



PALM TECHNOLOGY CO., LTD.

The LCD(M) Specialist

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PART NO. : PMG3224A-SBLW

FOR MESSRS. : _____

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ACCEPTED BY: _____ PROPOSED BY: _____

RECORD OF REVISION

DATE	PAGE	SUMMARY

3. General specifications

3.1 General specifications

PLEASE REFER TO:

“CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS (MS-10-10000)”.

3.2 This individual specification is prior to general specifications

4. Mechanical data

- (1) NUMBER OF DOTS ----- 320 W * 240 H DOTS
- (2) MODULE SIZE ----- 167.5 W * 109.0 H * 10.5 T (max) mm
- (3) EFFECTIVE AREA ----- 120.5 W(min) * 92.0 H mm
- (4) ACTIVE AREA ----- 115.17 W * 86.37 H mm
- (5) DOT SIZE ----- 0.33 W * 0.33 H mm
- (6) DOT PITCH ----- 0.36 W * 0.36 H mm
- (7) VIEWING DIRECTION ----- 6 O’CLOCK
- (8) LCD TYPE ----- STN.BLUE/NEGATIVE.TRANSMISSIVE
- (9) LED COLOR ----- WHITE

5. Absolute maximum ratings

5.1 Electrical absolute maximum ratings

<i>I T E M</i>	<i>SYMBOL</i>	<i>MIN.</i>	<i>MAX.</i>	<i>UNIT</i>	<i>COMMENT</i>
POWER SUPPLY FOR LOGIC	V _{DD} -V _{SS}	0	6.0	V	-----
INPUT VOLTAGE	V _I	V _{SS}	V _{DD}	V	-----
STATIC ELECTRICITY	-----	-----	100	V	NOTE (1)
POWER SUPPLY FOR LED BACKLIGHT	V _{LED}	0	6.0	V	-----
POWER SUPPLY FOR LCD	V _{DD} -V _{EE}	-----	30.0	V	-----

NOTE (1): ELECTRO-STATIC DISCHARGE RESISTANCE IS TESTED BY CHARGING A 200PF CAPACITOR AND DISCHARGING IT BY CONTACT WITH A INTERFACE CONNECTOR PIN.

5.2 Environmental absolute maximum ratings

<i>I T E M</i>	<i>OPERATING</i>		<i>STORAGE</i>		<i>COMMENT</i>
	<i>MIN.</i>	<i>MAX.</i>	<i>MIN.</i>	<i>MAX.</i>	
AMBIENT TEMPERATURE	-20℃	70℃	-20℃	70℃	-----
HUMIDITY	NOTE (2)		NOTE (2)		NO CONDENSATION
VIBRATION NOTE (3)	-----	0.5G	-----	2G	10~300Hz XYZ DIRECTIONS 1 Hr EACH
SHOCK NOTE (3)	-----	3G	-----	50G	10 msec XYZ DIRECTIONS 1 TIME EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		-----

NOTE (2): Ta ≤ 50℃: 85% RH MAX.

Ta > 50℃: ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF 85% RH AT 50℃. (50% RH AT 60℃)

NOTE (3): 1G = 9.8 m/s²

6. Electrical characteristics

$T_a = 25^{\circ}\text{C}$ $V_{DD} = 5.060.25\text{ V}$

<i>I T E M</i>	<i>SYMBOL</i>	<i>CONDITION</i>	<i>MIN.</i>	<i>TYP.</i>	<i>MAX.</i>	<i>UNIT</i>	
Power supply voltage for circuit	V _{DD} -V _{SS}	-----	4.75	5.0	5.25	V	
Power supply voltage for LCD drive	V _{EE} -V _{SS}	-----	-21.0	-22.0	-22.5	V	
Input voltage, NOTE (1)	V _{IH}	H LEVEL	0.8V _{DD}	-----	V _{DD}	V	
	V _{IL}	L LEVEL	V _{SS}	-----	0.2V _{DD}	V	
Power supply current, NOTE (2)	I _{DD}	V _{DD} -V _{SS} = 5.0V	-----	5.5	7.5	mA	
LCD display duty ratio	DUTY	-----	-----	1/240	-----	-----	
Recommended LCD driving voltage, NOTE (3)	V _{DD} -V _O	Φ= 10° θ = 0°	Ta=70 °C	-----	21.6	-----	V
			Ta=25°C	-----	23.5	-----	V
			Ta=-20°C	-----	25.0	-----	V
Power supply current for LED	I _{LED}	V _{LED} = +5.0V	-----	180	240	mA	
Power supply LCD current	I _{EE}	V _{DD} -V _O = 23.5V	-----	5.0	7.0	mA	
FLM frequency	F _{FLM}	-----	70	75	80	Hz	

