

深圳市拓浦光电技术有限公司



Topview Product Specification

12.8" Color TFT-LCD Module

Model: TPV128HAF50FIL70-01

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	2023/5/21	01	Formal product information was first released
2.0	2024/1/11	01	Modified temperature range

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1.0 GENERAL DESCRIPTION

1.1 Introduction

TOPVIEW TPV128HAF50PIL70-01 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 12.8" (16:9) inch diagonally measured active display area with 5760 x 1080 dot (1920 horizontal by 1080 vertical pixel) resolution.

1.2 Features

- . 12.8 (16:9 diagonal) inch configuration
- . 16.7M
- . ROHS / Halogen Free Compliance

1.3 Applications

- TFT LCD Monitor
- Industrial Application
- Amusement
- Vehicle

1.4 General information

Item		Specification	Unit
Outline Dimension		294.4(H) x 175.0(V) x 5.0(Typ.)	mm
Display area		283.392(H) x 159.408(V)	mm
Number of Pixel		1920 RGB (H) x 1080(V)	pixels
Pixel pitch		0.1476(H) x 0.1476 (V)	mm
Pixel arrangement		RGB Vertical stripe	
Display mode		Normally Black	
NTSC		75 (typ.)	%
Surface treatment		Glare	
Weight			g
Back-light		Single LED (Side-Light type)	
Power Consumption	Logic System (White Pattern)	1.65 W (Max)	W
	B/L System	15.504 (Max.)	W

1.5 Mechanical Information

Item		Min.	Typ.	Max.	Unit
Module Size	Horizontal (H)	293.9	294.4	294.9	mm
	Vertical (V)	174.5	175.0	175.5	mm
	Depth (D)	4.5	5.0	5.5	mm
Weight		-		-	g

2.0 ABSOLUTE MAXIMUM RATINGS

2.1 Electrical Absolute Rating

2.1.1 TFT LCD Module

Parameters	Symbol	Min.	Max.	Unit	Note
Power Logic	VCC	-0.3	4	V	

2.2 Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Operating Temperature	T _{opa}	-30	70	°C	
Storage Temperature	T _{stg}	-30	80	°C	

3.0 OPTICAL CHARACTERISTICS

3.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast		CR	$\Theta = 0$ Normal viewing angle	1100	1500	-		(1)(2)
Response time	Rising	T _R		-	13	16	msec	(1)(3)
	Falling	T _F		-	12	14		
White luminance (Center)		Y _L		650	700	-	cd/m ²	(1)(4) (I _L =380mA)
Color chromaticity (CIE1931)	White	W _x		0.254	0.294	0.334		(1)(4)
		W _y		0.269	0.309	0.349		
	Red	R _x		0.595	0.635	0.675		
		R _y		0.289	0.329	0.369		
	Green	G _x		0.255	0.295	0.335		
		G _y		0.577	0.617	0.657		
	Blue	B _x		0.113	0.153	0.193		
		B _y		0.010	0.050	0.090		
Viewing angle	Hor.	Θ_L	CR>10	80	85	-		
		Θ_R		80	85	-		
	Ver.	Θ_U		80	85	-		
		Θ_D		80	85	-		
Brightness uniformity		B _{UNI}	$\Theta = 0$	70	80	-	%	(5)
Optima View Direction		Free						(6)
Reflection	%	R (%)	-	-	5.0	5.5	%	(7)

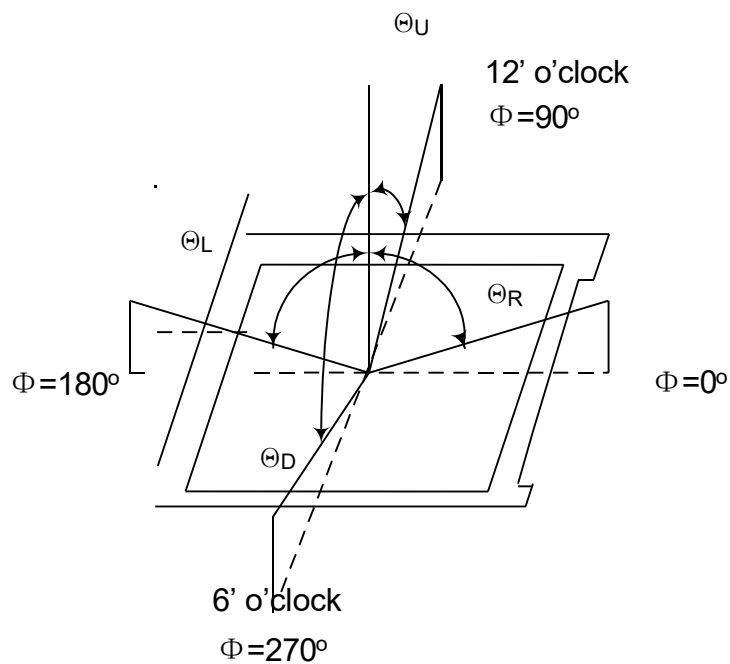
3.2 Measuring Condition

- . Measuring surrounding: dark room
- . LED current I_L : **380mA**
- . Ambient temperature: $25 \pm 2^\circ C$
- . 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

