

EXAMINED BY :  Yung Chang Hu	EMERGING DISPLAY  TECHNOLOGIES CORPORATION	FILE NO . CAS- 51555
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		TOTAL PAGE : 30
		VERSION : 5

CUSTOMER                      ACCEPTANCE                      SPECIFICATIONS

MODEL NO. :  
  
ET057002DH6  
(RoHS)  
FOR MESSRS :  
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CUSTOMER'S APPROVAL

DATE : \_\_\_\_\_

BY : \_\_\_\_\_

RECORDS OF REVISION

DOC . FIRST ISSUE

FEB.16, 2007

DATE	REVISED PAGE NO.	SUMMARY																																																																																																																																																																				
NOV.22, 2007	1	2. MECHANICAL SPECIFICATIONS (8) LCD TYPE : TFT, TRANSMISSIVE → TFT, TRANSMISSIVE, ANTE-GLARE																																																																																																																																																																				
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	GREEN	x		0.28	0.33	0.38																																																																																																																																																																
		y		0.55	0.60	0.65																																																																																																																																																																
	BLUE	x		0.09	0.14	0.19																																																																																																																																																																
		y		0.06	0.11	0.16																																																																																																																																																																
	6	6.2 THE BRIGHTNESS TEST METHOD (28V~32V) → VF DELETE IF=40mA ADD POWER (+28V~32V) TO LED, A, K PIN TEST POINT ARE ① ~ ⑨																																																																																																																																																																				
	7	DELETE PAGE 7 : 6.4 LED BACK-LIGHT UNIT																																																																																																																																																																				
	8	8. BLOCK DIMENSIONS ADD VCC, GND → VSS																																																																																																																																																																				
	11	10. INTERFACE SIGNAL NO. 49 : GND → VSS																																																																																																																																																																				

RECORDS OF REVISION FEB.16, 2007

DATE	REVISED PAGE NO.	SUMMARY
NOV.22, 2007	12	11.1 POWER SUPPLY FOR LCM DELETE NOTE : VCOM AC WAVEFORM
	20	13. SPECIFICATION OF AUDACITY ASSURANCE → 13. INSPECTION CRITERION
	22 ~ 26	13.3.2 INSPECTION CRITERION REVISING THE ENTIRE PAGE

DEC.26, 2007	1	2. MECHANICAL SPECIFICATIONS (1)DISPLAY SIZE (inch) : 5.7" → DIAGONALS : 5.7 inch (4)EFFECTIVE AREA : 117.2W * 88.4H mm →117.2W * 88.4H mm (T/P) (5) ACTIVE AREA : ADD 116.2W * 87.4H mm (T/P) DELETE (9) COLOR:(24 BIT), ADD (12) INTERFACE MODE
	3	4. ELECTRICAL CHARACTERISTICS ADD NOTE (4) AMBIENT TEMP. VS. ALLOWABLE FORWARD CURRENT (PER LED)

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ITEM	SYMBOL	CONDITION	MIN.	TYE	MAX.	UNIT	REMARK	
VIEWING ANGLE	$\theta_v$	CR ≥ 10	55	60	—	—	(5)	
	$\theta_h$		70	75	—	deg.		
	$\theta_v$		70	75	—	—		
	$\theta_h$		70	75	—	—		
RESPONSE TIME	$t_r$ (rise) $t_f$ (fall)	$\theta_v=0^\circ, \theta_h=0^\circ$	—	15	30	msec	(2)	
THE BRIGHTNESS OF MODULE	B	$\theta_v=0^\circ, \theta_h=0^\circ$ IF=40mA	400	450	—	cd/m <sup>2</sup>	(4)	
COLOR OF CIE COORDINATE	WHITE	$\theta_v=0^\circ, \theta_h=0^\circ$ IF=40mA NTSC: 60%	$x$	0.27	0.32	0.37	—	(6)
	RED		$y$	0.30	0.55	0.40	—	
	GREEN		$x$	0.31	0.36	0.41	—	
	BLUE		$y$	0.28	0.33	0.38	—	
			$y$	0.09	0.14	0.19	—	
THE BRIGHTNESS OF UNIFORMITY	—	IF=40mA	75	80	—	%	—	

ITEM	SYMBOL	CONDITION	MIN.	TYE	MAX.	UNIT	REMARK	
VIEWING ANGLE	$\theta_v$	CR ≥ 10	55	60	—	—	(2)	
	$\theta_h$		70	75	—	deg.		
	$\theta_v$		70	75	—	—		
	$\theta_h$		70	75	—	—		
RESPONSE TIME	$t_r$ (rise) $t_f$ (fall)	$\theta_v=0^\circ, \theta_h=0^\circ$	—	15	30	msec	(4)	
THE BRIGHTNESS OF MODULE	B	$\theta_v=0^\circ, \theta_h=0^\circ$ IF=40mA	400	450	—	cd/m <sup>2</sup>	(5)	
COLOR OF CIE COORDINATE	WHITE	$\theta_v=0^\circ, \theta_h=0^\circ$ IF=40mA NTSC: 60%	$w_x$	0.27	0.32	0.37	—	(6)
	RED		$w_y$	0.30	0.55	0.40	—	
	GREEN		$R_x$	0.38	0.63	0.68	—	
	BLUE		$R_y$	0.31	0.36	0.41	—	
			$G_x$	0.28	0.33	0.38	—	
THE BRIGHTNESS OF UNIFORMITY	—	IF=40mA	75	80	—	%	—	

6	6.2 THE TEST METHOD OF BRIGHTNESS AND UNIFORMITY
	6.3 THE CALCULATING METHOD OF UNIFORMITY
	UNIFORMITY: $\left[ 1 - \frac{\text{MAXIMUM BRIGHTNESS} - \text{MINIMUM BRIGHTNESS}}{\text{AVERAGE BRIGHTNESS}} \right] \times 100\% \rightarrow$ UNIFORMITY: $\left[ 1 - \frac{\text{MAXIMUM BRIGHTNESS} - \text{MINIMUM BRIGHTNESS}}{\text{AVERAGE BRIGHTNESS}} \right] \times 100\%$

12	11. POWER SUPPLY

RECORDS OF REVISION	DOC . FIRST ISSUE	FEB.16, 2007
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DATE	REVISED PAGE NO.	SUMMARY																															
DEC.26, 2007	14	12.1 ELECTRICAL CHARACTERISTICS ADD INPUT VOLTAGE DELETE 12.2 ABSOLUTE MAXIMUM RATINGS																															
	27	13.4.1 STANDARD SPECIFICATIONS FOR RELIABILITY OF LCD MODULE UPDATE 13.4.1 STANDARD SPECIFICATIONS FOR RELIABILITY OF LCD MODULE																															
	29	ADD 13.6.5 Not allowed to inflict any external stress and to cause any mechanical interference on the bending area of FPC during the tail bending backwards! Do NOT stress FPC and IC on the Module!																															
AUG.04, 2008	1	2. MECHANICAL SPECIFICATIONS (12) INTERFACE MODE ---- RGB, 18 BIT,PARALLEL → (12) INTERFACE MODE ---- RGB, 24 BIT,PARALLEL(DE/SYNC MODE)																															
	4	5. TIMING CHART REVISING THE ENTIRE PAGE ADD PAGE 5																															
	6	6.1 OPTICAL CHARACTERISTICS NOTE (1) : TEST EQUIPMENT SETUP : 2° → 1°																															
	8	7. OUTLINE DIMENSIONS MARK △ : ADD NOTE																															
	12	10. INTERFACE SIGNALS <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>PIN NO</th> <th>SYMBOL</th> <th>I/O</th> <th>FUNCTION</th> </tr> </thead> <tbody> <tr> <td>36</td> <td>HSYNC</td> <td>I</td> <td>HORIZONTAL SYNC INPUT</td> </tr> <tr> <td>37</td> <td>VSYNC</td> <td>I</td> <td>VERTICAL SYNC INPUT</td> </tr> <tr> <td>38</td> <td>ENB</td> <td>I</td> <td>DATAENABLE INPUT</td> </tr> </tbody> </table> <p style="text-align: center;">↓</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>PIN NO</th> <th>SYMBOL</th> <th>I/O</th> <th>FUNCTION</th> </tr> </thead> <tbody> <tr> <td>36</td> <td>HSYNC</td> <td>I</td> <td>HORIZONTAL SYNC INPUT DE MODE &amp; SYNC MODE SETTING DE MODE : ONLY ENB AND PIXEL CLOCK IS NECESSARY.</td> </tr> <tr> <td>37</td> <td>VSYNC</td> <td>I</td> <td>VERTICAL SYNC INPUT SYNC MODE : ENB SHOULD BE CONNECTED TO VSS.</td> </tr> <tr> <td>38</td> <td>ENB</td> <td>I</td> <td>DATAENABLE INPUT HSYNC/VSYNC AND PIXEL CLOCK IS NECESSARY.</td> </tr> </tbody> </table>	PIN NO	SYMBOL	I/O	FUNCTION	36	HSYNC	I	HORIZONTAL SYNC INPUT	37	VSYNC	I	VERTICAL SYNC INPUT	38	ENB	I	DATAENABLE INPUT	PIN NO	SYMBOL	I/O	FUNCTION	36	HSYNC	I	HORIZONTAL SYNC INPUT DE MODE & SYNC MODE SETTING DE MODE : ONLY ENB AND PIXEL CLOCK IS NECESSARY.	37	VSYNC	I	VERTICAL SYNC INPUT SYNC MODE : ENB SHOULD BE CONNECTED TO VSS.	38	ENB	I
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38	ENB	I	DATAENABLE INPUT HSYNC/VSYNC AND PIXEL CLOCK IS NECESSARY.																														
21	13.2.4 INSPECTION METHOD (b)AQL : 0.65% → 0.65 1.0% → 1.0																																
MAY.16, 2014	5	5.2 WAVEFORM MODIFY END																															

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5.	TIMING CHART -----	4 , 5
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9.	DETAIL DRAWING OF DOT MATRIX -----	10
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1. GENERAL SPECIFICATIONS

1.1 APPLICATION NOTES FOR CONTROLLER/DRIVER  
PLEASE REFER TO :

H I M A X H X 8 2 1 8  
H I M A X H X 8 6 1 5

1.2 MATERIAL SAFETY DESCRIPTION

ASSEMBLIES SHALL COMPLY WITH EUROPEAN ROHS REQUIREMENTS, INCLUDING PROHIBITED MATERIALS/COMPONENTS CONTAINING LEAD, MERCURY, CADMIUM, HEXAVALENT CHROMIUM, POLYBROMINATED BIPHENYLS (PBB) AND POLYBROMINATED DIPHENYL ETHERS (PBDE)

2. MECHANICAL SPECIFICATIONS

(1) DIAGONALS	-----	5.7 inch
(2) NUMBER OF DOTS	-----	320W * (RGB) * 240H DOTS
(3) MODULE SIZE	-----	124.7W * 100.0H * 7.5D mm (WITHOUT FPC)
(4) EFFECTIVE AREA	-----	117.2W * 88.4H mm (T/P)
(5) ACTIVE AREA	-----	115.2W * 86.4H mm (LCD) 116.2W * 87.4H mm (T/P)
(6) DOT SIZE	-----	0.12W * 0.36H mm
(7) PIXEL SIZE	-----	0.36W * 0.36H mm
(8) LCD TYPE	-----	TFT , TRANSMISSIVE, ANTE-GLARE
(9) COLOR	-----	16.7M
(10) VIEWING DIRECTION	-----	6 O'CLOCK
(11) BACK LIGHT	-----	LED , COLOR : WHITE
(12) INTERFACE MODE	-----	RGB, 24 BIT, PARALLEL (DE/SYNC MODE)

### 3. ABSOLUTE MAXIMUM RATINGS

#### 3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS .

PARAMETER	SYMBOL	MIN.	MAX.	UNIT	REMARK
POWER VOLTAGE	VDD	-0.3	7.0	V	AVSS=0
	VCC	-0.3	7.0	V	VSS=0
	VGH	-0.3	32.0	V	VSS=0
	VGL	-22.0	+0.3	V	VSS=0
	VGH-VGL	-0.3	+45	V	VSS=0
INPUT SIGNAL VOLTAGE	Vi	- 0.3	VDD+0.3	V	
	VL	-0.3	VCC+0.3		
LED BACKLIGHT DISSIPATION	PD	—	1.28	W	
LED BACKLIGHT CURRENT	IF	—	0.06	mA	
LED BACKLIGHT REVERSE VOLTAGE	VR	—	45	V	
STATIC ELECTRICITY	—	—	—	V	NOTE ( 1 )

NOTE ( 1 ) : LCM SHOULD BE GROUNDED DURING HANDING LCM.

