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LCD MODULE SPECIFICATION

Customer: _____

Module No.: ET018FH01-G

Date: 2026-01-09

Version: 1.2

■ **Pre-Specification for parameter checking**

□ **Final-Specification for sample approval**

For Customer's Acceptance:

Approved by	Comment

Approved by	Checked by	Prepared by

Table of Contents

Record of Revision

Rev.	Date	Description	Editor
1.0	2025-04-22	First release	Chenchen.Wang
1.1	2026-11-25	Update power supply configuration	Chenchen.Wang
1.2	2026-01-09	Update chromaticity coordinate information	Chenchen.Wang

1 General Specifications

No.	Item	Specification	Remark
1	LCD Size	1.8 inch (Diagonal)	
2	Driver Element	a-Si TFT active matrix	
3	Resolution	1920 (RGB) ×1080	
4	Display Mode	Normally Black	
5	Pixel Pitch(mm)	0.0069 (H) × 0.0207 (V)	
6	Display Colors	16.7M	
7	Surface Treatment	/	
8	Color Arrangement	RGB-Stripe	
9	Interface	MIPI	
10	Viewing Direction	ALL	
11	Gray Scale Inversion Direction	--	Note 1
12	Outline Dimension (mm)	43.14 (W) × 29.93 (H) × 1.59 (T)	
13	Active Area (mm)	39.74 (W) × 22.36 (H)	
14	Touch Screen	/	
15	Display Driver IC	EK79303AB	
16	Touch Driver IC	/	

Note 1: Viewing direction for best image quality is different from TFT definition. There is a 180°shift.

Note 2: RoHS compliant.

2 Pin Assignment

2.1 LCD Pin assignment

Connector: OK-14GM040-04 or equivalent

PIN	Symbol	I/O	Description	Remark
1	GND	P	Ground	
2	GND	P	Ground	
3	D3P	I	MIPI DSI differential data pair (Data lane 3)	
4	GND	P	Ground	
5	D3N	I	MIPI DSI differential data pair (Data lane 3)	
6	LEDA	P	LED ANODE	
7	GND	P	Ground	
8	GND	P	Ground	
9	GND	P	Ground	
10	LEDK2	P	LED CATHODE	
11	D2P	I	MIPI DSI differential data pair (Data lane 2)	
12	LEDK1	P	LED CATHODE	
13	D2N	I	MIPI DSI differential data pair (Data lane 2)	
14	GND	P	Ground	
15	GND	P	Ground	
16	GND	P	Ground	
17	GND	P	Ground	
18	VSN	P	-6.0V	
19	CLKP	I	MIPI DSI differential clock pair	
20	GND	P	Ground	
21	CLKN	I	MIPI DSI differential clock pair	
22	VSP	P	6.0V	
23	GND	P	Ground	
24	GND	P	Ground	
25	GND	P	Ground	
26	VDDI	P	3.3V	
27	D1P	I	MIPI DSI differential data pair (Data lane 1)	
28	VDDI	P	3.3V	
29	D1N	I	MIPI DSI differential data pair (Data lane 1)	
30	GND	P	Ground	
31	GND	P	Ground	

32	RESET	I	Reset Signal ,Active Low(1.8V)	
33	GND	P	Ground	
34	GND	P	Ground	
35	D0P	I	MIPI DSI differential data pair (Data lane 0)	
36	TE	O	Tearing effect(1.8V)	
37	D0N	I	MIPI DSI differential data pair (Data lane 0)	
38	GND	P	Ground	
39	GND	P	Ground	
40	GND	P	Ground	

I---Input, O---Output, P--- Power/Ground

3 Absolute Maximum Ratings

Ta = 25℃

Item	Symbol	Min.	Max.	Unit	Remark
Power Voltage	VDDI	+3.0	+3.6	V	
	VSP	+5.0	+6.6	V	
	VSN	-6.6	-5.0	V	
Operating Temperature	Top	-20.0	70.0	℃	
Storage Temperature	T_{st}	-30.0	80.0	℃	
Operating and Storage Humidity	H_{stg}	10%	90%	%(RH)	

4. Electrical Characteristics

4.1 Recommended Operating Condition

VCI=3.3V， GND=0V， Ta = 25℃

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Logic voltage	VDDI	-	3.3	-	V	
Positive Analog Power Supply Voltage	VSP	-	6	-	V	
Negative Analog Power Supply Voltage	VSN	-	-6	-	V	
Input logic high voltage	VIH	0.7 IOVCC	-	IOVCC	V	
Input logic low voltage	VIL	0	-	0.3 IOVCC	V	

