EXAMINED BY : Kevin Kuo	EMERGING DISPLAY TECHNOLOGIES CORPORATION	FILE NO . CAS-
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		VERSION : 1

CUSTOMER ACCEPTANCE SPECIFICATIONS

MODEL NO. :

ETML101002NDR6
(GP)

FOR MESSRS :

_____

CUSTOMER'S APPROVAL

DATE :

_____

BY :

_____

RECORDS OF REVISION

DOC . FIRST ISSUE

NOV.23, 2017

DATE	REVISED PAGE NO.	SUMMARY

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1. GENERAL SPECIFICATIONS

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

SITRONIX ST5651CB
SITRONIX ST5021

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

ILITEK ILI2511

1.3 MATERIAL SAFETY DESCRIPTION
ASSEMBLIES SHALL COMPLY WITH EDT GREEN PRODUCT (GP) REQUIREMENTS, INCLUDING PROHIBITED MATERIALS/COMPONENTS CONTAINING LEAD, MERCURY, CADMIUM, HEXAVALENT CHROMIUM, POLYBROMINATED BIPHENYLS (PBB), POLYBROMINATED DIPHENYL ETHERS (PBDE), POLYCHLORINATED BIPHENYLS (PCB) CATEGORY, POLYCHLORINATED NAPHTHALENE (PCN) CATEGORY, POLYCHLORINATED TERPHENYLS (PCT) CATEGORY, CHLORINATED PARAFFINS (CP) CATEGORY, TRIBUTHYL TIN CATEGORY / TRIPHENYL TIN CATEGORY, ASBESTOS, SPECIFIC AZO COMPOUNDS, FORMALDEHYDE, POLYVINYL CHLORIDE (PVC) AND PVC BLENDS, OTHER BROMINATED ORGANIC COMPOUNDS AND OTHER CHLORINATED ORGANIC COMPOUNDS.

2. MECHANICAL SPECIFICATIONS

2.1 LCD MODULE MECHANICAL SPECIFICATIONS

(1)	DISPLAY SIZE	10.1 inch
(2)	NUMBER OF DOTS	1024W * (RGB) * 600H DOTS
(3)	MODULE SIZE	235.5W * 143H * 11.8D(MAX.) mm
(4)	VIEWING AREA	225.15W * 127.68H mm
(5)	ACTIVE AREA	222.72W * 125.28H mm
(6)	DOT SIZE	0.0725W * 0.2088H mm
(7)	PIXEL SIZE	0.2175W * 0.2088H mm
(8)	LCD TYPE	TFT , TRANSMISSIVE , ANTI-GLARE
(9)	COLOR	16.7 M
(10)	VIEWING DIRECTION	6 O'CLOCK (GRAY LEVEL INVERSION)
(11)	BACK LIGHT	LED , COLOR : WHITE
(12)	INTERFACE MODE	LVDS

2.2 CAPACITIVE TOUCH PANEL MECHANICAL SPECIFICATIONS

(1) TOUCH PANEL SIZE	10.1 inch
(2) OUTER DIMENSION	234W * 139.5H * 1.35D mm (NOT INCLUDED FPC)
(3) VIEWING AREA	225.15W * 127.68H mm
(4) ACTIVE AREA	225.15W * 127.68H mm
(5) INPUT TYPE	MULTI-TOUCH
(6) NUMBER OF TOUCH SENSOR	38*21 SENSORS
(7) INTERFACE MODE	USB
(8) RESOLUTION	16384 * 9600

3. ABSOLUTE MAXIMUM RATINGS

3.1 LCD MODULE ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
POWER SUPPLY VOLTAGE	VDD-VSS	-0.5	5.0	V	
STATIC ELECTRICITY	—	—	—	V	NOTE (1)
LED BACKLIGHT POWER DISSIPATION	PD	—	18.36	W	
LED BACKLIGHT FORWARD CURRENT	IF	—	900	mA	
LED BACKLIGHT REVERSE VOLTAGE	VR	—	7.2	V	

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

3.2 CAPACITIVE TOUCH PANEL ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
POWER SUPPLY FOR DRIVER	VDD1-VSS1	-0.3	6	V	

3.3 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	-30°C	80°C	-30°C	80°C	NOTE (1) , (2)
HUMIDITY	NOTE (3)		NOTE (3)		WITHOUT CONDENSATION
VIBRATION	—	2.45 m/s^2 (0.25 G)	—	11.76m/s^2 (1.2 G)	10~55Hz X,Y,Z,EACH 2HRS
SHOCK	—	29.4 m/s^2 (3 G)	—	490.0 m/s^2 (50 G)	6 ms XYZ DIRECTIONS 3 TIMES EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

