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		TOTAL PAGE : 8
		VERSION : 4
CUSTOMER	ACCEPTANCE	SPECIFICATIONS
MODEL NO. : <u>32F40(CCFL TYPES)</u> FOR MESSRS : _____		
CUSTOMER'S APPROVAL DATE : _____ BY : _____		

EMERGING DISPLAY
TECHNOLOGIES CORPORATION

MODEL NO.

32F40(CCFL TYPES)

VERSION

4

PAGE

0-1

DOC. FIRST ISSUE

FEB.17,1998

RECORDS OF REVISION

DATE	REVISED PAGE NO.	SUMMARY																																																								
JAN.28,2000	1,2,3,4,5	THE ENTIRE PAGES REVISED																																																								
AUG.09,2003	3	4. ELECTRICAL CHARACTERISTICS <table><tr><th>PARAMETER</th><th>SYMBOL</th><th>CONDITION</th><th>MIN.</th><th>TYP.</th><th>MAX.</th><th>UNIT</th></tr><tr><td>POWER SUPPLY CURRENT FOR LOGIC NOTE (2)</td><td>IDD</td><td>VDD - VSS = 5.0 V VDD - VEE = 22.0 V</td><td>—</td><td>40.0</td><td>—</td><td>mA</td></tr><tr><td>POWER SUPPLY CURRENT FOR LCD DRIVE NOTE (2)</td><td>IEE</td><td>VDD - VSS = 5.0 V VDD - VEE = 22.0 V</td><td>—</td><td>2.5</td><td>—</td><td>mA</td></tr></table> ↓ <table><tr><th>PARAMETER</th><th>SYMBOL</th><th>CONDITION</th><th>MIN.</th><th>TYP.</th><th>MAX.</th><th>UNIT</th></tr><tr><td>POWER SUPPLY CURRENT FOR LOGIC NOTE (2)</td><td>IDD</td><td>VDD - VSS = 5.0 V VDD - VEE = 22.0 V</td><td>—</td><td>22.0</td><td>40.0</td><td>mA</td></tr><tr><td>POWER SUPPLY CURRENT FOR LCD DRIVE NOTE (2)</td><td>IEE</td><td>VDD - VSS = 5.0 V VDD - VEE = 22.0 V</td><td>—</td><td>6.0</td><td>8.0</td><td>mA</td></tr></table>	PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	POWER SUPPLY CURRENT FOR LOGIC NOTE (2)	IDD	VDD - VSS = 5.0 V VDD - VEE = 22.0 V	—	40.0	—	mA	POWER SUPPLY CURRENT FOR LCD DRIVE NOTE (2)	IEE	VDD - VSS = 5.0 V VDD - VEE = 22.0 V	—	2.5	—	mA	PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	POWER SUPPLY CURRENT FOR LOGIC NOTE (2)	IDD	VDD - VSS = 5.0 V VDD - VEE = 22.0 V	—	22.0	40.0	mA	POWER SUPPLY CURRENT FOR LCD DRIVE NOTE (2)	IEE	VDD - VSS = 5.0 V VDD - VEE = 22.0 V	—	6.0	8.0	mA														
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NUMBERING SYSTEM

Polarizer Mode	Backlight	Code value
Transflective	CCFL	D
Transmissive	CCFL	C

E	W	32	F	40	B	C	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 :

E U - 0 0 1 A

1.2 APPLICATION NOTES FOR CONTROLLER / DRIVER :

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

E U - S E D 1 3 3 5

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 ----- CCFL , COLOR : 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	30 . 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	-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 .