4.2 Backlight Unit Driving Condition

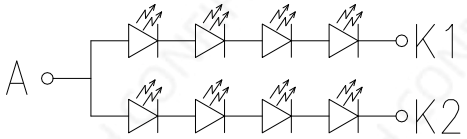
Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Forward Current	I_F	-	26	-	mA	8 LEDs (4 LED Serial, 2 LED Parallel)
Forward Current Voltage	V_F	-	12	-	V	
Backlight Power Consumption	W_{BL}	-	312	-	mW	
Operating Life Time	--	30000	--	--	hrs	Note 2, Note 3

Note1: The LED driving condition is defined for each module (4 LED Serial, 2 LED Parallel).

Note2: When LCM is operated, the stable forward current should be inputted. And forward voltage is for reference only.

Note3: Optical performance should be evaluated at Ta=25℃ When LED is driven at high current, high ambient temperature & humidity condition. The life time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

Note4: The LED driving condition is defined for each LED module.



5 Timing Chart

5.1 MIPI DC characteristic

Parameter	Symbol	Min.	Typ.	Max.	Unit
MIPI Characteristics for High Speed Receiver					
Single-ended input low voltage	V_{ILHS}	-40	-	-	mV
Single-ended input high voltage	V_{IHHS}	-	-	460	mV
Common-mode voltage	V_{CMRXDC}	70	-	330	mV
Differential input impedance	Z_{ID}	80	100	120	ohm
HS transmit differential voltage(V_{OD}=V_{DP}-V_{DN})	$\|V_{OD}\|$	100	200	250	mV
MIPI Characteristics for Low Power Mode					
Pad signal voltage range	V_I	-50	-	1350	mV
Ground shift	V_{GNDSH}	-50	-	50	mV
Logic 0 input threshold	V_{IL}	0	-	550	mV
Logic 1 input threshold	V_{IH}	1000	-	1350	mV
Input hysteresis	V_{HYST}	25	-	-	mV
Output low level	V_{OL}	-50	-	50	mV
Output high level	V_{OH}	1.1	1.2	1.3	V
Output impedance of Low Power Transmitter	ZOLP	110			ohm
Logic 0 contention threshold	$V_{ILCD,MAX}$	-	-	200	mV
Logic 1 contention threshold	$V_{IHCD,MIN}$	450	-	-	mV
MIPI Digital Operating Current	$I_{VDDMIPI}$	-	15	20	mA
MIPI Digital Stand-by Current	I_{STMIPI}	-	-	250	uA

Note: MIPI Digital Operating and Stand-by Current is at RT 25°C condition.

