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		Revision	1

TO :

Date :

5.7" QVGA TFT Specification

P/N : **TFP507MWQVGAHBE-01**

MODEL NO.	VERSION	PAGE
TFP507MWQVGAHBE-01	1	0-1

RECORDS OF REVISION	DOC . FIRST ISSUE	FEB.16, 2007
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1. GENERAL SPECIFICATIONS

1.1 APPLICATION NOTES FOR CONTROLLER/DRIVER
PLEASE REFER TO :

H I M A X H X 8 2 1 8
H I M A X H X 8 6 1 5

1.2 MATERIAL SAFETY DESCRIPTION

ASSEMBLIES SHALL COMPLY WITH EUROPEAN ROHS REQUIREMENTS, INCLUDING PROHIBITED MATERIALS/COMPONENTS CONTAINING LEAD, MERCURY, CADMIUM, HEXAVALENT CHROMIUM, POLYBROMINATED BIPHENYLS (PBB) AND POLYBROMINATED DIPHENYL ETHERS (PBDE)

2. MECHANICAL SPECIFICATIONS

- (1) DISPLAY SIZE (inch) ----- 5.7"
- (2) NUMBER OF DOTS ----- 320W * (RGB) * 240H DOTS
- (3) MODULE SIZE ----- 124.7W * 100.0H * 7.5D mm
(WITHOUT FPC)
- (4) EFFECTIVE AREA ----- 117.2W * 88.4H mm
- (5) ACTIVE AREA ----- 115.2W * 86.4H mm (LCD)
- (6) DOT SIZE ----- 0.12W * 0.36H mm
- (7) PIXEL SIZE ----- 0.36W * 0.36H mm
- (8) LCD TYPE ----- TFT , TRANSMISSIVE
- (9) COLOR ----- 16.7M (24BIT)
- (10) VIEWING DIRECTION ----- 6 O'CLOCK
- (11) BACK LIGHT ----- LED , COLOR : WHITE

3. ABSOLUTE MAXIMUM RATINGS

3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS .

PARAMETER	SYMBOL	MIN.	MAX.	UNIT	REMARK
POWER VOLTAGE	VDD	-0.3	7.0	V	AVSS=0
	VCC	-0.3	7.0	V	VSS=0
	VGH	-0.3	32.0	V	VSS=0
	VGL	-22.0	+0.3	V	VSS=0
	VGH-VGL	-0.3	+45	V	VSS=0
INPUT SIGNAL VOLTAGE	Vi	- 0.3	VDD+0.3	V	
	VL	-0.3	VCC+0.3		
STATIC ELECTRICITY	—	—	—	V	NOTE (1)

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

3.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS .

I T E M	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	- 1 0 °C	6 0 °C	- 2 0 °C	7 0 °C	NOTE (2), (3)
HUMIDITY	NOTE (4)		NOTE (4)		WITHOUT CONDENSATION
VIBRATION	—	2.45 m/s ² (0.25 G)	—	11.76 m/s ² (1.2 G)	5~20Hz, 1HR 20~500Hz(20Hz), 1HR 20~500Hz(500Hz), 1HR X,Y,Z,TOTAL 3HR
SHOCK	—	29.4 m/s ² (3 G)	—	490 m/s ² (5 0 G)	10 m SECONDS XYZ DIRECTIONS 1 TIME EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE (2) : Ta AT -20°C : 48HR MAX.
70°C : 168HR MAX.

NOTE (3) : BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT TEMPERATURE THIS PHENOMENON IS REVERSIBLE .

NOTE (4) : Ta ≤ 60°C : 90%RH MAX (96HRS MAX).

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

4. ELECTRICAL CHARACTERISTICS

Ta = 25 °C

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
DIGITAL POWER SUPPLY	VCC	—	3	3.3	3.6	V	
DIGITAL OPERATING CURRENT	ICC	H LEVEL	—	6	12	mA	
ANALOG POWER SUPPLY	VDD	L LEVEL	3.8	5	5.5	V	
ANALOG OPERATING CURRENT	IDD	—	—	8	15	mA	
GATE ON POWER	VGH	H LEVEL	—	15	—	V	
GATE OFF POWER	VGL	L LEVEL	—	-10	—	V	
GATE ON CURRENT	IGH	H LEVEL	—	0.04	0.08	mA	
GATE OFF CURRENT	IGL	L LEVEL	—	0.06	0.12	mA	
VCOM CURRENT (2)	ICOM(RMS)	—	—	8	20	mArms	
VCOM HIGH VOLTAGE	VCOMH	H LEVEL	2.3	2.8	3.2	V	NOTE (1)
VCOM LOW VOLTAGE	VCOML	L LEVEL	-2.5	-2.1	-1.7	V	NOTE (1)
FRAME FREQUENCY	fFRAME	—	—	60	90	Hz	
DOT DATA CLOCK	DCLK	—	—	6.4	—	MHz	

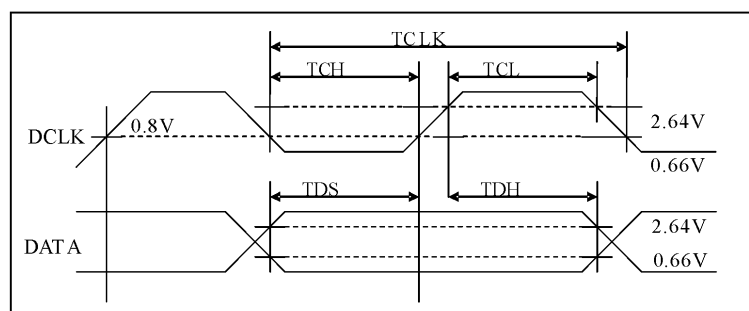
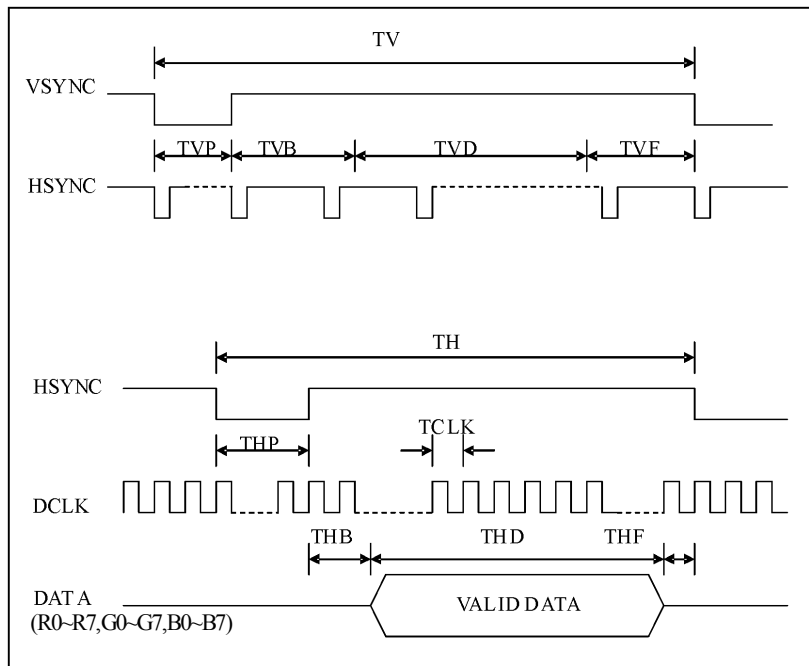
NOTE (1) : VCOMH & VCOML : ADJUST THE COLOR WITH GAMMA DATA.

NOTE (2) : THE DISPLAY PATTERN IS ALL “ OFF “ / “ ON”.

