EXAMINED BY : Yung Chang Hu	EMERGING DISPLAY	FILE NO. CAS-10466
		ISSUE : JUL.17,2006
APPROVED BY: David Chang	TECHNOLOGIES CORPORATION	TOTAL PAGE : 15
		VERSION : 2

CUSTOMER ACCEPTANCE SPECIFICATIONS

MODEL NO . :

ER057005(CCFL TYPES)

(RoHS)

FOR MESSRS :

CUSTOMER'S APPROVAL

DATE :

BY :

RECORDS OF REVISION

DOC . FIRST ISSUE NOV.15,2005

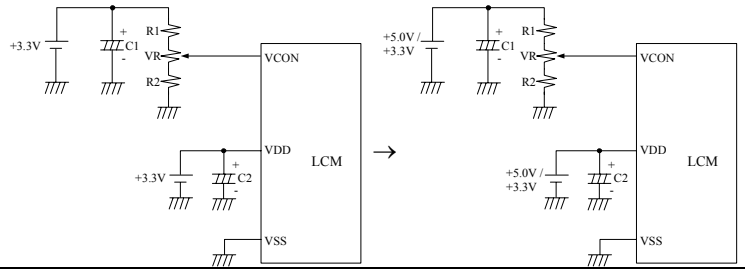
DATE	REVISED DRAWING NO.	SUMMARY
JUL.17,2006	2	3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS. DELETE (AT Ta = 25°C)
	3	4 . 1 ELECTRICAL CHARACTERISTICS OF LCM

ITEM	SYMBOL	CONDITION		MIN.	TYP.	MAX	UNIT
LOGIC CIRCUIT POWER SUPPLY	VDD–VSS	—		3.15	3.3	3.45	V
CONTRAST ADJUSTMENT VOLTAGE	VCON	θx=0°,θy=0° DUTY=1/240 VDD=3.3V/5.0V	0 °C	1.5	2.0	—	V
			25°C	—	2.0	—	
			60°C	—	2.0	2.5	
SUPPLY CURRENT FOR LOGIC NOTE(2)	IDD	VDD-VSS=5.0/3.3V		—	60	85	mA

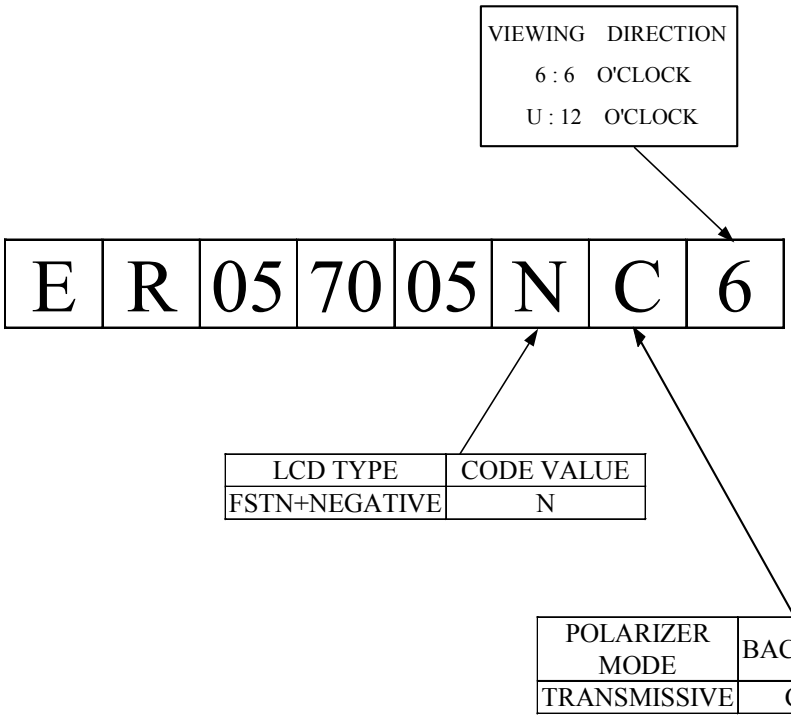
↓

ITEM	SYMBOL	CONDITION		MIN.	TYP.	MAX	UNIT
LOGIC CIRCUIT POWER SUPPLY	VDD–VSS	—		4.5	5.0	5.5	V
				3.15	3.3	3.45	
CONTRAST ADJUSTMENT VOLTAGE	VCON	θx=0°,θy=0° DUTY=1/240 VDD=3.3V	0 °C	1.5	2.0	—	V
			25°C	—	2.0	—	
			60°C	—	2.0	2.5	
SUPPLY CURRENT FOR LOGIC NOTE(2)	IDD	VDD-VSS=3.3V		—	60	85	mA

	7	ADD 5 . 2 . 2 SWITCHING CHARACTERISTICS OF VDD=5.0V
	15	11.1 POWER SUPPLY FOR LCM



NUMBERING SYSTEM



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1. GENERAL SPECIFICATIONS

1.1 GENERAL SPECIFICATIONS
PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

E U - 0 0 6 B

1.2 THIS INDIVIDUAL SPECIFICATION IS PRIOR TO GENERAL SPECIFICATIONS .

1.3 MATERIAL SAFETY DESCRIPTION
ASSEMBLIES SHALL COMPLY WITH EUROPEAN ROHS REQUIREMENTS, INCLUDING PROHIBITED MATERIALS/COMPONENTS CONTAINING LEAD, MERCURY, CADMIUM, HEXAVALENT CHROMIUM, POLYBROMINATED BIPHENYLS (PBB) AND POLYBROMINATED DIPHENYL ETHERS (PBDE)

