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MCT0144C6W128128PML	128 x 128	MULTI Interface	TFT Module
(MDT0144ASS-MULTI)		**Specification**	
Version: 1		Date: 08/07/2021	

Revision

1	14/10/2020	First issue
2	06/07/2021	Updated Brightness

Display Features	
Display Size	1.44”
Resolution	128 x 128
Orientation	Square
Appearance	RGB
Logic Voltage	3.3V
Interface	Parallel/ SPI
Brightness	200 cd/m^2
Touchscreen	---
Module Size	32.36 x 38.00 x 2.60mm
Operating Temperature	-20°C ~ +70°C
Pinout	30 way FFC
Pitch	0.5mm

RoHS compliant

Box Quantity	Weight / Display
---	---

* - For full design functionality, please use this specification in conjunction with the ST7735S specification.(Provided Separately)

Display Accessories	
Part Number	**Description**

Optional Variants	
Appearances	**Voltage**

General Description

*** Description**

This is a color active matrix TFT (Thin Film Transistor) LCD (liquid crystal display) that uses amorp hous silicon TFT as a switching device. This model is composed of a Transmissive type TFT-LCD Panel, driver circuit, back-light unit. The resolution of a 1.44'TFT-LCD contains 128x128pixels, and c an display up to 65K colors.

*** Features**

-Low Input Voltage: 3.3V (TYP)

-Display Colors of TFT LCD: 65K colors

-RGB Interface: - 8/16-BIT 8080 MCU interface

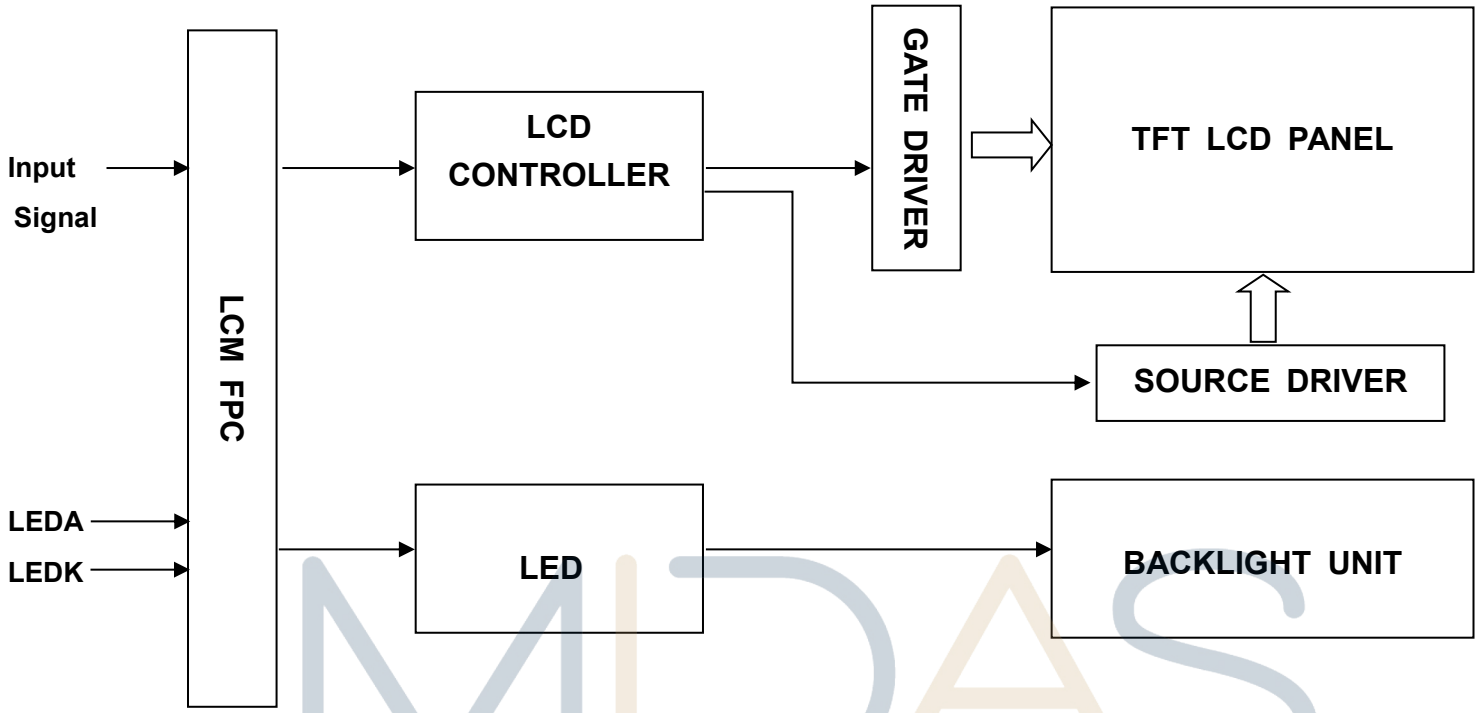
- 3/4-line SPI

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	25.50(H)*26.50(V) (1.44inch)	mm	-
Driver element	TFT active matrix	-	-
Display colors	65K	colors	-
Number of pixels	128(RGB)*128	dots	-
Pixel arrangement	RGB vertical stripe	-	-
Pixel pitch	0.1992(H)*0.207(V)	mm	-
Viewing angle	6:00	o'clock	-
TFT Driver IC	ST7735S	-	-
Display mode	TN/ Normally white	-	-
Operating temperature	-20～+70	℃	-
Storage temperature	-30～+80	℃	-

