



WINSTAR Display Co.,Ltd.
華凌光電股份有限公司



Winstar Display Co., LTD

華凌光電股份有限公司



WEB: <https://www.winstar.com.tw> E-mail: sales@winstar.com.tw

SPECIFICATION

CUSTOMER : _____

MODULE NO.: WF35LTIACDNG0#

<p>APPROVED BY: (FOR CUSTOMER USE ONLY)</p>	<p>PCB VERSION: _____ DATA: _____</p>
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SALES BY	APPROVED BY	CHECKED BY	PREPARED BY
			葉虹蘭
ISSUED DATE: 2021/04/09			

TFT Display Inspection Specification: <https://www.winstar.com.tw/technology/download.html>

Precaution in use of TFT module: <https://www.winstar.com.tw/technology/download/declaration.html>



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MODLE NO :

RECORDS OF REVISION

DOC. FIRST ISSUE

VERSION	DATE	REVISED PAGE NO.	SUMMARY
0	2021/04/09		First issue

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1.Module Classification Information

W F 35 L T I A C D N G 0 #
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬

①	Brand : WINSTAR DISPLAY CORPORATION											
②	Display Type : F→TFT Type, J→Custom TFT											
③	Display Size : 3.5" TFT											
④	Model serials no.											
⑤	Backlight Type :	F→CCFL, White S→LED, High Light White					T→LED, White Z→Nichia LED, White					
⑥	LCD Polarize Type/ Temperature range/ Gray Scale Inversion Direction	A→Transmissive, N.T, IPS TFT C→Transmissive, N. T, 6:00 ; F→Transmissive, N.T,12:00 ; I→Transmissive, W. T, 6:00 K→Transflective, W.T,12:00 L→Transmissive, W.T,12:00 N→Transmissive, Super W.T, 6:00					Q→Transmissive, Super W.T, 12:00 R→Transmissive, Super W.T, O-TFT V→Transmissive, Super W.T, VA TFT W→Transmissive, Super W.T, IPS TFT X→Transmissive, W.T, VA TFT Y→Transmissive, W.T, IPS TFT Z→Transmissive, W.T, O-TFT					
⑦	A : TFT LCD B : TFT+SCREW HOLES+CONTROL BOARD C : TFT+ SCREW HOLES +A/D BOARD D : TFT+ SCREW HOLES +A/D BOARD+CONTROL BOARD E : TFT+ SCREW HOLES +POWER BOARD					F : TFT+CONTROL BOARD G : TFT+ SCREW HOLES H : TFT+D/V BOARD I : TFT+ SCREW HOLES +D/V BOARD J : TFT+POWER BD						
⑧	Resolution:											
	A	128160	B	320234	C	320240	D	480234	E	480272	F	640480
	G	800480	H	1024600	I	320480	J	240320	K	800600	L	240400
	M	1024768	N	128128	P	1280800	Q	480800	R	640320	S	480128
	T	800320	U	8001280	V	176220	W	1280398	X	1024250	Y	1920720
	Z	800200	2	1024324	3	7201280	4	19201200	5	1366768	6	1280320
⑨	D: Digital L : LVDS M:MIPI											
⑩	Interface:											
	N	Without control board			A	8Bit		B	16Bit		H	HDMI
	I	I2C Interface			R	RS232		S	SPI Interface		U	USB
⑪	TS:											
	N	Without TS			T	Resistive touch panel			C	Capacitive touch panel (G-F-F)		
	G	Capacitive touch panel (G-G)					C1	Capacitive touch panel (G-F-F)+OCA				
	C2	Capacitive touch panel (G-F-F)+OCR					G1	Capacitive touch panel (G-G)+OCA				
	G2	Capacitive touch panel (G-G)+OCR					B	CTP+GG+USB				
⑫	Version: X:Raspberry pi											
⑬	Special Code		#:Fit in with ROHS directive regulations									

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2.Summary

TFT 3.5" is a TN transmissive type color active matrix TFT liquid crystal display that use amorphous silicon TFT as switching devices. This module is composed of a TFT_LCD module, it is usually designed for industrial application and this module follows RoHs.

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3. General Specifications

Item	Dimension	Unit
Size	3.5	inch
Dot Matrix	320 x RGBx240(TFT)	dots
Module dimension	76.84x 63.84x 4.86	mm
Active area	70.08 x 52.56	mm
Dot pitch	0.073 x 0.219	mm
LCD type	TFT, Normally White, Transmissive	
TFT Driver IC	HX8238 or Equivalent	
TFT Interface	24-bit RGB Or option other mode	
View Direction	12o'clock	
Gray Scale Inversion Direction	6 o'clock	
Aspect Ratio	4:3	
CTP IC	ILI2130 or equivalent	
CTP Interface	I2C	
CTP FW Version	0x07.0x00.0x00.0x00.0x00.0x35.0x5A.0x01	
Backlight Type	LED ,Normally White	
With /Without TP	With CTP	
Surface	Glare	

*Color tone slight changed by temperature and driving voltage.

4. Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	TOP	-20	—	+70	°C
Storage Temperature	TST	-30	—	+80	°C

Note: Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above

1. Temp. $\leq 60^{\circ}\text{C}$, 90% RH MAX. Temp. $> 60^{\circ}\text{C}$, Absolute humidity shall be less than 90% RH at 60°C

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5. Electrical Characteristics

5.1. Operating conditions:

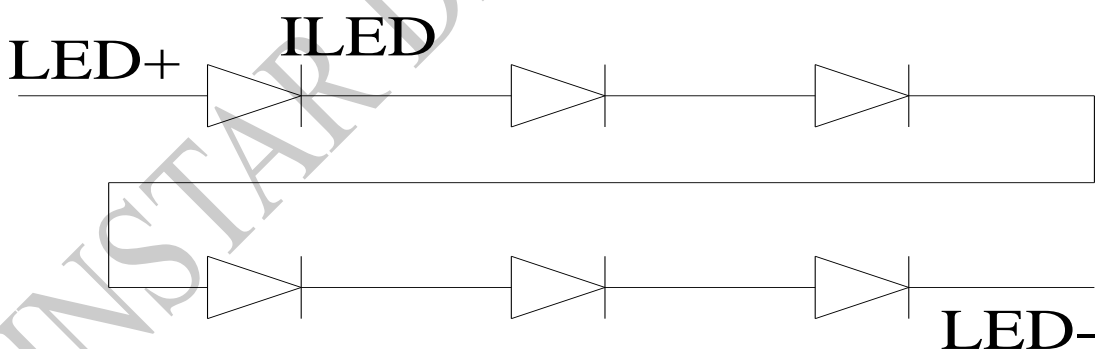
Item	Symbol	Min	Typ	Max	Unit	Remark
Supply Voltage For LCM	VCC	3.0	3.3	3.6	V	
Supply Current For LCM	ICC	—	8.6	15	mA	Note 1
Supply CTP	VDDT	3.0	3.3	3.6	V	
	I _{CTP}	—	45	68	mA	

Note 1 : This value is test for VDD=3.3V , Ta=25 °C only

5.2. LED driving conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current		-	20	-	mA	
Power Consumption		336	384	408	mW	
LED voltage	LED+	16.8	19.2	20.4	V	Note 1
LED Life Time		-	50,000	-	Hr	Note 2,3,4

Note 1 : There are 1 Groups LED



Note 2 : Ta = 25 °C

Note 3 : Brightness to be decreased to 50% of the initial value

Note 4 : The single LED lamp case

6.DC CHARATERISTICS

Parameter	Symbol	Rating			Unit	Condition
		Min	Typ	Max		
Low level input voltage	V_{IL}	0	-	0.3VCC	V	
High level input voltage	V_{IH}	0.7VCC	-	VCC	V	

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7.AC Characteristics

Digital Parallel RGB interface

Signal	Item	Symbol	Min	Typ	Max	Unit
Dclk	Frequency	Tosc	-	6.5	10	MHz
	High Time	Tch	-	77	-	ns
	Low Time	Tcl	-	77	-	ns
Data	Setup Time	Tsu	12	-	-	ns
	Hold Time	Thd	12	-	-	ns
Hsync	Period	TH	-	408	-	Tosc
	Pulse Width	THS	5	30	-	Tosc
	Back-Porch	Thb	-	38	-	Tosc
	Display Period	TEP	-	320	-	Tosc
	Hsync-den time	THE	36	68	88	-
	Front-Porch	Thf	-	20	-	Tosc
Vsync	Period	Tv	-	262	-	TH
	Pulse Width	Tvs	1	3	5	TH
	Back-Porch	Tvb	-	15	-	TH
	Display Period	Tvd	-	240	-	TH
	Front-Porch	Tvf	2	4	-	TH

Note:

1. $Thp + Thb = 68$, the user is make up by yourself.
2. $Tv = Tvs + Tvb + Tvd + Tvf$, the user is make up by yourself.
3. When SYNC mode is used, 1st data start from 68th Dclk after Hsync falling

CCIR601/656 Interface

Signal	Item	Symbol	Min	Typ	Max	Unit
Dclk	Frequency	Tosc	-	37	-	ns
	High Time	Tch	-	78	-	ns
	Low Time	Tcl	-	78	-	ns
Data	Setup Time	Tsu	12	-	-	ns
	Hold Time	Thd	12	-	-	ns

