


MDT1010AIS-MIPI	800 x 1280	MIPI Interface	TFT Module
Specification			
Version: 1		Date: 22/09/2017	
Revision			
1	20/09/2017	First issue	

Display Features		
Display Size	10.10"	
Resolution	800 x 1280	
Orientation	Portrait	
Appearance	RGB	
Logic Voltage	3.3V	
Interface	MIPI	
Brightness	280 cd/m ²	
Touchscreen	---	
Module Size	143.00 x 228.60 x 2.60mm	
Operating Temperature	-10°C ~ +50°C	
Pinout	40 Way Connector	
Pitch	---	Weight / Display

Display Accessories	
Part Number	Description

Optional Variants	
Appearances	Voltage



GENERAL DESCRIPTION

DESCRIPTION

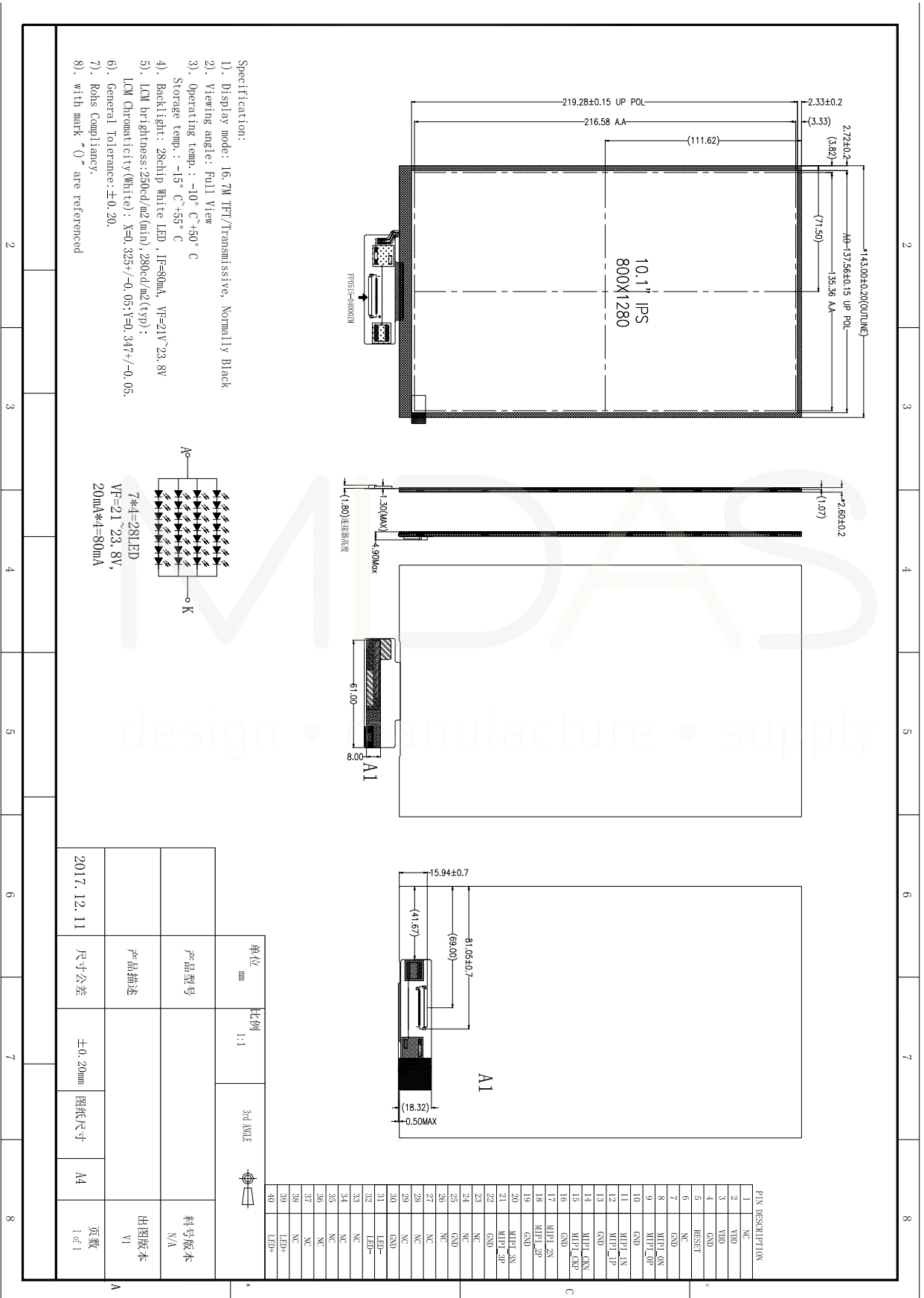
MDT1010AIS-MIPI is a color active matrix thin film transistor IPS (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. It is composed of a TFT LCD panel, Driver IC , FPC and Backlight.

