

AZ DISPLAYS, INC.

COMPLETE LCD SOLUTIONS

SPECIFICATIONS FOR LIQUID CRYSTAL DISPLAY

PART NUMBER:

AGM1216B Series

REVISED:

MAY 14, 2003

General Specifications

Item	<input checked="" type="checkbox"/> Standard Value	Unit
Display Pattern	<input checked="" type="checkbox"/> Graphic <input type="checkbox"/> Character <input type="checkbox"/> Segment <input type="checkbox"/> _____ <input type="checkbox"/> with ICON	
Color	<input type="checkbox"/> Mono. <input type="checkbox"/> Grayscale <input checked="" type="checkbox"/> _65K_____	
Module Dimension (W x H x T)	33.54 (W) x 44.9 (H) x1.46 (T)	mm
Viewing Area (W x H)	30.54(W)X36.04(H)	mm
Active Area (W x H)	28.02(W)X35.028(H)	mm
Character Size (W x H)	\	mm
Character Pitch (W x H)	\	mm
DOT Size (W x H)	0.061(W)X0.207(H)	mm
DOT Pitch (W x H)	0.073(W)X0.219(H)	mm
LCD Type	<input type="checkbox"/> TN, Positive <input type="checkbox"/> TN, Negative <input type="checkbox"/> HTN, Positive <input type="checkbox"/> HTN, Negative	
	<input type="checkbox"/> STN, Yellow-Green <input type="checkbox"/> STN, Gray <input type="checkbox"/> STN, Blue <input type="checkbox"/> FSTN, Positive <input type="checkbox"/> FSTN, Negative	
	<input type="checkbox"/> _____ <input type="checkbox"/> FM LCD <input checked="" type="checkbox"/> Color STN	
Polarizer Type	<input type="checkbox"/> Transflective <input checked="" type="checkbox"/> Transmissive <input type="checkbox"/> Reflective <input type="checkbox"/> Anti-Glare	
View Direction	<input checked="" type="checkbox"/> 6H <input type="checkbox"/> 12H <input type="checkbox"/> _____	
LCD Controller & Driver	S6B33B2 (or Equivalent)	
LCD Driving Method	1/162duty, 1/5bias	
Interface Type	Serial <input type="checkbox"/> I ² C <input type="checkbox"/> 4-line SPI <input type="checkbox"/> 3-line SPI <input type="checkbox"/> _____	
	Parallel <input checked="" type="checkbox"/> 6800 <input checked="" type="checkbox"/> 8080 <input type="checkbox"/> 4-bit <input type="checkbox"/> _____	
Backlight Type	<input checked="" type="checkbox"/> LED <input type="checkbox"/> Bottom <input checked="" type="checkbox"/> Single Side <input type="checkbox"/> Dual Side	
	<input type="checkbox"/> _____ <input type="checkbox"/> EL <input type="checkbox"/> CCFL	
Backlight Color	<input type="checkbox"/> Yellow-Green <input checked="" type="checkbox"/> White <input type="checkbox"/> Amber <input type="checkbox"/> Blue <input type="checkbox"/> Red <input type="checkbox"/> _____	
EL/CCFL Driver type	<input type="checkbox"/> Build-in <input type="checkbox"/> External	
DC-DC Converter	<input checked="" type="checkbox"/> Build-in <input type="checkbox"/> External	
Operation Temperature	T _{OPL} = -0 T _{OPH} = 50	°C
Storage Temperature	T _{STL} = -10 T _{STH} = 60	°C

Note:

T_{OPL}: Lowest Operation Temperature.

T_{OPH}: Highest Operation Temperature.

T_{STL}: Lowest Storage Temperature.

T_{STH}: Highest Storage Temperature.

Electro-optical Specifications

1 Absolute Maximum Ratings

No	Item	Symbol	Min.	Max.	Unit
1	Supply Voltage For Logic	$V_{DD} - V_{SS}$	-0.3	4.0	V
2	Supply Voltage For LCD Driver	V_{LCD}	-0.3	22.0	V
3	Input Voltage	V_I	$V_{SS} - 0.3$	$V_{DD} + 0.3$	V

Note: Operating Temperature and Storage Temperature can be found in 1.General Specifications.