2. MECHANICAL SPECIFICATION

(1)	DISPLAY SIZE	5.7 inches
(2)	NUMBER OF DOTS	320W * (RGB) * 240H pixels
(3)	MODULE SIZE	167W * 109H * 8.9D mm (WITHOUT CCFL'S CABLE & FFC)
(4)	VIEWING AREA	118.18W * 89.38H mm
(5)	ACTIVE AREA	115.17W * 86.37H mm
(6)	PIXEL SIZE	0.33Wmm * 0.33H mm
(7)	PIXEL PITCH	0.36Wmm * 0.36H mm
(8)	DOT SIZE	0.09Wmm * 0.33H mm
(9)	DOT PITCH	0.12Wmm * 0.36H mm
(10)	LCD TYPE *	
(11)	DRIVING METHOD	1 / 240 DUTY MULTIPLEX DRIVE
(12)	BACKLIGHT*	
(13)	VIEWING DIRECTION *	
(14)	TEMPERATURE COMPENSATION CIRCUIT IS BUILT-IN	

* PLEASE REFER TO NUMBERING SYSTEM

3. ABSOLUTE MAXIMUM RATINGS

3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	MIN.	MAX.	UNIT	REMARK
POWER SUPPLY FOR LOGIC	VDD – VSS	0	7.0	V	
CONTRAST ADJUSTEMEMT VOTAGE	VCON	1.0	3.0	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.

ITEM	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	0 °C	60 °C	-20 °C	70 °C	NOTE (2),(3),(4)
HUMIDITY	NOTE (5)		NOTE (5)		WITHOUT CONDENSATION
VIBRATION	—	2.45 m/s² (0.25 G)	—	11.76 m/s² (1.2 G)	10~100 HZ XYZ DIRECTIONS 1 Hr. EACH
SHOCK	—	29.4 m/s² (3 G)	—	490.0 m/s² (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
NOTE (5) : Ta ≤ 60°C : 90%RH MAX (96HRS MAX).
Ta > 60°C : ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF 90%RH AT 60°C(96HRS MAX).

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
				3.15	3.3	3.45	
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
CONTRAST ADJUSTMENT VOLTAGE	VCON	θx=0°,θy=0° DUTY=1/240 VDD=3.3V/5.0V	0 °C	1.5	2.0	—	V
			25°C	—	2.0	—	
			60°C	—	2.0	2.5	
SUPPLY CURRENT FOR LOGIC NOTE(2)	IDD	VDD-VSS=5.0 / 3.3V		—	60	85	mA
INPUT LEAK CURRENT	ICON	VCON=2.0V		—	—	10	μA
	I_{IN} NOTE (3)	VIN=VDD OR VSS		—	±10	—	
LCM SURFACE LUMINANCE	L	PATTERN : (PIXELS ALL ON OF WHITE COLOR)		—	150	—	cd/m²
		PATTERN : (PIXELS ALL OFF)		—	5	—	
RECOMMENDED FRAME FREQUENCY FOR OPTIMUM CONTRAST	FLM	—		110	120	130	Hz

NOTE(1) : APPLIED TO TERMINALS FLM , CL1 , CL2 , D7~D0 , $\overline{\text{DISPOFF}}$.
NOTE(2) : THE DISPLAY PATTERN IS ALL “OFF” / ”ON”.
NOTE(3) : $\overline{\text{DISPOFF}}$, FLM , CL1 , CL2 , D7~D0.

4 . 2 ELECTRICAL CHARACTERISTICS OF BACKLIGHT

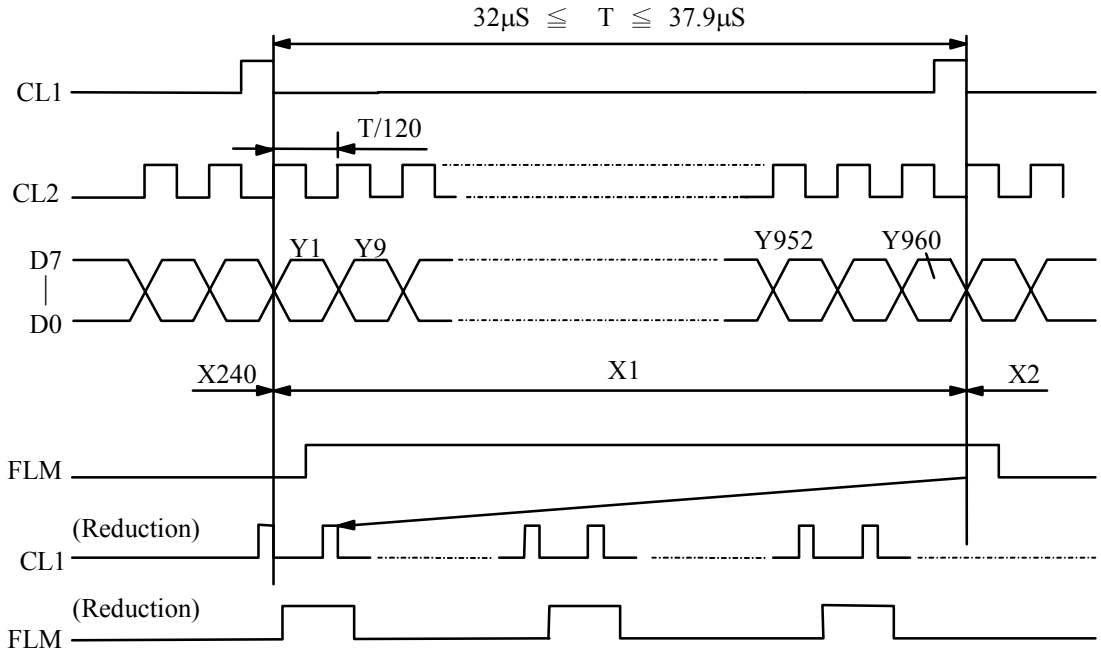
PARAMETER		SYMBOL	MIN.	TYP.	MAX .	UNIT	REMARK
POWER SUPPLY FOR CCFL	LAMP VOLTAGE	V_L	—	250	—	Vrms	—
	LAMP CURRENT	I_L	4.5	5.0	6.0	mArms	NOTE(1)
	LAMP POWER CONSUMPTION	P_L	—	1.25	—	W	NOTE(2)
	LAMP FREQUENCY	F_L	35	50	60	KHz	
	LAMP LIFE TIME	L_L	25K	35K	—	hrs	IL = 5 mArms
	STARTING VOLTAGE	Vs	—	—	450	Vrms	Ta=25°C
			—	—	600		Ta=0°C