FEATURES:

No.	Item	Specification	Unit
1	Panel Size	10.1"	inch
2	Number of Pixels	800×RGB (3) ×1280	pixels
3	Active Area	135.36 (W)x 216.58 (H)	mm
4	Pixel Pitch	0.1692 (W)×0.1692(H)	mm
5	Outline Dimension	143 (W)×228.6 (H)×2.6(D)	mm
6	Number of Colors	16.7M	-
7	Display Mode	Normally Black	-
8	Viewing Direction	Whole View	-
9	Display Format	RGB vertical stripe	-
10	Center Luminance (cd/m ²)	280(TYP.)	nit
11	Contrast Ratio	900(TYP.)	
12	Surface Treatment	Anti-Glare	-
13	Interface	MIPI	-
14	Backlight	White LED	-
15	Operation Temperature	-10-50	°C
16	Storage Temperature	-15-55	°C
17	Polarizer Type	AG: Anti Glare (2H,3H) HC: Hard Coating	



MECHANICAL SPECIFICATION



PIN DESCRIPTION

Pin No.	Symbol	Type	Function
1	NC	-	NC
2	VDD	P	Power supply 3.3V
3	VDD	P	Power supply 3.3V
4	GND	P	Ground
5	RESET	p	Global reset pin
6	NC	-	No connection
7	GND	P	Ground
8	MIPI-0N	I	MIPI Date negative signal
9	MIPI-0P	I	MIPI Date Positive signal
10	GND	P	Ground
11	MIPI-1N	I	MIPI Date negative signal
12	MIPI-1P	I	MIPI Date Positive signal
13	GND	P	Ground
14	MIPI-CLKN	I	MIPI CLK negative signal
15	MIPI-CLKP	I	MIPI CLK Positive signal
16	GND	P	Ground
17	MIPI-2N	I/O	MIPI Date negative signal
18	MIPI-2P	I/O	MIPI Date Positive signal
19	GND	P	Ground
20	MIPI-3N	I	MIPI Date negative signal
21	MIPI-3P	I	MIPI Date Positive signal
22	GND	P	Ground
23	NC	-	No connection
24	NC	-	No connection
25	GND	P	Ground
26	NC	-	No connection
27	NC	-	No connection
28	NC	-	No connection
29	NC	-	No connection
30	GND	P	Ground
31	LED-	P	Power for LED backlight (Cathode)
32	LED-	P	Power for LED backlight (Cathode)
33	NC	-	No connection
34	NC	-	No connection
35	NC	-	No connection
36	NC	-	No connection
37	NC	-	No connection
38	NC	-	No connection
39	LED+	P	Power for LED backlight (Anode)
40	LED+	P	Power for LED backlight (Anode)



ELECTRICAL CHARACTERISTICS
ABSOLUTE MAXIMUM RATINGS

LCD Module Electrical Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Power Supply Voltage (LCD Module)	VDD	-0.3	3.3	4.2	V	
Logic Low Threshold (LED_EN,PWM)	VIL	-	-	0.8	V	
Logic High Threshold (LED_EN,PWM)	VIH	1.9	-	-	V	
PWM Dimming Frequency	fDIM	100	-	30K	Hz	

ELECTRICAL SPECIFICATIONS

LCD Module Electrical Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Digital Supply Voltage 1	VDDIO	1.65	1.8	3.3	V	
Voltage Current 1	Ivddio	100			mA	
Digital Supply Voltage 2	VDD	3.0	3.3	3.6	V	
Voltage Current 2	Ivdd	200			mA	

Notes : 1. The supply voltage is measured and specified at the interface connector of LCM. The current draw and power consumption specified is for 3.3V at 25°C.

b) Typ. : Color Bar Pattern

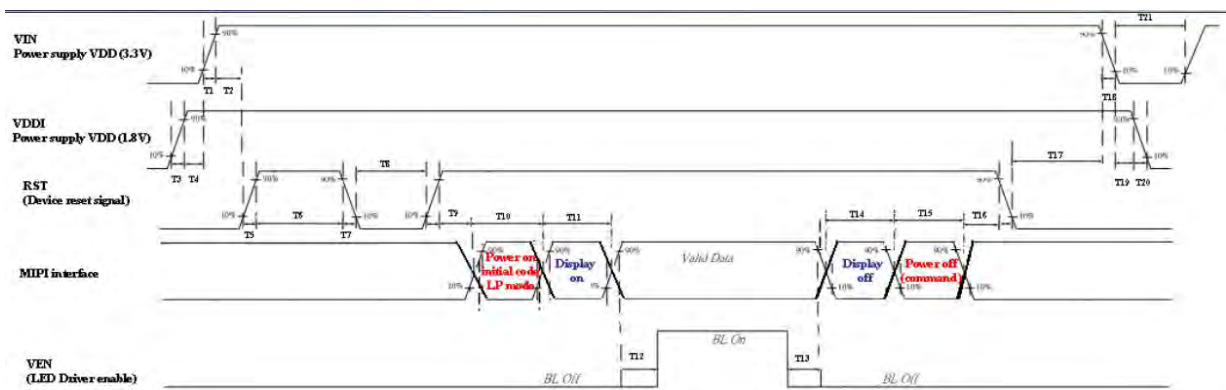
a) Max. : White(L255) Pattern

POWER ON/OFF SEQUENCE

To prevent a latch-up or DC operation of the LCD module, the power on/off sequence shall be as shown in below

