

EXAMINED BY : Jacky-kwo	EMERGING DISPLAY TECHNOLOGIES CORPORATION	FILE NO . CAS-P00966
APPROVED BY: Justin Horng		ISSUE : MAR.17, 2026
		TOTAL PAGE : 32
		VERSION : P
CUSTOMER ACCEPTANCE SPECIFICATIONS MODEL NO. : <u>E I M L 0 5 0 0 2 2 D B A</u> (RoHS) FOR MESSRS : _____ CUSTOMER'S APPROVAL DATE : _____ BY : _____		

EMERGING DISPLAY
TECHNOLOGIES CORPORATION

MODEL NO.	VERSION	PAGE
E I M L 0 5 0 0 2 2 D B A	P	0-1

RECORDS OF REVISION	DOC . FIRST ISSUE MAR.17, 2026
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DATE	REVISED PAGE NO.	SUMMARY

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.	TIMING CHARACTERISTICS -----	5 ~ 14
6.	OPTICAL CHARACTERISTICS -----	15 , 16
7.	OUTLINE DIMENSIONS -----	17
8.	BLOCK DIAGRAM -----	18
9.	DETAIL DRAWING OF DOT MATRIX -----	19
10.	INTERFACE SIGNALS -----	20 , 21
11.	POWER SUPPLY -----	22
12.	CAPACITIVE TOUCH PANEL SPECIFICATION -----	23
13.	INSPECTION CRITERIA -----	24 ~ 29
14.	RELIABILITY TEST -----	30
15.	CAUTION -----	31 , 32

1. GENERAL SPECIFICATIONS

1.1 DATA SHEETS FOR TFT MODULE CONTROLLER/DRIVER

PLEASE REFER TO :

SITRONIX ST7121P

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), 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 SIZE ----- 5.0 inch
- (2) NUMBER OF DOTS ----- 720(RGB)W *1280H DOTS
- (3) MODULE SIZE ----- 71.8W *124.5 H * 6.5D(MAX.) mm
- (4) VIEWING AREA ----- 62.58W * 110.62H mm
- (5) ACTIVE AREA ----- 61.78W * 109.82H mm
- (6) DOT SIZE ----- 0.0286W * 0.0858H mm
- (7) PIXEL SIZE ----- 0.0858W *0.0858H mm
- (8) LCD TYPE ----- TFT, IPS, TRANSMISSIVE,
NORMALLY BLACK
- (9) COLOR ----- 16.7M
- (10) VIEWING DIRECTION ----- SUPER WIDE VIEW
- (11) BACKLIGHT ----- LED, COLOR : WHITE
- (12) INTERFACE MODE ----- MIPI
- (13) WEIGHT ----- TBD

2.2 CAPACITIVE TOUCH PANEL MECHANICAL SPECIFICATIONS

- (1) TOUCH PANEL SIZE ----- 5.0 inch
- (2) OUTER DIMENSION ----- 71.8W * 124.5H mm
- (3) ACTIVE AREA ----- 61.78W * 109.82H mm
- (4) INPUT TYPE ----- MULTI TOUCH
- (5) NUMBER OF TOUCH SENSOR ----- 14*26 SENSORS
- (6) RESOLUTION ----- 720*1280
- (7) INTERFACE MODE ----- I2C
- (8) THE MATERIAL OF COVER LENS ----- GLASS

3. ABSOLUTE MAXIMUM RATINGS

3.1 TFT MODULE ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
POWER SUPPLY VOLTAGE	VDD-VSS	-0.3	2.1	V	—
	AVDD-VSS	-0.3	6.6	V	—
	AVEE-VSS	-6.6	-0.3	V	—
STATIC ELECTRICITY	—	—	—	V	NOTE (1)
POWER DISSIPATION FOR LED BACKLIGHT	PD	—	(1485)	mW	—
FORWARD CURRENT FOR LED BACKLIGHT	ILED	—	75	mA	—

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

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) , (3) , (4)
HUMIDITY	NOTE (3)		NOTE (3)		WITHOUT CONDENSATION
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE (1) : THE ABSOLUTE MAXIMUM RATINGS OF THIS PRODUCT SHOULD NOT BE EXCEEDED AT ANY TIME. IF THESE RATINGS ARE EXCEEDED, THE PRODUCT'S PERFORMANCE IS NOT GUARANTEED AND THE PRODUCT MAY EXPERIENCE PERMANENT DAMAGE.

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

NOTE (3) : Ta ≤ 60°C : 90%RH MAX.

Ta > 60°C : ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF 90%RH AT 60°C.

NOTE (4) : WHEN THE LCD MODULE IS OPERATED AT A HIGHER AMBIENT TEMPERATURE THAN 60°C, POWER SUPPLY CURRENT OF LED BACKLIGHT SHOULD BE ADJUSTED TO BE LESS THAN TBD%. IF THE MODULE IS OPERATED AT A HIGHER CURRENT THAN TBD%, THEN THERE IS A POSSIBILITY OF DISTORTION AND IRREGULARITY OF THE PICTURE DUE TO LIQUID CRYSTAL BEHAVIOR.

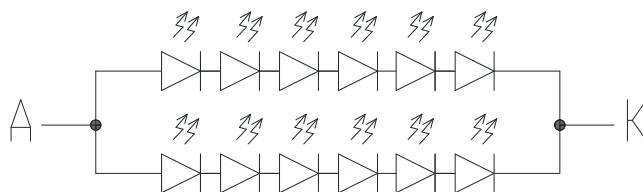
4. ELECTRICAL CHARACTERISTICS

$T_a = 25\text{ }^{\circ}\text{C}$

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
POWER SUPPLY VOLTAGE	VDD-VSS	—	(1.65)	(1.8)	(1.95)	V	
POWER SUPPLY VOLTAGE FOR CIRCUITS	AVDD-VSS	—	(5.3)	(5.5)	(5.7)	V	
	AVEE-VSS	—	(-5.7)	(-5.5)	(-5.3)	V	
POWER SUPPLY CURRENT	IDD	VDD-VSS = (1.8)V	—	TBD	TBD	mA	NOTE (1)
POWER SUPPLY CURRENT FOR CIRCUITS	IAVDD	AVDD-VSS=(5.5V)	—	TBD	TBD	mA	
	IAVEE	AVEE-VSS=-(-5.5V)	—	TBD	TBD	mA	
POWER SUPPLY VOLTAGE FOR LED BACKLIGHT	VLED-VLSS	I _{LED} =75mA	(15)	(17)	(19.8)	V	NOTE (2)
LED LIFE TIME	—	I _{LED} =37.5mA (PER LED)	(35k)	—	—	HRS	NOTE (4) NOTE (5)

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

NOTE (2) : INTERNAL CIRCUIT DIAGRAM OF BACKLIGHT



NOTE (3) : AMBIENT TEMP. VS. ALLOWABLE FORWARD CURRENT.(PER LED)
(TBD)

NOTE (4) : CONDITIONS; $T_a=25\text{ }^{\circ}\text{C}$, CONTINUOUS LIGHTING.

NOTE (5) : DEFINITIONS OF LIFE TIME

LCD LUMINANCE BECOMES HALF OF THE INITIAL VALUE.

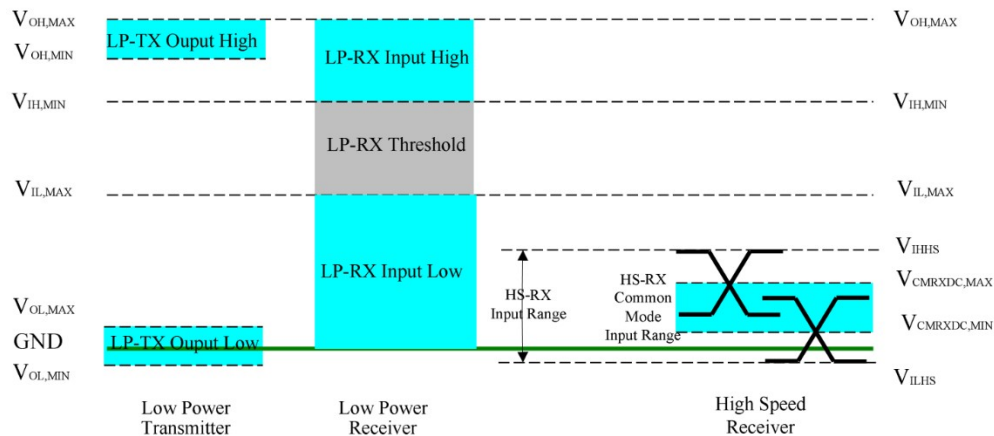
5. TIMING CHARACTERISTICS

5.1 FOR LCD MODULE

5.1.1 DC CHARACTERISTICS FOR PANEL DRIVING

PARAMETER	SYMBOL	CONDITIONS	SPECIFICATION			UNIT
			MIN.	TYP.	MAX.	
INPUT / OUTPUT						
LOGIC-HIGH INPUT VOLTAGE	VIH	—	0.7 VDDI	—	VDDI	V
LOGIC-LOW INPUT VOLTAGE	VIL	—	VSS	—	0.3VDDI	V
LOGIC-HIGH OUTPUT VOLTAGE	VOH	IOH = -1.0mA	0.8 VDDI	—	VDDI	V
LOGIC-LOW OUTPUT VOLTAGE	VOL	IOL = +1.0mA	VSS	—	0.2VDDI	V
INPUT LEAKAGE CURRENT	IIL	VIN= IOVCC/VSS	-1	—	+1	uA
VCOM VOLTAGE						
VCOM AMPLITUDE	VCOM	—	-2.75	—	-0.2	V
SOURCE DRIVER						
GAMMA AMPLITUDE (POSITIVE)	VGPAMP	—	3	—	6	V
GAMMA AMPLITUDE (NEGATIVE)	VGNAMP	—	-6	—	-3	V

