



深圳市一众显示科技有限公司

SHEN ZHEN TEAM SOURCE DISPLAYTECH. CO, LTD.

TFT-LCD Module Specification

Module NO.: TST070MIWN-10C

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

Version No.	Date	Content	Remark
V1.0	2018-4-12	Initial Release	

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1. LCM Specification

1.1 Description

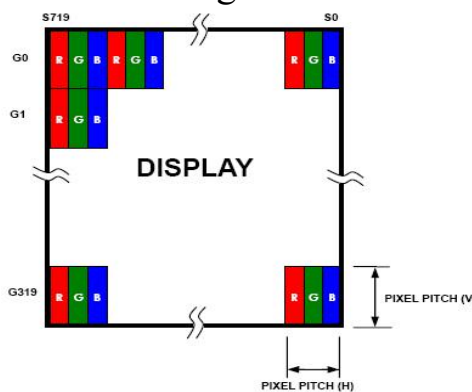
TST070MIWN-10C is a transmissive type color active matrix liquid crystal display (LCD) which uses amorphous thin film transistor (TFT) as switching devices. This product is composed of a TFT LCD panel, a drive IC, a FPC, and a WLED-backlight unit. The active display area is 7.0 inches diagonally measured 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

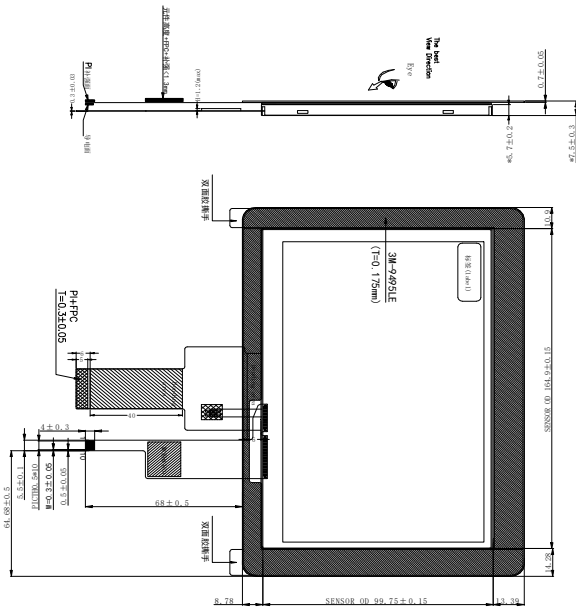
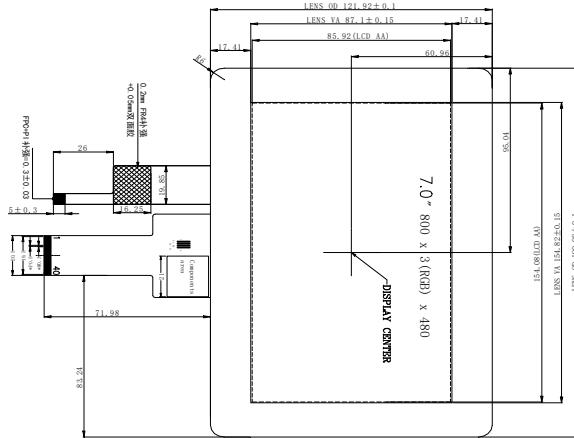
Parameter	Value	Unit
LCD Mode	a-Si TFT/transmissive	-
Color	16.7M	-
Display Resolution	800*3(RGB)*480	pixels
Outline Dimension	190.08(W) *121.92(H) *7.5(T)	mm
Active Area(A.A)	154.21*(W) *85.92(H)	mm
Pixel Arrangement	RGB-stripe	-
Viewing Direction	12 O'clock	
Display Mode	Normally WHITE	
LCD Driver IC	EK73002A+EK9713CA	-
CTP Surface Treatment	Clear ,Hardness: 6H	
Back-light	White LED*36CHIP	pcs
TP/Lens	With CTP (FT5446)	
Operation Temperature	-20~70	°C
Storage Temperature	-30~80	°C

Pixel Arrangement



2. Mechanical Specification

LCD Type	7.0" TFT Transmissive, Normally white, TN
Resolution	800(RGB) * 480
View Direction	12 O'CLOCK
Driver IC	EK73002A+EK9713CA
Color Depth	16.7M
Interface Types	TTL(RGB24-bit)
Operating voltage	3.3V
TP/Lens	With CTP(PT5446)
Backlight LEDs	36 LEDs, 240mA, 9.6V
Surface luminance	800 cd/m2
Operating temperature	-20 °C ~ 70 °C
Storage Temperature	-30 °C ~ 80 °C
Storage Humidity	60% 90% max

