深圳市拓浦光电技术有限公司

Topview Product Specification

10.25” Color TFT-LCD Module

Model:TPV103HAF60FIL60

Note: 1.Please contact Topview Optoelectronics before designing your product based on this module specification.

2.The information contained herein is presented merely to indicate the characteristics and performance of our products. No responsibility is assumed by Topview for any intellectual property claims or other problems that may result from application based on the module described herein.

Record of Revisions

Rev.	Date	Sub-Model	Description of change
1.0	Nov., 0 1 , 2023		Product information was first released.

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1.0 GENERAL DESCRIPTION

1.1 Introduction

TOPVIEW model TPV103HAF60FIL60 is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT LCD panel, a driving circuit and a back light system. This TFT LCD has a 10.25 inch diagonally measured active display area with HD (1920 horizontal by 720 vertical pixel) resolution.

1.2 Features

. 10.25 (8:3 diagonal) inch configuration
. Fast response time liquid crystal
. 16.7M LVDS (two port)
. ROHS / Halogen Free Compliance

1.3 Applications

■ TFT LCD Monitor
■ Industrial Application
■ Amusement
■ Vehicle

1.4 General information

Item		Specification	Unit
Outline Dimension		265.2 (H) x 109.8 (V) x 6.6 (D) (Typ)	mm
Display area		243.648(H) x 91.368(V) (10.25” diagonal)	mm
Number of Pixel		1920(H) x 720(V)	pixels
Pixel pitch		0.1269(H) x 0.1269(V)	mm
Pixel arrangement		RGB Vertical Stripe	
Display mode		Normally Black	
NTSC		70 (Typ.) / 65 (Min.) CF Glass (C-Light)	%
Surface treatment		Glare w/ Hard-Coating (3H)	
Weight		TBD	g
Power Consumption	Logic System (White Pattern)	2 (max)	W

2.0 ABSOLUTE MAXIMUM RATINGS

2.1 Electrical Absolute Rating

2.1.1 TFT LCD Module

Item	Symbol	Min.	Max.	Unit	Note
Logic Supply Voltage	VDD	-0.3	+5.0	V	-

2.2 Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Operating Temperature	T_{opa}	-20	70	℃	
Storage Temperature	T_{stg}	-30	80	℃	

3.0 OPTICAL CHARACTERISTICS

3.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
White luminance (Center)		Y_L		550	600	—	cd/m^2	(I_L=180mA)
Contrast		CR		1000	1500	-		(1)(2)
Response time	25℃	T_R+T_F		-	-	30	msec	(1)(3)
	-20℃	T_R+T_F		-	-	250		
	-30℃	T_R+T_F		-	-	450		
Color chromaticity (CIE1931)	White	W_x	Θ=0 Normal viewing angle	+/- 0.03	0.305	+/- 0.03		(1)(4) Color chromaticity (CIE1931) CF Under C-Light
		W_y			0.324			
	Red	R_x			0.655			
		R_y			0.318			
	Green	G_x			0.261			
		G_y			0.576			
	Blue	B_x			0.140			
		B_y			0.082			
Viewing angle	Hor.	Θ_L	CR>10	80	85	-		
		Θ_R		80	85	-		
	Ver.	Θ_U		80	85	-		
		Θ_D		80	85	-		
Optima View Direction		Free						(5)

3.2 Measuring Condition

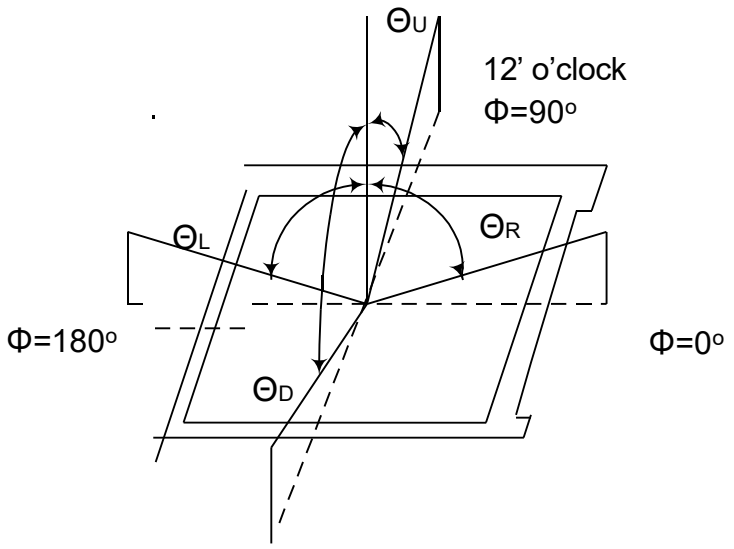
. Measuring surrounding: dark room
.Ambient temperature: 25±2°C
. 15min. warm-up time.

3.3 Measuring Equipment

. FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.

