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The LCD(M) Specialist

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PART NO. : PMGG2432C-SERIES

FOR MESSRS. :

CONTENTS

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08.03.06
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ACCEPTED BY : PROPOSED BY :

RECORD OF REVISION

DATE	PAGE	SUMMARY
2008/02/25	P.6	5. Modify the Electrical characteristics：VLCD：23.0V→21.5V
	P.7	6. Modify the Optical characteristics：VLCD：23.0V→21.5V
	P.9	8.1 Modify the Interface P/N 6 : M →N.C
	P.11	10. Modify the Interface timing chart

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

3.3 NUMBERING SYSTEM

PMGG2432C - | S | B | L | W | U |

(1) (2) (3) (4) (5)

(1).LCD TYPE :

"S" : STN TYPE

"F" : FSTN TYPE

(2).LCD COLOR :

"B" : BLUE(STN-NEGATIVE) / BLACK(FSTN-NEGATIVE)

"W" : WHITE(FSTN-POSITIVE)

(3).BACKLIGHT TYPE :

"L" : LED BACKLIGHT

(4).BACKLIGHT COLOR :

LED TYPE :

"nil"	: YELLOW-GREEN	"A"	: AMBER	"B"	: BLUE
"G"	: PURE GREEN	"O"	: ORANGE	"R"	: RED
"W"	: WHITE				

(5).VIEWING ANGLE :

"nil" : 6 O'CLOCK

"U" : 12 O'CLOCK

4. Mechanical data

(1) NUMBER OF DOTS ---------- 320 W * 240 H DOTS

(2) MODULE SIZE ---------- 92.1 W *83.3 H * 8.0 T (max) mm

(3) EFFECTIVE AREA ---------- 79.8 W *60.6 H (min) mm

(4) ACTIVE AREA ---------- 76.785 W *57.585 H mm

(5) DOT SIZE ---------- 0.225 W * 0.225 H mm

(6) DOT PITCH----------0.24 W * 0.24 H mm

5. Absolute maximum ratings

5.1 Electrical absolute maximum ratings

I T E M	SYMBOL	MIN.	MAX.	UNIT	COMMENT	
POWER SUPPLY FOR LOGIC	V_{DD}-V_{SS}	-0.3	7.0	V	------	
INPUT VOLTAGE	V_I	-0.3	V_{DD}+0.3	V	------	
STATIC ELECTRICITY	--------	------	100	V	NOTE (1)	
POWER SUPPLY FOR LCM	V_{EE}-V_{SS}	------	30.0	V	------	
POWER SUPPLY FOR LED	V_{LED}-V_{SS}	------	5.0	V	LED Color	Amber、Orange Yellow-Green、Red
		------	6.0	V		White、Blue、Pure Green

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 T E M	OPERATING		STORAGE		COMMENT
	MIN.	MAX.	MIN.	MAX.	
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℃.

NOTE (3): 1G = 9.8 m/s^2

6. Electrical characteristics

Ta = 25℃

ITEM	SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT
POWER SUPPLY VOLTAGE FOR CIRCUIT	V_{DD}-V_{SS}	------		2.7	------	5.5	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 FOR LOGIC, NOTE (2)	I_{DD}	V_{DD}-V_{SS}=3.3V ⚠1 V_{LCD}-V_{SS}=21.5V		------	------	1.2	mA
POWER SUPPLY CURRENT FOR LCD DRIVING, NOTE(2)	I_{LCD}	V_{DD}-V_{SS}=3.3V ⚠1 V_{LCD}-V_{SS}=21.5V		------	------	3.0	mA
RECOMMENDED LCD DRIVING VOLTAGE,NOTE(3)	V_{LCD} -V_{SS}	DUTY =1/240 Φ=10° NOTE(4)	Ta=-20°C	------	------	------	V
			Ta= 25°C	------	⚠1 (21.5)	------	V
			Ta= 70°C	------	------	------	V
POWER SUPPLY VOLTAGE FOR LCM	V_{EE} -V_{SS}	------		------	(25.0)	------	V
FRAME FREQUENCY, NOTE (5)	FLM	------		70	------	120	Hz
POWER SUPPLY CURRENT FOR LED	I_{LED}	V_{LED}=4.0V,NOTE(6)		------	120	160	mA
		V_{LED}=4.8V,NOTE(6)		------			