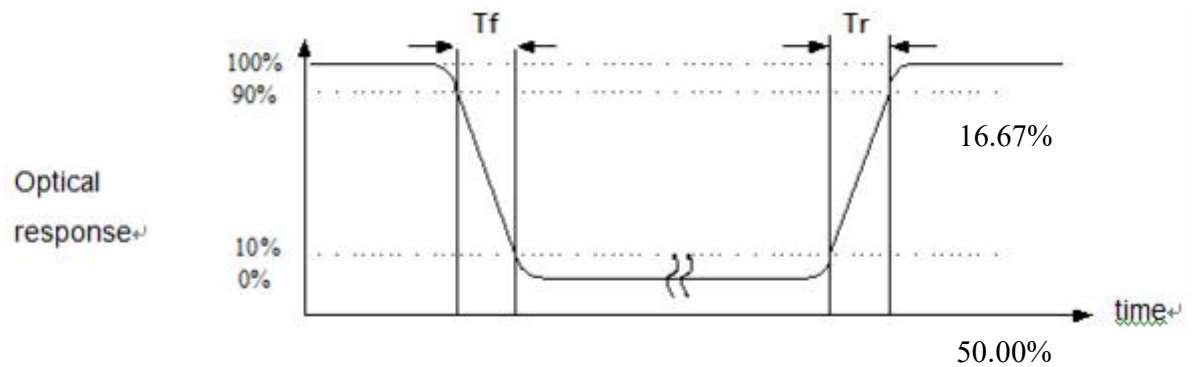
Note (1) Definition of Viewing Angle:



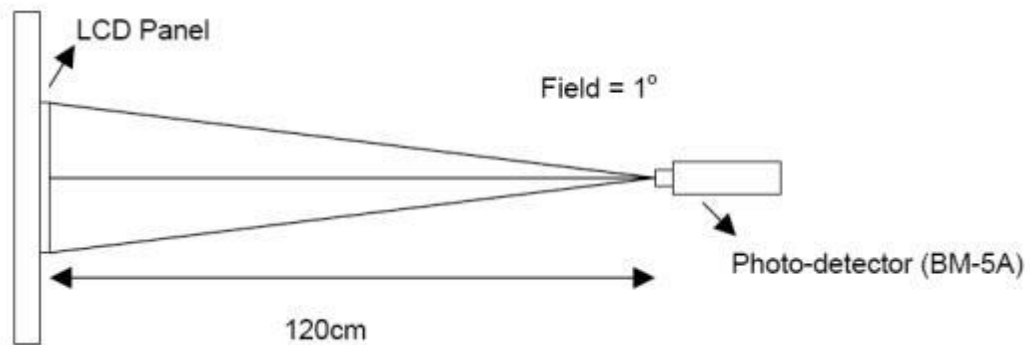
Note (2) Definition of Contrast Ratio (CR) :
measured at the center point of panel

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

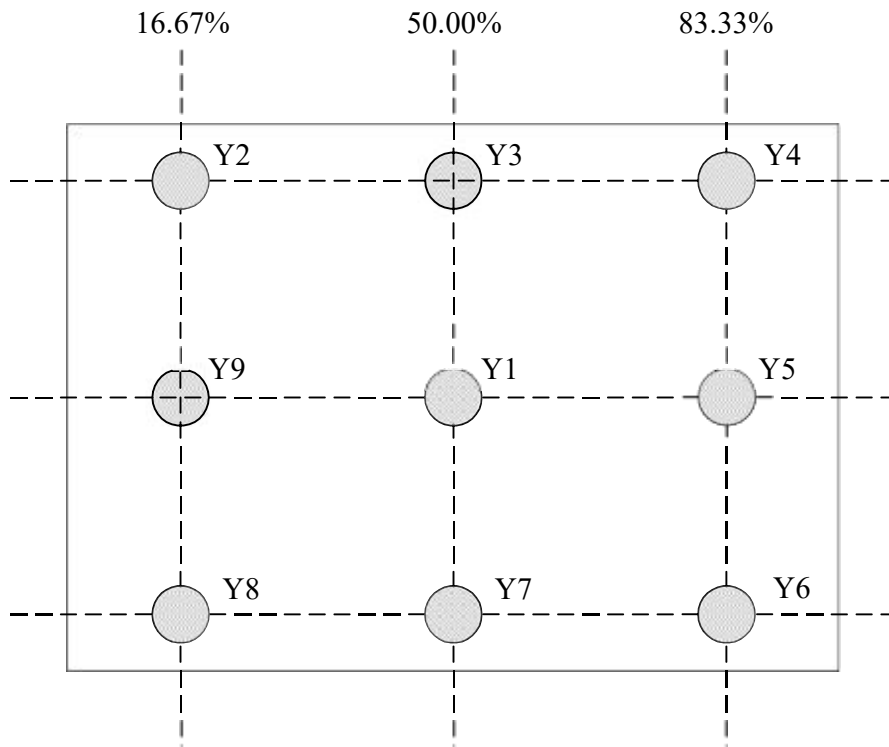
Note (3) Definition of Response Time : Sum of T_R and T_F



Note (4) Definition of optical measurement setup



Note (5) Definition of brightness uniformity



$$\text{Luminance uniformity} = \frac{(\text{Min Luminance of 9 points})}{(\text{Max Luminance of 9 points})} \times 100\%$$

Note (6): Rubbing Direction (The different Rubbing Direction will cause the different optima view direction).

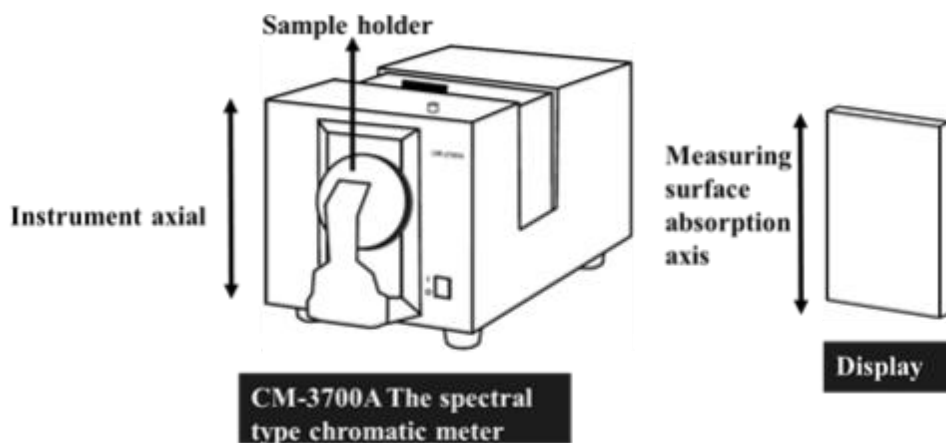
Note (7) Definition of CM-3700A(Konica Minolta) Measurement specification

. The Settings of the instrument:

- A. reflection rate;
- B. Measuring the aperture: MAV(8mm);
- C. Observer perspective: 2°;
- D. Specular light: SCI;
- E. The light source: D65.