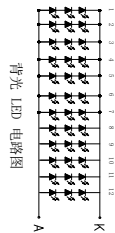


Pin	RESERPTION	Pin	DESCRIPTION
1	MED-	21	B0
2	MED-	22	B1
3	GND	23	B2
4	VDD(3.3V)	24	B3
5	R0	25	B4
6	R1	26	B5
7	R2	27	B6
8	R3	28	B7
9	R4	29	GND
10	R5	30	CLK
11	R6	31	SB1B
12	R7	32	HS
13	G0	33	VS
14	G1	34	DE
15	G2	35	NC
16	G3	36	GND
17	G4	37	XR/NC
18	G5	38	Y/NC
19	G6	39	X/NC
20	G7	40	Y/NC

PIN定义

PIN NO	DEFINITION
1	NC
2	NC
3	RST
4	GND
5	INT
6	SIM
7	SCL
8	GND
9	GND
10	VDD

- TECHNICAL NOTES:
1. LCD Type: G-G
 2. Interface: FPC, 6-DC
 3. IC: STS446
 4. Supply voltage: 2.8-3.3V
 5. Surface hardness: 6H
 6. Light transmittance: more than 83%
 7. Unspecified Tolerances: ±0.2mm
 8. REQUIREMENTS ENVIRONMENTAL PROTECTION: RoHS



Need to pay attention to the key size with *

版本 (Version)	变更记录 (Change History)	日期 (Date)	变更内容 (Change Content)	比例 (Proportion)	设计 (DESIGN)	审核 (AUDITING)	批准 (APPROVED)
V1				1:1			
V2				1:1			

TSD 东莞市一众显示科技有限公司
DONG GUAN TEAM SOURCE DISPLAY TECH. CO., LTD.

产品型号 (Product Type):	TST070MIWN-10C	设计 (DESIGN):	Jacky
限制版本 (Version):	V1	审核 (AUDITING):	Aron
		批准 (APPROVED):	

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 Cathode	LED -
2	LED Anode	LED+
3	Ground	GND
4	Power supply +3.3V	VDD
5~12	Red Data BUS	R0~R7
13~20	Green Data BUS	G0~G7
21~28	Blue Data BUS	B0~B7
29	Ground	GND
30	Clock for input data. Data latched at rising/falling edge of this signal. Default is falling edge.	DCLK

31	Standby mode control. (Normally pull high) STBYB= “L” , enter standby mode for power saving. Timing controller and source driver will turn off, all outputs are Hi-Z. STBYB= “H” , normal operation	STBYB
32	Horizontal sync input in digital parallel RGB. Negative polarity.	HS
33	Vertical sync input in digital parallel RGB. Negative polarity.	VS
34	Input data enable control. When DE mode, active High to enable data input. (Normally pull low)	DE
35		NC
36	Ground	GND
37	The touch panel X Right pin	XR/NC
38	The touch panel Y Down pin	YD/NC
39	The touch panel X Left pin	XL/NC
40	The touch panel Y Up pin	YU/NC

3.2.2 CTP interface description

PIN NO.	Symbol	description
1	NC	
2	NC	
3	RST	External Reset, Low is active
4	GND	Ground. (0V)
5	INT	Interrupt request to the host
6	SDA	I2C data input and output
7	SCL	I2C clock input
8	GND	Ground. (0V)
9	GND	Ground. (0V)
10	VDD	Power supply +3.3V