. Measuring spot size: 20 ~ 21 mm

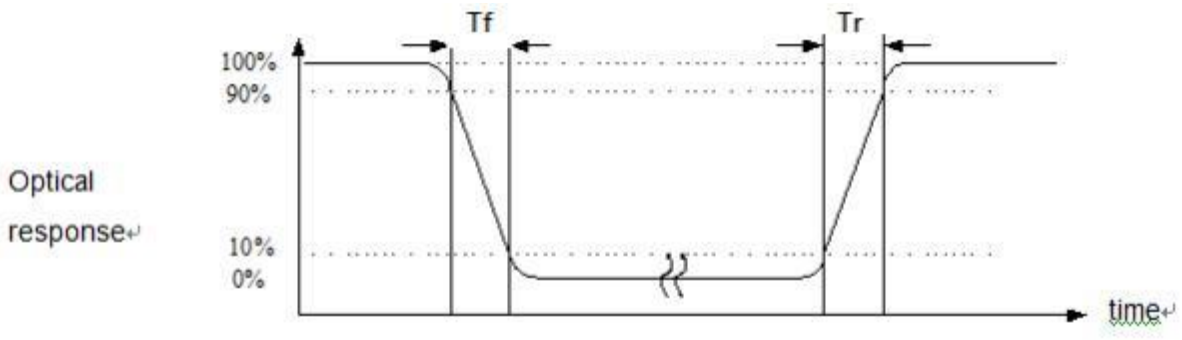
Note (1) Definition of Viewing Angle:



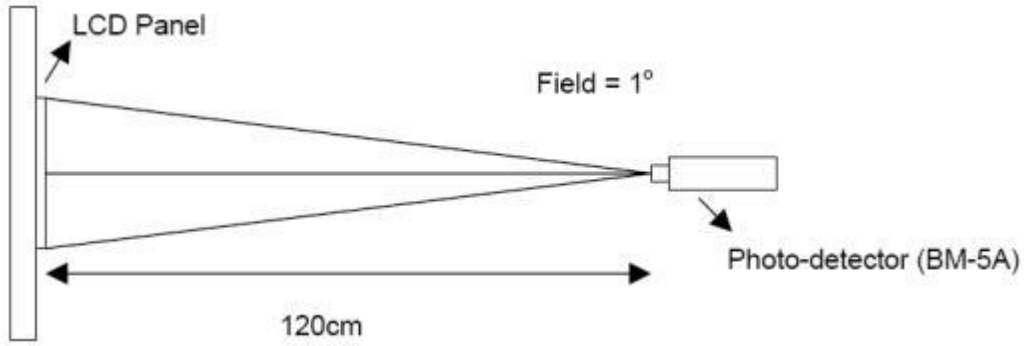
Note (2) Definition of Contrast Ratio (CR) :
measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

Note (3) Definition of Response Time：Sum of T_R and T_F



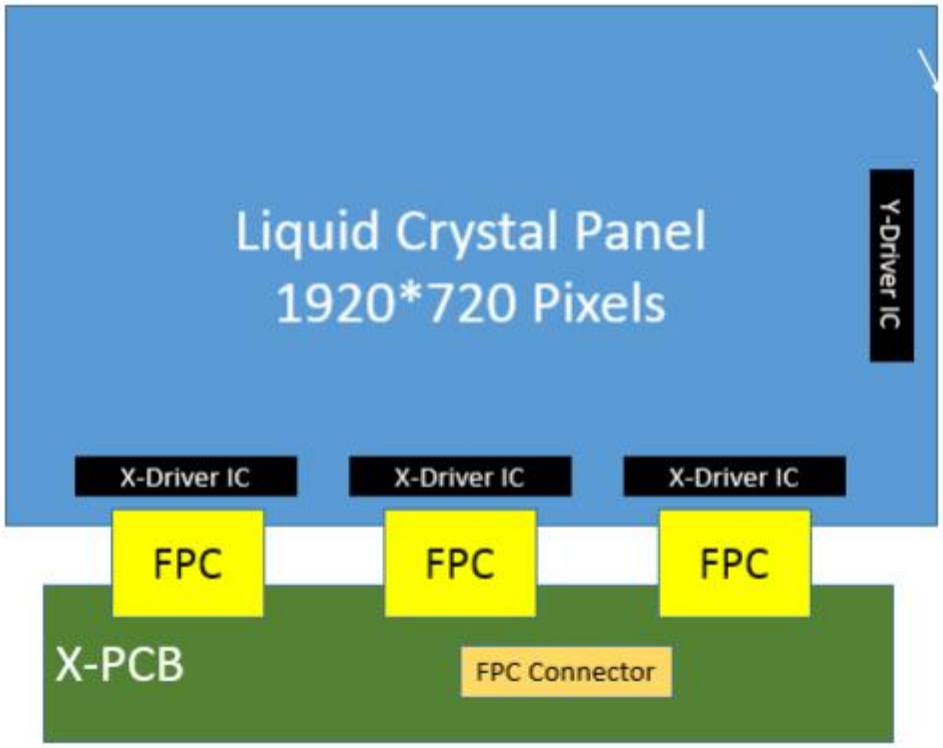
Note (4) Definition of optical measurement setup