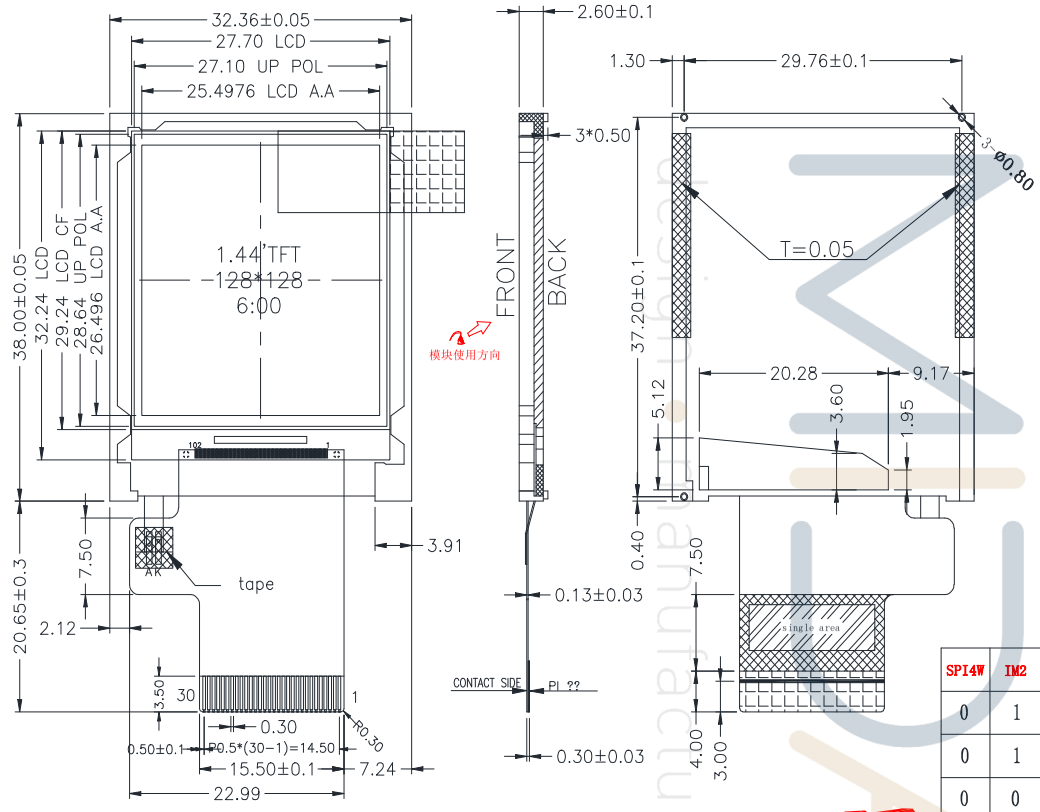
*** Mechanical Information**

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)		32.36		mm	-
	Vertical(V)		38.00		mm	-
	Depth(D)		2.60		mm	-
Weight			TBD		g	-

1. Block Diagram



Outline dimension



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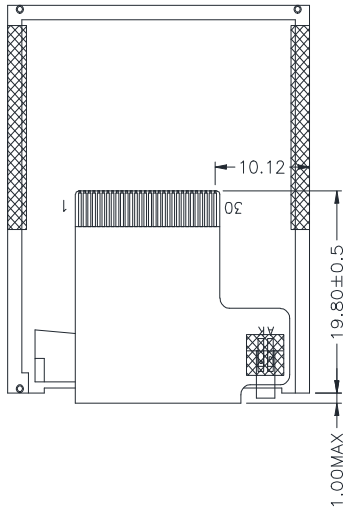


NO.	PIN NAME
1	GND
2	VCC
3	IOVCC
4	IM0
5	IM2
6	SPI4W
7	DB15
8	DB14
9	DB13
10	DB12
11	DB11
12	DB10
13	DB09
14	DB08
15	DB07
16	DB06
17	DB05
18	DB04
19	DB03
20	DB02
21	DB01
22	DB0(SPI-SDA)
23	RD
24	RS(SPI-SCL)
25	RESET
26	CS
27	WR(SPI-RS)
28	LEDK
29	LEDA
30	GND

SPI4W	IM2	IM0	Interface type	DB Pin in use
0	1	0	DBI Tyb_ 8-bit interface	DB7-DB0
0	1	1	DBI Tyb_ 16-bit interface	DB15-DB0
0	0	0	3-Wire 9 BIT data serial interface	SDA SCL CS
1	0	0	4-Wire 8 BIT data serial interface	SDA SCL CS RS

NOTE:
1. If not use PIN, fix to the GND , IOVCC or NC.

NOTES:
1. DISPLAY TYPE: 1.44", TFT-LCD
2. DISPLAY MODE: T/N NORMALLY WHITE
3. VIEWING DIRECTION: 6:00
4. DRIVER IC: ST7735S (COG)
5. VCI: 2.8-3.3V(TYP),IOVCC=1.8V-3.3V
6. OPERATING TEMP: -20°C TO 70°C
   STORAGE TEMP: -30°C TO 80°C
7. BACK LIGHT: LED WHITE, 1 LED, 15-20mA, 3.2±0.3V
8. RoHS COMPLIANT.

ReV	Revision content description	Date
V0	FIRST	2020/08/05

TOLERANCE(公差)		DRAWING NAME	MDT0144ASS-MULTI
		PARTS NO.	MDT0144ASS-MULTI
TOLERANCE UNLESS OTHERWISE SPECIFIED	X.X±0.3 X.XX±0.2	Drawn	Unit
		Checked	mm
Scale 1:1		Approve	Page 1/1

Input terminal Pin Assignment

NO.	SYMBOL	DISCRIPTION	I/O
1	GND	Ground.	P
2	VCC	Supply voltage (3.3V).	P
3	IOVCC	Supply voltage for I/O.(1.8V-3V)	P
4	IM0	IM0='1', MCU 8-bit parallel. IM0='0', MCU 16-bit parallel.	
5	IM2	MCU parallel interface and serial interface select. IM2='1', Parallel Interface. IM2='0', Serial Interface.	I
6	SPI4W	- SPI4W='0', 3-line SPI Enable. - SPI4W='1', 4-line SPI Enable. -If not used, Fix this pin to DGND.	I
7	DB15	- DB[15:0] are used as MCU parallel interface data bus.. - DB0 is the serial input/output signal in serial interface mode. - In serial interface, DB[15:1] are not used and should be fixed at GND.	I/O
8	DB14		I/O
9	DB13		I/O
10	DB12		I/O
11	DB11		I/O
12	DB10		I/O
13	DB09		I/O
14	DB08		I/O
15	DB07		I/O
16	DB06		I/O
17	DB05		I/O
18	DB04		I/O
19	DB03		I/O
20	DB02		I/O
21	DB01		I/O
22	DB0(SPI-SDA)		I/O
23	RD	Read Enable in 8080 MCU Parallel Interface.	I

