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CUSTOMER	ACCEPTANCE	SPECIFICATIONS
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MODEL NO :

TM128128A-1 VER:1.0

COMPATIBLE WITH THE:

E W 1 3 D 2 0 F L Y

CUSTOMER'S APPROVAL

DATE :

BY :

RECORDS OF REVISION		DOC . FIRST ISSUE	MARCH,28,2013
DATE	REVISED PAGE NO.	SUMMARY	

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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 / DRIVER : 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	-----	128W * 128H DOTS
(2)	MODULE SIZE	-----	92.0W * 106.0H * 15.0D(max) mm
(3)	VIEWING AREA	-----	73.0W * 73.0H mm
(4)	ACTIVE AREA	-----	70.35W * 70.35H mm
(5)	DOT SIZE	-----	0.5W * 0.5H mm
(6)	DOT PITCH	-----	0.55W * 0.55H mm
(7)	LCD TYPE	-----	FSTN , BLACK/WHITE , TRANSFLECTIVE
(8)	DRIVING METHOD	-----	1 / 128 DUTY MULTIPLEX DRIVE
(9)	BACKLIGHT	-----	LED , COLOR : YELLOW-GREEN

3. ABSOLUTE MAXIMUM RATINGS

3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS .

PARAMETER	SYMBOL	MIN .	MAX .	UNIT	REMARK
POWER SUPPLY FOR LOGIC	VDD – VSS	- 0 . 3	5 . 5	V	
INPUT VOLTAGE	VI	- 0 . 3	VDD	V	
STATIC ELECTRICITY	—	—	—	V	NOTE (1)
LED POWER DISSIPATION	PD	—	(7)	W	
LED FORWARD CURRENT	IF	—	(1520)	mA	
LED REVERSE VOLTAGE	VR	—	(8)	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	- 2 0 °	7 0 °C	- 3 0 °C	8 0 °C	NOTE (2) , (3)
HUMIDITY	—	7 5 % RH	—	7 5 % RH	WITHOUT CONDENSATION
VIBRATION	—	2 . 45 m /s ² (0 . 25 G)	—	19.6 m /s ² (2 G)	10~100 HZ XYZ DIRECTIONS 1 Hr . EACH
SHOCK	—	2 9 . 4 m /s ² (3 G)	—	490.0 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 : 120HR 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 ± 10 %

PARAMETER	SYMBOL	CONDITION	MIN .	TYP .	MAX .	UNIT
POWER SUPPLY VOLTAGE FOR LOGIC	VDD - VSS	—	4.5	5.0	5.5	V
INPUT VOLTAGE NOTE (1)	VIH	H LEVEL	VDD - 2.2	—	VDD	V
	VIL	L LEVEL	0	—	0.8	V
OUTPUT VOLTAGE NOTE (1)	VOH	H LEVEL	VDD - 0.3	—	VDD	V
	VOL	L LEVEL	0	—	0.3	V
POWER SUPPLY CURRENT FOR LOGIC NOTE (2)	IDD	VDD - VSS = 5.0 V	(17)	(22)	(29)	mA
RECOMMENDED LCD DRIVING VOLTAGE NOTE (3)	VDD - VO DUTY = 1/128	Ta = -20 °C	(16.8)	(17.2)	(17.6)	V
		Ta = 25 °C	(15.6)	(16.0)	(16.4)	
		Ta = 70 °C	(15.1)	(15.5)	(15.9)	
CLOCK OSCILLATION FREQUENCY	f _{osc}	—	—	5	—	MHz
POWER SUPPLY FOR LED BACKLIGHT	I _{LED}	V _{BL} = 4.2 V	—	(605)	—	mA

NOTE (1) : APPLIED TO TERMINALS \overline{WR} , \overline{RD} , \overline{CE} , $\overline{C/D}$, \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

