

# AZ Displays, Inc.

## 1. MECHANICAL DATA

(1) Product No.	<b>AGM6420A</b>
(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

# AZ Displays, Inc.

## 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  $50^\circ\text{C}$

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

# AZ Displays, Inc.

## 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	

# AZ Displays, Inc.

## 4. OPTICAL CHARACTERISTICS

AT Vop

ITEM		Cr(Contrast Ratio)		$\theta$ (Viewing Angle)		$\phi$ (Viewing Angle)	
		25℃		25℃		25℃	
MODE		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℃	—	—	—		

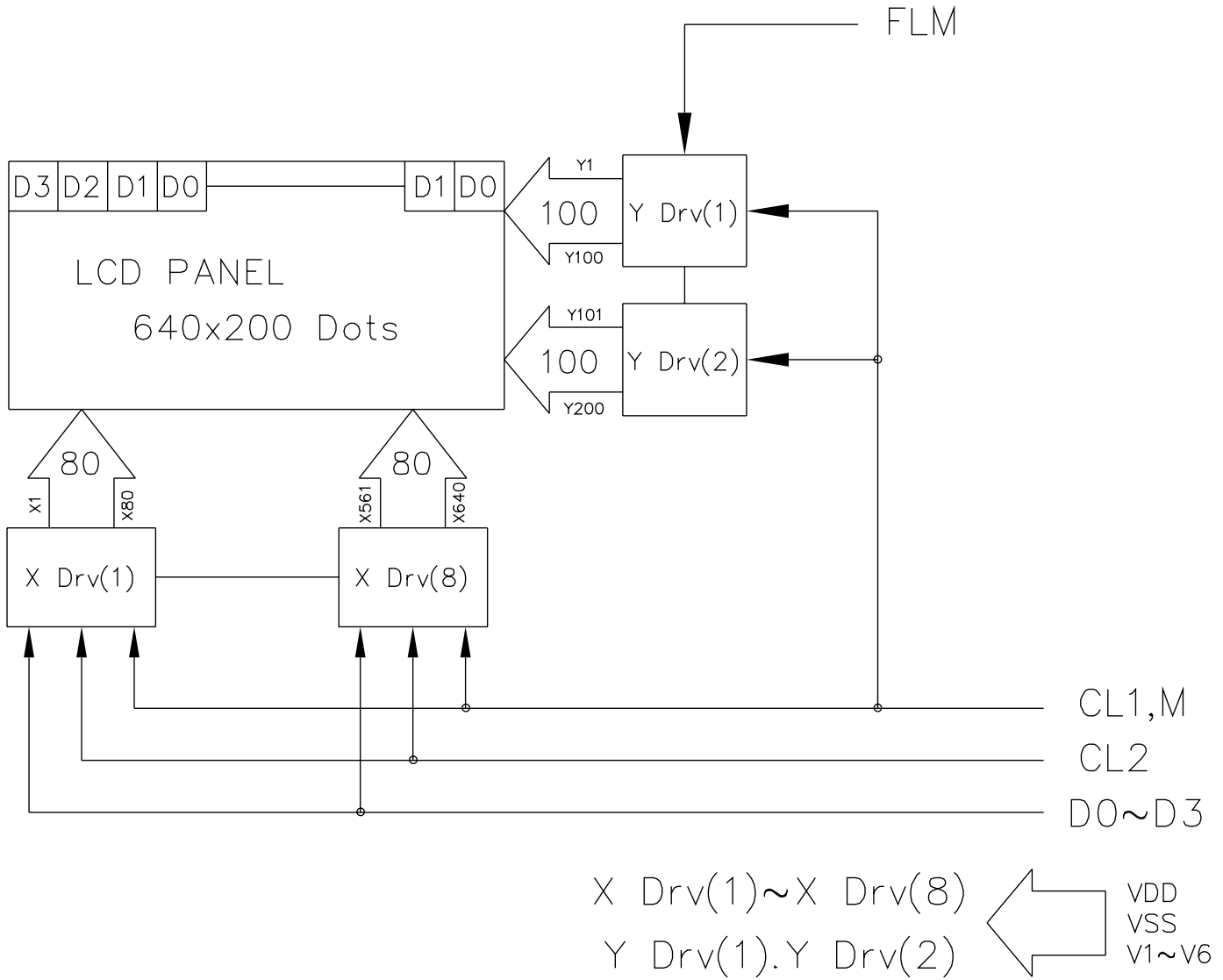
NOTE :