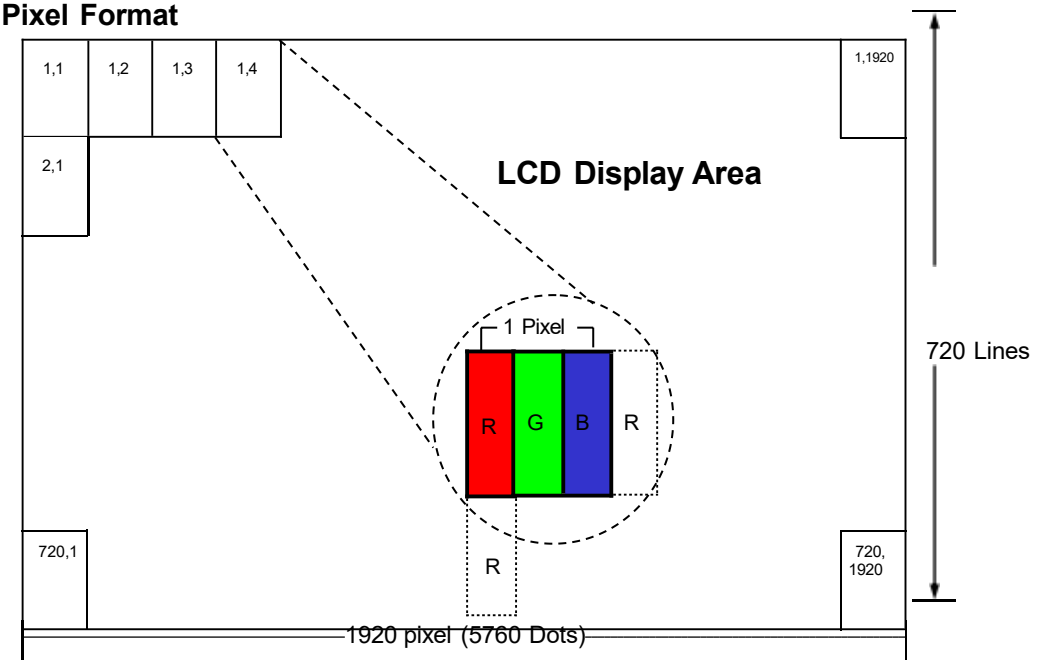
Note (5) Rubbing Direction (The different Rubbing Direction will cause the different optima view direction.

4.0 BLOCK DIAGRAM

4.1 TFT LCD Module:



4.2 Pixel Format



4.3 Relationship Between Displayed Color and Input

	Display	MSB R7	R6	R5	R4	R3	R2	R1	LSB R0	MSB G7	G6	G5	G4	G3	G2	G1	LSB G0	MSB B7	B6	B5	B4	B3	B2	B1	LSB B0	Gray scale Level
Basic color	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	-
	Blue	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	-
	Green	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	-
	Light Blue	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	-
	Red	H	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	-
	Purple	H	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	-
	Yellow	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	-
	White	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	-
Gray scale of Red	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L1
		L	L	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L2
	↑					:								:								:				L3…L251
	↓	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L252
	Light	H	H	H	H	H	H	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L253
		H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L254
	Red	H	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	Red L255
Gray scale of Green	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	L	L1
		L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L2
	↑					:								:								:				L3…L251
	↓	L	L	L	L	L	L	L	L	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L252
	Light	L	L	L	L	L	L	L	L	H	H	H	H	H	H	L	H	L	L	L	L	L	L	L	L	L253
		L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L254
	Green	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	Green L255
Gray scale of Blue	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L1
		L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L2
	↑					:								:								:				L3…L251
	↓	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	L	L	L252
	Light	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	L	H	L253
		L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	L	L254
	Blue	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	Blue L255
Gray scale of White & Black	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	H	L1
		L	L	L	L	L	L	H	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	H	L	L2
	↑					:								:								:				L3…L251
	↓	H	H	H	H	H	H	L	L	H	H	H	H	H	H	L	L	H	H	H	H	H	H	L	L	L252
	Light	H	H	H	H	H	H	L	H	H	H	H	H	H	H	L	H	H	H	H	H	H	H	L	H	L253
		H	H	H	H	H	H	H	L	H	H	H	H	H	H	H	L	H	H	H	H	H	H	H	L	L254
	White	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	White L255

5.0 INTERFACE PIN CONNECTION

5.1 FPC Pin Assignment:

FPC connector is used for electronics interface. The recommended model is
CN1 (Input signal): FH52E-60S-0.5SH