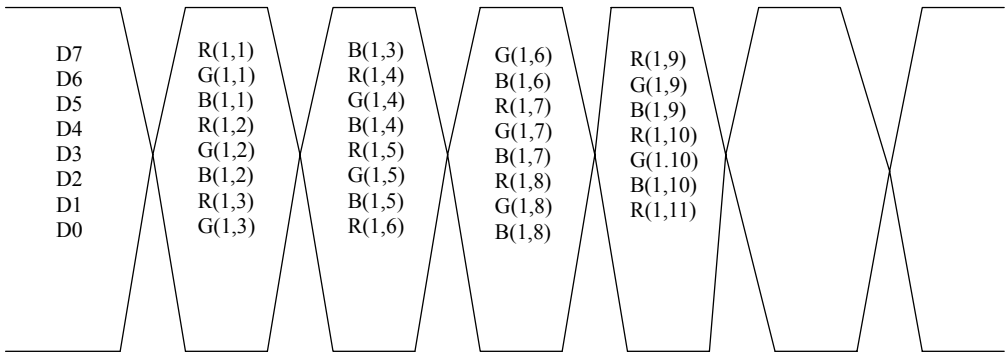
NOTE (1) : IT IS RECOMMENDED THAT THE LAMP CURRENT WILL NOT BE HIGHER THAN 5mArms TO MINIMIZE HEAT RADIATION SINCE THIS CAN AFFECT THE DISPLAY QUALITY.

NOTE (1) : POWER CONSUMPTION EXCLUDED INVERTER LOSS.

