EXAMINED BY : Lucica Lu	EMERGING DISPLAY TECHNOLOGIES CORPORATION	FILE NO . CAS-0008203
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APPROVED BY: Vincent Wu		TOTAL PAGE : 30
		VERSION : 3

CUSTOMER ACCEPTANCE SPECIFICATIONS

MODEL NO. :

ETM0700G0EDH6

(RoHS)

FOR MESSRS :

_____

CUSTOMER'S APPROVAL

DATE :

_____

BY :

_____

RECORDS OF REVISION

DOC . FIRST ISSUE

DEC.16, 2015

DATE	REVISED PAGE NO.	SUMMARY
JAN.18, 2016	14	10.1 IF1 : PIN 26~28：ADD DE MODE：HSYNC, VSYNC CONNECTED TO VDD. SYNC MODE：ENB CONNECTED TO GROUND.
APR.06, 2016	7	5.4 CAPACITIVE TOUCH PANEL I2C INTERFACE TIMING CHARACTERISTICS SCL FREQUENCY：MIN.=0→ —
	9	6.1 OPTICAL CHARACTERISTICS

ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	REMARK
VIEWING ANGLE		θ_{x+}	CR ≥ 10	θ_x=0°	(70)	(80)	—	deg.	NOTE (2) NOTE (3)
		θ_{x-}			(70)	(80)	—		
		θ_{y+}		θ_y=0°	(70)	(80)	—		
		θ_{y-}			(70)	(80)	—		
CONTRAST RATIO		CR	θx=0° , θy=0°		(300)	(350)	—	—	NOTE (3)
COLOR OF CIE COORDINATE	WHITE	Wx	θx=0° , θy=0° IF = 160 mA NTSC : 72 %		(0.25)	(0.30)	(0.35)	—	NOTE (5)
		Wy			(0.29)	(0.34)	(0.39)		
	RED	Rx			(0.59)	(0.64)	(0.69)	—	
		Ry			(0.30)	(0.35)	(0.40)		
	GREEN	Gx			(0.27)	(0.32)	(0.37)	—	
		Gy			(0.60)	(0.65)	(0.70)		
	BLUE	Bx			(0.11)	(0.16)	(0.21)	—	
		By			(0.02)	(0.07)	(0.12)		
THE BRIGHTNESS OF MODULE		B	θx=0° , θy=0° IF = 160mA		(308)	(352)	—	cd/m^2	NOTE (6)

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ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	REMARK
VIEWING ANGLE		θ_{x+}	CR ≥ 10	θ_x=0°	65	70	—	deg.	NOTE (2) NOTE (3)
		θ_{x-}			70	75	—		
		θ_{y+}		θ_y=0°	70	75	—		
		θ_{y-}			70	75	—		
CONTRAST RATIO		CR	θx=0° , θy=0°		675	900	—	—	NOTE (3)
COLOR OF CIE COORDINATE	WHITE	Wx	θx=0° , θy=0° IF = 160 mA NTSC : 72 %		0.255	0.305	.0355	—	NOTE (5)
		Wy			0.275	0.325	0.375		
	RED	Rx			0.585	0.635	0.685	—	
		Ry			0.295	0.345	0.395		
	GREEN	Gx			0.265	0.315	0.365	—	
		Gy			0.595	0.645	0.695		
	BLUE	Bx			0.115	0.165	0.215	—	
		By			0.020	0.070	0.120		
THE BRIGHTNESS OF MODULE		B	θx=0° , θy=0° IF = 160mA		308	352	—	cd/m^2	NOTE (6)

14	10.1 IF1		
PIN NO.	SYMBOL	I/O/P	FUNCTION
25	/WAKE	I	EXTERNAL INTERRUPT FROM THE HOST TOUCH PANEL

↓

PIN NO.	SYMBOL	I/O/P	FUNCTION
25	NC	—	NON CONNECTION

TABLE OF CONTENTS

1. GENERAL SPECIFICATIONS

1.1 DATA SHEETS FOR LCD MODULE CONTROLLER/DRIVER

PLEASE REFER TO :

HIMAX HX8262-A
HIMAX HX8678-A

1.2 DATA SHEET FOR CAPACITIVE TOUCH PANEL CONTROLLER/DRIVER

PLEASE REFER TO：

HYCON HY4614

1.3 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

2.1 LCD MODULE MECHANICAL SPECIFICATIONS

(1)	DIAGONALS	7 inch
(2)	NUMBER OF DOTS	800W * (RGB) * 480H DOTS
(3)	MODULE SIZE	166W * 105.44H *11.6D (MAX.) mm (WITHOUT FPC & LED BL'S CABLE)
(4)	EFFECTIVE AREA	154.4W * 93.44H mm
(5)	ACTIVE AREA	152.4W * 91.44H mm
(6)	DOT SIZE	0.0635W * 0.1905H mm
(7)	PIXEL SIZE	0.1905W * 0.1905H mm
(8)	LCD TYPE	TFT , TRANSMISSIVE , ANTI-GLARE
(9)	COLOR	262K
(10)	VIEWING DIRECTION	6 O'CLOCK (GRAY LEVEL INVERSION)
(11)	BACK LIGHT	LED , COLOR : WHITE
(12)	INTERFACE MODE	RGB 18BIT PARALLEL (DE/SYNC MODE)

2.2 CAPACITIVE TOUCH PANEL MECHANICAL SPECIFICATIONS

(1)	TOUCH PANEL SIZE	7.0 inch
(2)	OUTER DIMENSION	164W * 104H * 1.4D mm (WITHOUT FPC)
(3)	EFFECTIVE AREA	155W * 94.045H mm
(4)	ACTIVE AREA	154W * 93.05H mm
(5)	INPUT TYPE	MULTI TOUCH
(6)	NUMBER OF TOUCH SENSOR	28 * 16 SENSORS
(7)	RESOLUTION	1792 * 1024
(8)	INTERFACE MODE	I2C

3. ABSOLUTE MAXIMUM RATINGS

3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
POWER SUPPLY VOLTAGE	VDD-VSS	-0.3	3.6	V	
INPUT VOLTAGE	VIN-VSS	-0.3	VDD+0.3	V	
STATIC ELECTRICITY	—	—	—	V	NOTE (1)
LED BACKLIGHT POWER DISSIPATION	PD	—	2592	mW	
LED BACKLIGHT FORWARD CURRENT	IF	—	240	mA	

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

3.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	-20°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)	5~20Hz , 1HR 20~500Hz(20Hz) , 1HR 20~500Hz(500Hz) , 1HR X,Y,Z TOTAL 3HRS
SHOCK	—	29.4 m/s^2 (3 G)	—	490.0 m/s^2 (50 G)	10ms XYZ DIRECTIONS 1 TIME EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE (1) : Ta AT -30°C : WILL BE 48HRS MAX .
80°C : WILL BE 168HRS MAX .

NOTE (2) : BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT TEMPERATURE THIS PHENOMENON IS REVERSIBLE.

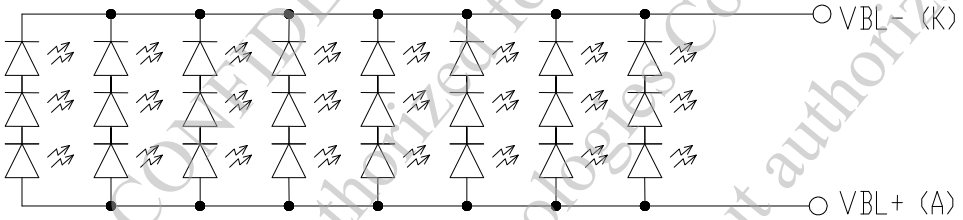
NOTE (3) : Ta ≤ 60°C : 90%RH MAX (96HRS MAX).
Ta > 60°C : ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF 90%RH AT 60°C(96HRS MAX).

4. ELECTRICAL CHARACTERISTICS

Ta = 25 °C

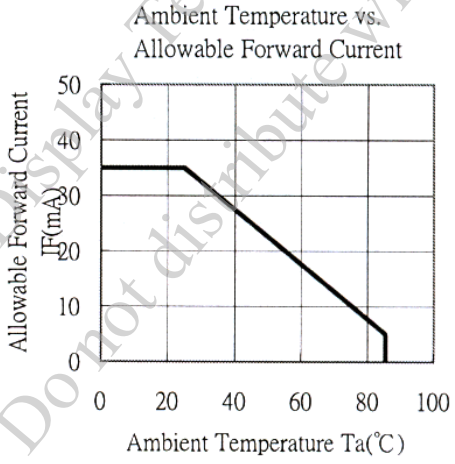
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
POWER SUPPLY VOLTAGE	VDD-VSS	—	3.2	3.3	3.6	V	
POWER SUPPLY VOLTAGE FOR LED DRIVER	VCC-VSS	—	3.0	3.3	3.6	V	
HIGH LEVEL INPUT VOLTAGE	VIH	—	0.7*VDD	—	VDD	V	NOTE (1)
LOW LEVEL INPUT VOLTAGE	VIL	—	0	—	0.3*VDD	V	NOTE (1)
POWER SUPPLY CURRENT	IDD	VDD-VSS=3.3V	—	240	300	mA	NOTE (2)
POWER SUPPLY CURRENT FOR LED DRIVER	ICC	VCC-VSS=3.3V LED B/L=ON	—	600	780	mA	
POWER SUPPLY FOR LED BACKLIGHT	V_{BL+}-V_{BL-}	IF=160mA	8.4	9.9	10.8	V	NOTE (3)
LED LIFE TIME	—	—	30K	40K		HRS	

NOTE (1) : APPLIED TO TERMINALS B5~B0 , G5~G0 , R5~R0 , DCLK , HSYNC ,VSYNC , ENB.
NOTE (2) : THE DISPLAY PATTERN IS ALL "WHITE"..
NOTE (3) : INTERNAL CIRCUIT DIAGRAM OF BACKLIGHT



