

SPECIFICATION

Product No.: **CDT-T-0220-3V0**

Customer: _____

Issue Date: **Nov. 2, 2006**

This specification maybe changed without any notice in order to improve performance or quality.
--

CHINA DISPLAY TECH.			CUSTOMER
APPROVED	CHECKED	PREPARED	APPROVED

TABLE OF CONTENT

1. GENERAL DESCRIPTION2

2. FEATURES2

3. MECHANICAL SPECIFICATION2

4. MECHANICAL DIMENSION3

5. ELECTRICAL CHARACTERISTICS4

6. BACKLIGHT CHARACETRISTIC4

7. MODULE FUNCTION DESCRIPTION.....5

7.1 PIN DESCRIPTION.....5

7.2 TIMING CHARACTERISTICS7

8. ELECTRO-OPTICAL CHARACT ERISTICS.....8

9. RELIABILITY9

9.1 MTBF9

9.2 TESTS.....9

10.INSPECTION CRITERIA10

11.ILLUSTRATION OF LCD DATE CODE16

12.PRECAUTIONS FOR USE17

12.1 SAFETY17

12.2 STORAGE CONDITIONS17

12.3 HANDLING PRECAUTIONS17

12.4 WARRANTY.....17

13.MARK AND PACKAGING18

14.FACTORY19

15.REVISION HISTORY19

1. GENERAL DESCRIPTION

The CDT-T-0220-3V0 is a 240(RGB)X320 dot-matrix TFT module. This module can be easily accessed by micro-processor-unit (MPU) via parallel 8080 interfaces, and is suitable for small mobile products as digital cell phone and MP3.

2. FEATURES

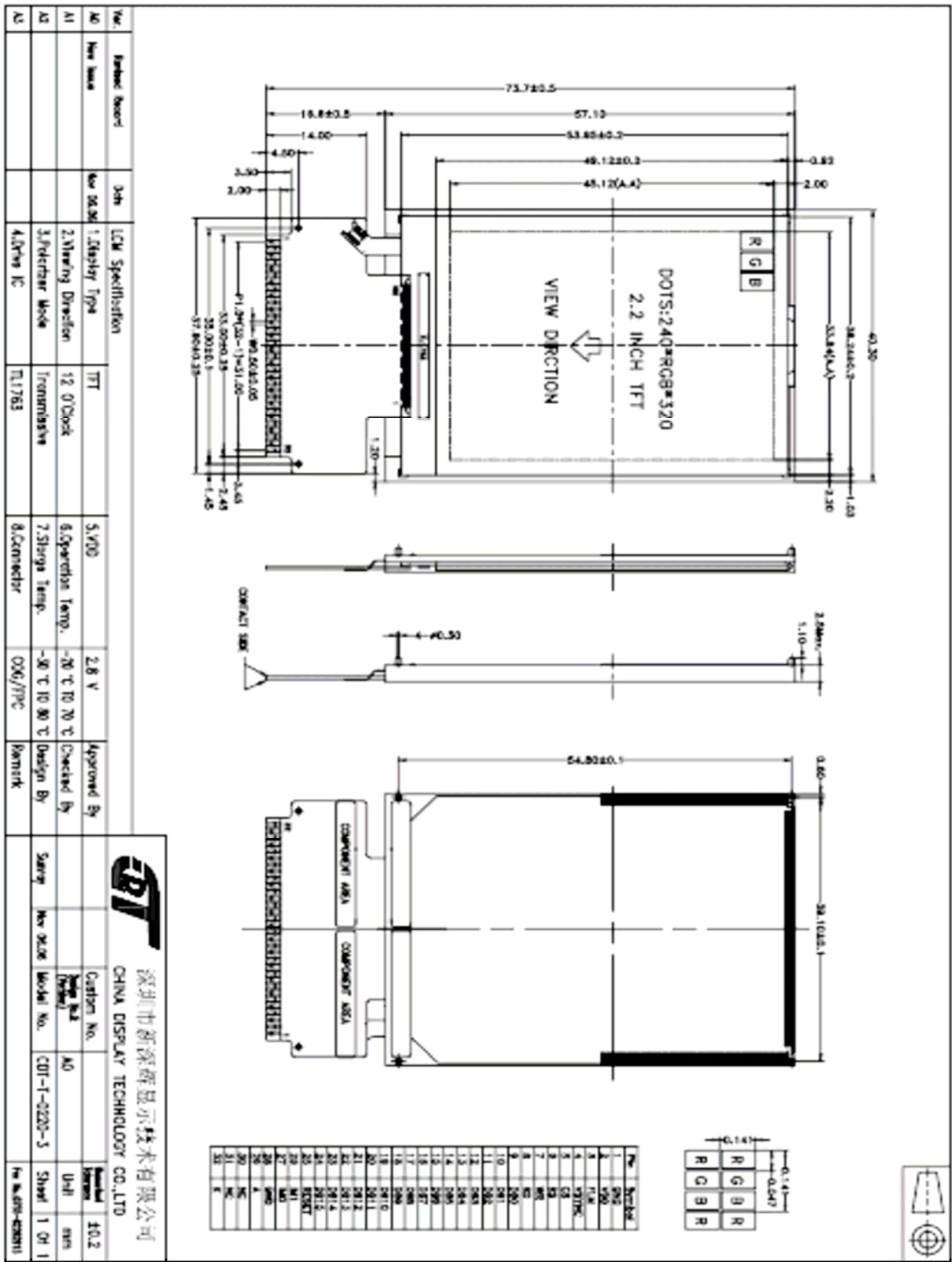
Display Mode	TFT LCD module
	TFT LCD, Transmissive type. Normally White.
Display Format	RGB Stripe
Color	262K/65k color
Input Data	16bit/8bit 80 system parallel input from MPU
Viewing Direction	12 O'clock
Backlight	White LED
Driver IC	TL1763