24	RS(SPI-SCL)	-Display data/command selection pin in MCU Interface. -RS='1': Display data or parameter. -RS='0': Command data. -In serial interface, this is used as SCL. -If not used, please fix this pin at IOVCC or GND level.	I
25	RESET	This signal will reset the device and must be applied to properly initialize the chip.	I
26	CS	Chip Selection Pin -Low Enable.	I
27	WR(SPI-RS)	-Write enable in MCU parallel interface. -In 4-line SPI, this pin is used as RS (data/ command selection). -If not used, please fix this pin at IOVCC or GND.	I
28	LEDK	Cathode pin of backlight.	P
29	LEDA	Anode pin of backlight.	P
30	GND	Ground.	P

LCD Optical Characteristics

1. Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit.	Note
Transmittance (with Polarizer)		T(%)	--	--	5	--		
Contrast Ratio		CR	Θ=0 Normal viewing angle	500	700			
Response time	Rising	T_R		--	5	10	msec	
	Falling	T_F		--	15	25		
Color gamut		S(%)		--	40	--	%	
Color Filter Chromacicity	White	W_X		0.263	0.303	0.343		
		W_Y		0.285	0.325	0.365		
	Red	R_X		0.555	0.575	0.595		
		R_Y		0.31	0.33	0.35		
	Green	G_X		0.321	0.341	0.361		
		G_Y		0.578	0.598	0.618		
	Blue	B_X		0.132	0.152	0.172		
		B_Y		0.04	0.06	0.08		
Viewing angle	Hor.	$Θ_L$	CR>10	--	60	--		
		$Θ_R$		--	60	--		
	Ver.	$Θ_U$		--	30	--		
		$Θ_D$		--	60	--		
Option View Direction		6 O'clock						

*The data comes from the LCD specification.

Measuring Condition

Measuring surrounding : dark room

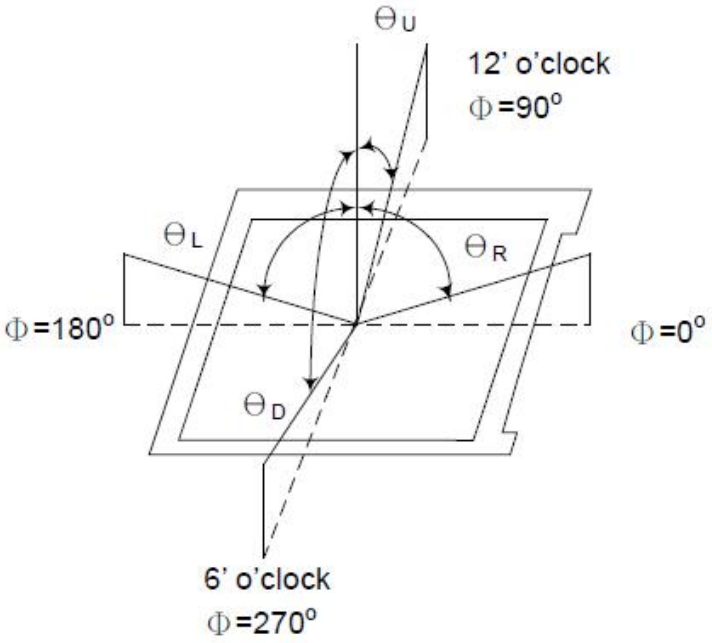
Ambient temperature : 25±2ₒC

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.

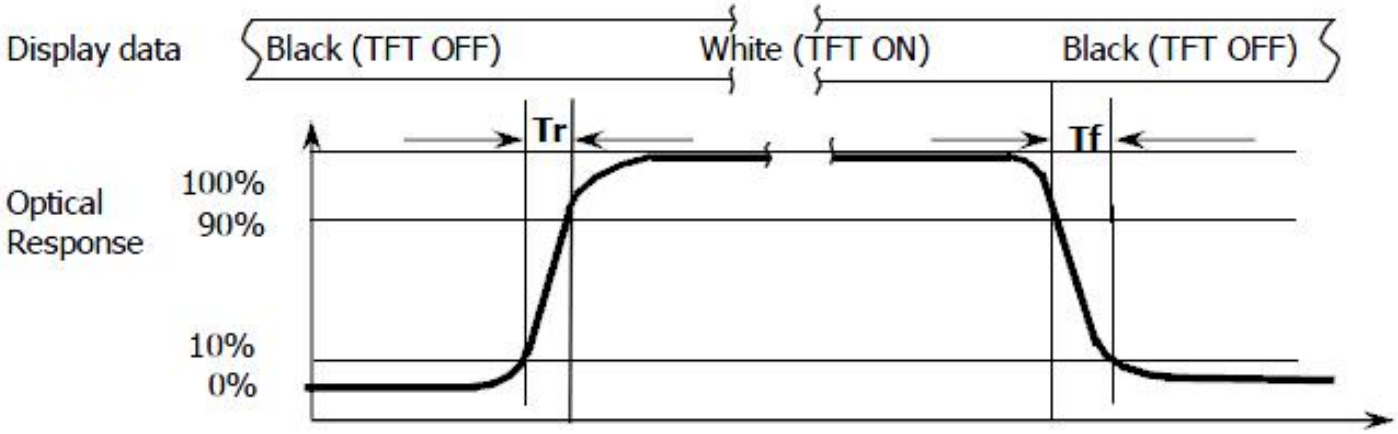
Note (1): Definition of Viewing Angle :