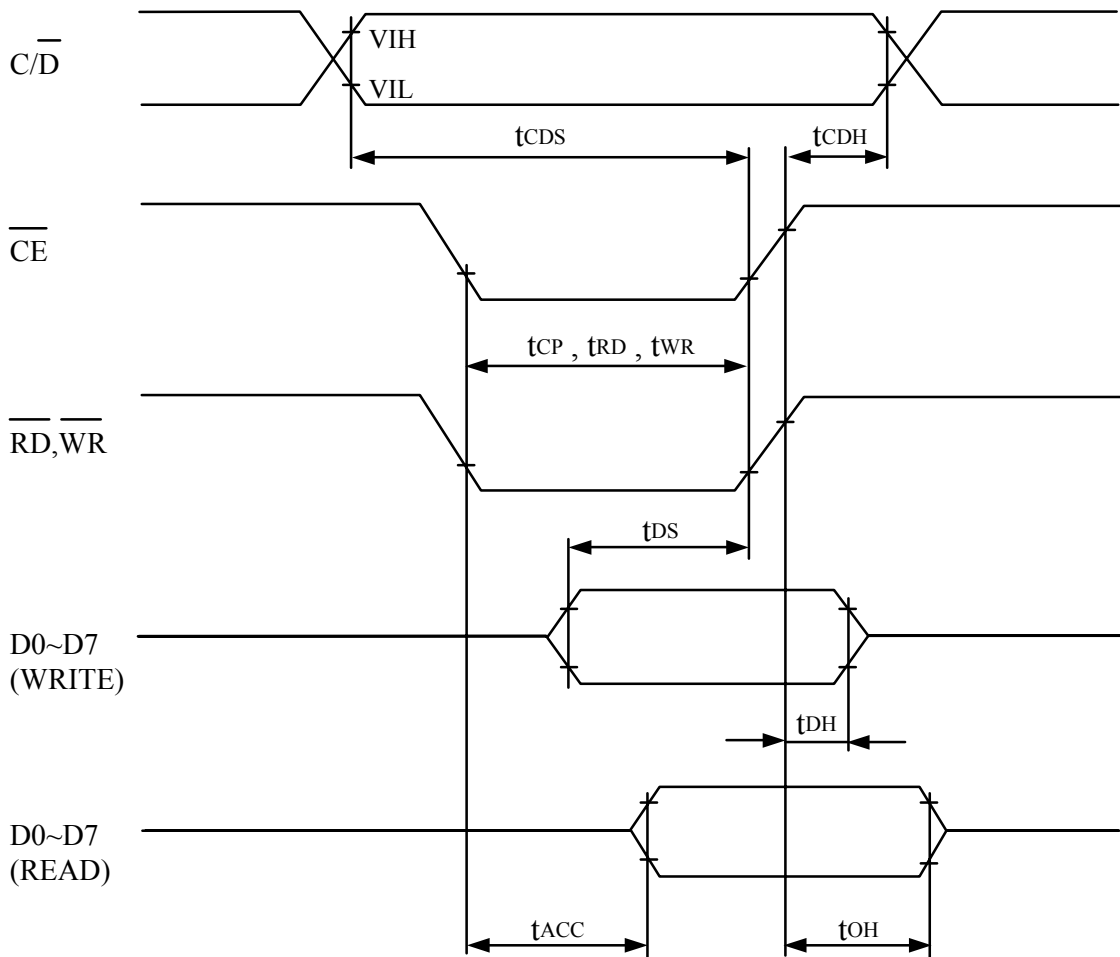
I T E M	SYMBOL	CONDITION	MIN .	TYP .	MAX.	UNIT	NOTE	
VIEWING AREA	$\varnothing 2 - \varnothing 1$	$K \geq 1.4$	50	—	—	deg.	1	
CONTRAST RATIO	K	$\varnothing = 0^\circ \quad \theta = 0^\circ$	5.0	—	—	—	1	
RESPONSE TIME	tr (rise)	$\varnothing = 0^\circ$ $\theta = 0^\circ$	Ta = -20°C	—	(1400)	—	ms	1
			Ta = 25°C	—	(150)	—		
			Ta = 70°C	—	(50)	—		
	tf (fall)		Ta = -20°C	—	(6500)	—		
			Ta = 25°C	—	(300)	—		
			Ta = 70°C	—	(85)	—		
THE BRIGHTNESS OF BACK-LIGHT	B	$\varnothing = 0^\circ$ $\theta = 0^\circ$	—	(5)	—	cd/m ²	1	

