0 °C	50 °C	-20 °C	70 °C	NOTE (2),(3),(4)
HUMIDITY	—	85 % RH	—	85 % RH	WITHOUT CONDENSATION
VIBRATION	—	2.45 m/s ² (0.25 G)	—	11.76 m/s ² (1.2 G)	10~100 HZ XYZ DIRECTIONS 1 Hr . EACH
SHOCK	—	29.4 m/s ² (3 G)	—	490.0 m/s ² (50 G)	10 mSECONDS XYZ DIRECTIONS 1 TIME EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE (2) : Ta AT -20 °C : 48HR MAX .
70 °C : 120HR MAX .

NOTE (3) : BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT
TEMPERATURE THIS PHENOMENON IS REVERSIBLE .

NOTE (4) : CCFL BACKLIGHT IS NOT AVAILABLE TO FUNCTION BELOW 0 °C

4. ELECTRICAL CHARACTERISTICS

4.1 ELECTRICAL CHARACTERISTICS OF LCM

Ta=25°C

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX	UNIT	
LOGIC CIRCUIT POWER SUPPLY	VDD-VSS	—	4.5	5.0	5.5	V	
			2.7	3.0	3.3		
INPUT VOLTAGE NOTE(1)	VIH	H LEVEL	0.8VDD	—	VDD	V	
	VIL	L LEVEL	0	—	0.2VDD		
OUTPUT VOLTAGE NOTE(1)	VOH	H LEVEL	VDD-0.4	—	—	V	
	VOL	L LEVEL	—	—	+0.4	V	
RECOMMENDED LCD DRIVING VOLTAGE (NORMAL TEMP. LCM)	VLCD-VSS	$\theta = 0^\circ, \varnothing = 10^\circ$ DUTY=1/240 VDD=5.0V	0 °C	(25.8)	(26.3)	(26.8)	V
			25°C	25.3	25.8	26.3	
			50°C	(24.8)	(25.3)	(25.8)	
		$\theta = 0^\circ, \varnothing = 10^\circ$ DUTY=1/240 VDD=3.0V	0 °C	(25.8)	(26.3)	(26.8)	V
			25°C	25.3	25.8	26.3	
			50°C	(24.8)	(25.3)	(25.8)	
SUPPLY CURRENT FOR LOGIC NOTE(2)	IDD	VDD-VSS=5.0V VLCD-VSS=25.8V	—	2	4	mA	
SUPPLY CURRENT FOR LCD NOTE(2)	ILCD		—	11.0	15.0		
SUPPLY CURRENT FOR LOGIC NOTE(2)	IDD	VDD-VSS=3.0V VLCD-VSS=25.8V	—	2	4	mA	
SUPPLY CURRENT FOR LCD NOTE(2)	ILCD		—	11.0	15.0		
LCM	SURFACE LUMINANCE	L	PATTERN : (PIXELS ALL ON OF WHITE COLOR)	—	(160)	—	cd/m ²
			PATTERN : (PIXELS ALL OFF)	—	(5.3)	—	
RECOMMENDED FRAME FREQUENCY FOR OPTIMUM CONTRAST	FLM	—	110	120	130	Hz	

NOTE(1) : APPLIED TO TERMINALS FLM , CL1 , CL2 , D7~D0 , DISPOFF.

NOTE(2) : THE DISPLAY PATTERN IS ALL "OFF" / "ON".

