EXAMINED BY : Vincent Wu	EMERGING DISPLAY	FILE NO . CAS-51226
		ISSUE : OCT.06,2005
APPROVED BY: Eric Lee	TECHNOLOGIES CORPORATION	TOTAL PAGE : 14
		VERSION : 1

CUSTOMER ACCEPTANCE SPECIFICATIONS

MODEL NO . :

E R 0 3 5 0 A 1 N M 6(STD.)

FOR MESSRS :

CUSTOMER'S APPROVAL

DATE :

BY :

EMERGING DISPLAY TECHNOLOGIES CORPORATION	MODEL NO.	VERSION	PAGE
	ER0350A1NM6(STD.)	1	0-1

RECORDS OF REVISION

DOC . FIRST ISSUE

OCT.06,2005

DATE	REVISED DRAWING NO.	SUMMARY

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1. GENERAL SPECIFICATIONS

1.1 GENERAL SPECIFICATIONS
PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

EU-006B

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	3.5 inches
(2)	NUMBER OF DOTS	320W * (RGB) * 240H pixels
(3)	MODULE SIZE	84.1W * 69.8H * 8.2D(max.) mm
(4)	VIEWING AREA	75.1W * 57.3H mm
(5)	ACTIVE AREA	71.025W * 53.265H mm
(6)	PIXEL SIZE	0.207W * 0.207H mm
(7)	PIXEL PITCH	0.222W * 0.222H mm
(8)	LCD TYPE	CSTN , TRANSMISSIVE
(9)	DRIVING METHOD	1 / 240 DUTY MULTIPLEX DRIVE
(10)	BACKLIGHT	LED B/L , COLOR : WHITE
(11)	VIEWING DIRECTION	6 O'CLOCK

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	VDDH-VSS	-0.3	+30	V	
INPUT VOLTAGE	VI	-0.3	VDD+0.3	V	
STATIC ELECTRICITY	—	—	100	V	NOTE (1)
INPUT VOLTAGE FOR LED B/L DRIVING	VIN	2.5	10	V	

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	-10 °C	60 °C	-30 °C	60 °C	NOTE (2),(3)
HUMIDITY	—	85 % RH	—	85 % RH	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 -30 °C : 48HR MAX .
60 °C : 120HR MAX .
NOTE (3) : BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT TEMPERATURE THIS PHENOMENON IS REVERSIBLE .

