Address: Midas Components Limited, Electra House, 32 Southdown Road, Great Yarmouth, Norfolk, NR31 0DU
Telephone: +44 (0)1493 602602
Fax: +44 (0)1493 665111
Email: sales@midascomponents.co.uk
Website: www.midascomponents.co.uk

Specification

MCT035L6TW320240LML

Contents

1. Revision History

DATE	VERSION	REVISED PAGE NO.	Note
2009/7/22	1		First issue

2. General Specification

- Dot Matrix: 320 x RGB x240
- Module dimension: 76.9 x 63.9 x 4.46 (max.) mm^3
- Active area: 70.08 x 52.56 mm^2
- Dot size: 0.073 x 0.219 mm^2
- LCD type: TFT, Negative, Transmissive
- View direction: 6 o'clock
- Backlight Type: LED, Normally White

*Color tone slight changed by temperature and driving voltage.

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Midas Active Matrix Display Part Number System

MC	T	057	A	6	*	W	320240	L	M	L	*	*	*	*	*
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 = **MC:** Midas Components

2 = **T:** TFT **A:** Active Matrix OLED

3 = **Size**

4 = **Series**

5 = **Viewing Angle: 6:** 6 O'clock **12:** 12 O'clock

6 = **Blank:** No Touch **T:** Touchscreen

7 = **Operating Temp Range:** **S:** 0 to 50Deg C **B:** -20+60Deg C
W: -20+70Deg C **E:** -30+85Deg C

8 = **No of Pixels**

9 = **Orientation:** **P:** Portrait **L:** Landscape

10 = **Mode:** **R:** Reflective **M:** Transmissive **T:** Transflective
S: Sunlight Readable (transmissive)

11 = **Backlight:** **Blank:** None **L:** LED **C:** CCFL

12 = **Blank:** No Module/board **C:** Controller board module

13 = **Blank:** None **V:** Video

14 = **Blank:** None **B:** Bracket

15 = **Blank:** None **H:** Host Cable

16 = **Blank:** None **K:** Keyboard

4. Interface Pin Function

4.1. LCM PIN Definition

Pin	Symbol	I/O	Function	Remark
1	VBL-	I	Backlight LED Ground	
2	VBL-	I	Backlight LED Ground	
3	VBL+	I	Backlight LED Power	
4	VBL+	I	Backlight LED Power	
5	NC		Not Use	
6	NC		Not Use	
7	NC		Not Use	
8	/RESET	-	Hardware reset	
9	SPENA	I	SPI interface Data Enable signal	
10	SPCLK	I	SPI interface Data Clock	
11	SPDAT	I	SPI interface Data	
12	B0	I	Blue Data Bit 0	
13	B1	I	Blue Data Bit 1	
14	B2	I	Blue Data Bit 2	
15	B3	I	Blue Data Bit 3	
16	B4	I	Blue Data Bit 4	
17	B5	I	Blue Data Bit 5	
18	B6	I	Blue Data Bit 6	
19	B7	I	Blue Data Bit 7	
20	G0	I	Green Data Bit 0	
21	G 1	I	Green Data Bit 1	
22	G 2	I	Green Data Bit 2	
23	G 3	I	Green Data Bit 3	
24	G 4	I	Green Data Bit 4	
25	G 5	I	Green Data Bit 5	
26	G 6	I	Green Data Bit 6	
27	G 7	I	Green Data Bit 7	
28	R0	I	Red Data Bit0/DX0	
29	R1	I	Red Data Bit1/DX1	
30	R2	I	Red Data Bit2/DX2	
31	R3	I	Red Data Bit3/DX3	
32	R4	I	Red Data Bit4/DX4	
33	R5	I	Red Data Bit5/DX5	
34	R6	I	Red Data Bit6/DX6	
35	R7	I	Red Data Bit7/DX7	
36	HSYNC	I	Horizontal sync input	
37	VSYNC	I	Vertical sync input	
38	DCLK	I	Dot Data Clock	
39	NC		Not use	
40	NC		Not use	
41	Vcc	I	Digital power	
42	Vcc	I	Digital power	

43	NC		Not Use	
44	NC		Not Use	
45	NC		Not use	
46	NC		Not use	
47	NC		Not use	
48	IF2	I	Control the input data format /floating	
49	IF1	I	Control the input data format	
50	IF0	I	Control the input data format	
51	NC		Not use	
52	DE	I	Data Enable input	
53	GND	I	Ground	
54	GND	I	Ground	

Note:

1. The mode control (IF2) 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.

IF2-0: Define the input interface mode.

IF2	IF1	IF0	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	19.5MHz
0	1	0	CCIR 656 data format (640RGB)	24.54MHz
0	1	1	CCIR 656 data format (720RGB)	27MHz
1	0	0	YUV mode A data format (Cr-Y-Cb-Y)	24.54MHz
1	0	1	YUV mode A data format (Cr-Y-Cb-Y)	27MHz
1	1	0	YUV mode B data format (Cb-Y-Cr-Y)	27MHz
1	1	1	YUV mode B data format (Cb-Y-Cr-Y)	24.54MHz

Input format	DOTCLK Freq (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

4.2 SPI timing Characteristics

PARAMETER	Symbol	Min.	Typ.	Max.	Unit
SPCK period	T_{CK}	60	-	-	ns
SPCK high width	T_{CKH}	30	-	-	ns
SPCK low width	T_{CKL}	30	-	-	ns
Data setup time	T_{SU1}	12	-	-	ns
Data hold time	T_{HD1}	12	-	-	ns
SPENA to SPCK setup time	T_{CS}	20	-	-	ns
SPENA to SPDA hold time	T_{CE}	20	-	-	ns
SPENA high pulse width	T_{CD}	50	-	-	ns
SPDA output latency	T_{CR}	-	1/2	-	T_{CK}