5. TIMING CHART

5.1 DIGITAL PARALLEL RGB INTERFACE

SIGNAL	ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
DCLK	FREQUENCY	TCLK	—	6.4	—	MHz
	HIGH TIME	TCH	—	78	—	ns
	LOW TIME	TCL	—	78	—	ns
DATA	SETUP TIME	TDS	12	—	—	ns
	HOLD TIME	TDH	12	—	—	ns
HSYNC	PERIOD	TH	—	408	—	DCLK
	PULSE WIDTH	THP	—	30	—	DCLK
	BACK-PORCH	THB	—	38	—	DCLK
	DISPLAY PERIOD	THD	—	320	—	DCLK
	FRONT-PORCH	THF	—	20	—	DCLK
VSYNC	PERIOD	NTSC	—	262.5	—	TH
		PAL		312.5		
	PULSE WIDTH	TVP	1	3	5	TH
	BACK-PORCH	NTSC	—	15	—	TH
		PAL		23		
	DISPLAY PERIOD	TVD	—	240	—	TH
	FRONT-PORCH	NTSC	—	4.5	—	TH
PAL		46.5				



6 . OPTICAL CHARACTERISTICS (NOTE 1)
6.1 OPTICAL CHARACTERISTICS

Ta = 25 ± 2 °C

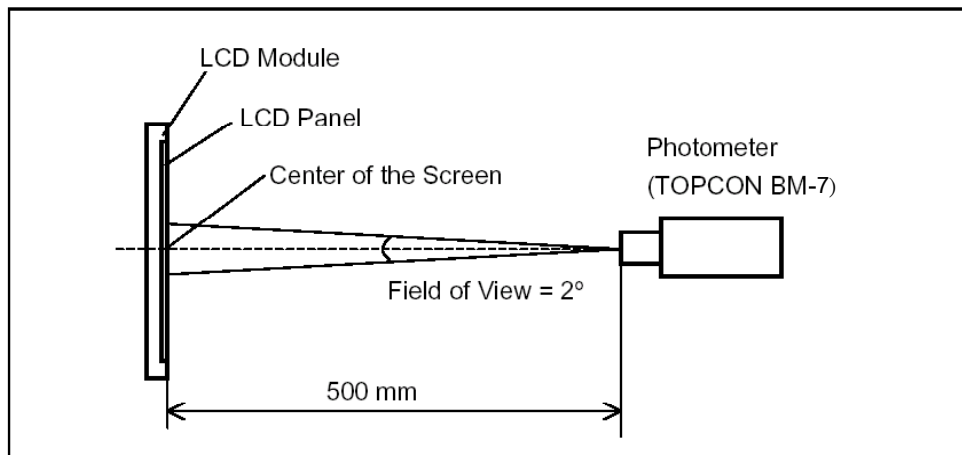
I T E M		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK	
VIEWING ANGLE		θ_{v+}	CR ≥ 10	55	62	—	deg .	(5)	
		θ_{v-}		$\theta_x=0^\circ$	60	67			—
		θ_{x+}		$\theta_y=0^\circ$	60	67			—
		θ_{x-}			60	67			—
CONTRAST RATIO		CR	$\theta_x=0^\circ, \theta_y=0^\circ$	200	300	—	—	(3)	
RESPONSE TIME		t r (rise)	$\theta_x=0^\circ, \theta_y=0^\circ$	—	15	30	msec	(2)	
		t f (fall)		—	35	50			
THE BRIGHTNESS OF MODULE		B	$\theta_x=0^\circ, \theta_y=0^\circ$	(330)	(380)	—	cd/m ²	—	
COLOR OF CIE COORDINATE	WHITE	x	$\theta_x=0^\circ, \theta_y=0^\circ$	(0.26)	(0.31)	(0.36)	—	(4)	
		y		(0.29)	(0.34)	(0.39)			
	RED	x		(0.58)	(0.63)	(0.68)	—	—	
		y		(0.31)	(0.36)	(0.41)			
	GREEN	x		(0.26)	(0.31)	(0.36)	—	—	
		y		(0.51)	(0.56)	(0.61)			
	BLUE	x		(0.09)	(0.14)	(0.19)	—	—	
		y		(0.08)	(0.13)	(0.18)			
THE BRIGHTNESS OF UNIFORMITY		—	—	75	80	—	%	—	

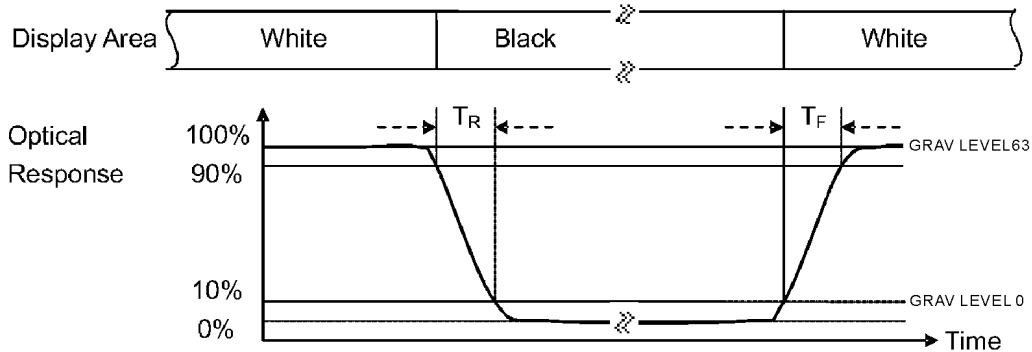
NOTE (1) : TEST EQUIPMENT SETUP :

AFTER STABILIZING AND LEAVING THE PANEL ALONE AT A GIVEN TEMPERATURE FOR 30 MINUTES , THE MEASUREMENT SHOULD BE EXECUTED. MEASUREMENT SHOULD BE EXECUTED IN A STABLE , WINDLESS , AND DARK ROOM. OPTICAL SPECIFICATIONS ARE MEASURED BY TOPCON BM-7(FAST) WITH A VIEWING ANGLE OF 2° AT A DISTANCE OF 50cm AND NORMAL DIRECTION.

NOTE (2) : DEFINITION OF RESPONSE TIME : TR AND TF

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





NOTE (3) : DEFINITION OF CONTRAST RATIO :

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

WHITE $V_i = V_i 50\% \pm 1.5V$

BLACK $V_i = V_i 50\% \mu 2.0V$

“±” MEANS THAT THE ANALOG INPUT SIGNAL SWINGS IN PHASE WITH VCOM SIGNAL.

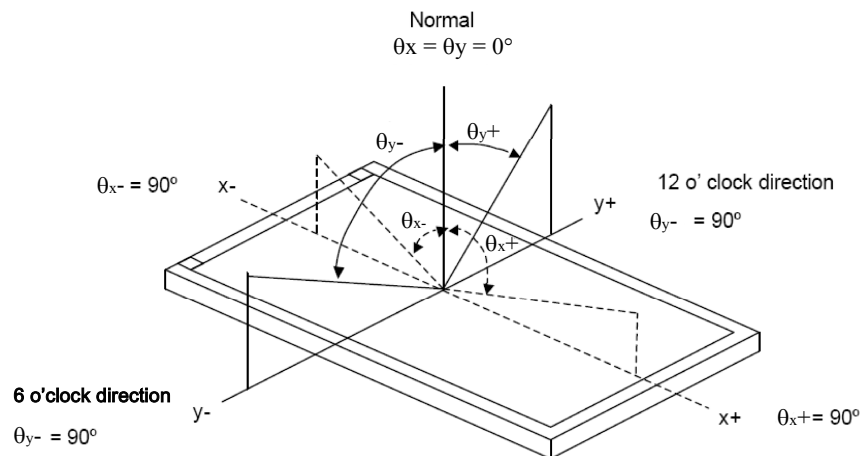
“μ” MEANS THAT THE ANALOG INPUT SIGNAL SWINGS OUT OF PHASE WITH VCOM SIGNAL.

$V_i 50\%$: THE ANALOG INPUT VOLTAGE WHEN TRANSMISSION IS 50%

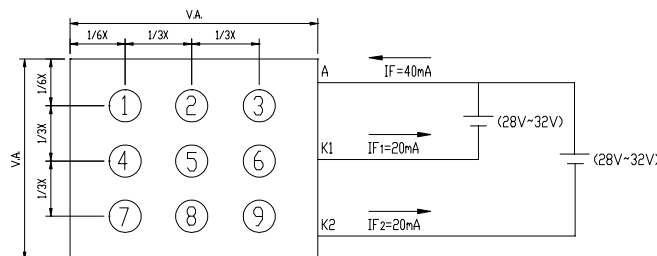
THE 100% TRANSMISSION IS DEFINED AS THE TRANSMISSION OF LCD PANEL WHEN ALL THE INPUT TERMINALS OF MODULE ARE ELECTRICALLY OPENED.