5.1.2 MIPI DC CHARACTERISTICS



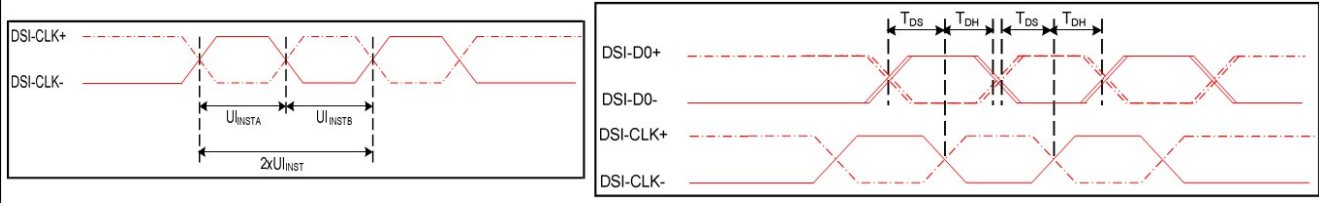
MIPI SIGNALING VOLTAGE LEVELS

PARAMETER	SYMBOL	SPECIFICATION			UNIT
		MIN.	TYP.	MAX.	
OPERATION VOLTAGE FOR MIPI RECEIVER					
LOW POWER MODE OPERATING VOLTAGE	VLPH	—	1.2	—	V
MIPI CHARACTERISTICS FOR HIGH SPEED RECEIVER					
SINGLE-ENDED INPUT LOW VOLTAGE	VILHS	-40	—	—	mV
SINGLE-ENDED INPUT HIGH VOLTAGE	VIHHS	—	—	460	mV
COMMON-MODE VOLTAGE	VCMRXDC	70	—	330	mV
DIFFERENTIAL INPUT IMPEDANCE	ZID	80	100	125	ohm
MIPI CHARACTERISTICS FOR LOW POWER MODE					
PAD SIGNAL VOLTAGE RANGE	VI	-50	—	1350	mV
LOGIC 0 INPUT THRESHOLD	VIL	0	—	550	mV
LOGIC 1 INPUT THRESHOLD	VIH	880	—	—	mV
OUTPUT LOW LEVEL	VOL	-50	—	50	mV
OUTPUT HIGH LEVEL	VOH	1.1	1.2	1.3	V

5.2 AC CHARACTERISTICS

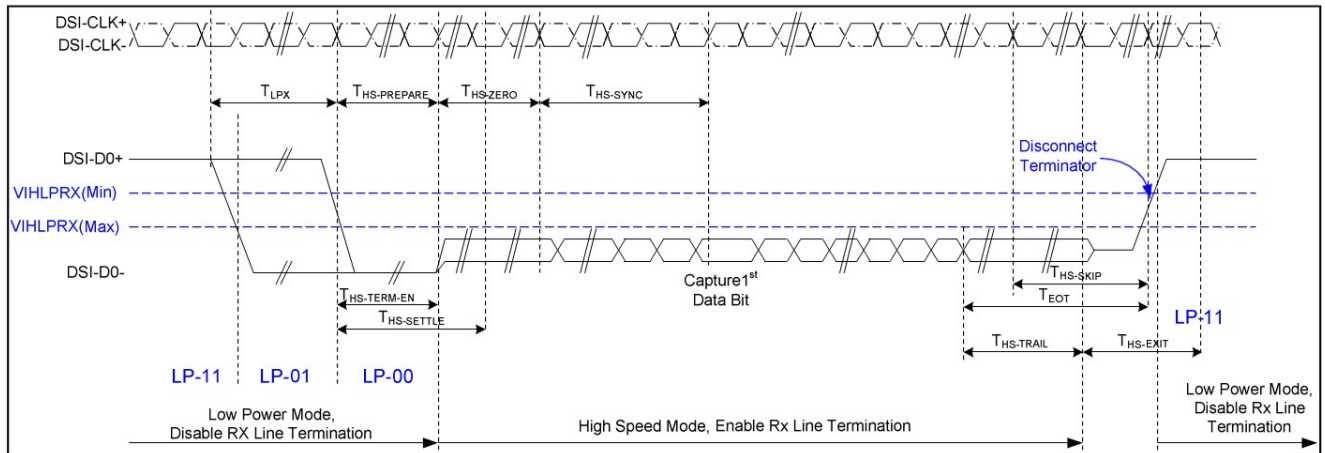
5.2.1 MIPI TIMING CHARACTERISTICS

5.2.1.1 HIGH SPEED MODE – CLOCK CHANNEL TIMING



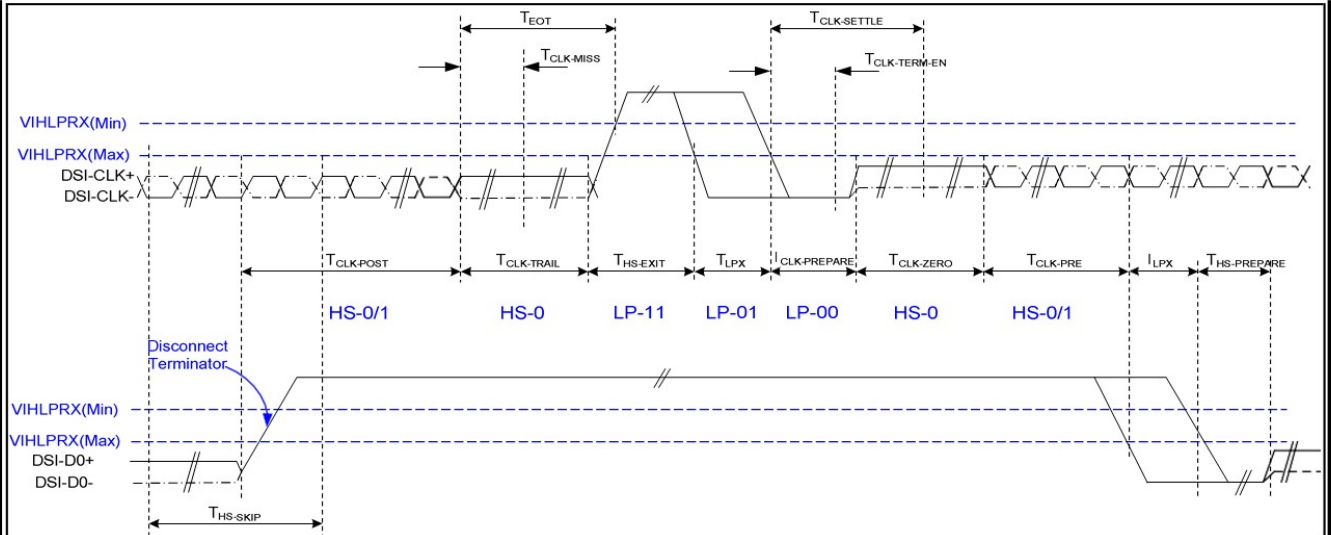
SIGNAL	SYMBOL	PARAMETER	SPECIFICATION			UNIT	DESCRIPTION
			MIN	TYP	MAX		
DSI-CLK+/-	2XUIINST	DOUBLE UI INSTANTANEOUS	2	—	10	NS	
DSI-CLK+/-	UIINSTA ,UIINSTB	UI INSTANTANEOUS HALF	1	—	5	NS	
DSI-DN+/-	TDS	DATA TO CLOCK SETUP TIME	0.15	—	—	UI	
DSI-DN+/-	TDH	DATA TO CLOCK HOLD TIME	0.15	—	—	UI	

5.2.1.2 HIGH SPEED MODE – DATA CLOCK CHANNEL TIMING



ITEM	SYMBOL	SPECIFICATION			UNIT
		MIN.	TYP.	MAX.	
TIME TO DRIVE LP-00 TO PREPARE FOR HS TRANSMISSION	$T_{HS-PREPARE}$	40+4UI	—	85+6UI	ns
TIME FROM START OF $T_{HS-TRAIL}$ OR $T_{CLK-TRAIL}$ PERIOD TO START OF LP-11 STATE	T_{EOT}	—	—	105+12UI	ns
TIME TO ENABLE DATA RECEIVER LINE TERMINATION MEASURED FROM WHEN DN CROSSSES VILMAX	$T_{HS-TERM-EN}$	—	—	35+4UI	ns
TIME TO DRIVE FLIPPED DIFFERENTIAL STATE AFTER LAST PAYLOAD DATA BIT OF A HS TRANSMISSION	$T_{HS-TRAIL}$	60+4UI	—	—	ns
TIME-OUT AT RX TO IGNORE TRANSITION PERIOD OF EOT	$T_{HS-SKIP}$	40	—	145+10UI	ns
TIME TO DRIVE LP-11 AFTER HS BURST	$T_{HS-EXIT}$	100	—	—	ns
LENGTH OF ANY LOW-POWER STATE PERIOD	T_{LPX}	50	—	—	ns
SYNC SEQUENCE PERIOD	$T_{HS-SYNC}$	—	8UI	—	ns
MINIMUM LEAD HS-0 DRIVE PERIOD BEFORE THE SYNC SEQUENCE	$T_{HS-ZERO}$	105+6UI	—	—	ns
TIME INTERVAL DURING WHICH THE HS RECEIVER SHOULD IGNORE ANY CLOCK LANE HS TRANSITIONS, STARTING FROM THE BEGINNING OF $T_{CLK-PREPARE}$	$T_{CLK-SETTLE}$	95	—	300	ns
TIME INTERVAL DURING WHICH THE HS RECEIVER SHALL IGNORE ANY DATA LANE HS TRANSITIONS, STARTING FROM THE BEGINNING OF $T_{HS-PREPARE}$. THE HS RECEIVER SHALL IGNORE ANY DATA LANE TRANSITIONS BEFORE THE MINIMUM VALUE, AND THE HS RECEIVER SHALL RESPOND TO ANY DATA LANE TRANSITIONS AFTER THE MAXIMUM VALUE.	$T_{HS-SETTLE}$	85+6UI	—	145+10UI	ns