3. MECHANICAL SPECIFICATION

Item	Specifications	Unit
Dimensional outline	40.3(W)×57.10(H)×2.8(D)(exclude FPC)	mm
Resolution	240(RGB)×320	Pixel
Active area	33.848(W)×45.12(H)	mm
C/F area	38.24(W)× 49.12(H)	mm
Pixel pitch	0.141(W)×0.141 (H)	mm
Dot size	0.047(W)× 0.141(H)	mm

Note: 1. pixel = 3 dots = Red dot +Green dot +Blue dot.
2. include component.

4. MECHANICAL DIMENSION



5. ELECTRICAL CHARACTERISTICS

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Voltage	System	V_{DD}	-	2.7	2.8	2.9	V
LCM driving voltage	LCM	V_{op}	-	---	--	--	V
Input Voltage	H level	V_{IH}	-	$0.8 \times V_{DD}$	---	V_{DD}	V
	L level	V_{IL}		0	---	$0.2 \times V_{DD}$	V
Supply current		I_{DD}	Without LED	---	---	2.8	mA

6. BACKLIGHT CHARACTERISTIC

Item	Symbol	Min.	Typical	Max.	Unit
LED module Forward voltage	V_{LED}	12.8	----	9.9	V
LED module current	I_{LED}	----	18	----	mA
LCM Surface Luminance ★1	L_S	3100	3500	-----	Cd/m^2
LCM Surface brightness uniform★2	L_D	----	80	----	%

★1 Test condition is :

(a) Center point on active area

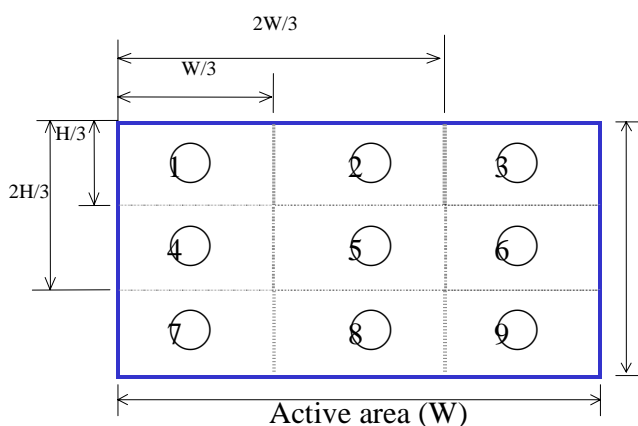
(b) Best Contrast

★2 Uniform measure condition :

(1) Measure 9 point. Measure location is show below :

(2) Uniform = (Min. brightness / Max. brightness) × 100%

(3) Best Contrast.