24 LED CHIPS

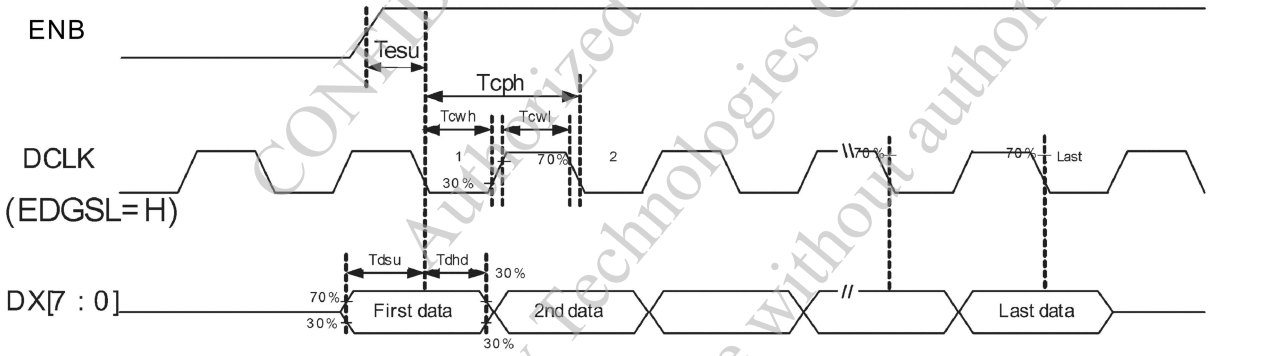
NOTE (4) : AMBIENT TEMP. VS. ALLOWABLE FORWARD CURRENT. (PER. LED)

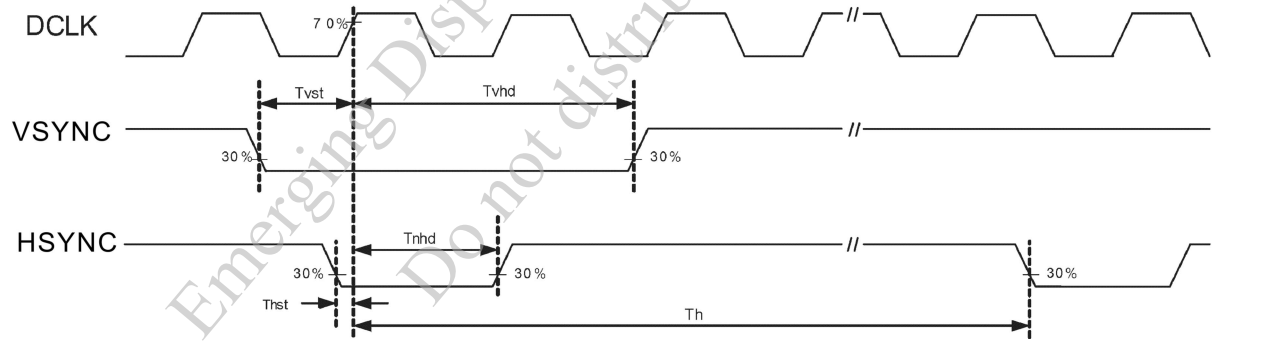


5. TIMING CHARACTERISTICS

5.1 LCD MODULE AC ELECTRICAL CHARACTERISTICS

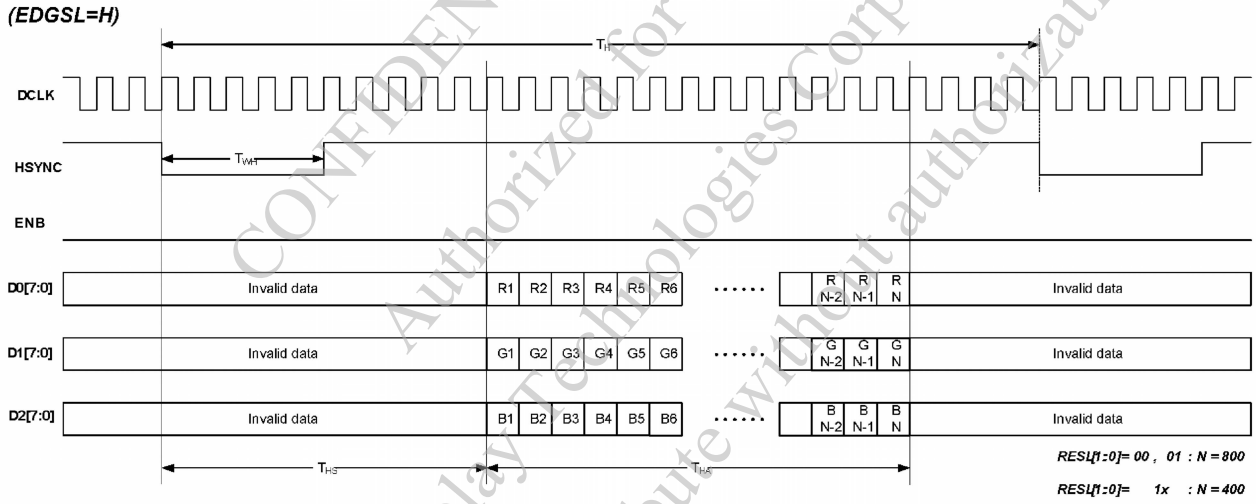
ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
HSYNC SETUP TIME	Thst	6	—	—	ns
HSYNC HOLD TIME	Thhd	6	—	—	ns
VSYNC SETUP TIME	Tvst	6	—	—	ns
VSYNC HOLD TIME	Tvhd	6	—	—	ns
DATA SETUP TIME	Tdsu	6	—	—	ns
DATA HOLD TIME	Tdhd	6	—	—	ns
ENB SETUP TIME	Tesu	6	—	—	ns
SOURCE OUTPUT SETTLING TIME	T_{ST}	—	—	15	µs
SOURCE OUTPUT LOADING R	R_{SL}	—	2	—	K ohm
SOURCE OUTPUT LOADING C	C_{SL}	—	60	—	pF



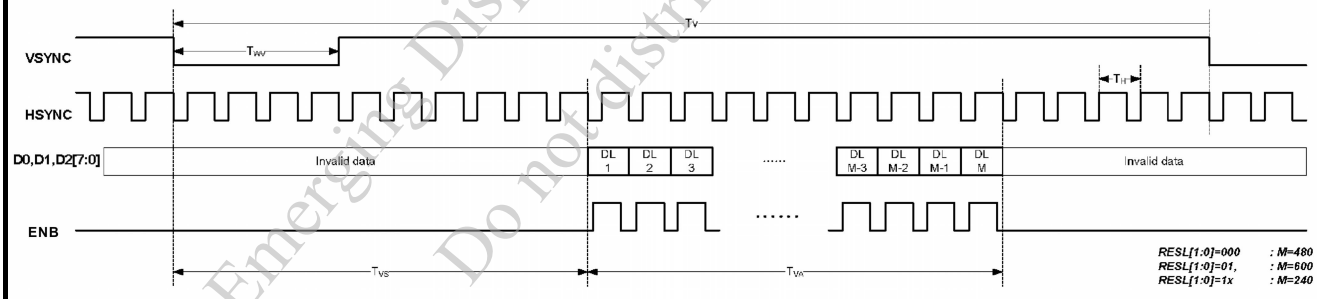


5.2 LCD MODULE SYNC MODE SIGNAL CHARACTERISTICS

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
DCLK FREQUENCY	F_{CPH}	—	33.26	—	MHz
DCLK PERIOD	T_{CPH}	—	30.06	—	ns
DCLK PULSE DUTY	T_{CWH}	40	50	60	%
HSYNC PERIOD	T_H	930	1056	1057	T_{CPH}
HSYNC PULSE WIDTH	T_{WH}	1	128	—	T_{CPH}
HSYNC -FIRST HORIZONTAL DATA TIME	T_{HS}	—	216	—	T_{CPH}
HSYNC ACTIVE TIME	T_{HA}	—	800	—	T_{CPH}
VSYNC PERIOD	T_V	—	525	—	T_H
VSYNC PULSE WIDTH	T_{WV}	1	2	—	T_H
VSYNC -DE TIME	T_{VS}	—	35	—	T_H
VSYNC ACTIVE TIME	T_{VA}	—	480	—	T_H



