EXAMINED BY :	EMERGING DISPLAY	FILE NO . CAS-0007013
Vincent Uh		ISSUE : FEB.03, 2010
APPROVED BY:	TECHNOLOGIES CORPORATION	TOTAL PAGE : 34
David Chang		VERSION : 3

CUSTOMER   ACCEPTANCE   SPECIFICATIONS

MODEL   NO. :

ETV570G6DHU
(RoHS)

FOR   MESSRS :

_____

CUSTOMER'S APPROVAL

DATE :

_____

BY :

_____

02101300-01-02

RECORDS OF REVISION	DOC . FIRST ISSUE NOV.13, 2009

DATE	REVISED PAGE NO.	SUMMARY
DEC.04, 2009	3	4. ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
POWER SUPPLY CURRENT FOR VCOM DRIVER	ICC	VCC−VSS = 3.3V	—	(150)	(200)	mA	
POWER SUPPLY CURRENT FOR LED DRIVER	ILED	VLED-VLSS=3.3V	—	(570)	(600)	mA	
		VLED-VLSS=12V	—	(140)	(180)		

↓

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
POWER SUPPLY CURRENT FOR VCOM DRIVER	ICC	VCC−VSS = 3.3V	—	130	170	mA	
POWER SUPPLY CURRENT FOR LED DRIVER	ILED	VLED-VLSS=3.3V	—	460	600	mA	
		VLED-VLSS=12V	—	120	160		

	5	DELETE 5.4 APPLICATION NOTES FOR TIMING CHARACTERISTICS
	6,7	ADD 5.4 SWITCHING CHARACTERISTICS AND AC TIMING DIAGRAMS (LVDS)
	16	10. INTERFACE SIGNALS MODIFY PIN NO.1~3 OF FUNCTION: (+12V)→(3.3~12V)
FEB.03, 2010	2	3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS. INPUST SIGNAL VOLTAGE: MAX.=VCC+0.3 →VDD+0.3 3.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS.

ITEM	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	-10°C	60°C	-20°C	70°C	NOTE(1),(2)

↓

ITEM	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	-10°C	70°C	-30°C	80°C	NOTE(1),(2)

NOTE (1) : Ta AT -20°C:48HRS MAX. →-30°C:48HRS MAX.
70°C:168HRS MAX. → 80°C:168HRS MAX.

	32	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
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

↓

NO	ITEM	DESCRIPTION
1	High temperature operation	The sample should be allowed to stand at +70°C for 240 hrs
3	High temperature storage	The sample should be allowed to stand at +80°c for 240 hrs
4	Low temperature storage	The sample should be allowed to stand at -30°C for 240 hrs

TABLE OF CONTENTS

02101300-01-02

1. GENERAL SPECIFICATIONS

1.1 APPLICATION NOTES FOR CONTROLLER/DRIVER
PLEASE REFER TO :

HIMAX   HX8250
HIMAX   HX8678

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 -------------------------- 640W * (RGB) * 480H DOTS

(3) MODULE SIZE ---------------------------------- 147.6W * 100H *11.7D (MAX) 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 ------------------------------------- 0.06W * 0.18H mm

(7) PIXEL SIZE ------------------------------------- 0.18W * 0.18H mm

(8) LCD TYPE ---------------------------------- TFT , TRANSMISSIVE

(9) COLOR ------------------------------------- 262K

(10) VIEWING DIRECTION ---------------------- 12 O'CLOCK

(11) BACK LIGHT ---------------------------------- LED , COLOR : WHITE

(12) INTERFACE MODE ----------------------------- LVDS

3. ABSOLUTE MAXIMUM RATINGS

3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	MIN.	MAX.	UNIT	REMARK
POWER SUPPLY VOLTAGE	VDD-VSS	-0.3	7.0	V	
	VCC-VSS	-0.3	4.0	V	
	VCC1-VSS	-0.5	6.5	V	
LVDS DRIVER OUTPUT VOLTAGE	—	- 0.3	VDD+0.3	V	
STATIC ELECTRICITY	—	—	—	V	NOTE (1)
LED BACKLIGHT POWER DISSIPATION	PD	—	1.28	W	
LED BACKLIGHT FORWARD CURRENT	IF	—	60	mA	
LED BACKLIGHT REVERSE VOLTAGE	VR	—	45	V	

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

3.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS.

ITEM	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	-10°C	70°C	-30°C	80°C	NOTE (1) , (2)
HUMIDITY	NOTE (3)		NOTE (3)		WITHOUT CONDENSATION
VIBRATION	—	2.45 m/s^2 (0.25 G)	—	11.76 m/s^2 (1.2 G)	10~55Hz X,Y,Z,EACH 2HRS
SHOCK	—	29.4 m/s^2 (3 G)	—	490 m/s^2 (50 G)	6 m SECONDS XYZ DIRECTIONS 3 TIMES EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE (1) : Ta AT -30°C : 48HRS MAX .
           80°C : 168HRS MAX .
NOTE (2) : BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT TEMPERATURE THIS PHENOMENON IS REVERSIBLE.
NOTE (3) : 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
POWER SUPPLY VOLTAGE FOR DIGITAL	VDD–VSS	——	3	3.3	3.6	V	
POWER SUPPLY VOLTAGE FOR VCOM DRIVER	VCC–VSS	——	3	3.3	3.6	V	
POWER SUPPLY VOLTAGE FOR EEPROM	VCC1-VSS	——	2.5	3.3	5.5	V	
POWER SUPPLY CURRENT FOR DIGITAL	IDD	VDD–VSS =3.3V	——	8	12	mA	NOTE (1)
POWER SUPPLY CURRENT FOR VCOM DRIVER	ICC	VCC–VSS = 3.3V	——	130	170	mA	
LVDS DIFFERENTIAL INPUT HIGH THRESHOLD	VTH	VOC=+1.2V	——	——	100	mV	
LVDS DIFFERENTIAL INPUT LOW THRESHOLD	VTL		-100	——	——	mV	
LOW LEVEL INPUT VOLTAGE	VIL	——	0	——	0.3*VDD	V	NOTE (2)
HIGH LEVEL INPUT VOLTAGE	VIH	——	0.7*VDD	——	VDD	V	
LVDS CLK FREQUENCY	——	VCC-VSS=3.3V	20	85	——	MHz	
FRAME FREQUENCY	fFRAME	——	50	60	72	Hz	
POWER SUPPLY VOLTAGE FOR LED DRIVER	VLED-VLSS	——	3.3	——	12	V	
POWER SUPPLY CURRENT FOR LED DRIVER	ILED	VLED-VLSS=3.3V	——	460	600	mA	
		VLED-VLSS=12V	——	120	160		
POWER SUPPLY VOLTAGE FOR LED BACKLIGHT	V_F	I_F=40mA	28	30	32	V	NOTE (3)
LED LIFE TIME	——	——	30000	40000	——	HRS	

NOTE (1) : THE DISPLAY PATTERN IS ALL "WHITE".
NOTE (2) : APPLIED TO TERMINALS /RESET, HSYNC, VSYNC, ENB, DCLK, B5~B0, G5~G0, R5~R0.
NOTE (3) : INTERNAL CIRCUIT DIAGRAM OF BACKLIGHT
    (VF=VBL+(A)—VBL1–(K1)=VBL+(A)—VBL2–(K2))

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

02101300-01-02
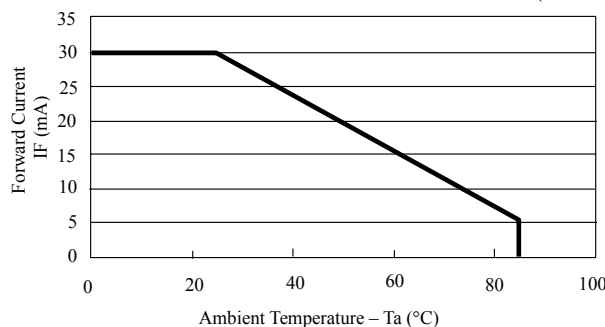
5 .   TIMING CHARACTERISTICS

5.1   DIGITAL PARALLEL RGB INTERFACE (SYNC MODE)

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
DCLK FREQUENCY	F_{CPH}	22.66	25.175	27.69	MHz
DCLK PERIOD	T_{CPH}	36.11	39.7	44.13	ns
DCLK PULSE DUTY	T_{CWH}	40	50	60	%
HSYNC PERIOD	T_H	750	800	850	T_{CPH}
HSYNC PULSE WIDTH	T_{WH}	5	30	—	T_{CPH}
HSYNC FIRST HORIZONTAL DATA TIME	T_{HS}	112	144	175	T_{CPH}
HORIZONTAL ACTIVE DATA AREA	T_{HA}	—	640	—	T_{CPH}
VSYNC PULSE WIDTH	T_{WV}	1	3	5	T_H
FIRST LINE DATA INPUT TIME	T_{STV}	—	35	—	T_H
VSYNC PERIOD	T_V	515	525	535	T_H