7.1. Waveform

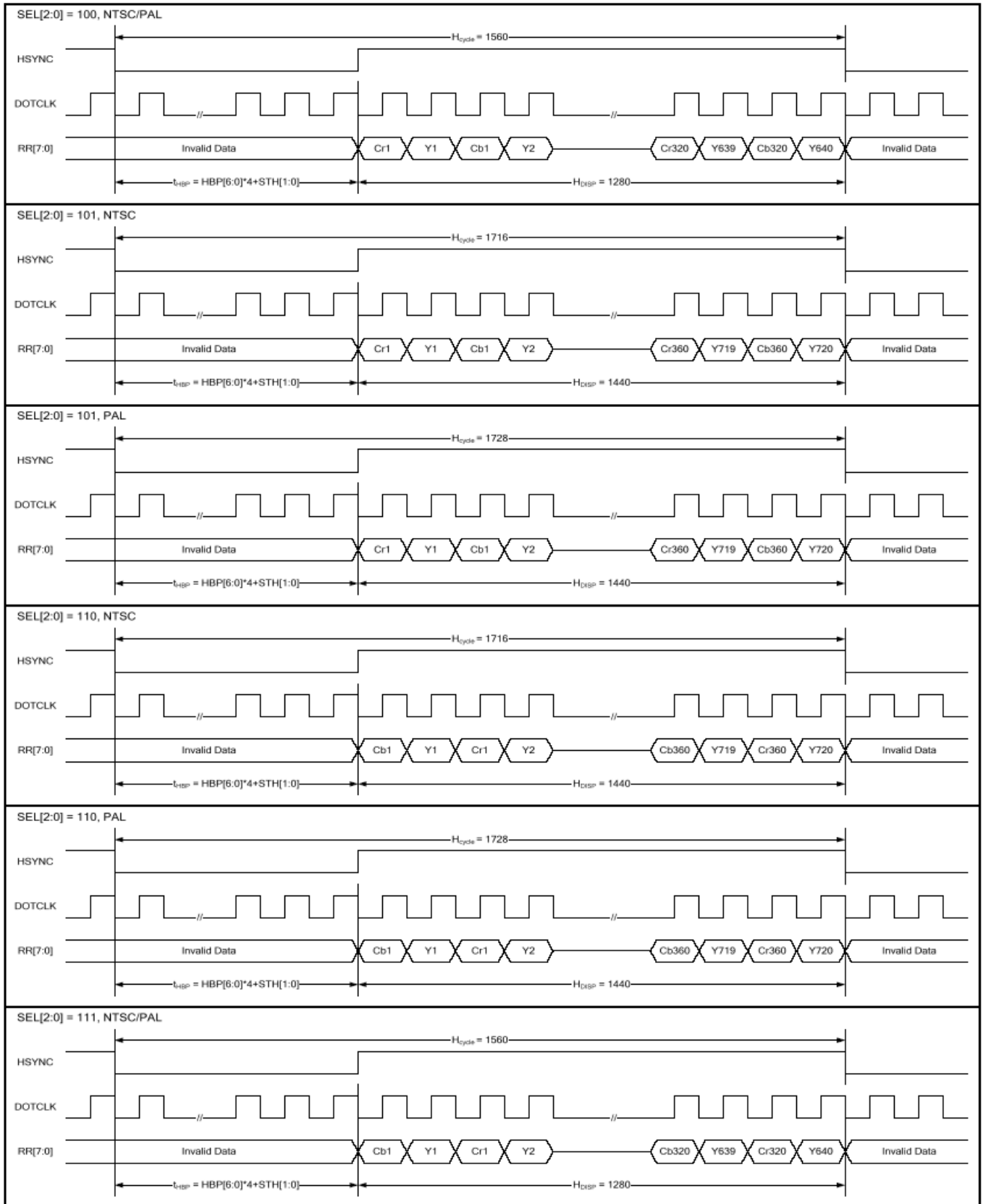


Figure 1 CCIR601 Horizontal Timing

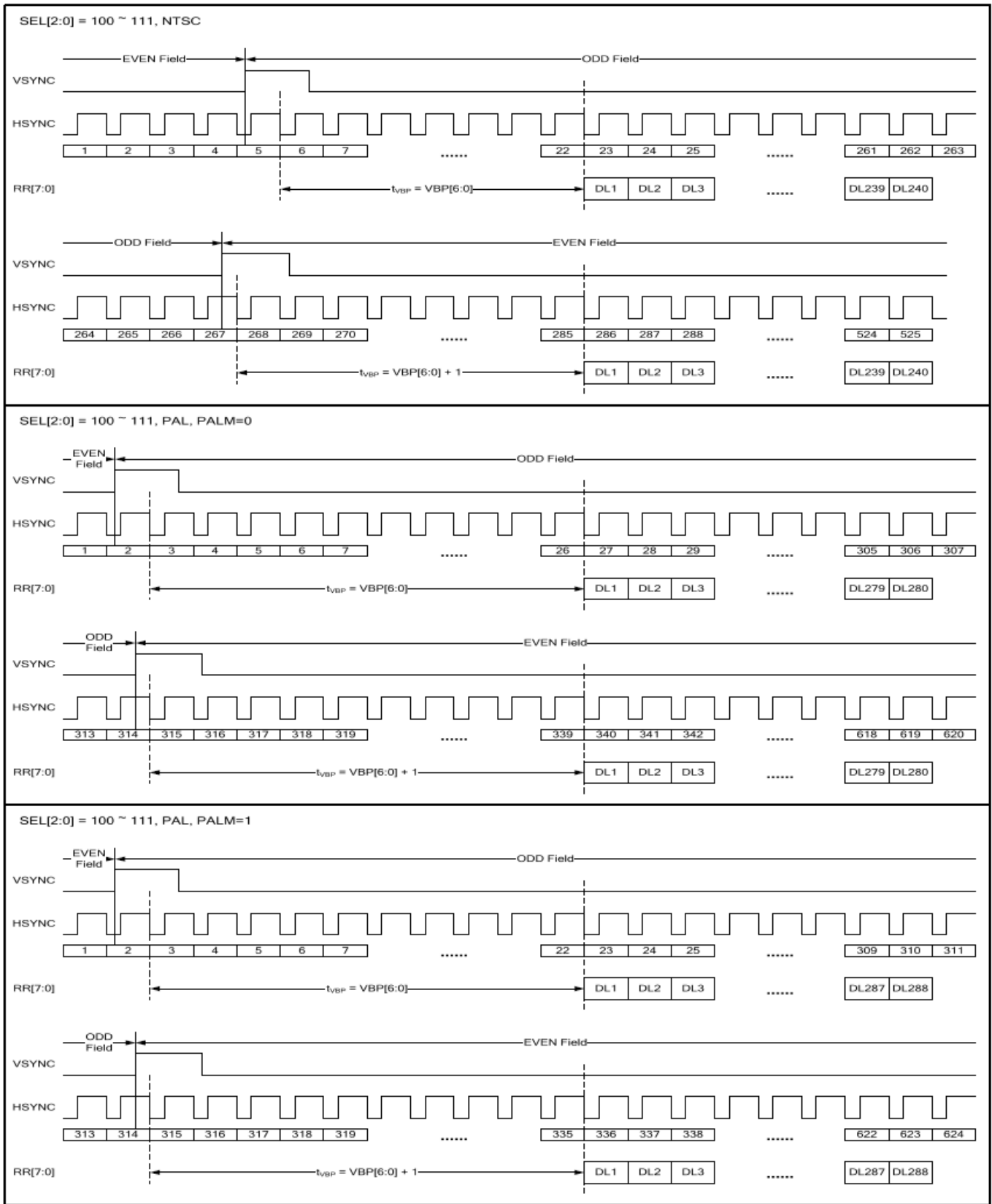


Figure 1 CCIR601 Vertical Timing

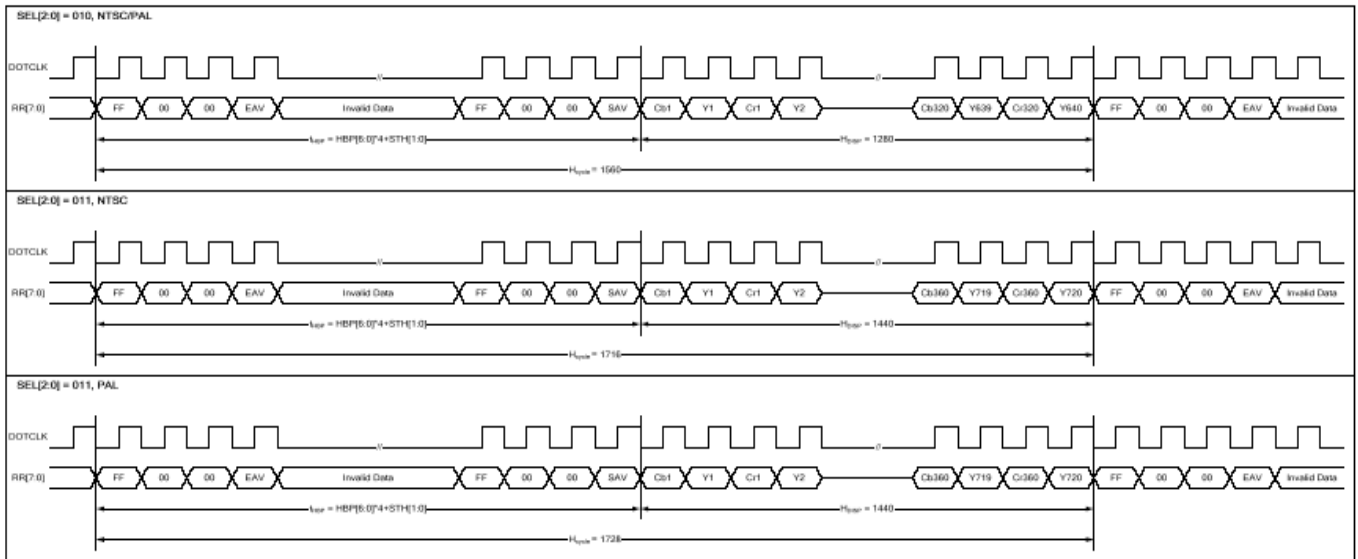