Pin NO.	Symbol	I/O	Description	Note
1	GND	P	Ground	
2	VDD	P	External main and I/O power supply ; +3.3V	
3	VDD	P	External main and I/O power supply ; +3.3V	
4	TP_Sync	O	Touch Sync signal	
5	RESET	I	Global reset pin (L = Reset state)	
6	STBYB	I	Standby mode control (L= LCM is in standby state)	
7	GND	P	Ground	
8	OLV0P	I	LVDS odd data 0+	
9	OLV0N	I	LVDS odd data 0-	
10	GND	P	Ground	
11	OLV1P	I	LVDS odd data 1+	
12	OLV1N	I	LVDS odd data 1-	
13	GND	P	Ground	
14	OLV2P	I	LVDS odd data 2+	
15	OLV2N	I	LVDS odd data 2-	
16	GND	P	Ground	
17	OLVCLKP	I	LVDS odd CLK +	
18	OLVCLKN	I	LVDS odd CLK -	
19	GND	P	Ground	
20	OLV3P	I	LVDS odd data 3+	
21	OLV3N	I	LVDS odd data 3-	
22	GND	P	Ground	
23	ELV0P	I	LVDS even data 0+	
24	ELV0N	I	LVDS even data 0-	
25	GND	P	Ground	
26	ELV1P	I	LVDS even data 1+	
27	ELV1N	I	LVDS even data 1-	
28	GND	P	Ground	
29	ELV2P	I	LVDS even data 2+	
30	ELV2N	I	LVDS even data 2-	

31	GND	P	Ground	
32	ELVCLKP	I	LVDS even CLK +	
33	ELVCLKN	I	LVDS even CLK -	
34	GND	P	Ground	
35	ELV3P	I	LVDS even data 3+	
36	ELV3N	I	LVDS even data 3-	
37	GND	P	Ground	
38	GND	P	Ground	
39	RL	I	Horizontal shift direction (source output) RL = L: Right -> Left	
40	TB	I	Vertical shift direction (gate output) selection. TB = L: Bottom->Top	
41	TFT detection	O	TFT output used to Identify which TFT • 0V -> 7” • 3.3V -> 10.25” DCSD: add 10KOhm pull down to detect voltage level	
42	VPP	P	Keep floating, internal used for LCM maker.	
43	NC	-	Keep floating	
44	VDD	P	External main and I/O power supply ; +3.3V	
45	BIST	I	Connect to GND, internal used for LCM maker.	
46	SDI	I	Serial interface data input.	
47	SDO	O	Serial interface data output.	
48	SCL	I	Serial interface clock input.	
49	CSB	I	Serial interface chip enable.	
50	AB_IND	O	Abnormal signal detection indicator. Combine the HV / DE / Clock / STV / UVP / LVD detection result. Note: 1. Output floating at initial state. 2. Active output when error occurred. 3. Connect all chips together with one single pull Low (or High, by setting) resistor.	Note 1
51	GND	P	Ground	
52	PLED	P	LED anode power supply	
53	PLED	P	LED anode power supply	
54	PLED	P	LED anode power supply	
55	NTC1	O	Heat sensor (Murata, reference P/N is NCU15XH103F6SRC)	
56	NTC2(GND)	O	Heat sensor (Murata, reference P/N is NCU15XH103F6SRC)	
57	NLED	P	LED cathode power supply	
58	NLED	P	LED cathode power supply	
59	NLED	P	LED cathode power supply	
60	NLED	P	LED cathode power supply	

Note 1: AB_IND (Abnormal signal detection indicator. Combine HV / DE / Clock / STV / LVD detection result. When abnormal detected, AB_IND output high.

HV detection: Only for HV mode. If Hsync or Vsync pulse stop, the HV error will be indicated.

DE detection: Only for DE mode. If DE pulse stop, the DE error will be indicated.

Clock detection: If clock pulse stop, the Clock error will be indicated.

STV detection: If STV pulse didn't return from gate IC, the STV error will be indicated.

LVD detection: When VDD drop lower than 2.0V, LVD error will be indicated.

CMD2 P0 R1Fh Register

SPI_Write(0x1E , 0x20) CMD2 Page0

SPI_Read(0x1F)

Bit	Name	Initial	R/W	Description
7	LVD_ERR	0	R	LVD Error indicator
6	-	0	R	Reserved
5	STV_ERR	0	R	STV Error indicator
4	CLK_EVEN_ERR	0	R	Even channel Clock Error indicator
3	CLK_ODD_ERR	0	R	Odd channel Clock Error indicator
2	HVDE_EVEN_ERR	0	R	Even channel HV/DE Error indicator
1	HVDE_ODD_ERR	0	R	Odd channel HV/DE Error indicator
0	-	0	R	Reserved

6.0 ELECTRICAL CHARACTERISTICS

6.1 TFT LCD Module

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage	VDD	+3.0	+3.3	+3.6		Note (1)
Input Signal Voltage	V_{IH}	0.7xVDD	-	VDD	V	Note (2)
	V_{IL}	GND	-	0.3xVDD	V	
Current of VDD	IDD	-	-	600	mA	@White Pattern

