深圳市一众显示科技有限公司

SHEN ZHEN TEAM SOURCE DISPLAY TECH. CO, LTD.

TFT-LCD Module Specification

Module NO.: TST070MIWN-01B

Version: V1.0

☐ APPROVAL FOR SPECIFICATION ☐ APPROVAL FOR SAMPLE

For Customer's Acceptance:	
Approved by	Comment

Team Source Display:		
Presented by	Reviewed by	Organized by

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1. LCM Specification

1.1 Description

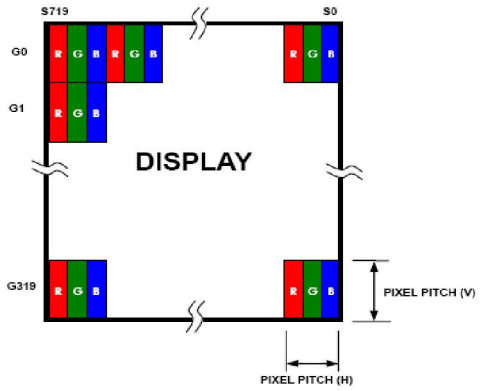
TST070MIWN-01B is a transmissive type color active matrix liquid crystal display (LCD) which uses amorphous thin film transistor (TFT) as switching devices. This product is composed of a TFT LCD panel, a drive IC, a FPC, and a WLED-backlight unit.The active display area is 7.0 inches diagonally measured and the native resolution is 800*RGB*480. Features of this product are listed in the following table.

