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		VERSION : 1

CUSTOMER

ACCEPTANCE

SPECIFICATIONS

MODEL NO. :

32F70(LED TYPES)

FOR MESSRS :

CUSTOMER'S APPROVAL

DATE :

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BY :

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EMERGING DISPLAY  
TECHNOLOGIES CORPORATION

MODEL NO . 32F70(LED TYPES)	VERSION 1
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RECORDS OF REVISION	DOC . FIRST ISSUE SEP.30,2002
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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 7 0 B M W

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

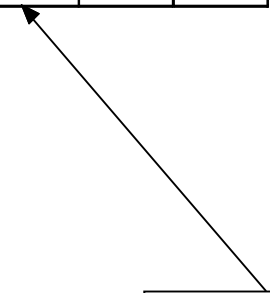
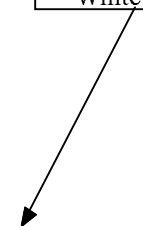
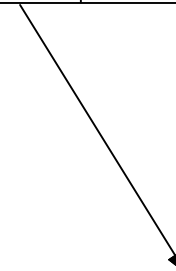


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1. GENERAL SPECIFICATIONS

1.1 GENERAL SPECIFICATIONS

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

EU - 001A

1.2 APPLICATION NOTE FOR CONTROLLER/DRIVER:SED1335 F

PLEASE REFER TO:

CUSTOMER ACCEPTANCE STANDAR SPECIFICATIONS:

EU - SED1335 F

1.3 THIS INDIVIDUAL SPECIFICATION IS PRIOR TO GENERAL SPECIFICATIONS .

2. MECHANICAL SPECIFICATIONS

- (1) NUMBER OF DOTS ----- 320W \* 240H DOTS
- (2) MODULE SIZE ----- 139.0W \* 102.5H \* 13.2D mm
- (3) EFFECTIVE 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 \* 0.30 mm
- (7) LCD TYPE \*
- (8) DRIVING METHOD ----- 1 / 240 DUTY MULTIPLEX DRIVE
- (9) VIEWING DIRECTION ----- 6 O'CLOCK
- (10) 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	6 . 0	V	
POWER SUPPLY FOR LCD DRIVING	VDD – VEE	0	30 . 0	V	
INPUT VOLTAGE	VI	VSS	VDD	V	
STATIC ELECTRICITY	—	—	1 0 0	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	- 1 0 °C	6 0 °C	- 2 0 °C	7 0 °C	NOTE (2) , (3) , (4)
HUMIDITY	—	8 5 % RH	—	8 5 % 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	—	2 9 . 4 m /s <sup>2</sup> ( 3 G )	—	490 . 0 m /s <sup>2</sup> ( 5 0 G )	1 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 .

NOTE (4) : CCFL BACKLIGHT IS NOT AVAILABLE TO FUNCTION BELOW 0°C

4. ELECTRICAL CHARACTERISTICS

Ta = 25 °C		VDD = 5.0 V		VEE - VSS = -22V		
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	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 VDD - VO = (23.5)V	—	25.0	—	mA
POWER SUPPLY CURRENT FOR LCD DRIVE NOTE (2)	IEE	VDD - VSS = 5.0 V VDD - VO = (23.5)V	—	6.0	—	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	fOSC	—	—	8	—	MHZ
LED FORWARD VOLTAGE	VLED - VLSS	—	—	5.0	—	V
LED FORWARD CURRENT	IF	VLED-VLSS=5.0V	—	16.0	—	mA

NOTE (1): APPLIED TO TERMINALS DO TO D7, AO,  $\overline{CS}$ , E, R/ $\overline{W}$ .

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

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 MODULE	B	VLED - VLSS = 5.0 V	( 7 )	—	—	cd / m <sup>2</sup>	1 , 2	
			( 5 )	—	—		1 , 3	
CHROMATICITY COORDINATES	X	IF = 160 mA	0.26	0.315	0.33	—	—	
	Y		0.29	0.305	0.32			