HORIZONTAL TIMING

VERTICAL TIMING

02101300-01-02
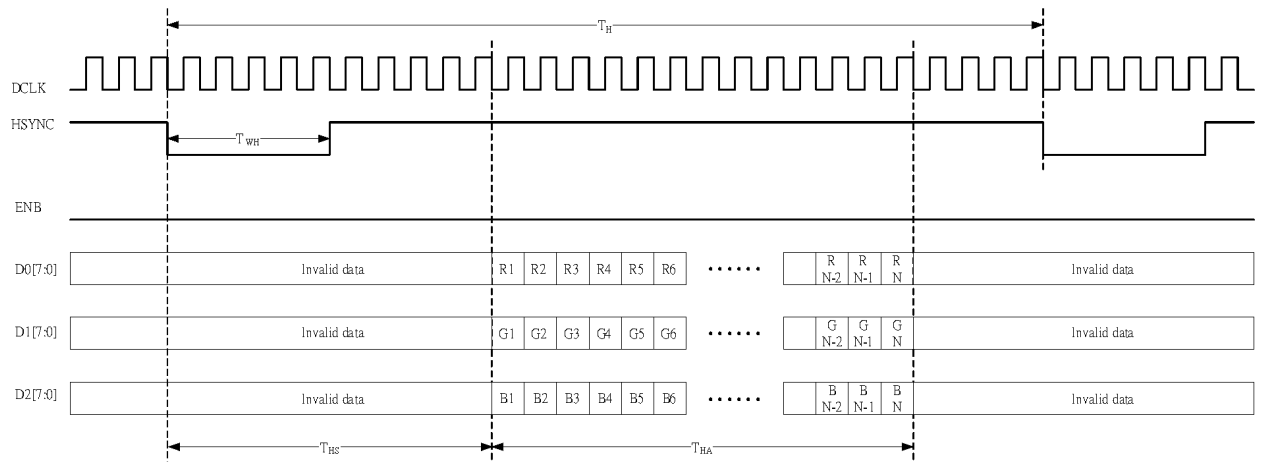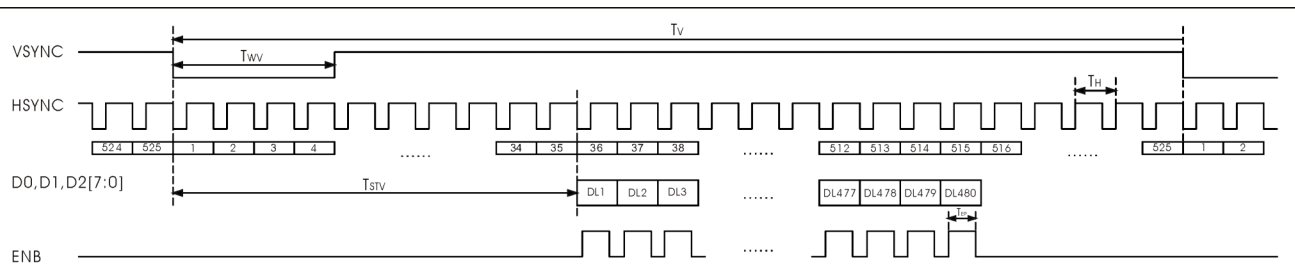
5.2   DIGITAL PARALLEL RGB INTERFACE (DE MODE)

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
DCLK FREQUENCY	F_{CPH}	22.66	25.175	27.69	MHz
DCLK PERIOD	T_{CPH}	36.11	39.7	44.13	ns
DCLK PULSE DUTY	T_{CWH}	40	50	60	%
ENB PERIOD	T_{DEN}	750	800	850	T_{CPH}
ENB PULSE WIDTH	T_{EP}	—	640	—	T_{CPH}
ENB FRAME ACTIVE TIME	T_{DEA}	—	480	—	T_{DEN}
ENB FRAME BLANKING TIME	T_{DEB}	10	45	110	T_{DEN}
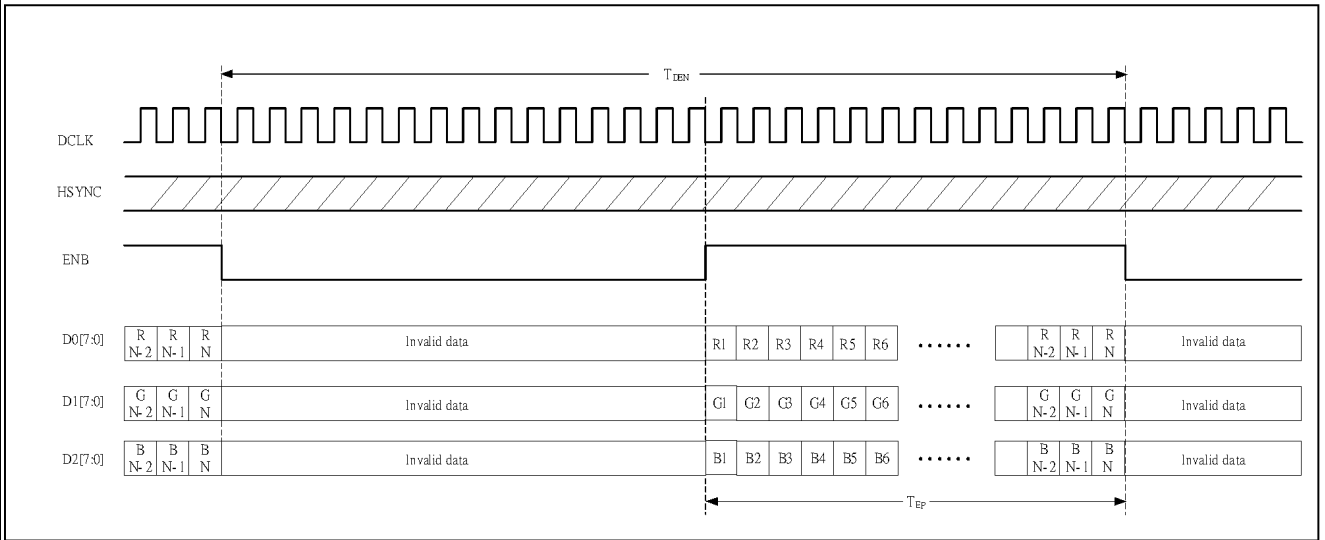
HORIZONTAL TIMING
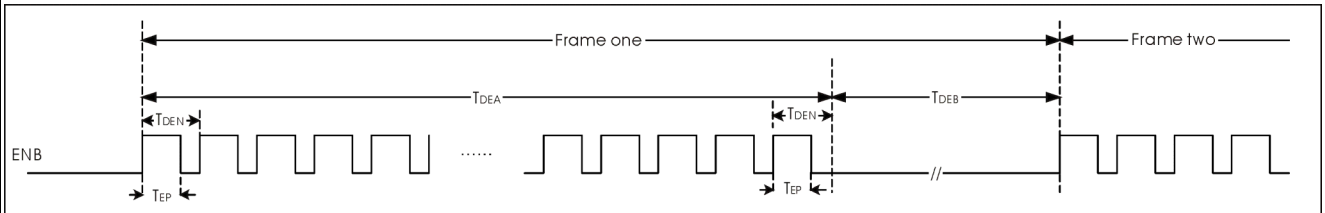
VERTICAL TIMING

5.3   DCLK AND DATA INPUT WAVEFORMS

02101300-01-02
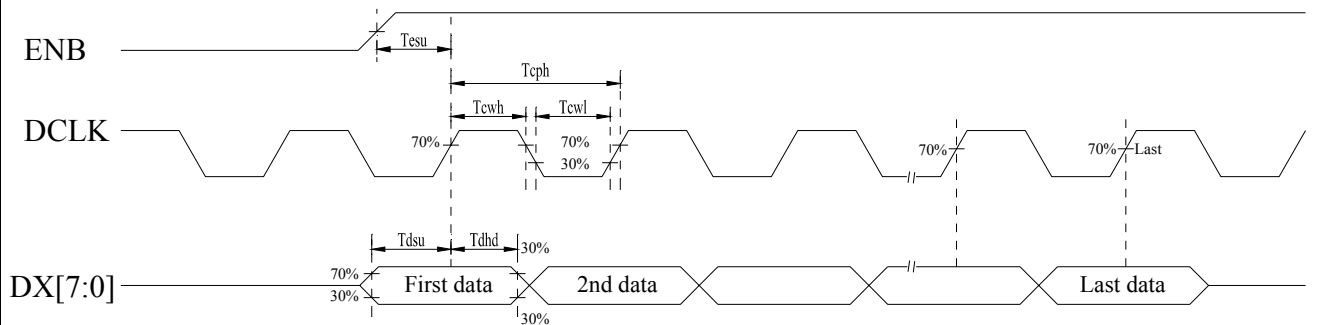
5.4   SWITCHING CHARACTERISTICS AND AC TIMING DIAGRAMS (LVDS)

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
CLK OUT PERIOD	t_{RCP}	11.76	T	50.0	ns
CLK OUT HIGH TIME	t_{RCH}	—	4T/7	—	ns
CLK OUT LOW TIME	t_{RCL}	—	3T/7	—	ns
RCLK +/- TO CLK OUT DELAY	t_{RCD}	—	5T/7	—	ns
TTL DATA SETUP TO CLK OUT	t_{RS}	0.35T-0.3	—	—	ns
TTL DATA HOLD FROM CLK OUT	t_{RH}	0.45T-1.6	—	—	ns
TTL LOW TO HIGH TRANSITION TIME	t_{TLH}	—	2.0	3.0	ns
TTL HIGH TO LOW TRANSITION TIME	t_{THL}	—	1.8	3.0	ns
INPUT DATA POSITION0 (T=11.76ns)	t_{RIP1}	-0.4	0.0	0.4	ns
INPUT DATA POSITION1 (T=11.76ns)	t_{RIP0}	T/7-0.4	T/7	T/7+0.4	ns
INPUT DATA POSITION2 (T=11.76ns)	t_{RIP6}	2T/7-0.4	2T/7	2T/7+0.4	ns
INPUT DATA POSITION3 (T=11.76ns)	t_{RIP5}	3T/7-0.4	3T/7	3T/7+0.4	ns
INPUT DATA POSITION4 (T=11.76ns)	t_{RIP4}	4T/7-0.4	4T/7	4T/7+0.4	ns
INPUT DATA POSITION5 (T=11.76ns)	t_{RIP3}	5T/7-0.4	5T/7	5T/7+0.4	ns
INPUT DATA POSITION6 (T=11.76ns)	t_{RIP2}	6T/7-0.4	6T/7	6T/7+0.4	ns
PHASE LOCK LOOP SET	t_{RPLL}	—	—	10.0	ms