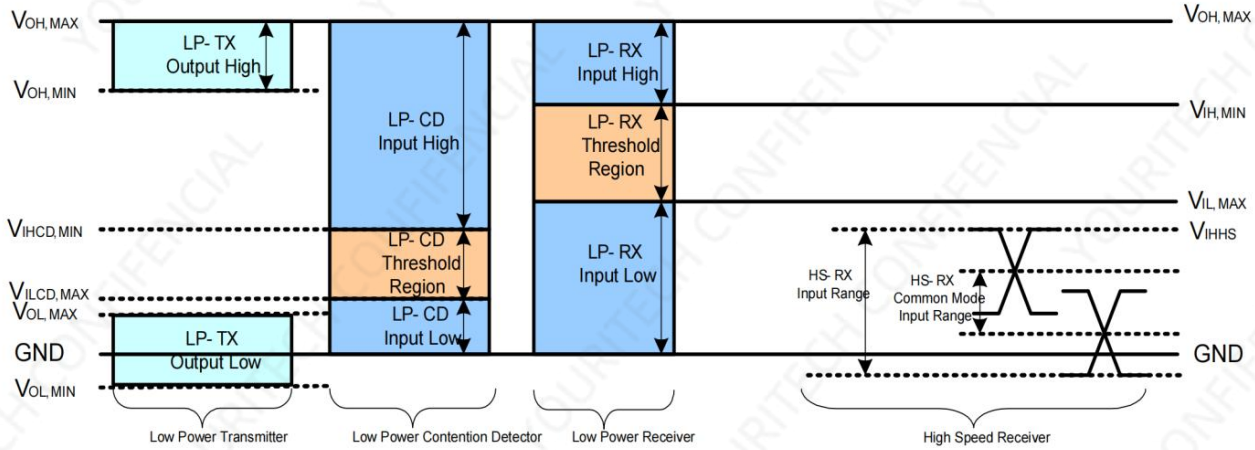


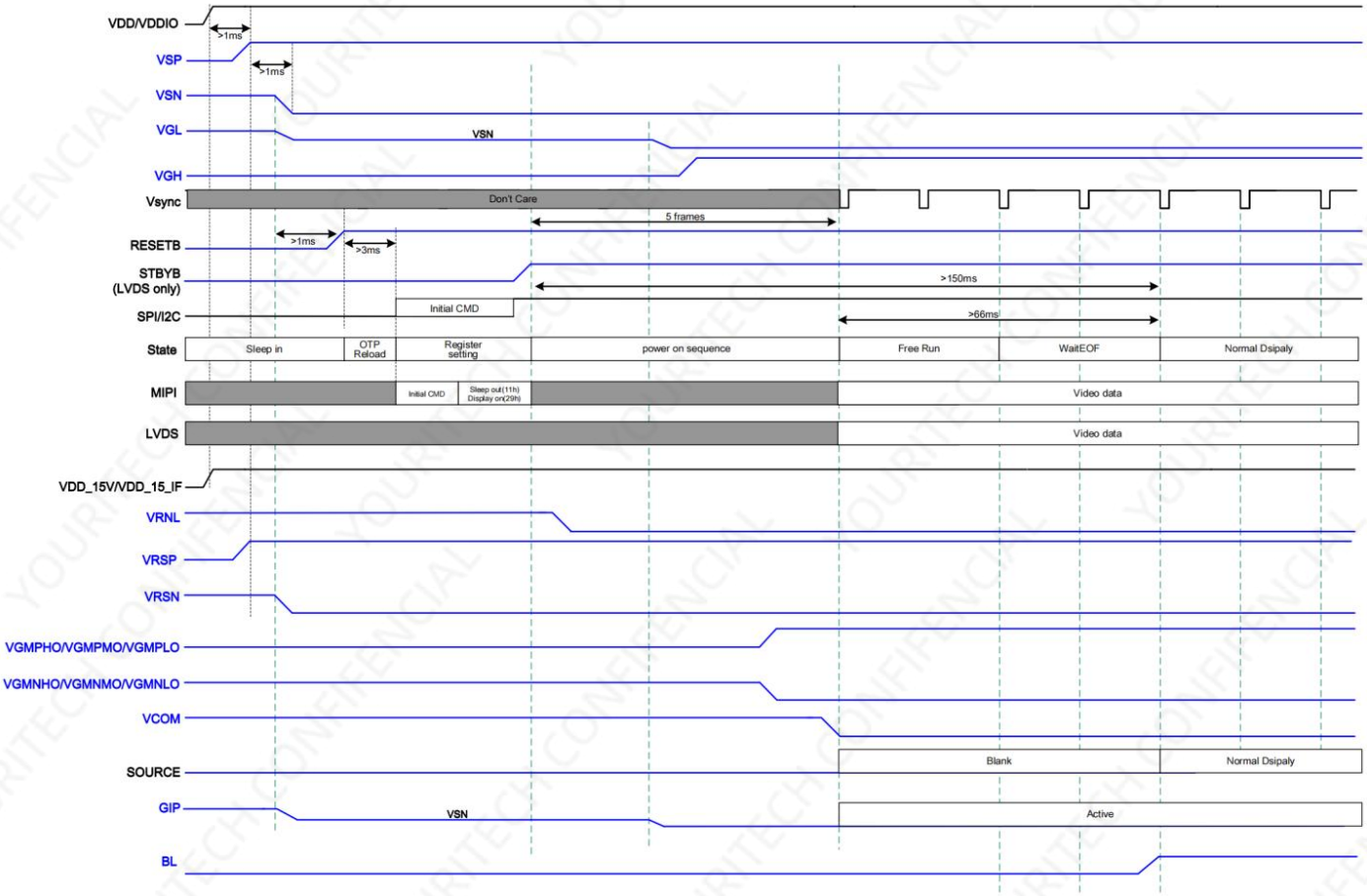
Figure : MIPI signaling and contention voltage levels

