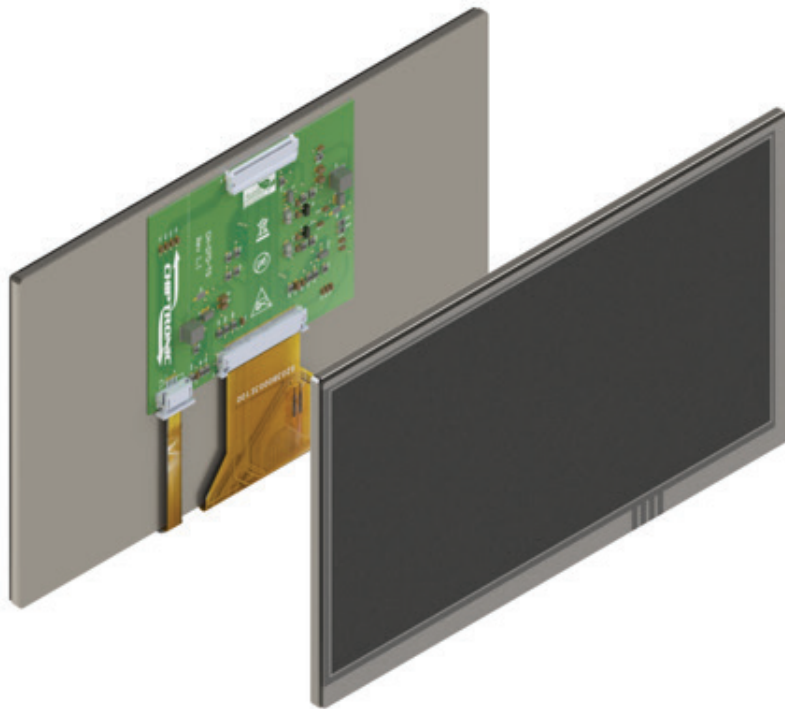




CH-070-TS

Interface LCD 7" with Touch-Screen
For
Colibri Modules



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Document Revision: 1.1

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1. Product Description

The CH-070-TS is a tool between the Unified TFT Interface standard and the 7" LCD display. This interface provides agility and convenience to the development of your product or service on Toradex modules. By being an adaptation aimed directly at the use with the Toradex Carrier Board, no power supply or any other connection besides the data cable between the Unified TFT Interface (Carrier Board) and the CH-070-TS are needed.

2. General Specification

N°	Item	Especificação
1	LCD size	7.0 inch(Diagonal)
2	Driver Element	a-Si TFT active matrix
3	Resolution	800 × 3(RGB) × 480
4	Display mode	Normally White, transmissive
5	Dot Pitch	0.0642(W) × 0.1790(H) mm
6	Active area	154.08(W) × 85.92(H) mm
7	Module size	164.9(W) × 100.0(H) × 5.7(D)
8	Surface treatment	Anti-Glare
9	Color arrangement	RGB-stripe
10	Interface	Digital
11	Backlight power consumption	1,674W(Typ)
12	Panel power consumption	0.226W(Typ)
13	Weight	150g(Typ.)