Power-On/Off Timing Sequence:





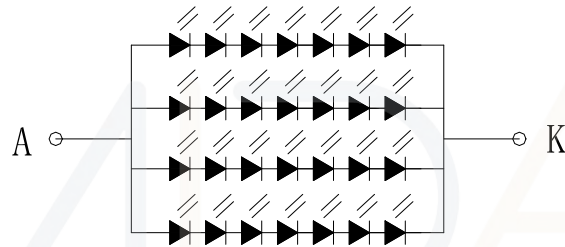
Power Sequence Timing			
Parameter	Value		Unit
	Min.	Max.	
T1	0.5	10	ms
T2	1	-	
T3	0.5	10	
T4	0	50	
T5	0	0.002	
T6	1	-	
T7	0	0.002	
T8	0.01	-	
T9	5	-	
T10	180	-	
T11	33.4	-	
T12	200	-	
T13	200	-	
T14	33.4	-	
T15	180	-	
T16	50	-	
T17	120	-	
T18	0	10	
T19	0	10	
T20	0	10	
T21	500	-	

BACK LIGHT UNIT

Ta=25°C

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current	I _{LED}		80		mA	28LEDS
Forward voltage	V _F	21	22.4	23.8	V	I _F =80mA 28LEDS
Reverse current	I _R			50	μA	V _R =10V, 1LED
Luminous tolerance	IV-M	70	75		%	(Min/Max)×100
Power dissipation	P _d	1792			mW	28LEDS
Peak forward current	I _{FP}	100			mA	1LED
Reverse Voltage	V _R	10			V	1LED

Internal Circuit Diagram



$7 \times 4 = 28 \text{ LED}$, $V_F = 21 \sim 23.8 \text{ V}$, $20 \text{ mA} \times 4 = 80 \text{ mA}$

design • manufacture • supply



INPUT SIGNAL TIMING

LCM INITIALIZATION CODE

TBD

PARALLEL MIPI INPUT TIMING TABLE

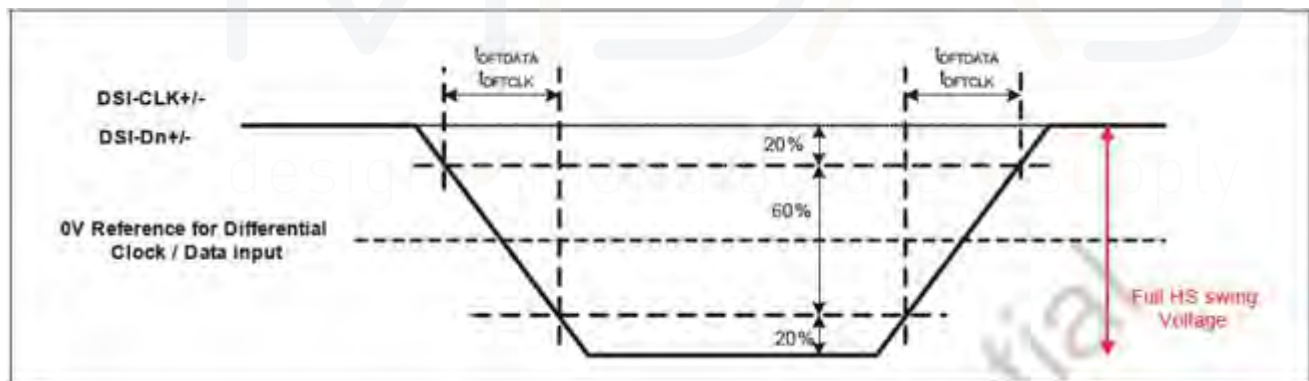
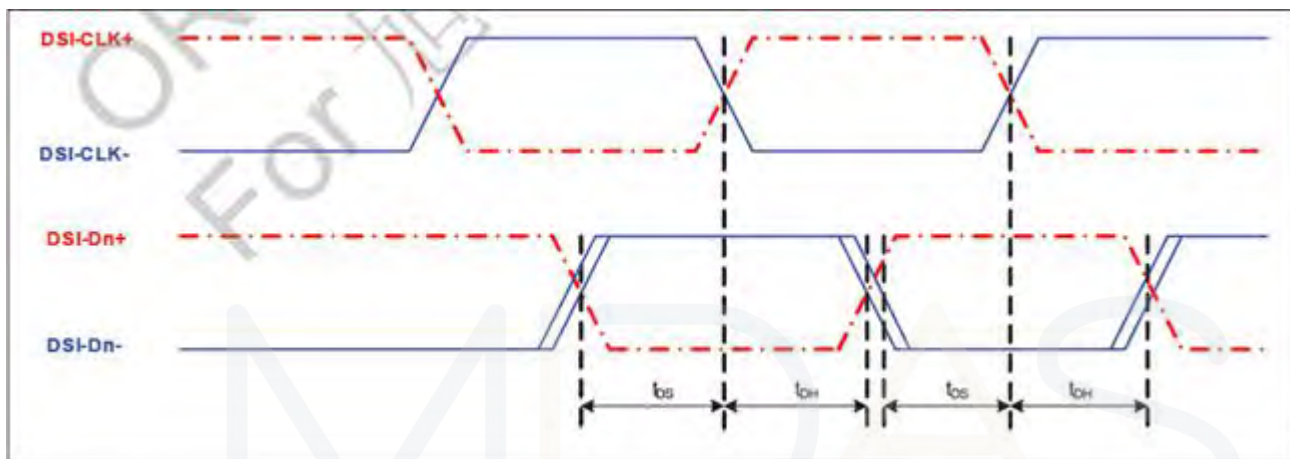
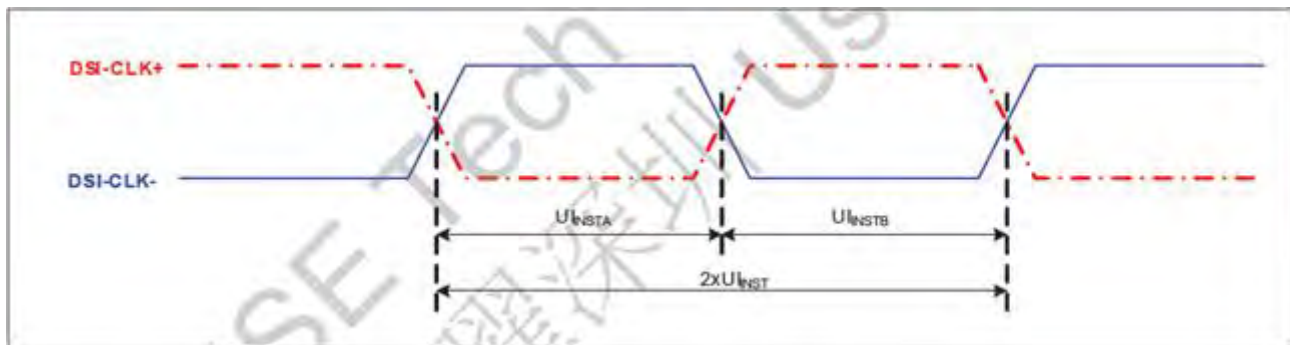
Porch data parameter

