Displaytech Ltd.

Website: www.displaytech.com.hk

LCD Module
Product Specification

Product: 7.0'' TFT Display Module (800RGBx480DOTS)

14 May 2010.

1. REVISION RECORD

VERSION	CHANGES	DATE
1.0	Initial revision	14 May 2010

Table of Content

2. Introduction

DT070TFT or ***DT070TFT-TS (Resistive touch screen version)*** or ***DT070TFT-TSC (Capacitive touch screen version)*** are a display modules that contain a TFT display with a 480 * 800 RGB resolution. The drivers used for this project are the Himax **HX8678-B and HX8262-A or compatible** and can display 16.7M colors. The drivers are mounted on the glass and the interconnection via FPC including components to drive the display module.

3. General Specifications

Item	Specification	Unit
LCD mode	Transmissive	---
Resolution	800(RGB)	Line
	480	Line
Viewing area	153.80	mm
	92.84	mm
Active area	152.40	mm
	91.44	mm
Driver IC	HX8678-B and HX8262-A	---
Interface type	Parallel RGB	---
Colours	16.7M	---
Operation temperature (w/o touch screen)	-20~70	°C
Storage temperature (w/o touch screen)	-30~80	°C
Operation temperature (w touch screen)	-10~60	°C
Storage temperature (w touch screen)	-20~70	°C

Remarks:

(1) Recommended mating connector: Hirose FH19SC-45S-0.5SH, FH12S-45S-0.5SH; or
Molex 0512964593, 0512964594; or equivalent

Component Life Cycle

1) Storage Life: min. 1 Year
2) Operation Life (*1): min. 43 x 10^3 h (24h per day x 7 days per week x 52 weeks / year x 5 years)
   (Not include backlight)
3) Storage and Operation Life Times are defined for a temperature of +25°C

Notes:

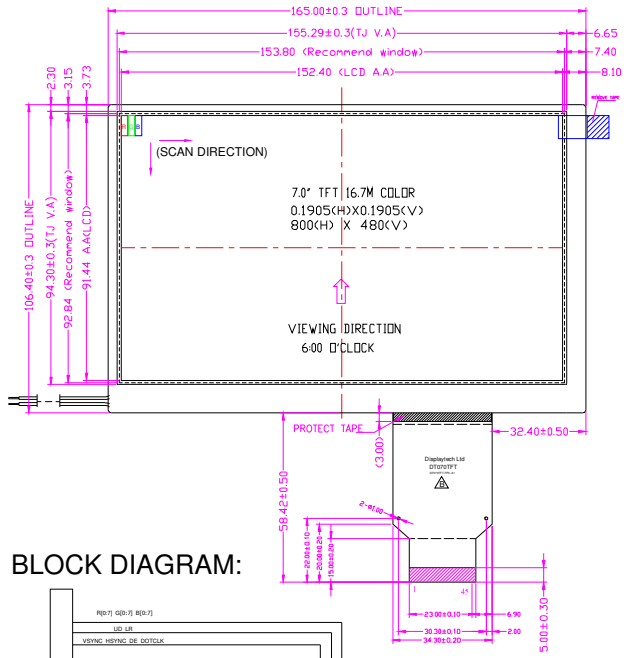
*1. Operation life ends when one of the listed faults occurs:

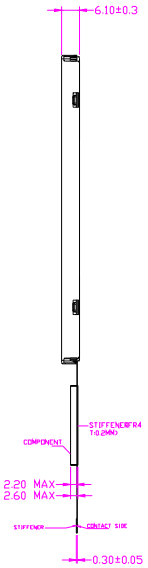
- The on/off response-times reach 1.5 times of the max. value specified for a new display
- The contrast is reduced to 0.5 of the original contrast value
- Loss of function
- The number of cosmetic defects exceeds the maximum defined