NOTE(1)：$\overline{\text{DISPOFF}}$, FLM , CL1 , CL2 , D0~D3

⚠1 (2)：FLM = 75Hz , D0~D3=0,1,0,1……., V_{LCD}-V_{SS}=21.5V , Ta=25℃

(3)：RECOMMENDED LCD DRIVING VOLTAGE MAY FLUCTUATE ABOUT ± 0.5V BY EACH MODULE.

(4): θ= 0° ： VIEWING ANGLE AT 6 O'CLOCK

θ= 180° ： VIEWING ANGLE AT 12 O'CLOCK

(5)：NEED TO MAKE SURE OF FLICKING AND RIPPING OF DISPLAY WHEN SETTING THE FRAME FREQUENCY IN YOUR SET .

(6)：

TYPE	V_{LED}	LED COLOR
A	4.0 V	WHITE、BLUE、PURE GREEN
B	4.8 V	AMBER、YELLOW-GREEN、ORANGE、RED

7. Optical characteristics

STN TYPE LCD

Ta = 25℃ V_{LCD}-V_{SS} =21.5V ⚠1

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING ANGLE	Φ2-Φ1	K = 2.0 NOTE(1)	30	40	----	deg.	NOTE(2)
CONTRAST RATIO	K	Φ = 10° NOTE(1)	3.0	4.0	----	----	
RESPONSE TIME	tr (rise)	Φ = 10° NOTE(1)	----	200	350	ms	
	tf (fall)	Φ = 10° NOTE(1)	----	300	400	ms	

FSTN TYPE LCD

Ta = 25℃ V_{LCD} -V_{SS} =21.5V ⚠1

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING ANGLE	Φ2-Φ1	K = 2.0 NOTE(1)	30	40	----	deg.	NOTE(2)
CONTRAST RATIO	K	Φ = 10° NOTE(1)	4.0	5.0	----	----	
RESPONSE TIME	tr (rise)	Φ = 10° NOTE(1)	----	200	350	ms	
	tf (fall)	Φ = 10° NOTE(1)	----	300	400	ms	

7.1 Brightness for backlight

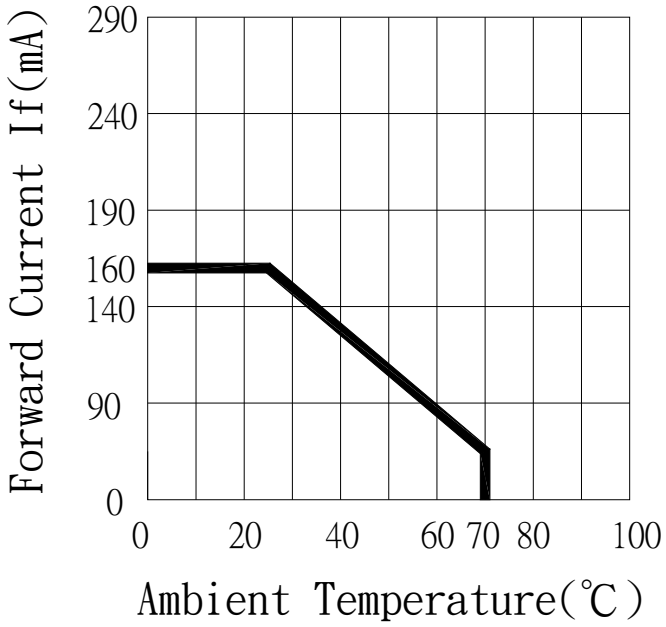
SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	B.L COLOR	NOTE
B	Φ = 0° θ = 0° I_{LED}=120mA STN/FSTN NEGATIVE	Dots all on	110	150	------	cd/m^2	WHITE、BLUE、PURE GREEN NOTE(4)	NOTE(2) NOTE(3)
		Dots all off	40	55	------			
	Φ = 0° θ = 0° I_{LED}=120mA STN/FSTN POSITIVE	Dots all off	4	-----	------			
	Φ = 0° θ = 0° I_{LED}=60mA	Dots all off	3	-----	-----		YELLOW-GREEN、RED、ORANGE、AMBER NOTE(5)	