5.2 High Speed Clock and Data Transmission Procedure

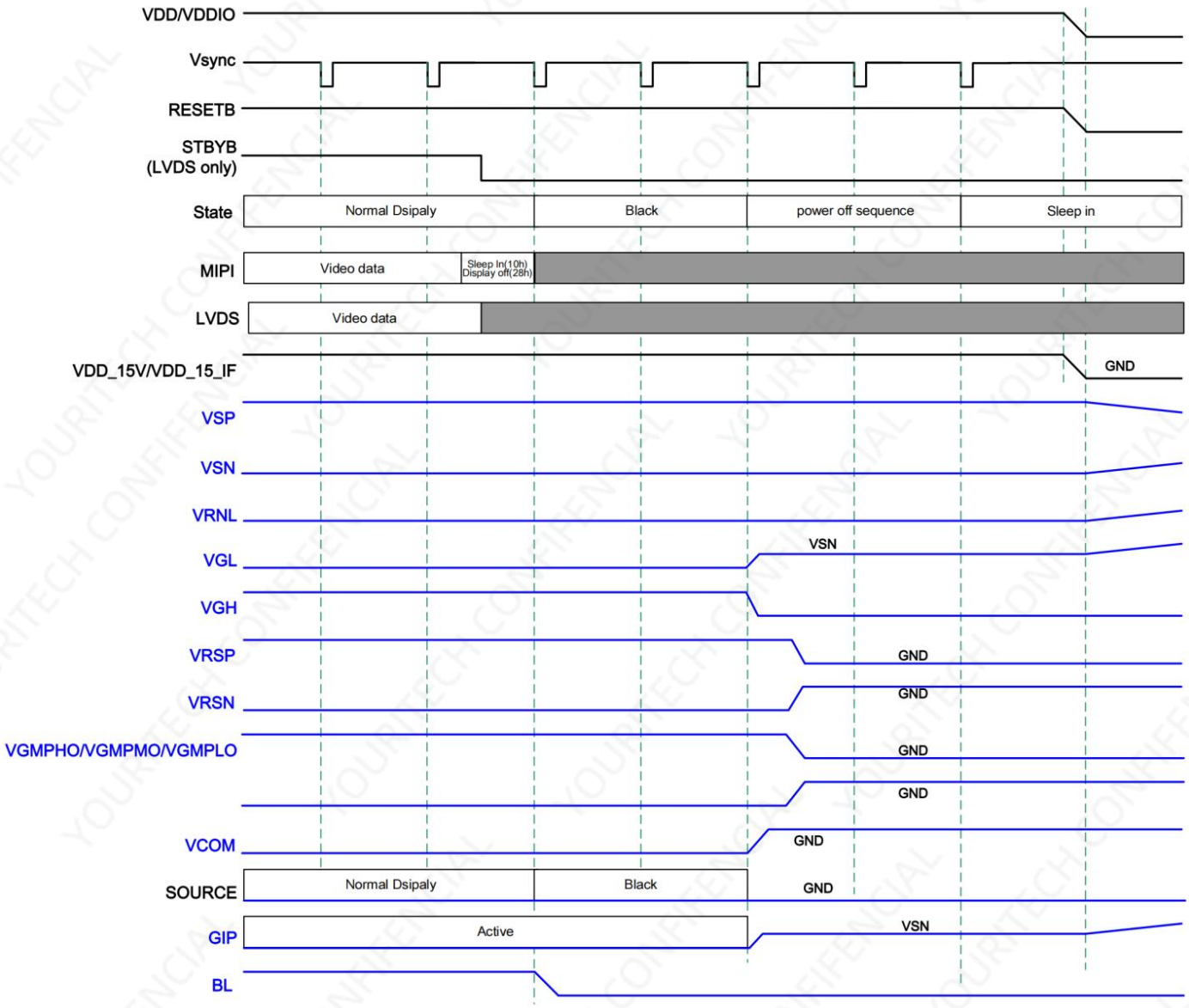
Parameter	Descript	Spec. Min.	Typ.	Max.	Unit
T_{REOT}	30%-85% rise time and fall time	-	-	35	ns
$T_{CLK-MISS}$	Timeout for receiver to detect absence of Clock transitions and disable the Clock Lane HS-RX.	-	-	60	ns
$T_{CLK-POST}$*1	Time that the transmitter continues to send HS clock after the last associated Data Lane has transitioned to LP Mode. Interval is defined as the period from the end of $T_{HS-TRAIL}$ to the beginning of $T_{CLK-TRAIL}$.	60 ns + 52*UI	-		ns
$T_{CLK-PRE}$	Time that the HS clock shall be driven by the transmitter prior to any associated Data Lane beginning the transition from LP to HS mode.	8	-		UI
$T_{CLK-SETTLE}$	Time interval during which the HS receiver shall ignore any Clock Lane HS transitions, starting from the beginning of $T_{CLK-PRE}$.	95	-	300	ns
$T_{CLK-TERM-EN}$	Time for the Clock Lane receiver to enable the HS line termination, starting from the time point when Dn crosses $V_{IL,MAX}$.	Time for Dn to reach VTERM-EN	-	38	ns
$T_{HS-SETTLE}$	Time interval during which the HS receiver shall ignore any Data Lane HS transitions, starting from the beginning of $T_{HSPREPARE}$.	85 ns + 6*UI	-	145 ns + 10*UI	ns
T_{EOT}	Time from start of $T_{HS-TRAIL}$ or $T_{CLK-TRAIL}$ period to start of LP-11 state	-	-	105ns+n*12*UI	-
$T_{HS-EXIT}$(1)	time to drive LP-11 after HS burst	100	-	-	ns
$T_{HS-PREPARE}$	Time to drive LP-00 to prepare for HS transmission	40ns + 4*UI	-	85ns+6*UI	ns
$T_{HS-PREPARE}$ + $T_{HS-ZERO}$	$T_{HS-PREPARE}$ + Time to drive HS-0 before the Sync sequence	145ns + 10*UI	-	-	ns
$T_{HS-SKIP}$	Time-out at RX to ignore transition period of EoT	40	-	55ns+4*UI	ns
$T_{HS-TRAIL}$	Time to drive flipped differential state after last payload data bit of a HS transmission burst	60 + 4*UI	-	-	ns
T_{LPX}	Length of any Low-Power state period	100	-	-	ns
Ratio T_{LPX}	Ratio of $T_{LPX(MASTER)}$/$T_{LPS(SLAVE)}$ between Master and Slave side	2/3	-	3/2	-
T_{TA-GET}	Time to drive LP-00 by new TX	5*T_{LPX}			ns
T_{TA-GO}	Time to drive LP-00 after Turnaround Request	4*T_{LPX}			ns
$T_{TA-SURE}$	Time-out before new TX side starts driving	T_{LPX}	-	2*T_{LPX}	ns