- **SPI read timing**

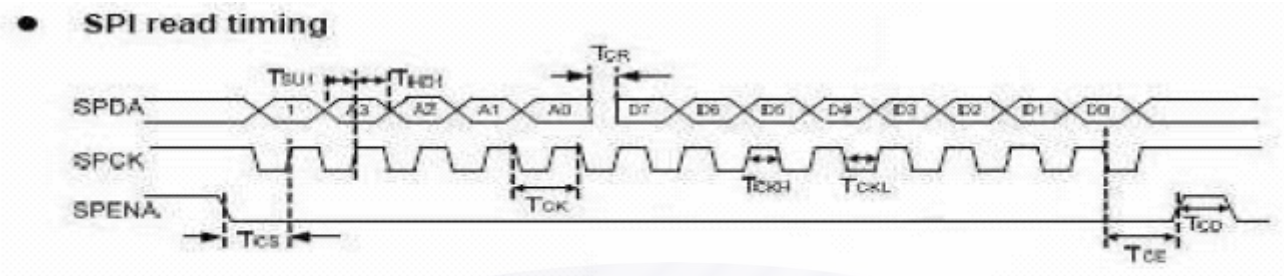


Figure8 SPI read timing

- **SPI write timing**

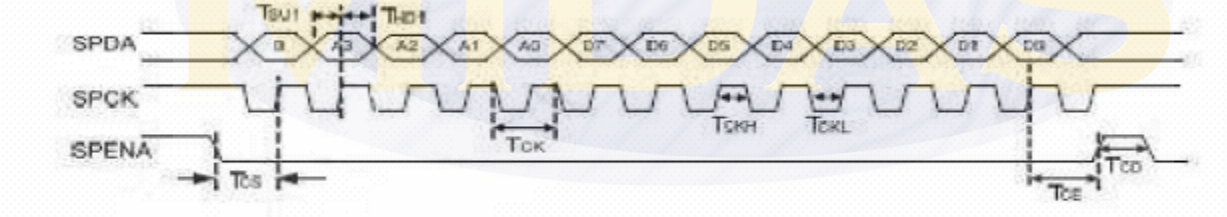


Figure9 SPI write timing

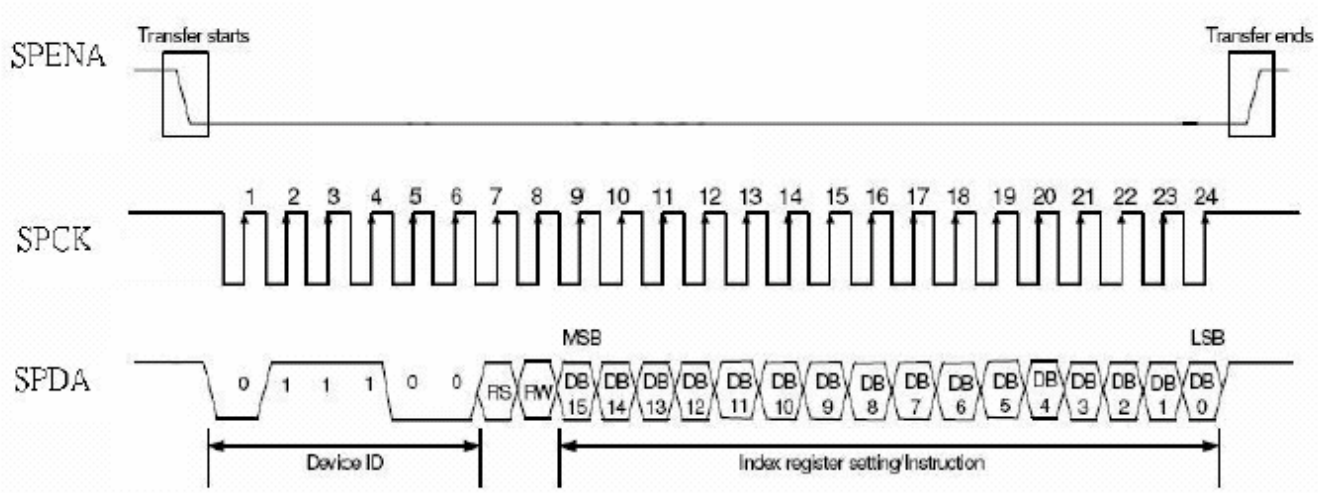


Figure10 SPI timing

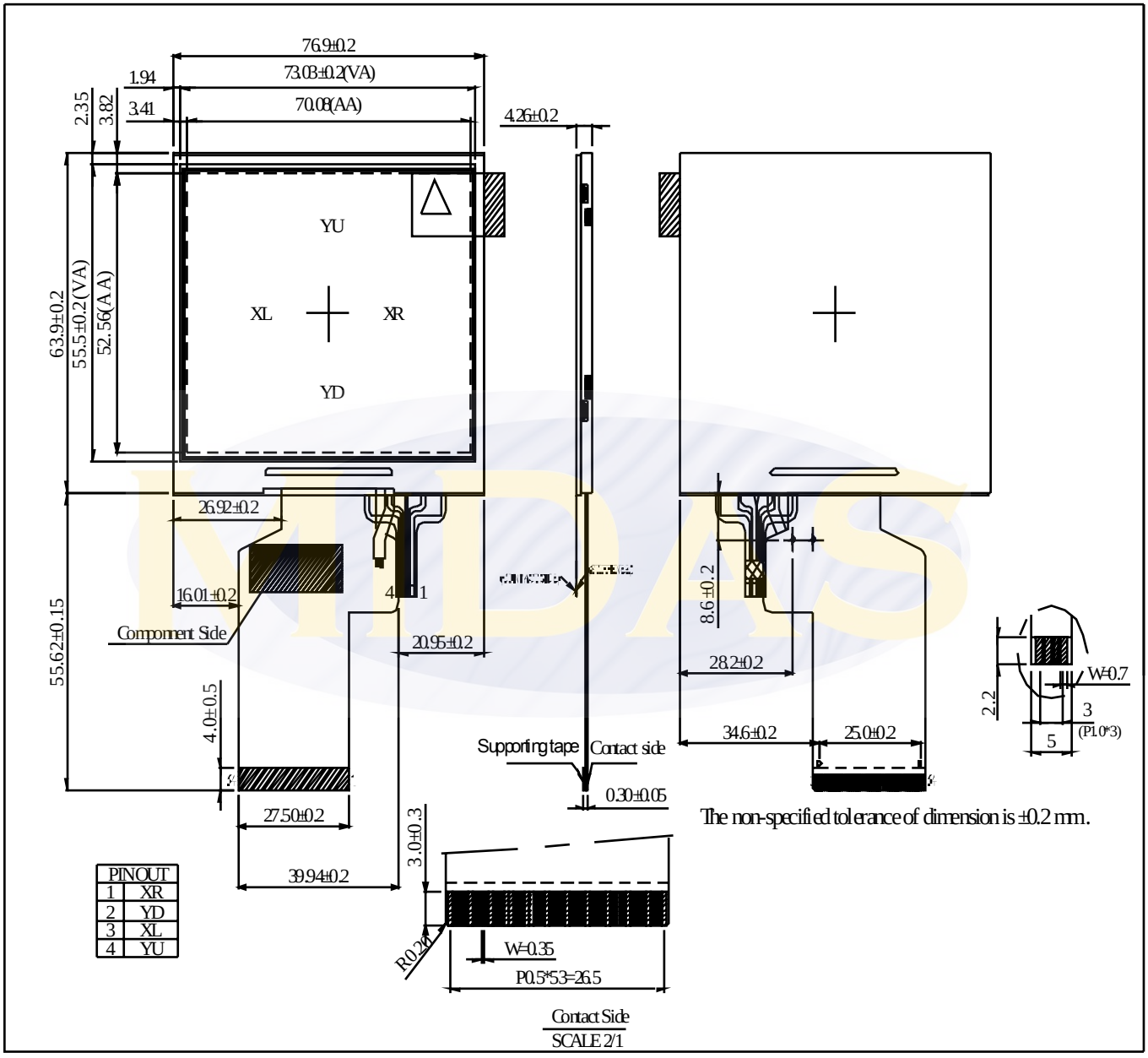
4.3 SPI Register Description

Will be showing on Application Note From Chilintech.