Vertical Total	VT	1300	Line
V-Front porch	VFP	12	Line
V-Back porch	VBP	12	Line
V-sync	VS	5	Line
V-active	VA	1280	Line
Horizontal Total	HT	960	Pixel
H-Front porch	HFP	50	Pixel
H-Back porch	HBP	40	Pixel
H-sync	HS	4	Pixel
H-active	HA	800	pixel

TIMING DIAGRAM

High speed mode timing

Parameter	Symbol	Parameter	Specification			Unit
			MIN	TYP	MAX	
High Speed Mode						
DSI-CLK+/-	$2 \times UI_{INST}$	Double UI instantaneous	2.22	-	25	ns
DSI-CLK+/-	$UI_{INSTA} - UI_{INSTB}$	UI instantaneous Halfs	1.11	-	12.5	ns
DSI-Dn+/-	t_{DS}	Data to clock setup time	0.15	-	-	UI
DSI-Dn+/-	t_{DH}	Data to clock hold time	0.15	-	-	UI
DSI-CLK+/-	t_{DRTCLK}	Differential rise time for clock	150	-	0.3UI	ps
DSI-Dn+/-	$t_{DRTDATA}$	Differential rise time for data	150	-	0.3UI	ps
DSI-CLK+/-	t_{DFTCLK}	Differential fall time for clock	150	-	0.3UI	ps
DSI-Dn+/-	$t_{DFTDATA}$	Differential fall time for data	150	-	0.3UI	ps



INPUT SIGNALS, BASIC DISPLAY COLORS & GRAY SCALE OF COLORS

Color & Gray Scale		Input Data Signal																							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Gray Scale of Red	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	△	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	▽	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Gray Scale of Green	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0		
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0		
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	
	▽	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	
Gray Scale of Blue	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	
	▽	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	
Gray Scale of White	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	△	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1		
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1		
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	1	1	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	
	▽	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	