NOTE (4) : MEASURED AT THE CENTER AREA OF THE PANEL WHEN ALL THE INPUT TERMINALS OF LCD PANEL ARE ELECTRICALLY OPENED.

NOTE (5) : DEFINITION OF VIEWING ANGLE :



6.2 THE TEST METHOD OF BRIGHTNESS AND UNIFORMITY



UNIT : mm

$I_f = 40mA$

ADD POWER (+28V~32V) TO LED , A , K PIN TEST POINT ARE ① ~ ⑨

6.3 THE CALCULATING METHOD OF UNIFORMITY

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

6.4 LED BACK-LIGHT UNIT

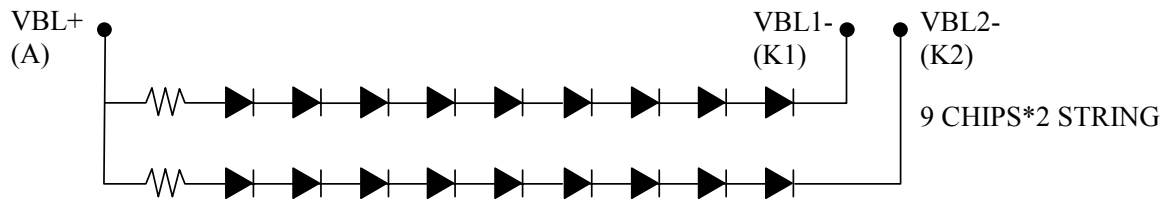
6.4.1 ELECTRICAL / OPTICAL CHARACTERISTICS AT Ta=25°C

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
AVERAGE LUMINOUS INTENSITUY	I_v	(6000)	(6500)	—	cd/m ²	I _F =40mA/BACK LIGHT
FORWARD VOLTAGE	V_F	(28)	(30)	(32)	V	I _F =40mA
LED LIFE TIME		30000	40000	—	hr	Ta=25°

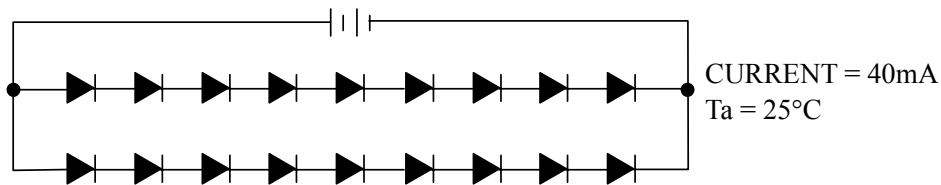
6.4.2 ABSOLUTE MAXIMUM RATINGS AT Ta=25°C

PARAMETER	SYMBOL	SPECIFICATION	UNIT	REMARK
POWER DISSIPATION	PAD	(1.28)	W	(1)
FORWARD CURRENT	IAF	(0.06)	A	(1)
REVERSE VOLTAGE	VR	(45)	V	(1)