2 Optical Characteristics

$T_a = 25^\circ\text{C}$

ITEM		SYMBOL	CONDITION	MIN	TYP	MAX	UNIT	DRIVE
LCD driving voltage		Vop		0	(9.3)	(9.8)	(10.3)	V
				25	(9.0)	(9.5)	(10.0)	
				50	(8.6)	(9.1)	(9.6)	
Response time	Rise	Tr	= $\pm 0^\circ$	0	-	(530)	(580)	ms
				25	-	(200)	(250)	
	Down	Td	= $\pm 0^\circ$	0	-	(200)	(250)	
				25	-	(85)	(130)	
Contrast ratio		CR	= $\pm 0^\circ$	(20)	(25)	-	%	A *1
Transmittance		T	-	(3.6)	(6.0)	-	%	
Viewing angle range		6H $\pm 270^\circ$	CR 2	1		50		
		12H $\pm 90^\circ$		2		25		
		3H $\pm 0^\circ$		3		45		
		9H $\pm 180^\circ$		4		60		
Chromaticity Coordinates *2	White	X	= $\pm 0^\circ$	(0.20)	(0.25)	(0.30)	-	B*1
		Y		(0.25)	(0.30)	(0.35)		
	Red	X	= $\pm 0^\circ$	(0.34)	(0.39)	(0.44)		
		Y		(0.26)	(0.31)	(0.36)		
	Green	X	= $\pm 0^\circ$	(0.24)	(0.29)	(0.34)		
		Y		(0.46)	(0.51)	(0.56)		
	Blue	X	= $\pm 0^\circ$	(0.15)	(0.18)	(0.21)		
		Y		(0.12)	(0.15)	(0.18)		
Color gamut (NTSC)		S		-	(18)	-	%	

Note:

*1 Driving A - Duty driving by DMS505 (fFRM = 100Hz, 1/132 duty, 1/6 bias)

Driving B - Duty driving by Actual driver IC

*2 Backlight coordinates (x , y) = (0.31 , 0.32)

4.3 Electrical Characteristics

No	Item	Symbol	Condition	Min.	Typ.	Max.	Unit
1	Supply Voltage for Logic	$V_{DD}-V_{SS}$	-	2.8	3.0	3.3	V
2	Supply Voltage for LCD Driver	V_{LCD}	$T_a=23\pm 3^{\circ}\text{C}$		9.4		V
3	Supply Current for Logic	I_{DD}	-....			3.0	mA

5	Input High Voltage	V_{IH}	-	$0.8 \times V_{DD}$	-	VDD	V
6	Input Low Voltage	V_{IL}	-	VSS	-	$0.2 \times V_{DD}$	V
7	Output High Voltage	V_{OH}	$I_{OH}=0.5\text{mA}$	$0.8 \times V_{DD}$	-	VDD	V
8	Output Low Voltage	V_{OL}	$I_{OL}=0.5\text{mA}$	VSS	-	$0.2 \times V_{DD}$	V

9	Supply Current for LED Backlight	I_{LED}	$V_{LED} = \text{Typ.}$ $T_a=23\pm 3^{\circ}\text{C}$	-	15	-	mA
10	Supply Voltage for LED Backlight	V_{LED}	$I_{LED} = \text{Typ.}$ $T_a=23\pm 3^{\circ}\text{C}$	-	9.6	10.0	V
11	Luminance	Lv	$I_{LED} = \text{Typ.}$ $T_a=23\pm 3^{\circ}\text{C}$	3000	3300	-	cd/m ²

Timing Characteristics

See Data sheet of LCD Driver for detail.

Programming

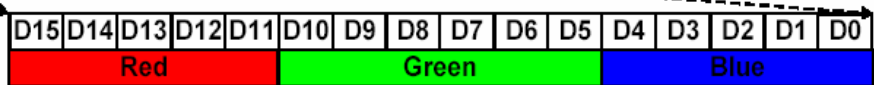
Instruction Table

See Data sheet of LCD Driver for detail.

Display Data RAM

Relationship between display pattern and Display Data RAM show as below:

XA Address	YA Address																
	00H	01H	02H	03H	04H	05H	06H	07H	08H	-----	7DH	7EH	7FH	80H	81H	82H	83H
00H										-----							
01H										-----							
02H										-----							
03H										-----							
04H										-----							
05H										-----							
06H										-----							
07H										-----							
08H										-----							
09H										-----							
0AH										-----							
0BH										-----							
0CH										-----							
0DH										-----							
0EH										-----							
0FH										-----							
⋮										⋮							
B2H										-----							
B3H										-----							
B4H										-----							
B5H										-----							
B6H										-----							
B7H										-----							
B8H										-----							
B9H										-----							
BAH										-----							
BBH										-----							
BCH										-----							
BDH										-----							
BEH										-----							
BFH										-----							
A0H										-----							
A1H										-----							



See Data sheet of LCD Driver for detail.

