EXAMINED BY : Tony Chen	EMERGING DISPLAY	FILE NO . CAS-10083
		ISSUE : MAR.17,2000
APPROVED BY: David Chang	TECHNOLOGIES CORPORATION	TOTAL PAGE : 10
		VERSION : 2

CUSTOMER ACCEPTANCE SPECIFICATIONS

MODEL NO . :

32F10(REFLECTIVE TYPES)

FOR MESSRS :

_____

CUSTOMER'S APPROVAL

DATE :

_____

BY :

_____

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EMERGING DISPLAY TECHNOLOGIES CORPORATION	MODEL NO. 32F10(REFLECTIVE TYPES)	VERSION 2
RECORDS OF REVISION	DOC. FIRST ISSUE APR.08,1998	

DATE	REVISED PAGE NO.	SUMMARY
MAR.17,2000	1 , 2 , 3 , 6	THE ENTIRE PAGES REVISED .

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NUMBERING SYSTEM

Polarizer Mode	Backlight	Code value
Reflective	——	R

E	W	32	F	10	G	R

LCD type + LCD color	Code Value
STN + Gray	G
FSTN + White	F

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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	160.0W * 109.0H * 11.0D(max.) mm
(3)	EFFECTIVE AREA	120.0W * 90.0H mm
(4)	ACTIVE AREA	115.17W * 86.37H mm
(5)	DOT SIZE	0.33W * 0.33H mm
(6)	DOT PITCH	0.36W * 0.36H mm
(7)	LCD TYPE *	
(8)	DRIVING METHOD	1/240 DUTY MULTIPLEX DRIVE

* 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	6.0	V	
POWER SUPPLY FOR LCD DRIVING	VDD – VEE	0	27.0	V	
INPUT VOLTAGE	VI	VSS	VDD	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	—	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 : 168HR MAX.
NOTE (3) : BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT TEMPERATURE THIS PHENOMENON IS REVERSIBLE.