4. MECHANICAL DIMENSION

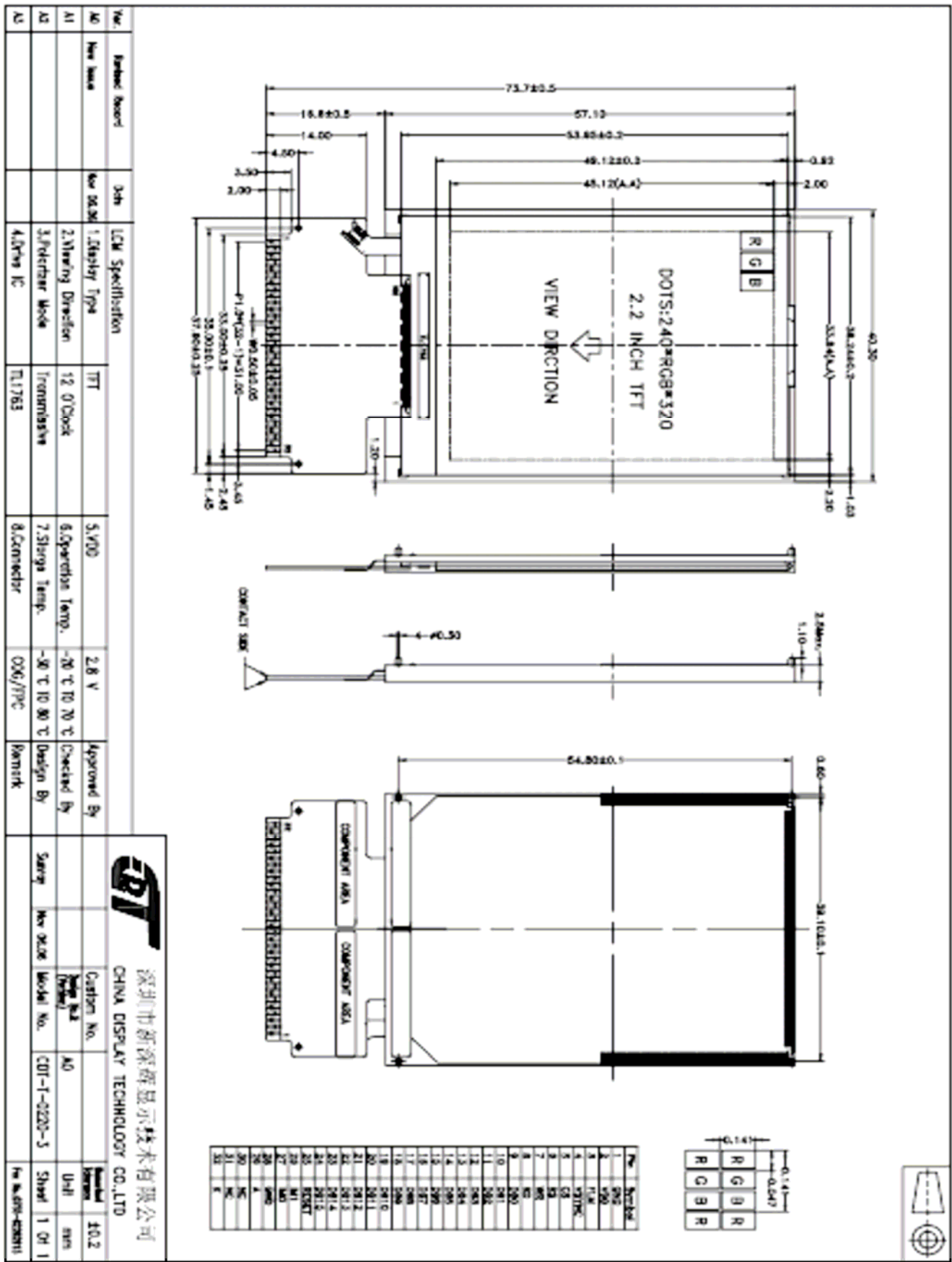


TABLE OF CONTENT

1. GENERAL DESCRIPTION2

2. FEATURES2

3. MECHANICAL SPECIFICATION2

4. MECHANICAL DIMENSION3

5. ELECTRICAL CHARACTERISTICS4

6. BACKLIGHT CHARACETRISTIC4

7. MODULE FUNCTION DESCRIPTION.....5

7.1 PIN DESCRIPTION.....5

7.2 TIMING CHARACTERISTICS7

8. ELECTRO-OPTICAL CHARACT ERISTICS.....8

9. RELIABILITY9

9.1 MTBF9

9.2 TESTS.....9

10.INSPECTION CRITERIA10

11.ILLUSTRATION OF LCD DATE CODE16

12.PRECAUTIONS FOR USE17

12.1 SAFETY17

12.2 STORAGE CONDITIONS17

12.3 HANDLING PRECAUTIONS17

12.4 WARRANTY.....17

13.MARK AND PACKAGING18

14.FACTORY19

15.REVISION HISTORY19

8. ELECTRO-OPTICAL CHARACTERISTICS

Optical characteristics are determined after the unit has been 'ON' and stable for approximately 30 minutes in a dark environment at 25 °C. The values specified are at an approximate distance 50cm from the TFT-LCD surface at a viewing angle of Φ and θ equal to 0°.