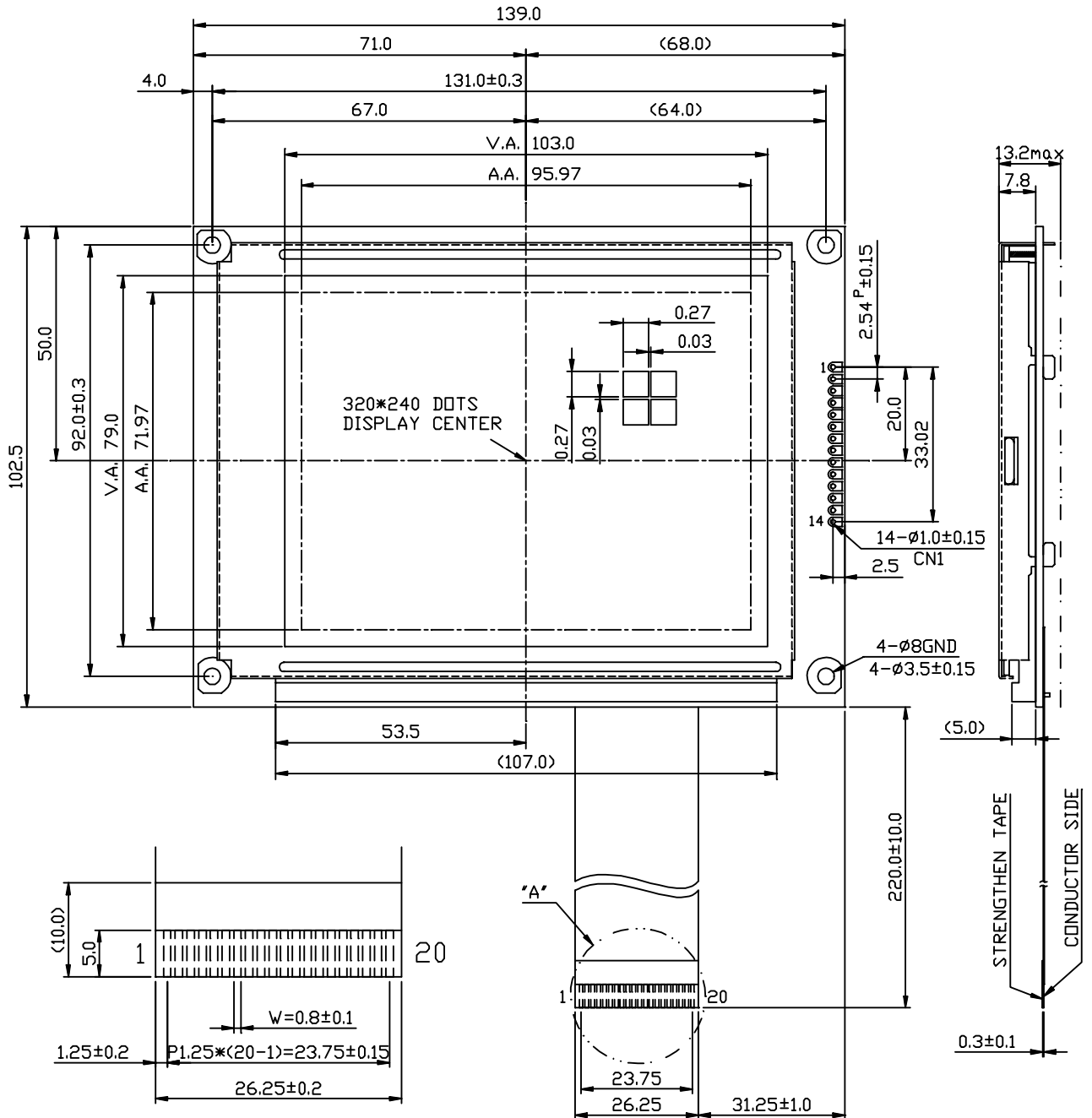
NOTE (1) : PLEASE REFER TO :  
CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS. (EU - 002A)