3. Pin Assignment

PIN NO	SYMBOL	I/O	FUNCTION	
1	VSS	P	GROUND	LCD
2	VSS	P	GROUND	
3	VCC	P	POWER SUPPLY	
4	VCC	P	POWER SUPPLY	
5	PWCTRL	I	POWER ON	
6	LEDCTRL	I	BRIGHTNESS CONTROL FOR LED BACKLIGHT	
7	RESET OUT	-	RESET OUT	
8	B5	I	BLUE DATA BIT 5	
9	B4	I	BLUE DATA BIT 4	
10	B3	I	BLUE DATA BIT 3	
11	B2	I	BLUE DATA BIT 2	
12	B1	I	BLUE DATA BIT 1	
13	B0	I	BLUE DATA BIT 0	
14	VSS	P	GROUND	
15	G5	I	GREEN DATA BIT 5	
16	G4	I	GREEN DATA BIT 4	
17	G3	I	GREEN DATA BIT 3	
18	G2	I	GREEN DATA BIT 2	
19	G1	I	GREEN DATA BIT 1	
20	G0	I	GREEN DATA BIT 0	
21	VSS	P	GROUND	
22	R5	I	RED DATA BIT 5	
23	R4	I	RED DATA BIT 4	
24	R3	I	RED DATA BIT 3	
25	R2	I	RED DATA BIT 2	
26	R1	I	RED DATA BIT 1	
27	R0	I	RED DATA BIT 0	
28	DCLK	I	DOT DATA CLOCK	
29	VSS	P	GROUND	
30	HSYNC	I	HORIZONTAL SYNC INPUT	
31	VSNC	I	VERTICAL SYNC INPUT	
32	ENB	I	DATA ENABLE INPUT	
33	NC	-	NON CONNECTION	
34	NC	-	NON CONNECTION	
35	VSS	P	GROUND	
36	VDD	P	POWER SUPPLY	
37	YU	-	TOP PANEL	TOUCH PANEL
38	XR	-	RIGHT PANEL	
39	YD	-	BOTTOM PANEL	
40	XL	-	LEFT PANEL	

3.1. Selection of scanning mode

A. U/D

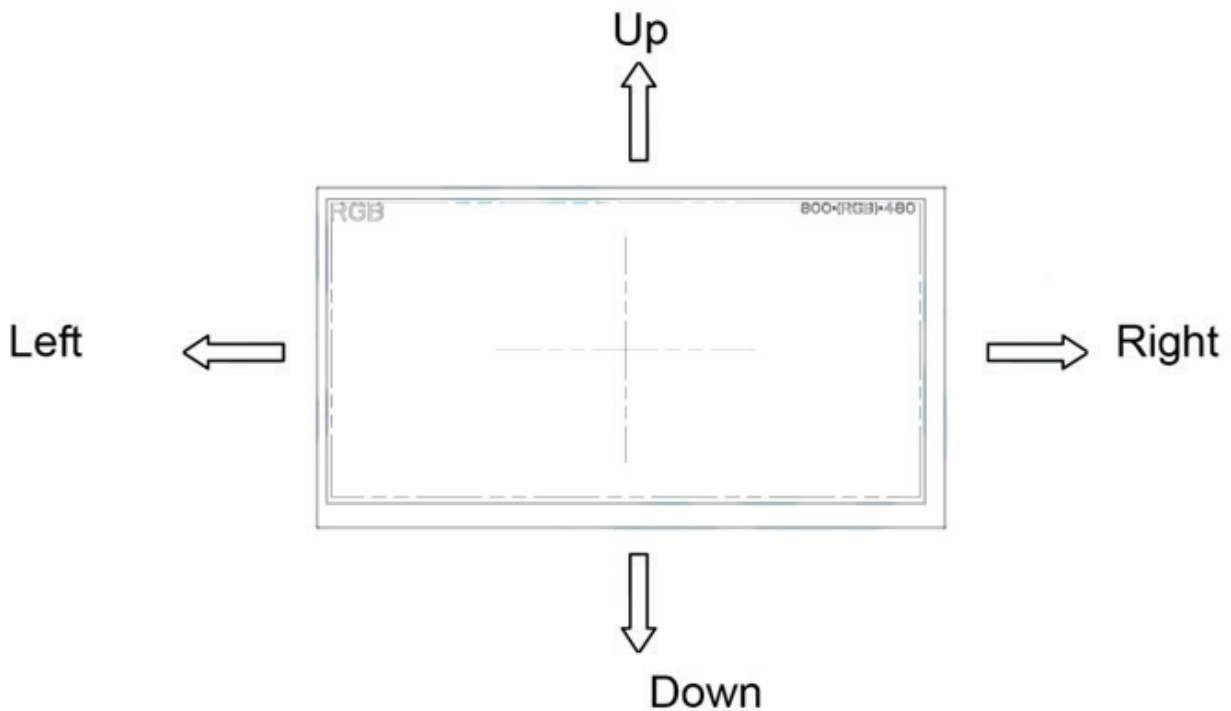
Setting of scan control input		Scanning direction
R19	R16	
UNMOUNTED	MOUNTED	DOWN TO UP *
MOUNTED	UNMOUNTED	UP TO DOWN *