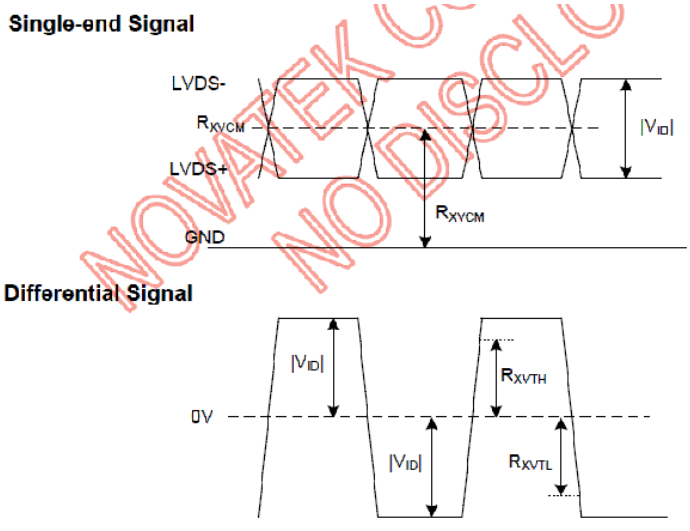
Note：

(1)：VDD setting should match the signals output voltage of customer's system board.

(2) : RESET,STBYB,RL,TB

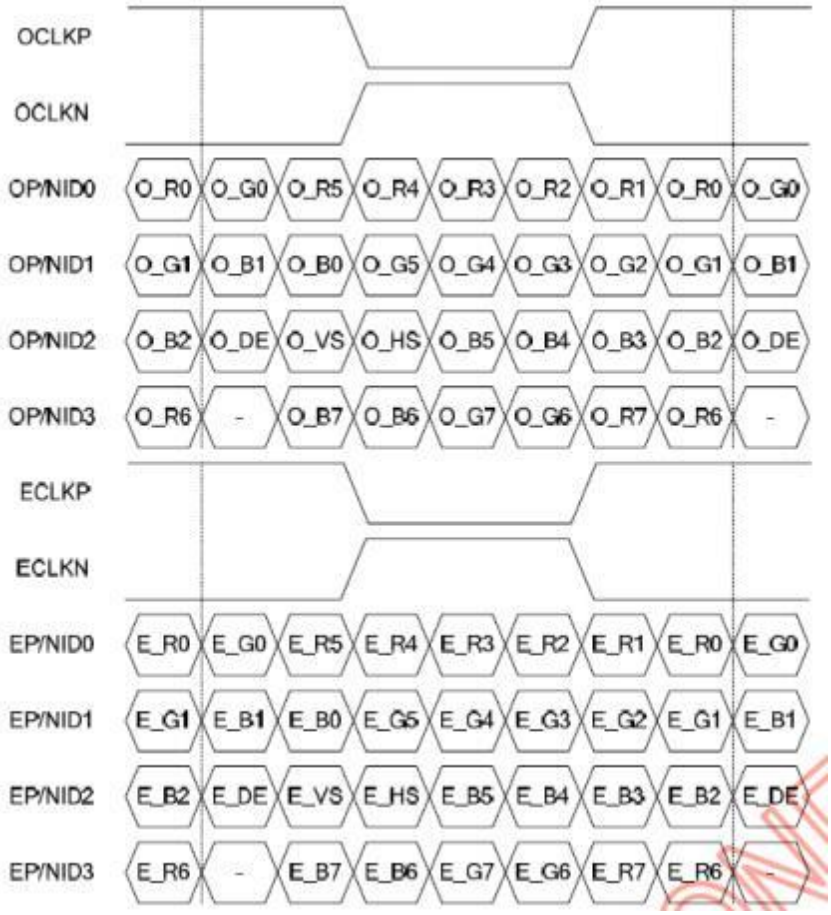
6.2 Switching Characteristics for LVDS Receiver

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Differential Input High Threshold	R_{xVTH}			+200	mV	
Differential Input Low Threshold	R_{xVTL}	-200			mV	
Differential input common mode voltage	R_{xVCM}	1.0	1.2	1.7- $IV_{ID}I/2$	V	
Input leakage Current	I_{IN}	-10		10	uA	RX+/-, RXC+/-
Differential input Voltage	$IV_{ID}I$	200		600	mV	