Figure 2 CCIR656 Horizontal Timing

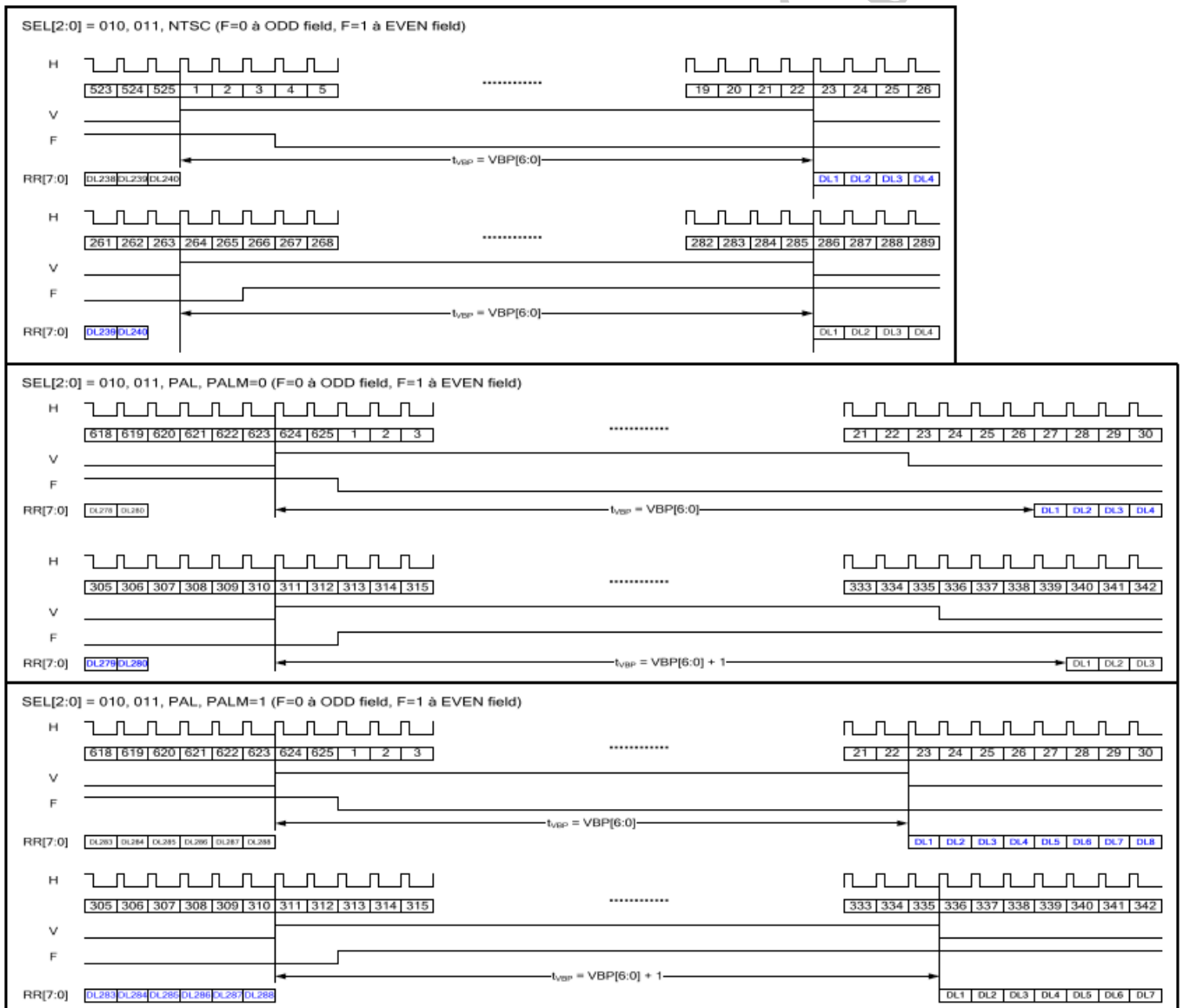


Figure 2 CCIR656 Vertical Timing

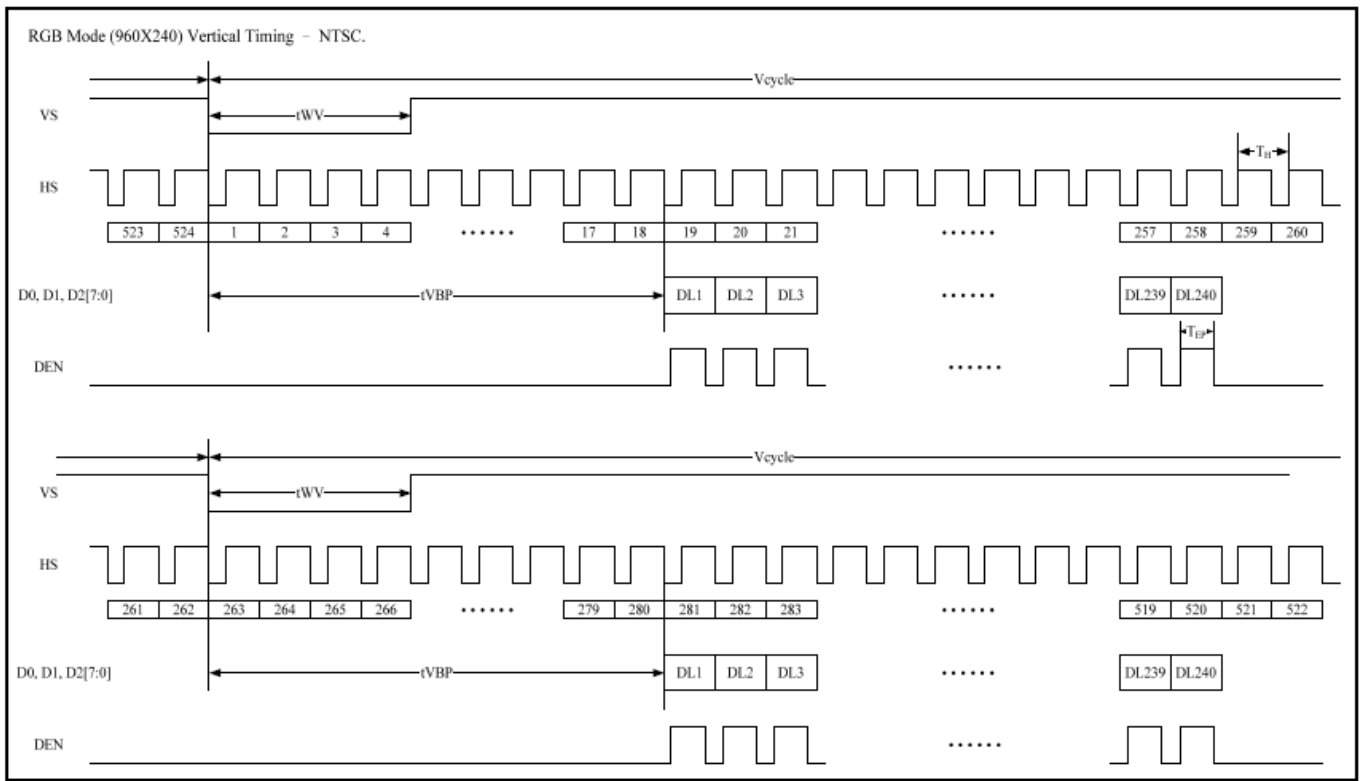
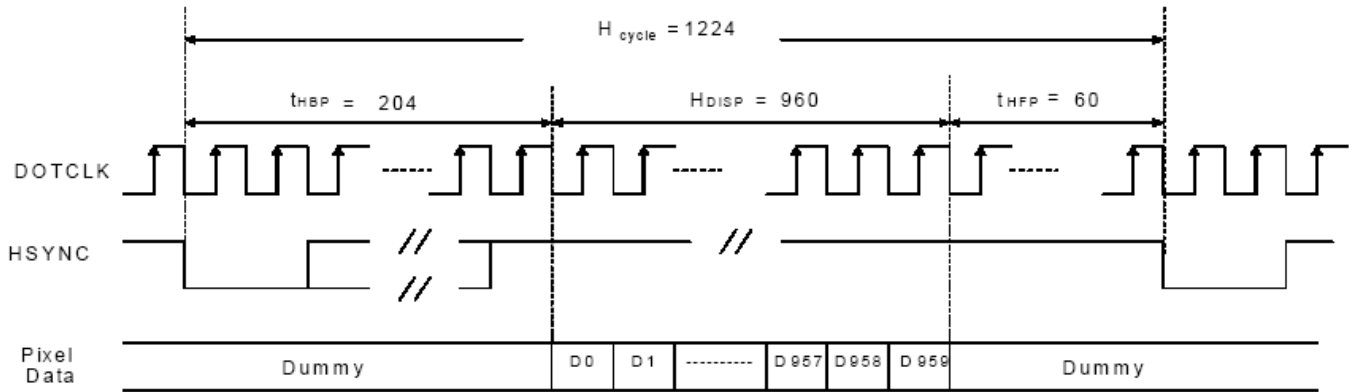
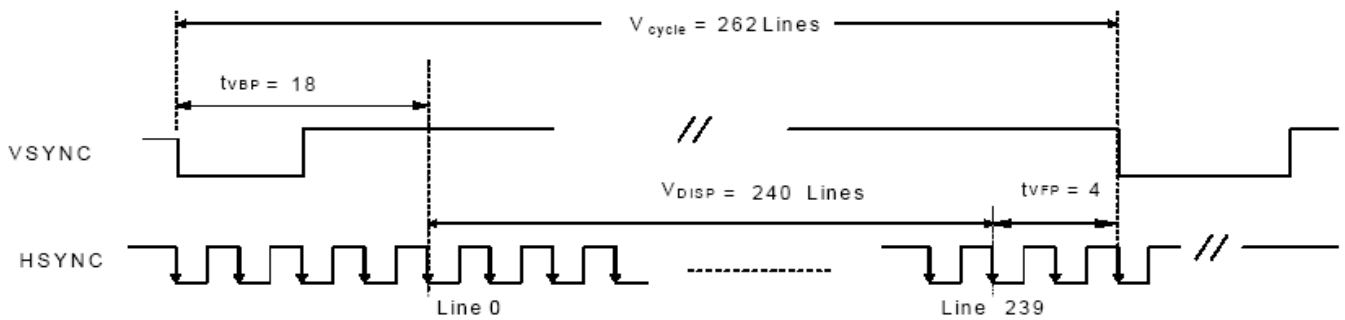