5.2.1.3 80 SWITCHING THE CLOCK LANE BETWEEN CLOCK TRANSMISSION AND LOW-POWER MODE



ITEM	SYMBOL	SPECIFICATION			UNIT
		MIN.	TYP.	MAX.	
TIME THAT THE TRANSMITTER SHALL CONTINUE SENDING HS CLOCK AFTER THE LAST ASSOCIATED DATA LANE HAS TRANSITIONED TO LP MODE	$T_{CLK-POST}$	60+52UI	—	—	ns
DETECTION TIME THAT THE CLOCK HAS STOPPED TOGGING	$T_{CLK-MISS}$	—	—	60	ns
TIME TO DRIVE LP-00 TO PREPARE FOR HS CLOCK TRANSMISSION	$T_{CLK-PREPARE}$	38	—	95	ns
MINIMUM LEAD HS-0 DRIVE PERIOD BEFORE STARTING CLOCK	$T_{CLK-PREPARE} + T_{CLK-ZERO}$	300	—	-	ns
TIME TO ENABLE CLOCK LANE RECEIVER LINE TERMINATION MEASURED FROM WHEN DN CROSS VIL,MAX	$T_{CLK-TERM-EN}$	—	—	38	ns
MINIMUM TIME THAT THE HS CLOCK MUST BE SET PRIOR TO ANY ASSOCIATED DATA LANE BEGINNING THE TRANSMISSION FROM LP TO HS MODE	$T_{CLK-PRE}$	8	—	—	UI
TIME TO DRIVE HS DIFFERENTIAL STATE AFTER LAST PAYLOAD CLOCK BIT OF A HS TRANSMISSION BURST	$T_{CLK-TRAIL}$	60	—	—	ns

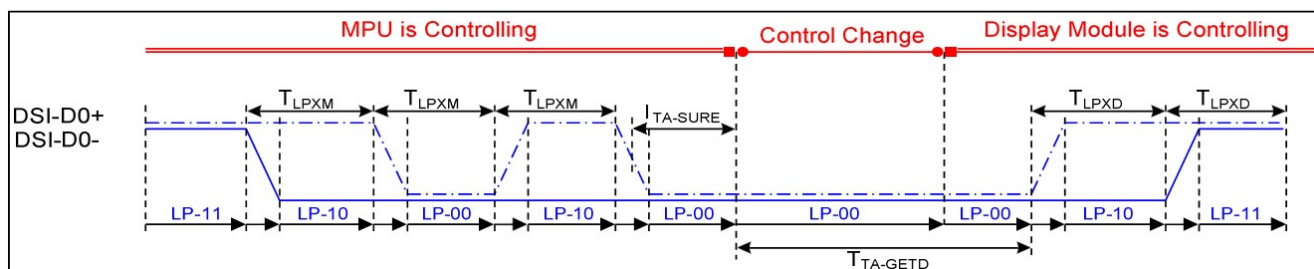
NOTE : 3-LANE = $(1000 / \text{FMIPI} * 8 * 52 - \text{THS_TRAIL} - 60) / (1000/\text{FMIPI})$

4-LANE = $(1000 / \text{FMIPI} * 8 * 39 - \text{THS_TRAIL} - 60) / (1000/\text{FMIPI})$

EXAMPLE: 3-LANE, 600MBPS : $N = (1000 / 600 * 8 * 52 - \text{THS_TRAIL} - 60) / (1000/600) = 340$

4-LANE, 600MBPS : $N = (1000 / 600 * 8 * 39 - \text{THS_TRAIL} - 60) / (1000/600) = 236$

5.2.1.4 81 BUS TURN-AROUND PROCEDURE

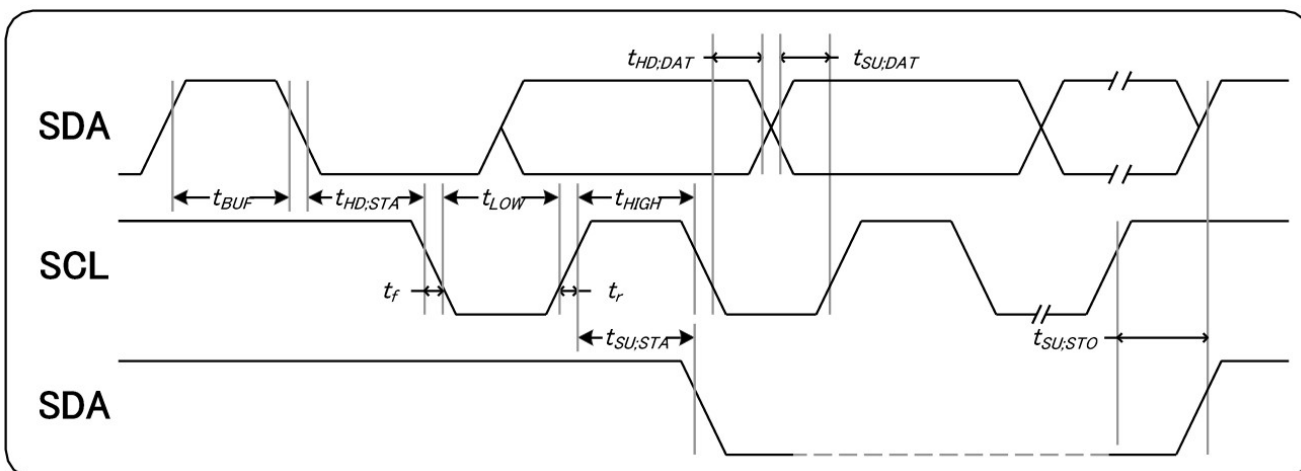


PARAMETER	SYMBOL	SPECIFICATION			UNIT
		MIN.	TYP.	MAX.	
LENGTH OF ANY LOW-POWER STATE PERIOD : MASTER SIDE	T_{LPX}	50	—	75	ns
LENGTH OF ANY LOW-POWER STATE PERIOD : SLAVE SIDE	T_{LPX}	47.5	—	52.5	ns
RATIO OF TLPX (MASTER)/ TLPX (SLAVE) BETWEEN MASTER AND SLAVE SIDE	RATIO T_{LPX}	2/3	—	3/2	
TIME-OUT BEFORE NEW TX SIDE START DRIVING	$T_{TA-SURE}$	T_{LPX}	—	$2 T_{LPX}$	ns
TIME TO DRIVE LP-00 BY NEW TX	T_{TA-GET}	—	$5 T_{LPX}$	—	ns
TIME TO DRIVE LP-00 AFTER TURNAROUND REQUEST	T_{TA-GO}	—	$4 T_{LPX}$	—	ns

5.2.1.5 MIPI INTERFACE TIMING

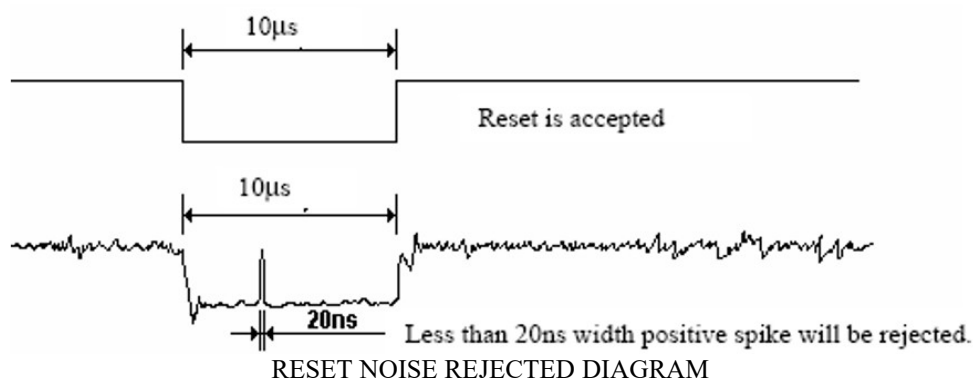
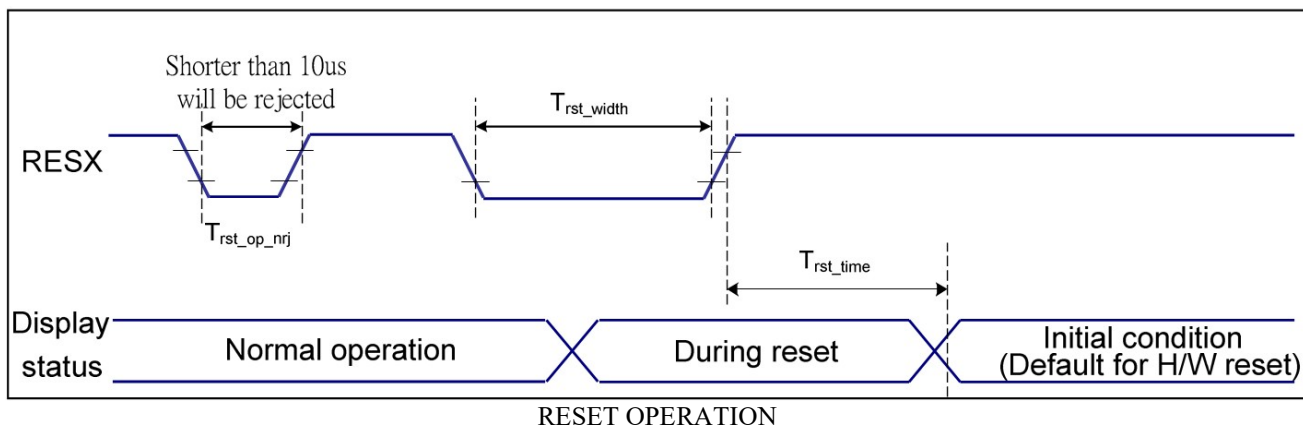
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
HORIZONTAL SYNC. WIDTH	HPW	2	—	—	BYTE CLOCK
HORIZONTAL SYNC. BACK PORCH	HBP	2	—	—	BYTE CLOCK
HORIZONTAL SYNC. FRONT PORCH	HFP	4	—	—	BYTE CLOCK
VERTICAL SYNC. WIDTH	VSW	2	—	—	LINE
VERTICAL SYNC. BACK PORCH	VBP	2	—	—	LINE
VERTICAL SYNC. FRONT PORCH	VFP	4	—	—	LINE
VERTICAL FREQUENCY		—	60	—	HZ

5.3 I2C TIMING



ITEM	SIGNAL	SYMBOL	CONDITION	RATING		UNIT
				MIN.	MAX.	
SCL CLOCK FREQUENCY	SCL	F_{SCL}	—	—	400	KHZ
SCL CLOCK LOW PERIOD		T_{LOW}	—	1300	—	nS
SCL CLOCK HIGH PERIOD		T_{HIGH}	—	600	—	
DATA SET-UP TIME	SDA	$T_{SU;DATA}$	—	100	—	
DATA HOLD TIME		$T_{HD;DATA}$	—	0	—	
SETUP TIME FOR A REPEATED START CONDITION	SDA	$T_{SU;STA}$	—	600	—	
START CONDITION HOLD TIME		$T_{HD;STA}$	—	600	—	
SETUP TIME FOR STOP CONDITION		$T_{SU;STO}$	—	600	—	
BUS FREE TIME BETWEEN A STOP AND START		T_{BUF}	—	1300	—	

