EXAMINED BY : Jason Ma.	EMERGING DISPLAY	FILE NO . CAS-50197
		ISSUE : AUG.03,2000
APPROVED BY: David Chang	TECHNOLOGIES CORPORATION	TOTAL PAGE : 10
		VERSION : 4

CUSTOMER ACCEPTANCE SPECIFICATIONS

MODEL NO. :

EW32F90FLW

FOR MESSRS :

CUSTOMER'S APPROVAL

DATE :

BY :

EMERGING DISPLAY TECHNOLOGIES CORPORATION	MODEL NO. EW32F90FLW	VERSION 4
RECORDS OF REVISION	DOC . FIRST ISSUE MAR.31,2000	

DATE	REVISED PAGE NO.	SUMMARY
APR.05,2000	1	2. MECHANICAL SPECIFICATIONS (2) MODULE SIZE : 88.3W * 68.6H * 7.0 D (max.) mm → 88.3W * 68.6H * 7.5 D (max.) mm
	7	7. OUTLINE DIMENSION ① MODULE THICKNESS : 7.0max → 7.5 max ② FLEX CABLE : PITCH 1.25 → PITCH 1.0
	9	9. DETAIL DRAWING OF DOT MATRIX 57.59 L * 76.79 W → 76.79 L * 57.59 W
JUN.12,2000	1	2. MECHANICAL SPECIFICATIONS (2) MODULE SIZE : 88.3W * 68.6H * 7.5 D (max.) mm → 93.8W * 66.6H * 6.5 D (max.) mm
	7	7. OUTLINE DIMENSION ALL PAGE WAS CHANGED.
AUG.03,2000	2	3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS POWER SUPPLY FOR LED : VLED – VLSS : 4.0 V max → 5.0 V max
	3	ALL PAGE WAS CHANGED .
	10	11.1 POWER SUPPLY FOR LCM VEE – VSS = 18.0 → 21.5 V VLED – VLSS = 3.6 → 5.0 V

TABLE OF CONTENTS

NO.	ITEM	PAGE
1.	GENERAL SPECIFICATIONS	1
2.	MECHANICAL SPECIFICATIONS	1
3.	ABSOLUTE MAXIMUM RATINGS	2
4.	ELECTRICAL CHARACTERISTICS	3
5.	TIME CHARACTERISTICS	4,5
6.	OPTICAL CHARACTERISTICS	6
7.	OUTLINE DIMENSION	7
8.	BLOCK DIAGRAM	8
9.	DETAIL DRAWING OF DOT MATRIX	9
10.	INTERFACE SIGNAL	9
11.	POWER SUPPLY	10

1. GENERAL SPECIFICATIONS

1.1 GENERAL SPECIFICATIONS
PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

EU-002A

1.2 THIS INDIVIDUAL SPECIFICATIONS IS PRIOR TO GENERAL SPECIFICATIONS .

2. MECHANICAL SPECIFICATIONS

(1) NUMBER OF DOTS	----------	320W * 240H DOTS
(2) MODULE SIZE	----------	93.8W * 66.6H * 6.5 D (max.) mm
(3) EFFECTIVE AREA	----------	78.8W * 59.6H mm
(4) ACTIVE AREA	----------	76.79W * 57.59H mm
(5) DOT SIZE	----------	0.23W * 0.23H mm
(8) DOT PITCH	----------	0.24W * 0.24H mm
(9) LCD TYPE	----------	FSTN,POSITIVE,BLACK/WHITE, TRANSFLECTIVE
(10) DRIVING METHOD	----------	1 / 240 DUTY MULTIPLEX DRIVE
(11) VIEWING DIRECTION	----------	6 O'CLOCK
(12) BACK LIGHT	----------	LED;COLOR : WHITE

3. ABSOLUTE MAXIMUM RATINGS

3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS. (AT Ta = 25 ℃)

PARAMETER	SYMBOL	MIN.	MAX.	UNIT	REMARK
POWER SUPPLY FOR LOGIC	VDD – VSS	0	7.0	V	
POWER SUPPLY FOR LCD DRIVING	VEE – VSS	0	27	V	
INPUT VOLTAGE	VI	VSS	VDD	V	
STATIC ELECTRICITY	—	—	100	V	NOTE (1)
POWER SUPPLY FOR LED	VLED – VLSS	—	5.0	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.