#### 3.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS .

I T E M	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	-10 °C	60 °C	-20 °C	70 °C	NOTE ( 2 ) , ( 3 )
HUMIDITY	NOTE ( 4 )		NOTE ( 4 )		WITHOUT CONDENSATION
VIBRATION	—	2.45 m/s <sup>2</sup> ( 0.25 G )	—	11.76 m/s <sup>2</sup> ( 1.2 G )	5~20Hz , 1HR 20~500Hz(20Hz) , 1HR 20~500Hz(500Hz) , 1HR X,Y,Z,TOTAL 3HR
SHOCK	—	29.4 m/s <sup>2</sup> ( 3 G )	—	490 m/s <sup>2</sup> ( 50 G )	10 m SECONDS XYZ DIRECTIONS 1 TIME EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE ( 2 ) : Ta AT -20°C : 48HR MAX .  
70°C : 168HR MAX .

NOTE ( 3 ) : BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT TEMPERATURE THIS PHENOMENON IS REVERSIBLE .

NOTE ( 4 ) : Ta ≤ 60°C : 90%RH MAX (96HRS MAX).  
Ta > 60°C : ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF 90%RH AT 60°C(96HRS MAX).

4. ELECTRICAL CHARACTERISTICS

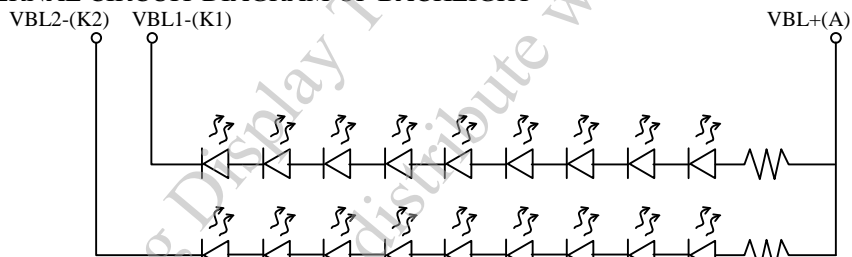
Ta = 25 °C

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
DIGITAL POWER SUPPLY	VCC	—	3	3.3	3.6	V	
DIGITAL OPERATING CURRENT	ICC	H LEVEL	—	6	12	mA	
ANALOG POWER SUPPLY	VDD	L LEVEL	3.8	5	5.5	V	
ANALOG OPERATING CURRENT	IDD	—	—	8	15	mA	
GATE ON POWER	VGH	H LEVEL	14.5	15	15.5	V	
GATE OFF POWER	VGL	L LEVEL	-10.5	-10	-9.5	V	
GATE ON CURRENT	IGH	H LEVEL	—	0.04	0.08	mA	
GATE OFF CURRENT	IGL	L LEVEL	—	0.06	0.12	mA	
VCOM CURRENT ( 2 )	ICOM (RMS)	—	—	8	20	mArms	NOTE (2)
VCOM HIGH VOLTAGE	VCOMH	H LEVEL	3.5	4.0	4.5	V	NOTE (1)
VCOM LOW VOLTAGE	VCOML	L LEVEL	-0.8	-0.3	0	V	NOTE (1)
FRAME FREQUENCY	fFRAME	—	—	83	92	Hz	
DOT DATA CLOCK	DCLK	—	—	6.4	7.1	MHz	
LED BACKLIGHT FORWARD VOLTAGE	VF	IF=40mA	28	30	32	V	NOTE (3)
LED LIFE TIME	—	—	30000	40000	—	hr	

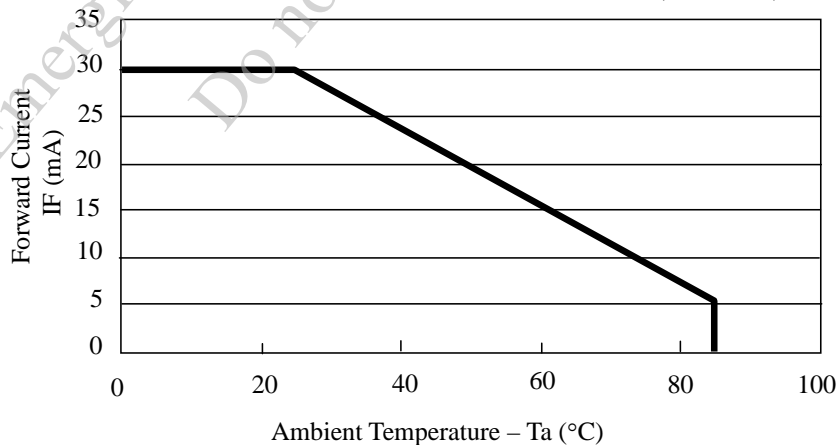
NOTE ( 1 ) : VCOMH & VCOML : ADJUST THE COLOR WITH GAMMA DATA.

NOTE ( 2 ) : THE DISPLAY PATTERN IS ALL “ OFF “ / “ ON ”.

NOTE ( 3 ) : INTERNAL CIRCUIT DIAGRAM OF BACKLIGHT



NOTE ( 4 ) : AMBIENT TEMP. VS. ALLOWABLE FORWARD CURRENT. (PER LED)



5. TIMING CHART

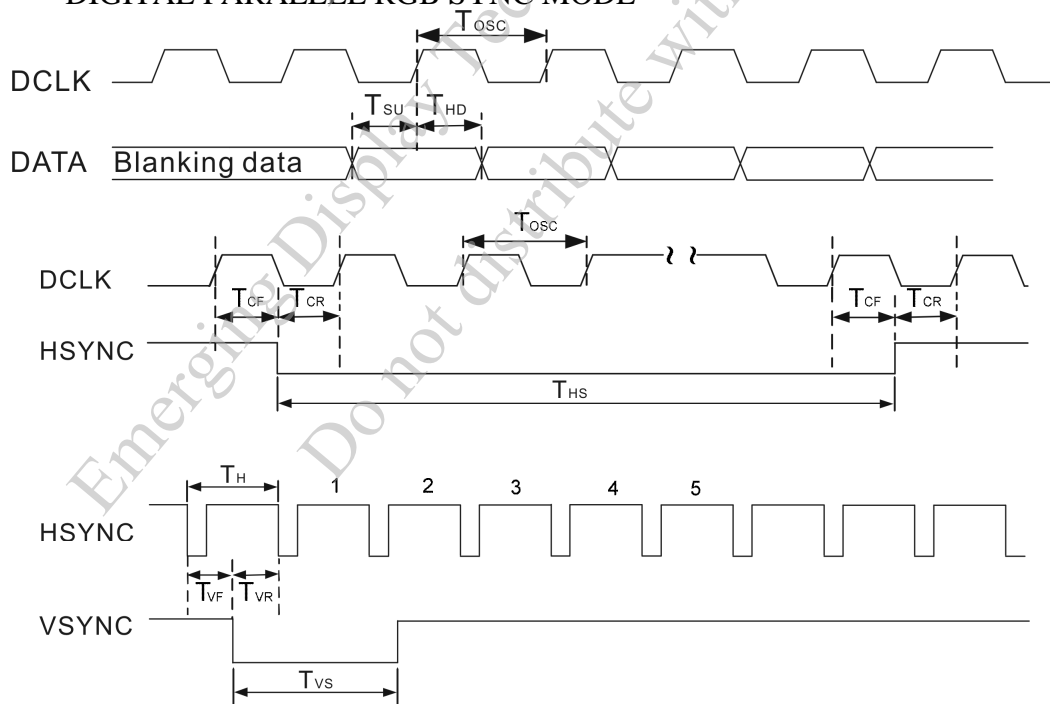
5.1 DIGITAL PARALLEL RGB INTERFACE

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
DCLK PERIOD	$T_{OSC}$	140.8	156	—	ns
DATA SETUP TIME	$T_{SU}$	12	—	—	ns
DATA HOLD TIME	$T_{HD}$	12	—	—	ns
HSYNC PERIOD	$T_H$	—	408	—	$T_{OSC}$
HSYNC PULSE WIDTH	$T_{HS}$	5	30	—	$T_{OSC}$
HSYNC SETUP TIME	$T_{CR}$	12	—	—	ns
HSYNC HOLD TIME	$T_{CF}$	12	—	—	ns
VSYNC PULSE WIDTH	$T_{VS}$	1	3	5	$T_H$
VSYNC SETUP TIME	$T_{VF}$	12	—	—	ns
VSYNC HOLD TIME	$T_{VR}$	12	—	—	$\mu S$
VSYNC ENB TIME	$T_{VSE}$	—	18	—	$T_H$
HSYNC-ENB TIME	$T_{HE}$	36	68	88	$T_{OSC}$
ENB PULSE WIDTH	$T_{EP}$	—	320	—	$T_{OSC}$
ENB-STH TIME	$T_{DES}$	—	1	—	$T_{OSC}$
VSYNC PERIOD	—	—	262.5	—	$T_H$

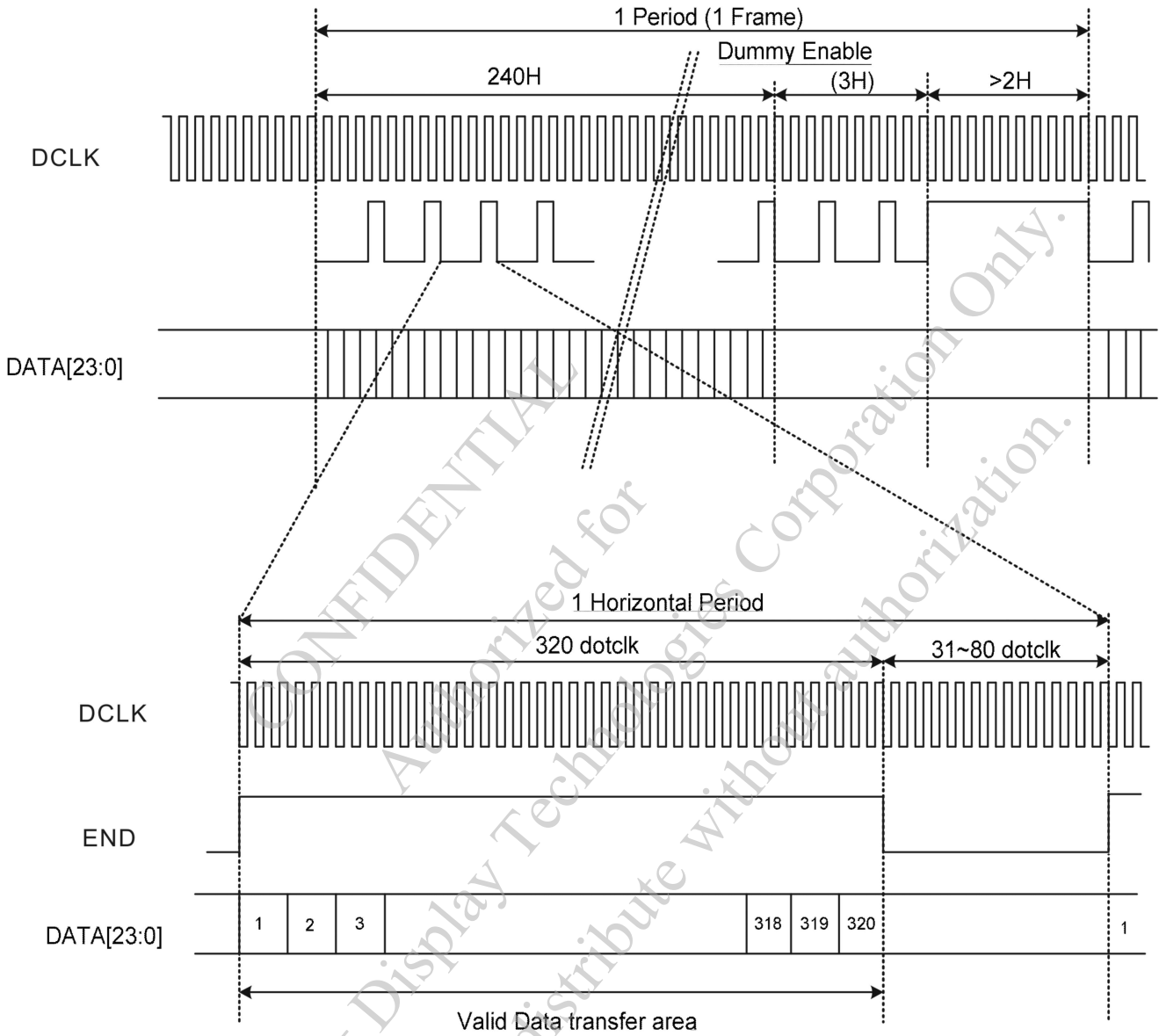
NOTE : WHEN SYNC MODE IS USED, 1<sup>ST</sup> DATA START FROM 68<sup>TH</sup> DCLK AFTER HSYNC FALLING.