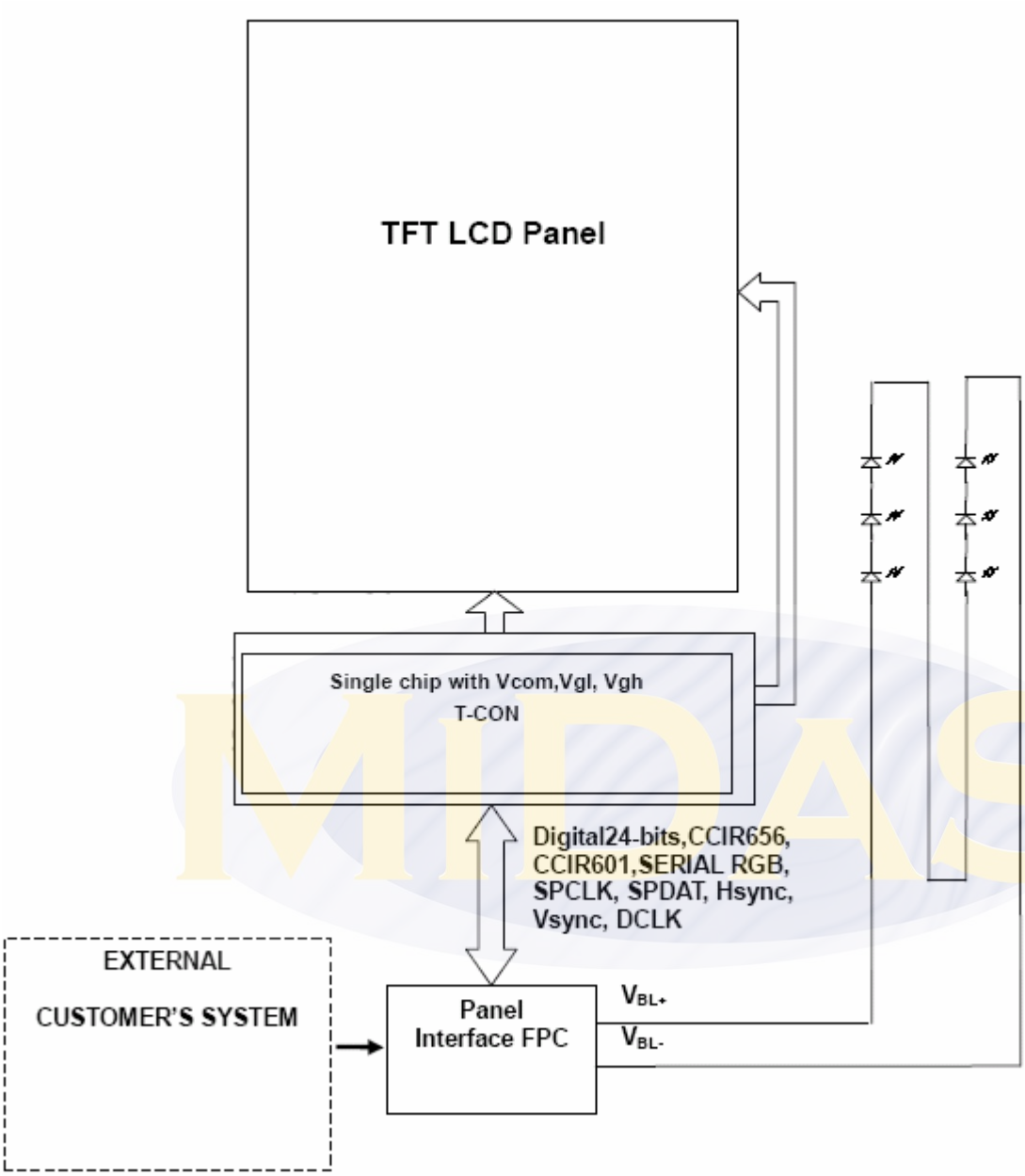
4.4 Basic Display Color and Gray Scale

Color		Input Color Data																							
		Red								Green								Blue							
		MSB							LSB	MSB							LSB	MSB							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	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	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	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	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	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	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	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	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	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	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	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	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	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	0	0

5. Outline Dimension & Block Diagram



PIN NO.	SYMBOL	PIN NO.	SYMBOL	PIN NO.	SYMBOL
1	VBL-	21	G1	41	VCC
2	VBL-	22	G2	42	VCC
3	VBL+	23	G3	43	Y2
4	VBL+	24	G4	44	X2
5	Y1	25	G5	45	NC
6	X1	26	G6	46	NC
7	NC	27	G7	47	NC
8	/RESET	28	R0	48	IF2
9	SPENA	29	R1	49	IF1
10	SPCLK	30	R2	50	IF0
11	SPDAT	31	R3	51	NC
12	B0	32	R4	52	DE
13	B1	33	R5	53	GND
14	B2	34	R6	54	GND
15	B3	35	R7		
16	B4	36	Hsync		
17	B5	37	Vsync		
18	B6	38	DATA CLK		
19	B7	39	NC		
20	G0	40	NC		


TFT LCD Panel
Single chip with Vcom,Vgl, Vgh
T-CON
Digital24-bits,CCIR656,
CCIR601,SERIAL RGB,
SPCLK, SPDAT, Hsync,
Vsync, DCLK
EXTERNAL
CUSTOMER'S SYSTEM
Panel
Interface FPC
VBL+
VBL-

6. Optical Characteristics

Ta=25±2℃, ILED=20mA

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Response time		Tr	θ =0° 、Φ=0°	-	10		ms	Note 3,5
		Tf		-	15		ms	
Contrast ratio		CR	At optimized viewing angle	300	400	-	-	Note 4,5
Color Chromaticity	White	Wx	θ =0° 、Φ=0	(0.26)	(0.31)	(0.36)		Note 2,6,7
		Wy		(0.28)	(0.33)	(0.38)		
	Red	Rx	θ =0° 、Φ=0					
		Ry						
	Green	Gx	θ =0° 、Φ=0					
		Gy						
	Blue	Bx	θ =0° 、Φ=0					
		By						
Viewing angle	Hor.	ΘR	CR≧10	(50)	(60)		Deg.	Note 1
		ΘL		(50)	(60)			
	Ver.	ΦT		(40)	(50)			
		ΦB		(45)	(55)			
Brightness		-	-	200	250	-	cd/m^2	Center of display

Ta=25±2℃, I_L=20mA

Note 1: Definition of viewing angle range

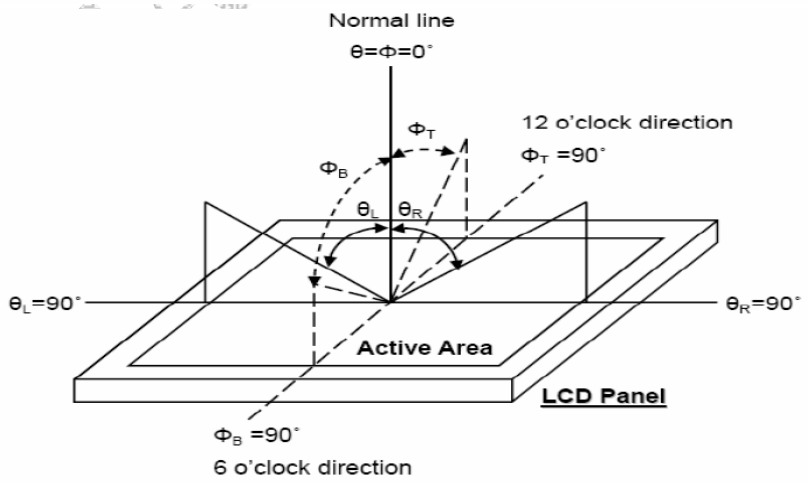


Fig. 8-1 Definition of viewing angle

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-7 luminance meter 1.0° field of view at a distance of 50cm

and normal direction.