ITEM	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	-20 °C	70 °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---100HZ XYZ DIRECTIONS 1 Hr.EACH
SHOCK	—	29.4 m/S^2 (3 G)	—	490 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

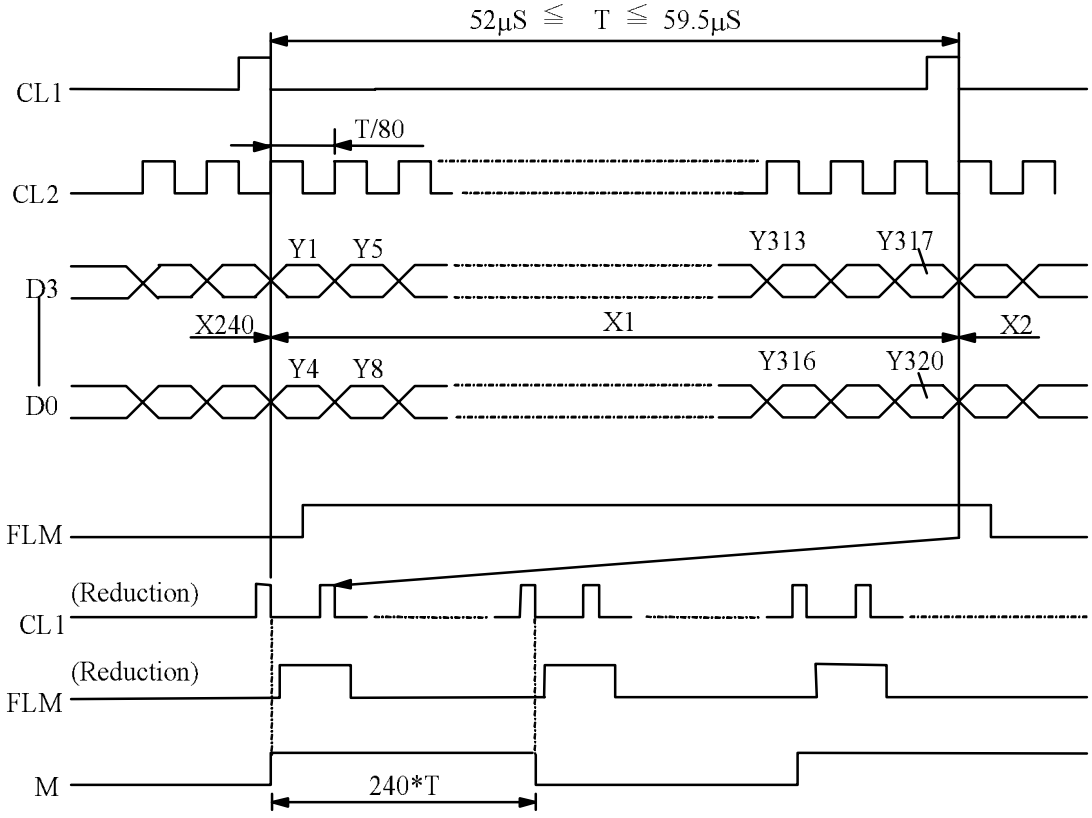
Ta = 25 °C

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
POWER SUPPLY VOLTAGE FOR LOGIC	VDD – VSS	—	2.5	—	5.0	V
POWER SUPPLY VOLTAGE FOR LCD DRIVE	VEE – VSS	—	+15	—	+27	V
INPUT VOLTAGE NOTE (1)	VIH	H LEVEL	0.8VDD	—	—	V
	VIL	L LEVEL	—		0.2VDD	V
POWER SUPPLY CURRENT FOR LOGIC NOTE (2)	IDD	VDD–VSS =3.0V VEE–VSS=21.5V	—	(90)	—	μA
POWER SUPPLY CURRENT FOR LCD DRIVE NOTE (2)	IEE	VDD–VSS =3.0V VEE–VSS=21.5V	—	(3.0)	—	mA
CONTRAST ADJUST VOLTAGE	VEE – VSS ∅ = 10° , θ = 0° DUTY=1/240	Ta = -20 °C	—	(24)	—	V
		Ta = 25 °C	—	(21.5)	—	V
		Ta = 70 °C	—	(18)	—	V
CLOCK OSCILLATION FREQUENCY	fFLM	—	70	75	80	HZ
POWER SUPPLY FOR LED	VLED – VLSS	IF = 100 mA	—	5.0	—	V