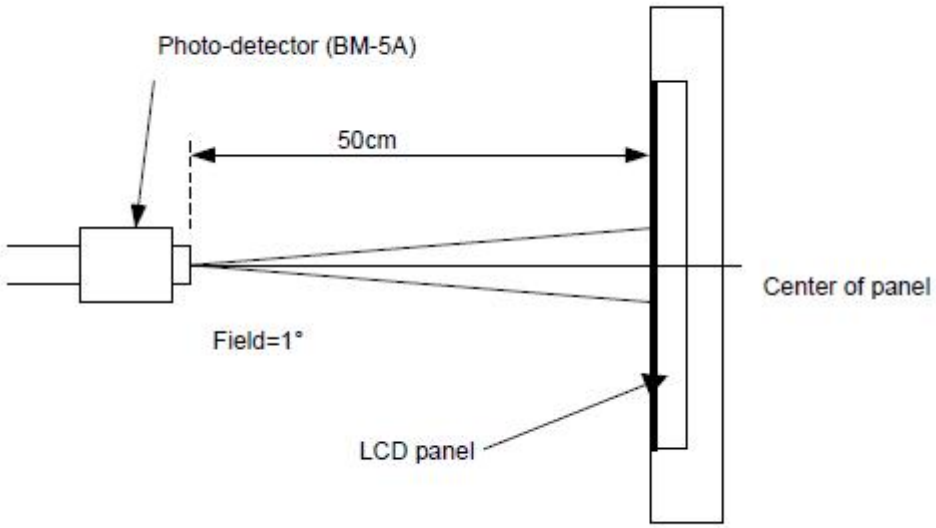
Note (2): Definition of Contrast Ratio(CR) :measured at the center point of panel

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

Note (3): Response Time



Note (4): Definition of optical measurement setup



Electrical Characteristics

1. Absolute Maximum Rating (Ta=25 VSS=0V)

Characteristics	Symbol	Min.	Max.	Unit
Digital Supply Voltage	VDD	-0.3	4.8	**V**
Digital interface supple Voltage	VDDIO	-0.3	4.6	**V**
Operating temperature	T_{OP}	-20	+70	℃
Storage temperature	T_{ST}	-30	+80	℃

2. DC Electrical Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Digital Supply Voltage	VDD	2.4	3.3	4.8	V	
Digital interface supple Voltage	VDDIO	1.65	3.3	4.8	V	
Normal mode Current consumption	IDD	--	1.2	--	mA	
Level input voltage	V_{IH}	$0.7V_{DDIO}$		VDDIO	V	
	V_{IL}	GND		$0.3V_{DDIO}$	V	
Level output voltage	V_{OH}	0.8VDDIO		VDDIO	V	
	V_{OL}	GND		0.2VDDIO	V	

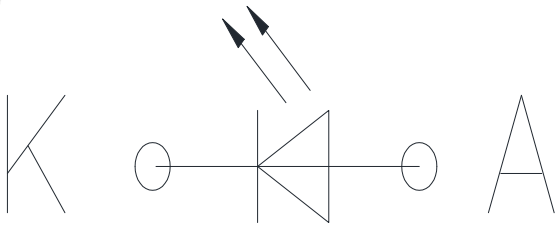
3. LED Backlight Characteristics

The back-light system is edge-lighting type with 1 chips White LED

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Current	I_F	15	20	--	mA	
Forward Voltage	V_F	--	3.2	--	V	
LCM Luminance	L_V	200	--	--	cd/m2	If=20mA
LED life time	Hr	50000	--	--	Hour	Note1,2
Uniformity	AVg	80	--	--	%	

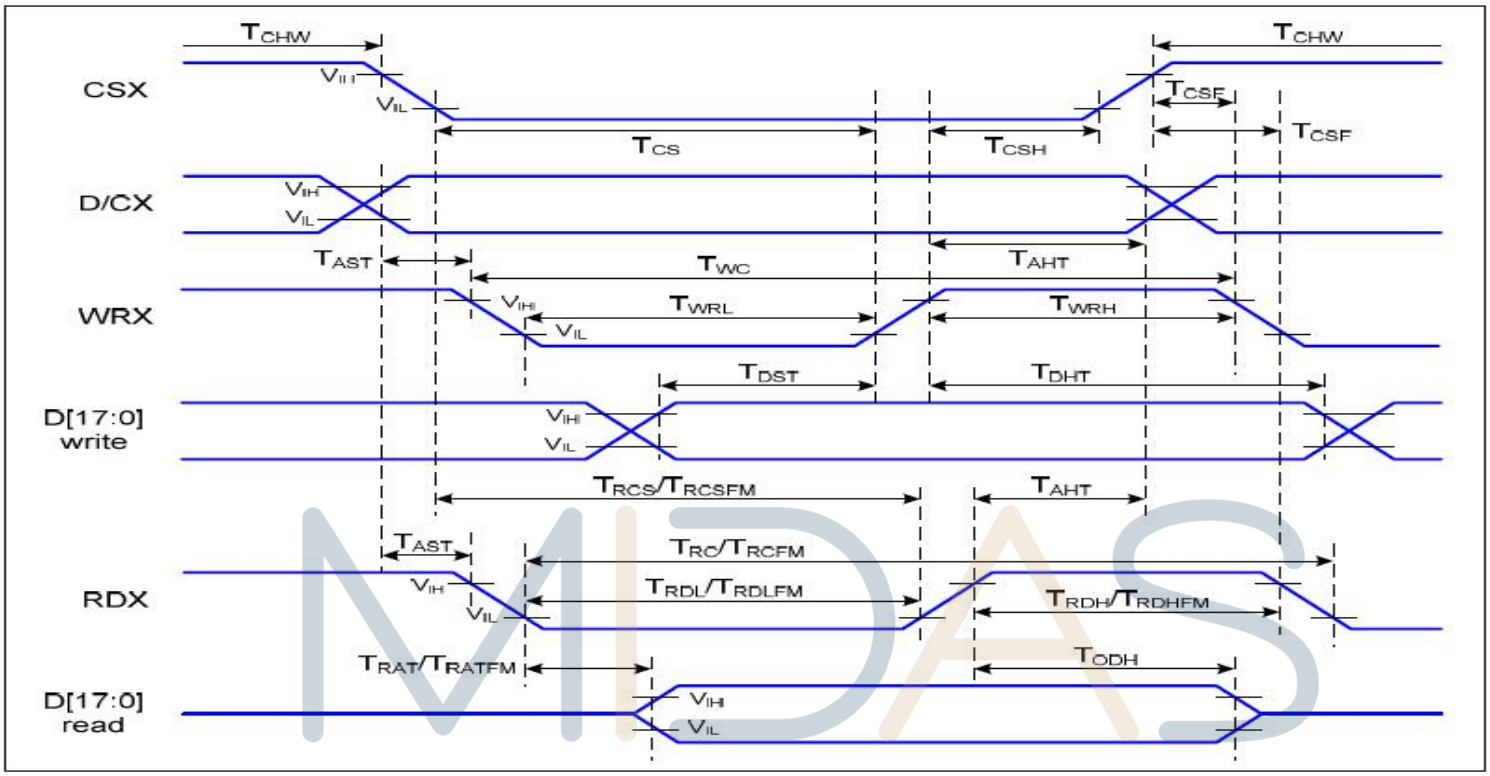
Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the condition: Ta=25±3 ℃, typical IL value indicated in the above table until the brightness becomes less than 50%.