1.2 Functions & Features

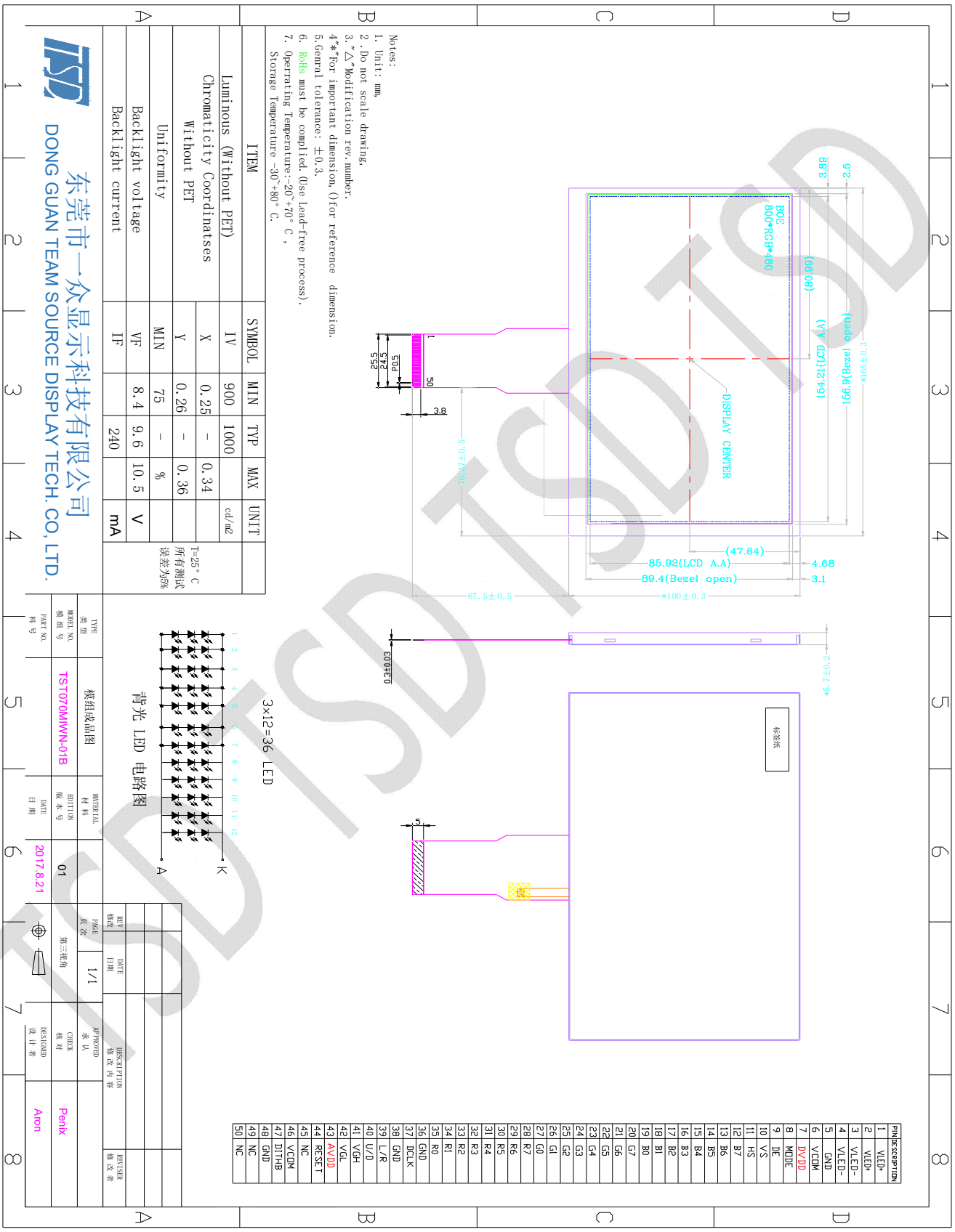
Table1.1 Module Functions & Features

Parameter	Value	Unit
LCD Mode	a-Si TFT/transmissive	-
Color	16.7M	-
Display Resolution	800*(RGB)*480	pixels
Outline Dimension	165.0(W) *100.0(H) *5.7(T)	mm
Active Area(A.A)	154.21*(W) *85.92(H)	mm
Pixel Arrangement	RGB-stripe	-
Viewing Direction	12 O'clock	
Display Mode	Normally WHITE	
IC Package Type	COG	-
Driver IC	EK9713CA+EK73002A	-
Surface Treatment	Anti-Glare ,Hardness:3H	
Back-light	White LED*36CHIP	pcs
TP/Lens	Without	
Operation Temperature	-20~70	℃
Storage Temperature	-30~80	℃

Pixel Arrangement



2. Mechanical Specification



3. Electrical Units

3.1 Electrical Specification

<Table3. Electrical specifications>

Item	Symbol	Unit	Value			Note
			Min	Typ	Max	
Power voltage	DVDD	V	3.0	3.3	3.6	
	AVDD	V	10.2	10.4	10.6	
	VGH	V	15.3	16	16.7	-
	VGL	V	-7.7	-7	-6.3	
Input signal voltage	VCOM	V	2.6	3.6	4.6	

Notes:

1. **VGH is TFT Gate operating voltage.**
2. **VGL is TFT Gate operating voltage.The low voltage level of VGL signal must be fluctuates with same phase as Vcom.**
3. **Be sure to apply DVDD and VGL to the LCD first, and then apply VGH.**
4. **DVDD setting should match the signals output voltage (refer to Note 3) of customer’s system board.**
5. **DCLK,HS,VS,RESET,U/D, L/R,DE,R0~R7,G0~G7,B0~B7,MODE,DITHB.**

3.2 Pin Descriptions

3.2.1 TFT LCD Panel interface FPC Pin Description

Pin NO.	Function Descriptions	Symbol
1	LED Anode	LED+
2	LED Anode	LED+
3	LED Cathode	LED -
4	LED Cathode	LED -
5	Ground	GND
6	Common Voltage	VCOM
7	Digital Power	DVDD
8	DE/SYNC mode select Normally pull high H:DE mode. L:HSD/VSD mode	MODE
9	Date Enable signal	DE
10	Vertical sync input.Negative polarity	VSD
11	Horizontal sync input.Negative polarity	HSD
12	Blue Date Input(MSB)	B7

