

TFT Displays 10.1" – IPS – 1000cd/m<sup>2</sup>

*Dimension 235x161x13.1mm*

## FEATURES

- 1280X800 DOTS FULL COLOR TFT (24 BIT) 16:9
- IPS TECHNOLOGY FOR WIDE VIEWING ANGLE OF 85° IN ALL DIRECTIONS
- LVDS INTERFACE
- HIGH BRIGHTNESS 1100cd/m<sup>2</sup> MAKES IT SUNLIGHT READABLE
- OPERATING TEMPERATURE RANGE (T<sub>OP</sub> 0°C - +50°C)
- INCL. MOUNTING BEZEL FOR PCB MOUNT

## ORDERING CODE

10.1" TFT PANEL, IPS, 1100cd/m<sup>2</sup> WITH LVDS INTERFACE

**EA W1280X-101ALW**

## ACCESSORIES

FFC CABLE 0.5MM PITCH, LENGTH 51MM  
ZIFF CONNECTOR 0.5MM PITCH, BOTTOM CONTACT  
TOUCHPANEL, PCAP 10.1", SELF-ADHESIVE  
ZIFF CONNECTOR FOR TOUCH, BOTTOM CONTACT

**EA KF050-40L51**  
**EA WF050-40S**  
**EA TOUCH1280-101C1**  
**EA WF100-06S**

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## SUMMARY

TFT 10.1" is an IPS transmissive type color active matrix TFT liquid crystal display. In-Plane Switching (IPS) was one of the first refinements to produce significant gains in the light-transmissive characteristics of TFT panels. It is a technology that addresses the two main issues of a standard twisted nematic (TN) TFT display: colour and viewing angle.

## GENERAL SPECIFICATIONS

Item	Dimension	Unit
Screen Diagonal	10.1	inch
Number of Pixels	1280 x 3(RGB) x 800	dots
Module dimension	235.0 x 161.0 x 13.1	mm
Active area	216.96 (H) x 135.6(V)	mm
Pixel pitch	0.1695 × 0.1695	mm
Display Mode	Normally Black	
Pixel Arrangement	R.G.B. Vertical Stripe	
Backlight Type	LED White	
Aspect Ratio	16:9	
Electrical Interface (Logic)	LVDS	
With /Without TP	Optional Touch Panel	
Surface	Glare	

\*Color tone slight changed by temperature and driving voltage.

## ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	TOP	0	—	+50	°C
Storage Temperature	TST	-20	—	+60	°C

Note: Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above

1. Temp.  $\leq 60^{\circ}\text{C}$ , 90% RH MAX. Temp.  $> 60^{\circ}\text{C}$ , Absolute humidity shall be less than 90% RH at  $60^{\circ}\text{C}$

## ELECTRICAL CHARACTERISTICS

### TYPICAL OPERATION CONDITIONS

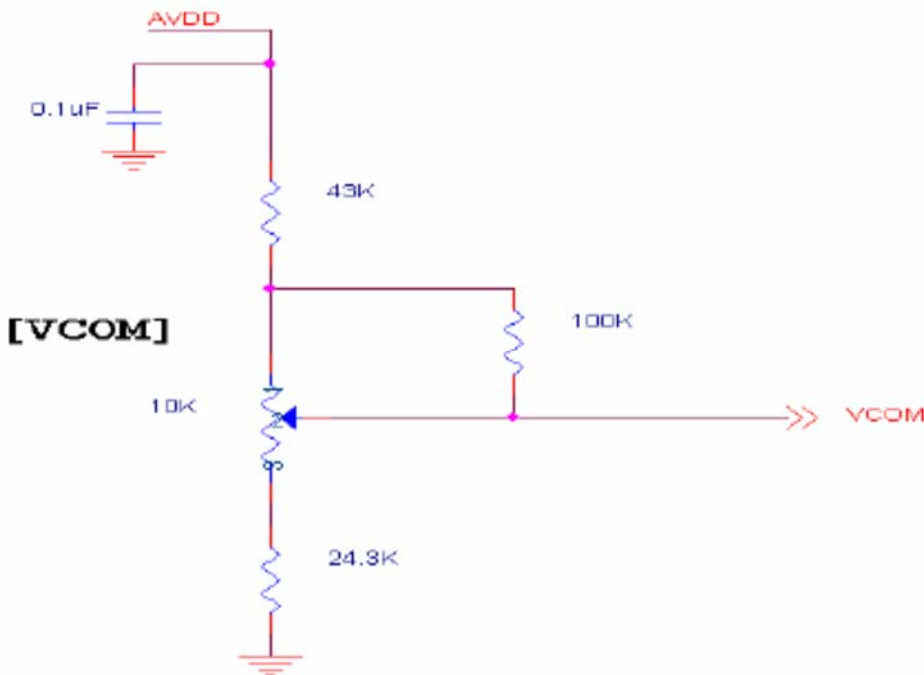
(Note 1)

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	MAX.		
Power voltage	VDD	2.3	2.5	2.7	V	Note 2
	AVDD	8.0	8.2	8.4	V	
	VGH	21.7	22	22.3	V	
	VGL	-7.3	-7	-6.7	V	
Input signal voltage	TOP	2.7	3.0	3.3	V	Note 4
Input logic high voltage	TST	0.8VDD	-	3.6	V	Note 3
Input logic low voltage		0	-	0.2VDD	V	

Note 1: Be sure to apply VDD and VGL to the LCD first, and then apply VGH.