5.2 WAVEFORM

DIGITAL PARALLEL RGB SYNC MODE



DIGITAL PARALLEL RGB DE ONLY MODE



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6. OPTICAL CHARACTERISTICS (NOTE 1)

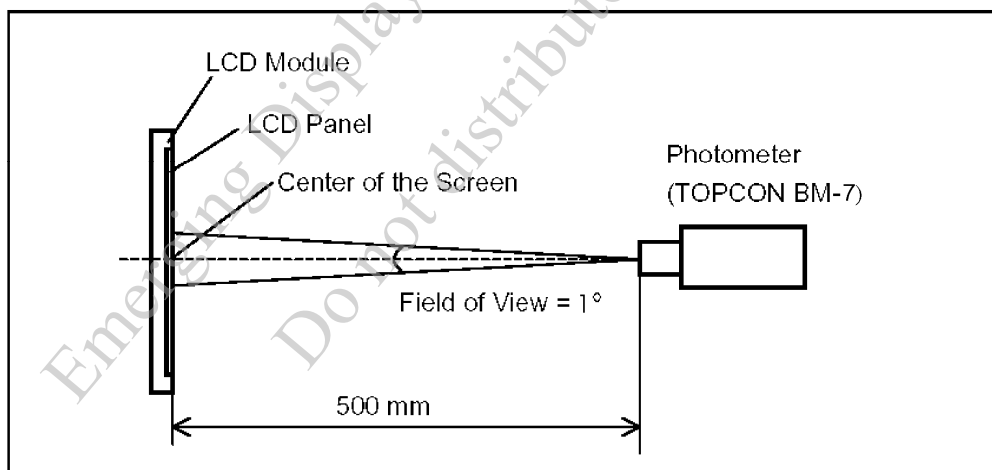
6.1 OPTICAL CHARACTERISTICS

Ta = 25 ± 2 °C

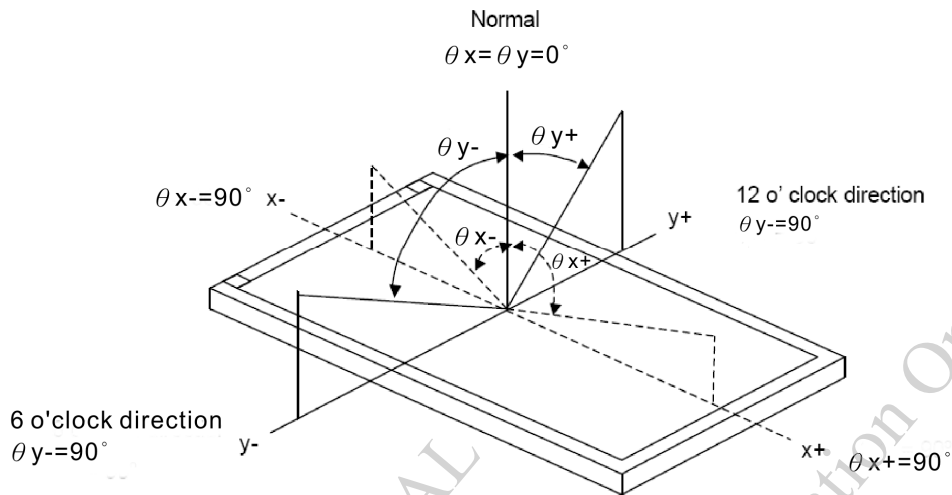
I T E M		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK	
VIEWING ANGLE		$\theta_{y+}$	CR ≥ 10	$\theta_x=0^\circ$	55	60	—	deg .	(2)
		$\theta_{y-}$			70	75	—		
		$\theta_{x+}$	$\theta_y=0^\circ$	70	75	—	(3)		
		$\theta_{x-}$		70	75	—			
CONTRAST RATIO		CR	$\theta_x=0^\circ, \theta_y=0^\circ$	300	400	—	—	(3)	
RESPONSE TIME		T <sub>R</sub> ( rise )	$\theta_x=0^\circ, \theta_y=0^\circ$	—	15	30	msec	(4)	
		T <sub>F</sub> ( fall )		—	35	50			
THE BRIGHTNESS OF MODULE		B	$\theta_x=0^\circ, \theta_y=0^\circ$ IF=40mA	400	450	—	cd/m <sup>2</sup>	(5)	
COLOR OF CIE COORDINATE	WHITE	W <sub>x</sub>	$\theta_x=0^\circ, \theta_y=0^\circ$ IF=40mA NTSC : 60%	0.27	0.32	0.37	—	(6)	
		W <sub>y</sub>		0.30	0.35	0.40			
	RED	R <sub>x</sub>		0.58	0.63	0.68	—	(6)	
		R <sub>y</sub>		0.31	0.36	0.41			
	GREEN	G <sub>x</sub>		0.28	0.33	0.38	—	(6)	
		G <sub>y</sub>		0.55	0.60	0.65			
	BLUE	B <sub>x</sub>		0.09	0.14	0.19	—	(6)	
		B <sub>y</sub>		0.06	0.11	0.16			
THE BRIGHTNESS OF UNIFORMITY		—	IF=40mA	75	80	—	%	—	

NOTE (1) : TEST EQUIPMENT SETUP :

AFTER STABILIZING AND LEAVING THE PANEL ALONE AT A GIVEN TEMPERATURE FOR 30 MINUTES, THE MEASUREMENT SHOULD BE EXECUTED. MEASUREMENT SHOULD BE EXECUTED IN A STABLE, WINDLESS, AND DARK ROOM. OPTICAL SPECIFICATIONS ARE MEASURED BY TOPCON BM-7 (FAST) WITH A VIEWING ANGLE OF 1° AT A DISTANCE OF 50cm AND NORMAL DIRECTION.



NOTE (2) : DEFINITION OF VIEWING ANGLE :

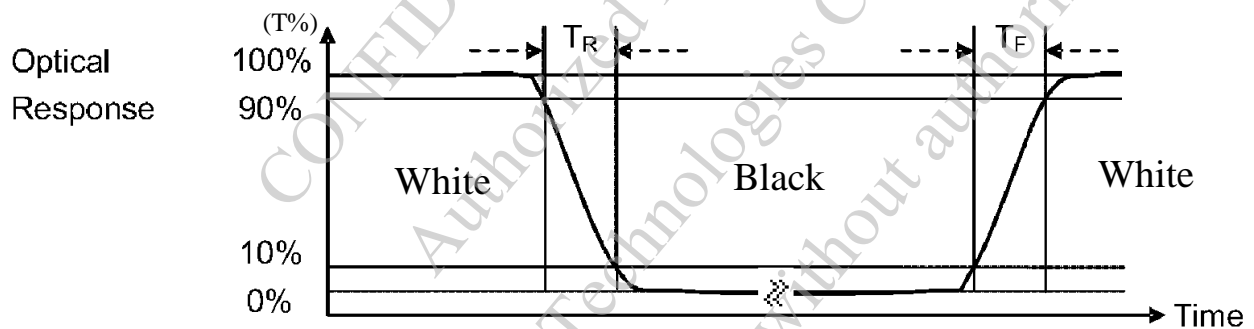


NOTE (3) : DEFINITION OF CONTRAST RATIO :

$$\text{CONTRAST RATIO (CR)} = \frac{\text{BRIGHTNESS MEASURED WHEN LCD IS AT "WHITE STATE"}}{\text{BRIGHTNESS MEASURED WHEN LCD IS AT "BLACK STATE"}}$$

NOTE (4) : DEFINITION OF RESPONSE TIME : TR AND TF

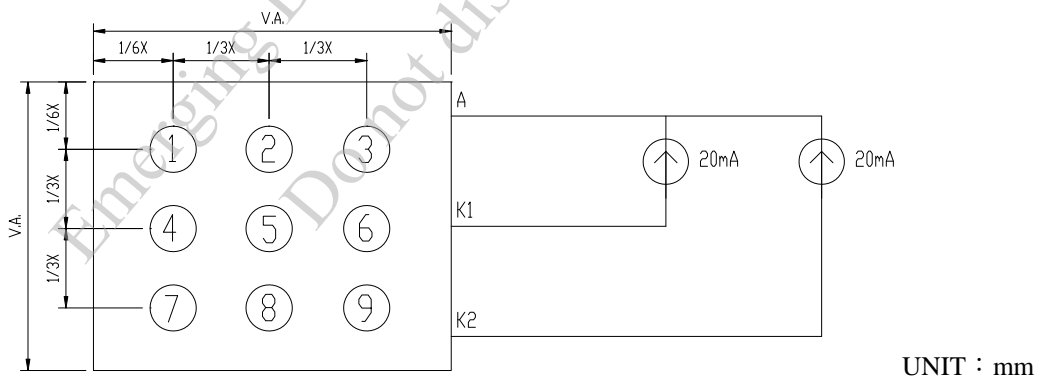
THE FIGURE BELOW IS THE OUTPUT SIGNAL OF THE PHOTO DETECTOR



NOTE (5) : BRIGHTNESS MEASURED WHEN LCD IS AT "WHITE STATE"

NOTE (6) : THE 100% TRANSMISSION IS DEFINED AS THE TRANSMISSION OF LCD PANEL WHEN ALL THE INPUT TERMINALS OF MODULE ARE ELECTRICALLY OPENED.

### 6.2 THE TEST METHOD OF BRIGHTNESS AND UNIFORMITY

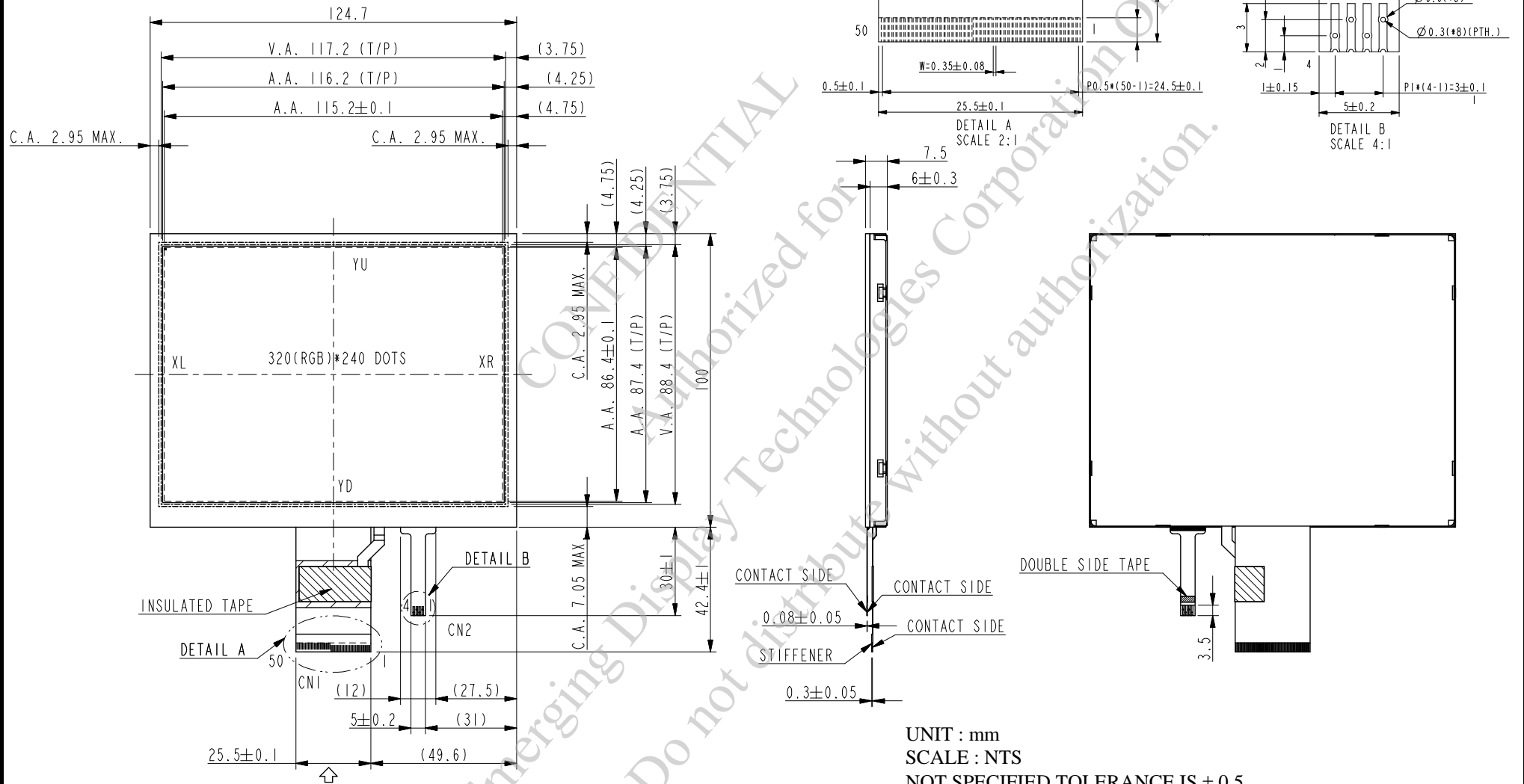


UNIT : mm

### 6.3 THE CALCULATING METHOD OF UNIFORMITY

$$\text{UNIFORMITY} = \left[ 1 - \frac{\text{MAXIMUM BRIGHTNESS} - \text{MINIMUM BRIGHTNESS}}{\text{AVERAGE BRIGHTNESS}} \right] \times 100\%$$