SYNC Mode Horizontal Data Format

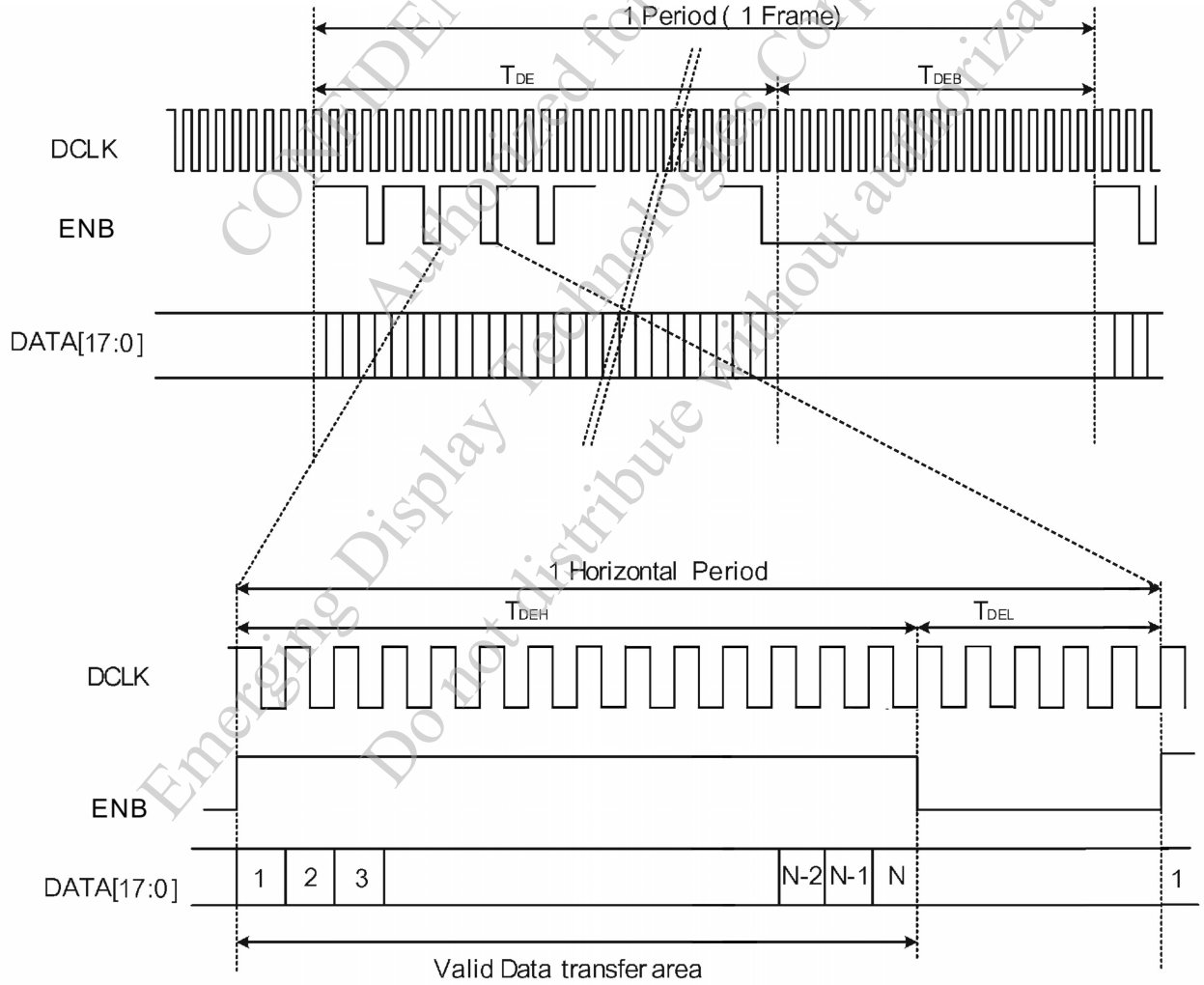


SYNC Mode Vertical Data Format

5.3 LCD MODULE DE MODE SIGNAL CHARACTERISTICS

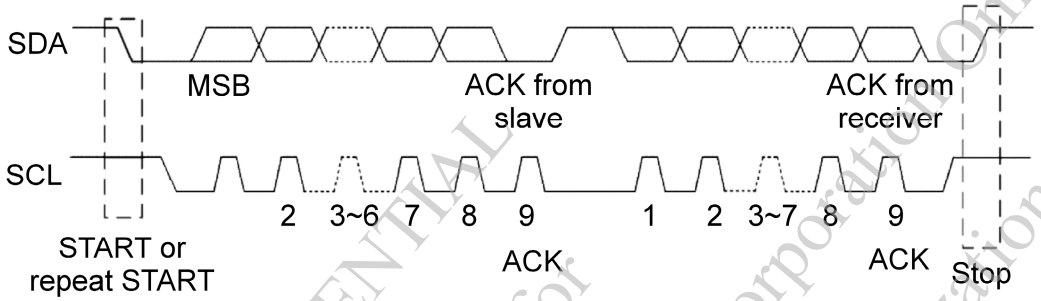
ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
DCLK FREQUENCY	F_{CPH}	—	33.26	—	MHz
DCLK PERIOD	T_{CPH}	—	30.06	—	ns
DCLK PULSE DUTY	T_{CWH}	40	50	60	%
ENB PERIOD	$T_{DEH}+T_{DEL}$	1000	1056	1200	T_{CPH}
ENB PULSE WIDTH	T_{DEH}	—	800	—	T_{CPH}
ENB FRAME BLANKING	T_{DEB}	10	45	110	$T_{DEH}+T_{DEL}$
ENB FRAME WIDTH	T_{DE}	—	480	—	$T_{DEH}+T_{DEL}$
OEV PULSE WIDTH	T_{OEV}	—	150	—	T_{CPH}
CKV PULSE WIDTH	T_{CKV}	—	133	—	T_{CPH}
ENB(INTERNAL)-STV TIME	T_1	—	4	—	T_{CPH}
ENB(INTERNAL)-CKV TIME	T_2	—	40	—	T_{CPH}
ENB(INTERNAL)-OEV TIME	T_3	—	23	—	T_{CPH}
ENB(INTERNAL)-POL TIME	T_4	—	157	—	T_{CPH}
STV PULSE WIDTH	—	—	1	—	T_H

NOTE (1) : $T_{HS}+T_{HA}<T_H$



5.4 CAPACITIVE TOUCH PANEL I2C INTERFACE TIMING CHARACTERISTICS

ITEM	MIN.	TYP.	MAX.	UNIT
SCL FREQUENCY	—	—	400	KHz
BUS FREE TIME BETWEEN A STOP AND START CONDITION	1.3	—	—	us
HOLD TIME (REPEATED) START CONDITION	0.6	—	—	us
DATA SETUP TIME	100	—	—	ns
SETUP TIME FOR A REPEATED START CONDITION	0.6	—	—	us
SETUP TIME FOR STOP CONDITION	0.6	—	—	us

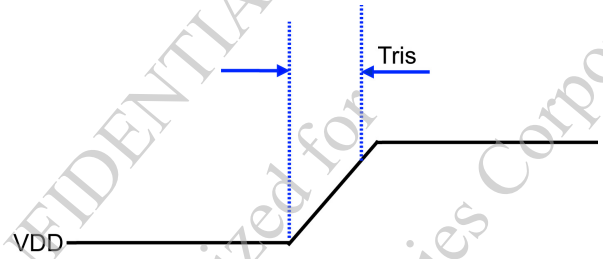


I2C SERIAL DATA TRANSFER FORMAT

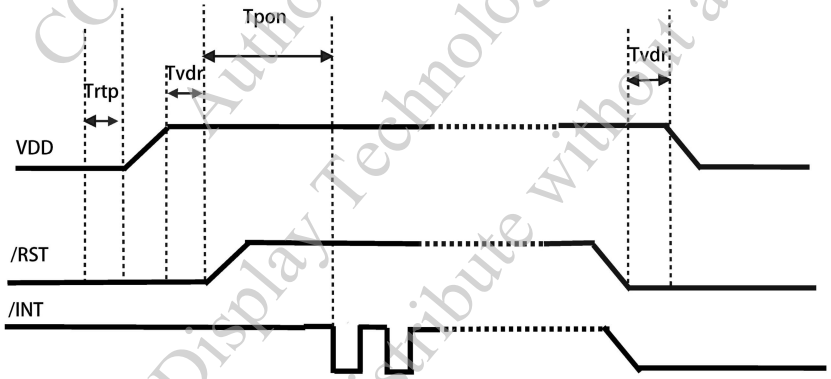
5.5 CAPACITIVE TOUCH PANEL POWER SEQUENCE

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
RISE TIME FROM 0.1VDD TO 0.9VDD	Tris	—	—	5	ms
TIME OF RESETTING TO BE LOW BEFORE POWERING ON	Trtp	100	—	—	us
TIME OF STARTING TO REPORT POINT AFTER POWERING ON	Tpon	200	—	—	ms
RESET TIME AFTER VDD POWERING ON	Tvdr	1	—	—	ms
TIME OF STARTING TO REPORT POINT AFTER RESETTING	Trsi	200	—	—	ms
RESET TIME	Trst	2	—	—	ms