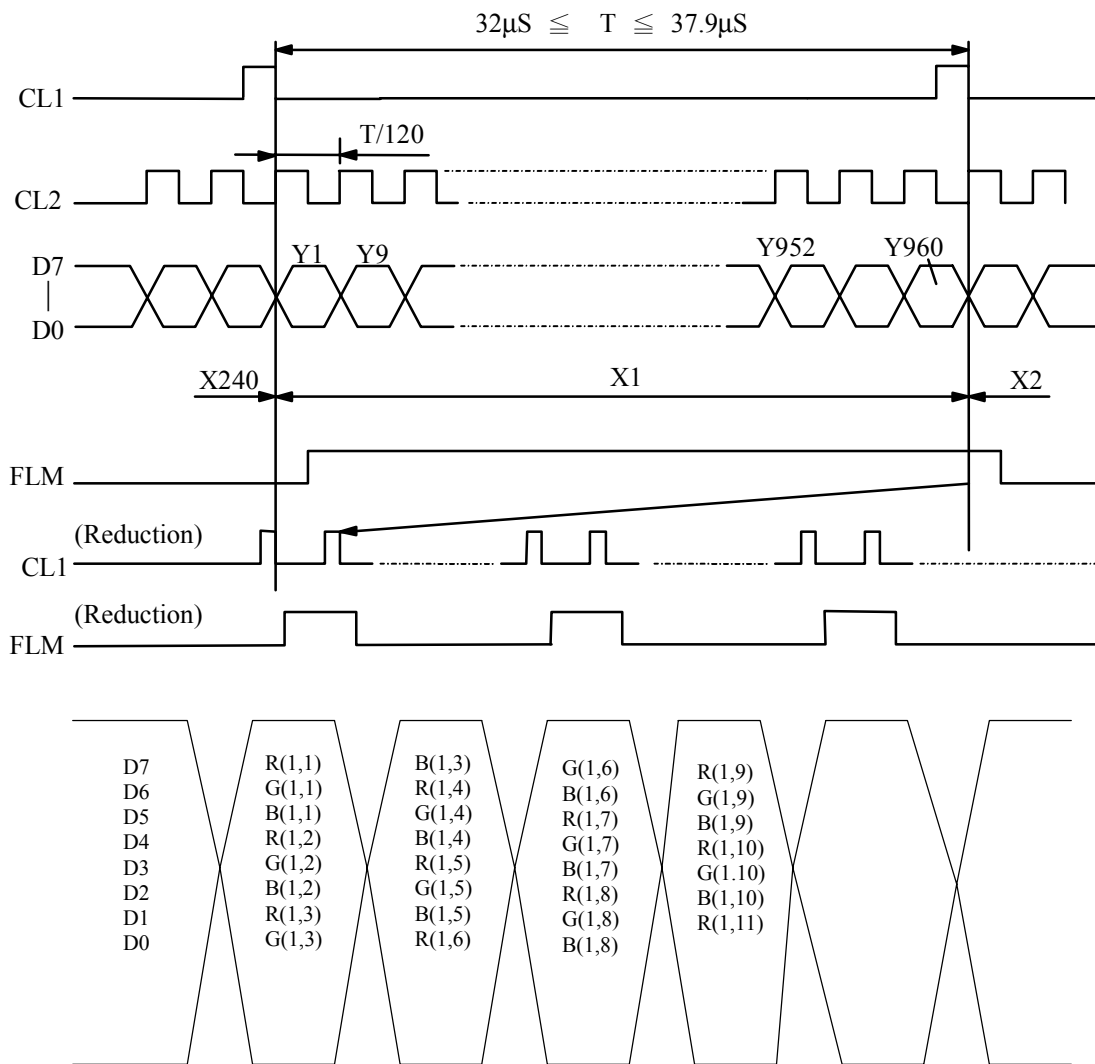
4.2 ELECTRICAL CHARACTERISTICS OF BACKLIGHT

PARAMETER		SYMBOL	MIN.	TYP.	MAX .	UNIT	REMARK
POWER SUPPLY FOR CCFL	LAMP VOLTAGE	V_L	—	550	—	Vrms	—
	LAMP CURRENT	I_L	4.0	5.0	6.0	mArms	NOTE(1)
	LAMP POWER CONSUMPTION	P_L	—	3.71	—	W	NOTE(2)
	LAMP FREQUENCY	F_L	35	50	(80)	KHz	
	LAMP LIFE TIME	L_L	—	—	—	hrs	$I_L = 5 \text{ mArms}$
	STARTING VOLTAGE	V_S	—	—	780	Vrms	$T_a=25^\circ\text{C}$
		—	—	1010	$T_a=0^\circ\text{C}$		

NOTE (1) IT IS RECOMMENDED THAT WILL BE NOT MORE THAN 5.0 mArms SO THAT HEAT RADIATION OF CCFL BACKLIGHT MAY LEAST AFFECT THE DISPLAY QUALITY.

NOTE (2) POWER CONSUMPTION EXCLUDED INVERTER LOSS.

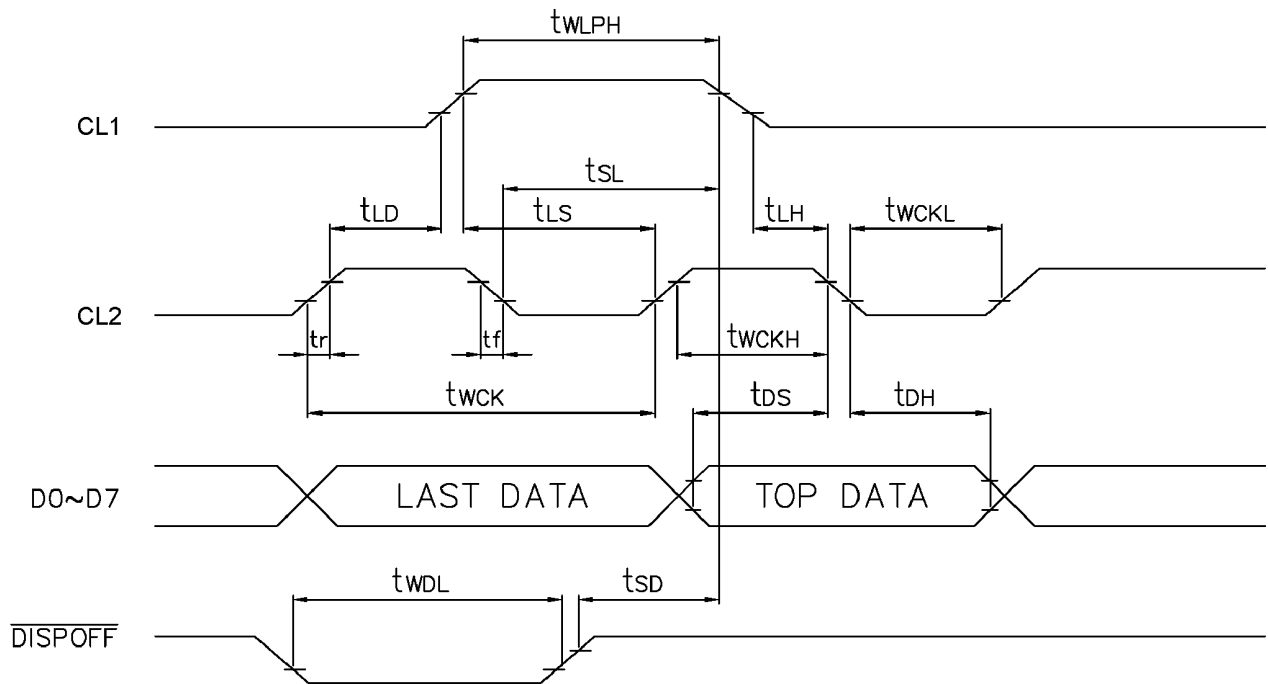
5. TIMING CHARACTERISTICS
5.1 INTERFACE TIMING