B. L/R

Setting of scan control input		Scanning direction
R12	R13	
UNMOUNTED	MOUNTED	RIGHT TO LEFT *
MOUNTED	UNMOUNTED	LEFT TO RIGHT *

* By standard the resistors R12 and R19 are assembled creating an image on the setting UP TO DOWN, LEFT TO RIGHT.

- * Never assemble R19 and R16 together for the U/D.
- * Never assemble R12 and R13 together for the L/R.
- * Select only one resistor at each table to set the image.



4. Operation Specifications

4.1. Absolute Maximum Ratings

Item	Símbolo	Values		Unid.
		Min.	Max.	
Power voltage	VDD-VSS	-0.3	5.0	V
Operation Temperature	TOP	-30	85	°C
Storage Temperature	TST	-30	85	°C
LED Forward Current	IF	-	25	mA

4.1.1. Typical Operation Conditions

Item	Símbolo	Values			Unit.
		Min.	Typ.	Max	
Power voltage	VDD	3.0	3.3	3.6	V
Input logic high voltage	VIH	0.7 VDD	-	DVDD	V
Input logic low voltage	VIL	0	-	0.3 VDD	V

4.1.2. Current Consumption

Item	Símbolo	Values			Unit.
		Min.	Typ.	Max	
Current for Driver	IGH	-	0.2	1.0	mA
	IGL	-	0.2	1.0	mA
	IDVDD	-	4.0	10	mA
	IAVDD	-	20	50	mA

4.1.3. Backlight Driving Conditions

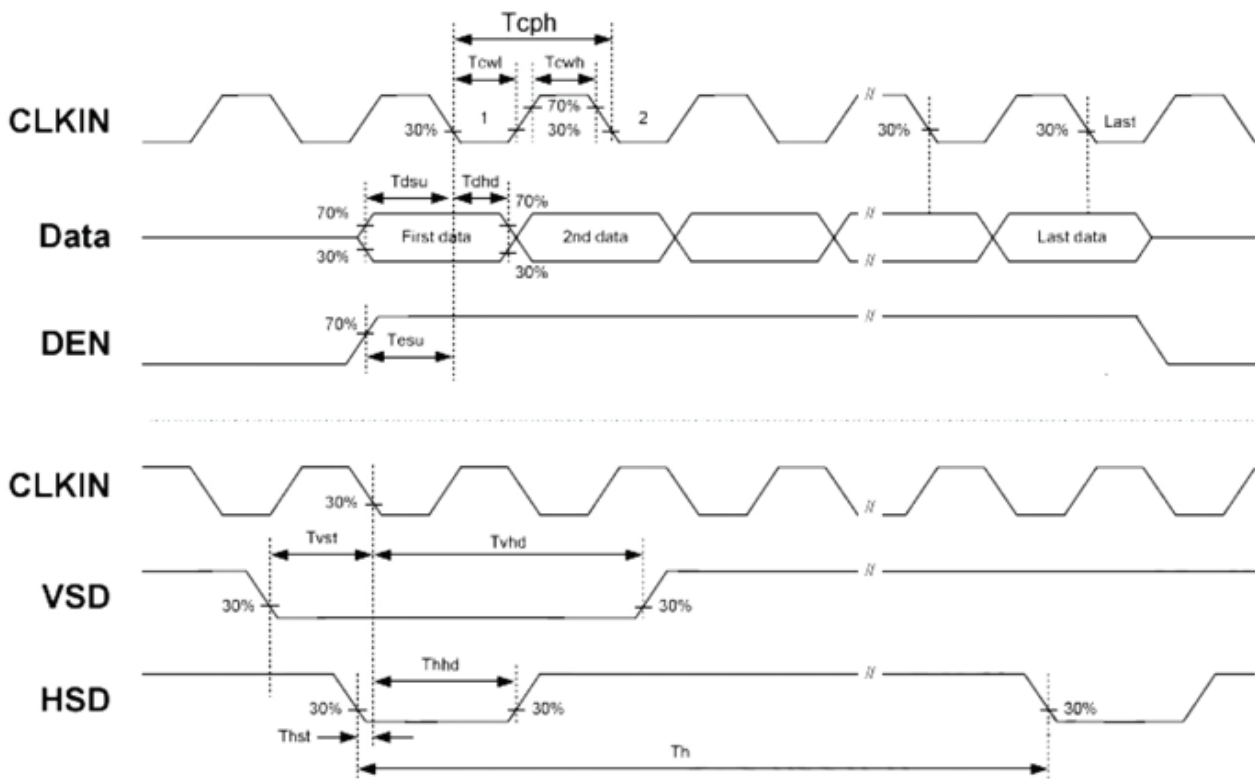
Item	Símbolo	Values			Unit.
		Min.	Typ.	Max	
Current for LED backlight	IL	170	180	200	mA
LED life time	-	20,000	-	-	Hr

