

AZ Displays, Inc.

1. MECHANICAL DATA

(1) Product No.	AGM6420A
(2) Module Size	210.6 (W)mm x 89.9 (H)mm x MAX2.8 (D)mm
(3) Dot Size	0.24 (W)mm x 0.30 (H)mm
(4) Dot Pitch	0.27 (W)mm x 0.33 (H)mm
(5) Number of Dots	640 (W) x 200 (H)Dots
(6) Duty	1/200
(7) LCD Display Mode	FSTN: Black and White(Normal White/Positive Image)
(8) Viewing Direction	<input type="checkbox"/> 6 O'clock <input type="checkbox"/> 12 O'clock <input type="checkbox"/> ___O'clock
(9) Weight	101.5 g

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2. ABSOLUTE MAXIMUM RATINGS

(1) ELECTRICAL ABSOLUTE RATINGS

ITEM	SYMBOL	MIN	MAX	UNIT	COMMENT
Power Supply for Logic	VDD-VSS	-0.3	6.5	V	
Power Supply for LCM	VDD-VEE	0	30	V	
Static Electricity	-	-	-	-	Note 1

Note 1 LCM should be grounded during handling

(2) ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE	
	MIN.	MAX.	MIN.	MAX.
Ambient Temperature	0	50	-20	70
Humidity (Without condensation)	Note 1		Note 2	

Note 1 $T_a \leq 50^\circ\text{C}$: 85%RH max

$T_a > 50^\circ\text{C}$: Absolute humidity must be lower

than the humidity of 85%RH at 50°C

Note 2 T_a at -20°C will be $< 48\text{hrs}$, at 70°C will be $< 120\text{hrs}$

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3. ELECTRICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	
Logic Circuit Power Supply	VDD-VSS	-	4.75	5.0	5.25	V	
LCD Driver Power Supply	VDD-VEE	VDD = 5V 1/13 Bias	0°C	20.9	21.7	22.5	V
			25°C	19.2	20.2	21.0	
			50°C	17.4	18.4	19.2	
Input Voltage	VIH	H level	0.8VDD	-	VDD	V	
	VIL	L level	GND	-	0.2VDD	V	
Supply Current for Logic	IDD	VDD = 5.0V	-	-	6.0	mA	
Supply Current for LCD	IEE	VDD-VEE=20.2V	-	-	5.0	mA	

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4. OPTICAL CHARACTERISTICS

AT Vop

ITEM MODE		Cr(Contrast Ratio)		θ (Viewing Angle)		ϕ (Viewing Angle)	
		25℃		25℃		25℃	
		MIN.	TYP.	MIN.	TYP.	MIN.	TYP.
R	J	4	8	—	50	—	40
NOTE		NOTE6		NOTE5			