4 . ELECTRICAL CHARACTERISTICS

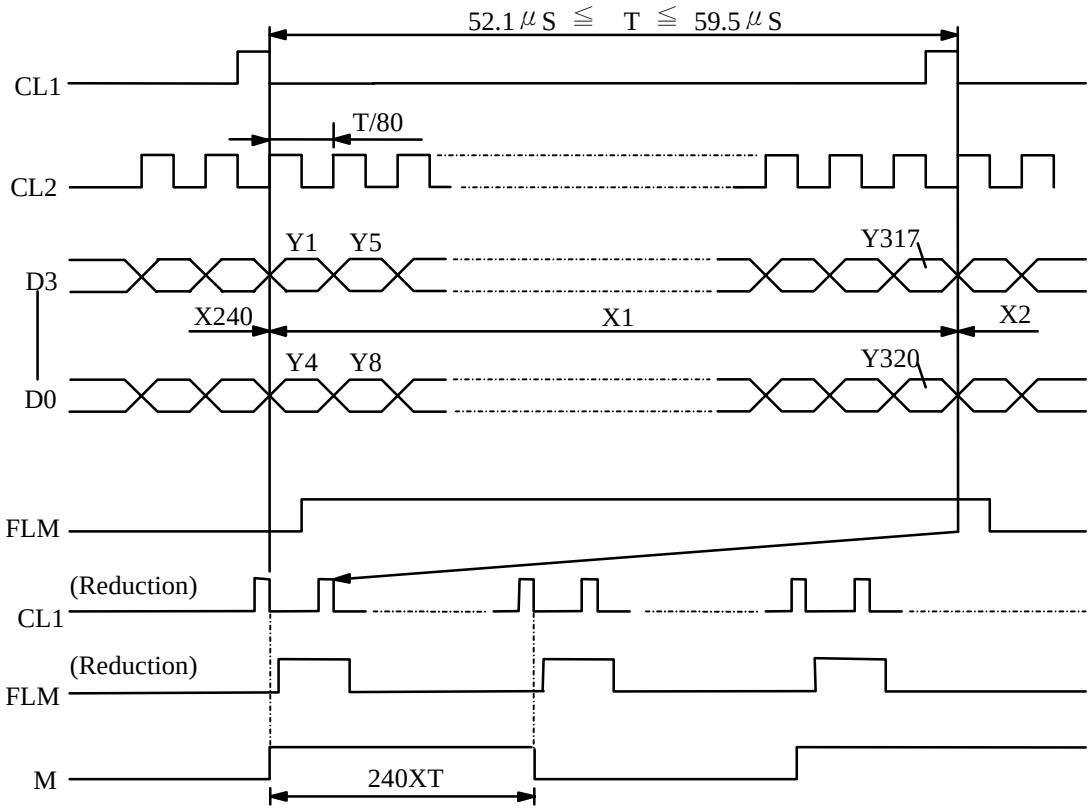
Ta = 2 5 °C VDD = 5 . 0 V

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	VEE – VSS	—	-21.5	-22.0	-22.5	V
INPUT VOLTAGE NOTE (1)	VIH	H LEVEL	0.8*VDD	—	—	V
	VIL	L LEVEL	—	—	0.2*VDD	V
POWER SUPPLY CURRENT FOR LOGIC NOTE (2)	IDD	VDD – VSS = 5 . 0 V VDD – VEE = 2 2 . 0 V	—	3.0	—	mA
POWER SUPPLY CURRENT FOR LCD DRIVE NOTE (2)	IEE	VDD – VSS = 5 . 0 V VDD – VEE = 2 2 . 0 V	—	2.8	—	mA
RECOMMENDED LCD DRIVING VOLTAGE NOTE (3)	VDD – VO ∅ = 10° DUTY =1/240	Ta = -10 °C	—	25.1	—	V
		Ta = 25 °C	—	23	—	V
		Ta = 60 °C	—	21.3	—	V
CLOCK OSCILLATION FREQUENCY	f FLM	—	70	75	80	HZ

NOTE (1) : APPLIED TO TERMINALS M , FLM , CL1 , CL2 , D0 ~ D3 , $\overline{\text{DISPOFF}}$.
NOTE (2) : THE DISPLAY PATTERN IS ALL " ON " / " OFF "
NOTE (3) : RECOMMENDED LCD DRIVING VOLTAGE MAY FLUCTUATE ABOUT ± 1 . 0V BY EACH MODULE .