Note (2) The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and IL=20mA. The LED lifetime could be decreased if operating IL is larger than 20mA. The constant current driving method is suggested.



AC Characteristic

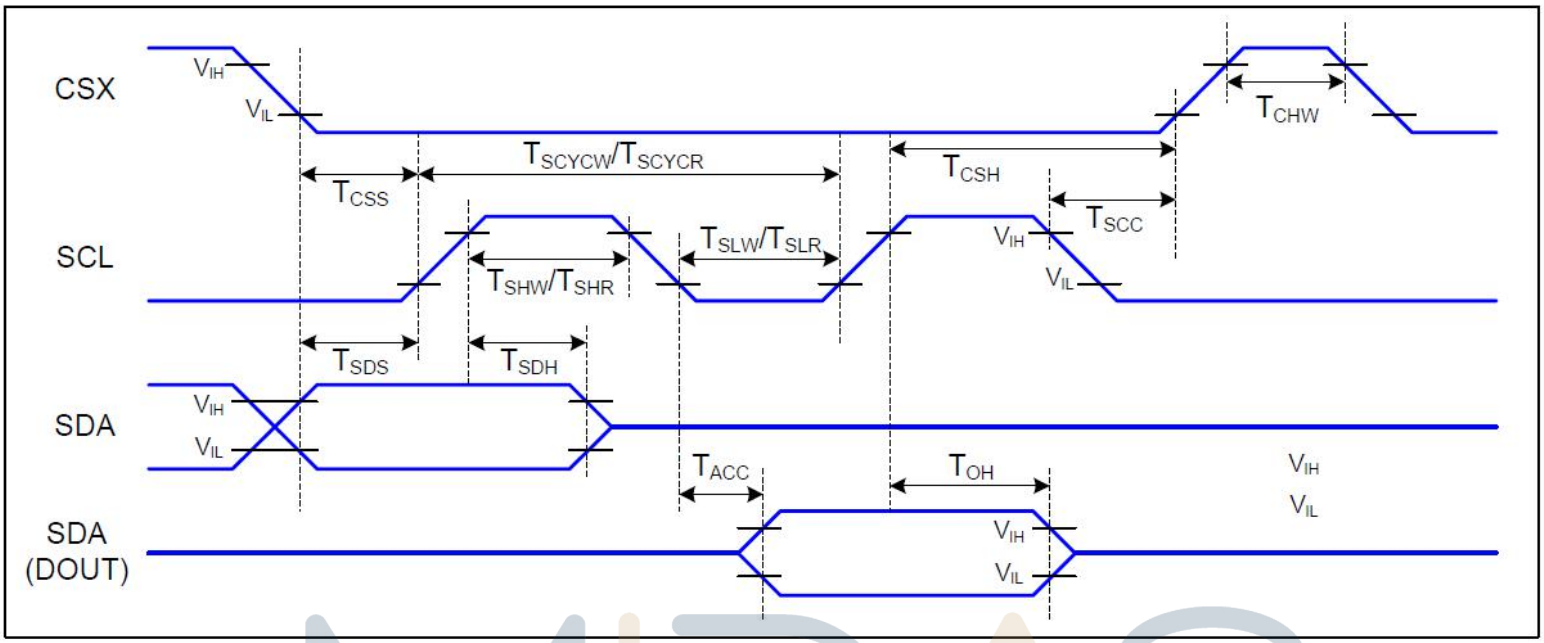
1. 8080 Series MCU Parallel Interface Timing Characteristics: 16/8-bit Bus



Ta=25 ℃, VDDI=1.65~3.7V, VDD=2.5~4.8V

Signal	Symbol	Parameter	Min	Max	Unit	Description
D/CX	TAST	Address Setup Ttime	0		ns	-
	TAHT	Address Hold Time (Write/Read)	10		ns	
CSX	TCHW	Chip Select “H” Pulse Width	0		ns	-
	TCS	Chip Select Setup Time (Write)	15		ns	
	TRCS	Chip Select Setup Time (Read ID)	45		ns	
	TRCSFM	Chip Select Setup time (Read FM)	355		ns	
	TCSF	Chip Select Wait Time (Write/Read)	10		ns	
	TCSH	Chip Select Hold Time	10		ns	
WRX	TWC	Write Cycle	66		ns	
	TWRH	Control Pulse “H” Duration	15		ns	
	TWRL	Control Pulse “L” Duration	15		ns	
RDX (ID)	TRC	Read Cycle (ID)	160		ns	When Read ID Data
	TRDH	Control Pulse “H” Duration (ID)	90		ns	
	TRDL	Control Pulse “L” Duration (ID)	45		ns	