Measurement condition: Refer to next pages (C-light source, Halogen Lamp)

*1): with Polarizer

*2): without Polarizer

*3): only Color Filter glass

Parameter	Symbol	Values			Unit	Notes
		Min	Typ	Max		
*1) Threshold Voltage	Vsat	2.0	2.1	2.2	V	Fig.2
	Vth	1.0	1.1	1.2	V	
*2) Transmittance	T(%)	-	15.9	-	%	Fig.1
*1) Contrast Ratio	C/R	300	350	-		
*1) Response Time	Tr+Tf	-	25	40	msec	Fig.3
*3) CIE Color Coordinate	Rx	0.579	0.599	0.619		
	Ry	0.300	0.320	0.340		
	Gx	0.290	0.310	0.330		
	Gy	0.543	0.563	0.583		
	Bx	0.118	0.138	0.158		
	By	0.140	0.160	0.180		
	Wx	0.288	0.308	0.328		
	Wy	0.324	0.344	0.364		
*1) Viewing Angle	θ_l	45	-	-	Degree	C/R>10 Fig.4
	θ_r	45	-	-		
	θ_u	35	-	-		
	θ_d	15	-	-		

Notes : 1. Contrast Ratio(CR) is defined mathematically as :

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

2. Surface luminance is the center point across the TFT-LCD surface 500mm from the surface with all pixels displaying white. For more information see FIG 1.
3. Response time is the time required for the display to transition from white to black(Rise Time, Tr) and from black to white(Falling Time, Tf). For additional information see FIG 3.
4. Viewing angle is the angle at which 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 TFT-LCD surface. For more information see FIG 4.
5. Optimum contrast is obtained by adjusting the TFT-LCD Threshold voltage(Vth & Vsat)

9. RELIABILITY

9.1. MTBF

The LCD module shall be designed to meet a minimum MTBF value of 50000 hours with normal. (25°C in the room without sunlight)

9.2. Test condition

NO.	ITEM	CONDITION	CRITERION
1	High Temperature Non-Operating Test	70°C * 240Hrs	◦ No Defect Of Operational Function In Room Temperature Are Allowable. ◦ IDD of LCM in Pre-and Post-Test Should Follow Specification
2	Low Temperature Non-Operating Test	-20°C * 240Hrs	
3	High Temperature/Humidity Non-Operating Test	50°C * 90%RH * 240 Hrs	
4	High Temperature Operating Test	80°C * 240Hrs	
5	Low Temperature Operating Test	-30°C * 240Hrs	
6	Thermal Shock Test	-20°C (30Min)↔70(30Min)* 10 CYCLES	

Notes:

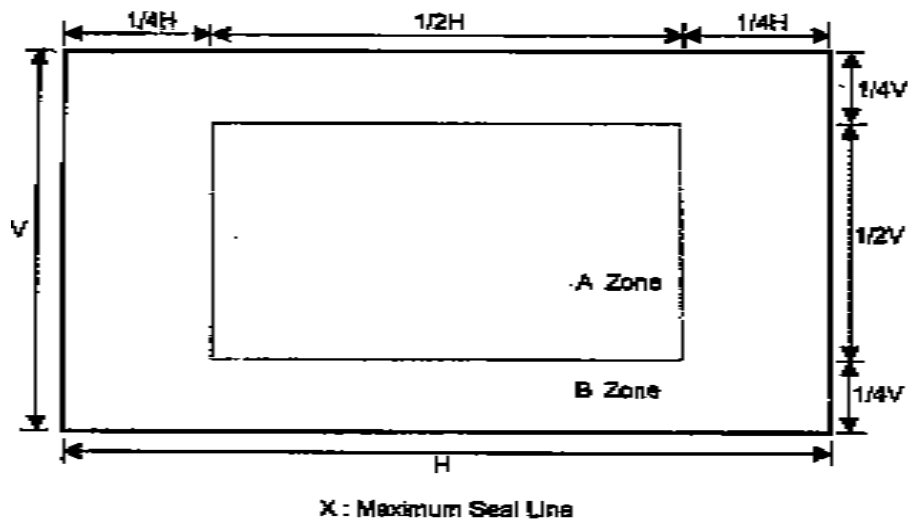
1. Judgments should be made after exposure in room temperature for two hours.
2. The distill water is used for the high temperature / humidity test.
3. The sample above is individually for every reliability tests condition.