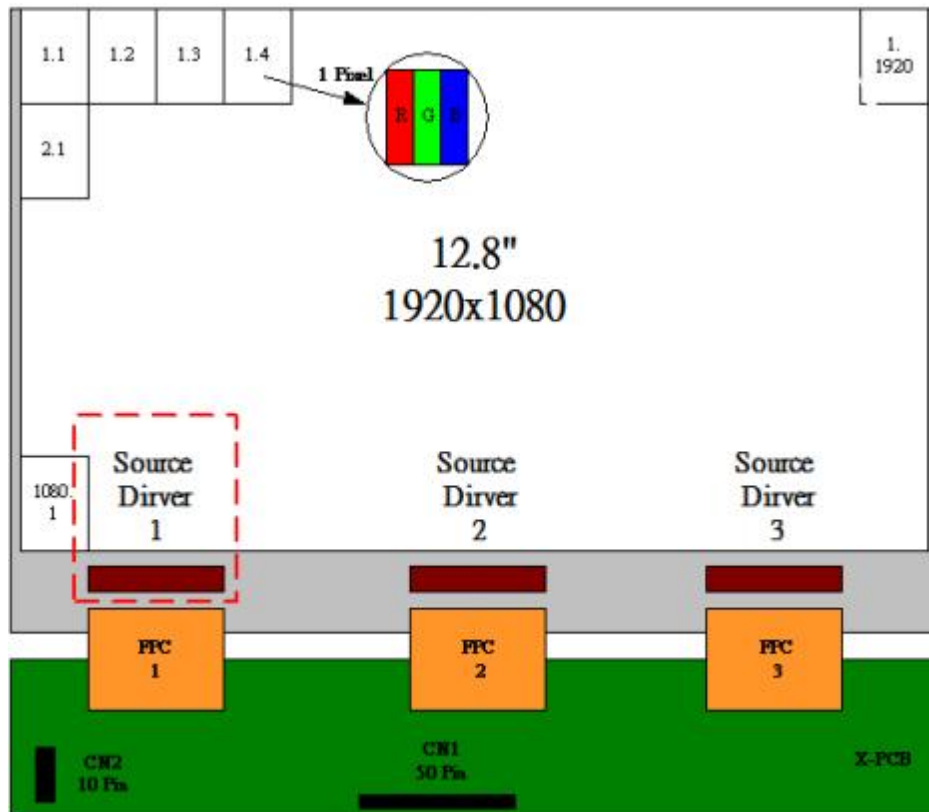
. The definition of measurement way

Chromatic meter will display the absorption of shaft and spectral type axial parallel alignment, and placed the sample frame for photometry.

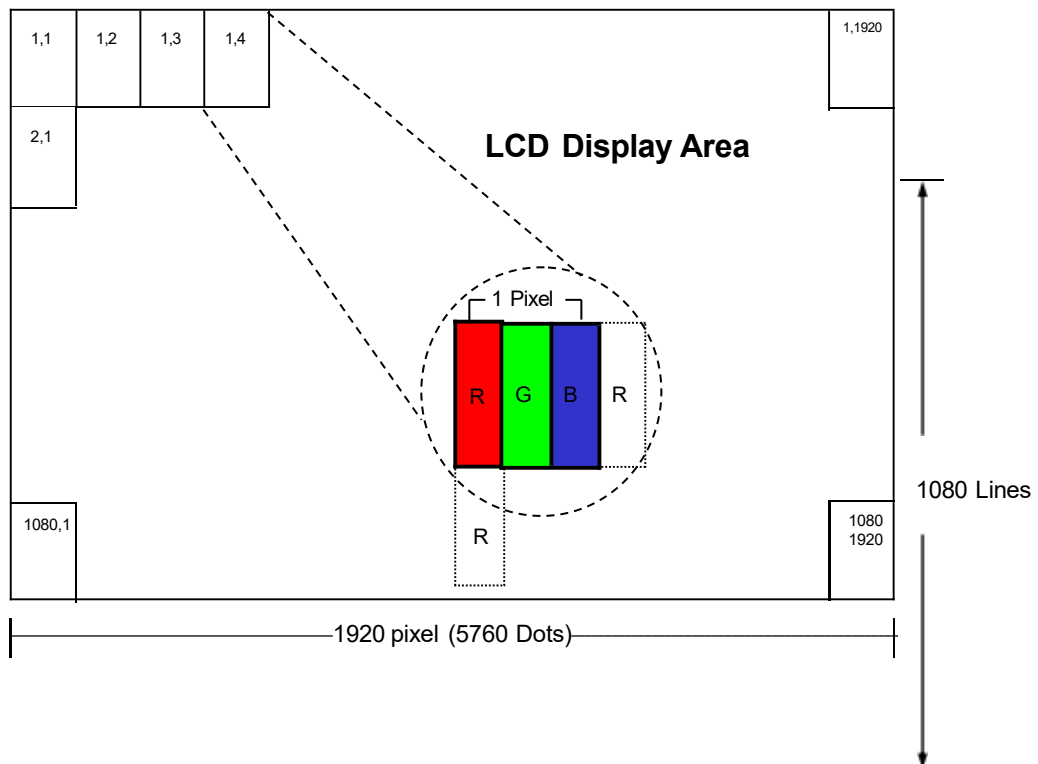


4.0 BLOCK DIAGRAM

4.1 TFT LCD Module:



4.2 Pixel Format



4.3 Relationship Between Displayed Color and Input

	Display	MSB LSB								MSB LSB								MSB LSB								Gray scale Level
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0	
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 ↑ ↓ Light	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 ↑ ↓ Light	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 ↑ ↓ Light	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L1
		L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L	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 ↑ ↓ Light	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	H	L	L	L	L	L	L	L	H	L	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	L	H	L	L253
		H	H	H	H	H	H	H	L	H	H	H	H	H	H	L	H	H	H	H	H	H	H	L	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

CN1 FPC connector is used for electronics interface.