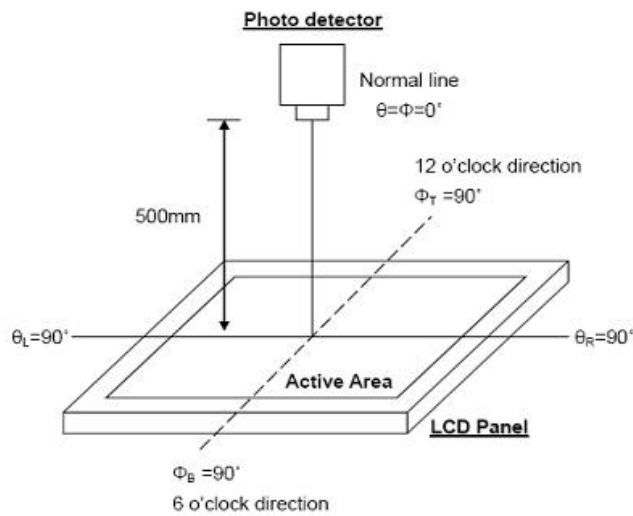
OPTICAL CHARACTERISTICS

Ta=25°C±2

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	$\theta = 0^\circ$	700	900	-		Note1 Note4
Center Luminance		YL		250	280	-	cd/m ²	Note1 Note6 Note7
Luminance Uniformity		IV-M		70	75		%	
Response Time (Rising + Falling)		T _{RT}	Ta= 25°C $\theta = 0^\circ$	-	25	-	ms	Note1 Note3
Viewing Angle range	Horizontal	θ _L	CR > 10	-	80	-		Note2
		θ _R		-	80	-		
	Vertical	θ _U		-	80	-		
		θ _D		-	80	-		
Color Chromaticity	White	x	Typ -0.03	Typ +0.03	0.304		Note1 Note5 Note7	
		y			0.333			
	Red	x			0.600			
		y			0.325			
	Green	x			0.282			
		y			0.536			
	Blue	x			0.143			
		y			0.151			
NTSC				-	50	-	%	

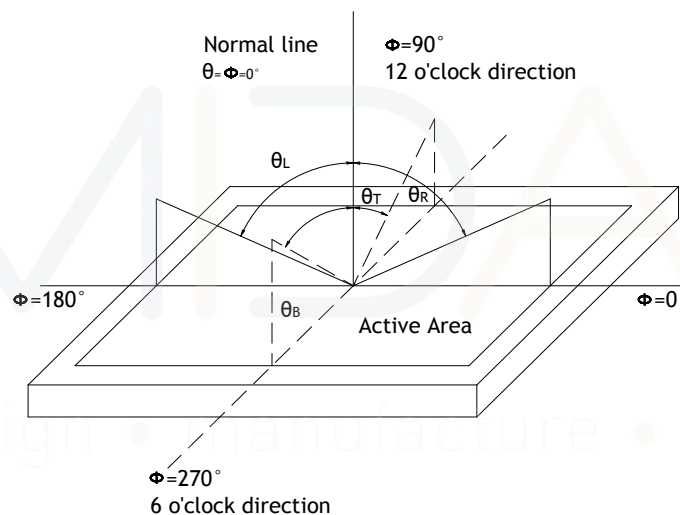
Note1: Definition of optical measurement system





Note2: Definition of viewing angle range and measurement system

Viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80).



Note3: Definition of Response time

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time (TON) is the time between photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is the time between photo detector output intensity changed from 10% to 90%.

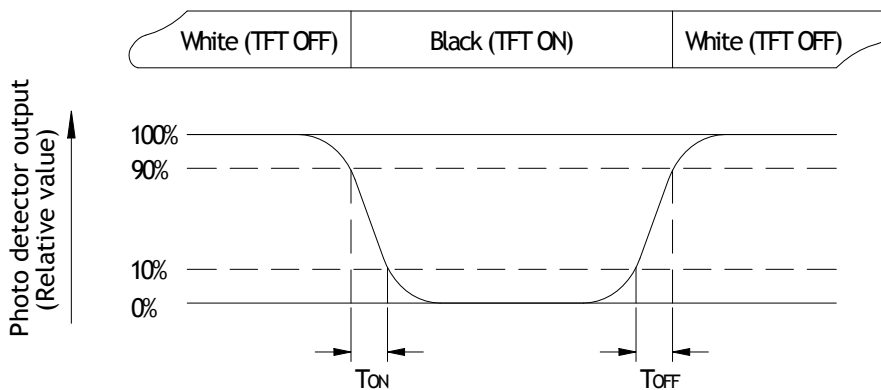


Fig. 6-3 Definition of response time



Note4: Definition of contrast ratio

Luminance measured when LCD on the Whitestate

Contrast ratio(CR)=**Luminance measured when LCD on the Blackstate**

“White state “: The state is that the LCD should drive by V_{white} .

“Black state”: The state is that the LCD should drive by V_{black} .

V_{white} : To be determined V_{black} : To be determined.

Note5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

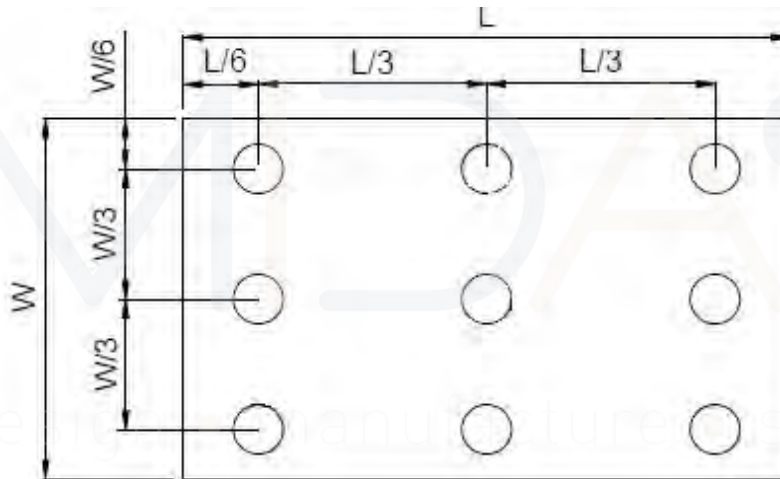
Note6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is $I_L=225mA$.

