

# AZ Displays, Inc.

## 1. MECHANICAL DATA

(1) Product No.	<b>AGM4832B</b>
(2) Module Size	148.2 (W)mm x 101.5 (H)mm x MAX 6.0 (D)mm
(3) Dot Size	0.22 (W)mm x 0.22 (H)mm
(4) Dot Pitch	0.24 (W)mm x 0.24 (H)mm
(5) Number of Dots	480 (W) x 320 (H)Dots
(6) Duty	1/320
(7) LCD Display Mode	FSTN:Black and White (Normally 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	56g

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## 2. ABSOLUTE MAXIMUM RATINGS

### (1) ELECTRICAL ABSOLUTE RATINGS

VSS=0V

ITEM	SYMBOL	MIN	MAX	UNIT	COMMENT
Power Supply for Logic	VDD-VSS	-0.3	6.5	V	
Input Voltage	VI	-0.3	VDD	V	
Power Supply for LCD	VEE-VSS	-0.3	38.0	V	
Static Electricity	-	-	-	-	NOTE 1

NOTE 1 LCM should be grounded during handling

### (2) ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	NORMAL TEMP.			
	OPERATING		STORAGE	
	MIN.	MAX.	MIN.	MAX.
Ambient Temperature	0	50	-20	70
Humidity (Without Condensation)	Note 1,3		Note 2,3	

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  $< 120\text{hrs}$

NOTE 3 Background color changes slightly depending on ambient temperature.  
This phenomenon is reversible.

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## 3. ELECTRICAL CHARACTERISTICS

VDD=5V±10%

ITEM	SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT
Input Voltage	VIH	H level		0.8VDD	–	VDD	V
	VIO	L level		0	–	0.2VDD	V
Recommended LC Driving Voltage	VEE	1/320 Duty	0°C	–	28.8	30.0	V
			25°C	25.9	26.8	27.5	
		1/17.6 Bias	50°C	23.5	24.3	–	
Power Supply Current	IDD	VDD = 5.0V		–	2.0	–	mA
	IEE	VEE = 27.0V		–	3.0	–	mA

## 4. OPTICAL CHARACTERISTICS

AT Vop

ITEM MODE		Cr(Contrast Ratio)		$\theta$ (Viewing Angle)		$\phi$ (Viewing Angle)	
		25°C		25°C		25°C	
		MIN.	TYP.	MIN.	TYP.	MIN.	TYP.
R	J	3	5.5	30	50	20	30
NOTE		NOTE6		NOTE5			

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

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Response Time (rise)	Tr	0°C	–	500	1000	ms	NOTE 2
		25°C	–	150	300		
		50°C	–	85	170		
Response Time (fall)	Tf	0°C	–	700	1400	ms	NOTE 2
		25°C	–	280	500		
		50°C	–	120	240		

