ALL SHORE INDUSTRIES

ASI-T-280DA216T/AW

Item	General feature	Remark
MODELE SIZE	2.8"	"
LCD Type	TFT TRANSMISSIVE	/
Viewing Direction	6:00	O'Clock
Outside dimensions(W*H*T)	50.00*69.20*2.30	mm^3
Active Area(W*H)	43.2*57.6	mm^2
Number of Pixels	240*RGB*320	/
Driver IC	ST7789V	/
Colors	262K	/
Interface Type	MCU 16 位/8 位 Interface	/
Input Voltage	2.8	V

CONTENTS

1.GENERAL INFORMATION

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2. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage for Logic	Vdd	-0.3	3.3	V
Input Voltage	Vin	-0.3	Vdd+0.3	V
Operating Temperature	Top	-20	70	C
Storage Temperature	Tst	-30	80	C
Humidity	RH	/	90%(Max60℃)	RH

3. ELECTRICAL CHARACTERISTICS

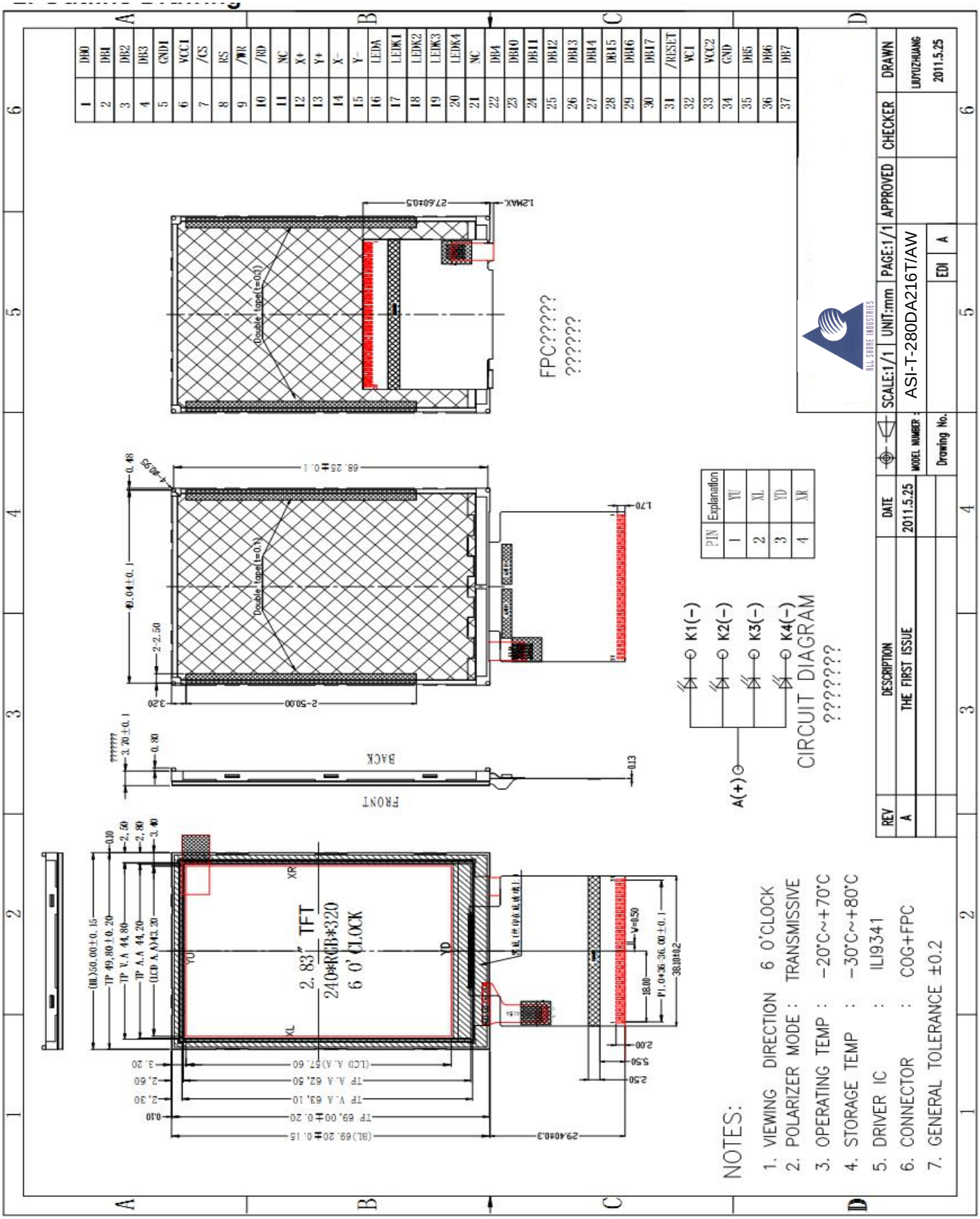
3.1 DC Characteristics

Parameter	Symbol	Min	Type	Max	Unit
Supply Voltage for Logic	Vdd-Vss	2.5	2.8	3.3	V
Input Current	Idd	/	TBD	TBD	mA
Input Voltage H Level	Vih	0.8IOVCC	-	IOVCC	V
Input Voltage L Level	Vil	-0.3	-	0.2 IOVCC	V
Output Voltage H Level	Voh	0.8 IOVCC	-	IOVCC	V
Output Voltage L Level	Vol	-	-	0.2 IOVCC	V

3.2 LCM Characteristics

Item	Symbol	Min	Type	Max	Unit	Condition
Forward voltage	Vf	3.1	3.2	3.3	V	If= 80mA/LED