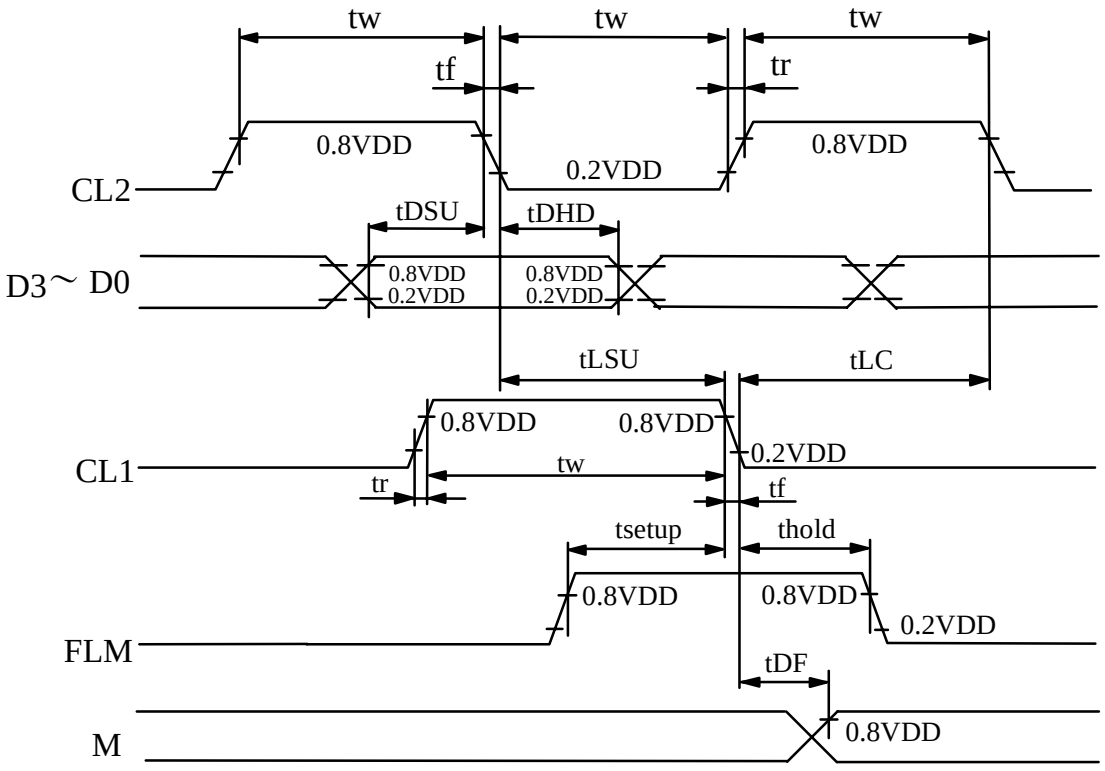
5. TIMING CHARACTERISTICS

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



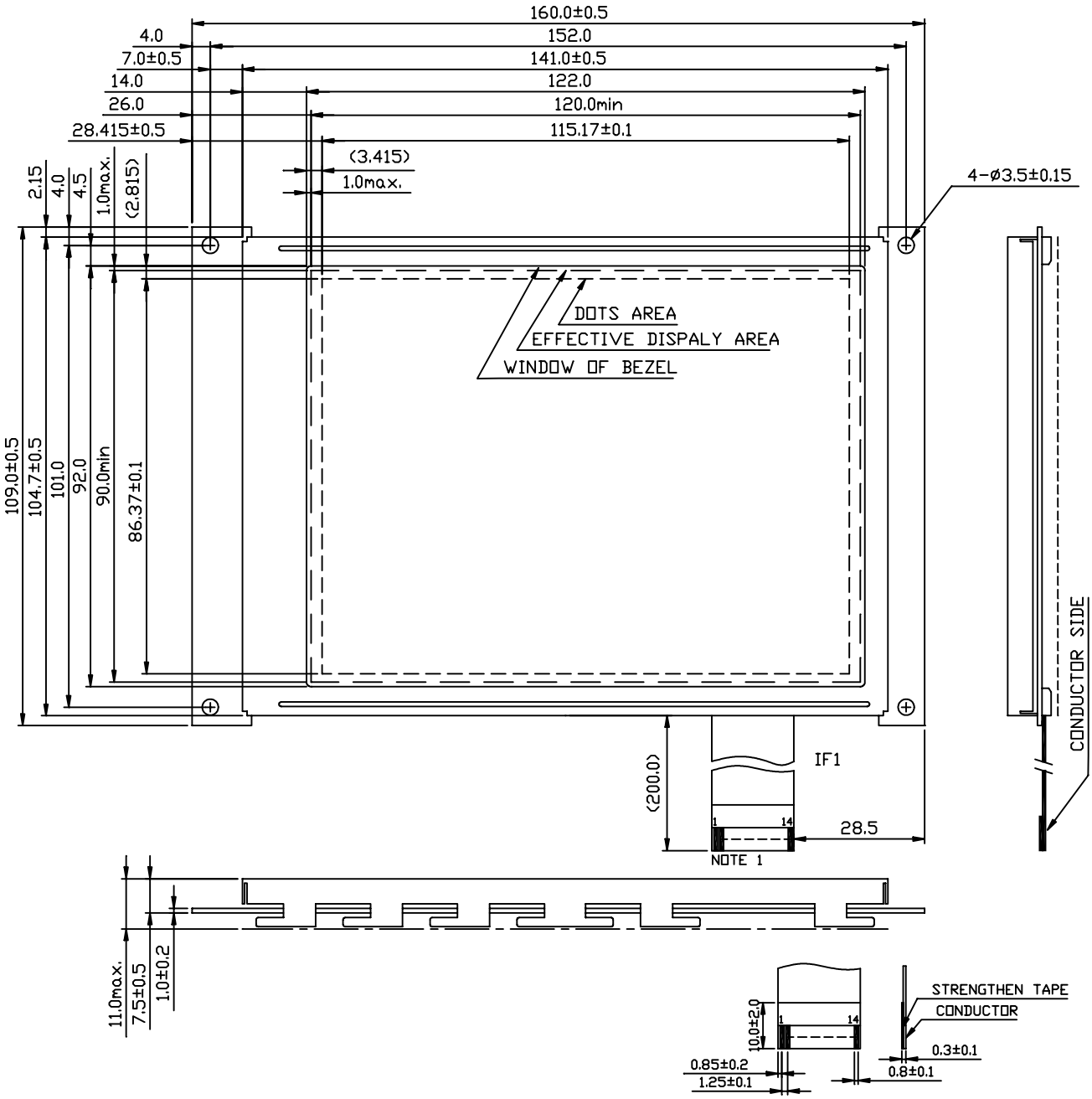
6. OPTICAL CHARACTERISTICS

Ta = 25 °C VDD = 5.0 V

ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING AREA	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 = -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	—		

