

EXAMINED BY :	EMERGING DISPLAY TECHNOLOGIES CORPORATION	FILE NO . CAS-0008890
Sam Chou		ISSUE : MAR.04, 2020
APPROVED BY:		TOTAL PAGE : 33
<i>Chris Mu</i>		VERSION : 3

CUSTOMER ACCEPTANCE SPECIFICATIONS

MODEL NO. :
ETML043013NDHA
 (RoHS)
 FOR MESSRS :

CUSTOMER'S APPROVAL

DATE :

BY :

RECORDS OF REVISION	DOC . FIRST ISSUE	OCT.01, 2019
---------------------	-------------------	--------------

DATE	REVISED PAGE NO.	SUMMARY
------	------------------	---------

NOV.26, 2019	12	<p>5.2.1 I2C INTERFACE TIMING CHARACTERISTICS</p> <table border="1"> <thead> <tr> <th rowspan="2">ITEM</th> <th colspan="2">STANDARD MODE</th> <th colspan="2">FAST MODE</th> <th rowspan="2">ITEM</th> <th colspan="2">STANDARD MODE</th> <th colspan="2">FAST MODE</th> </tr> <tr> <th>MIN.</th> <th>MAX.</th> <th>MIN.</th> <th>MAX.</th> <th>MIN.</th> <th>MAX.</th> </tr> </thead> <tbody> <tr> <td>DATA HOLD TIME</td> <td>5.0</td> <td>0</td> <td>0.9</td> <td></td> <td>DATA HOLD TIME</td> <td>300</td> <td>300</td> <td>—</td> <td></td> </tr> </tbody> </table>	ITEM	STANDARD MODE		FAST MODE		ITEM	STANDARD MODE		FAST MODE		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	DATA HOLD TIME	5.0	0	0.9		DATA HOLD TIME	300	300	—	
ITEM	STANDARD MODE			FAST MODE		ITEM	STANDARD MODE		FAST MODE																			
	MIN.	MAX.	MIN.	MAX.	MIN.		MAX.																					
DATA HOLD TIME	5.0	0	0.9		DATA HOLD TIME	300	300	—																				

MAR.04, 2020	12	<p>5.2.1 I2C INTERFACE TIMING CHARACTERISTICS</p> <table border="1"> <thead> <tr> <th rowspan="2">ITEM</th> <th>FAST MODE</th> <th rowspan="2">ITEM</th> <th>FAST MODE</th> </tr> <tr> <th>UNIT</th> <th>UNIT</th> </tr> </thead> <tbody> <tr> <td>DATA HOLD TIME</td> <td>μs</td> <td>DATA HOLD TIME</td> <td>ns</td> </tr> </tbody> </table>	ITEM	FAST MODE	ITEM	FAST MODE	UNIT	UNIT	DATA HOLD TIME	μs	DATA HOLD TIME	ns
ITEM	FAST MODE	ITEM		FAST MODE								
	UNIT		UNIT									
DATA HOLD TIME	μs	DATA HOLD TIME	ns									

CONFIDENTIAL
 Authorized for
 Emerging Display Technologies Corporation Only.
 Do not distribute without authorization.

TABLE OF CONTENTS

NO.	ITEM	PAGE
1.	GENERAL SPECIFICATIONS -----	1
2.	MECHANICAL SPECIFICATIONS -----	1, 2
3.	ABSOLUTE MAXIMUM RATINGS -----	3
4.	ELECTRICAL CHARACTERISTICS -----	4, 5
5.	TIMING CHARACTERISTICS -----	6 ~ 13
6.	OPTICAL CHARACTERISTICS -----	14, 15
7.	OUTLINE DIMENSIONS -----	16
8.	BLOCK DIAGRAM -----	17
9.	DETAIL DRAWING OF DOT MATRIX -----	18
10.	INTERFACE SIGNALS -----	19, 20
11.	PROTOCOL -----	21
12.	POWER SUPPLY -----	22
13.	CAPACITIVE TOUCH PANEL SPECIFICATION -----	23
14.	INSPECTION CRITERIA -----	24 ~ 30
15.	RELIABILITY TEST -----	31
16.	CAUTION -----	32, 33

CONFIDENTIAL
 Authorized for
 Emerging Display Technologies Corporation Only.
 Do not distribute without authorization.

1. GENERAL SPECIFICATIONS

1.1 DATA SHEET FOR LCD MODULE CONTROLLER/DRIVER
PLEASE REFER TO :

SITRONIX SC7283

1.2 DATA SHEET FOR CAPACITIVE TOUCH PANEL CONTROLLER/DRIVER
PLEASE REFER TO :

ILITEK ILI2511

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), BIS(2-ETHYLHEXYL) PHTHALATE (DEHP), BUTYL BENZYL PHTHALATE (BBP), DIBUTYL PHTHALATE (DBP), DIISOBUTYL PHTHALATE (DIBP).

2. MECHANICAL SPECIFICATIONS

2.1 LCD MODULE MECHANICAL SPECIFICATIONS

(1) DIAGONALS	-----	4.3 inch
(2) NUMBER OF DOTS	-----	480W * (RGB) * 272H DOTS
(3) MODULE SIZE	-----	105.5W * 67.2H * 4.66D mm (WITHOUT FPC & PROTECT FILM)
(4) VIEWING AREA	-----	99W * 56H mm
(5) ACTIVE AREA	-----	95.04W * 53.856H mm
(6) DOT SIZE	-----	0.066W * 0.198H mm
(7) PIXEL SIZE	-----	0.198W * 0.198H mm
(8) LCD TYPE	-----	TFT , TRANSMISSIVE , NORMALLY BLACK
(9) COLOR	-----	16.7M
(10) VIEWING DIRECTION	-----	SUPER WIDE VIEW
(11) BACK LIGHT	-----	LED , COLOR : WHITE
(12) INTERFACE MODE	-----	RGB (24 BIT) PARALLEL (SYNC/DE/SYNC-DE MODE)

MODEL NO.	VERSION	PAGE
ETML043013NDHA	3	2

2.2 CAPACITIVE TOUCH PANEL MECHANICAL SPECIFICATIONS

- (1) TOUCH PANEL SIZE ----- 4.3 inch
- (2) OUTER DIMENSION ----- 105.5W * 66.98H * 1.7D mm
(WITHOUT FPC)
- (3) ACTIVE AREA ----- 96.04W * 54.86H mm
- (4) INPUT TYPE ----- MULTI TOUCH
- (5) NUMBER OF TOUCH SENSOR ----- 18*10 SENSORS
- (6) INTERFACE MODE ----- I2C
- (7) RESOLUTION ----- 16384*9600

CONFIDENTIAL
Authorized for
Emerging Display Technologies Corporation Only.
Do not distribute without authorization.

3. ABSOLUTE MAXIMUM RATINGS

3.1 LCD MODULE ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
POWER SUPPLY VOLTAGE	VDD-VSS	-0.3	4.0	V	
LOGIC INPUT VOLTAGE RANGE	VIN	-0.3	VDD+0.3	V	
POWER DISSIPATION FOR LED BACKLIGHT	PD	—	413	mW	
FORWARD CURRENT FOR LED BACKLIGHT	ILED	—	25	mA	

3.2 CAPACITIVE TOUCH PANEL ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
POWER SUPPLY VOLTAGE	VDD1-VSS1	-0.3	3.6	V	

3.3 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)	10~100 Hz XYZ DIRECTIONS 1 HR EACH
SHOCK	—	29.4 m/s ² (3 G)	—	490 m/s ² (50 G)	10 ms 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

4.1 LCD MODULE ELECTRICAL CHARACTERISTICS

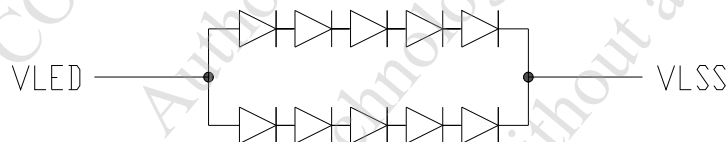
Ta = 25 °C

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
POWER SUPPLY VOLTAGE	VDD-VSS	—	3.15	3.3	3.45	V	
POWER SUPPLY CURRENT	IDD	VDD-VSS =3.3V	—	25	40	mA	NOTE (1)
LOGIC HIGH INPUT VOLTAGE	V _{IH}	—	0.7*V _D	—	VDD	V	NOTE (2)
LOGIC LOW INPUT VOLTAGE	V _{IL}	—	VSS	—	0.3*V _D	V	NOTE (2)
LOGIC HIGH OUTPUT VOLTAGE	V _{OH}	I _{OH} = -1.0mA	VDD-0.4	—	VDD	V	
LOGIC LOW OUTPUT VOLTAGE	V _{OL}	I _{OL} = +1.0mA	VSS	—	VSS+0.4	V	
POWER SUPPLY VOLTAGE FOR LED BACKLIGHT	VLED-VLSS	I _{LED} =25mA	13.2	14.9	16.5	V	NOTE (2)
LED LIFE TIME	—	I _F =20mA (PER LED)	30K	—	—	HRS	NOTE (3) NOTE (4)

NOTE (1) : THE DISPLAY PATTERN IS ALL “WHITE”.

NOTE (2) : APPLIED TO TERMINALS B5~B0, G5~G0, R5~R0, DCLK, HSYNC, VSYNC, DE.

NOTE (3) : INTERNAL CIRCUIT DIAGRAM OF BACKLIGHT

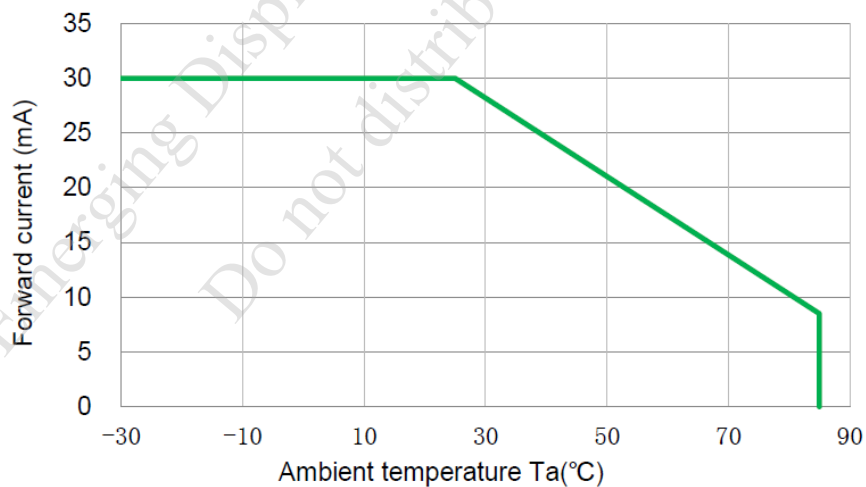


NOTE (4) : CONDITIONS; Ta=25 °C, CONTINUOUS LIGHTING

NOTE (5) : DEFINITIONS OF LIFE TIME :

LCM LUMINANCE BECOMES HALF OF THE INITIAL VALUE.