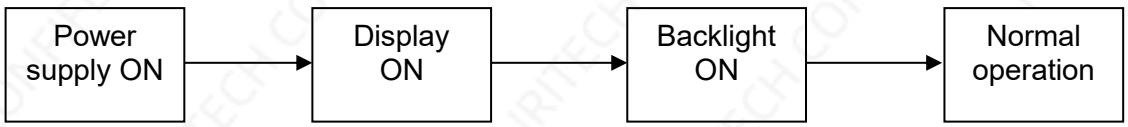
Note: (1) For $T_{CLK-POST}$ example:
$T_{CLK-POST}$ min value =164UI when MIPI max frequency per lane = 0.5Gbps.
$T_{CLK-POST}$ min value =112UI when MIPI max frequency per lane = 1Gbps
(2) For T_{EOT}: When n = 1 for Forward-direction HS mode and n=4 for Reverse-direction HS mode.

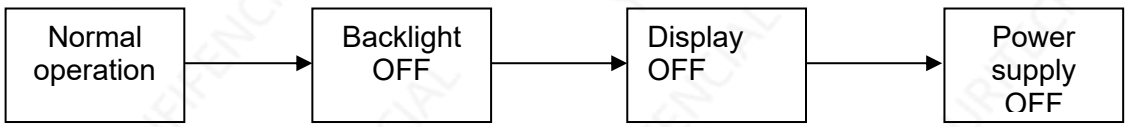
5.3 Power On Sequence



5.4 Power Off Sequence







5.6 Recommended Timing Setting of TCON

TCON (Embedded in Source IC) Input Timing (DCLK, HS, VS, DE)

VCI=3.3V, GND=0V, Ta=25℃

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK	Fclk	-	144.7	-	MHz	
	tclk	-	6.9	-	ns	
HSD	thd	-	1920	-	tclk	
	thpw	-	2	-	tclk	
	thb	-	88	-	tclk	
	thfp	-	120	-	tclk	
VSD	tvd	-	1080	-	th	
	tvpw	-	2	-	th	
	tvb	-	25	-	th	
	tvfp	-	25	-	th	

Note: For reference only, it needs to be adjusted according to the actual display effect.