AORORA F31L-1A7H1-21050 or BJD 101049-205050 (50PIN)

Pin no.	Symbol	Function	Note
1	GND	Power ground	
2	NC/BIST	No connector(BIST Pin)	
3	VCC	Digital Power/Vin = 3.3V	
4	VCC	Digital Power/Vin = 3.3V	
5	GND	Power ground	
6	GND	Power ground	
7	NC	No connector(Serial interface OTP Power)	
8	NC	No connector	
9	GND	Power ground	
10	ORXIN0-	Negative LVDS differential data input (Odd data)	
11	ORXIN0+	Positive LVDS differential data input (Odd data)	
12	ORXIN1-	Negative LVDS differential data input (Odd data)	
13	ORXIN1+	Positive LVDS differential data input (Odd data)	
14	ORXIN2-	Negative LVDS differential data input (Odd data)	
15	ORXIN2+	Positive LVDS differential data input (Odd data)	
16	ORXCLKIN-	Negative LVDS differential clock input (Odd clock)	
17	ORXCLKIN+	Positive LVDS differential clock input (Odd clock)	
18	ORXIN3-	Negative LVDS differential data input (Odd data)	
19	ORXIN3+	Positive LVDS differential data input (Odd data)	
20	ERXIN0-	Negative LVDS differential data input (Even data)	
21	ERXIN0+	Positive LVDS differential data input (Even data)	
22	ERXIN1-	Negative LVDS differential data input (Even data)	
23	ERXIN1+	Positive LVDS differential data input (Even data)	
24	ERXIN2-	Negative LVDS differential data input (Even data)	
25	ERXIN2+	Positive LVDS differential data input (Even data)	
26	ERXCLKIN-	Negative LVDS differential clock input (Even clock)	
27	ERXCLKIN+	Positive LVDS differential clock input (Even clock)	
28	ERXIN3-	Negative LVDS differential data input (Even data)	
29	ERXIN3+	Positive LVDS differential data input (Even data)	
30	GND	Power ground	

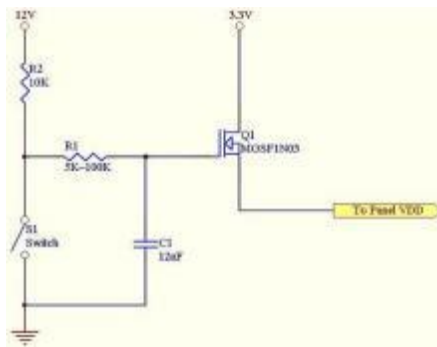
31	FAULT	FAULT signal output(normal=H,abnormal=L)	note1
32	RESET	Global reset pin, active low.	
33	STBYB	Standby mode setting pin, active low.	
34	NC	No connector(Serial interface chip enable.CSB)	
35	NC	No connector(Serial interface clock input.SCL)	
36	NC	No connector(Serial interface data input/output.CDA)	
37	NC	No connector(Serial interface data input/output.CDA)	
38	GND	Power ground	
39	GND	Power ground	
40	NC	No connector	
41	LEDA	LED power (Anode)	
42	LEDA	LED power (Anode)	
43	LEDA	LED power (Anode)	
44	NC	No connector	
45	LEDK	Cathode 1	
46	LEDK	Cathode 2	
47	LEDK	Cathode 3	
48	LEDK	Cathode 4	
49	NTC_A	NTC_Anode	note2
50	NTC_K	NTC_Cathode	
Note1: IC Enter self protection mode. (No HS/VS/DE/CLK)[Lower than 40Hz]			
Note2: Murata NCU15XH103F6SRC			

6.0 ELECTRICAL CHARACTERISTICS

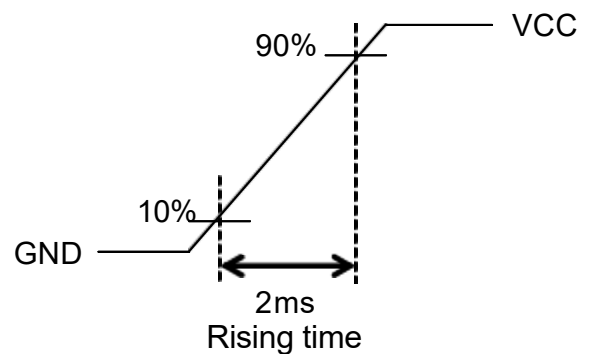
6.1 TFT LCD Module

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage	VCC	3	3.3	3.6	V	
Input signal voltage	ViH	VCC*0.7	-	VCC	V	
	ViL	0	-	VCC*0.3	V	
Current of power supply	I _{DD}	--	--	500	mA	VCC =3.3V White pattern
Inrush current	I _{RUSH}	-	-	2.0	A	Note*

Note* : Inrush current test circuit and rising time setting (power on)