3.3.1 Electrical characteristics (Ta=25°C)

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		

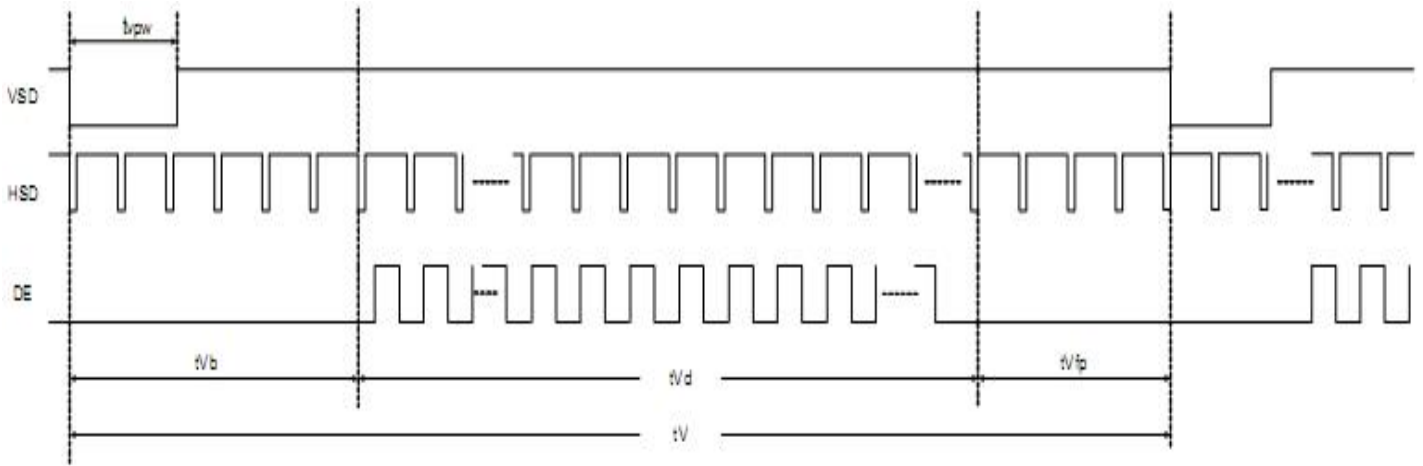
3.4 Back-light Specification

Table 3.3 Back-light Specification

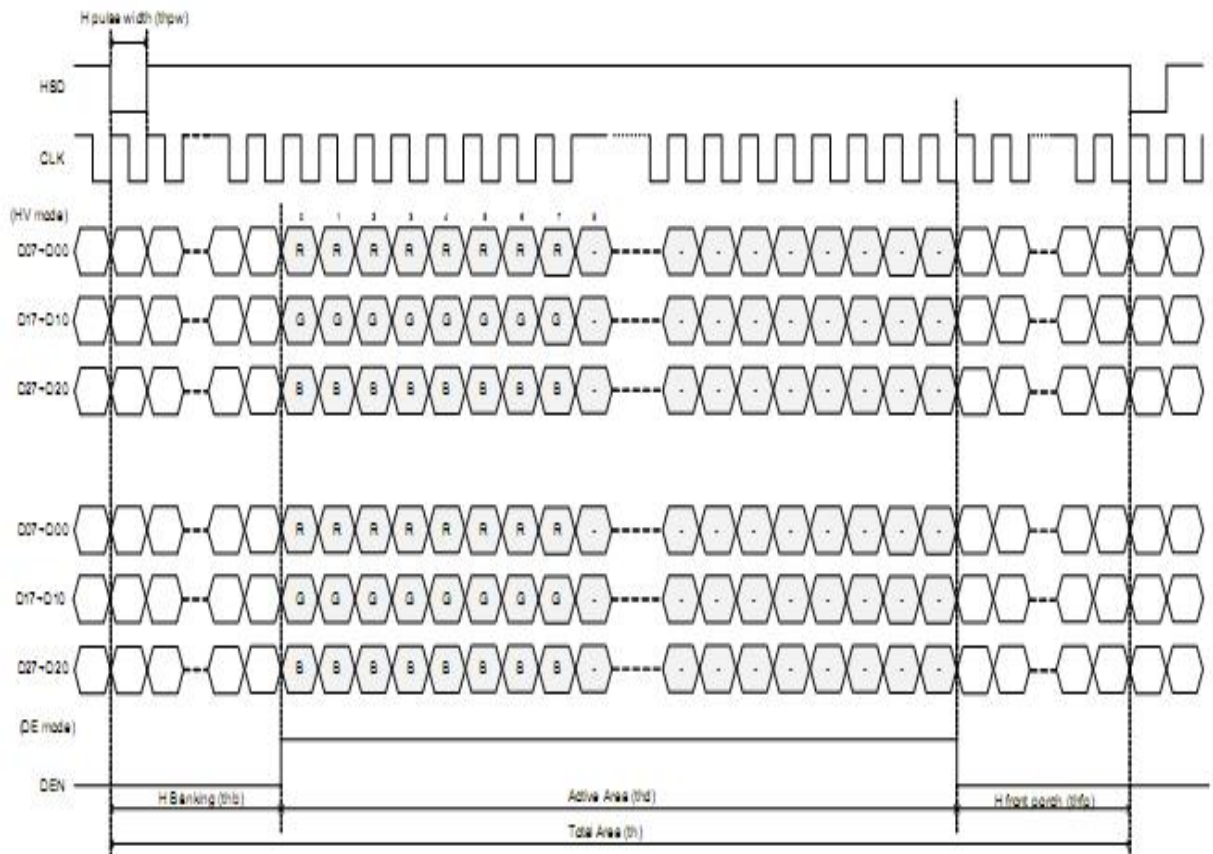
Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply Voltage	VF	Only Backlight	8.4	9	9.3	V
Supply Current	IF		20*12=240			mA
Average Brightness	IV	Backlight Current IF=160mA	750	800		Cd/m2
CIE Color Coordinate	X	Backlight Current IF=160mA	-		-	-
	Y		-		-	
Uniformity	B	Backlight Current IF=160mA	70	75	-S	(%)
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	MHz
			-	33.3	50	
1 Horizontal Line		th	862	1056	1200	DCLK
HSD pulse width	Min.	thpw	1			
	Typ.		-			
	Max.		40			
HSD Back Porch (Blanking)		thb	46	46	46	
HSD Front Porch		thfp	16	210	354	