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

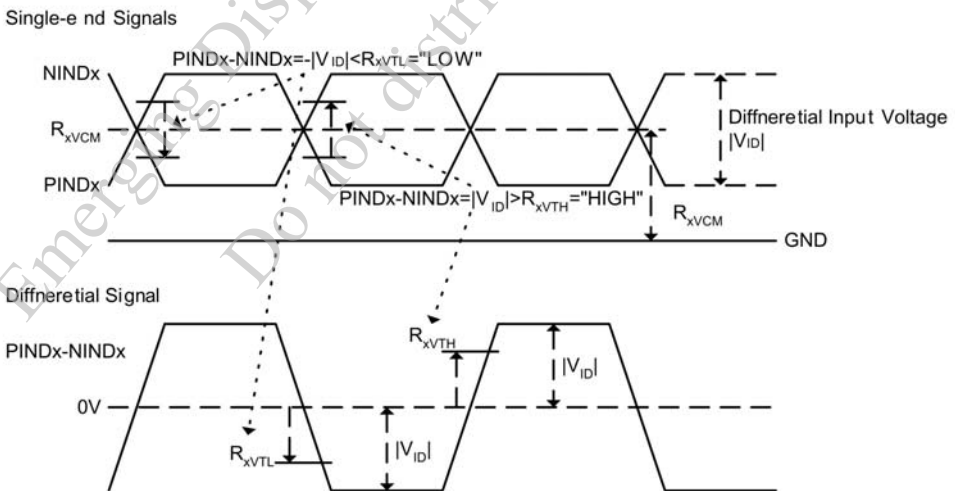
4. ELECTRICAL CHARACTERISTICS

4.1 LCD MODULE ELECTRICAL CHARACTERISTICS

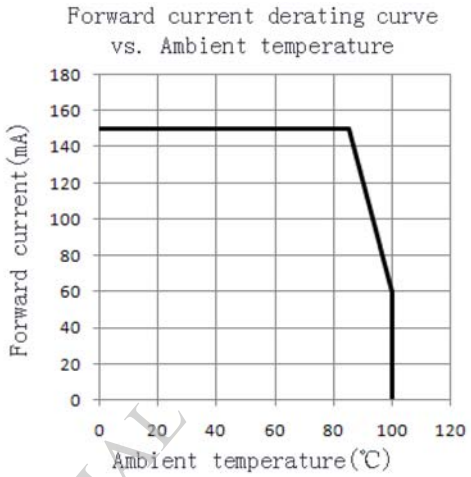
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
LOGIC/LCD DRIVE VOLTAGE	VDD-VSS	—	3.0	3.3	3.6	V	
VDD CURRENT	IDD	—	—	150	190	mA	
POWER SUPPLY VOLTAGE FOR LED DRIVER	VLED-VSS	—	11.7	12.0	12.3	V	
POWER SUPPLY CURRENT FOR LED DRIVER	IVLED	VLED-VSS =12.0V	—	500	625	mA	
DIFFERENTIAL INPUT HIGH THRESHOLD VOLTAGE	RxVTH	RxVCM=1.2V	—	—	0.1	V	
DIFFERENTIAL INPUT LOW THRESHOLD VOLTAGE	RxVTL		-0.1	—	—	V	
INPUT VOLTAGE RANGE (SINGLED-END)	RxVIN	—	0	—	2.4	V	
DIFFERENTIAL INPUT COMMON MODE VOLTAGE	RxVCM	—	|VID|/2	—	2.4-|VID|/2	V	
DIFFERENTIAL INPUT VOLTAGE	|VID|	—	0.2	—	0.6	V	
DIFFERENTIAL INPUT LEAKAGE CURRENT	RVxIiz	—	-10	—	+10	μA	
LVDS DIGITAL OPERATING CURRENT	Iddlvds	Fclk=65MHz, VDD-VSS=3.3V	—	40	50	mA	
LVDS DIGITAL STANDBY CURRENT	Istlvds	CLOCK & ALL FUNCTIONS ARE STOPPED	—	10	50	μA	
LED LIFE TIME	—	ILED=120mA (PER. LED)	50K	—	—	HRS	NOTE (5) NOTE (6)

NOTE (1)：A. INPUT SIGNALS SHALL BE LOW OR HI-Z STATE WHEN VDD IS OFF.
B. ALL ELECTRICAL CHARACTERISTICS FOR LVDS SIGNAL ARE DEFINED AND SHALL BE MEASURED AT THE INTERFACE CONNECTOR OF LCD.

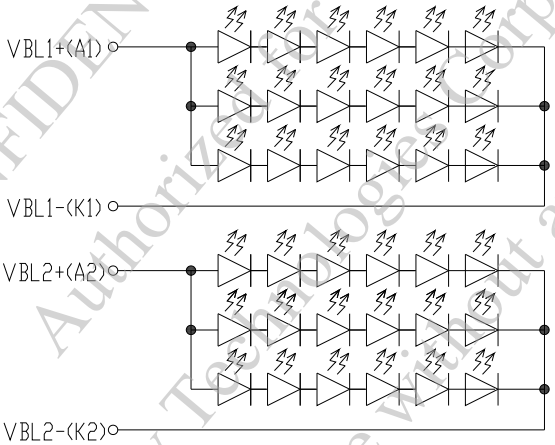
NOTE (2)：LVDS INPUT CHARACTERISTICS ARE AS FOLLOW



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



NOTE (4)：INTERNAL CIRCUIT DIAGRAM OF BACKLIGHT
VF=VBL1+(A1)–VBL1-(K1)=VBL2+(A2)–VBL2-(K2)



NOTE (5)：CONDITIONS; TA=25 °C, CONTINUOUS LIGHTING
NOTE (6)：DEFINITIONS OF LIFE TIME
LCM LUMINANCE BECOMES HALF OF THE INITIAL VALUE.

4.2 CAPACITIVE TOUCH PANEL ELECTRICAL CHARACTERISTICS

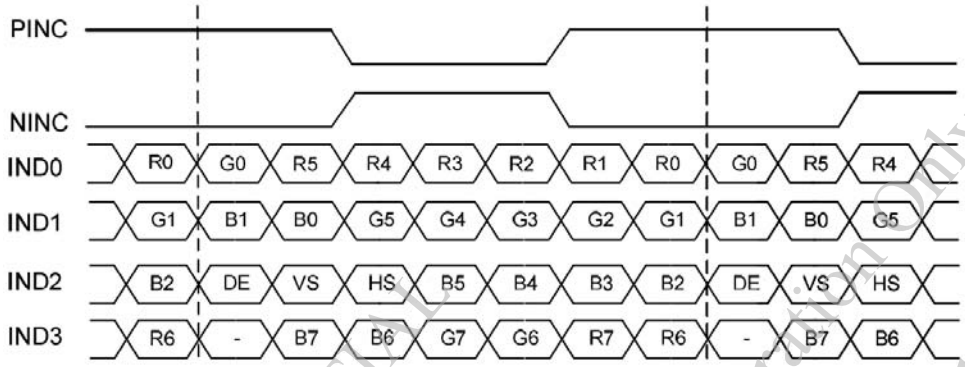
Ta=25°C

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
POWER SUPPLY FOR DRIVER	VDD1-VSS1	—	4.75	5	5.25	V
POWER SUPPLY CURRENT CONSUMPTION FOR OPERATION	IDD1	VDD1-VSS1=5.0V	—	100	130	mA

5. TIMING CHARACTERISTICS

5.1 LCD MODULE DATA INPUT FORMAT

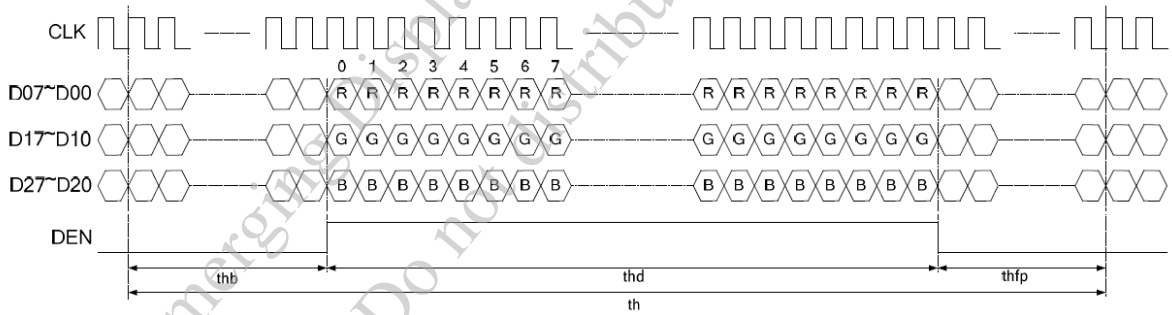
5.1.1 8 BIT LVDS INPUT(HSD="L")



