

**PRODUCT SPECIFICATION****TFT-LCD MODULE****Module No: 100368-01**☒ Preliminary Specification☐ Approval Specification

Designed by	Checked by	Approved by

Final Approval by Customer

Approved by	Comment

For more information, contact us:

WWW.DCLTEK.COM | 1-800-407-8917 | SALES@DCLTEK.COM

※The specification of "TBD" should refer to the measured value of sample . If there is difference between the design specification and measured value, we naturally shall negotiate and agree to solution with customer.

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1. Document Revision History

Version	Contents	Date	Note
V0	Initial version	2026.06.05	

2. General Description

Items	Specification	Remark
Diagonal Size	6.7 inch	--
Resolution	1280 RGB × 720	--
Active Area(mm)	147.84 × 83.16	--
Pixel Pitch (mm)	0.1155 × 0.1155	--
Pixel Configuration	R.G.B. Vertical Stripe	--
Technology Type	a-Si	--
Display Mode	SFT Normally Black	--
Landscape or Portrait	Landscape	--
Surface Treatment (Top Polarizer)	HC	--
Interface	1-Port LVDS (VESA)	--
Color Depth	16.7M	--
Timing Control Mode	DE	--
Dimension (H x V x D) (mm)	160.5× 100 × 5.98 (Typ.)	Note1
Weight (g)	110±5%	Note2

Table 2.1 General TFT Specifications

Note1: The dimensions do not include the length of FPC, and component height etc.. For detail dimension, please refer to the module outline drawing.

Note2: The weight does not include the weight of protective film.

3.Mechanical Drawing

1	2	3	4	5	6	7	8																																																																																													
DESIGN: (设计) CHECKED: (检查) APPROVED: (批准)		SPECIFICATION FOR BACKLIGHT CUSTOMER'S CODE: (客户编号) 100368-01		规 格 EDITION: (版本号) V0																																																																																																
Date: (日期) 2024-03-08		数 1/1		图纸视角:		MODEL NO.: (中部型号) Z. B.																																																																																														
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1. 主视角: 全视角 2. 未标注公差尺寸按照±0.5; 3. 符合环保要求; 4. 推荐: VCC=3.3V 5. 背光: 白光 6. CN1端子: 101049-203050																																																																																																				
7. " " "重要尺寸, " () "参考尺寸, " ☆ "安全特性, " ▽ "特殊特性; "▽"表示CPK管控项, CPK≥1.33, PPK≥1.67, 其 处: 0 8. 测量尺寸: ①-⑩ 9. 产品使用温度: -30~85℃; 储存温度: -40~90℃; 10. LED-FPC连接器: 101049-201050(BJD) 11. 标示 处为修改位置, 需客户确认:																																																																																																				
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4.0 Input / Output Terminals

4.1 CN1 Pin assignment (LCD Interface)

Mating Connector Type: 101049-203050 (BJD)

PIN NO.	Symbol	P/I/O	Description	Remark
1	VDD	P	Power supply 3.3+/-0.3V	
2	VDD	P	Power supply 3.3+/-0.3V	
3	NC	N	No connection	
4	GND	P	Ground	Note1
5	LVD0N	I	LVDS data input 0-	
6	LVD0P	I	LVDS data input 0+	
7	GND	P	Ground	
8	LVD1N	I	LVDS data input 1-	
9	LVD1P	I	LVDS data input 1+	
10	GND	P	Ground	
11	LVCLKN	I	LVDS Clock input -	
12	LVCLKP	I	LVDS Clock input +	
13	GND	P	Ground	
14	LVD2N	I	LVDS data input 2-	
15	LVD2P	I	LVDS data input 2+	
16	GND	P	Ground	
17	LVD3N	I	LVDS data input 3-	
18	LVD3P	I	LVDS data input 3+	
19	GND	P	Ground	
20	RESET	I	Global reset pin, active low	
21	STBYB	I	Standby mode setting pin	
22	CSB	I	Serial Interface chip enable signal	
23	SCL	I	Serial Interface clock input	
24	SDA	I/O	Serial Interface address and data input/output	
25	NC	N	No Connection	
26	RL	I	Horizontal shift direction selection	Note 2
27	Fail_T	O	Fail detection	Note 3
28	GND	P	Ground	
29	NC	N	No connection	
30	VDDOTP	I	Power supply for OTP, Tianma internal used, must be float on customer side	

4.2 CN1 Pin assignment (Backlight Interface)

Mating Connector Type: 101049-201050 (BJD)

PIN NO.	Symbol	P/I/O	Description	Remark
1	LED_A1	P	Power for LED backlight (Anode1)	
2	LED_A2	P	Power for LED backlight (Anode2)	
3	LED_A3	N	Power for LED backlight (Anode3)	
4	NC	P	No connection	
5	NTC+	I	NTC thermistor +	
6	NTC-	I	NTC thermistor -	
7	NC	P	No connection	
8	LED_K1	I	Power for LED backlight input (cathode1)	
9	LED_K2	I	Power for LED backlight input (cathode2)	
10	LED_K3	P	Power for LED backlight input (cathode3)	

I/O definition: I---Input, O---Output, P---Power/Ground, N---No connection

Table 3.1.1 Pin Assignment for LCD Interface

Note1: All of the GND pins should be connected to the system ground.

Note2: Description of scan direction.

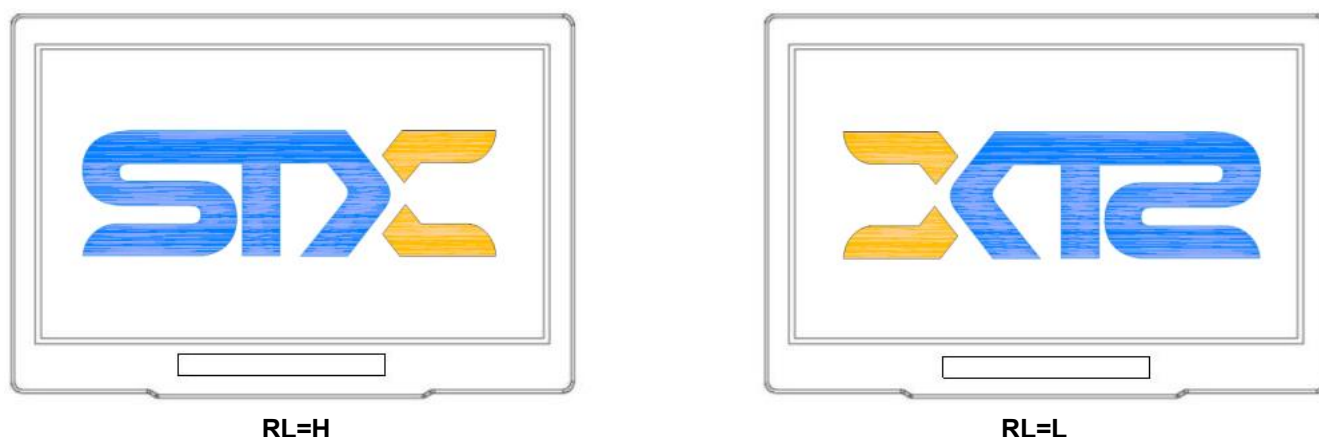


Figure 3.1.1 Description of Scan Direction

Note3: Fail_T: Fail detection signal output. When normal operating, Fail_T is high. Any one of the following cases will trigger the fail detect function to set the Fail_T to low.

- Input signals fail (CLK/HS/VS/DE loss).
- LVDS fail (LVDS-RX unlock).
- Power fail (Input voltage level too low (LVD) or too high (OVP)).

5. Absolute Maximum Ratings

GND=0V, Ta = 25°C

Item	Symbol	Min	Max	Unit	Remark
Logic supply voltage	VDD	-0.3	4.0	V	
Operating Temperature	Top	-30	85	°C	Note1/2/3
Storage Temperature	Tst	-40	90	°C	Note1

Table 4.1 Absolute Maximum Rating

Note1: The temperature is the ambient temperature of module.

Note2: No Electro-optical specification is guaranteed below -30°C. But above -30°C, electro-optical specifications can be recovered.

Note3: If the voltage exceeds the absolute maximum ratings, the LCM may be damaged. Also, if the LCM is operated with the absolute maximum ratings for a long time, its reliability may drop.

6.0 Electrical Characteristics

6.1 DC Characteristics for Panel Driving

GND=0V, Ta = 25°C

Item	Symbol	Min	Typ	Max	Unit	Remark
Logic supply voltage	VDD	3.0	3.3	3.6	V	Note1
VDD Current	IVDD	-	-	250	mA	
Inrush Current	IRUSH	-	1.0	1.5	A	
Permissible Ripple Voltage of VDD	VRPL	-	-	100	mV	
Input High Voltage	VIH	0.7VDD	-	VDD+0.3	V	Note1
Input Low Voltage	VIL	GND-0.3	-	0.3VDD	V	
Output High Voltage	Voh	VDD-0.4	-	-	V	
Output Low Voltage	Vol	GND	-	GND+0.4	V	
LVDS differential input high threshold voltage	VTH	100	-	-	mV	Note2
LVDS differential input low threshold voltage	VTL	-	-	-100	mV	
Differential input voltage	VID	0.1	-	0.6	V	
Differential input common mode voltage	VCMLVDS	1	1.2	1.7- VID /2	V	

Table 5.1.1 Operating Voltages

Note1: Including CSB, SCL, SDA, RESET, STBYB, FAIL_T

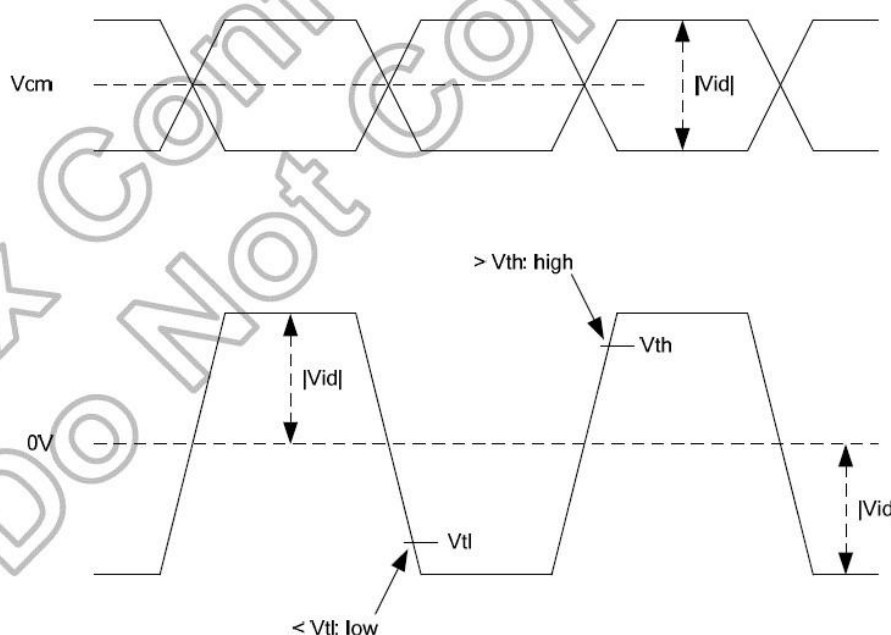
Note2: Refers to the LVDS waveform as shown below:

Single-ended:

LVCLKP,
LVCLKN,
LVD[3:0]P,
LVD[3:0]N

Differential:

LVCLKP-LVCLKN,
LVD[3:0]P-LVD[3:0]N



6.2 Recommended Power ON/OFF Sequence

Power ON Sequence

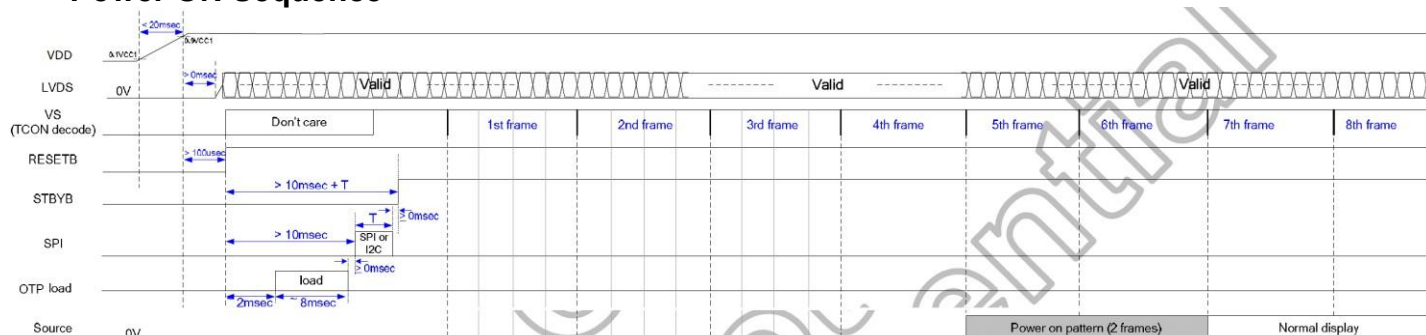


Figure Power ON Sequence

Power OFF Sequence

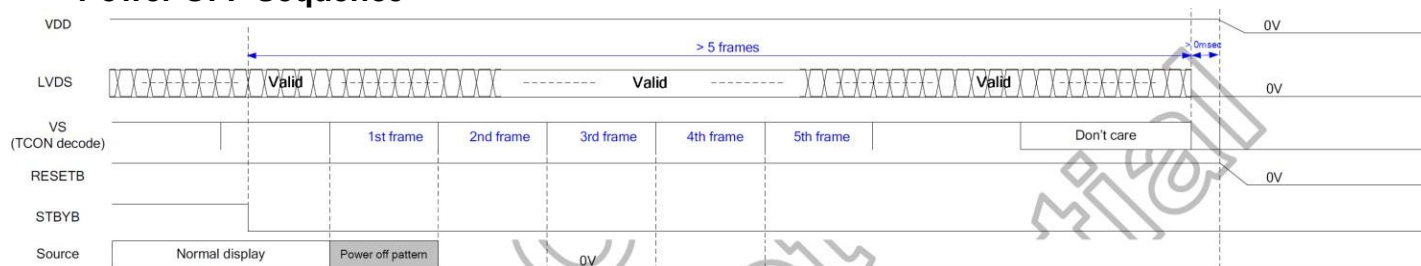


Figure Power OFF Sequence

Note1: The low level of these signals and analog powers are GND level.

Note2: All of the power and signals should be kept at GND level before power on. If there are residual voltages on them, the LCD might not work properly.

Note3: The power on/off sequence is the first version. It will be updated when the design is fixed.

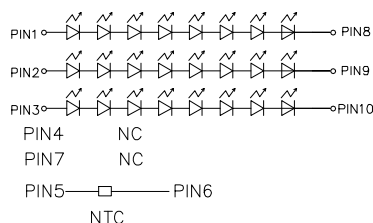
Note4: 1frame=1s/60Hz

6.3 DC Characteristics for Backlight Driving

The characteristics of the LED are shown in the following tables.

Item	Symbol	Min.	Typ.	Max.	Unit	Note
LED current	IL	-	270	360	mA	
LED Voltage	VL	22.4	24	25.6	V	
Power Consumption	W _{BL}	-	6.48	9.216	W	
Operating LED life time	Hr	-	30000	-	Hour	IF=90mA/serial

Figure LED backlight characteristics



Item	Value	Remarks
Part Number	NCU15XH103F6SRC	-
Resistance / Tolerance	10kΩ±5%	Ta=25℃
Permissive Operating Max. Current	0.31mA	Ta=25℃

Note1: IF is defined for one channel LEDs. There is a total of 3 LED channels in the backlight unit. While the LCM is operating, a stable forward current should be supplied. The forward current max value is only for inrush current.

Note2: IF =90mA/serial.

Note3: Optical performance should be evaluated at Ta=25 °C only. Operating lifetime means the brightness will decrease to 50% of the original brightness.

Note4: An NTC thermistor is included in the LED circuit. It is used to measure the LED temperature and located in the LED circuit on the backlight FPC. Please refer to the appendix 13 which is the relationship of temperature- resistance for NTC.

NCU15XH103F6SRC The Relationship of Temperature and Resistance for NTC.

TEMP. (deg.C)	R-center (k ohm)	TEMP. (deg.C)	R-center (k ohm)	TEMP. (deg.C)	R-center (k ohm)	TEMP. (deg.C)	R-center (k ohm)
-40	195.652	2	24.9877	44	5.0863	86	1.4129
-39	184.9171	3	23.9509	45	4.9169	87	1.3749
-38	174.8452	4	22.9629	46	4.7539	88	1.3381
-37	165.391	5	22.0211	47	4.5971	89	1.3025
-36	156.5125	6	21.123	48	4.4461	90	1.268
-35	148.171	7	20.2666	49	4.3008	91	1.2343
-34	140.3304	8	19.4495	50	4.1609	92	1.2016
-33	132.9576	9	18.6698	51	4.0262	93	1.17
-32	126.0215	10	17.9255	52	3.8964	94	1.1393
-31	119.4936	11	17.2139	53	3.7714	95	1.1096
-30	113.3471	12	16.5344	54	3.651	96	1.0807
-29	107.5649	13	15.8856	55	3.535	97	1.0528
-28	102.1155	14	15.2658	56	3.4231	98	1.0256
-27	96.9776	15	14.6735	57	3.3152	99	0.9993
-26	92.1315	16	14.1075	58	3.2113	100	0.9738
-25	87.5588	17	13.5664	59	3.111	101	0.9492
-24	83.2424	18	13.0489	60	3.0143	102	0.9254
-23	79.1663	19	12.554	61	2.9224	103	0.9022
-22	75.3157	20	12.0805	62	2.8337	104	0.8798
-21	71.6768	21	11.6281	63	2.7482	105	0.858
-20	68.2367	22	11.1947	64	2.6657	106	0.8368
-19	64.9907	23	10.7795	65	2.5861	107	0.8162
-18	61.919	24	10.3815	66	2.5093	108	0.7963
-17	59.0113	25	10	67	2.4351	109	0.7769
-16	56.2579	26	9.6342	68	2.3635	110	0.758
-15	53.6496	27	9.2835	69	2.2943	111	0.7397
-14	51.1779	28	8.947	70	2.2275	112	0.7219
-13	48.8349	29	8.6242	71	2.1627	113	0.7046
-12	46.6132	30	8.3145	72	2.1001	114	0.6878
-11	44.5058	31	8.0181	73	2.0396	115	0.6715
-10	42.5062	32	7.7337	74	1.9811	116	0.6556
-9	40.5997	33	7.4609	75	1.9245	117	0.6402
-8	38.7905	34	7.1991	76	1.8698	118	0.6252
-7	37.0729	35	6.9479	77	1.817	119	0.6106
-6	35.4417	36	6.7067	78	1.7658	120	0.5964
-5	33.8922	37	6.4751	79	1.7164	121	0.5826

-4	32.4197	38	6.2526	80	1.6685	122	0.5692
-3	31.02	39	6.039	81	1.6224	123	0.5562
-2	29.689	40	5.8336	82	1.5777	124	0.5435
-1	28.4231	41	5.6357	83	1.5345	125	0.5311
0	27.2186	42	5.4454	84	1.4927		
1	26.076	43	5.2623	85	1.4521		

6.4 LCD Module Block Diagram

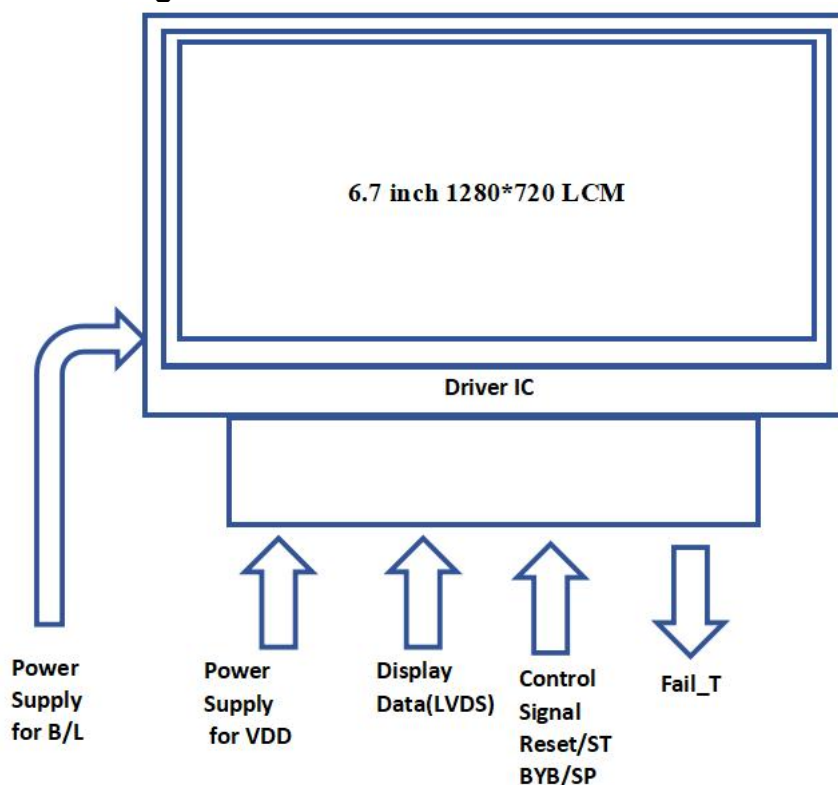


Figure 5.3.1 LCD Module Block Diagram

6.5 CRC Function

General Description for CRC Function

The figure shown below is the functional block diagram of CRC function and please also refer to Table 5.4.1 for more details on CRC function related registers.

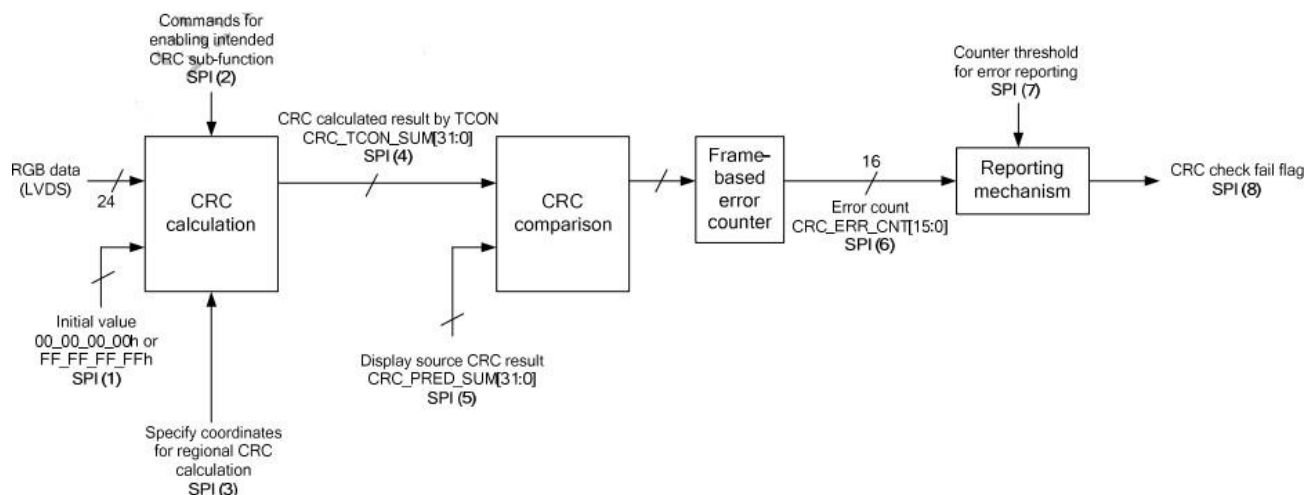


Figure CRC function work flow

CRC-related SPI item number	SPI address	SPI access allowed during OTP auto reload?	Remark
(1)	Page22 R01h[2]	NO	Select initial value for CRC calculation
(2)	Page22 R1Bh[4]	NO	CRC calculation engine enable
	Page22 R1Bh[3:0]	NO	CRC module 1~4 enable
	Page04 R02h[3:0]	YES	CRC module 1~4 fail detect output enable
	Page22 R01h[4:3]	NO	CRC mode switch (Regular mode or Frozen detection mode or Inter-frame check mode)
(3)	Page22 R02h~R07h Page22 R08h~R0Dh Page22 R0Eh~R13h Page22 R14h~R19h	NO	Coordinates for specifying the region of display data for CRC calculation
(4)	Page24 R01h~R04h Page24 R05h~R08h Page24 R09h~R0Ch Page24 R0Dh~R10h	YES	CRC result calculated by IC (read only)
(5)	Page23 R01h~R04h Page23 R05h~R08h Page23 R09h~R0Ch Page23 R0Dh~R10h	YES	CRC result calculated by display source processor (provided by display source side)
(6)	Page24 R11h~R12h Page24 R13h~R14h Page24 R15h~R16h Page24 R17h~R18h	YES	Accumulated number of frames with CRC error (read only)
(7)	Page22 R1Ah	NO	Threshold number of accumulated error counts for triggering failure flag
(8)	Page25 R02h[4]	NO	Register bit for indicating CRC error flag (read only)