NOTE (1): APPLIED TO TERMINALS D0~D3, LOAD, CP, $\overline{\text{DISP OFF}}$

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

NOTE (3): RECOMMENDED LCD DIRVING VOLTGE MAY FLUCTUATE ABOUT 6 0.5V BY EACH MODULE.

7. Optical characteristics

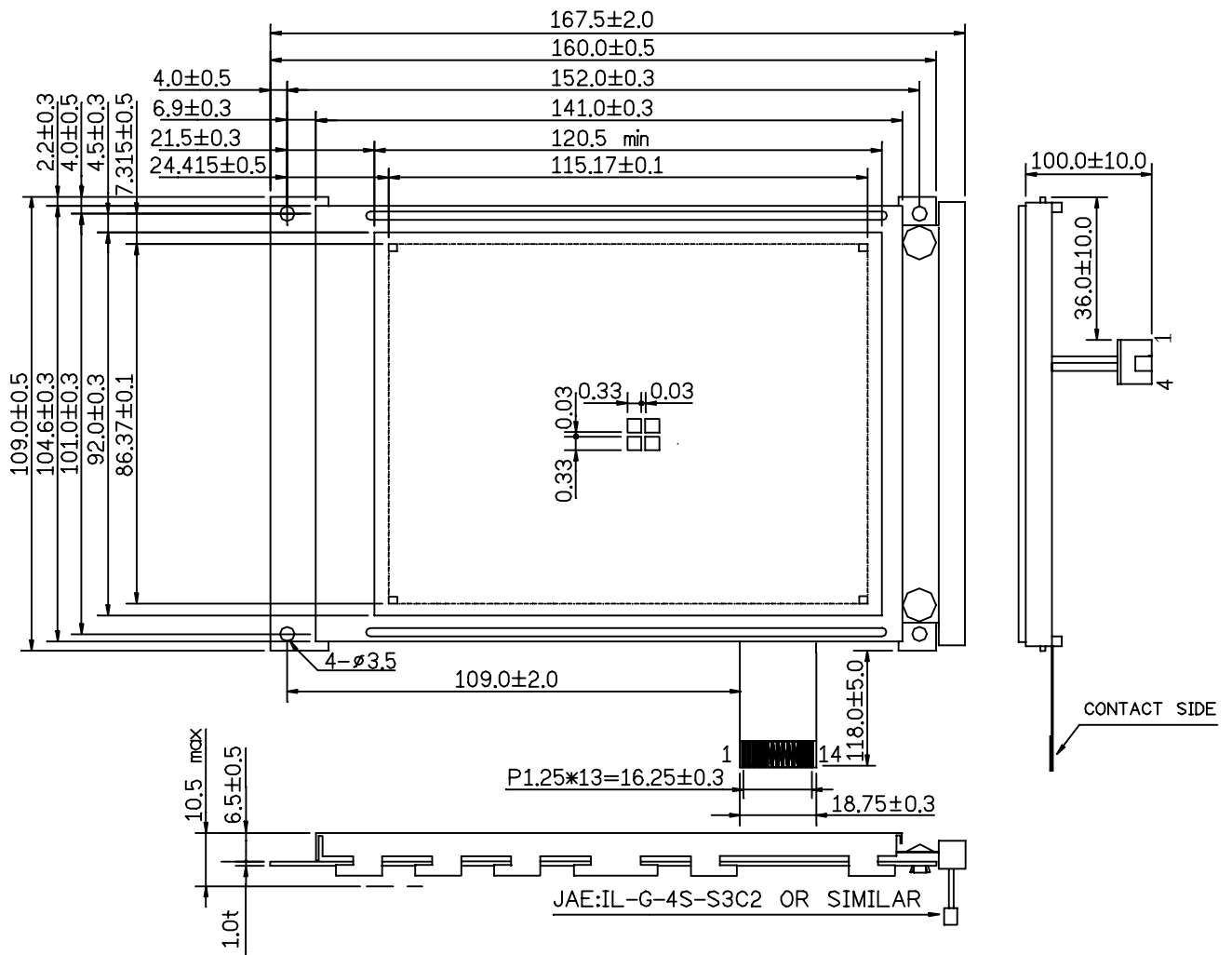
$T_a = 25^{\circ}\text{C}$ $V_{DD}-V_O = 23.5\text{ V}$