13-18	Blue Date Input	B6-B1
19	Blue Date Input(LSB)	B0
20	Green Data Input(MSB)	G7
21-26	Green Data Input	G6-G1
27	Green Data Input(LSB)	G0
28	Red Data Input(MSB)	R7
29-34	Red Data Input	R6-R1
35	Red Data Input(LSB)	R0
36	Power ground	GND
37	Clock input	DCLK
38	Ground	GND
39	Left / right selection	L/R
40	Up/down selection	U/D
41	Gate ON Voltag	VGH
42	Gate OFF Voltage	VGL
43	Analog Power	AVDD
44	Global rest pin.Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability. Normally pull high.(R=10K	RSTB
45	Not connect	NC
46	Common Voltage	VCOM
47	Dithering setting DITH= “ H ” 6bit resolution(last 2 bit of input data)truncated DITH= “H” 6bit resolution(default setting)	DITH
48	Power ground	GND
49	Not connection	NC
50	Not connection	NC

Remarks:

1)UPDN and SHLR control function

UPDN	SHLR	FUNCTION
0	1	Normal display
0	0	Inverse Left and Right
1	1	Inverse Up and Down
1	0	Inverse Left and Right ,Inverse Up and Down

3.3.1 Electrical characteristics (Ta=25℃)

3.3.2 TFT-LCD Current Consumption

Table 3.2:

Item	Symbol	Unit	Test Condition	Min	Typ.	Max	Note
Gate on power current	IVGH	mA	VGH=21V	-	TDB		-
Gate off power current	IVGL	mA	VGL= -7.0V	-	TDB		-
Analog power current	IVDD	mA	VDD=3.3V	-	TDB		-
Analog power current	IAVDD	mA	AVDD=9.6V	-	TDB		