Table CRC function related register address and description

When register CRC_FRAME_SET=1, CRC function timing chart is shown below: The CRC result calculated by Driver IC TCON of the Nth frame is available in the (N+1)th frame, and the display source CRC result should be given in the (N+1)th frame by application processor, then the CRC_ERR_CNT[15:0] is accumulated in the (N+2)th frame if CRC error is detected.

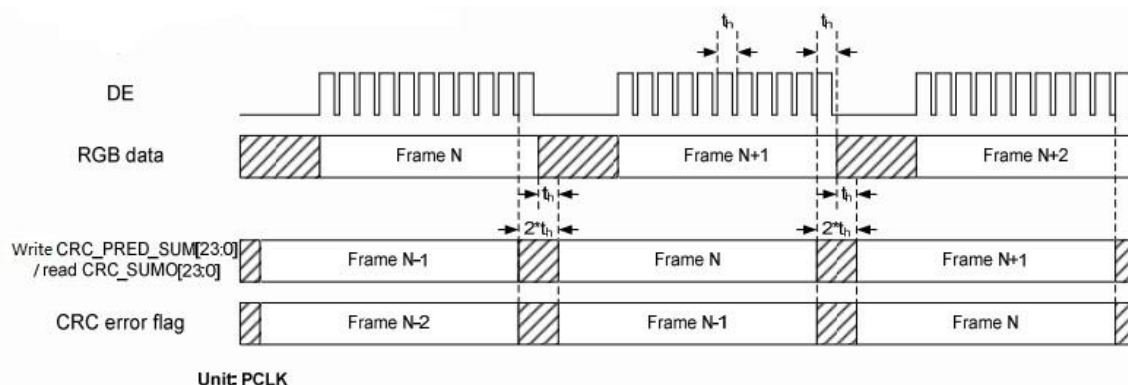


Figure CRC function related register address and description

Regular CRC Check Function

In regular CRC check mode, the TCON CRC result CRC_TCON_SUM[31:0] is compared to CRC result CRC_PRED_SUM[31:0] provided by display source. If CRC_TCON_SUM[31:0] does not match CRC_PRED_SUM[31:0], the error counter CRC_ERR_CNT[15:0] will be accumulated on a frame basis. When CRC_ERR_CNT[15:0] reaches the threshold value set by registers shown in Table 5.4.1 item (7), CRC check fail flag will be set.

CRC Window Function

Input display data for CRC calculation and check can be restricted by CRC window setting. Each CRC window is defined by two point coordinates (H1, V1) and (H2, V2) shown in Figure 5.4.3. Point H1, H2, V1, V2 can be set by registers CRC_WIN_H1, CRC_WIN_H2, CRC_WIN_V1, CRC_WIN_V2 which ranges from minimum (1,

1) to maximum (HRES, VRES).

The Driver IC of TM067JFKP01 supports 4 windows for CRC function. CRC_WINx_H1/CRC_WINx_H2/CRC_WINx_V1 /RC_WINx_V2 four registers are used to set a window(x means window number). CRC_WINx_H1[11:0] should set to odd numbers, and CRC_WINx_H2[11:0] should be set to even numbers.

This function only checks the data in CRC window (border is inclusive). In the following figure, parameters VRES and HRES are determined by display frame vertical and horizontal resolution and coordinate (x, y) mean xth pixel and yth line of display data.

It's recommended to set CRC window coordinates before CRC function is enabled.

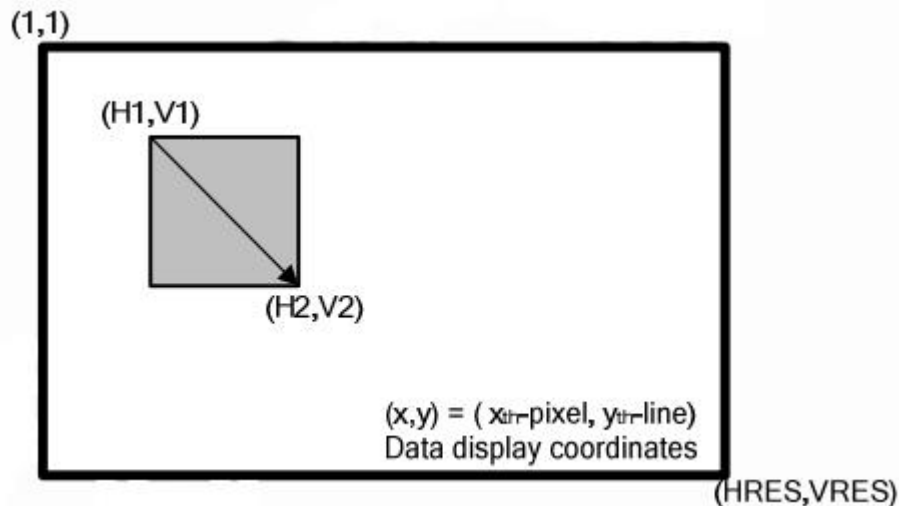


Figure CRC Window

Frozen Display (Still Image) Detection Function

The driver IC of TM067JFKP01 implements a function to detect frozen display by CRC function. A frame counter will be accumulated if frozen display is detected. When the frame counter achieves CRC_CKSUM_NUM[7:0] setting (number of compared frames: CRC_CKSUM_NUM[7:0] x 64 frames), CRC check fail flag will be set.

In this function mode, display source CRC result is not required while regional CRC function is supported. Please refer to Table 5.4.1 for more details on mode settings.

Use case example: The tachometer pointer in the dashboard is supposed to be constantly changing and should not be still. It's recommended to enable frozen display detection function in the tachometer display area to monitor the display status.

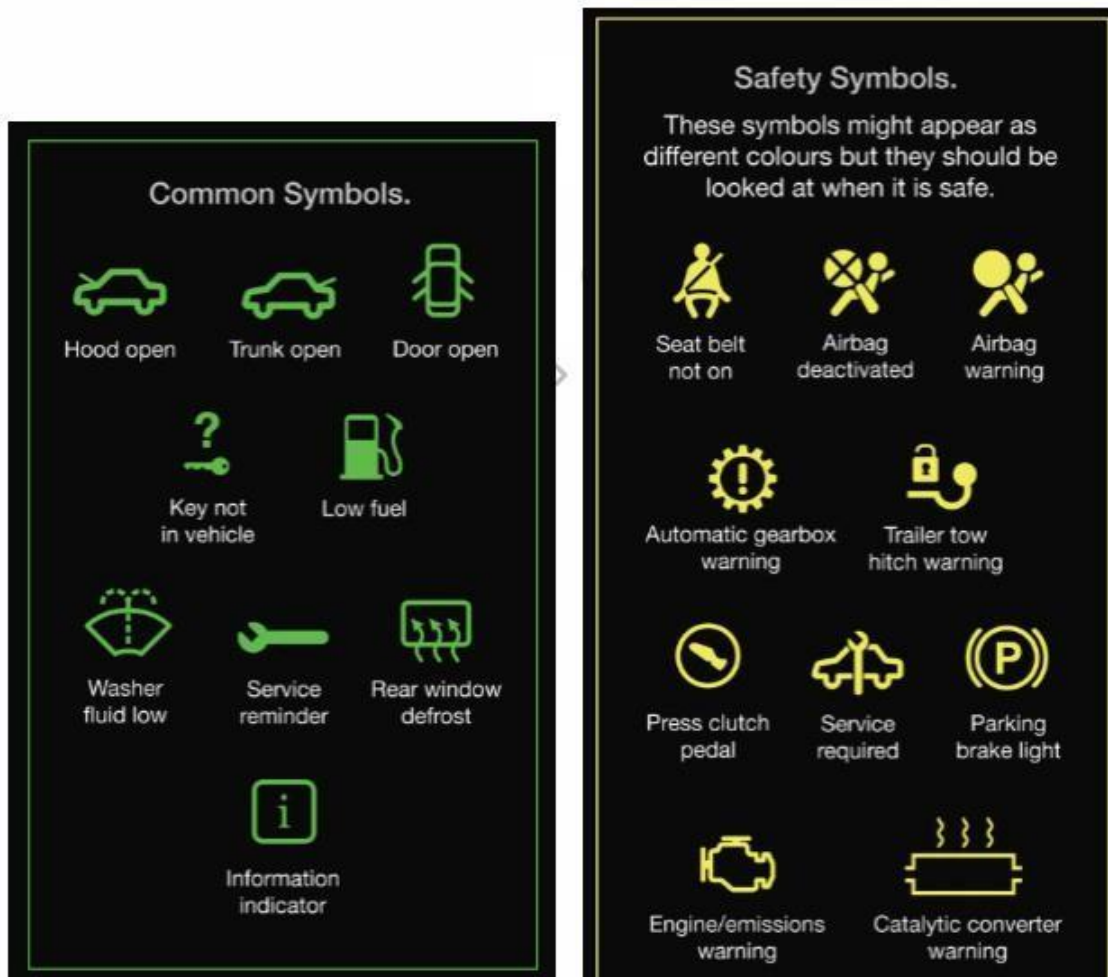


Auto Check (Inter-frame Check) Function

Opposite to frozen display detection, in inter-frame CRC check mode, if input data change from Nth frame to (N+1)th frame, the error counter CRC_ERR_CNT[15:0] will be accumulated. When CRC_ERR_CNT[15:0] reaches the value (number of compared frames: CRC_CKSUM_NUM[7:0] x 32 frames), CRC_CHECK_FLAG will be set.

In this function mode, system predicted CRC result is not required while regional CRC function is supported. Please refer to Table 2 for more details on mode settings.

Use case example: There are many alarm symbols in the dashboard. For safety reasons, it's important to maintain the display content of each icon once has been set ON by ECU. Therefore, it's recommended to enable inter-frame CRC check function for the icon to make sure the icon data not changed.