Note7: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas. Every measuring point is placed at the center of each measuring area.

Luminance Uniformity (U) = L_{min} / L_{max}

L-----Active area length, W----- Active area width



B_{max} : The measured maximum luminance of all measurement position.

B_{min} : The measured minimum luminance of all measurement position.



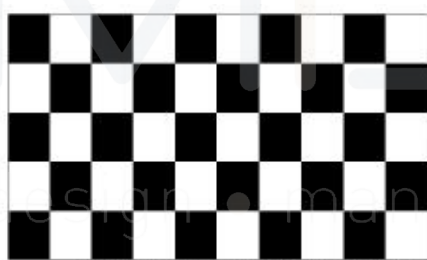
RELIABILITY TEST ITEMS

TEMPERATURE AND HUMIDITY

Test Item	Test Condition	Remark
High Temperature Storage	Ta=55°C; 72hrs	IEC60068-2-1 : 2007 GB2423.2-2008
Low Temperature Storage	Ta=-15°C; 72hrs	IEC60068-2-1 : 2007 GB2423.1-2008
High Temperature Operation	Ta=50°C , 72Hrs	IEC60068-2-1 : 2007 GB2423.2-2008
Low Temperature Operation	Ta=-10°C; 72hrs	IEC60068-2-1 : 2007 GB2423.1-2008
High Temperature High Humidity Operation	Ta=50°C , 90%RH , 72Hrs(no condensation)	IEC60068-2-78 : 2001 GB/T2423.3-2006
Thermal Shock	-15°C (0.5h) ~ 55°C (0.5h) / 10cycles	Start with cold temperature , End with high temperature , IEC60068-2-14:1984,GB2423.22-2002
Image Sticking	25°C ; 4hrs	Note1

Note1:Condition of image sticking test :25°C±2°C

Operation with test pattern sustained for 4hrs,then change to gray pattern immediately.after5 mins, the mura must be disappeared completely



(a) Test Pattern (chess board Pattern)



(b) Gray Pattern

VIBRATION & SHOCK

Test item	Conditions	Remark
Packing Shock (non-operation)	980m/s2,6ms, ±x,y,z 3times for direction	IEC60068-2-27 : 1987 GB/T2423.5-1995
Packing Vibration (non-operation)	Frequency range:10 HZ~50HZ Stroke:1.0mm,sweep:10 HZ ~50HZ x,y,z 2 hours for each direction	IEC60068-2-32 : 1990 GB/T2423.8-1995

ESD

Test item	Conditions	Remark	
Electro Static Discharge Test (non-operation)	150pF , 330Ω , Contact:±4KV,Air:±8KV	1	IEC61000-4-2 : 2001 GB/T17626.2-2006
	200pF , 0Ω , ±200V contact test	2	

Note: Measure point :

1. LCD glass and metal bezel
2. IF connector pins



GENERAL PRECAUTION

SAFETY

1. Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.
2. If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
3. If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

STORAGE CONDITIONS

1. Store the panel or module in a dark place where the temperature is $23\pm 5^{\circ}\text{C}$ and The humidity is below $50\pm 20\%RH$.
2. Store in anti-static electricity container.
3. Store in clean environment, free from dust, active gas, and solvent.
4. Do not place the module near organics solvents or corrosive gases.
5. Do not crush, shake, or jolt the module.

HANDLING PRECAUTIONS

- (1) Avoid static electricity which can damage the CMOS LSI.
- (2) The polarizing plate of the display is very fragile. So, please handle it very carefully.
- (3) Do not give external shock.
- (4) Do not apply excessive force on the surface.
- (5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the Surface of plate.
- (6) Do not use ketonics solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
- (7) Do not operate it above the absolute maximum rating.
- (8) Do not remove the panel or frame from the module.
- (9) When the module is assembled, it should be attached to the system firmly, Be careful not to twist and bend the module.
- (10) Wipe off water droplets or oil immediately. If you leave the droplets for a long time, staining and discoloration may occur.
- (11) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs or clothes, it must be washed away thoroughly with soap.

WARRANTY

- (1) The period is within twelve months since the date of shipping out under normal using and storage conditions.
- (2) Do not repaired or modified the LCM. It may cause function to lose efficacy, AMELIN does not warrant the LCM.
- (3) All process and material comply ROHS.



