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CUSTOMER                      ACCEPTANCE                      SPECIFICATIONS

MODEL NO. :

EW 3 2 F 9 1 F R

FOR MESSRS :

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CUSTOMER'S APPROVAL

DATE :

\_\_\_\_\_

BY :

\_\_\_\_\_

EMERGING DISPLAY  
TECHNOLOGIES CORPORATION

MODEL NO. E W 3 2 F 9 1 F R	VERSION 1
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RECORDS OF REVISION	DOC . FIRST ISSUE OCT.13,2000
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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 * 5.5D (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, REFLECTIVE
( 10 ) DRIVING METHOD	-----	1 / 240 DUTY MULTIPLEX DRIVE
( 11 ) VIEWING DIRECTION	-----	6 O'CLOCK

### 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	
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	- 20 °C	70 °C	- 30 °C	80 °C	NOTE (2), (3)
HUMIDITY	—	85 % RH	—	85 % RH	WITHOUT CONDENSATION
VIBRATION	—	2.45 m/S <sup>2</sup> (0.25 G)	—	11.76 m/S <sup>2</sup> (1.2 G)	10~100HZ XYZ DIRECTIONS 1 Hr.EACH
SHOCK	—	29.4 m/S <sup>2</sup> (3 G)	—	490 m/S <sup>2</sup> (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

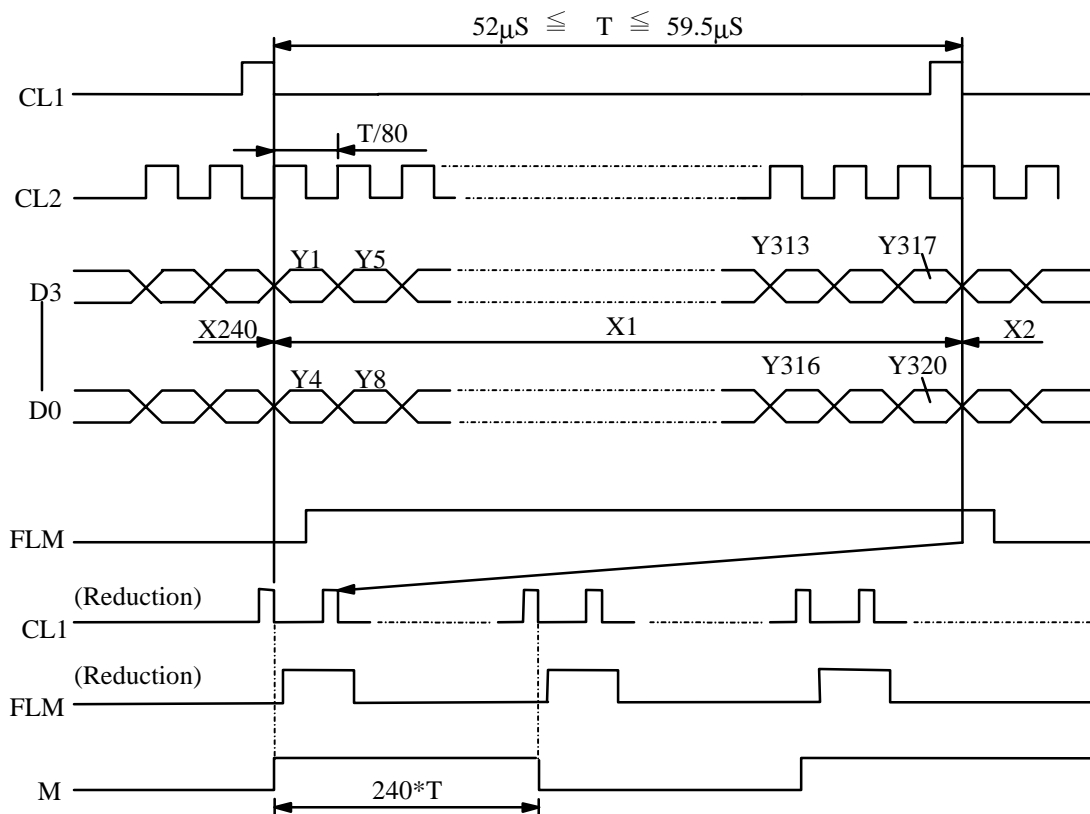
Ta = 25 °C

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 REE – VSS =10KΩ	—	27	—	mA
CONTRAST ADJUST RESISTER VALUE	REE – VSS ∅=10°, θ=0° DUTY=1/240	Ta = -20 °C	—	( 5 )	—	KΩ
		Ta = 25 °C	—	( 10 )	—	KΩ
		Ta = 70 °C	—	( 15 )	—	KΩ
CLOCK OSCILLATION FREQUENCY	fFLM	—	70	75	80	HZ