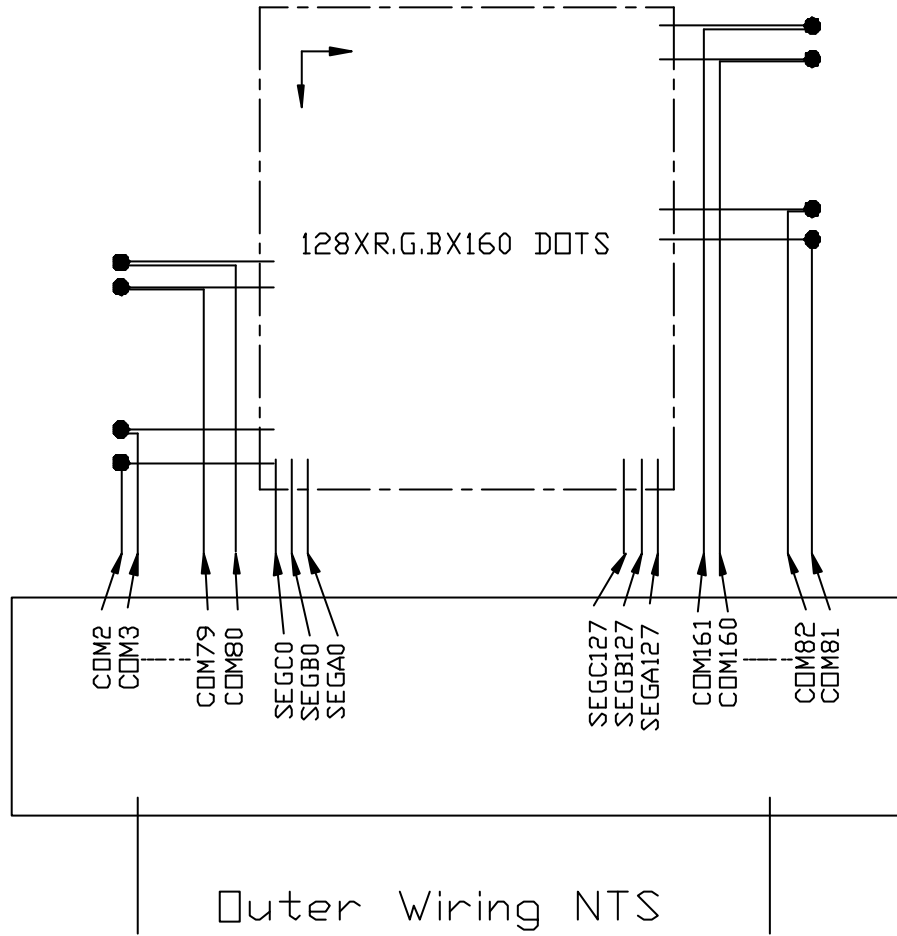
I/O Terminal

1 Pin Description(See Datasheet of LCD Driver for detail)

Pin NO.	Symbol	Function Description																												
1	OTPD	Drain Voltage for OTP programming.																												
2	OTPG	Gate Voltage for OTP programming.																												
3	PS																													
4~5	MPU1~MP U0	MPU interface select pin																												
		<table border="1"> <thead> <tr> <th>PS</th> <th>MPU[1]</th> <th>MPU[0]</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>H</td> <td>L</td> <td>L</td> <td>8080-series 8bit interface</td> </tr> <tr> <td>H</td> <td>L</td> <td>H</td> <td>8080-series 16bit interface</td> </tr> <tr> <td>H</td> <td>H</td> <td>L</td> <td>6800-series 8bit interface</td> </tr> <tr> <td>H</td> <td>H</td> <td>H</td> <td>6800-series 16bit interface</td> </tr> <tr> <td>L</td> <td>L</td> <td>X</td> <td>3 pin SPI(Write only)</td> </tr> <tr> <td>L</td> <td>H</td> <td>X</td> <td>4 pin SPI(Write only)</td> </tr> </tbody> </table>	PS	MPU[1]	MPU[0]	Description	H	L	L	8080-series 8bit interface	H	L	H	8080-series 16bit interface	H	H	L	6800-series 8bit interface	H	H	H	6800-series 16bit interface	L	L	X	3 pin SPI(Write only)	L	H	X	4 pin SPI(Write only)
		PS	MPU[1]	MPU[0]	Description																									
		H	L	L	8080-series 8bit interface																									
		H	L	H	8080-series 16bit interface																									
		H	H	L	6800-series 8bit interface																									
		H	H	H	6800-series 16bit interface																									
L	L	X	3 pin SPI(Write only)																											
L	H	X	4 pin SPI(Write only)																											
6	CSB	Chip select input pins Data / instruction I/O is enabled only when CSB is “ L ” . When chip select is non-active, DB0 to DB15 may be high impedance.																												
7	RESETB	Reset input pin. When RESETB is “ L ” , initialization is executed.																												
8	RS	Data / Instruction select input pin . RS = “ H ” : DB0 to DB15 are display data . RS = “ L ” : DB0 to DB7 are instruction data																												
9	WRB	Read / Write execution control pin																												