Figure 3 Digital RGB NTSC mode Vertical Data Format for 262T



a) Horizontal Data Transaction Timing



Vertical Data Transaction Timing

Figure 3 Data Transaction Timing in Serial RGB (8 bit) Interface (SYNC Mode)

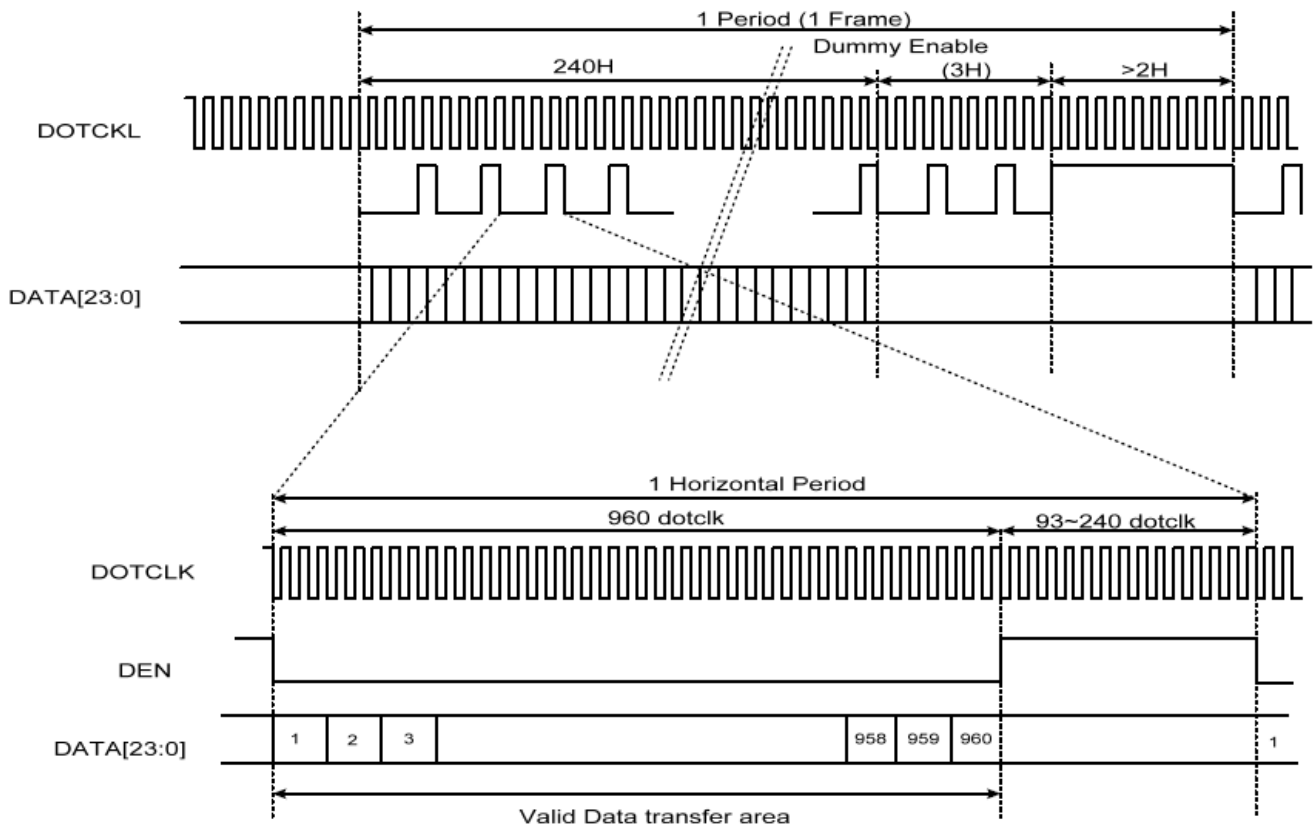
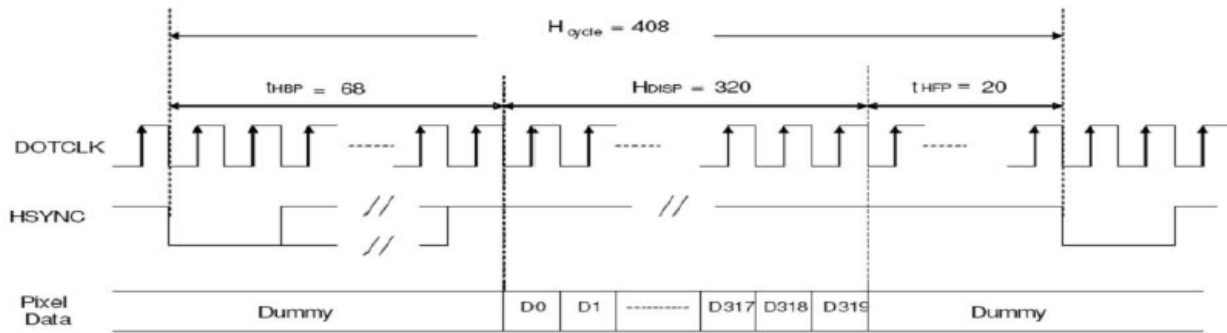
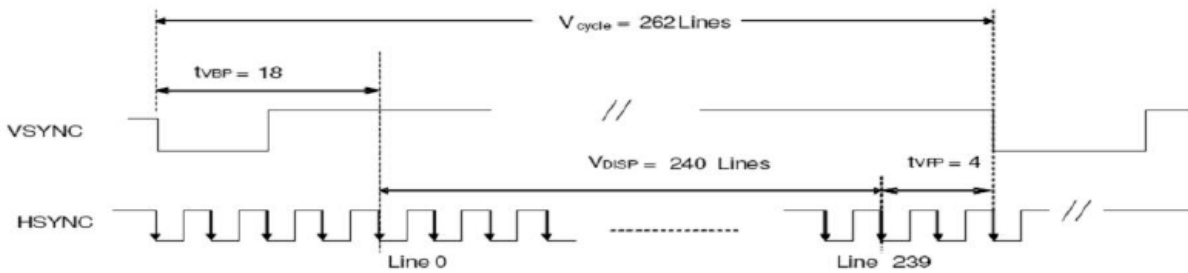


Figure 3 Data Transaction Timing in Serial RGB (8 bit) Interface (DE Mode)



a) Horizontal Data Transaction Timing



b) Vertical Data Transaction Timing

Figure 3 Data Transaction Timing in Parallel RGB (24 bit) Interface (SYNC Mode)

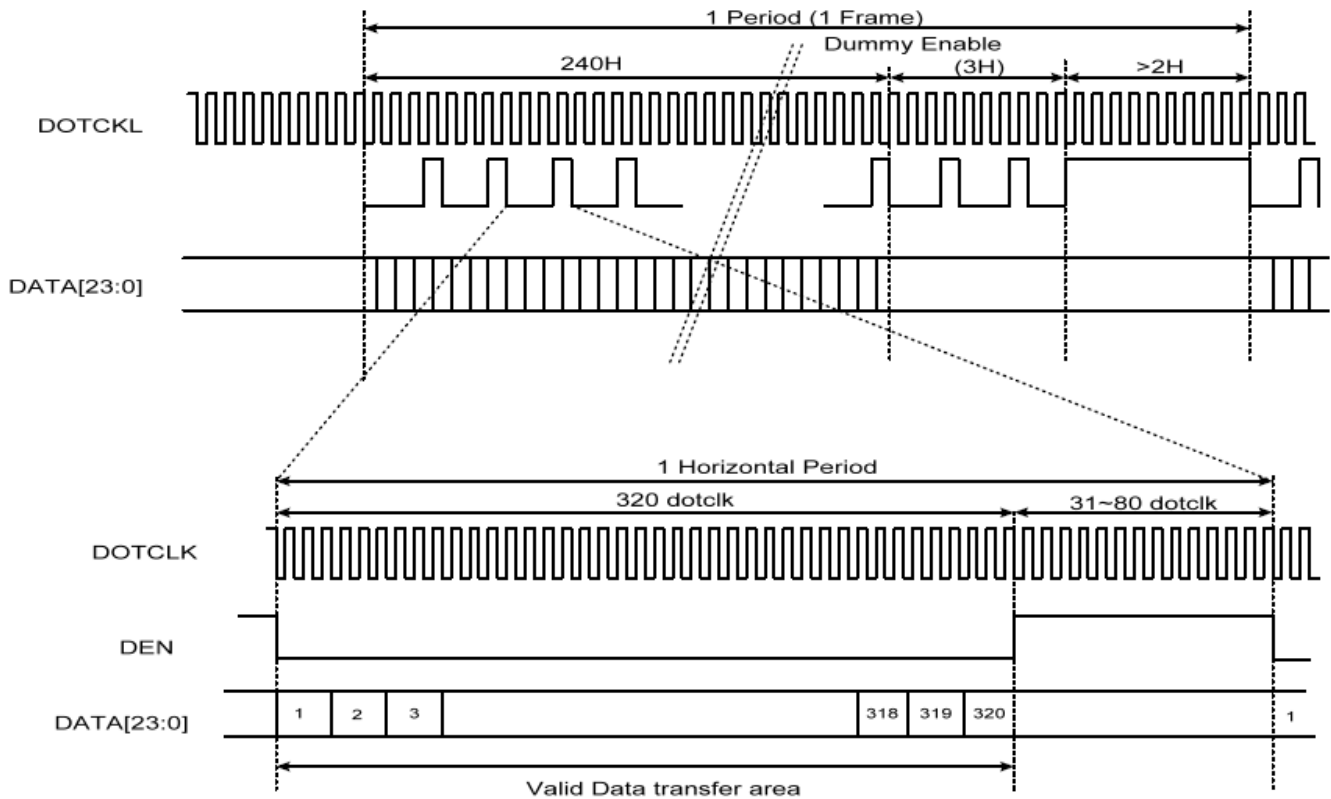


Figure 3 Data Transaction Timing in Parallel RGB (24 bit) Interface (DE Mode)