NOTE (2) : POLARIZER MODE : TRANSMISSIVE

NOTE (3) : POLARIZER MODE : TRANSFLECTIVE



6. OUTLINE DIMENSION



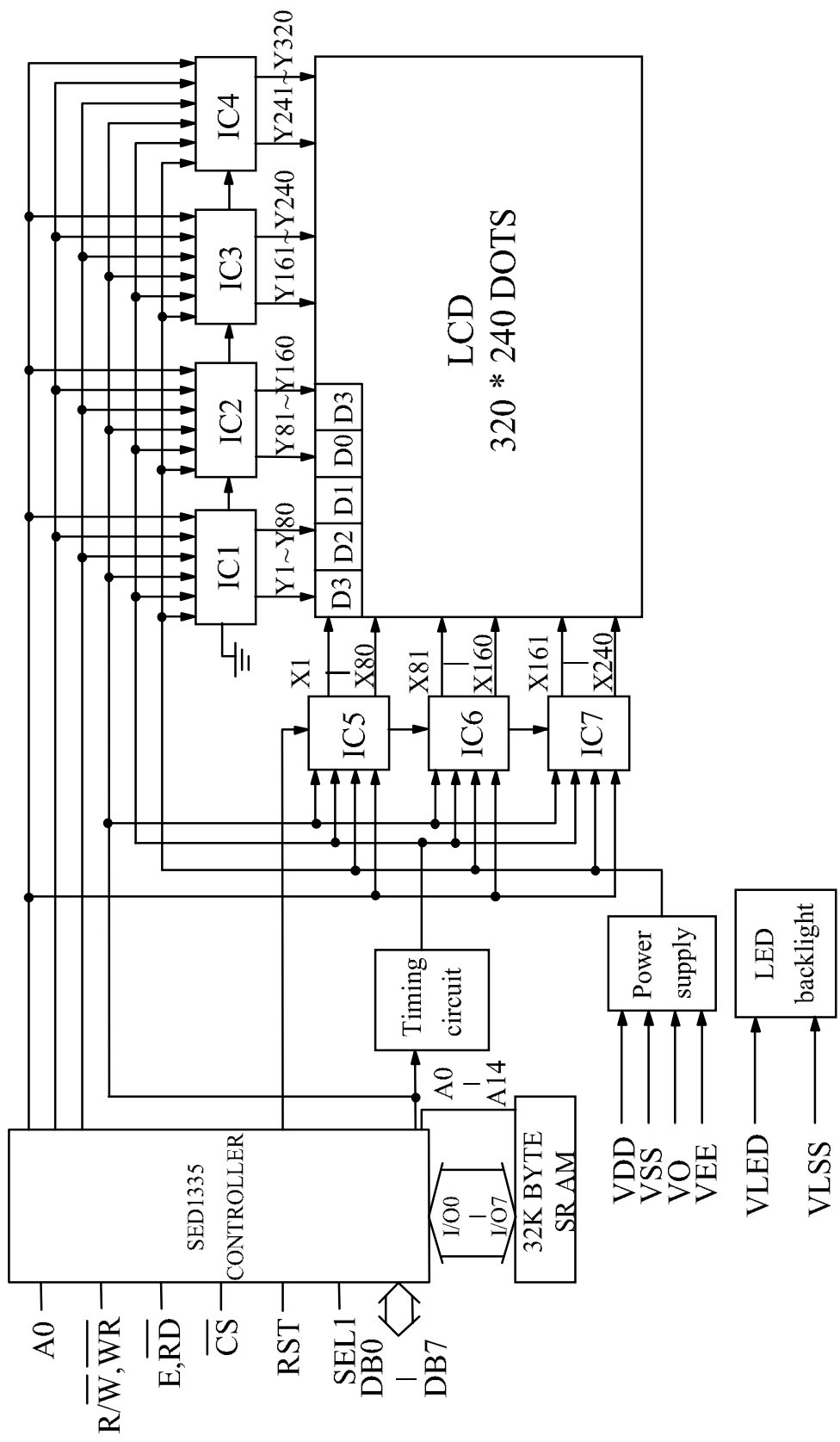
DETAIL "A"