		<table border="1"> <thead> <tr> <th>PS</th> <th>MPU</th> <th>MPU Type</th> <th>WRB</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>H</td> <td>H</td> <td>6800-series</td> <td>R/W</td> <td>ReadWRBite control input pin – R/W = “H”: read – R/W = “L”: write</td> </tr> <tr> <td>H</td> <td>L</td> <td>8080-series</td> <td>WRB</td> <td>Write enable clock input pin The data on DB0 to DB15 are latched at the rising edge of the WRB signal.</td> </tr> </tbody> </table>	PS	MPU	MPU Type	WRB	Description	H	H	6800-series	R/W	ReadWRBite control input pin – R/W = “H”: read – R/W = “L”: write	H	L	8080-series	WRB	Write enable clock input pin The data on DB0 to DB15 are latched at the rising edge of the WRB signal.													
		PS	MPU	MPU Type	WRB	Description																								
H	H	6800-series	R/W	ReadWRBite control input pin – R/W = “H”: read – R/W = “L”: write																										
H	L	8080-series	WRB	Write enable clock input pin The data on DB0 to DB15 are latched at the rising edge of the WRB signal.																										
10	RDB	Read / Write execution control pin																												
10	RDB	<table border="1"> <thead> <tr> <th>MPU[1]</th> <th>MPU type</th> <th>RDB</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>H</td> <td>6800-series</td> <td>E</td> <td>Read / Write control input pin – R/W = “H”: When E is “H”, DB0 to DB15 are in an output status. – R/W = “L”: The data on DB0 to DB15 are latched at the falling edge of the E signal.</td> </tr> <tr> <td>L</td> <td>8080-series</td> <td>RDB</td> <td>Read enable clock input pin When RDB is “L”, DB0 to DB15 are in an output status.</td> </tr> </tbody> </table>	MPU[1]	MPU type	RDB	Description	H	6800-series	E	Read / Write control input pin – R/W = “H”: When E is “H”, DB0 to DB15 are in an output status. – R/W = “L”: The data on DB0 to DB15 are latched at the falling edge of the E signal.	L	8080-series	RDB	Read enable clock input pin When RDB is “L”, DB0 to DB15 are in an output status.																
		MPU[1]	MPU type	RDB	Description																									
		H	6800-series	E	Read / Write control input pin – R/W = “H”: When E is “H”, DB0 to DB15 are in an output status. – R/W = “L”: The data on DB0 to DB15 are latched at the falling edge of the E signal.																									
L	8080-series	RDB	Read enable clock input pin When RDB is “L”, DB0 to DB15 are in an output status.																											
11~26	DB0~DB15	DB[0:15]: 16-bit bi-directional data bus.																												
27	GND	GND																												
28	VDD	VDD																												
29	VRN	NC																												
30	VRP	NC																												
31	VIN	NC																												

