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David Chang		VERSION : 1

CUSTOMER ACCEPTANCE SPECIFICATIONS

MODEL NO. :

EW 3 2 F 9 0 F E W

FOR MESSRS :

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CUSTOMER'S APPROVAL

DATE :

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BY :

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EMERGING DISPLAY  
TECHNOLOGIES CORPORATION

MODEL NO. EW32F90FEW	VERSION 1
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RECORDS OF REVISION	DOC . FIRST ISSUE SEP.05,2000
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DATE	REVISED PAGE NO.	SUMMARY

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 :

E U - 0 0 2 A

1.2 THIS INDIVIDUAL SPECIFICATIONS IS PRIOR TO GENERAL SPECIFICATIONS .

2. MECHANICAL SPECIFICATIONS

( 1 ) NUMBER OF DOTS	-----	320W * 240H DOTS
( 2 ) MODULE SIZE	-----	85.8W * 66.6H * 7.0D (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	-----	EL; COLOR : WHITE

### 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	7.0	V	
POWER SUPPLY FOR EL BACKLIGHT	ELON – VSS	—	6	V	
POWER SUPPLY FOR LCD DRIVING	VEE – VSS	0	3.0	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 .

I T E M	OPERATING		STORAGE		REMARK
	MIN .	MAX .	MIN .	MAX .	
AMBIENT TEMPERATURE	- 2 0 °C	5 0 °C	- 3 0 °C	6 0 °C	NOTE ( 2 ), ( 3 )
HUMIDITY	—	8 5 % RH	—	8 5 % RH	WITHOUT CONDENSATION
VIBRATION	—	2 . 4 5 m/S <sup>2</sup> ( 0 . 2 5 G )	—	11.76 m/S <sup>2</sup> ( 1 . 2 G )	10~100HZ XYZ DIRECTIONS 1 Hr.EACH
SHOCK	—	2 9 . 4 m/S <sup>2</sup> ( 3 G )	—	4 9 0 m/S <sup>2</sup> ( 5 0 G )	10 mSECONDS XYZ DIRECTIONS 1 TIME EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE ( 2 ) : Ta AT -30°C : 48HR MAX .  
60°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	—	5.5	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 =5.0V VEE - VSS=21.5V	—	30	—	mA
POWER SUPPLY CURRENT FOR LOGIC NOTE ( 3 )	IDD	VDD - VSS =5.0V VEE - VSS =21.5V	—	300	—	μA
POWER SUPPLY CURRENT FOR LCD DRIVE NOTE ( 2 )	IEE	VDD - VSS =5.0V VEE - VSS=21.5V	—	2.5	—	mA
CONTRAST ADJUST VOLTAGE	VEE - VSS ∅=10°, θ=0° DUTY=1/240	Ta = -20 °C	—	( 24.5 )	—	V
		Ta = 25 °C	—	( 21.5 )	—	V
		Ta = 50 °C	—	( 19.5 )	—	V
CLOCK OSCILLATION FREQUENCY	fFLM	—	70	75	80	HZ
POWER SUPPLY FOR EL BACKLIGHT	ELON	—	—	5.0	—	V