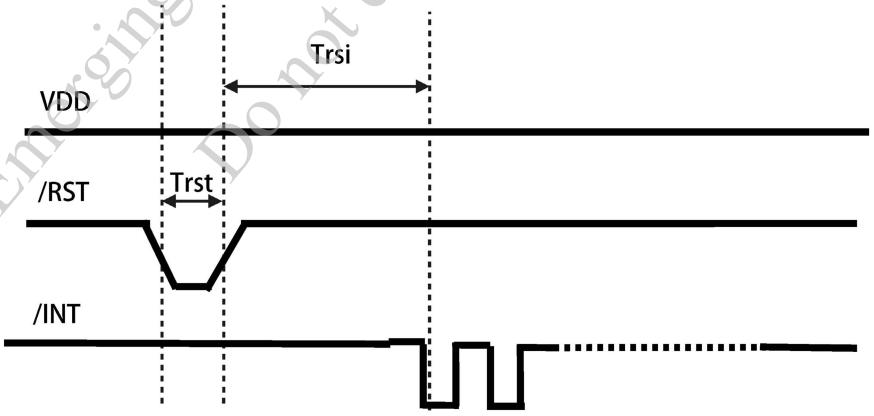
POWER RISE TIMING



POWER ON / OFF TIMING



RESET SEQUENCE



6. OPTICAL CHARACTERISTICS (NOTE 1)

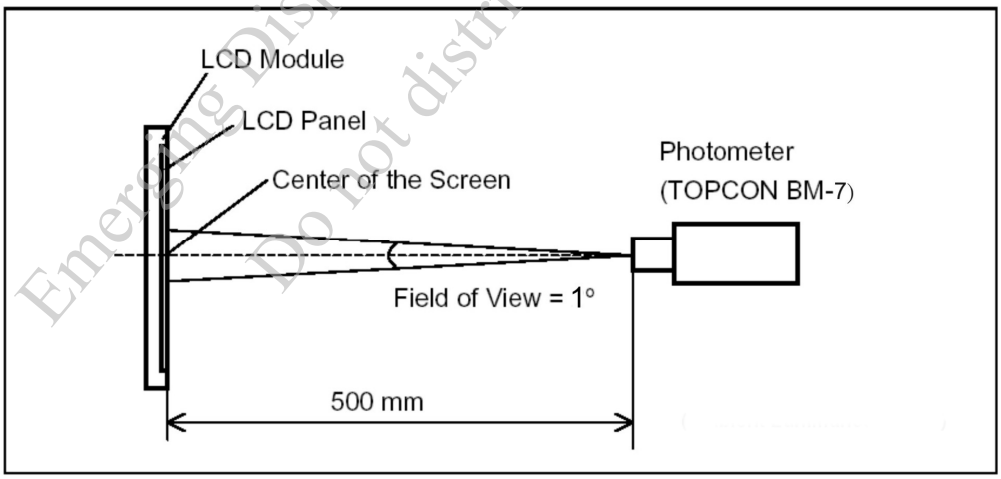
6.1 OPTICAL CHARACTERISTICS

Ta = 25 ± 2 °C

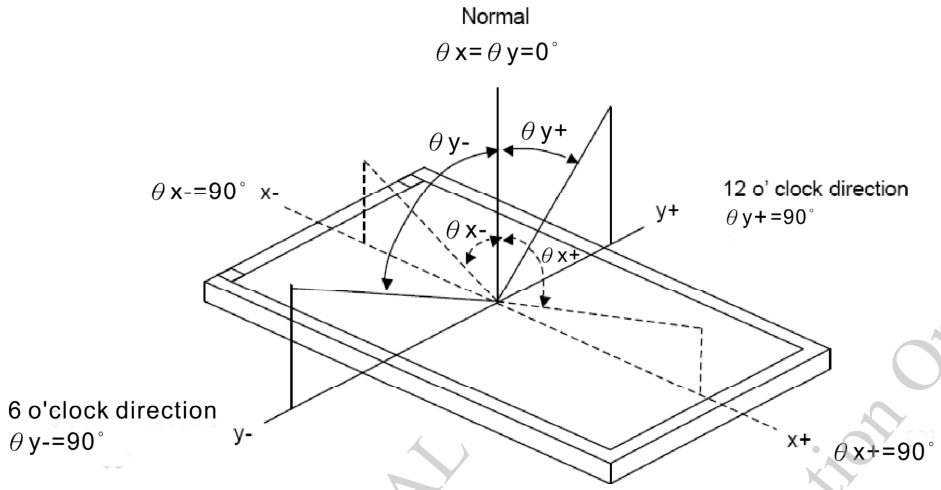
ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	REMARK
VIEWING ANGLE		θ_{y+}	CR ≥ 10	θ_x=0°	65	70	—	deg.	NOTE (2) NOTE (3)
		θ_{y-}			70	75	—		
		θ_{x+}		θ_y=0°	70	75	—		
		θ_{x-}			70	75	—		
CONTRAST RATIO		CR	θx=0° , θy=0°		675	900	—	—	NOTE (3)
RESPONSE TIME		T_R (rise)	θx=0° , θy=0°		—	5	10	msec	NOTE (4)
		T_F (fall)			—	15	20		
COLOR OF CIE COORDINATE	WHITE	Wx	θx=0° , θy=0° IF = 160 mA NTSC : 72 %		0.255	0.305	.0355	—	NOTE (5)
		Wy			0.275	0.325	0.375		
	RED	Rx			0.585	0.635	0.685	—	
		Ry			0.295	0.345	0.395		
	GREEN	Gx			0.265	0.315	0.365	—	
		Gy			0.595	0.645	0.695		
	BLUE	Bx			0.115	0.165	0.215	—	
		By			0.020	0.070	0.120		
THE BRIGHTNESS OF MODULE		B	θx=0° , θy=0° IF = 160mA		308	352	—	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.



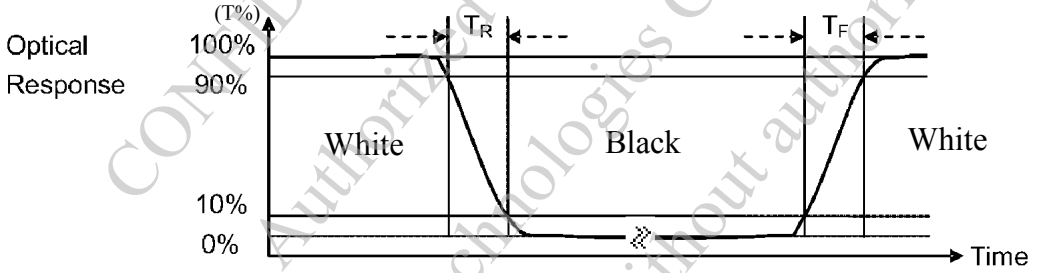
NOTE (2) : DEFINITION OF VIEWING ANGLE :



NOTE (3) : DEFINITION OF CONTRAST RATIO :

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

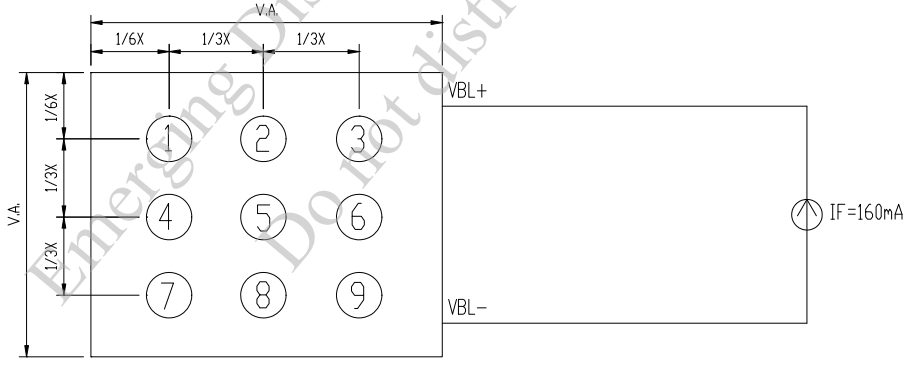
NOTE (4) : DEFINITION OF RESPONSE TIME : T_R AND T_F
THE FIGURE BELOW IS THE OUTPUT SIGNAL OF THE PHOTO DETECTOR.



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

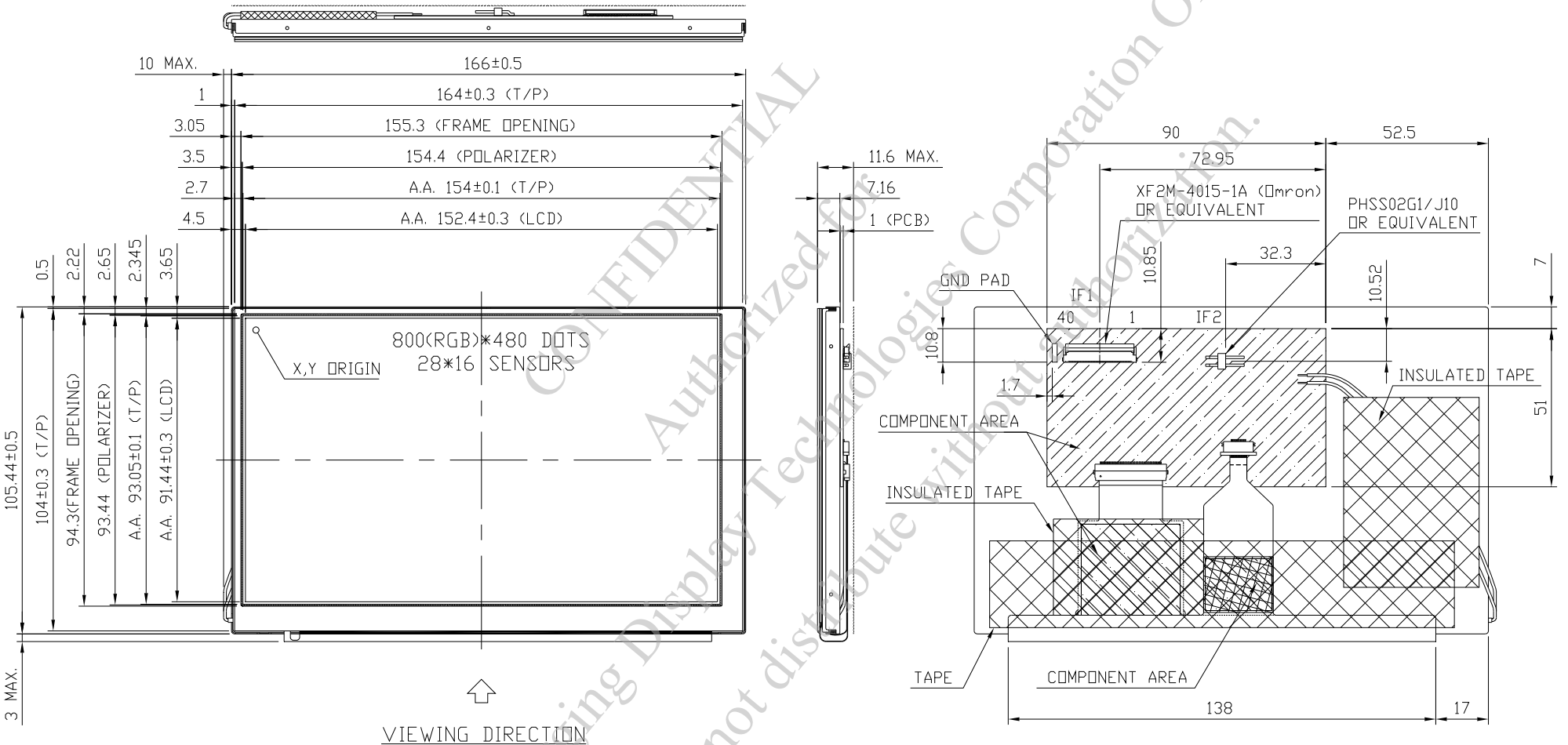


UNIT：mm

6.3 THE CALCULATING METHOD OF UNIFORMITY

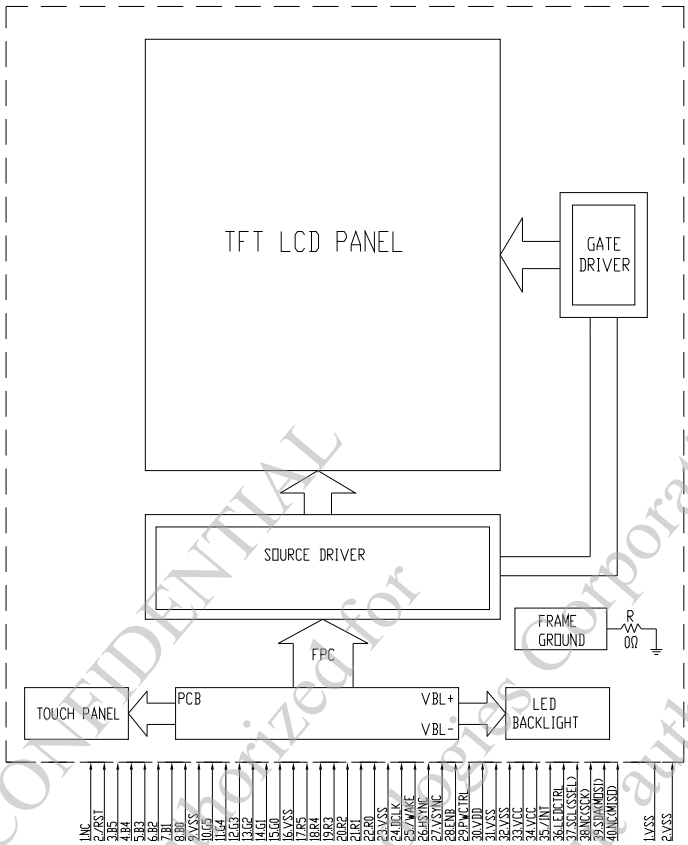
$$\text{UNIFORMITY}: \left[1 - \frac{\text{MAXIMUM BRIGHTNESS - MINIMUM BRIGHTNESS}}{\text{AVERAGE BRIGHTNESS}}\right] \times 100\%$$