Vertical input timing

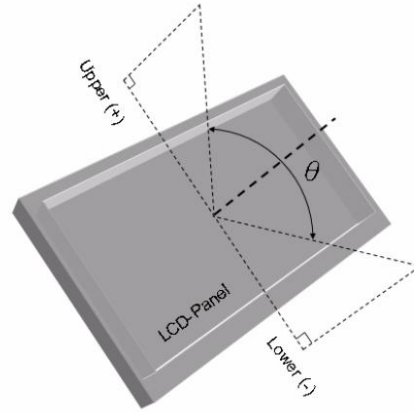
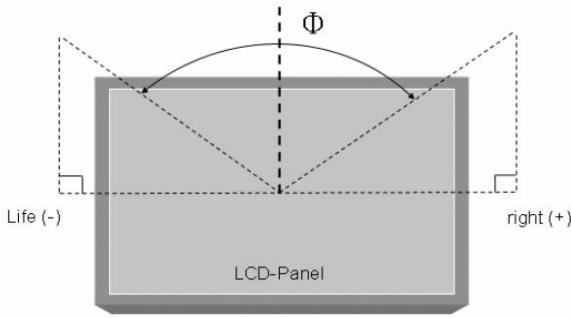
Parameter	Symbol	Min.	Typ.	Max.	Unit
Vertical display area	tvd	480			H
VSD period time	tv	510	525	650	H
VSD pulse width	tvpw	1	-	20	H
VSD Back Porch (Blanking)	tvb	23	23	23	H
VSD Front Porch	tvfp	7	22	147	H

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:

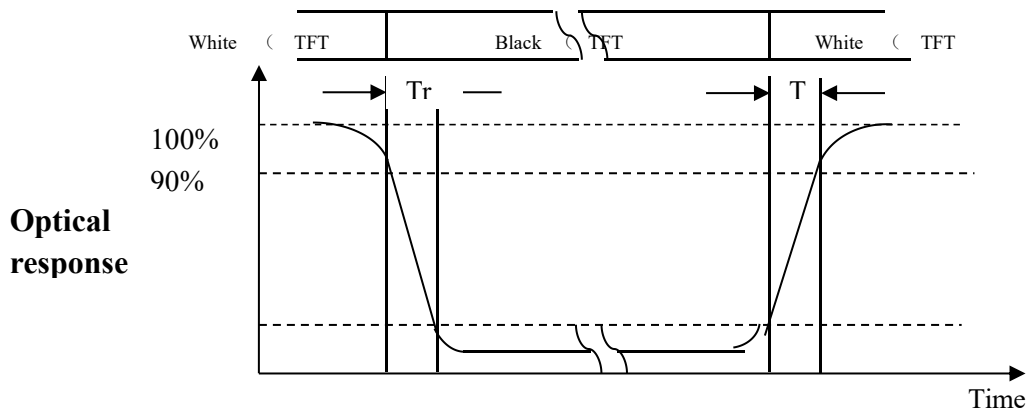
- DV_{DD}=3.6V, I_L=140mA (Backlight current), the ambient temperature is 25°C
- The test systems refer to Note 2.