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

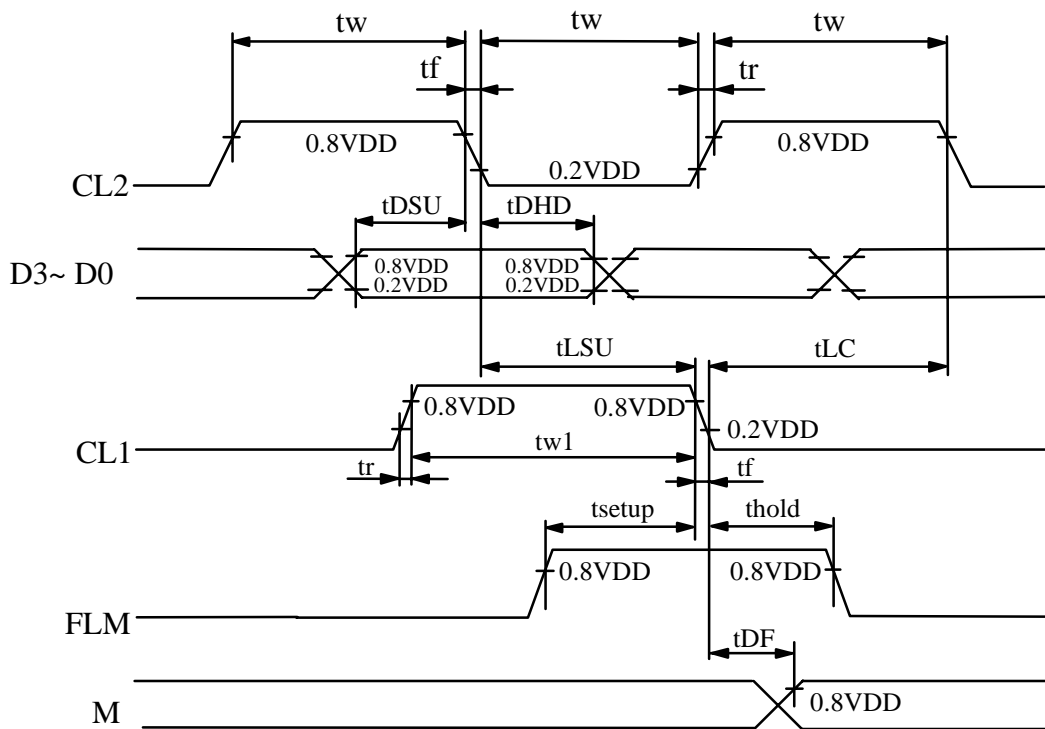
NOTE ( 2 ) : THIS DISPLAY PATTERN IS ALL ON OR OFF .