Note 2: VDD setting should match the signals output voltage (refer to Note 3) of customer's system board.

Note 4: Typical VCOM is only a reference value, it must be optimized according to each LCM. Be sure to use VR.

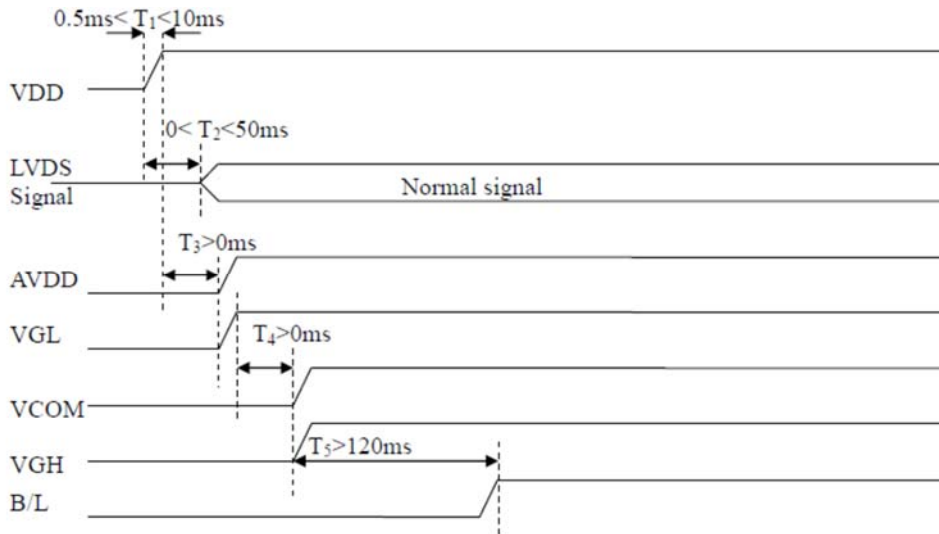


**CURRENT CONSUMPTION**

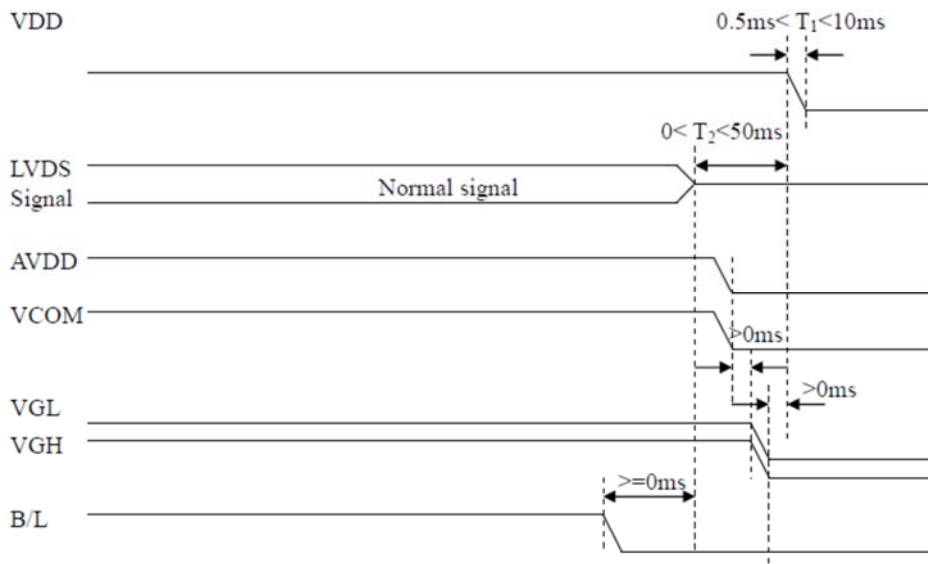
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	MAX.		
Current for Driver	IGH	-	705	750	uA	VGH =22V
	IGL	-	705	750	uA	VGL = -7V
	IVDD	-	95	120	mA	VDD =2.5V
	IAVDD	-	45	70	mA	AVDD=8.2V

**POWER SEQUENCE**

a. Power on:



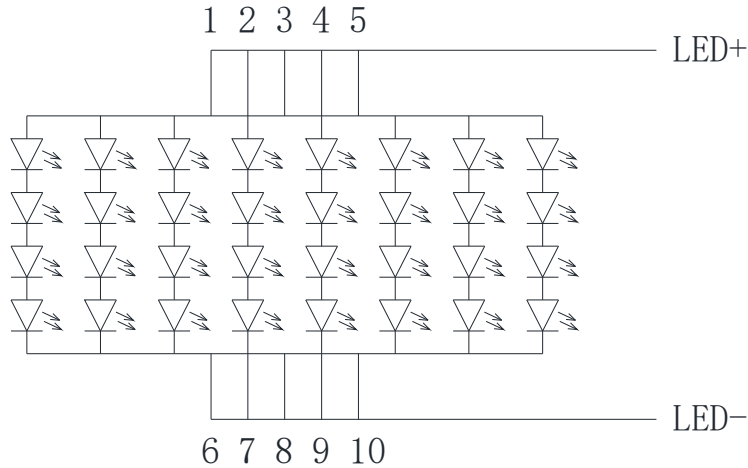
b. Power off:



**BACKLIGHT CHARACTERISTICS**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Supply voltage of white LED backlight	VL	—	12.8	13.6	V	Note 1
Current for LED backlight	IL	—	480	—	mA	
LED life time	-	50000	-	-	Hr	Note 1

Note 1 : There are 8 groups LED



Note 2 : Ta = 25 °C

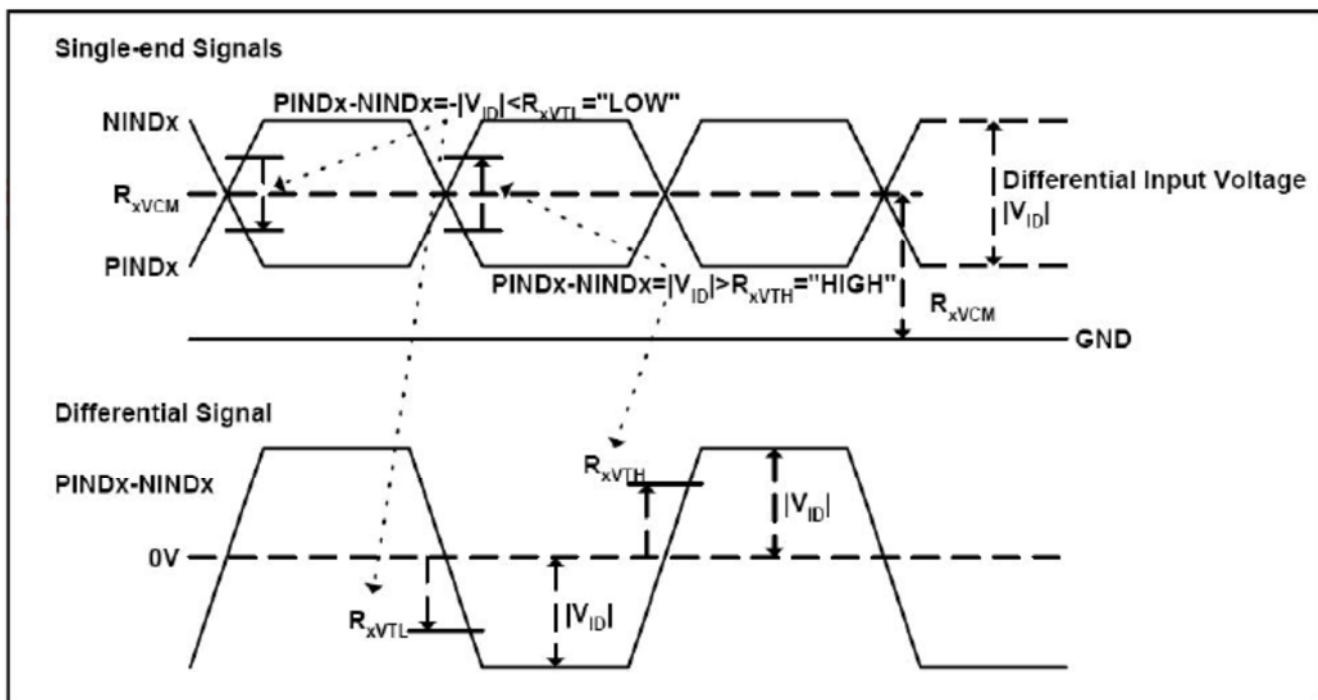
Note 3 : Brightness to be decreased to 50% of the initial value

Note 4 : The single LED lamp case

## LVDS SIGNAL TIMING CHARACTERISTICS

### AC ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	MAX.		
LVDS Differential input high Threshold voltage	RxVTH	-	-	+100	mV	RXVCM=1.2 V
LVDS Differential input low Threshold voltage	RxVTL	-100	-	-	mV	
LVDS Differential input common mode voltage	RxVCM	0.7	-	1.6	V	
LVDS Differential voltage	VID	200	-	600	mV	