AT $\phi=0^\circ$ $\theta=0^\circ$

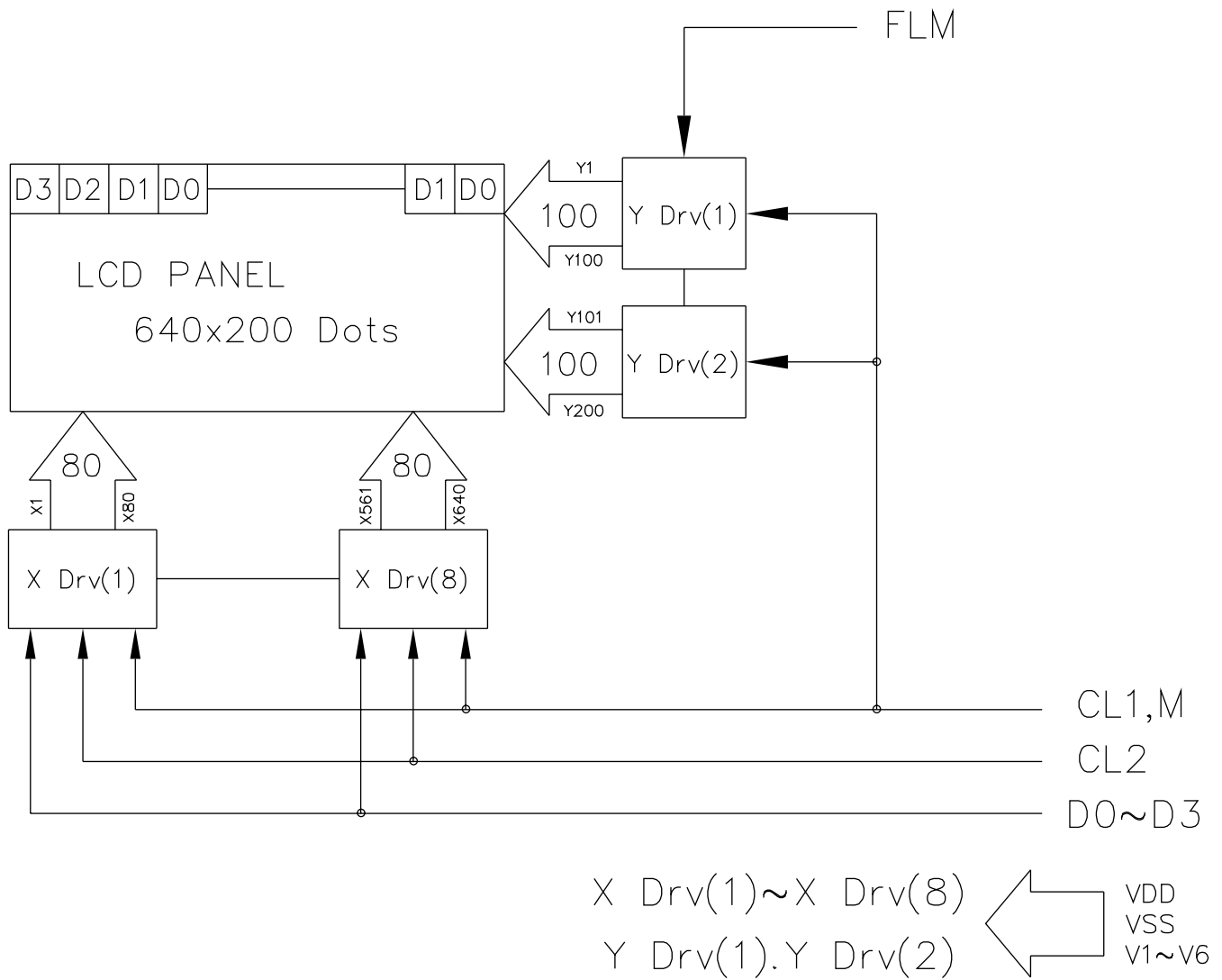
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Response Time (rise)	Tr	0℃	—	—	—	ms	NOTE 2
		25℃	—	130	260		
		50℃	—	—	—		
Response Time (fall)	Tr	0℃	—	—	—	ms	NOTE 2
		25℃	—	220	440		
		50℃	—	—	—		

NOTE :