CRC-related Registers List

Page22(16h) (SPI access **NOT** allowed during OTP auto reload period)

Address	Default	Read/Write	D[7:0]	Name	Description
01h	40h	R/W	[7]	-	Reserved.
		R/W	[6]	CRC_CNT_OPT	CRC compare mode selection
		R/W	[5]	CRC_TYPE	CRC compare mode selection
		R/W	[4:3]	CRC_MODE	CRC mode setting.
		R/W	[2]	CRC_INI_SEL	CRC initial value.
		R/W	[1:0]	CRC_IN_SWAP	CRC input data order swap function.
02h	00h	R/W	[7:4]	CRC_WIN1_H1[11:8]	Define CRC window1 left side X_ordinate
		R/W	[3:0]	CRC_WIN1_H2[11:8]	Define CRC window1 right side X_ordinate
03h	01h	R/W	[7:0]	CRC_WIN1_H1[7:0]	Define CRC window1 left side X_ordinate
04h	A0h	R/W	[7:0]	CRC_WIN1_H2[7:0]	Define CRC window1 right side X_ordinate
05h	00h	R/W	[7:4]	CRC_WIN1_V1[11:8]	Define CRC window1 Top side Y_ordinate
		R/W	[3:0]	CRC_WIN1_V2[11:8]	Define CRC window1 Bottom side Y_ordinate
06h	01h	R/W	[7:0]	CRC_WIN1_V1[7:0]	Define CRC window1 Top side Y_ordinate
07h	80h	R/W	[7:0]	CRC_WIN1_V2[7:0]	Define CRC window1 Bottom side Y_ordinate
08h	00h	R/W	[7:4]	CRC_WIN2_H1[11:8]	Define CRC window2 left side X_ordinate
		R/W	[3:0]	CRC_WIN2_H2[11:8]	Define CRC window2 right side X_ordinate
09h	01h	R/W	[7:0]	CRC_WIN2_H1[7:0]	Define CRC window2 left side X_ordinate
0Ah	A0h	R/W	[7:0]	CRC_WIN2_H2[7:0]	Define CRC window2 right side X_ordinate
0Bh	00h	R/W	[7:4]	CRC_WIN2_V1[11:8]	Define CRC window2 Top side Y_ordinate
		R/W	[3:0]	CRC_WIN2_V2[11:8]	Define CRC window2 Bottom side Y_ordinate
0Ch	01h	R/W	[7:0]	CRC_WIN2_V1[7:0]	Define CRC window2 Top side Y_ordinate
0Dh	80h	R/W	[7:0]	CRC_WIN2_V2[7:0]	Define CRC window2 Bottom side Y_ordinate
0Eh	00h	R/W	[7:4]	CRC_WIN3_H1[11:8]	Define CRC window3 left side X_ordinate
		R/W	[3:0]	CRC_WIN3_H2[11:8]	Define CRC window3 right side X_ordinate
0Fh	01h	R/W	[7:0]	CRC_WIN3_H1[7:0]	Define CRC window3 left side X_ordinate
10h	A0h	R/W	[7:0]	CRC_WIN3_H2[7:0]	Define CRC window3 right side X_ordinate
11h	00h	R/W	[7:4]	CRC_WIN3_V1[11:8]	Define CRC window3 Top side Y_ordinate
		R/W	[3:0]	CRC_WIN3_V2[11:8]	Define CRC window3 Bottom side Y_ordinate
12h	01h	R/W	[7:0]	CRC_WIN3_V1[7:0]	Define CRC window3 Top side Y_ordinate
13h	80h	R/W	[7:0]	CRC_WIN3_V2[7:0]	Define CRC window3 Bottom side Y_ordinate
14h	00h	R/W	[7:4]	CRC_WIN4_H1[11:8]	Define CRC window4 left side X_ordinate
		R/W	[3:0]	CRC_WIN4_H2[11:8]	Define CRC window4 right side X_ordinate
15h	01h	R/W	[7:0]	CRC_WIN4_H1[7:0]	Define CRC window4 left side X_ordinate
16h	A0h	R/W	[7:0]	CRC_WIN4_H2[7:0]	Define CRC window4 right side X_ordinate
17h	00h	R/W	[7:4]	CRC_WIN4_V1[11:8]	Define CRC window4 Top side Y_ordinate
		R/W	[3:0]	CRC_WIN4_V2[11:8]	Define CRC window4 Bottom side Y_ordinate
18h	01h	R/W	[7:0]	CRC_WIN4_V1[7:0]	Define CRC window4 Top side Y_ordinate
19h	80h	R/W	[7:0]	CRC_WIN4_V2[7:0]	Define CRC window4 Bottom side Y_ordinate
1Ah	00h	R/W	[7:0]	CRC_CKSUM_NUM	CRC checksum compare frames
1Bh	00h	R/W	[7:5]	-	Reserved.
		R/W	[4]	CRC_EN	CRC function enable
		R/W	[3]	CRC4_EN	CRC4 enable
		R/W	[2]	CRC3_EN	CRC3 enable
		R/W	[1]	CRC2_EN	CRC2 enable
		R/W	[0]	CRC1_EN	CRC1 enable

Page23(17h) (SPI access allowed during OTP auto reload period)

Address	Default	Read/Write	D[7:0]	Name	Description
00h	1Bh	R/W	[7:0]	PAGE[7:0]	
01h	00h	R/W	[7:0]	CRC_PRED_SUM1[31:24]	CRC System predict value of window1.
02h	00h	R/W	[7:0]	CRC_PRED_SUM1[23:16]	CRC System predict value of window1.
03h	00h	R/W	[7:0]	CRC_PRED_SUM1[15:8]	CRC System predict value of window1.
04h	00h	R/W	[7:0]	CRC_PRED_SUM1[7:0]	CRC System predict value of window1.
05h	00h	R/W	[7:0]	CRC_PRED_SUM2[31:24]	CRC System predict value of window2.
06h	00h	R/W	[7:0]	CRC_PRED_SUM2[23:16]	CRC System predict value of window2.
07h	00h	R/W	[7:0]	CRC_PRED_SUM2[15:8]	CRC System predict value of window2.
08h	00h	R/W	[7:0]	CRC_PRED_SUM2[7:0]	CRC System predict value of window2.
09h	00h	R/W	[7:0]	CRC_PRED_SUM3[31:24]	CRC System predict value of window3.
0Ah	00h	R/W	[7:0]	CRC_PRED_SUM3[23:16]	CRC System predict value of window3.
0Bh	00h	R/W	[7:0]	CRC_PRED_SUM3[15:8]	CRC System predict value of window3.
0Ch	00h	R/W	[7:0]	CRC_PRED_SUM3[7:0]	CRC System predict value of window3.
0Dh	00h	R/W	[7:0]	CRC_PRED_SUM4[31:24]	CRC System predict value of window4.
0Eh	00h	R/W	[7:0]	CRC_PRED_SUM4[23:16]	CRC System predict value of window4.
0Fh	00h	R/W	[7:0]	CRC_PRED_SUM4[15:8]	CRC System predict value of window4.
10h	00h	R/W	[7:0]	CRC_PRED_SUM4[7:0]	CRC System predict value of window4.

Page24(18h) (SPI access allowed during OTP auto reload period)

Address	Default	Read/Write	D[7:0]	Name	Description
00h	0Ch	R	[7:0]	PAGE[7:0]	Register page selection.
01h	00h	R	[7:1]	CRC_TCON_SUM1[31:24]	CRC TCON calculated value of window 1.
02h	00h	R	[7:2]	CRC_TCON_SUM1[23:16]	CRC TCON calculated value of window 1.
03h	00h	R	[7:3]	CRC_TCON_SUM1[15:8]	CRC TCON calculated value of window 1.
04h	00h	R	[7:4]	CRC_TCON_SUM1[7:0]	CRC TCON calculated value of window 1.
05h	00h	R	[7:5]	CRC_TCON_SUM2[31:24]	CRC TCON calculated value of window 2.
06h	00h	R	[7:6]	CRC_TCON_SUM2[23:16]	CRC TCON calculated value of window 2.
07h	00h	R	[7:7]	CRC_TCON_SUM2[15:8]	CRC TCON calculated value of window 2.
08h	00h	R	[7:8]	CRC_TCON_SUM2[7:0]	CRC TCON calculated value of window 2.
09h	00h	R	[7:9]	CRC_TCON_SUM3[31:24]	CRC TCON calculated value of window 3.
0Ah	00h	R	[7:10]	CRC_TCON_SUM3[23:16]	CRC TCON calculated value of window 3.
0Bh	00h	R	[7:11]	CRC_TCON_SUM3[15:8]	CRC TCON calculated value of window 3.
0Ch	00h	R	[7:12]	CRC_TCON_SUM3[7:0]	CRC TCON calculated value of window 3.
0Dh	00h	R	[7:13]	CRC_TCON_SUM4[31:24]	CRC TCON calculated value of window 4.
0Eh	00h	R	[7:14]	CRC_TCON_SUM4[23:16]	CRC TCON calculated value of window 4.
0Fh	00h	R	[7:15]	CRC_TCON_SUM4[15:8]	CRC TCON calculated value of window 4.
10h	00h	R	[7:16]	CRC_TCON_SUM4[7:0]	CRC TCON calculated value of window 4.
11h	00h	R	[7:17]	CRC_ERR_CNT1[15:8]	CRC fail accumulated counter of window 1.
12h	00h	R	[7:18]	CRC_ERR_CNT1[7:0]	CRC fail accumulated counter of window 1.
13h	00h	R	[7:19]	CRC_ERR_CNT2[15:8]	CRC fail accumulated counter of window 2.
14h	00h	R	[7:20]	CRC_ERR_CNT2[7:0]	CRC fail accumulated counter of window 2.
15h	00h	R	[7:21]	CRC_ERR_CNT3[15:8]	CRC fail accumulated counter of window 3.
16h	00h	R	[7:22]	CRC_ERR_CNT3[7:0]	CRC fail accumulated counter of window 3.
17h	00h	R	[7:23]	CRC_ERR_CNT4[15:8]	CRC fail accumulated counter of window 4.
18h	00h	R	[7:24]	CRC_ERR_CNT4[7:0]	CRC fail accumulated counter of window 4.

Page04 (04h) (SPI access **NOT allowed during OTP auto reload period)**

Address	Default	Read/Write	D[7:0]	Name	Description
00h	0Ch	R/W	[7:0]	PAGE[7:0]	Page 0 register table
02h	3Fh	R/W	[3]	CRC4_FAIL_ENB	CRC4 windows4 fail flag enable
		R/W	[2]	CRC3_FAIL_ENB	CRC3 windows3 fail flag enable
		R/W	[1]	CRC2_FAIL_ENB	CRC2 windows2 fail flag enable
		R/W	[0]	CRC1_FAIL_ENB	CRC1 windows1 fail flag enable