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

4 . ELECTRICAL CHARACTERISTICS

Ta = 25 °C

VDD-VSS = 5 . 0 V

VEE-VSS = -22.0

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 VDD – VEE = 22 . 0 V	—	22.0	40.0	mA
POWER SUPPLY CURRENT FOR LCD DRIVE NOTE (2)	IEE	VDD – VSS = 5 . 0 V VDD – VEE = 22 . 0 V	—	6.0	8.0	mA
RECOMMENDED LCD DRIVING VOLTAGE NOTE (3)	VDD – VO ∅ = 10° θ = 0° DUTY =1/240	Ta =- 10 °C	22.5	23.5	24.5	V
		Ta = 25 °C	22	23.0	24	V
		Ta = 60 °C	21.2	22.2	23.2	V
CLOCK OSCILLATION FREQUENCY	f OSC	—	—	8	—	MHZ
POWER SUPPLY FOR CCFL	VOLTAGE	VCCFL	—	300	—	Vrms
	FREQUENCY	f CCFL	—	30K	—	HZ
	CURRENT	IL	—	5	—	mA

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

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

NOTE (3) : RECOMMENDED LCD DRIVING VOLTAGE MAY FLUCTUATE ABOUT ± 1 . 0V BY EACH MODULE .

5. OPTICAL CHARACTERISTICS

Ta = 25 °C

VDD = 5.0 V

VDD-V0 = (22.5V)

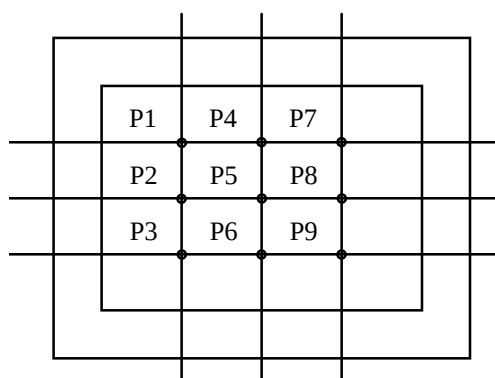
I T E M		SYMBOL	CONDITION		MIN .	TYP .	MAX.	UNIT	NOTE
VIEWING AREA	STN	Ø 2 - Ø 1	K ≥ 2 . 0		—	40	—	d e g .	1
	FSTN				—	50	—	d e g .	1
CONTRAST RATIO	STN	K	Ø = 1 0 ° θ = 0 °		—	10	—	—	1
	FSTN				—	20	—	—	1
RESPONSE TIME		tr (rise)	Ø =10° θ = 0°	Ta = -10 °C	—	2149	—	ms	1
				Ta = 25 °C	—	228	—		
				Ta = 60 °C	—	124	—		
		tf (fall)		Ta = -10 °C	—	1709	—		
				Ta = 25 °C	—	191	—		
				Ta = 60 °C	—	96	—		
BRIGHTNESS OF MODULE		L	—		60	90	—	cd / m ²	2 , 3
RISE TIME OF BACKLIGHT		TC	—		—	5	—	MINUTE	
BRIGHTNESS UNIFORMITY		—	—		—	—	20	%	4 , 5

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

NOTE (2) : MEASUREMENT AFTER 10 MINUTES OF CCFL OPERATING .

NOTE (3) : BRIGHTNESS CONTROL : 100% AND DISPLAY ALL ON .