7.2. Clock and Sync waveforms



Figure 6 CLK and IHS timing waveform

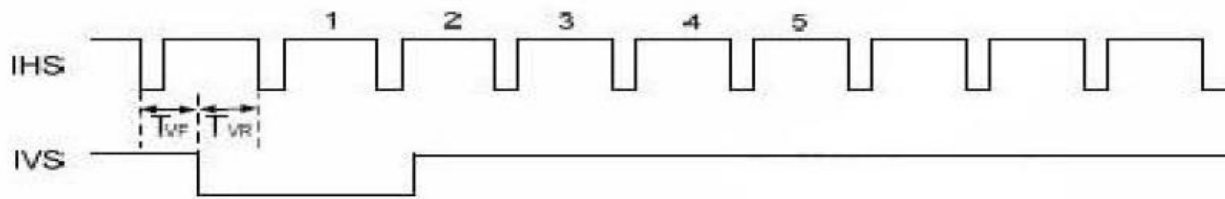
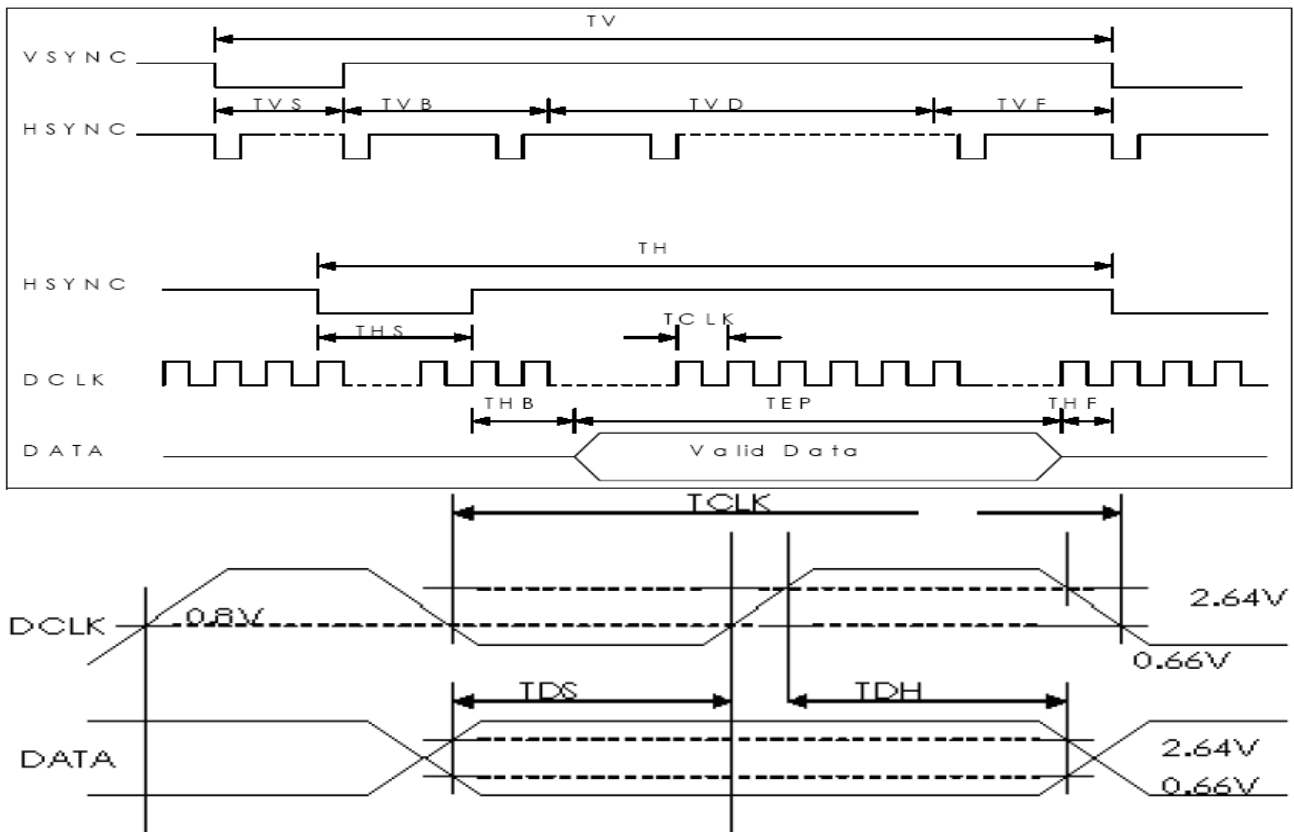
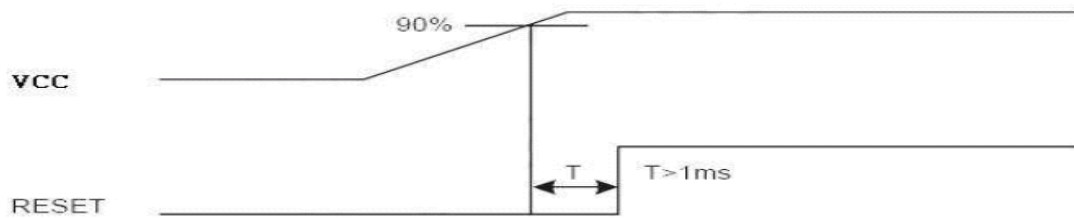


Figure 4 IHS and IVS timing waveforms



7.3. Reset Timing Chart

The RESET input must be held at least 1ms after power is stable



Reset timing

8. Optical Characteristics

Item	Symbol	Condition.	Min	Typ.	Max.	Unit	Remark	
Response time	Tr	$\theta=0^\circ$ 、 $\phi=0^\circ$	-	10	-	ms	Note 3	
	Tf		-	15	-	ms		
Contrast ratio	CR	At optimized viewing angle	300	350	-	-	Note 4	
Color Chromaticity	White	$\theta=0^\circ$ 、 $\phi=0^\circ$	Wx	0.26	0.31	0.36	-	Note 2,6,7
			Wy	0.28	0.33	0.38	-	
Viewing angle (Gray Scale Inversion Direction)	Hor.	$CR \geq 10$	Θ_R	-	55	-	Deg.	Note 1
			Θ_L	-	55	-		
	Ver.		Φ_T	-	45	-		
			Φ_B	-	50	-		
Brightness	-	-	280	340	-	cd/m ²	Center of display	
Uniformity	(U)	-	75	-	-	%	Note 5	

Ta=25±2°C, IL=20mA

Note 1: Definition of viewing angle range

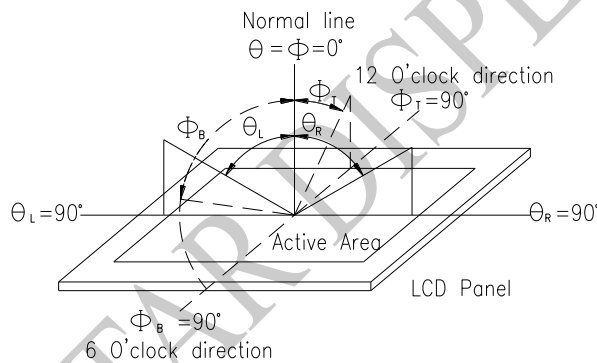


Fig. 8.1. Definition of viewing angle

Note 2: Test equipment setup:

After stabilizing and leaving the panel alone at a driven temperature for 10 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7orBM-5 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

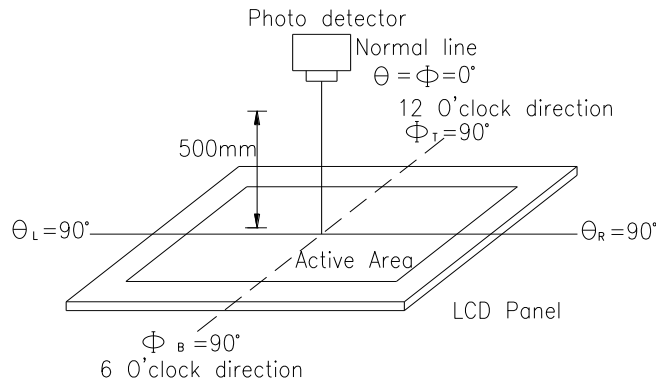
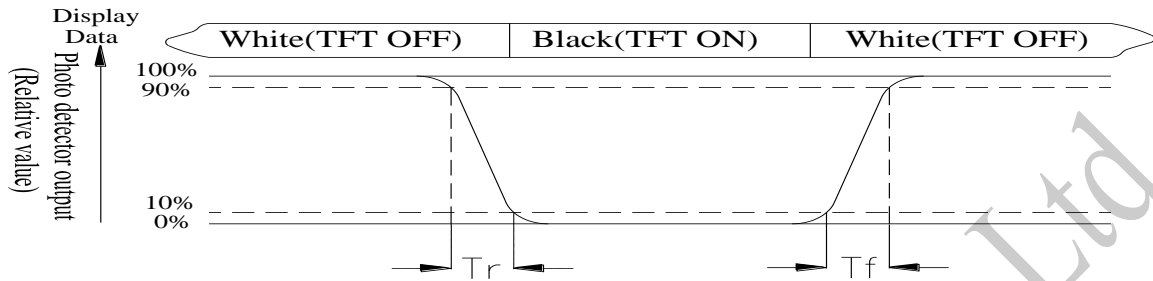


Fig. 8.2. Optical measurement system setup

Note 3: 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_r , is the time between photo detector output intensity changed from 90% to 10%. And fall time, T_f , is the time between photo detector output intensity changed from 10% to 90%



Note 4: Definition of contrast ratio:

The contrast ratio is defined as the following expression.