7. OUTLINE DIMENSIONS

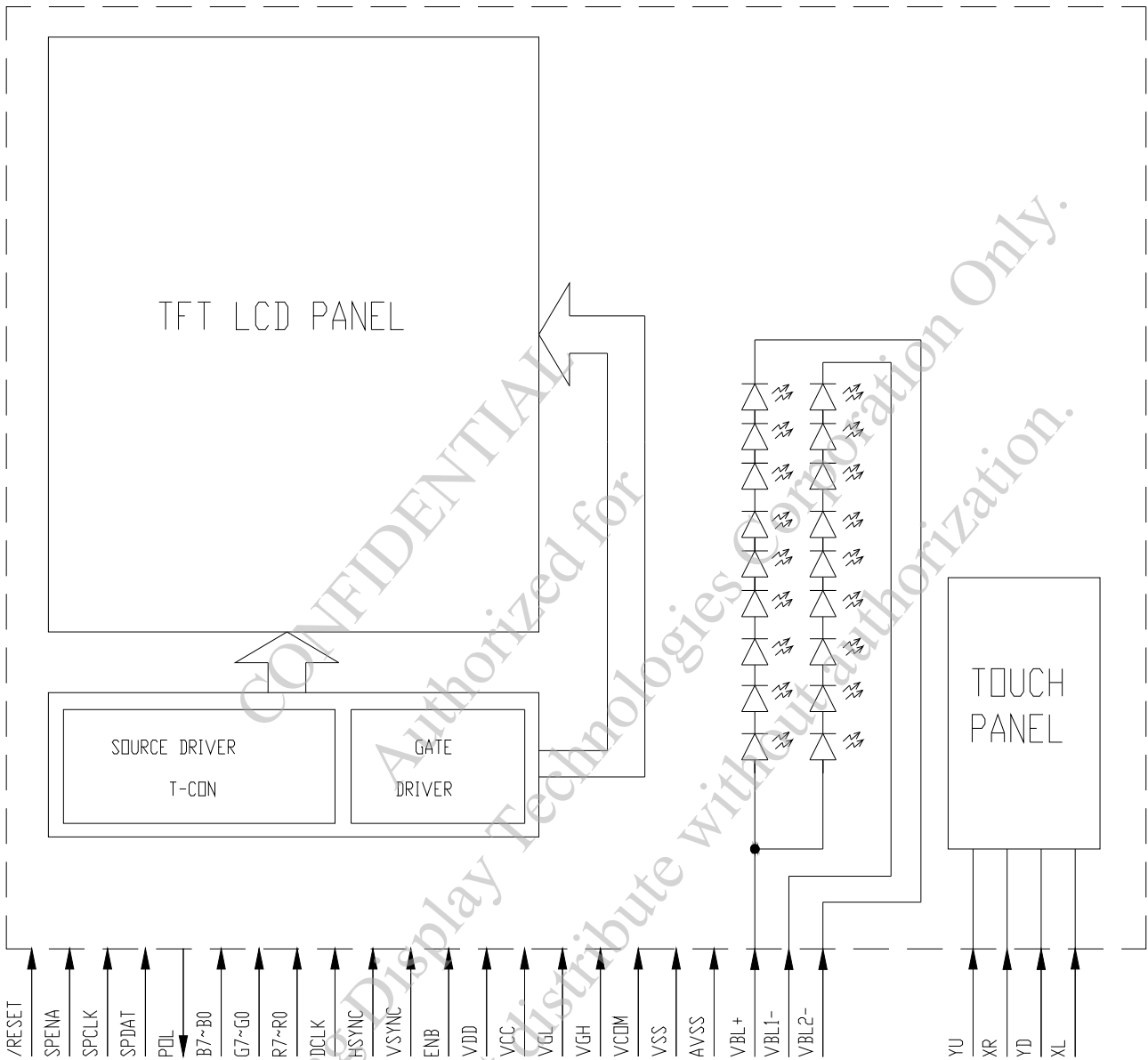


VIEWING DIRECTION

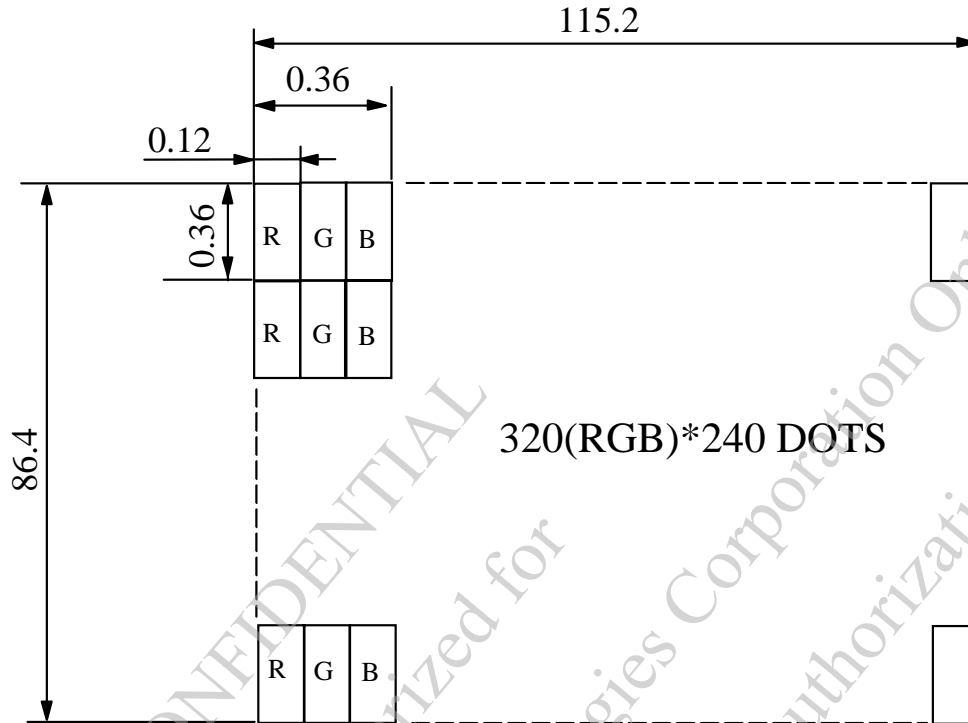
△Best Contrast but with Gray Level Inversion

UNIT : mm  
SCALE : NTS  
NOT SPECIFIED TOLERANCE IS ± 0.5  
NOTE : MARK △ MODIFY (NUMBER NOTE MODIFY VERSION)

8. BLOCK DIMENSION



9. DETAIL DRAWING OF DOT MATRIX



UNIT : mm

SCALE : NTS

NOT SPECIFIED TOLERANCE IS  $\pm 0.1$

DOTS MATRIX TOLERANCE IS  $\pm 0.01$

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10. INTERFACE SIGNALS

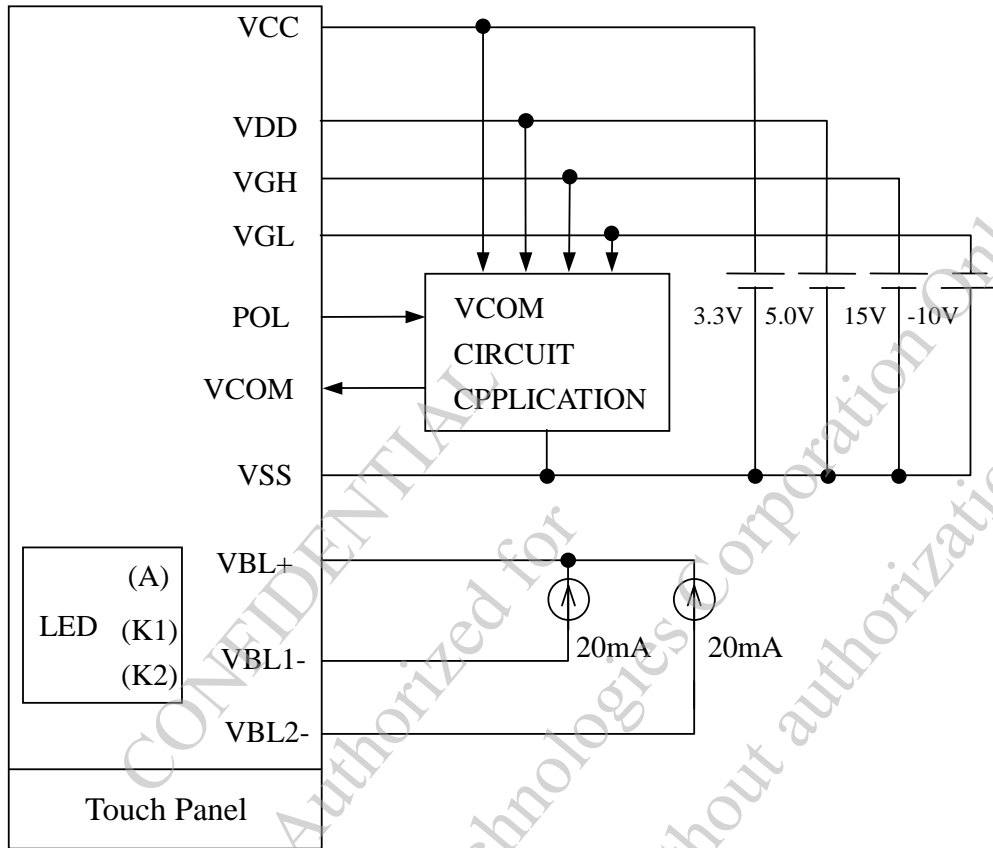
PIN NO	SYMBOL	I/O	FUNCTION
1	VBL2-	P	BACKLIGHT LED GROUND (K2)
2	VBL1-	P	BACKLIGHT LED GROUND (K1)
3	VBL+	P	BACKLIGHT LED POWER (A)
4	VBL+	P	BACKLIGHT LED POWER (A)
5	NC	—	NOT USE
6	/RESET	I	HARDWARE RESET
7	SPENA	I	SPI INTERFACE DATA ENABLE SIGNAL
8	SPCLK	I	SPI INTERFACE DATA CLOCK
9	SPDAT	I	SPI INTERFACE DATA
10	POL	O	POLARITY SIGNAL CONNECT TO VCOM DRIVING CIRCUIT
11	B7	I	BLUE DATA BIT 7
12	B6	I	BLUE DATA BIT 6
13	B5	I	BLUE DATA BIT 5
14	B4	I	BLUE DATA BIT 4
15	B3	I	BLUE DATA BIT 3
16	B2	I	BLUE DATA BIT 2
17	B1	I	BLUE DATA BIT 1
18	B0	I	BLUE DATA BIT 0
19	G7	I	GREEN DATA BIT 7
20	G6	I	GREEN DATA BIT 6
21	G5	I	GREEN DATA BIT 5
22	G4	I	GREEN DATA BIT 4
23	G3	I	GREEN DATA BIT 3
24	G2	I	GREEN DATA BIT 2
25	G1	I	GREEN DATA BIT 1
26	G0	I	GREEN DATA BIT 0
27	R7	I	RED DATA BIT 7
28	R6	I	RED DATA BIT 6
29	R5	I	RED DATA BIT 5
30	R4	I	RED DATA BIT 4
31	R3	I	RED DATA BIT 3
32	R2	I	RED DATA BIT 2
33	R1	I	RED DATA BIT 1
34	R0	I	RED DATA BIT 0