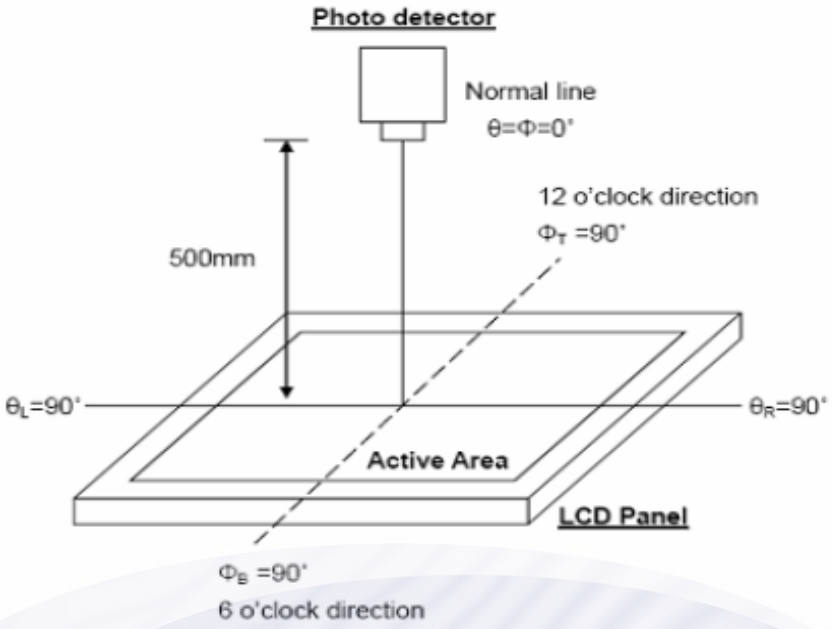
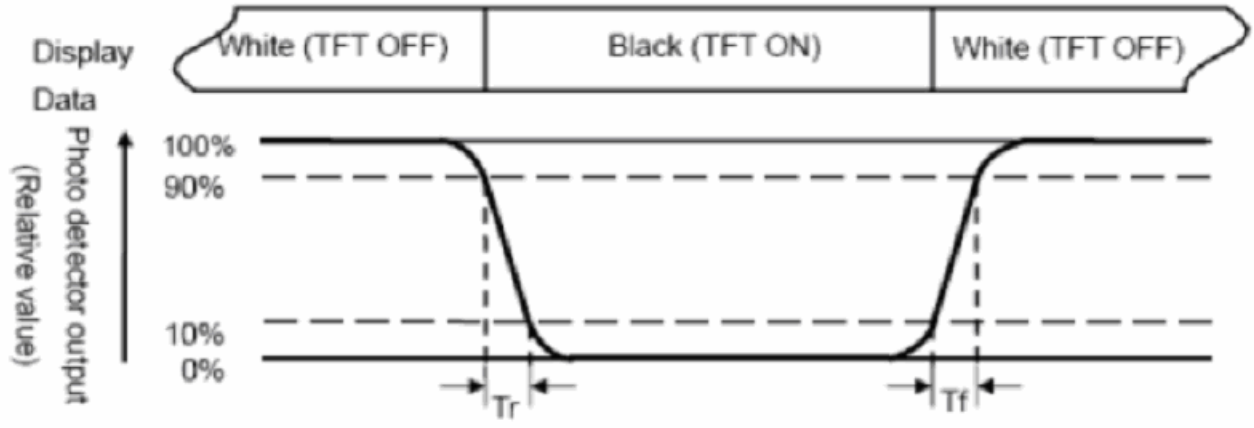


Fig. 8-2 Optical measurement system setup

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, Tr, is the time between photo detector output intensity changed from 90% to 10% . And fall time, Tf, is the time between photo detector output intensity changed from10% to 90% .



Definition of response time

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: White Vi = Vi50 ± 1.5V
Black Vi = Vi50 ± 2.0V
“±” means that the analog input signal swings in phase with VCOM signal.
“±” means that the analog input signal swings out of phase with VCOM signal.
The 100% transmission is defined as the transmission of LCD panel when all the input terminals of module are electrically opened.

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.

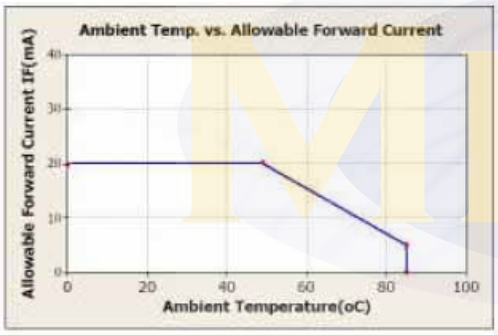
$$\text{Note 8 : Uniformity (U)} = \frac{\text{Brightness (min)}}{\text{Brightness (max)}} \times 100\%$$

7. Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	T_{OP}	-20	—	+70	℃
Storage Temperature	T_{ST}	-30	—	+80	℃
Power Supply Voltage	DVDD,AVDD	-0.3	—	5.0	V
Input signal voltage	V_{IN}	-0.3	—	VDD+0.3	V
Logic output voltage	V_{OUT}	-0.3	—	VDD+0.3	

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

1. Temp. $\leqq 60^0$C, 90% RH MAX. Temp. $>$ 60^0C , Absolute humidity shall be less than 90% RH at 60^0C



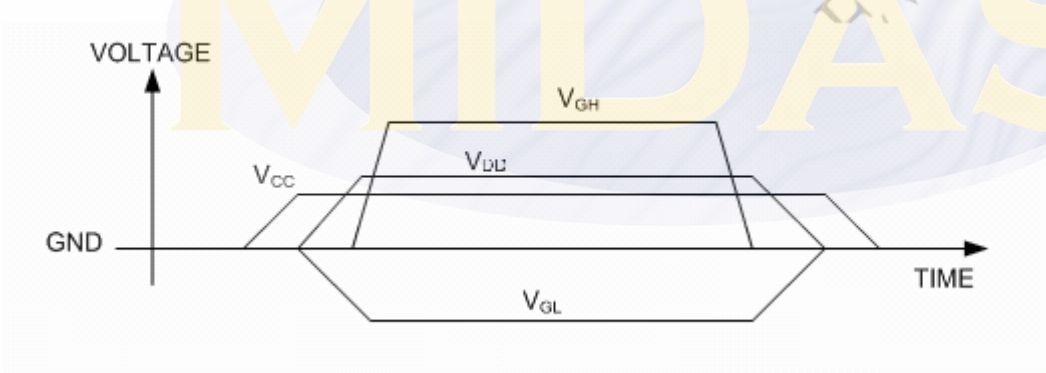
8. Electrical Characteristics

Operating conditions:

Item	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage For Logic	VCC	—	3.0	3.3	3.6	V
Digital operation current	Icc			8.6		mA
Power Supply Voltage	V_{GH}	Ta=25℃	14	15	18	V
	V_{GL}	Ta=25℃	-11	-10	-8	V
V_{COM} High voltage	V_{COM} H			3.7		Note1
V_{COM} Low voltage	V_{COM} L			-1.6		Note1
V_{COM} level voltage	V_{COM} A				6	

Note：VcomH& VcomL_Adjust the color with gamma data. Vp-p should be higher then 4V.(Option 5V)

Note 1：Please power on following the sequence VCC → VDD



■ DC CHARATERISTICS

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

■ AC Characteristics

Digital Parallal RGB interface

Signal	Item	Symbol	Min	Typ	Max	Unit
Dclk	Frequency	Tosc	-	156	-	ns
	High Time	Tch	-	78	-	ns
	Low Time	Tcl	-	78	-	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

Digital Serial RGB interface

Signal	Item	Symbol	Min	Typ	Max	Unit
Dclk	Frequency	Tosc	-	52	-	ns
	High Time	Tch	-	78	-	ns
	Low Time	Tcl	-	78	-	ns
Data	Setup Time	Tsu	12	-	-	ns
	Hold Time	Thd	12	-	-	ns
Hsync	Period	TH	-	1224		Tosc
	Pulse Width	THS	5	90	-	Tosc
	Back-Porch	Thb		114		Tosc
	Display Period	TEP	-	960	-	Tosc
	Hsync-den time	THE	108	204	264	
	Front-Porch	Thf	-	60	-	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 = 204, 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 204th 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

8.1 Waveform

- CCIR601 (HS_POL=L in Register R2)