NOTE (6) : AMBIENT TEMPERATURE VS. ALLOWABLE FORWARD CURRENT.(PER LED)



4.2 CAPACITIVE TOUCH PANEL ELECTRICAL CHARACTERISTICS

Ta=25°C

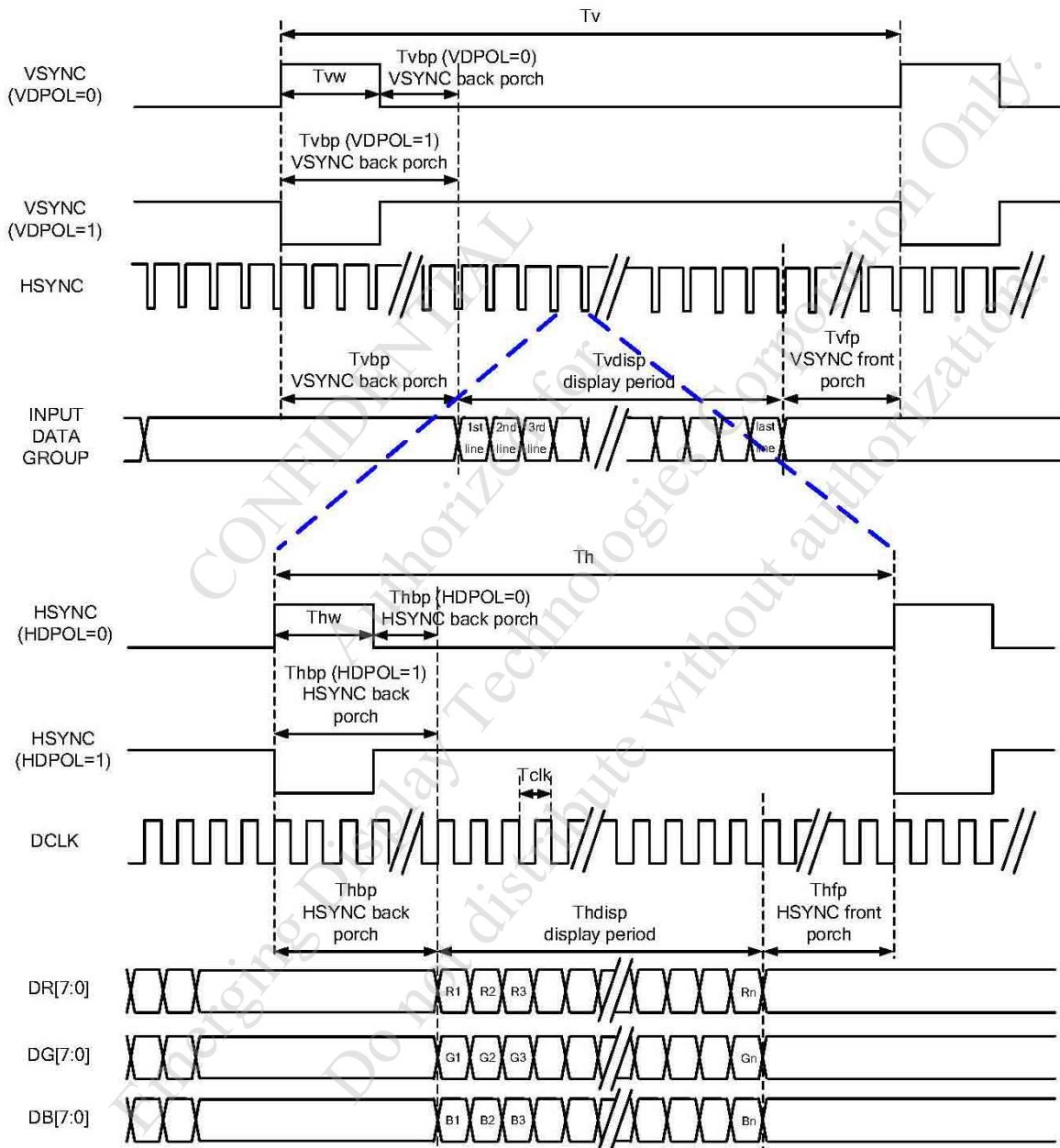
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
POWER SUPPLY VOLTAGE	VDD1-VSS1	—	3.15	3.30	3.45	V
LOGIC HIGH INPUT VOLTAGE	VIH	—	0.6*VDD1	—	VDD1+0.5	V
LOGIC LOW INPUT VOLTAGE	VIL	—	0	—	0.3*VDD1	V
LOGIC HIGH OUTPUT VOLTAGE	VOH	IOH=8mA	0.7*VDD1	—	—	V
LOGIC LOW OUTPUT VOLTAGE	VOL	IOL=10mA	—	—	0.3*VDD1	V
POWER SUPPLY CURRENT	IDD1	VDD1-VSS1 =3.30V	—	85	120	mA

CONFIDENTIAL
Authorized for
Emerging Display Technologies Corporation Only.
Do not distribute without authorization.