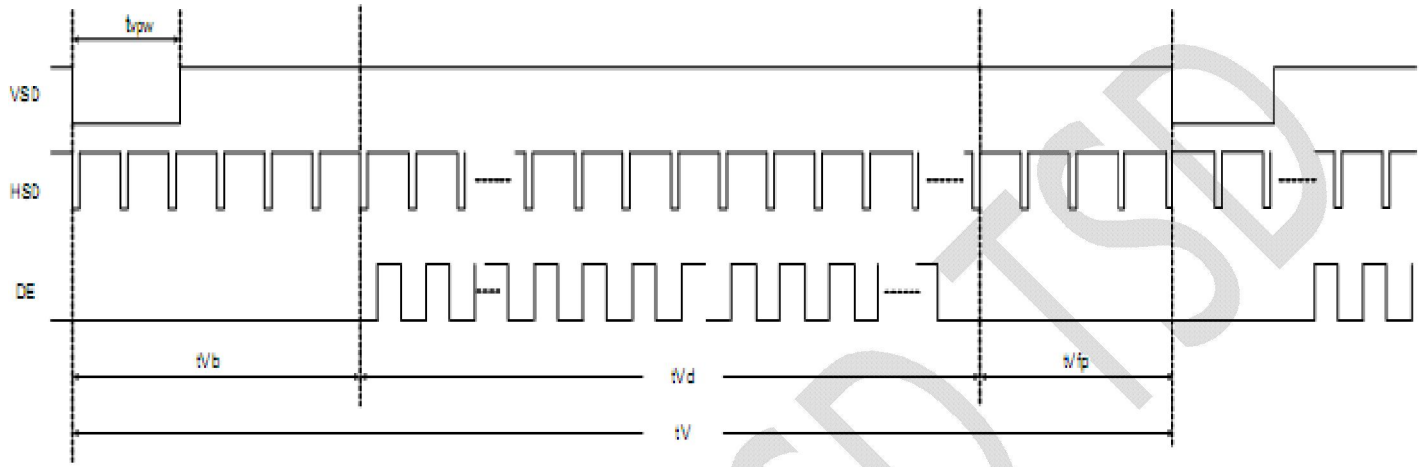
3.4 Back-light Specification

Table 3.3 Back-light Specification

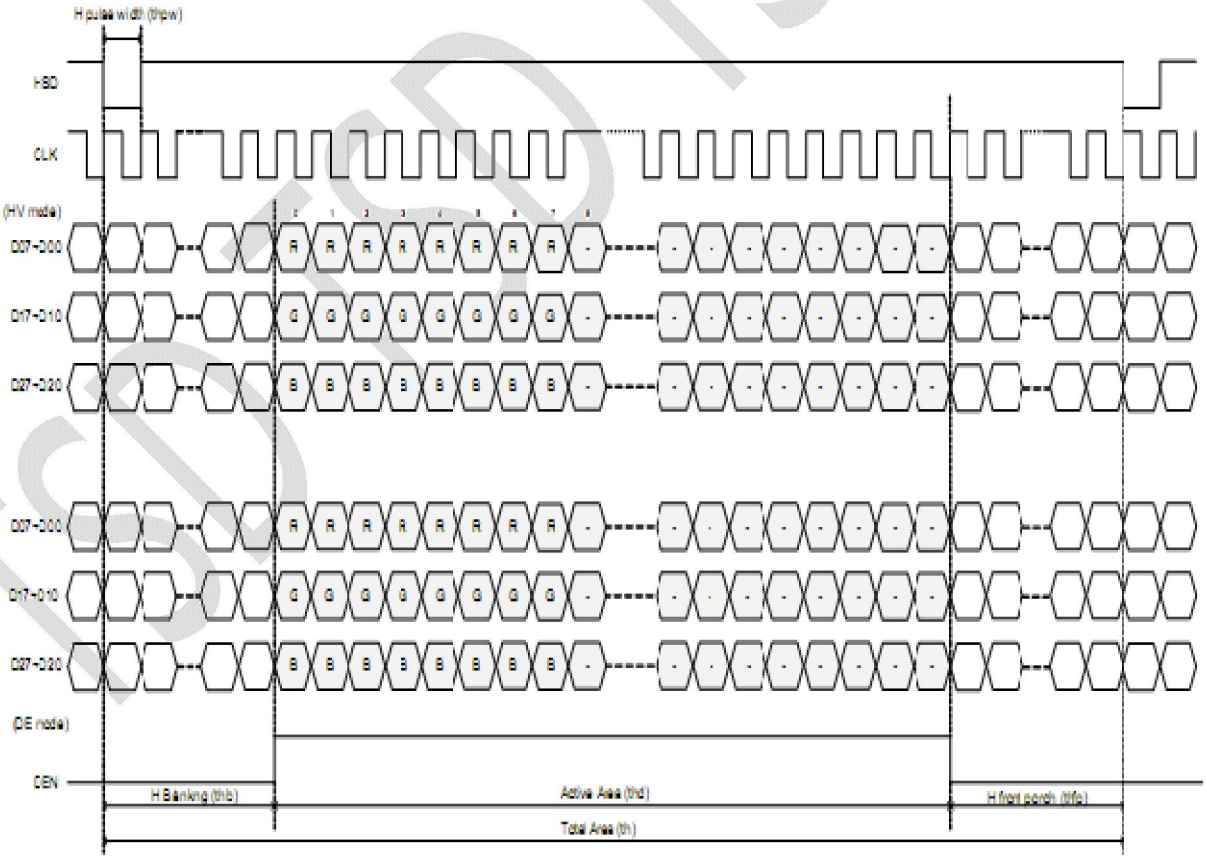
Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply Voltage	VF	Only Backlight	8.4	9	9.3	V
Supply Current	IF		20*12=240			mA
Average Brightness	IV	Backlight Current IF=240mA	950	1000		Cd/m2
CIE Color Coordinate	X	Backlight Current IF=240mA	-		-	-
	Y		-		-	
Uniformity	B	Backlight Current IF=240mA	70	75	-S	(%)
Color	White					