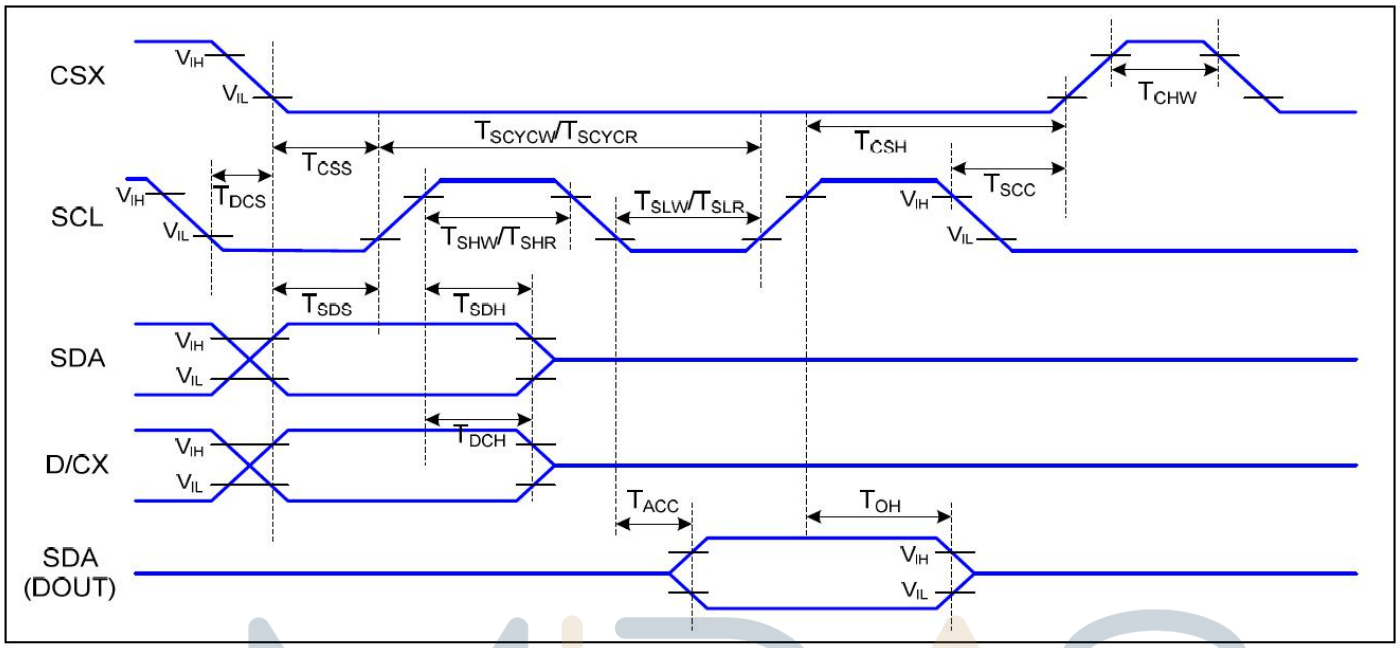
2. Serial Interface Characteristics (3-line Serial)



Ta=25 ℃, VDDI=1.65~3.7V, VDD=2.5~4.8V

Signal	Symbol	Parameter	Min	Max	Unit	Description
CSX	TCSS	Chip Select Setup Time (Write)	15		ns	
	TCSH	Chip Select Hold Time (Write)	15		ns	
	TCSS	Chip Select Setup Time (Read)	60		ns	
	TSCC	Chip Select Hold Time (Read)	65		ns	
	TCHW	Chip Select “H” pulse width	40		ns	
SCL	TSCYCW	Serial Clock Cycle (Write)	66		ns	
	TSHW	SCL “H” Pulse Width (Write)	15		ns	
	TSLW	SCL “L” Pulse Width (Write)	15		ns	
	TSCYCR	Serial Clock Cycle (Read)	150		ns	
	TSHR	SCL “H” Pulse Width (Read)	60		ns	
	TSLR	SCL “L” Pulse Width (Read)	60		ns	
SDA (DIN) (DOUT)	TSDS	Data Setup Time	10		ns	For Maximum CL=30pF For Minimum CL=8pF
	TSDH	Data Hold Time	10		ns	
	TACC	Access Time	10	50	ns	
	TOH	Output Disable Time	15	50	ns	

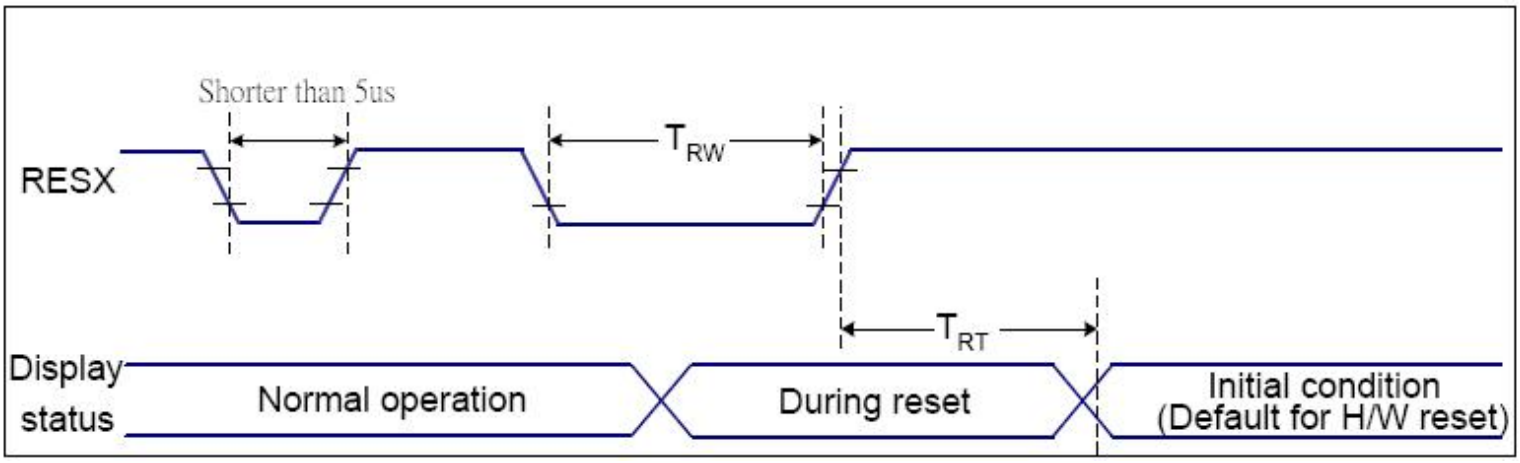
3. Serial Interface Characteristics (4-line Serial)