4. ELECTRICAL CHARACTERISTICS

4.1 ELECTRICAL CHARACTERISTICS OF LCM

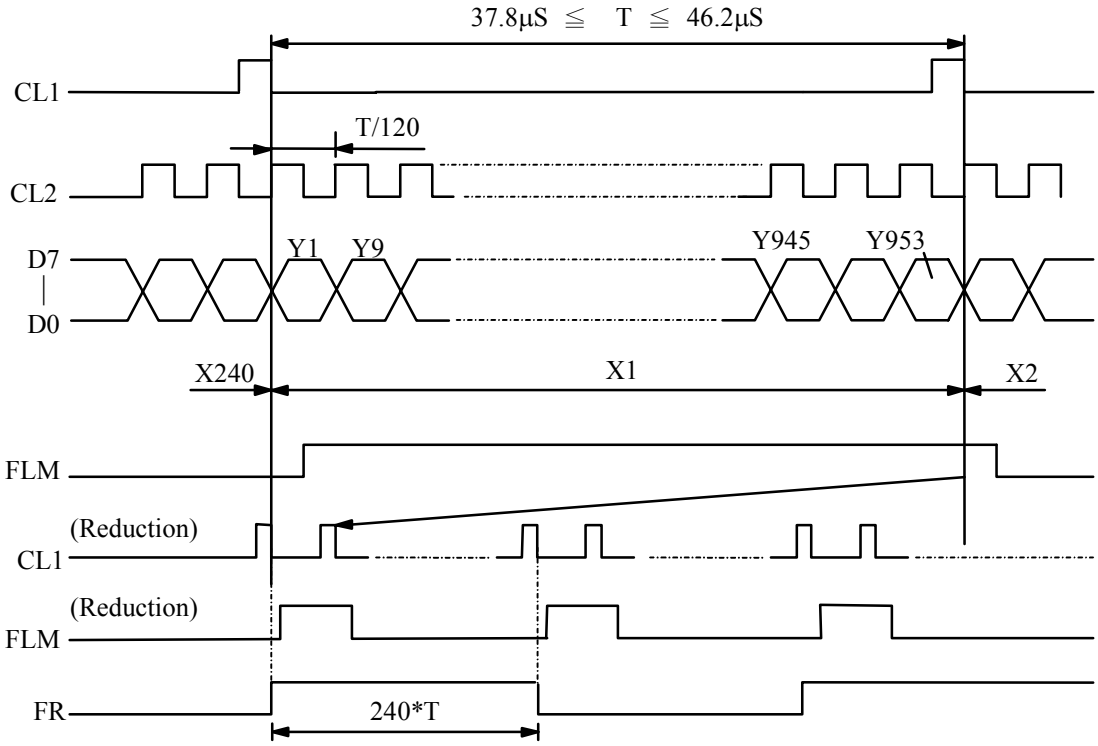
Ta=25°C

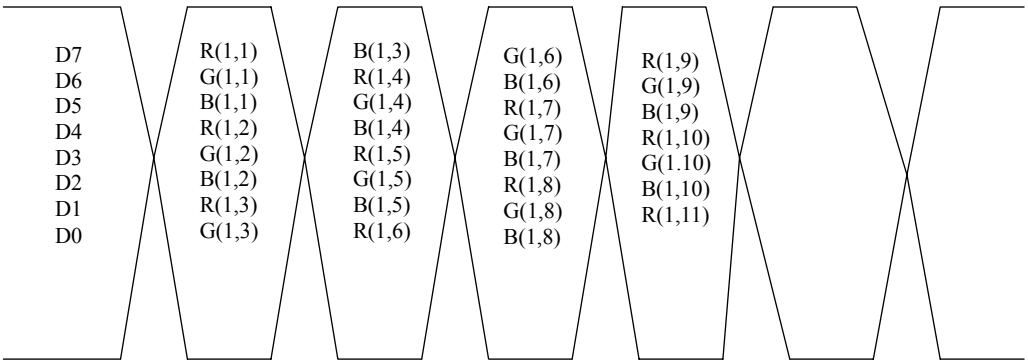
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX	UNIT
LOGIC CIRCUIT POWER SUPPLY	VDD–VSS	—	3.0	3.3	3.6	V
INPUT VOLTAGE NOTE(1)	VIH	H LEVEL	0.8VDD	—	VDD	V
	VIL	L LEVEL	0	—	0.2VDD	
OUTPUT VOLTAGE NOTE(1)	VOH	H LEVEL	VDD-0.4	—	—	V
	VOL	L LEVEL	—	—	+0.4	V
SUPPLY CURRENT FOR LOGIC NOTE(2)	IDD	VDD-VSS=3.3V	—	1.5	2.0	mA
	IDD (WITH LCD DC-DC DRIVER)	LCD DC-DC DRIVER SWITCH ON	—	30	40	mA
SUPPLY CURRENT FOR LED DC-DC DRIVER	ILED	LED DC-DC DRIVER SWITCH ON	—	100	150	mA
		LED DC-DC DRIVER SHOTDOWN	—	0.1	1.0	μA
CONTRAST ADJUST VOLTAGE	VLCD_PWM	—	—	1.65	—	V
POWER SUPPLY FOR LED BACK-LIGHT DRIVER	VLED-VSS_LED	—	4.7	5.0	5.9	V
LIFE TIME FOR LED BACKLIGHT	LIFE TIME	VLED-VSS_LED =5.0V ILED=24mA	—	5000	—	hrs
RECOMMENDED FRAME FREQUENCY FOR OPTIMUM CONTRAST	FLM	—	90	100	110	Hz