7. OUTLINE DIMENSIONS

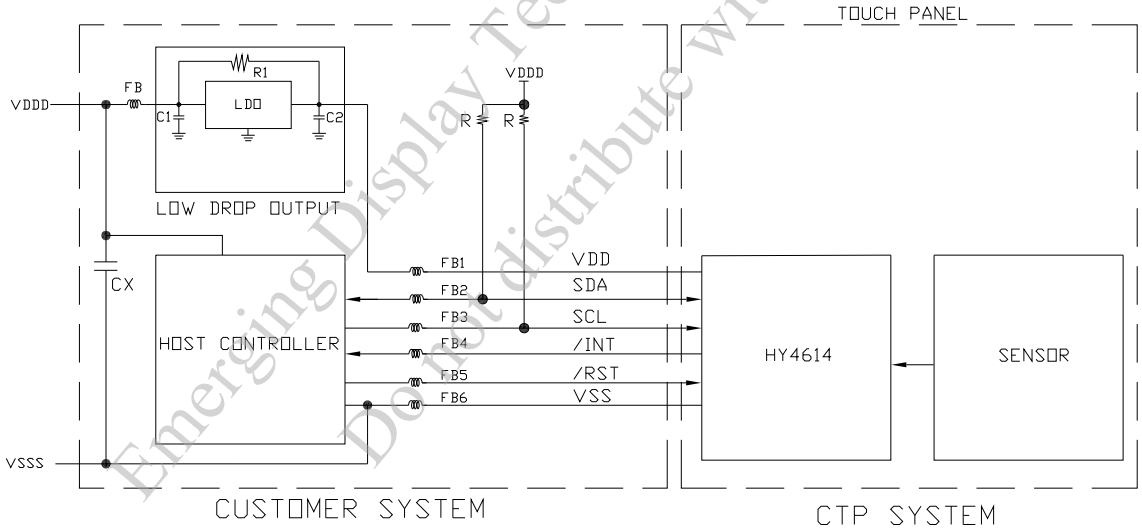


UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.5
NOTE : REAR BEZEL MATERIAL: SUS430 1D ANTI-GLARE

8. BLOCK DIAGRAM



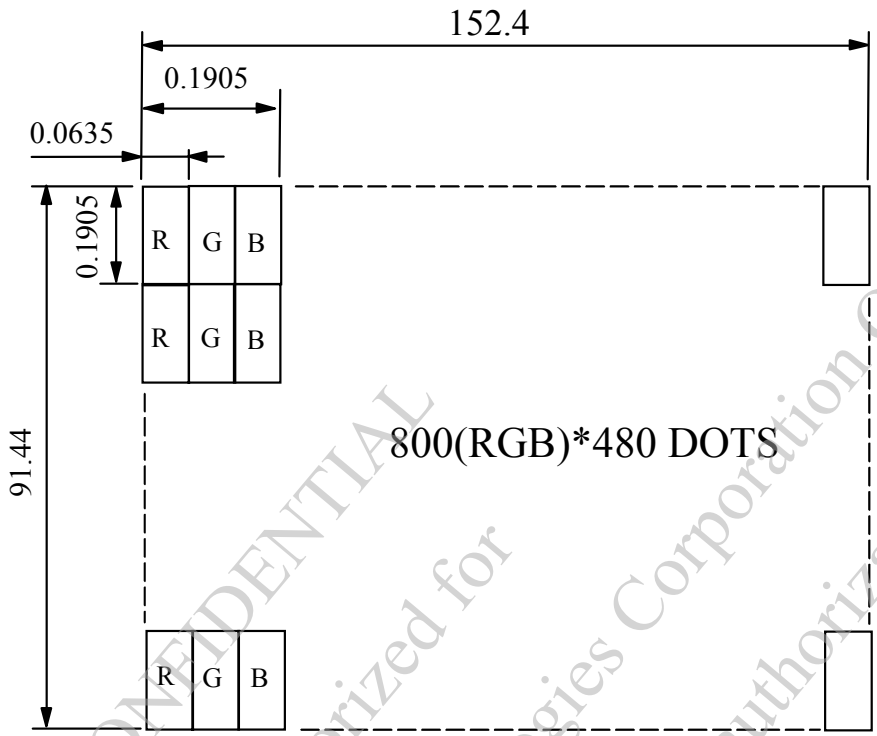
NOTE : UD = "H" LEVEL : OUT1→480 ; LR = "H" LEVEL : OUT1→800(DEFAULT)
"L" LEVEL : OUT480→1 (DEFAULT) "L" LEVEL : OUT800→1



NOTE (1)：THE STANDARD IIC COMMUNICATION INTERFACE, SUPREME SCL CLOCK IS 400 KHz, SLAVE ADDRESS CAN BE SET UP, SUPPORTS VDD LEVEL POWER, NEEDS PULL HIGH RESISTANCE AND WE RECOMMEND THE PULL HIGH RESISTANCE IS 2.0K OHM.

NOTE (2)：POWER SUPPLY SHALL BE CLEAN AND NOISE FREE. ADDITIONAL FILTERING OR A SEPARATE LDO (LOW DROP OUT) REGULATOR CAN BE REQUIRED. C1 AND C2 CAPACITORS RECOMMENDATION：4.7μF OR 10 μF

9. DETAIL DRAWING OF DOT MATRIX



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

10. INTERFACE SIGNALS

10.1 IF1 :

PIN NO.	SYMBOL	I/O/P	FUNCTION	
1	NC	—	NON CONNECTION	
2	/RST	I	EXTERNAL RESET, LOW IS ACTIVE	TOUCH PANEL
3	B5	I	BLUE DATA BIT 5	
4	B4	I	BLUE DATA BIT 4	
5	B3	I	BLUE DATA BIT 3	
6	B2	I	BLUE DATA BIT 2	
7	B1	I	BLUE DATA BIT 1	
8	B0	I	BLUE DATA BIT 0	
9	VSS	P	GROUND (VSS IS CONNECTED TO METAL HOUSING WITH CONDUCTIVE TAPE)	
10	G5	I	GREEN DATA BIT 5	
11	G4	I	GREEN DATA BIT 4	
12	G3	I	GREEN DATA BIT 3	
13	G2	I	GREEN DATA BIT 2	
14	G1	I	GREEN DATA BIT 1	
15	G0	I	GREEN DATA BIT 0	
16	VSS	P	GROUND (VSS IS CONNECTED TO METAL HOUSING WITH CONDUCTIVE TAPE)	
17	R5	I	RED DATA BIT 5	
18	R4	I	RED DATA BIT 4	
19	R3	I	RED DATA BIT 3	
20	R2	I	RED DATA BIT 2	
21	R1	I	RED DATA BIT 1	
22	R0	I	RED DATA BIT 0	
23	VSS	P	GROUND (VSS IS CONNECTED TO METAL HOUSING WITH CONDUCTIVE TAPE)	
24	DCLK	I	DOT DATA CLOCK	
25	NC	—	NON CONNECTION	
26	HSYNC	I	HORIZONTAL SYNC INPUT. INTERNALLY PULL HIGH.	DE MODE：HSYNC, VSYNC CONNECTED TO VDD. SYNC MODE：ENB CONNECTED TO GROUND.
27	VSYNC	I	VERTICAL SYNC INPUT. INTERNALLY PULL HIGH.	
28	ENB	I	INPUT DATA ENABLE CONTROL. INTERNALLY PULLED LOW.	

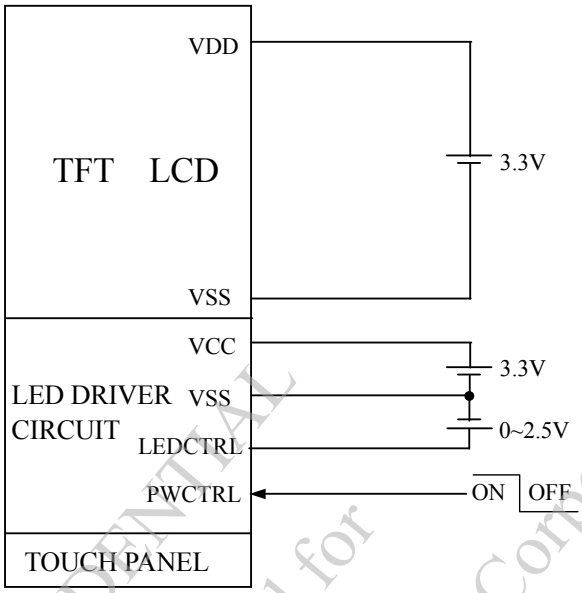
PIN NO.	SYMBOL	I/O/P	FUNCTION	
29	PWCTRL	I	LOGIC LEVEL H=3.3V L=0V: PWCTRL H = POWER ON; PWCTRL L = SHUTDOWN	
30	VDD	P	POWER SUPPLY VOLTAGE	
31	VSS	P	GROUND (VSS IS CONNECTED TO METAL HOUSING WITH CONDUCTIVE TAPE)	
32	VSS	P	GROUND (VSS IS CONNECTED TO METAL HOUSING WITH CONDUCTIVE TAPE)	
33	VCC	P	POWER SUPPLY FOR LED DRIVER CIRCUIT	
34	VCC	P	POWER SUPPLY FOR LED DRIVER CIRCUIT	
35	/INT	O	EXTERNAL INTERRUPT TO THE HOST	TOUCH PANEL
36	LEDCTRL	I	BRIGHTNESS CONTROL FOR LED BACKLIGHT	
37	SCL	I	I2C CLOCK INPUT	TOUCH PANEL
38	NC	—	NON CONNECTION	
39	SDA	I/O	I2C DATA INPUT AND OUTPUT	
40	NC	—	NON CONNECTION	

