

EXAMINED BY :	EMERGING DISPLAY TECHNOLOGIES CORPORATION	FILE NO . CAS-10282
Kevin Kuo		ISSUE : MAY.06,2002
APPROVED BY:		TOTAL PAGE : 10
<i>Roger Yang</i>		VERSION : 1

CUSTOMER

ACCEPTANCE

SPECIFICATIONS

MODEL NO. :

32F00(LED TYPES)

FOR MESSRS :

CUSTOMER'S APPROVAL

DATE :

BY :

EMERGING DISPLAY
TECHNOLOGIES CORPORATION

MODEL NO . 32F00(LED TYPES)	VERSION 1
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RECORDS OF REVISION	DOC . FIRST ISSUE MAY.06,2002
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DATE	REVISED PAGE NO.	SUMMARY

NUMBERING SYSTEM

Polarizer Mode	Backlight	Code value
Transflective	LED	L
Transmissive	LED	M

Backlight Color	Code Value
White	W

E W 3 2 F 0 0 B M W

LCD type + LCD color	Code Value
STN + Gray	G
STN + Blue	B
FSTN + White	F
FSTN + Black	N

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1. GENERAL SPECIFICATIONS

1.1 GENERAL SPECIFICATIONS

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

EU-002A

1.2 THIS INDIVIDUAL SPECIFICATION IS PRIOR TO GENERAL SPECIFICATIONS .

2. MECHANICAL SPECIFICATIONS

- (1) NUMBER OF DOTS ----- 320W * 240H DOTS
- (2) MODULE SIZE ----- 139.0W * 120H * 13.2D(max.) mm
- (3) VIEWING AREA ----- 103.0W * 79.0H mm
- (4) ACTIVE AREA ----- 95.97W * 71.97H mm
- (5) DOT SIZE ----- 0.27W * 0.27H mm
- (6) DOT PITCH ----- 0.30W * 0.30H mm
- (7) LCD TYPE *
- (8) DRIVING METHOD ----- 1 / 240 DUTY MULTIPLEX DRIVE
- (9) BACKLIGHT ----- LED , WHITE

* 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	32.0	V	
INPUT VOLTAGE	VI	VSS	VDD	V	
STATIC ELECTRICITY	—	—	100	V	NOTE (1)
POWER SUPPLY FOR LED	VLED – VLSS	—	6	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 .