4.2. Timing Characteristics

4.2.1. AC Electrical Characteristics

Item	Símbolo	Values			Unit.
		Min.	Typ.	Max	
HS setup time	T _{hst}	8	-	-	ns
HS hold time	T _{hhd}	8	-	-	ns
VS setup time	T _{vst}	8	-	-	ns
VS hold time	T _{vhd}	8	-	-	ns
Data setup time	T _{dsu}	8	-	-	ns
Data hole time	T _{dhd}	8	-	-	ns
DE setup time	T _{esu}	8	-	-	ns
DE hole time	T _{ehd}	8	-	-	ns
DVDD Power On Slew rate	TPOR	-	-	20	ms
RESET pulse width	TRst	1	-	-	ms
DCLK cycle time	T _{coh}	20	-	-	ns
DCLK pulse duty	T _{cwh}	40	50	60	%

4.2.2. Input Clock and Data Timing Diagram



4.2.3. Timing

Item	Símbolo	Values			Unit.
		Min.	Typ.	Max	
Horizontal Display Area	thd	-	800	-	DCLK
DCLK Frequency	fclk	26.4	33.3	46.8	MHz
One Horizontal Line	th	862	1056	1200	DCLK
HS pulse width	thpw	1	-	40	DCLK
HS Blanking	thb	46	46	46	DCLK
HS Front Porch	thfp	16	210	354	DCLK

Item	Símbolo	Values			Unit.
		Min.	Typ.	Max	
Vertical Display Area	tvd	-	480	-	TH
VS period time	tv	510	525	650	TH
VS pulse width	tvpw	1	-	20	TH
VS Blanking	tvb	23	23	23	TH
VS Front Porch	tvfp	7	22	147	TH