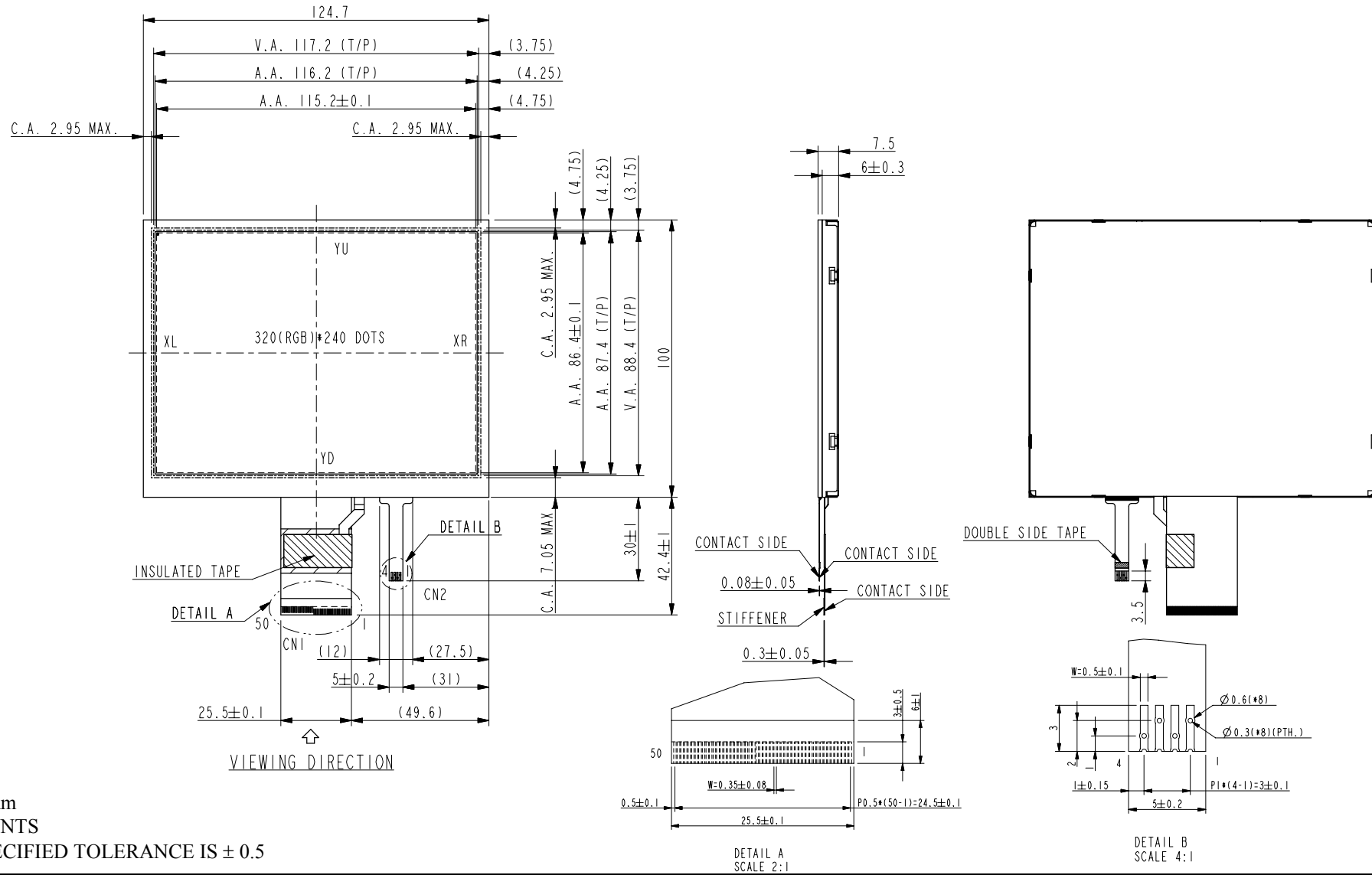
NOTE (1) : INTERNAL CIRCUIT DIAGRAM



NOTE (2) : TESTING CIRRCUIT

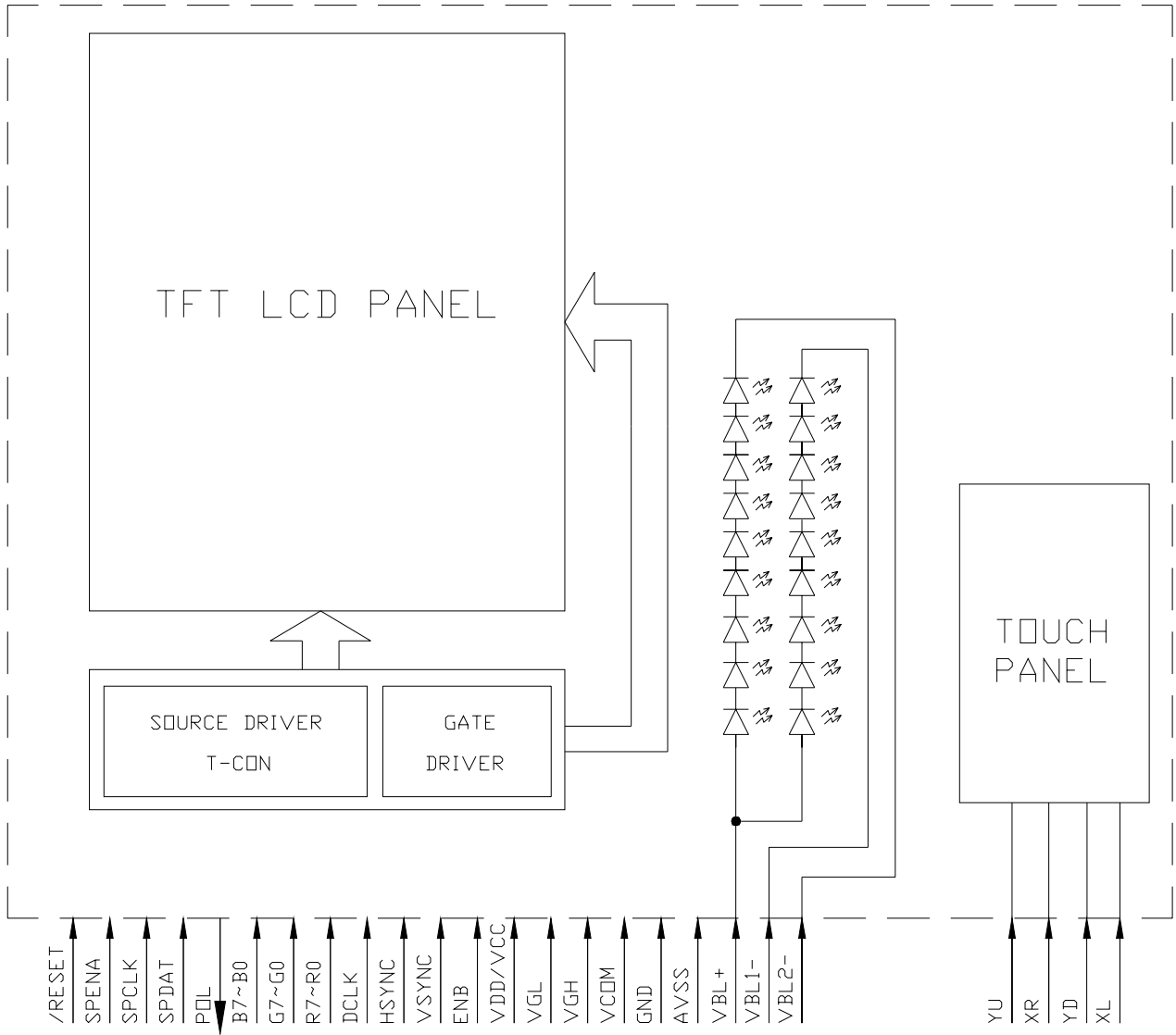


7. OUTLINE DIMENSIONS

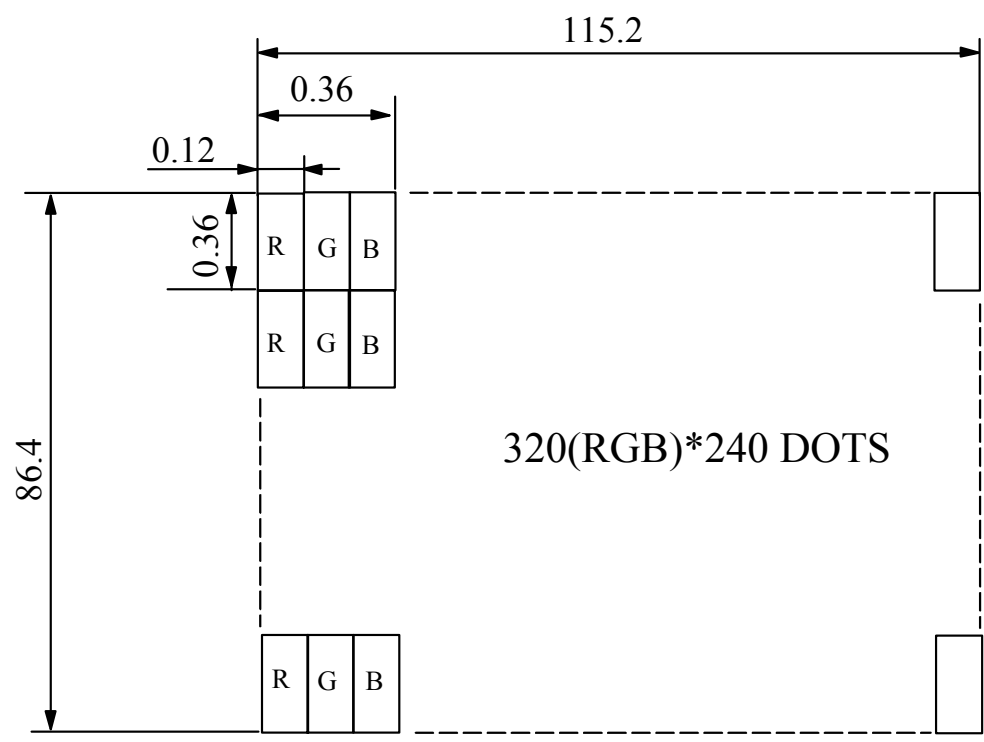


UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.5

8. BLOCK DIMENSION



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

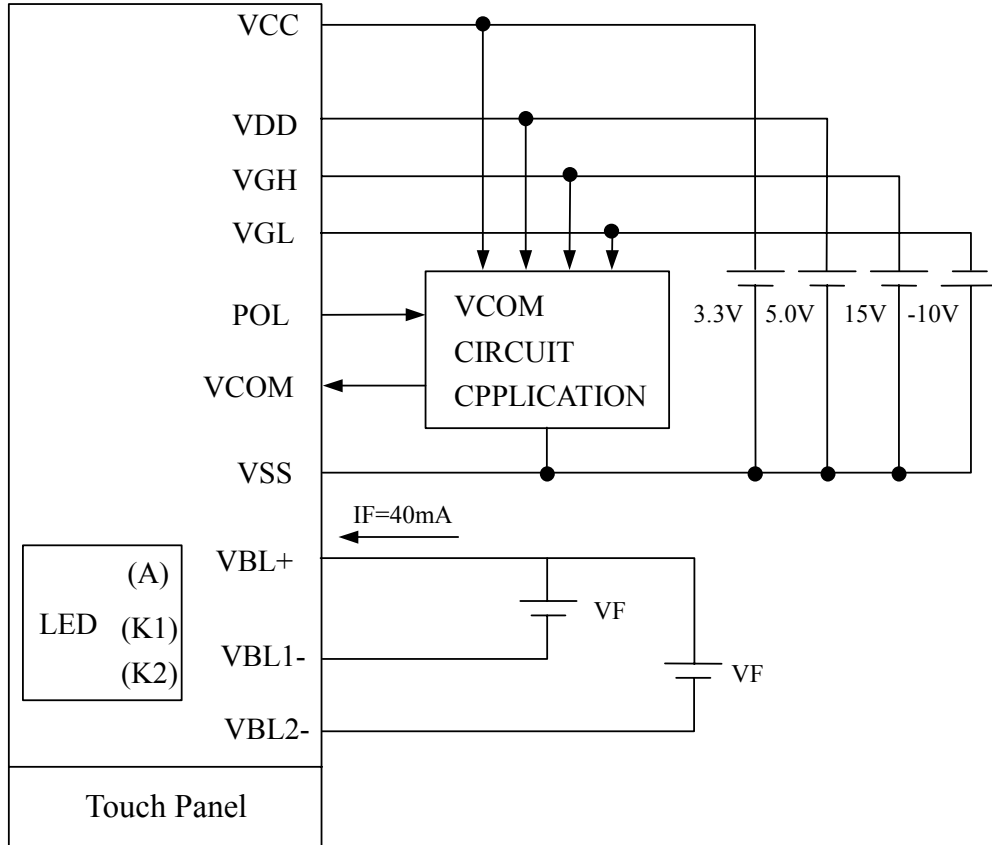
PIN NO	SYMBOL	I/O	FUNCTION
1	VBL2-	P	BACKLIGHT LED GROUND (K2)
2	VBL1-	P	BACKLIGHT LED GROUND (K1)
3	VBL+	P	BACKLIGHT LED POWER (A)
4	VBL+	P	BACKLIGHT LED POWER (A)
5	NC	—	NOT USE
6	/RESET	I	HARDWARE RESET
7	SPENA	I	SPI INTERFACE DATA ENABLE SIGNAL
8	SPCLK	I	SPI INTERFACE DATA CLOCK
9	SPDAT	I	SPI INTERFACE DATA
10	POL	O	POLARITY SIGNAL CONNECT TO VCOM DRIVING CIRCUIT
11	B7	I	BLUE DATA BIT 7
12	B6	I	BLUE DATA BIT 6
13	B5	I	BLUE DATA BIT 5
14	B4	I	BLUE DATA BIT 4
15	B3	I	BLUE DATA BIT 3
16	B2	I	BLUE DATA BIT 2
17	B1	I	BLUE DATA BIT 1
18	B0	I	BLUE DATA BIT 0
19	G7	I	GREEN DATA BIT 7
20	G6	I	GREEN DATA BIT 6
21	G5	I	GREEN DATA BIT 5
22	G4	I	GREEN DATA BIT 4
23	G3	I	GREEN DATA BIT 3
24	G2	I	GREEN DATA BIT 2
25	G1	I	GREEN DATA BIT 1
26	G0	I	GREEN DATA BIT 0
27	R7	I	RED DATA BIT 7
28	R6	I	RED DATA BIT 6
29	R5	I	RED DATA BIT 5
30	R4	I	RED DATA BIT 4
31	R3	I	RED DATA BIT 3
32	R2	I	RED DATA BIT 2
33	R1	I	RED DATA BIT 1
34	R0	I	RED DATA BIT 0