10.2 IF2 :

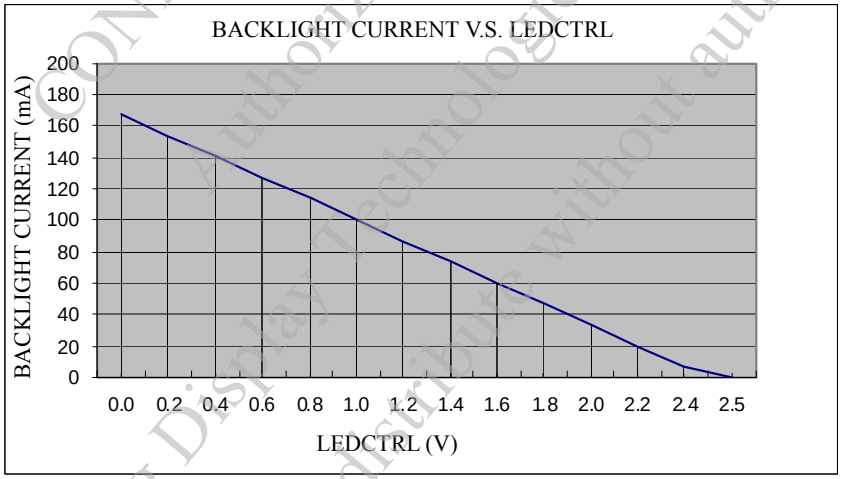
PIN NO.	SYMBOL	I/O/P	FUNCTION
1	VSS	P	GROUND (VSS IS CONNECTED TO METAL HOUSING WITH CONDUCTIVE TAPE)
2	VSS	P	GROUND (VSS IS CONNECTED TO METAL HOUSING WITH CONDUCTIVE TAPE)

11. POWER SUPPLY

11.1 POWER SUPPLY FOR LCM



11.2 THE BRIGHTNESS CONTROLLED BY BACKLIGHT CURRENT OF LEDCTRL



12. CAPACITIVE TOUCH PANEL SPECIFICATION

12.1 OPTICAL CHARACTERISTICS

ITEM	CONDITION	MIN.	TYP.	MAX.	UNIT
TRANSPARENCY NOTE (1)	Ta = 25°C	85	—	—	%

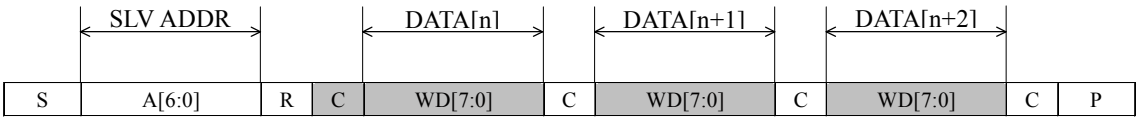
NOTE (1) : OPTICAL MEASUREMENT SHOULD BE EXECUTED AFTER PANEL IS SECURED. MEASUREMENT PROCESS SHOULD BE EXECUTED IN A STABLE, WINDLESS, AND DARK ROOM. OPTICAL SPECIFICATIONS SHOULD BE MEASURED BY SPECTROPHOTOMETER.

12.2 HARDNESS

ITEM	DESCRIPTION
SURFACE HARDNESS	7H (MIN.)

12.3 PROTOCOL

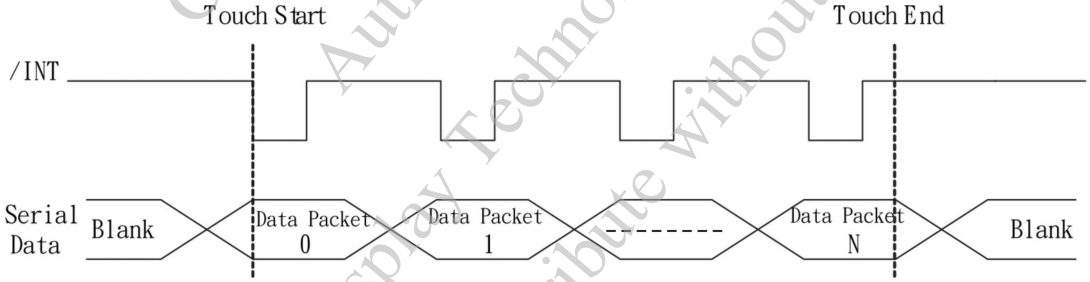
12.3.1 I2C READ



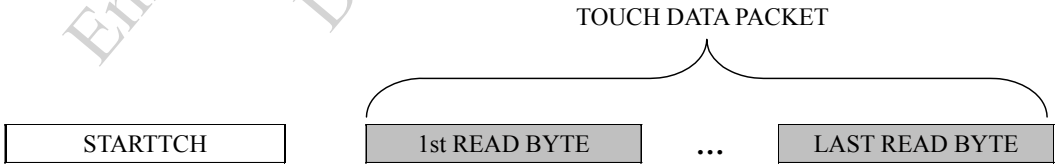
CHARACTER	DESCRIPITION
S	I2C START OR I2C RESTART
A[6:0]	SLAVE ADDRESS, THE VALUE CAN BE CUSTOMIZED
R	OPERATOR BYTE, SHOULD BE 1'b1, STANDS FOR READ
C	ACK SIGNAL
P	STOP SIGNAL (STOP SIGNAL IS OPTIONAL, RESTART SIGNAL IS ALSO OK FOR NEXT PACKET)

SLAVE ADDRESS=0x38

12.3.2 INTERRUPT SIGNAL FOR CTPM TO HOST
AS FOR STANDARD CTPM, HOST NEED TO USE BOTH INTERRUPT CONTROL SIGNAL AND SERIAL DATA INTERFACE TO GET THE TOUCH DATA.
HERE IS THE TIMING TO GET TOUCH DATA



12.3.3 READ TOUCH DATA PACKET
WE DEFINED A CTPM PERIOD AS EACH CAPACITANCE DATA GATHERING AND DATA PROCESS, IN EACH CTPM, IF THERE IS A TOUCH DETECTS, THERE WILL WE A FAME OF TOUCH DATA. HOST CAN GET THE SPECIFIED FORMAT TOUCH DATA BY SERIAL DATA INTERFACE.



TOUCH DATA FORMAT

TOUCH DATA READ PROTOCOL
IN THIS MODE THE CTP IS FULLY FUNCTIONAL AS A TOUCH SCREEN CONTROLLER. READ AND WRITE ACCESS ADDRESS IS JUST LOGICAL ADDRESS WHICH IS NOT ENFORCED BY HARDWARE OR FIRMWARE. HERE IS THE OPERATING MODE REGISTER MAP.

ADDRESS	NAME	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0	HOST ACCESS
02h	TD_STATUS					NUMBER OF TOUCH POINTS[3:0]				R
03h	TOUCH1_XH	1stEVENT FLAG				1st TOUCH X POSITION[11:8]				R
04h	TOUCH1_XL	1st TOUCH X POSITION[7:0]								R
05h	TOUCH1_YH	1st TOUCH ID[3:0]				1st TOUCH Y POSITION[11:8]				R
06h	TOUCH1_YL	1st TOUCH Y POSITION[7:0]								R
07h										
08h										
09h	TOUCH2_XH	2ndEVENT FLAG				2nd TOUCH X POSITION[11:8]				R
0Ah	TOUCH2_XL	2nd TOUCH X POSITION[7:0]								R
0Bh	TOUCH2_YH	2nd TOUCH ID[3:0]				2nd TOUCH Y POSITION[11:8]				R
0Ch	TOUCH2_YL	2nd TOUCH Y POSITION[7:0]								R
0Dh										R
0Eh										R
0Fh	TOUCH3_XH	3rdEVENT FLAG				3rd TOUCH X POSITION[11:8]				R
10h	TOUCH3_XL	3rd TOUCH X POSITION[7:0]								R
11h	TOUCH3_YH	3rd TOUCH ID[3:0]				3rd TOUCH Y POSITION[11:8]				R
12h	TOUCH3_YL	3rd TOUCH Y POSITION[7:0]								R
13h										R
14h										R
15h	TOUCH4_XH	4thEVENT FLAG				4th TOUCH X POSITION[11:8]				R
16h	TOUCH4_XL	4th TOUCH X POSITION[7:0]								R
17h	TOUCH4_YH	4th TOUCH ID[3:0]				4th TOUCH Y POSITION[11:8]				R
18h	TOUCH4_YL	4th TOUCH Y POSITION[7:0]								R
19h										R
1Ah										R
1Bh	TOUCH5_XH	5thEVENT FLAG				5th TOUCH X POSITION[11:8]				R
1Ch	TOUCH5_XL	5th TOUCH X POSITION[7:0]								R
1Dh	TOUCH5_YH	5th TOUCH ID[3:0]				5th TOUCH Y POSITION[11:8]				R
1Eh	TOUCH5_YL	5th TOUCH Y POSITION[7:0]								R
1Fh										R
20h										R
A6h	ID_G_FIRMID	FIRMWARE ID								R

TD_STATUS
THIS REGISTER IS THE TOUCH DATA STATUS REGISTER.

ADDRESS	BIT ADDRESS	REGISTER NAME	DESCRIPTION
02h	3:0	NUMBER OF TOUCH POINTS [3:0]	HOW MANY POINTS DETECTED. 1-5 IS VALID.
	7:4	NONE	NONE

TOUCHn_XH (n:1-5)
THIS REGISTER DESCRIBES MSB OF THE X COORDINATE OF THE NTH TOUCH POINT AND THE CORRESPONDING EVENT FLAG.

