MDT0700AC-USBC	1920 x 1200	USB-C Interface	TFT Module

Specification	
Version: 1	Date: 22/04/2023

Revision		
1	20/04/2023	First issue

Display Features			
Display Size	7.00"		
Resolution	1920 x 1200		
Orientation	Portrait		
Appearance	RGB		
Supply Voltage	5V		
Interface	USB-C		
Brightness	410 cd/m^2		
Touchscreen	CTP		
Module Size	108.70 x 165.80 x 15.51^{MAX} mm	Created By	Checked By
Operating Temperature	-20°C ~ +70°C	CL	WE
Pinout	N/A	Box Quantity	Weight / Display
Pitch	N/A	---	---

RoHS Compliant

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Display Accessories	
Part Number	Description

Optional Variants	
Appearances	Voltage

1. Basic Specifications

* Description

This is a plug and play device, this is a color active matrix TFT (Thin Film Transistor) LCD (liquid crystal display) that uses amorphous silicon TFT as a switching device. This module is composed of a Transmissive type TFT-LCD Panel, driver circuit, capacitance touch panel,back-light unit, HDMI adapter board. The resolution of a 7.0" TFT-LCD contains 1920x1200 pixels,and can display up to 16.7M colors.

* Operating Instructions

This product supports the following operating systems:Windows 8/10/11,Android, Linux,etc.

1.Connect the type c connector.

2.Connect the typec c cable to Windows 8/10/11 or Android or Linux, etc.

1.1 TFT Features

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	151.20(H) *94.50(V) (7.0 inch)	mm	
Driver element	TFT active matrix	-	
Display colors	16.7M	colors	
Number of pixels	1200(RGB)*1920	dots	
Pixel arrangement	RGB vertical stripe	-	
Pixel pitch	0.07875 (H) x 0.07875 (V)	mm	
Viewing angle	Free	o'clock	
Display mode	Transmissive /Normally Black	-	
Module bonding technology	Use Optical bonding between LCM and CTP	–	
Operating temperature	-20～+70	℃	
Storage temperature	-30～+80	℃	

1.2 Module Features

General Information Items	Specification	Unit	Note
Display Interface	Type C	-	
Touch Interface	Type C	-	
Touch Type	Capacitive touch panel	-	
Touch Mode	Multiple point	-	
Power supply	Type C	-	

Note: Video and touch and power are transfered by type c cable.

1.3 Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)	-	108.7	-	mm	
	Vertical(V)	-	165.80	-	mm	
	Depth(D)	-	-	15.51	mm	
Weight		-	TBD	-	g	

2. Block Diagram

3.   Outline dimension

NOTES:
1. DISPLAY TYPE: 7.0", TFT-LCD, 16.7M COLORS
2. DISPLAY MODE: NORMALLY BLACK/IPS
3. VIEWING DIRECTION: FREE
4. LCM Interface: USB Type-C (No support PD protocol)
5. Touch Interface: Type C Interface
6. POWER IN: USB-C (5V/2A) or Micro-USB (5V/2A)
7. OPERATING TEMP: -20°C TO 70°C
   STORAGE TEMP: -30°C TO 80°C
8. RoHS COMPLIANT.
9. " * " critical dimension;( )reference dimension.

The unmarked size shall be subject to CAD !

Detail:"A"
Scale:4/1

Detail:"B"
Scale:1.5/1

7.0" TFT
1200*RGB1920
All

Bottom view
Side view
Front view

MiDAS DISPLAYS

| | ReV | Revision content description | Date |
| G | V0 | First Issue | 2022.12.07 |

DRAWING NAME: MDT0700AC-USBC
PARTS NO.