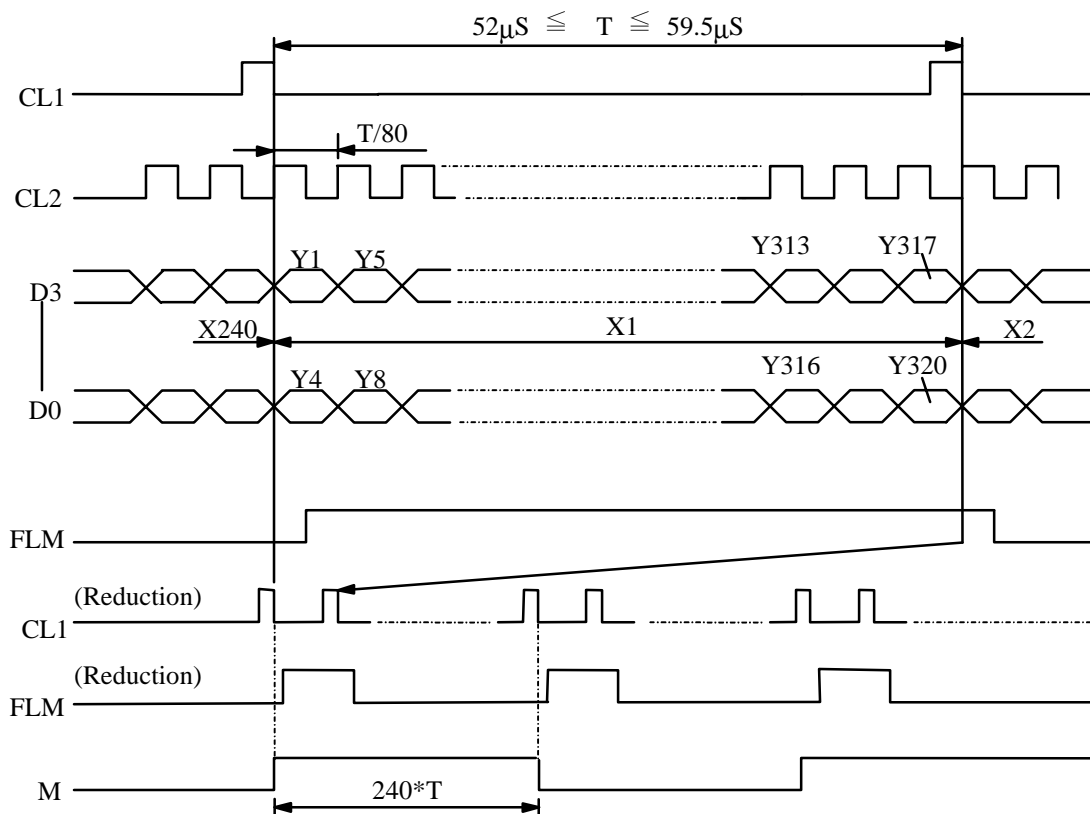
NOTE ( 1 ) : APPLIED TO TERMINALS FLM , CL1, CL2, M, D0, D1, D2, D3.

NOTE ( 2 ) : THIS DISPLAY PATTERN IS ALL ON OR OFF , EL BACKLIGHT ON .

NOTE ( 3 ) : THIS DISPLAY PATTERN IS ALL ON OR OFF , EL BACKLIGHT OFF.

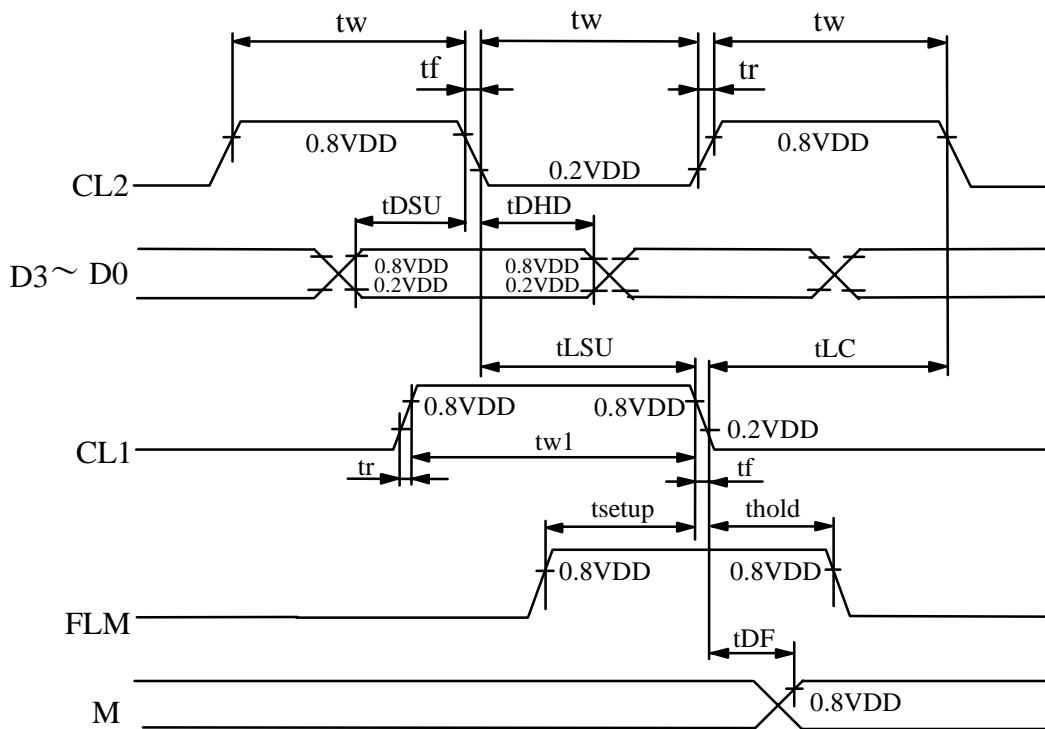
NOTE ( 4 ) : RECOMMENDED LCD DRIVING VOLTAGE MAY FLUCTUATE ABOUT ± 1 . 0 V BY EACH MODULE.