R: REFLECTIVE
J: NORMALLY WHITE

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5. BLOCK DIAGRAM



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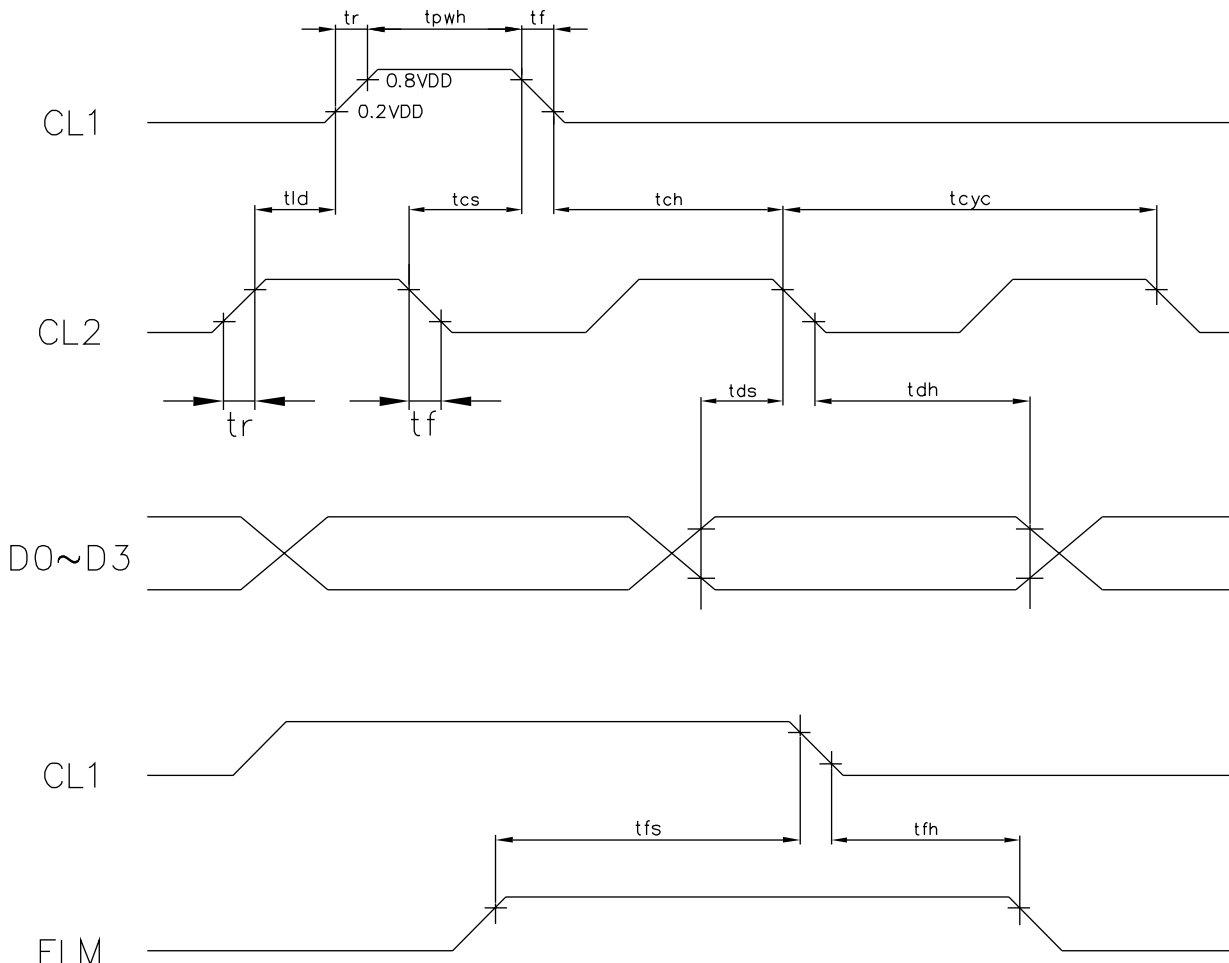
6. INTERNAL PIN CONNECTION

Pin No.	Symbol	Function	Level
1	VDD	Power supply for logic (+5V)	
2	VSS	Power supply (GND)	
3	FLM	First line marker	H
4	CL1	Display data latch clock	H → L
5	CL2	Display data shift clock	H → L
6	M	Control signal for AC driving	H/L
7	D0	Display data	H/L
8	D1	Display data	H/L
9	D2	Display data	H/L
10	D3	Display data	H/L
11	V1	Power supply for LCD(COM,SEG selected level)	
12	V2	Power supply for LCD(COM non-selected level)	
13	V3	Power supply for LCD(SEG non-selected level)	
14	V4	Power supply for LCD(SEG non-selected level)	
15	V5	Power supply for LCD(COM non-selected level)	
16	V6	Power supply for LCD(COM,SEG selected level)	