R: REFLECTIVE

J: NORMALLY WHITE

# AZ Displays, Inc.

## 5. BLOCK DIAGRAM



# AZ Displays, Inc.

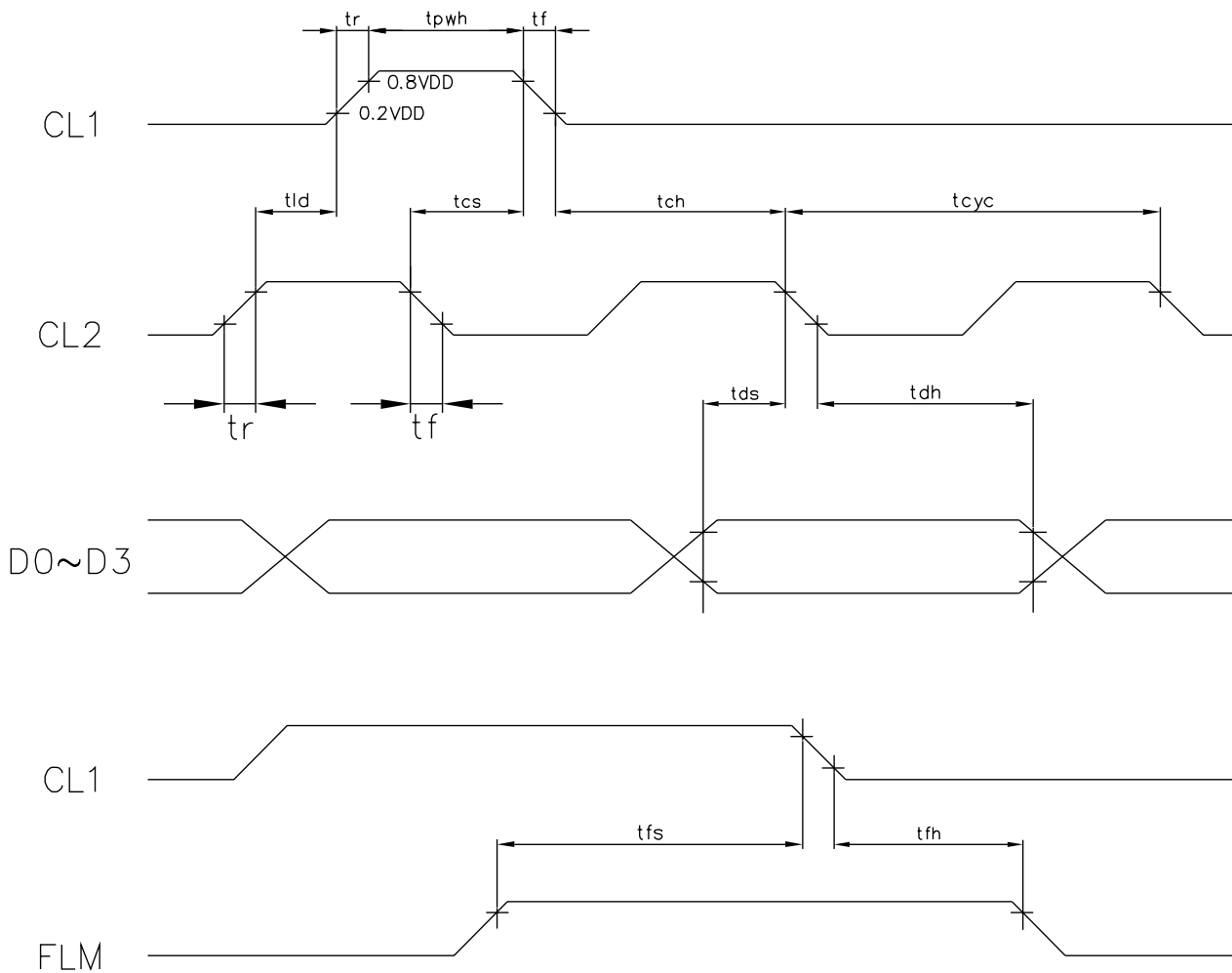
## 6. INTERNAL PIN CONNECTION

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)	

