EXAMINED BY :	EMERGING DISPLAY	FILE NO . CAS-10210
		ISSUE : OCT.23,2003
APPROVED BY :	TECHNOLOGIES CORPORATION	TOTAL PAGE : 10
		VERSION : 2

CUSTOMER ACCEPTANCE SPECIFICATIONS

MODEL NO . :

32F50(LED TYPES)

FOR MESSRS :

CUSTOMER'S APPROVAL

DATE :

BY :

EMERGING DISPLAY TECHNOLOGIES CORPORATION	MODEL NO. 32F50(LED TYPES)	VERSION 2
RECORDS OF REVISION	DOC. FIRST ISSUE APR.05,2000	

DATE	REVISED PAGE NO.	SUMMARY
OCT.23,2003	1	2. MECHANICAL SPECIFICATIONS (4)ACTIVE AREA ---- 95.97W*71.97H → (4)ACTIVE AREA ---- 95.98W*71.98H (5)DOT SIZE ---- 0.27W*0.27H → (5)DOT SIZE ---- 0.28W*0.28H
	6	6. OPTICAL CHARACTERISTICS ITEM : VIEWING AREA → VIEWING ANGLE
	7	7. OUTLINE DIMENSIONS AA. 95.97 → 95.98 , 71.97 → 71.98
	9	9. DETAIL DRAWING OF DOT MATRIX REVISED THE ENTIRE PAGE

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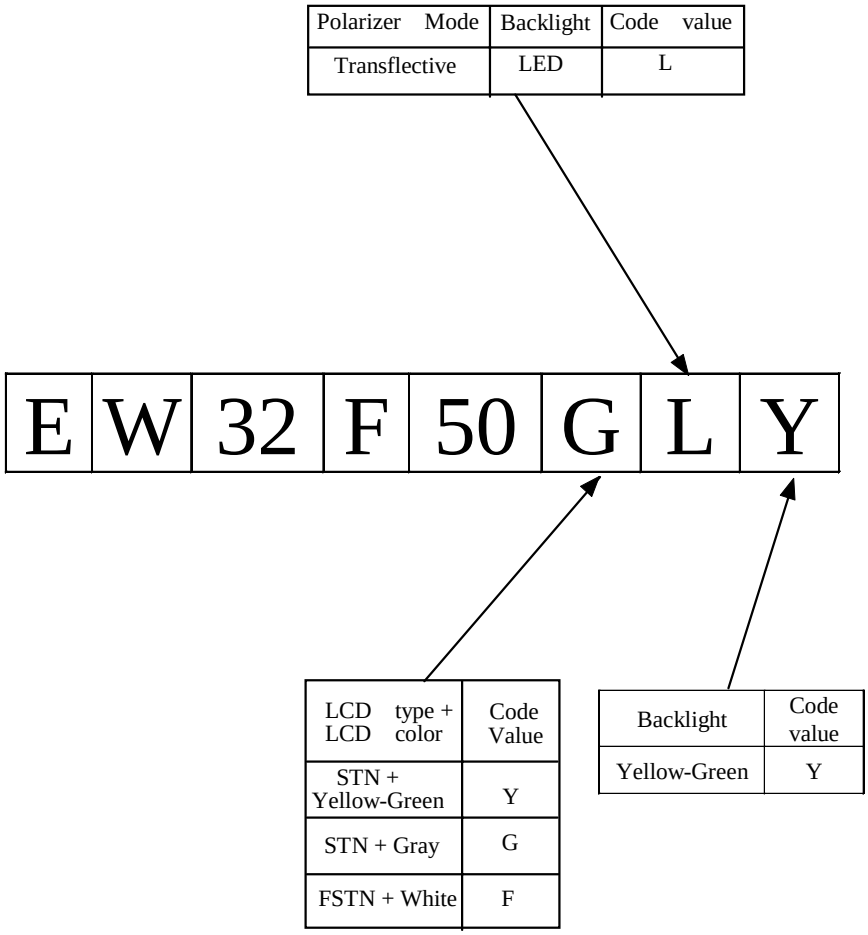
NUMBERING SYSTEM



1. GENERAL SPECIFICATIONS

1.1 GENERAL SPECIFICATIONS
PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

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1.2 THIS INDIVIDUAL SPECIFICATION IS PRIOR TO GENERAL SPECIFICATIONS .