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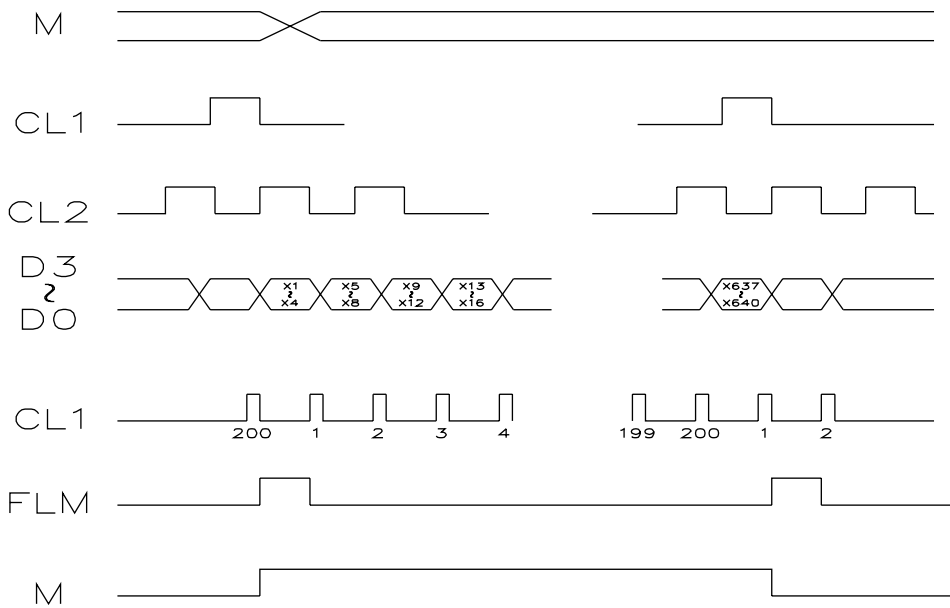
7. TIMING CHARACTERISTICS

Item	Symbol	Min.	Typ.	Max.	Unit
Clock cycle time	tcyc	160	—	—	ns
High-level pulse width	tpwh	125	—	—	ns
Latch delay time	tld	80	—	—	ns
Clock setup time	tcs	80	—	—	ns
Clock hold time	tch	120	—	—	ns
Rise and fall time	tr,tf	—	—	30	ns
Data setup time	tds	60	—	—	ns
Data hold time	tdh	60	—	—	ns
FLM setup time	tfs	100	—	—	ns
FLM hold time	tfh	100	—	—	ns

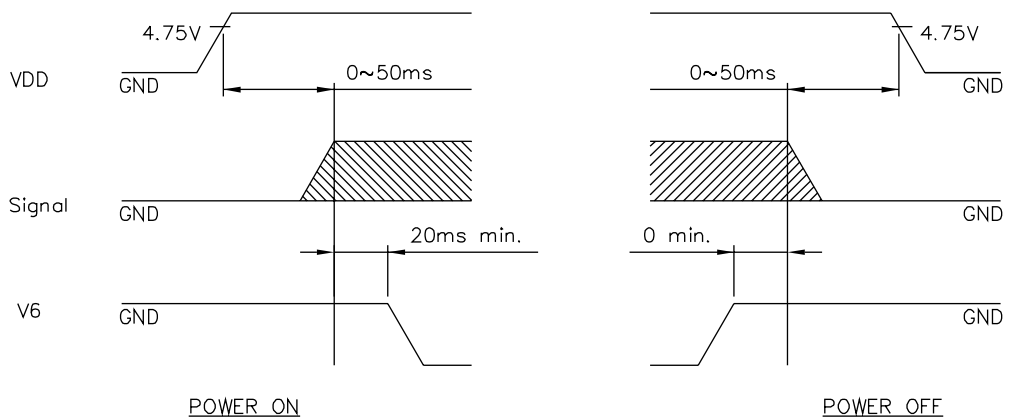


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7-1. INTERFACE TIMING CHART



7-2. POWER ON/OFF TIMING



1. Power on sequence:

The power on/off sequence is very important for the LCM. Please follow the power on/off sequence as stated:

power on: VDD, VSS -> Signal -> V6 -> V1~V5

power off: V1~V5 -> V6 -> Signal -> VSS, VDD

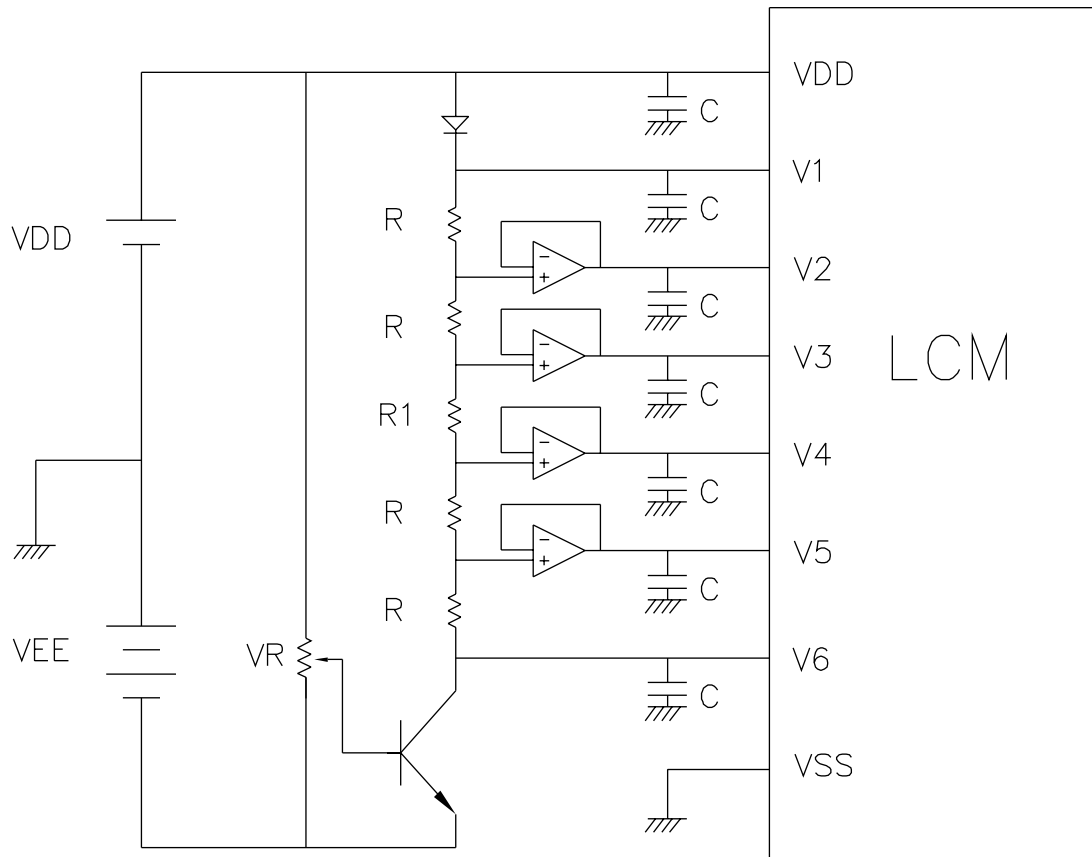
If this proper sequence is not followed, the drivers of the LCM may become damaged.

2. LCM connection

It is suggested that VSS never be shorted with V4~V6. If they are shorted, the drivers of the LCM may become damaged.

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8. POWER SUPPLY



$$R1 = 9R \sim 11R$$

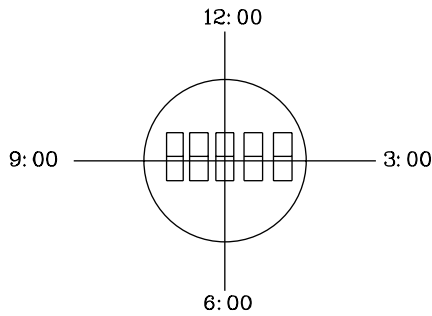
$$C = 3.3\mu\text{F}$$

$$VR = 10\text{K} \sim 20\text{K}$$

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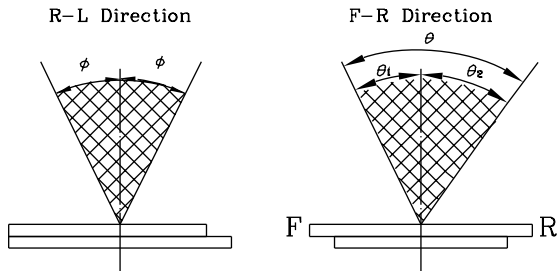
(NOTE 4)