7.0 Timing Characteristics

7.1 LVDS Timing

Display Data Format

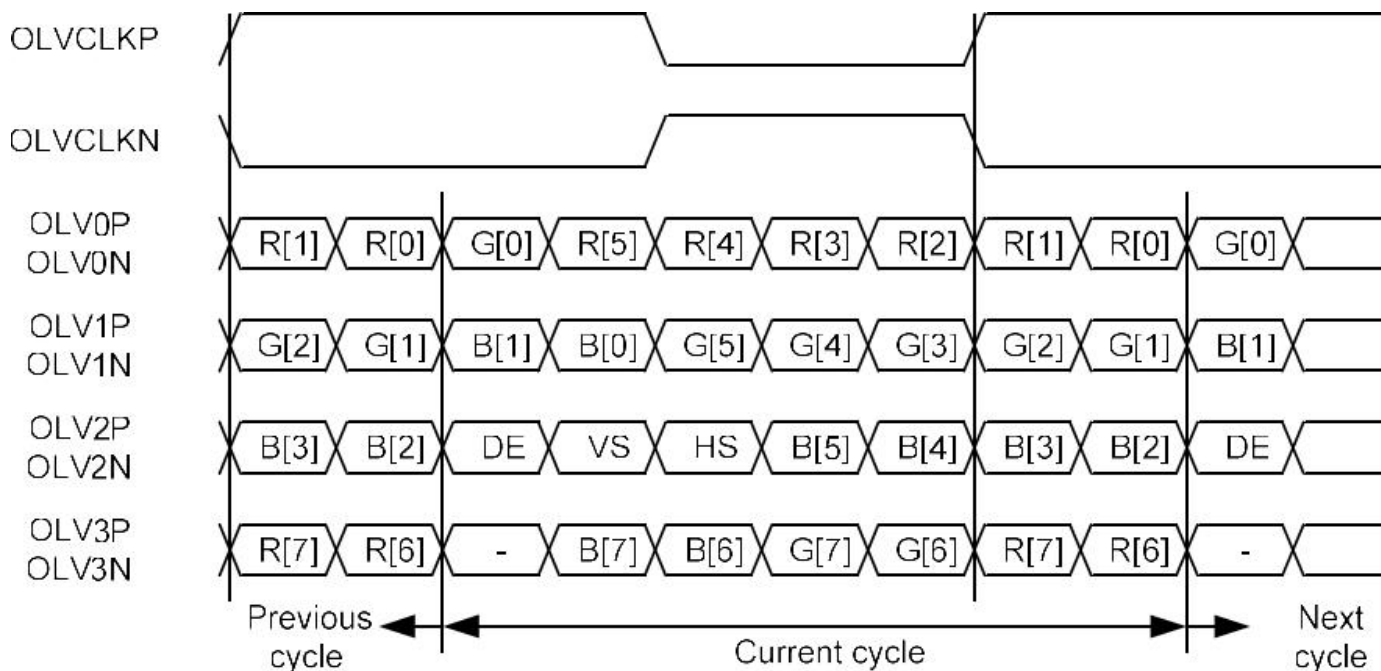


Figure6.1.1 1-port LVDS signal, VESA format (8 bit)

LVDS Interface Timing Characteristics-1 port LVDS

Parameter	Symbol	Unit	Min.	Typ.	Max.	Remarks
Dclk Frequency	1/T _{CLK}	MHz	59.27	59.76		
Horizontal total	T _H	DCLK	1335	1346	1664	Horizontal section
Hsync pulse Width	T _{HPW}	DCLK	10	12		
Hsync back porch	T _{HBP}	DCLK	15	16		
Hsync front porch	T _{HFP}	DCLK	40	50		
Horizontal valid data	T _{HD}	DCLK	1280			
Vertical total	T _V	T _H	740	740	756	Vertical section
Vsync pulse Width	T _{VPW}	T _H	3	3		
Vsync back porch	T _{VBP}	T _H	8	8		
Vsync front porch	T _{VFP}	T _H	12	12		
Vertical valid data	T _{VD}	T _H	720			
Frame rate	FR	Hz	60			

* Frame Rate= Dclk / (Horizontal total* Vertical total)

Table 6.1.1 LVDS Interface Timing

Note: This is the first version, and it will be updated when the design is fixed.

• Horizontal

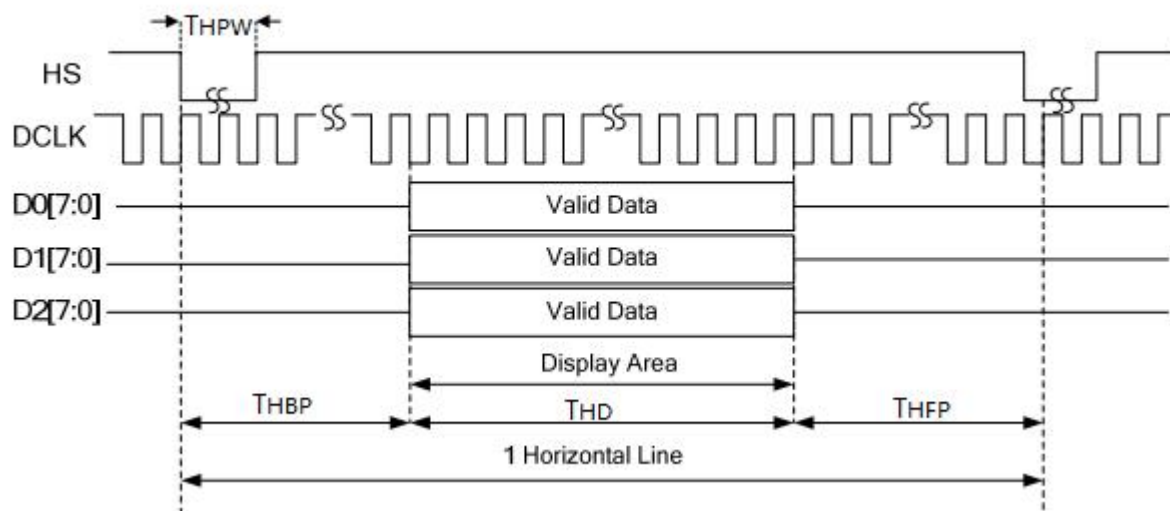


Figure 6.1.2 Horizontal input timing

• Vertical

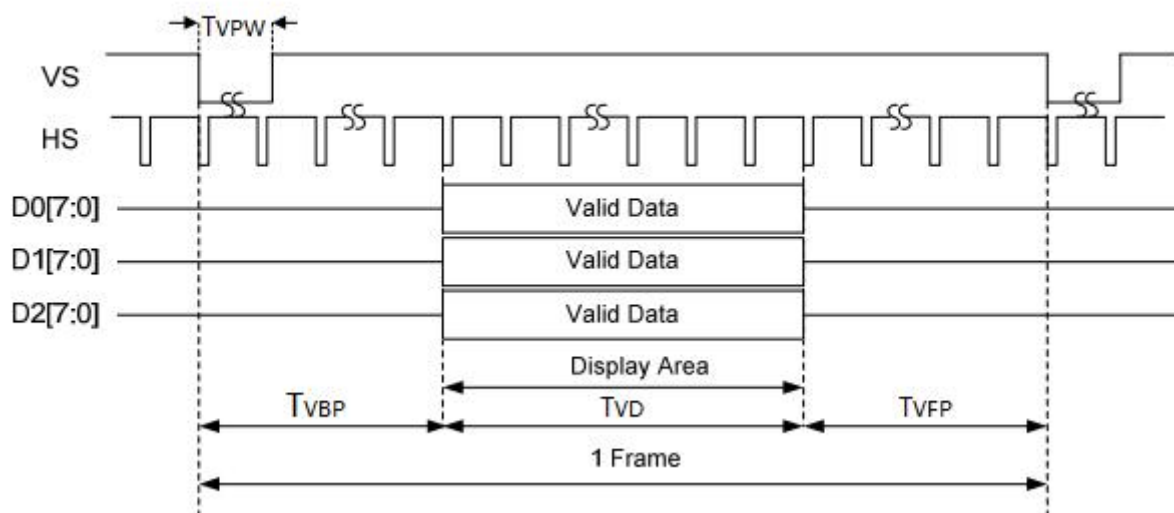


Figure 6.1.3 Vertical input timing

7.2 SPI Timing

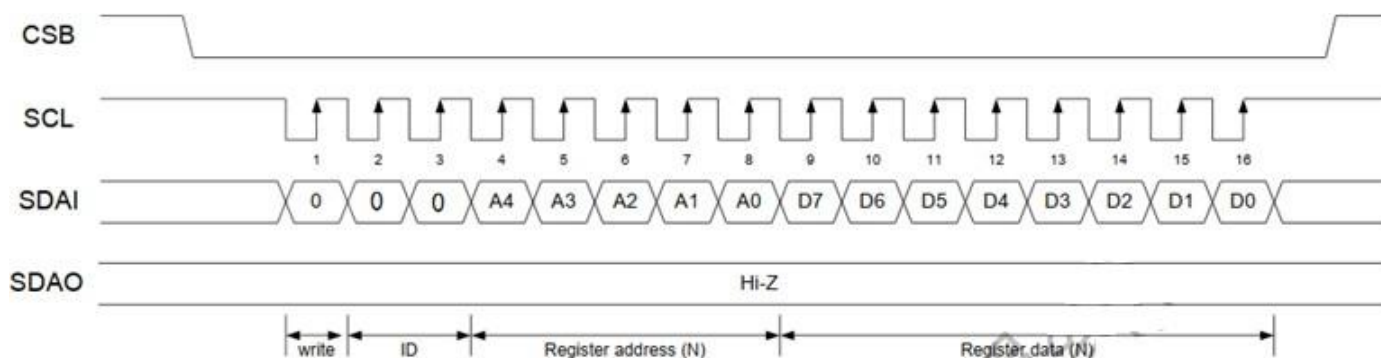


Figure 6.2.1 SPI Write timing

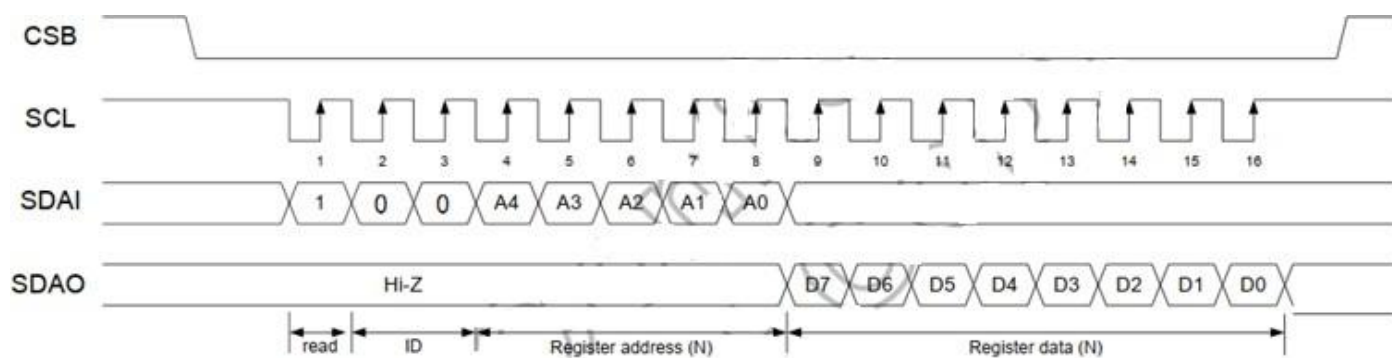
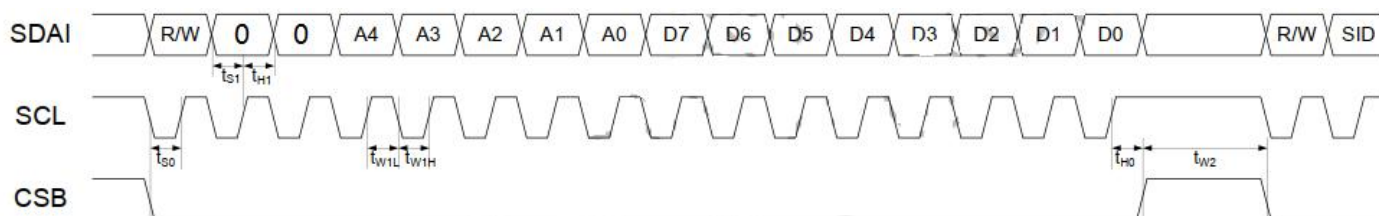


Figure 6.2.2 SPI Read timing



Parameter	Symbol	Condition	Spec.			Unit
			Min.	Typ.	Max.	
SDAI Setup Time	t_{s0}	CSB to SCL	60	-	-	ns
	t_{s1}	SDAI to SCL	60	-	-	ns
SDAI Hold Time	t_{h0}	CSB to SCL	60	-	-	ns
	t_{h1}	SDAI to SCL	60	-	-	ns
Pulse Width	t_{w1L}	SCL pulse width	100	-	-	ns
	t_{w1H}	SCL pulse width	100	-	-	ns
	t_{w2}	CSB pulse width	1	-	-	μ s
Clock duty	-	-	40	50	60	%