5. TIMING CHARACTERISTICS

5.1 INTERFACE TIMING

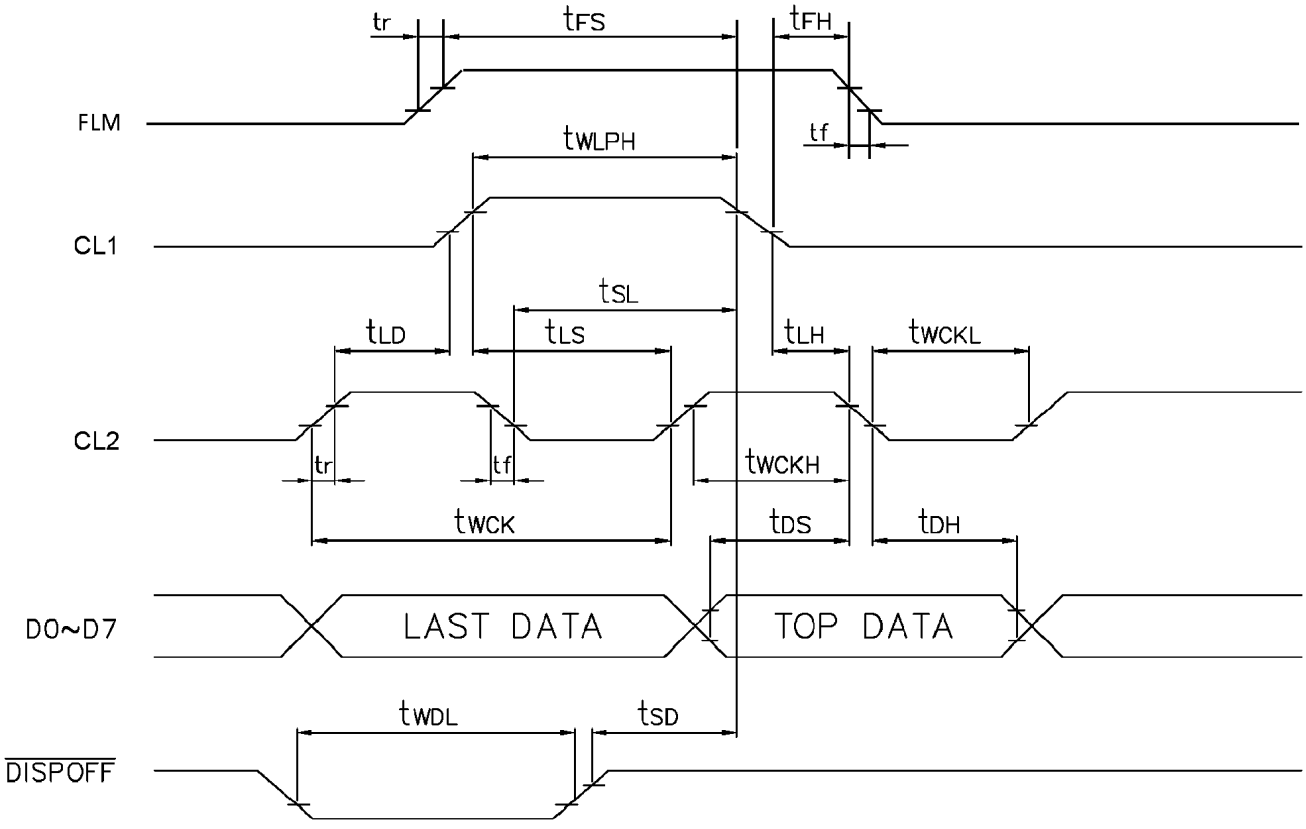




5.2 SWITCHING CHARACTERISTICS

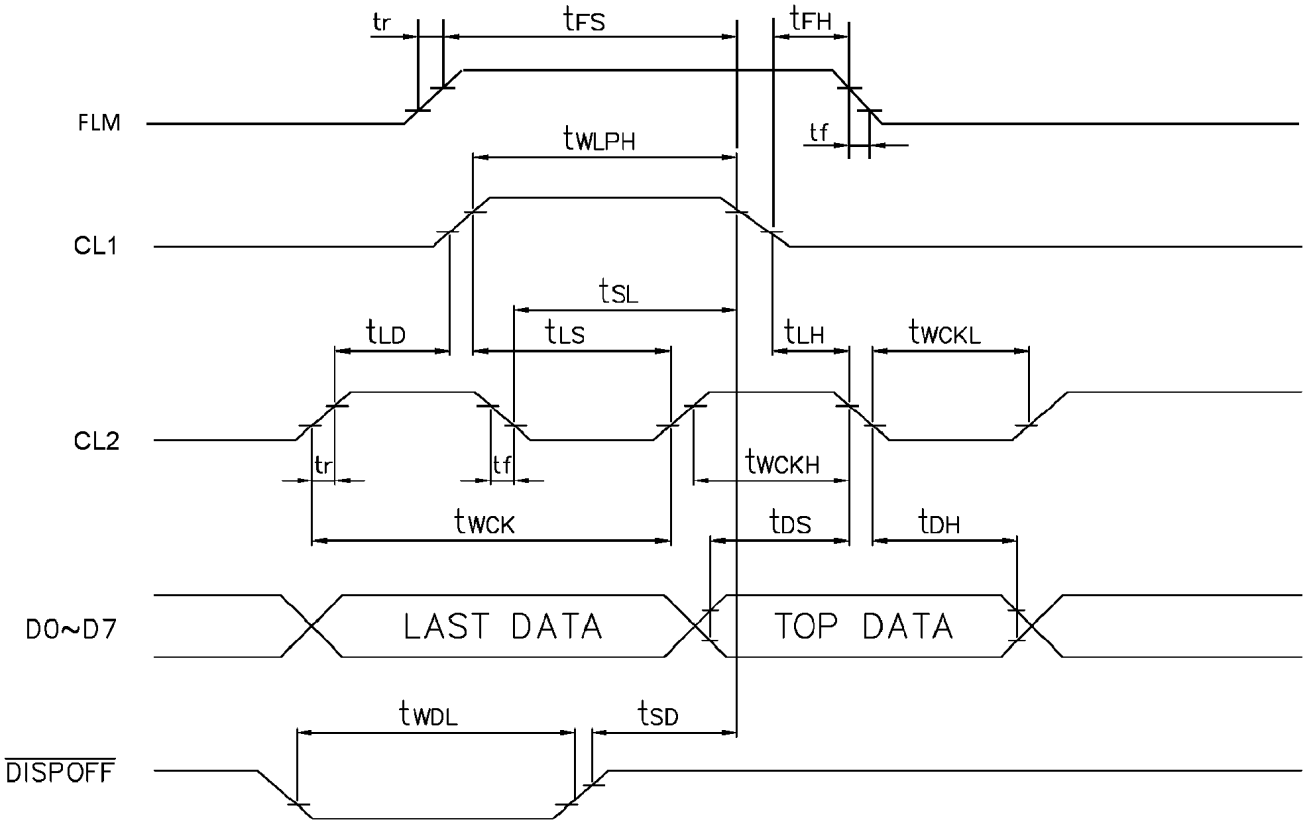
5.2.1 SWITCHING CHARACTERISTICS OF VDD=3.3V

PARAMETER	SYMBOL	MIN.	MAX.	UNIT
CL2 PULSE CYCLE TIME	t_{WCK}	82	—	ns
CL2 PULSE HIGH LEVEL WIDTH	t_{WCKH}	28	—	ns
CL2 PULSE LOW LEVEL WIDTH	t_{WCKL}	28	—	ns
CL1 PULSE HIGH LEVEL WIDTH	t_{WLPH}	30	—	ns
CL2 RISE TO CL1 RISE TIME	t_{LD}	10	—	ns
CL2 FALL TO CL1 FALL TIME	t_{SL}	30	—	ns
CL1 RISE TO CL2 RISE TIME	t_{LS}	30	—	ns
CL1 FALL TO CL2 FALL TIME	t_{LH}	30	—	ns
CLOCK PULSE RISE/FALL TIME	tr , tf	—	50	ns
DATA SETUP TIME	t_{DS}	10	—	ns
DATA HOLD TIME	t_{DH}	30	—	ns
FLM SETUP TIME	t_{FS}	30	—	ns
FLM HOLD TIME	t_{FH}	50	—	ns
$\overline{\text{DISPOFF}}$ LOW LEVEL WIDTH	t_{WDL}	1.2	—	μs
$\overline{\text{DISPOFF}}$ CANCELLATION TIME	t_{SD}	100	—	ns