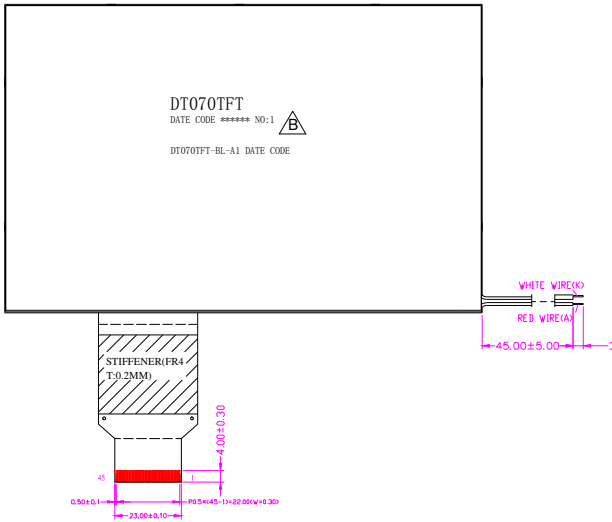
4. Mechanical Drawing

4.1. DT070TFT

MECHANICAL OUTLINE:



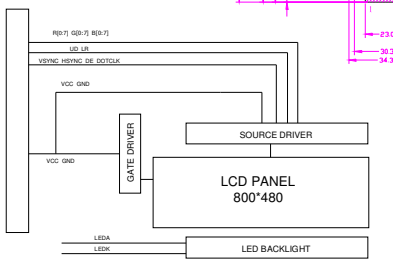


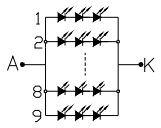


PIN ASSIGNMENT

1	GND	24	B3
2	GND	25	B4
3	VCC	26	B5
4	VCC	27	B6
5	R0	28	B7
6	R1	29	GND
7	R2	30	DOTCLK
8	R3	31	NC
9	R4	32	HSYNC
10	R5	33	VSYNC
11	R6	34	DE
12	R7	35	NC
13	G0	36	NC
14	G1	37	GND
15	G2	38	GND
16	G3	39	LR
17	G4	40	UD
18	G5	41	NC
19	G6	42	NC
20	G7	43	NC
21	B0	44	NC
22	B1	45	NC
23	B2		

BLOCK DIAGRAM:





B/L CURCUIT DIAGRAM

NOTES:

1. OPERATING TEMP: -20°C-70°C
2. STORAGE TEMP : -30°C-80°C
3. ROHS COMPLIANCE
4. VCC=3.3V
5. Backlight type:WHITE LED
6. IC:1*(HX8678-B)+2*(HX8262-A)

REV.	DESCRIPTIONS	DWN.	APPD.	DATE

PROJECTION

ALL ARE PRODUCT DIMENSIONS. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN mm (INCHES) AND TOLERANCES
.XXX ± .XX ± 0.20 ANGULAR ±
DO NOT SCALE DRAWING