6 Optical Characteristics

Ta=25℃

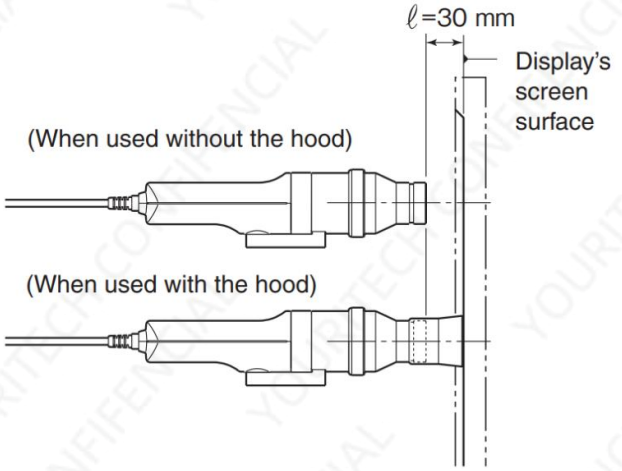
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
View Angles		θT	CR≧100	--	20	--	Degree	Note 2
Contrast Ratio		CR	θ=0°	500	650	--		Note1 Note3
Response Time		T_{ON}	25℃	--	--	6	ms	Note1 Note4
		T_{OFF}						
Chromaticity	White	x	Backlight is on	0.256	0.286	0.316		Note1 Note5
		y		0.284	0.314	0.347		
	Red	x		0.620	0.650	0.680		
		y		0.297	0.327	0.357		
	Green	x		0.241	0.271	0.301		
		y		0.636	0.666	0.696		
	Blue	x		0.125	0.155	0.185		
		y		0.030	0.060	0.090		
Uniformity		U		--	--	--	%	Note1 Note6
NTSC				80	85	--	%	Note 5
Luminance		L		400	500	--	cd/m^2	Note1 Note7

Test Conditions:

1. I_F= 26 mA, V_F=12 V and the ambient temperature is 25±2℃.humidity is 65±7%
2. The test systems refer to Note 1 and Note 2.

Note 1: Definition of optical measurement system.

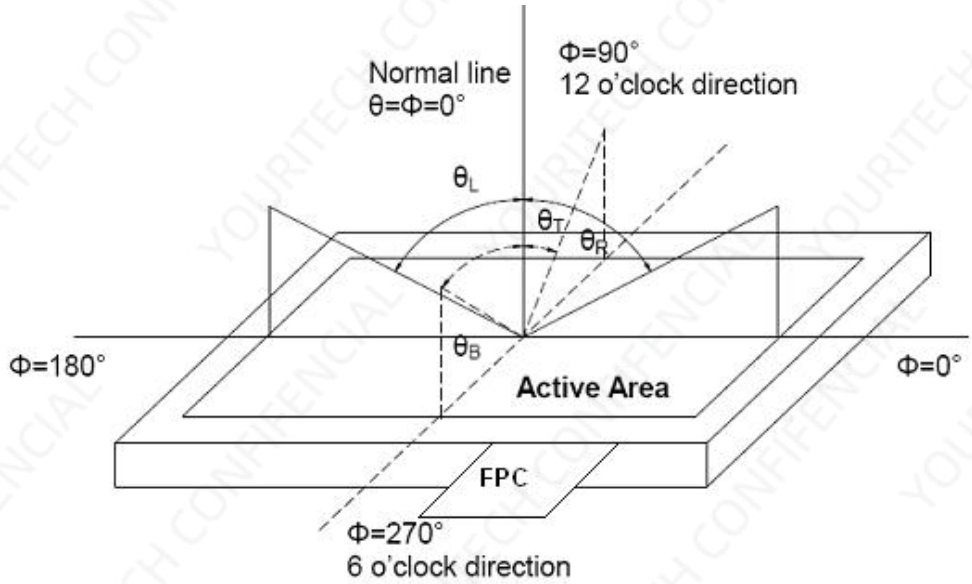
Properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



Item	Photo detector	Field
Contrast Ratio	CA210 or similar equipment	1°
Luminance		
Chromaticity		
Lum Uniformity		
Response Time	BM-7A	2°

Note 2: Definition of viewing angle range and measurement system.