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

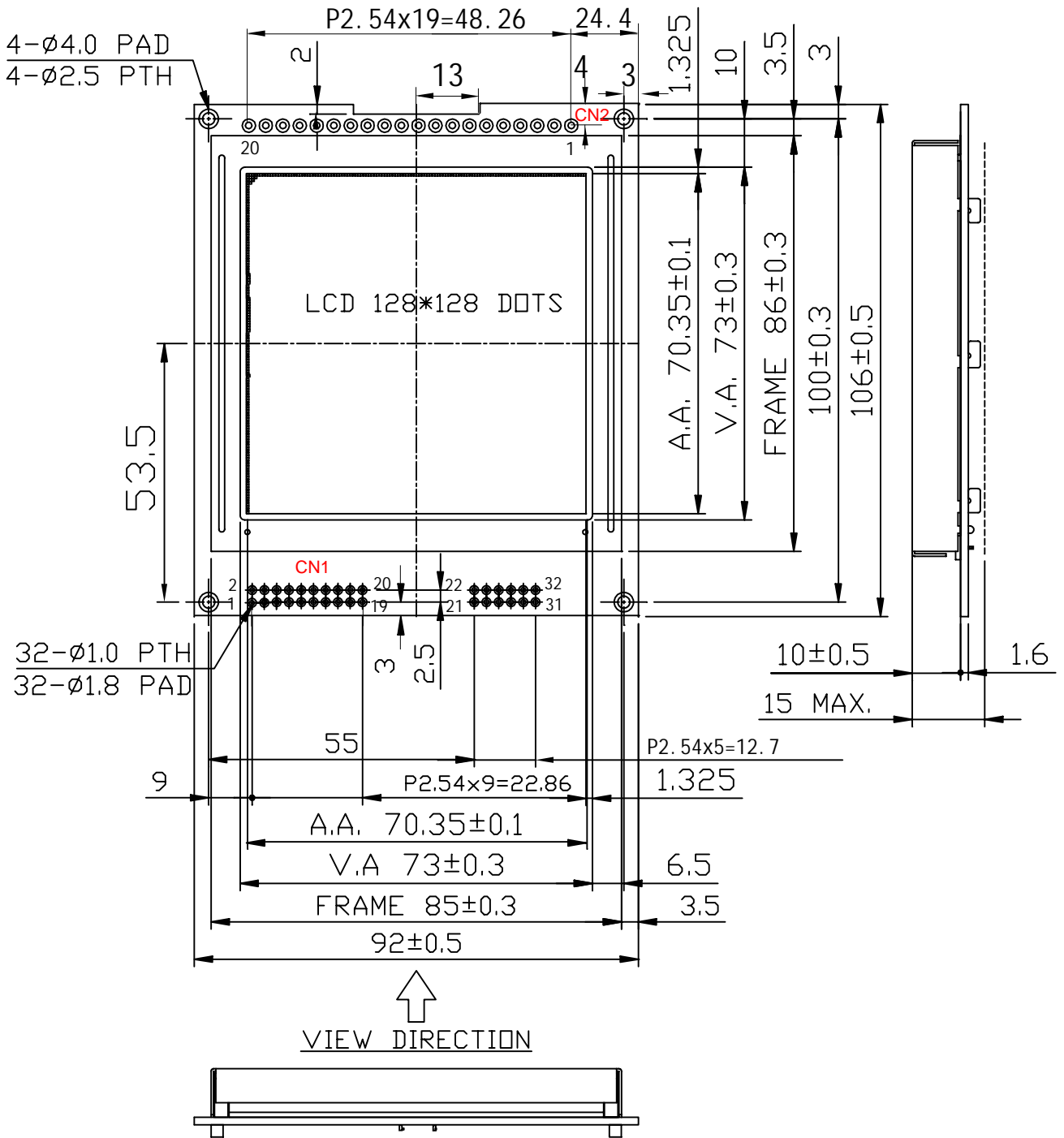
6. TIMING CHARACTERISTICS

6.1 INTERFACE TIMING

TIME	ITEM	MIN.	MAX.	UNIT
C/D SET UP TIME	tCDS	100	—	ns
C/D HOLD TIME	tCDH	10	—	ns
CE, RD, WR CLOCK WIDTH	tCP, tRD, tWR	80	—	ns
DATA SET UP TIME	tDS	80	—	ns
DAT HOLD TIME	tDH	40	—	ns
ACCESS TIME	tACC	—	150	ns
DATA OUTPUT HOLD TIME	tOH	10	50	ns