5.4 RESET TIMING



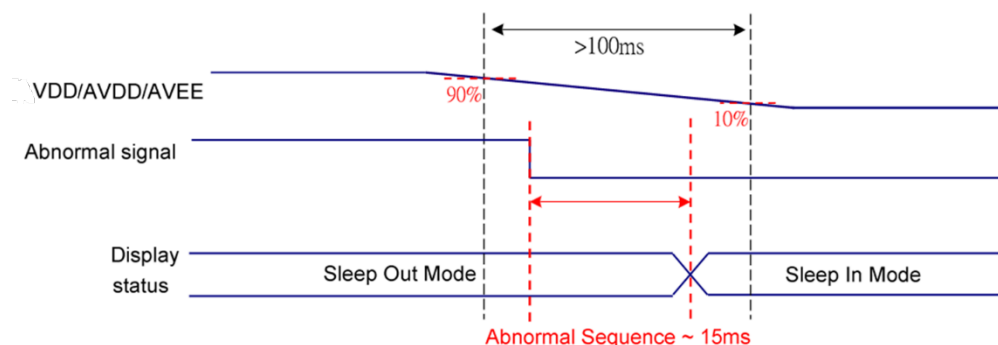
RESET TIMING CHARACTERISTICS VDD=1.65~1.95V TA=25°C

ITEM	SYMBOL	SPECIFICATION			UNIT
		MIN.	TYP.	MAX.	
RESET LOW WIDTH	T_{rst_width}	1	—	—	ms
RESET TIME	T_{rst_time}	120	—	—	ms
OP NOISE REJECT	$T_{rst_op_nrj}$	—	—	10	us

DURING THE RESET PERIOD, THE DISPLAY WILL BE BLANKED, THEN RETURN TO DEFAULT CONDITION FOR IC INITIALIZATION.

5.5 ABNORMAL TIMING

ST7121P PROVIDES ABNORMAL POWER DROP DETECTION FUNCTION, BUT THERE HAS A PREMISE THAT EXTERNAL POWER MUST DROP AT LOW RAMP, OR THE DISCHARGE FUNCTION WILL NOT WORK. THE FOLLOWING DIAGRAM IS SHOW HOW MUCH TIME THAT EXTERNAL POWER DROP FROM 90% TO 10% IS SUITABLE.



RESET NOISE REJECTED DIAGRAM

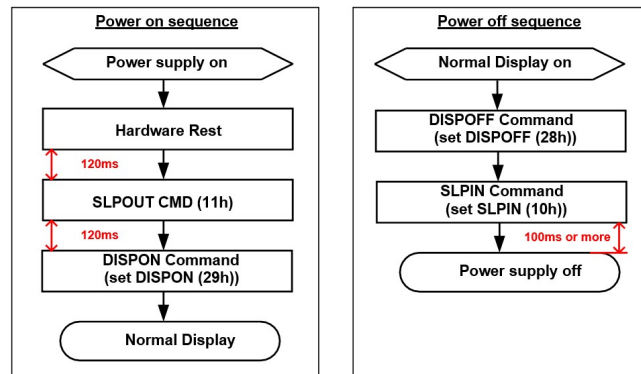
RESET TIMING CHARACTERISTICS VDD=1.8V, AVDD=5.5V, AVEE=-5.5V TA=25°C

EXTERNAL POWER	POWER DROP TIME FROM 90% TO 10%			UNIT
	MIN.	TYP.	MAX.	
VDD	100	—	—	ms
AVDD	100	—	—	ms
AVEE	100	—	—	ms

NOTE : DUE TO VDD IS CRITICAL FOR WHOLE CHIP, KEEP VDD AS STABLE AS POSSIBLE

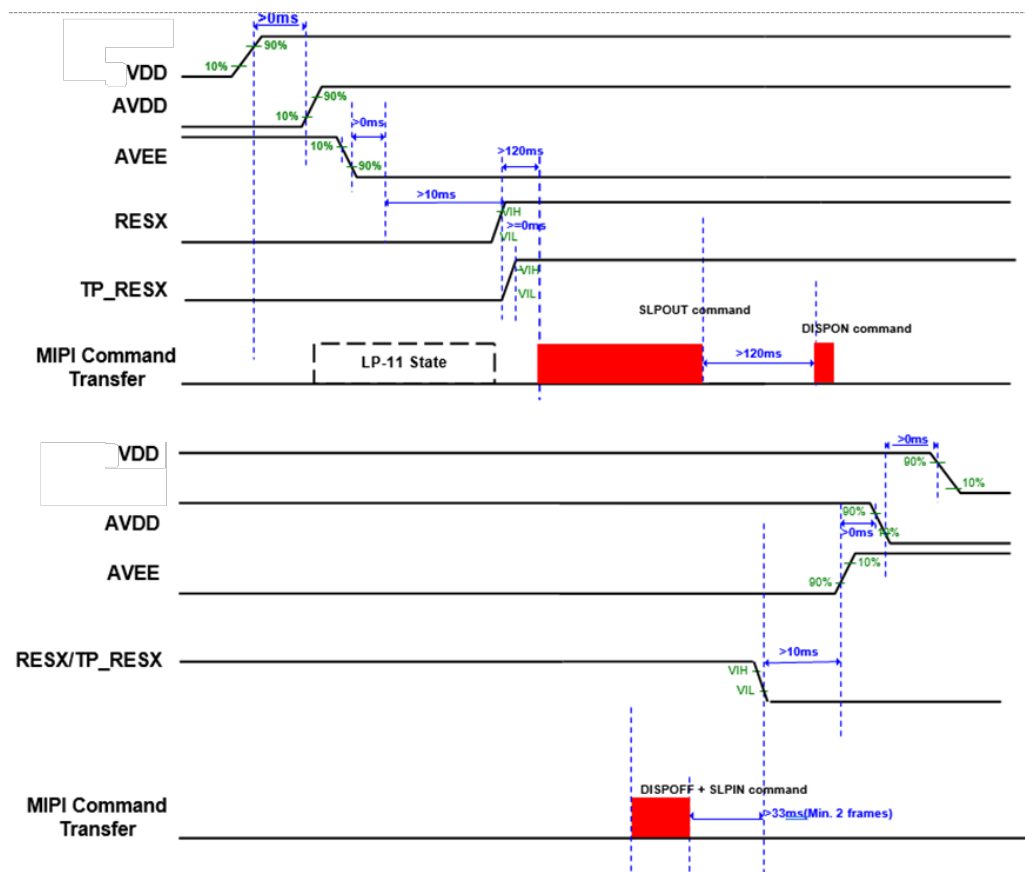
5.6 POWER ON/OFF SEQUENCE

THE POWER ON/OFF SEQUENCE IS ILLUSTRATED BELOW.



5.6.1 POWER ON/OFF TIMING

THE POWER ON/OFF TIMING DIAGRAM IS ILLUSTRATED BELOW.



NOTE 1: MIPI LANES MUST GO TO LP11 AFTER POWER VDD IS READY

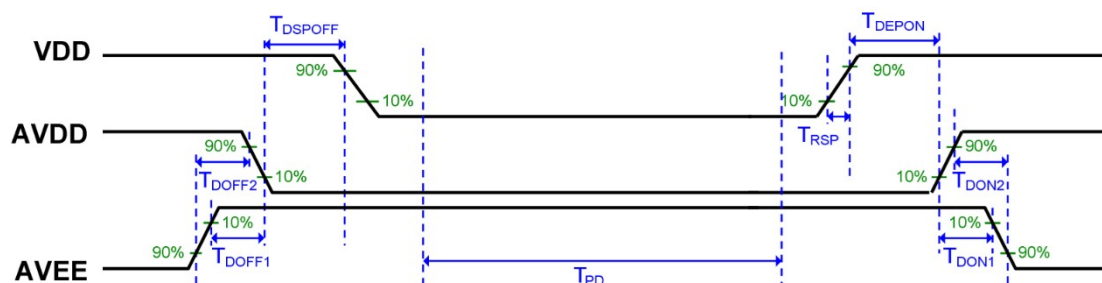
NOTE 2: AFTER SLPOUT COMMAND, DRIVER IC WILL START INTERNAL POWER ON ACTION. ANY OTHER SETTINGS SHOULD BE SET AFTER SLPOUT COMMAND WITH A MINIMUM OF 120MS.

NOTE 3: DISPOFF AND SLPIN COMMAND SHOULD BE SET AFTER SLPOUT COMMAND WITH A MINIMUM DELAY TIME OF 120MS.

NOTE 4: RESX TIED LOW INTO DEEP STANDBY MODE WITH A MINIMUM TIME OF 10MS.

5.6.2 POWER RAMP UP/DOWN SPECIFICATIONS

THE POWER RAMP UP/DOWN SPECIFICATIONS ARE ILLUSTRATE BELOW.