The foreign standards

Appearance Inspection

- (1) visual range: 35cm - 40cm
- (2) visual Angle: normal visual LCD panel view (figure 1)
- (3) temperature: 23 ± 5 °C
- (4) ambient humidity: 60, plus or minus 5 RH
- (5) ambient illumination: under the optical test 50 Lux, test 300 Lux below, the appearance 1000 Lux above, operate 500 Lux above
- (6) the test conditions refer to the specification
- (7) Mura & leakage USES ND - 5%
- (8) The standards are not implemented according to the explicit standards

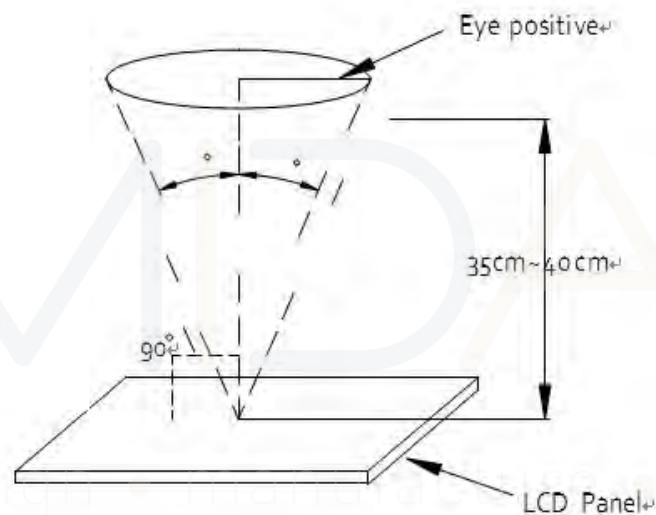
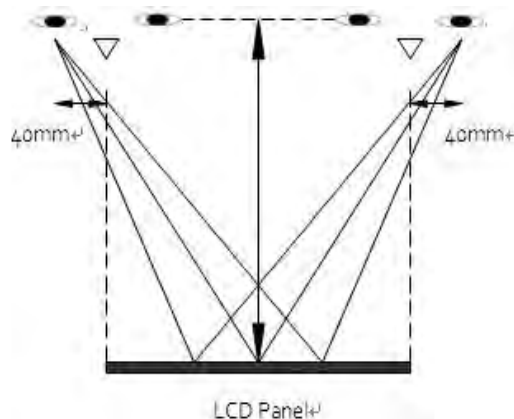


figure 1

Special survey

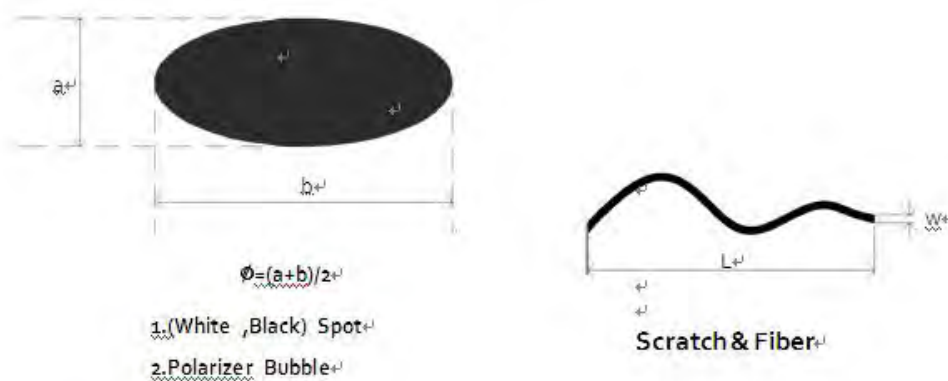
- (1) visual distance: check the distance between the adjacent points and the defect points
- (2) view change check
- (3) special inspection: image residue test



Inspection standard

Defect types		specifications		note	
Visual impairment	The scratch	$W \leq 0.05\text{mm}$		ignore	
		$0.05\text{mm} \leq w \leq 0.1\text{mm}$		$N \leq 3$	
		$L \leq 10\text{mm}$		$N=0$	
		$10\text{mm} < L, 0.1\text{mm} < w$			
	internal	point	$\Phi < 0.15\text{mm}$		ignore
			$0.15\text{mm} \leq \Phi \leq 0.35\text{mm}$		$N \leq 3$
			$0.35\text{mm} < \Phi$		$N=0$
		Linear foreign POL	$0.1\text{mm} \leq W \leq 0.2\text{mm}, l \leq 5\text{mm}$		$N \leq 4$
			$0.2\text{mm} < w, 2.5\text{mm} < l$		$N=0$
			convex-concave point		
Electrical defect	specifications	A ☒	B ☒	Total	
	LCD dot	$\Phi < 0.15\text{mm}$	$0.15\text{mm} < d \leq 0.35\text{mm}$	$N \leq 2$	
	BL dot	$\Phi < 0.15\text{mm}$	$0.15\text{mm} < d \leq 0.35\text{mm}$	$N \leq 2$	
	Total points	N	$N \leq 2$	$N \leq 2$	
	Two or more adjacent points	Don't allow			
(1) 1 pixel is 3 subpixels, including R, G, and B (2) the distance between two points is greater than 10cm					