TTL OUTPUT

TTL Output Load

02101300-01-02

t_{RIP2}

t_{RIP3}

t_{RIP4}

t_{RIP5}

t_{RIP6}

t_{RIP0}

t_{RIP1}

Rx+/- | Rx6 | Rx5 | Rx4 | Rx3 | Rx2 | Rx1 | Rx0 |

RCLK+ $V_{diff} = 0V$ $V_{diff} = 0V$

t_{RCD}

t_{RCP} t_{RCH} t_{RCL}

CLKOUT   VCC/2   VCC/2   VCC/2   VCC/2

t_{RS} t_{RH}

Rx0 - Rx6   DATA VALID   VCC/2   DATA VALID   VCC/2
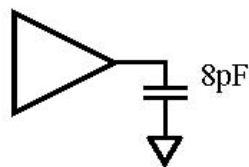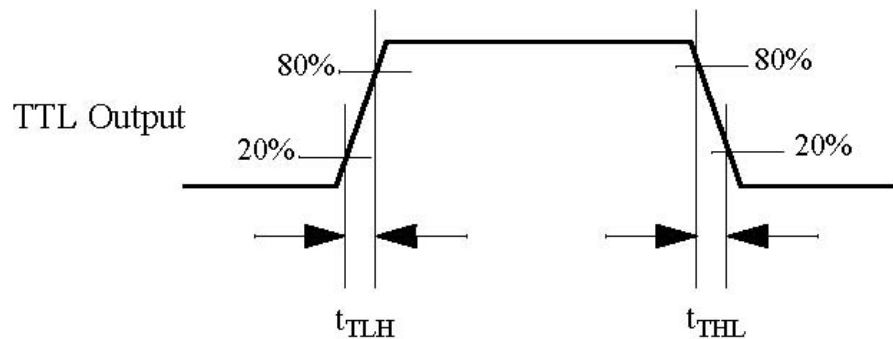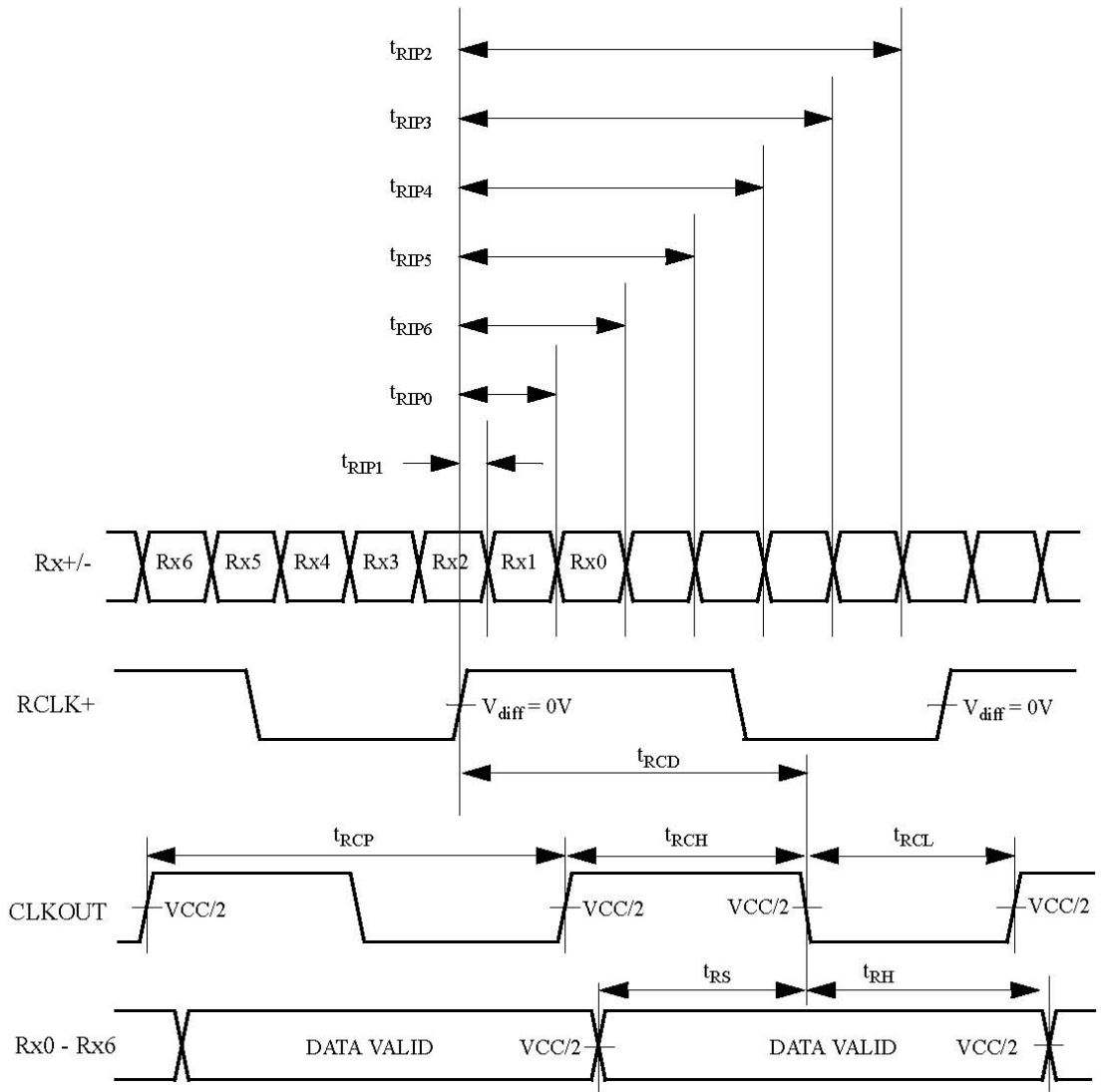
Note:
1) Vdiff = (RA+) - (RA-), ... (RCLK+) - (RCLK-)

PHASE LOCK LOOP SET TIME

/PDWN   VCC/2

3.6V

VCC   VCC/2

t_{RPLL}

RCLK+/-

CLKOUT   VCC/2

02101300-01-02
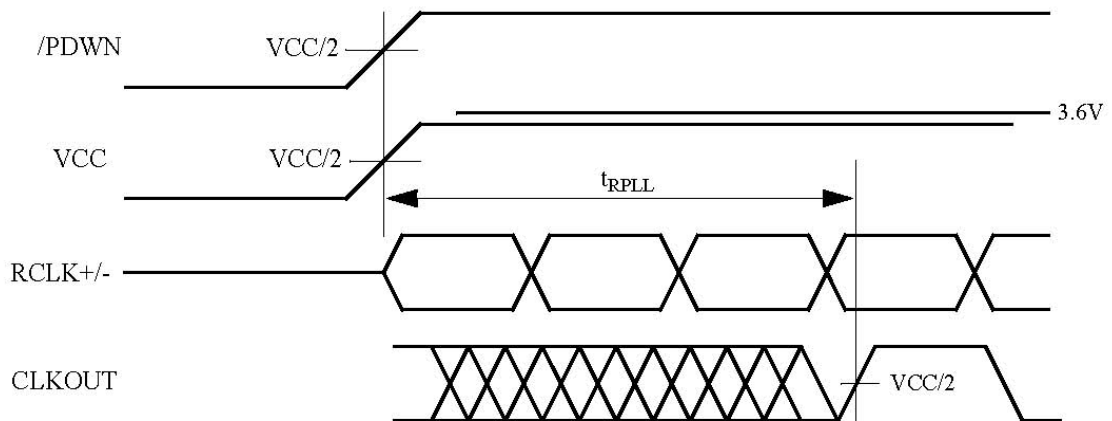
6. OPTICAL CHARACTERISTICS (NOTE1)
6.1 OPTICAL CHARACTERISTICS

Ta = 25 ± 2 °C

I T E M		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	REMARK
VIEWING ANGLE		θ_{y+}	CR ≥ 10	$\theta_x=0°$	50	55	—	d e g .	NOTE (2) NOTE (3)
		θ_{y-}			47	52	—		
		θ_{x+}		$\theta_y=0°$	60	65	—		
		θ_{x-}			60	65	—		
CONTRAST RATIO		CR	$\theta x=0°$, $\theta y=0°$		300	350	—	—	NOTE (3)
RESPONSE TIME		T_R (rise)	$\theta x=0°$, $\theta y=0°$		—	15	30	msec	NOTE (4)
		T_F (fall)			—	35	50		
COLOR OF CIE COORDINATE	WHITE	Wx	$\theta x=0°$, $\theta y=0°$ IF = 40mA NTSC : 50 %		0.26	0.31	0.36	—	NOTE (5)
		Wy			0.30	0.35	0.40		
	RED	Rx			0.56	0.61	0.66	—	
		Ry			0.31	0.36	0.41		
	GREEN	Gx			0.28	0.33	0.38	—	
		Gy			0.51	0.56	0.61		
	BLUE	Bx			0.09	0.14	0.19	—	
		By			0.07	0.12	0.17		
THE BRIGHTNESS OF MODULE		B	$\theta x=0°$, $\theta y=0°$ IF = 40mA		350	400	—	cd/m^2	NOTE (6)
THE UNIFORMITY OF MODULE		—			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.