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





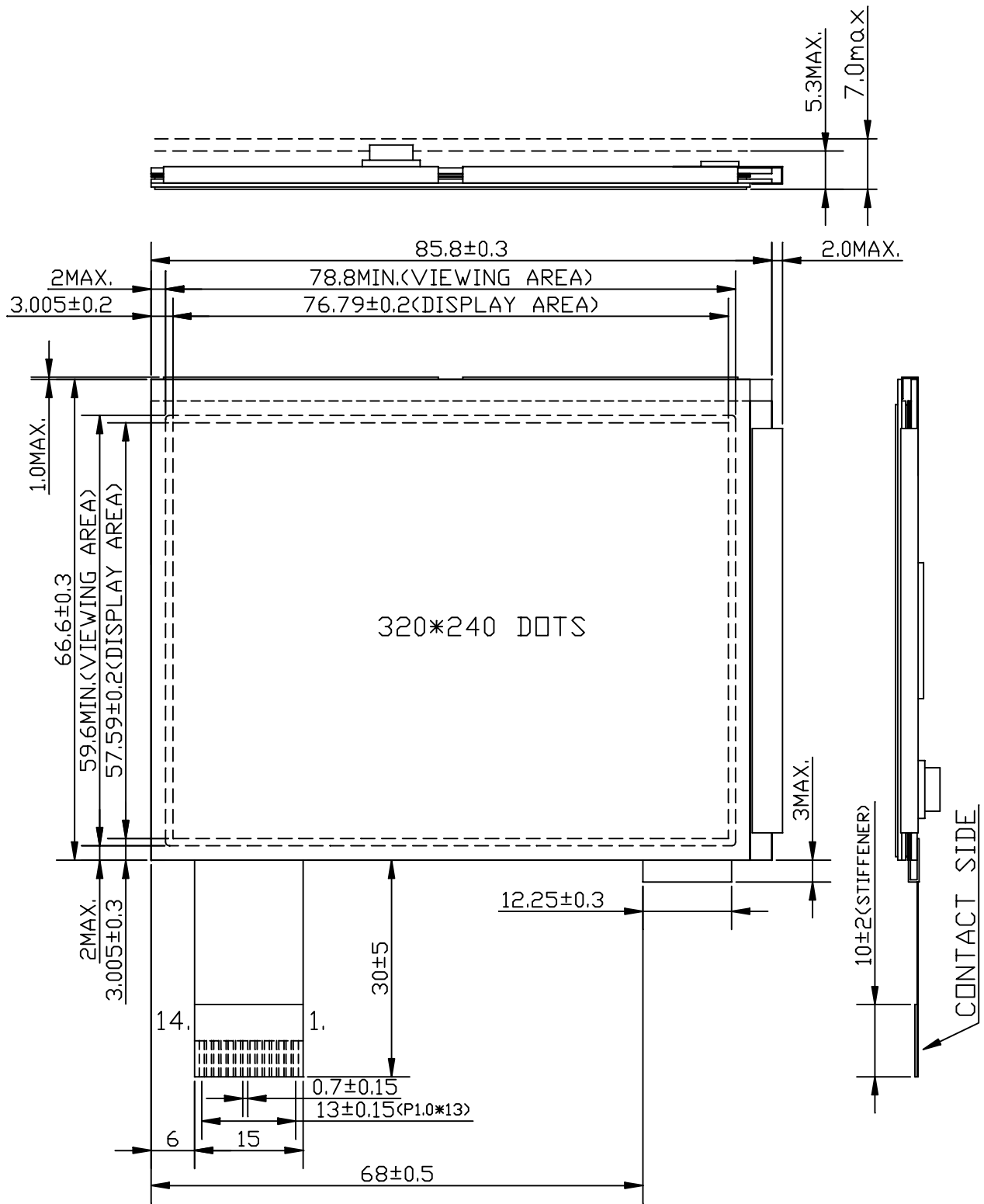
6. OPTICAL CHARACTERISTICS

Ta = 25 °C

I T E M	SYMBOL	CONDITION	MIN .	TYP .	MAX.	UNIT	NOTE
VIEWING AREA	$\varnothing 2 - \varnothing 1$	$K \geq 2.0$	50	—	—	d e g .	1
CONTRAST	K	$\varnothing = 10^\circ$	—	3	—	—	1
RESPONSE TIME	t r ( rise )	$\varnothing = 10^\circ$ $\theta = 0^\circ$	—	( 330 )	—	msec	1