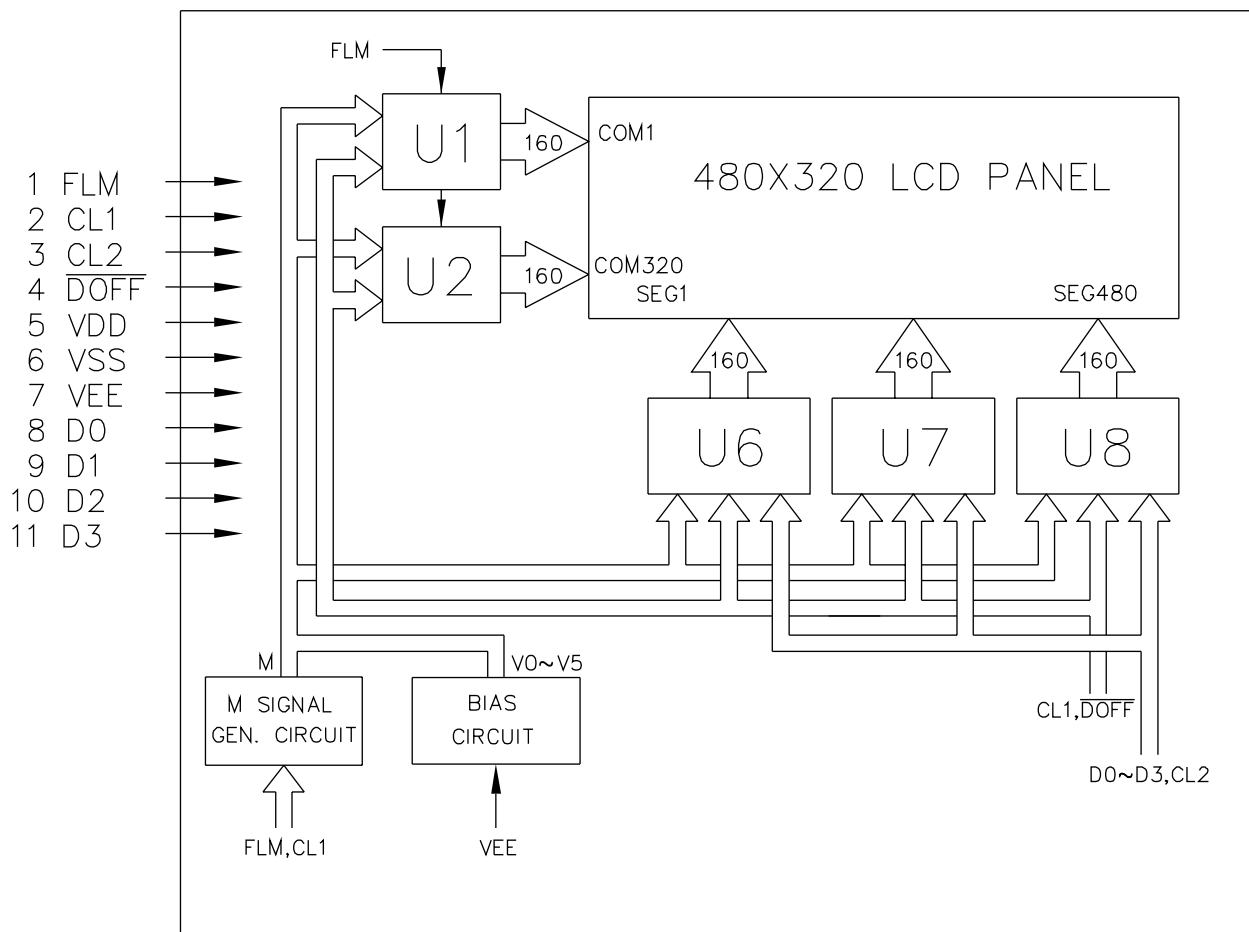
note:

R: REFLECTIVE

J: NORMALLY WHITE

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## 5. BLOCK DIAGRAM



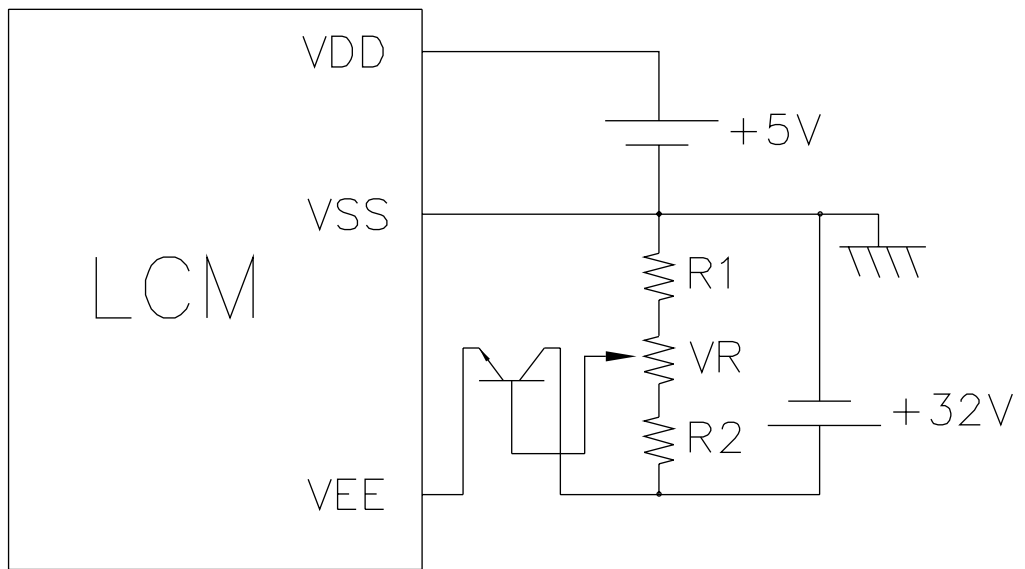
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## 6. INTERNAL PIN CONNECTION