TOLERANCE		
TOLERANCE UNLESS	X.X±0.3	
OTHERWISE SPECIFIED	X.XX±0.2	

Drawn
Checked
Approve

Scale 1:1
Unit mm
Page 1/1

USB1:Micro-USB/USB-BP-004-BU

Pin	Logic
1	VBUS_5V
2	NC
3	NC
4	NC
5	GND

COM4: S32261-D/FT10in1(ex)

Pin	Logic
1	OFF/ON
2	BLK-
3	BLK+
4	GND

COM3:MIPI OLT-TS10M1D11M(ex)

Pin	Name	Pin	Name	Pin	Name	Pin	Name
1	GND	11	BL_VDD	21	MIPI_CLKP	31	LCD_3.3V
2	GND	12	GND	22	GND	32	CTP_SCL
3	MIPI_RST	13	GND	23	MIPI_D0N	33	CTP_SDA
4	LCD_1.8V	14	MIPI_D3N	24	MIPI_D0P	34	CTP_INT
5	LCD_3.3V	15	MIPI_D3P	25	GND	35	CTP_RST
6	LCD_3.3V	16	GND	26	MIPI_D00N	36	USB_DP
7	NC	17	MIPI_D2N	27	MIPI_D00P	37	USB_DN
8	BL_PWM	18	MIPI_D2P	28	GND	38	VBUS_5V
9	NC	19	GND	29	GND	39	GND
10	BL_VDD	20	MIPI_CLKN	30	LCD_3.3V	40	GND

USB2:TypeC IN/U262-24IN-4BV04

Pin	Logic	Pin	Logic	Pin	Logic
1	GND	9	VBUS_5V	17	CC2
2	DP_D1P	10	DP_D2P	18	USB_DP
3	DP_D1N	11	DP_D2N	19	USB_DN
4	VBUS_5V	12	GND	20	AUXP
5	CC1	13	GND	21	VBUS_5V
6	USB_DP	14	DP_D3P	22	DP_D0P
7	USB_DN	15	DP_D3N	23	DP_D0N
8	AUXN	16	VBUS_5V	24	GND

Detail "A" labels: CF of LCD, Housing, Bottom Bezel, Black Tape, FPC, Lens, OCA/SCA, Sensor, OCA, Up Pol

Detail "B" labels: Connector, Copper pillar, FPC, PCB, Foam, Protective film, Lens, OCA/SCA, Housing, Sensor, Up Pol

Black Tape(T=0.06mm)

4. Pin Assignment

4.1 Type C Input

NO.	SYMBOL	DESCRIPTION	I/O
A1	GND	Ground.	P
A2	SSTXP1	Positive TX Super Speed Differential Signal #1.	I
A3	SSTXN1	Negative TX Super Speed Differential Signal #1.	I
A4	VBUS	Supply voltage(5V).	P
A5	CC1	Configuration channel.	I
A6	DP1	USB2.0+ signal.	I
A7	DN1	USB2.0- signal.	I
A8	SBU1	Sideband use (SBU)	I
A9	VBUS	Supply voltage(5V).	P
A10	SSRXN2	Negative RX Super Speed Differential Signal #2.	I
A11	SSRXP2	Positive RX Super Speed Differential Signal #2.	I
A12	GND	Ground.	P
B1	GND	Ground.	P
B2	SSTXP2	Positive TX Super Speed Differential Signal #2.	I
B3	SSTXN2	Negative TX Super Speed Differential Signal #2.	I
B4	VBUS	Supply voltage(5V).	P
B5	CC2	Configuration channel.	I
B6	DP2	USB2.0+ signal.	I
B7	DN2	USB2.0- signal.	I
B8	SBU2	Sideband use (SBU)	I
B9	VBUS	Supply voltage(5V).	I
B10	SSRXN1	Negative RX Super Speed Differential Signal #1.	P
B11	SSRXP1	Positive RX Super Speed Differential Signal #1.	P

B12	GND	Ground.	P

4.2 Backup power Input

USB1(Micro USB)

NO.	SYMBOL	DESCRIPTION	I/O
1	VBUS_5V	Supply voltage(5V).	P
2	NC	No connection.	
3	NC	No connection.	
4	NC	No connection.	
5	GND	Ground.	P

Note: When the power of type c is not enough, user could enable this power, usually user don't need to enable it.