NOTE (1) : PLEASE REFER TO :
CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS. (EU - 001A)

7. OUTLINE DIMENSION



NOTE 1 : MAKER : SUMITOMO(JAPAN)

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

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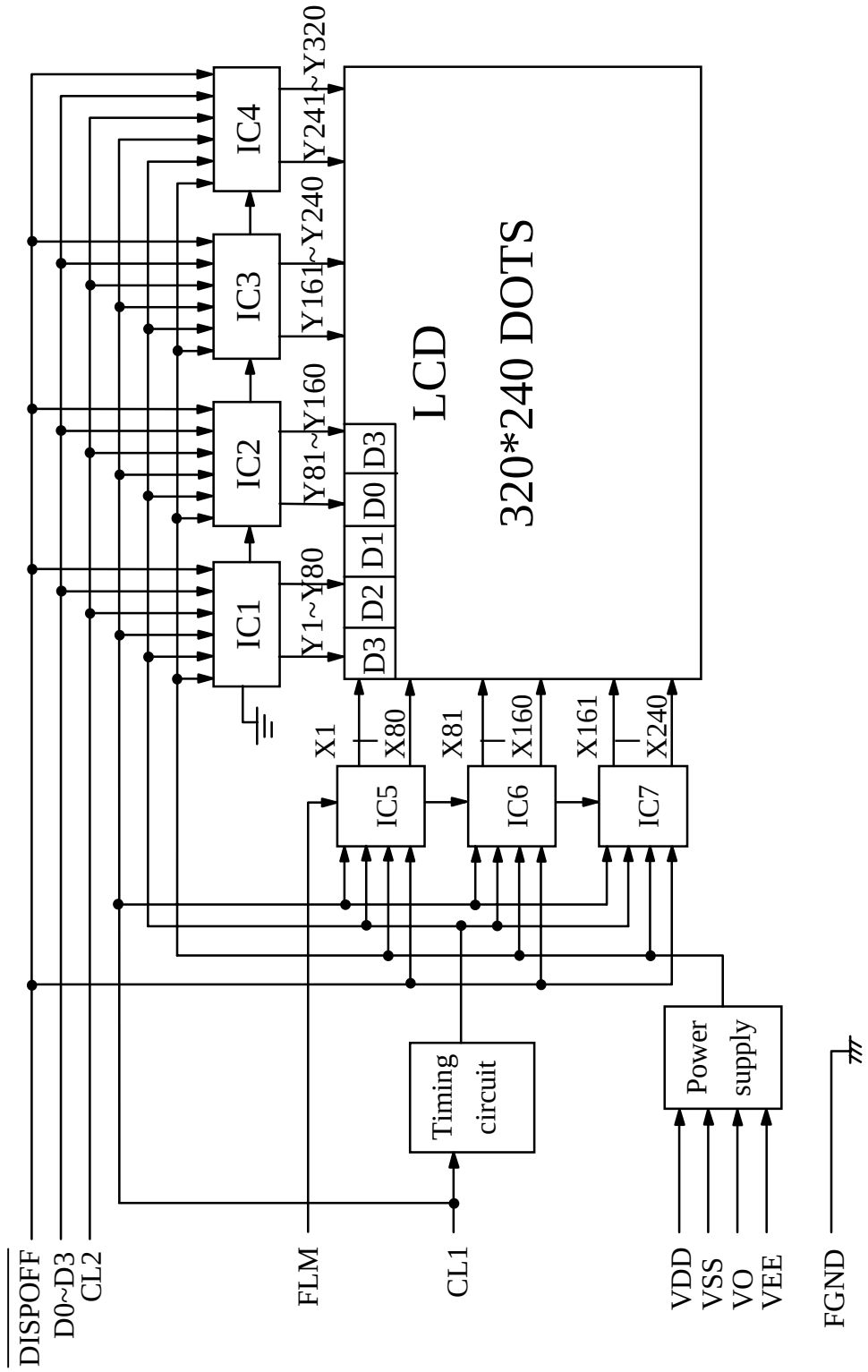
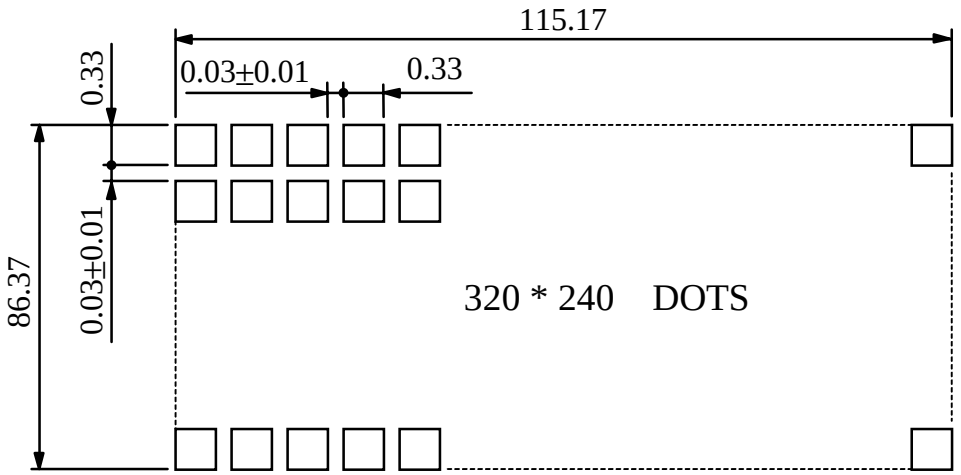
8. BLOCK DIAGRAM