PIN NO	SYMBOL	I/O	FUNCTION
35	DCLK	I	DOT DATA COLCK
36	HSYNC	I	HORIZONTAL SYNC INPUT
37	VSYNC	I	VERTICAL SYNC INPUT
38	ENB	I	DATA ENABLE INPUT
39	VDD	P	ANALOG POWER
40	VDD	P	ANALOG POWER
41	VCC	P	DIGITAL POWER
42	VCC	P	DIGITAL POWER
43	NC	—	NOT USE
44	VGL	P	GATE OFF POWER
45	NC	—	NOT USE
46	VGH	P	GATE ON POWER
47	NC	I	NOT USE
48	VCOM	P	DRIVING INPUT
49	VSS	P	GROUND
50	AVSS	P	GROUND

T/P INTERFACE

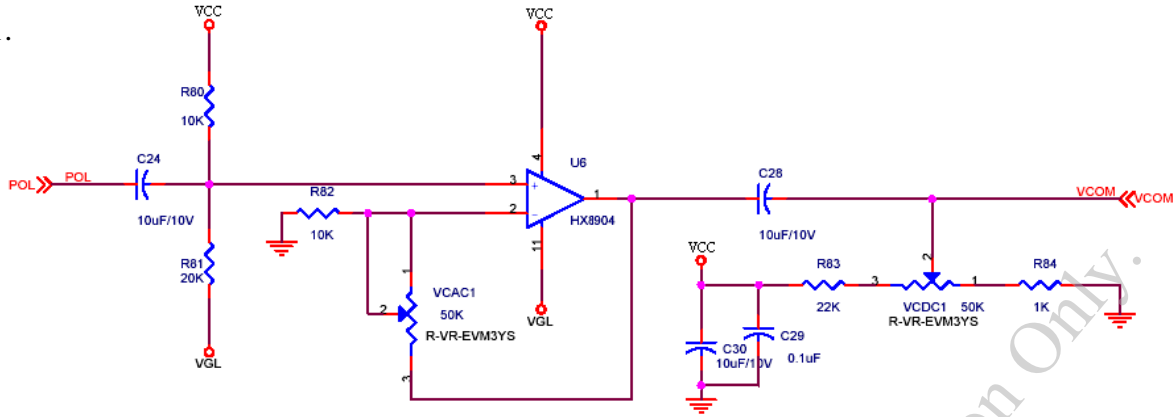
NO	SYMBOL	FUNCTION
1	YU	TOP PANEL
2	XR	RIGHT PANEL
3	YD	BOTTOM PANEL
4	XL	LEFT PANEL

1.1. POWER SUPPLY  
1.1.1 POWER SUPPLY FOR LCM

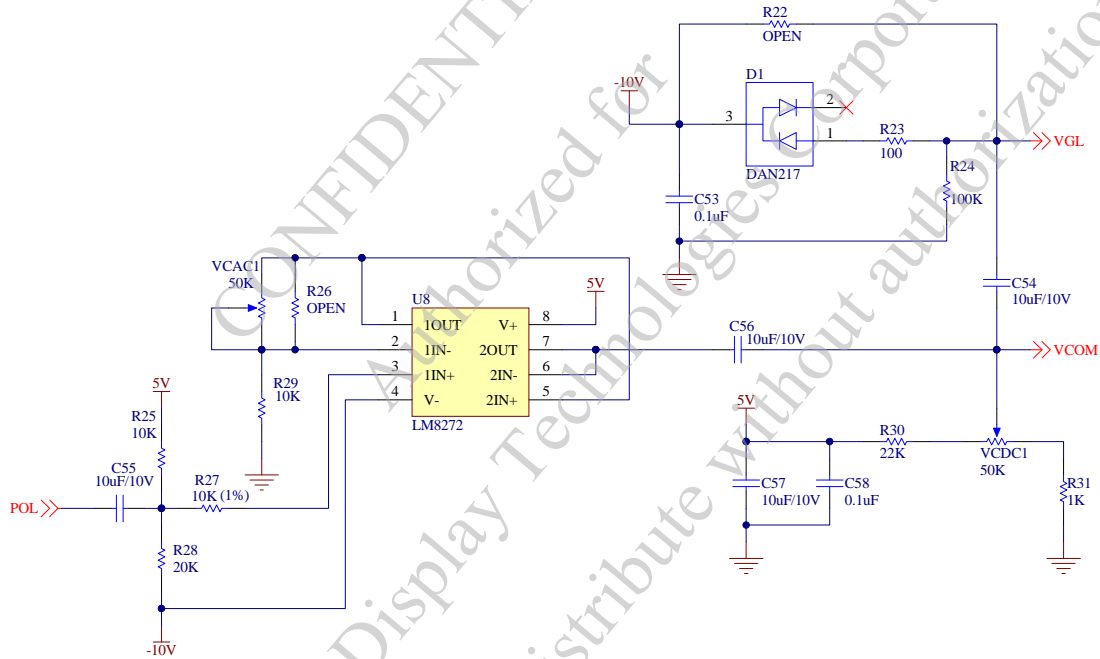


VCOM CIRCUIT REFERENCE :

1.

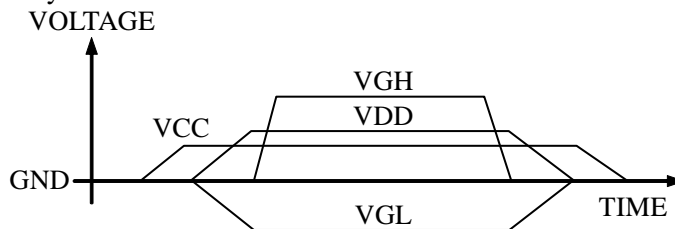


2.



1 1 .2 POWER SEQUENCE

The LCD panel adopts high voltage driver ICs, so it could be permanently damaged if a wrong power on/off sequence is used. When powering on the LCD, VCC should go up firstly, and then turn on VGL and VDD, and finally VGH. Turn off the LCD panel with reversed order or shut off all the power supplies simultaneously.



12. TOUCH PANEL SPECIFICATION

12.1 ELECTRICAL CHARACTERISTICS

Ta = 25°C

ITEM	CONDITION	SPEC.	UNIT
LINEARITY	—	≤ 1.5	%
TRANSMISSION	ASTM D1003	80 OR MORE	%
ON LOAD	POLYACETAL PEN INPUT	15 ~ 80	g
TERMINAL RESISTANCE	X AXIS	400 ~ 1000	Ω
	Y AXIS	200 ~ 700	
INSULATION RESISTANCE	DC25V	≥ 10	MΩ
INPUT VOLTAGE	—	5(typ.)	V

12.2 PRECAUTIONS IN USE OF TOUCH PANEL

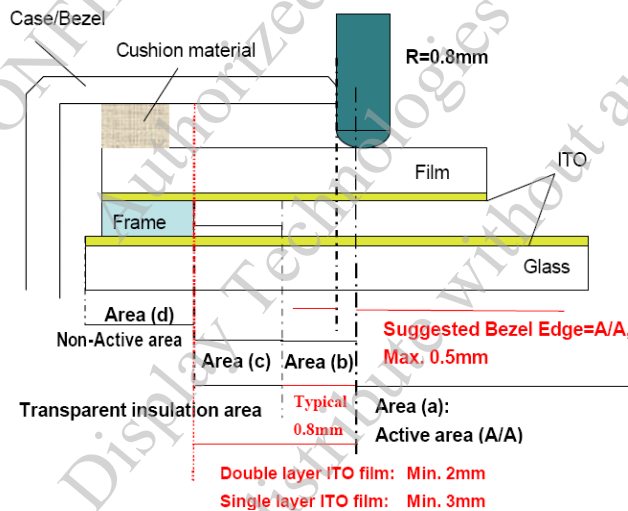
12.2.1 PURPOSE :

IN ORDER TO PREVENT ACCIDENTAL USE AND PERFORMANCE DETERIORATION, PLEASE KEEP THE FOLLOWING PRECAUTIONS AND INHIBITED POINTS.

12.2.2 ITEM AND ILLUSTRATION :

( 1 ) STRUCTURE, AREA DEFINITION

THE STRUCTURE AND THE PERFORMANCE GUARANTEED AREA OF THIS TOUCH PANEL ARE DEFINED BELOW :



THE ABOVE FIGURE IS OUR DESIGN RULE OF TOUCH PANEL. IF IT CANNOT MEET YOUR REQUIREMENT, PLEASE CONTACT WITH OUR ENGINEERS FOR FURTHER DISCUSSION.

ABOVE FIGURE ILLUSTRATES THE RECOMMENDED BEZEL AND CUSHION DESIGN. IN ORDER TO PREVENT UNUSUAL PERFORMANCE DEGRADATION AND MALFUNCTION OF A TOUCH PANEL, PLEASE CARRY OUT THE SET CASE DESIGNING AND A TOUCH PANEL ASSEMBLING METHOD AFTER SURELY CONSIDERING THE DEFINITION OF EACH AREA ILLUSTRATED IN ABOVE FIGURE.

AREA(a) : ACTIVE AREA

THE ACTIVE AREA IS GUARANTEED THE POSITION DATA DETECTABLE PRECISION, OPERATION FORCE AND OTHER OPERATIONS. IT IS STRONGLY RECOMMENDED TO PLACE THE OPERATION BUTTON OR MENU KEYS WITHIN THE ACTIVE AREA. DUE TO STRUCTURE, THE ACTIVE AREA IS LESS DURABLE AT THE EDGE OR CLOSE TO THE EDGE.

AREA(b) : OPERATION NON-GUARANTEED AREA

THIS AREA DOES NOT GUARANTEE A TOUCH PANEL OPERATION AND ITS FUNCTION. WHEN THIS AREA IS PRESSED, TOUCH PANEL SHOWS DEGRADATION OF ITS PERFORMANCE AND DURABILITY SUCH AS A PEN SLIDING DURABILITY BECOMES ABOUT ONE-TENTH COMPARED WITH THE ACTIVE AREA (AREA-(A) AS GUARANTEED AREA) AND ITS OPERATION FORCE REQUIRES ABOUT DOUBLE. ABOUT 0.5 MM OUTSIDE FROM A BOUNDARY OF THE ACTIVE AREA CORRESPONDS TO THIS AREA.

AREA(c) : PRESSING PROHIBITION AREA

THE AREA WHICH FORBIDS PRESSING, BECAUSE AN EXCESSIVE LOAD IS APPLIED TO A TRANSPARENT ELECTRODE (ITO) AND A SERIOUS DAMAGE IS GIVEN TO A TOUCH PANEL FUNCTION BY PRESSING.

AREA(d) : NON-ACTIVE AREA

THE AREA DOES NOT ACTIVATE EVEN IF PRESSED.

(2) CAUTIONS FOR INSTALLING AND ASSEMBLING

(i) DO NOT GIVE EXCESSIVE STRAIN TO THE PRODUCT.

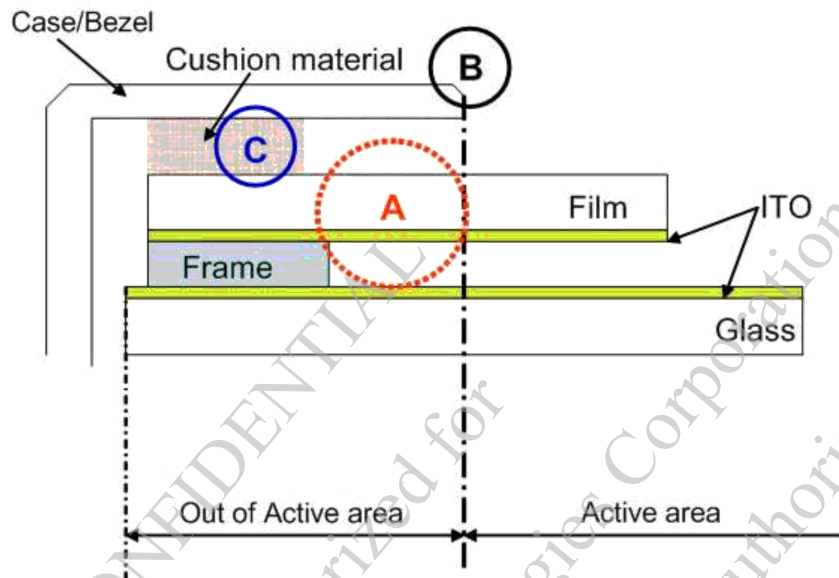
(ii) FLEXIBLE PATTERN CABLE IS CONNECTED TO THE BODY BY THERMAL PRESSURE METHOD. SO, DO NOT APPLY EXCESSIVE FORCES TO THE FLEXIBLE PATTERN. DO NOT ADD AN EXCESSIVE FORCE TO A FPC(FLEX TAIL) THAT MAKES PEELING OFF OF THE FPC FROM THE PRODUCT. DO NOT FIX, ADHERE OR MOUNT ANY ADDITIONAL GOODS ON THE FPC SUCH AS ADDITIONAL FILM/PLATE ON THE FPC, BECAUSE SUCH ADDITIONAL GOODS WILL APPLY A STRESS AT THE FPC BONDING AREA. IT MAY AFFECT THE CONDUCTIVITY OF FPC WITH TOUCH PANEL.