Test circuit

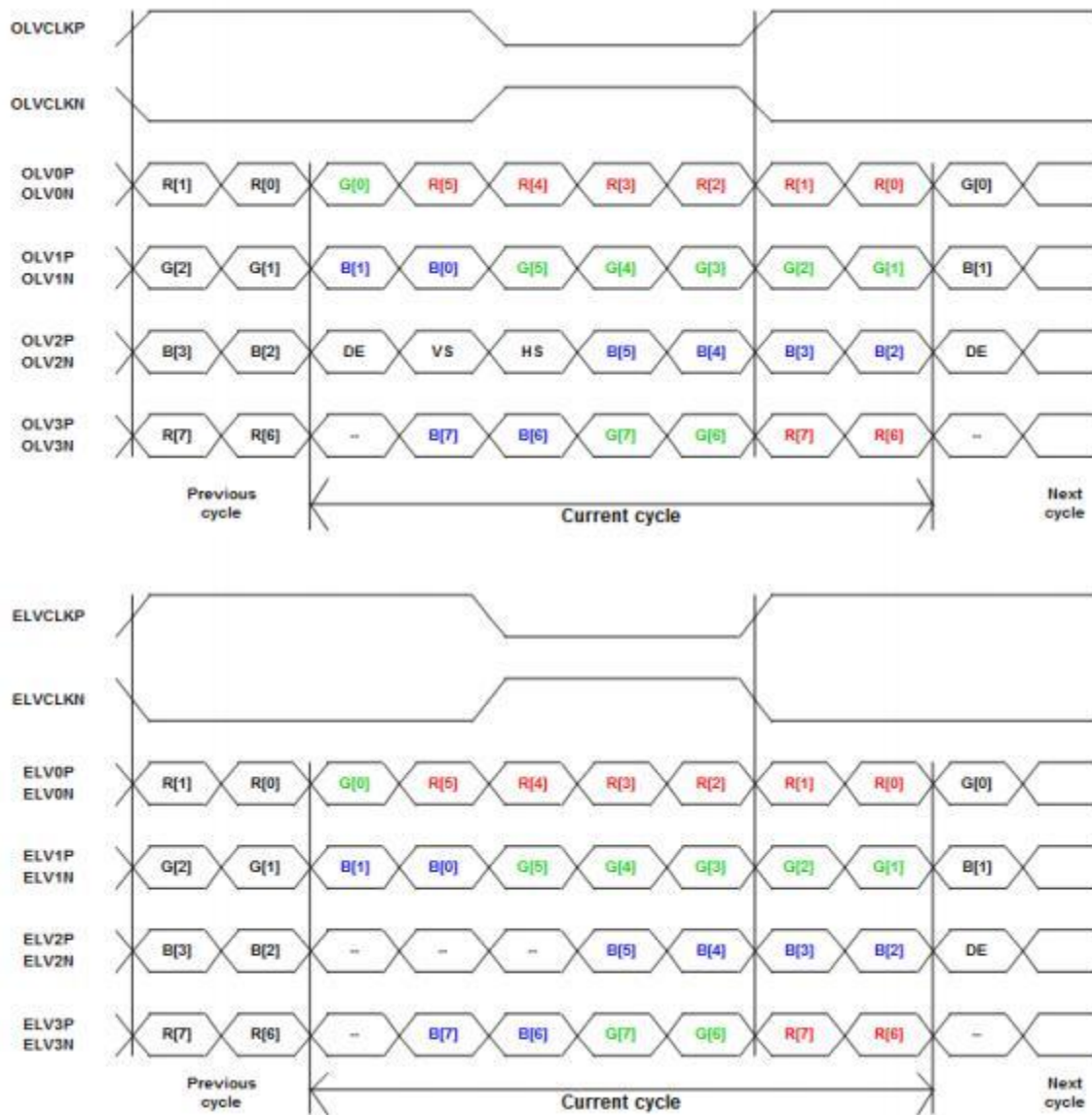


6.2 Switching Characteristics for LVDS Receiver

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Differential Input High Threshold	V _{th}	-	-	100	mV	V _{CM} =1.2V
Differential Input Low Threshold	V _{tl}	-100	-	-	mV	
Input Current	I _{IN}	-10	-	+10	uA	
Differential input Voltage	V _{ID}	0.1	-	0.6	V	
Common Mode Voltage Offset	V _{CM}	1	1.2	1.7-(V _{ID} /2)	V	