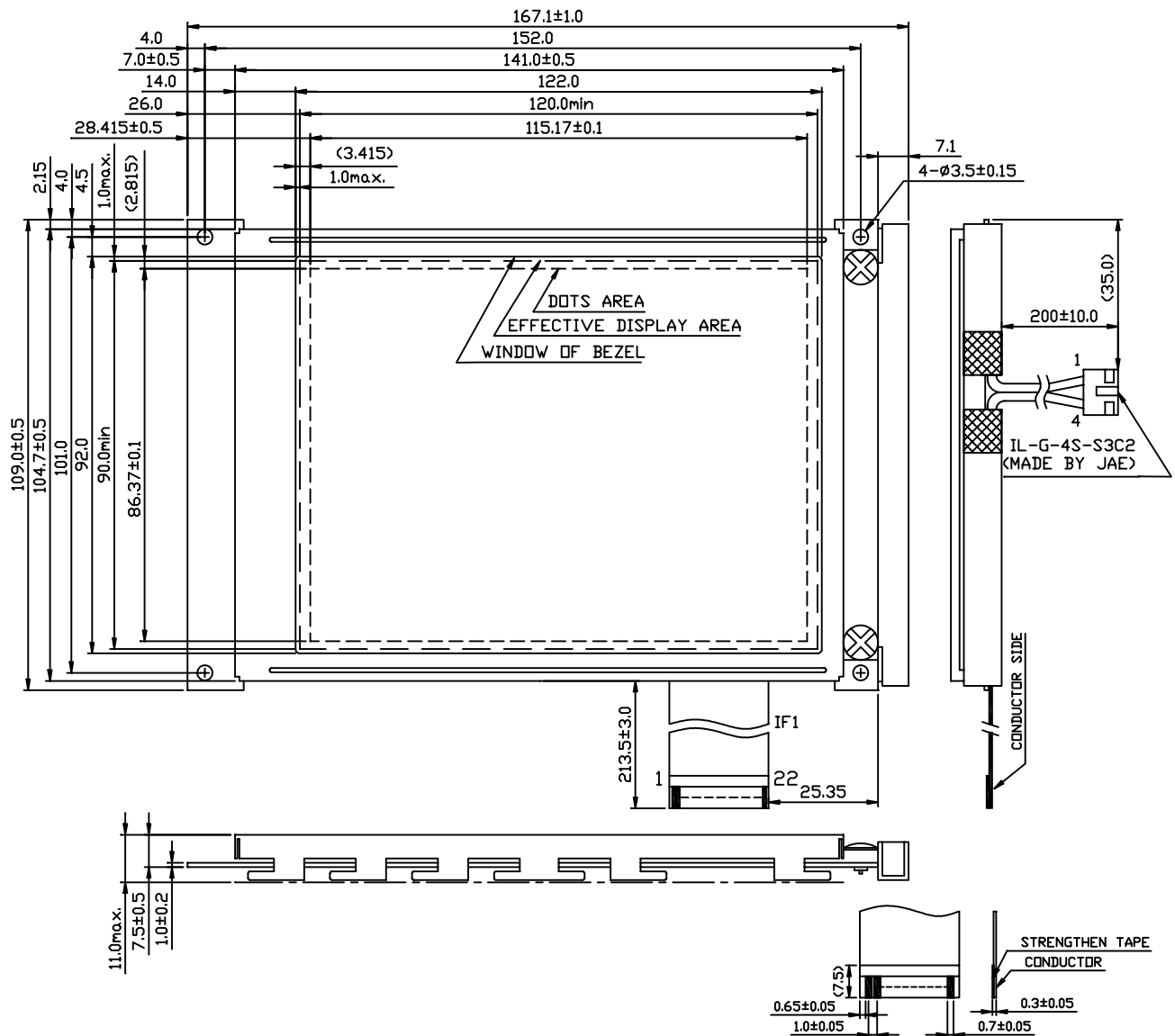
NOTE (4) : MEASUREMENT OF THE FOLLOWING 9 PLACES ON THE DISPLAY.
DEFINITION OF THE BRIGHTNESS TOLERANCE .