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

5. TIMING CHARACTERISTICS

5.1 INTERFACE TIMING



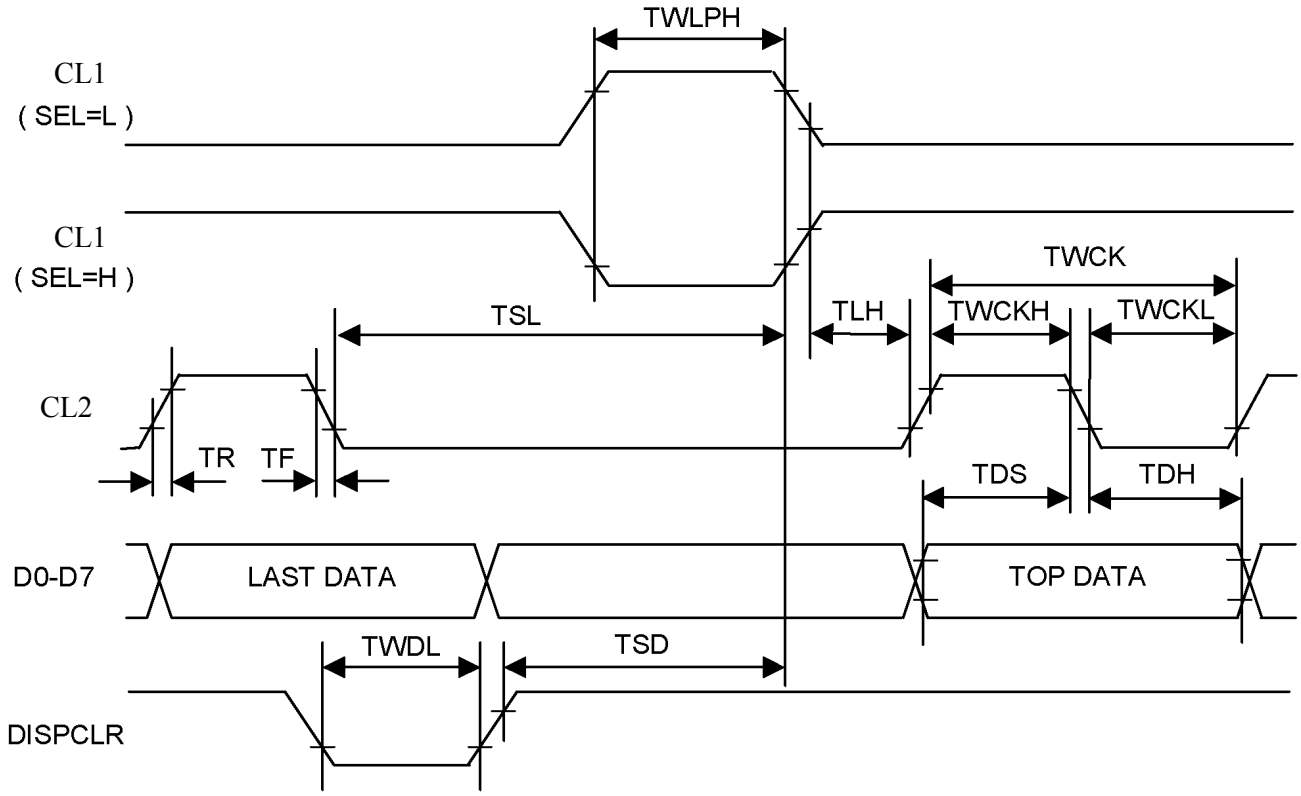


5.2 SWITCHING CHARACTERISTICS

VSS = V5 = 0V , VDD = +3.0 to +3.6V , V0 = +14 to +36V , Ta = -10 to +60°C)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	Applicable pins
Shift clock period *1	TWCK	TR,TF≦ 10ns	82			ns	CL2
Shift clock "H" pulse width	TWCKH		28			ns	CL2
Shift clock "L" pulse width	TWCKL		28			ns	CL2
DIn/CL2 setup time	TDS		20			ns	CL2, DIn
DIn/CL2 hold time	TDH		20			ns	CL2, DIn
Latch pulse "H" pulse width	TWLPH		30			ns	CL1
Shift clock fall to latch pulse fall time	TSL		50			ns	CL1,CL2
Latch pulse fall to shift clock rise time	TLH		50			ns	CL1,CL2
Input signal rise time *2	TR				50	ns	CL1,CL2
Input signal fall time *2	TF				50	ns	CL1,CL2
Enable setup time	TS		30			ns	CL2, EI
DISPCLR/CL1 setup time	TSD		100			ns	CL1,DISPCLR
DIPPCLR "L" pulse width	TWDL		1.2			μs	DISPCLR
Output delay time (1)	TD1	CL=15pF			130	ns	CL2, EO
Output delay time (2)	TPD1	CL=15pF			1.2	μs	FR,Yn
	TPD2	CL=15pF			1.2	μs	CL1,Yn
Output delay time (3)	TPD3	CL=15pF			1.2	μs	DISPCLR,Yn
	TPD4	CL=15pF			1.2	μs	DISP,Yn

NOTE *1 Take the cascade connection Into consideration.
*2 (TWCK- TWCKH- TWCKL)/2 Is maximum in the case oh high speed operation.



6. OPTICAL CHARACTERISTICS

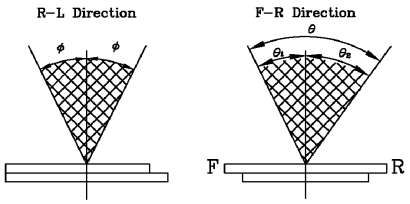
6.1 OPTICAL CHARACTERISTICS OF NORMAL TEMPERATURE MODE

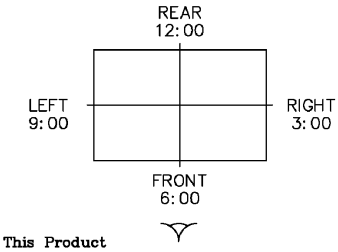
Ta=25°C

ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	REMARK
VIEWING ANGLE RANGE		θ	K ≥ 2		—	90	—	degree	2
		∅			20	—	35		
CONTRAST RATIO		K	θ = 0° ∅ = 0°		20	40	—	—	1
RESPONSE TIME	RISE	Tr	θ = 0° ∅ = 0°	Ta=-10°C	1800	2000	2200	ms	1
				Ta=25°C	450	480	580		
				Ta=60°C	100	110	130		
	FALL	Tf		Ta=-10°C	1000	1200	1400		
				Ta=25°C	110	130	150		
				Ta=60°C	80	90	110		
THE BRIGHTNESS OF MODULE		B	VLED-VSS_LED =5.0V PATTERN: (PIXELS ALL ON OF WHITE COLOR)	ILED=24 mA	110	140	—	cd/m^2	3
THE UNIFORMITY OF MODULE		—		ILED=24 mA	75	80	—	%	3