5.2.2 SWITCHING CHARACTERISTICS OF VDD=5.0V

PARAMETER	SYMBOL	MIN.	MAX.	UNIT
CL2 PULSE CYCLE TIME	t_{WCK}	56	—	ns
CL2 PULSE HIGH LEVEL WIDTH	t_{WCKH}	17	—	ns
CL2 PULSE LOW LEVEL WIDTH	t_{WCKL}	19	—	ns
CL1 PULSE HIGH LEVEL WIDTH	t_{WLPH}	15	—	ns
CL2 RISE TO CL1 RISE TIME	t_{LD}	5	—	ns
CL2 FALL TO CL1 FALL TIME	t_{SL}	25	—	ns
CL1 RISE TO CL2 RISE TIME	t_{LS}	25	—	ns
CL1 FALL TO CL2 FALL TIME	t_{LH}	25	—	ns
CLOCK PULSE RISE/FALL TIME	tr , tf	—	50	ns
DATA SETUP TIME	t_{DS}	5	—	ns
DATA HOLD TIME	t_{DH}	15	—	ns
FLM SETUP TIME	t_{FS}	30	—	ns
FLM HOLD TIME	t_{FH}	50	—	ns
$\overline{\text{DISPOFF}}$ LOW LEVEL WIDTH	t_{WDL}	1.2	—	μs
$\overline{\text{DISPOFF}}$ CANCELLATION TIME	t_{SD}	100	—	ns



6. OPTICAL CHARACTERISTICS

6.1 OPTICAL CHARACTERISTICS OF NORMAL TEMPERATURE MODE

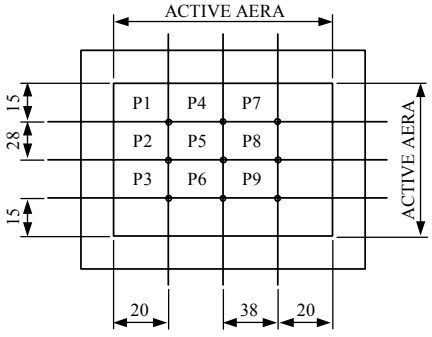
Ta=25°C

ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	REMARK
VIEWING ANGLE RANGE	6 O'CLOCK	θy+	K ≥ 2		15	20	—	degree	1
		θy-			35	40	—		
		θx+			35	40	—		
		θx-			35	40	—		
	12 O'CLOCK	θy+			40	45	—		
		θy-			25	30	—		
		θx+			50	55	—		
		θx-			50	55	—		
CONTRAST RATIO	6 O'CLOCK	K	θy- = 10°, θx = 0°		35	50	—	—	1
	12 O'CLOCK		θy+ = 10°, θx = 0°		25	40	—	—	
RESPONSE TIME	RISE	Tr	θy = 0° θx = 0°	Ta=0°C	—	1700	2550	ms	1
				Ta=25°C	—	350	525		
				Ta=60°C	—	200	260		
	FALL	Tf		Ta=0°C	—	1040	1560		
				Ta=25°C	—	250	375		
				Ta=60°C	—	90	135		
THE BRIGHTNESS OF MODULE		B	IL=5mArms		—	150	—	cd/m^2	2
THE UNIFORMITY OF MODULE		—			70	75	—	%	3

NOTE (1) : PLEASE REFER TO :
CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS. (EU – 006B)

NOTE (2) : POLARIZER MODE : TRANSMISSIVE

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



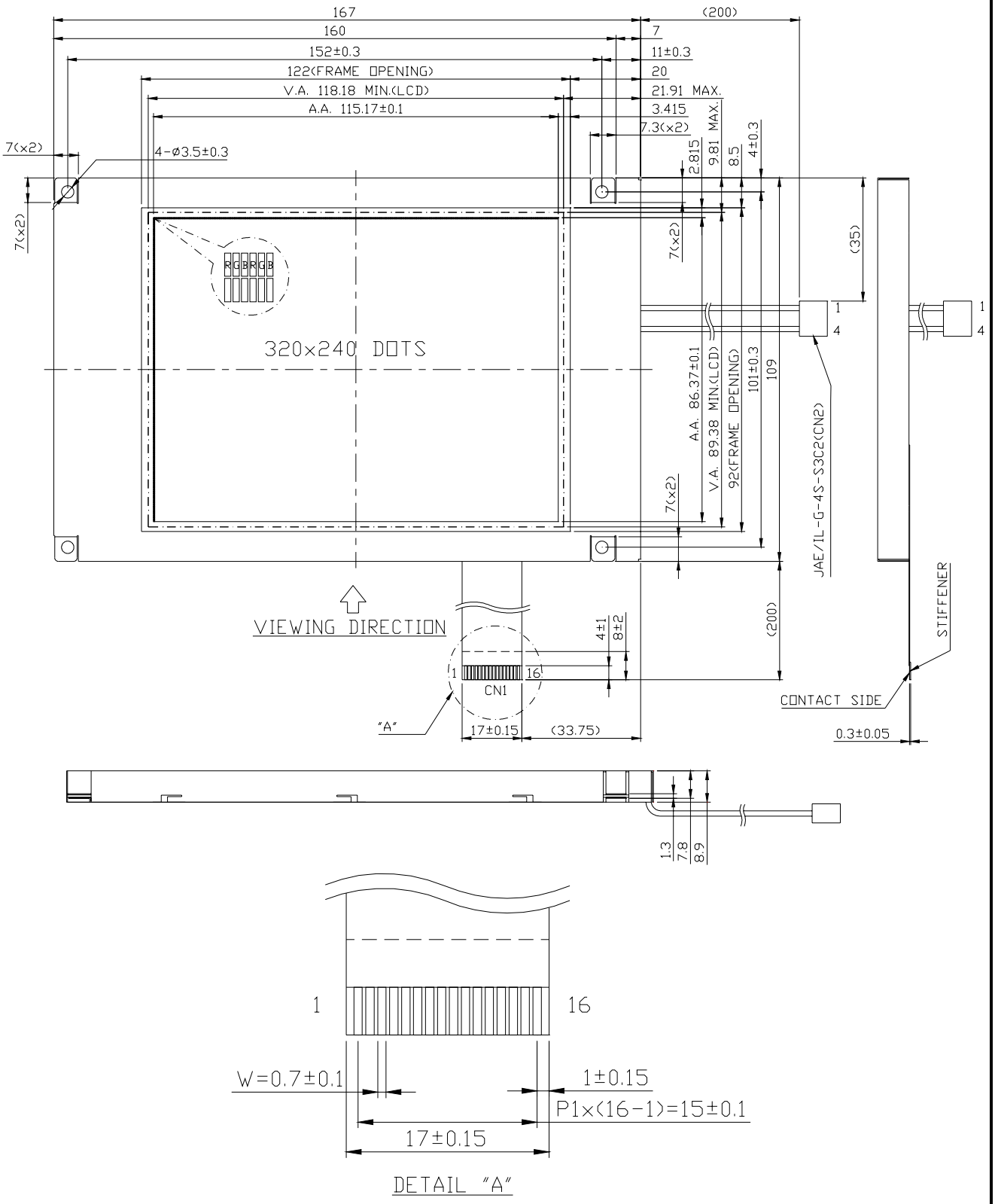
$$\text{UNIFORMITY} : \left[\frac{\text{MINIMUN BRIGHTESS}}{\text{MAXIMUN BRIGHTESS}}\right] \times 100\%$$

