

EXAMINED BY :	EMERGING DISPLAY  TECHNOLOGIES CORPORATION	FILE NO . CAS-10287
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APPROVED BY:		TOTAL PAGE : 8
<i>Roger Yang</i>		VERSION : 2

CUSTOMER	ACCEPTANCE	SPECIFICATIONS
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MODEL NO. :

32F4A (LED TYPES)

FOR MESSRS :

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CUSTOMER'S APPROVAL

DATE :  
\_\_\_\_\_

BY :  
\_\_\_\_\_

EMERGING DISPLAY  
TECHNOLOGIES CORPORATION

MODEL NO . <b>32F4A(LED TYPES)</b>	VERSION <b>2</b>
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RECORDS OF REVISION	DOC . FIRST ISSUE	JUN.21,2002
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DATE	REVISED PAGE NO.	SUMMARY
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NUMBERING SYSTEM

Polarizer Mode	Backlight	Code value
Transflective	LED	L
Transmissive	LED	M

Backlight Color	Code Value
White	W

E W 3 2 F 4 A B M W R

Viewing direction  
NIL : 6 o'clock  
R : 3 o'clock

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 - 001A

### 1.2 APPLICATION NOTES FOR CONTROLLER / DRIVER :

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

EU - SED1335

### 1.3 THIS INDIVIDUAL SPECIFICATION IS PRIOR TO GENERAL SPECIFICATIONS .

## 2. MECHANICAL SPECIFICATIONS

- (1) NUMBER OF DOTS ----- 320W \* 240H DOTS
- (2) MODULE SIZE ----- 167.1W \* 109.0H \* 11.0D 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
- (9) BACKLIGHT ----- LED , WHITE , WITH BEF

\* 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	30.0	V	
INPUT VOLTAGE	VI	VSS	VDD	V	
STATIC ELECTRICITY	—	—	100	V	NOTE (1)
LED POWER VOLTAGE	VLED	—	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	-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)	10~100 HZ XYZ DIRECTIONS 1 Hr . EACH
SHOCK	—	29.4 m/s <sup>2</sup> (3 G)	—	490.0 m/s <sup>2</sup> (50 G)	1 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

VDD-VSS = 5.0 V

VEE-VSS = -22.0V

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
POWER SUPPLY VOLTAGE FOR LOGIC	VDD – VSS	—	4.5	5.0	5.5	V
POWER SUPPLY VOLTAGE FOR LCD DRIVE	VEE – VSS	—	-21.5	-22.0	-22.5	V
INPUT VOLTAGE NOTE (1)	VIH	H LEVEL	0.5*VDD	—	—	V
	VIL	L LEVEL	—	—	0.2*VDD	V
OUTPUT VOLTAGE NOTE (1)	VOH	H LEVEL	2.4	—	—	V
	VOL	L LEVEL	—	—	VSS+0.4	V
POWER SUPPLY CURRENT FOR LOGIC NOTE (2)	IDD	VDD – VSS = 5.0 V	—	40.0	—	mA
POWER SUPPLY CURRENT FOR LCD DRIVE NOTE (2)	IEE	VDD – VO = 2.5V	—	2.5	—	mA
RECOMMENDED LCD DRIVING VOLTAGE	VDD – VO ∅ = 10° θ = ** DUTY =1/240	Ta = - 20 °C	22.7	23.7	24.7	V
		Ta = 25 °C	21.5	22.5	23.5	V
		Ta = 70 °C	19.7	20.7	21.7	V
CLOCK OSCILLATION FREQUENCY	f OSC	—	—	8	—	MHz
LED FORWARD VOLTAGE	VLED – VLSS	—	—	5.0	—	V
LED FORWARD CURRENT	IF	VLED-VLSS	—	140	—	mA

\*\* θ = 0° WHEN VIEWING DIRECTION IS 6 O'CLOCK

θ = 90° WHEN VIEWING DIRECTION IS 3 O'CLOCK

NOTE (1): APPLIED TO TERMINALS D0 TO D7, A0,  $\overline{CS}$ ,  $R/\overline{W}(\overline{WR})$ ,  $E(\overline{RD})$ .