4.2.4. Data Input Format

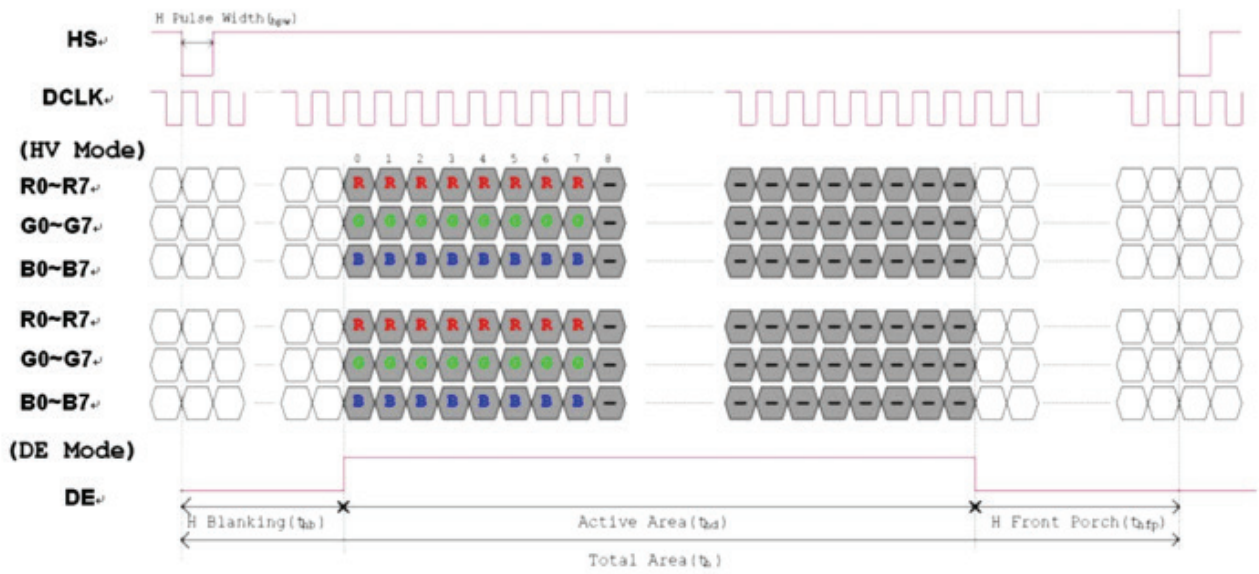


Figure 3.1 Horizontal input timing diagram.