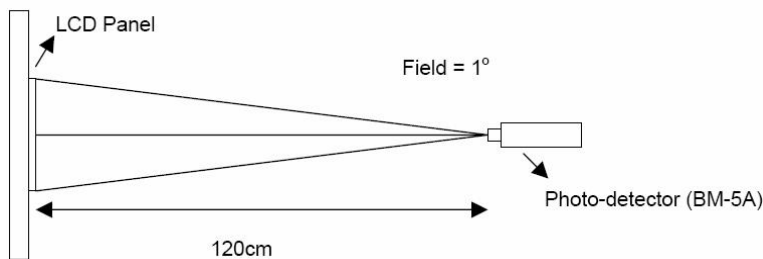
Note (2) Definition of Contrast Ratio (CR):
measured at the center point of pane

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

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



Note (4) Definition of optical measurement setup



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

6 Capacitive Touch Panel specifications

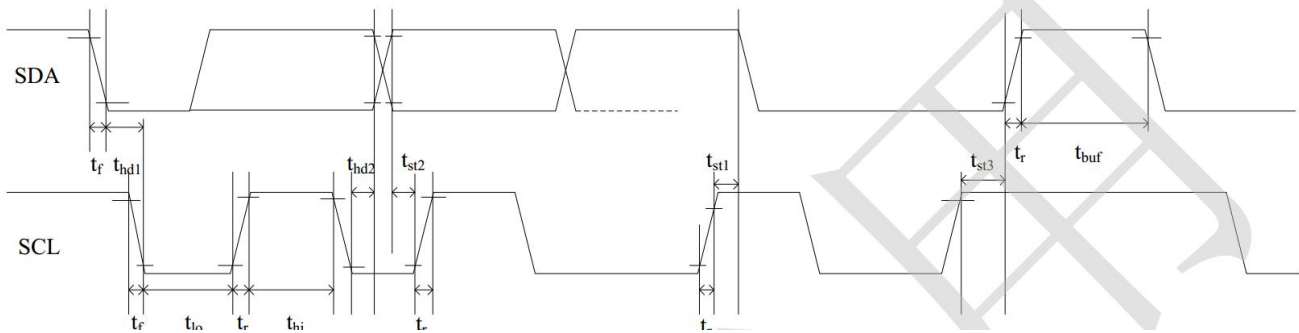
6.1 Mechanical characteristics

DESCRIPTION	INL SPECIFICATION	REMARK
Touch Panel Size	7.0	
Outline Dimension (OD)	190.8(H) x 121.92(V)mm	Cover Lens Outline
Product Thickness	1.7mm(max)	With D.S.T
Cover Glass Thickness	0.7mm	
Ink View Area	154.82x87.1mm	
Input Method	5 Fingers	
Activation Force	Touch	
Surface Hardness	≥6H	

6.2 Electrical characteristics

DESCRIPTION	SPECIFICATION	
Operating Voltage	DC 2.8~3.3V	
Power Consumption (IDD)	Active Mode	12~4.5mA
	Sleep Mode	TBD
Interface	I ² C	
Controller IC	FT5446	
I ² C address	0x70	
Resolution	800*480	

6.3 Interface timing characteristics



Parameter	Symbol	MIN.	Max.	Unit
SCL low period	t_{lo}	0.9	-	us
SCL high period	t_{hi}	0.8	-	us
SCL setup time for START condition	t_{st1}	0.4	-	us
SCL setup time for STOP condition	t_{st3}	0.4	-	us
SCL hold time for START condition	t_{hd1}	0.3	-	us
SDA setup time	t_{st2}	0.4	-	us
SDA hold time	t_{hd2}	0.4	-	us

Test condition: 3.3V communication interface, 400Kbps, pull up resistor is 2K ohm

7 Reliability Test Items

No.	Item	Conditions	Remark
1	High Temperature Storage	Ta=+80°C, 240hrs	
2	Low Temperature Storage	Ta=-30°C, 240hrs	
3	High Temperature Operation	Ta=+70°C, 240hrs	
4	Low Temperature Operation	Ta=-20°C, 240hrs	
5	High Temperature and High Humidity (operation)	Ta=+70°C, 90%RH, 240hrs	
6	Thermal Cycling Test (non operation)	-30°C(30min) → +80°C(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.

8. Handling Precautions

8.1 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.

8.2 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.**

8.3 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.

8.4 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.

8.5 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.