<i>I T E M</i>	<i>SYMBOL</i>	<i>CONDITION</i>	<i>MIN.</i>	<i>TYP.</i>	<i>MAX.</i>	<i>UNIT</i>	<i>NOTE</i>
VIEWING ANGLE	$\Phi 2-\Phi 1$	$K = 1.4$	30	40	-----	deg.	1
CONTRAST RATIO	K	$\Phi = 10^{\circ}$ $\theta = 0^{\circ}$	2.5	4.0	-----	-----	1
RESPONSE TIME	tr (rise)	$\Phi = 10^{\circ}$ $\theta = 0^{\circ}$	-----	250	-----	ms	1
	tf (fall)	$\Phi = 10^{\circ}$ $\theta = 0^{\circ}$	-----	350	-----	ms	1
LCM SURFACE LUMINANCE	B	DOTS ALL OFF	-----	5	-----	cd/m^2	1,2
		DOTS ALL ON	-----	160	-----		

NOTE (1): SEE CUSTOMER ACCEPTANCE STANDARD SPECIFICATION FOR DEFINITION OF OPTICAL CHARACTERISTICS

NOTE (2): UNDER NORMAL TEMPERATURE AND HUMIDITY IN A DARK ROOM

8. Outline dimension



8.1 Interface

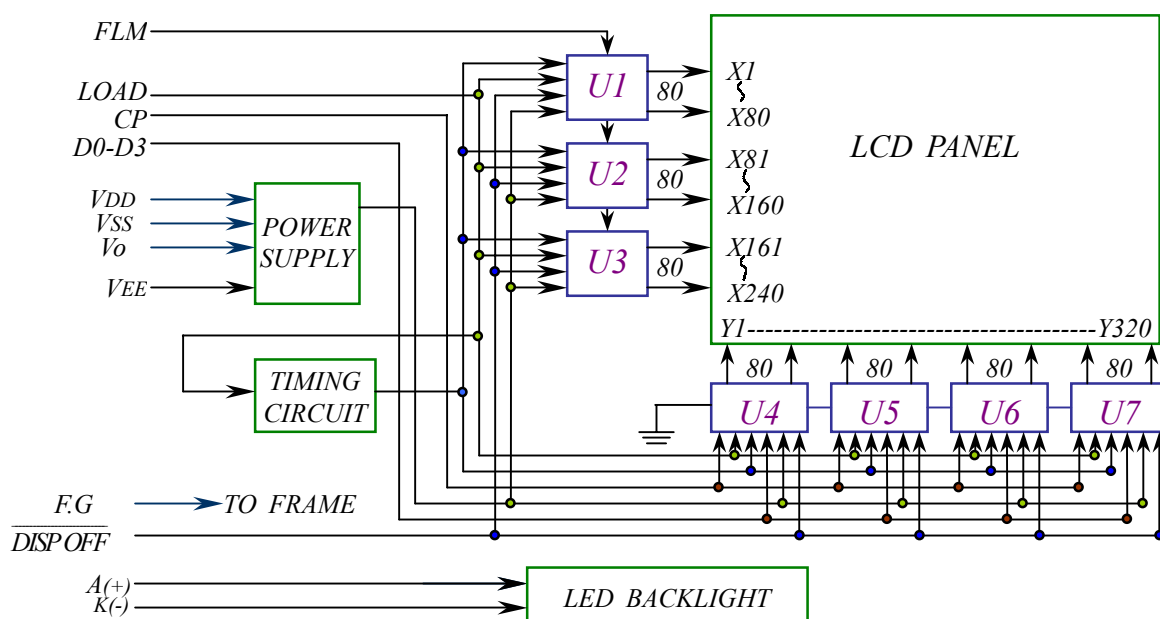
(a) Pin Assignment

PIN NO.	SYMBOL	FUNCTION
1	D0	DISPLAY DATA
2	D1	DISPLAY DATA
3	D2	DISPLAY DATA
4	D3	DISPLAY DATA
5	$\overline{\text{DISPOFF}}$	L: DISPLAY OFF H: DISPLAY ON
6	FLM	FRAME PULSE
7	N.C	NO CONNECTION
8	LOAD	DATA LATCH PULSE
9	CP	DATA SHIFT CLOCK PULSE
10	V _{DD}	POWER SUPPLY FOR LOGIC
11	V _{SS}	GRAND
12	V _{EE}	POWER SUPPLY FOR LCD
13	V _O	LCD DRIVING VOLTAGE
14	F.G	FRAME GRAND

(b) CCFL Connector

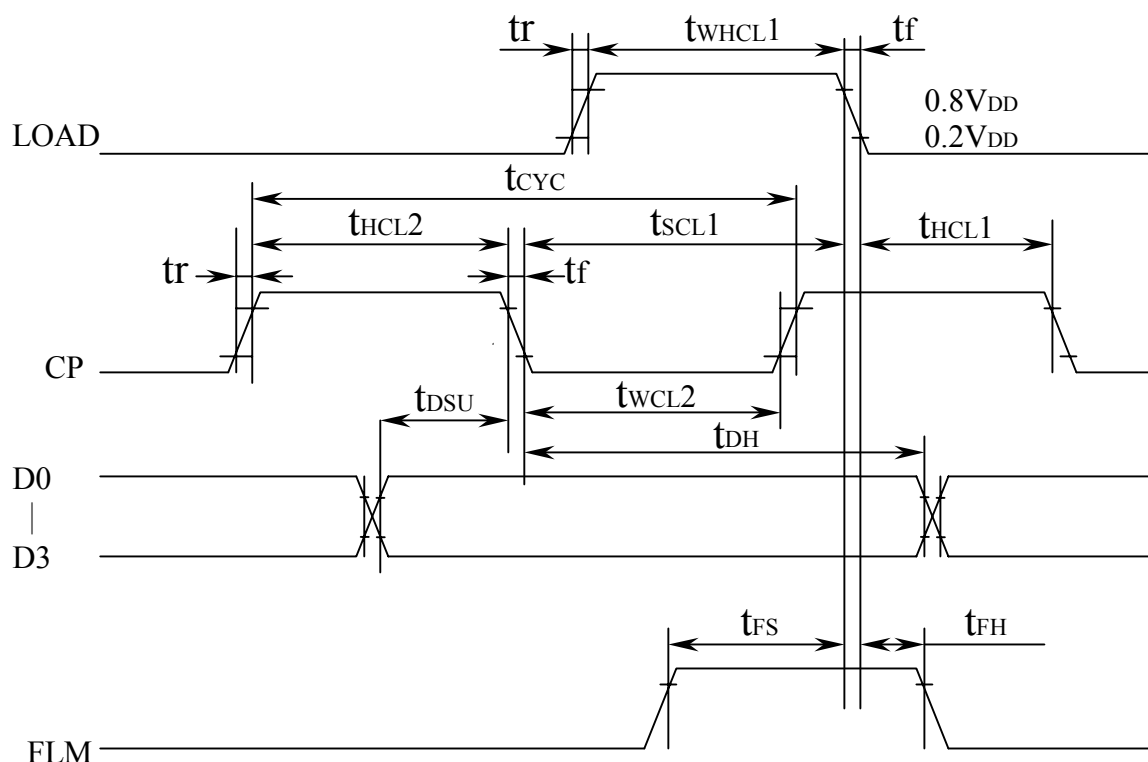
PIN NO.	SYMBOL	FUNCTION
1	A	POWER SUPPLY FOR LED(+)
2	N.C	NO CONNECTED
3	N.C	NO CONNECTED
4	K	POWER SUPPLY FOR LED(-)