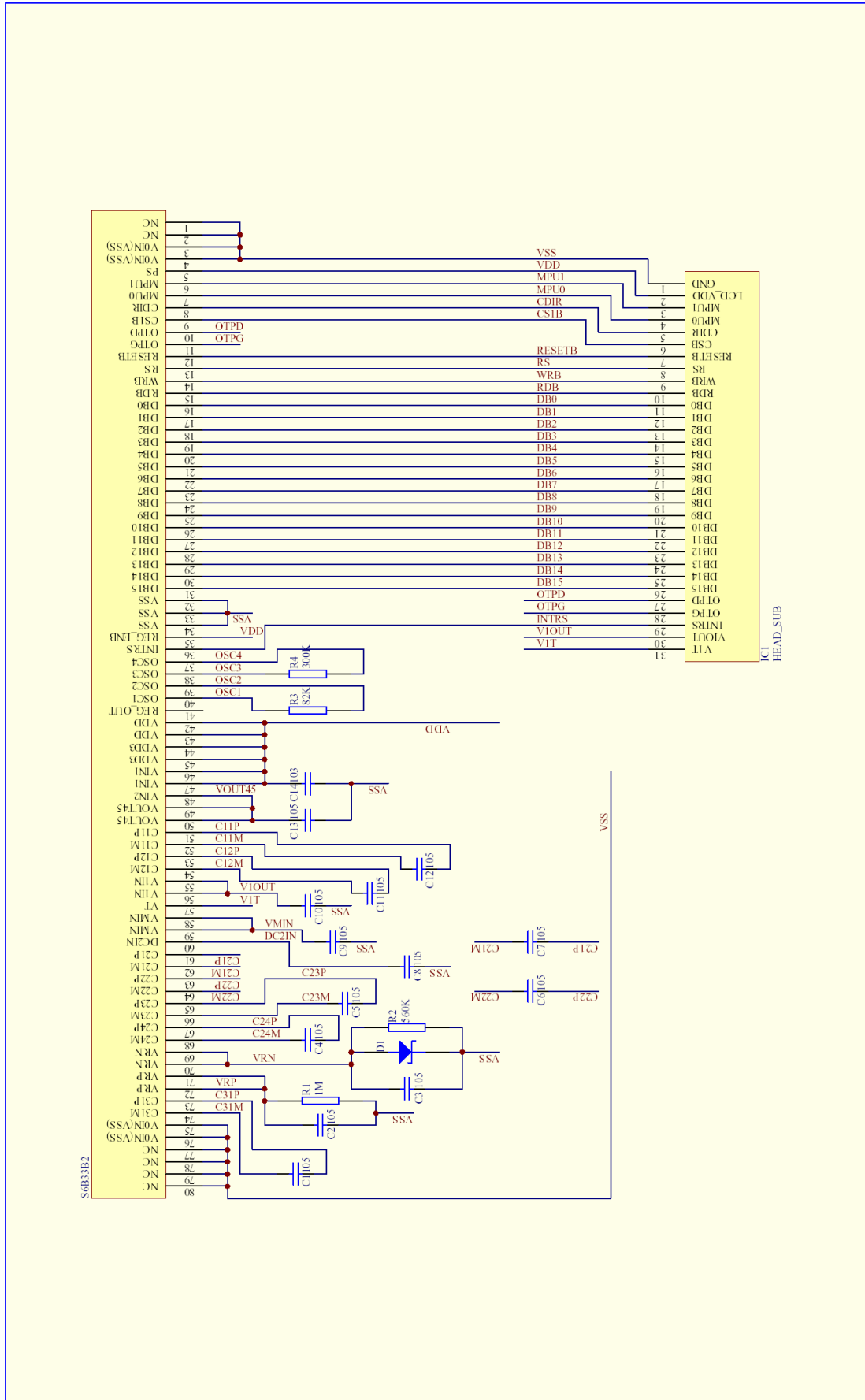
32	VT	NC
33	NC	NC

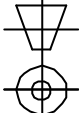
Block Diagram



*View from surface of Terminal

Application Circuit



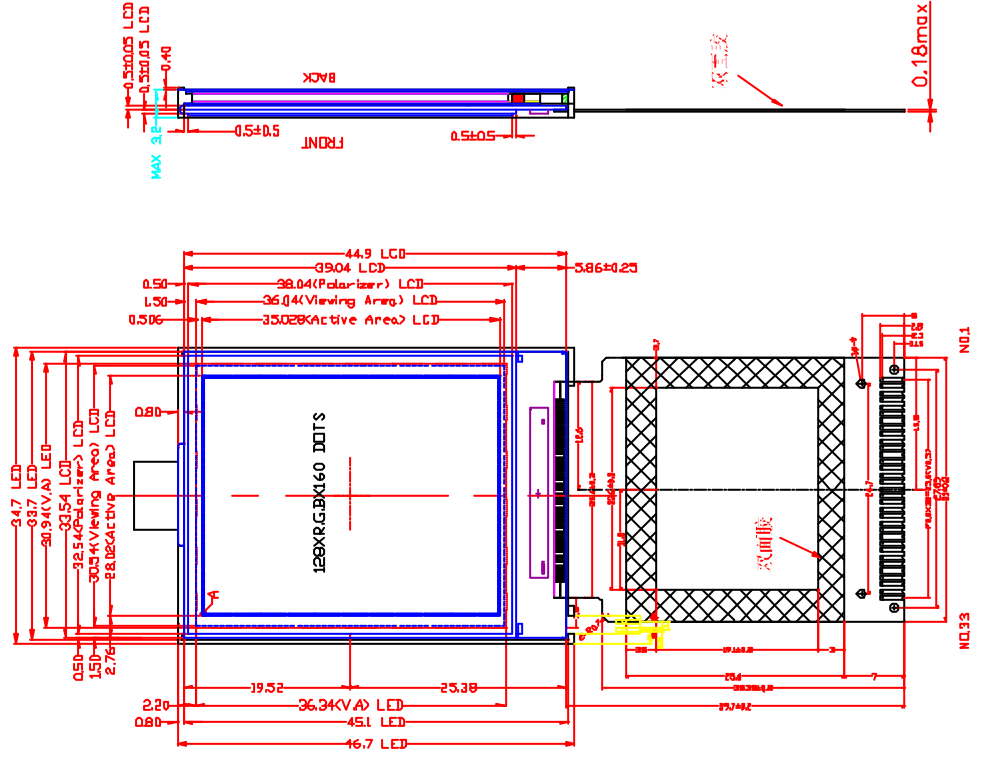


UNITS: mm
SHEET 1 OF 1

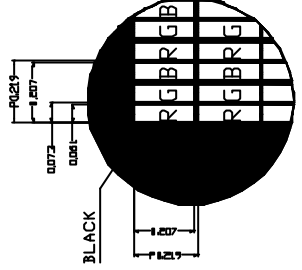
AGM1216B
DTG: NO:ED-4772-1CM/800

AZ Displays, Inc.

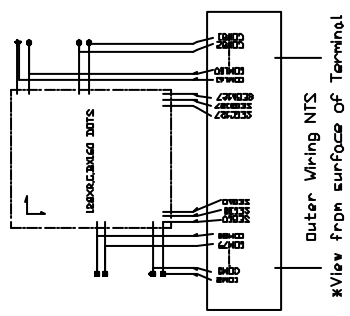
CUSTOMER APPROVAL:



33	NC	D16	D86
32	V1N	D15	D84
31	V1N	D14	D83
30	V1P	D13	D82
29	V1N	D12	D81
28	V1D	D11	D80
27	VSS	D10	R1B
26	D815	D9	VRB
25	D814	D8	RS
24	D813	D7	RESETB
23	D812	D6	CS1B
22	D811	D5	MP10
21	D810	D4	MP11
20	D809	D3	FS
19	D808	D2	DTFB
18	D807	D1	DTFB
D0A	DATA	D0A	DATA



DOT SIZE
DETAIL A UNITS



Display Type : CSTN / Transmissive
 Viewing Direction : 60D
 Driver IC : S68382
 Logic Voltage : 3.0V±0.1V
 LCD Driver Voltage (Vlcd) : 9.4
 Driving Method : 1/162 DUTY 1/5 BIAS
 Operating Temperature : -10~ +50°C
 Storage Temperature : -10~ +60°C
 Interface Connector : FPC
 Led color : White
 VLED=9.0V Iled(type)=15mA
 Luminance : 300Cd/m² (type)
 All unmarked tolerances: ±0.2mm