Pin No.	Symbol	Level	Function	
1	FLM	H/L	FRAME SIGNAL	
2	CL1	H/L	DATA LATCH SIGNAL	
3	CL2	H/L	DATA SHIFT SIGNAL	
4	$\overline{\text{DOFF}}$	H/L	DISPLAY OFF CONTROL	
5	VDD	-	+5V	POWER SUPPLY
6	VSS	-	0V	
7	VEE	-	LCD DRIVING VOLTAGE	
8	D0	H/L	DATA BUS LINE	
9	D1	H/L		
10	D2	H/L		
11	D3	H/L		

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## 7. POWER SUPPLY



$$R1 + VR + R2 = 10 \sim 20K \Omega$$

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## 8. TIMING CHARACTERISTICS

### 8-1. INTERFACE TIMING

VDD=4.5~5.5V

Item	Symbol	Test condition	Min.	Typ.	Max.	Unit
Clock Cycle	tC	Fig a	125	-	-	ns
SCP Pulse Width	tSWH,tSWL	Fig.a	50	-	-	ns
Data Set Up Time	tDSU	Fig.a , Fig.b	80	-	-	ns
Data Hold Time	tDHD	Fig.a , Fig.b	50	-	-	ns
SCP Rise/Fall Time	tr,tf	Fig.a , Fig.b	-	-	50	ns
LP Rise Time	tLRP	Fig.a	50	-	-	ns
LP Fall Time	tLFP	Fig.a	50	-	-	ns
LP Pulse Width	tLW	Fig.a	45	-	-	ns
SCP To LP Delay Time	tSL	Fig.a	40	-	-	ns
LP To SCP Delay Time	tLS	Fig.a	40	-	-	ns
LP "H" Pluse Width	tCWH	Fig.b	30	-	-	ns
LP "L" Pluse Width	tCWL	Fig.b	195	-	-	ns

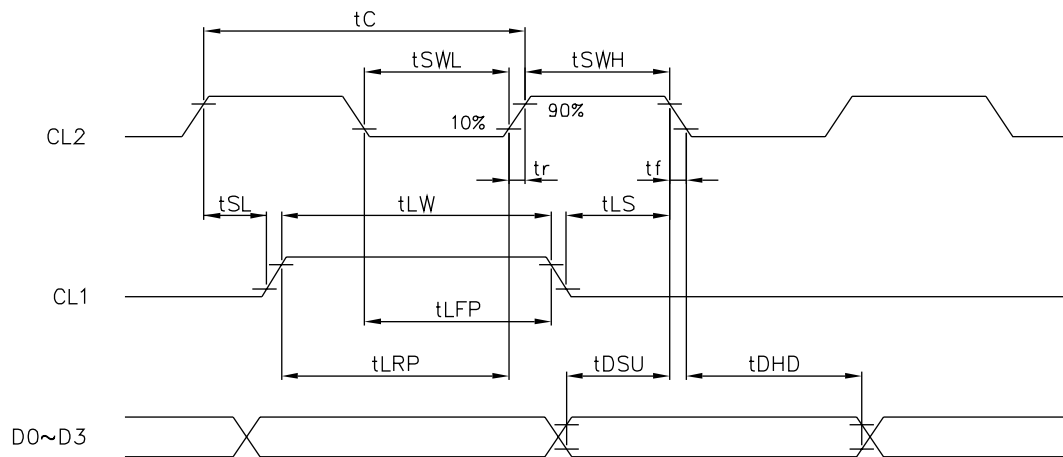


Fig . a Interface timing (SEGMENT)