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

5. OPTICAL CHARACTERISTICS

Ta = 25 °C

VDD = 5.0 V

VDD-V0 = ( 22.5V )

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 = **	Ta = -20 °C	—	3816	—	ms	1
			Ta = 25 °C	—	310	—		
			Ta = 70 °C	—	96	—		
	tf ( fall )		Ta = -20 °C	—	2411	—		
			Ta = 25 °C	—	158	—		
			Ta = 70 °C	—	89	—		
BRIGHTNESS OF BACKLIGHT	B	VLED - VLSS = 5.0 V	55	60	65	cd / m <sup>2</sup>	1, 2	
			22	24	26		1, 3	
CHROMATICITY COORDINATES	X	IF = 140 mA	0.267	0.322	0.337	—	—	
	Y		0.324	0.339	0.354			

\*\* θ = 0° WHEN VIEWING DIRECTION IS 6 O'CLOCK .  
θ = 90° WHEN VIEWING DIRECTION IS 3 O'CLOCK .

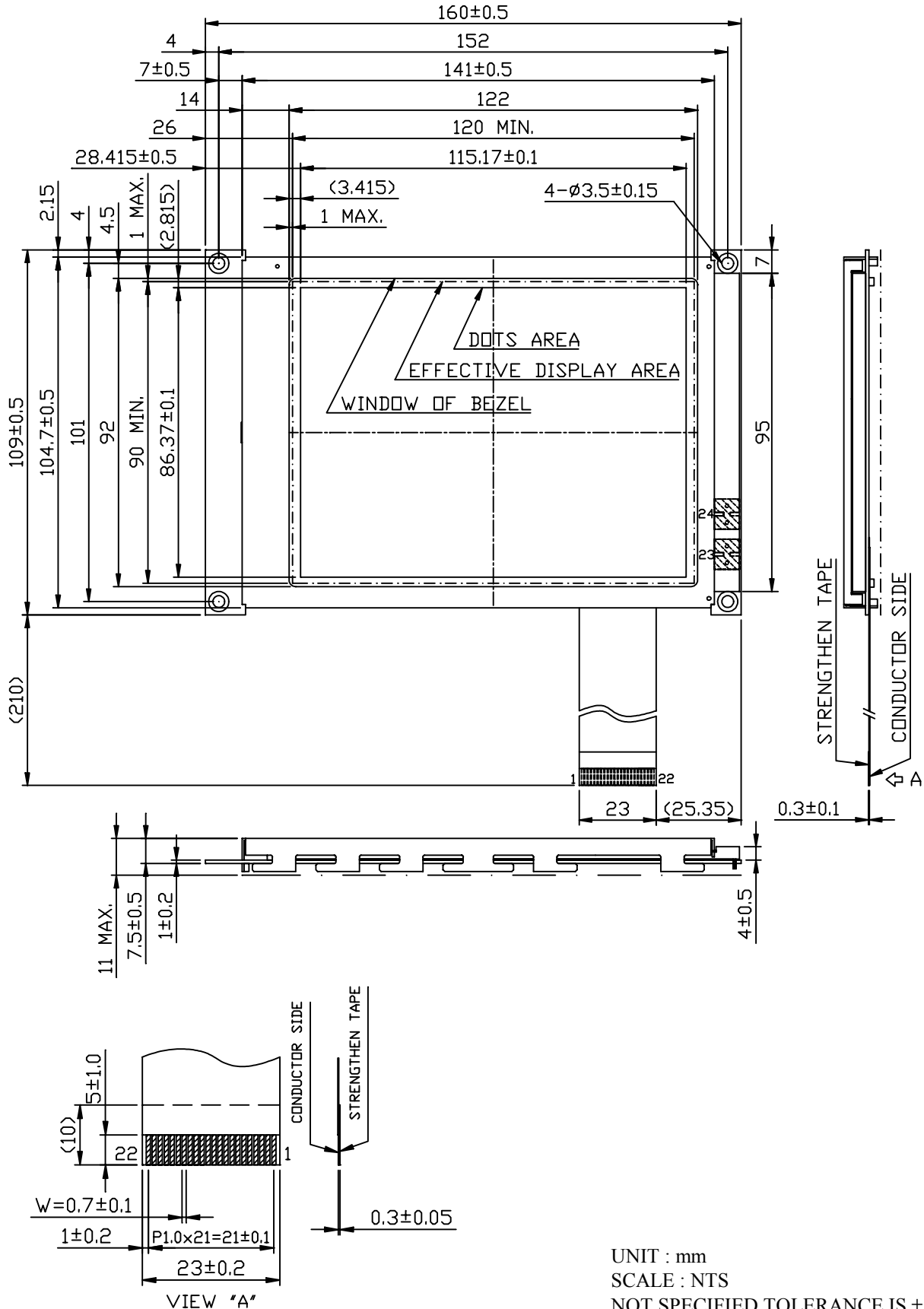
NOTE ( 1 ) : PLEASE REFER TO :  
CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS. ( EU - 001A )