ADDRESS	BIT ADDRESS	REGISTER NAME	DESCRIPTION
03h ~ 1Bh	7:6	EVENT FLAG	00b: PUT DOWN 01b: PUT UP 10b: CONTACT 11b: RESERVED
	5:4	NONE	RESERVED
	3:0	TOUCH X POSITION [11:8]	MSB OF TOUCH X POSITION IN PIXELS

TOUCHn_XL (n:1-5)
THIS REGISTER DESCRIBES LSB OF THE X COORDINATE OF THE NTH TOUCH POINT.

ADDRESS	BIT ADDRESS	REGISTER NAME	DESCRIPTION
04h ~ 1Ch	7:0	TOUCH X POSITION [7:0]	LSB OF THE TOUCH X POSITION IN PIXELS

TOUCHn_YH (n:1-5)
THIS REGISTER DESCRIBES MSB OF THE Y COORDINATE OF THE NTH TOUCH POINT AND CORRESPONDING TOUCH ID.

ADDRESS	BIT ADDRESS	REGISTER NAME	DESCRIPTION
05h ~ 1Dh	7:4	TOUCH ID [3:0]	TOUCH ID OF TOUCH POINT
	3:0	TOUCH X POSITION [11:8]	MSB OF TOUCH Y POSITION IN PIXELS

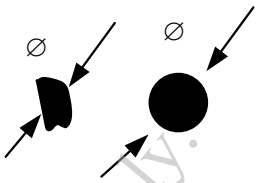
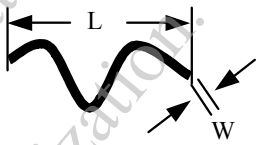
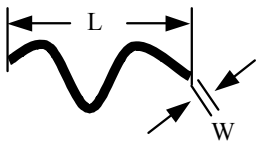
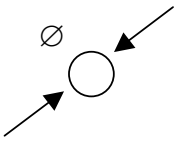
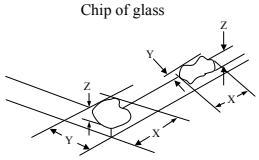
TOUCHn_YL (n:1-5)
THIS REGISTER DESCRIBES LSB OF THE Y COORDINATE OF THE NTH TOUCH POINT.

ADDRESS	BIT ADDRESS	REGISTER NAME	DESCRIPTION
06h ~ 1Eh	7:0	TOUCH X POSITION [7:0]	LSB OF THE TOUCH Y POSITION IN PIXELS

ID_G_ FIRMWARE_ID
THIS REGISTER DESCRIBES THE FIRMWARE ID OF THE APPLICATION

ADDRESS	BIT ADDRESS	REGISTER NAME	DESCRIPTION
A6h	7:0	ID_G_FIRMWARE_ID	FIRMWARE VERSION

12.4 INSPECTION STANDARDS

<table>
<tr><th>INSPECTION ITEMS</th><th>CRITERIA</th><th>REMARK</th></tr>
<tr><td>BLACK/WHITE SPOT</td><td>THE FOLLOWING BLACK/WHITE SPOT
ARE WITHIN THE VIEWING AREA.
AVERAGE DIAMETER：D (mm)
<table><tr><th>SIZE D</th><th>PERMISSIBLE NO.</th></tr><tr><td>D≤0.1mm</td><td>IGNORE</td></tr><tr><td>0.1mm<D≤0.3mm</td><td>5</td></tr><tr><td>0.3mm<D≤0.5mm</td><td>5</td></tr><tr><td>D>0.5 mm</td><td>0</td></tr></table>NOTE (1) : THE DISTANCE BETWEEN DOT DEFECTS SHOULD BE MORE THAN 10mm APART.</td><td>  </td></tr>
<tr><td>SCRATCH</td><td>THE FOLLOWING BLACK LINE, WHITE LINE IS WITHIN THE VIEWING AREA.
WIDTH：W (mm) , LENGH : L (mm)
<table><tr><th>SIZE W & L</th><th>PERMISSIBLE NO.</th></tr><tr><td>W≤0.05mm</td><td>IGNORE</td></tr><tr><td>0.05mm<W≤0.07mm, L≤5mm</td><td>1</td></tr><tr><td>W>0.07mm</td><td>0</td></tr></table></td><td>  </td></tr>
<tr><td>LINEAR TYPE / FOREIGN FIBER</td><td>THE FOLLOWING BLACK LINE, WHITE LINE IS WITHIN THE VIEWING AREA.
WIDTH：W (mm) , LENGH : L (mm)
<table><tr><th>SIZE W & L</th><th>PERMISSIBLE NO.</th></tr><tr><td>W≤0.05mm</td><td>IGNORE</td></tr><tr><td>0.05mm<W≤0.07mm, L≤5mm</td><td>1</td></tr><tr><td>W>0.07mm</td><td>0</td></tr></table></td><td>  </td></tr>
<tr><td>BUBBLE / DENT</td><td>BUBBLES WITHIN VIEWING AREA.
AVERAGE DIAMETER：D (mm)
<table><tr><th>SIZE D</th><th>PERMISSIBLE NO.</th></tr><tr><td>D≤0.2mm</td><td>IGNORE</td></tr><tr><td>0.2mm<D≤0.3mm</td><td>3</td></tr><tr><td>0.3mm<D≤0.5mm</td><td>1</td></tr><tr><td>D>0.5mm</td><td>0</td></tr></table>NOTE (1) : THE DISTANCE BETWEEN DOT DEFECTS SHOULD BE MORE THAN 10mm APART.</td><td>  </td></tr>
<tr><td>CHIP DAMAGE ON GLASS</td><td><table><tr><td>CORNER</td><td>X ≤ 3mm 、Y ≤ 3mm、Z ≤ t
(t : THICKNESS)</td></tr><tr><td>EDGE</td><td>X ≤ 6mm , Y ≤ 1mm , Z ≤ t
(t : THICKNESS)</td></tr></table></td><td>  </td></tr>
</table>

NOTE:
1.FOR ANY SPOTS OR LINES, WHICH ARE NOT OBSERVED UNDER APPROPRIATE PANEL OPERATING CONDITION ARE DEEMED ACCEPTABLE.
2.THE FOREIGN MATERIALS THAT CAN BE BLOWN OUT BY AIR AND REMOVED BY WET CLEANING ARE NOT REGARDED AS DEFECTS.

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：35±5cm

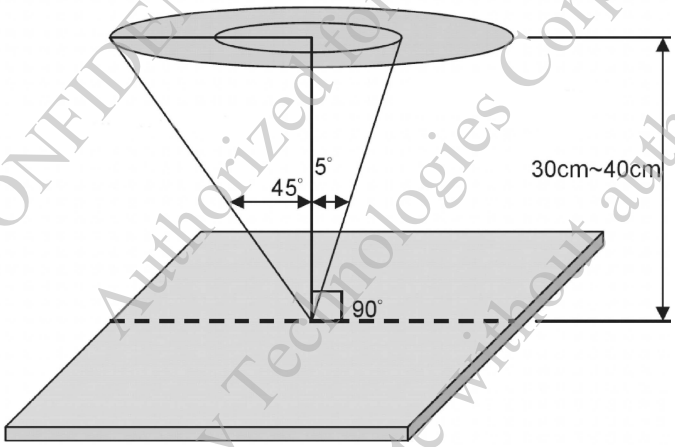
(2)VIEW ANGLE：

NON-OPERATION CONDITION： ±5°

(PERPENDICULAR TO LCD PANEL SURFACE)

OPERATION CONDITION：±45°

(PERPENDICULAR TO LCD PANEL SURFACE)



13.2.2 ENVIRONMENT CONDITIONS：

AMBIENT TEMPERATURE		25±5°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

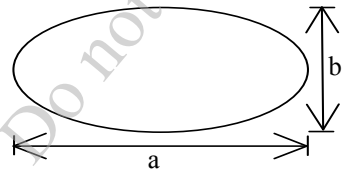
MINOR DEFECT：AQL 1.0

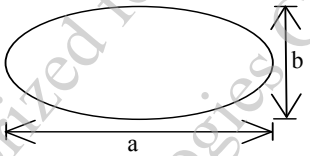
13.3 INSPECTION STANDARDS

13.3.1 VISUAL DEFECTS CLASSIFICATION

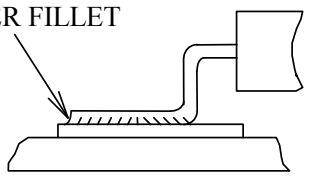
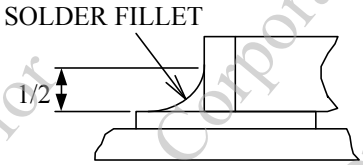
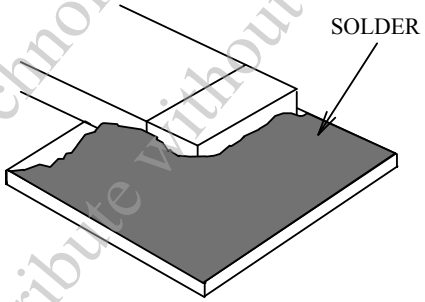
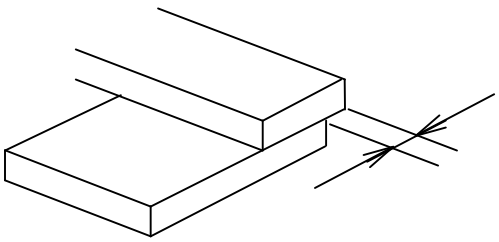
TYPE OF DEFECT	INSPECTION ITEM	DEFECT FEATURE	AQL
MAJOR DEFECT	1.DISPLAY ON	• DEFECT TO MISS SPECIFIED DISPLAY FUNCTION, FOR ALL AND SPECIFIED DOTS EX: DISCONNECTION, SHORT CIRCUIT ETC	0.65
	2.BACKLIGHT	• NO LIGHT • FLICKERING AND OTHER ABNORMAL ILLUMINATION	
	3.DIMENSIONS	• SUBJECT TO INDIVIDUAL ACCEPTANCE 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	