	t f ( fall )	$\varnothing = 10^\circ$ $\theta = 0^\circ$	—	( 330 )	—	msec	1
THE BRIGHTNESS OF BACK-LIGHT	B	$\varnothing = 10^\circ$ $\theta = 0^\circ$	—	( 5 )	—	cd/m <sup>2</sup>	1

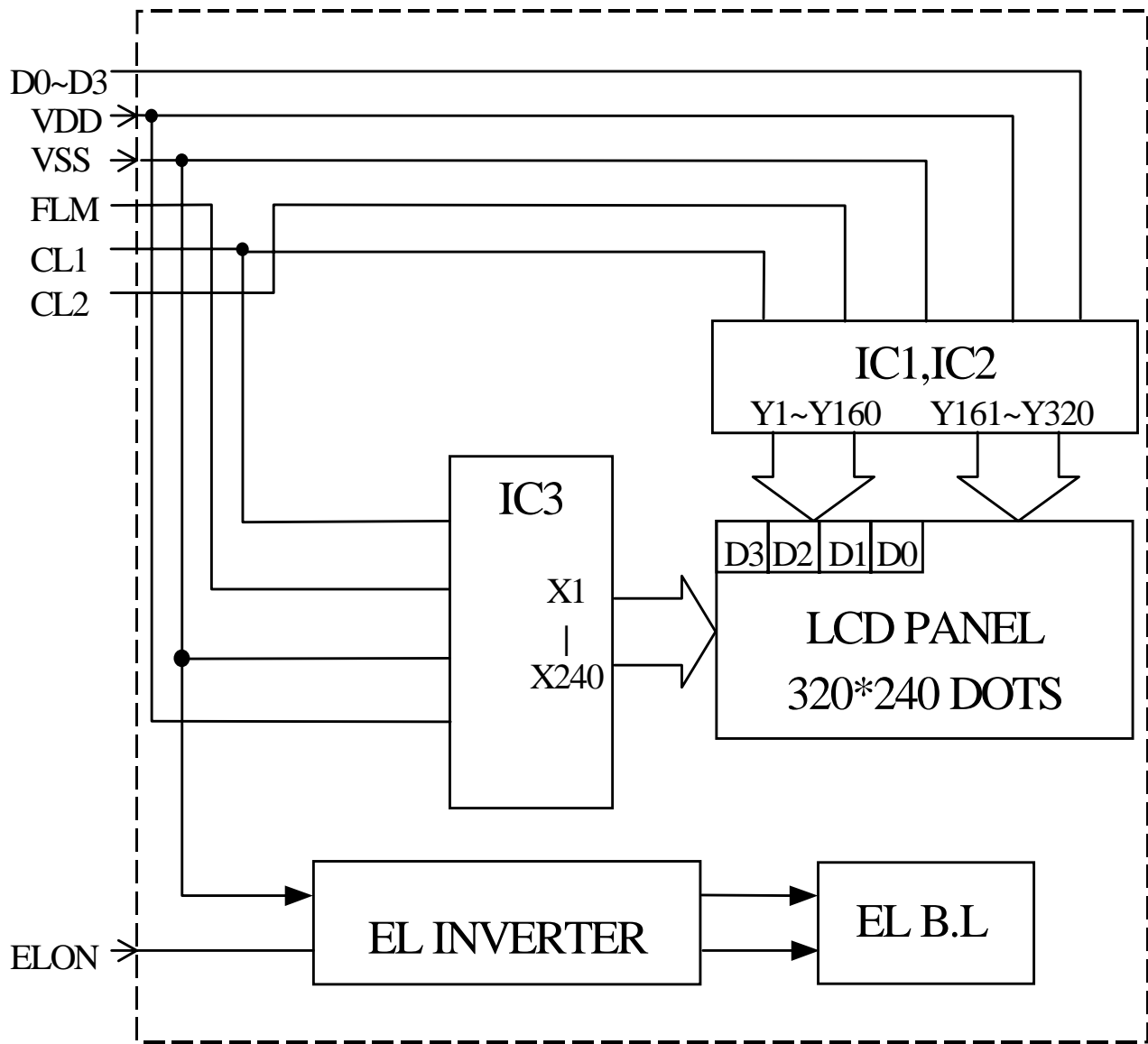
NOTE (1) : PLEASE REFER TO :  
CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS. ( EU - 002A)