2. MECHANICAL SPECIFICATIONS

(1)	NUMBER OF DOTS	320W * 240H DOTS
(2)	MODULE SIZE	134.5W * 117.0H * 14.0D(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	0.3W * 0.3H mm
(7)	LCD TYPE *	
(8)	DRIVING METHOD	1 / 240 DUTY MULTIPLEX DRIVE
(9)	BACKLIGHT	LED , COLOR : YELLOW-GREEN
(10)	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	
POWER SUPPLY FOR LCD DRIVING	VDD – VEE	0	35	V	
INPUT VOLTAGE	VI	VSS	VDD	V	
STATIC ELECTRICITY	—	—	100	V	NOTE (1)
LED POWER VOLTAGE	VLED	—	27	V	
LED FORWARD CURRENT	IF	—	80	mA	

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	-20°C	70°C	-30°C	80°C	NOTE (2), (3)
HUMIDITY	—	90 % RH	—	90 % 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.
80°C : 168HR MAX.
NOTE (3) : BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT TEMPERATURE THIS PHENOMENON IS REVERSIBLE.

4. ELECTRICAL CHARACTERISTICS

Ta = 25 °C VDD = 5.0 V

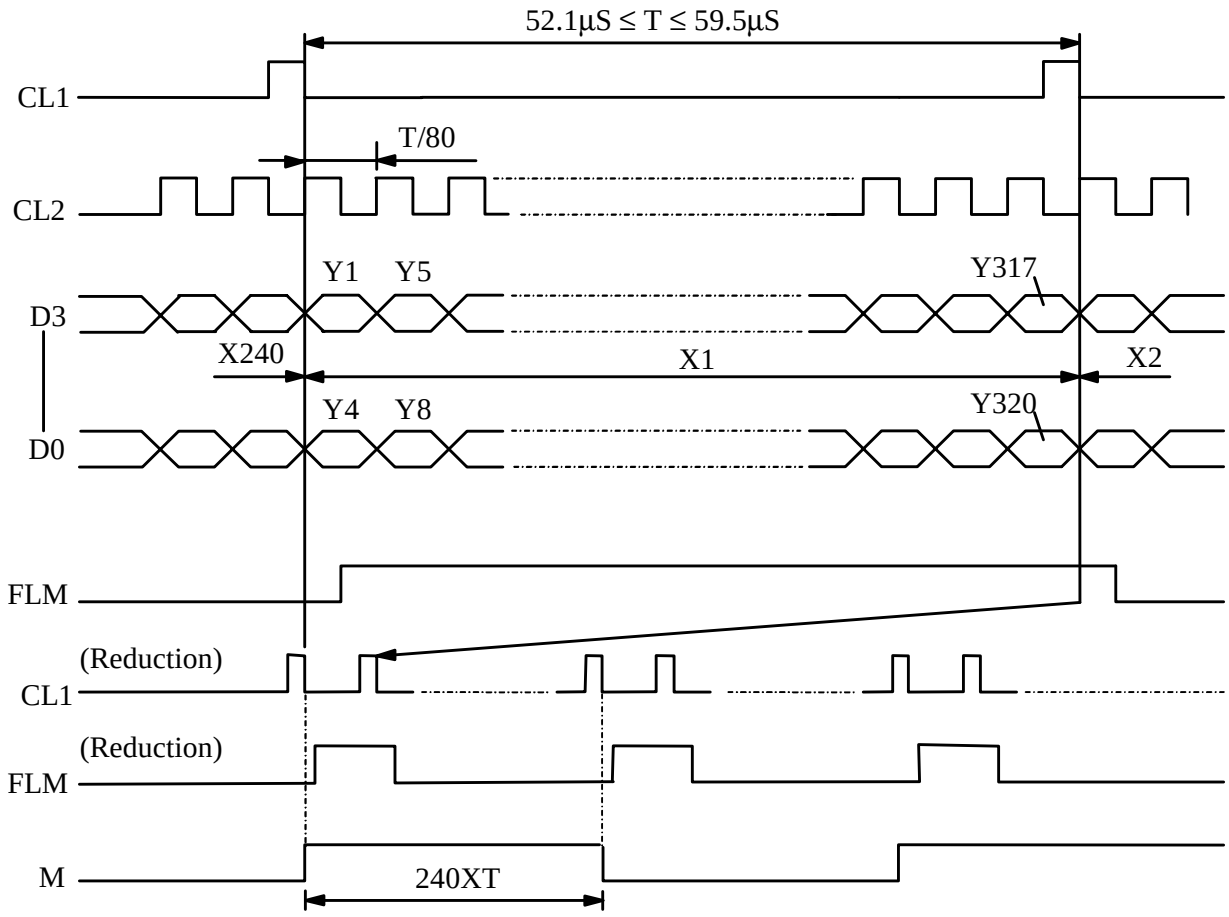
PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
POWER SUPPLY VOLTAGE FOR LOGIC	VDD – VSS	—	4.5	5.0	5.5	V
POWER SUPPLY VOLTAGE FOR LCD DRIVE	VEE – VSS	—	-26.5	-27.0	-27.5	V
INPUT VOLTAGE NOTE (1)	VIH	H LEVEL	0.8*VDD	—	—	V
	VIL	L LEVEL	—	—	0.2*VDD	V
POWER SUPPLY CURRENT FOR LOGIC	IDD	VDD – VSS = 5.0 V VEE – VSS = -27.0	—	4	8	mA
POWER SUPPLY CURRENT FOR LCD DRIVE	IEE	VDD – VSS = 5.0 V VEE – VSS = -27.0	—	5	10	mA
RECOMMENDED LCD DRIVING VOLTAGE NOTE (2)	VDD – VLCD ∅= 10° θ = 0°	Ta = -20 °C	—	24.3	—	V
		Ta = 25 °C	—	20.0	—	V
		Ta = 70 °C	—	15.8	—	V
	VDD – VO	Ta = 25 °C	—	14	—	V
FLM FREQUENCY	f FLM	—	70	75	80	HZ
POWER SUPPLY FOR LED	VLED	—	21	24	27	V
	ILED	VLED = 24V	—	40	50	mA

NOTE (1): APPLIED TO TERMINALS M, FLM, CL1, CL2, D0 ~ D3, $\overline{\text{DISPOFF}}$.

NOTE (2): RECOMMENDED LCD DRIVING VOLTAGE MAY FLUCTUATE ABOUT ± 1.0V BY EACH MODULE.