Figure 6.2.3 SPI Read timing

8.Optical Characteristics

Item		Symbol	Condition	Min	Typ	Max	Unit	Remark	
Viewing Angle		θU	CR ≥ 10	80	88	--	°	Note1 Note2 Note3	
		θD		80	88	--			
		θL		80	88	--			
		θR		80	88	--			
Contrast Ratio		CR	Vertical, 25℃	1000	1300	--	--		
Response Time		Tr+Tf	25℃	--	--	22	ms	Note1 Note4 Environment temperature	
		Tr+Tf	-20℃	--	--	150			
		Tr+Tf	-30℃	--	--	300			
Chromaticity	White	x	CIE1931-XYZ	0.270	0.300	0.320	--	Note1 Note5	
		y		0.285	0.315	0.345			
	Red	x		0.610	0.640	0.670			
		y		0.306	0.336	0.376			
	Green	x		0.290	0.308	0.350			
		y		0.589	0.626	0.649			
	Blue	x		0.120	0.148	0.180			
		y		0.030	0.059	0.090			
	NTSC				68	74	--		%
	Uniformity	Black		U	25℃ Module @ VESA 9 points	50	--		--
White		80	--			--	%		
Brightness		YL	25℃	1150	1350	--	cd/m²	Note1 Note6	
Flicker		JEITA	25℃	--	--	-30	dB	Note8	
Gamma		VESA	25℃	2.0	2.2	2.4	--		
Reflectivity		SCI	25℃	--	--	6	%	Note9	

Test Conditions:

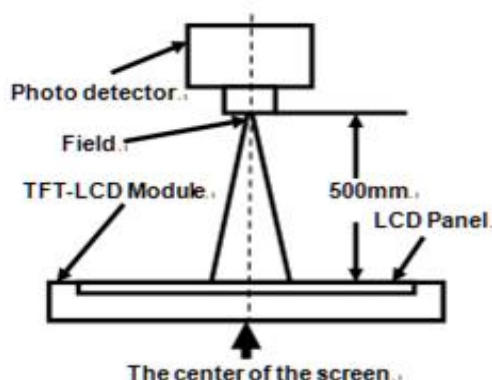
1. The ambient temperature is 25℃.
2. The test systems refer to Note 1 and Note 2.

Note1: Definition of optical measurement system

Measured at the center of the panel by SR-3

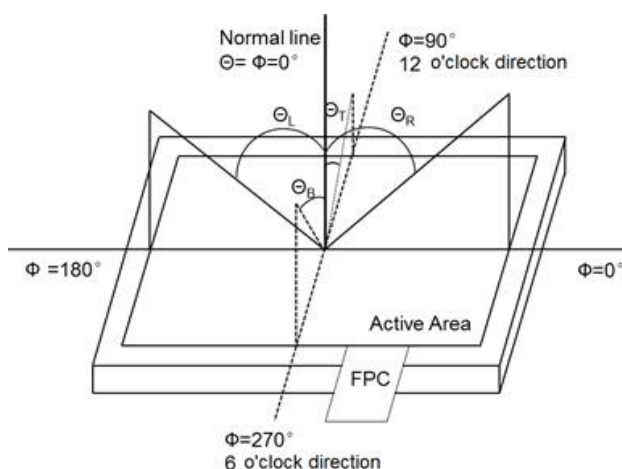
Measuring condition:

- Measuring surroundings: Dark room.
- Measuring temperature: $T_a = +25^\circ\text{C}$.
- Adjust operating voltage to get optimum contrast at the center of the display.
- Measured value at the center point of LCD panel after more than 10 minutes while backlight is turned on.



Item	Photo detector	Field	High
Contrast Ratio	SR-3 series	1°	H=500mm
Transmittance			
Chromaticity			
Luminance Uniformity	SR-3 & LMK 5-5 COLOR	/	/
Contrast Plot	EZ-Contrast/DMS	6mm/3mm	H=1mm/H≈80mm
Response Time	LCD5200	3mm	H=200mm
Reflectivity	CM-3600A	8mm/25.4mm	H=0mm

Note2: Definition of viewing angle range and measurement system.



Note3: Definition of contrast ratio:

$$\text{Contrast Ratio(CR)} = \frac{\text{Luminance When LCD is White}}{\text{Luminance When LCD is Black}}$$

Contrast Ratio is measured in the optimum common electrode voltage

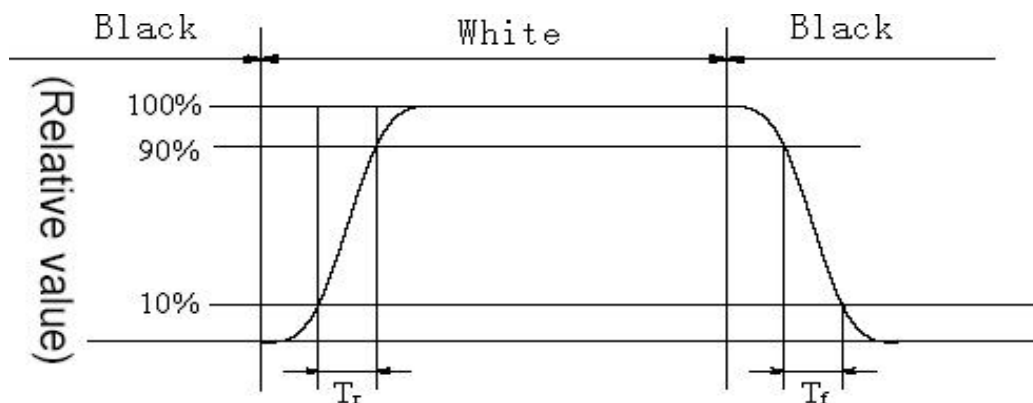
Note4: Definition of response time:

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 10% to 90%.

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

Please see the illustration below:



Note5: Definition of color chromaticity (CIE1931)

Color coordinates measured at the center point of the LCD.

Note6: Definition of Luminance

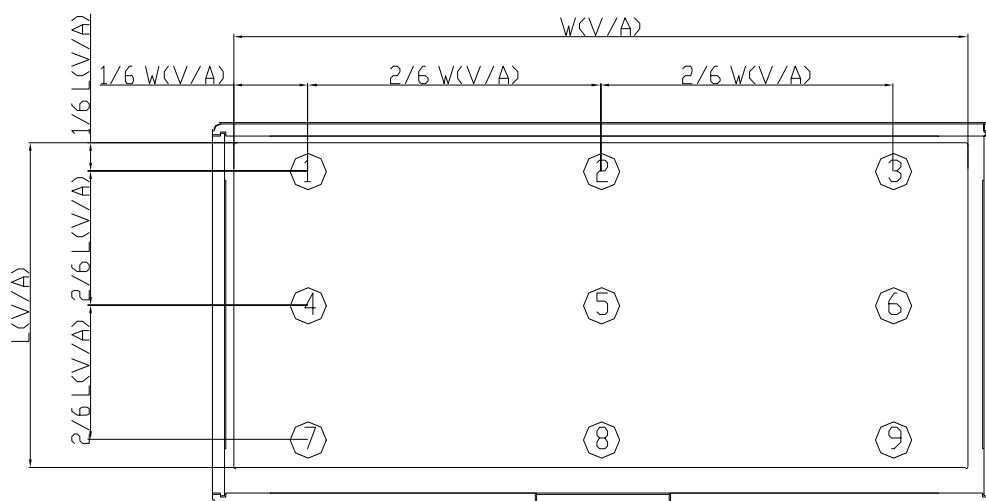
Measure the luminance at white state at the center point.

Note7: Definition of Luminance Uniformity

The luminance uniformity is calculated by using the following formula.

$$\text{Luminance uniformity (Lu)} = \frac{\text{Minimum luminance from (1) to (9)}}{\text{Maximum luminance from (1) to (9)}}$$

Luminance is measured at the 9 points shown below.



Note8: The value % base on CR measurement method, dB base on JEITA method, flicker test at half grey pattern.

Note9: SCI reflective ratio measure method.

Measurement system: CM 3600A fully integral sphere

Light source: D65

d/8°(ASTM E 1164-09)

Observing angle: 10°

State: LCD powered off

Standard d/8° Integration Sphere Spectroscopic – Reflectometer

Note10: Definition of Luminance Uniformity

The measuring condition is area scan.

Luminance Uniformity (U) = L_{min} / L_{max}

Lmax: The measured Maximum luminance of all measurement position.

Lmin: The measured Minimum luminance of all measurement position.

9. Reliability test items

No.	Test Item	Test Condition	Notes
1	High Temp. Storage	+90°C / 48H	1. Functional test is OK. Missing Segment, short, unclear segment non-display, display abnormally and liquid crystal leakage un-allowed. 2. No low temperature bubbles, end seal loose and fall, frame rainbow.
2	Low Temp. Storage	-40°C / 48H	
3	High Temp. Operating	+85°C / 48H	
4	Low Temp. Operating	-30°C / 48H	
5	High Temperature / Humidity storage	50°C x 90%RH / 48H	
6	Thermal and cold shock	Static state, -20°C (30min) ~70°C (30min), 50 cycles	
7	ESD test	±4KV, Human Body Mode, 150pF/330Ω; ±8KV, Air Mode, 150pF/330Ω;	

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 Assembly Precaution

- 1、 Please use the mounting hole on the module side in installing and do not bending or wrenching LCD in assembling. And please do not drop, bend or twist LCD module in handling.
- 2、 Please design display housing in accordance with the following guide lines.
- 3、 Housing case must be destined carefully so as not to put stresses on LCD all sides and not to wrench module. The stresses may cause non-uniformity even if there is no non-uniformity statically.
- 4、 Keep sufficient clearance between LCD module back surface and housing when the LCD module is mounted. The clearance in the design is recommended taking into account the tolerance of LCD module thickness and mounting structure height on the housing.
- 5、 Please do not push or scratch LCD panel surface with any-thing hard. And do not soil LCD panel surface by touching with bare hands. (Polarizer film, surface of LCD panel is easy to be flawed.)
- 6、 Please do not press any parts on the rear side such as source IC, gate IC, and FPC during handling LCD module. If pressing rear part is unavoidable, handle the LCD module with care not to damage them.
- 7、 Please wipe out LCD panel surface with absorbent cotton or soft cloth in case of it being soiled.
- 8、 Please wipe out drops of adhesives like saliva and water on LCD panel surface immediately. They might damage to cause panel surface variation and color change.
- 9、 Please do not take a LCD module to pieces and reconstruct it. Resolving and reconstructing modules may cause them not to work well.

10.3 Disassembling or Modification

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

10.4 Breakage of LCD Panel

- 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.
- 2、 If liquid crystal contacts mouth or eyes, rinse out with water immediately.
- 3、 If liquid crystal contacts skin or cloths, wash it off immediately with alcohol and rinse thoroughly with water.
- 4、 Handle carefully with chips of glass that may cause injury, when the glass is broken.

10.5 Absolute Maximum Ratings and Power Protection Circuit

- 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.
- 2、 Please do not leave LCD module in the environment of high humidity and high temperature for a long time.
- 3、 It's recommended employing protection circuit for power supply.

11.6 Operation

- 1 、 Do not touch, push or rub the polarizer with anything harder than HB pencil lead. Use fingerstalls of soft gloves in order to keep clean display quality, when persons handle the LCD module for incoming inspection or assembly.
- 2、 When the surface is dusty, please wipe gently with absorbent cotton or other soft material.
- 3 、 Wipe off saliva or water drops as soon as possible. If saliva or water drops contact with polarizer for a long time, they may causes deformation or color fading.
- 4 、 When cleaning the adhesives, please use absorbent cotton wetted with a little petroleum benzine or other adequate solvent.

10.6 Static Electricity

- 1 、 Protection film must remove very slowly from the surface of LCD module to prevent from electrostatic occurrence.
- 2、 Because LCD module uses CMOS-IC on TFT-LCD panel, it is very weak to electrostatic discharge. Please be careful with electrostatic discharge.
- 3 、 Persons who handle the module should be grounded through adequate methods.