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

Note 5: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (reference the picture in below). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity (U) = $L_{\min}/L_{\max} \times 100\%$

L = Active area length

W = Active area width

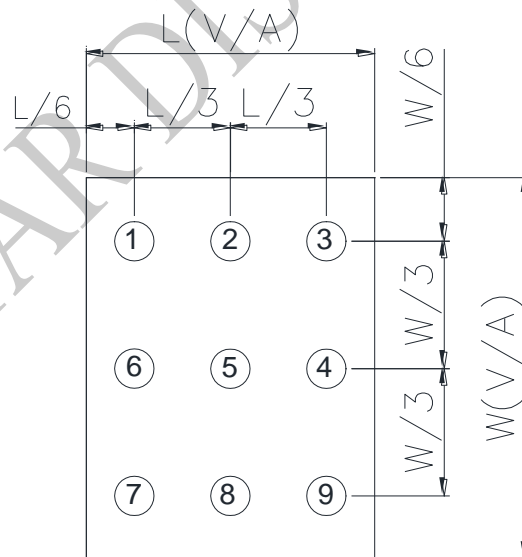


Fig8.3. Definition of uniformity

Note 6: Definition of color chromaticity (CIE 1931)

Color coordinates measured at the center point of LCD

Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

9.Interface

9.1. LCM PIN Definition

Pin	Symbol	Function	Remark
1	LED-	Power for LED backlight cathode	
2	LED-	Power for LED backlight cathode	
3	LED+	Power for LED backlight anode	
4	LED+	Power for LED backlight anode	
5	NC	No connect	
6	NC	No connect	
7	NC	No connect	
8	/RESET	Hardware reset	
9	SPENA	Chip select pin of serial interface	
10	SPCLK	Clock pin of serial interface (SPCK)	
11	SPDAT	Data input pin in serial mode(SPDA)	
12	B0	Data bus	
13	B1	Data bus	
14	B2	Data bus	
15	B3	Data bus	
16	B4	Data bus	
17	B5	Data bus	
18	B6	Data bus	
19	B7	Data bus	
20	G0	Data bus	
21	G1	Data bus	
22	G2	Data bus	
23	G3	Data bus	
24	G4	Data bus	
25	G5	Data bus	
26	G6	Data bus	
27	G7	Data bus	
28	R0	Data bus	
29	R1	Data bus	
30	R2	Data bus	

31	R3	Data bus	
32	R4	Data bus	
33	R5	Data bus	
34	R6	Data bus	
35	R7	Data bus	
36	HSYNC	Line synchronization signal	
37	VSYNC	Frame synchronization signal	
38	DCLK	Dot-clock signal and oscillator source	
39	NC	No connect	
40	NC	No connect	
41	VCC	Power Supply	
42	VCC	Power Supply	
43	NC	No connect	
44	NC	No connect	
45	NC	No connect	
46	NC	No connect	
47	NC	No connect	
48	SEL2	Input pin to select input interface mode	
49	SEL1	Input pin to select input interface mode	
50	SEL0	Input pin to select input interface mode	
51	NC	No connect	
52	DE	Display enable pin from controller. Internal pull high Connect to VDDIO or floating if not used	
53	DGND	System ground pin of the IC. Connect to system ground.	
54	AVSS	Grounding for analog circuit. Connect to system ground	

Note:

1. The mode control (SEL2) not use, it can't control CCIR601 interface, If not use CCIR601, it can floating.
2. For digital RGB input data format, both SYNC mode and DE+SYNC mode are supported. If DE signal is fixed low, SYNC mode is used. Otherwise, DE+SYNC mode is used. Suggest used SYNC mode!!
3. Usually pull high.
4. IF select serial RGB or CCIR601/656 input mode is selected, only DX0-DX7 used, and the other short to GND, Only selected serial RGB_CCIR601/656 interface, DX BUS will enable, Digital input mode DX0 is LSB and DX7 is MSB.

5. Control the input data format

SEL2	SEL1	SEL0	Format	Operating Frequency
0	0	0	Parallel-RGB data format (only support stripe type color filter)	6.5MHZ
0	0	1	Serial-RGB data format	19.5 MHZ
0	1	0	CCIR 656data format (640RGB)	24.54 MHZ
0	1	1	CCIR 656data format (720RGB)	27 MHZ
1	0	0	YUV mode A data format(Cr-Y-Cb-Y)	24.54 MHZ
1	0	1	YUV mode A data format(Cr-Y-Cb-Y)	27 MHZ
1	1	0	YUV mode B data format(Cr-Y-Cr-Y)	27 MHZ
1	1	1	YUV mode B data format(Cr-Y-Cr-Y)	24.54 MHZ

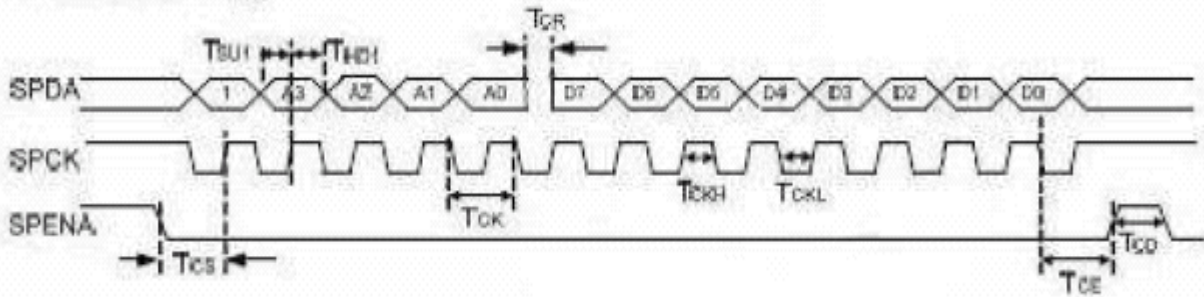
Input format	DOTCLK Ferg(MHz)	Display Data	Active Area (DOTCLK)
YUV mode	24.54	640	1280
	27	720	1440

Mode	D[23:16]	D[15:8]	D[7:0]	IHS	IVS	DEN
ITU-R BT 656	D[23:16]	GND	GND	NC	NC	NC
ITU-R BT 601	D[23:16]	GND	GND	IHS	IVS	NC
8 bit RGB	D[23:16]	GND	GND	IHS	IVS	NC for HV Mode
						DEN for DEN Mode
24 bit RGB	R[7:0]	G[7:0]	B[7:0]	IHS	IVS	NC for HV Mode
						DEN for DEN Mode

SPI timing Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
SPCK period	Tcx	60	-	-	ns
SPCK high width	Tcxh	30	-	-	ns
SPCK low width	Tcxl	30	-	-	ns
Data setup time	Tsu1	12	-	-	ns
Data hold time	Thd1	12	-	-	ns
SPENA to SPCK setup time	Tcs	20	-	-	ns
SPENA to SPDA hold time	Tce	20	-	-	ns
SPENA high pulse width	Tcd	50	-	-	ns
SPDA output latency	Tcs	-	1/2	-	Tcx

● SPI read timing



● SPI write timing

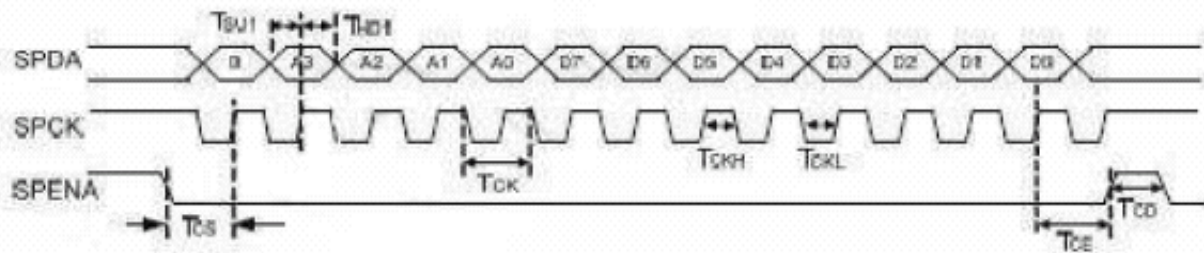


Figure11 SPI read and write timing

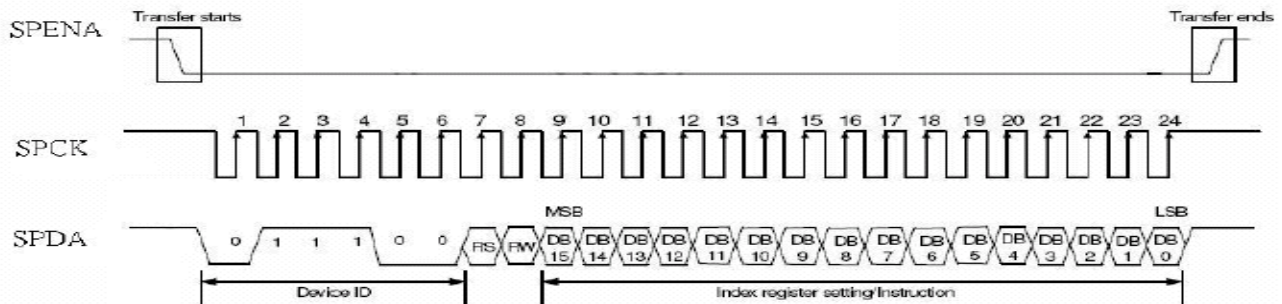


Figure12 SPI timing

WINSTAR DISPLAY Co., Ltd.