4.3 Backlight Key Input

CON4(Molex：53261-0471)

NO.	SYMBOL	DESCRIPTION	I/O
1	OFF/ON	Turn off or turn on backlight.	I
2	BLK-	Reduce brightness of backlight.	I
3	BLK+	Increase brightness of backlight. Note: The brightness is configured for maximum after power on.	I
4	GND	Ground	P
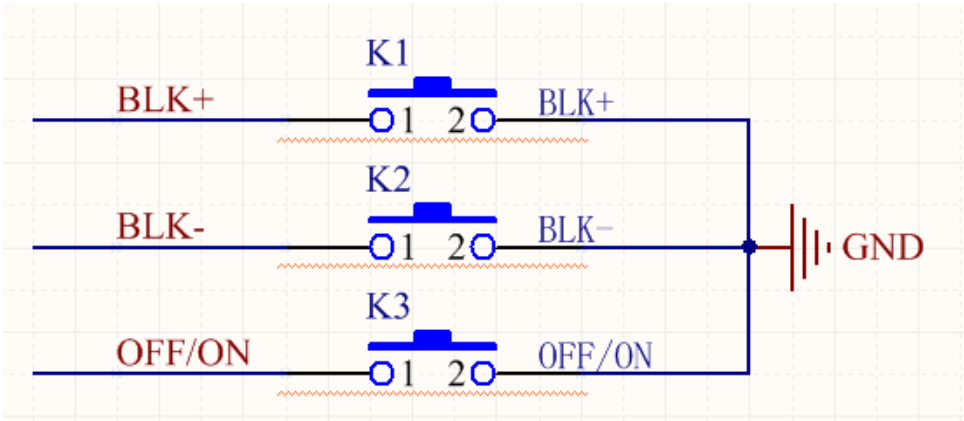
key circuit diagram

5. LCM Optical Characteristics

5.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit.	Note
Contrast Ratio		CR		800	1100	--		(1)(2)
Response time	Rising	T_R+T_F		--	25	35	msec	
	Falling			--	70	--		(1)(3)
Color Gamut		S(%)		-0.02	0.2952	+0.02	%	
LCM Luminance		LV		350	410		cd/m2	
Color Filter Chromacicity	White	W_X	$\Theta=0$ Normal viewing angle	--	25	35		(1)(4) CF glass
		W_Y			0.3366			
	Red	R_X			0.6492	+0.04		
		R_Y			0.3474			
	Green	G_X		-0.04	0.2926			
		G_Y			0.6010			
	Blue	B_X			0.1490			
		B_Y			0.0856			
Viewing angle	Hor.	ΘL	CR>10	75	80	--		(1)(4)
		ΘR		75	80	--		
	Ver.	ΘU		75	80	--		
		ΘD		75	80	--		
Option View Direction			Free					

*The data comes from the LCD specification.

Measuring Condition

Measuring surrounding : dark room

Ambient temperature : $25\pm2_oC$

15min. warm-up time.

Measuring Equipment

FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.

Note (1): Definition of Viewing Angle :
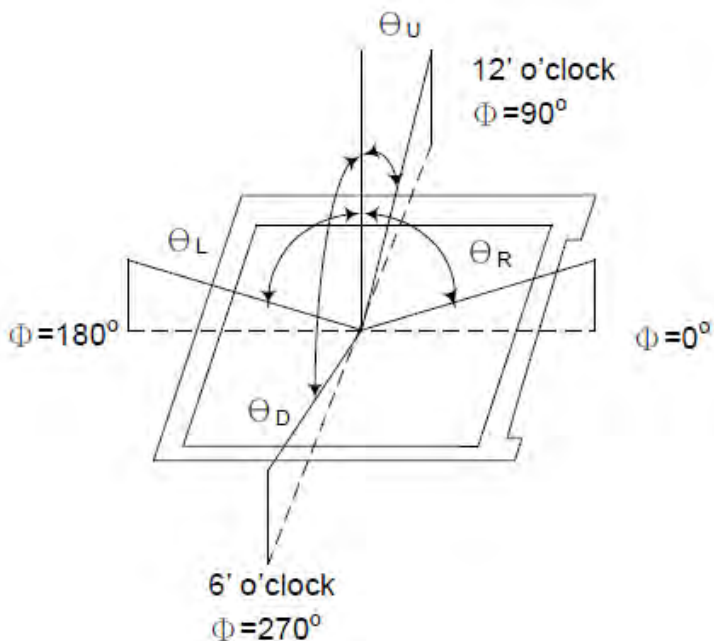
Note (2): Definition of Contrast Ratio(CR) :measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