5.2 LCD MODULE TIMING TABLE

5.2.1 MODE ="H" : DE MODE

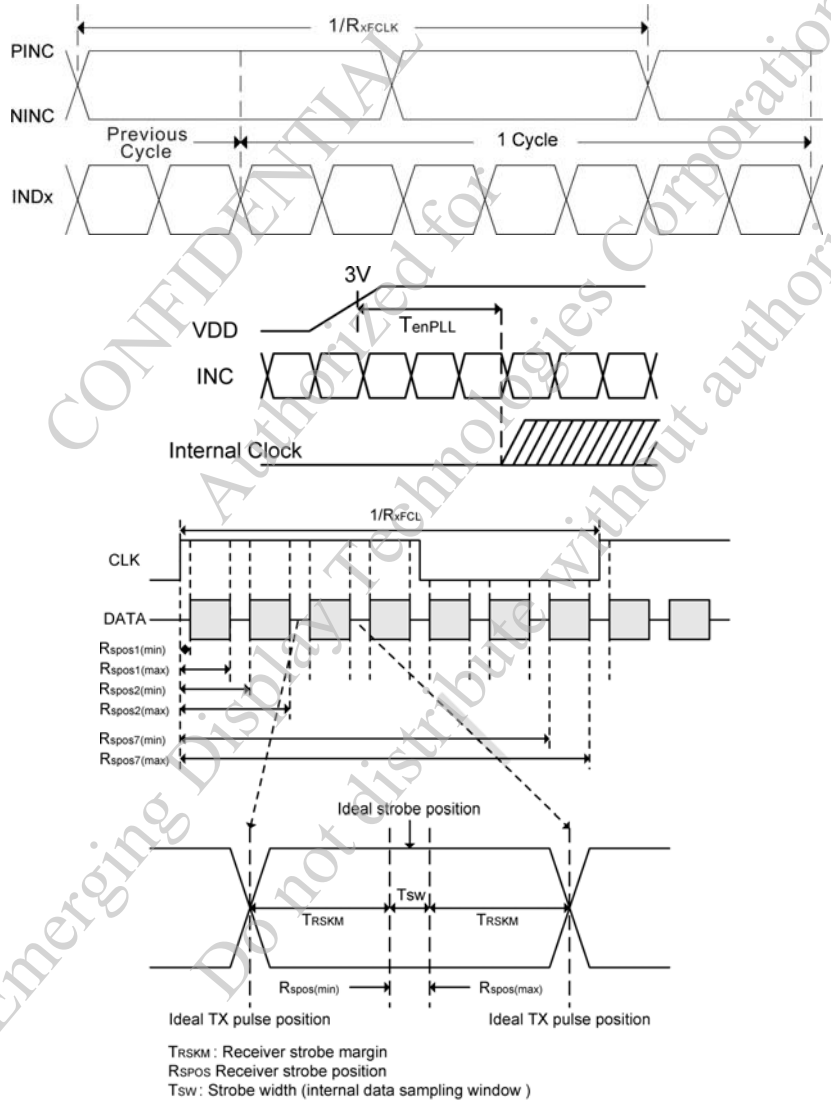
ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
CLKIN FREQUENCY@ FRAME RATE = 60Hz	fclk	40.8	51.2	67.2	MHz
HORIZONTAL DISPLAY AREA	thd		1024		CLKIN
1 HORIZONTAL LINE	th	1114	1344	1400	
HSD BLANKING	thb+thfp	90	320	376	
VERTICAL DISPLAY AREA	tvd		600		H
1 VERTICAL LINE	tv	610	635	800	
VSD BLANKING	tvb+tvfp	10	45	220	



5.3 LCD MODULE AC ELECTRICAL CHARACTERISTICS

LVDS MODE

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITION
CLOCK FREQUENCY	R_{xFCLK}	20	—	71	MHz	
INPUT DATA SKEW MARGIN	T_{RSKM}	500	—	—	pS	$\lvert V_{ID}\rvert$ = 400mV R_{xVCM} = 1.2V R_{xFCLK} = 71 MHz
CLOCK HIGH TIME	T_{LVCH}	—	4/(7* R_{xFCLK})	—	ns	
CLOCK LOW TIME	T_{LVCL}	—	3/(7* R_{xFCLK})	—	ns	
PLL WAKE-UP TIME	T_{enPLL}		—	150	us	



TRSKM : Receiver strobe margin
RSPOS Receiver strobe position
TSW : Strobe width (internal data sampling window)

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
MODULATION FREQUENCY	SSCMF	—	23	—	93	KHz
MODULATION RATE	SSCMR	LVDS CLOCK=71MHz CENTER SPREAD	—	—	±3	%