NOTE ( 2 ) : POLARIZER MODE : TRANSMISSIVE

NOTE ( 3 ) : POLARIZER MODE : TRANSFLECTIVE

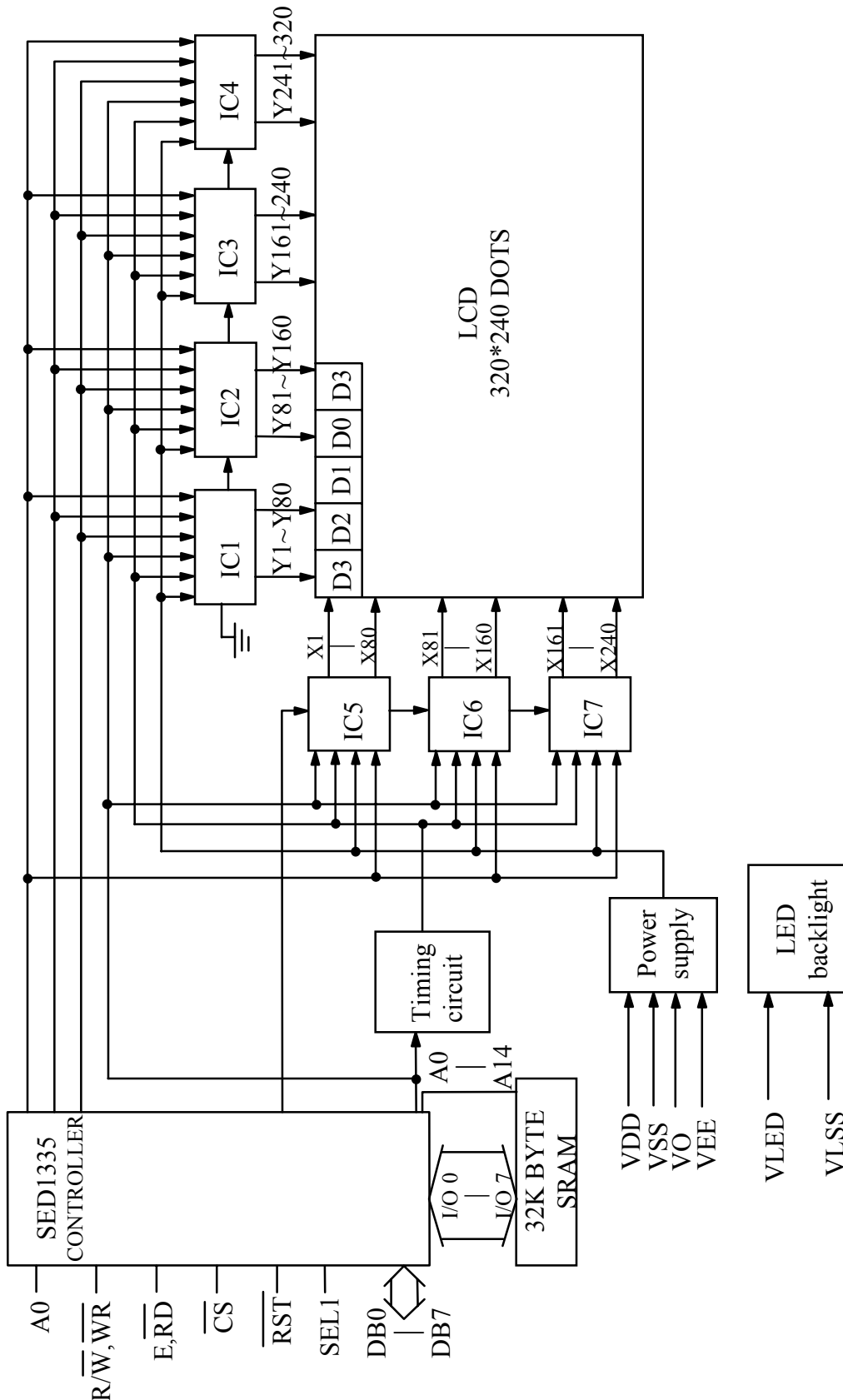


6. OUTLINE DIMENSION

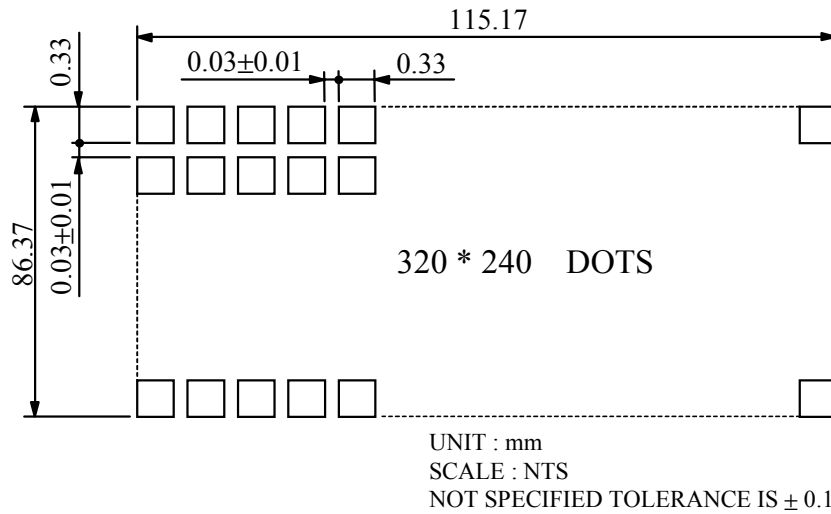


UNIT : mm  
SCALE : NTS  
NOT SPECIFIED TOLERANCE IS  $\pm 0.3$

7. BLOCK DIAGRAM



8. DETAIL DRAWING OF DOT MATRIX

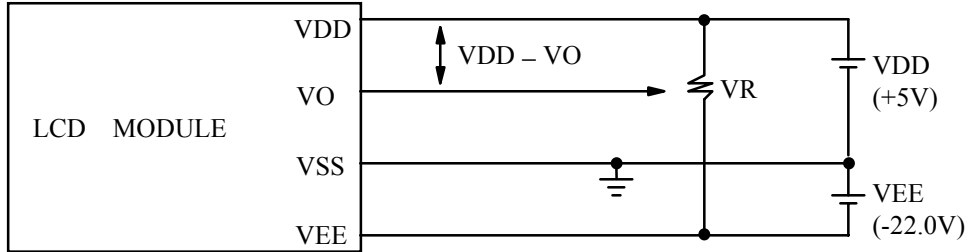


9. INTERFACE SIGNALS

PIN NO	SYMBOL	LEVEL	FUNCTION																				
1	VSS	—	GROUND																				
2	VDD	—	POWER SUPPLY FOR LOGIC CIRCUIT																				
3	VO	—	OPERATING VOLTAGE FOR LCD DRIVING																				
4	A0	—	8080 FAMILY INTERFACE																				
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			6800 FAMILY INTERFACE																				
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5	$\overline{WR}, R/\overline{W}$	H/L	8080 FAMILY INTERFACE ACTS AS THE ACTIVE-LOW WRITE STROBE . 6800 FAMILY INTERFACE ACTS AS THE READ/ WRITE CONTROL SIGNAL .																				
