

EXAMINED BY : <i>David Chang</i>	EMERGING DISPLAY TECHNOLOGIES CORPORATION	FILE NO . CAS-50307
APPROVED BY: <i>Tessie Chen</i>		ISSUE : SEP.03,2001
		TOTAL PAGE : 9
		VERSION : 5

CUSTOMER ACCEPTANCE SPECIFICATIONS

MODEL NO. :

EW 50114NCW

FOR MESSRS :

CUSTOMER'S APPROVAL

DATE :

BY :

EMERGING DISPLAY
TECHNOLOGIES CORPORATION

MODEL NO. EW50114NCW	VERSION 5
-------------------------	--------------

RECORDS OF REVISION	DOC . FIRST ISSUE MAY.04,2001
---------------------	----------------------------------

DATE	REVISED PAGE NO.	SUMMARY
AUG.01.2001	3	4. ELECTRICAL CHARACTERISTICS REVISED : VEE-VSS : MAX. = -14.5V → -15.0V f _{CCFL} : 30KHZ → 35 KHZ ADDING : CCFL LIFE : TYP. = 50KHrs , MIN. = 40 KHrs
	9	10.1 POWER SUPPLY FOR LCM VEE : -14.5V → -15.0V
AUG.22.2001	3	VEE - VSS → VSS - VEE , TYP = -10.8 → -15 MIN = -15.5 , MAX = -15 → -14.5
AUG.23.2001	9	10.3 TIMING OF POWER SUPPLY AND INTERFACE SIGNAL DELETE
SEP.03,2001	2	3. ABSOLUTE MAXIMUM RATINGS 3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS VDD - VEE : MAX = 20.0 → 21.0
	7	9. INTERFACE SIGNALS PIN 4 : C/D → C/D̄ , PIN 15 : LEVEL = H → L PIN 18 : DF̄ = "H" : LCD ON , DF̄ = "L" : LCD OFF
	8	CN2 : PIN 3 : DF̄ = "H" : LCD ON , DF̄ = "L" : LCD OFF

TABLE OF CONTENTS

NO.	ITEM	PAGE
1.	GENERAL SPECIFICATIONS -----	1
2.	MECHANICAL SPECIFICATIONS -----	1
3.	ABSOLUTE MAXIMUM RATINGS -----	2
4.	ELECTRICAL CHARACTERISTICS -----	3
5.	OPTICAL CHARACTERISTICS -----	4
6.	OUTLINE DIMENSION -----	5
7.	BLOCK DIAGRAM -----	6
8.	DETAIL DRAWING OF DOT MATRIX -----	7
9.	INTERFACE SIGNALS -----	7, 8
10.	POWER SUPPLY -----	9

1. GENERAL SPECIFICATIONS

1.1 GENERAL SPECIFICATIONS

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

E U - 0 0 2 A

1.2 APPLICATION NOTES FOR CONTROLLER : T6963C

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

E U - T 6 9 6 3 C

1.3 THIS INDIVIDUAL SPECIFICATION IS PRIOR TO GENERAL SPECIFICATIONS .

2. MECHANICAL SPECIFICATIONS

- | | | |
|--------------------|-------|--|
| (1) NUMBER OF DOTS | ----- | 240W * 128H DOTS |
| (2) MODULE SIZE | ----- | 159.4W * 101.0H * 11.0D (max) mm |
| (3) EFFECTIVE AREA | ----- | 124.0W * 70.0H mm |
| (4) ACTIVE AREA | ----- | 119.97W * 63.97H mm |
| (5) DOT SIZE | ----- | 0.47W * 0.47H mm |
| (6) DOT PITCH | ----- | 0.50W * 0.50H mm |
| (7) LCD TYPE | ----- | FSTN , NEGATIVE , BLACK/WHITE ,
TRANSMISSIVE , ANTI-GLARE |
| (8) DRIVING METHOD | ----- | 1 / 128 DUTY MULTIPLEX DRIVE |
| (9) BACKLIGHT | ----- | CCFL |

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	
LCD DRIVER CIRCUIT SUPPLY VOLTAGE	VDD – VEE	0	21.0	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	- 2 0 °C	7 0 °C	- 3 0 °C	8 0 °C	NOTE (2), (3), (4)
HUMIDITY	—	9 0 % RH	—	9 0 % RH	WITHOUT CONDENSATION
VIBRATION	—	2 . 4 5 m / s ² (0 . 2 5 G)	—	1 1 . 7 6 m / s ² (1 . 2 G)	10~100 HZ XYZ DIRECTIONS 1 Hr . EACH
SHOCK	—	2 9 . 4 m / s ² (3 G)	—	4 9 0 . 0 m / s ² (5 0 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 .