ITEM	SYMBOL	UNIT	MIN.	MAX.
SYSTEM POWER (VDD) RISE TIME (10% TO 90%)	TRSP	MS	—	2
SYSTEM POWER (VDD) ON TO AVDD ON TIME	TDEPON	MS	0	—
AVDD-AVEE ON DELAY TIME (10% TO 10%)	TDON1	MS	0	—
AVDD-AVEE ON DELAY TIME (90% TO 90%)	TDON2	MS	0	—
AVEE-AVDD OFF DELAY TIME (10% TO 10%)	TDOFF1	MS	0	—
AVEE-AVDD OFF DELAY TIME (90% TO 90%)	TDOFF2	MS	0	—
AVDD OFF TO SYSTEM POWER OFF TIME	TDSPOFF	MS	0	—
POWER DOWN TIME	TPD	MS	10	—

6. OPTICAL CHARACTERISTICS

6.1 OPTICAL CHARACTERISTICS(NOTE 1)

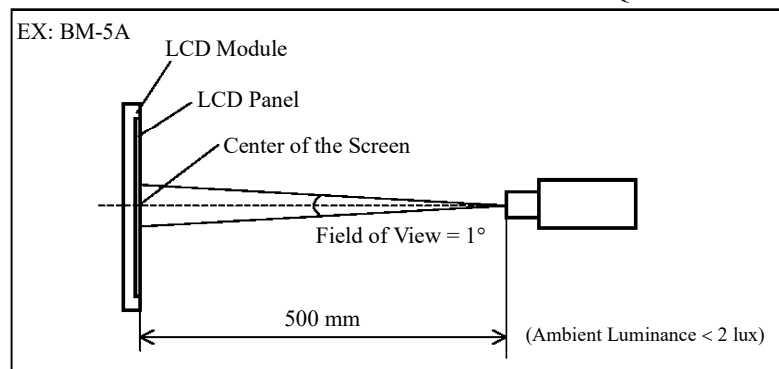
Ta=25±2°C

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
VIEWING ANGLE	θ_{y+}	$\theta_x=0^\circ$	(80)	(85)	—	deg	NOTE (2) NOTE (3)
	θ_{y-}		(80)	(85)	—	deg	
	θ_{x+}	$\theta_y=0^\circ$	(80)	(85)	—	deg	
	θ_{x-}		(80)	(85)	—	deg	
CONTRAST RATIO (CENTER)	CR	$\theta_x=0^\circ, \theta_y=0^\circ$	(1000)	(1500)	—	—	NOTE (3)
RESPONSE TIME	TR+TF	$\theta_x=0^\circ, \theta_y=0^\circ$	—	30	40	msec	NOTE (4)
COLOR CHROMATICITY (CENTER)	WHITE	Wx	(0.264)	(0.284)	(0.304)	—	NOTE (5)
		Wy	(0.298)	(0.318)	(0.338)	—	
	RED	Rx	(0.634)	(0.654)	(0.674)	—	
		Ry	(0.300)	(0.320)	(0.340)	—	
	GREEN	Gx	(0.225)	(0.245)	(0.265)	—	
		Gy	(0.546)	(0.566)	(0.586)	—	
	BLUE	Bx	(0.118)	(0.138)	(0.158)	—	
		By	(0.094)	(0.114)	(0.134)	—	
COLOR GAMUT	NTSC		—	(66.8)	—	%	
THE BRIGHTNESS OF MODULE (CENTER)	B		(700)	(800)	—	cd/m ²	NOTE (6)
THE UNIFORMITY OF MODULE(9 POINTS)	—		(70)	—	—	%	NOTE (7)

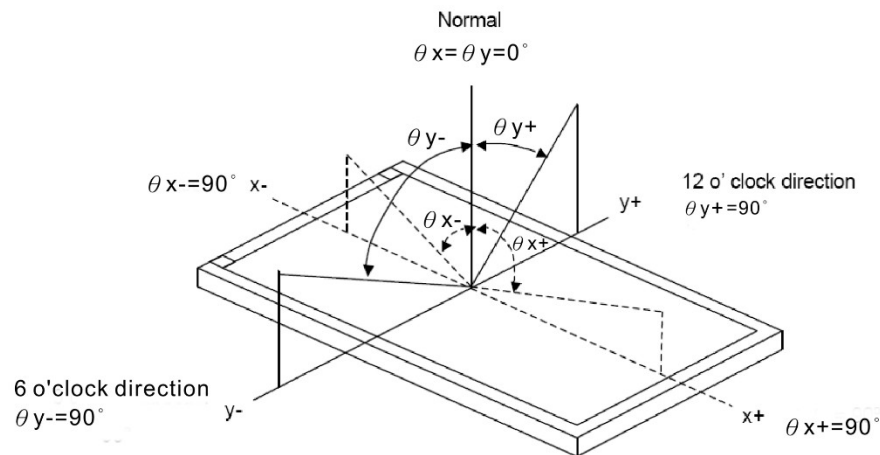
NOTE (1) : TEST CONDITION :

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.

THE MEASUREMENT CRITERIA AND CONDITION FOR EITHER BM-5A OR CA-210 OR EQUIVALENT LUMINANCE METER IS BASED ON THE EQUIPMENT'S MANUAL.



NOTE (2) : DEFINITION OF VIEWING ANGLE :



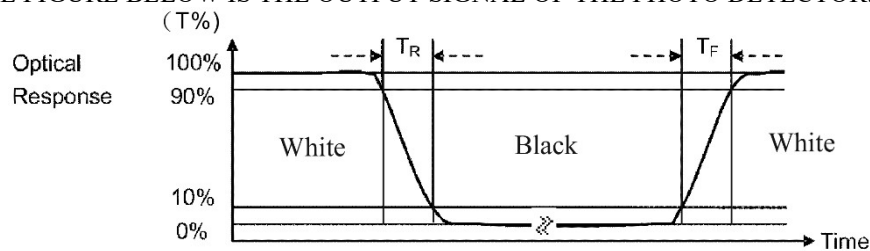
NOTE (3) : DEFINITION OF CONTRAST RATIO (CR) :

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.



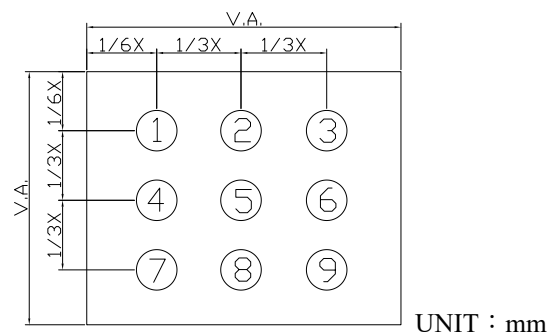
NOTE (5) : DEFINITION OF COLOR CHROMATICITY

(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.

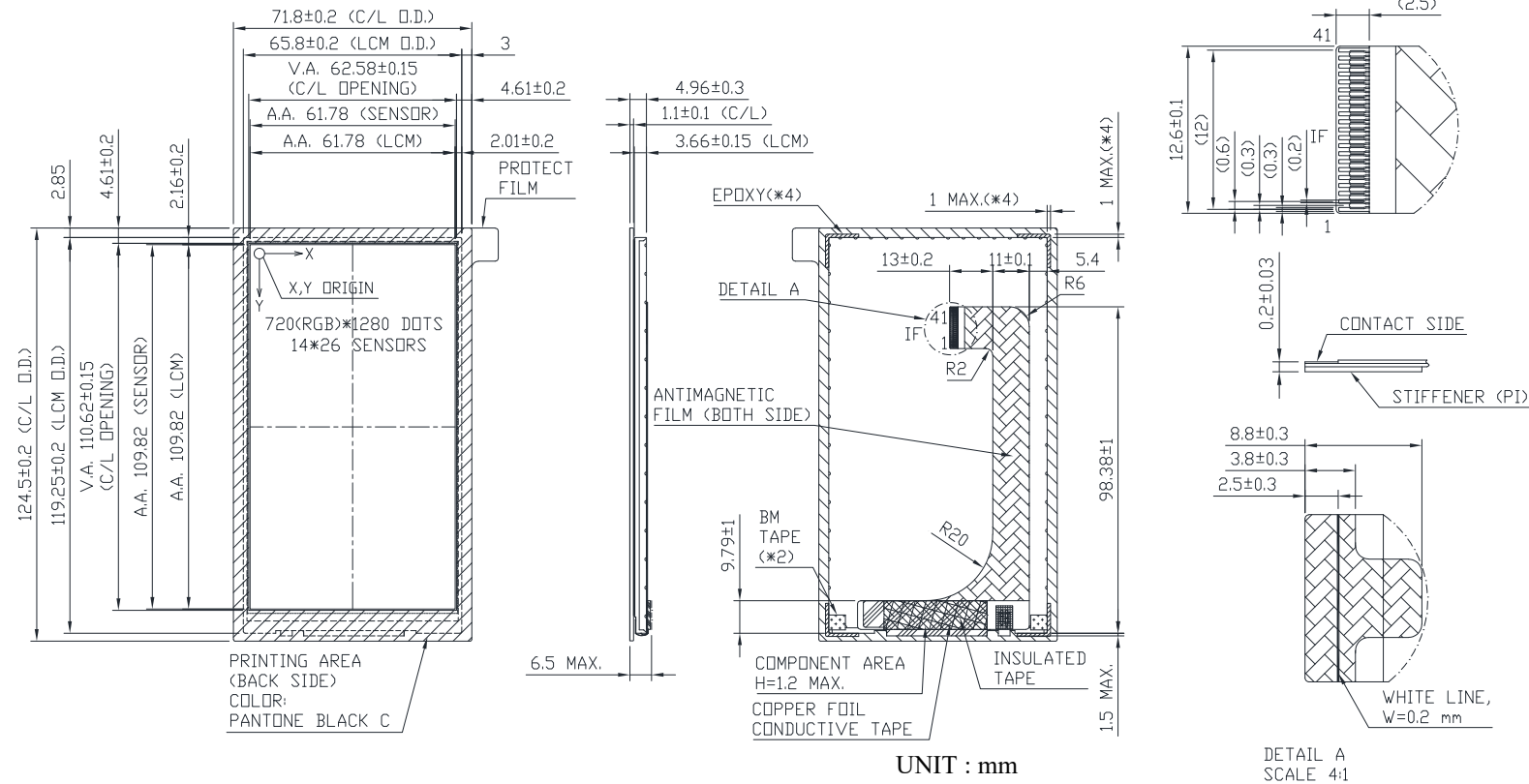
NOTE (7) : (a) DEFINITION OF BRIGHTNESS UNIFORMITY



