

EXAMINED BY: <i>Bob Hu</i>	EMERGING DISPLAY TECHNOLOGIES CORPORATION	FILE NO. CAS-51121
APPROVED BY: <i>Eric Lee</i>		ISSUE: JUN.06, 2005
		TOTAL PAGE: 10
		VERSION: 1

CUSTOMER	ACCEPTANCE	SPECIFICATIONS
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MODEL NO. :

E W 5 0 3 9 7 F D W

FOR MESSRS :

CUSTOMER'S APPROVAL

DATE:

BY:

EMERGING DISPLAY
TECHNOLOGIES CORPORATION

MODEL NO.	VERSION	PAGE
E W 5 0 3 9 7 F D W	1	0-1

RECORDS OF REVISION	DOC. FIRST ISSUE	JUN.06, 2005
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DATE	REVISED PAGE NO.	SUMMARY

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1. GENERAL SPECIFICATIONS

1.1 GENERAL SPECIFICATIONS

PLEASE REFER TO:

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS:

E U - 0 0 2 A

1.2 THIS INDIVIDUAL SPECIFICATION IS PRIOR TO GENERAL SPECIFICATIONS.

2. MECHANICAL SPECIFICATIONS

- | | | |
|--------------------|-------|------------------------------|
| (1) NUMBER OF DOTS | ----- | 320W * 240H DOTS |
| (2) MODULE SIZE | ----- | 154.3W * 96H * 14.6D(max) mm |
| (3) EFFECTIVE AREA | ----- | 103.0W * 79.0H mm |
| (4) ACTIVE AREA | ----- | 95.98W * 71.98H mm |
| (5) DOT SIZE | ----- | 0.28W * 0.28H mm |
| (6) DOT PITCH | ----- | 0.30W * 0.30 mm |
| (7) LCD TYPE | ----- | FSTN , WHITE , TRANSFLECTIVE |
| (8) DRIVING METHOD | ----- | 1 / 240 DUTY MULTIPLEX DRIVE |
| (9) BACKLIGHT | ----- | CCFL |

3. ABSOLUTE MAXIMUM RATINGS

3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	MIN.	MAX.	UNIT	REMARK
POWER SUPPLY FOR LOGIC	VDD – VSS	0	6.0	V	
POWER SUPPLY FOR LCD DRIVING	VDD – VEE	0	32.0	V	
INPUT VOLTAGE	VI	VSS-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	-10 °C	60 °C	-20 °C	70 °C	NOTE (2), (3)
HUMIDITY	—	95 % RH	—	95 % 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: 168HR 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