NOVATEK
NO DISCLO

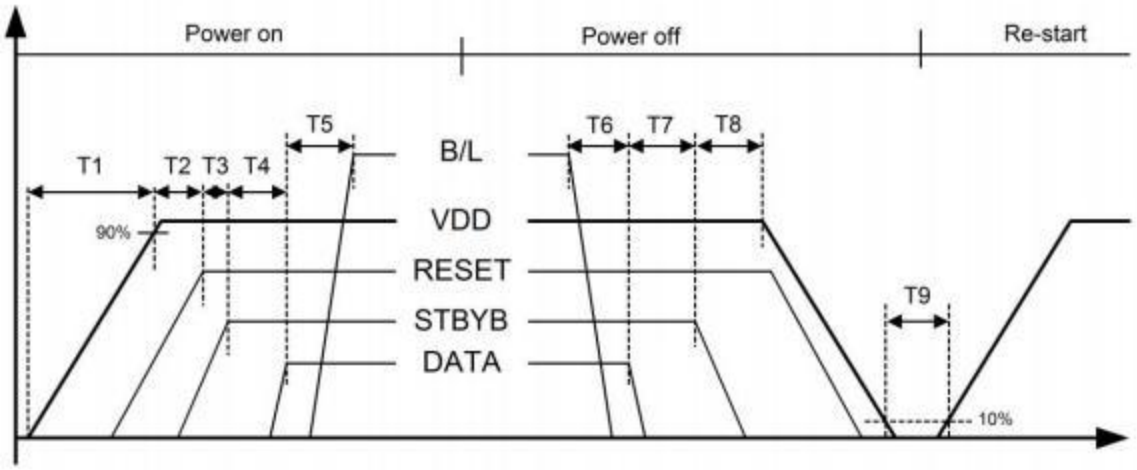
6.3 8Bit LVDS input



6.4 Interface Timing (DE mode)

Item	Symbol	Min.	Typ.	Max.	Unit
Frame Rate	--	55	60	65	Hz
Vertical Total Time	T_V	730	732	764	line
Vertical Display Time	T_{VD}		720		
Vertical Blanking Time	T_{VB}	10	12	44	line
Horizontal Total Time	T_H	1022	1045	1080	clock
Horizontal Display Time	T_{HD}		960		
Horizontal Blanking Time	T_{HB}	62	85	120	clock
Clock Rate	$1/T_{Clock}$	45.4	45.9	48.5	MHz

6.5 Power On / Off Sequence



Item	Min.	Typ.	Max.	Unit
T1	0.5	--	20	ms
T2	1	--	--	ms
T3	1	--	--	ms
T4	200	--	--	ms
T5	50	--	--	ms
T6	50	--	--	ms
T7	16	--	--	ms
T8	16	--	--	ms
T9	1000	--	--	ms

6.6 Backlight Unit

Parameter	Symbol	Min	Typ	Max	Units	Condition
LED Current	I_L	--	180	--	mA	Ta=25℃
LED Voltage	V_L	--	25		Volt	Ta=25℃
LED Life-Time	N/A	30,000	--	--	Hour	Ta=25℃ I_F=60mA Note (2)

Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the condition: Ta=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 Ta=25℃ and IL=180mA. The LED lifetime could be decreased if operating IL is larger than 180mA. The constant current driving method is suggested.

Note (3) LED Light Bar Circuit



BLU Circuit:8S-3P BLU If=180mA

7.0 RELIABILIRY TEST ITEMS

No.	Item	Conditions	Remark
1	High Temperature Storage	Ta = +80℃,240hrs	
2	Low Temperature Storage	Ta = -30℃, 240hrs	
3	High Temperature Operation	Ta = +70℃, 240hrs	
4	Low Temperature Operation	Ta = -20℃, 240hrs	
5	High Temperature and High Humidity (operation)	Ta = +60℃, 90%RH, 240hrs	
6	Thermal Cycling Test (non operation)	-30℃(30min) → +80℃(30min), 240 cycles	
7	Electrostatic Discharge	R=330Ω,C=150pF Contact = ± 8 kV, class B; Air = ± 15 kV, class B; 1 time for each point.	
9	Drop (with carton)	Drop height condition, basis on the product weight and follow QB100-0027 1 corner, 3 edges, 6 surfaces	

Note 1 : All tests above are practiced at module type.

Note 2 : There is no display function NG issue occurred, all the cosmetic specification is judged before the reliability stress.