PIN NO	SYMBOL	I/O	FUNCTION
35	DCLK	I	DOT DATA COLCK
36	HSYNC	I	HORIZONTAL SYNC INPUT
37	VSYNC	I	VERTICAL SYNC INPUT
38	ENB	I	DATA ENABLE INPUT
39	VDD	P	ANALOG POWER
40	VDD	P	ANALOG POWER
41	VCC	P	DIGITAL POWER
42	VCC	P	DIGITAL POWER
43	NC	—	NOT USE
44	VGL	P	GATE OFF POWER
45	NC	—	NOT USE
46	VGH	P	GATE ON POWER
47	NC	I	NOT USE
48	VCOM	P	DRIVING INPUT
49	GND	P	GROUND
50	AVSS	P	GROUND

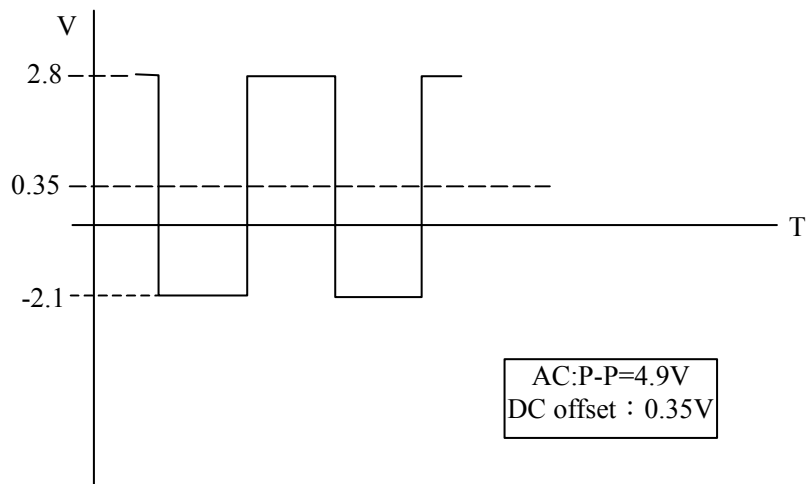
T/P INTERFACE

NO	SYMBOL	FUNCTION
1	YU	TOP PANEL
2	XR	RIGHT PANEL
3	YD	BOTTOM PANEL
4	XL	LEFT PANEL

1 1 . POWER SUPPLY
1 1 .1 POWER SUPPLY FOR LCM

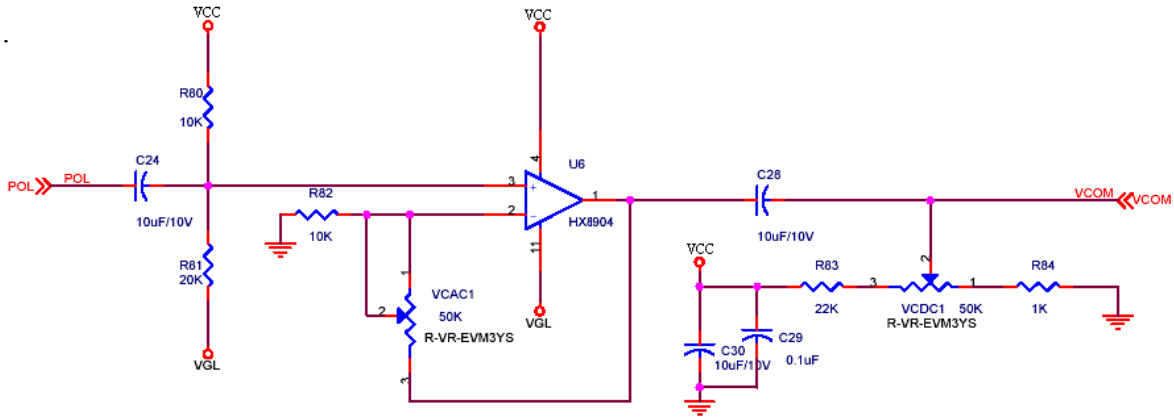


NOTE : VCOM AC WAVEFORM

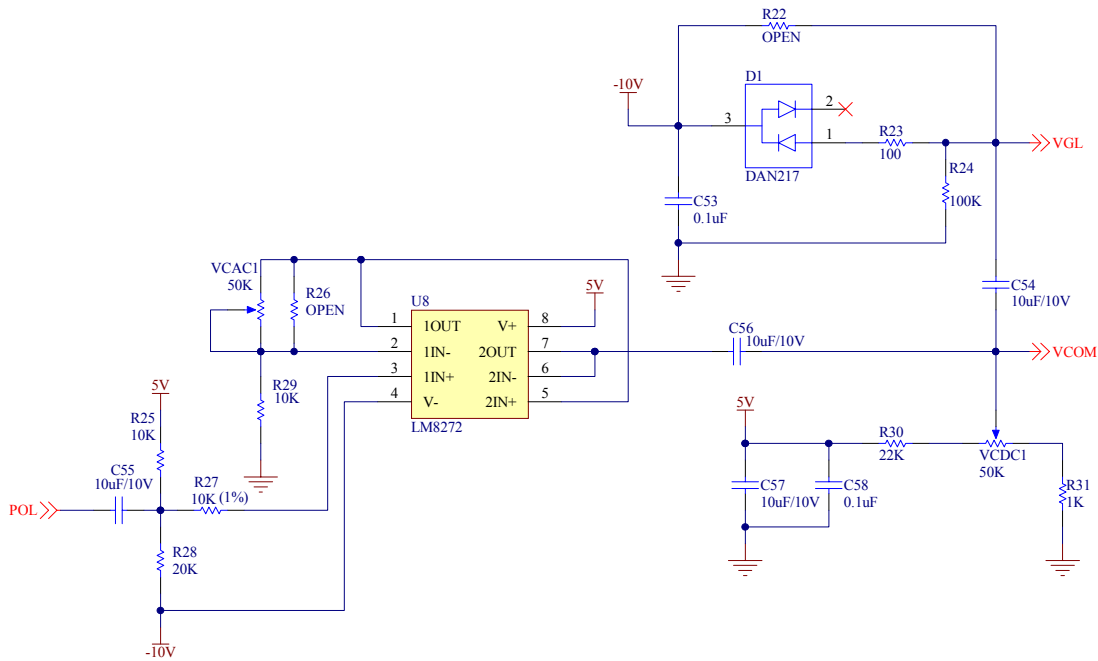


VCOM CIRCUIT REFERENCE :

1.