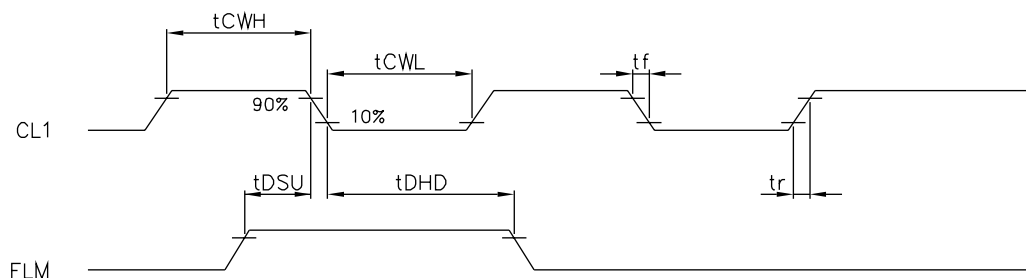
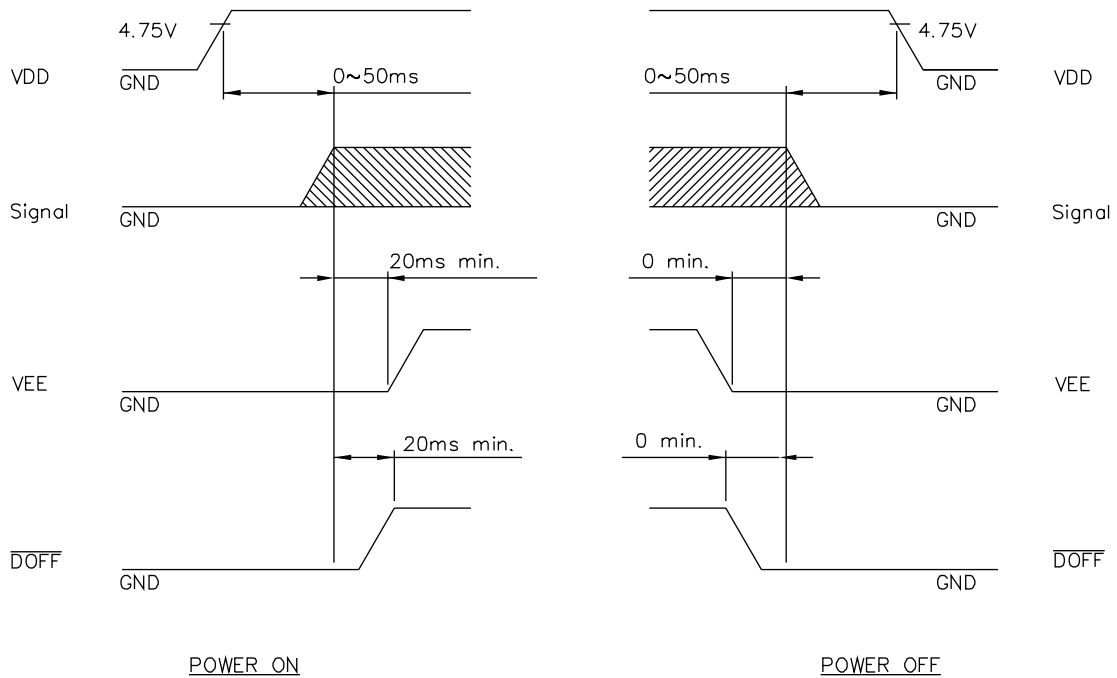


Fig . b Interface timing (COMMON)

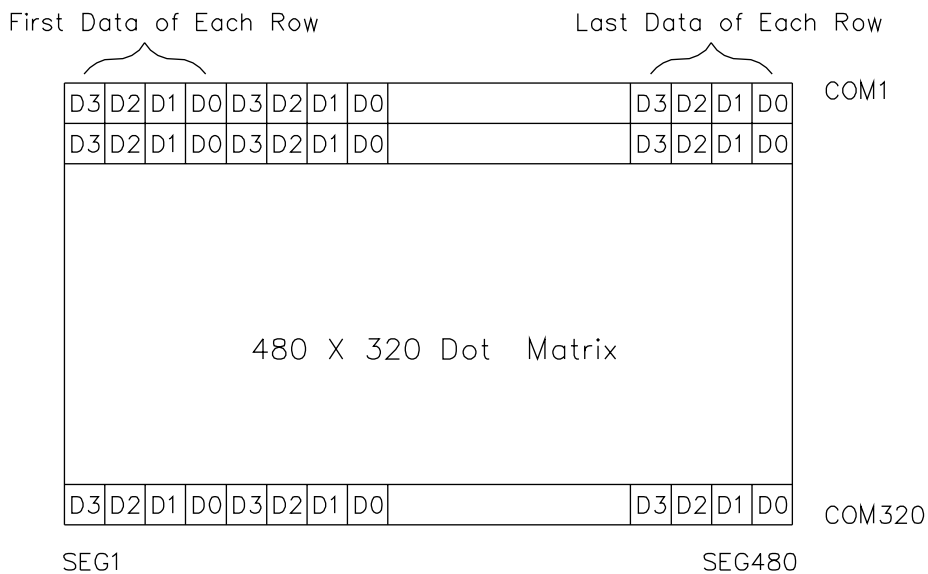
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## 8-2 POWER ON/OFF TIMING