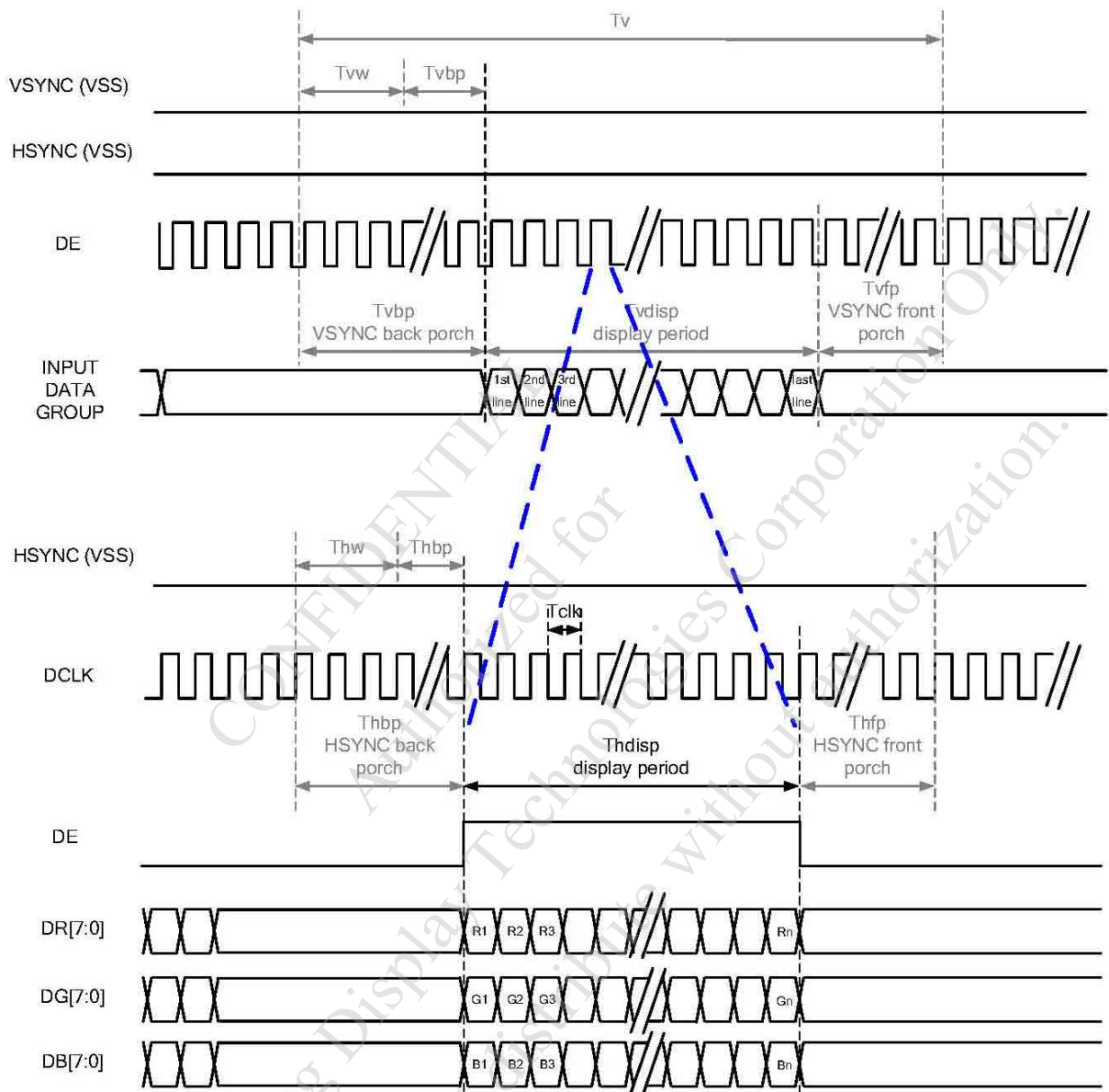
5. TIMING CHARACTERISTICS

5.1 FOR LCD MODULE

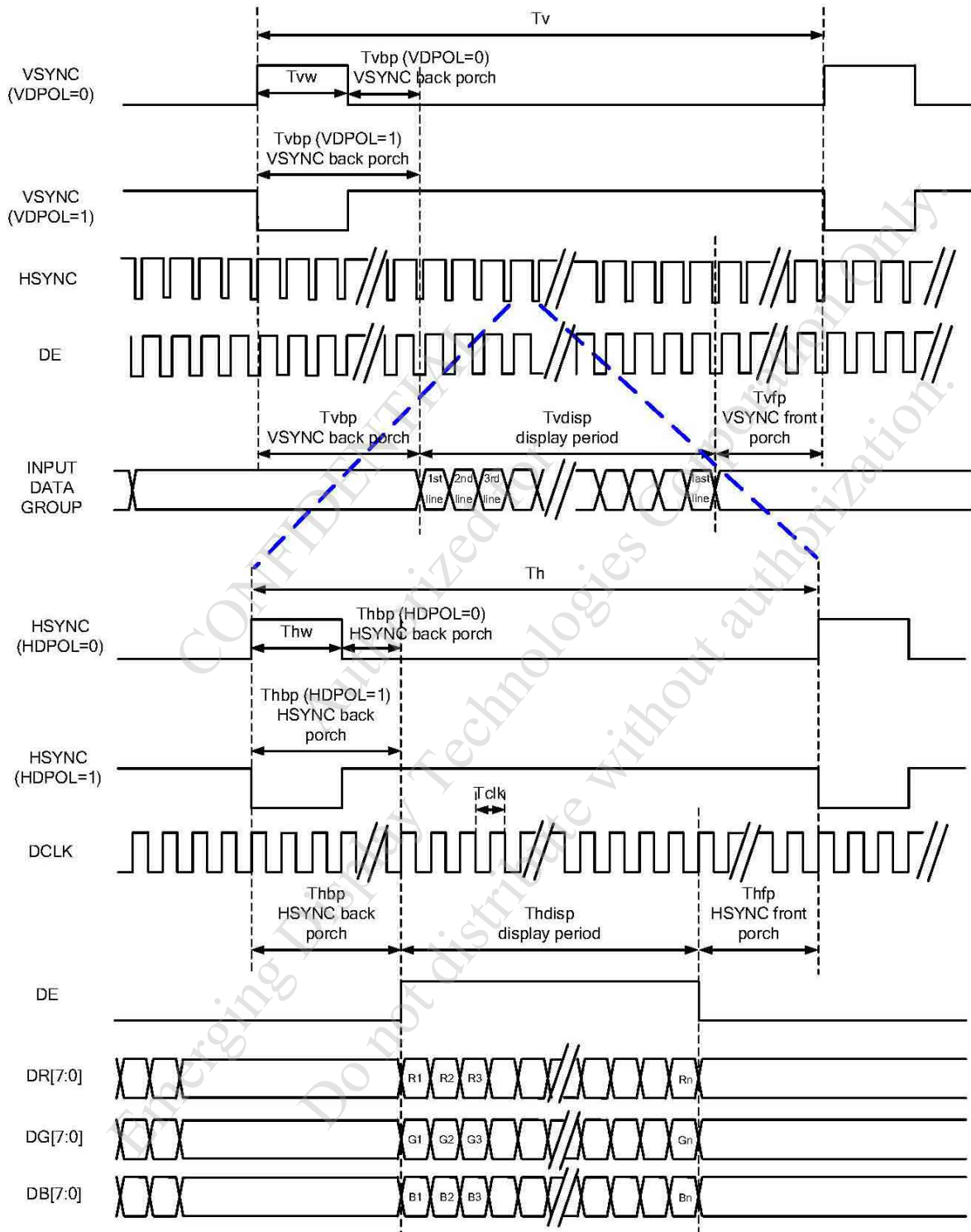
5.1.1 SYNC MODE



5.1.2 DE MODE



5.1.3 SYNC-DE MODE



5.1.4 PARALLEL 24 BIT RGB INPUT TIMING TABLE

PARALLEL 24-BIT RGB INPUT TIMING

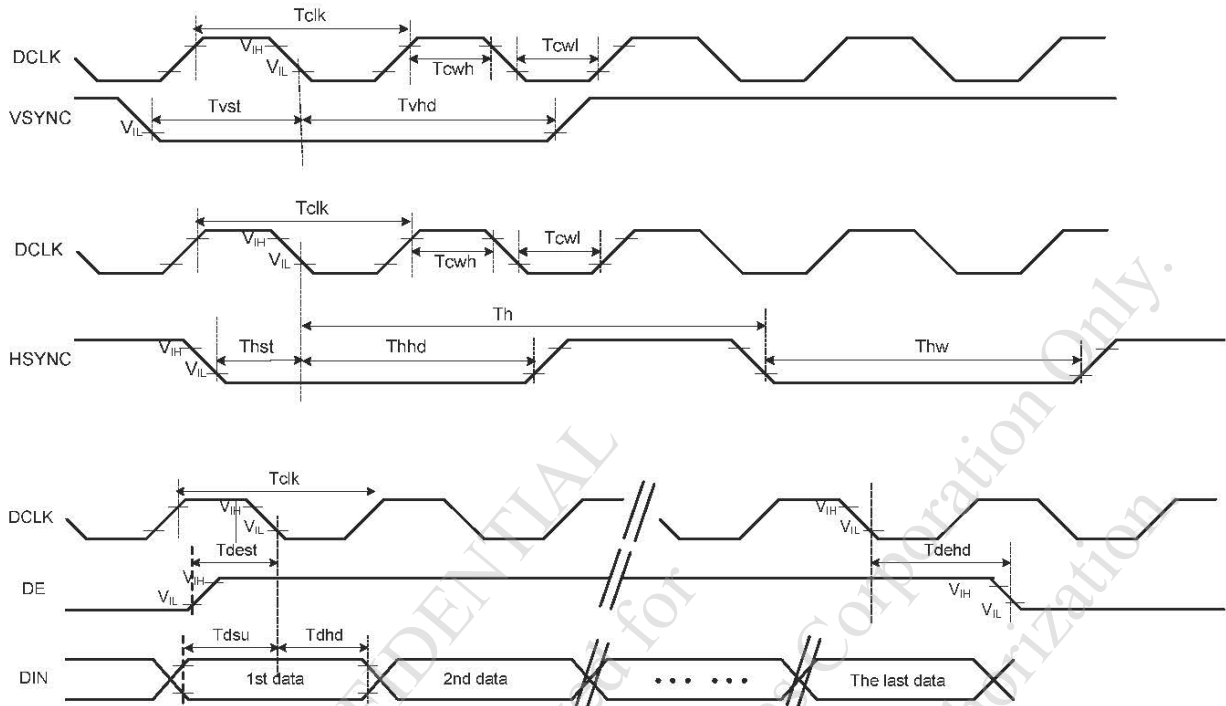
Ta=25°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK	
DCLK FREQUENCY	Fclk	8	9	12	MHz		
DCLK PERIOD	Tclk	83	111	125	ns		
HSYNC	PERIOD TIME	Th	485	531	598	DCLK	
	DISPLAY PERIOD	Thdisp	—	480	—	DCLK	
	BACK PORCH	Thbp	3	43	43	DCLK	BY H_BLANKING SETTING
	FRONT PORCH	Thfp	2	8	75	DCLK	
	PULSE WIDTH	Thw	2	4	43	DCLK	
VSYNC	PERIOD TIME	Tv	276	292	321	HSYNC	
	DISPLAY PERIOD	Tvdisp		272		HSYNC	
	BACK PORCH	Tvbp	2	12	12	HSYNC	BY V_BLANKING SETTING
	FRONT PORCH	Tvfp	2	8	37	HSYNC	
	PULSE WIDTH	Tvw	2	4	12	HSYNC	

NOTE: IT IS NECESSARY TO KEEP Tvbp =12 AND Thbp =43 IN SYNC MODE. DE MODE IS UNNECESSARY TO KEEP IT.

CONFIDENTIAL
Authorized for
Emerging Display Technologies Corporation Only
Do not distribute without authorization.

5.1.5 SYSTEM BUS TIMING FOR RGB INTERFACE

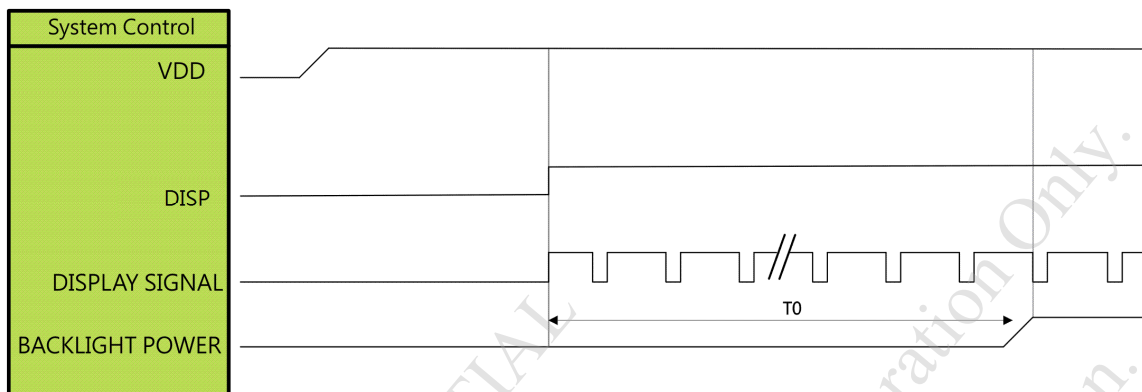


ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
CLK PULSE DUTY	Tcw	40	50	60	%	
HSYNC WIDTH	Thw	2	—	—	DCLK	
HSYNC PERIOD	Th	55	60	65	us	
VSYNC SETUP TIME	Tvst	12	—	—	ns	
VSYNC HOLD TIME	Tvhd	12	—	—	ns	
HSYNC SETUP TIME	Thst	12	—	—	ns	
HSYNC HOLD TIME	Thhd	12	—	—	ns	
DATA SETUP TIME	Tdsu	12	—	—	ns	
DATA HOLD TIME	Tdhd	12	—	—	ns	
DE SETUP TIME	Tdest	12	—	—	ns	
DE HOLD TIME	Tdehd	12	—	—	ns	

5.1.6 POWER ON SEQUENCE

SYMBOL	DESCRIPTION	MIN. TIME	UNIT
T0	DISPLAY SIGNAL OUTPUT TO BACKLIGHT POWER ON	250	ms

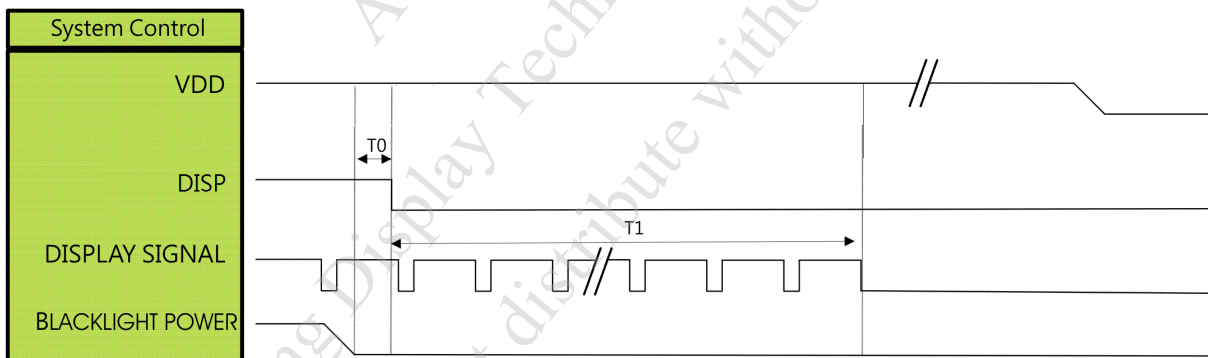
NOTE: RGB INTERFACE DISPLAY SIGNAL: DCLK; VSYNC; HSYNC; DE; DR[7:0]; DG[7:0]; DB[7:0]



5.1.7 POWER OFF TIMING SEQUENCE

SYMBOL	DESCRIPTION	MIN. TIME	UNIT
T0	BACKLIGHT POWER OFF TO DISP="LOW"	5	ms
T1	DISP="LOW" TO IC INTERNAL VOLTAGE DISCHARGE COMPLETE	100	ms

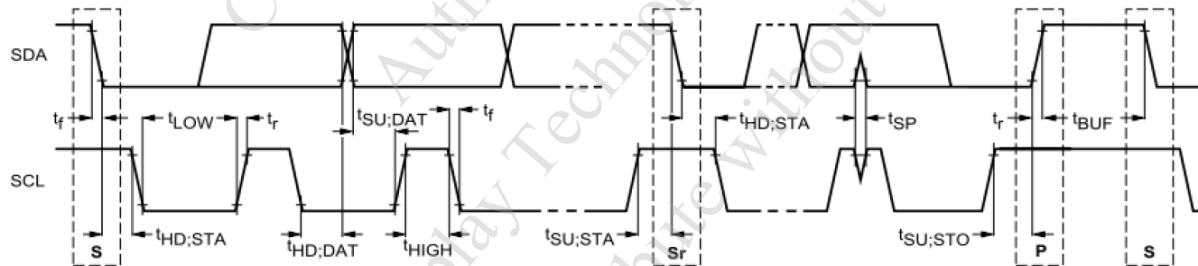
NOTE: RGB INTERFACE DISPLAY SIGNAL: DCLK; VSYNC; HSYNC; DE; DR[7:0]; DG[7:0]; DB[7:0]