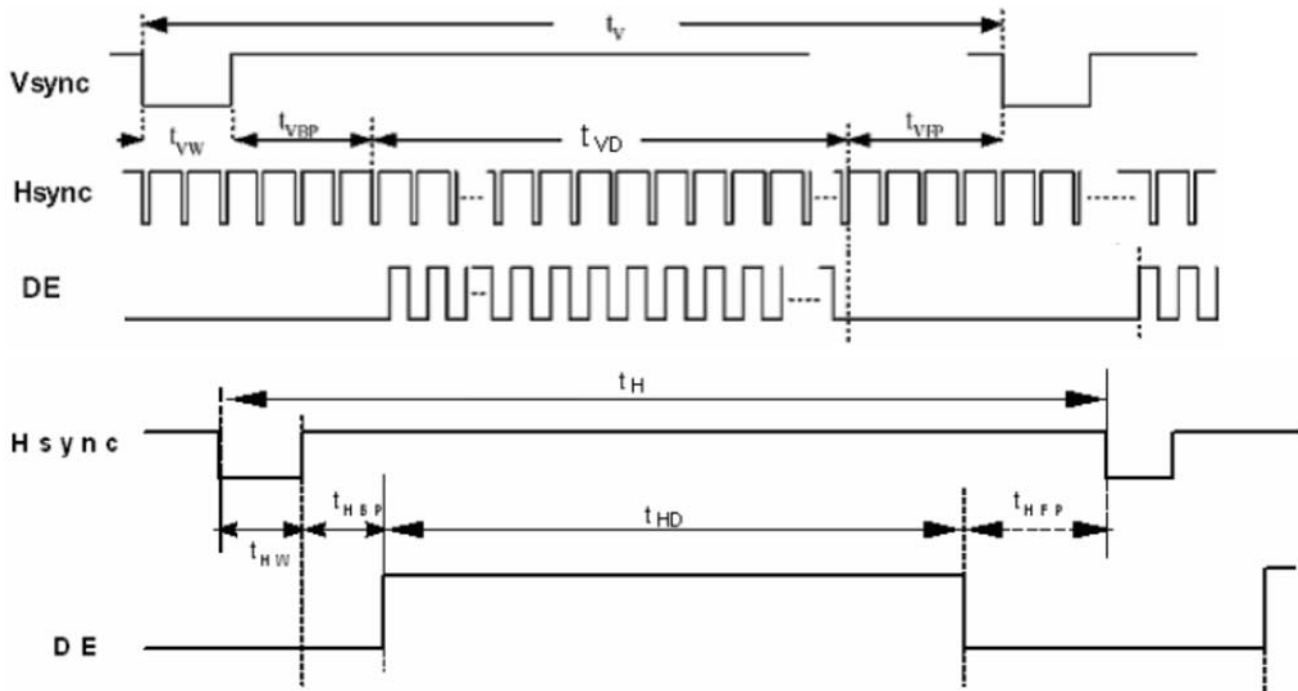
6.2.

### TIMING TABLE

Parameter	Symbol	Value			Unit	Remark
		Min.	Typ.	Max.		
Clock Frequency	1/Tc	68.9	71.1	73.4	Mhz	Frame rate =60Hz
Horizontal display area	thd	1280			Tc	
HS period time	th	1410	1440	1470	Tc	
HS Width +Back Porch +Front Porch	tHW+ tHBP +tHFP	60	160	190	Tc	
Vertical display area	tvd	800			tH	