5.2 SWITCHING CHARACTERISTICS

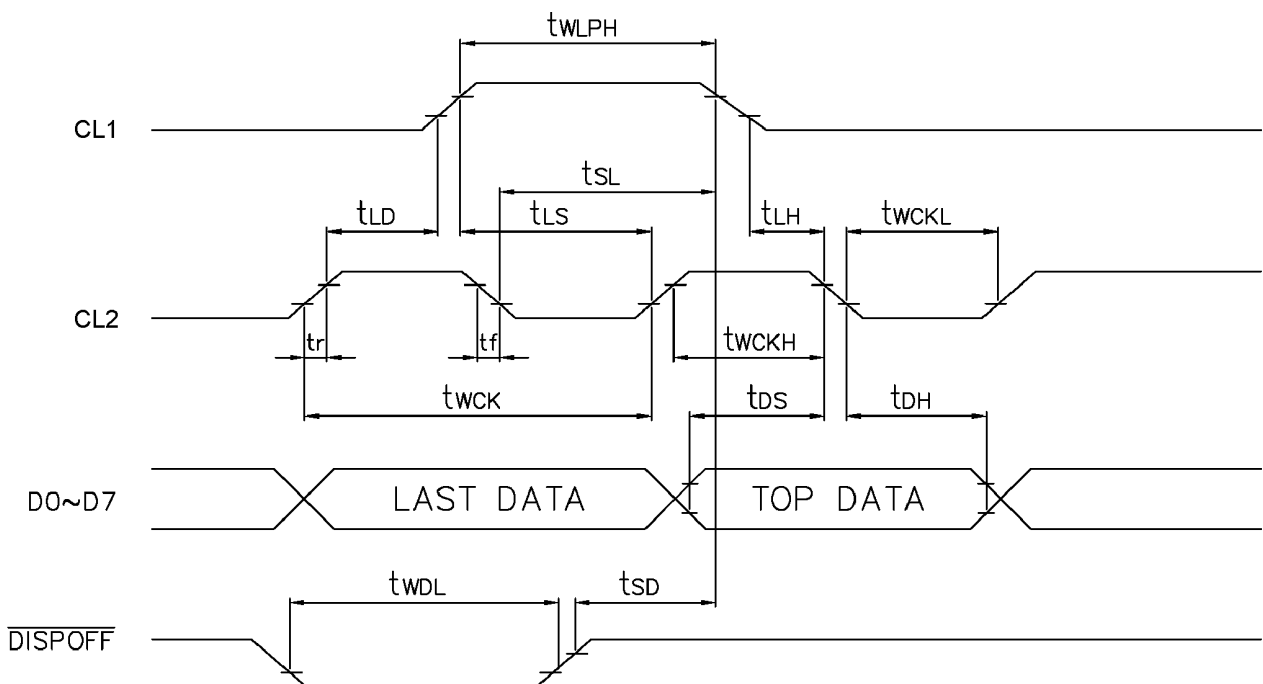
5.2.1 SWITCHING CHARACTERISTICS OF VDD=3.0V

Parameter	SYMBOL	MIN.	MAX.	UNIT
CLOCK PULSE CYCLE TIME	t_{WCK}	66	—	ns
CLOCK PULSE HIGH LEVEL WIDTH	t_{WCKH}	23	—	ns
CLOCK PULSE LOW LEVEL WIDTH	t_{WCKL}	23	—	ns
LATCH PULSE HIGH LEVEL WIDTH	t_{WLPH}	30	—	ns
CL2→CL1 RISE TIME	t_{LD}	10	—	ns
CL2→CL1 FALL TIME	t_{SL}	30	—	ns
CL1→CL2 RISE TIME	t_{LS}	30	—	ns
CL1→CL2 FALL TIME	t_{LH}	30	—	ns
CLOCK PULSE RISE/FALL TIME	t_r, t_f	—	50	ns
DATA SETUP TIME	t_{DS}	10	—	ns
DATA HOLD TIME	t_{DH}	25	—	ns
$\overline{DISPOFF}$ LOW LEVEL WIDTH	t_{WDL}	1.2	—	μs
$\overline{DISPOFF}$ CANCELLATION TIME	t_{SD}	100	—	ns