5.2 FOR CTP MODULE

5.2.1 I2C INTERFACE TIMING CHARACTERISTICS

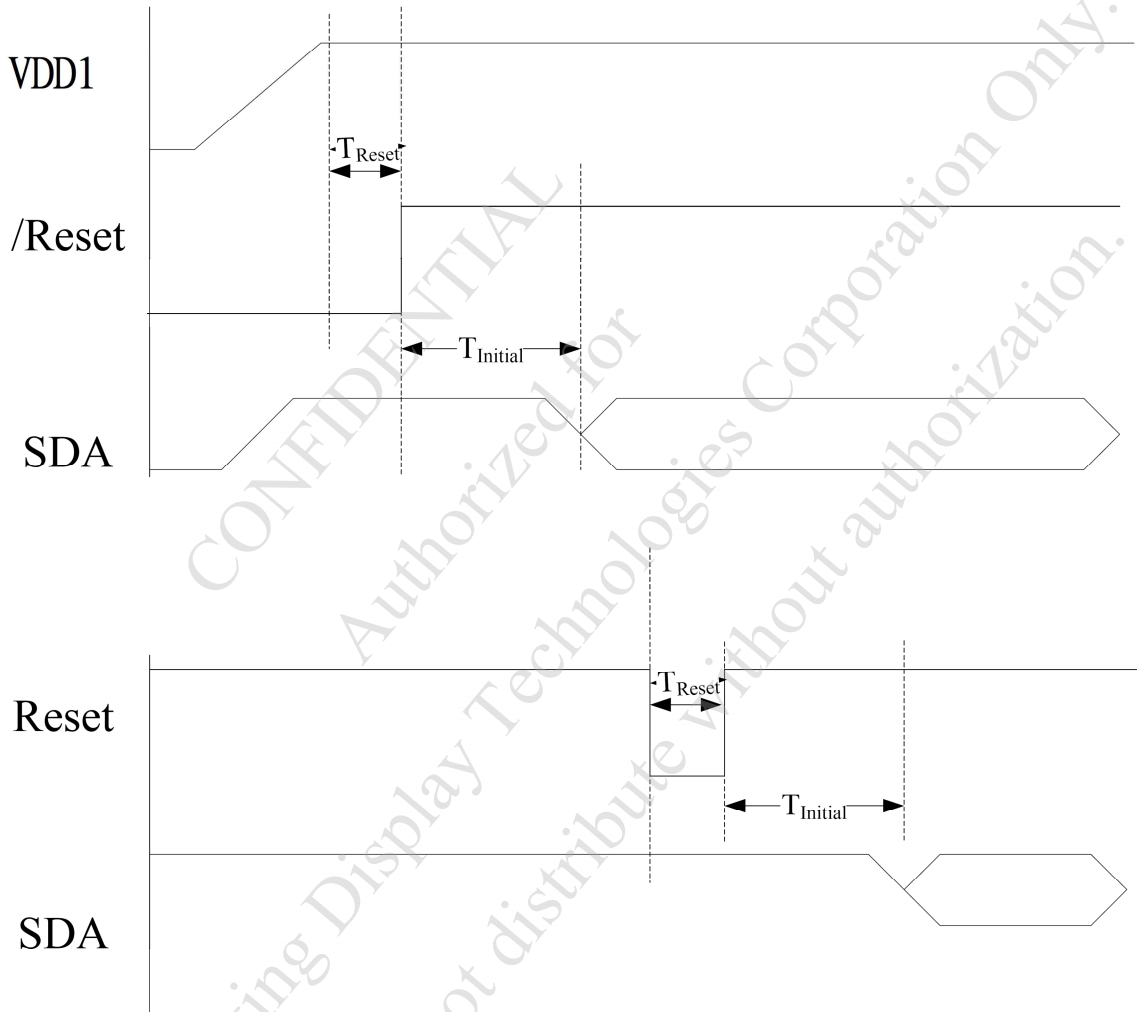
ITEM	SYMBOL	STANDARD MODE			FAST MODE		
		MIN.	MAX.	UNIT	MIN.	MAX.	UNIT
SCL CLOCK FREQUENCY	f_{SCL}	0	100	kHz	0	400	kHz
HOLD TIME (REPEATED) START CONDITION. AFTER THIS PERIOD, THE FIRST CLOCK PULSE IS GENERATED	$t_{HD;STA}$	4.0	—	μs	0.6	—	μs
LOW PERIOD OF THE SCL CLOCK	t_{LOW}	4.7	—	μs	1.3	—	μs
HIGH PERIOD OF THE SCL CLOCK	t_{HIGH}	4.0	—	μs	0.6	—	μs
SET-UP TIME FOR A REPEATED START CONDITION	$t_{SU;STA}$	4.7	—	μs	0.6	—	μs
DATA HOLD TIME	$t_{HD;DAT}$	300	—	μs	300	—	ns
DATA SET-UP TIME	$t_{SU;DAT}$	250	—	ns	100	—	ns
RISE TIME OF BOTH SDA AND SCL SIGNALS	t_r	—	1000	ns	—	300	ns
FALL TIME OF BOTH SDA AND SCL SIGNALS	t_f	—	300	ns	—	300	ns
SET-UP TIME FOR STOP CONDITION	$t_{SU;STO}$	4.0	—	μs	0.6	—	μs
BUS FREE TIME BETWEEN A STOP AND START CONDITION	t_{BUF}	4.7	—	μs	1.3	—	μs



THE TIMING OF I2C INTERFACE

5.2.2 POWER-ON SEQUENCE

ITEM	SYMBOL	MIN.	MAX.	UNIT
AFTER POWERING-ON OR RESETTING THE DEVICE, THE DEVICE NEEDS INITIAL TIME TO CONFIGURE THE SYSTEM.	$T_{Initial}$	—	100	ms
/RESET PIN LOW HOLD TIME	T_{Reset}	50	—	us



POWER UP SEQUENCE AND RESET DIAGRAM

6. OPTICAL CHARACTERISTICS

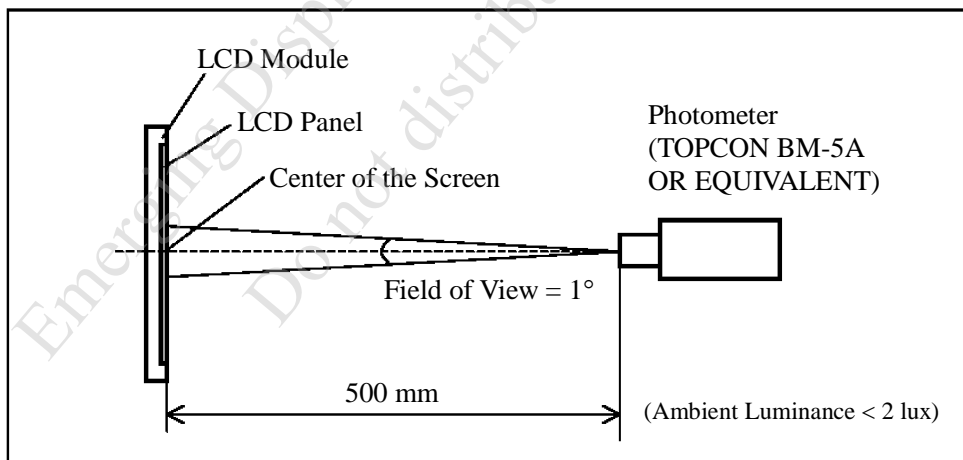
6.1 OPTICAL CHARACTERISTICS

Ta=25±2°C

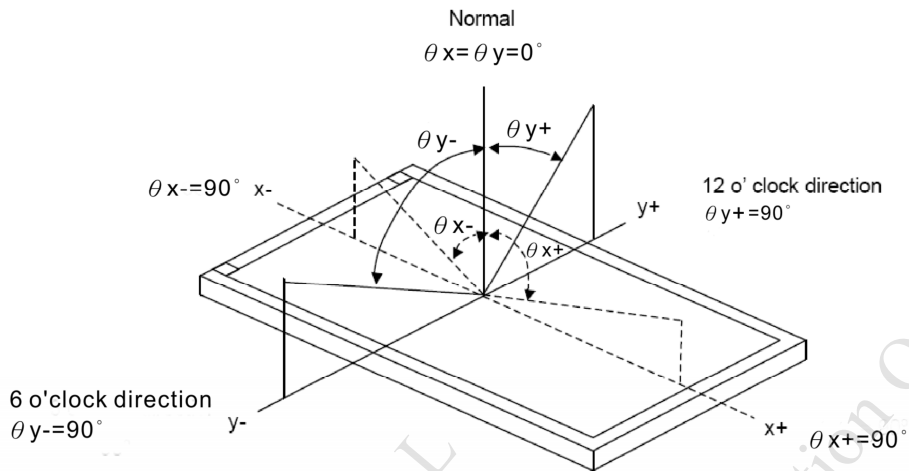
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK	
VIEWING ANGLE	θ_{y+}	CR≥10	$\theta_x=0^\circ$	70	80	—	deg.	NOTE (2) NOTE (3)
	θ_{y-}			70	80	—		
	θ_{x+}		$\theta_y=0^\circ$	70	80	—		
	θ_{x-}			70	80	—		
CONTRAST RATIO (CENTER)	CR	$\theta_x=0^\circ, \theta_y=0^\circ$	640	800	—	—	NOTE (3)	
RESPONSE TIME	TR(rise)+TF(fall)	$\theta_x=0^\circ, \theta_y=0^\circ$	—	30	40	msec	NOTE (4)	
COLOR CHROMATICITY (CENTER)	WHITE	Wx	$\theta_x=0^\circ, \theta_y=0^\circ$ VDD-VSS=3.3V ILED = 25mA (NTSC : 45%)	0.25	0.30	0.35	—	NOTE (5)
		Wy		0.27	0.32	0.37		
	RED	Rx		0.55	0.60	0.65		
		Ry		0.31	0.36	0.41		
	GREEN	Gx		0.32	0.37	0.42		
		Gy		0.52	0.57	0.62		
	BLUE	Bx		0.10	0.15	0.20		
		By		0.04	0.09	0.14		
THE BRIGHTNESS OF MODULE (CENTER)	B		380	425	—	cd/m ²	NOTE (6)	
THE UNIFORMITY OF MODULE			70	—	—	%	NOTE (7)	

NOTE (1) : TEST CONDITION :

AFTER STABILIZING AND LEAVING THE PANEL ALONE AT A GIVEN TEMPERATURE FOR 30 MINUTES. MEASUREMENT SHOULD BE EXECUTED IN A STABLE, WINDLESS, AND DARK ROOM.



NOTE (2) : DEFINITION OF VIEWING ANGLE :



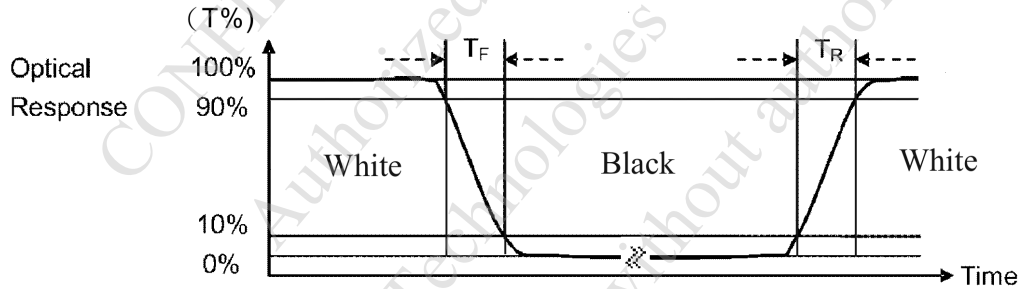
NOTE (3) : DEFINITION OF CONTRAST RATIO (CR) :

MEASURED AT THE CENTER POINT OF MODULE

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

NOTE (4) : DEFINITION OF RESPONSE TIME : T_R AND T_F

THE FIGURE BELOW IS THE OUTPUT SIGNAL OF THE PHOTO DETECTOR.