Basic Display Color and Gray Scale

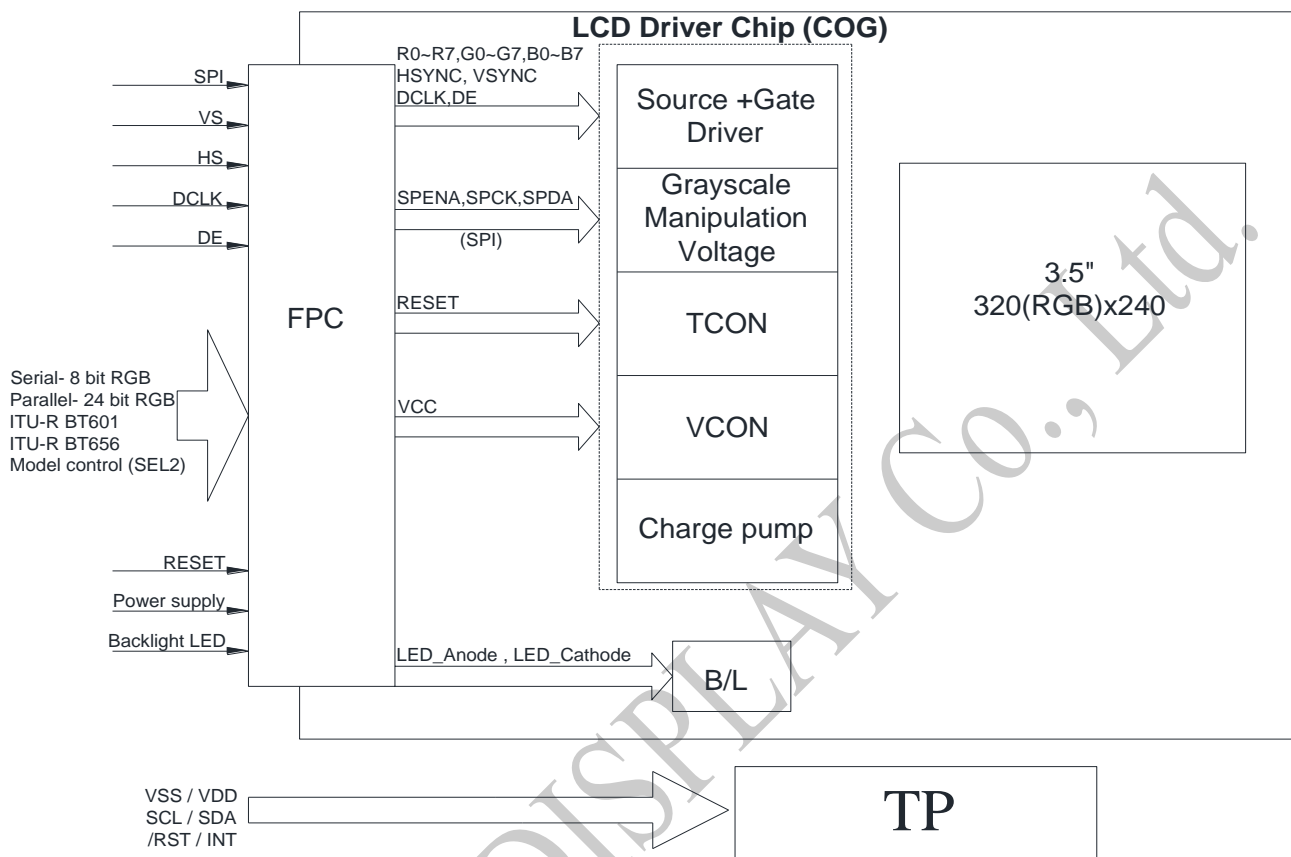
Color		Input Color Data																							
		Red								Green								Blue							
		MSB	Red						LSB	MSB	Green						LSB	MSB	Blue						LSB
	R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0	
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Red(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Green(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	
	Blue(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Red	Red(0) Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Red(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Red(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:		
	Red(253)	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Red(254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Red(255) Bright	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Green	Green(0) Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Green(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0		
	Green(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0		
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:		
	Green(253)	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0		
	Green(254)	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0		
	Green(255) Bright	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0		
Blue	Blue(0) Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Blue(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
	Blue(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:		
	Blue(253)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0		
	Blue(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1		
	Blue(255) Bright	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1		

9.2. CTP PIN Definition

Pin	Symbol	Function	Remark
1	VSS	Ground.	
2	VDDT	Power Supply : +3.3V	
3	SCL	I2C clock input	
4	NC	No connect	
5	SDA	I2C data input and output	
6	NC	No connect	
7	/RST	External Reset, Low is active	
8	NC	No connect	
9	/INT	External interrupt to the host	
10	VSS	Ground.	

10. Block Diagram

LCD Panel



11. Reliability

Content of Reliability Test (Wide temperature, -20°C~70°C)

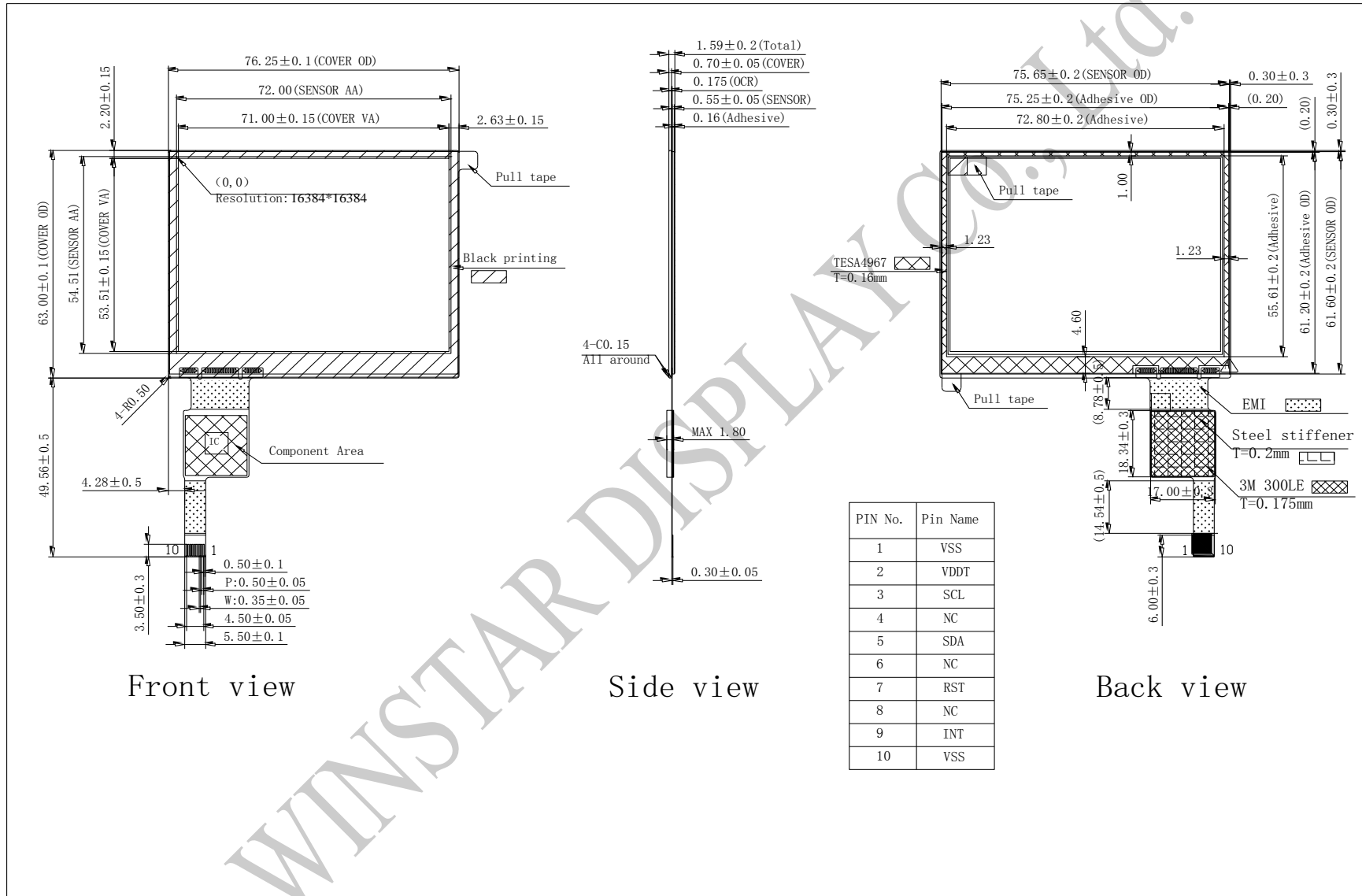
Environmental Test			
Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80°C 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C 200hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70°C 200hrs	—
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20°C 200hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 60°C,90%RH max	60°C,90%RH 96hrs	1,2
Thermal shock resistance	The sample should be allowed stand the following 10 cycles of operation <div style="text-align: center;"> <p style="margin: 0;">-20°C 25°C 70°C</p> <p style="margin: 0;">30min 5min 30min</p> <p style="margin: 0;">1 cycle</p> </div>	-20°C/70°C 10 cycles	—
Vibration test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude : 1.5mm Vibration Frequency : 10~55Hz One cycle 60 seconds to 3 directions of X,Y,Z for Each 15 minutes	3
Static electricity test	Endurance test applying the electric stress to the terminal.	VS=±600V(contact), ±800v(air), RS=330Ω CS=150pF 10 times	—

Note1: No dew condensation to be observed.