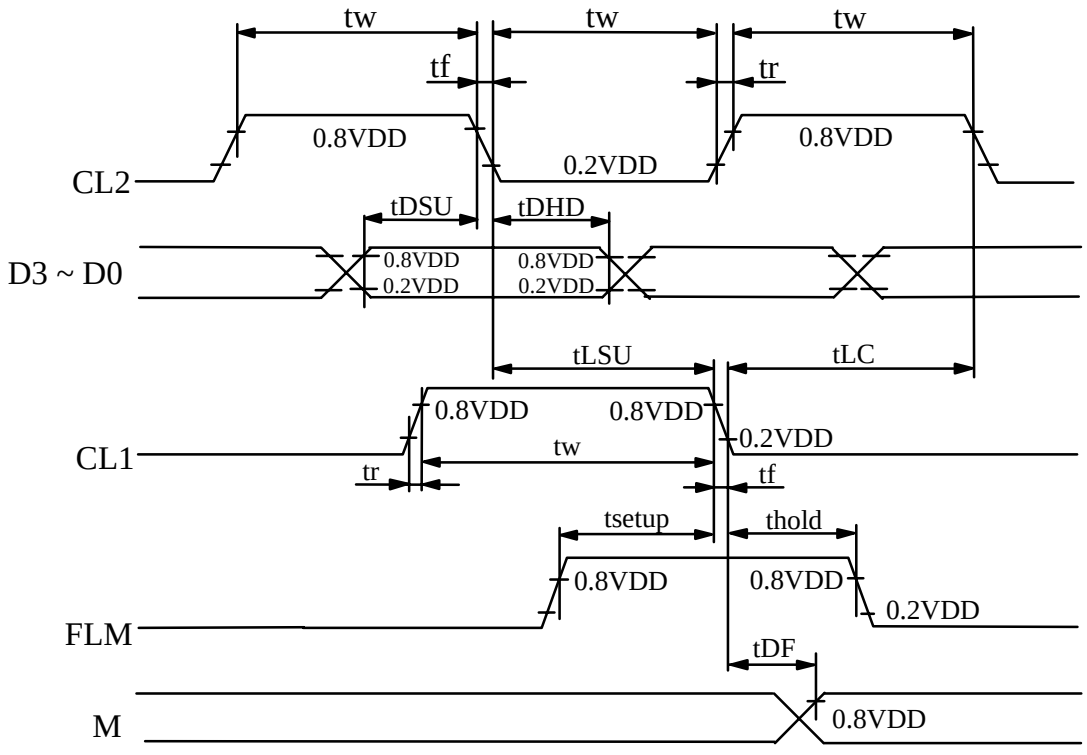
5. TIMING CHARACTERISTICS

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	t_{DSU}	20	—	—	ns
Data hold time	t_{DHD}	20	—	—	ns
CL1 setup time	t_{LSU}	80	—	—	ns
CL1 → CL2 time	t_{LC}	80	—	—	ns
FLM setup time	tsetup	100	—	—	ns
FLM hold time	thold	100	—	—	ns
M delay time	t_{DF}	—	—	300	ns