I T E M	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 = 25 °C

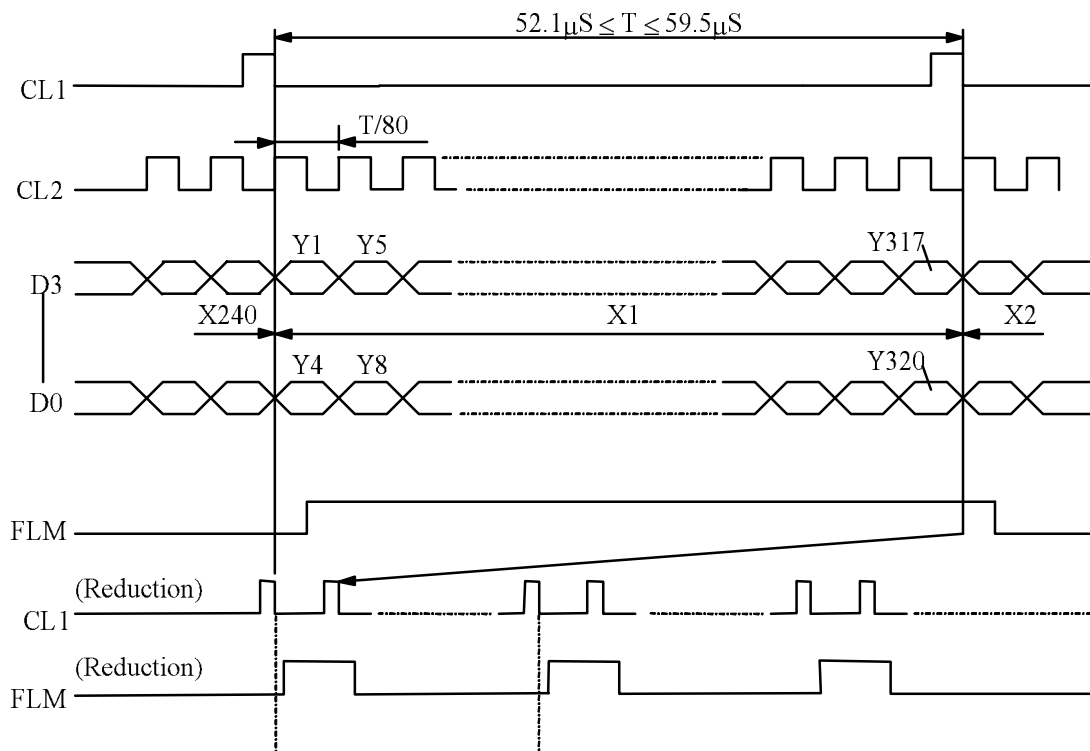
VDD = 5.0 V

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	VDD - VEE	—	27	—	30.0	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	—	6.0	—	mA
POWER SUPPLY CURRENT FOR LCD DRIVE NOTE (2)	IEE	VDD - VO = 23.5 V	—	5.0	—	mA
RECOMMENDED LCD DRIVING VOLTAGE NOTE (3)	VDD - VO ∅ = 10°, θ = 0° DUTY = 1/240	Ta = -10 °C	25.6	26.6	27.6	V
		Ta = 25 °C	22.5	23.5	24.5	V
		Ta = 60 °C	17.4	18.4	19.4	V
CLOCK OSCILLATION FREQUENCY	f FLM	—	70	75	80	Hz
LED FORWARD VOLTAGE	VLED - VLSS	—	—	5.0	—	V
LED FORWARD VOLTAGE	IF	VLED-VLSS=5.0V	—	120	—	mA

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

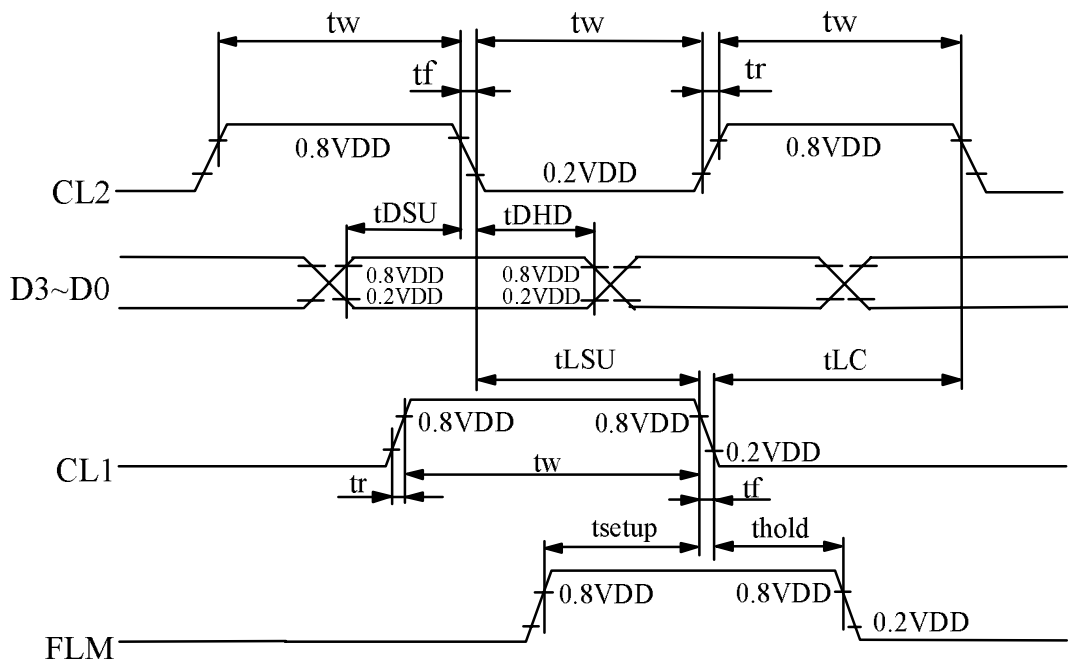
NOTE (2): THE DISPLAY PATTERN IS ALL "OFF"/"ON".