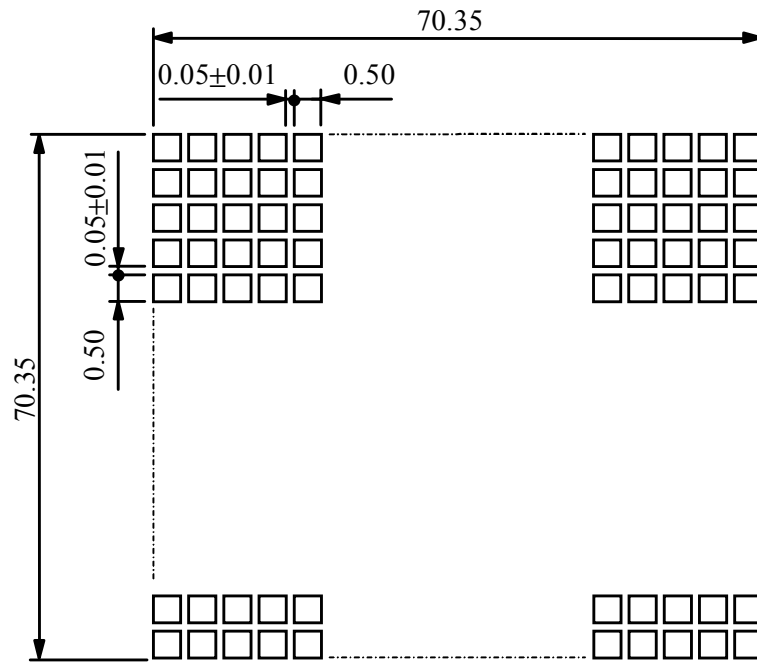


7. OUTLINE DIMENSION



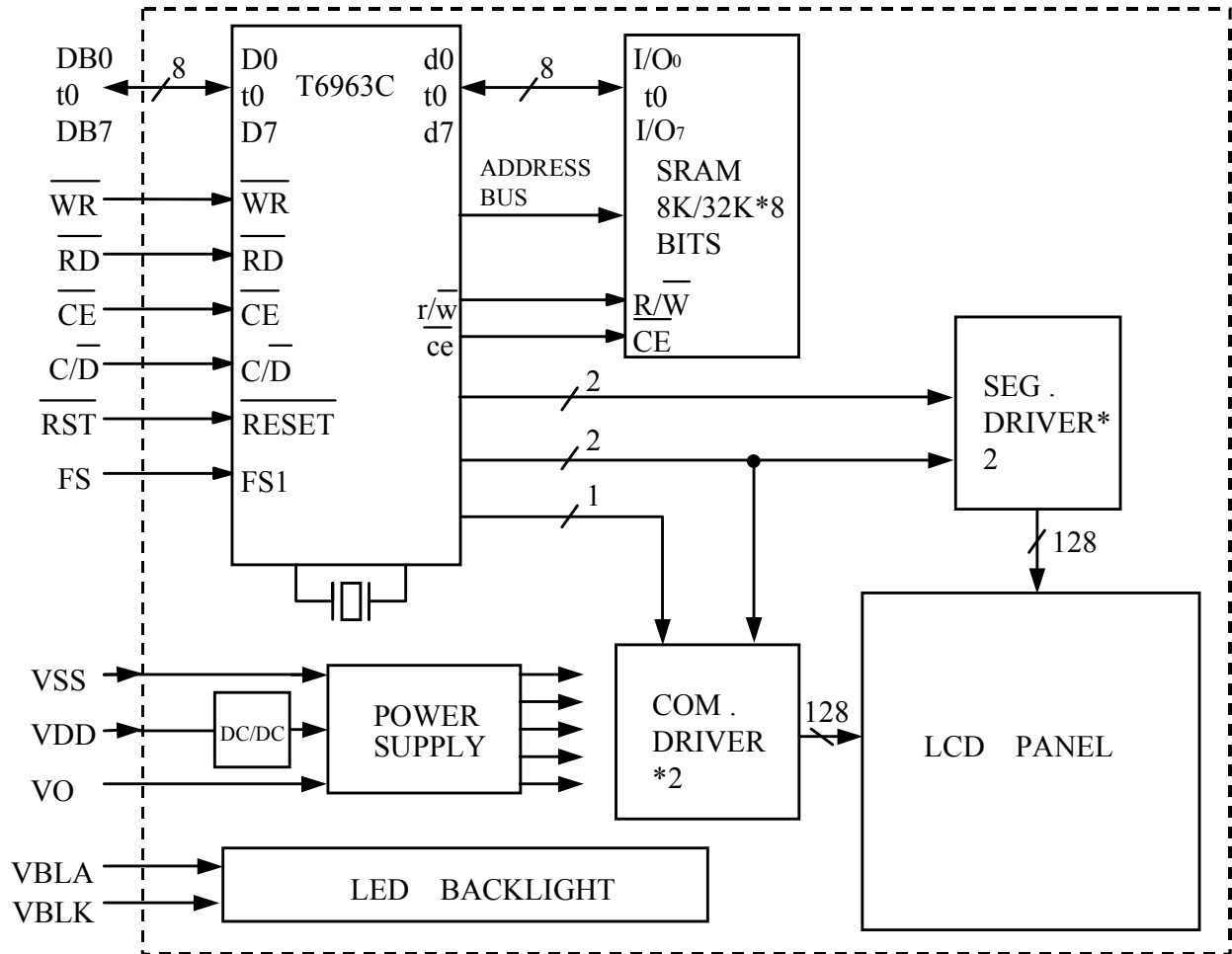
UNIT : mm
 SCALE : NTS
 NOT SPECIFIED TOLERANCE IS ± 0.5