# AZ Displays, Inc.

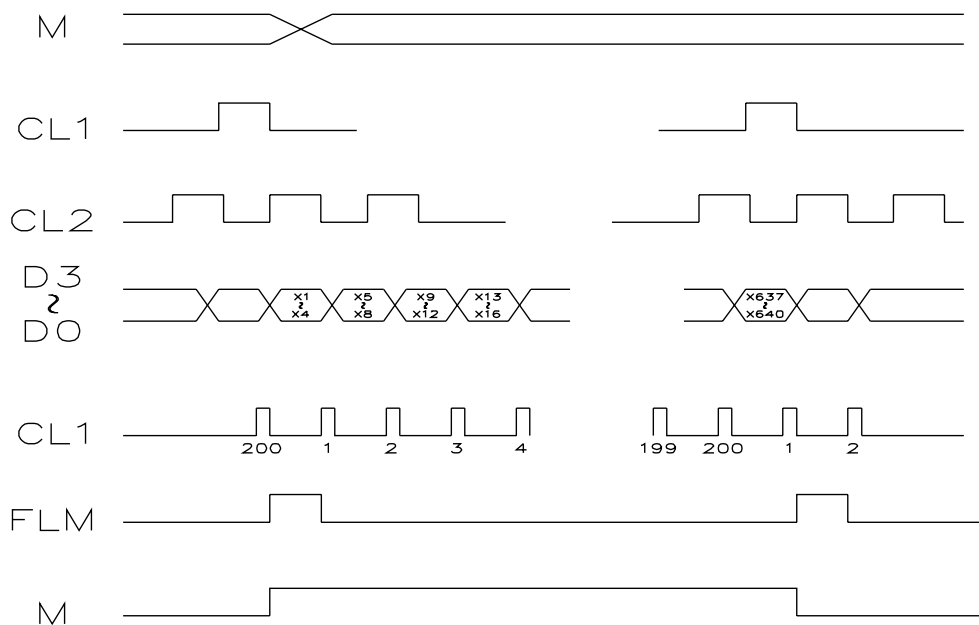
## 7. TIMING CHARACTERISTICS

Item	Symbol	Min.	Typ.	Max.	Unit
Clock cycle time	$t_{cyc}$	160	—	—	ns
High-level pulse width	$t_{pwh}$	125	—	—	ns
Latch delay time	$t_{ld}$	80	—	—	ns
Clock setup time	$t_{cs}$	80	—	—	ns
Clock hold time	$t_{ch}$	120	—	—	ns
Rise and fall time	$t_r, t_f$	—	—	30	ns
Data setup time	$t_{ds}$	60	—	—	ns
Data hold time	$t_{dh}$	60	—	—	ns
FLM setup time	$t_{fs}$	100	—	—	ns
FLM hold time	$t_{fh}$	100	—	—	ns