Ta=25 ℃, VDDI=1.65~3.7V, VDD=2.5~4.8V

Signal	Symbol	Parameter	MIN	MAX	Unit	Description
CSX	TCSS	Chip Select Setup Time (Write)	45		ns	
	TCSH	Chip Select Hold Time (Write)	45		ns	
	TCSS	Chip Select Setup Time (Read)	60		ns	
	TSCC	Chip Select Hold Time (Read)	65		ns	
	TCHW	Chip Select "H" Pulse Width	40		ns	
SCL	TSCYCW	Serial Clock Cycle (Write)	66		ns	-Write Command & Data Ram
	TSHW	SCL "H" Pulse Width (Write)	15		ns	
	TSLW	SCL "L" Pulse Width (Write)	15		ns	
	TSCYCR	Serial Clock Cycle (Read)	150		ns	-Read Command & Data Ram
	TSHR	SCL "H" Pulse Width (Read)	60		ns	
	TSLR	SCL "L" Pulse Width (Read)	60		ns	
D/CX	TDCS	D/CX Setup Time	10		ns	
	TDCH	D/CX Hold Time	10		ns	
SDA (DIN) (DOUT)	TSDS	Data Setup Time	10		ns	For Maximum CL=30pF For Minimum CL=8pF
	TSDH	Data Hold Time	10		ns	
	TACC	Access Time	10	50	ns	
	TOH	Output Disable Time	15	50	ns	

4. Reset Timing Characteristics



VDDI=1.65 to 3.3V, VDD=2.4 to 3.3V, AGND=DGND=0V, Ta=-30 ~ 70 ℃

Related Pins	Symbol	Parameter	MIN	MAX	Unit
RESX	TRW	Reset pulse duration	10	-	us
	TRT	Reset cancel	-	5 (Note 1, 5)	ms
				120 (Note 1, 6, 7)	ms

Notes:

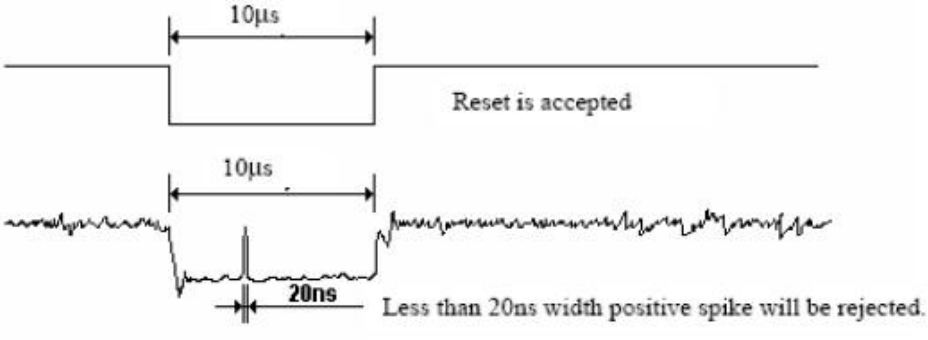
1. The reset cancel includes also required time for loading ID bytes, VCOM setting and other settings from NVM (or similar device) to registers. This loading is done every time when there is HW reset cancel time (tRT) within 5 ms after a rising edge of RESX.

2. Spike due to an electrostatic discharge on RESX line does not cause irregular system reset according to the table below:

RESX Pulse	Action
Shorter than 5us	Reset Rejected
Longer than 9us	Reset
Between 5us and 9us	Reset starts

3. During the Resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120 ms, when Reset Starts in Sleep Out –mode. The display remains the blank state in Sleep In –mode.) and then return to Default condition for Hardware Reset.

4. Spike Rejection also applies during a valid reset pulse as shown below:



5. When Reset applied during Sleep In Mode.

6. When Reset applied during Sleep Out Mode.

7. It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120msec.

LCD Module Out-Going Quality Level

1. VISUAL & FUNCTION INSPECTION STANDARD

1.1 Inspection conditions

Inspection performed under the following conditions is recommended.

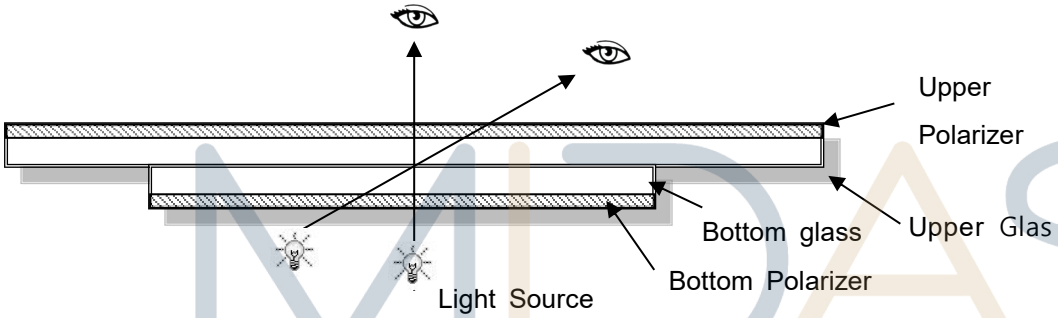
Temperature : 25±5℃

Humidity : 65%±10%RH

Viewing Angle : Normal viewing Angle.

