

SPECIFICATION : TSOPA-1010

	Open Frame LCD Monitor
MODEL	TSOPA
PRODUCT NO.	TSOPA-1010
CUSTOMER	
DATE	2022-03-22

APPROVED BY TOUCH AND DISPLAYS CO.,LTD	
ENGINEER	
REVIEWER	 Touch & Displays Co., Ltd. Sung-Hyun Kim Marketing Director
CONFIRMED	



DOCUMENT REVISION HISTORY

Date	Rev. No	Page	Description
03,22	TDS154	All	New



DQ : TDS230322-J01

MONITOR SPECIFICATIONS

ITEMS	SPECIFICATION	
LCD	Size	10.1"
	Active Area(mm)	216.81(H)*135.50(V)
	Pixel Pitch(mm)	0.03764(H)*0.11292(V)
	Resolution	1920x1200
	Contrast Ratio	900
	Display Color	16.7M
	Response Time	30(Typ)
	Brightness(cd/m2)	550cd/m2
	Viewing Angle(L/R/U/D)	80/80x80x80
	Operating Temperature	-20'~70'C
	Storage Temperature	-30~+85'C
	Frame	Chassis frame VES mount
	Signal Connector	VGA,HDMI
	Power source	DC12V, AC 110~220V
I/O Port	Video	1x VGA 1x HDMI 1x DVI
Mechanical	Dimension	250x168x39mm
	Enclosure	Metal
Audio	Speaker	Optional
Accessories	Cable/ Adapter	1 x Power Adapter,1 x Power Cable, HDMI



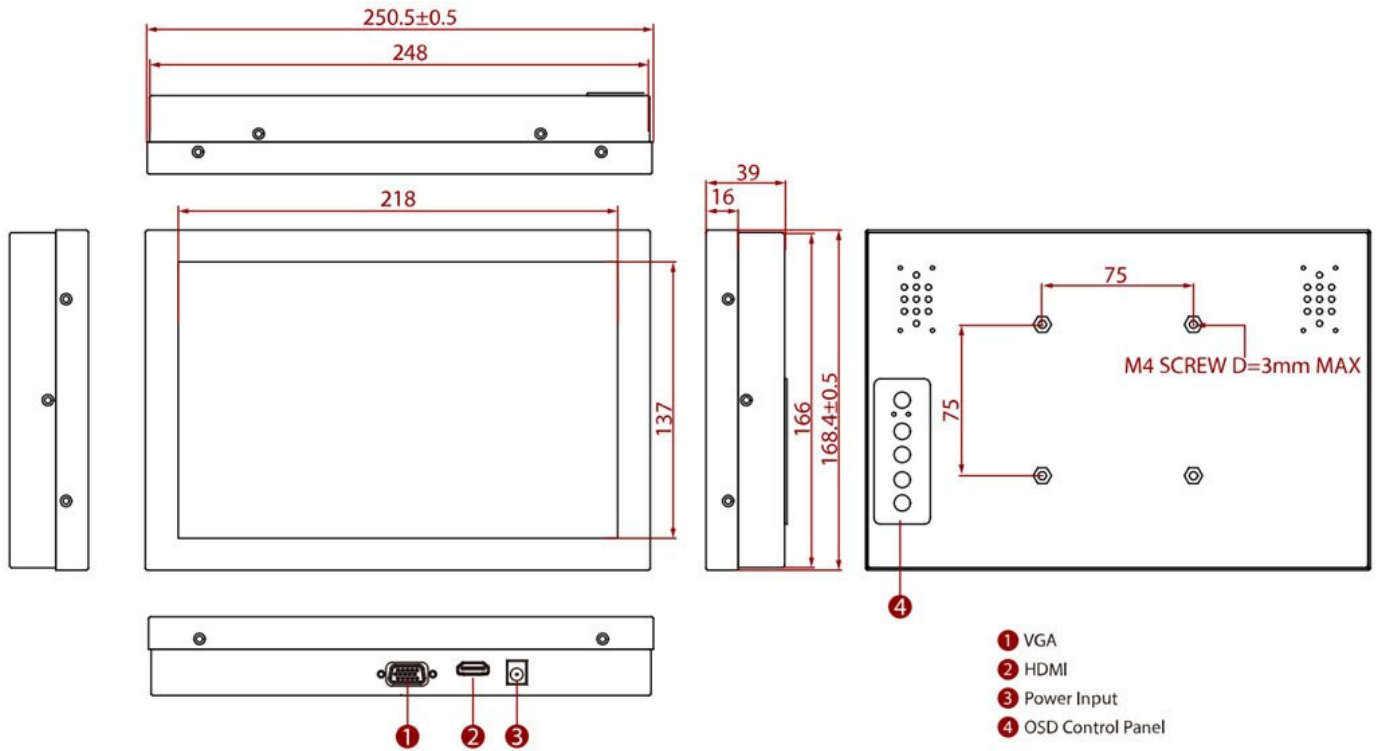


DQ : TDS230322-J01

IO Port	Video	1x VGA 1x HDMI 1x DVI	
Mechanical	Dimension	250x168x39mm	
	Enclosure	Metal	
	Speaker	Optional	
Accessories		1 x Power Adapter,1 x Power Cable, HDMI	



MECHANICAL DRAWING



NOTE

1. This is a simplified drawing and some components are not marked in detail.
2. Please contact our sales representative if you need further product information.
3. All specifications are subject to change without prior notice.
4. The product shown in this datasheet is a standard model. For diagrams that contain customized or optional I/O , please contact our Team for more information.