Note (1)：θ= 0° WHEN VIEWING ANGLE AT 6 O'CLOCK
θ= 180° WHEN VIEWING ANGLE AT 12 O'CLOCK
(2)：SEE CUSTOMER ACCEPTANCE STANDARD SPECIFICATION FOR DEFINITION OF OPTICAL CHARACTERISTICS.

(3)：UNDER NORMAL TEMPERATURE AND HUMIDITY IN A DARK ROOM.

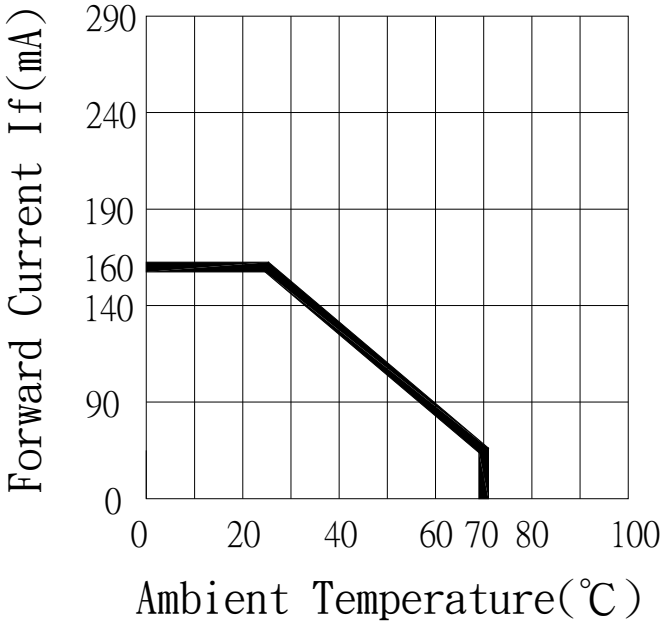
(4)：CURRENT REDUCTION RATE OF LED BACKLIGHT IS ACCORDING TO THE GRAPH INDICATED BELOW：