5.2.2 SWITCHING CHARACTERISTICS OF VDD=5.0V

Parameter	SYMBOL	MIN.	MAX.	UNIT
CLOCK PULSE CYCLE TIME	t_{WCK}	40	—	ns
CLOCK PULSE HIGH LEVEL WIDTH	t_{WCKH}	12	—	ns
CLOCK PULSE LOW LEVEL WIDTH	t_{WCKL}	14	—	ns
LATCH PULSE HIGH LEVEL WIDTH	t_{WLPH}	15	—	ns
CL2→CL1 RISE TIME	t_{LD}	5	—	ns
CL2→CL1 FALL TIME	t_{SL}	25	—	ns
CL1→CL2 RISE TIME	t_{LS}	25	—	ns
CL1→CL2 FALL TIME	t_{LH}	25	—	ns
CLOCK PULSE RISE/FALL TIME	t_r, t_f	—	50	ns
DATA SETUP TIME	t_{DS}	5	—	ns
DATA HOLD TIME	t_{DH}	15	—	ns
$\overline{DISPOFF}$ LOW LEVEL WIDTH	t_{WDL}	1.2	—	μs
$\overline{DISPOFF}$ CANCELLATION TIME	t_{SD}	100	—	ns



6. OPTICAL CHARACTERISTICS

6.1 OPTICAL CHARACTERISTICS OF NORMAL TEMPERATURE MODE

Ta=25°C

I T E M		SYMBOL	CONDITION	MIN .	TYP .	MAX.	UNIT	REMARK	
VIEWING ANGLE RANGE		θ	K ≥ 2	—	(90)	—	degree	4	
		\varnothing		—	(±58)	—			
CONTRAST RATIO		K	$\theta = 0^\circ$ $\varnothing = 0^\circ$	—	(30)	—	—	1	
RESPONSE TIME	RISE	Tr	$\theta = 0^\circ$ $\varnothing = 0^\circ$	Ta=0°C	(1650)	(1700)	(1750)	ms	1
				Ta=25°C	(200)	(230)	(330)		
				Ta=50°C	(120)	(150)	(180)		
	FALL	Tf		Ta=0°C	(990)	(1040)	(1090)		
				Ta=25°C	(120)	(150)	(180)		
				Ta=50°C	(60)	(90)	(120)		
THE BRIGHTNESS OF MODULE		B	IL=5mArms	—	(160)	—	cd/m ²	2	
THE UNIFORMITY OF MODULE		—		(75)	(80)	—	%	3	

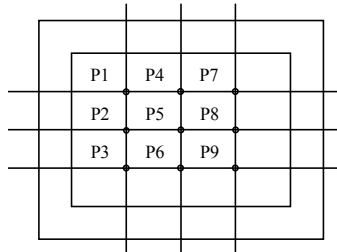
NOTE (1) : PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS. (EU - 002A)

NOTE (2) : POLARIZER MODE : TRANSMISSIVE

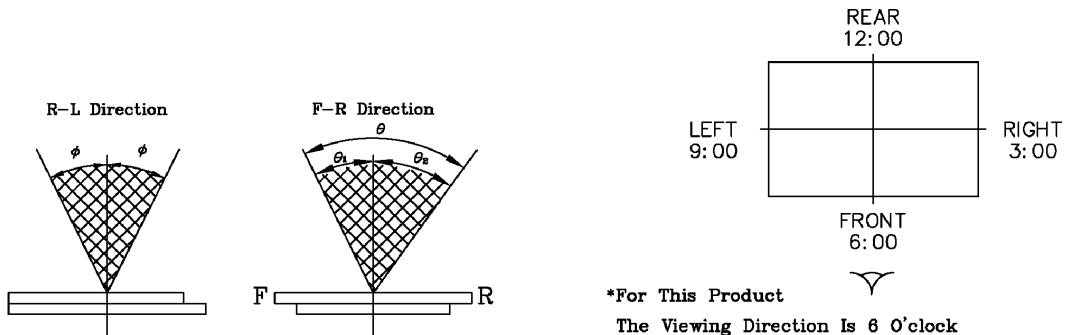
NOTE (3) : MEASUREMENT OF THE FOLLOWING 9 PLACES ON THE DISPLAY.

DEFINITION OF THE BRIGHTNESS TOLERANCE .



$$\text{UNIFORMITY} : \left[1 - \frac{\text{MAXIMUM BRIGHTNESS} - \text{MINIMUM BRIGHTNESS}}{\text{AVERAGE BRIGHTNESS}} \right] \times 100\%$$

NOTE (4) : DEFINITION OF VIEWING ANGLE.



*For This Product
The Viewing Direction Is 6 O'clock
So $\theta_1 > \theta_2$

$\theta = \theta_1 + \theta_2$
*Conditions

Operating Voltage : VLCD-VSS
Frame Frequency : 120Hz
Applying Waveform : 1/N duty 1/a bias
Contrast Ratio : larger than 2