LCD Module

LCD Panel

Center of the Screen

Photometer
(TOPCON BM-7)

Field of View = 1°

500mm

02101300-01-02
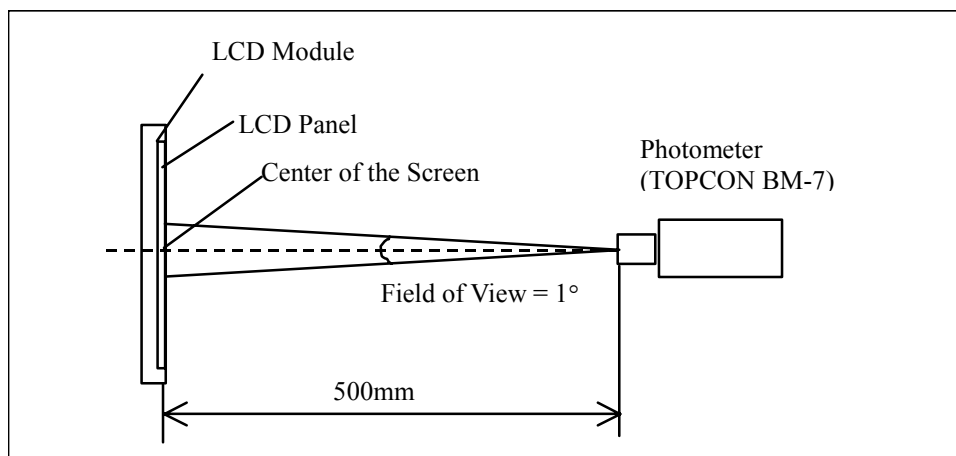
NOTE (2) : DEFINITION OF VIEWING ANGLE :
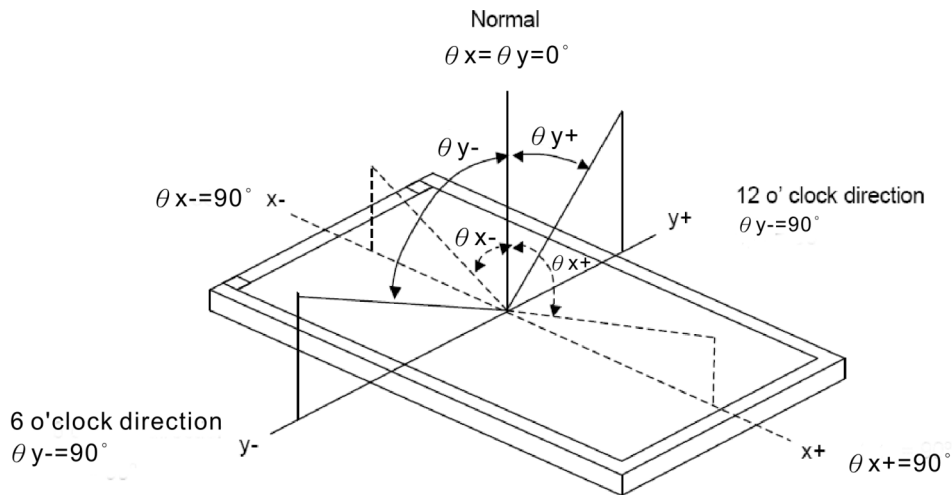
NOTE (3) : DEFINITION OF CONTRAST RATIO :

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

NOTE (4) : DEFINITION OF RESPONSE TIME : T_R AND T_F
THE FIGURE BELOW IS THE OUTPUT SIGNAL OF THE PHOTO DETECTOR.
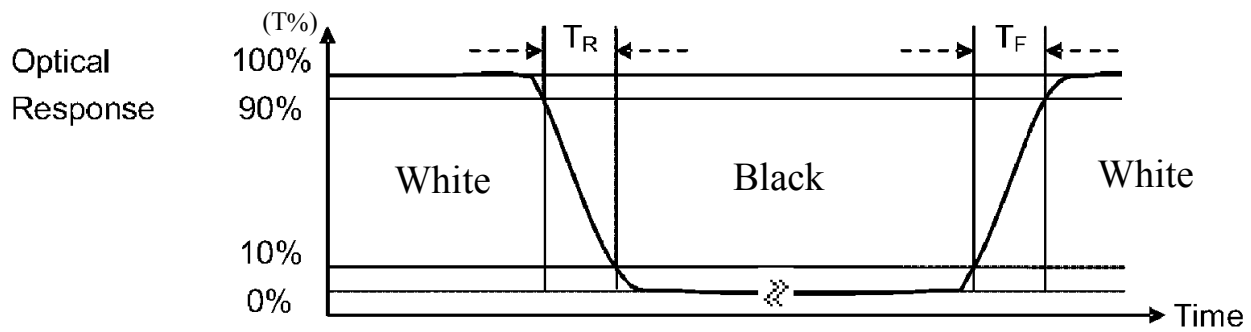
NOTE (5) : THE 100% TRANSMISSION IS DEFINED AS THE TRANSMISSION OF LCD PANEL WHEN ALL
THE INPUT TERMINALS OF MODULE ARE ELECTRICALLY OPENED.

NOTE (6) : BRIGHTNESS MEASURED WHEN LCD IS AT "WHITE STATE"

6.2   THE TEST METHOD OF BRIGHTNESS AND UNIFORMITY
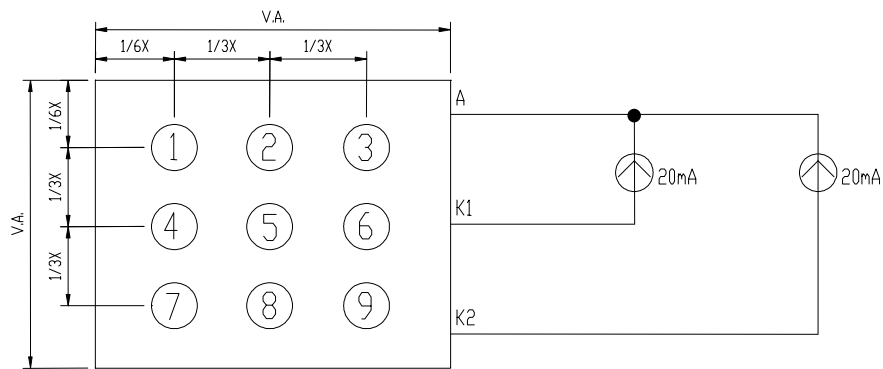
UNIT：mm

6.3   THE CALCULATING METHOD OF UNIFORMITY

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

02101300-01-02

7. OUTLINE DIMENSIONS

Best Contrast but with Gray Level Inversion

VIEWING DIRECTION

147.6(*2)

135.6±0.2   6(*2)

124.7   5.45

V.A. 117.2 (T/P)   (3.75)

A.A. 116.2 (T/P)   (4.25)

A.A. 115.2±0.2   (4.75)

C.A. 2.95 MAX.   C.A. 2.95 MAX.

6.55(*2)

A   A

(4.75) (4.25) (3.75)

YU

C.A. 2.95 MAX.

86.9±0.2(*2)

XL   640(RGB)*480 DOTS   XR

C.A. 7.05 MAX. C.A. 2.95 MAX. A.A. 86.4±0.2 A.A. 87.4 (T/P) A.A. 88.4 (T/P) V.A. 88.4 (T/P) 100

YD

DETAIL A

DETAIL B

(2)

7.5

Ø4   10.5   9

12   9   DETAIL A SCALE 1:1 (*4)

1.5

4.1   2.1   DETAIL B SCALE 2:1 (*4)

11.7 MAX.

1 (PCB)

(8)   108.7

(62.35)

(8)   (10.35)

CN:OMRON XF2M-3315-1A OR EQUIVALENT

CN

33   1

69

TAPE

COMPONENT AREA
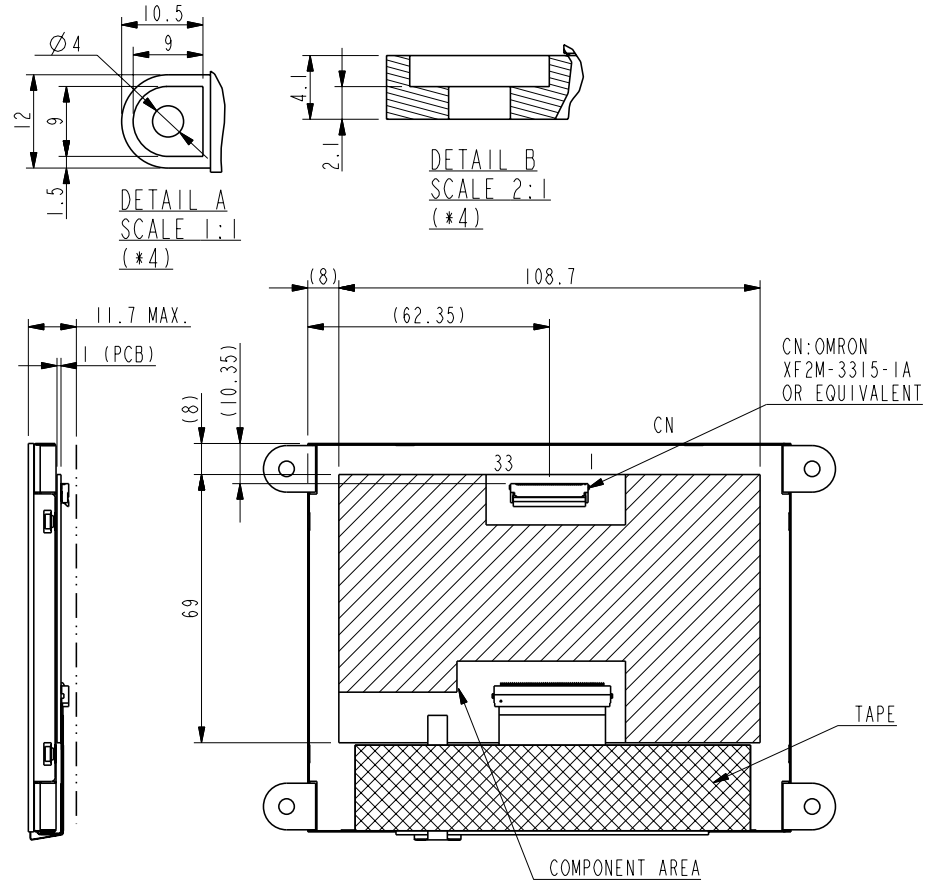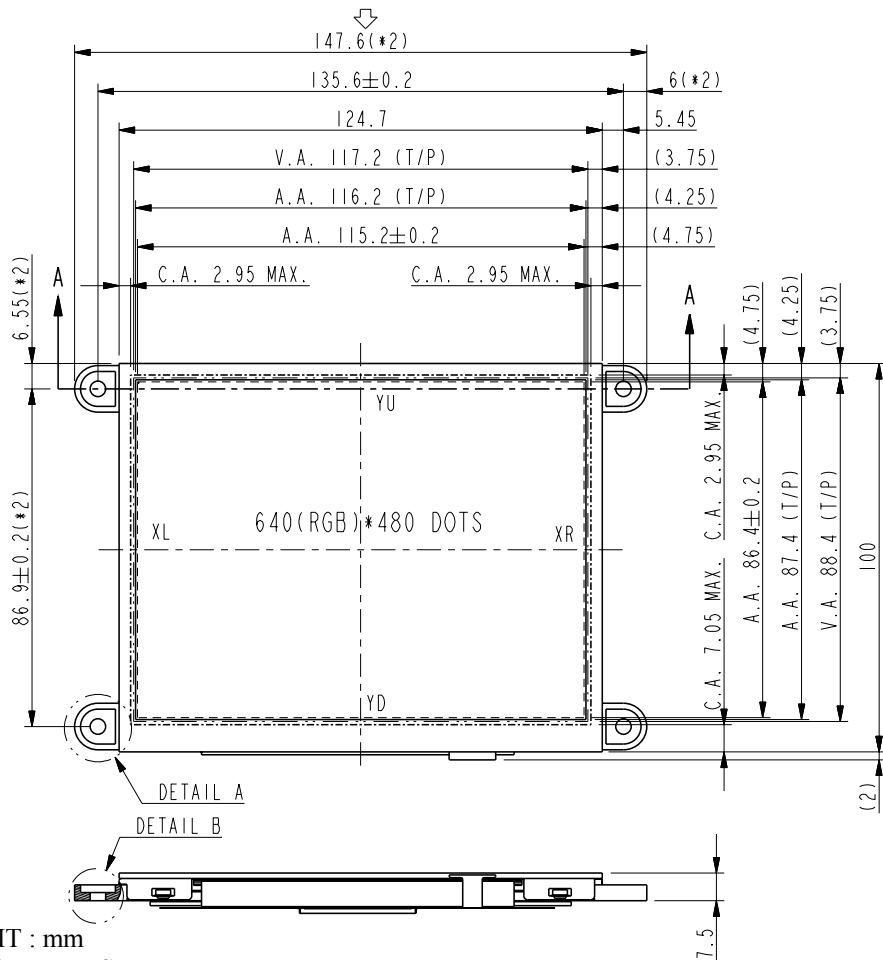
UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.5