6.2 COLOR OF CIE COORDINATE

Ta=25°C

ITEM		SYMBOL	CONDITION	MIN	TYP	MAX	REMARK
COLOR OF CIE COORDINATE	RED	x	θy = 0° , θx = 0°	0.52	0.57	0.62	
		y		0.29	0.34	0.39	
	GREEN	x	θy = 0° , θx = 0°	0.23	0.28	0.33	
		y		0.49	0.54	0.59	
	BLUE	x	θy = 0° , θx = 0°	0.10	0.15	0.20	
		y		0.05	0.10	0.15	
	WHITE	x	θy = 0° , θx = 0°	0.25	0.30	0.35	
		y		0.26	0.31	0.36	

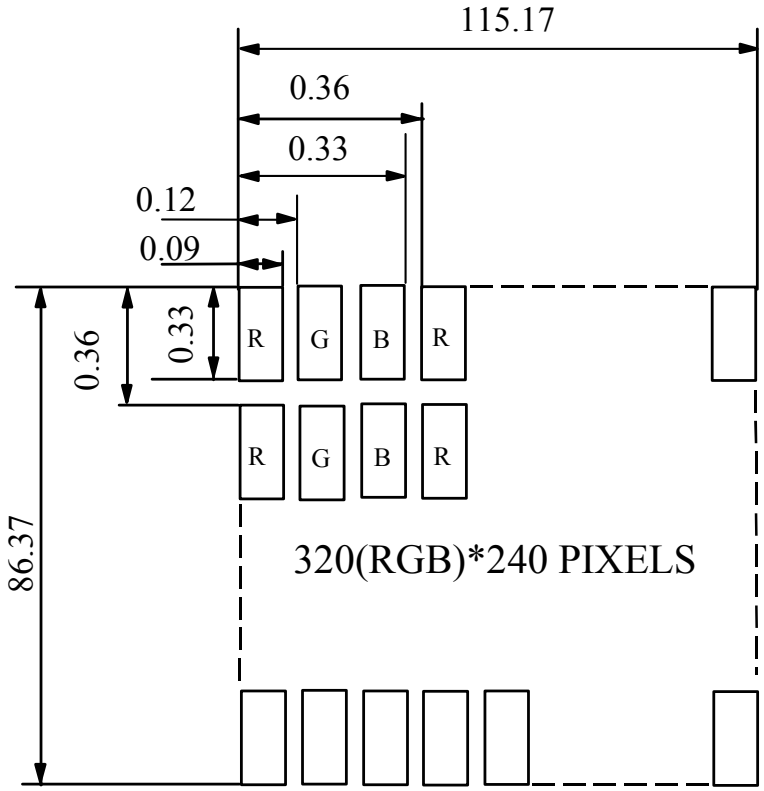
7 . OUTLINE DIMENSIONS



UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.5

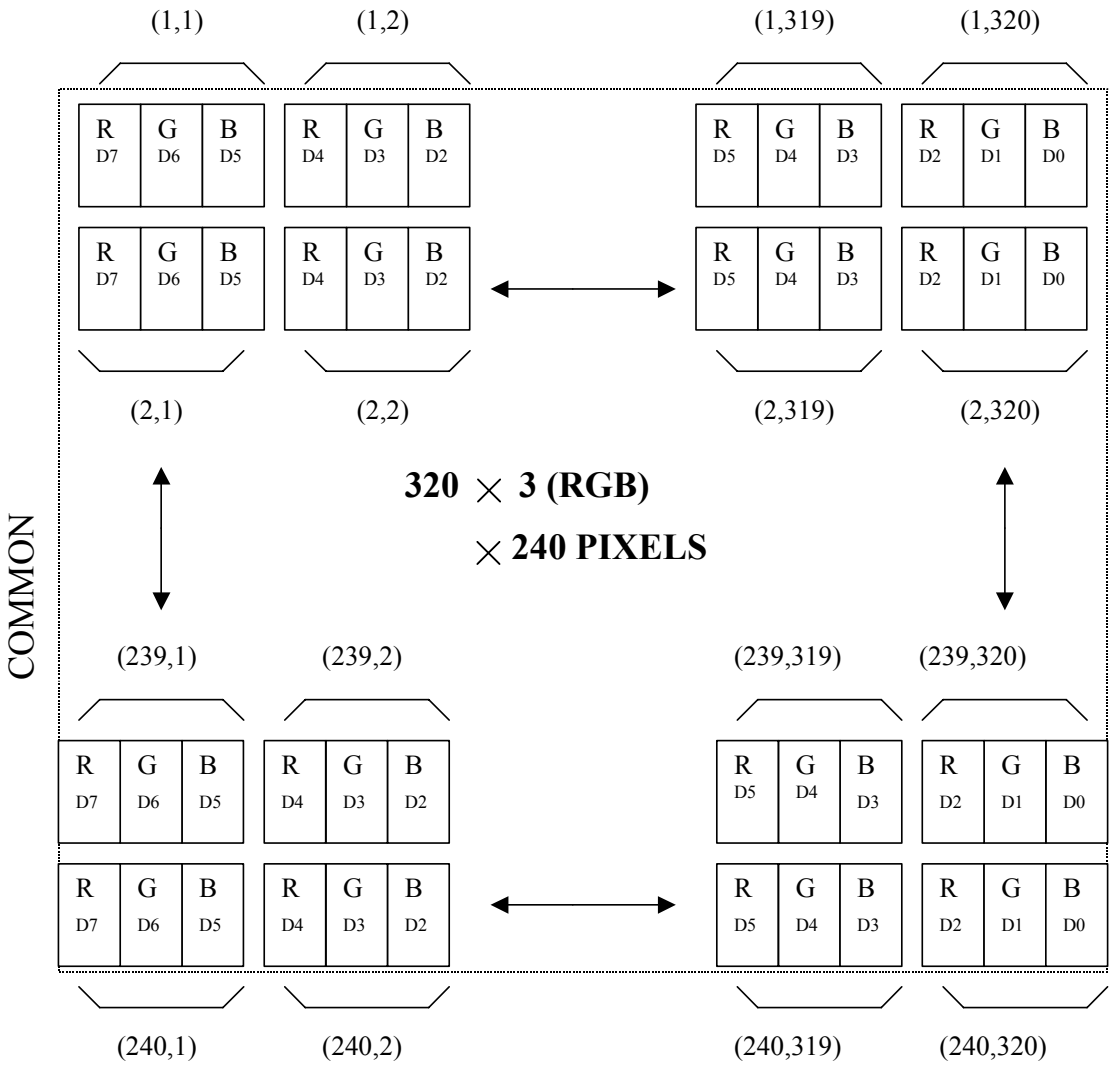
8. DETAIL DRAWING

8.1 DETAIL DRAWING OF PIXEL MATRIX

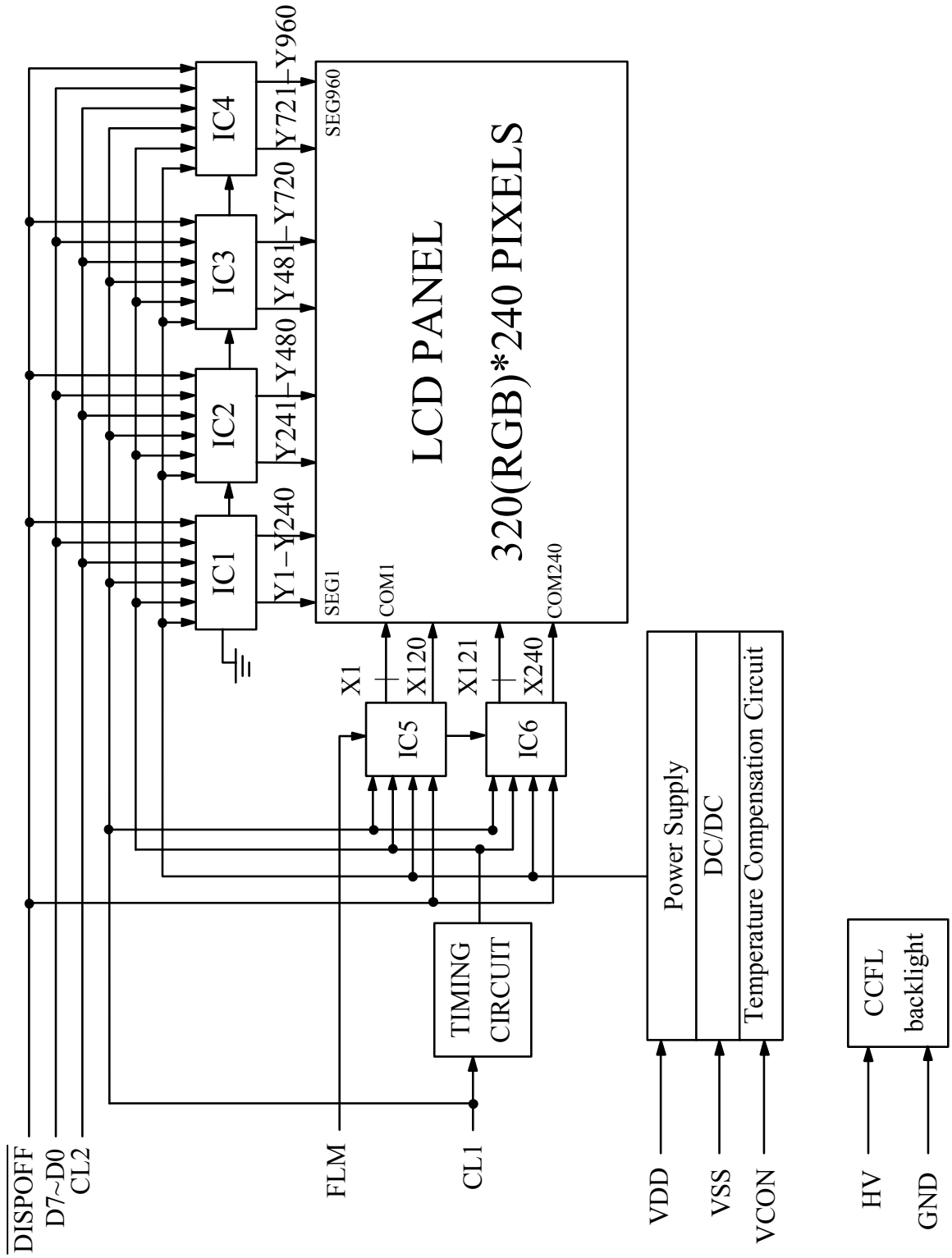


UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ±0.1
DOTS MATRIX TOLERANCE IS ±0.01