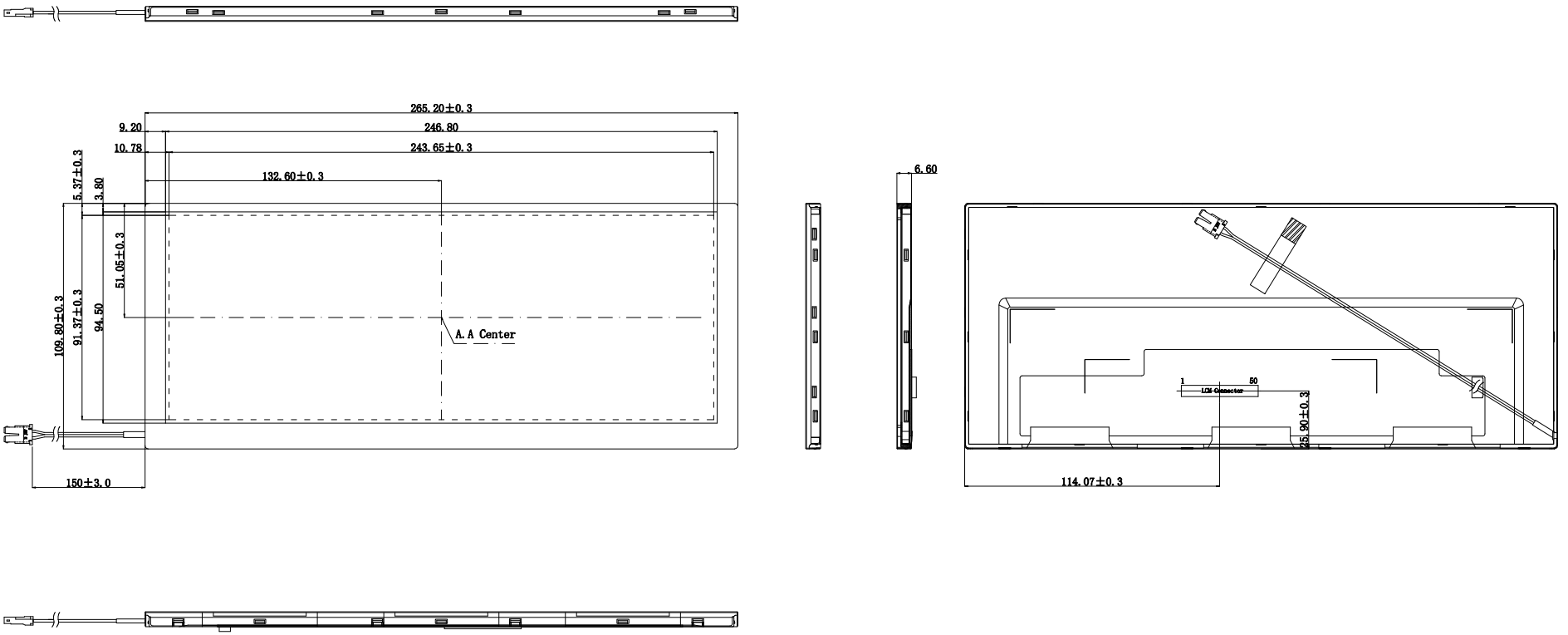
Note 3 : All of the function & cosmetic Judgment basis base on IIS Spec. at room temperature. (The tested module must have enough recovery time at least 2 hours at room temperature.)

Note 4 : The test condition definition panel's surface temperature.

REV	DESCRIPTION:	DATE
V0	新发行	2023.11.02

8.0 MECHANICAL OUTLINE, UNIT:mm

(Unspecified Tolerances is: ±0.3 mm)



ELECTRICAL-OPTICAL CHARACTERISTICS

(Ta=25° C. The Ambient temperature Ta=25° C)

Item(项目)	Symbol (符号)	平均最小值 Min.	典型值 Typ.	最大值 Max.	Units (单位)	Condition (条件)
Forward Voltage (正向电压)	Vf	22.4	24.8	27.2	V	If= 180 mA
Reverse Current (反向电流)	Ir			10	μA	Vr= 5 V
CIE	X		0.31			If=60 mA/LED
*(色坐标)	Y		0.33			
Luminance	BLU	/			cd/m²	
*(撕掉PET亮度)	LCM					
Uniformity (均匀性)	△	80			%	
Operating Temperature:-20° c"+70° c Storage Temperature :-30° c"+80° c						

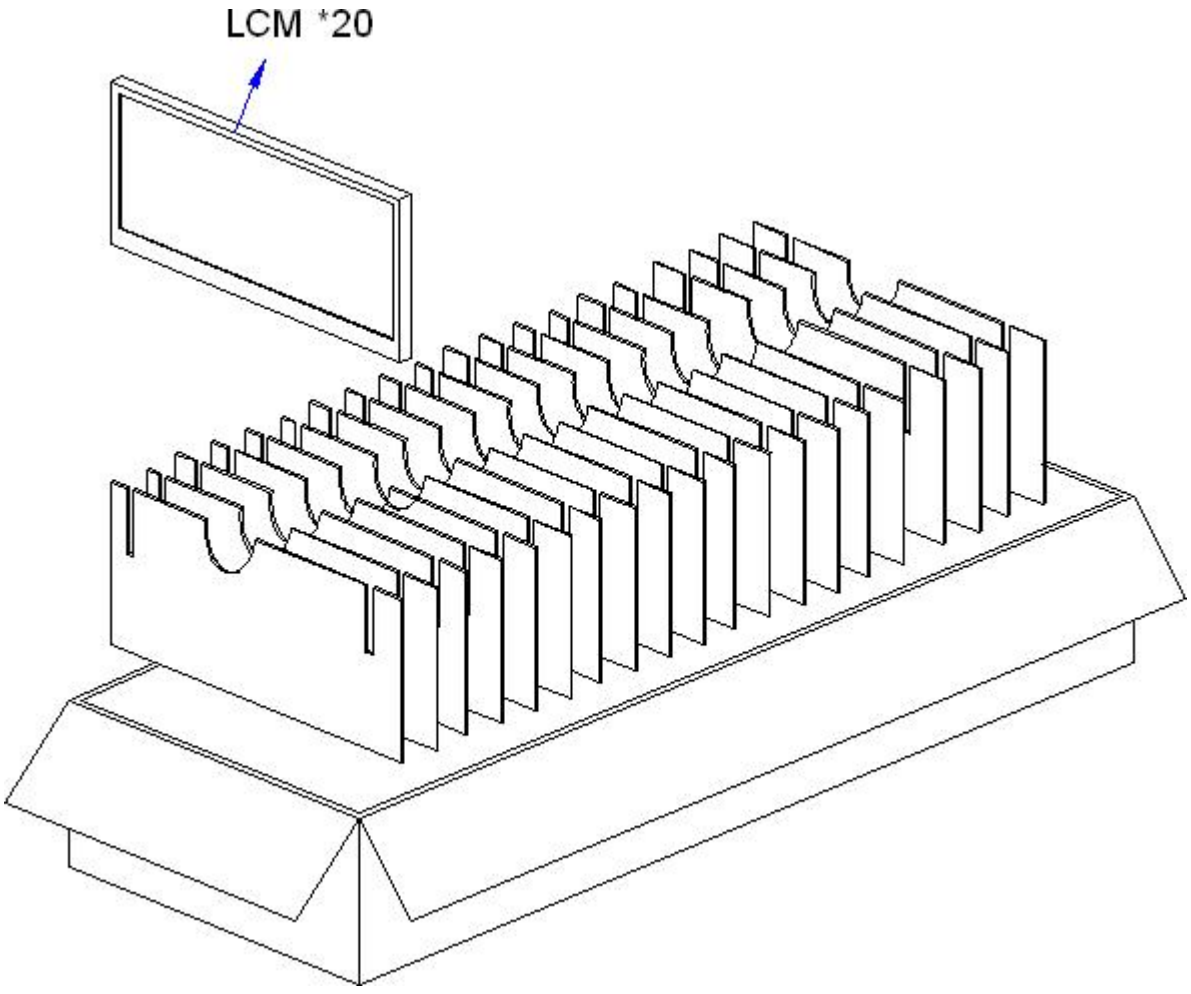
CIRCUIT DIAGRAM (LED 8X3=24 dies)