Ta = 25 °C

VDD = 5.0 V

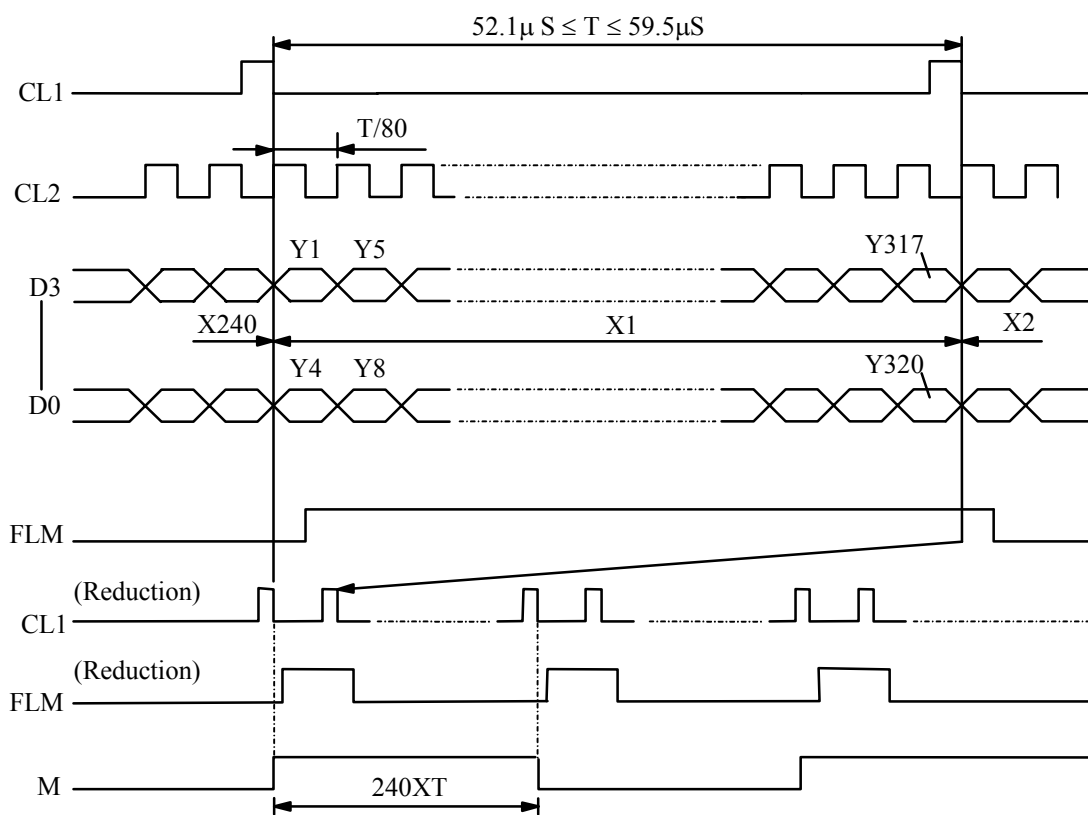
PARAMETER	SYMBOL	CONDITION	MIN .	TYP.	MAX .	UNIT
POWER SUPPLY VOLTAGE FOR LOGIC	VDD - VSS	—	4.75	5.0	5.25	V
POWER SUPPLY VOLTAGE FOR LCD DRIVE	VDD - VEE	—	—	30	—	V
INPUT VOLTAGE NOTE (1)	VIH	H LEVEL	0.8*VDD	—	—	V
	VIL	L LEVEL	—	—	0.2*VDD	V
POWER SUPPLY CURRENT FOR LOGIC NOTE (2)	IDD	VDD-VSS = 5.0 V VDD-VO = 21.6 V	—	4.0	7.0	mA
POWER SUPPLY CURRENT FOR LCD DRIVE NOTE (2)	IEE	VDD-VSS = 5.0 V VDD-VO = 21.6 V	—	3.0	5.0	mA
RECOMMENDED LCD DRIVING VOLTAGE NOTE (3)	VDD-VO ∅ = 10° θ = 0° DUTY = 1/240	Ta = -10 °C	23.6	24.6	25.6	V
		Ta = 25 °C	20.6	21.6	22.6	V
		Ta = 60 °C	15.6	16.6	17.6	V
CLOCK OSCILLATION FREQUENCY	f FLM	—	70	75	80	Hz
POWER SUPPLY FOR CCFL	VOLTAGE	VCCFL	—	—	300	Vrms
	FREQUENCY	f CCFL	—	—	30K	Hz
	CURRENT	IL	—	—	5	mA
	LIFE TIME	L	IL = 5.0mA	45000	50000	—

NOTE (1): APPLIED TO TERMINALS M, FLM, CL1, CL2, D0~D3, D.OFF.

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

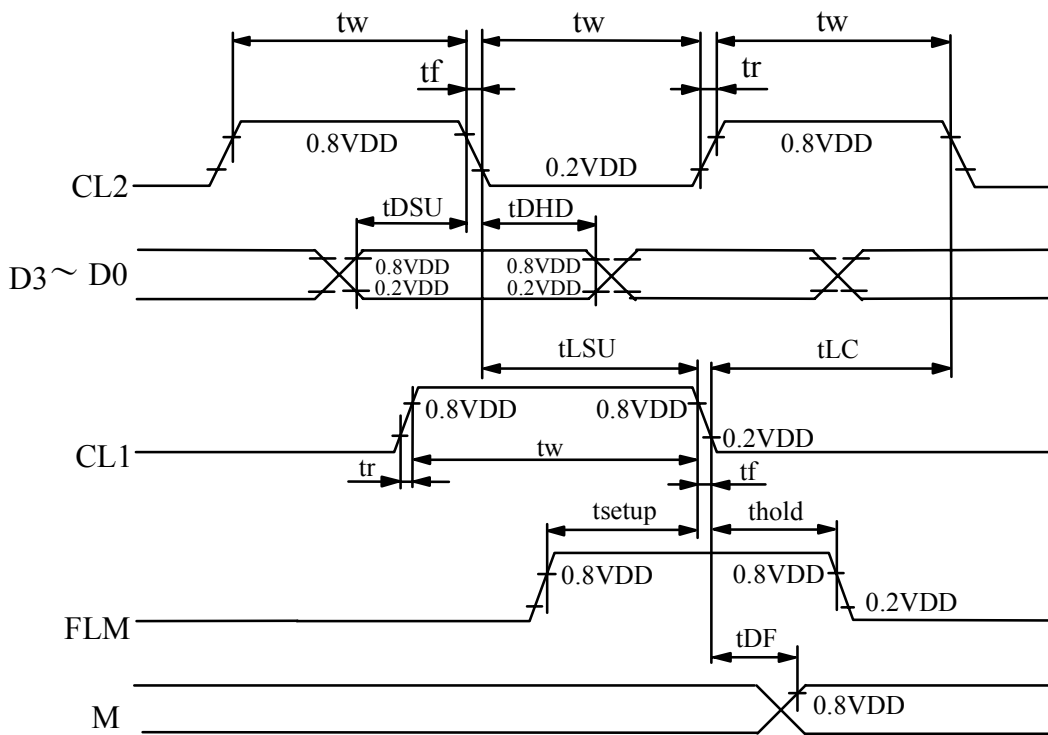
NOTE (3): RECOMMENDED LCD DRIVING VOLTAGE MAY FLUCTUATE ABOUT ±1.0V BY EACH MODULE.