6.2 COLOR OF CIE COORDINATE

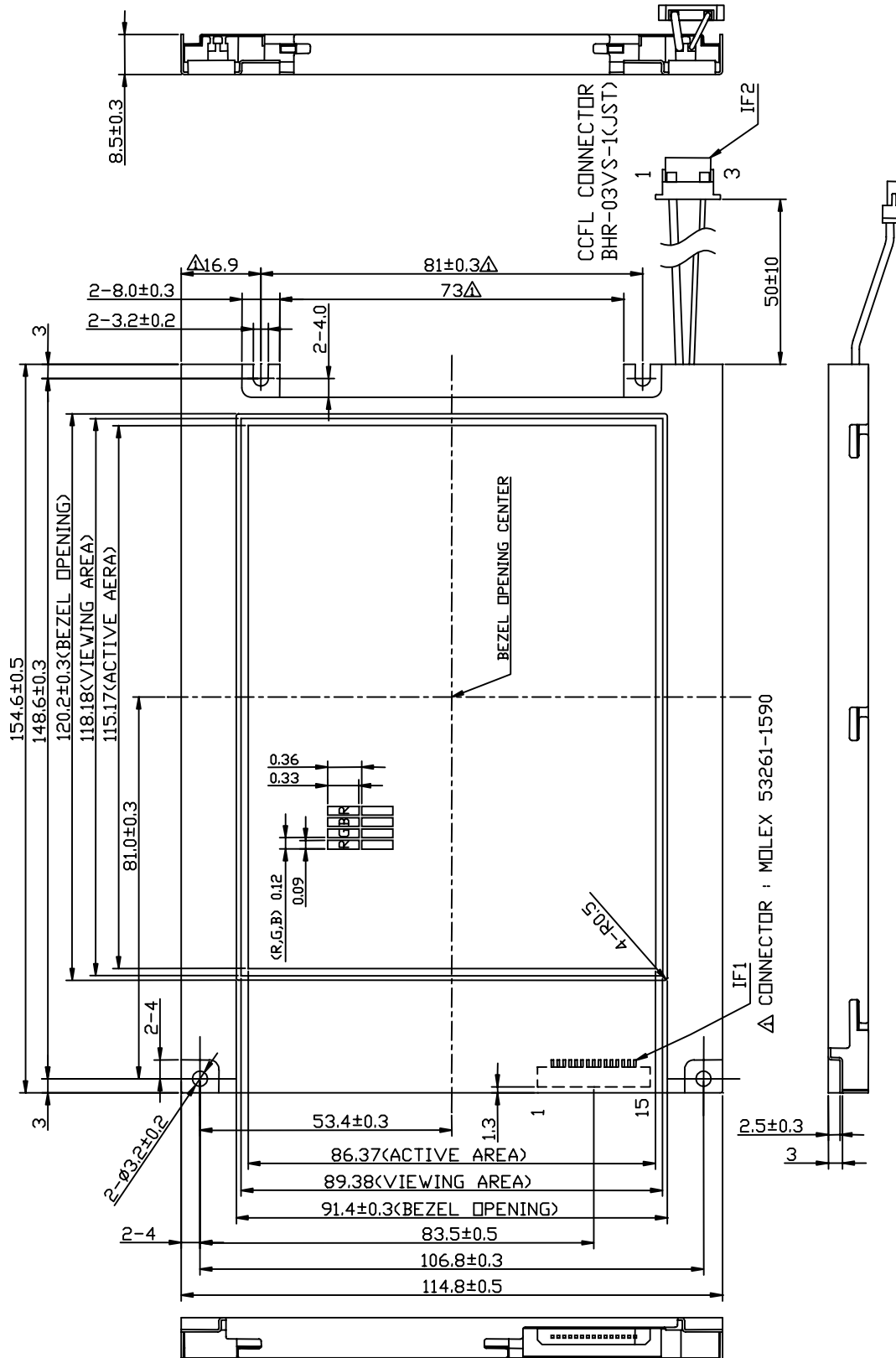
Ta=25°C

ITEM		SYMBOL	CONDITION	MIN	TYP	MAX	REMARK
COLOR OF CIE COORDINATE	RED	x	$\theta = 0^\circ, \varnothing = 0^\circ$	(0.40)	(0.45)	(0.46)	
		y		(0.26)	(0.31)	(0.31)	
	GREEN	x	$\theta = 0^\circ, \varnothing = 0^\circ$	(0.25)	(0.30)	(0.27)	
		y		(0.34)	(0.39)	(0.51)	
	BLUE	x	$\theta = 0^\circ, \varnothing = 0^\circ$	(0.15)	(0.20)	(0.16)	
		y		(0.15)	(0.20)	(0.12)	
	WHITE	x	$\theta = 0^\circ, \varnothing = 0^\circ$	(0.25)	(0.30)	(0.35)	
		y		(0.26)	(0.31)	(0.29)	

TOLERANCE : ± 0.05

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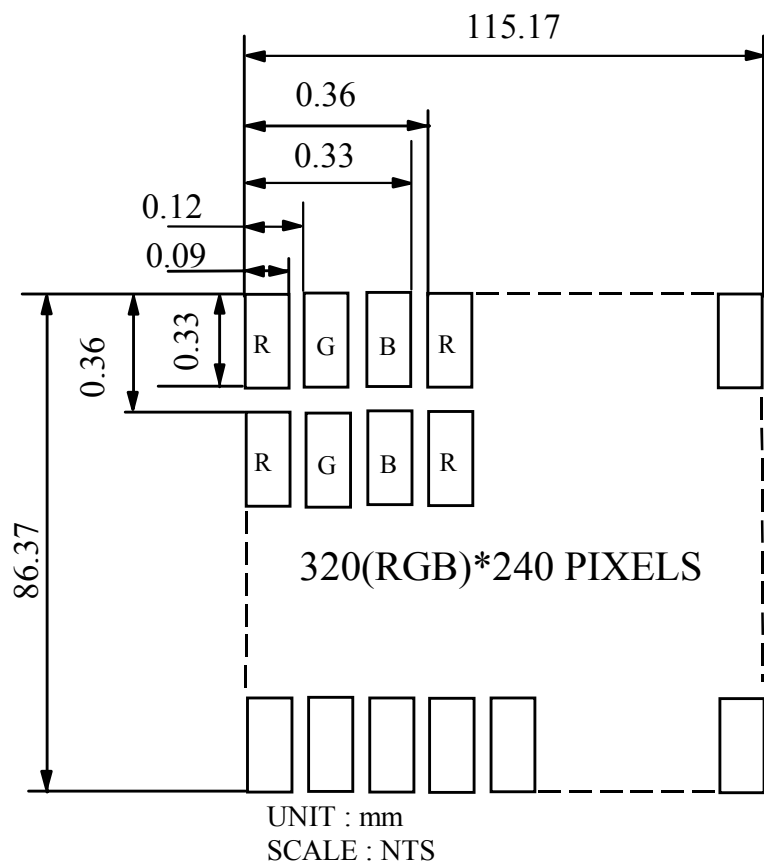
7. OUTLINE DIMENSIONS