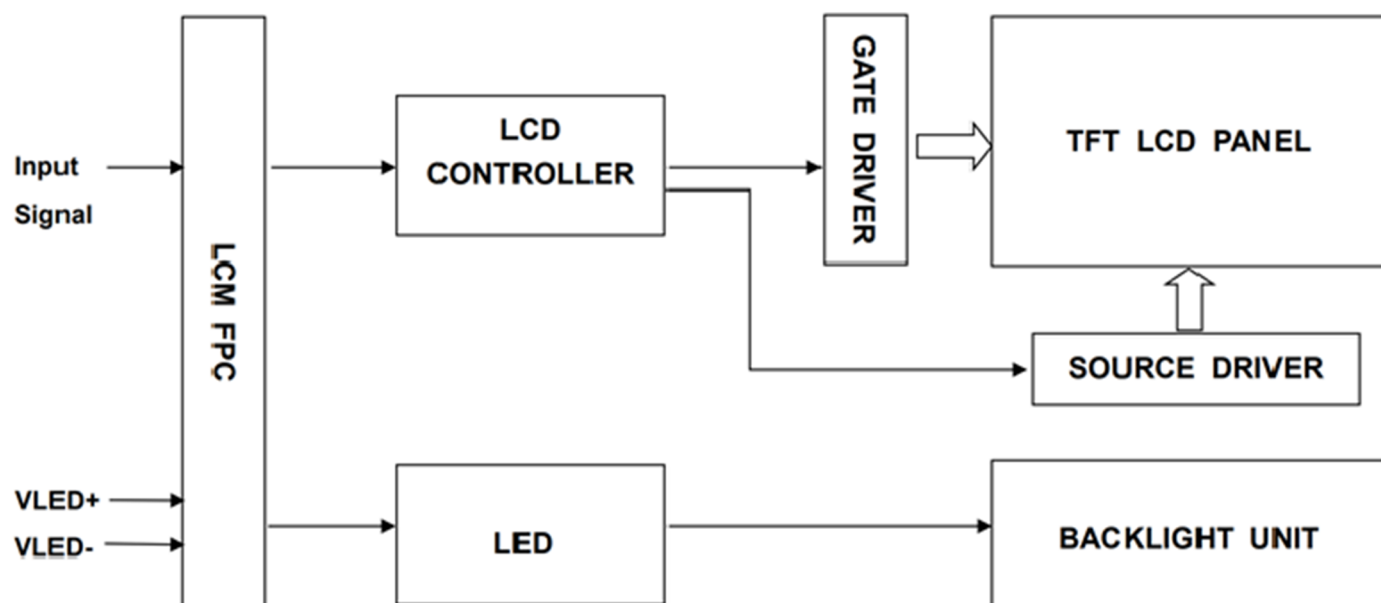
* Description

This is a color active matrix TFT (Thin Film Transistor) LCD (liquid crystal display) that uses amorphous silicon TFT as a switching device. This module is composed of a Transmissive type TFT-LCD Panel, driver circuit, back-light unit. The resolution of a 10.1" TFT-LCD contains 1920X1200 pixels, and can display up to 16.7M colors.

* Features

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	216.81(H)*135.50(V) (10.1 inch)	mm	
Driver element	TFT active matrix	-	
Display colors	16.7M	colors	
Number of pixels	1920(RGB)*1200	dots	
Pixel arrangement	Pixels RGB stripe arrangement	-	
Pixel pitch	0.03764(H)*0.11292(V)	mm	
Viewing angle	ALL	o'clock	
Controller IC	Source(HX8290-B)x3	-	
Display mode	Transmissive /Normally Black	-	
LCM Interface	LVDS	-	
Operating temperature	-20 ~ +70	℃	
Storage temperature	-30 ~ +85	℃	

1. Block Diagram



4.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit.	Note
Contrast Ratio		CR	$\Theta=0$ Normal viewing angle	700	900	--		(1)(2)
Response time	Rising	T_{R+T_F}		--	30	35	msec	(1)(3)
	Falling							
Color Gamut		S(%)		58	63	--	%	
Color Filter Chromaticity	White	W_X		0.248	0.288	0.328		(1)(4) CA-310
		W_Y		0.293	0.333	0.373		
	Red	R_X		0.589	0.629	0.669		
		R_Y		0.316	0.356	0.396		
	Green	G_X		0.276	0.316	0.356		
		G_Y		0.548	0.588	0.628		
	Blue	B_X		0.109	0.149	0.189		
		B_Y		0.031	0.071	0.111		
Viewing angle	Hor.	Θ_L	CR>10	70	80	--		(1)(4)
		Θ_R		70	80	--		
	Ver.	Θ_U		70	80	--		
		Θ_D		70	80	--		
Option View Direction		ALL						

*The data comes from the LCD specification.