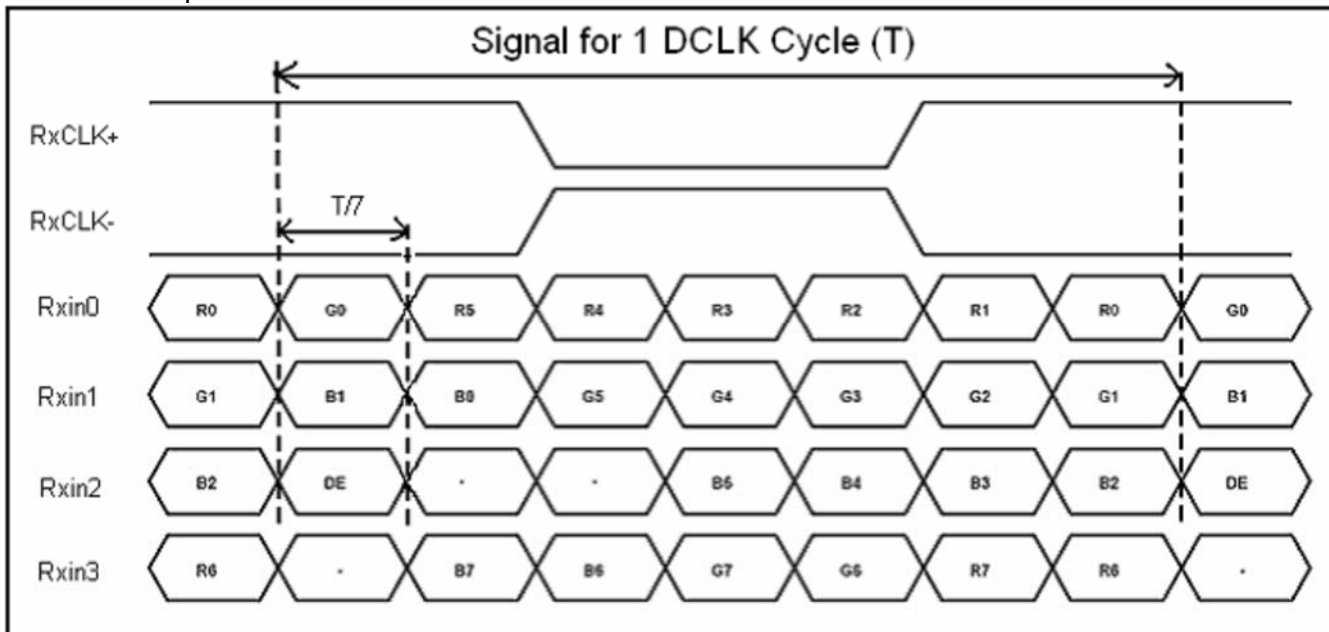


VS period time	$t_v$	815	823	833	$t_H$	
VS Width +Back Porch +Front Porch	$t_{vW} + t_{vBP} + t_{vFP}$	15	23	33	$t_H$	



6.3.

LVDS Data Input Format



**OPTICAL CHARACTERISTICS**

Item	Symbol	Condition.	Min	Typ.	Max.	Unit	Remark	
Response time	Tr	$\theta = 0^\circ$ 、 $\Phi = 0^\circ$	-	10	20	.ms	Note 3	
	Tf		-	15	30			
Contrast ratio	CR	At optimized viewing angle	600	800	-	-	Note 4	
Color Chromaticity	White	$\theta = 0^\circ$ 、 $\Phi = 0$	Wx	0.26	0.31	0.36	-	Note 2,5
	Wy		0.28	0.33	0.38	-		
Viewing angle (Gray Scale Inversion Direction)	Hor.	$\Theta_R$	75	85	-	Deg.	Note 1	
		$\Theta_L$	75	85	-			
	Ver.	$\Phi_T$	75	85	-			
		$\Phi_B$	75	85	-			
Brightness	-	-	1000	1100	-	cd/m <sup>2</sup>	Center of display	

Ta=25±2°C

Note 1: Definition of viewing angle range

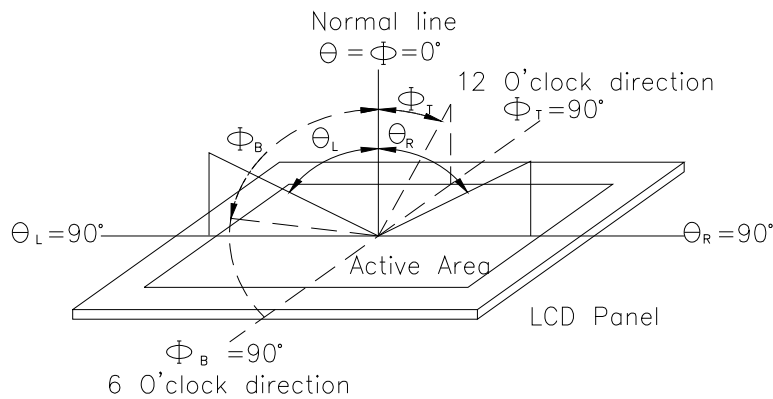


Fig. 7.1. Definition of viewing angle

Note 2: Test equipment setup:

After stabilizing and leaving the panel alone at a driven temperature for 10 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 or BM-5 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

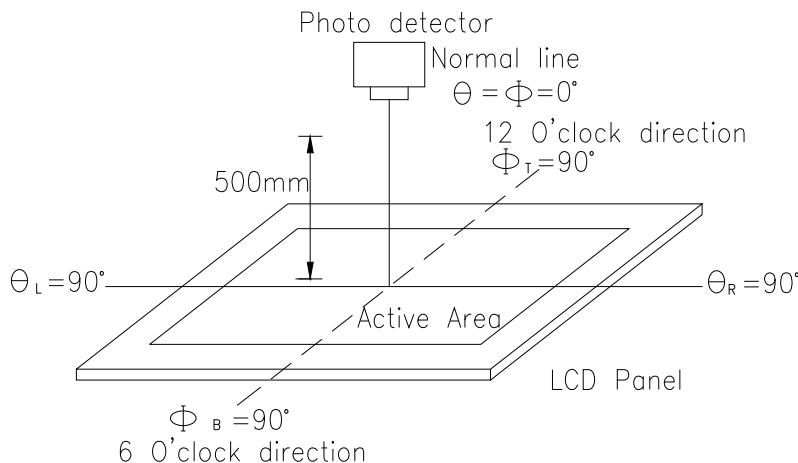


Fig. 7.2. Optical measurement system setup

Note 3: Definition of Response time:

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time,  $T_r$ , is the time between photo detector output intensity changed from 90% to 10%. And fall time,  $T_f$ , is the time between photo detector output intensity changed from 10% to 90%

Note 4: Definition of contrast ratio:

The contrast ratio is defined as the following expression.