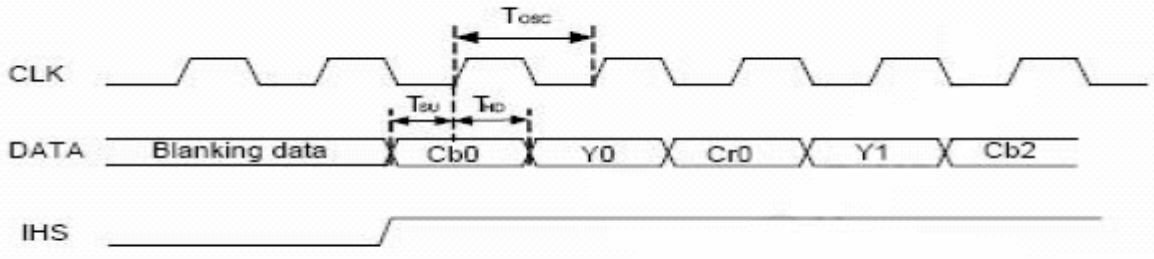


Figure1 CLK,DATA and HIS waveforms in CCIR601

- CCIR656

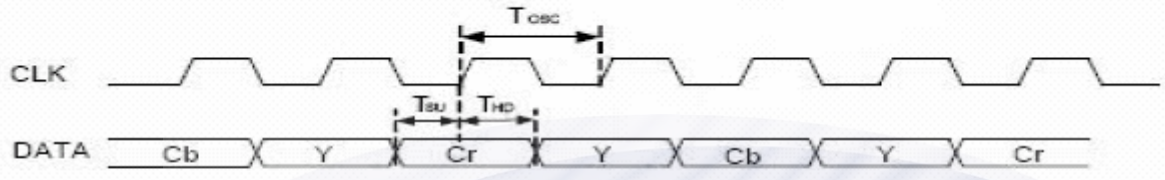


Figure2 CLK and DATA waveforms in CCIR656

- Digital Serial RGB

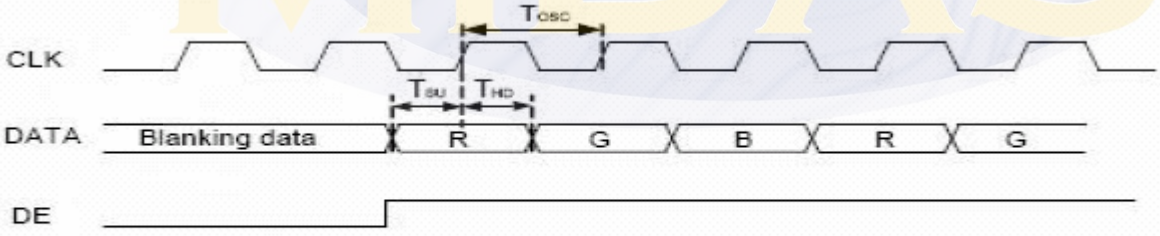


Figure3 CLK, DATA and DE waveforms in Digital Serial RGB

- **Digital Parallel RGB**

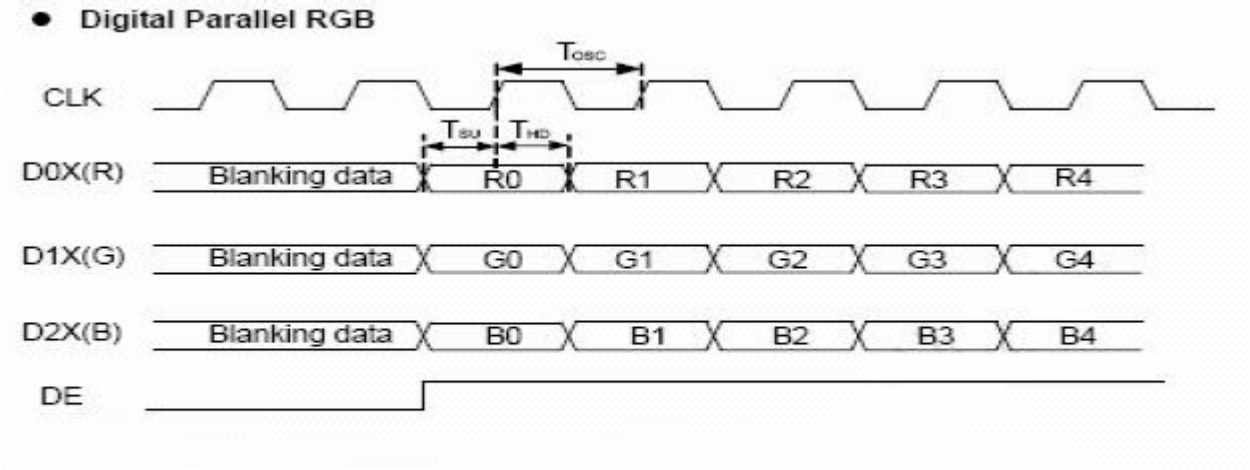


Figure4 CLK, DATA and DE waveforms in Digital Parallel RGB

8.1.1 Standby ON/OFF Control

LQ35HC112 has a power ON/OFF sequence control function. When STB pin is pulled L,blank data is outputted for 5-frames first, form the falling edge of the following VSYNC signal. The blank data would be gray level 255 for normally white LC.