6. OPTICAL CHARACTERISTICS

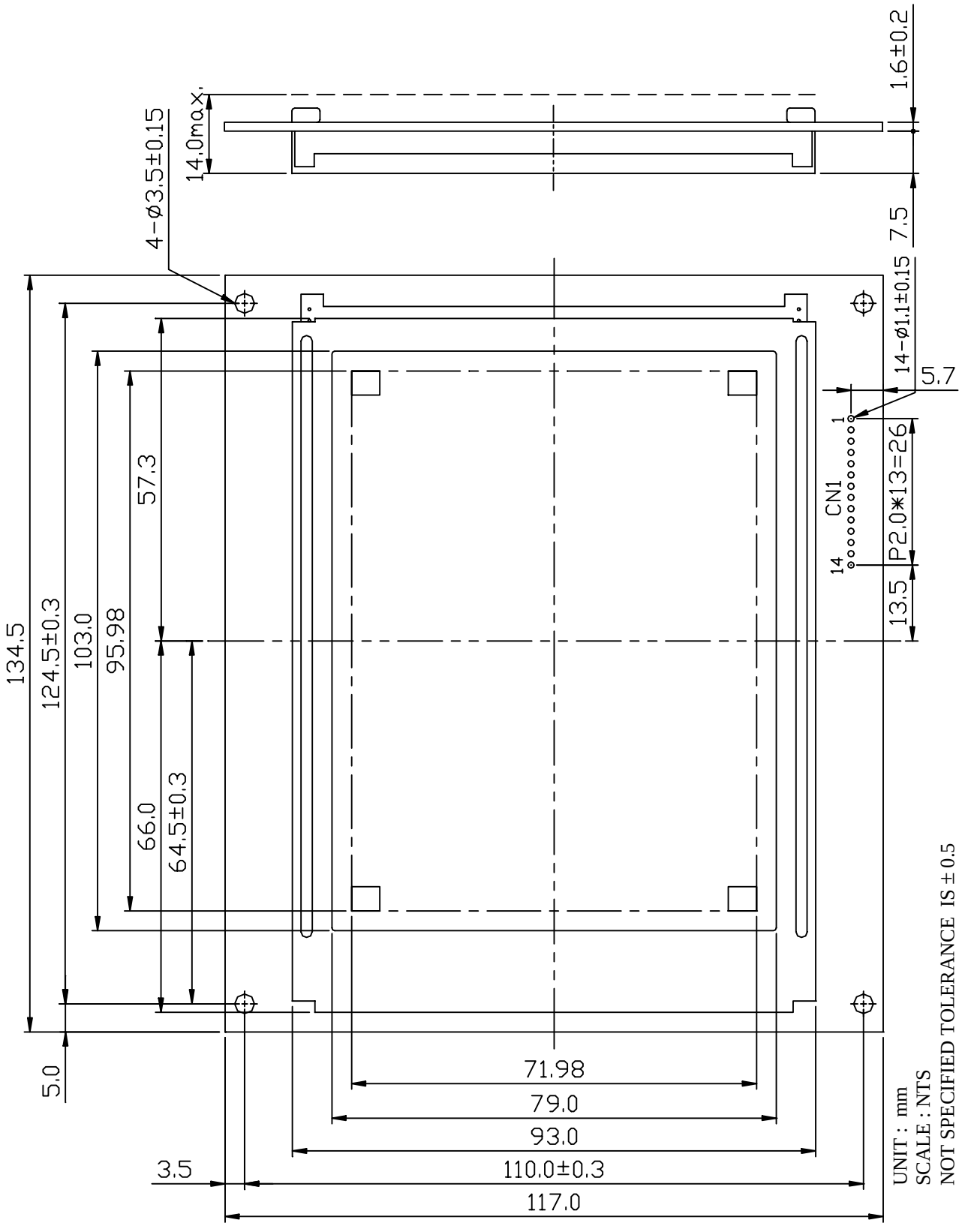
Ta = 25 °C VDD = 5.0 V VDD-VLCD = (22.7V)

ITEM		SYMBOL		CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING ANGLE	STN	∅2 - ∅1		K ≧ 2.0	—	40	—	deg.	1
	FSTN				—	50	—	deg.	1
CONTRAST RATIO	STN	K		∅ = 10 ° θ = 0 °	—	10	—	—	1
	FSTN				—	20	—	—	1
RESPONSE TIME		tr (rise)	∅=10° θ = 0°	Ta = - 20 °C	—	6268	—	ms	1
				Ta = 25 °C	—	228	—		
				Ta = 70 °C	—	104	—		
		tf (fall)		Ta = - 20 °C	—	5714	—		
				Ta = 25 °C	—	191	—		
				Ta = 70 °C	—	86	—		
BRIGHTNESS OF BACKLIGHT		B		—	—	3.5	—	cd / m²	—