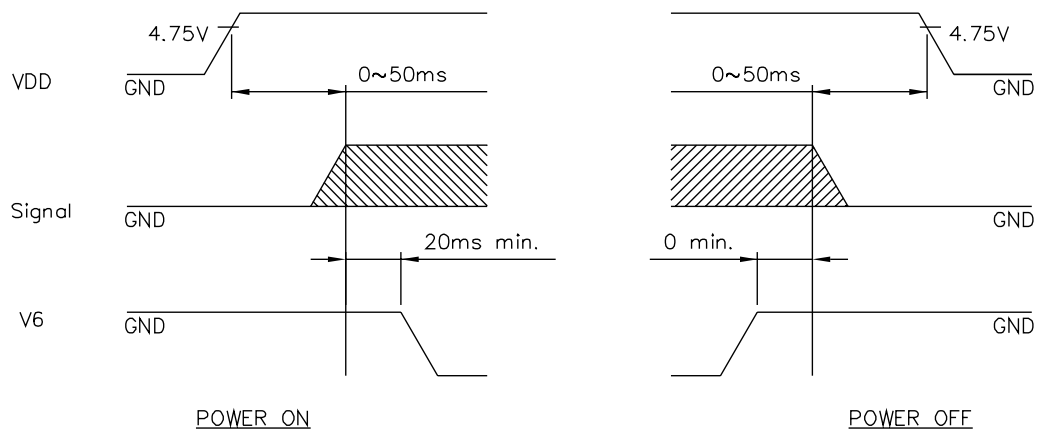


# AZ Displays, Inc.

## 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.

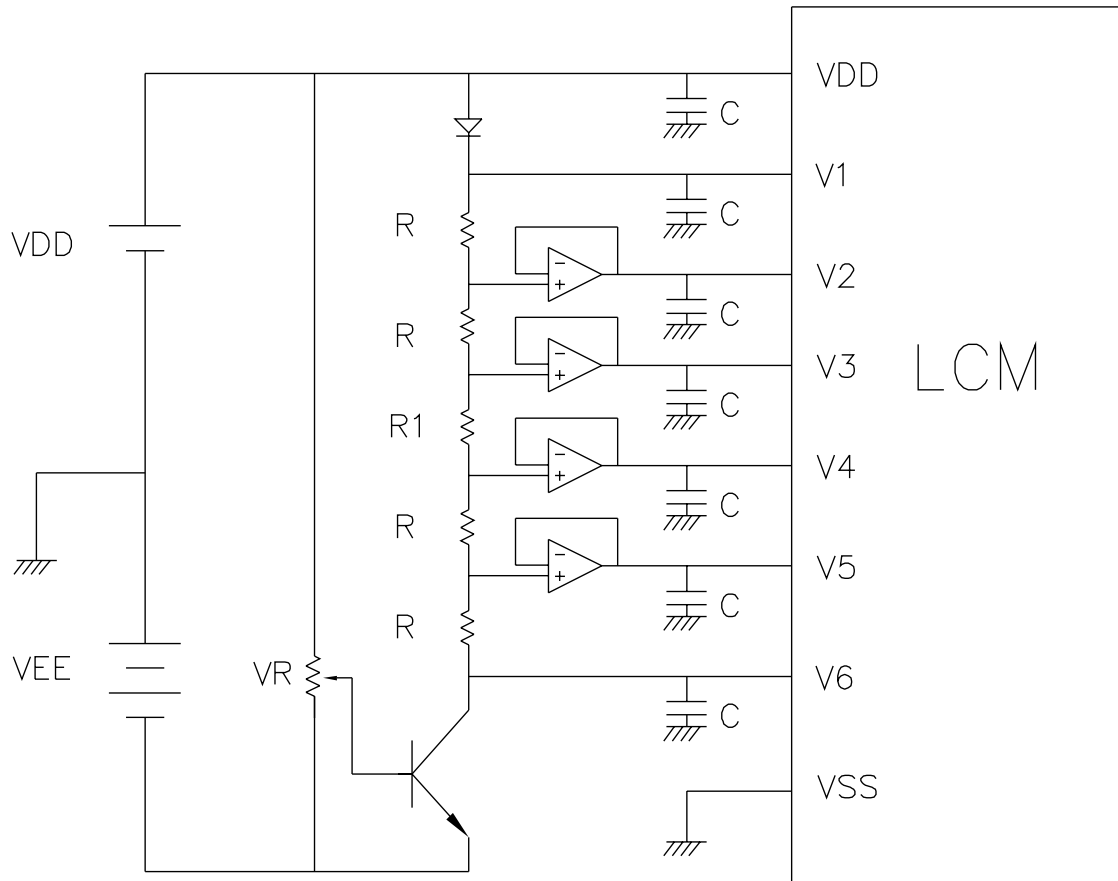
### 2. LCM connection

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



# AZ Displays, Inc.

## 8. POWER SUPPLY



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

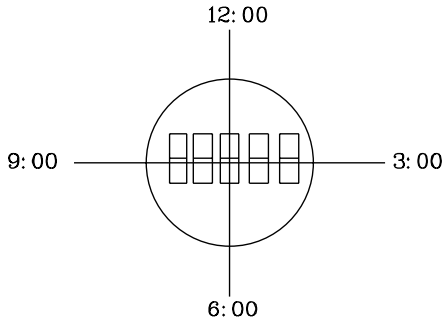
$$C = 3.3\mu F$$

$$VR = 10K \sim 20K$$