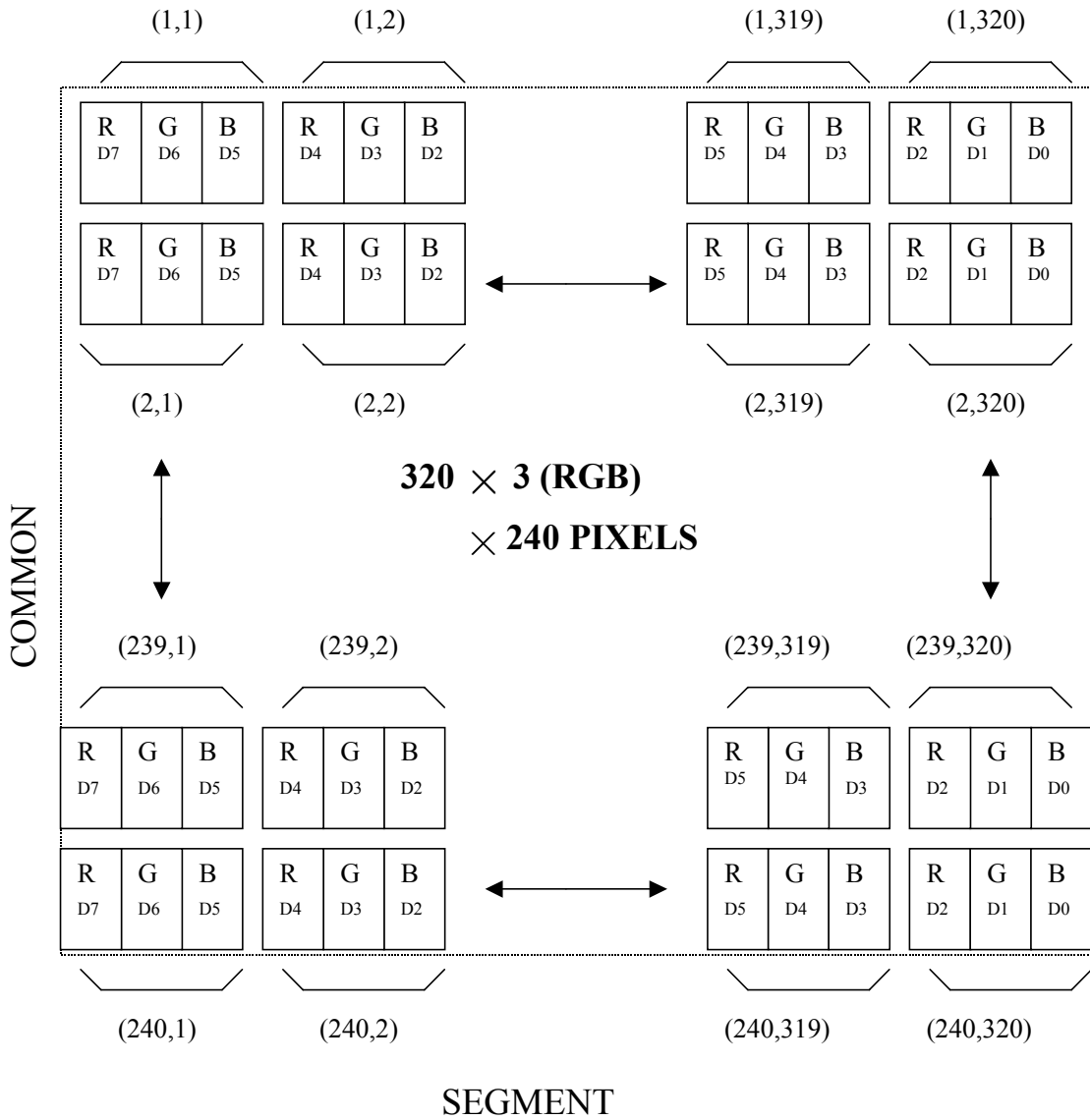
NOTES: 1.TOLERANCE ND SPECIFIED : ±0.5mm
 2.Matching Connector :
 IF1: 51021-1500(Molex)
 IF2: SM02-(8.0)B-BHS-1(JST)

NOTE : MARK Δ MODIFY (NUMBER NOTE MODIFY VERSION)