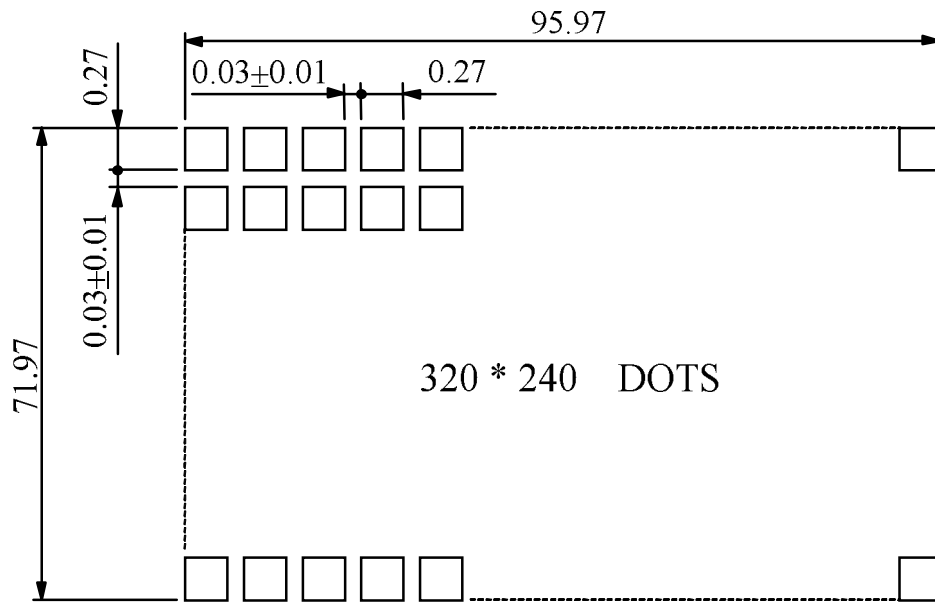
VIEWING DIRECTION 6 O'CLOCK

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

7. BLOCK DIAGRAM



8. DETAIL DRAWING OF DOT MATRIX



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

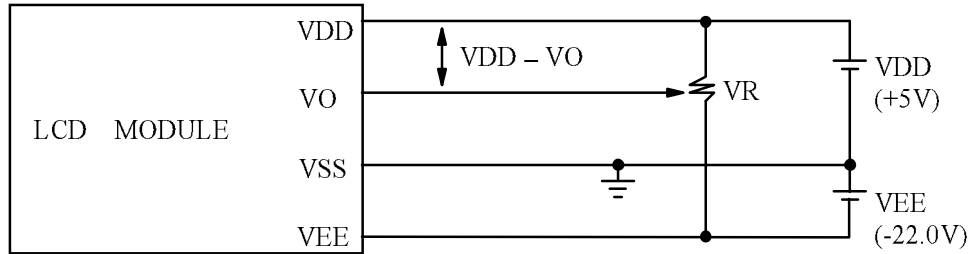
9. INTERFACE SIGNALS

PIN NO	SYMBOL	LEVEL	FUNCTION																				
1	VLED	—	POWER FOR LED (+5V)																				
2	VLSS	—	POWER FOR LED ( GND )																				
3	VSS	—	GROUND																				
4	VDD	—	POWER SUPPLY FOR LOGIC CIRCUIT																				
5	VO	—	OPERATING VOLTAGE FOR LCD DRIVING																				
6	A0	—	8080 FAMILY INTERFACE																				
			<table border="1"> <thead> <tr> <th>AO</th> <th><math>\overline{RD}</math></th> <th><math>\overline{WR}</math></th> <th>FUNCTION</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>1</td> <td>STATUS FLAG READ</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>DISPLAY DATA AND CURSOR ADDRESS READ</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> <td>DISPLAY DATA AND PARAMETER WRITE</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> <td>COMMAND WRITE</td> </tr> </tbody> </table>	AO	$\overline{RD}$	$\overline{WR}$	FUNCTION	0	0	1	STATUS FLAG READ	1	0	1	DISPLAY DATA AND CURSOR ADDRESS READ	0	1	0	DISPLAY DATA AND PARAMETER WRITE	1	1	0	COMMAND WRITE
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0	0	1	DISPLAY DATA AND PARAMETER WRITE																				
1	0	1	COMMAND WRITE																				
7	$\overline{WR}, R/\overline{W}$	H/L	8080 FAMILY INTERFACE ACTS AS THE ACTIVE-LOW WRITE STROBE . 6800 FAMILY INTERFACE ACTS AS THE READ/ WRITE CONTROL SIGNAL .																				
8	$\overline{RD}, E$	H/L	8080 FAMILY INTERFACE ACTS AS THE ACTIVE-LOW READ STROBE . 6800 FAMILY INTERFACE ACTS AS THE ACTIVE-HIGH ENABLE CLOCK .																				
9   16	D0   D7	H/L	DISPLAY DATA																				
17	$\overline{CS}$	H/L	CHIP SELECT																				
18	$\overline{RST}$	H/L	RESET																				
19	VEE	—	POWER SUPPLY FOR LCD DRIVING																				
20	SEL1	H/L	8080 OR 6800 FAMILY INTERFACE SELECT , H:6800 , L:8080																				

INTERFACE	PIN	SINGAL	LEVEL	FUNCTION
CCFL	1	VCCFL	—	POWER SUPPLY FOR CCFL DRIVING
	2 ~ 3	NC	—	NO CONNECTION
	4	VCCFL	—	POWER SUPPLY FOR CCFL DRIVING

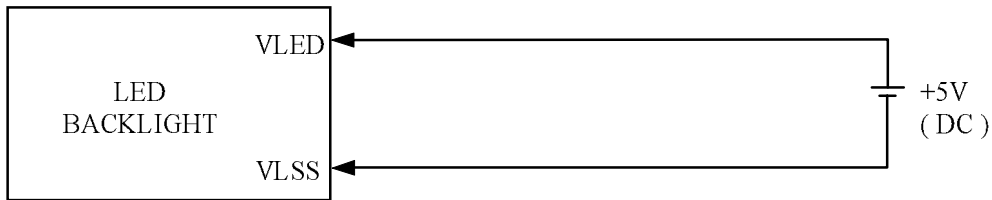
1.1. POWER SUPPLY

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