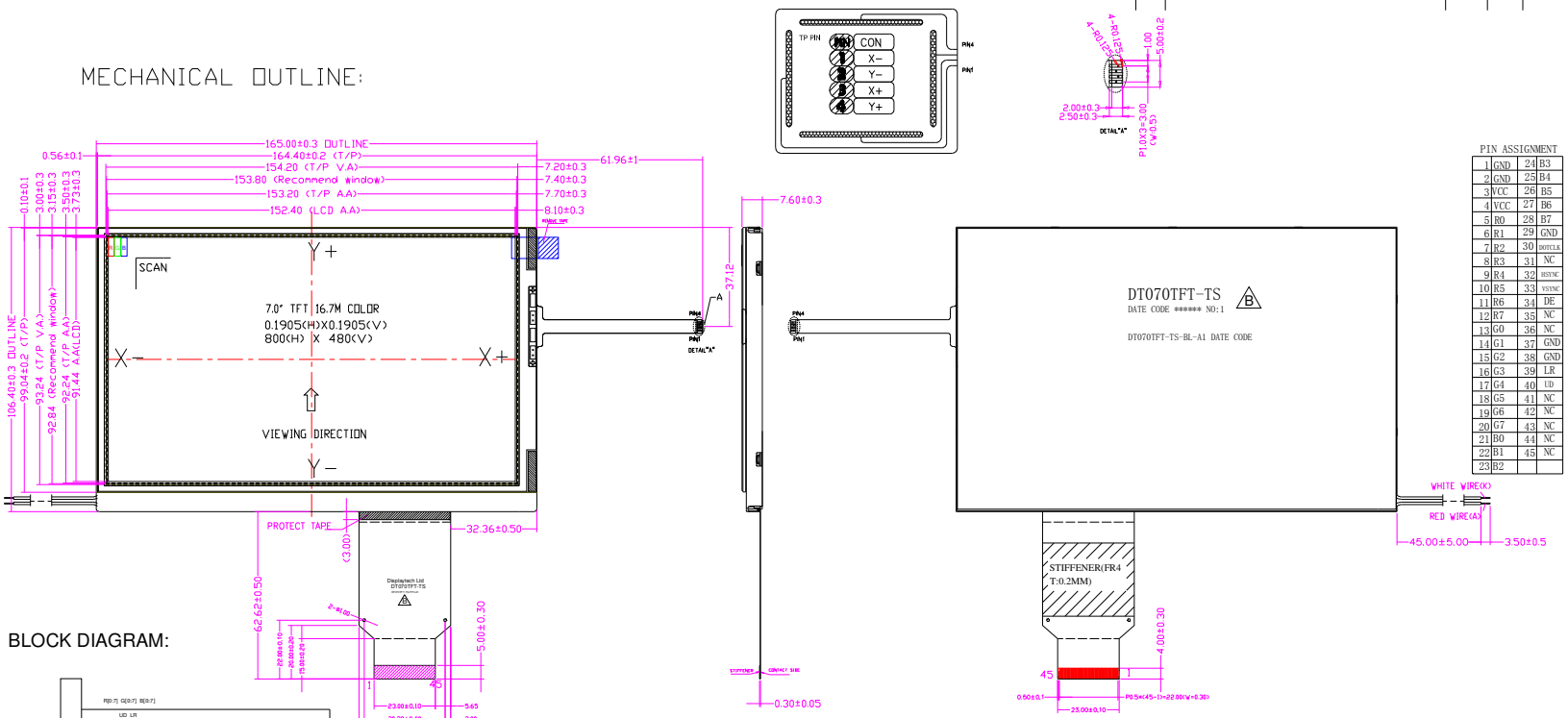
Displaytech Ltd

SCALE	DRAWN BY	DATE 18MAR10
SHT#	APP. BY	DATE
DWG.	DT070TFT ASSEMBLY	
PROJ#		DWG#
MODEL#		REV. B DATE
RELEASE TO:		

4.2. DT070TFT-TS (Resistive Touch Screen Version)

REV.	DESCRIPTIONS	DWN.	APPD.	DATE

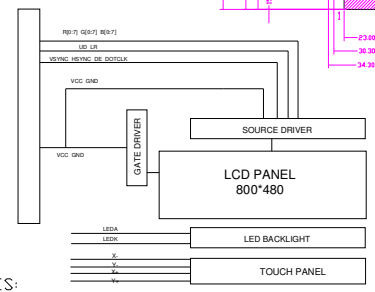
MECHANICAL OUTLINE:

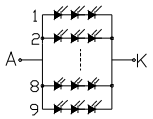


PIN ASSIGNMENT

1	GND	24	B3
2	GND	25	B4
3	VCC	26	B5
4	VCC	27	B6
5	R0	28	B7
6	R1	29	GND
7	R2	30	DOTCLK
8	R3	31	NC
9	R4	32	HSYNC
10	R5	33	VSYNC
11	R6	34	DE
12	R7	35	NC
13	G0	36	NC
14	G1	37	GND
15	G2	38	GND
16	G3	39	LR
17	G4	40	UD
18	G5	41	NC
19	G6	42	NC
20	G7	43	NC
21	B0	44	NC
22	B1	45	NC
23	B2		

BLOCK DIAGRAM:





B/L CURCUIT DIAGRAM

NOTES:

1. OPERATING TEMP: -10°C~60°C
2. STORAGE TEMP : -20°C~70°C
3. IC:1*(HX8678-B)+2*(HX8262-A)
4. Backlight:WHITE LED, VF(Type)=9.6V, IF(Type)=180mA
5. VCC=3.3V
6. ROHS COMPLIANCE