(b) THE BRIGHTNESS UNIFORMITY CALCULATING METHOD

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

7. OUTLINE DIMENSIONS



UNIT : mm
SCALE : NTS

THIRD ANGLE PROJECTION

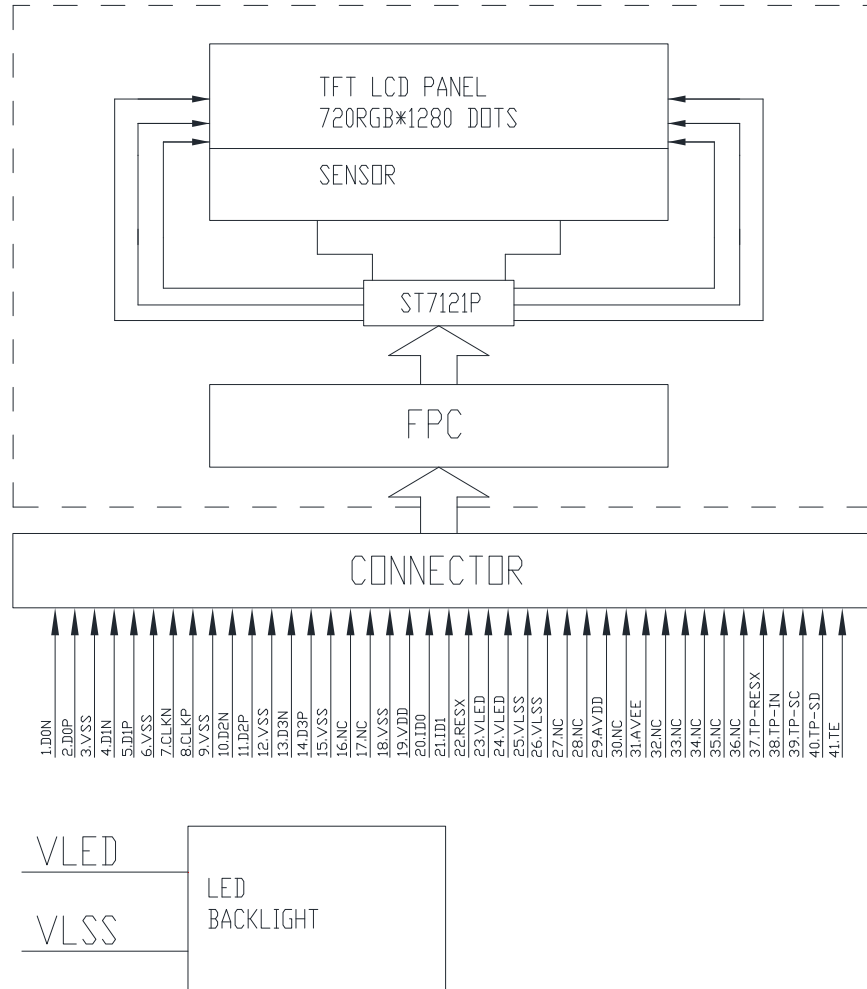
NOT SPECIFIED TOLERANCE IS ± 0.5 mm

NOTE :

- 1.C/L GLASS : SODA-LIME, CHAMFERED EDGES.
- 2.FPC BENDING RADIUS SHOULD BE MORE THAN 1.0 mm.
- 3.CONSIDERING THE TOLERANCE OF C/L V.A. AND POLARIZER, THE POLARIZER OF LCM IS VISIBLE WHICH SHOULD BE ACCEPTED.
- 4.IF:RECOMMEND MATCH CONNECTOR. HIROSE:FH26-41S-03SHW SERIES.

8. BLOCK DIAGRAM

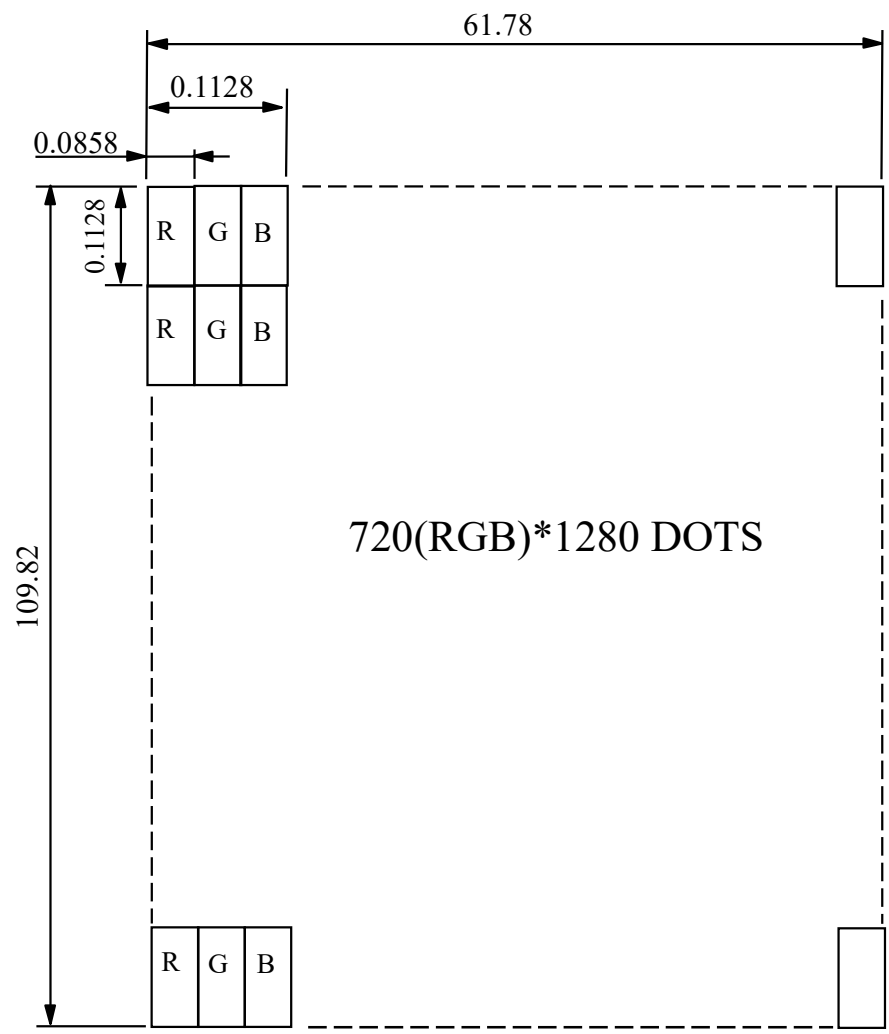
8.1 TFT AND CTP MODULE



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 : 4.7 μ F OR 10 μ F

9. DETAIL DRAWING OF DOT MATRIX



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

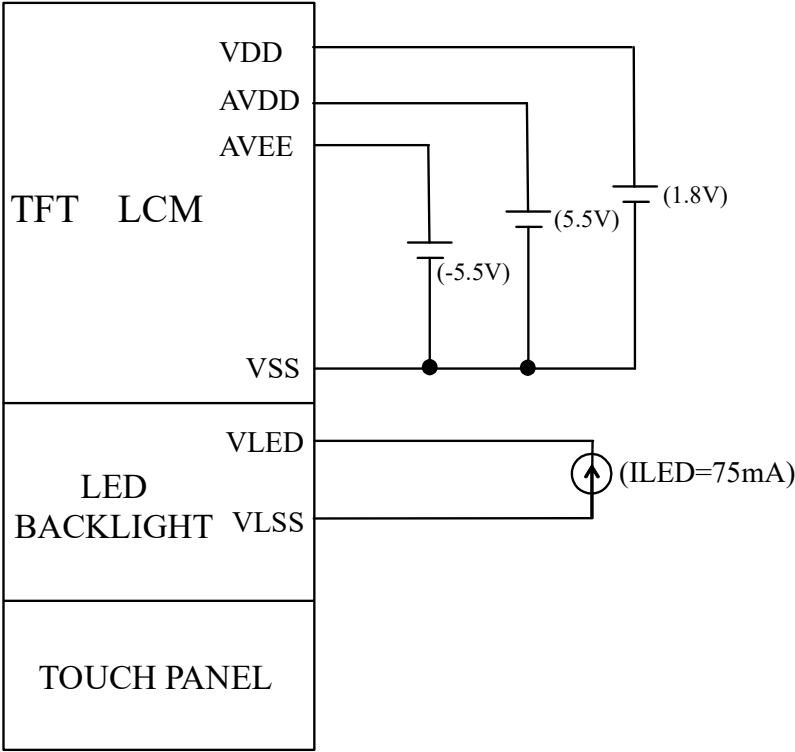
10. INTERFACE SIGNALS

PIN NO.	SYMBOL	FUNCTION	REMARKS
1	D0N	MIPI DATA PIN0 NEGATIVE	
2	D0P	MIPI DATA PIN0 POSITIVE	
3	VSS	GROUND	
4	D1N	MIPI DATA PIN1 NEGATIVE	
5	D1P	MIPI DATA PIN1 POSITIVE	
6	VSS	GROUND	
7	CLKN	MIPI CLOCK NEGATIVE SIGNAL	
8	CLKP	MIPI CLOCK POSITIVE SIGNAL	
9	VSS	GROUND	
10	D2N	MIPI DATA PIN2 NEGATIVE	
11	D2P	MIPI DATA PIN2 POSITIVE	
12	VSS	GROUND	
13	D3N	MIPI DATA PIN3 NEGATIVE	
14	D3P	MIPI DATA PIN3 POSITIVE	
15	VSS	GROUND	
16	NC	NC	
17	NC	NC	
18	VSS	GROUND	
19	VDD	POWER SETTING 1.8V	
20	ID0	ID0	
21	ID1	ID1	
22	RESX	GLOBAL RESET SIGNAL. LOW ACTIVE.	
23	VLED	LED POWER ANODE	
24	VLED	LED POWER ANODE	
25	VLSS	LED POWER CATHODE	
26	VLSS	LED POWER CATHODE	
27	NC	NC	
28	NC	NC	
29	AVDD	EXTERNAL POSITIVE POWER SUPPLY FOR ANALOG CIRCUIT	
30	NC	NC	

PIN NO.	SYMBOL	FUNCTION	REMARKS
31	AVEE	EXTERNAL NEGATIVE POWER SUPPLY FOR ANALOG CIRCUIT	
32	NC	NC	
33	NC	NC	
34	NC	NC	
35	NC	NC	
36	NC	NC	
37	TP-RESX	TP PIN_ EXTERNAL RESET	
38	TP-IN	TP PIN_ TOUCH SCREEN INTERRUPT	
39	TP-SC	TP PIN_ I2C INTERFACE CLOCK PIN	
40	TP-SD	TP PIN_ I2C INTERFACE DATA PIN	
41	TE	TEARING EFFECT OUTPUT PIN TO SYNCHRONIES MCU TO FRAME WRITING.	

11. POWER SUPPLY

11.1 POWER SUPPLY FOR LCM



12. CAPACITIVE TOUCH PANEL SPECIFICATION

12.1 OPTICAL CHARACTERISTICS

ITEM	CONDITION	MIN.	TYP.	MAX.	UNIT
TRANSPARENCY NOTE (1)	Ta = 25°C $\lambda=550\text{nm}$	(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.