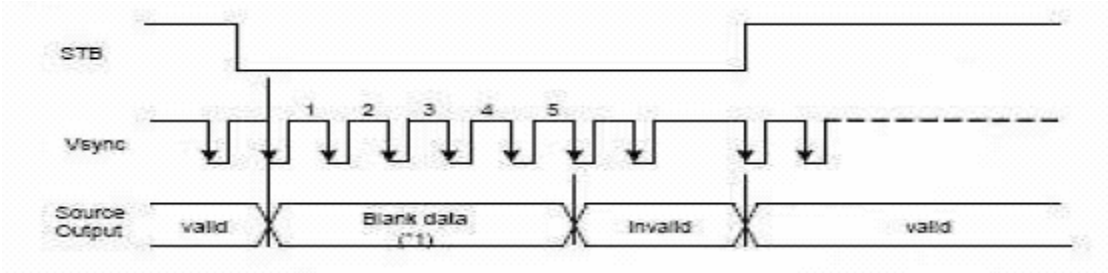


Figure5 Standby ON/OFF Control

8.1.2 Clock and Sync waveforms

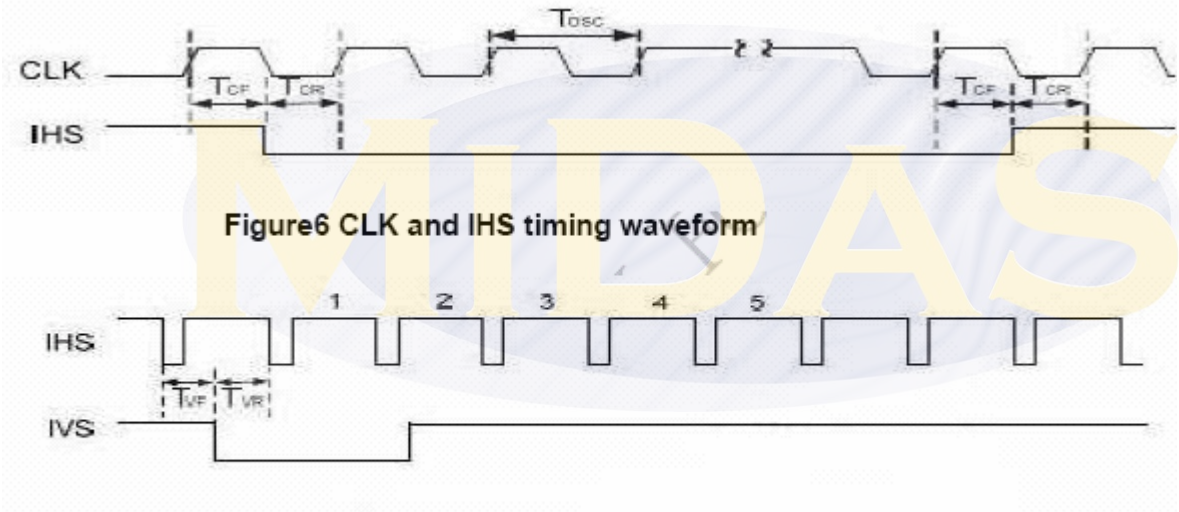
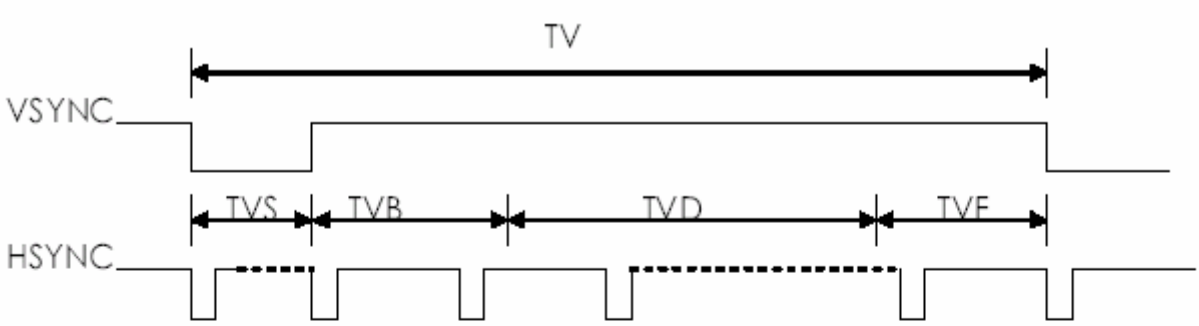
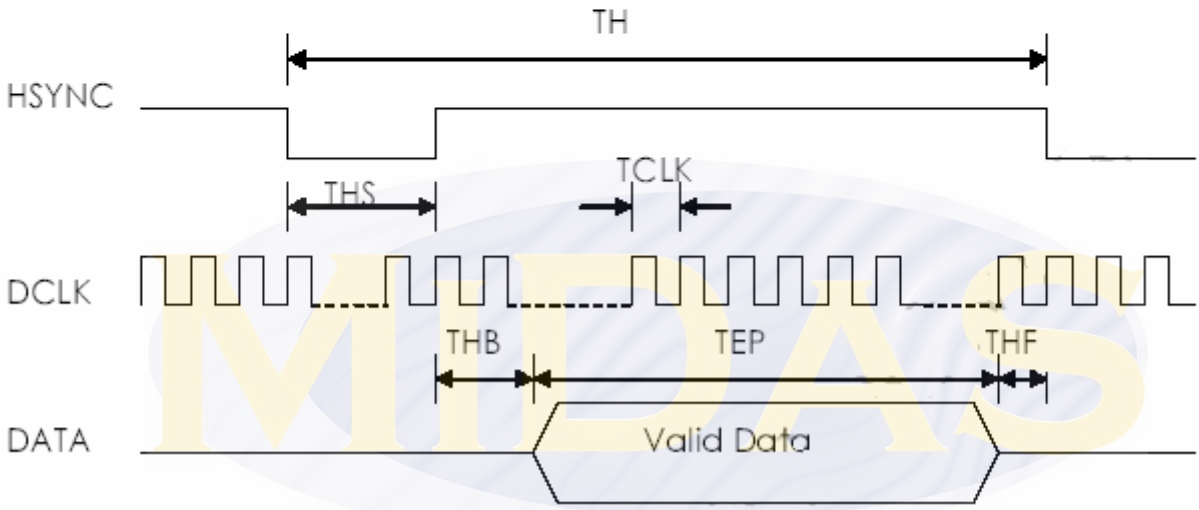
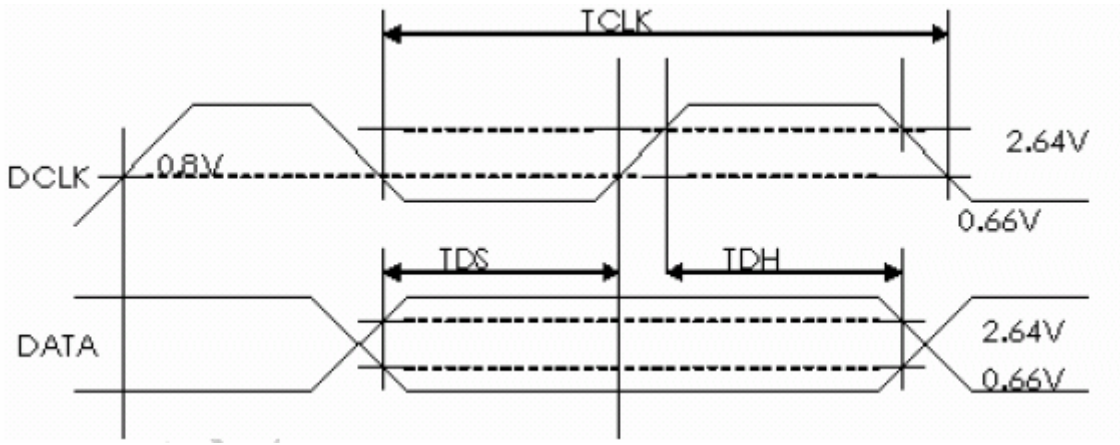