10. INSPECTION CRITERIA

1. AQL(Acceptable Quality Level) AQL of major and minor defect

	MAJOR DEFECT	MINOR DEFECT	MAJOR+MINOR
APPEARANCE	0.40%	1.0%	1.0%
ELECTRIC-OPTICAL	0.15%	0.15%	0.15%

2.Definition of inspection area



3. Basic conditions for inspection

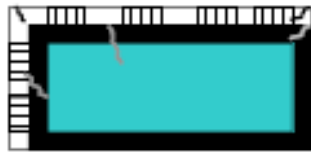
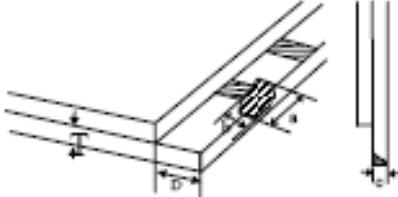
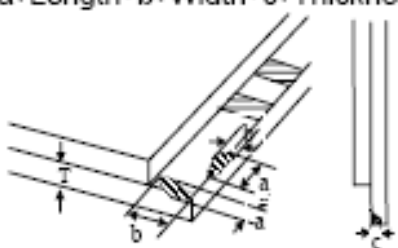
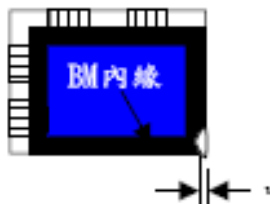
Inspection is implemented over 30cm vertical distance and 30° incidence from LCD 20W fluorescent lamps. Viewing direction for inspection is over 30cm far and 45±10°(without peeling the protective film off, except for additional requirement) against from LCD

4. Inspection item and criteria

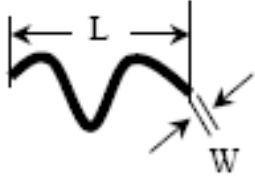
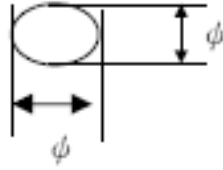
4.1 Visual inspection criterion in immobility

4.1.1 Glass defect

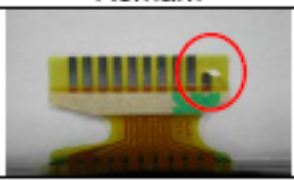
No	Defect item	Criteria	Remark
1	Dimension Unconformity (Major defect)	By Engineering Drawing	

No	Defect item	Criteria	Remark
2	Cracks (Major defect)	1.Linear cracks on panel 【 Reject 】 2. Nonlinear crack contrast by limited sample	
3	Glass extrude the conductive area (minor defect)	a: disregards and no influence assemblage 1) $b \leq 1/3$ Pin width(non bonding area) 【 Accept 】 2) bonding area $\leq 0.5\text{mm}$ 【 Accept 】	a:Length, b:Width
4	Pin-side , conductive area damaged (minor defect)	(a c : disregards) $b \leq 1/3$ of effective length for bonding electrode 【 Accept 】	a:Length・b:Width・c: Thickness 
5	Pin-side , non-conductive area damaged (minor defect)	1) Damage area don't touch the ITO (Including contraposition mark,except scribing mark) 【 Accept 】 2) $c < T$ $b \leq \text{BM } 1/3$ of width 【 Accept 】 3) $c = T$ b not touch the seal glue 【 Accept 】 4) a disregards	a:Length・b:Width・c: Thickness 
6	Non-pin-side damage (minor defect)	$c < T$ 1) b exceeds $1/3$ BM 【 Reject 】 $c = T$ b not touch the seal glue 【 Reject 】	c : Thickness b: width of damage 

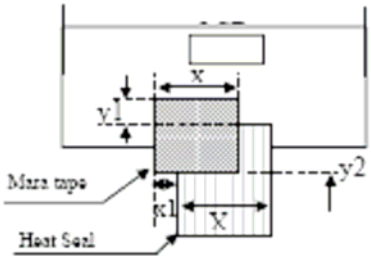
4.1.2 LCD appearance defect (View area)

No	Defect item	Criteria		Remark
1	Fiber 、glass cratch 、polarizer scratch/folded (minor defect)	Specification	Allowable	note1: L : Length , W : Width note2: disregard if out of AA 
		$W \leq 0.03\text{mm}$	disregard	
		$0.03\text{mm} < W \leq 0.05\text{mm} ;$ $L \leq 3.0\text{mm}$	2	
		$0.05\text{mm} < W \leq 0.1\text{mm} ;$ $L \leq 3.0\text{mm}$	1	
		$W > 0.1\text{mm} ; L > 3.0\text{mm}$	0	
2	Polarizer bubble 、 concave and convex (minor defect)	$\psi \leq 0.2\text{mm}$	disregard	note 1: $\psi = (L+W)/2$; L : Length , W : Width note2: disregard if out of AA
		$0.2\text{mm} < \psi \leq 0.3\text{mm}$	2	
		$0.3\text{mm} < \psi \leq 0.5\text{mm}$	1	
		$0.5\text{mm} < \psi$	0	
3	Black dots 、dirty dots 、 impurities 、eyewinker (Major defect)	$\psi \leq 0.15\text{mm}$	disregard	note2: disregard if out of AA 
		$0.15\text{mm} < \psi \leq 0.25\text{mm}$	2	
		$0.25\text{mm} < \psi \leq 0.3\text{mm}$	1	
		$0.3\text{mm} < \psi$	0	
4	Polarizer prick (Major defect)	$\psi \leq 0.1\text{mm}$	disregard	note1: $\psi = (L+W)/2$; L= Length , W=Width note2: the distance between two dots $> 5\text{mm}$
		$0.1\text{mm} < \psi \leq 0.25\text{mm}$	3	
		$\psi > 0.25\text{mm}$	0	