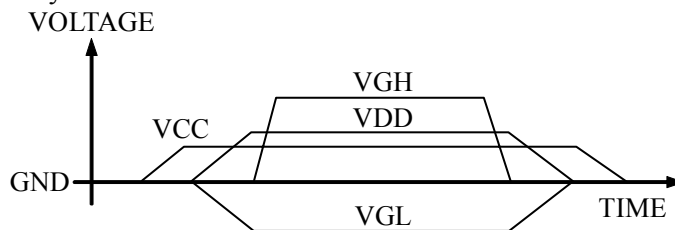


2.



1 1 .2 POWER SEQUENCE

The LCD panel adopts high voltage driver ICs, so it could be permanently damaged if a wrong power on/off sequence is used. When powering on the LCD, VCC should go up firstly, and then turn on VGL and VDD, and finally VGH. Turn off the LCD panel with reversed order or shut off all the power supplies simultaneously.



12. TOUCH PANEL SPECIFICATION

12.1 ELECTRICAL CHARACTERISTICS

Ta = 25°C

ITEM	CONDITION	SPEC.	UNIT
LINEARITY	—	≤ 1.5	%
TRANSMISSION	ASTM D1003	80 OR MORE	%
ON LOAD	POLYACETAL PEN INPUT	15 ~ 80	g
TERMINAL RESISTANCE	X AXIS	400 ~ 1000	Ω
	Y AXIS	200 ~ 700	
INSULATION RESISTANCE	DC25V	≥ 10	MΩ

12.2 ABSOLUTE MAXIMUM RATINGS :

ITEM	MIN.	TYP.	MAX.
OPERATING TEMPERATURE (Top)	-10°C	—	60°C
STORAGE TEMPERATURE (Tst)	-40°C	—	+80°C
INPUT VOLTAGE (V)	—	5	5.5

12.3 PRECAUTIONS IN USE OF TOUCH PANEL

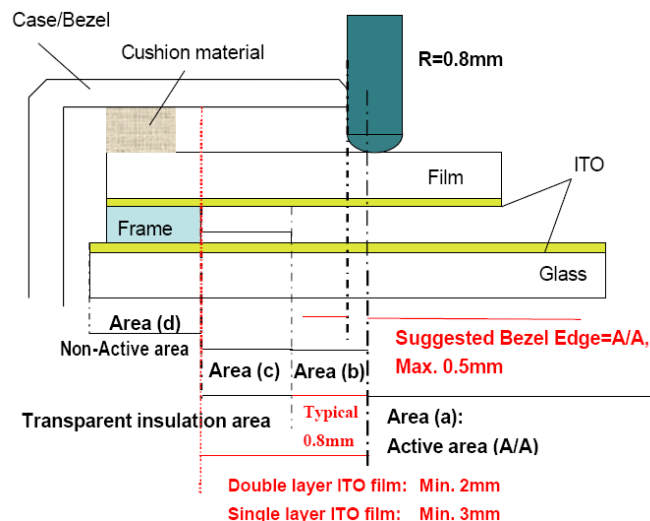
12.3.1 PURPOSE :

IN ORDER TO PREVENT ACCIDENTAL USE AND PERFORMANCE DETERIORATION, PLEASE KEEP THE FOLLOWING PRECAUTIONS AND INHIBITED POINTS.

12.3.2 ITEM AND ILLUSTRATION :

(1) STRUCTURE, AREA DEFINITION

THE STRUCTURE AND THE PERFORMANCE GUARANTEED AREA OF THIS TOUCH PANEL ARE DEFINED BELOW :



THE ABOVE FIGURE IS OUR DESIGN RULE OF TOUCH PANEL.

IF IT CANNOT MEET YOUR REQUIREMENT, PLEASE CONTACT WITH OUR ENGINEERS FOR FURTHER DISCUSSION.

ABOVE FIGURE ILLUSTRATES THE RECOMMENDED BEZEL AND CUSHION DESIGN. IN ORDER TO PREVENT UNUSUAL PERFORMANCE DEGRADATION AND MALFUNCTION OF A TOUCH PANEL, PLEASE CARRY OUT THE SET CASE DESIGNING AND A TOUCH PANEL ASSEMBLING METHOD AFTER SURELY CONSIDERING THE DEFINITION OF EACH AREA ILLUSTRATED IN ABOVE FIGURE.

AREA(a) : ACTIVE AREA

THE ACTIVE AREA IS GUARANTEED THE POSITION DATA DETECTABLE PRECISION, OPERATION FORCE AND OTHER OPERATIONS. IT IS STRONGLY RECOMMENDED TO PLACE THE OPERATION BUTTON OR MENU KEYS WITHIN THE ACTIVE AREA. DUE TO STRUCTURE, THE ACTIVE AREA IS LESS DURABLE AT THE EDGE OR CLOSE TO THE EDGE.

AREA(b) : OPERATION NON-GUARANTEED AREA

THIS AREA DOES NOT GUARANTEE A TOUCH PANEL OPERATION AND ITS FUNCTION. WHEN THIS AREA IS PRESSED, TOUCH PANEL SHOWS DEGRADATION OF ITS PERFORMANCE AND DURABILITY SUCH AS A PEN SLIDING DURABILITY BECOMES ABOUT ONE-TENTH COMPARED WITH THE ACTIVE AREA (AREA-(A) AS GUARANTEED AREA) AND ITS OPERATION FORCE REQUIRES ABOUT DOUBLE. ABOUT 0.5 MM OUTSIDE FROM A BOUNDARY OF THE ACTIVE AREA CORRESPONDS TO THIS AREA.

AREA(c) : PRESSING PROHIBITION AREA

THE AREA WHICH FORBIDS PRESSING, BECAUSE AN EXCESSIVE LOAD IS APPLIED TO A TRANSPARENT ELECTRODE (ITO) AND A SERIOUS DAMAGE IS GIVEN TO A TOUCH PANEL FUNCTION BY PRESSING.

AREA(d) : NON-ACTIVE AREA

THE AREA DOES NOT ACTIVATE EVEN IF PRESSED.

(2) CAUTIONS FOR INSTALLING AND ASSEMBLING

(i) DO NOT GIVE EXCESSIVE STRAIN TO THE PRODUCT.