NOTE (1) : APPLIED TO TERMINALS FLM , CL1, CL2, M, D0, D1, D2, D3.
NOTE (2) : THIS DISPLAY PATTERN IS ALL ON OR OFF.
NOTE (3) : RECOMMENDED LCD DRIVING VOLTAGE MAY FLUCTUATE ABOUT ± 1 . 0 V BY EACH MODULE.

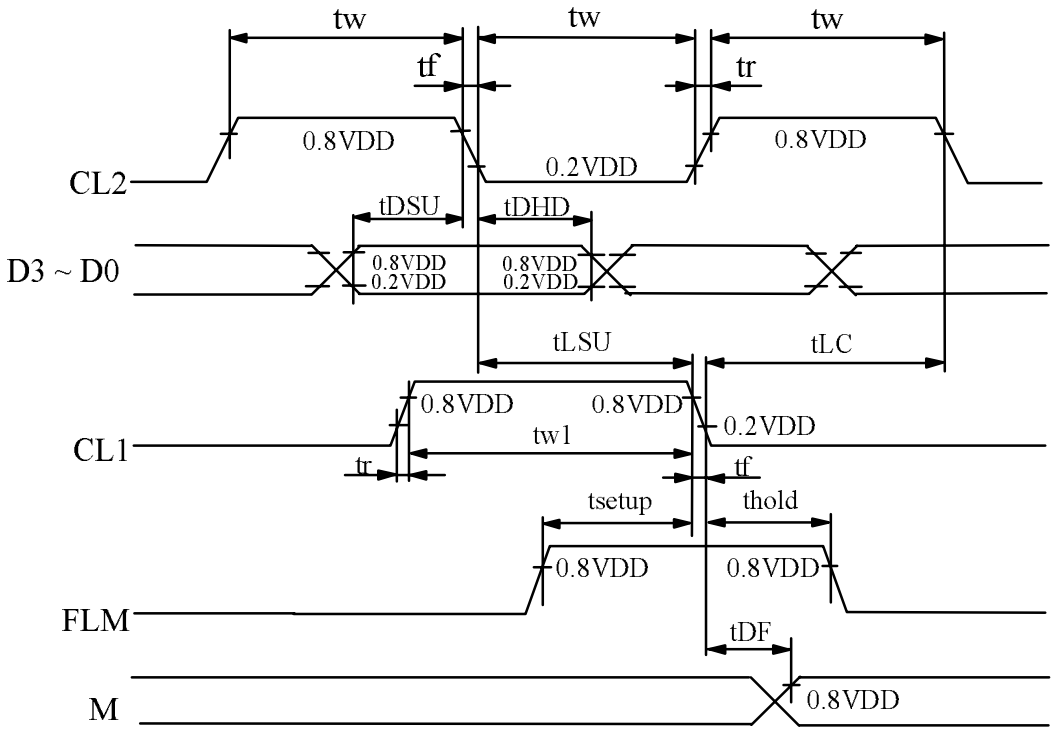
5. TIMING CHARACTERISTICS

5.1 INTERFACE TIMING



5.2 SWITCHING CHARACTERISTICS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
CL1 PULSE WIDTH	tw1	30	—	—	ns
CL2 PULSE	tw	51	—	—	ns
RISE,FALL TIME	tr,tf	—	—	50	ns
DATA SETUP TIME	tDSU	30	—	—	ns
DATA HOLD TIME	tDHD	40	—	—	ns
CL1 SETUP TIME	tLSU	51	—	—	ns
CL1 TO CL2 TIME	tLC	51	—	—	ns
FLM SETUP TIME	tsetup	30	—	—	ns
FLM HOLD TIME	thold	50	—	—	ns
OUTPUT DELAY TIME	tDF	—	—	200	ns