8. DETAIL DRAWING OF DOT MATRIX



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

9. BLOCK DIAGRAM

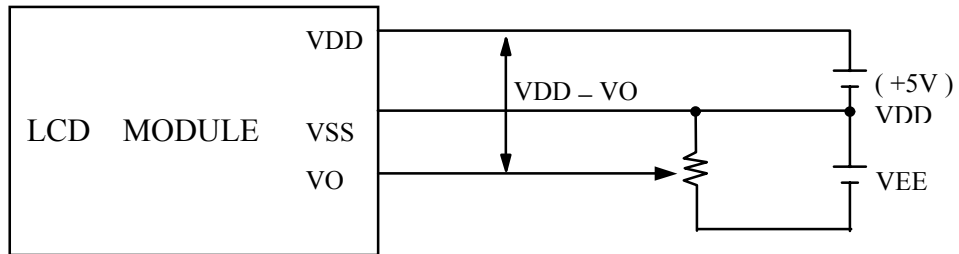


10. INTERFACE SIGNALS

PIN NO .	SIGNAL	FUNCTION	CN1
1	VO	POWER SUPPLY FOR LCD DRIVER	
2	VSS	GROUND	
3	VDD	POWER SUPPLY FOR LOGIC (+5V)	
4	NC	NO CONNECTION	
5	$\overline{\text{WR}}$	DATA WRITE	
6	$\overline{\text{RD}}$	DATA READ	
7	$\overline{\text{CE}}$	CHIP ENABLE	
8	$\overline{\text{C/D}}$	COMMAND/DATA SELECT “ H “ FOR COMMAND READ/WRITE	
9	$\overline{\text{RST}}$	CONTROLLER RESET	
10 ~ 17	DB0~DB7	DATA INPUT / OUTPUT	
18	FS	FONT SELECT “H” FOR 6*8 FONT “L” FOR 8*8 FONT	
19	VBLA	POWER FOR LED BACKLIGHT (ANODE) (+5V)	
20	VBLK	POWER FOR LED BACKLIGHT (CATHODE)	
PIN NO .	SIGNAL	FUNCTION	CN2
1	FG	FRAME GROUND	
2	VSS	GROUND	
3	VDD	POWER SUPPLY FOR LOGIC (+5V)	
4	V0	POWER SUPPLY FOR LCD DRIVER	
5	$\overline{\text{WR}}$	DATA WRITE	
6	$\overline{\text{RD}}$	DATA READ	
7	$\overline{\text{CE}}$	CHIP ENABLE	
8	$\overline{\text{C/D}}$	COMMAND/DATA SELECT “ H “ FOR COMMAND READ/WRITE	
9	$\overline{\text{RST}}$	CONTROLLER RESET	
10 ~ 17	DB0~DB7	DATA INPUT / OUTPUT	
18	FS	FONT SELECT “H” FOR 6*8 FONT “L” FOR 8*8 FONT	
19	VBLA	POWER FOR LED BACKLIGHT (ANODE) (+5V)	
20	VBLK	POWER FOR LED BACKLIGHT (CATHODE)	

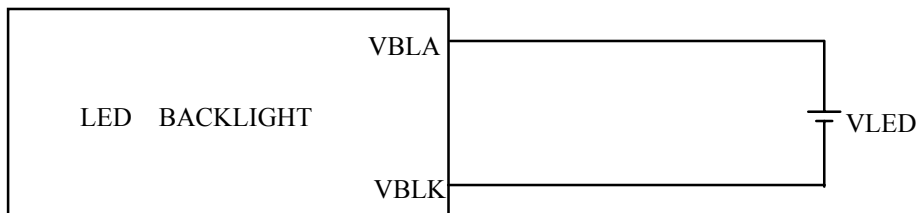
1 1 . POWER SUPPLY

1 1 . 1 POWER SUPPLY FOR LCM



VDD - VO : LCD DRIVING VOLTAGE

1 1 . 2 POWER SUPPLY FOR LED BACKLIGHT



VLED : 5.0 V