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



6. OPTICAL CHARACTERISTICS

Ta = 25 °C

VDD = 5.0 V

I T E M		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	—		
BRIGHTNESS OF BACKLIGHT	B	VLED - VLSS = 5.0 V	(7)	—	—	cd / m ²	1, 2	
			(5)	—	—		1, 3	
CHROMATICITY COORDINATES	X	IF = 120 mA	0.26	0.315	0.33	—	—	
	Y		0.29	0.305	0.32			

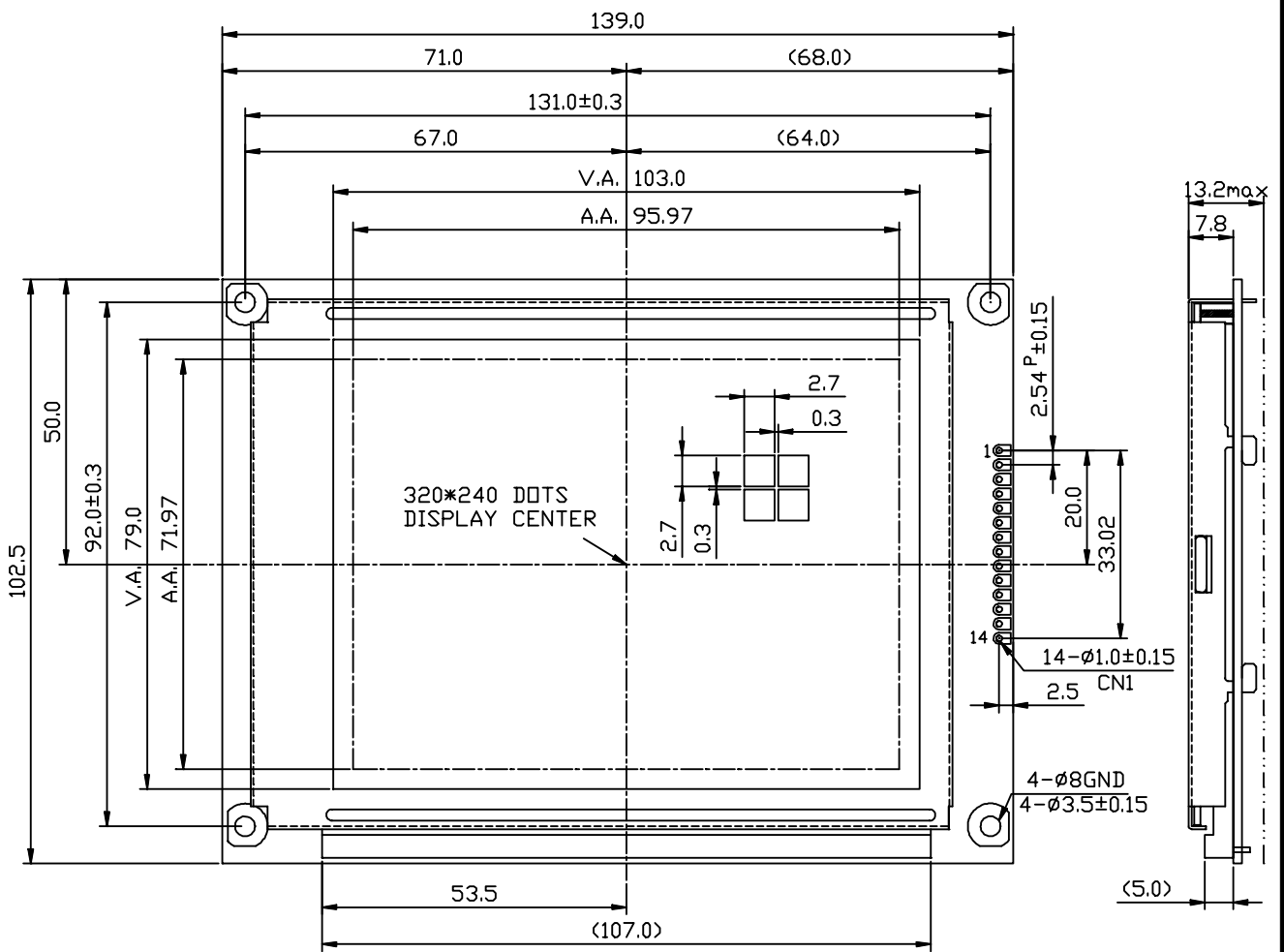
NOTE (1) : PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS. (EU - 002A)