6	$\overline{RD}, E$	H/L	8080 FAMILY INTERFACE ACTS AS THE ACTIVE-LOW READ STROBE . 6800 FAMILY INTERFACE ACTS AS THE ACTIVE-HIGH ENABLE CLOCK .																				
7 ∧ 14	D0 ∧ D7	H/L	DISPLAY DATA																				
15	$\overline{CS}$	H/L	CHIP SELECT																				
16	$\overline{RST}$	H/L	RESET																				
17	VEE	—	POWER SUPPLY FOR LCD DRIVING																				
18	SEL1	H/L	8080 OR 6800 FAMILY INTERFACE SELECT , H:6800 , L:8080																				
19   20	NC	—	NOT USE																				
21,23	VLED	—	POWER SUPPLY FOR LED BACKLIGHT ( A )																				
22,24	VLSS	—	POWER SUPPLY FOR LED BACKLIGHT ( K )																				

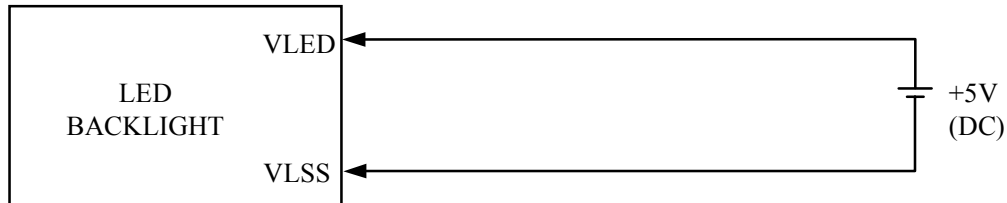
10. POWER SUPPLY

10.1 POWER SUPPLY FOR LCM



VDD - VO : LCD DRIVING VOLTAGE  
VR : 20KΩ

10.2 POWER SUPPLY FOR LED BACK - LIGHT



10.3 TIMING OF POWER SUPPLY AND INTERFACE SIGNAL