PROJECTION

ALL ARE PRODUCT DIMENSIONS, UNLESS OTHERWISE SPECIFIED. ALL DIMENSIONS ARE IN mm (INCHES) AND TOLERANCES
.XXX ± .XX ± ANGULAR ± 0.20 ±
DO NOT SCALE DRAWING

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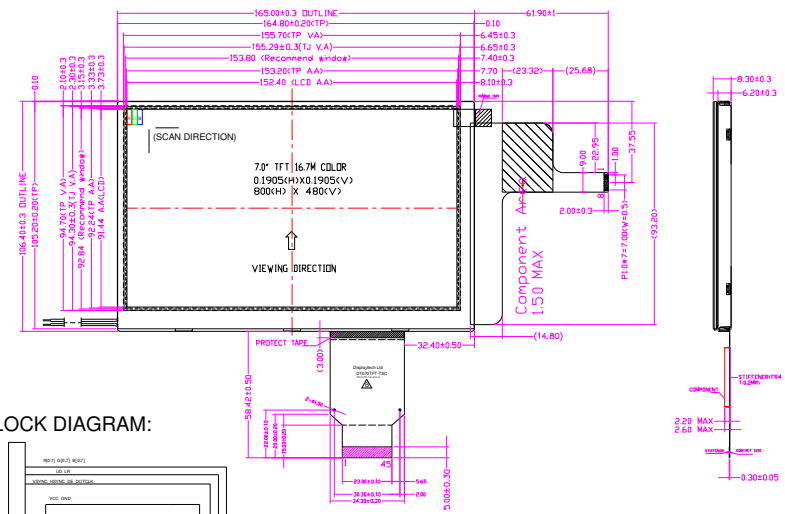
SCALE	DRAWN BY	DATE	18MAR10
SHT#	APP. BY	DATE	
DWG.	DT070TFT-TS ASSEMBLY		
PROJ#		DWG#	
MODEL#		REV. B	DATE
RELEASE TO:			

4.3. DT070TFT-TSC (Capacitive Touch Screen Version)

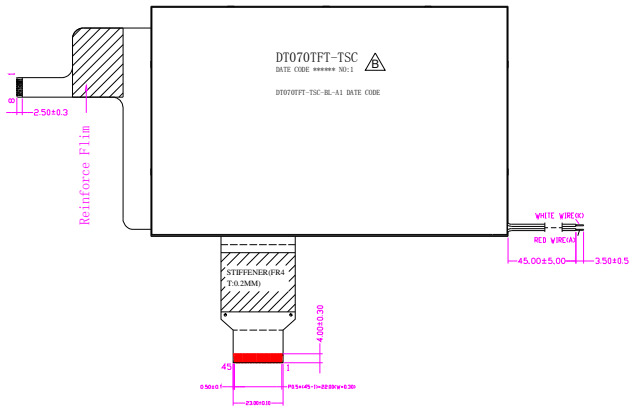
REV.	DESCRIPTIONS	DWN.	APP'D.	DATE

MECHANICAL OUTLINE:



TP PIN DESCRIPTION

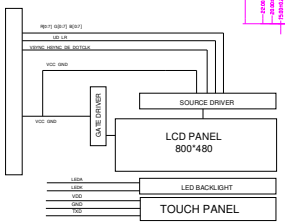
8	7	6	5	4	3	2	1
NC	NC	NC	NC	TXD	NC	GND	VDD

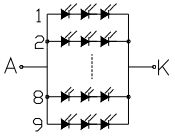


PIN ASSIGNMENT

1	GND	24	B3
2	GND	25	B4
3	VCC	26	B5
4	VCC	27	B6
5	R0	28	B7
6	R1	29	GND
7	R2	30	DOTCLK
8	R3	31	NC
9	R4	32	HSYNC
10	R5	33	VSYNC
11	R6	34	DE
12	R7	35	NC
13	G0	36	NC
14	G1	37	GND
15	G2	38	GND
16	G3	39	LR
17	G4	40	UD
18	G5	41	NC
19	G6	42	NC
20	G7	43	NC
21	B0	44	NC
22	B1	45	NC
23	B2		