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

4. ELECTRICAL CHARACTERISTICS

Ta = 25 °C

VDD = 5.0 V

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	
POWER SUPPLY VOLTAGE FOR LOGIC	VDD – VSS	—	4.5	5.0	5.5	V	
POWER SUPPLY VOLTAGE FOR LCD DRIVE	VSS – VEE	—	-15.5	-15	-14.5	V	
INPUT VOLTAGE NOTE (1)	VIH	H LEVEL	VDD – 2.2	—	VDD	V	
	VIL	L LEVEL	0	—	0.8	V	
OUTPUT VOLTAGE NOTE (1)	VIH	H LEVEL	VDD – 0.3	—	VDD	V	
	VIL	L LEVEL	0	—	0.3	V	
POWER SUPPLY CURRENT FOR LOGIC NOTE (2)	IDD	VDD – VSS = 5.0 V VDD – VO = 15.8V	—	9	24.0	mA	
POWER SUPPLY CURRENT FOR LCD DRIVE NOTE (2)	IEE	VDD – VSS = 5.0 V VDD – VO = 15.8 V	—	2	5	mA	
RECOMMENDED LCD DRIVING VOLTAGE NOTE (3)	VDD – VO ∅ = 10° θ = 0°	Ta = -20 °C	—	15.8	—	V	
		Ta = 25 °C	—	15.8	—	V	
		Ta = 70 °C	—	13.5	—	V	
CLOCK OSCILLATION FREQUENCY	f _{osc}	—	—	6.0	—	MHZ	
POWER SUPPLY FOR CCFL	VOLTAGE	VCCFL	—	—	300	—	Vrms
	FREQUENCY	fCCFL	—	—	35K	—	HZ
	CURRENT	IL	—	—	5	—	mA
	LIFE	LIFE TIME	—	—	40K	50K	Hrs

NOTE (1): APPLIED TO TERMINALS \overline{WR} , \overline{RD} , \overline{CS} , $\overline{C/D}$, \overline{RST} , FS, DB0~DB7.

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

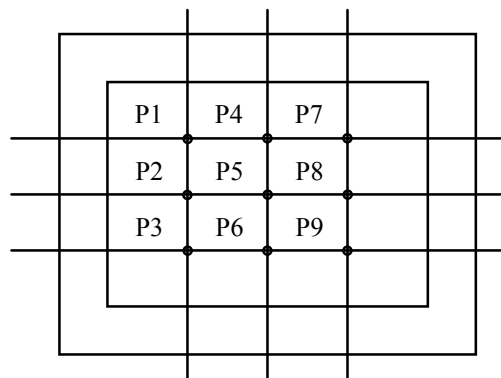
I T E M	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE	
VIEWING ANGLE	∅ 2 - ∅ 1	K ≥ 1.4	—	50	—	deg.	1	
CONTRAST RATIO	K	∅ = 10° θ = 0°	—	20	—	—	1	
RESPONSE TIME	tr (rise)	∅ = 10° θ = 0°	Ta = -20°C	—	5538	—	ms	1
			Ta = 25°C	—	228	—		
			Ta = 70°C	—	104	—		
	tf (fall)		Ta = -20°C	—	2316	—		
			Ta = 25°C	—	174	—		
			Ta = 70°C	—	85	—		
AVERAGE BRIGHTNESS OF BACKLIGHT	B	—	460	580	—	cd / m2	2, 3	
RISE TIME OF BACKLIGHT	TC	—	—	5	—	MINUTE		
BRIGHTNESS UNIFORMITY	—	—	—	—	25	%	4, 5	

NOTE (1) : PLEASE REFER TO :
CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS.
E U - 0 0 2 A