Note 5: White  $V_i = V_{i50} \pm 1.5V$

Black  $V_i = V_{i50} \pm 2.0V$

“±” means that the analog input signal swings in phase with VCOM signal.

“±” means that the analog input signal swings out of phase with VCOM signal.

The 100% transmission is defined as the transmission of LCD panel when all the input terminals of module are electrically opened.

Note 6: Definition of color chromaticity (CIE 1931)

Color coordinates measured at the center point of LCD

Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

## INTERFACE

### CONNECTOR

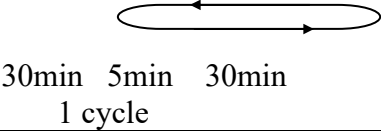
A 40pin connector is used for the module electronics interface. The recommended model is F62240-H1210B manufactured by Vigorconn.

Pin No.	Symbol	I/O	Function	Remark
1	VCOM	P	Common Voltage	
2	VDD	P	Power Supply	
3	VDD	P	Power Supply	
4	NC	-	No connection	
5	NC	-	No connection	
6	NC	-	No connection	
7	GND	P	Ground	
8	Rxin0-	I	-LVDS Differential Data Input	R0-R5,G0
9	Rxin0+	I	+LVDS Differential Data Input	
10	GND	P	Ground	
11	Rxin1-	I	-LVDS Differential Data Input	G1G5,B0,B1
12	Rxin1+	I	+LVDS Differential Data Input	
13	GND	P	Ground	
14	Rxin2-	I	-LVDS Differential Data Input	B2-B5,HS,VS, DE
15	Rxin2+	I	+LVDS Differential Data Input	
16	GND	P	Ground	
17	RxCLK-	I	-LVDS Differential Clock Input	LVDS CLK
18	RxCLK+	I	+LVDS Differential Clock Input	
19	GND	P	Ground	
20	Rxin3-	I	-LVDS Differential Data Input	R6,R7,G6,G7, B6,B7
21	Rxin3+	I	+LVDS Differential Data Input	
22	GND	P	Ground	
23	NC	-	No connection	
24	NC	-	No connection	
25	GND	P	Ground	
26	NC	-	No connection	
27	NC	-	No connection	
28	NC	-	No connection	
29	AVDD	P	No connection	
30	GND	P	Ground	
31	NC	-	No connection	
32	NC	-	No connection	
33	NC	-	No connection	
34	NC	-	No connection	
35	VGL	P	Gate OFF Voltage	
36	NC	-	No connection	
37	NC	-	No connection	
38	VGH	P	Gate ON Voltage	
39	NC	-	No connection	
40	NC	-	No connection	

I: input, O: output, P: Power

**RELIABILITY**

Content of Reliability Test (Wide temperature, 0°C~50°C)

<b>Environmental Test</b>			
<b>Test Item</b>	<b>Content of Test</b>	<b>Test Condition</b>	<b>Note</b>
High Temperature storage	Endurance test applying the high storage temperature for a long time.	60°C 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-20°C 200hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	50°C 200hrs	—
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	0°C 200hrs	1
High Temperature/Humidity Operation	The module should be allowed to stand at 60°C,90%RH max	60°C,90%RH 96hrs	1,2
Thermal shock resistance	The sample should be allowed stand the following 10 cycles of operation 0°C 25°C 50°C  30min 5min 30min 1 cycle	0°C/50°C 10 cycles	—
Vibration test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude : 1.5mm Vibration Frequency : 10~55Hz One cycle 60 seconds to 3 directions of X,Y,Z for Each 15 minutes	<b>3</b>
Static electricity test	Endurance test applying the electric stress to the terminal.	VS=±600V(contact), ±800v(air), RS=330Ω CS=150pF 10 times	—

Note1: No dew condensation to be observed.

Note2: The function test shall be conducted after 4 hours storage at the normal Temperature and humidity after remove from the test chamber.