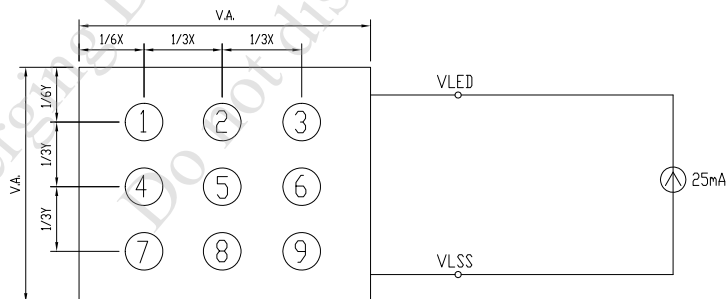
NOTE (5) : DEFINITION OF COLOR CHROMATICITY

(a)100% RGB PIXEL DATA TRANSMISSION WHEN ALL THE INPUT TERMINALS OF MODULE ARE ELECTRICALLY POWERED ON.

(b)MEASURED AT THE CENTER POINT OF MODULE

NOTE (6) : MEASURED THE BRIGHTNESS OF WHITE STATE AT CENTER POINT.

NOTE (7) : (a)DEFINITION OF BRIGHTNESS UNIFORMITY

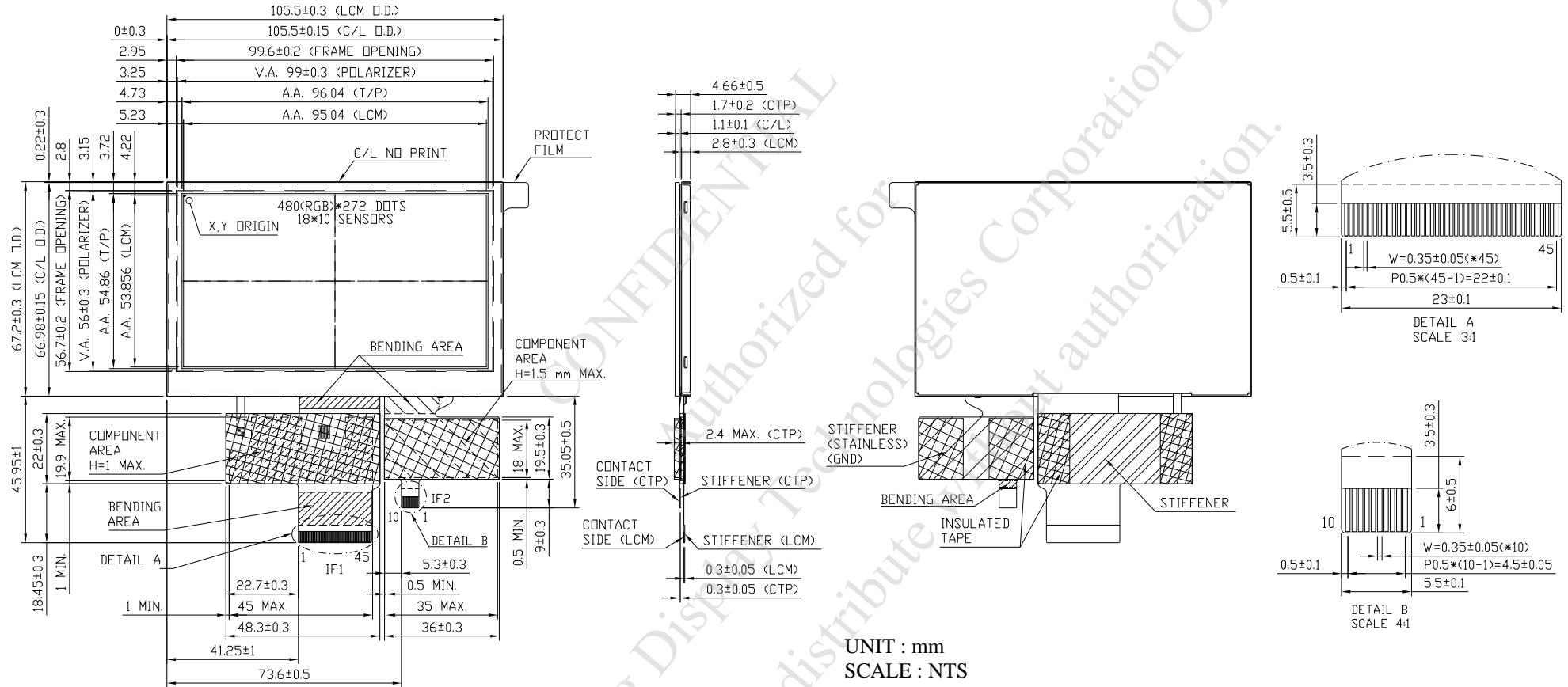


UNIT : mm

(b)THE BRIGHTNESS UNIFORMITY CALCULATING METHOD

$$\text{UNIFORMITY} : \frac{\text{MINIMUM BRIGHTNESS}}{\text{MAXIMUM BRIGHTNESS}} * 100\%$$

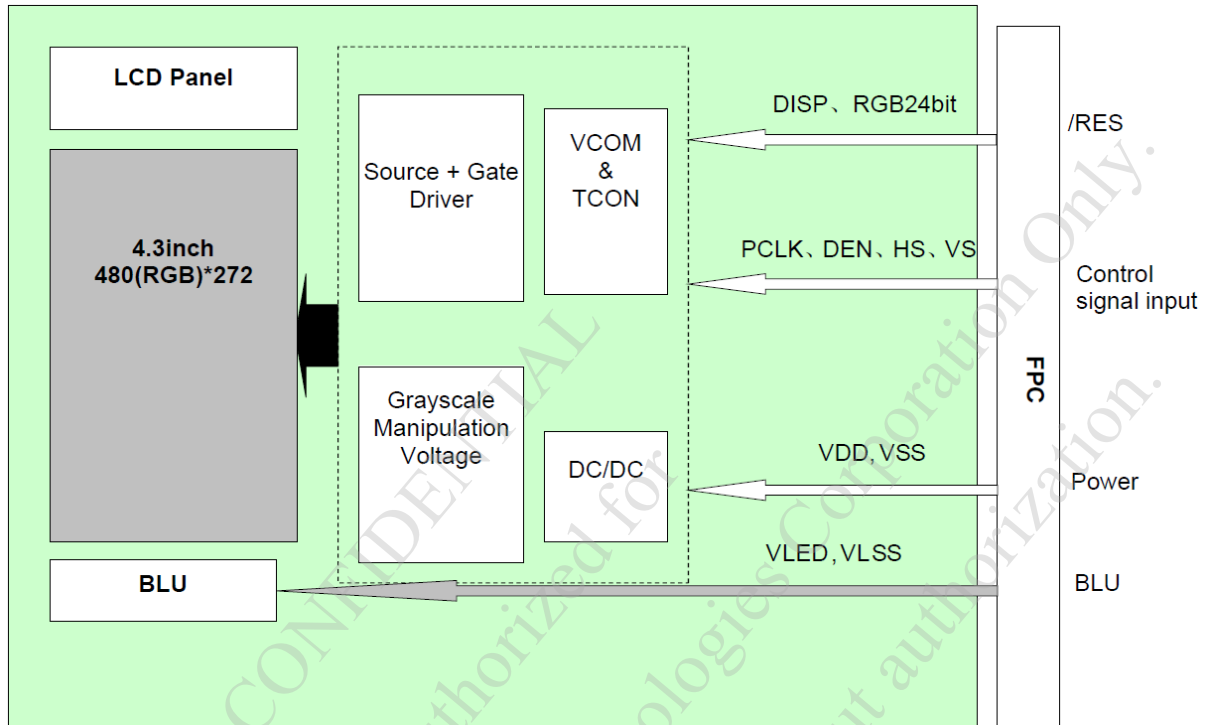
7. OUTLINE DIMENSIONS



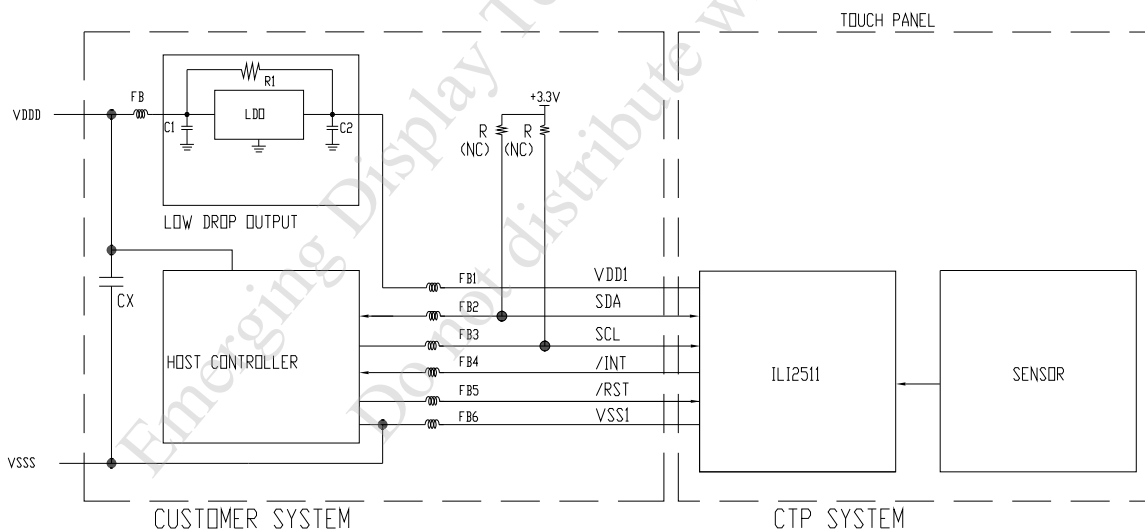
UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.5 mm
NOTE :
1.LCM RECOMMEND MATCH CONNECTOR KYOCERA : 04 6240 045 SERIES
2.CTP RECOMMEND MATCH CONNECTOR KYOCERA : 04 6 40 010 SERIES
3.C/L GLASS : SODA LIME

8. BLOCK DIAGRAM

8.1 TFT



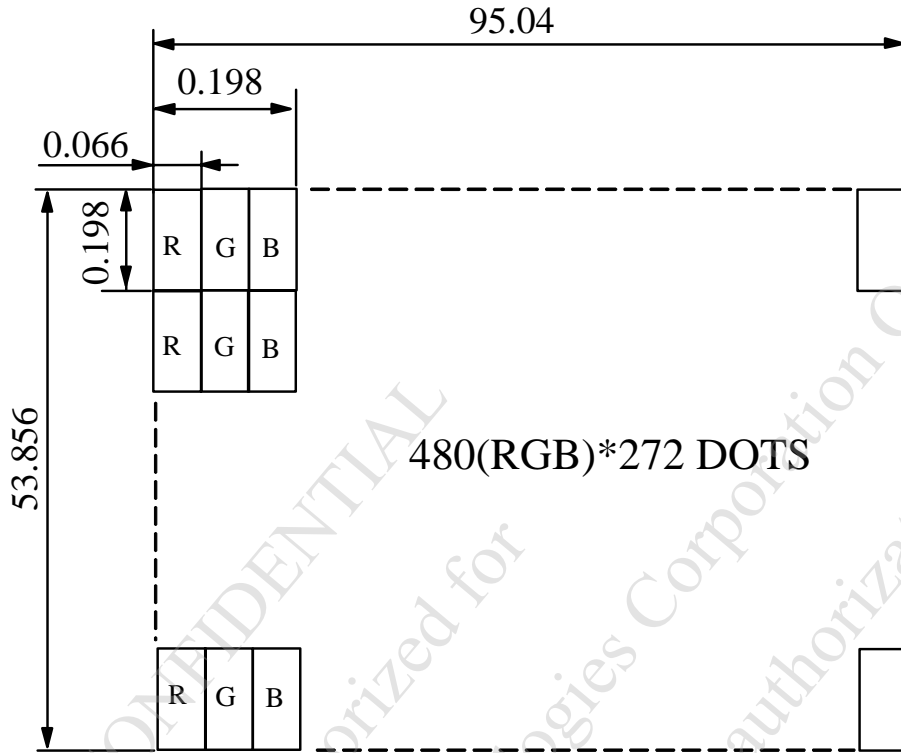
8.2 CTP



NOTE (1) : THE STANDARD I2C COMMUNICATION INTERFACE, SUPREME SCL CLOCK IS 400 KHz, SLAVE ADDRESS CAN BE SET UP, SUPPORTS VDD LEVEL POWER, RECOMMEND RESERVING PULL HIGH RESISTANCE FOR SPECIAL APPLICATION.