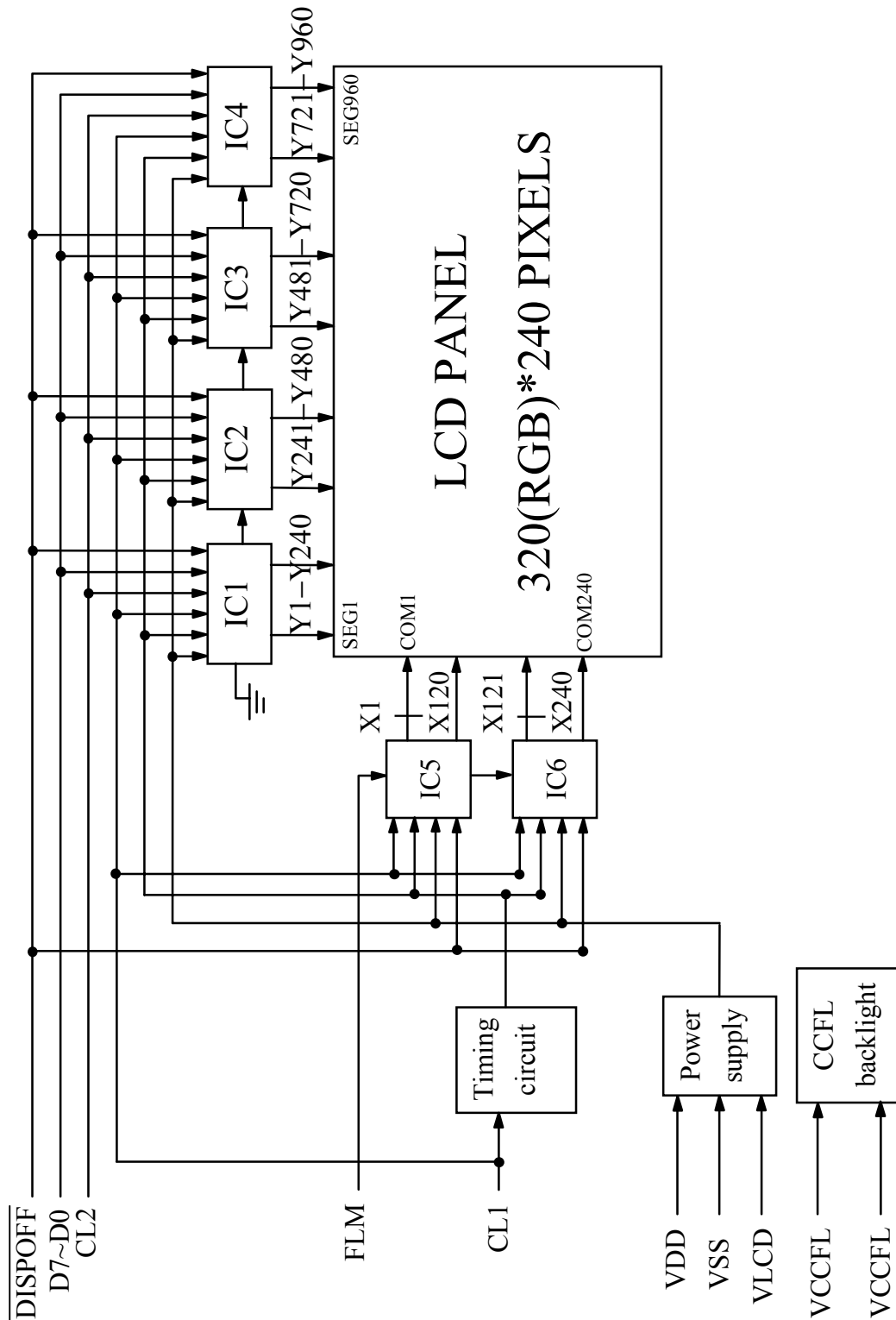
8. DETAIL DRAWING
8.1 DETAIL DRAWING OF PIXEL MATRIX



8.2 DETAIL DRAWING OF BLOCK DIAGRAM



9. BLOCK DIAGRAM



10 . INTERFACE SIGNALS

IF1 :

PIN NO.	SYMBOL	LEVEL	FUNCTION
1	FLM	H	SYNCHRONOUS SIGNAL FOR DRIVING SCANNING LINE
2	CL1	H→L	DATA SIGNAL LATCH CLOCK(LOAD)
3	CL2	H→L	DATA SIGNAL SHIFT CLOCK(CP)
4	$\overline{\text{DISPOFF}}$	H/L	DISPLAY CONTROL SIGNAL , H:DISPLAY ON L:DISPLAY OFF
5	VDD	—	POWER SUPPLY FOR LOGIC
6	VSS	—	POWER SUPPLY (0V , GND)
7	VLCD	—	POWER SUPPLY FOR LCD DRIVE
8	D7	H/L	DISPLAY DATA
9	D6		
10	D5		
11	D4		
12	D3		
13	D2		
14	D1		
15	D0		

CN1 : 53261-1590(MOLEX)

RECOMMENDED MATCHING CONNECTOR : 51021-1500(MOLEX) OR COMPATIBLE

IF2 :