# AZ Displays, Inc.

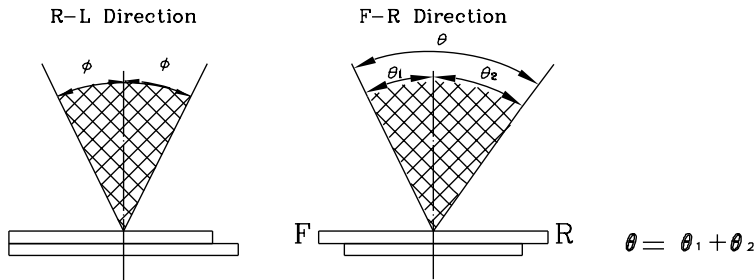
(NOTE 4)

Definition of Viewing Direction



(NOTE 5)

Definition of Viewing Angle

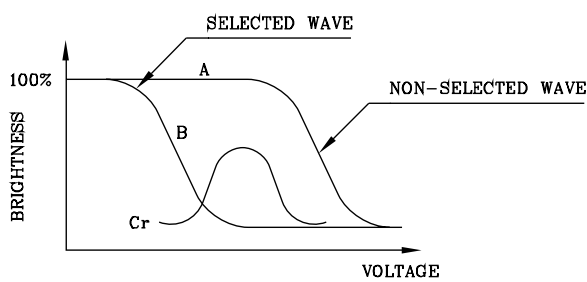


\*Conditions

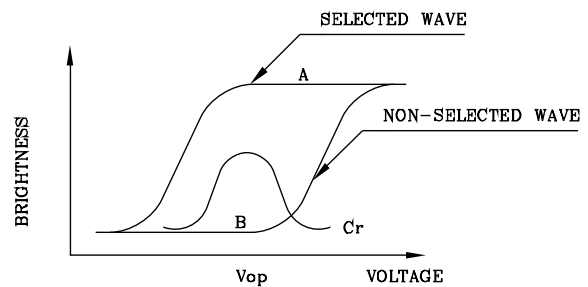
- Operating Voltage :  $V_{op}$
- Frame Frequency : 70Hz
- Applying Waveform : 1/N duty 1/a bias
- Contrast Ratio : larger than 2

(NOTE 6)

Definition of Contrast Ratio (Cr)



(positive type)