10.7 Disposal

When disposing LCD module, obey the local environmental regulations.

10.8 OTHERS

- 1 、 A strong incident light into LCD panel might cause display characteristics' changing inferior because of polarizer film, color filter, and other materials becoming inferior. Please do not expose LCD module direct sunlight land strong UV rays.
- 2、 Please pay attention to a panel side of LCD module not to contact with other materials in preserving it alone.
- 3、 For the packaging box, please pay attention to the followings:
- 4、 Packaging box and inner case for LCD are designed to protect the LCDs from the damage or scratching during transportation. Please do not open except picking LCDs up from the box.
- 5、 Please handle packaging box with care not to give them sudden shock and vibrations. And also please do not throw them up.
- 6、 Packing box and inner case for LCDs are made of cardboard. So please pay attention not to get them wet. (Such like keeping them in high humidity or wet place can occur getting them wet.)

11. Packing form-TBD



Incoming Inspection Standard

品质允收标准

Model N0. /产品型号: Applicable to Touch Screen

Updated Date /生效日期: 2025.04.01

Version / 版本号: V0

Record of Revision /修订履历.

Version /版本号	Revision Record /修订内容	Reviser /修订人	Revision Date /修订日期
V0	首发 / Initial release		2025.04.01

1、Scope of application /适用范围.

Applicable to Touch Screen.

2、Inspection conditions and environment / 检验条件与环境.

2.1、Inspection Conditions / 检验条件:

2.1.1、Inspection Distance / 检测距离: 35cm $\pm$ 5cm.

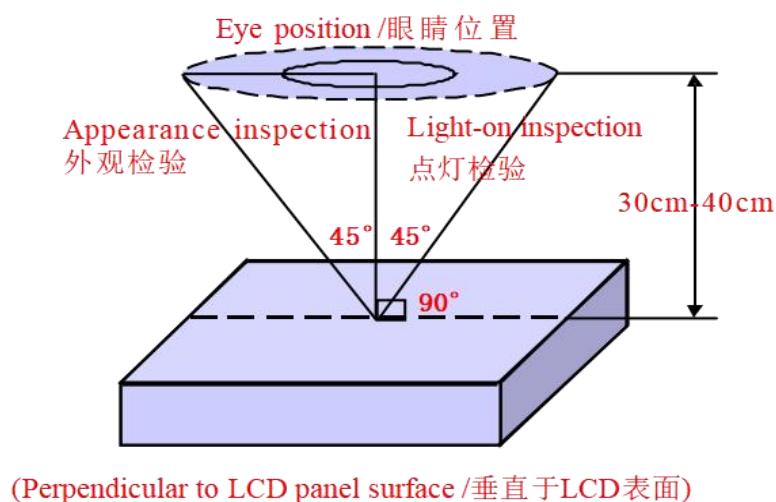
2.1.2、Inspection time /检验时间: Displays performance test /功能测试: 2~3S /Image, Appearance Inspection / 外观检验: 8~10S.

2.1.3、Inspection the viewing angle /检验视角:

Display Inspection Angle /显示检验角度: $\pm 45^\circ$.

Appearance Inspection Angle /外观检验角度: $\pm 45^\circ$.

Eye position /眼睛位置:



2.2、Inspection environment /检验环境:

Temperature / 温度		25 $\pm$ 5 $^\circ$ C
Humidity / 湿度		55 $\pm$ 5%RH
Brightness	Appearance Inspection / 外观检验	800~1000 Lux
亮度	Display Inspection / 功能检验	200~300 Lux

2.3、Sampling conditions / 抽样方式.

Sampling Plan / 抽样计划		GB/T 2828.1- 2003
		Batch single sampling/批量单次抽样
		General inspection level: II/一般检验水平: 二级
AQL	Major Defect / 主要缺陷	0.25
	Minor Defect / 次要缺陷	0.65

3、Terms and definitions / 术语和定义.

3.1、Defect classification / 缺陷分类:

3.1.1、Major defects / 主要缺陷: Defects that cause the product to fail or reduce the usability of the product / 引起产品功能失效和减少产品的有效使用与操作的缺陷.

3.1.2、Minor defects / 次要缺陷: Defects that do not affect the functionality and effective use and operation of the product / 不影响产品功能和有效使用与操作的缺陷.

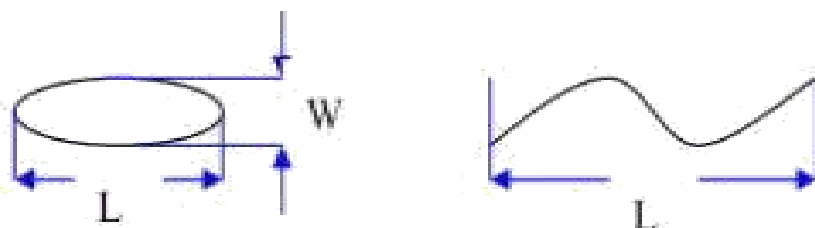
3.2、Point defects / 点状缺陷:

The size of a punctate defect is defined by the diameter D, and the average diameter of the defect is $D=1/2(W+L)$ / 点状缺陷由直径 D 定义大小, 缺陷的平均直径 $D=1/2(W+L)$.

3.3、line defects / 线状缺陷:

When defect size $L \geq 2W$, the defect count as liner type defect. Size of linear defect is defined by length (L) and the maximum width (W)

当缺陷尺寸 $L \geq 2W$ 时, 被视为线状缺陷, 线状缺陷是由长度 (L) 和最大宽度 (W) 定义的.



3.4、LCD sub-pixels / LCD 子像素点:

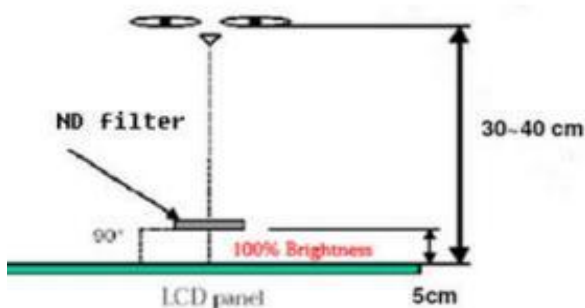
The sub-pixel defect area is greater than 50% of the LCD sub-pixel area, and is visible through ND5% masking

子像素点缺陷面积大于 50% LCD 子像素面积, 且透过 ND5%遮盖是可见的.

3.5、ND card test method / ND 卡检验方法:

Hold the ND card about 5cm above the display area, with your eyes 30-40cm away from the panel, and observe for 2~3 seconds

在显示区域上方大约 5cm 处握住 ND 卡, 眼睛距离面板 30-40cm, 观察 2~3 秒.



3.6、Surface substances that can be cleaned are not considered defects (e.g. finger prints on the protective film, dust particles)

可以被清洁干净的表面物质不视为缺陷 (如保护膜上的手指印, 尘粒) .

3.7、Defects that can be covered by the material and are not visible to the eye, and do not affect the function and use are not considered defects

能被物料覆盖目视不可见, 且不影响功能与使用的缺陷不视为缺陷.

3.8、AA shows that damage to the glass outside the area does not affect the effective line and does not expand the loss is acceptable

AA 显示区域以外的玻璃损伤, 不影响有效线路和不会在扩大损失的是可以接受的.

3.9、Issues not specified or defined in this document shall be dealt with through friendly negotiation between the parties / 本文件中未规定或定义的问题, 双方友好协商处理.

4.0、Inspection standards /检验标准:

4.1、Structural size standards / 结构尺寸标准:

Measurement items /测量项目		Specification /规格	Remark /备注
Name/名称	Unit /单位	Tolerance /公差	
Outside dimension: Length 尺寸: 长	mm /毫米	0.10mm~0.3mm	Please refer to the product specification for detailed dimensions and tolerances 详细的尺寸规格和公差请参考产品规格书
Outside dimension: Width 尺寸: 宽	mm /毫米	0.10mm~0.3mm	
Outside dimension: Thickness 尺寸: 厚	mm /毫米	0.20mm~0.50mm	

4.2、Appearance Inspection standards:

(D : diameter, W : width, L : length, N : quantity, DS : spacing)

Material 检验区域	Inspection items 检验项目	Product size 适用尺寸	Inspection standards 检验规格	Category 缺陷类别	
LCD	ITO	Full size 全尺寸	ITO can't open circuit, short circuit, ITO notch cannot exceed 70% of width. ITO 不能有开路 and 短路, ITO 缺口不能超过宽度的 70%.	MA	
	Corners broken 崩边/崩角	Full size 全尺寸	1、It cannot affect the appearance of valid routes and functions; 不能影响有效线路和功能外观.	MA	
			2、There must be no extensible rips 不能有可延伸性裂纹.	MA	
Silicone 硅胶	Silicone coating 硅胶涂布	Full size 全尺寸	1、The height cannot exceed the LCD CF surface / 高度不能超过 LCD CF 面.		MI
			2、No overflow and lack of glue / 不能溢胶和缺胶.		MI
			3、Silicone cannot cover POL and FPC/ 硅胶不能覆盖到 POL 和 FPC.		MI

Material 检验区域	Inspection items 检验项目	Product size 适用尺寸	Inspection standards 检验规格	Category 缺陷类别	
PCBA FPC Connector 连接器	Appearance 表面外观	Full size 全尺寸	1.FPC is not allowed to have drape/bubble/fold / 不允许有披锋/气泡/褶皱.		MI
			2.Surface scratches do not allow copper leakage / 表面划伤不允许出现漏铜.	MA	
			3.Cracking is not allowed / 不允许破裂.	MA	
			4.Gold finger oxidation is not allowed 不允许金手指氧化.	MA	
			5.Chromatic aberration is not allowed 不允许出现色差.	MA	
	Components 元器件	Full size 全尺寸	1. Damage, missing parts, and incorrect models are not allowed 不允许损伤、缺件、型号错误.	MA	
			2.Components need to be insulated with high temperature adhesive (unless not required by the drawings) / 元器件需要有高温胶绝缘保护 (除非图纸无要求) .		MI
	Weld 焊接	Full size 全尺寸	1. False soldering, virtual soldering, and tinning are not allowed 不允许假焊、虚焊、连锡.	MA	
			2. No solder bead residue is allowed 不允许有锡珠残留.		MI
			3.The pads need to be glued with high temperature (unless not required by the drawings) / 焊盘需贴高温胶 (除非图纸无要求) .		MI
POL 偏光片	Scratches 划伤	Under 6 inches 6 寸以下	1. $W \leq 0.05\text{mm}$; $L \leq 5\text{mm}$, Ignore (忽略) . 2. $0.05\text{mm} < W \leq 0.10\text{mm}$; $L \leq 5\text{mm}$; $N \leq 2$; $DS \geq 10\text{mm}$. 3. $0.10\text{mm} < W$; $5\text{mm} < L$, Not allowable (不允许) .		MI
		6~10.0 inches 6 寸~10.0 寸	1. $W \leq 0.07\text{mm}$; $L \leq 5\text{mm}$, Ignore (忽略) . 2. $0.07\text{mm} < W \leq 0.12\text{mm}$; $L \leq 10\text{mm}$; $N \leq 3$; $DS \geq 10\text{mm}$. 3. $0.12\text{mm} < W$; $10\text{mm} < L$, Not allowable (不允许) .		MI
		More than 10 inches 10 寸以上	1. $W \leq 0.10\text{mm}$; $L \leq 5\text{mm}$, Ignore (忽略) . 2. $0.10\text{mm} < W \leq 0.15\text{mm}$; $L \leq 10\text{mm}$; $N \leq 4$; $DS \geq 10\text{mm}$. 3. $0.15\text{mm} < W$; $10\text{mm} < L$, Not allowable (不允许) .		MI