*View from surface of Terminal

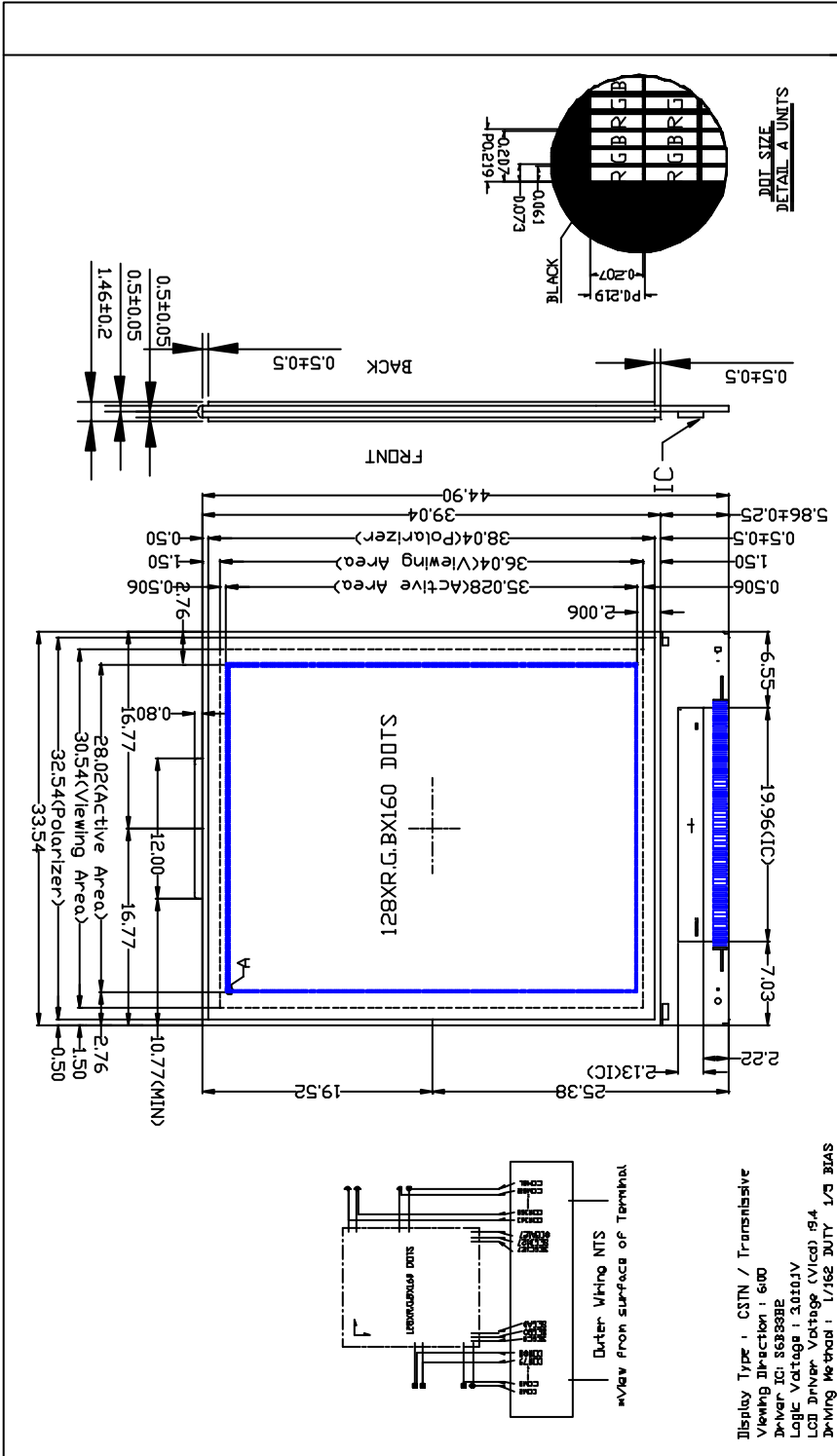
REV	DATE	DESCRIPTION
0	10/11/2017	INITIAL SHEET
1	02/14/2018	REVISED TO ADD DIMENSIONS
2	03/01/2018	REVISED TO ADD DIMENSIONS
3	03/01/2018	REVISED TO ADD DIMENSIONS
4	03/01/2018	REVISED TO ADD DIMENSIONS
5	03/01/2018	REVISED TO ADD DIMENSIONS
6	03/01/2018	REVISED TO ADD DIMENSIONS
7	03/01/2018	REVISED TO ADD DIMENSIONS
8	03/01/2018	REVISED TO ADD DIMENSIONS
9	03/01/2018	REVISED TO ADD DIMENSIONS
10	03/01/2018	REVISED TO ADD DIMENSIONS
11	03/01/2018	REVISED TO ADD DIMENSIONS
12	03/01/2018	REVISED TO ADD DIMENSIONS
13	03/01/2018	REVISED TO ADD DIMENSIONS
14	03/01/2018	REVISED TO ADD DIMENSIONS
15	03/01/2018	REVISED TO ADD DIMENSIONS
16	03/01/2018	REVISED TO ADD DIMENSIONS
17	03/01/2018	REVISED TO ADD DIMENSIONS
18	03/01/2018	REVISED TO ADD DIMENSIONS
19	03/01/2018	REVISED TO ADD DIMENSIONS
20	03/01/2018	REVISED TO ADD DIMENSIONS
21	03/01/2018	REVISED TO ADD DIMENSIONS
22	03/01/2018	REVISED TO ADD DIMENSIONS
23	03/01/2018	REVISED TO ADD DIMENSIONS
24	03/01/2018	REVISED TO ADD DIMENSIONS
25	03/01/2018	REVISED TO ADD DIMENSIONS
26	03/01/2018	REVISED TO ADD DIMENSIONS
27	03/01/2018	REVISED TO ADD DIMENSIONS
28	03/01/2018	REVISED TO ADD DIMENSIONS
29	03/01/2018	REVISED TO ADD DIMENSIONS
30	03/01/2018	REVISED TO ADD DIMENSIONS
31	03/01/2018	REVISED TO ADD DIMENSIONS
32	03/01/2018	REVISED TO ADD DIMENSIONS
33	03/01/2018	REVISED TO ADD DIMENSIONS
34	03/01/2018	REVISED TO ADD DIMENSIONS
35	03/01/2018	REVISED TO ADD DIMENSIONS
36	03/01/2018	REVISED TO ADD DIMENSIONS
37	03/01/2018	REVISED TO ADD DIMENSIONS
38	03/01/2018	REVISED TO ADD DIMENSIONS
39	03/01/2018	REVISED TO ADD DIMENSIONS
40	03/01/2018	REVISED TO ADD DIMENSIONS
41	03/01/2018	REVISED TO ADD DIMENSIONS
42	03/01/2018	REVISED TO ADD DIMENSIONS
43	03/01/2018	REVISED TO ADD DIMENSIONS
44	03/01/2018	REVISED TO ADD DIMENSIONS
45	03/01/2018	REVISED TO ADD DIMENSIONS
46	03/01/2018	REVISED TO ADD DIMENSIONS
47	03/01/2018	REVISED TO ADD DIMENSIONS
48	03/01/2018	REVISED TO ADD DIMENSIONS
49	03/01/2018	REVISED TO ADD DIMENSIONS
50	03/01/2018	REVISED TO ADD DIMENSIONS
51	03/01/2018	REVISED TO ADD DIMENSIONS
52	03/01/2018	REVISED TO ADD DIMENSIONS
53	03/01/2018	REVISED TO ADD DIMENSIONS