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

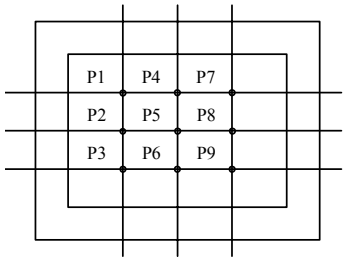
NOTE (2) : DEFINITION OF VIEWING ANGLE.





*For This Product
The Viewing Direction Is 6 O'clock
So θ1 > θ2
θ = θ1 + θ2
*Conditions
Operating Voltage : VLCD-VSS
Frame Frequency : 100 Hz
Appling Waveform : 1/N duty 1/a bias
Contrast Ratio : larger than 2

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



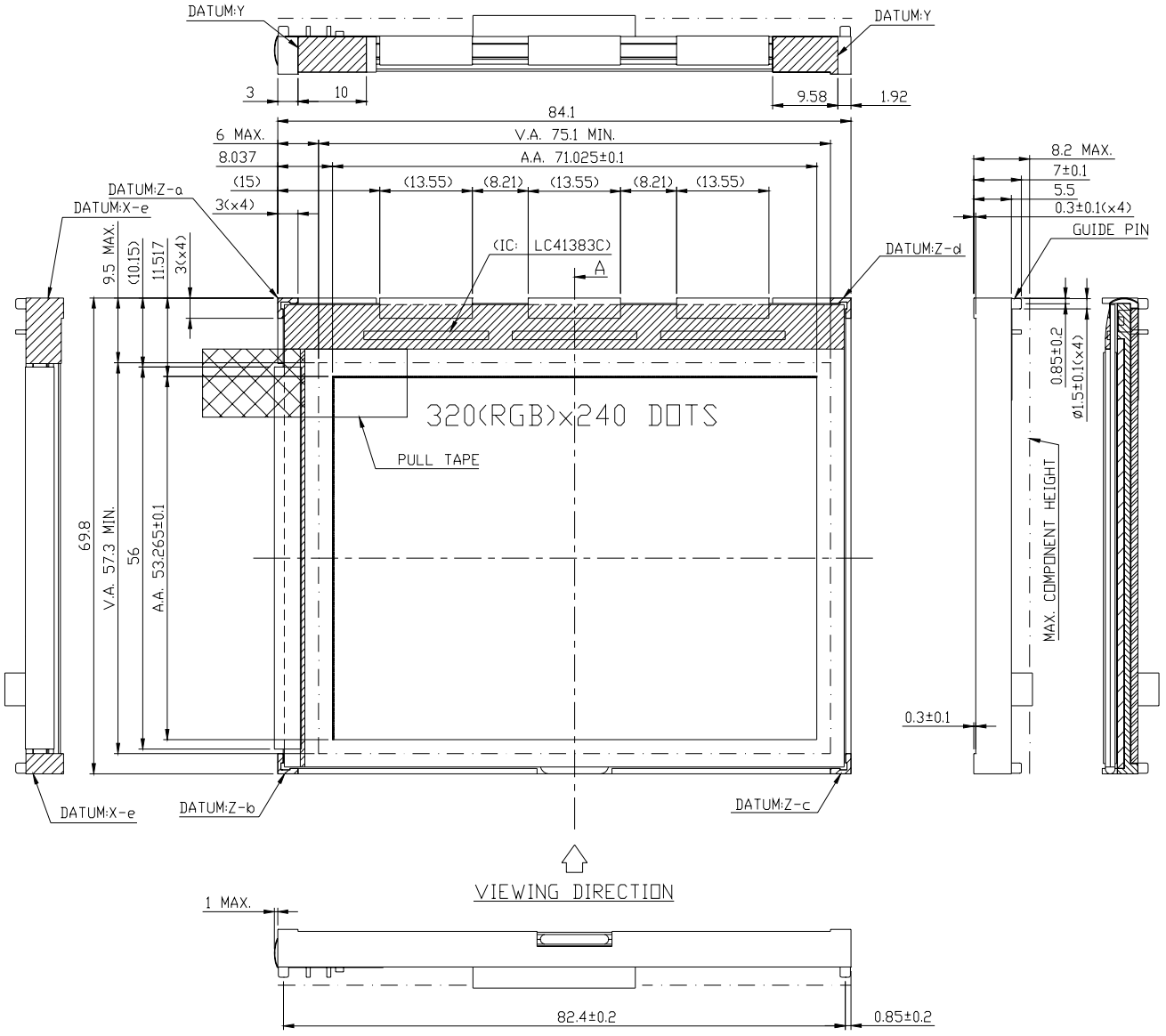
$$\text{UNIFORMITY} : \left[1 - \frac{\text{MAXIMUN BRIGHTESS} - \text{MINIMUN BRIGHTESS}}{\text{AVERAGE BRIGHTESS}}\right] \times 100\%$$