02101300-01-02

8．BLOCK DIAGRAM
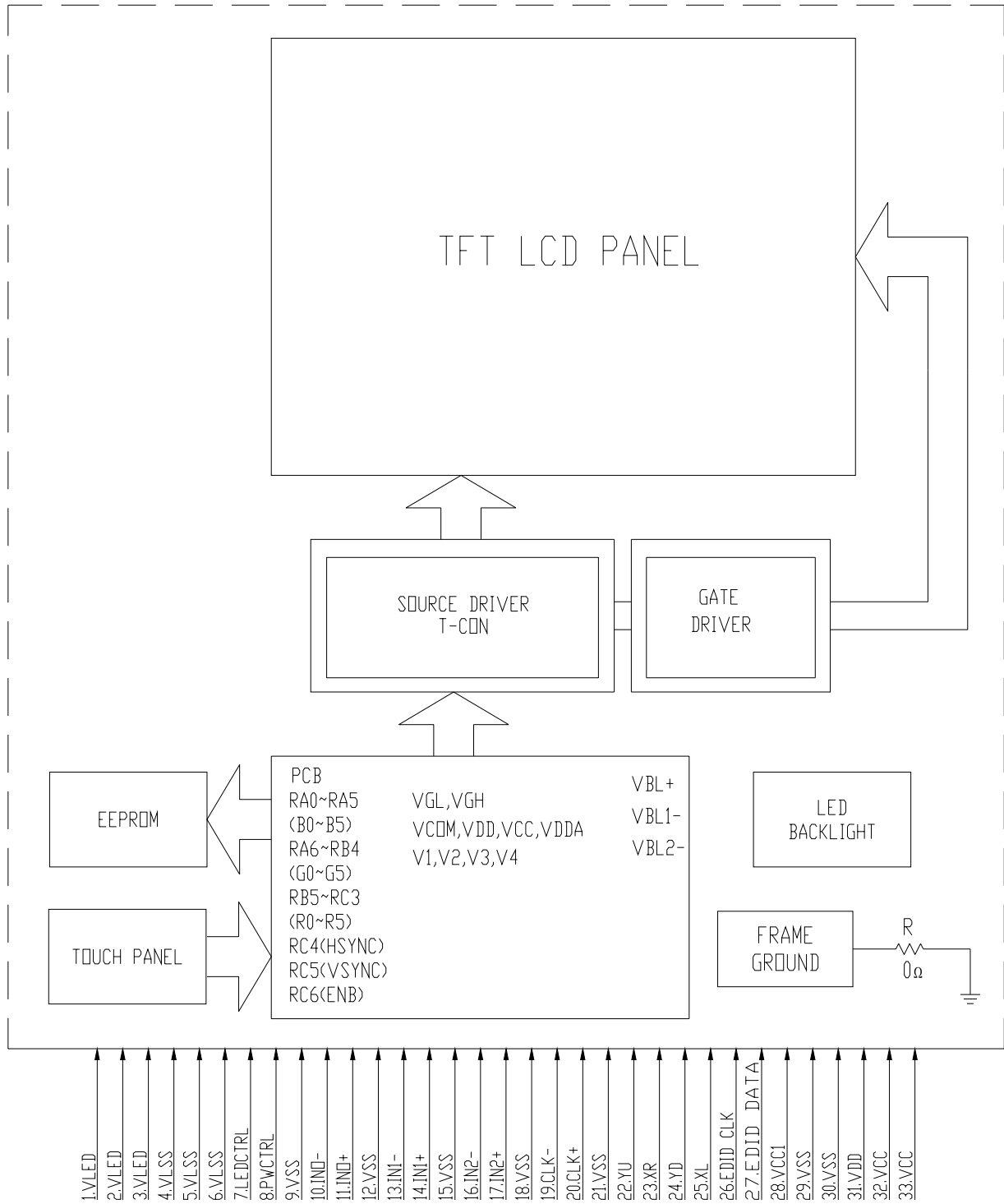
NOTE : (1) UD = "H" LEVEL JP1 1-2 : OUT1→480   ; LR = "H" LEVEL JP2 1-2 : OUT1→960(DEFAULT)
        "L" LEVEL JP1 2-3 : OUT480→1 (DEFAULT)   "L" LEVEL JP2 2-3 : OUT960→1
      (2) THE MODULE COMPLIES TO EDID VERSION 1.1

02101300-01-02

8.1   EDID TABLE (VERSION 1.1)

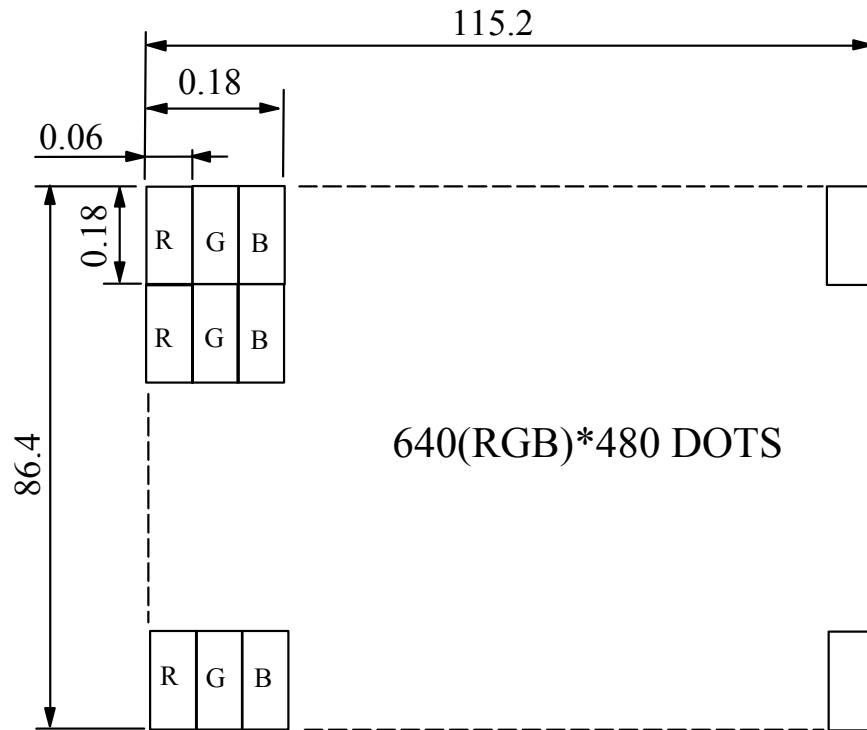| Address		Data	FUNCTION	Format
hex	dec	hex		
0x00	0	0x00	**Header**	
0x01	1	0xFF		
0x02	2	0xFF		
0x03	3	0xFF		
0x04	4	0xFF		
0x05	5	0xFF		
0x06	6	0xFF		
0x07	7	0x00		
0x08	8	0x14	**Vendor / Product Identification**	ID Manufacturer Name
0x09	9	0x94		
0x0A	10	0x01		ID Product Code
0x0B	11	0x00		
0x0C	12	0x00		ID Serial Number
0x0D	13	0x00		
0x0E	14	0x00		
0x0F	15	0x00		
0x10	16	0x25		Week of Manufacture
0x11	17	0x13		Year of Manufacture
0x12	18	0x01	**EDID Structure Version / Revision**	EDID version number "1"
0x13	19	0x03		EDID revision number "3"
0x14	20	0x80	**Basic Display Parameters / Features**	Video Input Definition
0x15	21	0x0C		Maximum Horizontal Image Size (in centimeters)
0x16	22	0x09		Maximum Vertical Image Size (in centimetres)
0x17	23	0x00		Display Transfer Characteristic (Gamma)
0x18	24	0x08		Year of Manufacture
0x19	25	0x59	**Color Characteristics**	Red/Green Low Bits
0x1A	26	0xF6		Blue/White Low Bits
0x1B	27	0x9C		Red-x
0x1C	28	0x5C		Red-y
0x1D	29	0x54		Green-x
0x1E	30	0x8F		Green-y
0x1F	31	0x23		Blue-x
0x20	32	0x1E		Blue-y
0x21	33	0x4F		White-x
0x22	34	0x59		White-y
0x23	35	0x00	**Established Timings**	Established Timings 1
0x24	36	0x00		Established Timings 2
0x25	37	0x00		Manufacturer's Reserved Timings
0x26	38	0x01	**Standard Timing Identification**	Standard Timing Identification # 1
0x27	39	0x01		
0x28	40	0x01		Standard Timing Identification # 2
0x29	41	0x01		
0x2A	42	0x01		Standard Timing Identification # 3
0x2B	43	0x01		
0x2C	44	0x01		Standard Timing Identification #4
0x2D	45	0x01		
0x2E	46	0x01		Standard Timing Identification # 5
0x2F	47	0x01		
0x30	48	0x01		Standard Timing Identification # 6
0x31	49	0x01		
0x32	50	0x01		Standard Timing Identification # 7
0x33	51	0x01		
0x34	52	0x01		Standard Timing Identification # 8
0x35	53	0x01		