6.3 Bit LVDS input

6.3.1 8Bit LVDS input

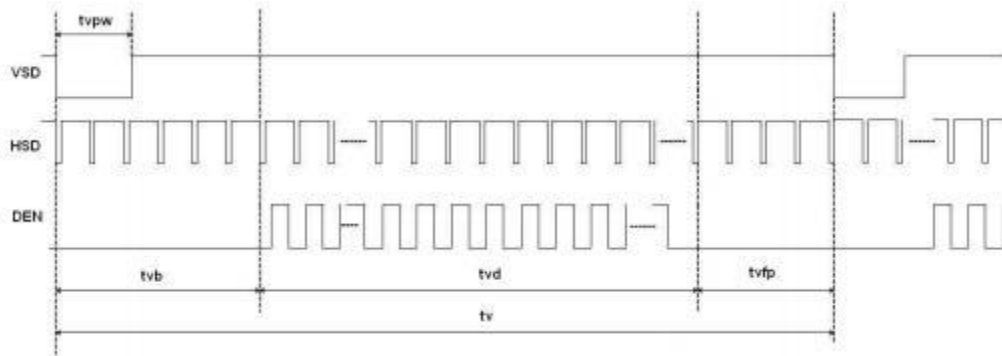


6.4 Interface Timing (DE mode)

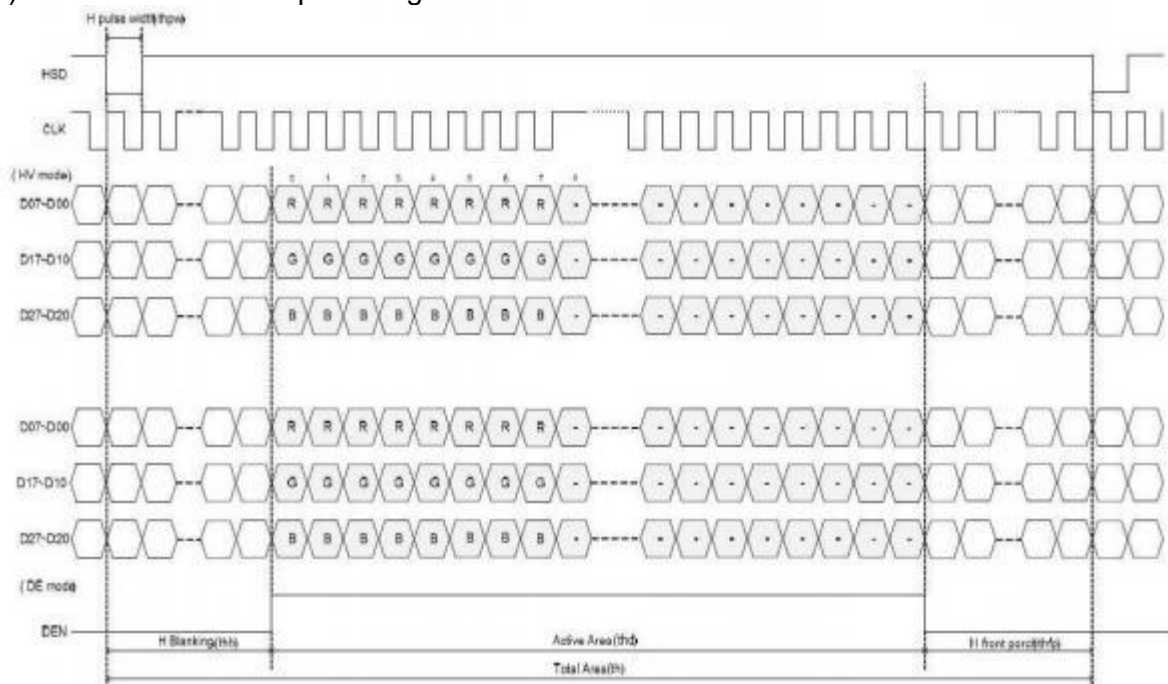
Interface Timing (DE mode) Two Port LVDS Timing.(1920xRGBx1080)					
Item	Symbol	Min.	Typ.	Max.	Unit
Frame Rate	FR	55	60	65	Hz
Vertical Display Time	T _{vd}	1080			H
Vertical pulse width	T _{vpw}	1	3	20	H
Vertical back porch	T _{vbp}	2	24	200	H
Vertical front porch	T _{vfp}	5	8	200	H
Frame Period	T _v	1087	1112	1404	H
Horizontal Display Time	T _{hd}	960			DCLK
Horizontal pulse width	T _{hpw}	10	12	200	DCLK
Horizontal back porch	T _{hbp}	5	16	200	DCLK
Horizontal front porch	T _{hfp}	24	26	200	DCLK
1 Horizontal line	T _v	989	1012	1248	DCLK
Clock Rate	F _{DCLK}	64.5	66.9	80	MHz

Timing Diagram of Interface Signal (DE mode)