BLOCK DIAGRAM:





B/L CIRCUIT DIAGRAM

NOTES:

1. OPERATING TEMP: -10°C~60°C
2. STORAGE TEMP : -20°C~70°C
3. VCC=3.3V,VDD=3.3V
4. BACKLIGHT TYPE:WHITE LED
5. IC:1*(HX8678-B)+2*(HX8262-A)
6. ROHS COMPLIANCE

PROJECTION

ALL ARE PRODUCT DIMENSIONS, UNLESS OTHERWISE SPECIFIED. ALL DIMENSIONS ARE IN mm (INCHES) AND TOLERANCES
.XXX ± .XX ± 0.20 ANGULAR ±
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Displaytech Ltd

SCALE	DRAWN BY	DATE 18MAR10
SHT#	APP. BY	DATE
DWG.	DT070TFT-TSC ASSEMBLY	
	PROJ#	DWG#
MODEL#	REV. B	DATE
RELEASE TO:		

5. Interface Description

Pin no	Symbol	Level	Description
1~2	GND	0V	Ground
3~4	VCC	3.3V	Power supply to module
5~12	R0 ~ R7	H/L	Red data bus
13~20	G0 ~ G7	H/L	Green data bus
21~28	B0 ~ B7	H/L	Blue data bus
29	GND	0V	Ground
30	DOTCLK	H/L	Clock signal. Latch data by falling edge.
31	NC	---	No connection
32	HSYNC	H/L	Horizontal sync input in digital parallel RGB.
33	VSYNC	H/L	Vertical sync input in digital parallel RGB.
34	DE	H/L	Input data enable control. When DE mode, active High to enable data input.
35~36	NC	---	No connection
37~38	GND	0V	Ground
39	LR	H/L	Shift direction of HX8362-A Source Driver internal shift register is controlled by this pin as shown below: LR=H: S01⋯SO1200 (default pull high) LR=L: SO1200⋯S01
40	UD	H/L	Gate Driver Up/down scan setting. When UD=H, reverse scan. When UD=L, normal scan.(Default pull low)
41~45	NC	---	No connection

LED Backlight Connection Wires

Color	Symbol	Level	Description
Red	A	---	LED Backlight anode
White	K	---	LED Backlight cathode

Resistive Touch Screen FPC (only for DT070TFT-TS)

Pin no	Symbol	Description
1	X-	Touch panel pinout for X-
2	Y-	Touch panel pinout for Y-
3	X+	Touch panel pinout for X+
4	Y+	Touch panel pinout for Y+

Capacitive Touch Screen FPC (only for DT070TFT-TSC)

Pin no	Symbol	Level	Description
1	VDD	3.3V	Supply voltage
2	GND	0V	Ground
3	NC	---	No connection
4	TXD	---	Data output, I^2C Clock and UART Serial interface, baud rate: 115200
5~8	NC	---	No connection

6. Absolute Maximum Ratings

Item	Symbol	Rating	Unit
Supply voltage range	Vcc	0.0 to +3.6	V
Input voltage range	Vin	-0.3 to Vcc + 0.3	V
Operating Temperature (DT070TFT)	Top	-20 ~ +70	°C
Operating Temperature (DT070TFT-TS or DT070TFT-TSC)	Top	-10 ~ +60	°C
Operating Humidity	Hop	10 ~ 90 (Max 60°C)	% RH
Storage Temperature (DT057TFT)	Tstg	-30 ~ +80	°C
Storage Temperature (DT070TFT-TS or DT070TFT-TSC)	Tstg	-20 ~ +70	°C
Storage Humidity	Hstg	10 ~ 90 (Max 60°C)	% RH

7. Electrical Characteristics

DC Characteristics

Item	Symbol	Rating	Unit
Power supply	Vcc	3.2 min; 3.3 typ; 3.6 max	V
Input current	Ivcc	195.07 typ; 292.60 max	mA
Input voltage “H”	VIH	0.8 Vcc to Vcc	V
Input voltage “L”	VIL	GND to 0.2 Vcc	V
Output voltage “H”	VOH	Vcc-0.4 to Vcc	V
Output voltage “L”	VOL	GND to GND+0.4	V

8. Display Controller /Power Supply Timing

See Display Controller Specification: **Himax HX8678-B and HX8262-A**

9. Operational EMC Requirements

The operational EMC immunity requirements and emission limits for DISPLAYTECH modules are provided in table 1: EMC specification for operational modules.