9. DETAIL DRAWING OF DOT MATRIX



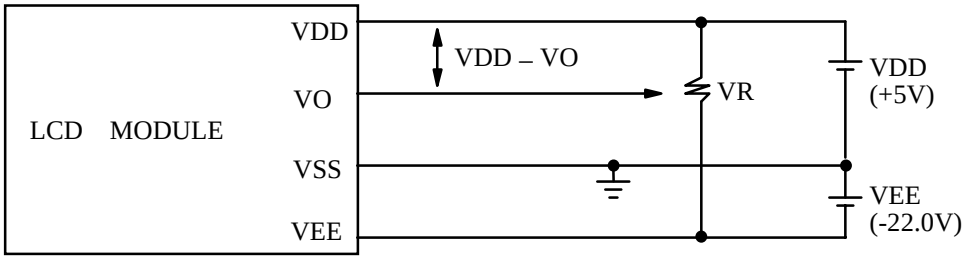
UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.1

10. INTERFACE SIGNALS

PIN NO	SYMBOL	LEVEL	FUNCTION
1	D0	H / L	DISPLAY DATA
2	D1	H / L	
3	D2	H / L	
4	D3	H / L	
5	$\overline{\text{DISPOFF}}$	H / L	H：DISPLAY ON , L：DISPLAY OFF
6	FLM	H	THE FLM SIGNAL INDICATING THE BEGINNING OF EACH DISPLAY CYCLE
7	NC	—	NO CONNECTION
8	CL1	H → L	DISPLAY DATA LATCH
9	CL2	H → L	DISPLAY DATA SHIFT
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	FGND	—	FRONT PANEL GROUND

11. POWER SUPPLY

11.1 POWER SUPPLY FOR LCM



VDD – VO : LCD DRIVING VOLTAGE
VR : 20KΩ

11.2 TIMING OF POWER SUPPLY AND INTERFACE SIGNAL