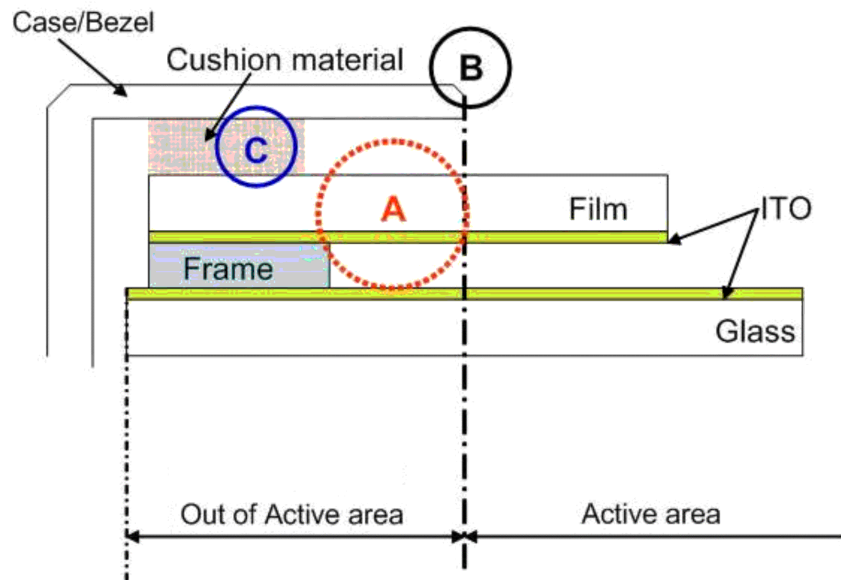
(ii) FLEXIBLE PATTERN CABLE IS CONNECTED TO THE BODY BY THERMAL PRESSURE METHOD. SO, DO NOT APPLY EXCESSIVE FORCES TO THE FLEXIBLE PATTERN. DO NOT ADD AN EXCESSIVE FORCE TO A FPC(FLEX TAIL) THAT MAKES PEELING OFF OF THE FPC FROM THE PRODUCT. DO NOT FIX, ADHERE OR MOUNT ANY ADDITIONAL GOODS ON THE FPC SUCH AS ADDITIONAL FILM/PLATE ON THE FPC, BECAUSE SUCH ADDITIONAL GOODS WILL APPLY A STRESS AT THE FPC BONDING AREA. IT MAY AFFECT THE CONDUCTIVITY OF FPC WITH TOUCH PANEL.

(iii) IN ORDER NOT TO APPLY LOAD ON THE DISPLAY, PROVIDE A CLEARANCE OF AT LEAST 0.3MM BETWEEN THE PRODUCT AND DISPLAY.

(iv) WE RECOMMEND THE DESIGN OF A CASE OR BEZEL SHOULD COVERS THE BOUNDARY OF THE ACTIVE AREA INSIDE IN ORDER TO PREVENT AN OPERATION AT OUTSIDE OF THE ACTIVE AREA WHICH CAN NOT GUARANTEE THE FUNCTION OR DURABILITY (REFER TO ITEM 5.1.2. STRUCTURE, AREA DEFINITION).

BEZEL'S EDGE PART MAY GUIDE THE PEN SLIDING ON THE SAME POSITION REPEATEDLY. IF THE BEZEL IS PLACED OUTSIDE OF THE ACTIVE AREA, IT MAY CAUSE THE DAMAGE OF THE ITO FILM.

- (v) PRESSING INSIDE OF BOUNDARY OF THE FRAME(PART (A) AS SHOWN IN BELOW) MAY CAUSES FAULT OPERATION, SO PLEASE DESIGN TO AVOID PRESSING OF TOUCH PANEL AT PART (A) SUCH AS HAVING GASKET/CUSHION AT PART (C). PARTICULARLY THE AREA (B) SHALL BE FREE FROM BURR. THE GASKET/CUSHION MATERIAL AT THE PART (C) SHOULD NOT BE EXCEEDED TO INSIDE OF THE BOUNDARY OF THE FRAME.



- (vi) TO PREVENT GIVING DISTORTION TO THE FILM OF THE PRODUCT AND PEELING OFF OF THE FILM FROM THE PRODUCT, DO NOT FIX THE FILM AND A SET CASE OR A SHOCK ABSORBING MATERIAL ADHERED TO A SET CASE BY ADHESION.
- (vii) WIPE OFF THE STAIN ON THE PRODUCT BY USING SOFT CLOTH MOISTENED WITH ETHANOL. TAKE CARE NOT TO ALLOW ETHANOL TO SOAK INTO THE JOINT OF UPPER FILM AND BOTTOM GLASS. IT MAY OTHERWISE CAUSE PEELING OR DEFECTIVE OPERATION. DO NOT USE ANY ORGANIC SOLVENT OR DETERGENT OTHER THAN ETHANOL.
- (viii) THE CORNERS OF THE PRODUCT ARE NOT CHAMFERED AND ARE SHARP. WHEN POSITIONING AND FIXING THE PRODUCT ON THE CASE, PROVIDE A ROUND PART ON THE CORNER OF THE CASE SO AS NOT TO APPLY LOAD ON THE CORNER OF THE TRANSPARENT TOUCH PANEL.
- (ix) DO NOT PRESS THE FILM OF THE PRODUCT WHEN THIS PRODUCT IS BUILT INTO A SET.

(3) CAUTIONS FOR OPERATION

- (i) OPERATE IT WITH A POLYACETAL PEN (TIP R0.8 OR OVER) OR A BELLY OF A FINGER WITHOUT APPLYING EXCESSIVE LOAD. NEVER USE ANY MECHANICAL PENCILS, BALL POINT PENS AND HARD FINGERTIPS WHOSE TIP IS HARD FOR INPUT, OTHERWISE MALFUNCTIONS MAY RESULT.

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(ii) THE INPUT POSITION MAY BE FLUCTUATED A LITTLE THROUGH LONG-TIME USE. IT IS DESIRABLE TO PROVIDE A ZERO-ADJUSTMENT FUNCTION BY USING A CIRCUIT AND SOFTWARE.

(iii) OPERATION AT THE OUT OF ACTIVE AREA IS OUT OF OUR GUARANTEE. IT CAUSES A SERIOUS DAMAGE OF A TRANSPARENT ELECTRODE. DO NOT OPERATE AT THE OUT OF ACTIVE AREA.

(iv) IN CASE OF CLEANING THE PART OF THE CASE BOUNDARY OF ACCOMPLISHED SET, USE A SOFT CLOTH WITH A FINGER BERRY OR A COTTON BUD. DO NOT CLEAN WITH A THING OTHER THAN THE FINGER SUCH AS HARD OR SHARP EDGES LIKE A FINGER NAIL ETC. ON THE CLOTH, BECAUSE IT CAUSE TRANSPARENT CONDUCTIVE FILM CRACKS. PLEASE ADVISE THIS PROHIBITION TO YOUR LAST CUSTOMERS.

12.4 DURABILITY

12.4.1 STYLUS HITTING :

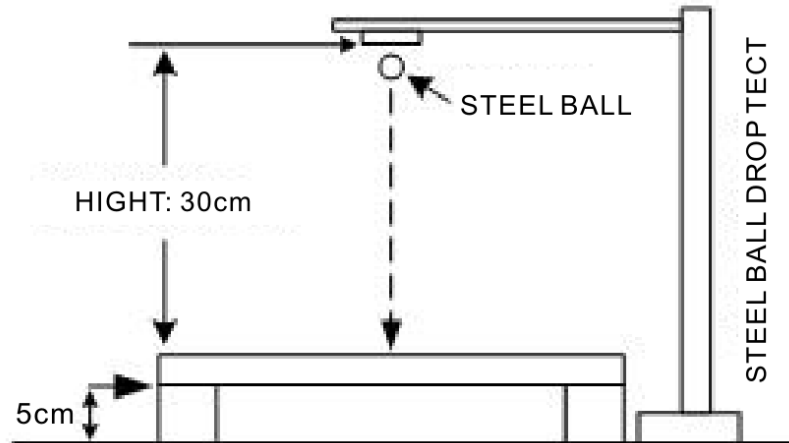
ONE MILLION TIMES OR OVER
 NO DAMAGE ON FILM SURFACE
 PEN : R8 mm SILICON RUBBER
 LOAD : 250g
 FREQUENCY : 240 times/min
 MEASUREMENT POSITION:
 1 POINT OF TOUCH PANEL ACTIVE AREA
 REPEATED : OVER 1,000,000 TIMES

12.4.2 PEN TOUCH SLIDING DURABILITY :

100,000 TIMES OR OVER
 WRITING WITH R0.8mm PLASTIC STYLUS PEN; WRITING FORCE 150g
 IN ACTIVE AREA.
 SPEED IS 60mm/sec.

12.5 STEEL BALL DROP TEST

BY USING F9mm STEEL BALL FROM THE HEIGHT OF 30cm AND FALLING ON TOUCH PANEL SURFACE, MUST PASS BELOW CONDITIONS :
 APPEARANCE : THE APPEARANCE WITHOUT ANY CHANGE, INCLUDING THE PANEL BROKEN.