NOTE (2) : POLARIZER MODE : TRANSMISSIVE

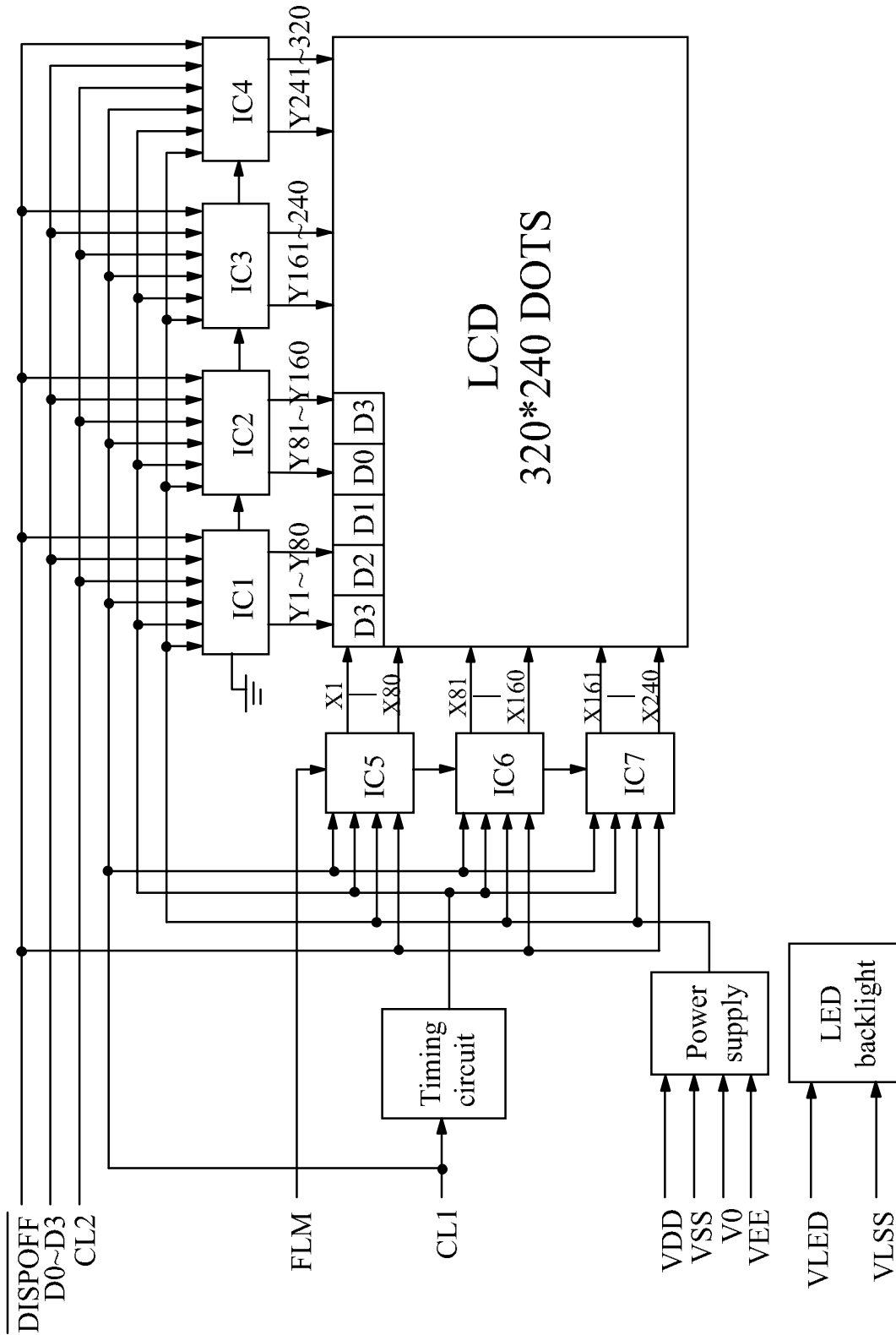
NOTE (3) : POLARIZER MODE : TRANSFLECTIVE