Table 1. EMC specification for operational modules

EMC phenomena	REFERENCE standard	Frequency range	Level/ Limit	Test specification	Performance criteria
Electromagnetic field	IEC 61000-4-3	30MHz-1000MHz	3 V/m	1kHz sine, 80% AM	C
EFT/Burst	IEC 61000-4-4	n.a.	10 V	-8us/50us -10ns/100ns	C C
Electrostatic Discharge*	IEC61000-4-2	n.a.	4 kV/ 8 kV	Contact/ Air	C
Conducted RF signals	IEC 61000-4-6	150kHz-30MHz	1 V	1kHz sine, 80% AM	C
Radiated emission	IEC 61000-6-4	30 MHz-1000MHz	47 dBuV	d = 10 m	n.a.

After a charge of 4kV, the display module is allowed to go down for 2 seconds and need to comeback again. With 8kV the display module is allowed to go down and has to comeback after a reset.

10.Optical Characteristics

Item		Symbol	Condition	Min	Typ	Max	Unit	Remark	Note
Response Time		Tr + Tf	θ=0º Ø=0º Ta=25ºC	---	22.2	33.3	ms	Fig 2	4
Contrast ratio		Cr		300	925	---	---		1
Luminance Uniformity		δ White		70	79	---	%		3
Surface Luminance		Lv		279	349	---	cd/m²		2
Viewing Angle range		θ	Ø=90º	70	80	---	deg	Fig 1	6
			Ø=270º	63	73	---			
			Ø=0º	70	80	---			
			Ø=180º	70	80	---			
CIE (x,y) Chromaticity	Red	x	θ=0º Ø=0º Ta=25ºC	0.526	0.576	0.626			5
		y		0.310	0.360	0.410			
	Green	x		0.307	0.357	0.407			
		y		0.532	0.582	0.632			
	Blue	x		0.106	0.156	0.206			
		y		0.084	0.134	0.184			
	White	x		0.271	0.331	0.391			
		y		0.243	0.303	0.363			

Note 1: Contrast Ratio = Average Surface Luminance with all white pixels (P_1,P_2, P_3,P_4, P_5) / Average Surface Luminance with all black pixels (P_1, P_2, P_3,P_4, P_5)

Note 2: Surface luminance is the LCD surface from the surface with all pixels displaying white.
Lv = Average Surface Luminance with all white pixels (P_1, P_2, P_3,P_4, P_5)

Note 3: The uniformity in surface luminance, δ WHITE is determined by measuring luminance at each test position 1 through 5, and then dividing the maximum luminance of 5 points luminance by minimum luminance of 5 points luminance.
δ WHITE = Minimum Surface Luminance with all white pixels (P_1, P_2, P_3,P_4, P_5) / Maximum Surface Luminance with all white pixels (P_1, P_2, P_3,P_4, P_5)

Note 4: Response time is the time required for the display to transition from White to black (Rise Time, Tr) and from black to white (Decay Time, Tf). For additional information see FIG 2.

Note 5: CIE (x, y) chromaticity: The x,y value is determined by measuring luminance at each test position 1 through 5,and then taking average value

Note 6: Viewing angle is the angle at which the contrast ratio is greater than 2. For TFT module the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For additional information see Fig 1.