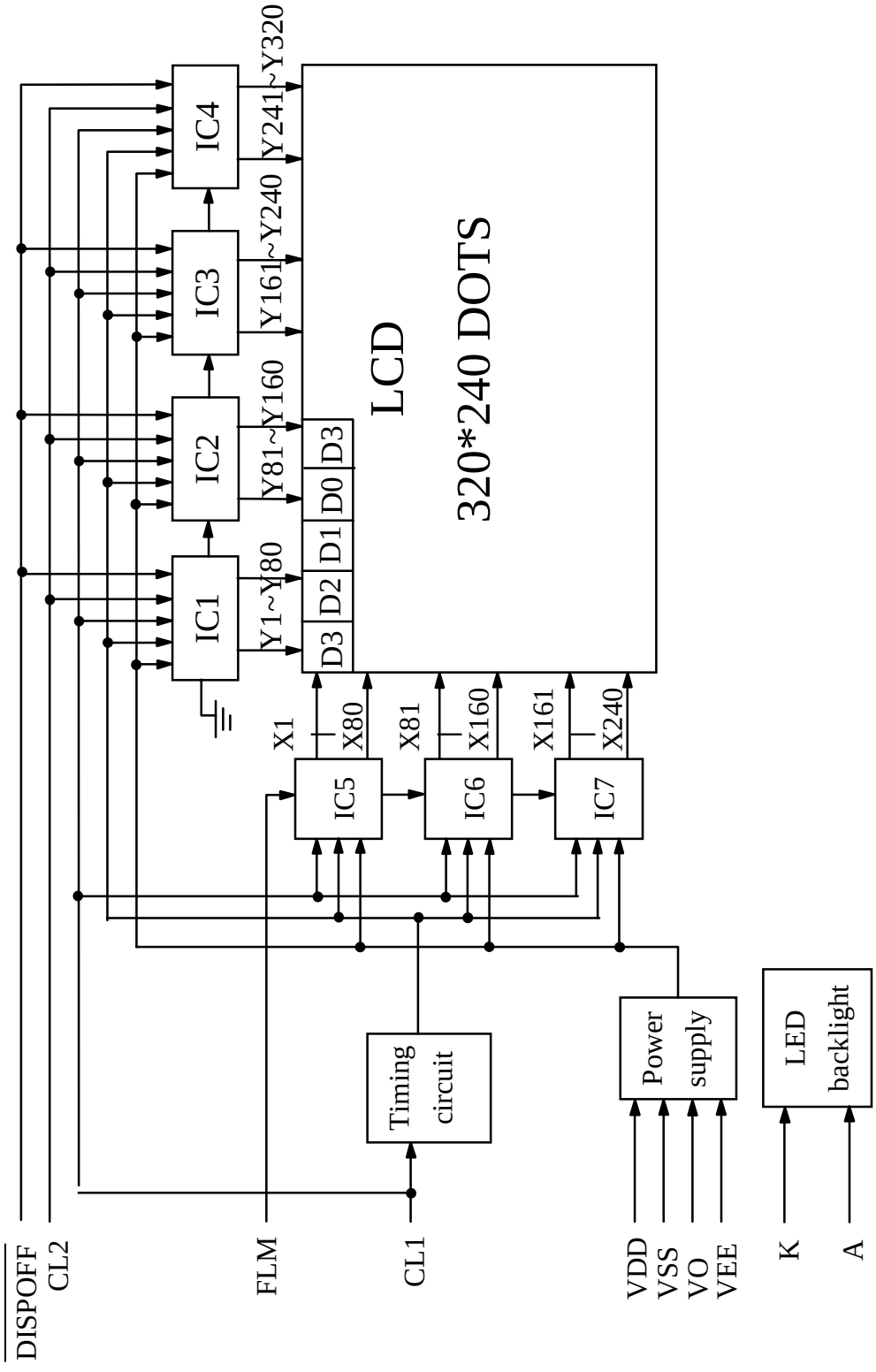
NOTE (1) : PLEASE REFER TO :
CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS.