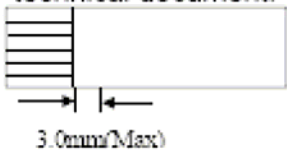
4.1.3 .FPC

No	Defect item	Criteria		Remark
1	Copper screen peel (Major defect)	Copper screen peel 【 Reject 】		
2	No release tape or peel (Major defect)	No release tape or peel 【 Reject 】		
3	Dirty dot and impurity of FPC for customer using side (minor defect)	Specification	Allowable	note1: Cannot have stride ITO impurities
		$\psi \leq 0.25\text{mm}$	2	
		$\psi > 0.25$	0	

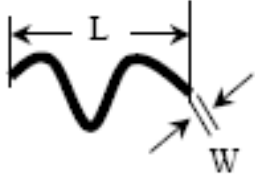
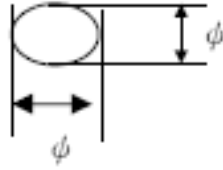
4.1.4 Black tape & Mara tape

No	Defect item	Criteria	Remark
1	FPC or H/S black tape shift (minor defect)	1.shift spec: 1)glue to the polarize 【Reject】 2) IC bare 【Reject】 2. left-and-right spec: 1) exceed of FPC edge or H-S edge 【Reject】 2)IC bare 【Reject】	
2	No black tape (Major defect)	No black tape 【Reject】	
3	Tape position mistake (minor defect)	Not by engineering drawing 【Reject】	
4	Mara tape defect (minor defect)	Peel before pulling the protecting film. 【Reject】	

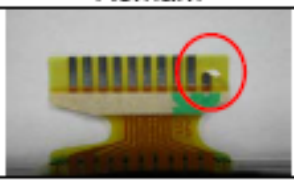
4.1.5 Silicon and Tuffy glue

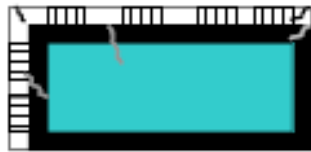
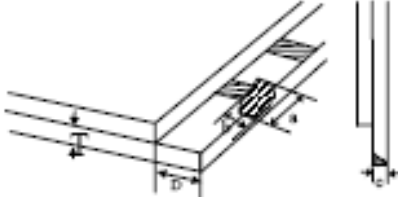
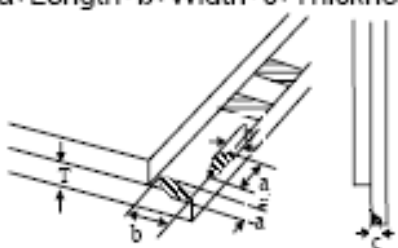
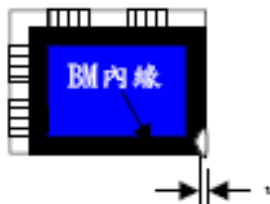
No	Defect item	Criteria	Remark
1	Quantity of silicon (minor defect)	Uncover the ITO and circuit area. 【Reject】	note: compared by engineering drawing.
2	Tuffy glue (minor defect)	1. Uncover the reveal copper area 【Reject】 2. Cover layer 0.3mm(Min) ~ 3.0mm(Max) 【accept】	note:if customer has special requirement , refer to the technical document. 
3	Depth of glue covering (minor defect)	Depth of glue covering overtop front Polarizer 【Reject】	Except of the special requirement .