02101300-01-02

Address		Data	FUNCTION	Format
hex	dec	hex		
0x36	54	0xD6	**Descriptor Block 1**	Pixel Clock (in 10 kHz)
0x37	55	0x09		
0x38	56	0x80		Horizontal Active (in pixels)
0x39	57	0xA0		Horizontal Blanking (in pixels)
0x3A	58	0x20		Horizontal Active + Blanking high
0x3B	59	0xE0		Vertical Active (in pixels)
0x3C	60	0x2D		Vertical Blanking (in lines)
0x3D	61	0x10		High significant bits for Vertical Active + Blanking
0x3E	62	0x90		HSync Offset (in pixels)
0x3F	63	0x1E		HSync Pulse Width (in pixels)
0x40	64	0x33		VSync Offset + Vsync Pulse width (in lines)
0x41	65	0x08		High sig. bits for HSync Offset + PW + Vsync Offset + PW
0x42	66	0x73		Horizontal Image Size (in mm)
0x43	67	0x56		Vertical Image Size (in mm)
0x44	68	0x00		High significant bits for Hor. + Vert. Image Size
0x45	69	0x00		Horizontal Border (in pixels representing only one side)
0x46	70	0x00		Vertical Border (in lines representing only one side)
0x47	71	0x18		Interlace/Stereo/Sep. Sync/Sync Pol.
0x48	72	0x00	**Descriptor Block 2**	Not used.
0x49	73	0x00		
0x4A	74	0x00		
0x4B	75	0x10		
0x4C	76	0x00		
0x4D	77	0x0D		
0x4E	78	0x00		
0x4F	79	0x20		
0x50	80	0x00		
0x51	81	0x00		
0x52	82	0x00		
0x53	83	0x00		
0x54	84	0x80		
0x55	85	0xE0		
0x56	86	0x21		
0x57	87	0x00		
0x58	88	0x00		
0x59	89	0x18		

02101300-01-02
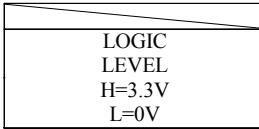
Address		Data	FUNCTION	Format
hex	dec	hex		
0x5A	90	0x00	**Descriptor Block 3**	Not used.
0x5B	91	0x00		
0x5C	92	0x00		
0x5D	93	0x10		
0x5E	94	0x00		
0x5F	95	0x00		
0x60	96	0x00		
0x61	97	0x00		
0x62	98	0x00		
0x63	99	0x00		
0x64	100	0x00		
0x65	101	0x00		
0x66	102	0x00		
0x67	103	0x00		
0x68	104	0x00		
0x69	105	0x00		
0x6A	106	0x00		
0x6B	107	0x00		
0x6C	108	0x00	**Descriptor Block 4**	Not used.
0x6D	109	0x00		
0x6E	110	0x00		
0x6F	111	0x10		
0x70	112	0x00		
0x71	113	0x0D		
0x72	114	0x00		
0x73	115	0x20		
0x74	116	0x00		
0x75	117	0x00		
0x76	118	0x00		
0x77	119	0x00		
0x78	120	0x80		
0x79	121	0xE0		
0x7A	122	0x21		
0x7B	123	0x00		
0x7C	124	0x00		
0x7D	125	0x18		
0x7E	126	0x00	Extension Flag	EXTENSION EDID BLOCK(S).
0x7F	127	0x1F	Checksum	The 1-byte sum of all 128 bytes

02101300-01-02

9. DETAIL DRAWING OF DOT MATRIX

115.2

0.18

0.06

0.18

| R | G | B |
| R | G | B |

86.4

640(RGB)*480 DOTS

| R | G | B |

UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.1
DOTS MATRIX TOLERANCE IS ± 0.01

02101300-01-02

10. INTERFACE SIGNALS

PIN NO.	SYMBOL	FUNCTION		
1	VLED	POWER SUPPLY FOR LED DRIVER (3.3~12V)		
2	VLED	POWER SUPPLY FOR LED DRIVER (3.3~12V)		
3	VLED	POWER SUPPLY FOR LED DRIVER (3.3~12V)		
4	VLSS	POWER SUPPLY FOR LED DRIVER (GROUND)		
5	VLSS	POWER SUPPLY FOR LED DRIVER (GROUND)		
6	VLSS	POWER SUPPLY FOR LED DRIVER (GROUND)		
7	LEDCTRL	BRIGHTNESS CONTROL FOR LED BACKLIGHT：POWER SUPPLY 0V~2.5V OR PWM SIGNAL		
8	PWCTRL	LOGIC LEVEL H=3.3V L=0V / PWCTRL: H = POWER ON, L = SHUTDOWN		
9	VSS	GROUND		
10	INO-	LVDS RECEIVER SIGNAL CHANNEL 0		
11	INO+	LVDS RECEIVER SIGNAL CHANNEL 0		
12	VSS	GROUND		
13	IN1-	LVDS RECEIVER SIGNAL CHANNEL 1		
14	IN1+	LVDS RECEIVER SIGNAL CHANNEL 1		
15	VSS	GROUND		
16	IN2-	LVDS RECEIVER SIGNAL CHANNEL 2		
17	IN2+	LVDS RECEIVER SIGNAL CHANNEL 2		
18	VSS	GROUND		
19	CLK-	LVDS RECEIVER SIGNAL CLOCK		
20	CLK+	LVDS RECEIVER SIGNAL CLOCK		
21	VSS	GROUND		
22	YU	TOP PANEL	TOUCH PANEL	
23	XR	RIGHT PANEL		
24	YD	BOTTOM PANEL		
25	XL	LEFT PANEL		
26	EDID CLK	SERIAL CLOCK INPUT FOR EEPROM		
27	EDID DATA	SERIAL DATA FOR EEPROM		
28	VCC1	POWER SUPPLY FOR EEPROM		
29	VSS	GROUND		

For PIN 8 (PWCTRL):

LOGIC LEVEL H=3.3V L=0V	PWCTRL	REMARK
	H	POWER ON
	L	SHUTDOWN

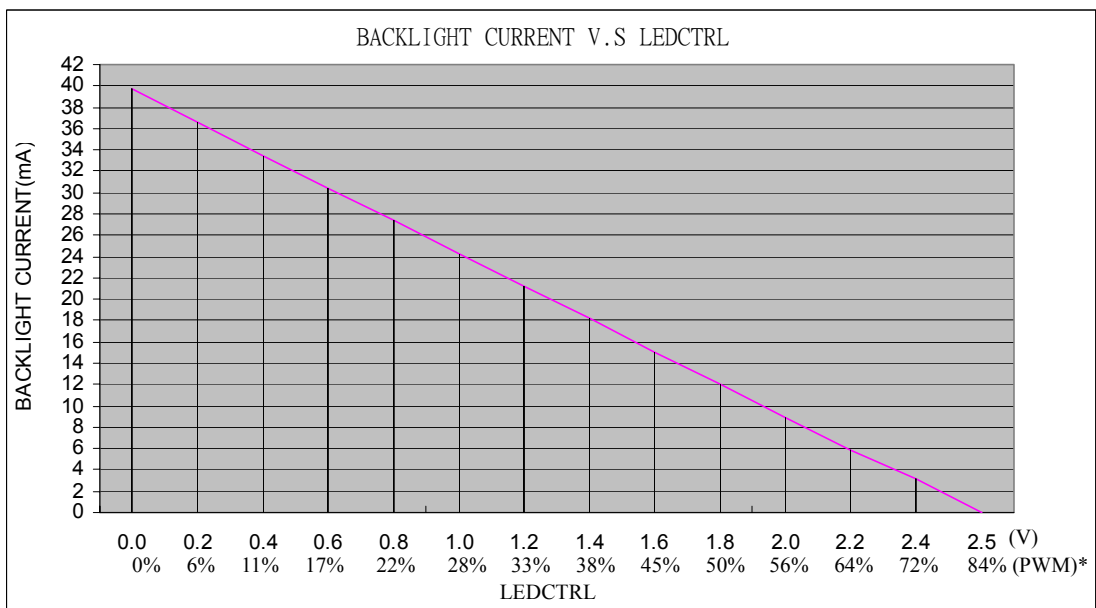| PIN NO.	SYMBOL	FUNCTION
30	VSS	GROUND
31	VDD	POWER SUPPLY FOR DIGITAL CIRCUIT
32	VCC	POWER SUPPLY FOR VCOM DRIVER CIRCUIT
33	VCC	POWER SUPPLY FOR VCOM DRIVER CIRCUIT