7. OUTLINE DIMENSION

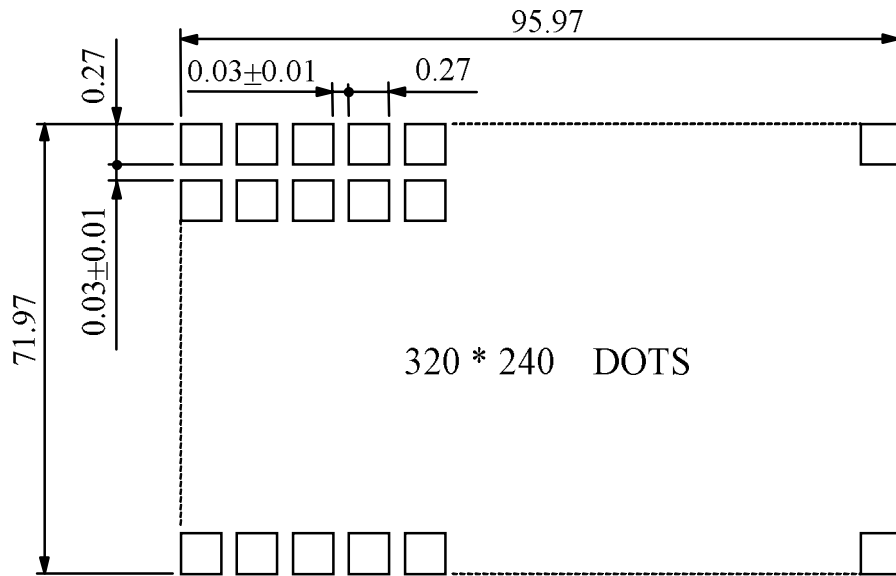


UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.3

8. BLOCK DIAGRAM



9. DETAIL DRAWING OF DOT MATRIX



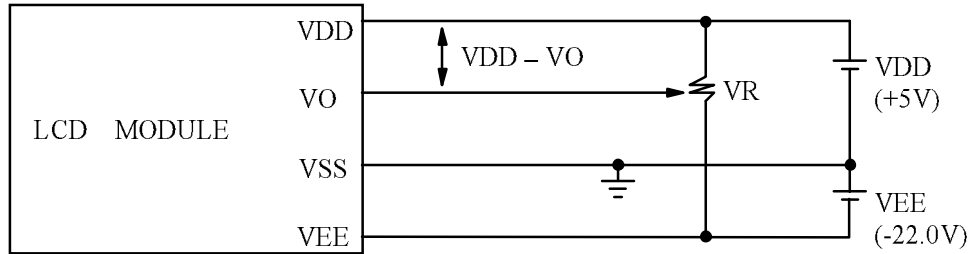
UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ±0.1

10. INTERFACE SIGNALS

PIN NO	SYMBOL	LEVEL	FUNCTION
1	FLM	H	THE FLM SIGNAL INDICATING THE BEGINNING OF EACH DISPLAY CYCLE
2	CL1	H → L	DISPLAY DATA LATCH
3	CL2	H → L	DISPLAY DATA SHIFT
4	M	H / L	CONTROL SIGNAL FOR AC DRIVING
5	VO	—	OPERATING VOLTAGE FOR LCD DRIVING
6	VDD	—	POWER SUPPLY FOR LOGIC CIRCUIT
7	VSS, VLSS	—	GROUND , POWER SUPPLY FOR LED BACKLIGHT(K)
8	VEE	—	POWER SUPPLY FOR LCD DRIVING
9	D0	H / L	DISPLAY DATA
10	D1	H / L	
11	D2	H / L	
12	D3	H / L	
13	$\overline{\text{DISPOFF}}$	H / L	H : DISPLAY ON , L : DISPLAY OFF
14	VLED	—	POWER SUPPLY FOR LED BACKLIGHT (A)

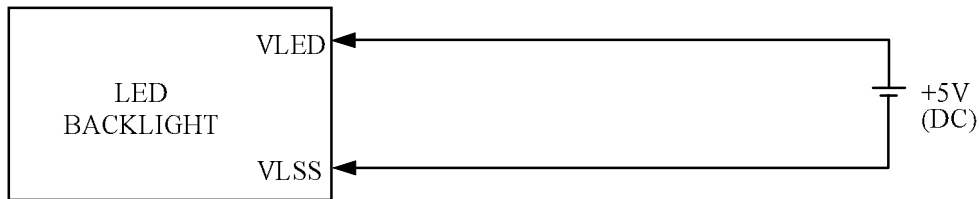
1.1. POWER SUPPLY

1.1.1 POWER SUPPLY FOR LCM



VDD - VO : LCD DRIVING VOLTAGE
VR: 20KΩ

1.1.2 POWER SUPPLY FOR LED BACK - LIGHT



1.1.3 TIMING OF POWER SUPPLY AND INTERFACE SIGNAL