NOTE (5) : BRIGHTNESS UNIFORMITY IS DEFINED AS FOLLOWING

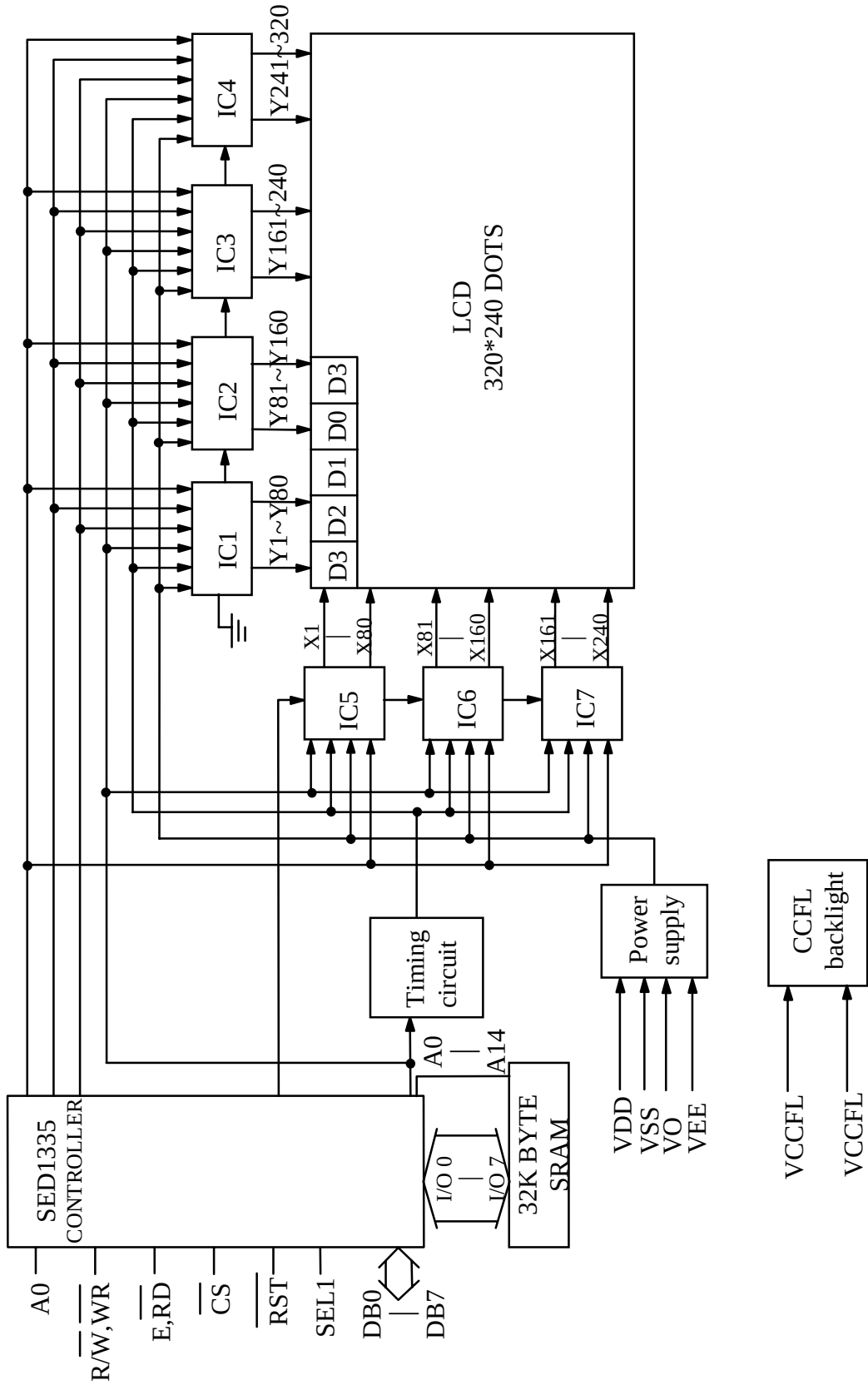
$$\Sigma_X = \left[\frac{(\text{MAXIMUN BRIGHTNESS OR MINIMUN BRIGHTNESS}) - \text{AVERAGE BRIGHTNESS}}{\text{AVERAGE BRIGHTNESS}} \right] \times 100\%$$