6. OPTICAL CHARACTERISTICS (NOTE 1)

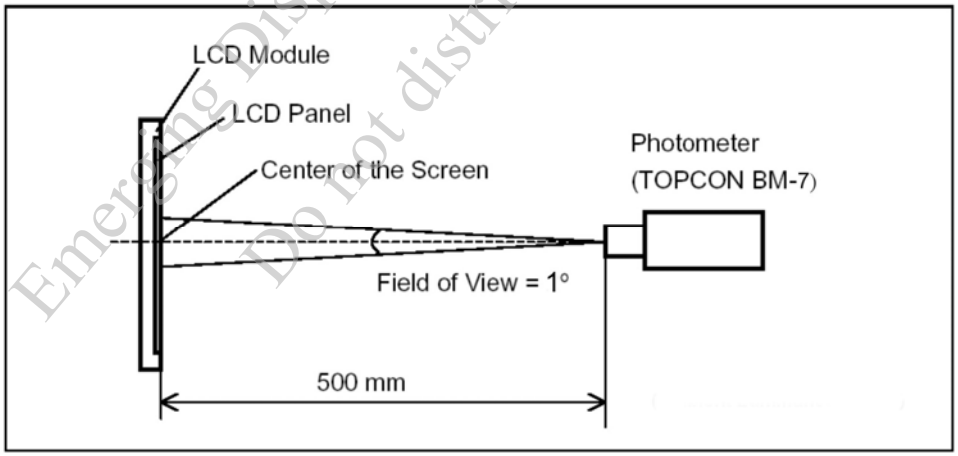
6.1 OPTICAL CHARACTERISTICS

Ta = 25 ± 2 °C

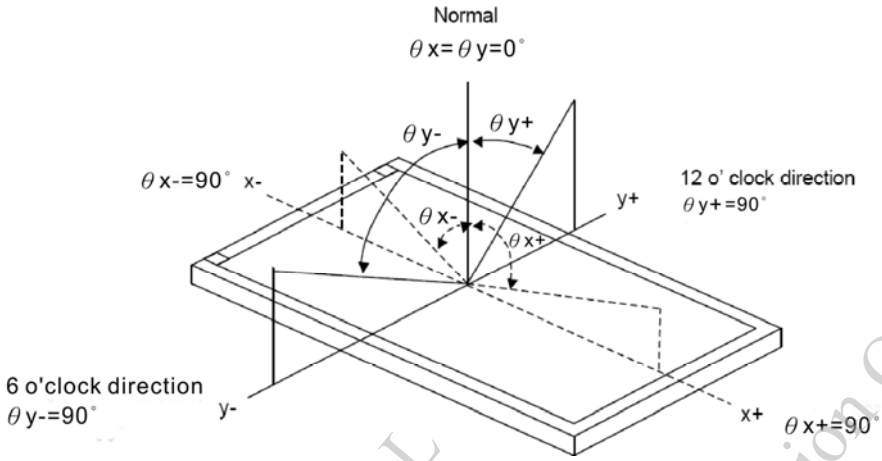
ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	REMARK
VIEWING ANGLE		θ_{y+}	CR ≥ 10	θ_x=0°	60	70	—	deg.	NOTE (2) NOTE (3)
		θ_{y-}			70	80	—		
		θ_{x+}		θ_y=0°	70	80	—		
		θ_{x-}			70	80	—		
CONTRAST RATIO		CR	θx=0° , θy=0°		510	680	—	—	NOTE (3)
RESPONSE TIME		T_R (rise)+ T_F (fall)	θx=0° , θy=0°		—	16	32	ms	NOTE (4)
COLOR OF CIE COORDINATE	WHITE	Wx	θx=0° , θy=0° VDD-VSS=3.3V VLED-VSS=12.0V NTSC : 45%		0.25	0.30	0.35	—	NOTE (5)
		Wy			0.30	0.35	0.40		
	RED	Rx			0.54	0.59	0.64	—	
		Ry			0.31	0.36	0.41		
	GREEN	Gx			0.25	0.30	0.35	—	
		Gy			0.52	0.57	0.57		
	BLUE	Bx			0.10	0.15	0.20	—	
		By			0.07	0.12	0.17		
THE BRIGHTNESS OF MODULE		B			680	850	—	cd/m^2	NOTE (6)
THE UNIFORMITY OF MODULE		—			70	—	—	%	NOTE (6)

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.



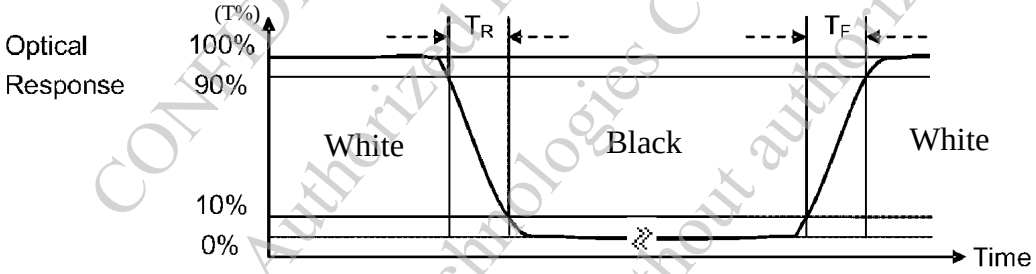
NOTE (2)：DEFINITION OF VIEWING ANGLE：



NOTE (3)：DEFINITION OF CONTRAST RATIO：

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

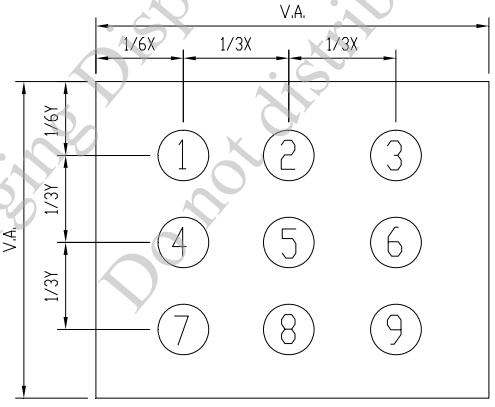
NOTE (4)：DEFINITION OF RESPONSE TIME : T_R AND T_F
THE FIGURE BELOW IS THE OUTPUT SIGNAL OF THE PHOTO DETECTOR.