12.6 APPEARANCE INSPECTION

PURPOSE :

TO ESTABLISH APPEARANCE STANDARD AND MAINTAIN PRODUCT QUALITY ◦

SCOPE :

TOUCH PANEL VIEW AREA WITHIN TOUCH PANEL ◦

12.6.1 RULE :

INSPECTION CONDITION

(A) ENVIRONMENTAL LUMINANCE : 500 LUX ◦

(B) DISTANCE BETWEEN HUMAN EYES AND PANEL : 30 CM

(PANEL MUST BE TESTED UNDER LIGHT TRANSPARENT) ◦

(C) VISUAL ANGEL : $> 60^\circ$ ◦

(D) LIGHT SOURCE : FLUORESCENT LIGHT SOURCE ◦

12.6.2 JUDGE CRITERION :

JUDGEMENT UNDER ABOVE MENTIONED CRITERION (PANEL MUST BE TESTED UNDER LIGHT TRANSPARENT),

TESTING GOODS DEFECT CAN BE VISIBLE WITHIN 10 SECONDS, WHICH WILL BE JUDGED AS MAJOR DEFECTS ◦

SAMPLING STANDARD :

THE SAMPLING STANDARD WILL BE CONFIRMED BY BOTH OF FACTORY AND CUSTOMER.

INSPECTION ITEMS	SEPC.	JUDGE CRITERION	OPERATION GUIDELINE
SCRATCH	$W \leq 0.05\text{mm} \ \& \ L \leq 10\text{mm}$	ACCEPTABLE	<p>REFL</p> <p>BACK GROUND</p> <p>TESTING GOODS</p> <p>FLUORESCENT LIGHT SOURCE</p> <p>300mm</p> <p>60°</p> <p>ENVIRONMENTAL 1UMINANCE : 500 Lux</p>
	$W > 0.05\text{mm} \ \text{or} \ L > 10\text{mm}$	NOT ACCEPTABLE	
LINEAR FOREIGN OBJECT	$W \leq 0.05\text{mm} \ \& \ L \leq 5\text{mm}$	ACCEPTABLE	<p>REFL</p> <p>FLUORESCENT LIGHT SOURCE</p> <p>TESTING GOODS</p> <p>300mm</p> <p>60°</p> <p>ENVIRONMENTAL 1UMINANCE : 500 Lux</p>
	$W > 0.05\text{mm} \ \text{or} \ L > 5\text{mm}$	NOT ACCEPTABLE	
GRANULAR FOREIGN OBJECT	$D \leq 0.25\text{mm}$	ACCEPTABLE	<p>REFL</p> <p>FLUORESCENT LIGHT SOURCE</p> <p>TESTING GOODS</p> <p>300mm</p> <p>60°</p> <p>ENVIRONMENTAL 1UMINANCE : 500 Lux</p>
	$0.25\text{mm} < D \leq 0.30\text{mm}$	MAX. 2 EA	
	$D > 0.30\text{mm}$	NOT ACCEPTABLE	
PET BUBBLES	$D \leq 0.5\text{mm}$	ACCEPTABLE	<p>D</p> <p>D</p>
	$D > 0.5\text{mm}$	NOT ACCEPTABLE	
CHIP ON GLASS	CORNER $X \leq 3\text{mm} \ \cdot \ Y \leq 3\text{mm} \ \cdot \ Z < t$ (t = /thickness)	ACCEPTABLE	<p>Chip of glass</p> <p>X</p> <p>Y</p> <p>Z</p>
	EDGE $W \leq 3\text{mm} \ \cdot \ Y \leq 3\text{mm} \ \cdot \ Z < t$		

13 . SPECIFICATION OF AUDACITY ASSURANCE

13.1 APPLICATION

This inspection standard is to be applied to the LCD module delivered from factory to customers

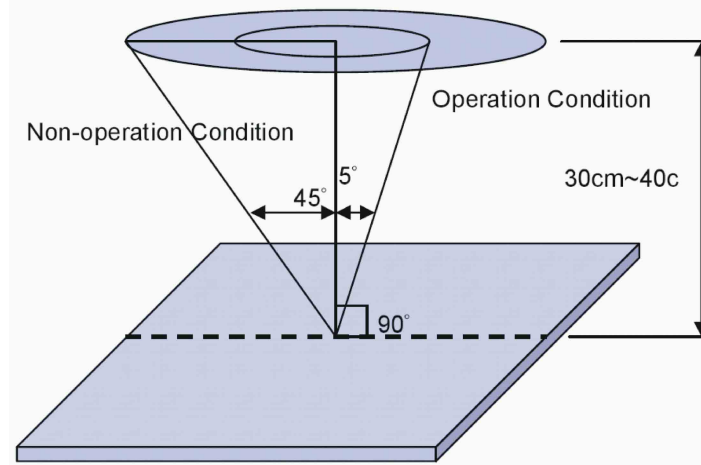
13.2 INSPECTION CONDITIONS

13.2.1 (1) Observation Distance : 35cm±5cm

(2) View Angle :

Non-operation Condition : ±5° (perpendicular to LCD panel surface)

Operation Condition : ±45° (perpendicular to LCD panel surface)



13.2.2 Environment Conditions :

Ambient Temperature		20°C~25°C
Ambient Humidity		65±20%RH
Ambient Illumination	Cosmetic Inspection	More than 600Lux
	Functional Inspection	300~500 Lux

13.2.3 Inspection lot

Quantity per delivery lot for each model

13.2.4 Inspection method

A sampling inspection shall be made according to the following provisions to judge The acceptability

(a) Applicable standard : MIL-STD-105E

Normal inspection , single sampling

Level II

(b) AQL : Major defect : AQL 0.65%

Minor defect : AQL 1.0%

13.3 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 12.5 , standard specifications for reliability have been executed in order to ensure stability .

NO	ITEM	TEST MODEL	INSPECTION CRITERIA
1	Current consumption	Refer To Specification	The current consumption should conform to the product specification.
2	Contrast	Refer TO Specification	After the tests have been executed, the contrast must be larger than half of its initial value prior to the tests.
3	Appearance	Visual inspection	Defect free

13.4 OPERATION

- 13.4.1 Do not connect or disconnect modules to or from the main system while power is being supplied .
- 13.4.2 Use the module within specified temperature ; lower temperature causes the retardation of blinking speed of the display ; higher temperature makes overall display discolor . When the temperature returns to normality , the display will operate normally .
- 13.4.3 Adjust the LC driving voltage to obtain the optimum contrast .
- 13.4.4 Power On Sequence input signals should not be supplied to LCD module before power supply voltage is applied and reaches the specified value . If above sequence is not followed , CMOS LSIs of LCD modules may be damaged due to latch - up problem .

13.5 NOTICE

- 13.5.1 Use a grounded soldering iron when soldering connector I/O terminals . For soldering or repairing , take precaution against the temperature of the soldering iron and the soldering time to prevent peeling off the through-hole-pad .
- 13.5.2 Do not disassemble . We shall not be held responsible if the module is disassembled and upon the reassembly the module failed .
- 13.5.3 Do not charge static electricity , as the circuit of this module contains CMOS LSIs. A workman's body should always be static-protected by use of an ESD STRAP . Working clothes for such personnel should be of static-protected material .
- 13.5.4 Always ground the electrically-powered driver before using it to install the LCD module. While cleaning the work station by vacuum cleaner, do not bring the sucking mouth near the module ; static electricity of the electrically-powered driver or the vacuum cleaner may destroy the module .
- 13.5.5 Don't give external shock.
- 13.5.6 Don't apply excessive force on the surface.
- 13.5.7 Liquid in LCD is hazardous substance. Must not lick and swallow. When the liquid is attach to your, skin, cloth etc. Wash it out thoroughly and immediately.
- 13.5.8 Don't operate it above the absolute maximum rating.
- 13.5.9 Storage in a clean environment, free from dust, active gas, and solvent.
- 13.5.10 Store without any physical load.
- 13.5.11 Rewiring: no more than 3 times .