(iii) IN ORDER NOT TO APPLY LOAD ON THE DISPLAY, PROVIDE A CLEARANCE OF AT LEAST 0.3MM BETWEEN THE PRODUCT AND DISPLAY.

(iv) WE RECOMMEND THE DESIGN OF A CASE OR BEZEL SHOULD COVERS THE BOUNDARY OF THE ACTIVE AREA INSIDE IN ORDER TO PREVENT AN OPERATION AT OUTSIDE OF THE ACTIVE AREA WHICH CAN NOT GUARANTEE THE FUNCTION OR DURABILITY (REFER TO ITEM 5.1.2. STRUCTURE, AREA DEFINITION).

BEZEL'S EDGE PART MAY GUIDE THE PEN SLIDING ON THE SAME POSITION REPEATEDLY. IF THE BEZEL IS PLACED OUTSIDE OF THE ACTIVE AREA, IT MAY CAUSE THE DAMAGE OF THE ITO FILM.

- (v) PRESSING INSIDE OF BOUNDARY OF THE FRAME(PART (A) AS SHOWN IN BELOW) MAY CAUSES FAULT OPERATION, SO PLEASE DESIGN TO AVOID PRESSING OF TOUCH PANEL AT PART (A) SUCH AS HAVING GASKET/CUSHION AT PART (C). PARTICULARLY THE AREA (B) SHALL BE FREE FROM BURR. THE GASKET/CUSHION MATERIAL AT THE PART (C) SHOULD NOT BE EXCEEDED TO INSIDE OF THE BOUNDARY OF THE FRAME.



- (vi) TO PREVENT GIVING DISTORTION TO THE FILM OF THE PRODUCT AND PEELING OFF OF THE FILM FROM THE PRODUCT, DO NOT FIX THE FILM AND A SET CASE OR A SHOCK ABSORBING MATERIAL ADHERED TO A SET CASE BY ADHESION.
- (vii) WIPE OFF THE STAIN ON THE PRODUCT BY USING SOFT CLOTH MOISTENED WITH ETHANOL. TAKE CARE NOT TO ALLOW ETHANOL TO SOAK INTO THE JOINT OF UPPER FILM AND BOTTOM GLASS. IT MAY OTHERWISE CAUSE PEELING OR DEFECTIVE OPERATION. DO NOT USE ANY ORGANIC SOLVENT OR DETERGENT OTHER THAN ETHANOL.
- (viii) THE CORNERS OF THE PRODUCT ARE NOT CHAMFERED AND ARE SHARP. WHEN POSITIONING AND FIXING THE PRODUCT ON THE CASE, PROVIDE A ROUND PART ON THE CORNER OF THE CASE SO AS NOT TO APPLY LOAD ON THE CORNER OF THE TRANSPARENT TOUCH PANEL.
- (ix) DO NOT PRESS THE FILM OF THE PRODUCT WHEN THIS PRODUCT IS BUILT INTO A SET.
- (3) CAUTIONS FOR OPERATION
- (i) OPERATE IT WITH A POLYACETAL PEN (TIP R0.8 OR OVER) OR A BELLY OF A FINGER WITHOUT APPLYING EXCESSIVE LOAD. NEVER USE ANY MECHANICAL PENCILS, BALL POINT PENS AND HARD FINGERTIPS WHOSE TIP IS HARD FOR INPUT, OTHERWISE MALFUNCTIONS MAY RESULT.

- (ii) THE INPUT POSITION MAY BE FLUCTUATED A LITTLE THROUGH LONG-TIME USE. IT IS DESIRABLE TO PROVIDE A ZERO-ADJUSTMENT FUNCTION BY USING A CIRCUIT AND SOFTWARE.
- (iii) OPERATION AT THE OUT OF ACTIVE AREA IS OUT OF OUR GUARANTEE. IT CAUSES A SERIOUS DAMAGE OF A TRANSPARENT ELECTRODE. DO NOT OPERATE AT THE OUT OF ACTIVE AREA.
- (iv) IN CASE OF CLEANING THE PART OF THE CASE BOUNDARY OF ACCOMPLISHED SET, USE A SOFT CLOTH WITH A FINGER BERRY OR A COTTON BUD. DO NOT CLEAN WITH A THING OTHER THAN THE FINGER SUCH AS HARD OR SHARP EDGES LIKE A FINGER NAIL ETC. ON THE CLOTH, BECAUSE IT CAUSE TRANSPARENT CONDUCTIVE FILM CRACKS. PLEASE ADVISE THIS PROHIBITION TO YOUR LAST CUSTOMERS.

### 12.3 DURABILITY

#### 12.3.1 STYLUS HITTING :

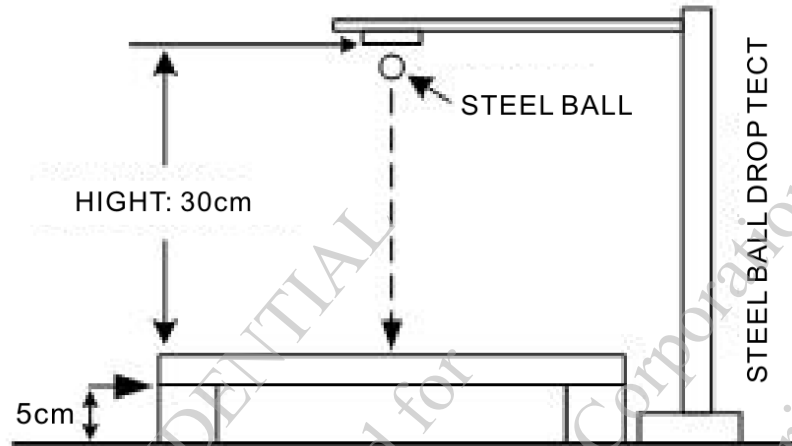
ONE MILLION TIMES OR OVER  
NO DAMAGE ON FILM SURFACE  
PEN : R8 mm SILICON RUBBER  
LOAD : 250g  
FREQUENCY : 240 times/min  
MEASUREMENT POSITION:  
1 POINT OF TOUCH PANEL ACTIVE AREA  
REPEATED : OVER 1,000,000 TIMES

#### 12.3.2 PEN TOUCH SLIDING DURABILITY :

100,000 TIMES OR OVER  
WRITING WITH R0.8mm PLASTIC STYLUS PEN; WRITING FORCE 150g  
IN ACTIVE AREA.  
SPEED IS 60mm/sec.

#### 12.4 STEEL BALL DROP TEST

BY USING F9mm STEEL BALL FROM THE HEIGHT OF 30cm AND FALLING ON TOUCH PANEL SURFACE, MUST PASS BELOW CONDITIONS :  
APPEARANCE : THE APPEARANCE WITHOUT ANY CHANGE, INCLUDING THE PANEL BROKEN.



#### 12.5 APPEARANCE INSPECTION

PURPOSE :

TO ESTABLISH APPEARANCE STANDARD AND MAINTAIN PRODUCT QUALITY .

SCOPE :

TOUCH PANEL VIEW AREA WITHIN TOUCH PANEL .

##### 12.5.1 RULE :

INSPECTION CONDITION

(A) ENVIRONMENTAL LUMINANCE : 500 LUX .

(B) DISTANCE BETWEEN HUMAN EYES AND PANEL : 30 CM

(PANEL MUST BE TESTED UNDER LIGHT TRANSPARENT) .

(C) VISUAL ANGEL :  $> 60^\circ$  .

(D) LIGHT SOURCE : FLUORESCENT LIGHT SOURCE .

##### 12.5.2 JUDGE CRITERION :

JUDGEMENT UNDER ABOVE MENTIONED CRITERION (PANEL MUST BE TESTED UNDER LIGHT TRANSPARENT),

TESTING GOODS DEFECT CAN BE VISIBLE WITHIN 10 SECONDS, WHICH WILL BE JUDGED AS MAJOR DEFECTS .

SAMPLING STANDARD :

THE SAMPLING STANDARD WILL BE CONFIRMED BY BOTH OF EDT AND CUSTOMER.

INSPECTION ITEMS	SEPC.	JUDGE CRITERION	OPERATION GUIDELINE
SCRATCH	$W \leq 0.05\text{mm} \ \& \ L \leq 10\text{mm}$	ACCEPTABLE	
	$W > 0.05\text{mm} \ \text{or} \ L > 10\text{mm}$	NOT ACCEPTABLE	
LINEAR FOREIGN OBJECT	$W \leq 0.05\text{mm} \ \& \ L \leq 5\text{mm}$	ACCEPTABLE	
	$W > 0.05\text{mm} \ \text{or} \ L > 5\text{mm}$	NOT ACCEPTABLE	
GRANULAR FOREIGN OBJECT	$D \leq 0.25\text{mm}$	ACCEPTABLE	
	$0.25\text{mm} < D \leq 0.30\text{mm}$	MAX. 2 EA	
	$D > 0.30\text{mm}$	NOT ACCEPTABLE	
PET BUBBLES	$D \leq 0.5\text{mm}$	ACCEPTABLE	
	$D > 0.5\text{mm}$	NOT ACCEPTABLE	
CHIP ON GLASS	CORNER $X \leq 3\text{mm} \ \cdot$ $Y \leq 3\text{mm} \ \cdot$ $Z < t$ (t = /thickness)	ACCEPTABLE	
	EDGE $W \leq 3\text{mm} \ \cdot$ $Y \leq 3\text{mm} \ \cdot$ $Z < t$		

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### 13 . INSPECTION CRITERION

#### 13.1 APPLICATION

This inspection standard is to be applied to the LCD module delivered from EMERGING DISPLAY TECHNOLOGIES CORP.( E.D.T ) to customers

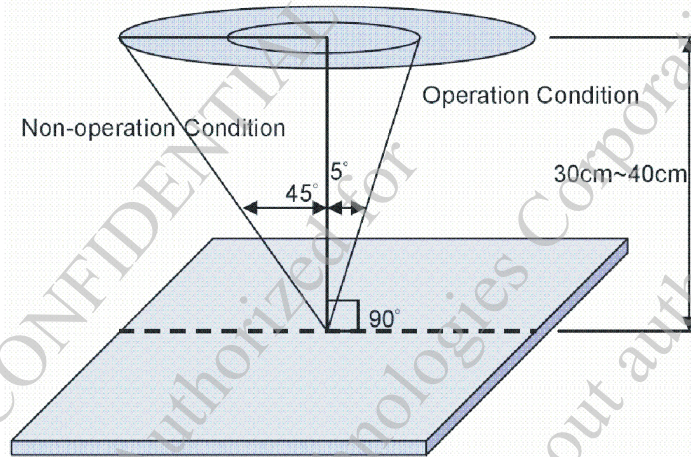
#### 13.2 INSPECTION CONDITIONS

13.2.1 (1)Observation Distance : 35cm±5cm

(2)View Angle :

Non-operation Condition : ±5°(perpendicular to LCD panel surface)

Operation Condition : ±45° (perpendicular to LCD panel surface)



13.2.2 Environment Conditions :

Ambient Temperature		20°C~25°C
Ambient Humidity		65±20%RH
Ambient Illumination	Cosmetic Inspection	More than 600Lux
	Functional Inspection	300~500 Lux

13.2.3 Inspection lot

Quantity per delivery lot for each model

13.2.4 Inspection method

A sampling inspection shall be made according to the following provisions to judge The acceptability