9. Block diagram

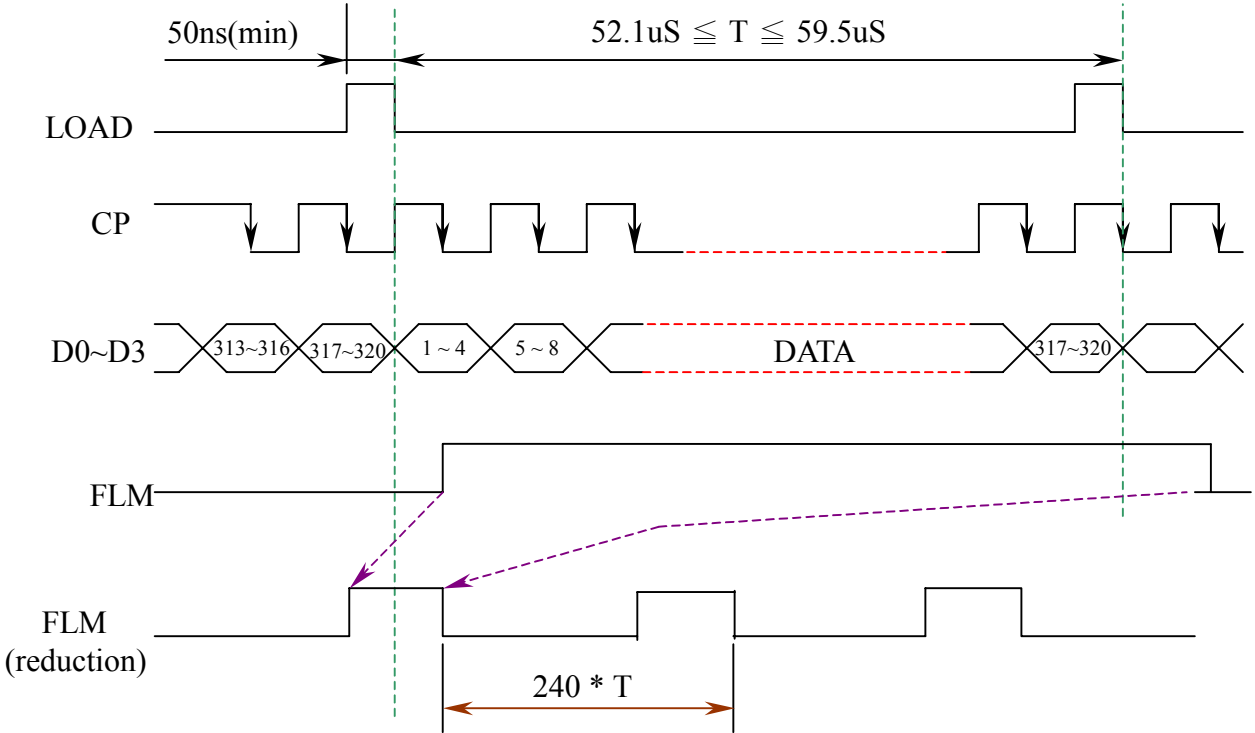


10. Timing characteristic

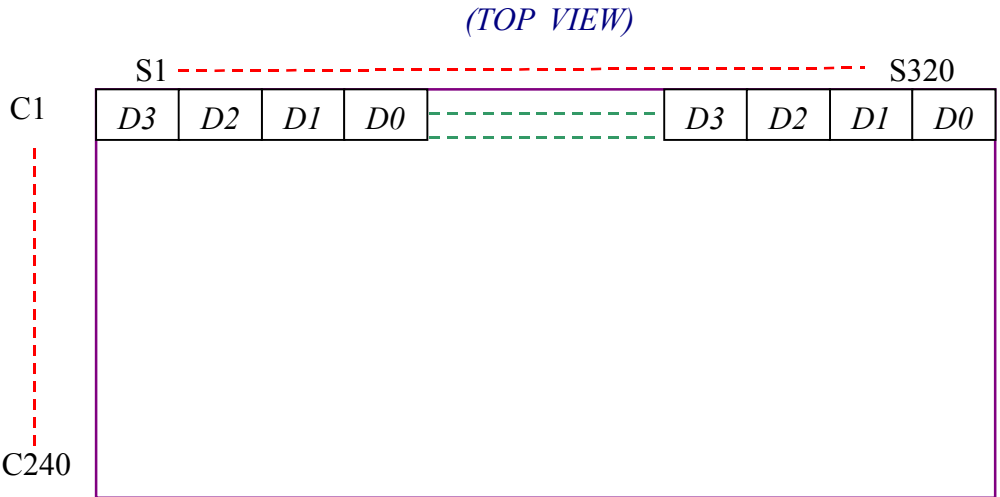
ITEM	SYMBOL	MIN	MAX	UNIT
LOAD PULSE WIDTH "H"	t_{WHCL1}	50	-----	ns
CP PULSE WIDTH	t_{HCL2}	50	-----	ns
CLOCK SET UP TIME	t_{SCL1}	80	-----	ns
CLOCK HOLD TIME	t_{HCL1}	80	-----	ns
CLOCK RISE/FALL TIME	$t_{r/f}$	-----	50	ns
DATA SET UP TIME	t_{DSU}	30	-----	ns