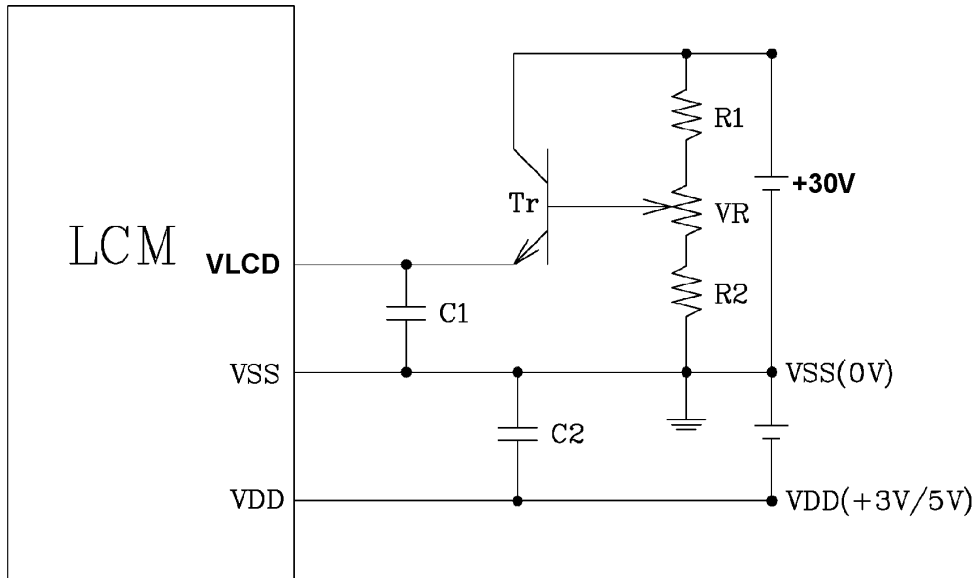
INTERFACE	PIN NO.	SIGNAL	LEVEL	FUNCTION
CCFL	1	HV	AC	POWER SUPPLY FOR CCFL(HOT)
	2	NC	—	NON-CONNECTION
	3	GND	—	POWER SUPPLY FOR CCFL(GND)

CN2 : BHR-03VS-1(JST)

RECOMMENDED MATCHING CONNECTOR : SM02-(8.0)B-BHS-1(JST) OR COMPATIBLE

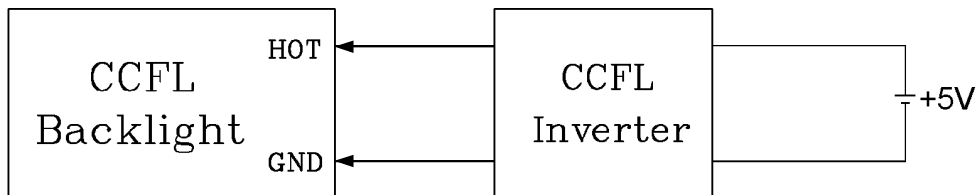
11 . POWER SUPPLY

11.1 POWER SUPPLY FOR LCM



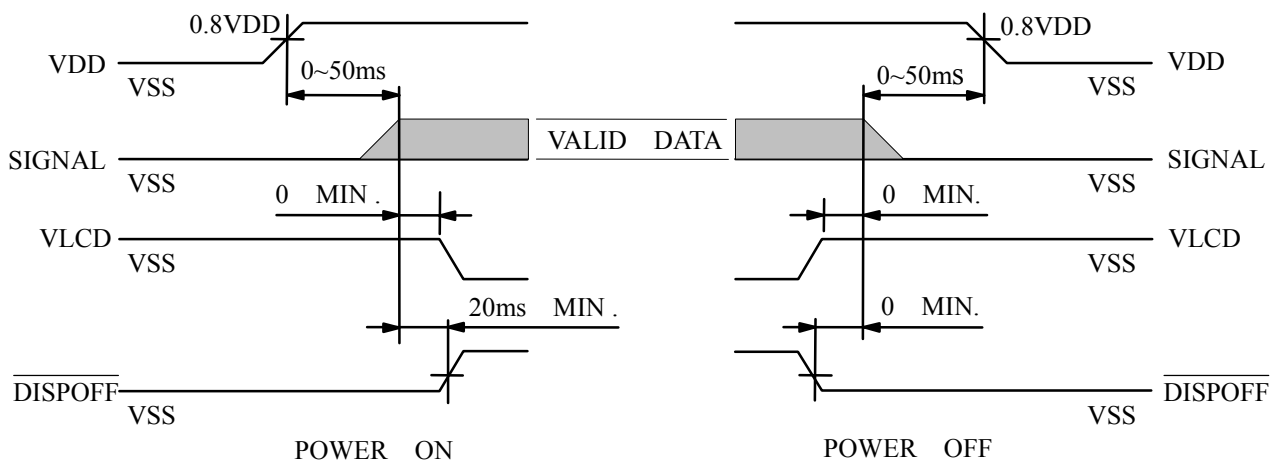
RECOMMENDED : $R1+R2+VR=10\sim 20K\Omega$; $(C1,C2=10\mu F)$

11.2 POWER SUPPLY FOR CCFL BACK-LIGHT



RECOMMENDED CCFL INVERTER : 01-B069-0001

11.3 TIMING OF POWER SUPPLY AND INTERFACE SIGNAL



The missing pixels may occur when the LCM is driven beyond above power interface timing sequence.