Missing pixels may occur when the LCM is driven beyond above power interface timing sequence.

## 9. DISPLAY PATTERN

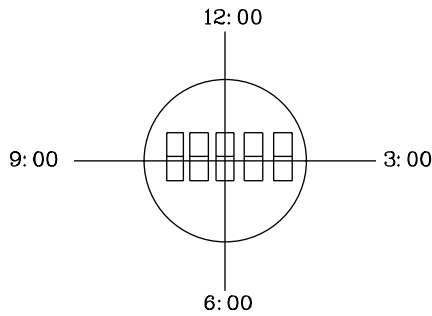




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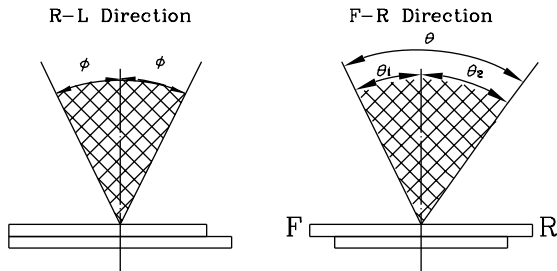
(NOTE 4)

Definition of Viewing Direction



(NOTE 5)

Definition of Viewing Angle



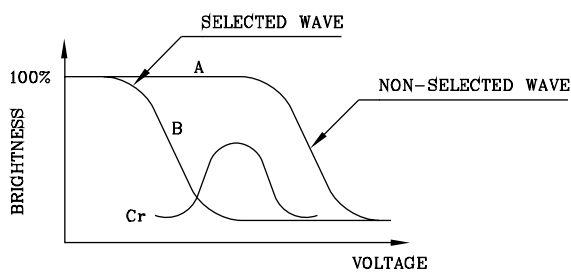
$$\theta = \theta_1 + \theta_2$$

\*Conditions

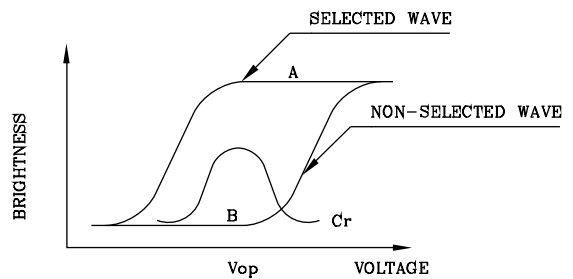
- Operating Voltage : Vop
- Frame Frequency : 70Hz
- Applying Waveform : 1/N duty 1/a bias
- Contrast Ratio : larger than 2

(NOTE 6)

Definition of Contrast Ratio (Cr)



(positive type)