深圳市拓浦光电技术有限公司			SHEET: 1 of 1	SCALE: ? ?FIT
			APPROVALS	DATE
PRODUCT NANE:	CUST NUMBER:	PROJECTION	DESIGN:	
			CHECK:	
			APPROVE:	

9.0 PACKAGE SPECIFICATION

LCM Model	Qty. in the Box	Inner Box Size(mm)	Notice
TPV103HAF60FIL60	20 pcs/Box	Ref.360 x 340 x 195^{H}	--



10.0 GENERAL PRECAUTION

10.1 Use Restriction

This product is not authorized for use in life supporting systems, aircraft navigation control systems, military systems and any other application where performance failure could be life-threatening or otherwise catastrophic.

10.2 Disassembling or Modification

Do not disassemble or modify the module. It may damage sensitive parts inside LCD module, and may cause scratches or dust on the display. HannStar does not warrant the module, if customers disassemble or modify the module.

10.3 Breakage of LCD Panel

10.3.1 If LCD panel is broken and liquid crystal spills out, do not ingest or inhale liquid crystal, and do not contact liquid crystal with skin.

10.3.2 If liquid crystal contacts mouth or eyes, rinse out with water immediately.

10.3.3 If liquid crystal contacts skin or cloths, wash it off immediately with alcohol and rinse thoroughly with water.

10.3.4 Handle carefully with chips of glass that may cause injury, when the glass is broken.

10.4 Electric Shock

10.4.1 Disconnect power supply before handling LCD module.

10.4.2 Do not pull or fold the LED cable.

10.4.3 Do not touch the parts inside LCD modules and the fluorescent LED's connectoror cables in order to prevent electric shock.

10.5 Absolute Maximum Ratings and Power Protection Circuit

10.5.1 Do not exceed the absolute maximum rating values, such as the supply voltage variation, input voltage variation, variation in parts' parameters, environmental temperature, etc., otherwise LCD module may be damaged.

10.5.2 Please do not leave LCD module in the environment of high humidity and high temperature for a long time.

10.5.3 It's recommended to employ protection circuit for power supply.

10.6 Operation

10.6.1 Do not touch, push or rub the polarizer with anything harder than HB pencil lead.

10.6.2 Use fingerstalls of soft gloves in order to keep clean display quality, when persons handle the LCD module for incoming inspection or assembly.

10.6.3 When the surface is dusty, please wipe gently with absorbent cotton or other soft material.

10.6.4 Wipe off saliva or water drops as soon as possible. If saliva or water drops contact with polarizerfor a long time, they may causes deformation or color fading.

10.6.5 When cleaning the adhesives, please use absorbent cotton wetted with a little petroleum benzine or other adequate solvent.

10.7 Mechanism

Please mount LCD module by using mounting holes arranged in four corners tightly.

10.8 Static Electricity

10.8.1 Protection film must remove very slowly from the surface of LCD module to prevent from electrostatic occurrence.

10.8.2 Because LCD module use CMOS-IC on circuit board and TFT-LCD panel, it is very weak to electrostatic discharge. Please be careful with electrostatic discharge. Persons who handle the module should be grounded through adequate methods.

10.9 Strong Light Exposure

The module shall not be exposed under strong light such as direct sunlight. Otherwise, display characteristics may be changed.

10.10 Disposal

When disposing LCD module, obey the local environmental regulations.