5. TIMING CHARACTERISTICS
5.1 INTERFACE TIMING



5.2 SWITCHING CHARACTERISTICS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Frequency of maximum clock	fcp	—	—	8	MHZ
CL1, CL2, pulse width	tw	45	—	—	ns
Rise, fall time	tr, tf	—	—	15	ns
Data setup time	tDSU	20	—	—	ns
Data hold time	tDHD	20	—	—	ns
CL1 setup time	tLSU	80	—	—	ns
CL1 → CL2 time	tLC	80	—	—	ns
FLM setup time	tsetup	100	—	—	ns
FLM hold time	thold	100	—	—	ns
M delay time	tDF	—	—	300	ns



6. OPTICAL CHARACTERISTICS

Ta = 25 °C

VDD = 5.0 V

I T E M		SYMBOL	CONDITION	MIN .	TYP .	MAX.	UNIT	NOTE
VIEWING ANGLE	FSTN	∅ 2 - ∅ 1	K ≥ 2.0	—	50	—	D e g.	1
CONTRAST RATIO	FSTN	K	∅ = 10° θ = 0°	—	20	—	—	1
RESPONSE TIME	tr (rise)	∅=10° θ = 0°	Ta = -10 °C	—	2149	—	ms	1
			Ta = 25 °C	—	228	—		
			Ta = 60 °C	—	124	—		
	tf (fall)		Ta = -10 °C	—	1709	—		
			Ta = 25 °C	—	191	—		
			Ta = 60 °C	—	96	—		
BRIGHTNESS OF MODULE	B	—	80	85	—	cd / m ²	2, 3	
RISE TIME OF BACKLIGHT	TC	—	—	5	—	MINUTE		
BRIGHTNESS UNIFORMITY	—	—	—	—	—	20	%	4, 5

NOTE (1): PLEASE REFER TO:

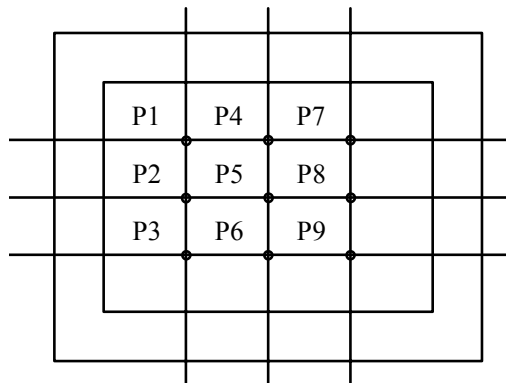
CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS. (EU - 002A)

NOTE (2): MEASUREMENT AFTER 10 MINUTES OF CCFL OPERATING.

NOTE (3): POLARIZER MODE: TRANSMISSIVE

NOTE (4): MEASUREMENT OF THE FOLLOWING 9 PLACES ON THE DISPLAY.