6. OUTLINE DIMENSION

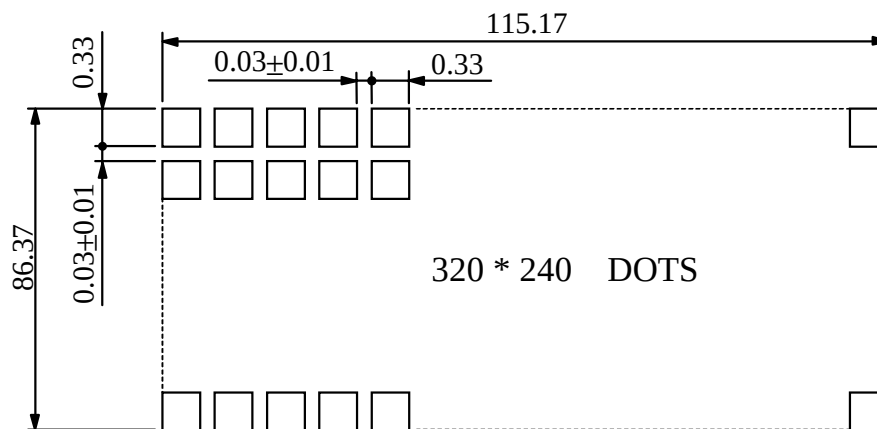


UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.5

7. BLOCK DIAGRAM



8. DETAIL DRAWING OF DOT MATRIX



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

9. INTERFACE SIGNALS

IF1 :

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
			AO RD 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
			6800 FAMILY INTERFACE
			AO R/W E FUNCTION
			0 1 1 STATUS FLAG READ
			1 1 1 DISPLAY DATA AND CURSOR ADDRESS READ
			0 0 1 DISPLAY DATA AND PARAMETER WRITE
			1 0 1 COMMAND WRITE
5	WR,R/W	H/L	8080 FAMILY INTERFACE ACTS AS THE ACTIVE-LOW WRITE STROBE . 6800 FAMILY INTERFACE ACTS AS THE READ/ WRITE CONTROL SIGNAL .
6	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	CS	H/L	CHIP SELECT
16	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 └ 22	NC	—	NOT USE

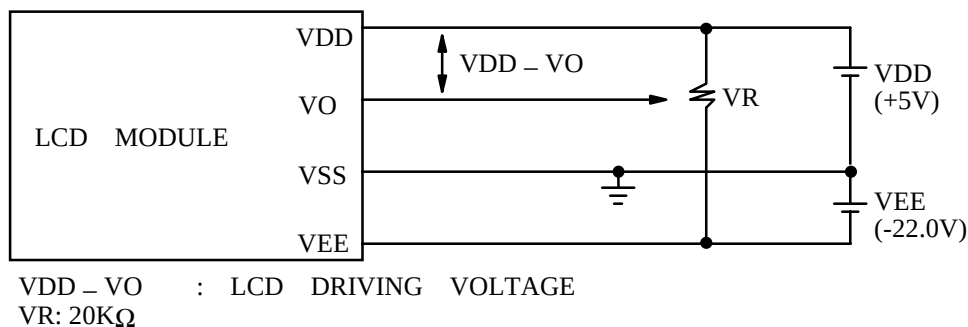
9. INTERFACE SIGNALS

IF2 :

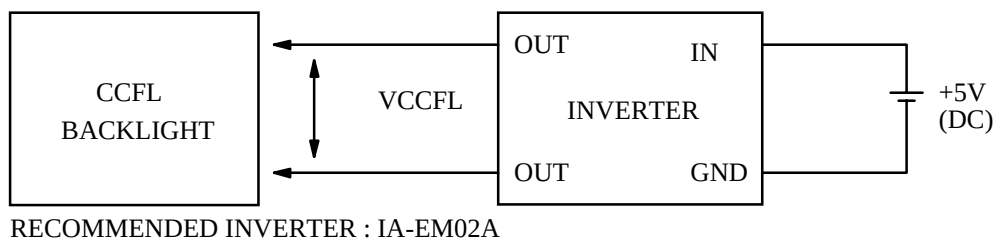
INTERFACE	PIN	SIGNAL	LEVEL	FUNCTION
CCFL	1	VCCFL	—	POWER SUPPLY FOR CCFL DRIVING
	2~3	NC	—	NO CONNECTION
	4	VCCFL	—	POWER SUPPLY FOR CCFL DRIVING

10. POWER SUPPLY

10.1 POWER SUPPLY FOR LCM



10.2 POWER SUPPLY FOR CCFL BACK - LIGHT



10.3 TIMING OF POWER SUPPLY AND INTERFACE SIGNAL