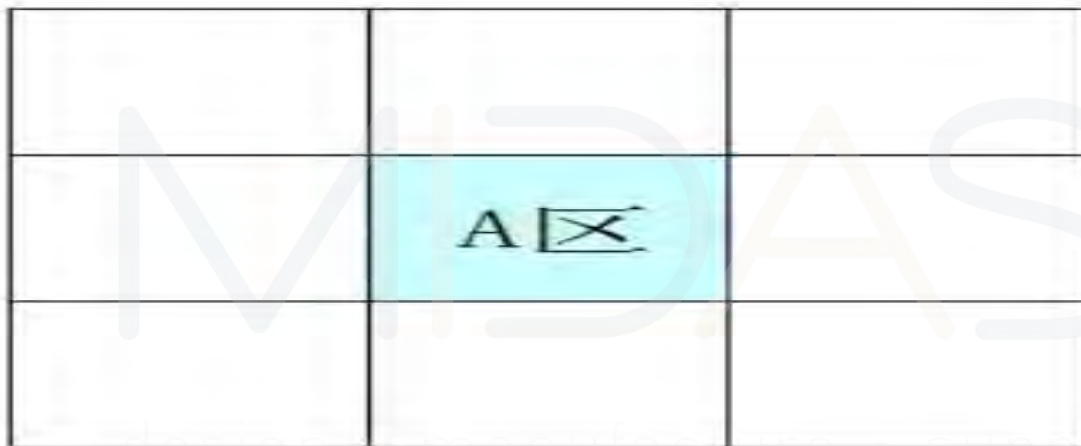
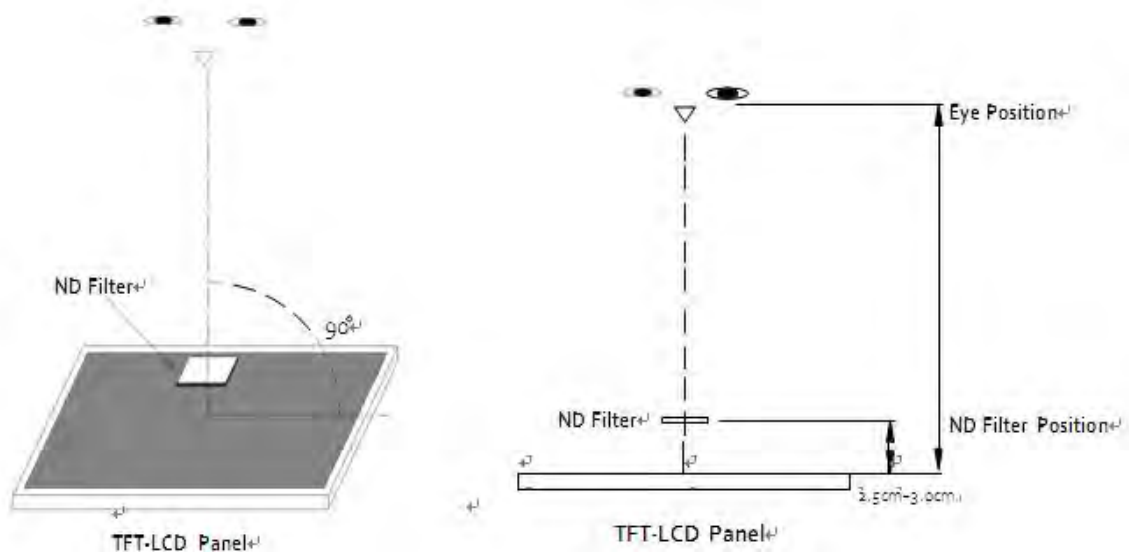
note 1: W : breadth [mm], L : length [mm], N : number Φ : diameter



Note2: Highlights: according to panel vendor specification

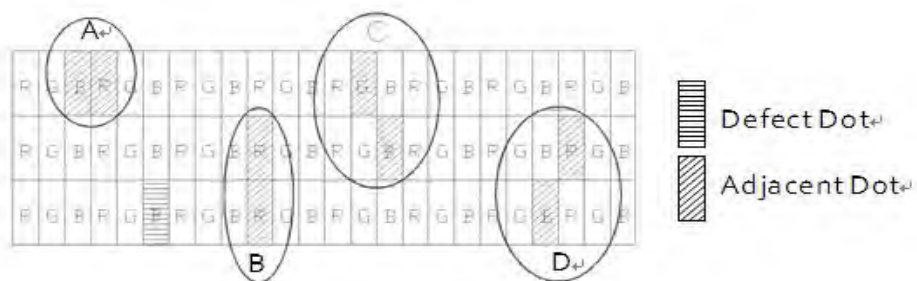
Note3: area in the middle, and other areas





Note 4: the defect points and adjacent points are as follows

Adjacent defect points, including bright and adjacent points. They're going to count the total number of points of defect.



Note 5: other conditions

- (1) the lack of line mentioned above shall be handled by both parties
- (2) the missing line is not a defect or count under the black interface



Treatment measures

- (1) Don't disassemble and reassemble the module by self.
- (2) Acid, alkali, alcohol or touched directly by hand will damage the display.
- (3) Static electricity will damage the module. Please configure grounding device.
- (4) The strong vibration, shock, twist or bend will cause material damage, even module broken.
- (5) It is easy to cause image sticking while displaying the same pattern for very long time.
- (6) The response time, brightness and performance will vary from different temperature.
- (7) 12 months of the product term, Xianchuang shipment date began to count.

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