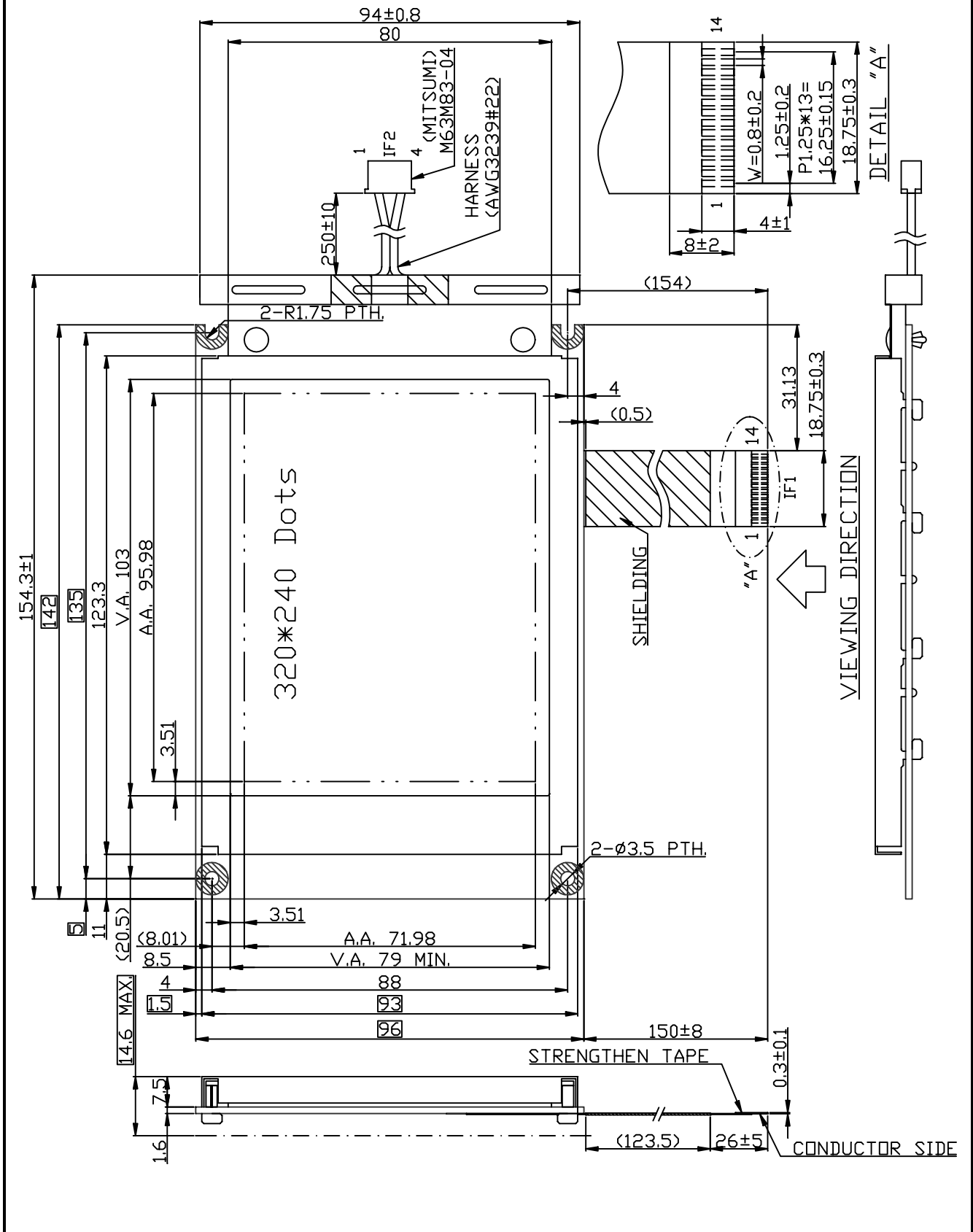
DEFINITION OF THE BRIGHTNESS TOLERANCE.