Material 检验区域	Inspection items 检验项目	Product size 适用尺寸	Inspection standards 检验规格	Category 缺陷类别	
POL 偏光片	Bubbles	Under 6 inches 6 寸以下	1.D≤0.15mm, Ignore (忽略) . 2.0.15mm < D≤0.30mm; N≤2; DS≥10mm. 3.D > 0.30mm, Not allowable (不允许) .		MI
		More than 6 inches 6 寸以上	1.D≤0.20mm, Ignore (忽略) . 2.0.20mm < D≤0.40mm; N≤3; DS≥10mm. 3.D > 0.40mm, Not allowable (不允许) .		MI
	Bubbles around the edges 边缘气泡	Full size 全尺寸	1.Within 1/2BM of the display area, it is not allowed 显示区往外 1/2BM 区域内, 不允许. 2.The display area is 1/2 outside the BM area, and it is not controlled 显示区往外 1/2BM 区域以外, 不管控.		MI
	Point defects Embossing	Under 6 inches 6 寸以下	1.D≤0.15mm, Ignore (忽略) . 2.0.15mm < D≤0.30mm; N≤2; DS≥10mm. 3.D > 0.30mm, Not allowable (不允许) .		MI
		6~10.0 inches 6 寸~10.0 寸	1.D≤0.20mm, Ignore (忽略) . 2.0.20mm < D≤0.40mm; N≤3; DS≥10mm. 3.D > 0.40mm, Not allowable (不允许) .		MI
		More than 10 inches 10 寸以上	1.D≤0.25mm, Ignore (忽略) . 2.0.25mm < D≤0.50mm; N≤4; DS≥10mm. 3.D > 0.50mm, Not allowable (不允许) .		MI
	Dirty 脏污	Full size 全尺寸	Dirt, finger prints, etc. are not allowed 不允许有脏污、手指印等.		MI
	Warping 起翘	Full size 全尺寸	Not allowed 不允许.		MI
	Paste offset 贴附偏位	Full size 全尺寸	It is not allowed to exceed the patch tolerance required by the drawing; After TP lamination, it is not allowed to leak the edges of the polarizer 不允许超出图纸要求的贴片公差; 在 TP 贴合后不允许漏偏光片边缘.		MI
	Angle mistake 角度错误	Full size 全尺寸	Not allowed 不允许.	MA	
	Mixture 混料	Full size 全尺寸	Not allowed 不允许.	MA	

Material 检验区域	Inspection items 检验项目	Product size 适用尺寸	Inspection standards 检验规格	Category 缺陷类别	
TP	Scratches 划伤	Under 6 inches 6 寸以下	1.W≤0.05mm; L≤5mm, Ignore (忽略) . 2.0.05mm < W≤0.10mm ; L≤5mm ; N≤2 ; DS≥10mm. 3.0.10mm < W; 5mm < L, Not allowable (不允许) . 4.There is a feeling scratch, Not allowable 有感划伤, 不允许.		MI
		6~10.0 inches 6 寸~10.0 寸	1.W≤0.07mm; L≤5mm, Ignore (忽略) . 2.0.07mm < W≤0.12mm ; L≤10mm ; N≤3 ; DS≥10mm. 3.0.12mm < W; 10mm < L, Not allowable (不允许) . 4.There is a feeling scratch, Not allowable 有感划伤, 不允许.		MI
		More than 10 inches 10 寸以上	1.W≤0.10mm; L≤5mm, Ignore (忽略) . 2.0.10mm < W≤0.15mm ; L≤10mm ; N≤4 ; DS≥10mm. 3.0.15mm < W; 10mm < L, Not allowable (不允许) . 4.There is a feeling scratch, Not allowable 有感划伤, 不允许.		MI
	Black dots white dots 黑点/白点	Under 6 inches 6 寸以下	1.D≤0.15mm, Ignore (忽略) . 2.0.15mm < D≤0.30mm; N≤2; DS≥10mm. 3.D > 0.30mm, Not allowable (不允许) .		MI
		6~10.0 inches 6 寸~10.0 寸	1.D≤0.20mm, Ignore (忽略) . 2.0.20mm < D≤0.40mm; N≤3; DS≥10mm. 3.D > 0.40mm, Not allowable (不允许) .		MI
		More than 10 inches 10 寸以上	1.D≤0.25mm, Ignore (忽略) . 2.0.25mm < D≤0.50mm; N≤4; DS≥10mm. 3.D > 0.50mm, Not allowable (不允许) .		MI
	OCA Bubbles 气泡	Full size 全尺寸	Not allowed 不允许.		MI
	Corners broken 崩边/崩角	Full size 全尺寸	1.Product front /产品正面: Edge and corner chipping is not allowed / 崩角、崩边不允许 2.Product back /产品背面: X≤0.5, Y≤0.5, Z≤1/2T; N≤4; DS≥10mm.	MA	
	Silk screen 丝印	Full size 全尺寸	The silk screen is clear, complete and correct 丝印清晰、完整、内容正确.		MI

Material 检验区域	Inspection items 检验项目	Product size 适用尺寸	Inspection standards 检验规格	Category 缺陷类别	
TP	Dirty 脏污	Full size 全尺寸	Uncleanable dirt, Not allowable. 不可擦拭的脏污, 不允许.		MI
	Broken 破损	Full size 全尺寸	Not allowable. 不允许.		MI
	Ink color aberration 油墨色差	Full size 全尺寸	$\Delta E > 1$, Not allowable (不允许) .		MI
	Cover pinholes 针孔	Full size 全尺寸	1.D $\leq$ 0.20mm, N $\leq$ 2, DS $\geq$ 10mm, allowable 2.D > 0.20mm, intensive pinholes (密集型针孔) , Not allowable (不允许) .		MI
	Paint off 掉漆	Full size 全尺寸	Touch-up on the back of the cover is allowed, and the touch-up area cannot exceed 2.0mm in diameter / 允许在盖板背面补漆, 补漆面积不 能超过直径 2.0mm.		MI
BL 背光	Backlight separation 背光分离	Full size 全尺寸	Not allowable 不允许.		MI
	Deformed 变形	Full size 全尺寸	Measured using a plug gauge, If the deformation exceeds 0.3mm, NG is judged 使用塞规测量, 形变超过 0.3mm, 判定 NG.		MI
	Iron frame Oxidation /abscission 铁框氧化/脱落	Full size 全尺寸	Not allowable 不允许.		MI
	Dirt/adhesive residue/solder beads 脏污/残胶/锡珠	Full size 全尺寸	Not allowable 不允许.		MI
	Inkjet/barcode/ QR code 喷码/条码/二维 码	Full size 全尺寸	The inkjet code is clear and complete, the barcode and QR code can be scanned normally, and the content and format meet the requirement / 喷码清晰完整、条码和二 维码可正常扫描, 内容和格式与要求相符.		MI
	Auxiliary materials 辅料	Full size 全尺寸	Accessories (vinyl, double-sided tape, insulating glue, etc.) are not allowed to be missed, misguided, defective, etc 辅料 (黑胶、双面胶、绝缘胶等) 不允许有漏贴、 贴偏、残缺等.		MI

4.3、Functional inspection standards:

(D : diameter, W : width, L : length, N : quantity, DS : spacing)

Material 检验区域	Inspection items 检验项目	Product size 适用尺寸	Inspection standards 检验规格	Category 缺陷类别	
Display Screen 模组	Light leakage / Mura 漏光/ Mura	Full size 全尺寸	1.Use ND5% filter masking, visual invisibility is OK 使用 ND5%遮盖, 目视不可见即为 OK. 2.If necessary, sign off on the sample 必要时, 签限定样.		MI
	Brightness uniformity 亮度均匀性	Full size 全尺寸	Brightness uniformity < 75.0%, Not allowable 亮度均匀性 < 75.0%, 不允许.	MA	
	LCD bright spots/dark spots 玻璃亮点/暗点	Under 6 inches 6 寸以下	1.D≤0.10mm, Ignore (忽略) . 2.0.10mm < D≤0.20mm; N≤2; DS≥10mm. 3.D > 0.20mm, Not allowable (不允许) .		MI
		6~10.0 inches 6 寸~10.0 寸	1.D≤0.15mm, Ignore (忽略) . 2.0.15mm < D≤0.30mm; N≤3; DS≥10mm. 3.D > 0.30mm, Not allowable (不允许) .		MI
		More than 10 inches 10 寸以上	1.D≤0.20mm, Ignore (忽略) . 2.0.20mm < D≤0.40mm; N≤4; DS≥10mm. 3.D > 0.40mm, Not allowable (不允许) .		MI
	Backlight black dots/white dots 背光黑点/白点	Under 6 inches 6 寸以下	1.D≤0.15mm, Ignore (忽略) . 2.0.15mm < D≤0.30mm; N≤2; DS≥10mm. 3.D > 0.30mm, Not allowable (不允许) .		MI
		6~10.0 inches 6 寸~10.0 寸	1.D≤0.20mm, Ignore (忽略) . 2.0.20mm < D≤0.40mm; N≤3; DS≥10mm. 3.D > 0.40mm, Not allowable (不允许) .		MI
		More than 10 inches 10 寸以上	1.D≤0.25mm, Ignore (忽略) . 2.0.25mm < D≤0.50mm; N≤4; DS≥10mm. 3.D > 0.50mm, Not allowable (不允许) .		MI
	Linear foreign bodies 线状异物	Under 6 inches 6 寸以下	1.W≤0.05mm; L≤5mm, Ignore (忽略) . 2.0.05mm < W≤0.10mm ; L≤5mm ; N≤2; DS≥10mm. 3.0.10mm < W; 5mm < L, Not allowable (不允许) .		MI
		6~10.0 inches 6 寸~10.0 寸	1.W≤0.07mm; L≤5mm, Ignore (忽略) . 2.0.07mm < W≤0.12mm ; L≤10mm ; N≤3 ; DS≥10mm. 3.0.12mm < W; 10mm < L, Not allowable (不允许) .		MI
		More than 10 inches 10 寸以上	1.W≤0.10mm; L≤5mm, Ignore (忽略) . 2.0.10mm < W≤0.15mm ; L≤10mm ; N≤4 ; DS≥10mm. 3.0.15mm < W; 10mm < L, Not allowable (不允许) .		MI

Material 检验区域	Inspection items 检验项目	Product size 适用尺寸	Inspection standards 检验规格	Category 缺陷类别	
Display Screen 模组	White/Black print 白印/黑印	Full size 全尺寸	Use ND5% filter masking, visual invisibility is OK 使用 ND5%遮盖, 目视不可见即为 OK.		MI
	Interference pattern/Newton pattern 干涉纹/牛顿纹	Full size 全尺寸	Not allowable 不允许.		MI
	Membranes displacement 膜材移位	Full size 全尺寸	Not allowable 不允许.		MI
	Color blocks 色斑	Full size 全尺寸	Use ND5% filter masking, visual invisibility is OK /使用 ND5%遮盖, 目视不可见即为 OK.		MI
	Display abnormal 画异	Full size 全尺寸	Not allowable 不允许.	MA	
	No display 无显示	Full size 全尺寸	Not allowable 不允许.	MA	
	Line/Missing Drawing 线条/缺画	Full size 全尺寸	Not allowable 不允许.	MA	
	Splash screen 闪屏	Full size 全尺寸	Not allowable 不允许.	MA	
	LCD grid LCD 网格	Full size 全尺寸	Not allowable 不允许.	MA	
	Afterimage 残影	Full size 全尺寸	Not allowable 不允许.	MA	
	Wrong viewing angle 可视角错误	Full size 全尺寸	Not allowable 不允许.	MA	
TP	No touch 无触摸	Full size 全尺寸	Not allowable 不允许.	MA	
	Touch the jump point 触摸跳点	Full size 全尺寸	Not allowable 不允许.	MA	
	Touch not sensitive 触摸不灵敏	Full size 全尺寸	Not allowable 不允许.	MA	