4.1.2 LCD appearance defect (View area)

No	Defect item	Criteria		Remark
1	Fiber 、glass cratch 、polarizer scratch/folded (minor defect)	Specification	Allowable	note1: L : Length , W : Width note2: disregard if out of AA 
		$W \leq 0.03\text{mm}$	disregard	
		$0.03\text{mm} < W \leq 0.05\text{mm} ;$ $L \leq 3.0\text{mm}$	2	
		$0.05\text{mm} < W \leq 0.1\text{mm} ;$ $L \leq 3.0\text{mm}$	1	
		$W > 0.1\text{mm} ; L > 3.0\text{mm}$	0	
2	Polarizer bubble 、 concave and convex (minor defect)	$\psi \leq 0.2\text{mm}$	disregard	note 1: $\psi = (L+W)/2$; L : Length , W : Width note2: disregard if out of AA
		$0.2\text{mm} < \psi \leq 0.3\text{mm}$	2	
		$0.3\text{mm} < \psi \leq 0.5\text{mm}$	1	
		$0.5\text{mm} < \psi$	0	
3	Black dots 、dirty dots 、 impurities 、eyewinker (Major defect)	$\psi \leq 0.15\text{mm}$	disregard	note2: disregard if out of AA 
		$0.15\text{mm} < \psi \leq 0.25\text{mm}$	2	
		$0.25\text{mm} < \psi \leq 0.3\text{mm}$	1	
		$0.3\text{mm} < \psi$	0	
4	Polarizer prick (Major defect)	$\psi \leq 0.1\text{mm}$	disregard	note1: $\psi = (L+W)/2$; L= Length , W=Width note2: the distance between two dots $> 5\text{mm}$
		$0.1\text{mm} < \psi \leq 0.25\text{mm}$	3	
		$\psi > 0.25\text{mm}$	0	

4.1.3 .FPC

No	Defect item	Criteria		Remark
1	Copper screen peel (Major defect)	Copper screen peel 【 Reject 】		
2	No release tape or peel (Major defect)	No release tape or peel 【 Reject 】		
3	Dirty dot and impurity of FPC for customer using side (minor defect)	Specification	Allowable	note1: Cannot have stride ITO impurities
		$\psi \leq 0.25\text{mm}$	2	
		$\psi > 0.25$	0	

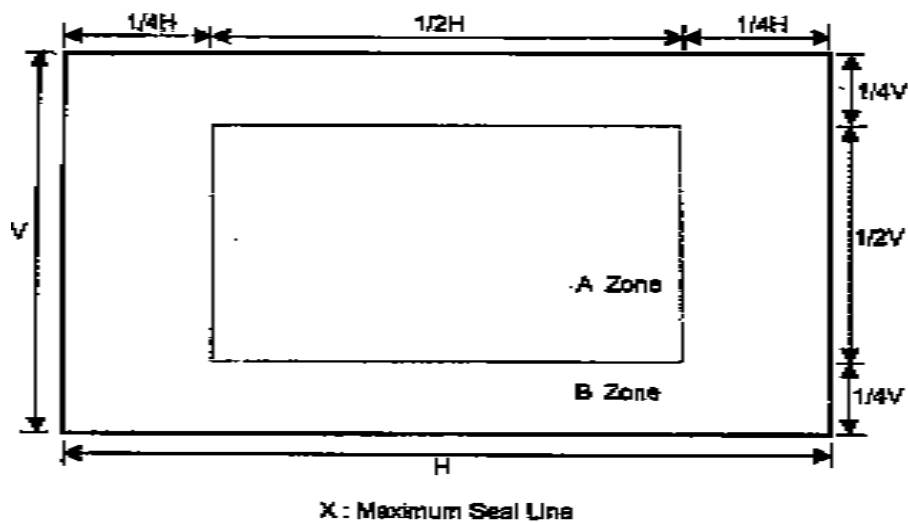
No	Defect item	Criteria	Remark
2	Cracks (Major defect)	1.Linear cracks on panel 【 Reject 】 2. Nonlinear crack contrast by limited sample	
3	Glass extrude the conductive area (minor defect)	a: disregards and no influence assemblage 1) $b \leq 1/3$ Pin width(non bonding area) 【 Accept 】 2) bonding area $\leq 0.5\text{mm}$ 【 Accept 】	a:Length, b:Width
4	Pin-side , conductive area damaged (minor defect)	(a c : disregards) $b \leq 1/3$ of effective length for bonding electrode 【 Accept 】	a:Length・b:Width・c: Thickness 
5	Pin-side , non-conductive area damaged (minor defect)	1) Damage area don't touch the ITO (Including contraposition mark,except scribing mark) 【 Accept 】 2) $c < T$ $b \leq \text{BM } 1/3$ of width 【 Accept 】 3) $c = T$ b not touch the seal glue 【 Accept 】 4) a disregards	a:Length・b:Width・c: Thickness 
6	Non-pin-side damage (minor defect)	$c < T$ 1) b exceeds $1/3$ BM 【 Reject 】 $c = T$ b not touch the seal glue 【 Reject 】	c : Thickness b: width of damage 

10. INSPECTION CRITERIA

1. AQL(Acceptable Quality Level) AQL of major and minor defect

	MAJOR DEFECT	MINOR DEFECT	MAJOR+MINOR
APPEARANCE	0.40%	1.0%	1.0%
ELECTRIC-OPTICAL	0.15%	0.15%	0.15%

2.Definition of inspection area



3. Basic conditions for inspection

Inspection is implemented over 30cm vertical distance and 30° incidence from LCD 20W fluorescent lamps. Viewing direction for inspection is over 30cm far and 45±10°(without peeling the protective film off, except for additional requirement) against from LCD

4. Inspection item and criteria

4.1 Visual inspection criterion in immobility

4.1.1 Glass defect

No	Defect item	Criteria	Remark
1	Dimension Unconformity (Major defect)	By Engineering Drawing	

8. ELECTRO-OPTICAL CHARACTERISTICS

Optical characteristics are determined after the unit has been 'ON' and stable for approximately 30 minutes in a dark environment at 25 °C. The values specified are at an approximate distance 50cm from the TFT-LCD surface at a viewing angle of Φ and θ equal to 0°.