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

CONFIDENTIAL
Authorized for Emerging Display Technologies Corporation Only.
Do not distribute without authorization.

10. INTERFACE SIGNALS

10.1 IF1

PIN NO.	SYMBOL	FUNCTION
1	VSS	GROUND
2	VSS	GROUND
3	VDD	POWER SUPPLY VOLTAGE
4	VDD	POWER SUPPLY VOLTAGE
5	R0	RED DATA SIGNAL (LSB)
6	R1	RED DATA SIGNAL
7	R2	RED DATA SIGNAL
8	R3	RED DATA SIGNAL
9	R4	RED DATA SIGNAL
10	R5	RED DATA SIGNAL
11	R6	RED DATA SIGNAL
12	R7	RED DATA SIGNAL (MSB)
13	G0	GREEN DATA SIGNAL (LSB)
14	G1	GREEN DATA SIGNAL
15	G2	GREEN DATA SIGNAL
16	G3	GREEN DATA SIGNAL
17	G4	GREEN DATA SIGNAL
18	G5	GREEN DATA SIGNAL
19	G6	GREEN DATA SIGNAL
20	G7	GREEN DATA SIGNAL (MSB)
21	B0	BLUE DATA SIGNAL (LSB)
22	B1	BLUE DATA SIGNAL
23	B2	BLUE DATA SIGNAL
24	B3	BLUE DATA SIGNAL
25	B4	BLUE DATA SIGNAL
26	B5	BLUE DATA SIGNAL
27	B6	BLUE DATA SIGNAL
28	B7	BLUE DATA SIGNAL (MSB)
29	VSS	GROUND
30	DCLK	CLOCK SIGNAL; LATCHING DATA AT THE FALLING EDGE
31	DISP	DISPLAY CONTROL / STANDBY MODE SELECTION. DISP = "LOW" : STANDBY; DISP = "HIGH" : NORMAL DISPLAY(DEFAULT)
32	HSYNC	HORIZONTAL SYNC SIGNAL; NEGATIVE POLARITY

PIN NO.	SYMBOL	FUNCTION
33	VSYNC	VERTICAL SYNC SIGNAL; NEGATIVE POLARITY
34	DE	DATA INPUT ENABLE. ACTIVE HIGH TO ENABLE THE DATA INPUT.
35	CSB	SERIAL COMMUNICATION CHIP SELECT
36	NC	NC
37	NC	NC
38	NC	NC
39	NC	NC
40	NC	NC
41	VSS	GROUND
42	VLSS	LED POWER SOURCE INPUT TERMINAL (CATHODE SIDE)
43	VLED	LED POWER SOURCE INPUT TERMINAL (ANODE SIDE)
44	SCL	SERIAL COMMUNICATION CLOCK INPUT
45	SDA	SERIAL COMMUNICATION DATA INPUT AND OUTPUT

RGB MODE SELECTION TABLE	DCLK	HSYNC	VSYNC	DE
SYNC-DE MODE	INPUT	INPUT	INPUT	INPUT
SYNC MODE	INPUT	INPUT	INPUT	GND
DE MODE	INPUT	GND	GND	INPUT

NOTE: "INPUT" MEANS THESE SIGNALS ARE DRIVEN BY HOST SIDE.

10.2 IF2

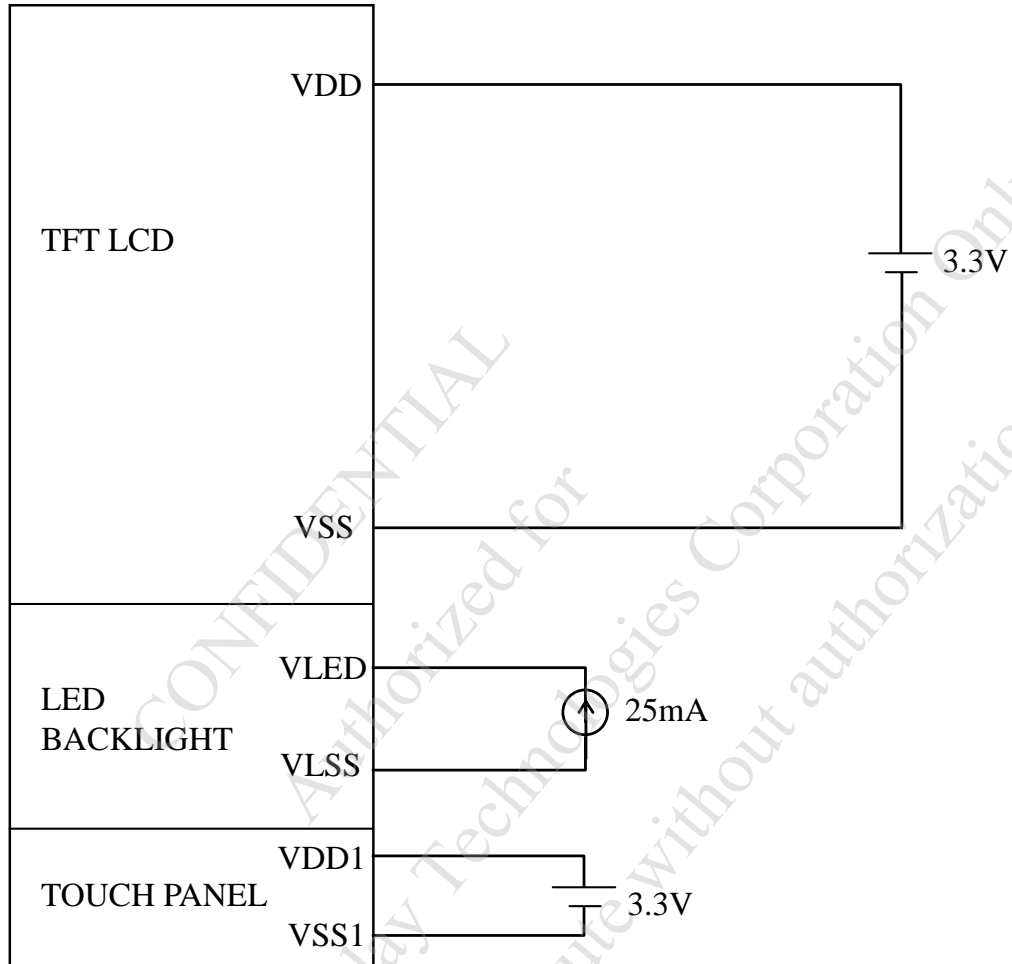
PIN NO.	SYMBOL	FUNCTION
1	VSS1	GROUND
2	/RST	EXTERNAL RESET, LOW IS ACTIVE (+3.3V)
3	/INT	EXTERNAL INTERRUPT TO THE HOST (+3.3V)
4	SCL	I2C CLOCK INPUT (+3.3V)
5	SDA	I2C DATA INPUT AND OUTPUT (+3.3V)
6	VDD1	POWER SUPPLY VOLTAGE (+3.3V)
7	NC	THE PIN WAS RESERVED FOR USB VDD (+5.0V)
8	NC	THE PIN WAS RESERVED FOR USB D-
9	NC	THE PIN WAS RESERVED FOR USB D+
10	NC	THE PIN WAS RESERVED FOR USB GND

11. PROTOCOL

CMD CODE	NAME	SET/GET	B7	B6	B5	B4	B3	B2	B1	B0
0x10	TOUCH REPORTED NUMBER	GET	THE NUMBERS OF THE TOUCH INFORMATION REPORT							
0x11	TOUCH INFORMATION REPORT	GET	TOUCH _ STATUS	0	REPORTED_ID					
			X POSITION (BIT 15:8) OF THE FINGER							
			X POSITION (BIT 7:0) OF THE FINGER							
			Y POSITION (BIT 15:8) OF THE FINGER							
0x11	TOUCH KEY REPORT	GET	TOUCH _ STATUS	1	REPORTED_ID					
			TOUCH KEY ID							
			0x00							
			0xFF							
0x20	PANEL INFORMATION	GET	THE MAXIMUM X COORDINATE (BIT 15:8)							
			THE MAXIMUM Y COORDINATE (BIT 7:0)							
			THE MAXIMUM Y COORDINATE (BIT 15:8)							
			THE CHANNEL NUMBERS OF X DIRECTION							
			THE CHANNEL NUMBERS OF Y DIRECTION							
			THE MAXIMUM REPORT POINTS							
			THE CHANNEL NUMBERS OF TOUCHKEY							
			FOR TOUCH KEY APPLICATION (MAXIMUM SUPPORTS 31 TOUCH KEY) BYTE 8 : THE TOUCH KEY NUMBER (<32) BYTE 9: 0xFF							
0x30	ENTER SLEEP MODE	SET	--							
0x40	FIRMWARE VERSION	GET	CHIP ID CODE							
			MAJOR FIRMWARE VERSION							
			MINOR FIRMWARE VERSION							
			RELEASE FIRMWARE VERSION							
			FOR CUSTOMER FIRMWARE VERSION							
			FOR CUSTOMER FIRMWARE VERSION							
			FOR CUSTOMER FIRMWARE VERSION							
0x42	PROTOCOL VERSION	GET	MAJOR PROTOCOL VERSION : 0X02							
			MINOR PROTOCOL VERSION : XX							
			RELEASE PROTOCOL VERSION : XX							

12. POWER SUPPLY

12.1 POWER SUPPLY FOR LCM



13. CAPACITIVE TOUCH PANEL SPECIFICATION

13.1 OPTICAL CHARACTERISTICS

ITEM	CONDITION	MIN.	TYP.	MAX.	UNIT
TRANSPARENCY NOTE (1)	Ta = 25°C λ=550 nm	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.

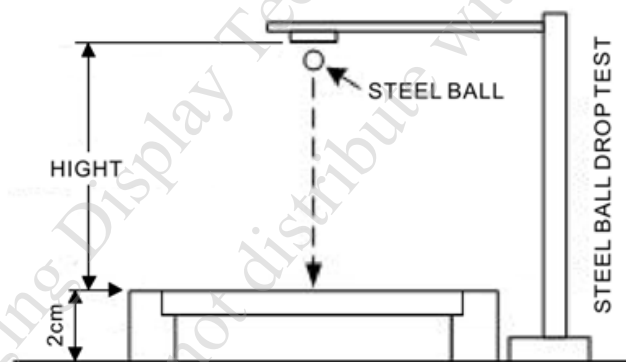
13.2 HARDNESS

ITEM	DESCRIPTION
SURFACE HARDNESS	7H (MIN.)