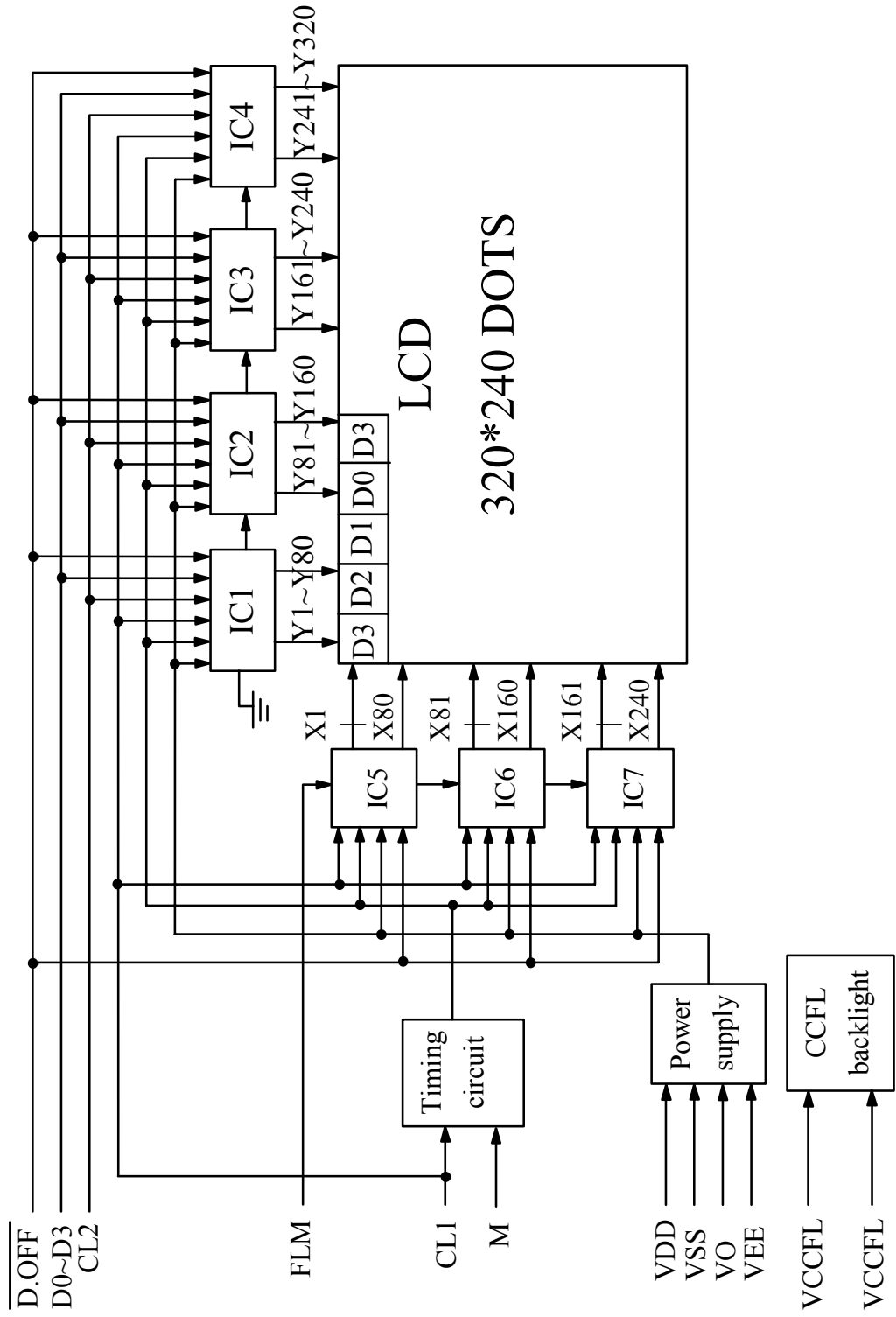
NOTE (5): BRIGHTNESS UNIFORMITY IS DEFINED AS FOLLOWING

$$\sum X = \left[\frac{(\text{MAXIMUN BRIGHTNESS OR MINIMUN BRIGHTESS}) - \text{AVERAGE BRIGHTNESS}}{\text{AVERAGE BRIGHTNESS}} \right] \times 100\%$$