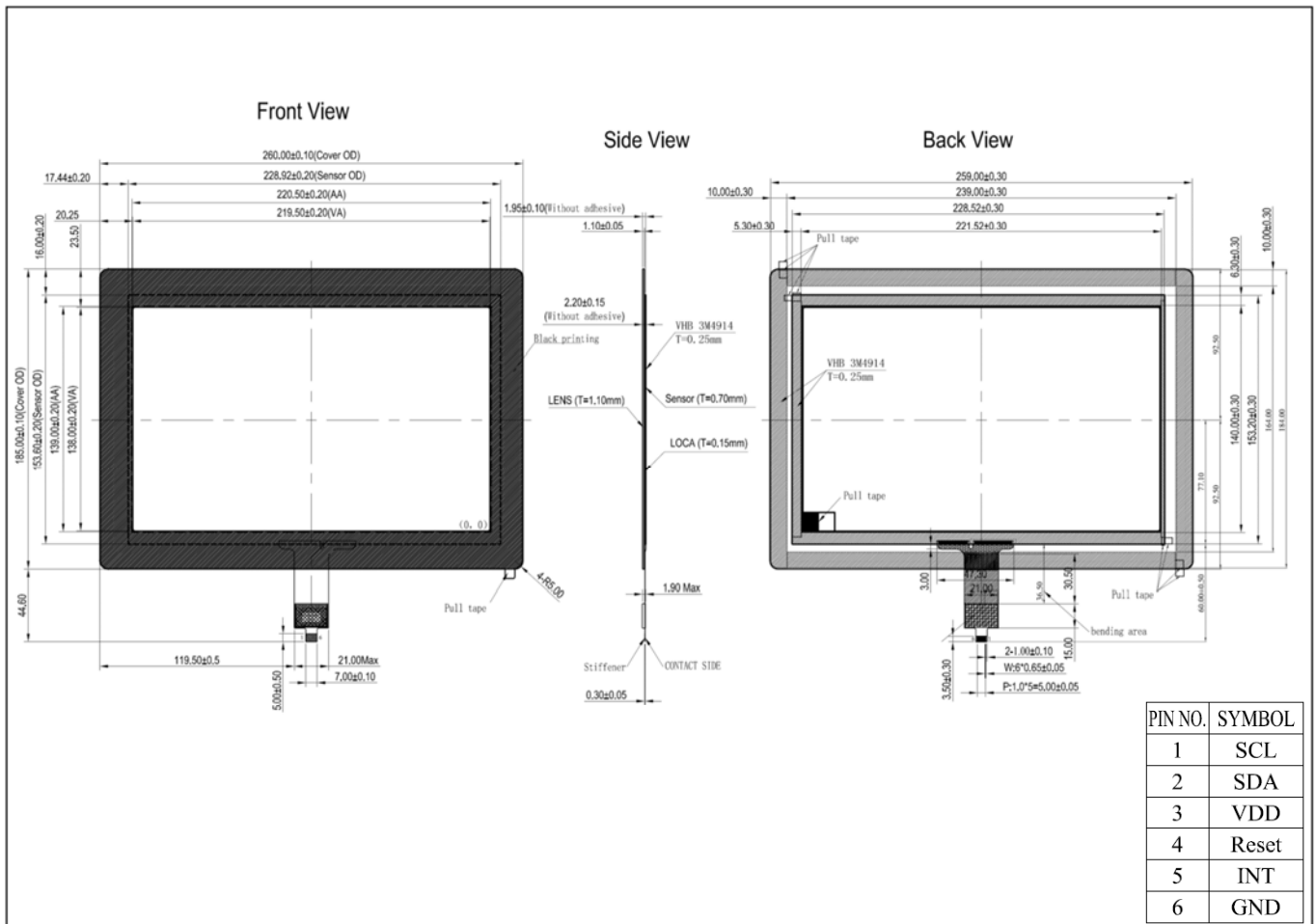
Note3: The packing have to including into the vibration testing.

## TOUCH PANEL

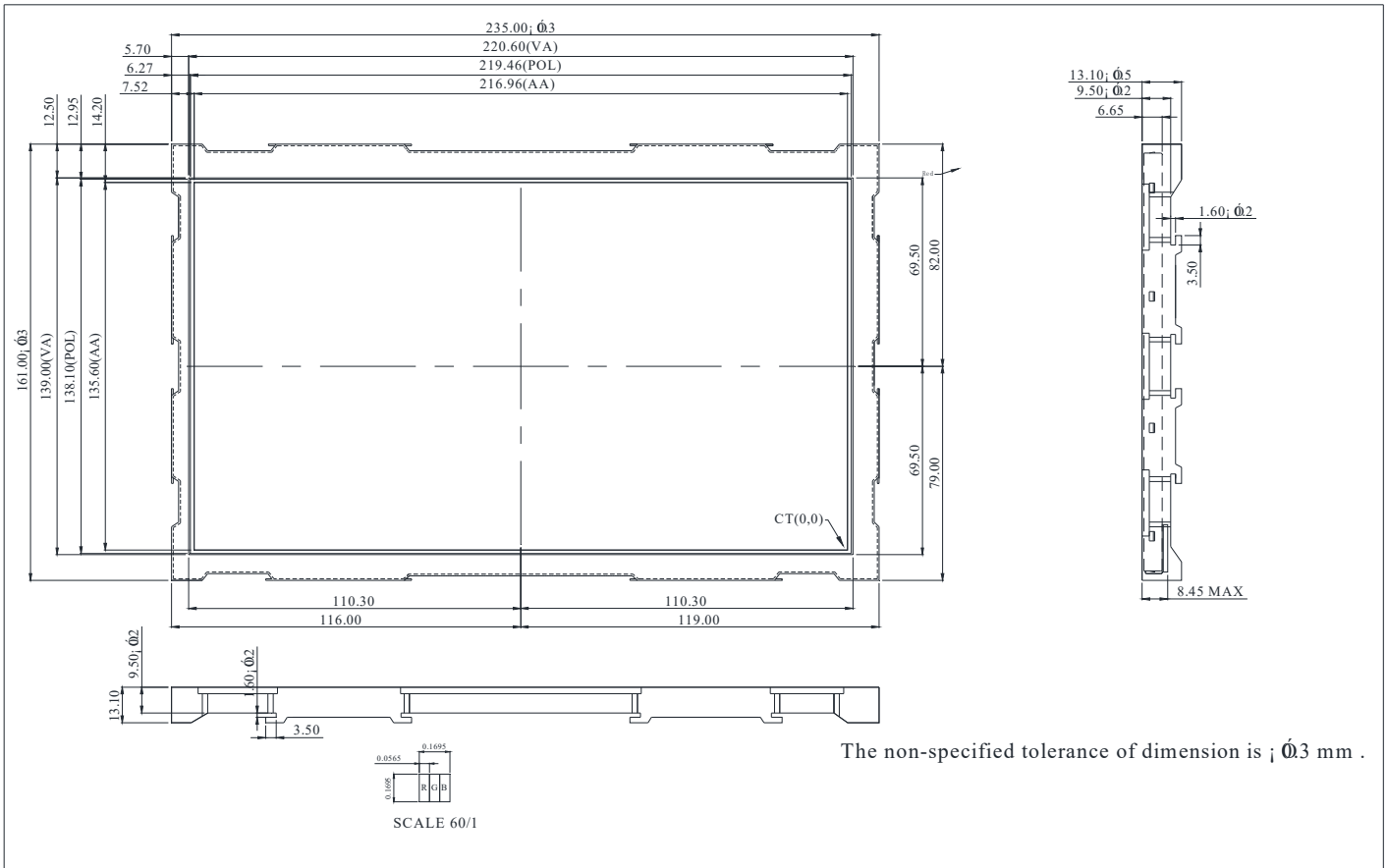
The Touchpanel EA TOUCH1280-101C1 is a projected capacitive touchpanel (PCAP). It comes with an integrated touch panel controller GT928 with I<sup>2</sup>C bus interface. The surface is finished with an anti-finger-print coating. The rear side is equipped with a double side adhesive.