Note (3): Response Time
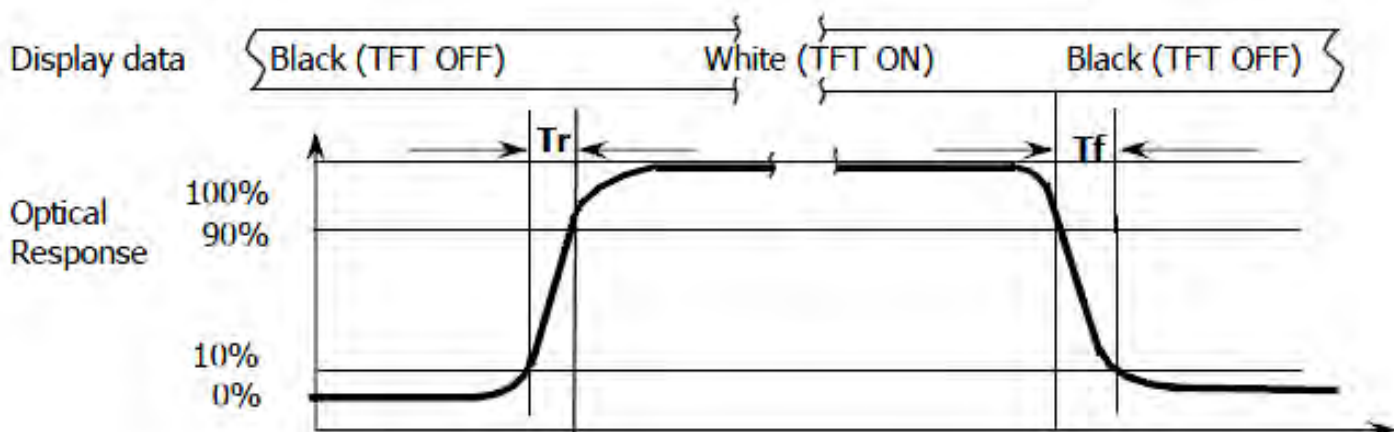
Note (4): Definition of optical measurement setup
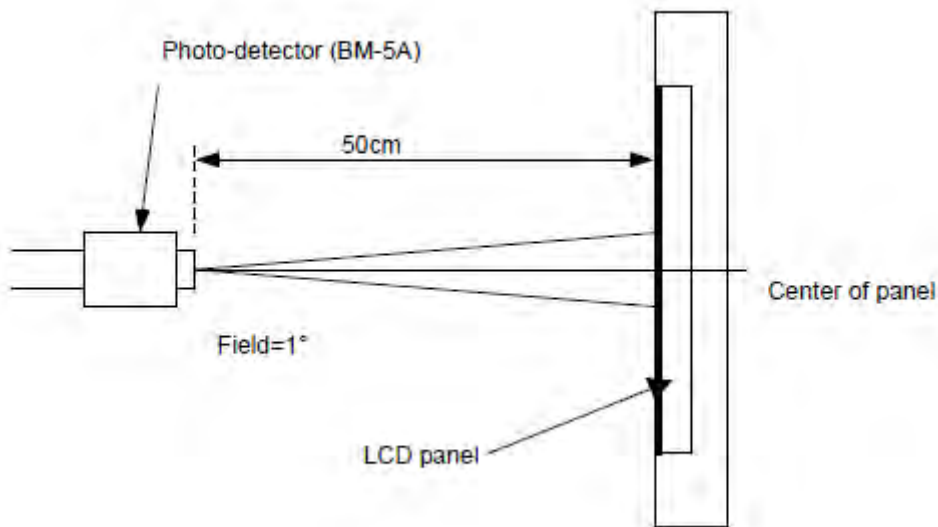
6. Electrical Characteristics