DATA HOLD TIME	t_{DH}	30	-----	ns
FLM DATA SET UP TIME	t_{FS}	100	-----	ns
FLM DATA HOLD TIME	t_{FH}	100	-----	ns
CLOCK CYCLE TIME	t_{CYC}	125	-----	ns



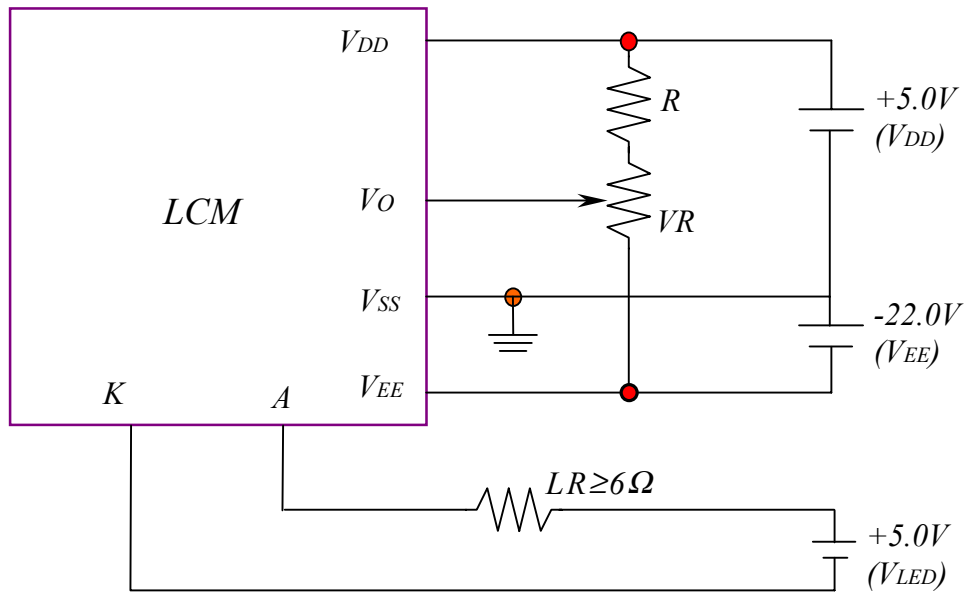
10.1 Interface timing chart



10.2 Comparison between display and data



11. Power supply for LCM



$V_{DD}-V_O$: LCD DRIVING VOLTAGE

V_R : $200K\Omega$

Power supply sequency