(a)Applicable standard : MIL-STD-105E

Normal inspection , single sampling

Level II

(b)AQL : Major defect : AQL 0.65

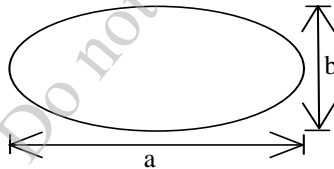
Minor defect : AQL 1.0

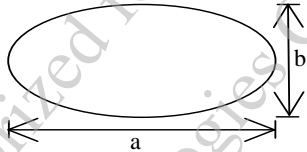
13.3 INSPECTION STANDARDS

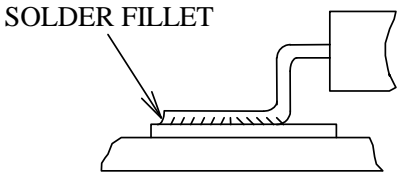
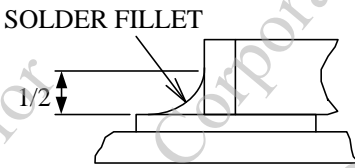
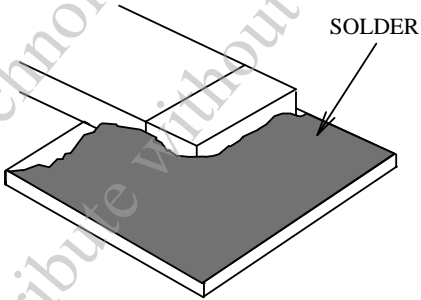
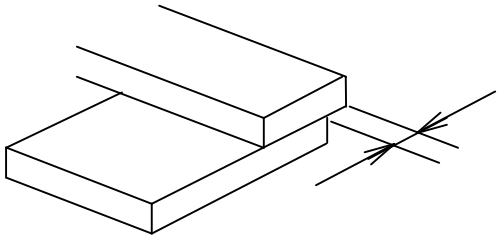
13.3.1 VISUAL DEFECTS CLASSIFICATION

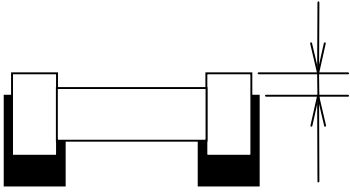
TYPE OF DEFECT	INSPECTION ITEM	DEFECT FEATURE	AQL
MAJOR DEFECT	1.DISPLAY ON	<ul style="list-style-type: none"> <li>• DEFECT TO MISS SPECIFIED DISPLAY FUNCTION, FOR ALL AND SPECIFIED DOTS</li> <li>EX: DISCONNECTION, SHORT CIRCUIT ETC</li> </ul>	0.65
	2.BACKLIGHT	<ul style="list-style-type: none"> <li>• NO LIGHT</li> <li>• FLICKERING AND OTHER ABNORMAL ILLUMINATION</li> </ul>	
	3.DIMENSIONS	<ul style="list-style-type: none"> <li>• SUBJECT TO INDIVIDUAL ACCEPTANCE SPECIFICATIONS</li> </ul>	
MINOR DEFECT	1.DISPLAY ZONE	<ul style="list-style-type: none"> <li>• BLACK/WHITE SPOT</li> <li>• BUBBLES ON POLARIZER</li> <li>• NEWTON RING</li> <li>• BLACK/WHITE LINE</li> <li>• SCRATCH</li> <li>• CONTAMINATION</li> <li>• LEVER COLOR SPREED</li> </ul>	1.0
	2.BEZEL ZONE	<ul style="list-style-type: none"> <li>• STAINS</li> <li>• SCRATCHES</li> <li>• FOREIGN MATTER</li> </ul>	
	3.SOLDERING	<ul style="list-style-type: none"> <li>• INSUFFICIENT SOLDER</li> <li>• SOLDERED IN INCORRECT POSITION</li> <li>• CONVEX SOLDERING SPOT</li> <li>• SOLDER BALLS</li> <li>• SOLDER SCRAPS</li> </ul>	
	4.DISPLAY ON (ALL ON)	<ul style="list-style-type: none"> <li>• LIGHT LINE</li> </ul>	

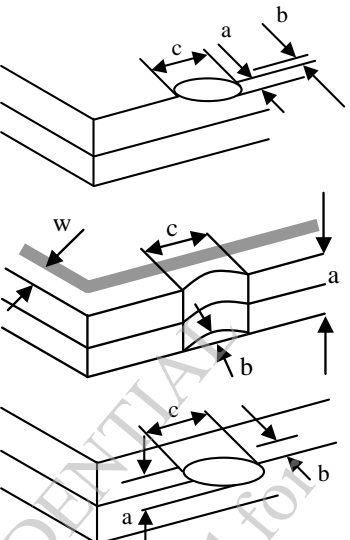
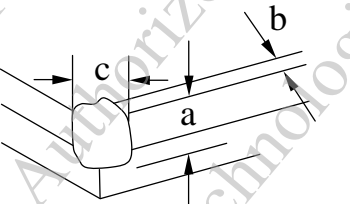
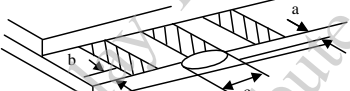
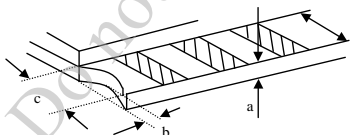
13.3.2 MODULE DEFECTS CALSSIFICATION

NO.	ITEM	CRITERIA												
1.	DISPLAY ON INSPECTION	(1)INCORRECT PATTERN (2)MISSING SEGMENT (3)DIM SEGMENT (4)OPERATING VOLTAGE BEYOND SPEC												
2.	OVERALL DIMENSIONS	(1)OVERALL DIMENSION BEYOND SPEC												
3.	DOT DEFECT	(1) INSPECTION PATTERN: FULL WHITE, FULL BLACK, RED, GREEN AND BLUE SCREENS. (2) <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>ITEMS</th> <th>ACCEPTABLE COUNT</th> </tr> </thead> <tbody> <tr> <td>BRIGHT DOT</td> <td><math>N \leq 2</math></td> </tr> <tr> <td>DARK DOT</td> <td><math>N \leq 3</math></td> </tr> <tr> <td>TOAL BRIGHT AND DARK DOTS</td> <td><math>N \leq 4</math></td> </tr> </tbody> </table> <p>NOTE :</p> <p>1. THE DEFINITION OF DOT : THE SIZE OF A DEFECTIVE DOT OVER 1/2 OF WHOLE DOT IS REGARDED AS ONE DEFECTIVE DOT.</p> <p>2. BRIGHT DOT : DOTS APPEAR BRIGHT AND UNCHANGED IN SIZE IN WHICH LCD PANEL IS DISPLAYING UNDER BLACK PATTERN.</p> <p>3. DARK DOT : DOTS APPEAR DARK AND UNCHANGED IN SIZE IN WHICH LCD PANEL IS DISPLAYING UNDER PURE RED, GREEN, BLUE PICTURE.</p>	ITEMS	ACCEPTABLE COUNT	BRIGHT DOT	$N \leq 2$	DARK DOT	$N \leq 3$	TOAL BRIGHT AND DARK DOTS	$N \leq 4$				
ITEMS	ACCEPTABLE COUNT													
BRIGHT DOT	$N \leq 2$													
DARK DOT	$N \leq 3$													
TOAL BRIGHT AND DARK DOTS	$N \leq 4$													
4.	FOREIGN BLACK/WHITE/ BRIGHT LINE/ SCRATCH OF VIEWING AREA	<table border="1" style="margin-left: 20px;"> <thead> <tr> <th>LENGTH : L</th> <th>WIDTH : W</th> <th>PERMISSIBLE NO.</th> </tr> </thead> <tbody> <tr> <td><math>L \leq 0.3</math></td> <td><math>W \leq 0.05</math></td> <td>IGNORE</td> </tr> <tr> <td><math>0.3 &lt; L \leq 2.5</math></td> <td><math>0.05 &lt; W \leq 0.1</math></td> <td>4</td> </tr> <tr> <td><math>2.5 &lt; L</math></td> <td><math>0.1 &lt; W</math></td> <td>NONE</td> </tr> </tbody> </table> <p>WIDTH : W mm, LENGH : L mm</p>	LENGTH : L	WIDTH : W	PERMISSIBLE NO.	$L \leq 0.3$	$W \leq 0.05$	IGNORE	$0.3 < L \leq 2.5$	$0.05 < W \leq 0.1$	4	$2.5 < L$	$0.1 < W$	NONE
LENGTH : L	WIDTH : W	PERMISSIBLE NO.												
$L \leq 0.3$	$W \leq 0.05$	IGNORE												
$0.3 < L \leq 2.5$	$0.05 < W \leq 0.1$	4												
$2.5 < L$	$0.1 < W$	NONE												
5.	FOREIGN MATTER \ BLACK SPOTS \ WHITE SPOTS \ DENT (INCLUDING LIGHT LEAKAGE DUE TO POLARIZING PLATES PINHOLES, ETC.)	<table border="1" style="margin-left: 20px;"> <thead> <tr> <th>AVERAGE DIAMETER (mm): D</th> <th>NUMBER OF PIECES PERMITTED</th> </tr> </thead> <tbody> <tr> <td><math>D \leq 0.15</math></td> <td>IGNORE</td> </tr> <tr> <td><math>0.15 &lt; D \leq 0.5</math></td> <td>4</td> </tr> <tr> <td><math>0.5 &lt; D</math></td> <td>NONE</td> </tr> </tbody> </table> <p>NOTE : DIAMETER <math>D=(a+b)/2</math></p> 	AVERAGE DIAMETER (mm): D	NUMBER OF PIECES PERMITTED	$D \leq 0.15$	IGNORE	$0.15 < D \leq 0.5$	4	$0.5 < D$	NONE				
AVERAGE DIAMETER (mm): D	NUMBER OF PIECES PERMITTED													
$D \leq 0.15$	IGNORE													
$0.15 < D \leq 0.5$	4													
$0.5 < D$	NONE													

NO.	ITEM	CRITERIA		
			AVERAGE DIAMETER (mm) : D	NUMBER OF PIECES PERMITTED
6.	BUBBLES OF POLARIZER /DIRT/CF FAIL /SURFACE STAINS	BUBBLE ON THE POLARIZER	$D \leq 0.25$	IGNORE
			$0.25 < D \leq 0.5$	$N \leq 5$
			$0.5 < D$	NOTE
		SURFACE STATUS	$D < 0.1 \text{ mm}$	IGNORE
			$0.1 < D \leq 0.3\text{mm}$	$N \leq 3$
		CF FAIL / SPOT	$D < 0.1 \text{ mm}$	IGNORE
$0.1 < D \leq 0.3\text{mm}$	$N \leq 3$			
		<p>NOTE : (1)POLARIZER BUBBLE IS DEFINED AS THE BUBBLE APPEARS ON ACTIVE DISPLAY AREA. THE DEFECT OF POLARIZER BUBBLE SHALL BE IGNORED IF THE POLARIZER BUBBLE APPEARS ON THE OUTSIDE OF ACTIVE DISPLAY AREA.</p> <p>(2)THE EXTRANEIOUS SUBSTANCE IS DEFINED AS IT CAN BE OBSERVED WHEN THE MODULE IS POWER ON.</p> <p>(3)THE DEFINITION OF AVERAGE DIAMETER, D IS DEFINED AS FOLLOWING.</p> <p>AVERAGE DIAMETER (D)=(a+b)/2</p> 		
7.	LINE DEFECT ON DISPLAY	OBVIOUS VERTICAL OR HORIZONTAL LINE DEFECT IS NOT ALLOW		
8.	MURA ON DISPLAY	IT'S OK IF MURA IS SLIGHT VISIBLE THROUG 6% ND FILTER		
9.	UNEVEN COLOR SPREAD, COLORATION	(1)TO BE DETERMINED BASED UPON THE STANDARD SAMPLE.		
10.	BEZEL APPEARANCE	(1)BEZEL MAY NOT HAVE RUST, BE DEFORMED OR HAVE FINGER PRINTS STAINS OF OTHER CONTAMINATION. (2)BEZEL MUST COMPLY WITH JOB SPECIFICATIONS.		
11	PCB	<p>(1)THERE MAY NOT BE MORE THAN 2mm OF SEALANT OUTSIDE THE SEAL AREA ON THE PCB, AND THERE SHOULD BE NO MORE THAN THREE PLACES.</p> <p>(2)NO OXIDATION OR CONTAMINATION PCB TERMINALS.</p> <p>(3)PARTS ON PCB MUST BE THE SAME AS ON THE PRODUCTION CHARACTERISTIC CHART. THERE SHOULD BE NO WRONG PARTS, MISSING PARTS OR EXCESS PARTS.</p> <p>(4)THE JUMPER ON THE PCB SHOULD CONFORM TO THE PRODUCT CHARACTERISTIC CHART.</p> <p>(5)IF SOLDER GETS ON BEZEL TAB PADS, LED PAD, ZEBRA PAD OR SCREW HOLD PAD, MAKE SURE IT IS SMOOTHED DOWN.</p>		