6.2 COLOR OF CIE COORDINATE

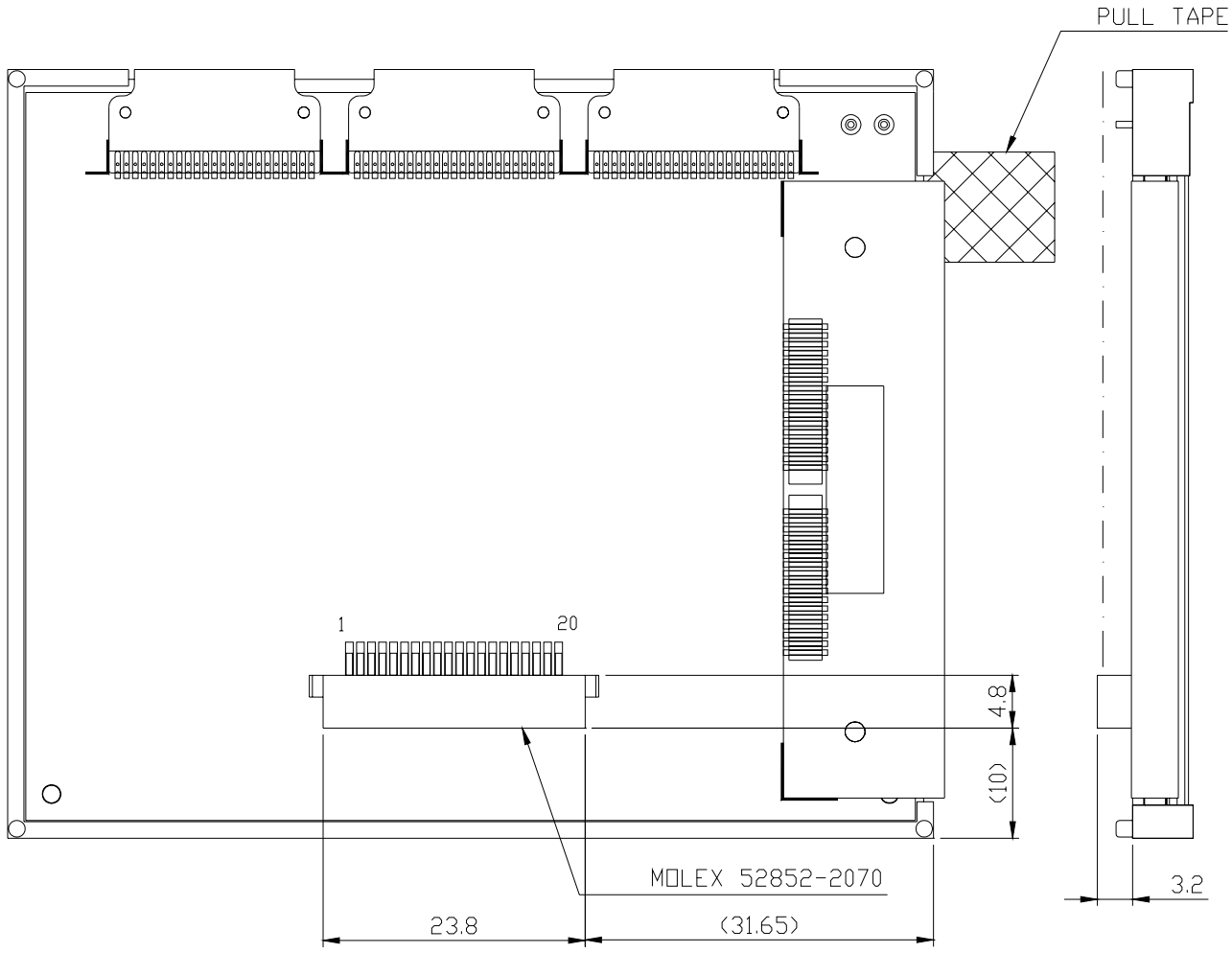
Ta=25°C

ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	REMARK
COLOR OF CIE COORDINATE	RED	x	θ = 0° ∅ = 0°	0.47	0.52	0.57	
		y		0.28	0.33	0.38	
	GREEN	x	θ = 0° ∅ = 0°	0.24	0.29	0.34	
		y		0.44	0.49	0.54	
	BLUE	x	θ = 0° ∅ = 0°	0.10	0.15	0.20	
		y		0.07	0.12	0.17	
	WHITE	x	θ = 0° ∅ = 0°	0.22	0.27	0.32	
		y		0.27	0.32	0.37	