6.1 Absolute Maximum Rating

Characteristics	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	VBUS	-0.5	6	V	Note1
Operating temperature	T_{OP}	-20	+70	℃	
Storage temperature	T_{ST}	-30	+80	℃	

NOTE1: If the absolute maximum rating of even is one of the above parameters is exceeded even momentarily, the quality of the product may be degraded. Absolute maximum ratings, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the range of the absolute maximum ratings.

6.2 DC Electrical Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply Voltage	VBUS	4.5	5	5.5	V	
Normal mode Current consumption	I_{VBUS}	--	300	--	mA	

7. LCM Module Out-Going Quality Level

7.1 VISUAL & FUNCTION INSPECTION STANDARD

7.1.1 Inspection conditions

Inspection performed under the following conditions is recommended.

Temperature : 25±5℃

Humidity :   65%±10%RH

Viewing Angle : Normal viewing Angle.

Illumination: Single fluorescent lamp (300 to 700Lux)

Viewing distance:30-50cm

Upper Polarizer

Bottom glass   Upper

Bottom Polarizer

Light Source
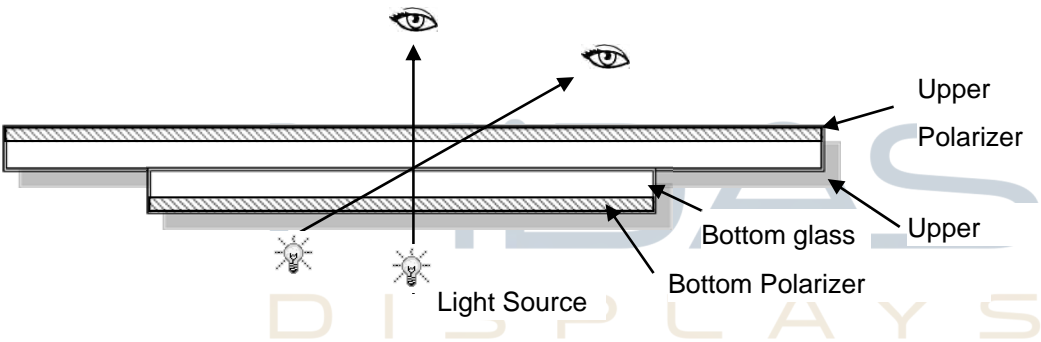
7.1.2 Definition

Zone D
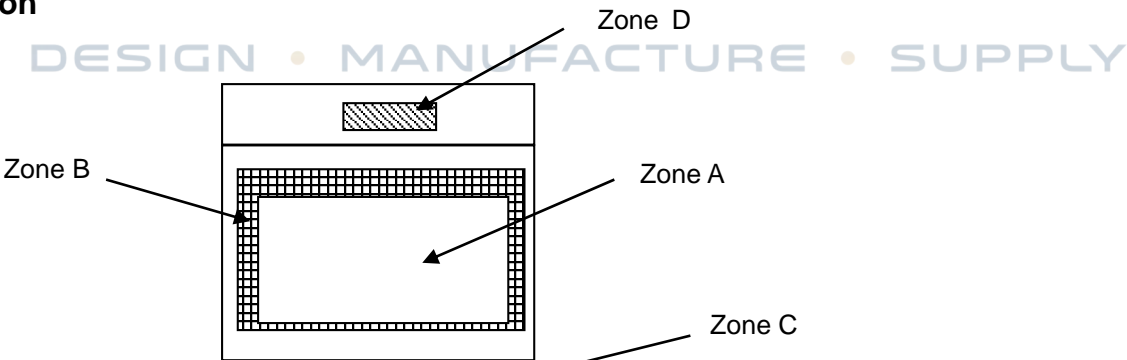
Zone B

Zone A

Zone C

Zone A : Effective Viewing   Area(Character or Digit can be seen)