13.3 DURABILITY

USING STEEL BALL AND FALLING ON TOUCH PANEL SURFACE, FROM THE HEIGHT MUST PASS BELOW CONDITIONS :

ITEM	CONDITION	INSPECTION METHOD	DESCRIPTION
STEEL BALL DROP TEST	WEIGHT : 67g HEIGHT OF FALL : 30 cm	VISUAL INSPECTION	SIGN OF FRACTURE OR DAMAGE IS NOT ACCEPTABLE 3 TIME/ 1 POINTS, 25°C (CENTER POINT)



14. INSPECTION CRITERIA

14.1 APPLICATION

THIS INSPECTION STANDARD IS TO BE APPLIED TO THE LCD MODULE DELIVERED FROM EMERGING DISPLAY TECHNOLOGIES CORP.(E.D.T) TO CUSTOMERS

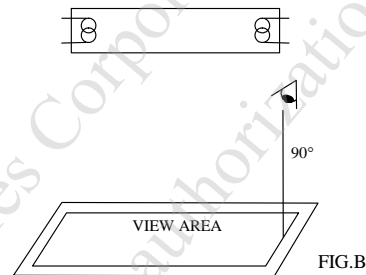
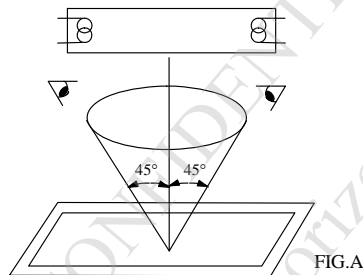
14.2 INSPECTION CONDITIONS

14.2.1 (1)OBSERVATION DISTANCE : 45±5cm

(2)VIEWING ANGLE : ±45°

±45° (FOR SECTION WITHIN VIEWING AREA), REFER TO FIG.A
90° (FOR SECTION OUTSIDE OF VIEWING AREA), REF TO FIG.B
PERPENDICULAR TO MODULE SURFACE

VIEWING ANGLE SHOULD BE SMALLER THAN 45°



THE INSPECTION CRITERIA IS ACCORDING TO LINE OF SIGHT. INSPECTION SHALL BE MADE WITHIN THE HALF SECTION OF THE VIEWING CONE GENERATED BY LINE SEGMENT OF 45° WITH RESPECT TO THE VERTICAL AXIS FROM CENTER VERTEX OF LCD, THE FLUORESCENT LAMP AND THE CONE AXIS MUST BE PERPENDICULAR TO THE LCD SURFACE.

IF THE DEFECTS ARE OUTSIDE OF VIEWING AREA, IT SHALL BE INSPECTED BY 90° WITH RESPECT TO THE VERTICAL AXIS FROM EDGE OF VIEWING AREA.

14.2.2 ENVIRONMENT CONDITIONS :

AMBIENT TEMPERATURE		25±5°C
AMBIENT HUMIDITY		65 ± 20%RH
AMBIENT ILLUMINATION	COSMETIC INSPECTION	600~800 lux
	FUNCTIONAL INSPECTION	300~500 lux
INSPECTION TIME		10 secs

14.2.3 INSPECTION LOT

QUANTITY PER DELIVERY LOT FOR EACH MODEL

14.2.4 INSPECTION METHOD

A SAMPLING INSPECTION SHALL BE MADE ACCORDING TO THE FOLLOWING PROVISIONS TO JUDGE THE ACCEPTABILITY

(a)APPLICABLE STANDARD :

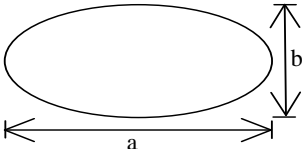
ANSI/ ASQ Z1.4 NORMAL INSPECTION LEVEL II

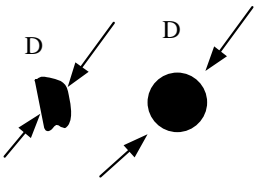
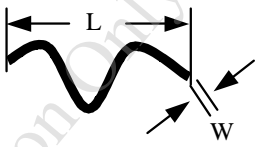
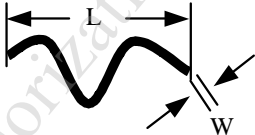
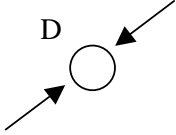
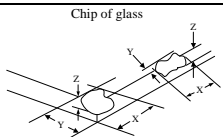
(b)AQL : MAJOR DEFECT : AQL 0.65

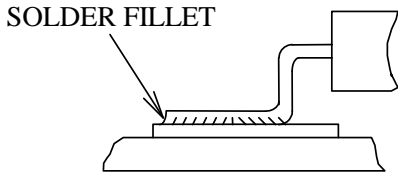
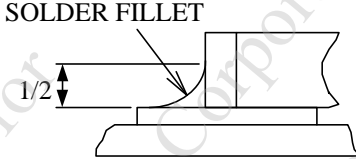
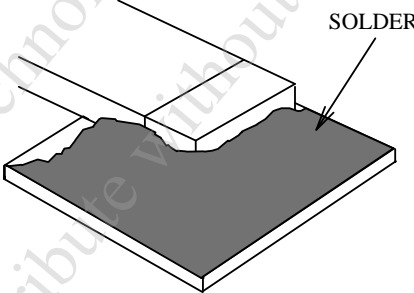
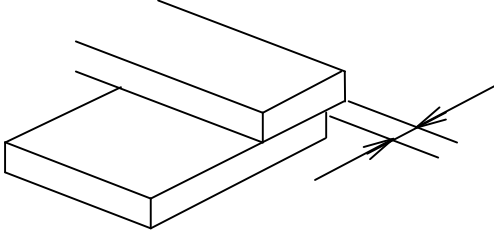
MINOR DEFECT : AQL 1.0

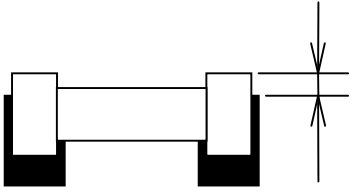
14.3 DEFECTS CLASSIFICATION

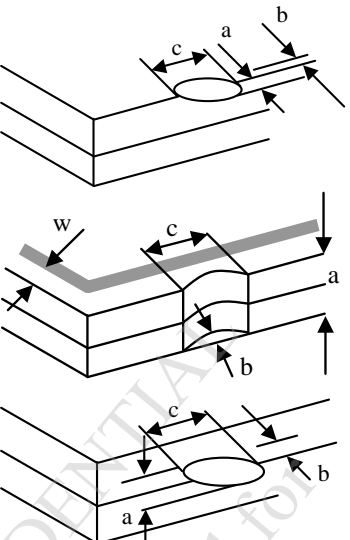
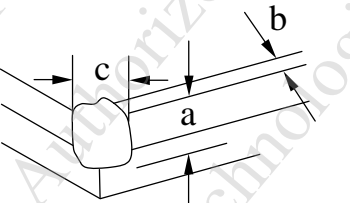
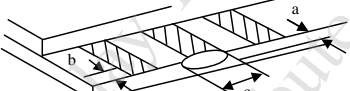
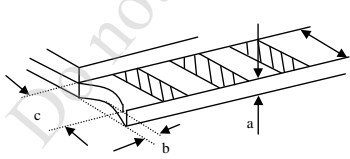
TYPE OF DEFECT	INSPECTION ITEM	DEFECT FEATURE	AQL
MAJOR DEFECT	1.DISPLAY ON	<ul style="list-style-type: none"> • DEFECT TO MISS SPECIFIED DISPLAY FUNCTION, FOR ALL AND SPECIFIED DOTS EX: DISCONNECTION, SHORT CIRCUIT ETC 	0.65
	2.CTP FUNCTION	<ul style="list-style-type: none"> • NO FUNCTION • BROKEN LINE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

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	<p>1. INSPECTION PATTERN: FULL WHITE, FULL BLACK, RED, GREEN AND BLUE SCREENS.</p> <p>2.</p> <table border="1"> <thead> <tr> <th>ITEMS</th> <th>PERMISSIBLE NO.</th> </tr> </thead> <tbody> <tr> <td>BRIGHT DOT</td> <td>$N \leq 2$</td> </tr> <tr> <td>DARK DOT</td> <td>$N \leq 3$</td> </tr> <tr> <td>TOTAL BRIGHT AND DARK DOTS</td> <td>$N \leq 4$</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. THE BRIGHT DOT DEFECT MUST BE VISIBLE THROUGH 5% ND FILTER.</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	PERMISSIBLE NO.	BRIGHT DOT	$N \leq 2$	DARK DOT	$N \leq 3$	TOTAL BRIGHT AND DARK DOTS	$N \leq 4$																
ITEMS	PERMISSIBLE NO.																									
BRIGHT DOT	$N \leq 2$																									
DARK DOT	$N \leq 3$																									
TOTAL BRIGHT AND DARK DOTS	$N \leq 4$																									
4	BUBBLES ON POLARIZER /SURFACE STAINS /DIRT/CF FAIL/SPOT	<table border="1"> <thead> <tr> <th></th> <th>AVERAGE DIAMETER (mm) : D</th> <th>PERMISSIBLE NO.</th> </tr> </thead> <tbody> <tr> <td rowspan="3">BUBBLE ON POLARIZER</td> <td>$D \leq 0.25$</td> <td>IGNORE</td> </tr> <tr> <td>$0.25 < D \leq 0.5$</td> <td>$N \leq 5$</td> </tr> <tr> <td>$0.5 < D$</td> <td>NONE</td> </tr> <tr> <td rowspan="3">SURFACE STAINS / DIRT ON POLARIZER</td> <td>$D < 0.25$</td> <td>IGNORE</td> </tr> <tr> <td>$0.25 < D \leq 0.4$</td> <td>$N \leq 3$</td> </tr> <tr> <td>$0.4 < D$</td> <td>NONE</td> </tr> <tr> <td rowspan="3">CF FAIL / SPOT</td> <td>$D < 0.1$</td> <td>IGNORE</td> </tr> <tr> <td>$0.1 < D \leq 0.3$</td> <td>$N \leq 3$</td> </tr> <tr> <td>$0.3 < D$</td> <td>NONE</td> </tr> </tbody> </table> <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. AVERAGE DIAMETER (D)=(a+b)/2</p> 		AVERAGE DIAMETER (mm) : D	PERMISSIBLE NO.	BUBBLE ON POLARIZER	$D \leq 0.25$	IGNORE	$0.25 < D \leq 0.5$	$N \leq 5$	$0.5 < D$	NONE	SURFACE STAINS / DIRT ON POLARIZER	$D < 0.25$	IGNORE	$0.25 < D \leq 0.4$	$N \leq 3$	$0.4 < D$	NONE	CF FAIL / SPOT	$D < 0.1$	IGNORE	$0.1 < D \leq 0.3$	$N \leq 3$	$0.3 < D$	NONE
	AVERAGE DIAMETER (mm) : D	PERMISSIBLE NO.																								
BUBBLE ON POLARIZER	$D \leq 0.25$	IGNORE																								
	$0.25 < D \leq 0.5$	$N \leq 5$																								
	$0.5 < D$	NONE																								
SURFACE STAINS / DIRT ON POLARIZER	$D < 0.25$	IGNORE																								
	$0.25 < D \leq 0.4$	$N \leq 3$																								
	$0.4 < D$	NONE																								
CF FAIL / SPOT	$D < 0.1$	IGNORE																								
	$0.1 < D \leq 0.3$	$N \leq 3$																								
	$0.3 < D$	NONE																								