Forward Current Derating Curve

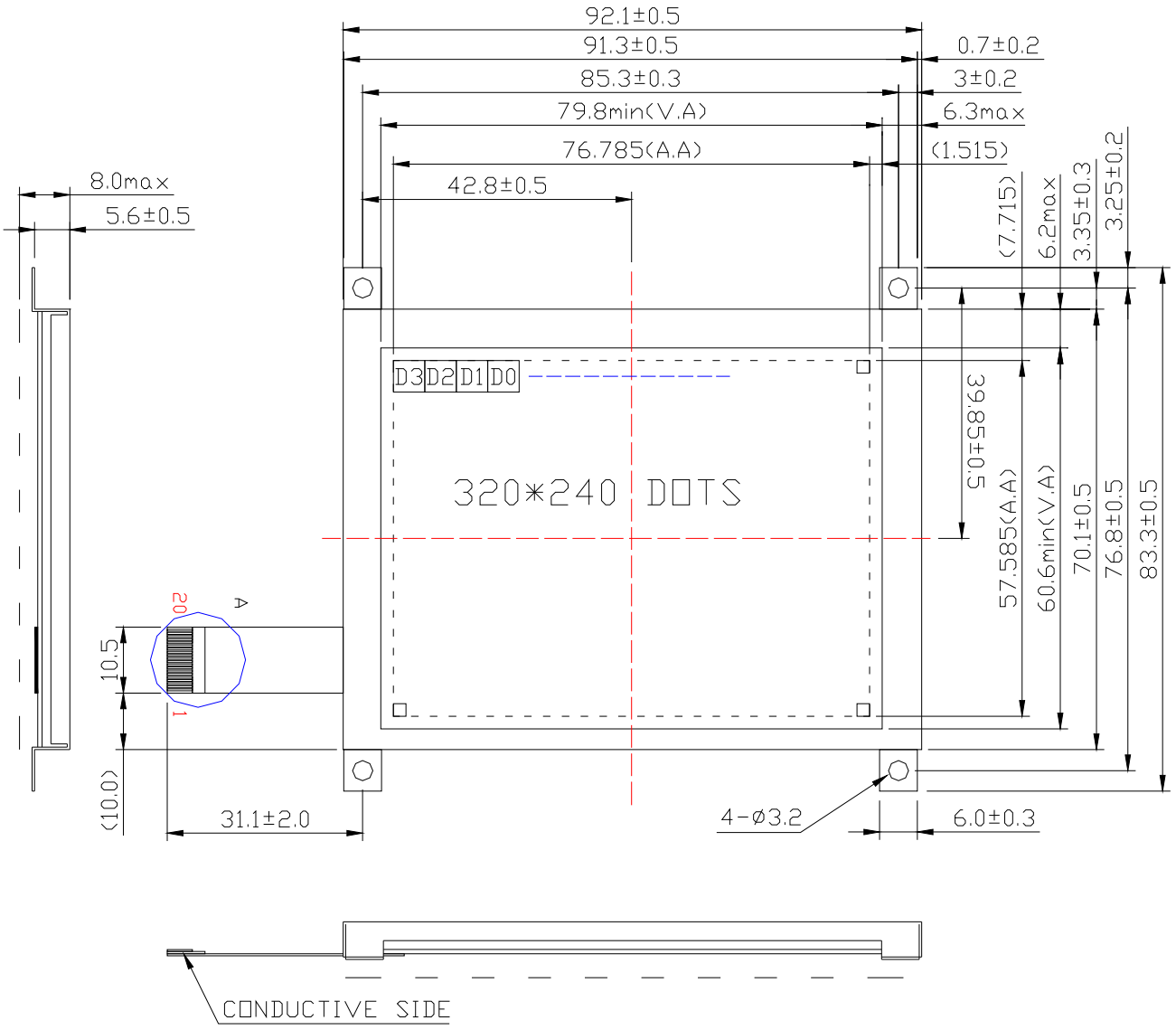


(5)：CURRENT REDUCTION RATE OF LED BACKLIGHT IS ACCORDING TO THE GRAPH INDICATED BELOW：

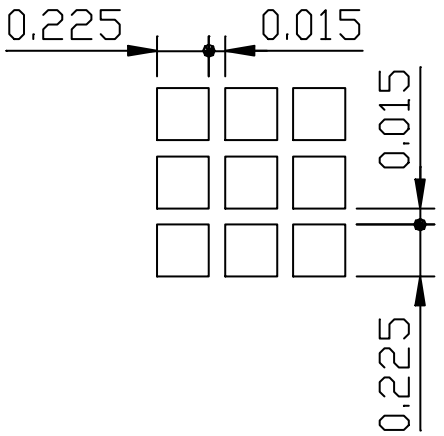
Forward Current Derating Curve



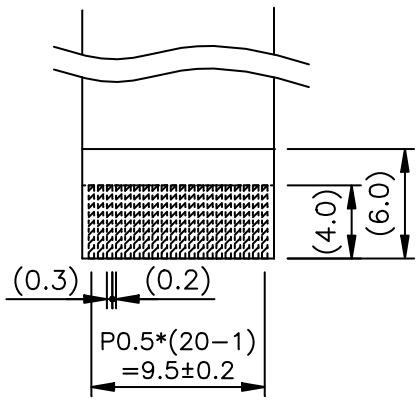
8. Outline dimension



(a)Dot size:



(b)Detail of A:



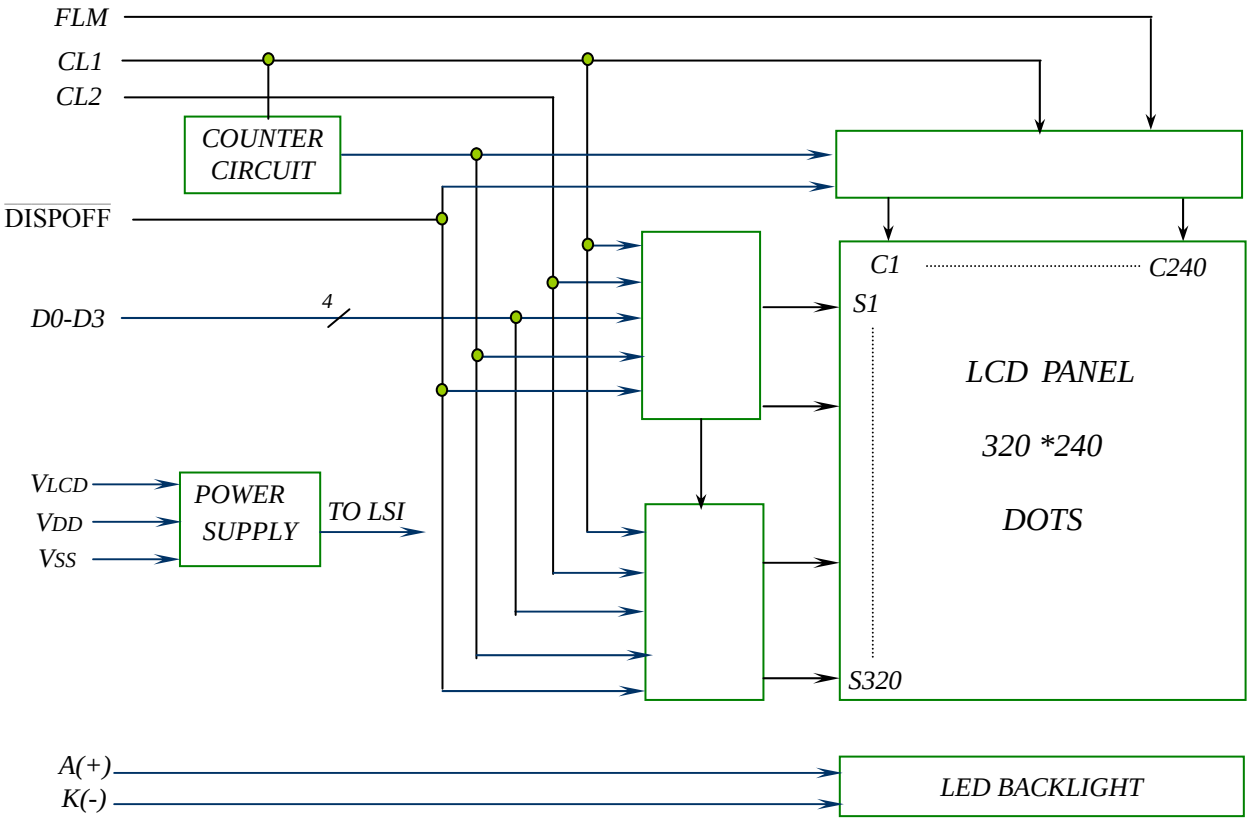
Note:
1.SCALE:NTS
2.UNIT:mm

8.1 Interface

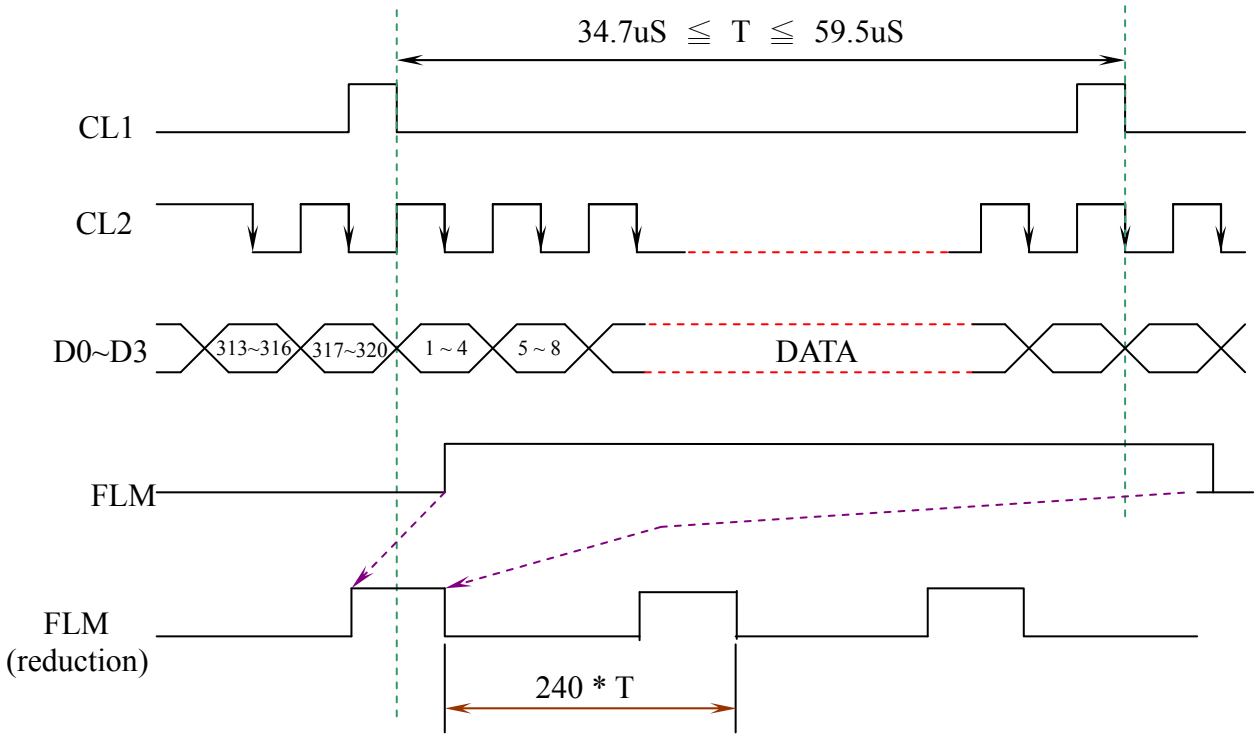
Pin Assignment

PIN NO.	SYMBOL	FUNCTION
1	V_{DD}	POWER SUPPLY FOR LOGIC
2	F.G	FRAME GROUND
3	V_{LCD}	POWER SUPPLY FOR LCD (+V)
4	FLM	FRAME SIGNAL
5	$\overline{\text{DISP OFF}}$	H:DISPLAY ON,L:DISPLAY OFF
⚠1 6	N.C	NO CONNECTION
7	CL1	DATA LATCH CLOCK SIGNAL
8	CL2	DATA SHIFT CLOCK SIGNAL
9	V_{SS}	GND
10	D0	DATA INPUT SIGNAL
11	D1	DATA INPUT SIGNAL
12	D2	DATA INPUT SIGNAL
13	D3	DATA INPUT SIGNAL
14	V_{SS}	GND
15	A(+)	POWER SUPPLY FOR LED (+)
16	K(-)	POWER SUPPLY FOR LED (-)
17	N.C	NO CONNECTION
18	N.C	NO CONNECTION
19	N.C	NO CONNECTION
20	N.C	NO CONNECTION