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

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

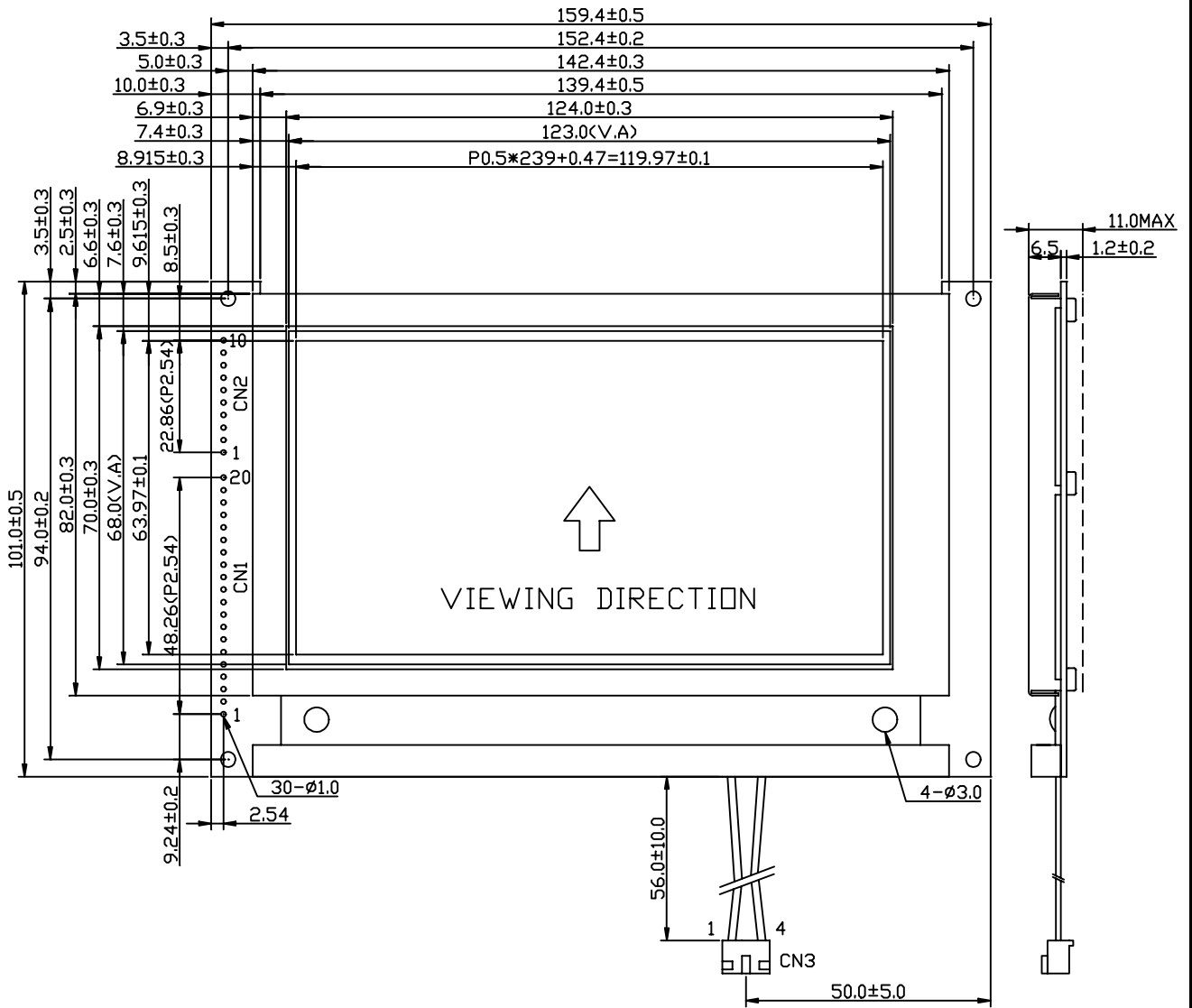
NOTE (4) : MEASUREMENT OF THE FOLLOWING 9 PLACES ON THE DISPLAY.
DEFINITION OF THE BRIGHTNESS UNIFORMITY.