Figure6 CLK and IHS timing waveform

Figure7 IHS and IVS timing waveforms

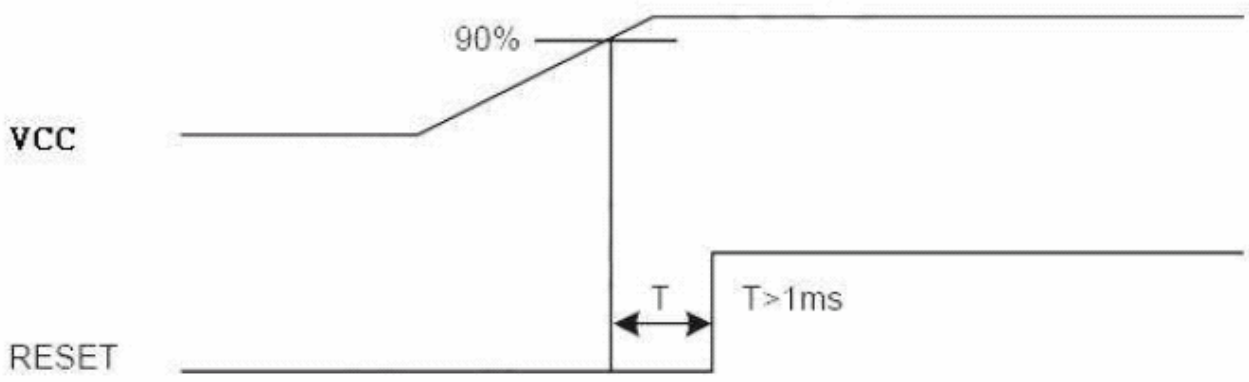

TV
VSYNC
TVS
TVB
TVD
TVF
HSYNC


TH
HSYNC
THS
TCLK
DCLK
THB
TEP
THF
DATA
Valid Data


TCLK
DCLK
0.8V
2.64V
0.66V
TDS
TDH
DATA
2.64V
0.66V

8.2 Reset Timing Chart

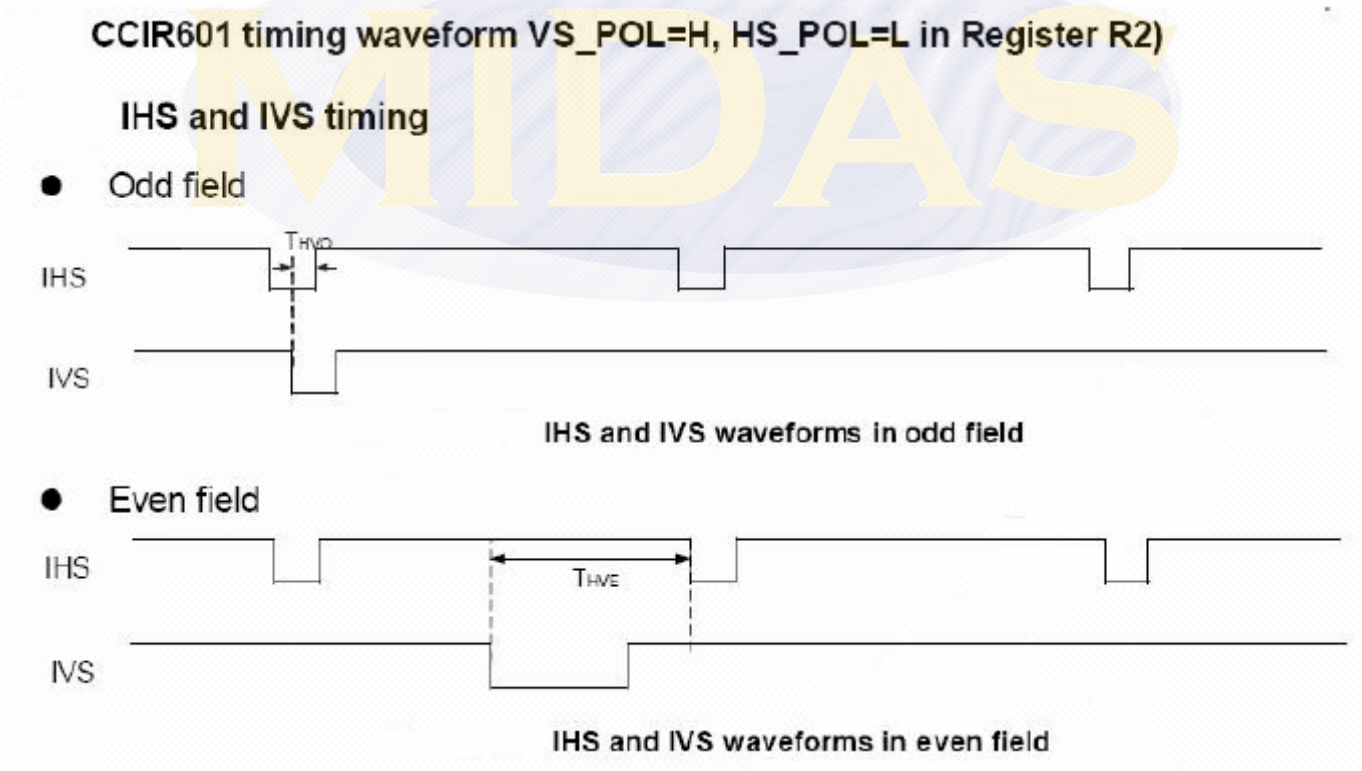
The RESET input must be held at least 1ms after power is stable



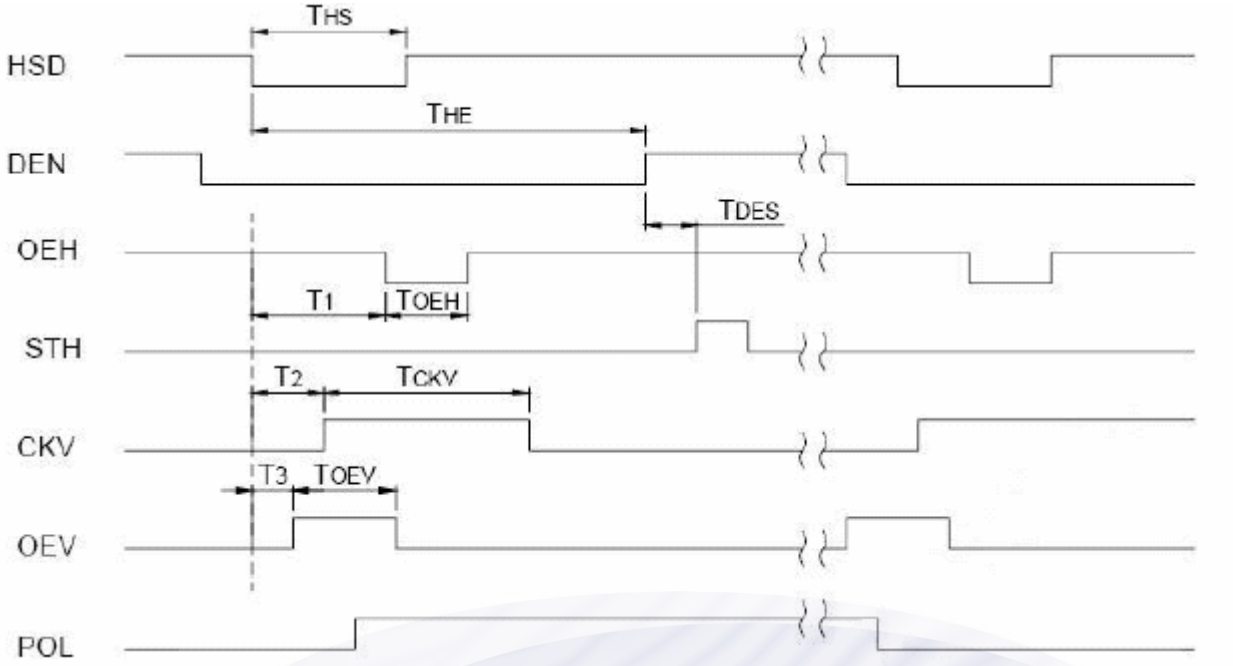
Reset timing

8.3 Digital RGB timing waveform

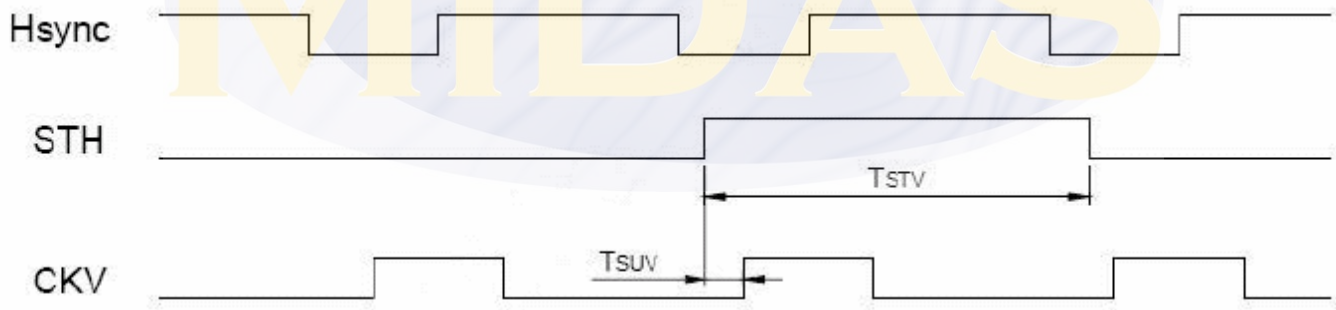
Hsync and Vsync timing



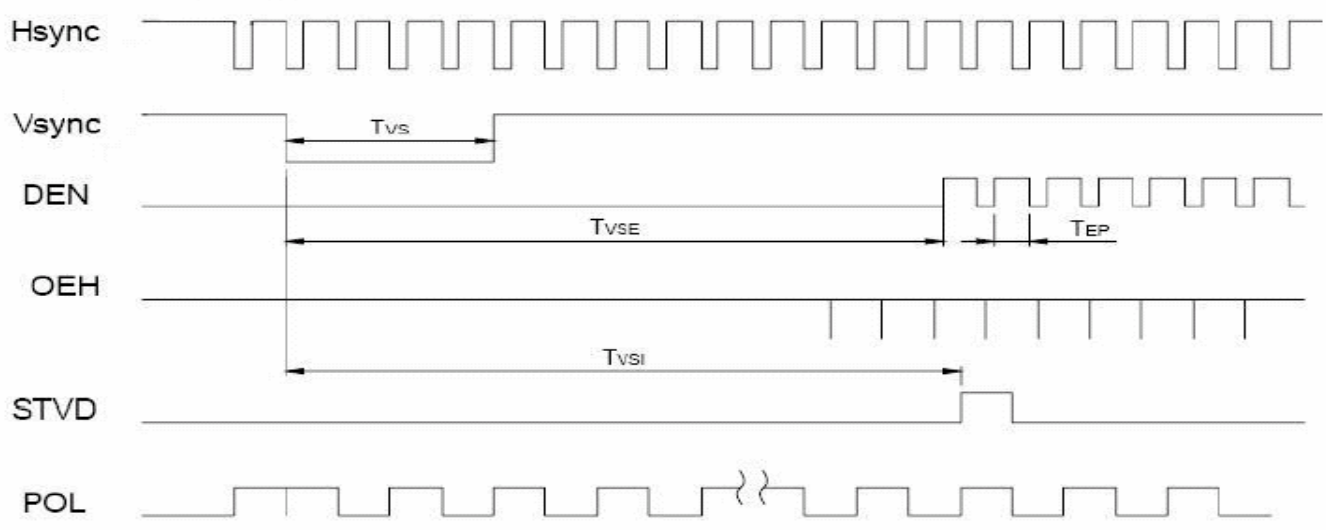
8.3.1 Hsync and horizontal control timing waveform