Zone B : Viewing Area except Zone A

Zone C : Outside (Zone A+Zone B) which can not be seen after assembly by customer .)

Zone D : IC Bonding Area

Note:

As a general rule ,visual defects in Zone C can be ignored when it doesn't effect product function or appearance

after assembly by customer

7.1.3 Sampling Plan

According to GB/T 2828-2003 ; , normal inspection, Class Ⅱ

AQL:

Major defect	Minor defect
0.65	1.5
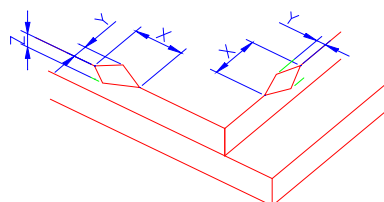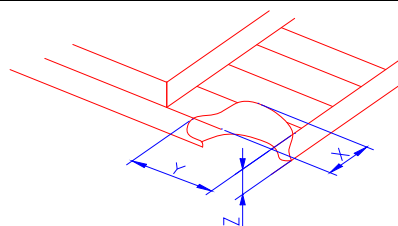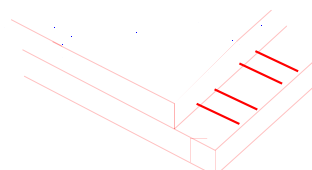
LCD: Liquid Crystal Display , LCM: Liquid Crystal Module, CTP: Capacitive Touch Panel

No	Items to be inspected	Criteria	Classification of defects
1	Functional defects	1) No display, Open or miss line 2) Display abnormally, Short 3) Backlight no lighting, abnormal lighting. etc	Major
2	Missing	Missing components and etc	
3	Outline dimension	Overall outline dimension beyond the drawing is not allowed,deformation and etc	
4	Color tone	Color unevenness, refer to limited sample	Minor
5	Spot/Line defect	Light dot,Dim spot,(Note1) Polarizer Air Bubble, Polarizer accidented spot and etc	
6	Soldering appearance	Good soldering , Peeling off is not allowed and etc	
7	LCD/Polarizer/CTP	Black/White spot/line, scratch, crack, etc.	

Note1: a) Light dot：Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern.

b) Dim dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue picture.
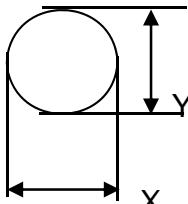
7.1.4 Criteria (Visual)

Number	Items	Criteria(mm)
1.0 LCD Crack/Broken NOTE: X: Length Y: Width Z: Height L: Length of ITO, T: Height of LCD	(1) The edge of LCD broken	 | X	Y	Z
≤3.0mm	<Inner border line of the seal	≤T	
	(2)LCD corner broken	 | X	Y	Z
≤3.0mm	≤L	≤T	
	(3) LCD crack	 Crack Not allowed

| 2.0 | Spot defect

 Φ=(X+Y)/2 | ① light dot (black/white spot , pinhole, stain，etc.)

 ② Dim spot（light leakage、 dent、 dark spot，etc)

 ③ Polarizer accidented spot

 ④Polarizer Bubble |

① light dot (black/white spot , pinhole, stain，etc.)