Luminance	Lv	220	235	260	cd/m^2	
Number of LED	/	4			Piece	/
Connection mode	P	Parallel			/	/
Uniformity	Avg	80	/	/	%	If= 80mA/LED

4. LCM Structure chart



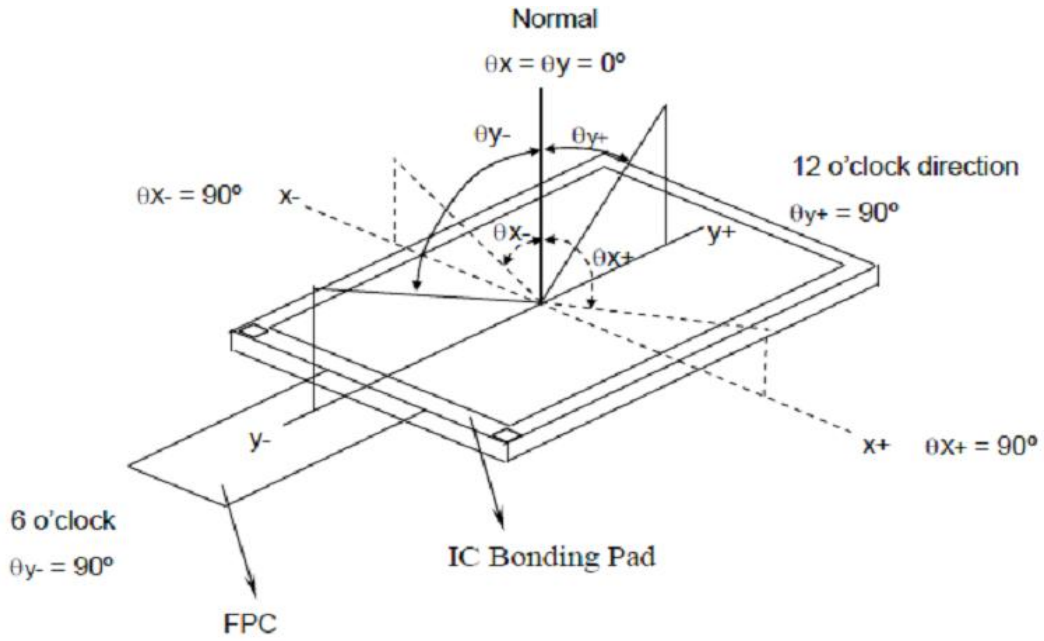
5.Interface Description

No.	SYMBOL	I/O	Description
1-4	DB0-DB3		*Data bus input .*
5	GND		*Ground pin for analog circuits.*
6	IOVCC		***LCD display derive gate supply voltage***
7	CS		*A chip select signal.*
8	RS		*A register select signal.*
9	WR		*This serves as a write strobe signal.*
10	RD		*This serves as a read strobe signal.*
11	NC		**NC**
12	XL/NC		***TP control***
13	YU/Y+		***TP control***
14	XR/NC		***TP control***
15	YD/Y-		***TP control***
16	A		*LED power anode.*
17	K1		*LED power cathode.*
18	K2		*LED power cathode.*
19	K3		*LED power cathode.*
20	K4		*LED power cathode.*
21	NC		**NC**
22	DB4		*Data bus input .*
23-30	DB10-DB17		*Data bus input .*
31	RESET		*This signal will reset the device and must be applied to properly initialize the chip*
32	VCC		*Power supply for interface logic circuit. 2.8V*
33	VCC		*Power supply for interface logic circuit. 2.8V*
34	GND		*Ground pin for analog circuits.*
35-37	DB5-DB7		*Data bus input .*