NO.	ITEM	CRITERIA
12.	SOLDERING	<p>(1)NO SOLDERING FOUND ON THE SPECIFIED PLACE</p> <p>(2)INSUFFICIENT SOLDER</p> <p>(a)LSI, IC A POOR WETTING OF SOLDER IS BETWEEN LOWER BEND OR "HEEL" OF LEAD AND PAD</p>  <p>(b)CHIP COMPONENT • SOLDER IS LESS THAN 50% OF SIDES AND FRONT FACE WETTING</p>  <p>• SOLDER WETS 3 SIDES OF TERMINAL, BUT LESS THAN 25% OF SIDES AND FRONT SURFACE AREA ARE COVERED</p>  <p>(3)PARTS ALIGMENT</p> <p>(a)LSI, IC LEAD WIDTH IS MORE THAN 50% BEYOND PAD OUTLINE</p> 

NO.	ITEM	CRITERIA
12.	SOLDERING	<p>(b)CHIP COMPONENT COMPONENT IS OFF CENTER, AND MORE THAN 50% OF THE LEADS IS OFF THE PAD OUTLINE</p>  <p>(4)NO UNMELTED SOLDER PASTE MAY BE PRESENT ON THE PCB.            (5)NO COLD SOLDER JOINTS, MISSING SOLDER CONNECTIONS, OXIDATION OR ICICLE.            (6)NO RESIDUE OR SOLDER BALLS ON PCB.            (7)NO SHORT CIRCUITS IN COMPONENTS ON PCB.</p>
13.	BACKLIGHT	<p>(1)NO LIGHT            (2)FLICKERING AND OTHER ABNORMAL ILLUMINATION            (3)SPOTS OR SCRATCHES THAT APPEAR WHEN LIT MUST BE JUDGED USING LCD SPOT, LINES AND CONTAMINATION STANDARDS.            (4)BACKLIGHT DOESN'T LIGHT OR COLOR IS WRONG.</p>
14.	GENERAL APPEARANCE	<p>(1)NO OXIDATION, CONTAMINATION, CURVES OR, BENDS ON INTERFACE PIN (OLB) OF TCP.            (2)NO CRACKS ON INTERFACE PIN (OLB) OF TCP.            (3)NO CONTAMINATION, SOLDER RESIDUE OR SOLDER BALLS ON PRODUCT.            (4)THE IC ON THE TCP MAY NOT BE DAMAGED, CIRCUITS.            (5)THE UPPERMOST EDGE OF THE PROTECTIVE STRIP ON THE INTERFACE PIN MUST BE PRESENT OR LOOK AS IF IT CAUSE THE INTERFACE PIN TO SEVER.            (6)THE RESIDUAL ROSIN OR TIN OIL OF SOLDERING (COMPONENT OR CHIP COMPONENT) IS NOT BURNED INTO BROWN OR BLACK COLOR.            (7)SEALANT ON TOP OF THE ITO CIRCUIT HAS NOT HARDENED.            (8)PIN TYPE MUST MATCH TYPE IN SPECIFICATION SHEET.            (9)LCD PIN LOOSE OR MISSING PINS.            (10)PRODUCT PACKAGING MUST THE SAME AS SPECIFIED ON PACKAGING SPECIFICATION SHEET.            (11)PRODUCT DIMENSION AND STRUCTURE MUST CONFORM TO PRODUCT SPECIFICATION SHEET.            (12)THE APPEARANCE OF HEAT SEAL SHOULD NOT ADMIT ANY DIRT AND BREAK.</p>

NO.	ITEM	CRITERIA										
15.	CRACKED GLASS	<p>THE LCD WITH EXTENSIVE CRACK IS NOT ACCEPTABLE</p>										
		<p>GENERAL GLASS CHIP :</p> 	<table border="1" data-bbox="935 418 1458 497"> <thead> <tr> <th>a</th> <th>b</th> <th>c</th> </tr> </thead> <tbody> <tr> <td><math>\leq t/2</math></td> <td>&lt; VIEWING AREA</td> <td><math>\leq 1/8X</math></td> </tr> <tr> <td><math>t/2 &gt; , \leq 2t</math></td> <td><math>\leq W/2</math></td> <td><math>\leq 1/8X</math></td> </tr> </tbody> </table> <p>*W=DISTANCE BETWEEN SEALANT AREA AND LCD PANEL EDGE X = LCD SIDE LENGTH t = GLASS THICKNESS</p>	a	b	c	$\leq t/2$	< VIEWING AREA	$\leq 1/8X$	$t/2 > , \leq 2t$	$\leq W/2$	$\leq 1/8X$
		a	b	c								
		$\leq t/2$	< VIEWING AREA	$\leq 1/8X$								
		$t/2 > , \leq 2t$	$\leq W/2$	$\leq 1/8X$								
<p>CORNER PART :</p> 	<table border="1" data-bbox="935 1005 1458 1084"> <thead> <tr> <th>a</th> <th>b</th> <th>c</th> </tr> </thead> <tbody> <tr> <td><math>\leq t/2</math></td> <td>&lt; VIEWING AREA</td> <td><math>\leq 1/8X</math></td> </tr> <tr> <td><math>&gt; t/2 , \leq 2t</math></td> <td><math>\leq W/2</math></td> <td><math>\leq 1/8X</math></td> </tr> </tbody> </table> <p>*W=DISTANCE BETWEEN SEALANT AREA AND LCD PANEL EDGE X = LCD SIDE LENGTH t = GLASS THICKNESS</p>	a	b	c	$\leq t/2$	< VIEWING AREA	$\leq 1/8X$	$> t/2 , \leq 2t$	$\leq W/2$	$\leq 1/8X$		
a	b	c										
$\leq t/2$	< VIEWING AREA	$\leq 1/8X$										
$> t/2 , \leq 2t$	$\leq W/2$	$\leq 1/8X$										
<p>CHIP ON ELECTRODE PAD</p> 	<table border="1" data-bbox="935 1279 1458 1335"> <thead> <tr> <th>a</th> <th>b</th> <th>c</th> </tr> </thead> <tbody> <tr> <td><math>\leq t</math></td> <td><math>\leq 0.5\text{mm}</math></td> <td><math>\leq 1/8X</math></td> </tr> </tbody> </table> <p>* X=LCD SIDE WIDTH t=GLASS THICKNESS</p>	a	b	c	$\leq t$	$\leq 0.5\text{mm}$	$\leq 1/8X$					
a	b	c										
$\leq t$	$\leq 0.5\text{mm}$	$\leq 1/8X$										
	<table border="1" data-bbox="935 1435 1458 1491"> <thead> <tr> <th>a</th> <th>b</th> <th>c</th> </tr> </thead> <tbody> <tr> <td><math>\leq t</math></td> <td><math>\leq 1/8X</math></td> <td><math>\leq L</math></td> </tr> </tbody> </table> <p>*X=LCD SIDE WIDTH t = GLASS THICKNESS L=ELECTRODE PAD LENGTH ①IF GLASS CHIPPING THE ITO TERMINAL, OVER 2/3 OF THE ITO MUST REMAIN AND BE, INSPECTED ACCORDING TO ELECTRODE TERMINAL SPECIFICATIONS ②IF THE PRODUCT WILL BE HEAT SEALED BY THE CUSTOMER, THE ALIGNMENT MARK MUST NOT BE DAMAGED</p>	a	b	c	$\leq t$	$\leq 1/8X$	$\leq L$					
a	b	c										
$\leq t$	$\leq 1/8X$	$\leq L$										

### 13.4 RELIABILITY TEST

#### 13.4.1 STANDARD SPECIFICATIONS FOR RELIABILITY OF LCD MODULE

NO	ITEM	DESCRIPTION
1	High temperature operation	The sample should be allowed to stand at +60°C for 240 hrs
2	Low temperature operation	The sample should be allowed to stand at -10°C for 240 hrs
3	High temperature storage	The sample should be allowed to stand at +70°C for 240 hrs
4	Low temperature storage	The sample should be allowed to stand at -20°C for 240 hrs
5	High temp / humidity test storage	The sample should be allowed to stand at 60°C , 90% RH. 120 hrs
6	Thermal shock (not operated )	The sample should be allowed to stand the following 10 cycles of operation: -40°C for 30 minutes ~ +80°C for 30 minutes
7	ESD (Electrostatic Discharge) (not operated )	AIR DISCHARGE ± 12KV CONTACT DISCHARGE ± 8KV

NOTE (1) : THE TEST SAMPLES HAVE RECOVERY TIME FOR 2 HOURS AT ROOM TEMPERATURE BEFORE THE FUNCTION CHECK. IN THE STANDARD CONDITIONS, THERE IS NO DISPLAY FUNCTION NG ISSUE OCCURRED.

### 13.5 TESTING CONDITIONS AND INSPECTION CRITERIA

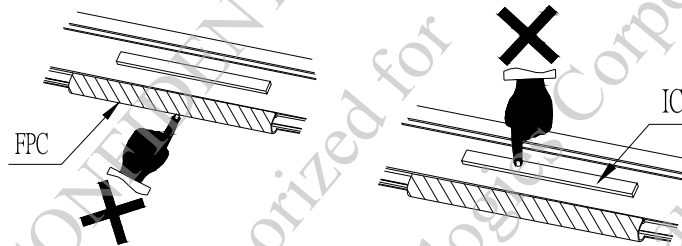
For the final test the testing sample must be stored at room temperature for 24 hours, after the tests listed in table 12.5 , standard specifications for reliability have been executed in order to ensure stability .

NO	ITEM	TEST MODEL	INSPECTION CRITERIA
1	Current consumption	Refer To Specification	The current consumption should conform to the product specification.
2	Contrast	Refer TO Specification	After the tests have been executed, the contrast must be larger than half of its initial value prior to the tests.
3	Appearance	Visual inspection	Defect free

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### 13.6 OPERATION

- 13.6.1 Do not connect or disconnect modules to or from the main system while power is being supplied .
- 13.6.2 Use the module within specified temperature ; lower temperature causes the retardation of blinking speed of the display ; higher temperature makes overall display discolor . When the temperature returns to normality , the display will operate normally .
- 13.6.3 Adjust the LC driving voltage to obtain the optimum contrast .
- 13.6.4 Power On Sequence input signals should not be supplied to LCD module before power supply voltage is applied and reaches the specified value . If above sequence is not followed , CMOS LSIs of LCD modules may be damaged due to latch - up problem .
- 13.6.5 Not allowed to inflict any external stress and to cause any mechanical interference on the bending area of FPC during the tail bending backwards!  
Do NOT stress FPC and IC on the Module!



### 13.7 NOTICE

- 13.7.1 Use a grounded soldering iron when soldering connector I/O terminals . For soldering or repairing , take precaution against the temperature of the soldering iron and the soldering time to prevent peeling off the through-hole-pad .
- 13.7.2 Do not disassemble . EDT shall not be held responsible if the module is disassembled and upon the reassembly the module failed .
- 13.7.3 Do not charge static electricity , as the circuit of this module contains CMOS LSIs. A workman's body should always be static-protected by use of an ESD STRAP . Working clothes for such personnel should be of static-protected material .
- 13.7.4 Always ground the electrically-powered driver before using it to install the LCD module. While cleaning the work station by vacuum cleaner, do not bring the sucking mouth near the module ; static electricity of the electrically-powered driver or the vacuum cleaner may destroy the module .
- 13.7.5 Don't give external shock.
- 13.7.6 Don't apply excessive force on the surface.
- 13.7.7 Liquid in LCD is hazardous substance. Must not lick and swallow.  
When the liquid is attach to your, skin, cloth etc. Wash it out thoroughly and immediately.
- 13.7.8 Don't operate it above the absolute maximum rating.
- 13.7.9 Storage in a clean environment, free from dust, active gas, and solvent.
- 13.7.10 Store without any physical load.
- 13.7.11 Rewiring: no more than 3 times.