7. OUTLINE DIMENSIONS

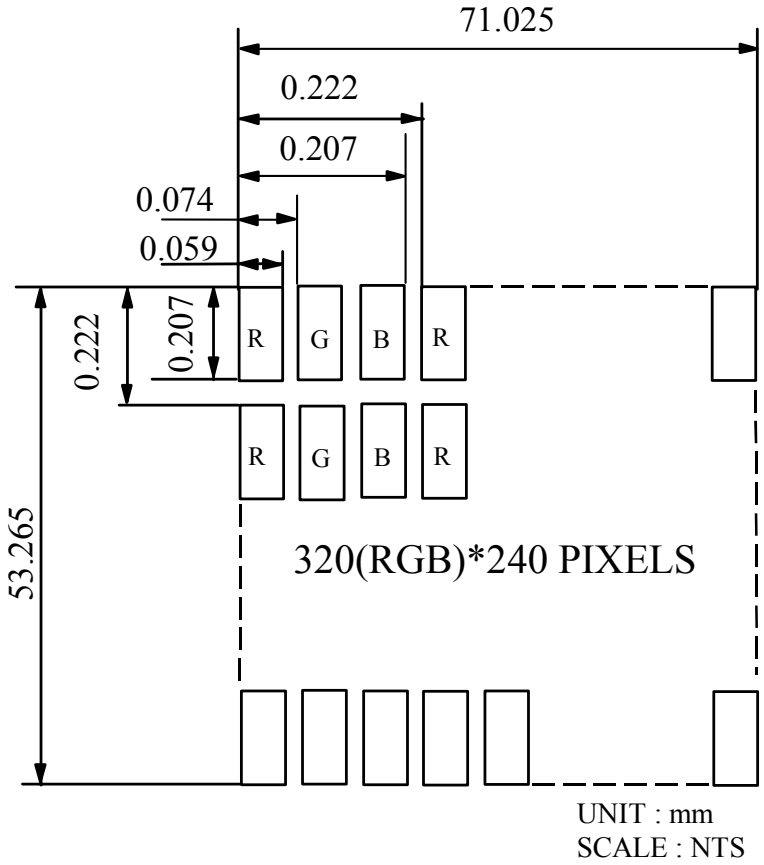


UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.3


PULL TAPE
1
20
4.8
(10)
MOLEX 52852-2070
23.8
(31.65)
3.2

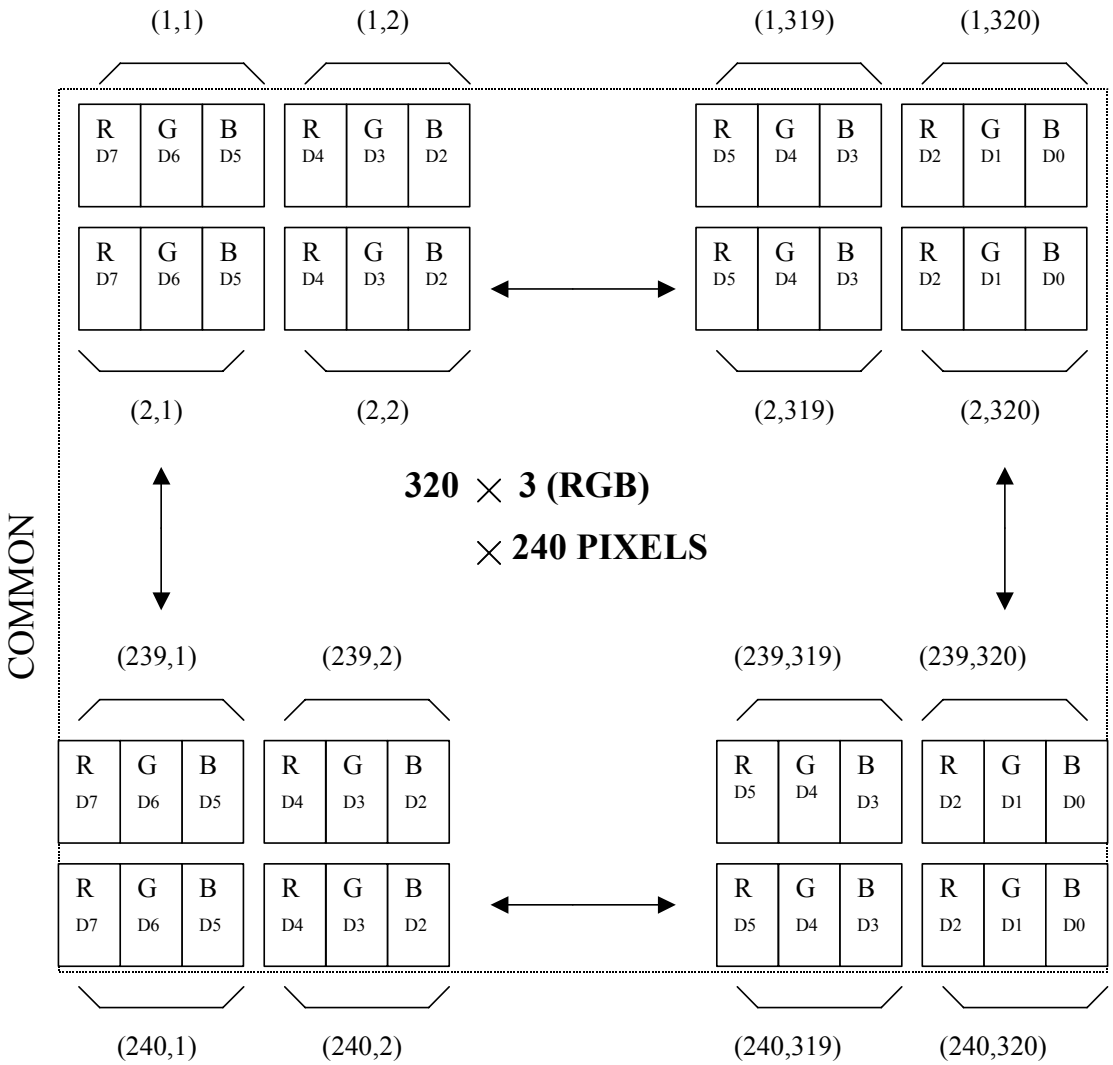
8. DETAIL DRAWING

8.1 DETAIL DRAWING OF PIXEL MATRIX

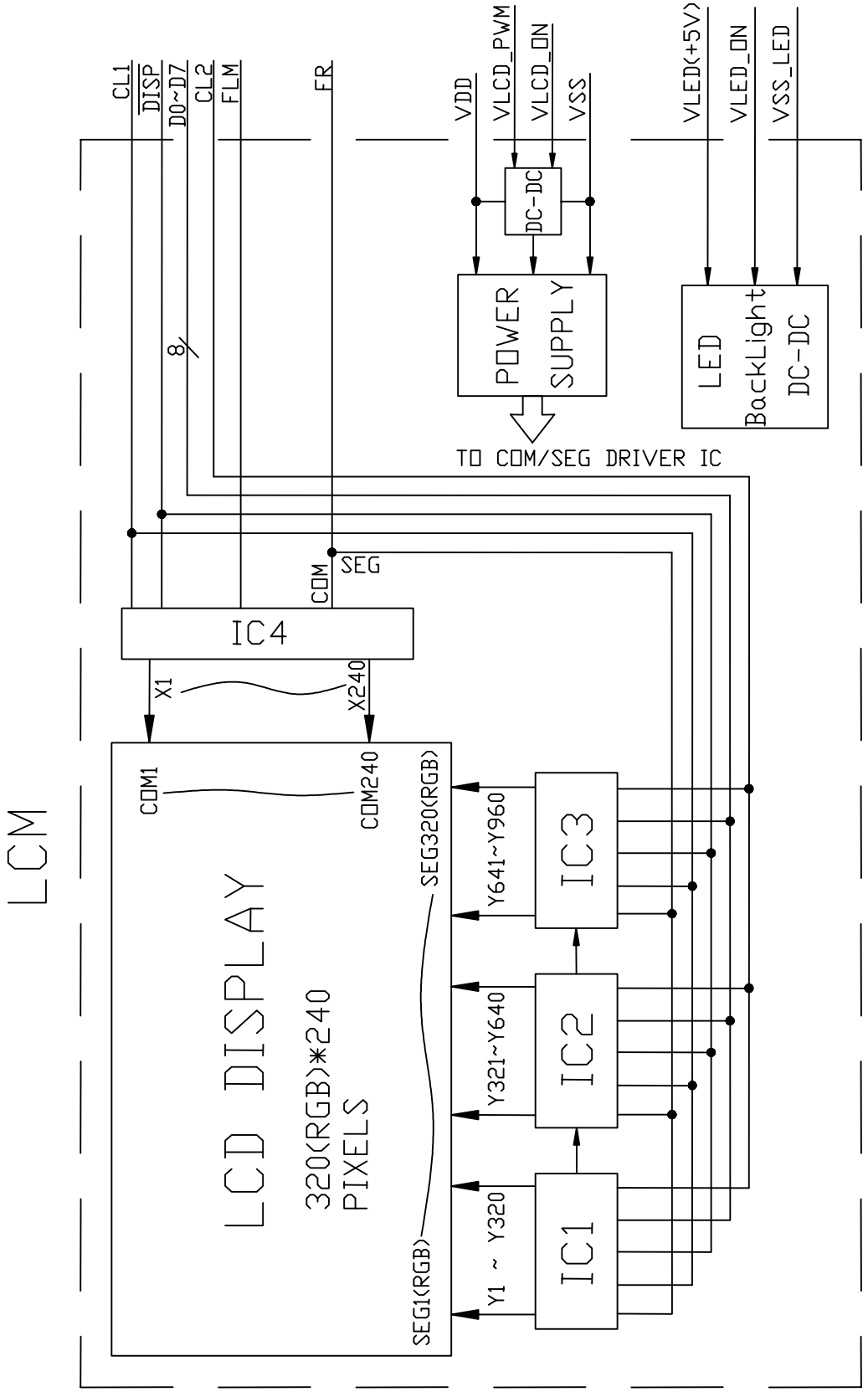


UNIT : mm
SCALE : NTS

8.2 DETAIL DRAWING OF BLOCK DIAGRAM



9. BLOCK DIAGRAM



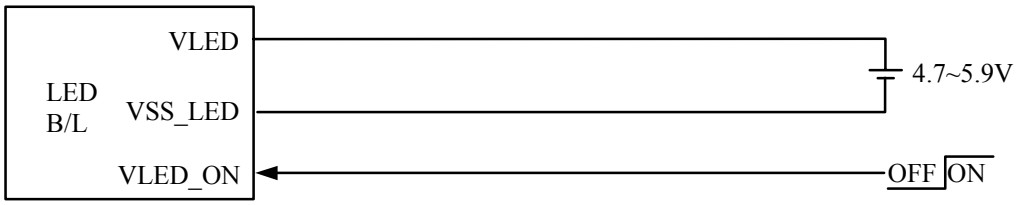
10. INTERFACE SIGNALS