6. Optical Specification

6.1 LCD Angle parameter

Item	Symbol	Condition	Specification			Unit
			Min.	Typ.	Max.	
Response time (By Quick)	Tr+Tf	θ= 0°	-	**16**		ms
Contrast ratio	CR	θ= 0°	-	**500**	-	
Viewing angle	Top	CR≧10	-	**50**	-	deg.
	Bottom	CR≧10	-	**20**	-	
	Left	CR≧10	-	**45**	-	
	Right	CR≧10	-	**45**	-	
Color chromaticity (CF only with ITO, light source is C light, CIE 1931)	Wx	θ= 0°		**0.301**		
	Wy			**0.337**		
	Rx			**0.621**		
	Ry			**0.332**		
	Gx			**0.294**		
	Gy			**0.577**		
	Bx			**0.141**		
	By			**0.157**		
NTSC			-	**55**	-	%
Transmittance	Trans		-	**6.4**	-	%



Response time is the time required for the display to transition from white to black (Rising time, Tr and from black to white (Falling time, Tf).for additional information

(3)Contrast Ratio(CR)

Contrast Ratio(CR) is defined mathematically as: CR

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

Surface luminance is the center point across the lcd surface 500mm from the surface with all pixels displaying white.

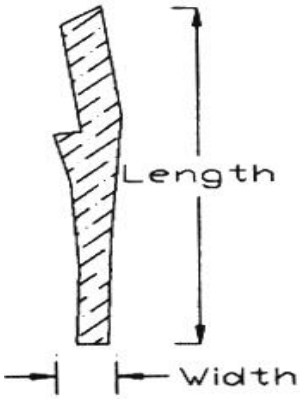
7.LCM Inspection standard

7.1 Special examination requirements:

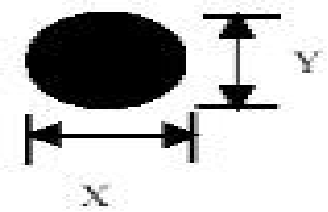
Examination Items:	Acceptable Standard:	Remarks:
Backlight	1. Backlight installed 2. Brightness, uniformity and efficiency must be in specs requested. 3. Backlight colors must be in specs requested	Visual Examination With Magnifier
Bezzel	To reject visible damages, shape changes or solder chips.	
FPC	1. Bent track angle cannot be bigger than 90°C as shown 2. To reject cracks or breaks on enforced panel, or bubbles taking more than 20% of whole section 3. To reject scratches or dirt spots or small objects on connection pins 4. To reject oxygenized or defects on connection pins 5. To reject any connection pins missing or incomplete electroplated layers	

7.2 TFT examination standard:

Examination Items:		Accesseble standard	Remarks:
1. Line Defects (lines in black or white)	Shape length (mm)	wide (mm)	Accesseble QTY
	----	W ≤ 0.05	access
	L ≤ 5	0.05 < W ≤ 0.1	1
2. Scraching	length (mm)	wide (mm)	Accesseble QTY
	----	W ≤ 0.05	access
	L ≤ 5	0.05 < W ≤ 0.1	1



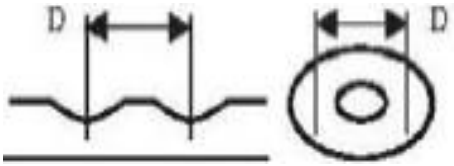
3. Dot Shape Defectives	size(mm)	Accesseble QTY
	D≤0.10	access
	0.10<D≤0.20	2
	0.2<D≤0.25	1
	D>0.25	0



D= (long lengthX+short lengthY)/2

4. TP: Dimples or Bubbles

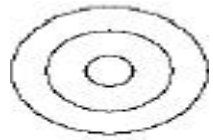
size(mm)	Accesseble QTY
D≤0.20	access
0.20<D≤0.30	6
0.3<D≤0.5	2
D>0.5	0



5. Neton's Rings Exam.

A Even & equal Newton's rings(as drawing A)

1. If the size of Newton's rings is more than 25% of T/P area, it is rejected.
2. Under fluorescent light, if the size of Newton's rings is no more than 25% and also do not change display images, it is acceptable.

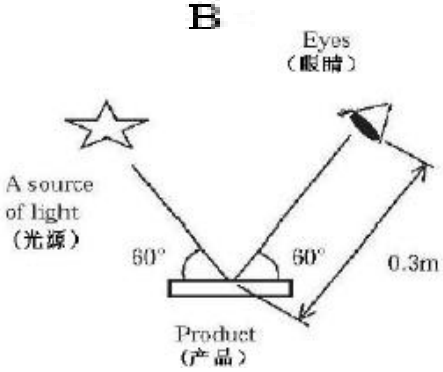


A

B Uneven & unequal Newton's rings (as drawing B)

1. Under no fluorescent light, if the size of Newton's rings is bigger than 7mm, it is rejected.
2. Under fluorescent light, as long as the display characters or images are changed, no matter how big the size of Newton's rings, it is rejected.