54	03/01/2018	REVISED TO ADD DIMENSIONS
55	03/01/2018	REVISED TO ADD DIMENSIONS
56	03/01/2018	REVISED TO ADD DIMENSIONS
57	03/01/2018	REVISED TO ADD DIMENSIONS
58	03/01/2018	REVISED TO ADD DIMENSIONS
59	03/01/2018	REVISED TO ADD DIMENSIONS
60	03/01/2018	REVISED TO ADD DIMENSIONS
61	03/01/2018	REVISED TO ADD DIMENSIONS
62	03/01/2018	REVISED TO ADD DIMENSIONS
63	03/01/2018	REVISED TO ADD DIMENSIONS
64	03/01/2018	REVISED TO ADD DIMENSIONS
65	03/01/2018	REVISED TO ADD DIMENSIONS
66	03/01/2018	REVISED TO ADD DIMENSIONS
67	03/01/2018	REVISED TO ADD DIMENSIONS
68	03/01/2018	REVISED TO ADD DIMENSIONS
69	03/01/2018	REVISED TO ADD DIMENSIONS
70	03/01/2018	REVISED TO ADD DIMENSIONS
71	03/01/2018	REVISED TO ADD DIMENSIONS
72	03/01/2018	REVISED TO ADD DIMENSIONS
73	03/01/2018	REVISED TO ADD DIMENSIONS
74	03/01/2018	REVISED TO ADD DIMENSIONS
75	03/01/2018	REVISED TO ADD DIMENSIONS
76	03/01/2018	REVISED TO ADD DIMENSIONS
77	03/01/2018	REVISED TO ADD DIMENSIONS
78	03/01/2018	REVISED TO ADD DIMENSIONS
79	03/01/2018	REVISED TO ADD DIMENSIONS
80	03/01/2018	REVISED TO ADD DIMENSIONS
81	03/01/2018	REVISED TO ADD DIMENSIONS
82	03/01/2018	REVISED TO ADD DIMENSIONS
83	03/01/2018	REVISED TO ADD DIMENSIONS
84	03/01/2018	REVISED TO ADD DIMENSIONS
85	03/01/2018	REVISED TO ADD DIMENSIONS
86	03/01/2018	REVISED TO ADD DIMENSIONS
87	03/01/2018	REVISED TO ADD DIMENSIONS
88	03/01/2018	REVISED TO ADD DIMENSIONS
89	03/01/2018	REVISED TO ADD DIMENSIONS
90	03/01/2018	REVISED TO ADD DIMENSIONS
91	03/01/2018	REVISED TO ADD DIMENSIONS
92	03/01/2018	REVISED TO ADD DIMENSIONS
93	03/01/2018	REVISED TO ADD DIMENSIONS
94	03/01/2018	REVISED TO ADD DIMENSIONS
95	03/01/2018	REVISED TO ADD DIMENSIONS
96	03/01/2018	REVISED TO ADD DIMENSIONS
97	03/01/2018	REVISED TO ADD DIMENSIONS
98	03/01/2018	REVISED TO ADD DIMENSIONS
99	03/01/2018	REVISED TO ADD DIMENSIONS
100	03/01/2018	REVISED TO ADD DIMENSIONS

AGM1216B	AGM1216B
----------	----------

AZ Displays, Inc.



CUSTOMER APPROVAL:



Display Type : CSTN / Transmissive
 Viewing Direction : 600
 Driver IC : S68888B
 Logic Voltage : 3.0V
 Logic Voltage (Vcd) : 3.0V
 Driving Voltage : 6V
 Operating Temperature : -20~+70°C
 Storage Temperature : -30~+100°C
 Interface Connector : FPC
 All unmarked tolerances: ±0.2mm