Viewing angle is measured at the center point of the LCD by CONOSCOPE(ergo-80)。



Note 3: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

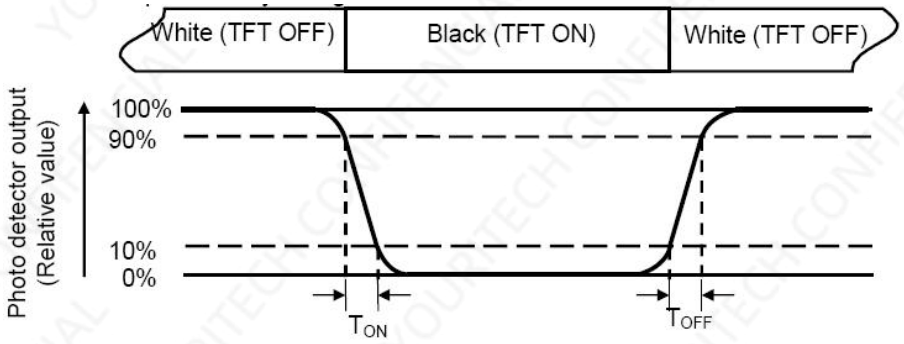
"White state ": The state is that the LCD should drive by Vwhite.

"Black state": The state is that the LCD should drive by Vblack.

Vwhite: To be determined Vblack: To be determined.

Note 4: 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%.



Note 5: Definition of color chromaticity (CIE1931)

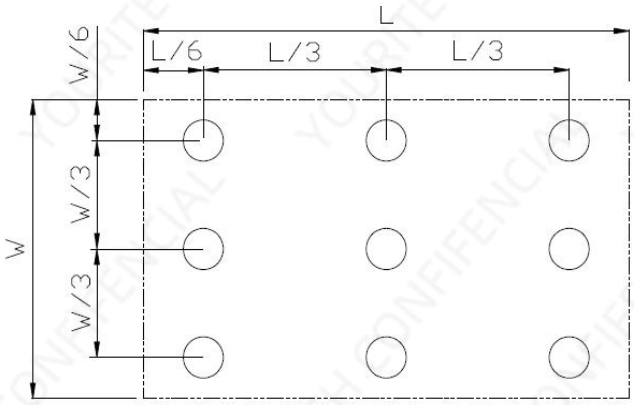
Color coordinates measured at center point of LCD.

Note 6: Definition of luminance uniformity

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity (U) = Lmin/ Lmax

L-------Active area length W----- Active area width



Lmax: The measured Maximum luminance of all measurement position.

Lmin: The measured Minimum luminance of all measurement position.

Note 7: Definition of luminance:

Measure the luminance of white state at center point.