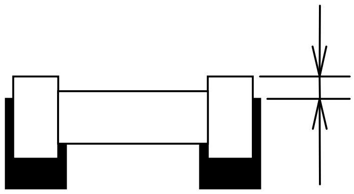
13.3.2 MODULE DEFECTS CLASSIFICATION

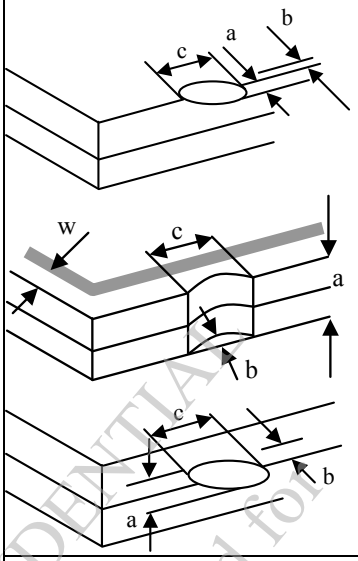
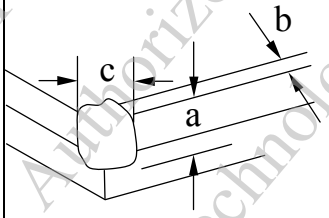
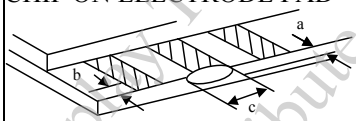
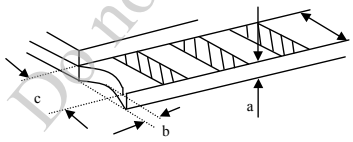
<table>
<tr><th>NO.</th><th>ITEM</th><th>CRITERIA</th></tr>
<tr><td>1</td><td>DISPLAY ON INSPECTION</td><td>(1)INCORRECT PATTERN
(2)MISSING SEGMENT
(3)DIM SEGMENT
(4)OPERATING VOLTAGE BEYOND SPEC</td></tr>
<tr><td>2</td><td>OVERALL DIMENSIONS</td><td>(1)OVERALL DIMENSION BEYOND SPEC</td></tr>
<tr><td>3</td><td>DOT DEFECT</td><td>(1)INSPECTION PATTERN: FULL WHITE, FULL BLACK, RED, GREEN AND BLUE SCREENS.
(2)
<table>
<tr><th>ITEMS</th><th>ACCEPTABLE COUNT</th></tr>
<tr><td>BRIGHT DOT</td><td>N ≤ 4</td></tr>
<tr><td>DARK DOT</td><td>N ≤ 5</td></tr>
<tr><td>TOTAL BRIGHT AND DARK DOTS</td><td>N ≤ 5</td></tr>
</table>
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.</td></tr>
<tr><td>4</td><td>FOREIGN BLACK/WHITE/ BRIGHT LINE/ SCRATCH OF VIEWING AREA</td><td>
<table>
<tr><th>LENGTH：L</th><th>WIDTH：W</th><th>PERMISSIBLE NO.</th></tr>
<tr><td>L ≤ 0.3</td><td>W ≤ 0.05</td><td>IGNORE</td></tr>
<tr><td>0.3 < L ≤ 2.5</td><td>0.05 < W ≤ 0.1</td><td>4</td></tr>
<tr><td>2.5 < L</td><td>0.1 < W</td><td>NONE</td></tr>
</table>
WIDTH：W mm, LENGH：L mm</td></tr>
<tr><td>5</td><td>FOREIGN MATTER \ BLACK SPOTS \ WHITE SPOTS \ DENT (INCLUDING LIGHT LEAKAGE DUE TO POLARIZING PLATES PINHOLES, ETC.)</td><td>
<table>
<tr><th>AVERAGE DIAMETER (mm): D</th><th>NUMBER OF PIECES PERMITTED</th></tr>
<tr><td>D ≤ 0.15</td><td>IGNORE</td></tr>
<tr><td>0.15 < D ≤ 0.5</td><td>4</td></tr>
<tr><td>0.5 < D</td><td>NONE</td></tr>
</table>
NOTE ：DIAMETER D=(a+b)/2
 
</td></tr>
</table>

<table>
<tr><th>NO.</th><th>ITEM</th><th>CRITERIA</th></tr>
<tr><td>6</td><td>BUBBLES OF POLARIZER /DIRT/CF FAIL /SURFACE STAINS</td><td>
<table>
<tr><th></th><th>AVERAGE DIAMETER (mm)：D</th><th>NUMBER OF PIECES PERMITTED</th></tr>
<tr><td rowspan="3">BUBBLE ON THE POLARIZER</td><td>D ≤ 0.25</td><td>IGNORE</td></tr>
<tr><td>0.25 < D ≤ 0.5</td><td>N ≤ 5</td></tr>
<tr><td>0.5 < D</td><td>NONE</td></tr>
<tr><td rowspan="2">SURFACE STAINS</td><td>D < 0.1</td><td>IGNORE</td></tr>
<tr><td>0.1 < D ≤ 0.3</td><td>N ≤ 3</td></tr>
<tr><td rowspan="2">CF FAIL / SPOT</td><td>D < 0.1</td><td>IGNORE</td></tr>
<tr><td>0.1 < D ≤ 0.3</td><td>N ≤ 3</td></tr>
</table>
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
 

</td></tr>
<tr><td>7</td><td>LINE DEFECT ON DISPLAY</td><td>OBVIOUS VERTICAL OR HORIZONTAL LINE DEFECT IS NOT ALLOWED</td></tr>
<tr><td>8</td><td>MURA ON DISPLAY</td><td>IT’S OK IF MURA IS SLIGHT VISIBLE THROUGH 6% ND FILTER</td></tr>
<tr><td>9</td><td>UNEVEN COLOR SPREAD, COLORATION</td><td>(1)TO BE DETERMINED BASED UPON THE STANDARD SAMPLE.</td></tr>
<tr><td>10</td><td>BEZEL APPEARANCE</td><td>(1)BEZEL MAY NOT HAVE RUST, BE DEFORMED OR HAVE FINGER PRINTS STAINS OF OTHER CONTAMINATION.
(2)BEZEL MUST COMPLY WITH JOB SPECIFICATIONS.</td></tr>
<tr><td>11</td><td>PCB</td><td>(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.</td></tr>
</table>

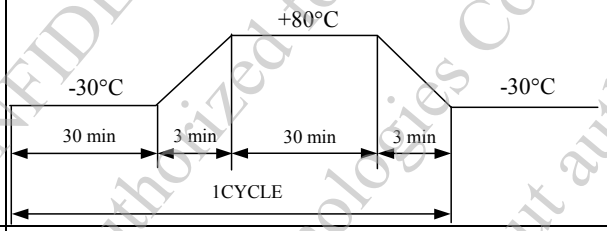
NO.	ITEM	CRITERIA
12	SOLDERING	(1)NO SOLDERING FOUND ON THE SPECIFIED PLACE (2)INSUFFICENT SOLDER (a)LSI, IC A POOR WETTING OF SOLDER IS BETWEEN LOWER BEND OR "HEEL" OF LEAD AND PAD  (b)CHIP COMPONENT · SOLDER IS LESS THAN 50% OF SIDES AND FRONT FACE WETTING  · SOLDER WETS 3 SIDES OF TERMINAL, BUT LESS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

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.

<table>
<tr><th>NO.</th><th>ITEM</th><th>CRITERIA</th></tr>
<tr><td rowspan="4">15</td><td rowspan="4">CRACKED GLASS</td><td colspan="2">THE LCD WITH EXTENSIVE CRACK IS NOT ACCEPTABLE</td></tr>
<tr><td>GENERAL GLASS CHIP：
 
</td><td>
<table>
<tr><th>a</th><th>b</th><th>c</th></tr>
<tr><td>≤ t/2</td><td>< VIEWING AREA</td><td>≤ 1/8X</td></tr>
<tr><td>t/2 > , ≤ 2t</td><td>≤ W/2</td><td>≤ 1/8X</td></tr>
</table>
*W=DISTANCE BETWEEN SEALANT AREA AND LCD PANEL EDGE
X = LCD SIDE LENGTH
t = GLASS THICKNESS</td></tr>
<tr><td>CORNER PART：
 
</td><td>
<table>
<tr><th>a</th><th>b</th><th>c</th></tr>
<tr><td>≤ t/2</td><td>< VIEWING AREA</td><td>≤ 1/8X</td></tr>
<tr><td>> t/2 , ≤ 2t</td><td>≤ W/2</td><td>≤ 1/8X</td></tr>
</table>
*W=DISTANCE BETWEEN SEALANT AREA AND LCD PANEL EDGE
X = LCD SIDE LENGTH
t = GLASS THICKNESS</td></tr>
<tr><td>CHIP ON ELECTRODE PAD
 
</td><td>
<table>
<tr><th>a</th><th>b</th><th>c</th></tr>
<tr><td>≤ t</td><td>≤ 0.5mm</td><td>≤ 1/8X</td></tr>
</table>
* X=LCD SIDE WIDTH
t =GLASS THICKNESS</td></tr>
<tr><td colspan="2"> 
</td><td>
<table>
<tr><th>a</th><th>b</th><th>c</th></tr>
<tr><td>≤ t</td><td>≤ 1/8X</td><td>≤ L</td></tr>
</table>
*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</td></tr>
</table>

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 -20°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 TEMPERATURE /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: 
7	ESD (ELECTROSTATIC DISCHARGE) (NOT OPERATED)	AIR DISCHARGE ± 12KV CONTACT DISCHARGE ± 8KV (ACCORDING TO IEC-61000-4-2)

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 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

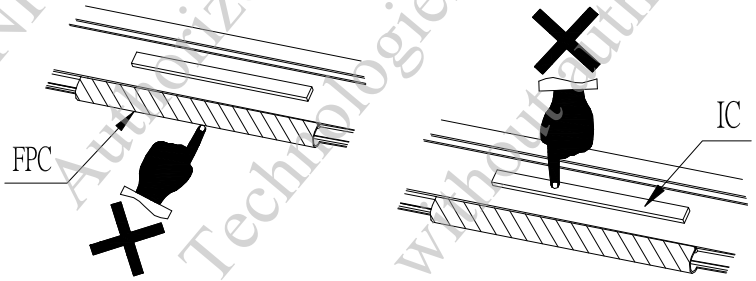
13.6.1 DO NOT CONNECT OR DISCONNECT MODULES TO OR FROM THE MAIN SYSTEM WHILE POWER IS BEING SUPPLIED .

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!



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 ATTACHED 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.