Definition of Viewing Direction



(NOTE 5)

Definition of Viewing Angle



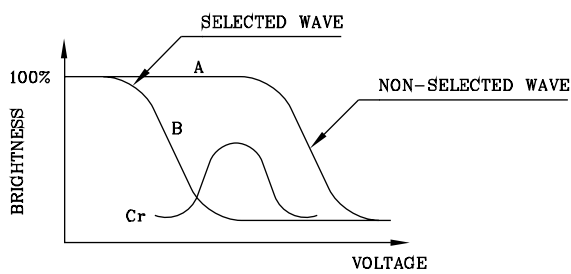
$$\theta = \theta_1 + \theta_2$$

*Conditions

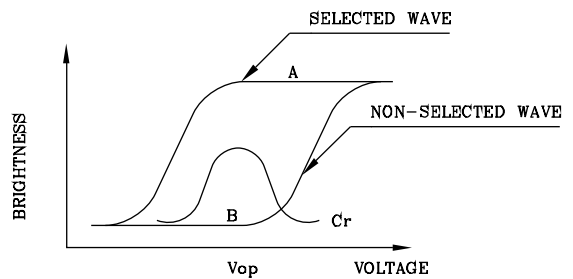
- Operating Voltage : Vop
- Frame Frequency : 70Hz
- Applying Waveform : 1/N duty 1/a bias
- Contrast Ratio : larger than 2

(NOTE 6)

Definition of Contrast Ratio (Cr)



(positive type)