NOTE (5) : BRIGHTNESS UNIFORMITY IS DEFINED AS FOLLOWING

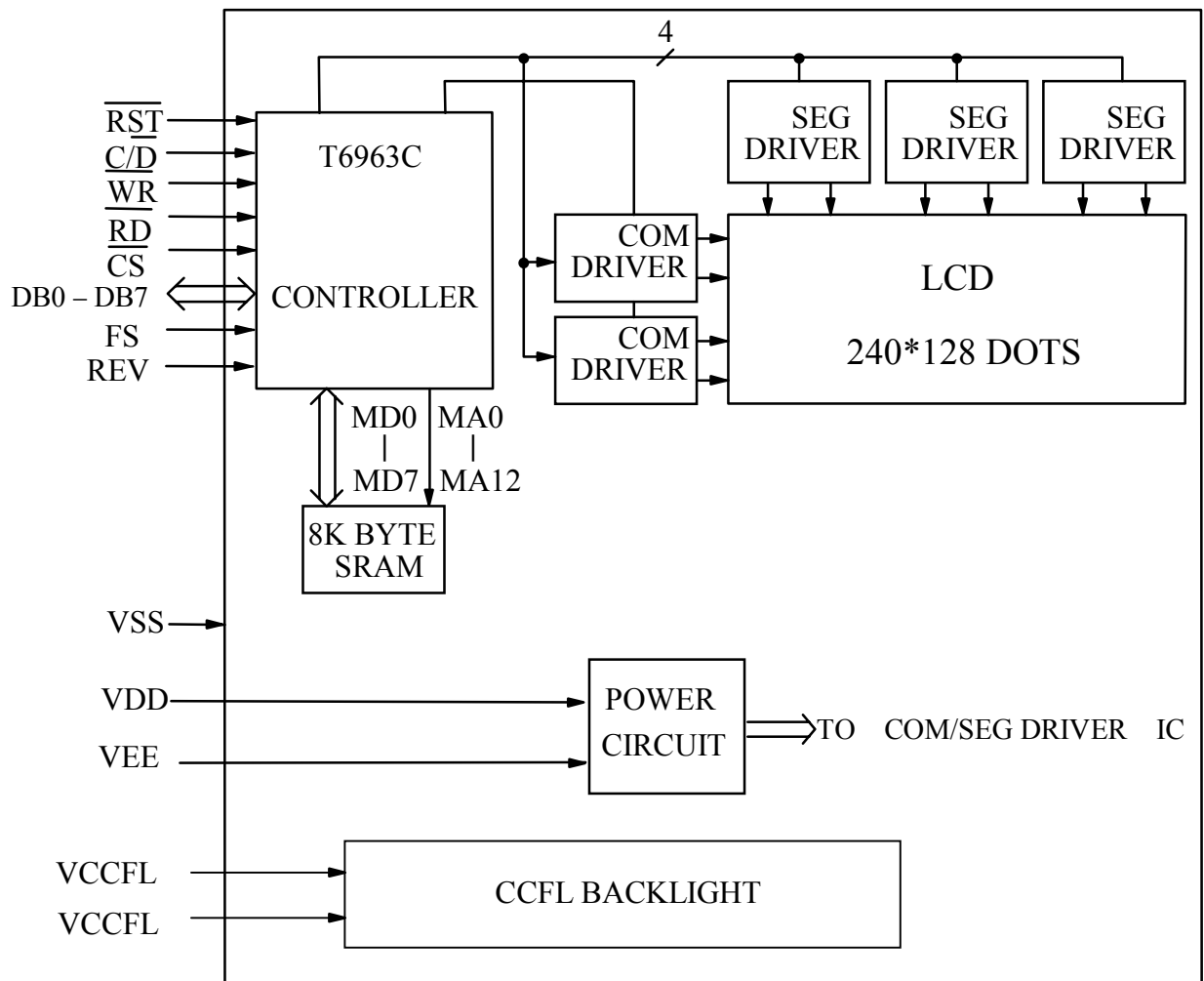
$$\sum X = \left[\frac{(\text{MAXIMUN BRIGHTNESS OR MINIMUN BRIGHTNESS}) - \text{AVERAGE BRIGHTNESS}}{\text{AVERAGE BRIGHTNESS}} \right] \times 100\%$$

6. OUTLINE DIMENSION

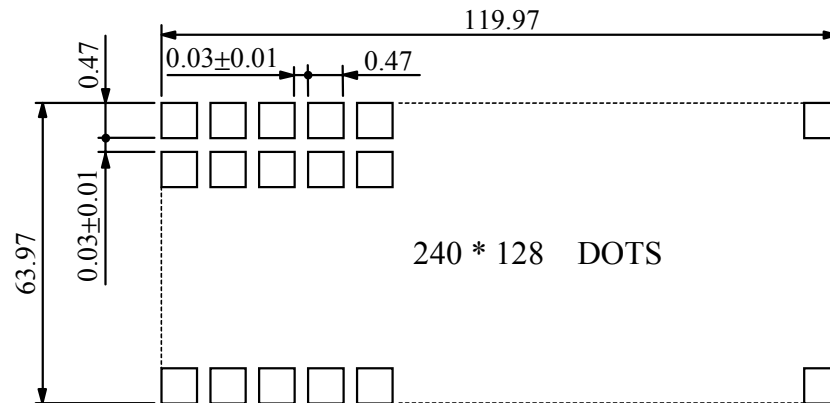


UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.5

7. BLOCK DIAGRAM



8. DETAIL DRAWING OF DOT MATRIX



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

9. INTERFACE SIGNALS

CN1 :