NO.	ITEM	CRITERIA										
5	BLACK/WHITE SPOT CIRCULAR TYPE	<p>THE FOLLOWING BLACK/WHITE SPOT ARE WITHIN THE VIEWING AREA. AVERAGE DIAMETER : D (mm)</p> <table border="1"> <thead> <tr> <th>SIZE D</th> <th>PERMISSIBLE NO.</th> </tr> </thead> <tbody> <tr> <td>$D \leq 0.15$</td> <td>IGNORE</td> </tr> <tr> <td>$0.15 < D \leq 0.3$</td> <td>4</td> </tr> <tr> <td>$0.3 < D \leq 0.5$</td> <td>2</td> </tr> <tr> <td>$D > 0.5$</td> <td>0</td> </tr> </tbody> </table> <p>NOTE (1) : THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART.</p> 	SIZE D	PERMISSIBLE NO.	$D \leq 0.15$	IGNORE	$0.15 < D \leq 0.3$	4	$0.3 < D \leq 0.5$	2	$D > 0.5$	0
SIZE D	PERMISSIBLE NO.											
$D \leq 0.15$	IGNORE											
$0.15 < D \leq 0.3$	4											
$0.3 < D \leq 0.5$	2											
$D > 0.5$	0											
6	SCRATCH	<p>THE FOLLOWING SCRATCH IS WITHIN THE VIEWING AREA. WIDTH : W (mm) , LENGTH : L (mm)</p> <table border="1"> <thead> <tr> <th>SIZE W & L</th> <th>PERMISSIBLE NO.</th> </tr> </thead> <tbody> <tr> <td>$W \leq 0.05$</td> <td>IGNORE</td> </tr> <tr> <td>$0.05 < W \leq 0.08, L \leq 8$</td> <td>3</td> </tr> <tr> <td>$0.08 < W \leq 0.1, L \leq 5$</td> <td>3</td> </tr> <tr> <td>$W > 0.1$</td> <td>0</td> </tr> </tbody> </table> <p>NOTE (1) : THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 5mm APART.</p> 	SIZE W & L	PERMISSIBLE NO.	$W \leq 0.05$	IGNORE	$0.05 < W \leq 0.08, L \leq 8$	3	$0.08 < W \leq 0.1, L \leq 5$	3	$W > 0.1$	0
SIZE W & L	PERMISSIBLE NO.											
$W \leq 0.05$	IGNORE											
$0.05 < W \leq 0.08, L \leq 8$	3											
$0.08 < W \leq 0.1, L \leq 5$	3											
$W > 0.1$	0											
7	BLACK / WHITE LINE LINEAR TYPE / FOREIGN FIBER	<p>THE FOLLOWING BLACK LINE, WHITE LINE IS WITHIN THE VIEWING AREA. WIDTH : W (mm) , LENGTH : L (mm)</p> <table border="1"> <thead> <tr> <th>SIZE W & L</th> <th>PERMISSIBLE NO.</th> </tr> </thead> <tbody> <tr> <td>$W \leq 0.05$</td> <td>IGNORE</td> </tr> <tr> <td>$0.05 < W \leq 0.08, L \leq 8$</td> <td>3</td> </tr> <tr> <td>$0.08 < W \leq 0.1, L \leq 5$</td> <td>3</td> </tr> <tr> <td>$W > 0.1$</td> <td>0</td> </tr> </tbody> </table> <p>NOTE (1) : THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 5mm APART.</p> 	SIZE W & L	PERMISSIBLE NO.	$W \leq 0.05$	IGNORE	$0.05 < W \leq 0.08, L \leq 8$	3	$0.08 < W \leq 0.1, L \leq 5$	3	$W > 0.1$	0
SIZE W & L	PERMISSIBLE NO.											
$W \leq 0.05$	IGNORE											
$0.05 < W \leq 0.08, L \leq 8$	3											
$0.08 < W \leq 0.1, L \leq 5$	3											
$W > 0.1$	0											
8	BUBBLE / DENT FOR OPTICAL BONDING	<p>BUBBLES WITHIN VIEWING AREA. AVERAGE DIAMETER : D (mm)</p> <table border="1"> <thead> <tr> <th>SIZE D</th> <th>PERMISSIBLE NO.</th> </tr> </thead> <tbody> <tr> <td>$D \leq 0.2$</td> <td>IGNORE</td> </tr> <tr> <td>$0.2 < D \leq 0.3$</td> <td>3</td> </tr> <tr> <td>$0.3 < D \leq 0.5$</td> <td>2</td> </tr> <tr> <td>$D > 0.5$</td> <td>0</td> </tr> </tbody> </table> <p>NOTE (1) : THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART.</p> 	SIZE D	PERMISSIBLE NO.	$D \leq 0.2$	IGNORE	$0.2 < D \leq 0.3$	3	$0.3 < D \leq 0.5$	2	$D > 0.5$	0
SIZE D	PERMISSIBLE NO.											
$D \leq 0.2$	IGNORE											
$0.2 < D \leq 0.3$	3											
$0.3 < D \leq 0.5$	2											
$D > 0.5$	0											
9	CHIPPING	<table border="1"> <tr> <td>CORNER</td> <td>$X \leq 3\text{mm} \cdot Y \leq 3\text{mm} \cdot Z \leq t$ (t : THICKNESS)</td> </tr> <tr> <td>EDGE</td> <td>$X \leq 6\text{mm} \cdot Y \leq 1\text{mm} \cdot Z < t$ (t : THICKNESS)</td> </tr> </table> 	CORNER	$X \leq 3\text{mm} \cdot Y \leq 3\text{mm} \cdot Z \leq t$ (t : THICKNESS)	EDGE	$X \leq 6\text{mm} \cdot Y \leq 1\text{mm} \cdot Z < t$ (t : THICKNESS)						
CORNER	$X \leq 3\text{mm} \cdot Y \leq 3\text{mm} \cdot Z \leq t$ (t : THICKNESS)											
EDGE	$X \leq 6\text{mm} \cdot Y \leq 1\text{mm} \cdot Z < t$ (t : THICKNESS)											
10	CRACKED GLASS	NOT ACCEPTABLE										
11	LINE DEFECT ON DISPLAY	OBVIOUS VERTICAL OR HORIZONTAL LINE DEFECT IS NOT ALLOWED.										
12	MURA ON DISPLAY	IT'S ACCEPTABLE, IF MURA IS SLIGHT VISIBLE THROUGH 6% ND FILTER.										
13	UNEVEN COLOR SPREAD, COLORATION	TO BE DETERMINED BASED UPON THE LIMITED SAMPLE.										
14	BEZEL APPEARANCE	<p>1. BEZEL MAY NOT HAVE RUST, BE DEFORMED OR HAVE FINGER PRINTS STAINS OF OTHER CONTAMINATION.</p> <p>2. BEZEL MUST COMPLY WITH JOB SPECIFICATIONS.</p>										

NO.	ITEM	CRITERIA
15	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 ALIGNMENT</p> <p>(a)LSI, IC LEAD WIDTH IS MORE THAN 50% BEYOND PAD OUTLINE</p> 

NO.	ITEM	CRITERIA
15	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>
16	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>
17	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										
18	CRACKED GLASS	THE LCD WITH EXTENSIVE CRACK IS NOT ACCEPTABLE										
		<p>GENERAL GLASS CHIP :</p> 	<table border="1" data-bbox="938 421 1458 504"> <thead> <tr> <th>a</th> <th>b</th> <th>c</th> </tr> </thead> <tbody> <tr> <td>$\leq t/2$</td> <td>< VIEWING AREA</td> <td>$\leq 1/8X$</td> </tr> <tr> <td>$t/2 > , \leq 2t$</td> <td>$\leq W/2$</td> <td>$\leq 1/8X$</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="938 1003 1458 1086"> <thead> <tr> <th>a</th> <th>b</th> <th>c</th> </tr> </thead> <tbody> <tr> <td>$\leq t/2$</td> <td>< VIEWING AREA</td> <td>$\leq 1/8X$</td> </tr> <tr> <td>$> t/2 , \leq 2t$</td> <td>$\leq W/2$</td> <td>$\leq 1/8X$</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="938 1272 1458 1332"> <thead> <tr> <th>a</th> <th>b</th> <th>c</th> </tr> </thead> <tbody> <tr> <td>$\leq t$</td> <td>$\leq 0.5\text{mm}$</td> <td>$\leq 1/8X$</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="938 1429 1458 1489"> <thead> <tr> <th>a</th> <th>b</th> <th>c</th> </tr> </thead> <tbody> <tr> <td>$\leq t$</td> <td>$\leq 1/8X$</td> <td>$\leq L$</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										
$\leq t$	$\leq 1/8X$	$\leq L$										

15. RELIABILITY TEST

15.1 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)	<p>THE SAMPLE SHOULD BE ALLOWED TO STAND THE FOLLOWING 10 CYCLES OF OPERATION :</p>
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.

15.2 TESTING CONDITIONS AND INSPECTION CRITERIA

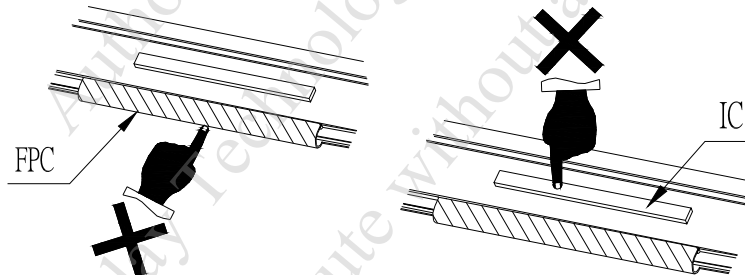
FOR THE FINAL TEST THE TESTING SAMPLE MUST BE STORED AT ROOM TEMPERATURE FOR 24 HOURS, AFTER THE TESTS LISTED IN TABLE 15.1, STANDARD SPECIFICATIONS FOR RELIABILITY HAVE BEEN EXECUTED IN ORDER TO ENSURE STABILITY.

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

16. CAUTION

16.1 OPERATION

- 16.1.1 DO NOT CONNECT OR DISCONNECT MODULES TO OR FROM THE MAIN SYSTEM WHILE POWER IS BEING SUPPLIED .
- 16.1.2 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 .
- 16.1.3 ADJUST THE LC DRIVING VOLTAGE TO OBTAIN THE OPTIMUM CONTRAST .
- 16.1.4 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 .
- 16.1.5 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!



16.2 NOTICE

- 16.2.1 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 .
- 16.2.2 DO NOT DISASSEMBLE . EDT SHALL NOT BE HELD RESPONSIBLE IF THE MODULE IS DISASSEMBLED AND UPON THE REASSEMBLY THE MODULE FAILED .
- 16.2.3 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 .
- 16.2.4 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 .
- 16.2.5 DON'T GIVE EXTERNAL SHOCK.
- 16.2.6 DON'T APPLY EXCESSIVE FORCE ON THE SURFACE.
- 16.2.7 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.
- 16.2.8 DON'T OPERATE IT ABOVE THE ABSOLUTE MAXIMUM RATING.
- 16.2.9 STORAGE IN A CLEAN ENVIRONMENT, FREE FROM DUST, ACTIVE GAS, AND SOLVENT.
- 16.2.10 STORE WITHOUT ANY PHYSICAL LOAD.
- 16.2.11 REWIRING: NO MORE THAN 3 TIMES.