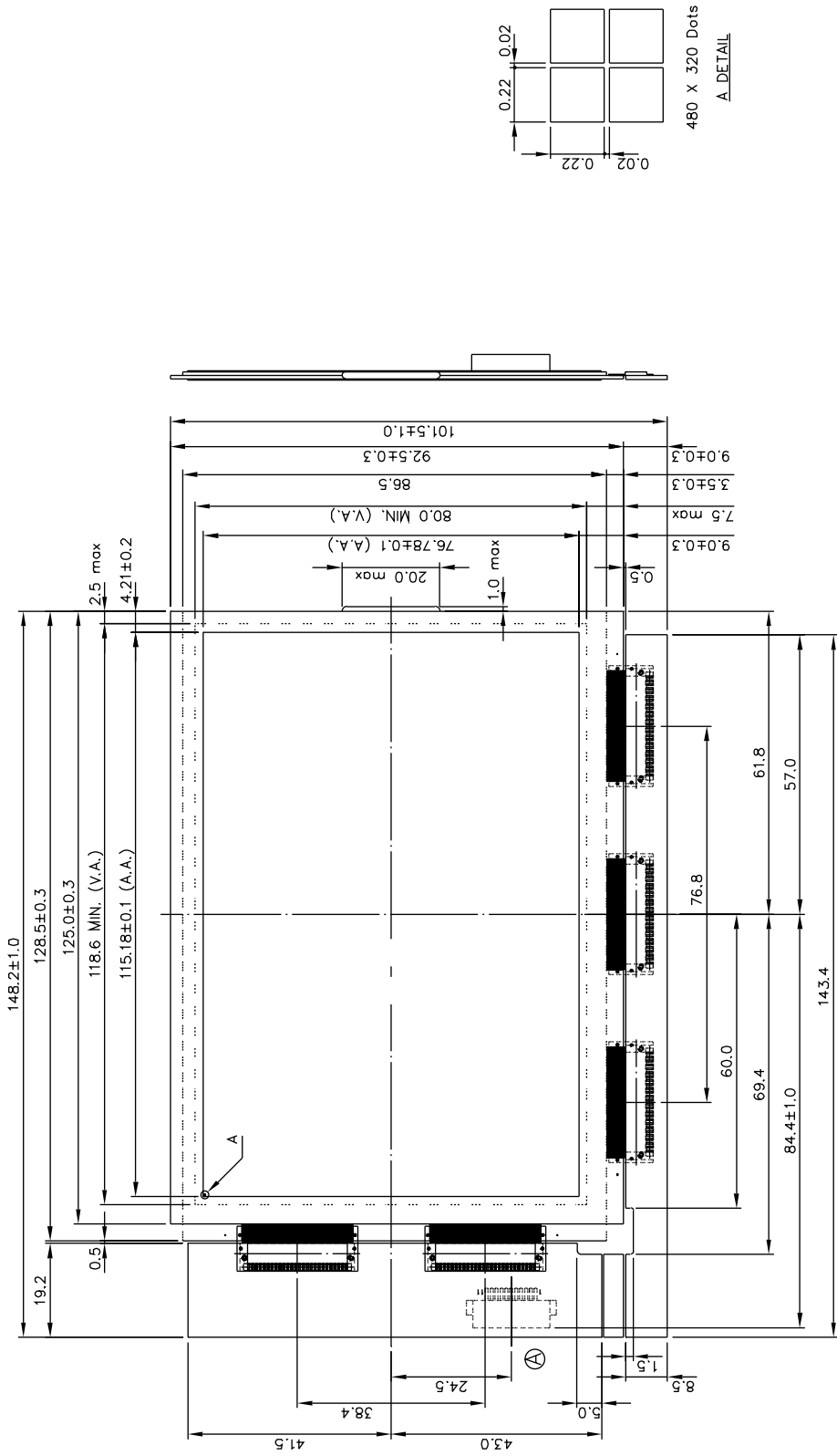


(negative type)

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

\*Conditions

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



480 X 320 Dots  
A DETAIL

Ⓐ INTERFACE CONNECTOR  
(11 pins, FPC/FPC P1.0mm)  
SD-52207-1117 (MOLEX)

- NOTES:
- 1.RESOLUTION : 480 x 320 Dots
  - 2.CONTROLLER : Without
  - 3.DC/DC : Without
  - 4.General Tolerance : ±0.5mm

Pin No.	Symbol	Description
1	FLM	Frame Signal
2	CL1	Data Latch Signal
3	CL2	Data Shift Signal
4	DOFF	Display OFF Control
5	VDD	Power Supply (+5V)
6	VSS	Power Supply (GND)
7	VEE	LCD Driving Voltage
8	D0	Data Bus
9	D1	
10	D2	
11	D3	

AGM4832B		AZ DISPLAYS, INC.	
APPROVE	NAME	DATE	TITLE
CHECK			DWG-NO
DESIGN			TA-X054X
DRAWN	MAY PING	86.11.4	Rev.A
			UNIT : mm
			SCALE : 2/3