PIN NO	SYMBOL	LEVEL	FUNCTION
1	VSS	—	GROUND
2	VDD	—	POWER SUPPLY FOR LOGIC CIRCUIT
3	VO	—	POWER SUPPLY FOR LCD
4	$\overline{C/D}$	H/L	$\overline{WR}=\text{“L”}, \overline{C/D}=\text{“H”}$: COMMAND WRITE $\overline{C/D}=\text{“L”}$: DATA WRITE $\overline{RD}=\text{“L”}, \overline{C/D}=\text{“H”}$: STATUS READ $\overline{C/D}=\text{“L”}$: DATA READ
5	\overline{WR}	L	DATA WRITE
6	\overline{RD}	L	DATA READ
7 14	DB0 DB7	H/L	DATA BUS LINE
15	\overline{CS}	L	CHIP ENABLE
16	\overline{RST}	L	RESET
17	VEE	—	POWER SUPPLY FOR LCD DRIVING
18	\overline{DF}	H/L	$\overline{DF} = \text{“H”}$: LCD ON , $\overline{DF} = \text{“L”}$: LCD OFF
19	FS	H/L	SELECT : “H” : 6*8 PIXEL/FONT “L” : 8*8 PIXEL/FONT
20	REV	H/L	H: BLACK CHARACTERS L : WHITE CHARACTERS

CN2 :

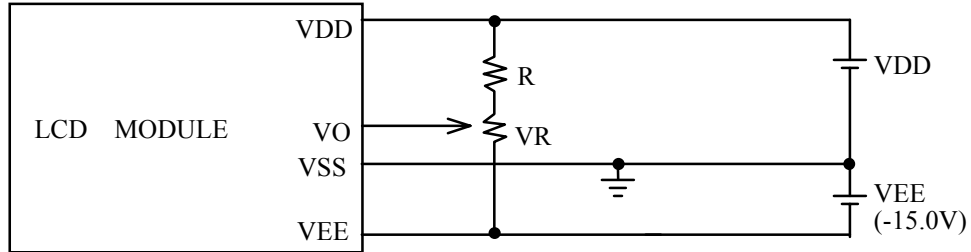
PIN NO	SYMBOL	LEVEL	FUNCTION
1	D1	—	SDSEL = H : DATA OUTPUT FOR EVEN COLUMNS IN BOTH UPPER AND LOWER AREAS OF LCD SDSEL = L : DATA OUTPUT FOR COLUMNS IN BOTH UPPER AND LOWER AREAS OF LCD
2	FLM	—	THE FLM SIGNAL INDICATING THE BEGINNING OF EACH DISPLAY CYCLE
3	\overline{DF}	H/L	\overline{DF} = "H" : LCD ON , \overline{DF} = "L" : LCD OFF
4	CL2	—	DISPLAY DATA SHIFT
5	CL1	—	DISPLAY DATA LATCH
6	REV	—	H: BLACK CHARACTERS L : WHITE CHARACTERS
7	VDD	H	POWER SUPPLY FOR LOGIC CIRCUIT
8	GND	L	GROUND
9	VEE	—	POWER SUPPLY FOR LCD DRIVING
10	VO	—	POWER SUPPLY FOR LCD

CN3 :

PIN NO	SYMBOL	LEVEL	FUNCTION
1	VCCFL	—	POWER SUPPLY FOR CCFL DRIVING
2	N.C	—	NO CONNECTION
3	N.C	—	NO CONNECTION
4	VCCFL	—	POWER SUPPLY FOR CCFL DRIVING

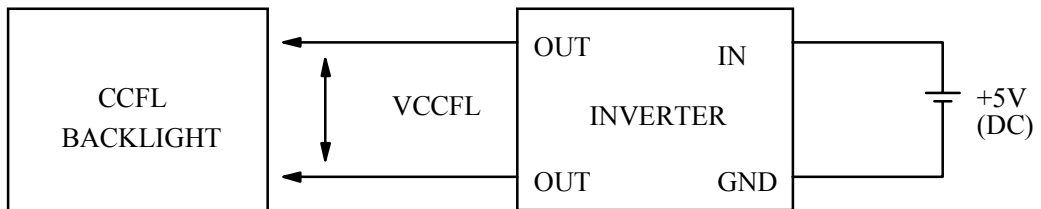
10. POWER SUPPLY

10.1 POWER SUPPLY FOR LCM



VR : 20K Ω

10.2 POWER SUPPLY FOR CCFL BACK - LIGHT



RECOMMENDED INVERTER : IA-EM02A