(1) Vertical input timing

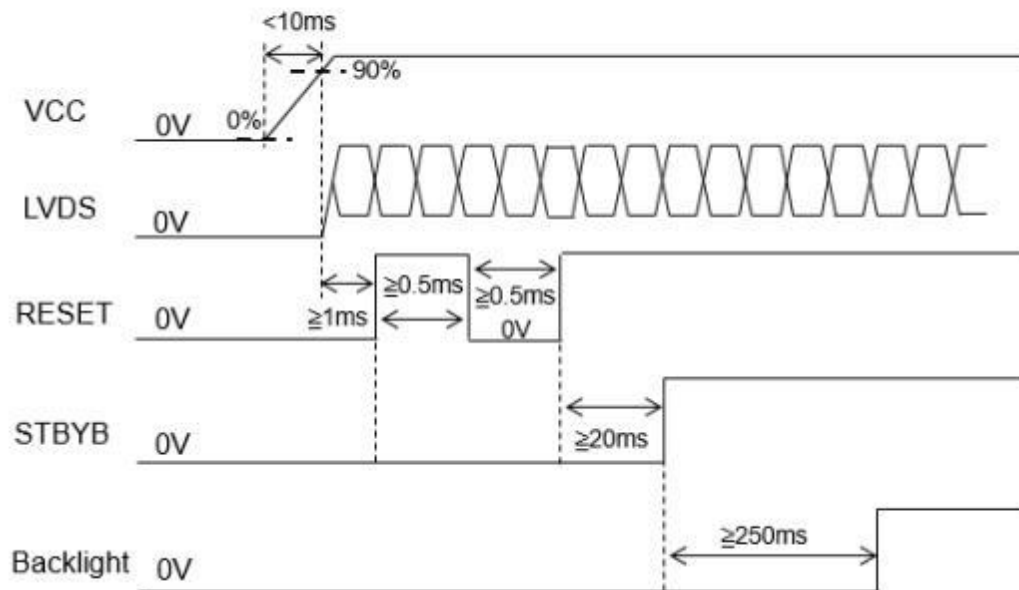


(2) Horizontal Vertical input timing

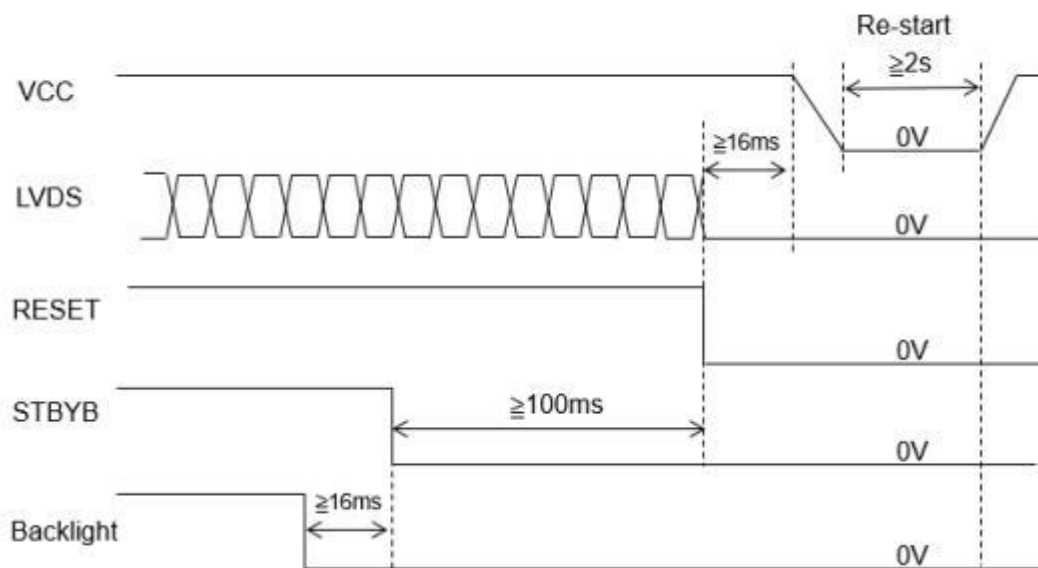


6.5 Power On / Off Sequence

Power on Sequence



Power off Sequence



6.6 Backlight Unit

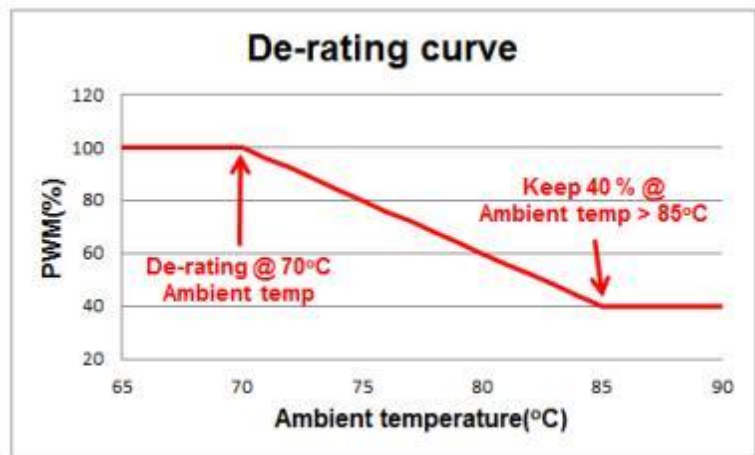
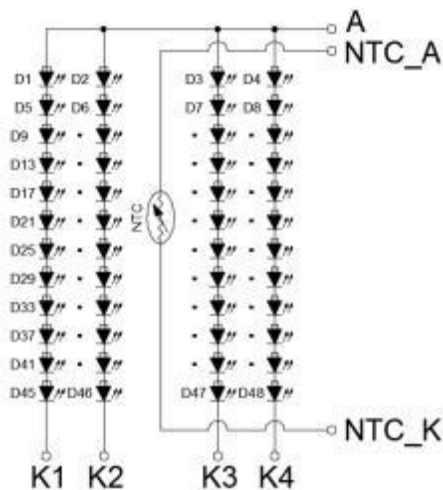
Parameter	Symbol	Min	Typ	Max	Units	Condition
LED Current	IL	--	380	--	mA	Ta=25°C
LED Voltage	V _F	--	38.4	40.8	Volt	Ta=25°C
LED Life-Time	N/A	30,000	--	--	Hour	Ta=25°C I _F =95mA Note (2)

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°C and IL= 380 mA. The LED lifetime could be decreased if operating IL is larger than 380 mA. The constant current driving method is suggested.

Note (3) LED Light Bar Circuit 12S4P =48pcs LED

Note (4) LED temperature current curve, The temperature at 70 degrees before the output Duty 100%,70 degrees to 85 degrees when the linear drop to Duty 40%.



7.0 RELIABILITY TEST ITEMS

No.	Item	Conditions	Remark
1	High Temperature Storage	Ta=+80°C, 240hrs	1, 2, 3
2	Low Temperature Storage	Ta=-30°C, 240hrs	1, 2, 3
3	High Temperature Operation	Ta=+70°C, 240hrs	1, 2, 3
4	Low Temperature Operation	Ta=-30°C, 240hrs	1, 2, 3
5	High Temperature and High Humidity (operation)	Ta=+60°C, 90%RH, 120hrs	1, 2, 3
6	Thermal Cycling Test (non operation)	-30°C(30min)→+80°C(30min),100 cycles	1, 2, 3
7	Electrostatic Discharge	R=330Ω,C=150pF Contact = ± 8 kV, class B Air = ± 15 kV, class B 1 time for each point	
8	Vibration	1.Random: 1.04G, 10~500Hz, XYZ, 30 min/each direction 2.Sine: Freq.Range, 8~33.3Hz, Stoke: 1.3mm Sweep: 2.9G, 33.3~400Hz X/Z: 2hrs, Y:4hrs	
9	Shock	Half-Sine, 100G, 6ms, ±XYZ, 1time	
10	Vibration (with carton)	Random: 0.015G ² /Hz, 5~200Hz -6dB/Octave, 200~400Hz XYZ, 2hrs/each direction	
11	Drop (with carton)	Drop height condition, basis on the product weight and follow QB200-0015, 1 corner, 3 edges, 6 surfaces	

Note1: There is no display function NG issue occurred, all the cosmetic specification is judged before the reliability stress.