4 RGB Timing Characteristics

4.1.1 Data Input Format



Vertical input timing



4.1.2 Timing Characteristics

For 800 × 480 panel

Horizontal input timing

Parameter		Symbol	Value			Unit
Horizontal display area		thd		800		DCLK
DCLK frequency		fclk	Min.	Typ.	Max	
			-	33.3	50	MHz
1 Horizontal Line		th	862	1056	1200	
HSD pulse width	Min.	thpw		1		DCLK
	Typ.			-		
	Max.			40		
HSD Back Porch (Blanking)		thb	46	46	46	
HSD Front Porch		thfp	16	210	354	

Vertical input timing

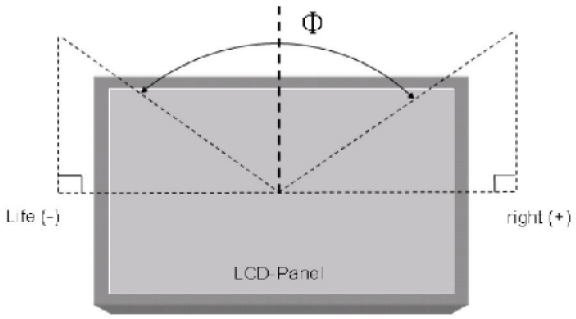
Parameter	Symbol	Min.	Typ.	Max.	Unit
Vertical display area	tvd		480		H
VSD period time	tv	510	525	650	H
VSD pulse width	tvpw	1	-	20	H
VSD Back Porch (Blanking)	tvb	23	23	23	H
VSD Front Porch	tvfp	7	22	147	H

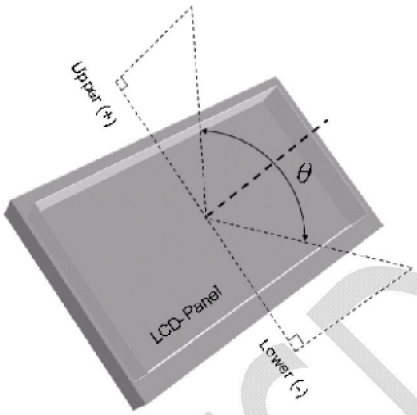
5 Optical Specifications

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR≥ 10)	θL	Φ=180°(9 o'clock)	60	70	-	degree	Note 1
	θR	Φ=0°(3 o'clock)	60	70	-		
	θT	Φ=90°(12 o'clock)	60	70	-		
	θB	Φ=270°(6 o'clock)	40	50	-		
Response time	TON	Normal θ=Φ=0°	-	10	20	msec	Note 3
	TOFF		-	15	30	msec	Note 3
Contrast ratio	CR		400	500	-	-	Note 4
	WX		0.250	0.300	0.350	-	
	WY		0.290	0.340	0.390	-	
Luminance	L		380	420	460	cd/m^2	Note 6
Luminance uniformity	YU		70	75	-	%	Note 7

Test conditions:

1. DV_{DD}=3.6V, I_L=140mA (Backlight current), the ambient temperature is 25℃
2. The test systems refer to Note 2.



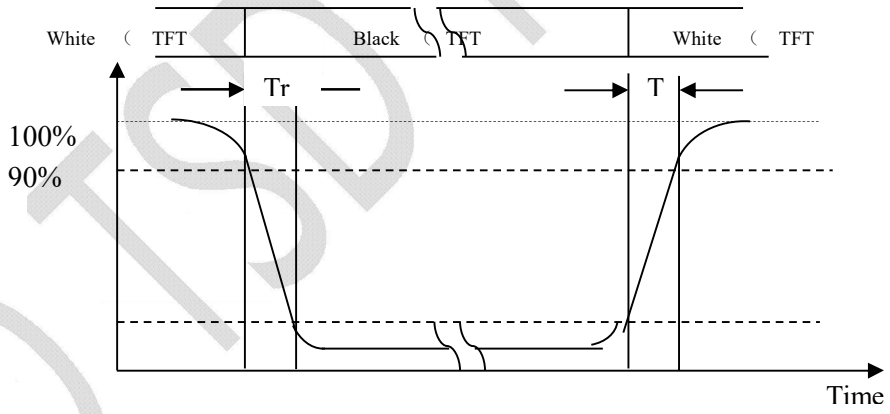


Note (2) Definition of Contrast Ratio (CR):
measured at the center point of pane

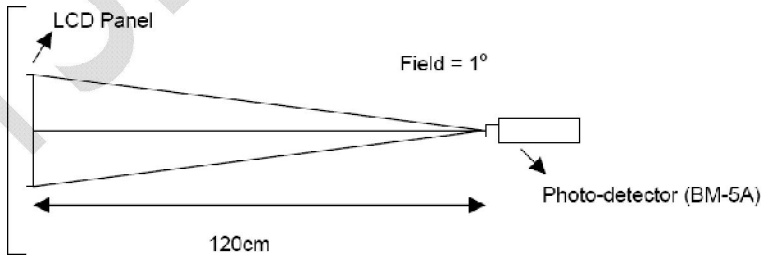
$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

Note (3) Definition of Response Time: Sum of T_R and T_F

Optical response



Note (4) Definition of optical measurement setup



Note (5) Rubbing Direction (The different Rubbing Direction will cause the different optimal view direction.

6 Reliability Test Items

No.	Item	Conditions	Remark
1	High Temperature Storage	Ta=+80℃, 240hrs	
2	Low Temperature Storage	Ta=-30℃, 240hrs	
3	High Temperature Operation	Ta=+70℃, 240hrs	
4	Low Temperature Operation	Ta=-20℃, 240hrs	
5	High Temperature and High Humidity (operation)	Ta=+70℃, 90%RH, 240hrs	
6	Thermal Cycling Test (non operation)	-30℃(30min) → +80℃(30min), 200cycles	
7	Electrostatic Discharge	±200V,200pF(0Ω) 1 time/each terminal	
8	Vibration	1.Random: 1.04Grms, 5~500Hz, X/Y/Z, 30min/each direction 2. Sine: Freq. Range: 8~33.3Hz Stoke: 1.3mm Sweep: 2.9G, 33.3~400Hz X/Z: 2hr, Y: 4hr, cyc: 15min	
9	Shock	100G, 6ms, ±X, ±Y, ±Z 3 time for each direction	JIS C7021, A-10 (Condition A)
10	Vibration (with carton)	Random: 0.015G^2/Hz, 5~200Hz -6dB/Octave, 200~400Hz XYZ each direction: 2hr	
11	Drop (with carton)	Height: 60cm 1 corner, 3 edges, 6 surfaces	JIS Z0202

Reliability Test Criteria:
Display function should be no change under normal operating condition.

7. Handling Precautions

7.1 Safety

The liquid crystal in the LCD is poisonous. Keep away from your mouth and eyes. If the liquid crystal contacts with your skin, mouse or clothes, use soap to wash it off immediately.

7.2 Handling

i. The LCD panel is made by thin glass. Prevent the panel from mechanical shock or putting excessive force on its surface.
ii. The polarizer attached on the display is very easy to be damaged, handle it with special attention.
iii. To avoid contamination on the display surface, do not touch the display surface with bare hands.

iv. The transparent electrodes may be disconnected if you use the LCD panel under dew-condensing environment.

v. The characteristics of the semiconductor devices may be affected when they are exposed to light, possibly resulting in malfunctioning of the ICs. To prevent such malfunctioning of the ICs, make sure the application and the mounting of the panel are designed so that the IC is not exposed to light.

7.3 Static Electricity

Ground soldering iron tips, tools and testers when you operate. Also ground your body when handling the products and store the products in an anti-electrostatic container.

7.4 Storage

Store the products in a dark place where the temperature is within the range of 25±10 and with low humidity (65%RH or less). Do not store the LCD product in an atmosphere containing organic solvents or corrosive gases.

7.5 Cleaning

Do not wipe the polarizer with dry cloth, as it might cause scratching. Wipe the polarizer with a soft cloth soaked with petroleum IPA. Other chemical might damage the panel.