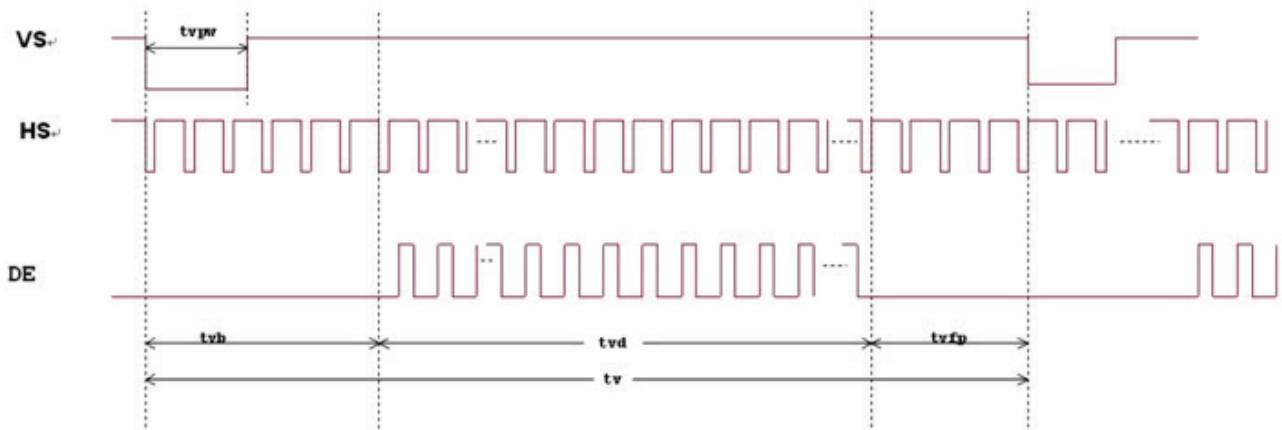
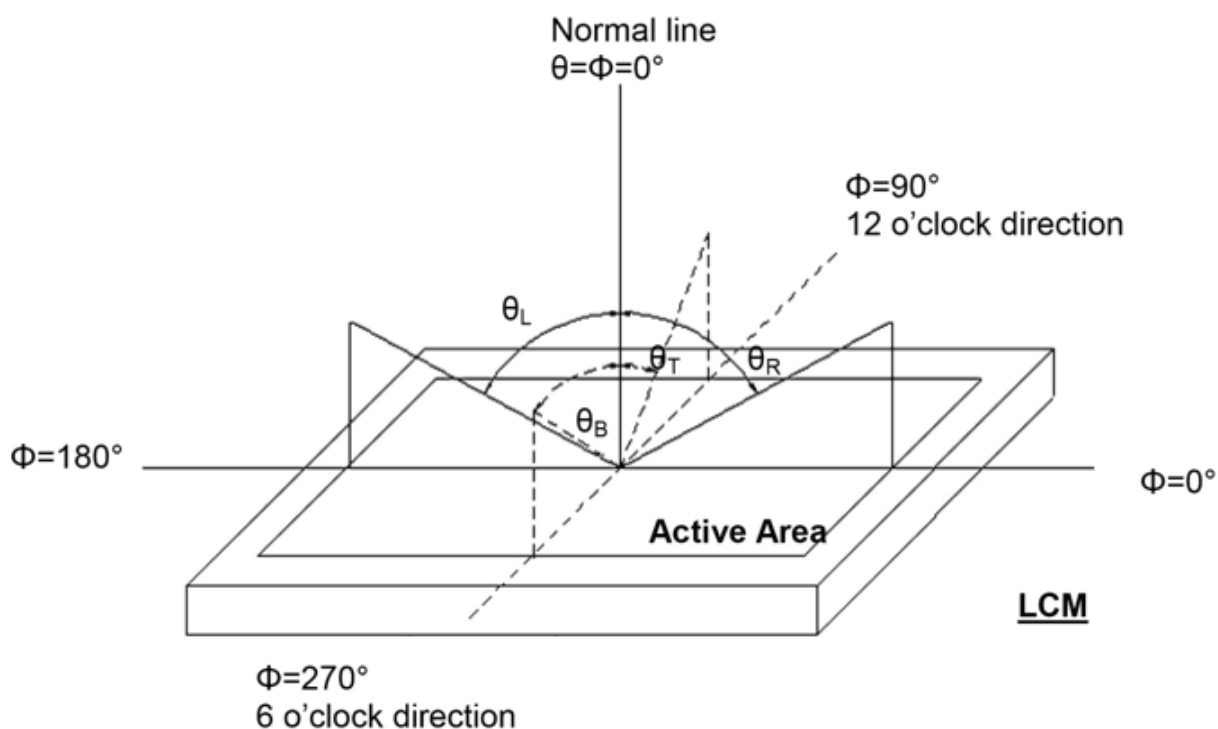


Figure 3.2 Vertical input timing diagram.