As an accessory there's a ZIFF connector available: EA WF100-06S.

	Condition	Min.	Typ.	Max.	Unit
Resolution	1280x800				dots
Controller	GT928				
Touch points				5	
Hardness		6			H
Operating temp.		-20		+70	°C
I <sup>2</sup> C bus	INT high		0x28/0x29		
	INT low		0xBA/0xBB		



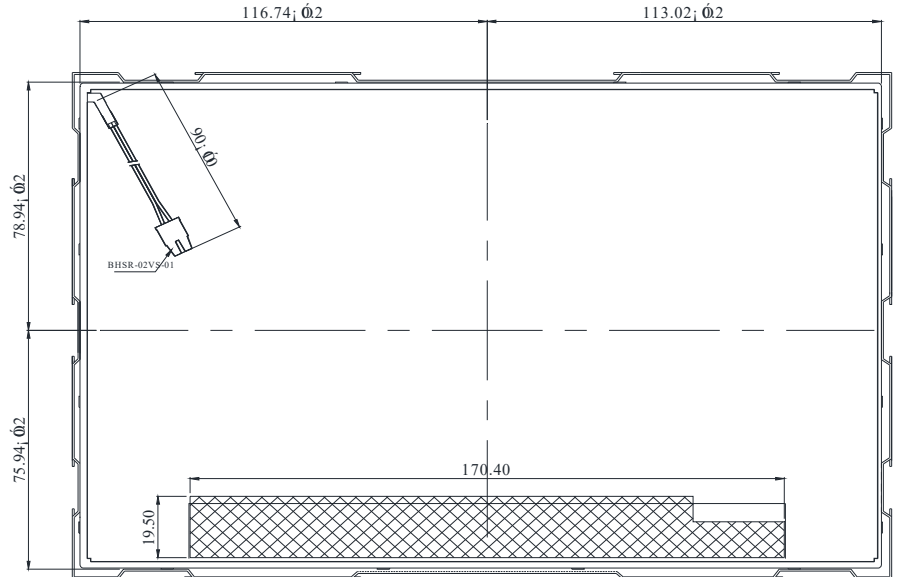
**CONTOUR DRAWING**



**REAR SIDE**

PIN NO.	SYMBOL	PIN NO.	SYMBOL
1	VCOM	21	Rxin3+
2	VDD	22	GND
3	VDD	23	NC
4	NC	24	NC
5	NC	25	GND
6	NC	26	NC
7	GND	27	NC
8	Rxin0-	28	NC
9	Rxin0+	29	AVDD
10	GND	30	GND
11	Rxin1-	31	NC
12	Rxin1+	32	NC
13	GND	33	NC
14	Rxin2-	34	NC
15	Rxin2+	35	VGL
16	GND	36	NC
17	RxCLK-	37	NC
18	RxCLK+	38	VGH
19	GND	39	NC
20	Rxin3-	40	NC

PIN NO	SYMBOL
1(Red)	LED+
2(Black)	LED-



The non-specified tolerance of dimension is ;  $\pm 0.3$  mm .



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