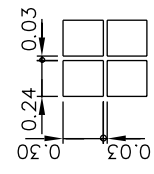
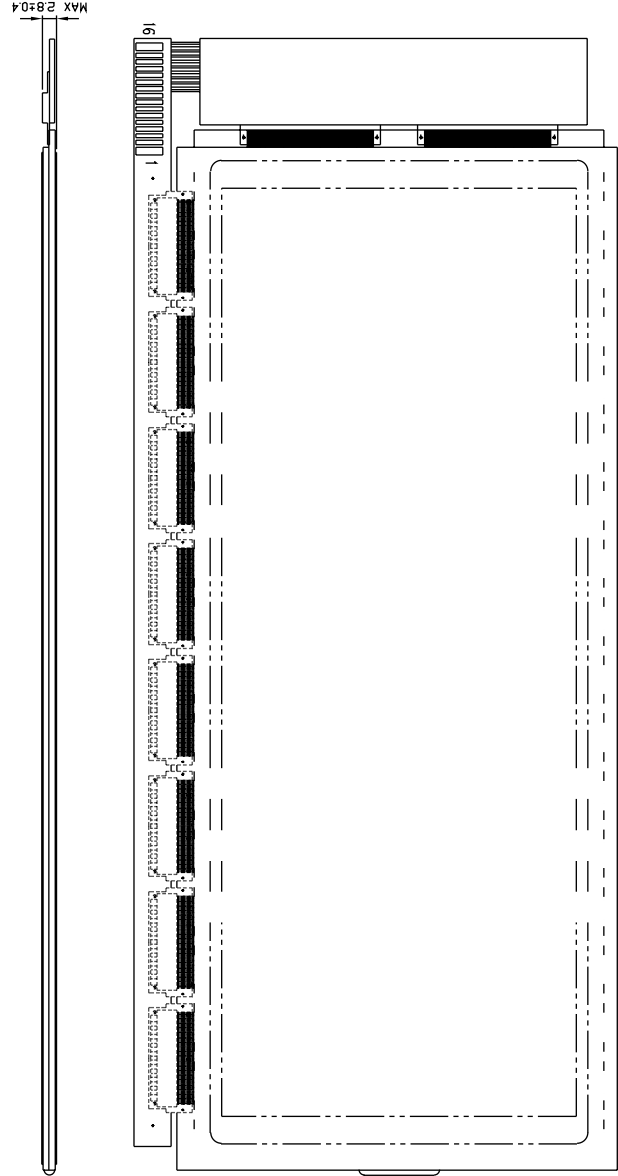
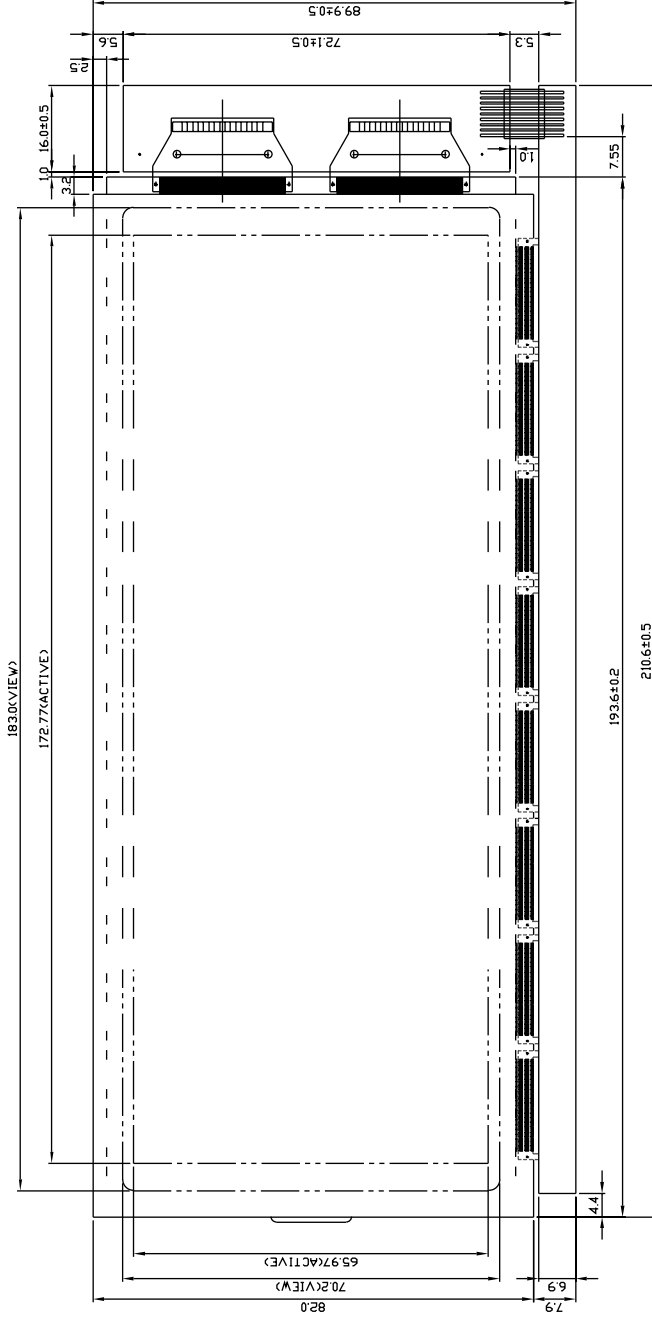


(negative type)

$$\text{Contrast Ratio : } Cr = A/B$$

*Conditions

- Viewing Angle : 0
- Frame Frequency : 70Hz
- Applying Waveform : 1/N duty 1/a bias



640x200 DOTS

Pin No.	Symbol	Function	Level
1	VDD	Power supply for logic (+5V)	
2	VSS	Power supply (GND)	
3	FLM	First line marker	H
4	CL1	Display data latch clock	H → L
5	CL2	Display data shift clock	H → L
6	M	Control signal for AC driving	H/L
7	DO	Display data	H/L
8	D1	Display data	H/L
9	D2	Display data	H/L
10	D3	Display data	H/L
11	V1	Power supply for LCD(COM/SEG selected level)	
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14	V4	Power supply for LCD(SEG non-selected level)	
15	V5	Power supply for LCD(COM non-selected level)	
16	V6	Power supply for LCD(COM/SEG selected level)	

AGM6420A		AZ DISPLAYS, INC.	
APPROVE	NAME	TITLE	
CHECK	DATE	DWG-NO	TA-R023X
DESIGN		UNIT	mm
DRAW	MAY PING 84.08.07	THIRD ANGLE PROJECT	SCALE : 2/3
		Rev.A	