02101300-01-02

1 1 ．POWER SUPPLY

1 1 .1 POWER SUPPLY FOR LCM

TFT   LCD

VDD

VSS

3.3V

VCOM
CIRCUIT

VCC1, VCC

VSS

3.3V

LEDCTRL*

0~2.5V OR

1KHz
3.3V
0V

PWCTRL

ON OFF

TOUCH PANEL

LED
BLACKLIGHT

VLED

VLSS

3.3V~12V
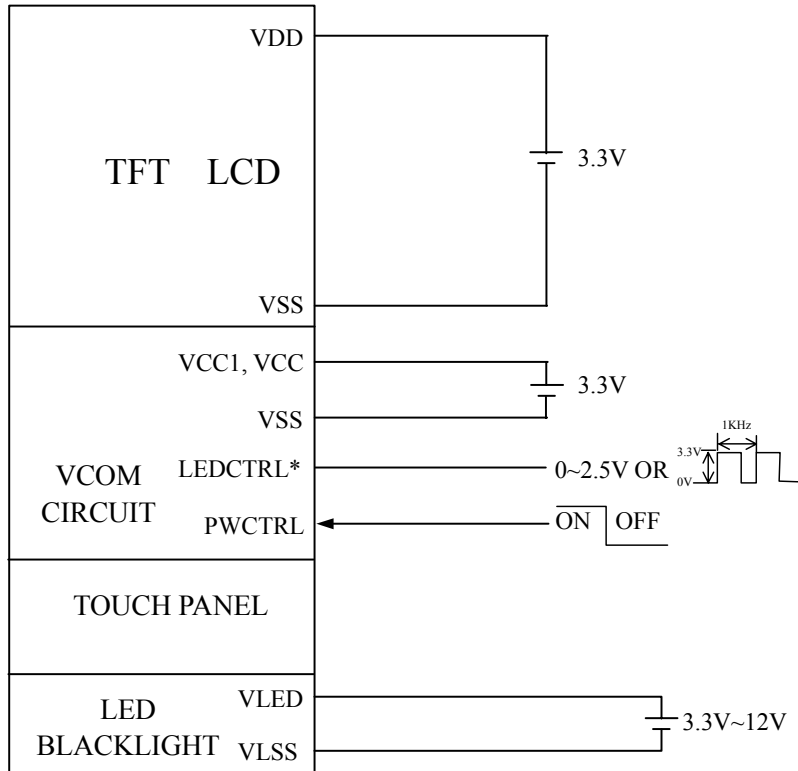
NOTE：(1) DV VOLTAGE ABSOLUTE MAXIMUM RATINGS FOR LEDCTRL：MIN=0V,MAX=5.5V

(2) THE LEDCTRL CAN ALTERNATIVELY BE USED WITH A PWM,MINIMUM1KHz FREQUENCY.

11.2 THE BRIGHTNESS CONTROLLED BY BACKLIGHT CURRENT OF LEDCTRL

BACKLIGHT CURRENT V.S LEDCTRL

BACKLIGHT CURRENT(mA)

| 0.0 | 0.2 | 0.4 | 0.6 | 0.8 | 1.0 | 1.2 | 1.4 | 1.6 | 1.8 | 2.0 | 2.2 | 2.4 | 2.5 (V) |
| 0% | 6% | 11% | 17% | 22% | 28% | 33% | 38% | 45% | 50% | 56% | 64% | 72% | 84% (PWM)* |

LEDCTRL

*PWM IS BASED ON A 0~3.3V PWM SIGNAL RUNNING AT 1KHz

02101300-01-02

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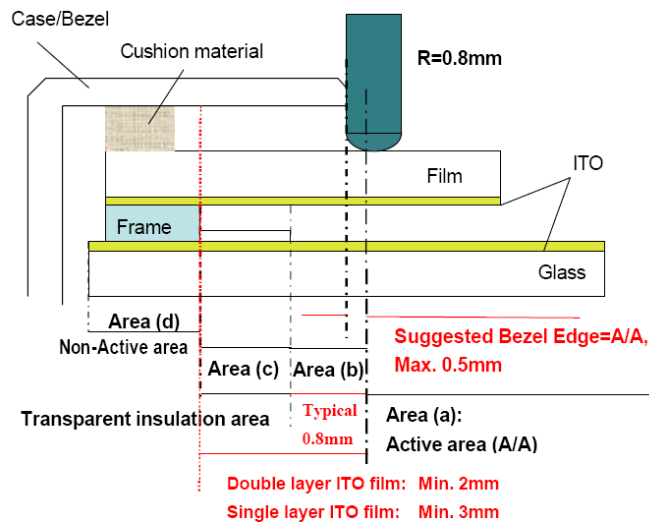
THE ABOVE FIGURE IS OUR DESIGN RULE OF TOUCH PANEL. IF IT CANNOT MEET YOUR REQUIREMENT, PLEASE CONTACT WITH OUR ENGINEERS FOR FURTHER DISCUSSION.

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.

02101300-01-02

(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.
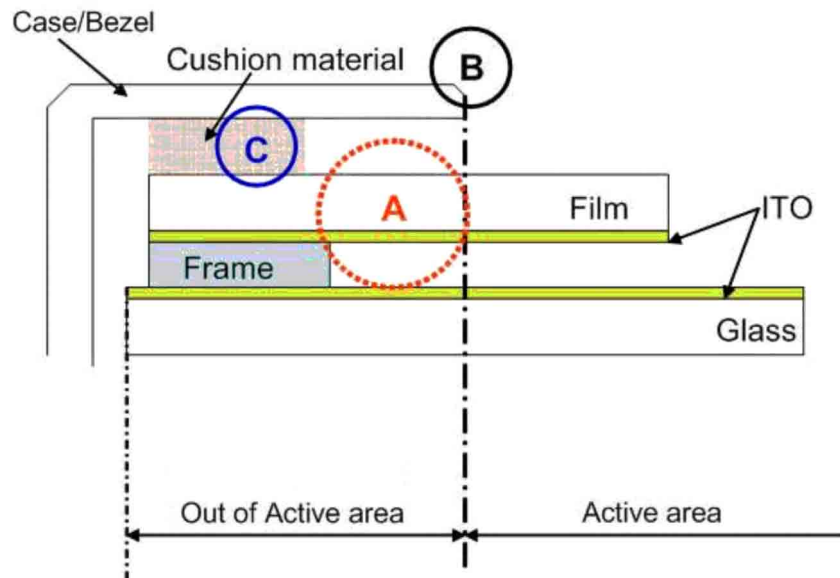
(vi) TO PREVENT GIVING DISTORTION TO THE FILM OF THE PRODUCT AND PEELING OFF OF THE FILM FROM THE PRODUCT, DO NOT FIX THE FILM AND A SET CASE OR A SHOCK ABSORBING MATERIAL ADHERED TO A SET CASE BY ADHESION.

(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 WHO'S TIP IS HARD FOR INPUT, OTHERWISE MALFUNCTIONS MAY RESULT.

02101300-01-02

(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 THI NG 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.
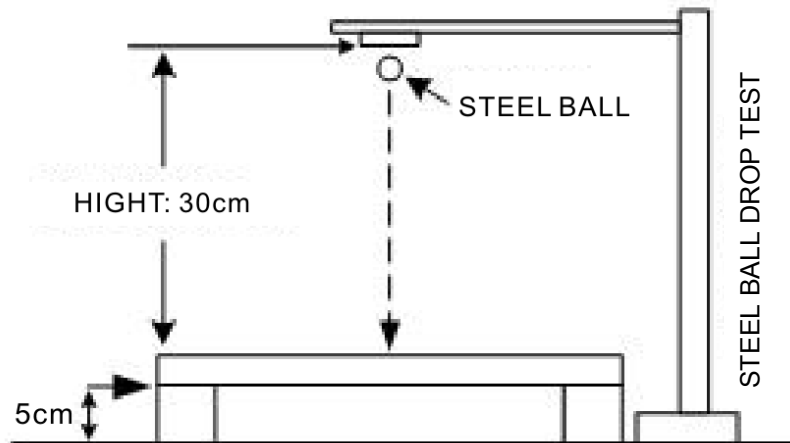
12.5   APPEARANCE INSPECTION
PURPOSE：
TO ESTABLISH APPEARANCE STANDARD AND MAINTAIN PRODUCT
QUALITY。
SCOPE：
TOUCH PANEL VIEW AREA WITHIN TOUCH PANEL。

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°。
(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.

02101300-01-02

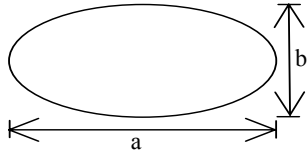| INSPECTION ITEMS	SEPC.		JUDGE CRITERION	OPERATION GUIDELINE
SCRATCH	W ≤ 0.05mm & L≤10mm		ACCEPTABLE	
	W > 0.05mm or L > 10mm		NOT ACCEPTABLE	
LINEAR FOREIGN OBJECT	W ≤ 0.05mm & L ≤5mm		ACCEPTABLE	
	W > 0.05mm or L >5mm		NOT ACCEPTABLE	
GRANULAR FOREIGN OBJECT	D ≤ 0.25mm		ACCEPTABLE	
	0.25mm < D ≤0.30mm		MAX. 2 EA	
	D >0.30mm		NOT ACCEPTABLE	
PET BUBBLES	D ≤0.5mm		ACCEPTABLE	
	D >0.5mm		NOT ACCEPTABLE	
CHIP ON GLASS	CORNER	X ≤ 6mm 、 Y ≤ 3mm、Z < t (t = /thickness)	ACCEPTABLE	Chip of glass
	EDGE	W ≤ 3mm、 Y ≤ 3mm、Z < t		

02101300-01-02

1 3 . 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)
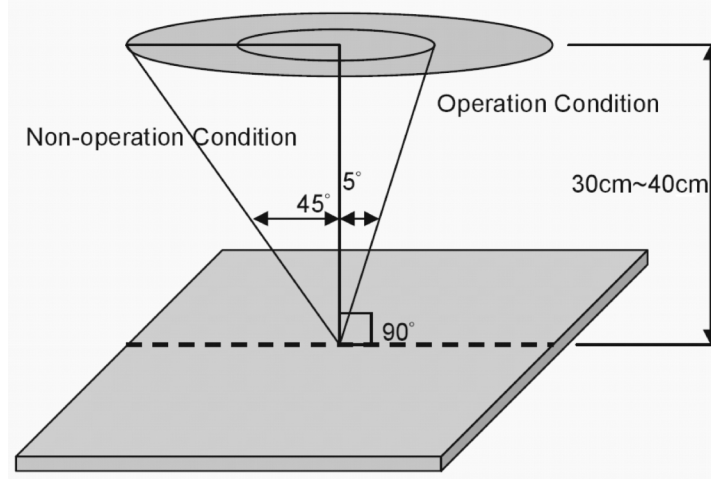
        13.2.2 Environment Conditions :

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
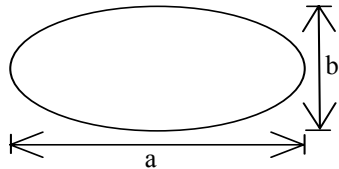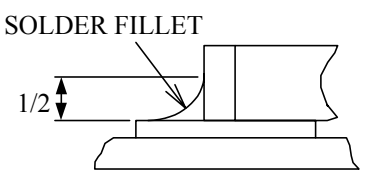
02101300-01-02