Measurement condition: Refer to next pages (C-light source, Halogen Lamp)

*1): with Polarizer

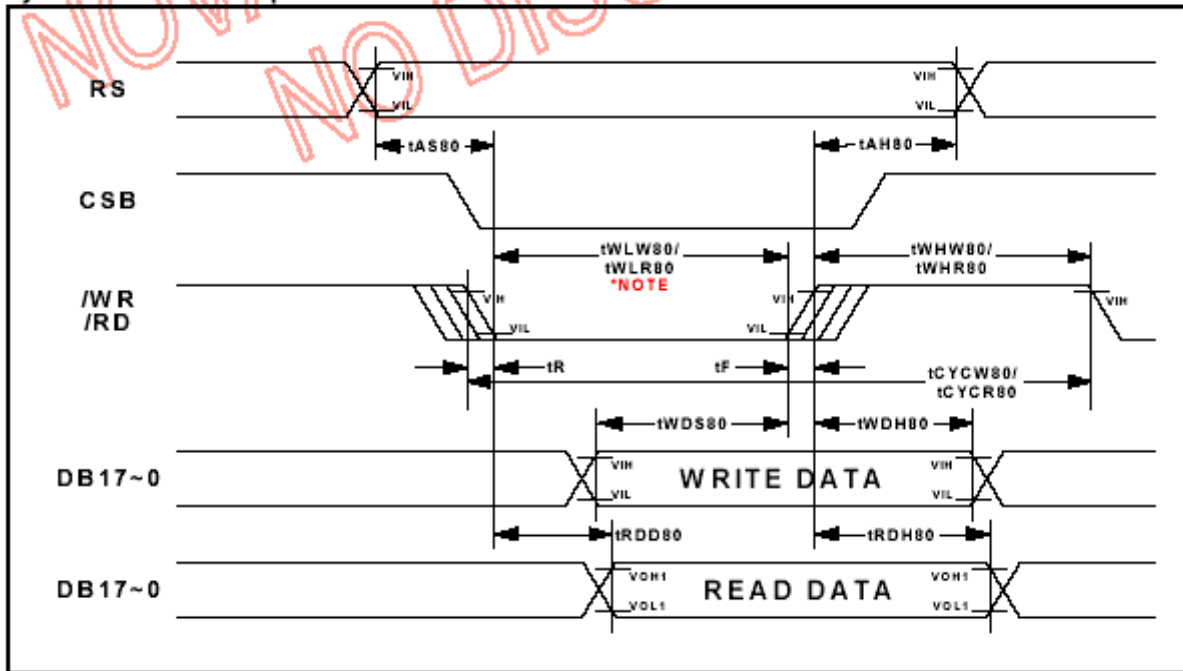
*2): without Polarizer

*3): only Color Filter glass

Parameter	Symbol	Values			Unit	Notes
		Min	Typ	Max		
*1) Threshold Voltage	Vsat	2.0	2.1	2.2	V	Fig.2
	Vth	1.0	1.1	1.2	V	
*2) Transmittance	T(%)	-	15.9	-	%	Fig.1
*1) Contrast Ratio	C/R	300	350	-		
*1) Response Time	Tr+Tf	-	25	40	msec	Fig.3
*3) CIE Color Coordinate	Rx	0.579	0.599	0.619		
	Ry	0.300	0.320	0.340		
	Gx	0.290	0.310	0.330		
	Gy	0.543	0.563	0.583		
	Bx	0.118	0.138	0.158		
	By	0.140	0.160	0.180		
	Wx	0.288	0.308	0.328		
	Wy	0.324	0.344	0.364		
*1) Viewing Angle	θ_l	45	-	-	Degree	C/R>10 Fig.4
	θ_r	45	-	-		
	θ_u	35	-	-		
	θ_d	15	-	-		

7.2 Timing characteristics

80-system bus interface operation



*NOTE: t_{WLW80} is specified during the overlap period.(CS="Low" and /WR=" Low")

t_{WLR80} is specified during the overlap period.(CS="Low" and /RD=" Low")