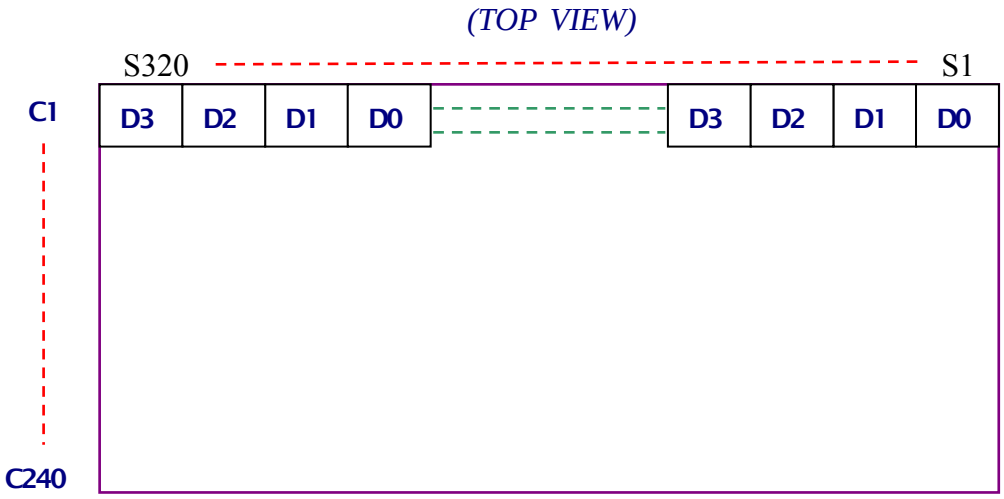
9. Block diagram



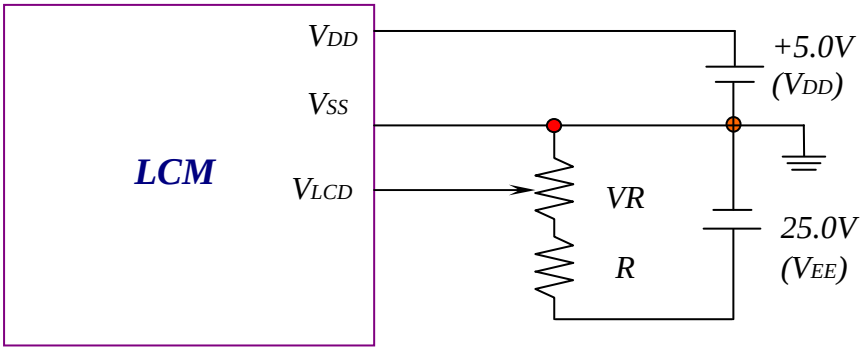
10. Interface timing chart



10.2 Comparison between display and data



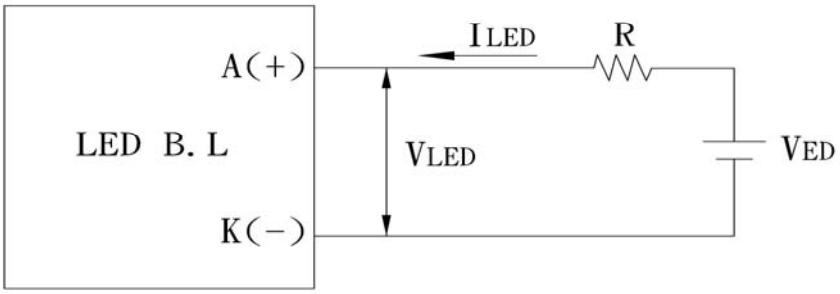
11. Power supply for LCM



VLCD-VSS: LCD DRIVING VOLTAGE

VR: 200 KΩ

11.1 Power supply for backlight



R≧(VED-VLED) / ILED

TYPE	VLED	ILED (max)	THE VALUE OF R
A	4.0 V	160 mA	WHITE、BLUE、PURE GREEN
B	4.8 V		AMBER、YELLOW-GREEN、ORANGE、RED

11.2 Power supply sequency