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	VCON	—	CONTRAST ADJUSTMENT
8	D0	H/L	DISPLAY DATA
9	D1		
10	D2		
11	D3		
12	D4		
13	D5		
14	D6		
15	D7		
16	VSS	—	GND

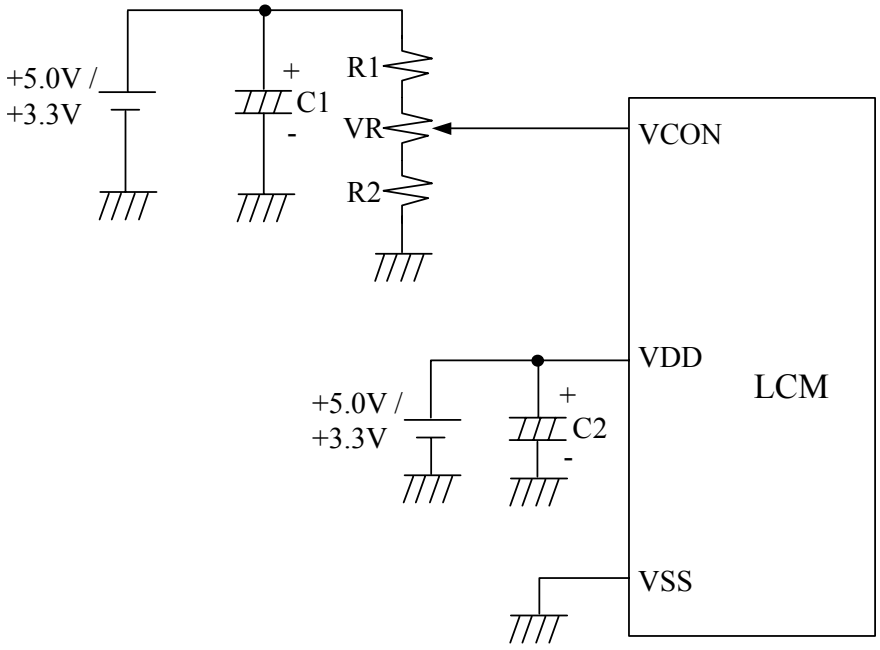
IF2 :

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

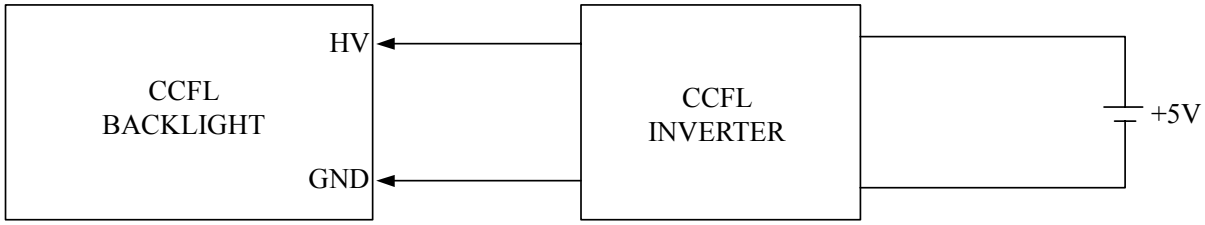
CN2 : IL-G-4S-S3C2(JAE)
RECOMMENDED MATCHING CONNECTOR : IL-G-4P-S3L2-E(JAE) OR COMPATIBLE

11 . POWER SUPPLY

11.1 POWER SUPPLY FOR LCM

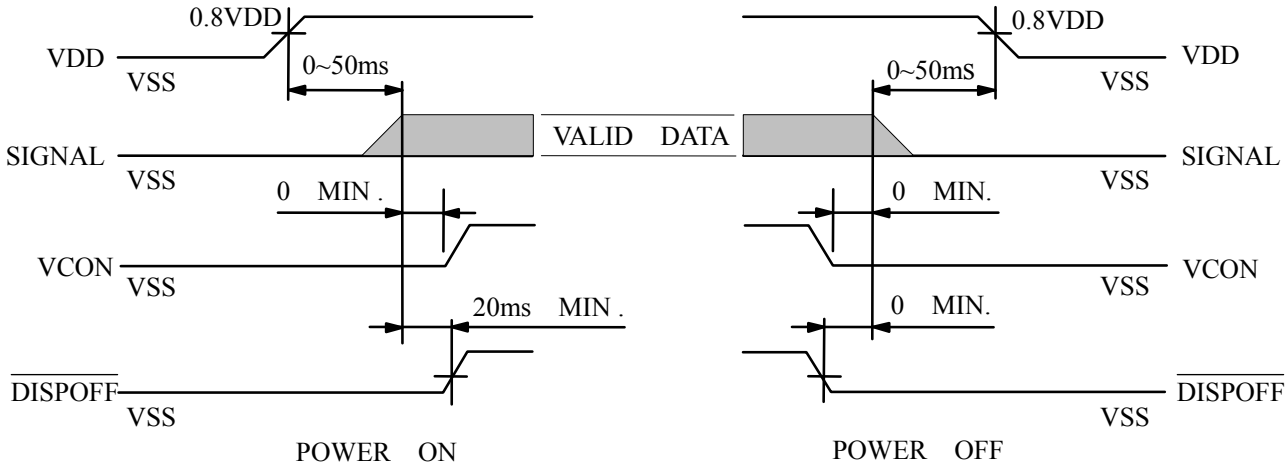


11.2 POWER SUPPLY FOR CCFL BACK-LIGHT



RECOMMENDED CCFL INVERTER : 01-B069-0002

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.