B



Remarks: please remove the protect film when it is tested.

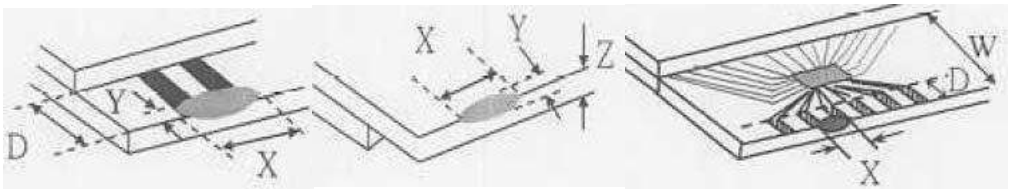
6. Surface Defect

Z	X	Y
Z≤1/2t	X≤a	
Z≤1/2t	X≤a	

7. Corner Defect

Z	X	Y
Z≤1/2t	X≤1/8a	
Z≤1/2t	X≤1/8a	

8 Contact Pads Defects



	X	Y	Z
Front Side	X≤1/5a	Y≤0.5mm	z≤t
Back Side	X≤1/5a	Y≤0.5mm	z≤1/2t

When it has defects more than one location, X is the total length of all defects. It cannot be in view area. Defect size cannot be bigger than 25% of each single contact pad.

9. Crack Defect

Minor

Polarizer, Reflection Panel or Glass Panel	Any cracks that trend to extend to longer is rejected

	S<0.3mm	Acceptable
	0.3mm≤S<0.5mm	Minor
	S≥0.5mm	Major
	In batch processing if there are two or more bias/oblique at the same time, according to the highest defect level surface can not be soft cloth light wipe or air gun blowing dirty foreign matter (including Buss, dust, solder ball, glue, shadow, etc.) according to the point line specifications to determine Strip color, stagger, flow trace, glass leaky according to color picture judgment Viewing angle error is not acceptable;Shows that the water ripple is not acceptable;It's not acceptable to be with a shaking display.	Major
Missing	1. Irregular Black Regiment found in the viewport, light group (extruded glass will move) cannot be accepted 2. Cavitation rebound: Percussion bubbles cannot be accepted	Major
COG	1. IC can not be damaged 、 scratch 2. Sealing glue into the viewport can not be accepted	minor

3. That my be acceptable to have the sealing falling off, if the penetrating glue depth achieves the request.
4. The surface of the coating adhesive position according to the operating document requirements, height can not exceed the polarizing film, ITO line must be with fully covered terminals.

If the above undesirable does not occur in the viewable area, the standard can be properly relaxed

8.RELIABILITY TEST

Test items	Test condition
High temperature storage	80℃，48hr
Low temperature storage	-30℃，240 hr/ -40℃，8hr
High temperature operation	70℃，48 hr
Low temperature operation	-20℃，48 hr
High temperature and high humidity operation	60℃、95%RH，48 hr
Thermal shock	-40℃ (30min)； 80℃(30min)； 48 cycles

After completing the reliability test, leave the samples under the room temperature and for the following inspection items:

1.No clearly visible defects or deterioration of display quality allowed.

2.No function-related abnormalities.

3.Connected parts still connecting tightly.

4.Display characteristics fulfill initial value，contrast ratio should be an least 30% of initial value.

9. Storage Precautions

9.1 When storing the LCD modules, the following precaution are necessary.

9.2 Store them in a sealed polyethylene bag. If properly sealed, there is no need for the desiccant.

9.3 Store them in a dark place. Do not expose to sunlight or fluorescent light, keep the temperature between 0℃ and 35℃, and keep the relative humidity between 40%RH and 60%RH.

9.4 The polarizer surface should not come in contact with any other objects (We advise you to store them in the anti-static electricity container in which they were shipped).

9.5 Liquid crystals solidify under low temperature (below the storage temperature range) leading to defective orientation or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is s ubject to a low temperature.

9.6 If the LCD modules have been operating for a long time showing the same display patterns, the display patter nsmay remain on the screen as ghost images and a slight contrast irregularity may also appear. A normal operatin g status can beregained by suspending use for some time. It should be noted that this phenomenon does not adver sely affect performance reliability.

9.7 To minimize the performance degradation of the LCD modules resulting from destruction caused by static electricity etc., exercise care to avoid holding the following sections when handling the modules.

9.7.1 - Exposed area of the printed circuit board.

9.7.2 -Terminal electrode sections.