5.1 Absolute Maximum Rating

Characteristics	Symbol	Min.	Max.	Unit	Note
Digital Supply Voltage	VDD	-0.3	3.6	V	Note1
Operating temperature	T_{OP}	-20	+70	°C	
Storage temperature	T_{ST}	-30	+85	°C	

NOTE1: If the absolute maximum rating of even is one of the above parameters is exceeded even momentarily, the quality of the product may be degraded. Absolute maximum ratings, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the range of the absolute maximum ratings.

5.2 DC Electrical Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Digital Supply Voltage	VDD	3.0	3.3	3.6	V	
	VRP	--	--	300	mV	Ripple
Normal mode Current	IDD	--	250	500	mA	
Level input voltage	V _{IH}	2.7	--	3.3	V	
	V _{IL}	0	--	0.5	V	
Level output voltage	V _{OH}	2.7	--	3.3	V	
	V _{OL}	0	--	0.5	V	

5.3 LED Backlight Characteristics

The back-light system is edge-lighting type with 33 chips LED

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Current	I _F	--	220	--	mA	
Forward Voltage	V _F	17.1	--	19.2	V	
LCM Luminance	LV	500	550	--	cd/m ²	Note3
LED life time	Hr	--	50000	--	Hour	Note1,2
Uniformity	Avg	70	80	--	%	Note3

Note1: LED life time (Hr) can be defined as the time in which it continues to operate under the condition:

T_a=25±3 °C, typical IL value indicated in the above table until the brightness becomes less than 50%.

Note 2: The "LED life time" is defined as the module brightness decrease to 50% original brightness at

T_a=25°C and I_L=220mA. The LED lifetime could be decreased if operating I_L is larger than 220mA. The constant current driving method is suggested.

6.1 LVDS Timing Parameter

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK Frequency	Fdclk	145	150	--	MHz
Horizontal display area	Thd	1920			DCLK
HSYNC period time	Th	1949	2000	2208	DCLK
Horizontal Blank	THB	29	80	288	DCLK
HSYNC pulse width	Thp	2	10	255	DCLK
HSYNC back porch	thbp	3	6	255	DCLK
HSYNC Front porch	thfp	24	64	260	DCLK
Vertical display area	Tvd	1200			H
VSYNC period time	Tv	1243	1243	1560	H
Vertical Blank	TVB	43	43	360	H
VSYNC Pulse width	Tvp	4	4	20	H
VSYNC back porch	Tvbp	20	20	255	H
VSYNC front porch	Tvfp	19	19	260	H
Frequency	fV	--	60	--	Hz



6.2 LVDS DC Timing Specification

<Table 7. LVDS DC Timing Specification>

Item	Symbol	Condition	MIN	TYP	MAX	Unit
Differential input high Threshold voltage	Vth	Vcm=1.2V	-	-	+0.1	V
Differential input low Threshold voltage	Vtl	-	-0.1	-	-	V
Differential input common Threshold voltage	Vcm	-	1	1.2	1.7- Vid /2	V
LVDS input voltage	Vinlv	-	0.7	-	1.7	V
Differential input voltage	Vid	-	0.35	-	0.6	V
Differential input leakage voltage	Ilvleak	-	-10	-	+10	uA

8. Reliability Test Result

Item	Condition	Inspection after test
High Temperature Operating	70°C,96H	Inspection after 2~4hours storage at room temperature, the sample shall be free from defects: 1.Air bubble in the LCD; 2.Non-display; 3.Missing segments/line; 4.Glass crack; 5.Current IDD is twice higher than initial value.
Low Temperature Operating	-20°C, 96HR	
High Temperature Storage	85°C, 96HR	
Low Temperature Storage	-30°C, 96HR	
High Temperature & High Humidity Operating	+60°C, 90% RH ,96 hours.	
Thermal Shock (Non-operation)	-10°C,30 min ↔ 60°C,30 min, Change time:5min 20CYC.	
ESD test	C=150pF, R=330,5points/panel Air:±8KV, 5times; Contact:±6KV, 5 times; (Environment: 15°C~35°C, 30%~60%).	
Vibration (Non-operation)	Frequency range:10~55Hz, Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z. (6 hours for total) (Package condition).	
Box Drop Test	1 Corner 3 Edges 6 faces,80 _{cm} (MEDIUM BOX)	