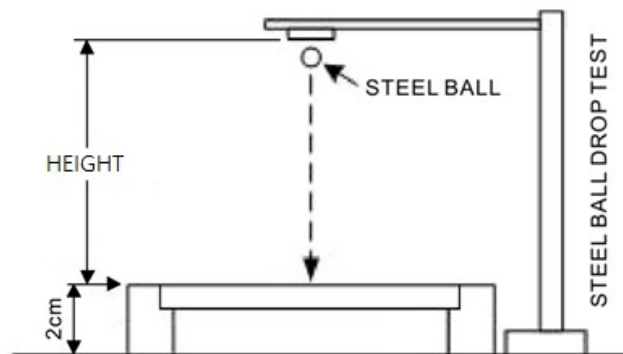
12.2 HARDNESS

ITEM	DESCRIPTION
SURFACE HARDNESS	7H(min)

12.3 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 (IK02)	VISUAL INSPECTION	SIGN OF FRACTURE OR DAMAGE IS NOT ACCEPTABLE 3 TIMES/ 1 POINTS, 25°C (CENTER POINT)



13. INSPECTION CRITERIA

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 : $45\pm 5\text{cm}$

(2)VIEWING ANGLE : $\pm 45^\circ$

$\pm 45^\circ$ (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°

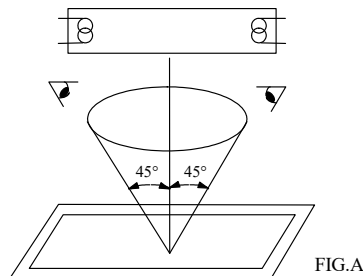


FIG.A

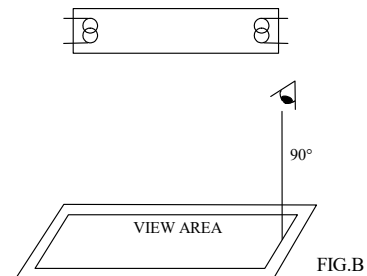


FIG.B

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.

13.2.2 ENVIRONMENT CONDITIONS :

AMBIENT TEMPERATURE		$20\pm 5^\circ\text{C}$
AMBIENT HUMIDITY		$55 \pm 20\%\text{RH}$
AMBIENT ILLUMINATION	COSMETIC INSPECTION	600~800 lux
	FUNCTIONAL INSPECTION	300~500 lux
INSPECTION TIME		15 secs

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 :

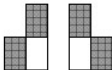
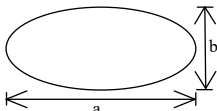
ANSI/ ASQ Z1.4 NORMAL INSPECTION LEVEL II

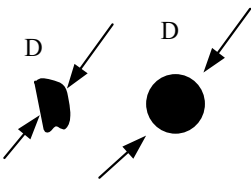
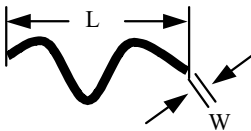
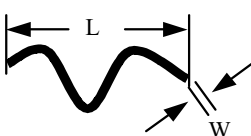
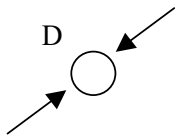
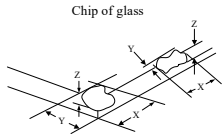
(b)AQL : MAJOR DEFECT : AQL 0.65

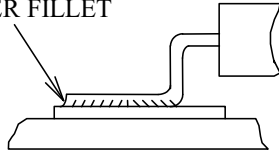
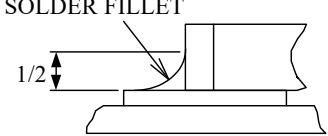
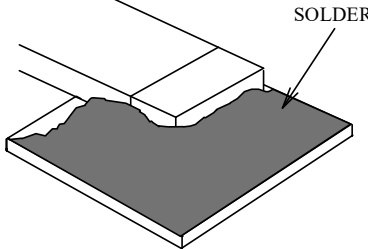
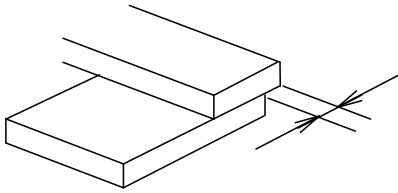
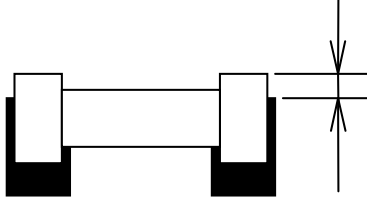
MINOR DEFECT : AQL 1.0

13.3 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.CTP FUNCTION	• NO FUNCTION • BROKEN LINE • FALSE TOUCH	
	3.BACKLIGHT	• NO LIGHT • FLICKERING AND OTHER ABNORMAL ILLUMINATION	
	4.DIMENSIONS	• SUBJECT TO INDIVIDUAL ACCEPTANCE SPECIFICATIONS	
MINOR DEFECT	1.DISPLAY ZONE (VIEWING AREA)	• BLACK/WHITE SPOT / CIRCULAR TYPE • BUBBLES ON POLARIZER • NEWTON RING • BLACK/WHITE LINE / LINEAR TYPE • SCRATCH • CONTAMINATION • UNEVEN COLOR SPREAD	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	

NO.	ITEM	CRITERIA																								
1	DISPLAY ON INSPECTION	1.INCORRECT PATTERN 2.MISSING SEGMENT 3.DIM SEGMENT 4.OPERATING VOLTAGE BEYOND SPEC																								
2	OVERALL DIMENSIONS	OVERALL DIMENSION BEYOND SPEC																								
3	DOT DEFECT	1.INSPECTION PATTERN: FULL WHITE, FULL BLACK, RED, GREEN AND BLUE SCREENS. 2.<table><thead><tr><th>DEFECT TYPE</th><th>CRITERIA</th></tr></thead><tbody><tr><td>BRIGHT DOT</td><td>$N \leq 3$, $DS \geq 10\text{mm}$</td></tr><tr><td>DARK DOT</td><td>$N \leq 4$, $DS \geq 5\text{mm}$</td></tr><tr><td>TWO DARK DOTS ADJACENT</td><td>$N \leq 3$, $DS \geq 5\text{mm}$</td></tr><tr><td>TOTAL BRIGHT AND DARK DOT</td><td>$N \leq 6$</td></tr></tbody></table> NOTE : DEFINITION OF DOT DEFECT INDUCED FROM THE PANEL INSIDE (A) BRIGHT DOT : DOTS APPEAR BRIGHT AND UNCHANGED IN SIZE IN WHICH LCD PANEL IS DISPLAYING UNDER BLACK PATTERN. (B) DARK DOT : DOTS APPEAR DARK AND UNCHANGED IN SIZE IN WHICH LCD PANEL IS DISPLAYING UNDER PURE RED, GREEN, BLUE PICTURE. (C) 2 DOT ADJACENT = 1 PAIR = 2 DOTS PICTURE:    2 dot adjacent 2 dot adjacent (vertical) 2 dot adjacent (slant)	DEFECT TYPE	CRITERIA	BRIGHT DOT	$N \leq 3$, $DS \geq 10\text{mm}$	DARK DOT	$N \leq 4$, $DS \geq 5\text{mm}$	TWO DARK DOTS ADJACENT	$N \leq 3$, $DS \geq 5\text{mm}$	TOTAL BRIGHT AND DARK DOT	$N \leq 6$														
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TWO DARK DOTS ADJACENT	$N \leq 3$, $DS \geq 5\text{mm}$																									
TOTAL BRIGHT AND DARK DOT	$N \leq 6$																									
4	BUBBLES ON POLARIZER /SURFACE STAINS /DIRT/CF FAIL/SPOT	<table><thead><tr><th></th><th>AVERAGE DIAMETER (mm) : D</th><th>NUMBER OF PIECES PERMITTED</th></tr></thead><tbody><tr><td rowspan="3">BUBBLE ON THE POLARIZER</td><td>$D \leq 0.3$</td><td>IGNORE</td></tr><tr><td>$0.3 < D \leq 0.5$</td><td>4</td></tr><tr><td>$D > 0.5$</td><td>0</td></tr><tr><td rowspan="3">SURFACE STAINS / DIRT ON POLARIZER</td><td>$D \leq 0.3$</td><td>IGNORE</td></tr><tr><td>$0.3 < D \leq 0.5$</td><td>4</td></tr><tr><td>$0.5 < D$</td><td>0</td></tr><tr><td rowspan="3">CF FAIL / SPOT</td><td>$D \leq 0.3$</td><td>IGNORE</td></tr><tr><td>$0.3 < D \leq 0.5$</td><td>4</td></tr><tr><td>$D > 0.5$</td><td>0</td></tr></tbody></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 EXTRANEIOUS 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 		AVERAGE DIAMETER (mm) : D	NUMBER OF PIECES PERMITTED	BUBBLE ON THE POLARIZER	$D \leq 0.3$	IGNORE	$0.3 < D \leq 0.5$	4	$D > 0.5$	0	SURFACE STAINS / DIRT ON POLARIZER	$D \leq 0.3$	IGNORE	$0.3 < D \leq 0.5$	4	$0.5 < D$	0	CF FAIL / SPOT	$D \leq 0.3$	IGNORE	$0.3 < D \leq 0.5$	4	$D > 0.5$	0
	AVERAGE DIAMETER (mm) : D	NUMBER OF PIECES PERMITTED																								
BUBBLE ON THE POLARIZER	$D \leq 0.3$	IGNORE																								
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CF FAIL / SPOT	$D \leq 0.3$	IGNORE																								
	$0.3 < D \leq 0.5$	4																								
	$D > 0.5$	0																								