EU-001A

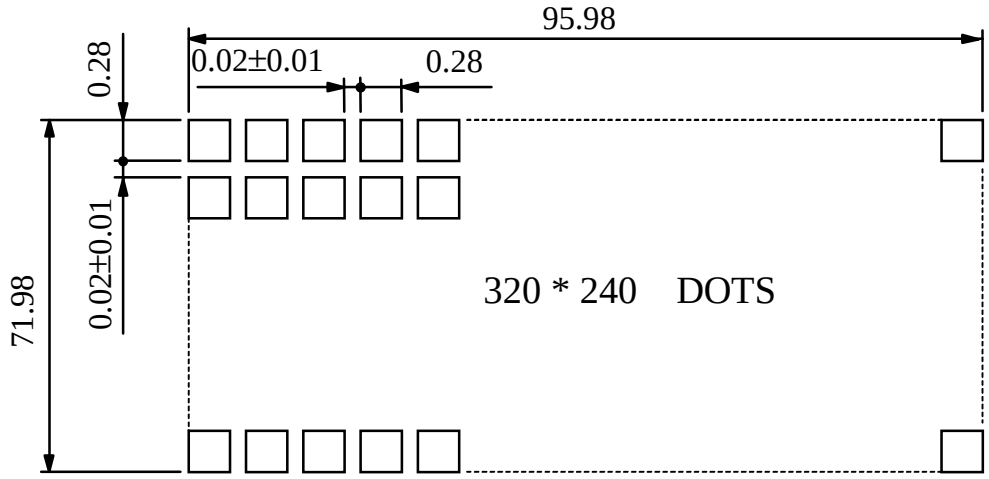
7. OUTLINE DIMENSIONS



8. BLOCK DIAGRAM



9. DETAIL DRAWING OF DOT MATRIX



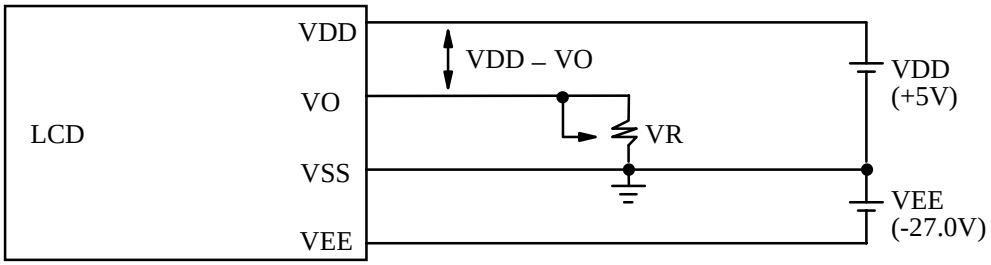
UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.1

10. INTERFACE SIGNALS

PIN NO	SYMBOL	LEVEL	FUNCTION
1	VO	—	OPERATING VOLTAGE FOR LCD DRIVING
2	VEE	—	POWER SUPPLY FOR LCD DRIVING (-27V)
3	D3	H / L	DISPLAY DATA
4	D2	H / L	
5	D1	H / L	
6	D0	H / L	
7	VSS	—	GROUND
8	VDD	—	POWER SUPPLY FOR LOGIC CIRCUIT
9	CL2	H → L	DISPLAY DATA SHIFT
10	CL1	H → L	DISPLAY DATA LATCH
11	FLM	H	THE FLM SIGNAL INDICATING THE BEGINNING OF EACH DISPLAY CYCLE
12	K	—	POWER SUPPLY FOR LED BACKLIGHT (GND)
13	A	—	POWER SUPPLY FOR LED BACKLIGHT (+24V)
14	NC	—	NO CONNECTION

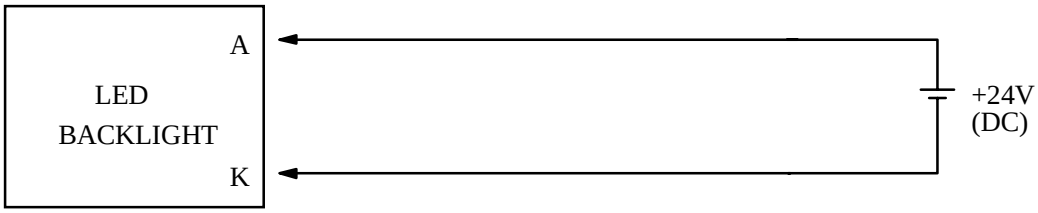
11. POWER SUPPLY

11.1 POWER SUPPLY FOR LCM



VDD – VO : LCD DRIVING VOLTAGE
VR : 30KΩ ~ 50KΩ

11.2 POWER SUPPLY FOR LED BACK - LIGHT



11.3 TIMING OF POWER SUPPLY AND INTERFACE SIGNAL