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

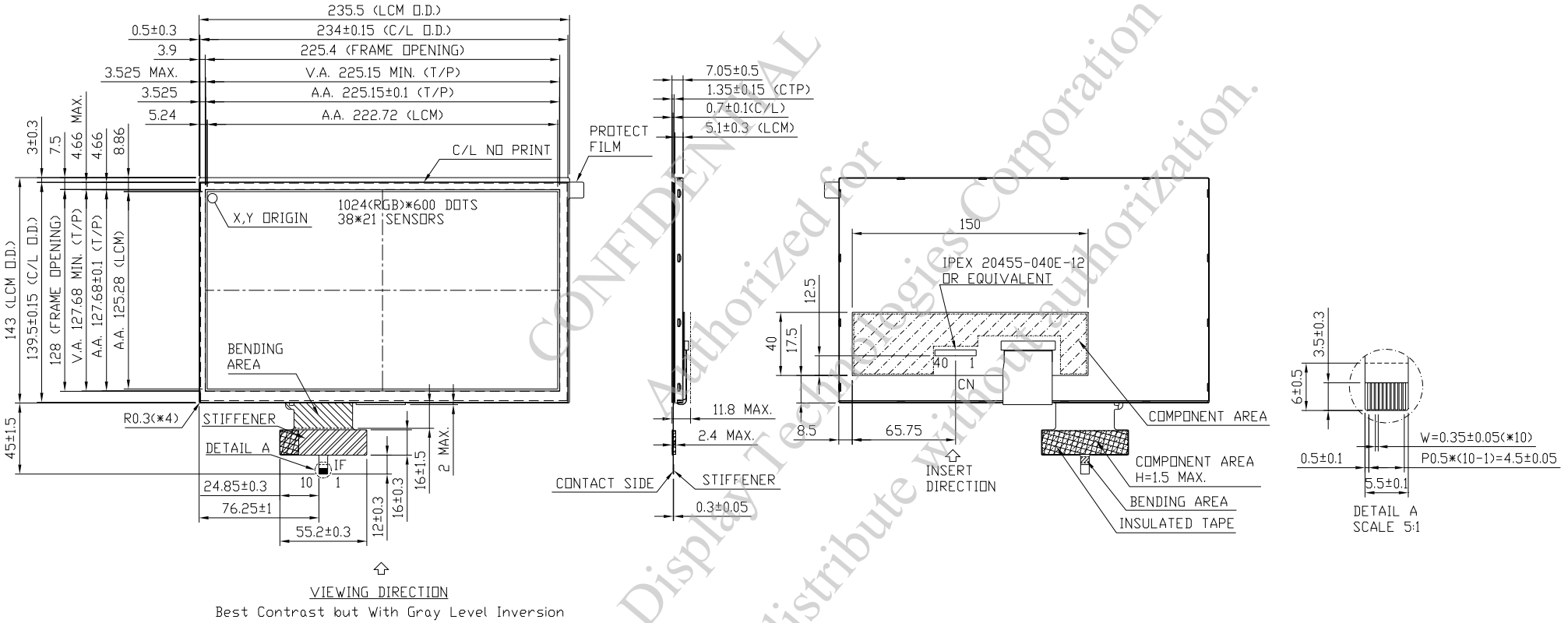


UNIT：mm

6.3 THE CALCULATING METHOD OF UNIFORMITY

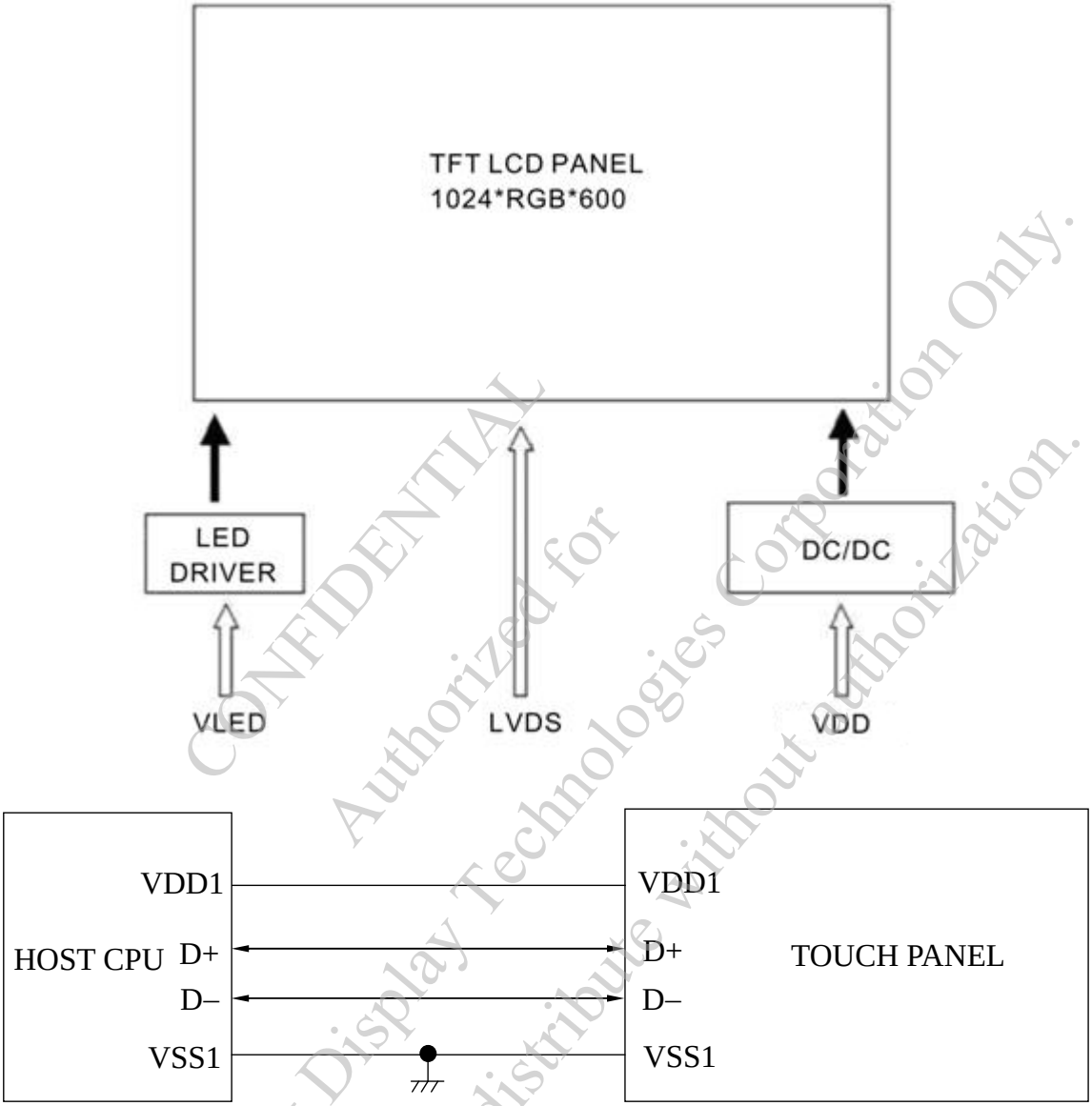
$$\text{UNIFORMITY}: \left[1 - \frac{\text{MAXIMUM BRIGHTNESS - MINIMUM BRIGHTNESS}}{\text{AVERAGE BRIGHTNESS}}\right] \times 100\%$$

7. OUTLINE DIMENSIONS

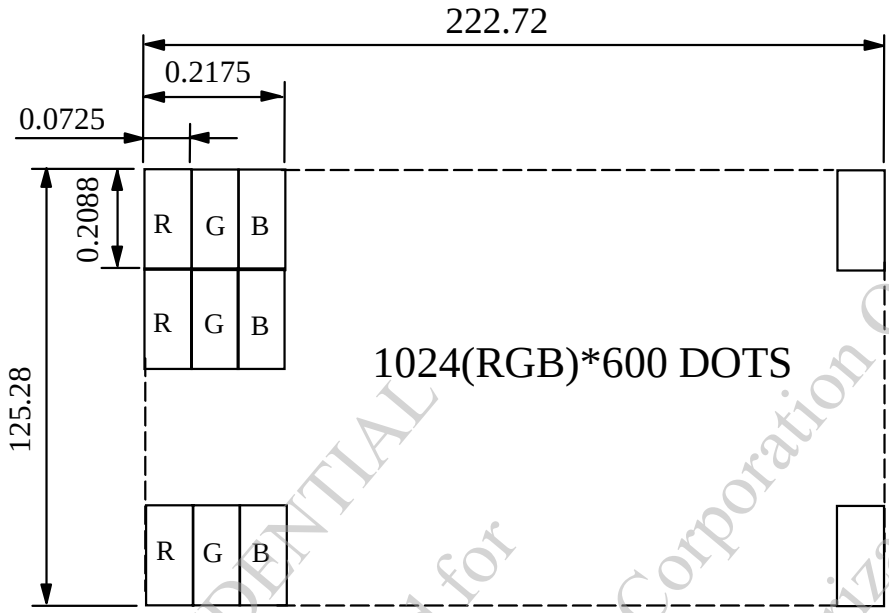


UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.5
NOTE :
1.C/L GLASS : SODA LIME
2.RECOMMEND MATCH CONNECTOR KYOCERA : 04 6240 010 SERIES