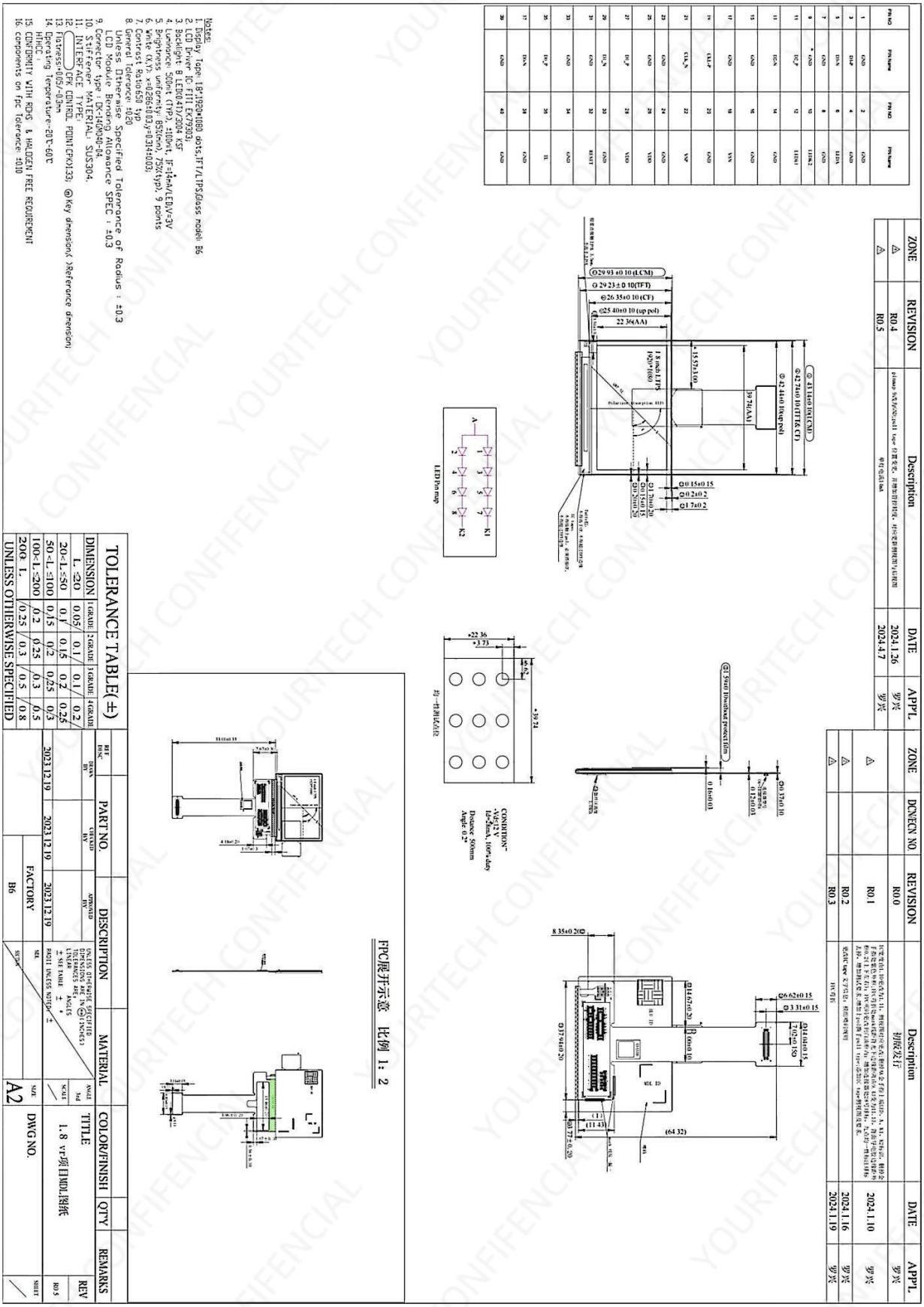
7 Environmental / Reliability Test

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts = +70℃, 240 hours	No abnormalities in functions
2	Low Temperature Operation	Ta = -20℃, 240 hours	No abnormalities in functions
3	High Temperature Storage	Ta = +80℃, 240 hours	No abnormalities in functions
4	Low Temperature Storage	Ta = -30℃, 240 hours	No abnormalities in functions
5	Storage at High Temperature and Humidity	Ta = +60℃, 90% RH max,240hours	No abnormalities in functions
6	Thermal Shock (non-operating)	-30℃ 30 min~ +70℃ 30 min, Change time: 0.5 hour ← 5 min → 0.5 hour.10 Cycle	Start with cold temperature, End with high temperature,
7	ESD	C=150pF, R=330Ω,5point/panel Air: ±8Kv, 5times; Contact:±4Kv,5times (Environment:15℃~35℃, 30%~60%.86Kpa~106Kpa)	No abnormalities in functions

Note1: Ts is the temperature of panel's surface.

Note2: Ta is the ambient temperature of samples.

8 Mechanical Drawing



9 Precautions for Use of LCD Modules

Handling Precautions

9.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

9.1.2 If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

9.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

9.1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

9.1.5 If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

- Isopropyl alcohol
- Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

- Water
- Ketone
- Aromatic solvents

9.1.6 Do not attempt to disassemble the LCD Module.

9.1.7 If the logic circuit power is off, do not apply the input signals.

9.1.8 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

9.1.8.1 Be sure to ground the body when handling the LCD Modules.

9.1.8.2 Tools required for assembly, such as soldering irons, must be properly ground.

9.1.8.3 To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

9.1.8.4 The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

Storage Precautions

9.2.1 When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

9.2.2 The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is: Temperature : 0℃ ～ 40℃ Relatively humidity: ≤80%

9.2.3 The LCD modules should be stored in the room without acid, alkali and harmful gas.

Transportation Precautions

9.3.1 The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.