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





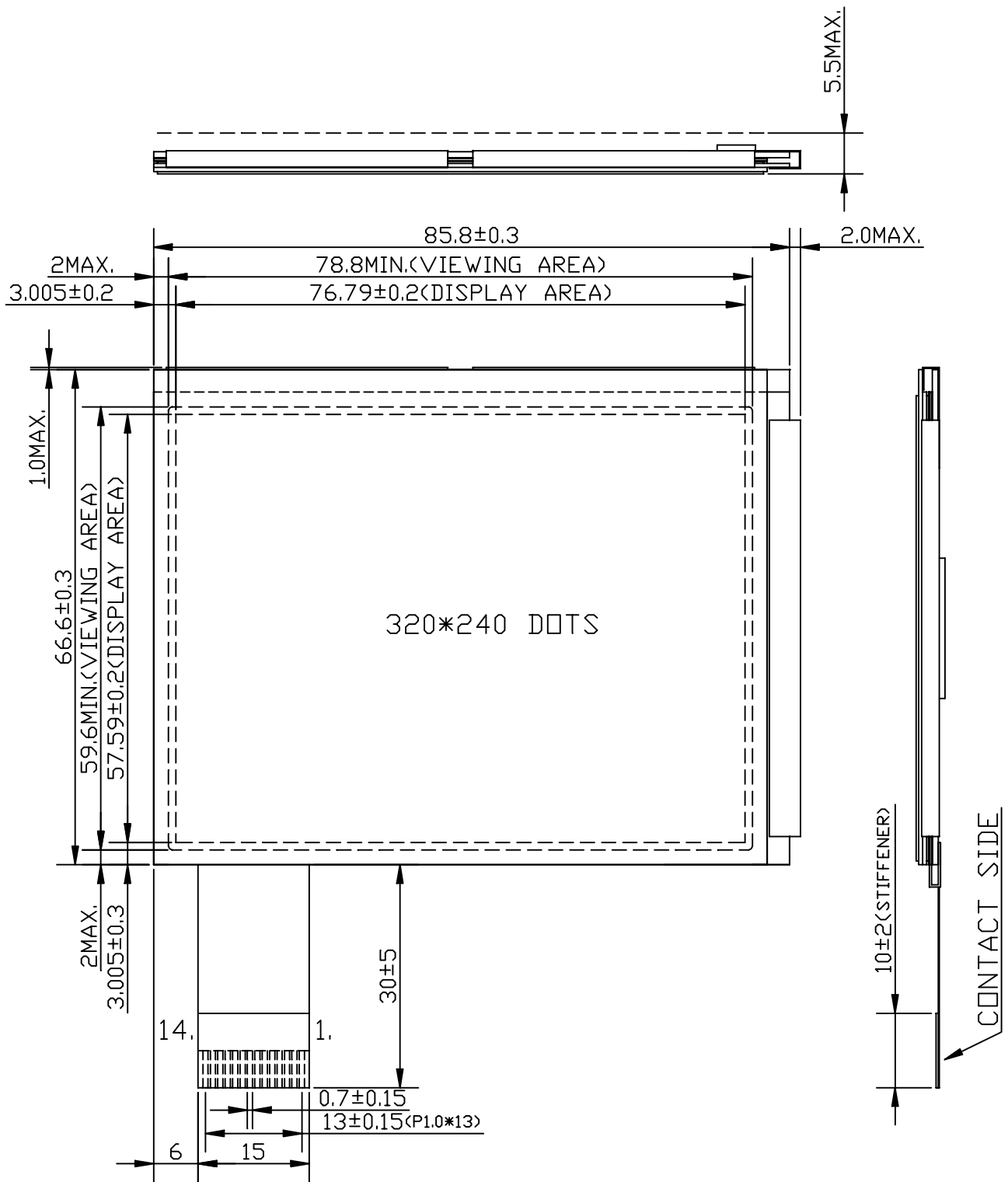
6. OPTICAL CHARACTERISTICS

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

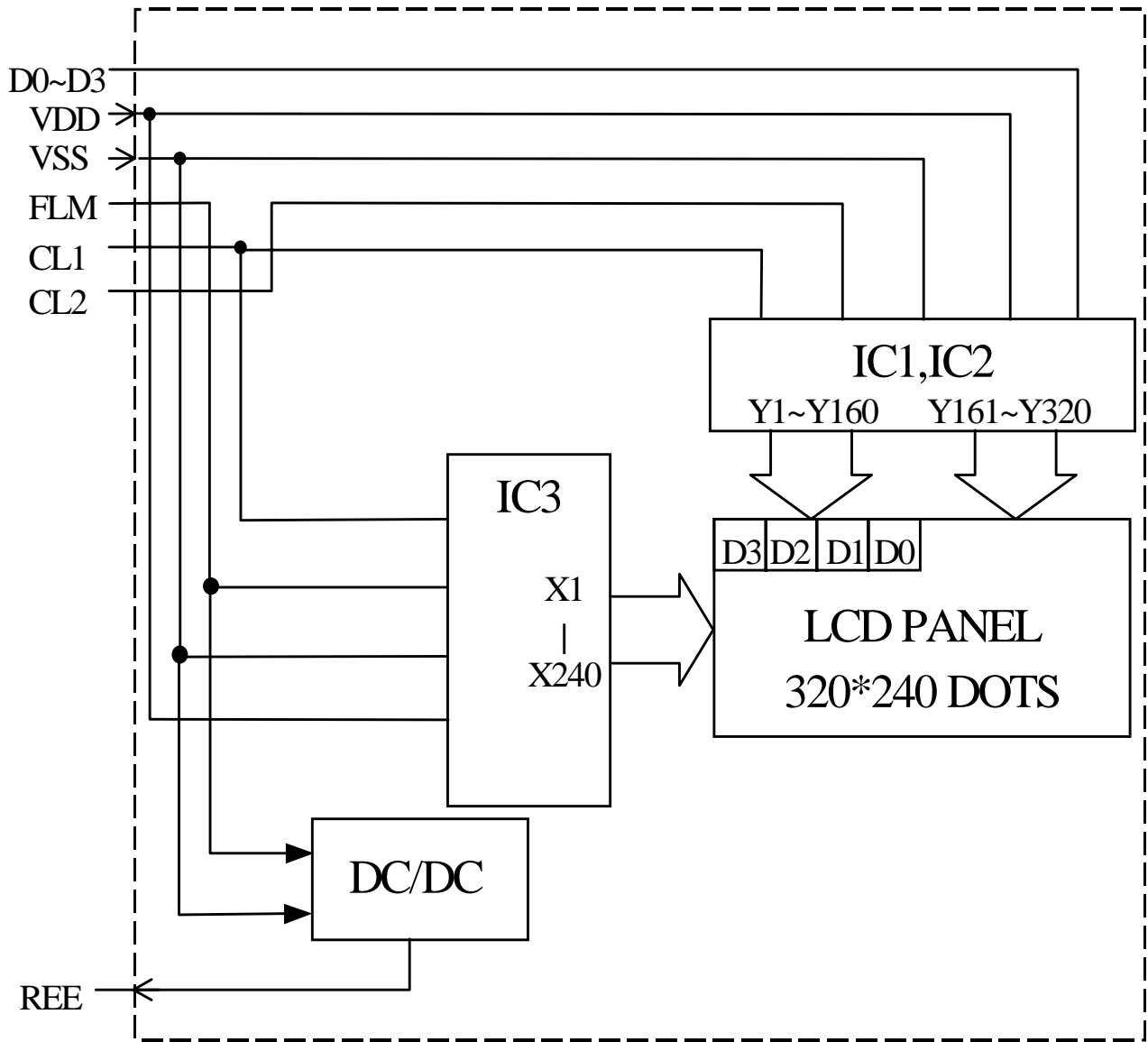
NOTE (1) : PLEASE REFER TO :  
CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS. ( EU - 002A)