8. BLOCK DIAGRAM



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 TFT MODULE INTERFACE (CN)

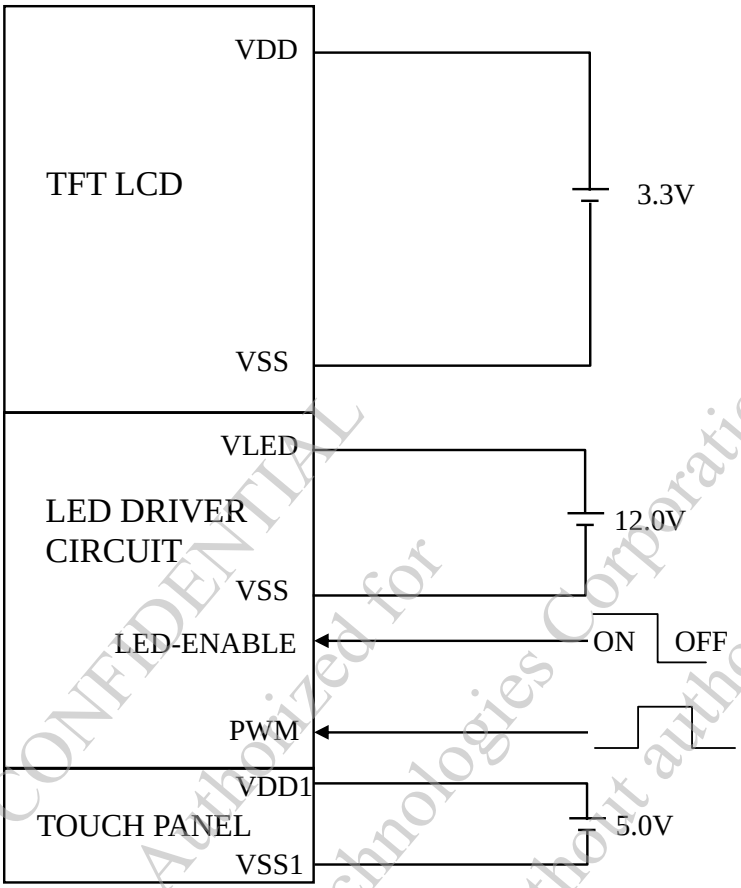
PIN NO.	SYMBOL	FUNCTION
1	NC	NON CONNECTION
2	VDD	POWER SUPPLY VOLTAGE
3	VDD	POWER SUPPLY VOLTAGE
4	NC	NON CONNECTION
5	NC	NON CONNECTION
6	NC	NON CONNECTION
7	NC	NON CONNECTION
8	IND0–	LVDS SIGNAL (–) — CHANNEL 0 (R0~R5,G0)
9	IND0+	LVDS SIGNAL (+) — CHANNEL 0 (R0~R5,G0)
10	VSS	GROUND
11	IND1–	LVDS SIGNAL (–) — CHANNEL 1 (G1~G5,B0~B1)
12	IND1+	LVDS SIGNAL (+) — CHANNEL 1 (G1~G5,B0~B1)
13	VSS	GROUND
14	IND2–	LVDS SIGNAL (–) — CHANNEL 2 (B2~B5,VS,HS,DE)
15	IND2+	LVDS SIGNAL (+) — CHANNEL 2 (B2~B5,VS,HS,DE)
16	VSS	GROUND
17	NINC	LVDS CLOCK SIGNAL (–)
18	PINC	LVDS CLOCK SIGNAL (+)
19	VSS	GROUND
20	IND3–	LVDS SIGNAL (–) — CHANNEL 3 (R6,R7,G6,G7,B6,B7)
21	IND3+	LVDS SIGNAL (+) — CHANNEL 3 (R6,R7,G6,G7,B6,B7)
22	VSS	GROUND
23	NC	NON CONNECTION
24	NC	NON CONNECTION
25	VSS	GROUND
26	NC	NON CONNECTION
27	NC	NON CONNECTION
28	VSS	GROUND
29	NC	NON CONNECTION
30	NC	NON CONNECTION
31	VSS	GROUND
32	VSS	GROUND
33	VSS	GROUND
34	NC	NON CONNECTION
35	PWM	ADJUST FOR LED BRIGHTNESS
36	LED-ENABLE	INTERNAL PULL UP TO +3.3V
37	NC	NON CONNECTION
38	VLED	POWER SUPPLY VOLTAGE FOR LED BACKLIGHT
39	VLED	POWER SUPPLY VOLTAGE FOR LED BACKLIGHT
40	VLED	POWER SUPPLY VOLTAGE FOR LED BACKLIGHT

10.2 TOUCH PANEL INTERFACE (IF)

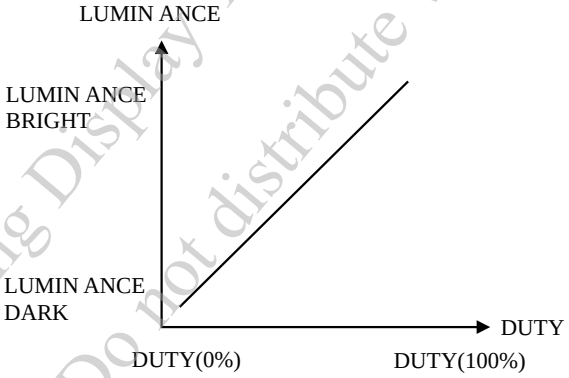
PIN NO.	SYMBOL	FUNCTION
1	NC	THE PIN WAS RESERVED FOR I2C GND
2	NC	THE PIN WAS RESERVED FOR I2C /RST
3	NC	THE PIN WAS RESERVED FOR I2C /INT
4	NC	THE PIN WAS RESERVED FOR I2C SCL
5	NC	THE PIN WAS RESERVED FOR I2C SDA
6	NC	THE PIN WAS RESERVED FOR I2C VCC(3.3V)
7	VDD1	POWER SUPPLY VOLTAGE(5V)
8	D–	USB D–
9	D+	USB D+
10	VSS1	GROUND

11. POWER SUPPLY

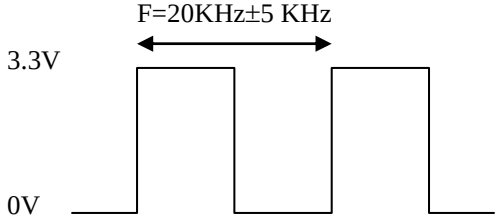
11.1 POWER SUPPLY FOR LCM



NOTE (1)：PWM ADJUST BRIGHTNESS TO CONTROL PIN, PULSE DUTY THE BIGGER THE BRIGHTER.