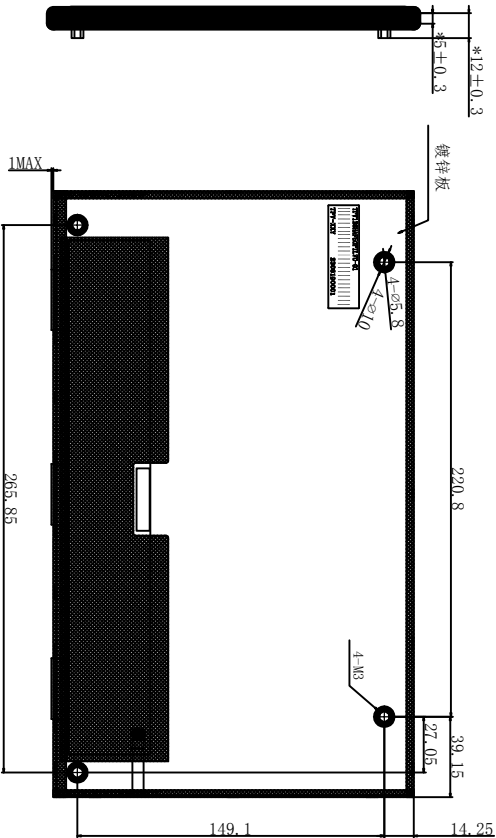
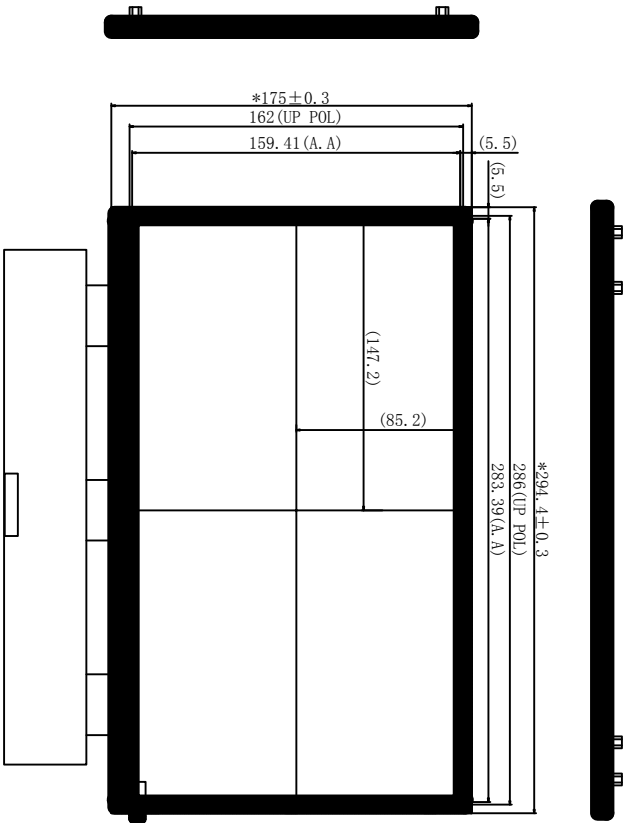
Note2: The test result shall be evaluated after the sample has been left at room temperature and humidity for 2 hours without load. No condensation shall be accepted. The

sample shall be free from defects:

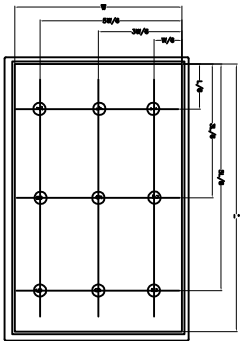
(Air bubble in the LCD、Seal leak、Non-display、Missing segments、Glass crack). Note3: The test condition definition panel's surface temperature.

客户确认	结构确认	项目确认
签 名		

REV.	DESCRIPTION	REVISER	DATE

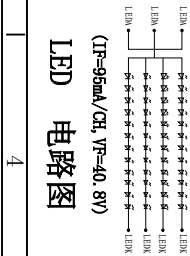


- Notes:
- Unit: mm
 - Do not scale drawing
 - All radii without dimension R0.20mm, Not specified tolerance is: ± 0.2
 - For important dimension: For CPK dimension
 - For reference dimension: Draft angle 1.0°
 - Modify to new process:
 - Bohls must be compiled. (Use Lead-free process)
 - 平整度控制到0.6MAX



测试点, 测试距离: 50±5cm, 测试角度: 1° Ø5
均匀性: 最小/最大亮度*100%, 测试仪器 BM-7A

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	Condition
Forward Voltage	V _F	—	—	40.8	V	
Luminance (9 Points average)	L _v	21000	23000	—	cd/m ²	
Uniformity	Avg	75	—	—	%	
Colour Coordinate	X	0.310	0.340	0.370		
(Center Point)	Y	0.170	0.200	0.230		
Luminance (9 Points average)	L _v	650	700	—	cd/m ²	If=95mA*F=380mA (恒定电流)
Uniformity	Avg	75	80	—	%	测量仪器: BM-7
Colour Coordinate	X	0.215	0.245	0.275		测试距离: 500mm
(Center Point)	Y	0.250	0.280	0.310		Ta=25℃
Operating Temperature	Topr	-30	—	+70	℃	
Storage Temperature	Tstg	-30	—	+80	℃	



Design by:	模组成品图	数量	比例	第三视角	Customer's Code:	TPV128HAF50PIL70-01
Check by:	版本	A	1:1		(客户料号)	
Approval By:	单位	mm	页数	第 1 张 共 1 张		
(签字)						

Don't scale this drawing (请勿缩放此图纸)

9.0 PACKAGE SPECIFICATION

TBD