Size (mm) / Zone	Acceptable Qty		
	A	B	C
Φ≤0.15	Ignore	Ignore	
0.15<Φ≤0.25	3(distance≧10mm)		
0.25<Φ≤0.4	2(distance≧10mm)		
Φ>0.4	0		

② Dim spot（light leakage、 dent、 dark spot，etc)
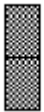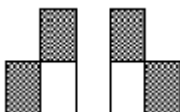
Size (mm) / Zone	Acceptable Qty		
	A	B	C
Φ≤0.15	Ignore	Ignore	
0.15<Φ≤0.25	3(distance≧10mm)		
0.25<Φ≤0.4	2(distance≧10mm)		
Φ>0.4	0		

③ Polarizer accidented spot

Size (mm) / Zone	Acceptable Qty		
	A	B	C
Φ≤0.2	Ignore		Ignore
0.2<Φ≤0.5	2(distance≧10mm)		
Φ>0.5	0		

④Polarizer Bubble

Size (mm) / Zone	Acceptable Qty		
	A	B	C
Φ≤0.2	Ignore		Ignore
0.2<Φ≤0.4	2(distance≧10mm)		
Φ>0.4	0		

3.0	LCD Pixel defect	Pixel bad points

Item	Zone A		Acceptable Qty
Bright dot	Random		N≤2
	2 dots adjacent		N≤0
	3 dots adjacent		N≤0
Dark dot	Random		N≤3
	2 dots adjacent		N≤0
	3 dots adjacent		N≤0
Distance	1. Minimum Distance Between Bright dots. 2. Minimum Distance Between dark dots 3. Minimum Distance Between dark and bright dot.		5mm
Total bright and dark dot			N≤4

Note:

A) Bright dot：Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern.

B) Dark dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue picture.

C) 2 dot adjacent = 1 pair = 2 dots

Picture:

2 dot adjacent   2 dot adjacent

2 dot adjacent (vertical)   2 dot adjacent (slant)
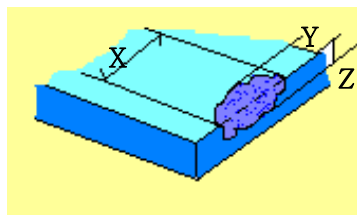
	Line defect (LCD /Polarizer backlight black/white line, scratch, stain) W: width, L：length N：Count					
		Width(mm)	Length(mm)	Acceptable Qty		
4.0				A	B	C
		Φ≤0.05	Ignore	Ignore		Ignore
		0.05<W≤0.06	L≤5.0	N≤3		
		0.06<W≤0.08	L≤4.0	N≤2		
		W>0.08	Define as spot defect			

5.0	Electronic Components SMT.	Not allow missing parts，solderless connection，cold solder joint，mis match，The positive and negative polarity opposite
6.0	Display color& Brightness.	1. Color：Measuring the color coordinates, The measurement standard according to the datasheet or samples. 2. Brightness：Measuring the brightness of White screen, The measurement standard according to the datasheet or Samples.
7.0	LCD Mura/Waving/ Hot spot	Not visible through 5% ND filter in 50% gray or judge by limit sample if necessary.

8.0	CTP Related	CTP Cover sensor accidented black/white spot				
			Size Φ(mm)	Acceptable Qty		
				A	B	C
			Φ≤0.15	Ignore		Ignore
			0.15<Φ≤0.25	4（distance≧10mm）		
			0.25<Φ≤0.35	3（distance≧10mm）		
			Φ>0.35	0		

	CTP Cover scratch	Width(mm)	Ignore(mm)	Acceptable Qty		
				A	B	C
		Φ≤0.05	Ignore	Ignore		
		0.05<W≤0.06	L≤4.0	N≤3		
		0.06<W≤0.08	L≤3.0	N≤2		
		0.08<W	Define as spot defect			

CTP Cover Pinhole/ Lack of ink	Zone Size (mm)	Acceptable Qty
		C
	Φ≤0.2	Ignore
	0.2<Φ≤0.3	4(distance≧10mm)
	0.3<Φ≤0.4	2(distance≧10mm)
	Φ>0.4	0

CTP Bonding bubble/ accidented spot	Size Φ(mm)	Acceptable Qty	
		A	B
	Φ≤0.1	Ignore	
	0.1<Φ≤0.2	3(distance≧10mm)	
	0.2<Φ≤0.3	2(distance≧10mm)	
	Φ>0.3	0	

Assembly deflection	beyond the edge of backlight ≤0.2mm

CTP cover broken X：length Y：width Z：height	X	Y	Z
	X≤0.5mm	Y≤0.5mm	Z<cover thickness
	Circuitry broken is not allowed.		