13.3 INSPECTION STANDARDS
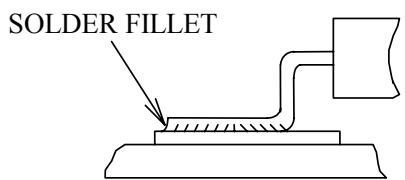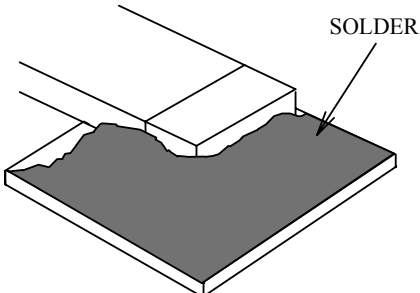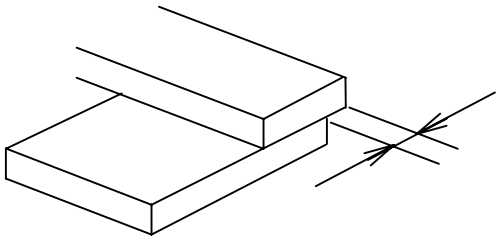
13.3.1 VISUAL DEFECTS CLASSIFICATION
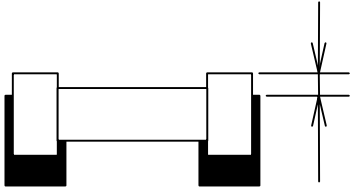
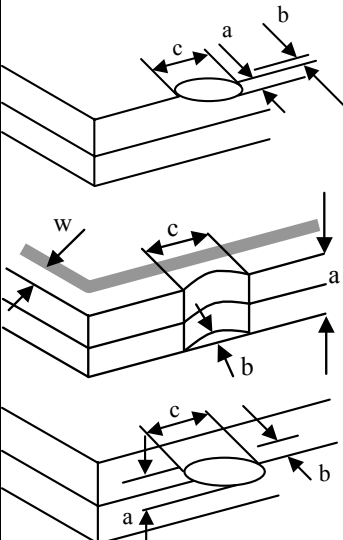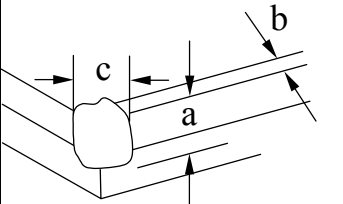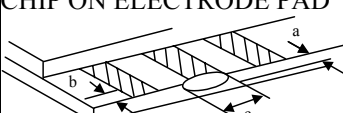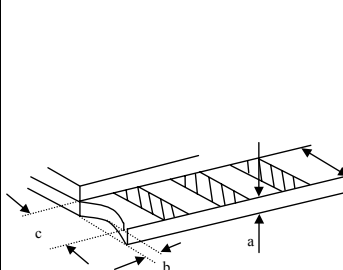| TYPE OF DEFECT	INSPECTION ITEM	DEFECT FEATURE	AQL
MAJOR DEFECT	1.DISPLAY ON	• DEFECT TO MISS SPECIFIED DISPLAY FUNCTION, FOR ALL AND SPECIFIED DOTS EX: DISCONNECTION, SHORT CIRCUIT ETC	0.65
	2.BACKLIGHT	• NO LIGHT • FLICKERING AND OTHER ABNORMAL ILLUMINATION	
	3.DIMENSIONS	• SUBJECT TO INDIVIDUAL ACCEPTANCE SPECIFICATIONS	
MINOR DEFECT	1.DISPLAY ZONE	• BLACK/WHITE SPOT • BUBBLES ON POLARIZER • NEWTON RING • BLACK/WHITE LINE • SCRATCH • CONTAMINATION • LEVER COLOR SPREED	1.0
	2.BEZEL ZONE	• STAINS • SCRATCHES • FOREIGN MATTER	
	3.SOLDERING	• INSUFFICIENT SOLDER • SOLDERED IN INCORRECT POSITION • CONVEX SOLDERING SPOT • SOLDER BALLS • SOLDER SCRAPS	
	4.DISPLAY ON (ALL ON)	• LIGHT LINE	

02101300-01-02

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) ITEMS / ACCEPTABLE COUNT table below NOTE： 1. THE DEFINITION OF DOT： THE SIZE OF A DEFECTIVE DOT OVER 1/2 OF WHOLE DOT IS REGARDED AS ONE DEFECTIVE DOT. 2. BRIGHT DOT： DOTS APPEAR BRIGHT AND UNCHANGED IN SIZE IN WHICH LCD PANEL IS DISPLAYING UNDER BLACK PATTERN. 3. DARK DOT： DOTS APPEAR DARK AND UNCHANGED IN SIZE IN WHICH LCD PANEL IS DISPLAYING UNDER PURE RED, GREEN, BLUE PICTURE.		

ITEMS	ACCEPTABLE COUNT
BRIGHT DOT	$N \leq 2$
DARK DOT	$N \leq 3$
TOAL BRIGHT AND DARK DOTS	$N \leq 4$

NO.	ITEM	CRITERIA
4.	FOREIGN BLACK/WHITE/ BRIGHT LINE/ SCRATCH OF VIEWING AREA	(table below)

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

WIDTH：W mm, LENGH：L mm

NO.	ITEM	CRITERIA
5.	FOREIGN MATTER \ BLACK SPOTS \ WHITE SPOTS \ DENT (INCLUDING LIGHT LEAKAGE DUE TO POLARIZING PLATES PINHOLES, ETC.)	(table and figure below)

AVERAGE DIAMETER (mm): D	NUMBER OF PIECES PERMITTED
$D \leq 0.15$	IGNORE
$0.15 < D \leq 0.5$	4
$0.5 < D$	NONE

NOTE ：DIAMETER D=(a+b)/2

02101300-01-02

NO.	ITEM	CRITERIA		
6.	BUBBLES OF POLARIZER /DIRT/CF FAIL /SURFACE STAINS		AVERAGE DIAMETER (mm) : D	NUMBER OF PIECES PERMITTED
		BUBBLE ON THE POLARIZER	D ≤ 0.25	IGNORE
			0.25 < D ≤ 0.6	N ≤ 5
			0.6 < D	NOTE
		SURFACE STATUS	D < 0.1 mm	IGNORE
			0.1 < D ≤ 0.3mm	N ≤ 3
		CF FAIL / SPOT	D < 0.1 mm	IGNORE
			0.1 < D ≤ 0.3mm	N ≤ 3

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.
(2)THE EXTRANEOUS SUBSTANCE IS DEFINED AS IT CAN BE OBSERVED WHEN THE MODULE IS POWER ON.
(3)THE DEFINITION OF AVERAGE DIAMETER, D IS DEFINED AS FOLLOWING.
AVERAGE DIAMETER (D)=(a+b)/2

NO.	ITEM	CRITERIA
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 THROUNG 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	(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. (2)NO OXIDATION OR CONTAMINATION PCB TERMINALS. (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. (4)THE JUMPER ON THE PCB SHOULD CONFORM TO THE PRODUCT CHARACTERISTIC CHART. (5)IF SOLDER GETS ON BEZEL TAB PADS, LED PAD, ZEBRA PAD OR SCREW HOLD PAD; MAKE SURE IT IS SMOOTHED DOWN.

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

02101300-01-02

NO.	ITEM	CRITERIA
12.	SOLDERING	(b)CHIP COMPONENT 　COMPONENT IS OFF CENTER, AND MORE THAN 50% OF THE LEADS IS OFF THE PAD OUTLINE (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.
13.	BACKLIGHT	(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.
14.	GENERAL APPEARANCE	(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.

02101300-01-02

NO.	ITEM	CRITERIA

THE LCD WITH EXTENSIVE CRACK IS NOT ACCEPTABLE

GENERAL GLASS CHIP：

a	b	c
≤ t/2	< VIEWING AREA	≤ 1/8X
t/2 > , ≤ 2t	≤ W/2	≤ 1/8X

*W=DISTANCE BETWEEN
　SEALANT AREA AND LCD
　PANEL EDGE
 X = LCD SIDE LENGTH
 t = GLASS THICKNESS

CORNER PART：

a	b	c
≤ t/2	< VIEWING AREA	≤ 1/8X
> t/2　, ≤ 2t	≤ W/2	≤ 1/8X

*W=DISTANCE BETWEEN
　SEALANT AREA AND LCD
　PANEL EDGE
 X = LCD SIDE LENGTH
 t = GLASS THICKNESS

CHIP ON ELECTRODE PAD

a	b	c
≤ t	≤ 0.5mm	≤ 1/8X

* X=LCD SIDE WIDTH
 t =GLASS THICKNESS

a	b	c
≤ t	≤ 1/8X	≤ L

*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 DEMAGED

15. CRACKED GLASS

02101300-01-02

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 +70°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 +80°c for 240 hrs
4	Low temperature storage	The sample should be allowed to stand at -30°C for 240 hrs
5	High temp / humidity test storage	The sample should be allowed to stand at 60°C , 90% RH 240 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.

02101300-01-02

E M E R G I N G   D I S P L A Y
TECHNOLOGIES CORPORATION

MODEL NO .
E T V 5 7 0 G 6 D H U

VERSION
3

PAGE
33

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 13.5 , 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

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!

02101300-01-02
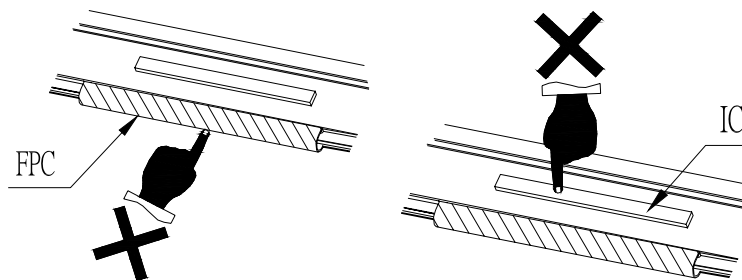
13.7 NOTICE

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.

02101300-01-02