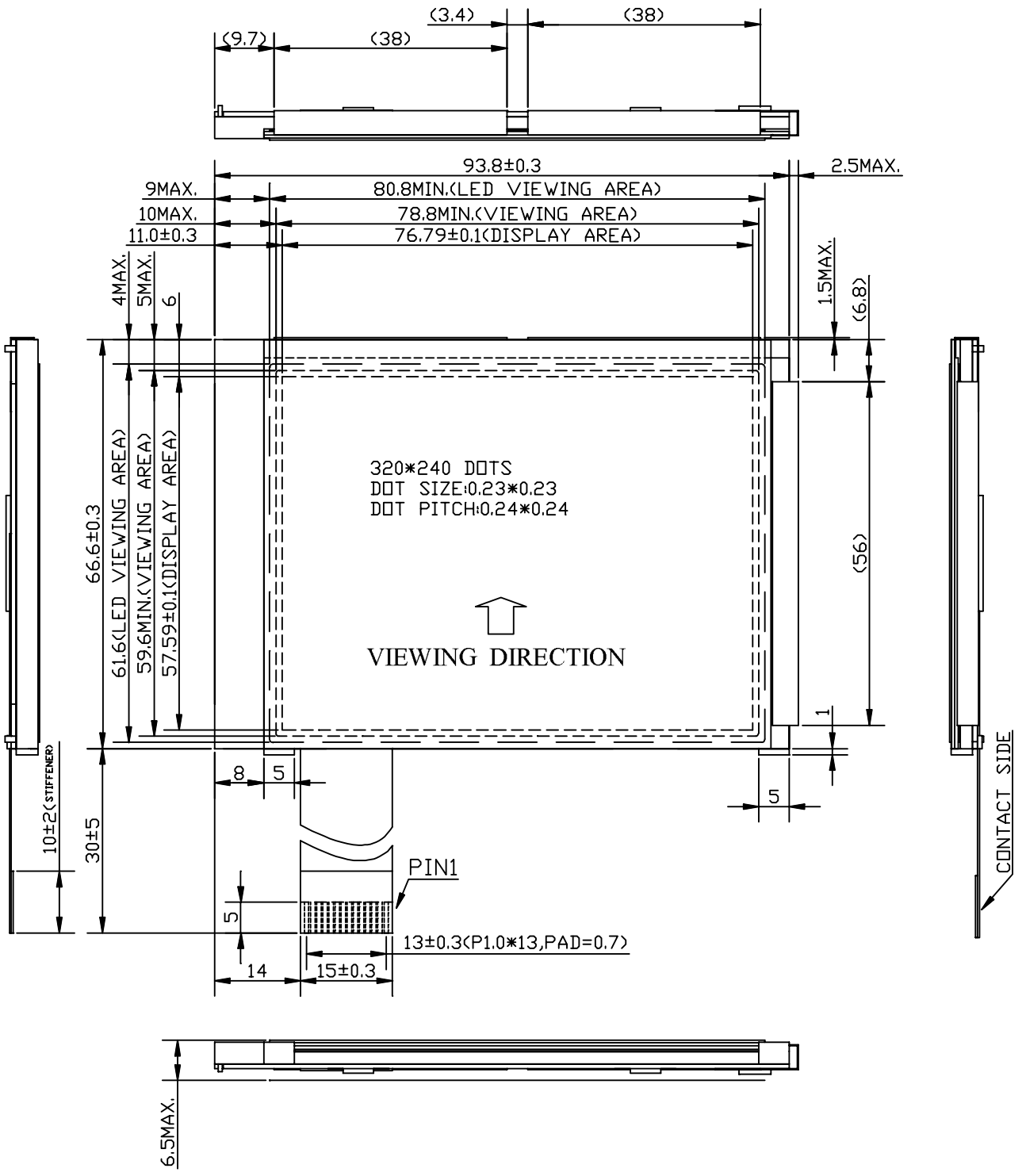
6. OPTICAL CHARACTERISTICS

Ta = 25 °C

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING AREA	∅2 - ∅1	K ≧ 2.0	50	—	—	deg.	1
CONTRAST	K	∅ = 10°	5	—	—	—	1
RESPONSE TIME	tr (rise)	∅ = 10° θ = 0°	—	(330)	—	msec	1