NO.	ITEM	CRITERIA						
5	BLACK/WHITE SPOT CIRCULAR TYPE	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>$D \leq 0.3\text{mm}$</td><td>IGNORE</td></tr><tr><td>$0.3 < D \leq 0.5\text{mm}$</td><td>6</td></tr><tr><td>$D > 0.5$</td><td>0</td></tr></table>		SIZE D	PERMISSIBLE NO.	$D \leq 0.3\text{mm}$	IGNORE	$0.3 < D \leq 0.5\text{mm}$
SIZE D	PERMISSIBLE NO.							
$D \leq 0.3\text{mm}$	IGNORE							
$0.3 < D \leq 0.5\text{mm}$	6							
$D > 0.5$	0							
		NOTE (1) : THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART.						
6	SCRATCH	THE FOLLOWING BLACK LINE, WHITE LINE IS WITHIN THE VIEWING AREA. WIDTH : W (mm) , LENGTH : L (mm)						
		<table><tr><th>SIZE W & L</th><th>PERMISSIBLE NO.</th></tr><tr><td>$W \leq 0.07\text{mm}$</td><td>IGNORE</td></tr><tr><td>$0.07 < W \leq 0.1\text{mm} , L \leq 10\text{mm}$</td><td>6</td></tr><tr><td>$W > 0.1\text{mm}$</td><td>0</td></tr></table>		SIZE W & L	PERMISSIBLE NO.	$W \leq 0.07\text{mm}$	IGNORE	$0.07 < W \leq 0.1\text{mm} , L \leq 10\text{mm}$
SIZE W & L	PERMISSIBLE NO.							
$W \leq 0.07\text{mm}$	IGNORE							
$0.07 < W \leq 0.1\text{mm} , L \leq 10\text{mm}$	6							
$W > 0.1\text{mm}$	0							
		NOTE (1) : THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART.						
7	BLACK / WHITE LINE LINEAR TYPE / FOREIGN FIBER	THE FOLLOWING BLACK LINE, WHITE LINE IS WITHIN THE VIEWING AREA. WIDTH : W (mm) , LENGTH : L (mm)						
		<table><tr><th>SIZE W & L</th><th>PERMISSIBLE NO.</th></tr><tr><td>$W \leq 0.07\text{mm}$</td><td>IGNORE</td></tr><tr><td>$0.07 < W \leq 0.1\text{mm} , L \leq 10\text{mm}$</td><td>6</td></tr><tr><td>$W > 0.1\text{mm}$</td><td>0</td></tr></table>		SIZE W & L	PERMISSIBLE NO.	$W \leq 0.07\text{mm}$	IGNORE	$0.07 < W \leq 0.1\text{mm} , L \leq 10\text{mm}$
SIZE W & L	PERMISSIBLE NO.							
$W \leq 0.07\text{mm}$	IGNORE							
$0.07 < W \leq 0.1\text{mm} , L \leq 10\text{mm}$	6							
$W > 0.1\text{mm}$	0							
		NOTE (1) : THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART.						
8	BUBBLE / DENT FOR OPTICAL BONDING	BUBBLES WITHIN VIEWING AREA. AVERAGE DIAMETER : D (mm)						
		<table><tr><th>SIZE D</th><th>PERMISSIBLE NO.</th></tr><tr><td>$D \leq 0.3\text{mm}$</td><td>IGNORE</td></tr><tr><td>$0.3 < D \leq 0.5\text{mm}$</td><td>6</td></tr><tr><td>$D > 0.5$</td><td>0</td></tr></table>		SIZE D	PERMISSIBLE NO.	$D \leq 0.3\text{mm}$	IGNORE	$0.3 < D \leq 0.5\text{mm}$
SIZE D	PERMISSIBLE NO.							
$D \leq 0.3\text{mm}$	IGNORE							
$0.3 < D \leq 0.5\text{mm}$	6							
$D > 0.5$	0							
		NOTE (1) : THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART.						
10	CHIPPING	<table><tr><td>CORNER</td><td>$X+Y \leq 3\text{mm} , Z < t$ (t : THICKNESS)</td></tr><tr><td>EDGE</td><td>$X \leq 6\text{mm} , Y \leq 1\text{mm} , Z < t$ (t : THICKNESS)</td></tr></table>	CORNER	$X+Y \leq 3\text{mm} , Z < t$ (t : THICKNESS)	EDGE	$X \leq 6\text{mm} , Y \leq 1\text{mm} , Z < t$ (t : THICKNESS)		
CORNER	$X+Y \leq 3\text{mm} , Z < t$ (t : THICKNESS)							
EDGE	$X \leq 6\text{mm} , Y \leq 1\text{mm} , Z < t$ (t : THICKNESS)							
11	CRACKED GLASS	NOT ACCEPTABLE						
12	LINE DEFECT ON DISPLAY	OBVIOUS VERTICAL OR HORIZONTAL LINE DEFECT IS NOT ALLOWED.						
13	MURA ON DISPLAY	IT'S ACCEPTABLE, IF MURA IS SLIGHT VISIBLE THROUGH 5% ND FILTER.						
14	UNEVEN COLOR SPREAD, COLORATION	TO BE DETERMINED BASED UPON THE LIMITED SAMPLE.						
15	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.						
16	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 ON 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
17	SOLDERING	1. NO SOLDERING FOUND ON THE SPECIFIED PLACE 2. INSUFFICIENT 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  · SOLDER WETS 3 SIDES OF TERMINAL, BUT LESS THAN 25% OF SIDES AND FRONT SURFACE AREA ARE COVERED  3. PARTS ALIGNMENT (a)LSI, IC LEAD WIDTH IS MORE THAN 50% BEYOND PAD OUTLINE  (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.

NO.	ITEM	CRITERIA
18	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.
19	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 BE 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.

NOTE (1) : FOR ANY SPOTS OR LINES, WHICH ARE NOT OBSERVED UNDER APPROPRIATE PANEL OPERATING CONDITION ARE DEEMED ACCEPTABLE.

NOTE (2) : THE FOREIGN MATERIALS THAT CAN BE BLOWN OUT BY AIR AND REMOVED BY WET CLEANING ARE NOT REGARDED AS DEFECTS.

14. RELIABILITY TEST

14.1 STANDARD SPECIFICATIONS FOR RELIABILITY OF LCD MODULE

NO.	ITEM	DESCRIPTION
1	HIGH TEMPERATURE TEST (OPERATION)	THE SAMPLE SHOULD BE ALLOWED TO STAND AT +70°C FOR 240 HRS
2	LOW TEMPERATURE TEST (OPERATION)	THE SAMPLE SHOULD BE ALLOWED TO STAND AT -20°C FOR 240 HRS
3	HIGH TEMPERATURE TEST (STORAGE)	THE SAMPLE SHOULD BE ALLOWED TO STAND AT +80°C FOR 240 HRS
4	LOW TEMPERATURE TEST (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 TEST (NOT OPERATED)	THE SAMPLE SHOULD BE ALLOWED TO STAND THE FOLLOWING 10 CYCLES OF OPERATION:
7	VIBRATION (NOT OPERATED)	11.76 m/s ² (1.2G), 10~100 Hz XYZ DIRECTIONS, 1 HR EACH
8	SHOCK (NOT OPERATED)	490.0 m/s ² (50G), 10 ms XYZ DIRECTIONS, 1 TIME EACH
9	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.

NOTE(2) : THERE IS NO DISPLAY FUNCTION NG ISSUE OCCURRED, ALL THE COSMETIC SPECIFICATION IS JUDGED BEFORE THE RELIABILITY STRESS.

NOTE(3) : THE MODULE SHOULDN'T BE TESTED MORE THAN ONE CONDITION, AND ALL THE TEST CONDITIONS ARE INDEPENDENT.

NOTE(4) : TESTING CONDITIONS AND INSPECTION CRITERIA

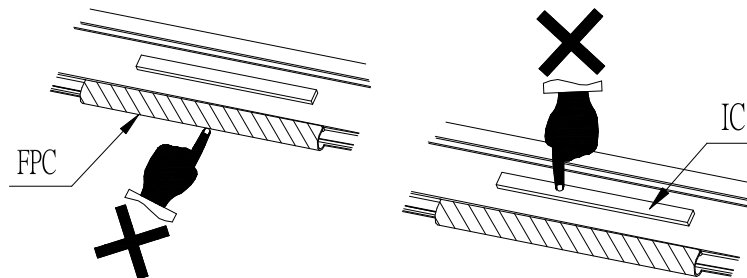
NOTE(5) : WHEN THE LCD MODULE IS OPERATED AT A HIGHER AMBIENT TEMPERATURE THAN 60°C, POWER SUPPLY CURRENT OF LED BACKLIGHT SHOULD BE ADJUSTED TO BE LESS THAN TBD%. IF THE MODULE IS OPERATED AT A HIGHER CURRENT THAN TBD%, THEN THERE IS A POSSIBILITY OF DISTORTION AND IRREGULARITY OF THE PICTURE DUE TO LIQUID CRYSTAL BEHAVIOR.

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

15. CAUTION

15.1 OPERATION

- 15.1.1 DO NOT CONNECT OR DISCONNECT MODULES TO OR FROM THE MAIN SYSTEM WHILE POWER IS BEING SUPPLIED .
- 15.1.2 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.
- 15.1.3 ADJUST THE LC DRIVING VOLTAGE TO OBTAIN THE OPTIMUM CONTRAST .
- 15.1.4 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.
- 15.1.5 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!



15.2 STORAGE

- 15.2.1 STORE THE MODULE IN A DARK ROOM OR KEEP IN ORIGINAL PACKAGE WHERE MUST KEEP AT $25\pm 10^{\circ}\text{C}$ AND 65%RH OR LESS.
- 15.2.2 DO NOT STORE THE MODULE IN SURROUNDINGS CONTAINING ORGANIC SOLVENT OR CORROSIVE GAS.
- 15.2.3 STORE THE MODULE IN AN ANTI-ELECTROSTATIC CONTAINER OR BAG.

15.3 NOTICE

- 15.3.1 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.
- 15.3.2 DO NOT DISASSEMBLE . EDT SHALL NOT BE HELD RESPONSIBLE IF THE MODULE IS DISASSEMBLED AND UPON THE REASSEMBLY THE MODULE FAILED.
- 15.3.3 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.
- 15.3.4 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.
- 15.3.5 DON'T GIVE EXTERNAL SHOCK.
- 15.3.6 DON'T APPLY EXCESSIVE FORCE ON THE SURFACE.
- 15.3.7 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.
- 15.3.8 DON'T OPERATE IT ABOVE THE ABSOLUTE MAXIMUM RATING.
- 15.3.9 STORAGE IN A CLEAN ENVIRONMENT, FREE FROM DUST, ACTIVE GAS, AND SOLVENT.
- 15.3.10 STORE WITHOUT ANY PHYSICAL LOAD.
- 15.3.11 REWIRING: NO MORE THAN 3 TIMES.