PIN NO.	SYMBOL	LEVEL	FUNCTION
1	LED_ON	H/L	LED BACKLIGHT DRVIING ENABLE PIN H : ENABLE , L : DISABLE
2	VSS_LED	—	POWER SUPPLY FOR LED BACKLIGHT DC-DC(0V)
3	VLED	—	POWER SUPPLY FOR LED BACKLIGHT DC-DC(+5V)
4	VLCD_PWM	—	ADJUST VLCD DC-DC VOUT VOLTAGE
5	VLCD_ON	H/L	VLCD DC-DC DRIVING ENABLE PIN H : ENABLE , L : DISABLE
6	FLM	H	SYNCHRONOUS SIGNAL FOR DRIVING SCANNING LINE
7	VDD	—	POWER SUPPLY FOR LOGIC(+3.3V)
8	D0	H/L	DISPLAY DATA
9	D1		
10	D2		
11	D3		
12	D4		
13	D5		
14	D6		
15	D7		
16	CL2	H→L	DATA SIGNAL SHIFT CLOCK(CP)
17	$\overline{DISP}$	H/L	DISPLAY CONTROL SIGNAL , H:DISPLAY ON L:DISPLAY OFF
18	CL1	H→L	DATA SIGNAL LATCH CLOCK(LOAD)
19	FR	H/L	SWITCH SIGNAL TO CONVERT LCD DRIVER WAVEFORM INTO AC
20	VSS	—	POWER SUPPLY (0V , GND)

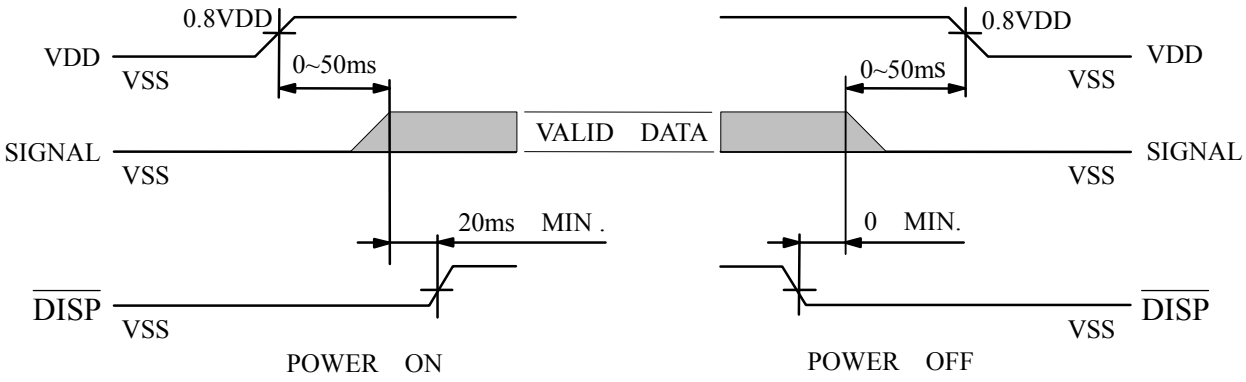
11. POWER SUPPLY

11.1 POWER SUPPLY FOR LCM

11.2 POWER SUPPLY FOR LED BACK-LIGHT



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.