	tf (fall)	∅ = 10° θ = 0°	—	(330)	—	msec	1
THE BRIGHTNESS OF BACK-LIGHT	B	∅ = 10° θ = 0°	10	—	—	cd/m^2	1

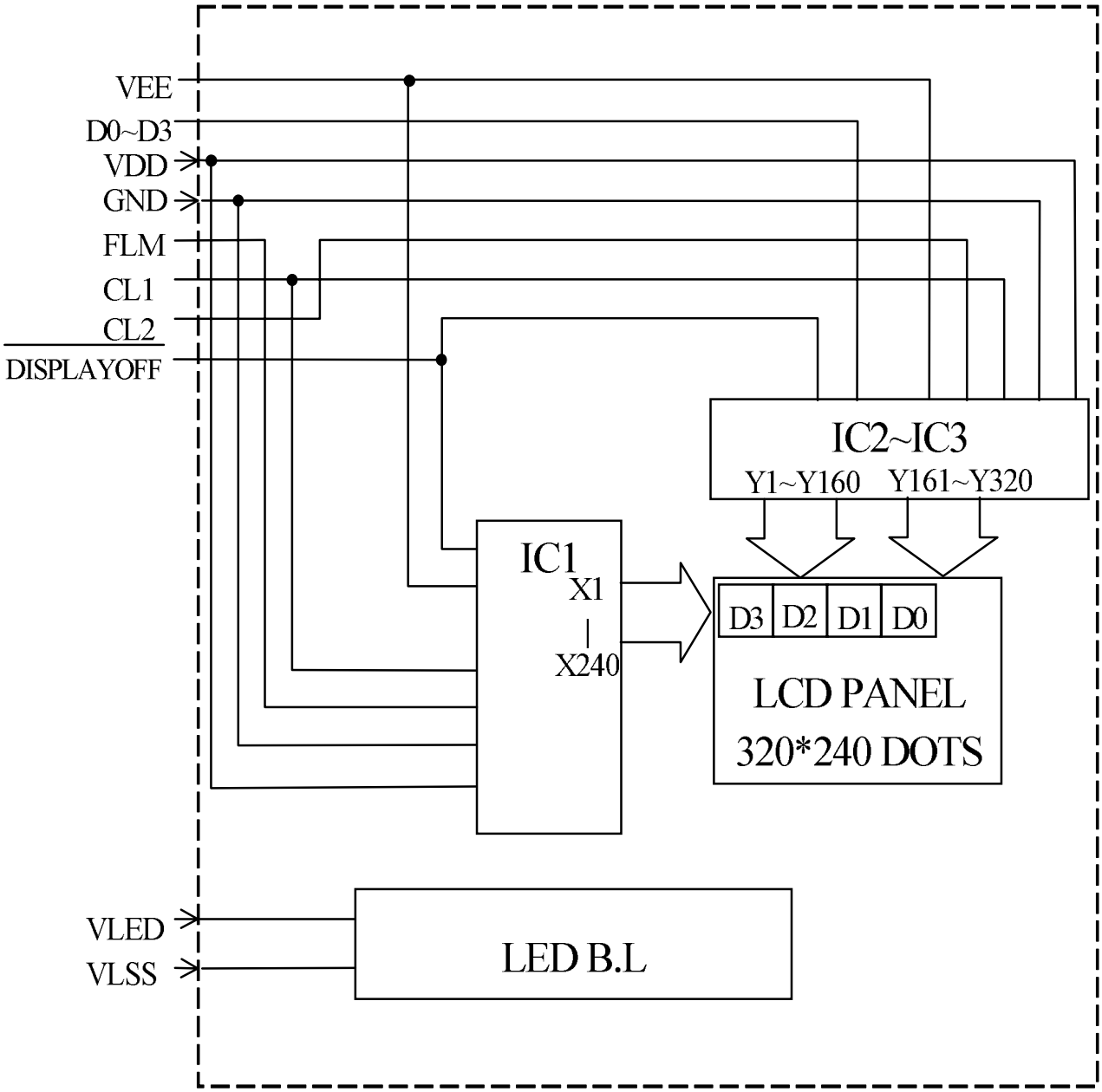
NOTE (1) : PLEASE REFER TO :
CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS. (EU - 002A)