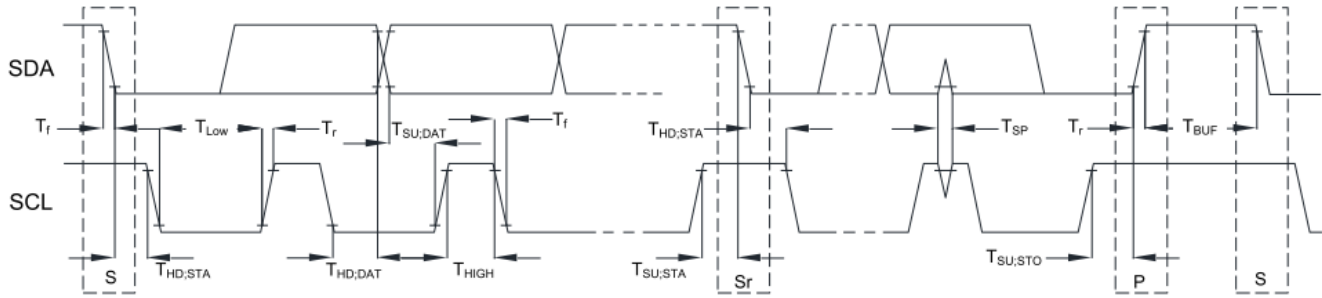
Note2: The function test shall be conducted after 4 hours storage at the normal Temperature and humidity after remove from the test chamber.

Note3: The packing have to including into the vibration testing.

12.Touch Panel Information

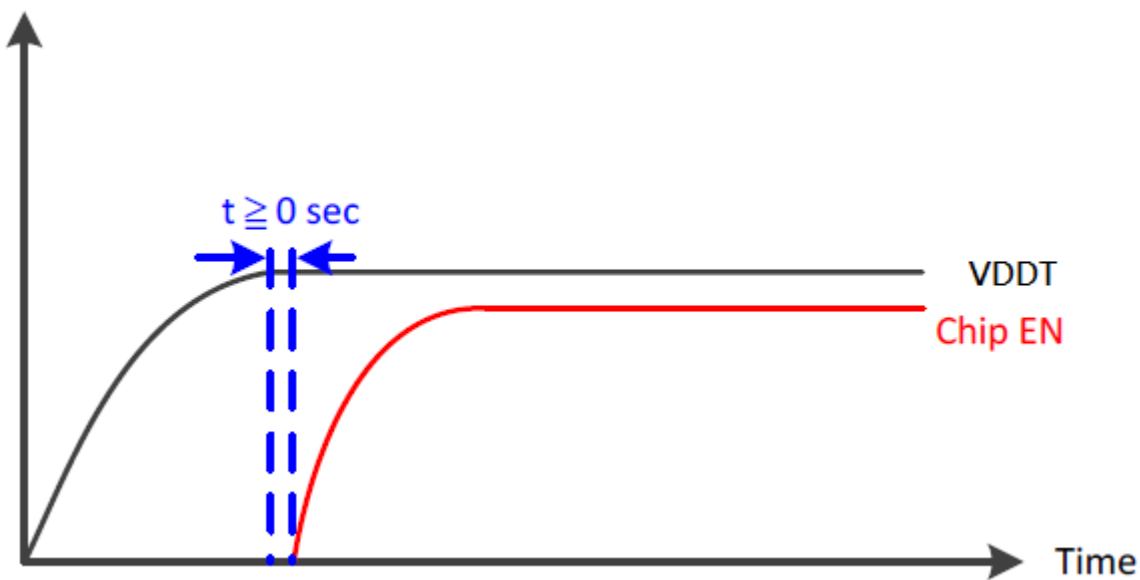


12.1. I2C AC Characteristics

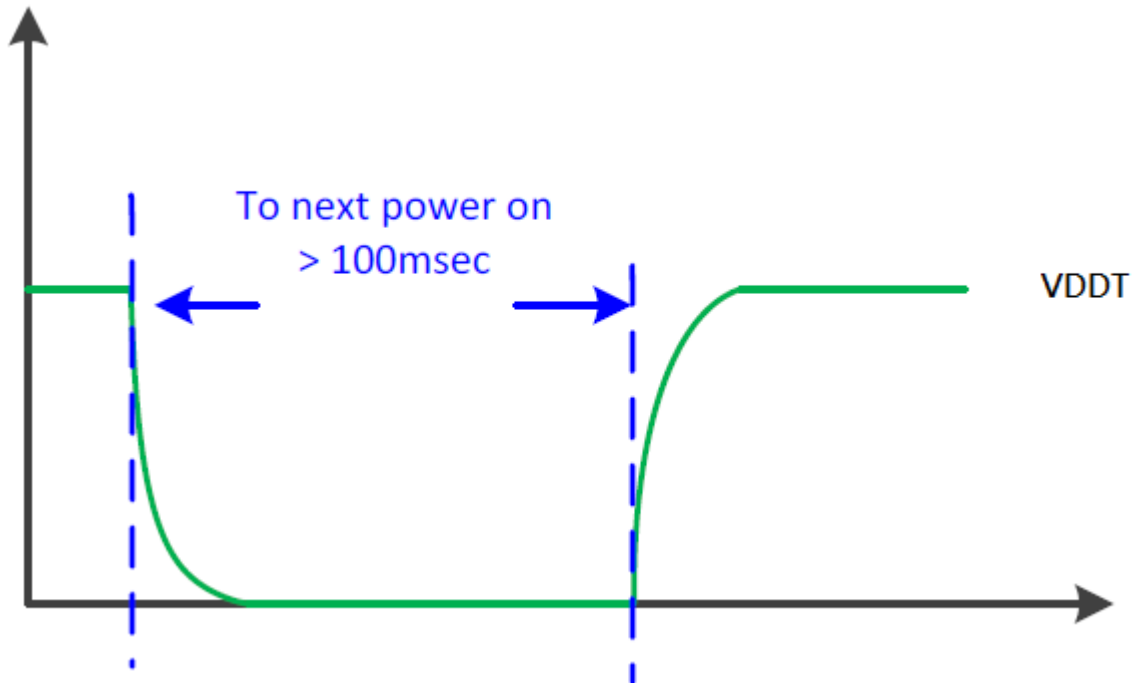


Item	Symbol	100kHz		400kHz		Unit
		Min.	Max.	Min.	Max.	
SCL standard mode clock frequency	F _{SCL}	0	100	0	400	kHz
Hold time (repeated) START condition. After this period, the first clock is generated.	T _{HD;STA}	4	--	0.6	--	us
LOW period of the SCL clock	T _{LOW}	4.7	--	1.3	--	us
HIGH period of the SCL clock	T _{HIGH}	4	--	0.6	--	us
Setup time for a repeat START condition.	T _{SU;STA}	4.7	--	0.6	--	us
Data hold time	T _{HD;DAT}	0	3.45	0	0.9	us
Data setup time	T _{SU;DAT}	250	--	100	--	ns
Rising time of both SDA and SCL signals	T _r	--	1000	--	300	ns
Falling time of both SDA and SCL signals	T _f	--	300	--	300	ns
Setup time for STOP condition.	T _{SU;STO}	4	--	0.6	--	us
Free time between STOP and START condition	T _{BUF}	4.7	--	1.3	--	us
Pulse width of spikes which must be suppressed by input filter	T _{SP}	--	--	0	50	ns

12.2. Power On Sequence



12.3. Power Off to Power On Sequence



WINSTAR DISPLAY



1、Panel Specification :

- 1. Panel Type : Pass NG , _____
- 2. View Direction : Pass NG , _____
- 3. Numbers of Dots : Pass NG , _____
- 4. View Area : Pass NG , _____
- 5. Active Area : Pass NG , _____
- 6. Operating : Pass NG , _____
- 7. Storage Temperature : Pass NG , _____
- 8. Others : _____

2、Mechanical

- 1. PCB Size : Pass NG , _____
- 2. Frame Size : Pass NG , _____
- 3. Material of Frame : Pass NG , _____
- 4. Connector Position : Pass NG , _____
- 5. Fix Hole Position : Pass NG , _____
- 6. Backlight Position : Pass NG , _____
- 7. Thickness of PCB : Pass NG , _____
- 8. Height of Frame to PCB : Pass NG , _____
- 9. Height of Module : Pass NG , _____
- 10. Others : Pass NG , _____

3、Relative Hole Size :

- 1. Pitch of Connector : Pass NG , _____
- 2. Hole size of Connector : Pass NG , _____
- 3. Mounting Hole size : Pass NG , _____
- 4. Mounting Hole Type : Pass NG , _____
- 5. Others : Pass NG , _____

4、Backlight Specification :

- 1. B/L Type : Pass NG , _____
- 2. B/L Color : Pass NG , _____
- 3. B/L Driving Voltage (Reference for LED) : Pass NG , _____
- 4. B/L Driving Current : Pass NG , _____
- 5. Brightness of B/L : Pass NG , _____
- 6. B/L Solder Method : Pass NG , _____
- 7. Others : Pass NG , _____



Winstar Module Number : _____

Page: 2

5、Electronic Characteristics of Module :

- 1. Input Voltage : Pass NG , _____
- 2. Supply Current : Pass NG , _____
- 3. Driving Voltage for LCD : Pass NG , _____
- 4. Contrast for LCD : Pass NG , _____
- 5. B/L Driving Method : Pass NG , _____
- 6. Negative Voltage Output : Pass NG , _____
- 7. Interface Function : Pass NG , _____
- 8. LCD Uniformity : Pass NG , _____
- 9. ESD test : Pass NG , _____
- 10. Others : Pass NG , _____

6、Summary :

Sales signature : _____

Customer Signature : _____

Date : / / _____