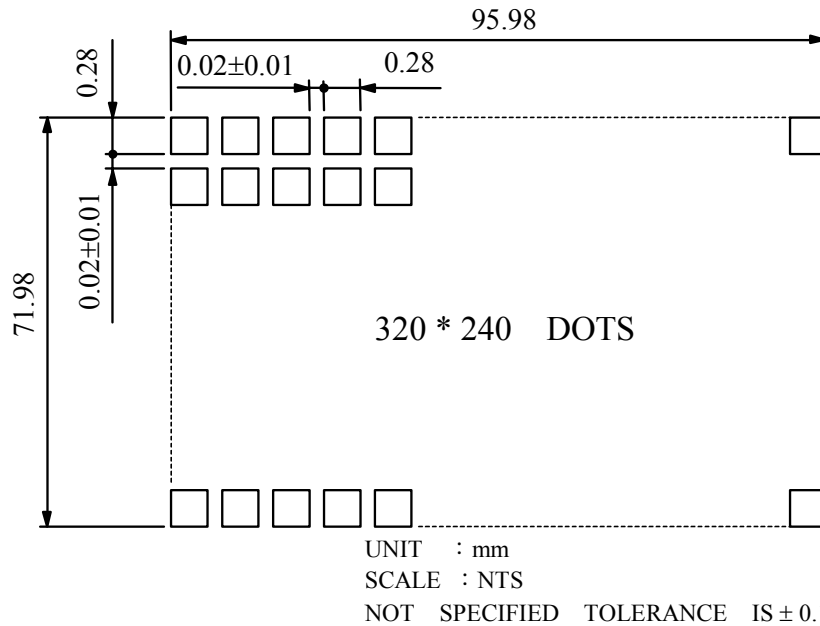
7. OUTLINE DIMENSIONS



8. BLOCK DIAGRAM



9. DETAIL DRAWING OF DOT MATRIX



10. INTERFACE SIGNALS

IF1 :

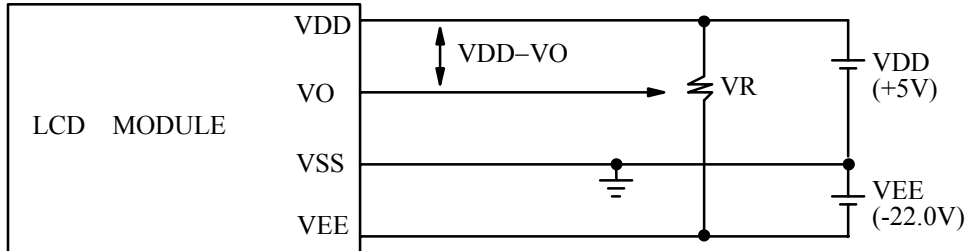
PIN NO	SYMBOL	LEVEL	FUNCTION
1	FLM	H	THE FLM SIGNAL INDICATING THE BEGINNING OF EACH DISPLAY CYCLE
2	M	H / L	CONTROL SIGNAL FOR AC DRIVING
3	CL1	H → L	DISPLAY DATA LATCH
4	CL2	H → L	DISPLAY DATA SHIFT
5	$\overline{\text{D.OFF}}$	H / L	H : DISPLAY ON , L : DISPLAY OFF
6	D0	H / L	DISPLAY DATA
7	D1	H / L	
8	D2	H / L	
9	D3	H / L	
10	VDD	—	POWER SUPPLY FOR LOGIC CIRCUIT
11	VSS	—	GROUND
12	VEE	—	POWER SUPPLY FOR LCD DRIVING
13	VO	—	OPERATING VOLTAGE FOR LCD DRIVING
14	FG	—	FRAME GROUND

IF2 :

PIN NO	ASSIGNMENT	LEVEL	FUNCTION
1	GND	—	POWER SUPPLY FOR CCFL DRIVING
2	NC	—	NO CONNECTION
3	NC	—	NO CONNECTION
4	H.V.	—	POWER SUPPLY FOR CCFL DRIVING

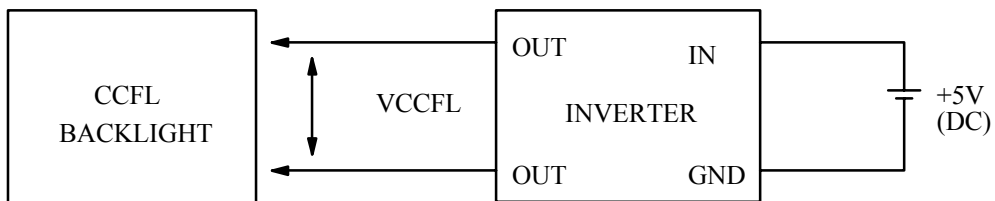
1 1. POWER SUPPLY

1 1. 1 POWER SUPPLY FOR LCM



VDD-VO : LCD DRIVING VOLTAGE
VR : 20KΩ

1 1. 2 POWER SUPPLY FOR CCFL BACK - LIGHT



RECOMMENDED INVERTER : IA-EM02A

1 1. 3 TIMING OF POWER SUPPLY AND INTERFACE SIGNAL