7. OUTLINE DIMENSION

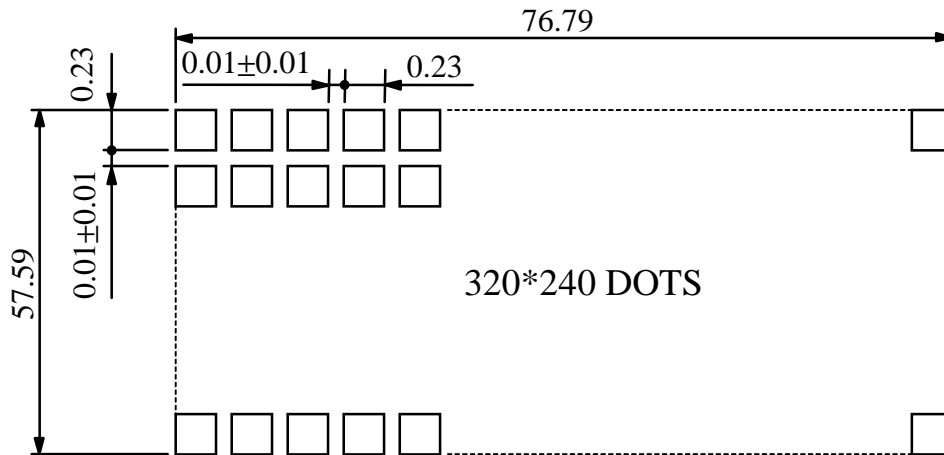


UNIT : mm  
SCALE : NTS  
NOT SPECIFIED TOLERANCE IS ± 0.5

8. BLOCK DIAGRAM



9. DETAIL DRAWING OF DOT MATRIX



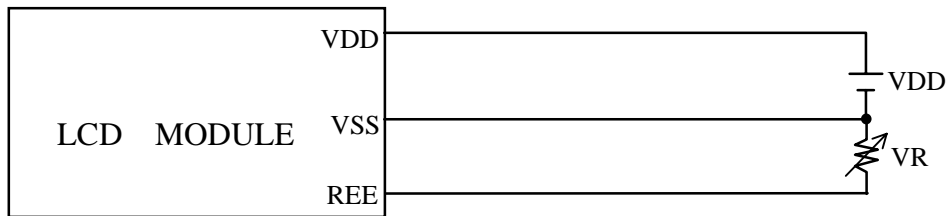
UNIT : mm  
SCALE : NTS  
NOT SPECIFIED TOLERANCE IS  $\pm 0.1$

10. INTERFACE SIGNALS

PIN NO.	SYMBOL	FUNCTION
1	VDD	POWER SUPPLY FOR LOGIC CIRCUIT.
2	VSS	GROUND.
3	REE	CONNECTION RESISTER TO GND ( FOR CONTRAST ADJUST )
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	N.C.	NO CONNECTION
14	N.C.	NO CONNECTION

## 1 1 . POWER SUPPLY

### 1 1.1 POWER SUPPLY FOR LCM



V.R=20K $\Omega$ ( FOR CONTRAST ADJUST )