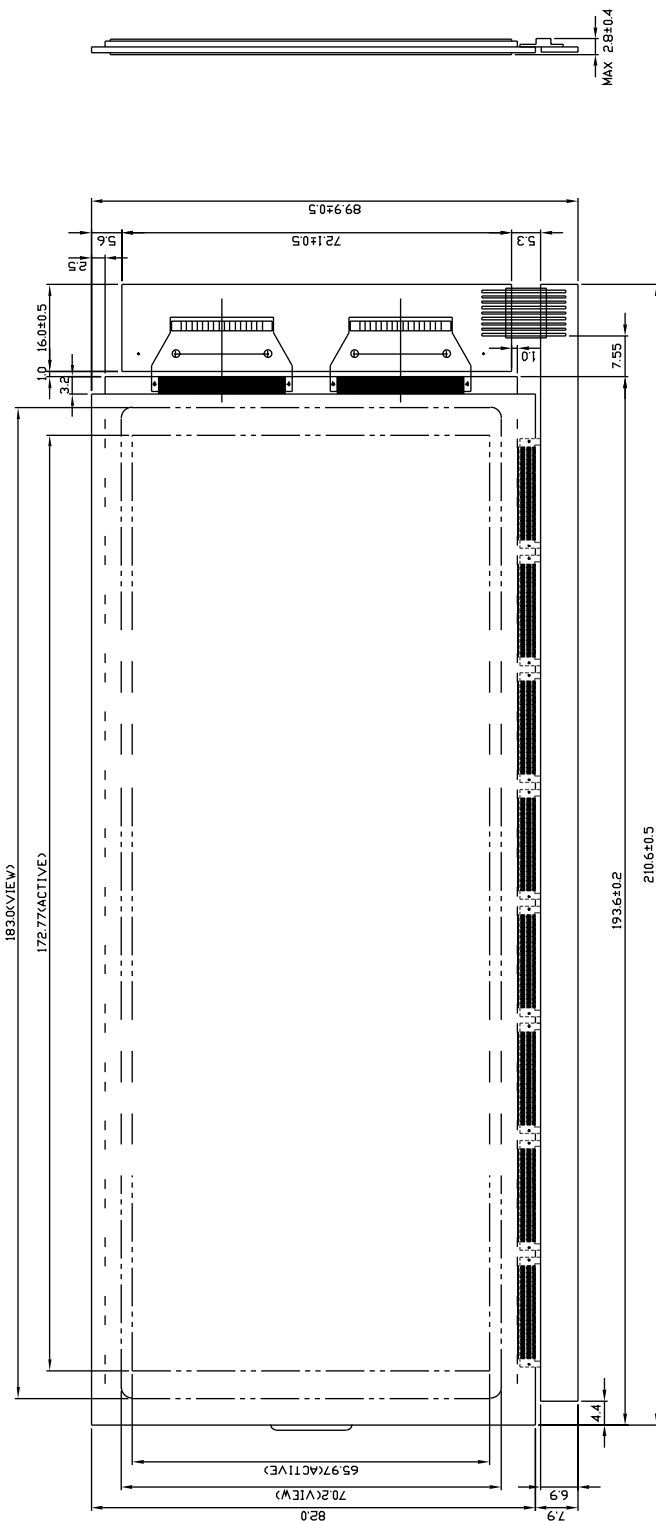
(negative type)

Contrast Ratio :  $Cr=A/B$

\*Conditions

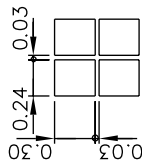
- Viewing Angle : 0
- Frame Frequency : 70Hz
- Applying Waveform : 1/N duty 1/a bias

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)	
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)	

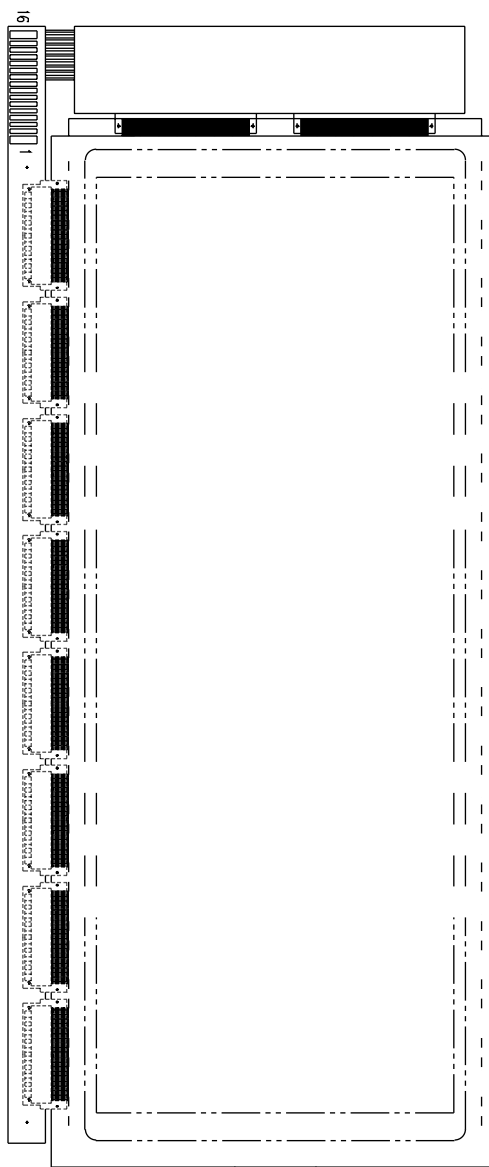


MAX 28±0.4

MAX 28±0.4



640x200 DOTS



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