NOTE (2)：PWM SIGNAL=0~3.3V，OPERATION FREQUENCY：20KHz±5KHz



12. CAPACITIVE TOUCH PANEL SPECIFICATION

12.1 OPTICAL CHARACTERISTICS

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

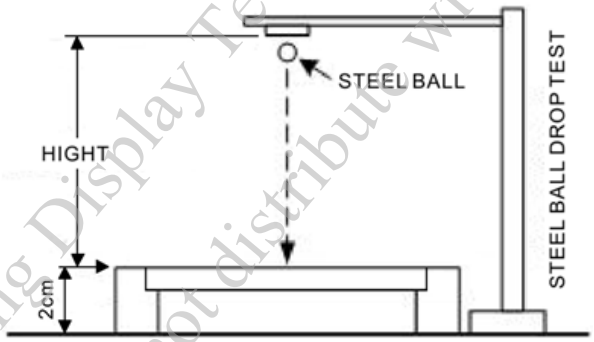
12.2 HARDNESS

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	VISUAL INSPECTION	SIGN OF FRACTURE OR DAMAGE IS NOT ACCEPTABLE 3 TIMES/ 1 POINTS, 25°C



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

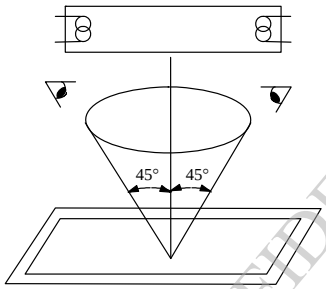
13.2 INSPECTION CONDITIONS

13.2.1 (1)OBSERVATION DISTANCE：45±5cm

(2)VIEW ANGLE：±45°

PERPENDICULAR TO MODULE SURFACE

VIEWING ANGLE SHOULD BE SMALLER THAN 45°



LINE OF SIGHT FOR INSPECTION SHALL BE WITHIN THE HALF SECTION OF THE VIEWING CONE GENERATED BY LINE SEGMENT 45° WITH RESPECTS TO THE VERTICAL AXIS FROM CENTER VERTEX OF LCD, THE CONE AXIS MUST BE PERPENDICULAR NORMAL TO LCD SURFACE AND PASSES THROUGH THE FLUORESCENT LAMP.

13.2.2 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		15 secs

13.2.3 INSPECTION LOT

QUANTITY PER DELIVERY LOT FOR EACH MODEL

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

(a)APPLICABLE STANDARD：

MIL-STD-105E LEVEL II

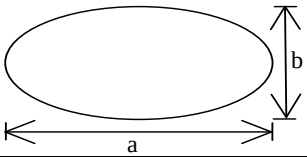
NORMAL INSPECTION, SINGLE SAMPLING

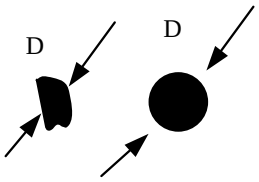
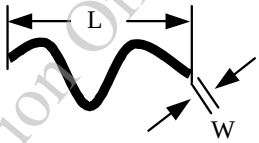
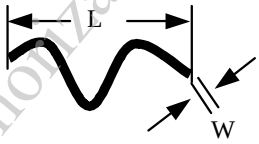
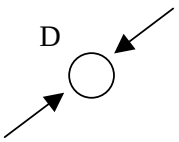
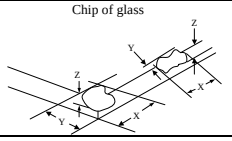
(b)AQL：MAJOR DEFECT：AQL 0.65

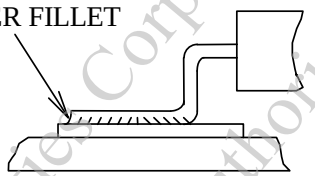
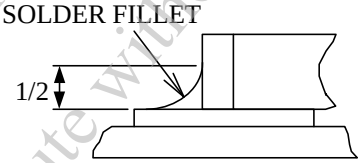
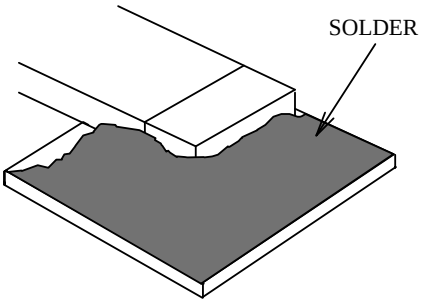
MINOR DEFECT：AQL 1.0

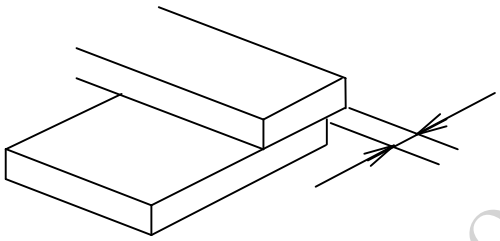
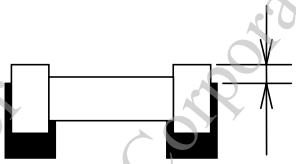
13.3 DEFECTS CLASSIFICATION

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	

<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 ≤ 3</td></tr>
<tr><td>DARK DOT</td><td>N ≤ 4</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.
THE BRIGHT DOT DEFECT MUST BE VISIBLE THROUGH 5% ND FILTER.
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>BUBBLES ON POLARIZER /SURFACE STAINS /DIRT/CF FAIL/SPOT</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 ≤ 0.15</td><td>LGNORE</td></tr>
<tr><td>0.15 < D ≤ 0.5</td><td>N ≤ 4</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>
</table>

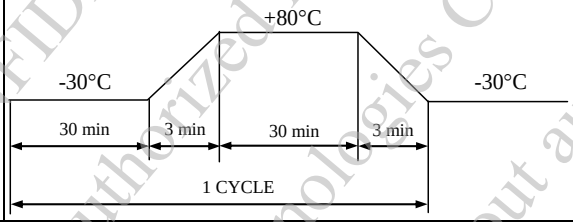
<table>
<tr><th>NO.</th><th>ITEM</th><th>CRITERIA</th></tr>
<tr><td>5</td><td>BLACK/WHITE SPOT CIRCULAR TYPE</td><td>THE FOLLOWING BLACK/WHITE SPOT ARE WITHIN THE VIEWING AREA. AVERAGE DIAMETER：D (mm)
<table>
<tr><th>SIZE D</th><th>PERMISSIBLE NO.</th></tr>
<tr><td>D≤0.1</td><td>IGNORE</td></tr>
<tr><td>0.1<D≤0.3</td><td>5</td></tr>
<tr><td>0.3<D≤0.5</td><td>5</td></tr>
<tr><td>D>0.5</td><td>0</td></tr>
</table>
NOTE (1)：THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART.