7. OUTLINE DIMENSION

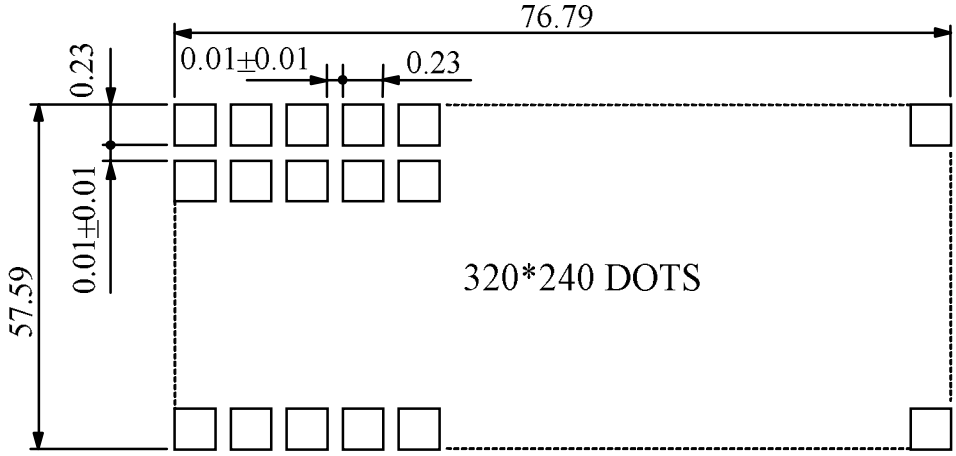


UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.5

8. BLOCK DIAGRAM



9. DETAIL DRAWING OF DOT MATRIX



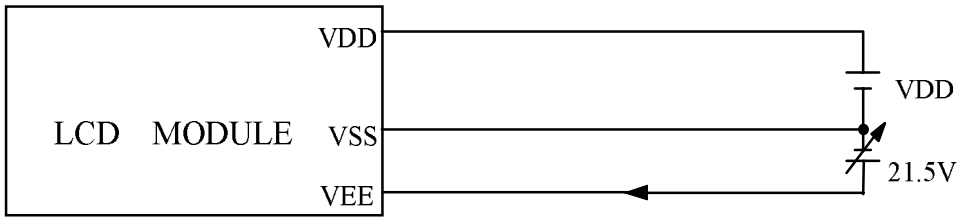
UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.1

10. INTERFACE SIGNALS

PIN NO.	SYMBOL	FUNCTION
1	VDD	POWER SUPPLY FOR LOGIC CIRCUIT.
2	VSS	GROUND.
3	VEE	POWER SUPPLY FOR LCD DRIVING VOLTAGE
4	FLM	THE FLM SIGNAL INDICATING THE BEGINNING OF EACH DISPLAY CYCLE.
5	N.C	NO CONNECTION
6	CL1	DISPLAY DATA LATCH.
7	CL2	DISPLAY DATA SHIFT.
8	D0	DISPLAY DATA
9	D1	DISPLAY DATA
10	D2	DISPLAY DATA
11	D3	DISPLAY DATA
12	$\overline{\text{DISPLAYOFF}}$	CONTROLL LCD ON/OFF " L " : DISPLAY OFF , " H " DISPLAY ON
13	VLED	POWER SUPPLY FOR LED B.L
14	VLSS	POWER SUPPLY FOR LED B.L

11. POWER SUPPLY

11.1 POWER SUPPLY FOR LCM



11.2 POWER SUPPLY FOR LED BACK - LIGHT