X	Y	Z
X≤0.3mm	Y≤0.3mm	Z<cover thickness

CTP cover broken
X：length
Y：width
Z：height

* Circuitry broken is not allowed.

<u>Criteria (functional items)</u>

Number	Items	Criteria (mm)
1	No display	Not allowed
2	Missing segment	Not allowed
3	Short	Not allowed
4	Backlight no lighting	Not allowed
5	CTP no function	Not allowed

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8. Reliability Test Result

Item	Condition	Inspection after test
High Temperature Operating	70℃,96HR	Inspection after 2~4hours storage at room temperature, the sample shall be free from defects: 1.Air bubble in the LCD; 2.Non-display; 3.Missing segments/line; 4.Glass crack; 5.Current IDD is twice higher than initial value.
Low Temperature Operating	-20℃, 96HR	
High Temperature Storage	80℃, 96HR	
Low Temperature Storage	-30℃, 96HR	
High Temperature & High Humidity Operating	+60℃, 90% RH ,96 hours.	
Thermal Shock (Non-operation)	-30℃,30 min ↔ 80℃,30 min, Change time:5min 20CYC.	
ESD test	C=150pF, R=330,5points/panel Air:±8KV, 5times; Contact:±6KV, 5 times; (Environment: 15℃~35℃, 30%~60%).	
Vibration (Non-operation)	Frequency range:10~55Hz, Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z. (6 hours for total) (Package condition).	
Box Drop Test	1 Corner 3 Edges 6 faces,80㎝(MEDIUM BOX)	

Remark:

1.The test samples should be applied to only one test item.

2.Sample size for each test item is 3~10pcs.

3.For Damp Proof Test, Pure water(Resistance＞10MΩ) should be used.

4.In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.

5.Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.

9. Cautions and Handling Precautions

9.1 Handling and Operating the Module

(1) When the module is assembled, it should be attached to the system firmly.

Do not warp or twist the module during assembly work.

(2) Protect the module from physical shock or any force. In addition to damage, this may cause improper operation or damage to the module and back-light unit.

(3) Note that polarizer is very fragile and could be easily damaged. Do not press or scratch the surface.

(4) Do not allow drops of water or chemicals to remain on the display surface.

If you have the droplets for a long time, staining and discoloration may occur.

(5) If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.

(6) The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane.

Do not use ketene type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.

(7) 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.

(8) Protect the module from static; it may cause damage to the CMOS ICs.

(9) Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.

(10) Do not disassemble the module.

(11) Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.

(12) Pins of I/F connector shall not be touched directly with bare hands.

(13) Do not connect, disconnect the module in the "Power ON" condition.

9.2 Storage and Transportation.

(1) Do not leave the panel in high temperature, and high humidity for a long time.

It is highly recommended to store the module with temperature from 0 to 35 ℃ and relative humidity of less than 70%

(2) Do not store the TFT-LCD module in direct sunlight.

(3) The module shall be stored in a dark place. When storing the modules for a long time, be sure to adopt effective measures for protecting the modules from strong ultraviolet radiation, sunlight, or fluorescent light.

(4) It is recommended that the modules should be stored under a condition where no condensation is allowed. Formation of dewdrops may cause an abnormal operation or a failure of the module.

In particular, the greatest possible care should be taken to prevent any module from being operated where condensation has occurred inside.

(5) This panel has its circuitry FPC on the bottom side and should be handled carefully in order not to be stressed.