5. Optical Specifications

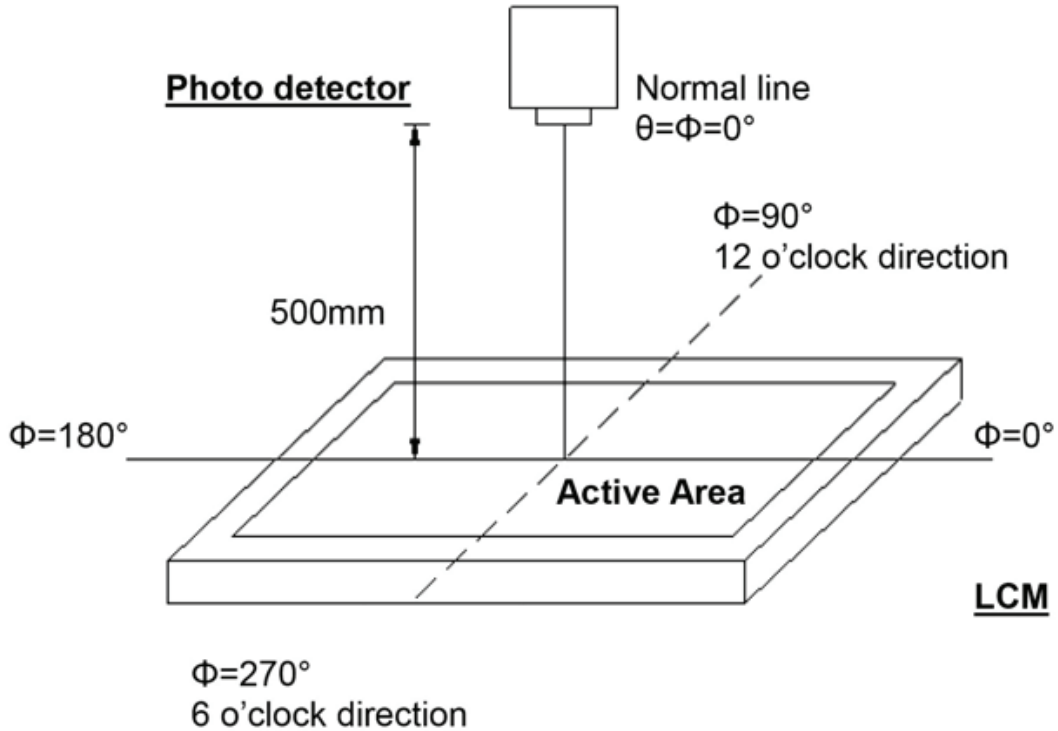
Item	Símbolo	Condition	Values			Unit
			Min.	Typ.	Max.	
Viewing angle (CR \geq 10)	θ_L	$\Phi=180^\circ$ (9 o'clock)	60	70	-	Degree
	θ_R	$\Phi=0^\circ$ (3 o'clock)	60	70	-	
	θ_T	$\Phi=90^\circ$ (12 o'clock)	40	50	-	
	θ_B	$\Phi=270^\circ$ (6 o'clock)	60	70	-	
Response time	TON	Normal $\theta=\Phi=0^\circ$	-	10	20	msec
	TOFF		-	15	30	msec
Contrast ratio	CR		400	500	-	-
Color chromaticity	WX		0.26	0.31	0.36	-
	WY		0.28	0.33	0.38	-
Luminance	L		320	400	-	cd/m ²
Luminance uniformity	YU		70	75	-	%

Definition of viewing angle range:



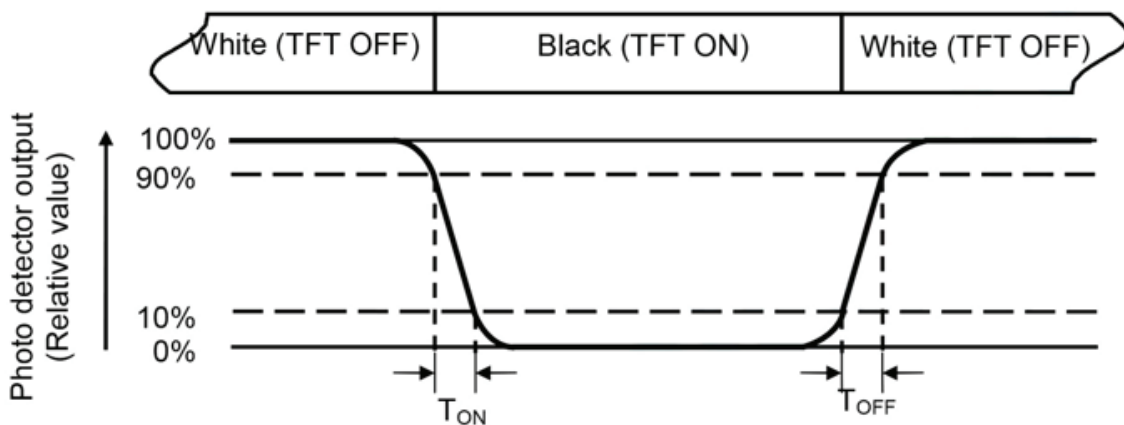
Definition of optical measurement system:

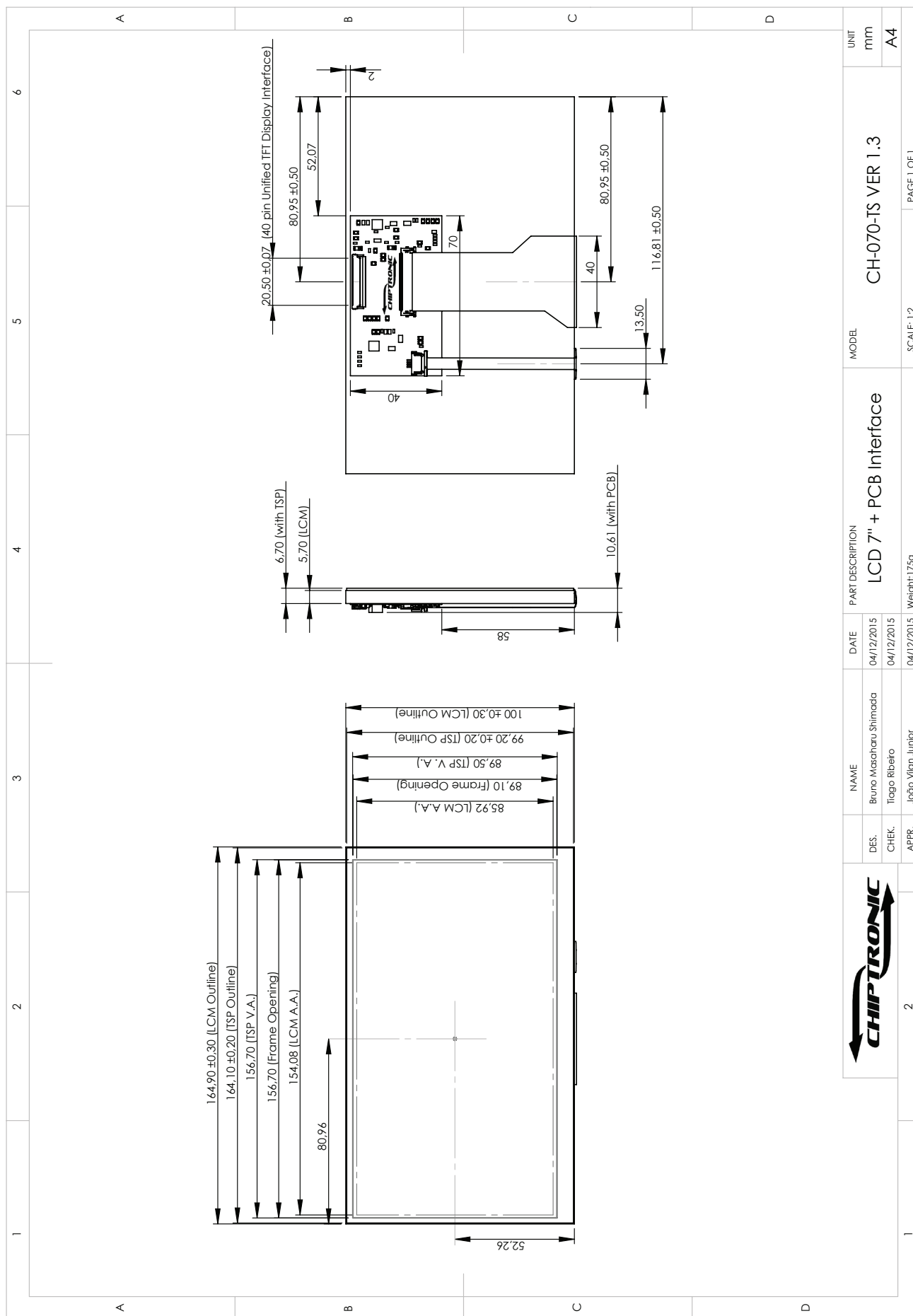
The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view: 1° /Height: 500mm.)



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_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.





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