</td></tr>
<tr><td>6</td><td>SCRATCH</td><td>THE FOLLOWING SCRATCH 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≤0.05</td><td>IGNORE</td></tr>
<tr><td>0.05<W≤0.08, L≤8</td><td>3</td></tr>
<tr><td>0.08<W≤0.1, L≤5</td><td>2</td></tr>
<tr><td>W>0.1</td><td>0</td></tr>
</table>
NOTE (1)：THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART.

</td></tr>
<tr><td>7</td><td>BLACK / WHITE LINE LINEAR TYPE / FOREIGN FIBER</td><td>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≤0.05</td><td>IGNORE</td></tr>
<tr><td>0.05<W≤0.08, L≤8</td><td>3</td></tr>
<tr><td>0.08<W≤0.1, L≤5</td><td>2</td></tr>
<tr><td>W>0.1</td><td>0</td></tr>
</table>
NOTE (1)：THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART.

</td></tr>
<tr><td>8</td><td>BUBBLE / DENT FOR OPTICAL BONDING</td><td>BUBBLES WITHIN VIEWING AREA.
AVERAGE DIAMETER：D (mm)
<table>
<tr><th>SIZE D</th><th>PERMISSIBLE NO.</th></tr>
<tr><td>D≤0.2</td><td>IGNORE</td></tr>
<tr><td>0.2<D≤0.3</td><td>3</td></tr>
<tr><td>0.3<D≤0.5</td><td>2</td></tr>
<tr><td>D>0.5</td><td>0</td></tr>
</table>
NOTE (1)：THE DISTANCE BETWEEN DEFECTS SHOULD BE MORE THAN 10mm APART.

</td></tr>
<tr><td>9</td><td>CHIPPING</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></tr>
<tr><td>10</td><td>CRACKED GLASS</td><td>NOT ACCEPTABLE</td></tr>
<tr><td>11</td><td>LINE DEFECT ON DISPLAY</td><td colspan="2">OBVIOUS VERTICAL OR HORIZONTAL LINE DEFECT IS NOT ALLOWED</td></tr>
<tr><td>12</td><td>MURA ON DISPLAY</td><td colspan="2">IT’S OK IF MURA IS SLIGHT VISIBLE THROUGH 5% ND FILTER</td></tr>
<tr><td>13</td><td>UNEVEN COLOR SPREAD, COLORATION</td><td colspan="2">TO BE DETERMINED BASED UPON THE LIMITED SAMPLE.</td></tr>
<tr><td>14</td><td>BEZEL APPEARANCE</td><td colspan="2">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>
</table>

NO.	ITEM	CRITERIA
15	PCB	1. THERE MAY NOT BE MORE THAN 2mm OF SEALANT OUTSIDE THE SEAL AREA ON THE PCB, AND THERE SHOULD BE NO MORE THAN THREE PLACES. 2. NO OXIDATION OR CONTAMINATION PCB TERMINALS. 3. PARTS ON PCB MUST BE THE SAME AS ON THE PRODUCTION CHARACTERISTIC CHART. THERE SHOULD BE NO WRONG PARTS, MISSING PARTS OR EXCESS PARTS. 4. THE JUMPER ON THE PCB SHOULD CONFORM TO THE PRODUCT CHARACTERISTIC CHART. 5. IF SOLDER GETS ON BEZEL TAB PADS, LED PAD, ZEBRA PAD OR SCREW HOLD PAD; MAKE SURE IT IS SMOOTHED DOWN.
16	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  (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 

NO.	ITEM	CRITERIA
16	SOLDERING	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.
17	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.
18	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.

14. RELIABILITY TEST

14.1 STANDARD SPECIFICATIONS FOR RELIABILITY OF LCD MODULE

NO.	ITEM	DESCRIPTION
1	HIGH TEMPERATURE OPERATION	THE SAMPLE SHOULD BE ALLOWED TO STAND AT +80°C FOR 240 HRS
2	LOW TEMPERATURE OPERATION	THE SAMPLE SHOULD BE ALLOWED TO STAND AT -30°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.

14.2 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 14.2, 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

15. CAUTION

15.1 OPERATION

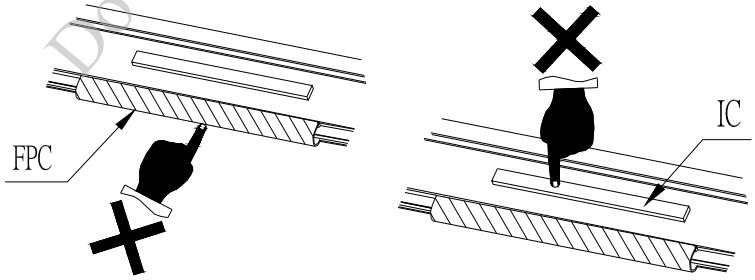
15.1.1 DO NOT CONNECT OR DISCONNECT MODULES TO OR FROM THE MAIN SYSTEM WHILE POWER IS BEING SUPPLIED .

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 NOTICE

15.2.1 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 .

15.2.2 DO NOT DISASSEMBLE . EDT SHALL NOT BE HELD RESPONSIBLE IF THE MODULE IS DISASSEMBLED AND UPON THE REASSEMBLY THE MODULE FAILED.

15.2.3 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.

15.2.4 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.

15.2.5 DON'T GIVE EXTERNAL SHOCK.

15.2.6 DON'T APPLY EXCESSIVE FORCE ON THE SURFACE.

15.2.7 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.

15.2.8 DON'T OPERATE IT ABOVE THE ABSOLUTE MAXIMUM RATING.

15.2.9 STORAGE IN A CLEAN ENVIRONMENT, FREE FROM DUST, ACTIVE GAS, AND SOLVENT.

15.2.10 STORE WITHOUT ANY PHYSICAL LOAD.

15.2.11 REWIRING: NO MORE THAN 3 TIMES.