7. OUTLINE DIMENSION

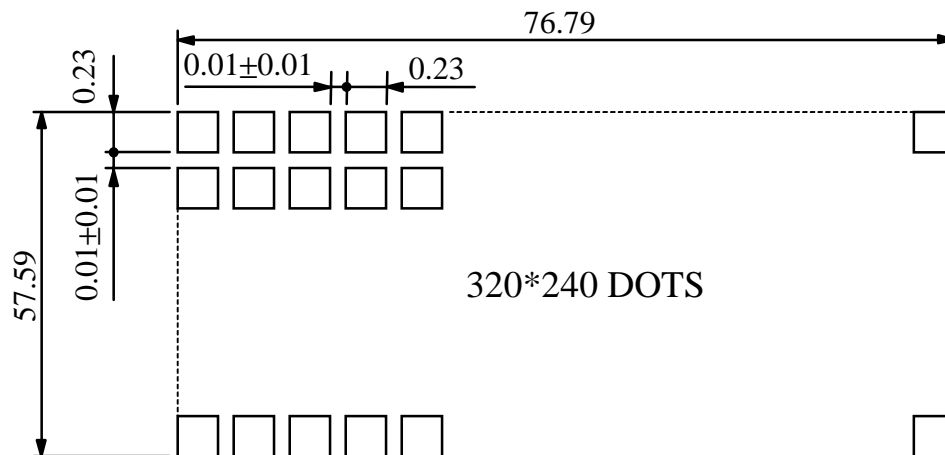


UNIT : mm  
SCALE : NTS  
NOT SPECIFIED TOLERANCE IS ± 0.5

8. BLOCK DIAGRAM



9. DETAIL DRAWING OF DOT MATRIX



UNIT : mm  
SCALE : NTS  
NOT SPECIFIED TOLERANCE IS  $\pm 0.1$

10. INTERFACE SIGNALS

PIN NO.	SYMBOL	FUNCTION
1	VDD	POWER SUPPLY FOR LOGIC CIRCUIT.
2	VSS	GROUND.
3	VEE	POWER SUPPLY FOR LCD
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	$\overline{\text{DOFF}}$	LOW : DISPLAY OFF , HIGH : DISPLAY ON DRIVING VOLTAGE
13	ELON	HIGH : EL BACKLIGHT ON LOW : EL BACKLIGHT OFF
14	N.C.	NO CONNECTION

## 1 1 . POWER SUPPLY

### 1 1.1 POWER SUPPLY FOR LCM