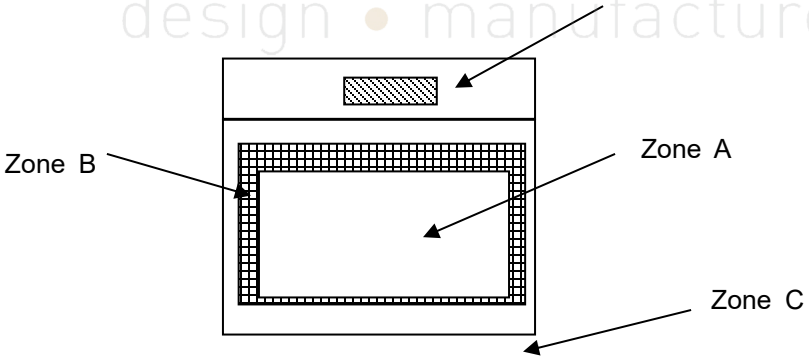
Illumination: Single fluorescent lamp (300 to 700Lux)

Viewing distance:30-50cm



1.2 Definition

Zone D



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

1.3 Sampling Plan

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

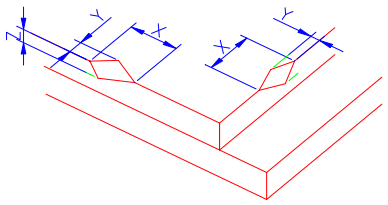
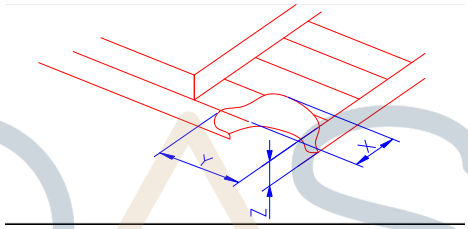
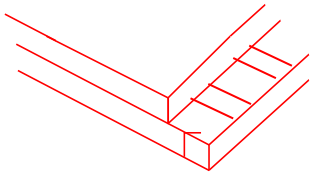
AQL:

Major defect	Minor defect
0.65	1.5

LCD: Liquid Crystal Display, TP: Touch Panel, LCM: Liquid Crystal Module

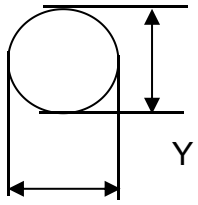
No	Items to be inspected	Criteria	Classification of defects
1	Functional defects	1) No display, Open or miss line 2) Display abnormally, Short 3) Backlight no lighting, abnormal lighting.	Major
2	Missing	Missing component	
3	Outline dimension	Overall outline dimension beyond the drawing is not allowed	
4	Color tone	Color unevenness, refer to limited sample	Minor
5	Soldering appearance	Good soldering, Peeling off is not allowed.	
6	LCD/Polarizer	Black/White spot/line, scratch, crack, etc.	

1.4 Criteria (Visual)

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

2.0

Spot defect



Φ=(X+Y)/2

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

Zone / Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.15	Ignore	Ignore	
0.15<Φ≤0.25	3(distance≧6mm)		
0.25<Φ≤0.4	2(distance≧6mm)		
Φ>0.4	0		

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

Zone / Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.15	Ignore	Ignore	
0.15<Φ≤0.25	3(distance≧6mm)		
0.25<Φ≤0.4	2(distance≧6mm)		
Φ>0.4	0		

③ Polarizer accidented spot

Zone / Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.2	Ignore		Ignore
0.2<Φ≤0.5	2(distance≧6mm)		
Φ>0.5	0		

④Polarizer Bubble

Zone / Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.2	Ignore		Ignore
0.2<Φ≤0.4	3(distance≧6mm)		
Φ>0.4	0		

3.0	LCD Pixel defect	Pixel bad points

Item	Zone A	Acceptable Qt
Bright dot	Random	N≤2
	2 dots adjacent	N≤0
	3 dots adjacent	N≤0
Dark dot	Random	N≤2
	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:

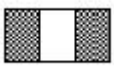
A) Bright dot：Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern.

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

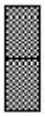
C) 2 dot adjacent = 1 pair = 2 dots

Picture:

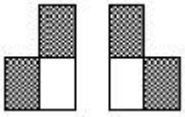
2 dot adjacent



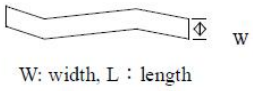
2 dot adjacent



2 dot adjacent (vertical)



2 dot adjacent (slant)

<table>
<tr>
<td>4.0</td>
<td>Line defect (LCD /Polarizer backlight black/white line, scratch, stain)
 

N : Count</td>
<td>
<table>
<tr><th rowspan="2">Width(mm)</th><th rowspan="2">Length(mm)</th><th colspan="3">Acceptable Qty</th></tr>
<tr><th>A</th><th>B</th><th>C</th></tr>
<tr><td>Φ≤0.03</td><td>Ignore</td><td colspan="2">Ignore</td><td rowspan="3">Ignore</td></tr>
<tr><td>0.03<W≤0.04</td><td>L≤3.0</td><td colspan="2">N≤2</td></tr>
<tr><td>0.04<W≤0.05</td><td>L≤2.0</td><td colspan="2">N≤1</td></tr>
<tr><td>W>0.05</td><td colspan="4">Define as spot defect</td></tr>
</table>
</td>
</tr>
<tr>
<td>5.0</td>
<td>Electronic Components SMT.</td>
<td>Not allow missing parts，solderless connection，cold solder joint，mismatch，The positive and negative polarity opposite</td>
</tr>
<tr>
<td>6.0</td>
<td>Display color& Brightness.</td>
<td>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.</td>
</tr>
<tr>
<td>7.0</td>
<td>LCD Mura/Waving/ Hot spot</td>
<td>Not visible through 5% ND filter in 50% gray or judge by limit sample if necessary.</td>
</tr>
</table>

Criteria (functional items)

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

Reliability Test Result

Item	Condition	Inspection after test
High Temperature Operating	70℃,96H	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)	-10℃,30 min ↔ +60℃,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 5~10pcs.

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.

6. The color fading mura of polarizing filter should not care.

Cautions and Handling Precautions

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.

(14) Power supply should always be turned on/off by the item 6.1 Power On Sequence &6.2 Power Off Sequence

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.