Fig.1 (Definition of Viewing Angle)

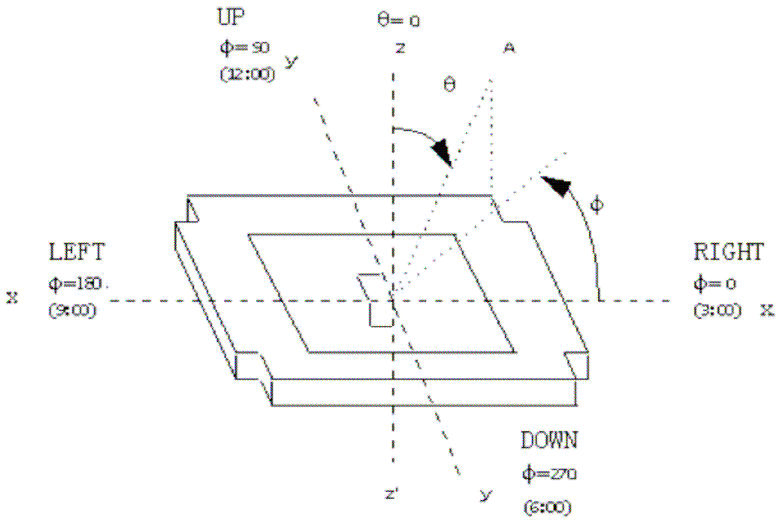
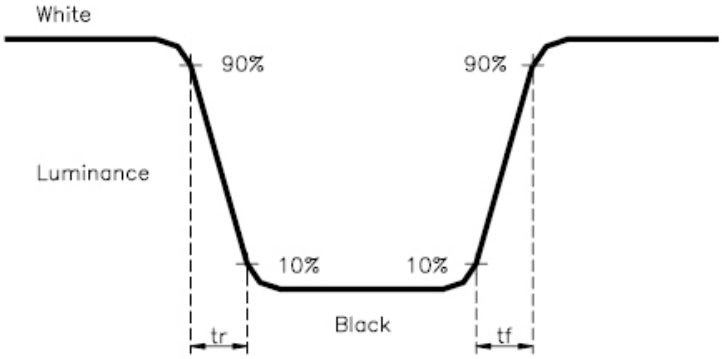


Fig. 2 (The response time is defined as the time interval between the 10% and 90% amplitudes. Refer to figure below.)



11.Backlight specification

ITEM	PARAMETER	UNIT
COLOR	WHITE	
AVERAGE LUMINOUS INTENSITY (LV)	4200 min (IF 180mA)	cd/m^2
NO.OF LED SMT	3 x 9	---
FORWARD VOLTAGE (VF)	9.0 min; 9.6 typ; 10.5 max (IF 180mA)	V

12.Safety Precaution

Handling precautions:

- This device is susceptible to Electro-Static Discharge (ESD) damage. Observe Anti-Static precautions.

Power supply precautions:

- Identify and, at all times, observe absolute maximum ratings for both logic and LC drivers. Note that there is some variance between models.
- Prevent the application of reverse polarity to VCC and GND, however briefly.
- Use a clean power source free from transients. Power up conditions are occasionally “jolting” and may exceed the maximum ratings of the modules.
- The VCC power of the module should also supply the power to all devices that may access the display. Don’t allow the data bus to be driven when the logic supply to the module is turned off.

Operating precautions:

- DO NOT plug or unplug the module when the system is powered up.
- Minimize the cable length between the module and host MPU.
- Operate the module within the limits of the modules temperature specifications.

Mechanical/Environmental precautions:

- Improper soldering is the major cause of module difficulty. Use of flux cleaner is not recommended as they may seep under the elastomeric connection and cause display failure.
- Mount the module so that it is free from torque and mechanical stress.
- Surface of the LCD panel should not be touched or scratched. The display front surface is an easily scratched, plastic polarizer. Avoid contact and clean only when necessary with soft, absorbent cotton dampened with petroleum benzene.
- Always employ anti-static procedure while handling the module.
- Prevent moisture build-up upon the module and observe the environmental constraints for storage temperature and humidity.
- Do not store in direct sunlight
- If leakage of the liquid crystal material should occur, avoid contact with this material, particularly ingestion. If the body or clothing becomes contaminated by the liquid crystal material, wash thoroughly with water and soap