8.3.2 Hsync and vertical shift clock timing waveform

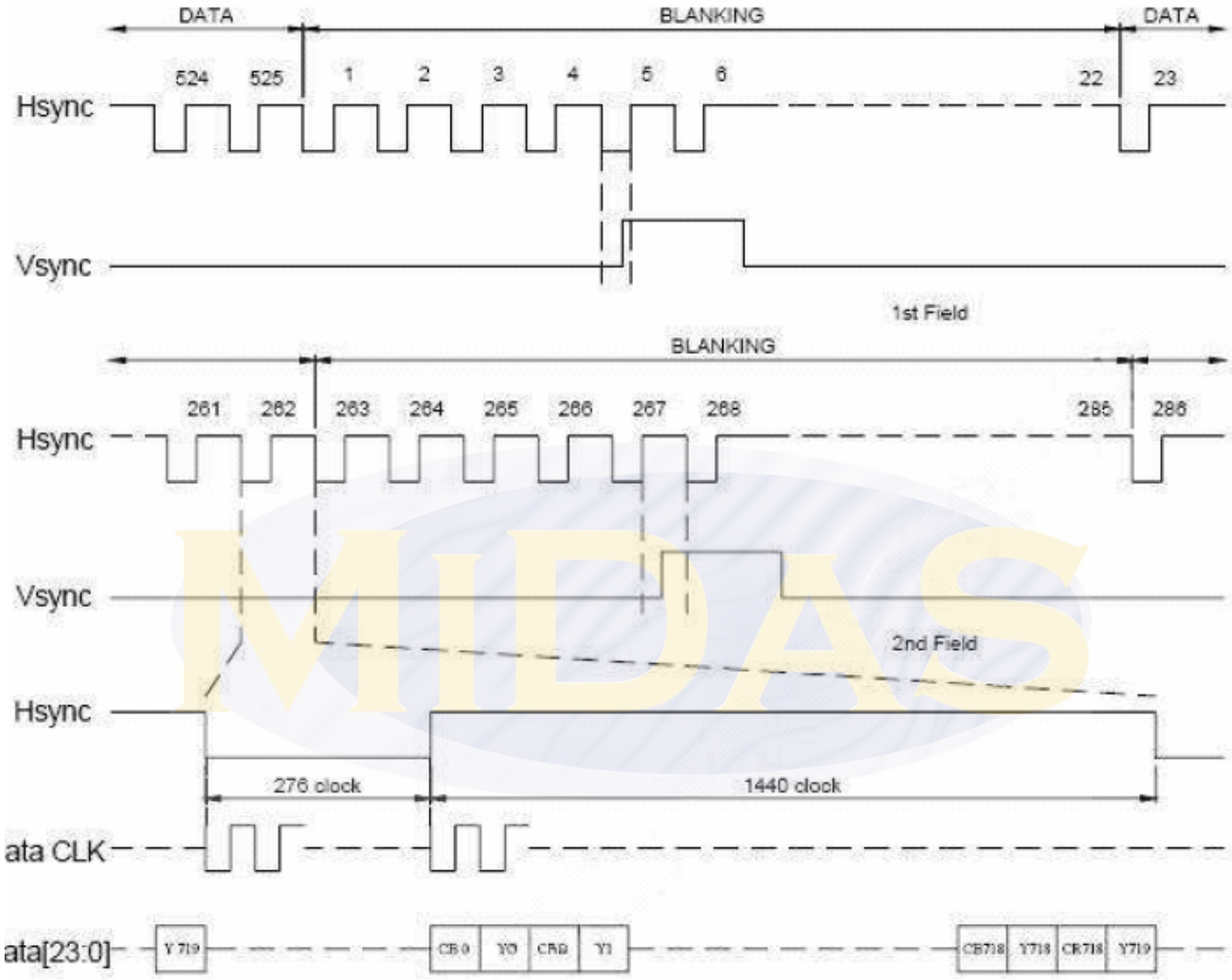


8.3.3 Hsync and vertical control timing waveform

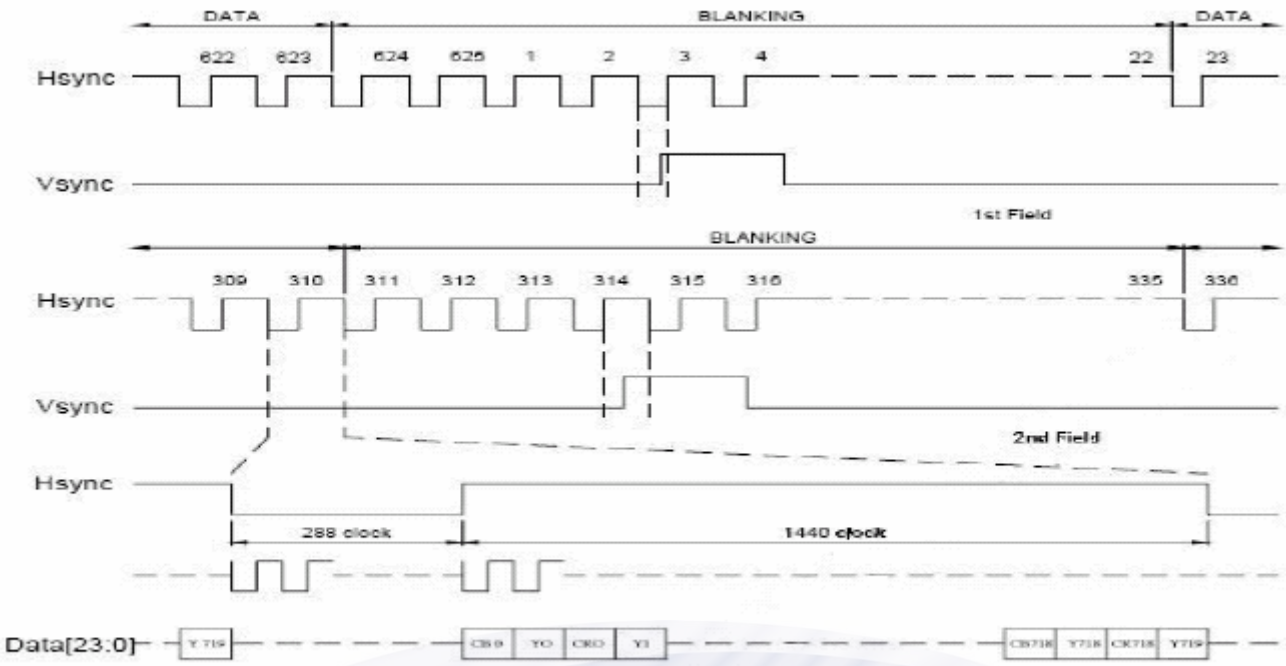


8.3.4 CCIR601 timing waveform

CCIR601 timing waveform (VS_POL="H" , HS_POL="L" in Register R2)

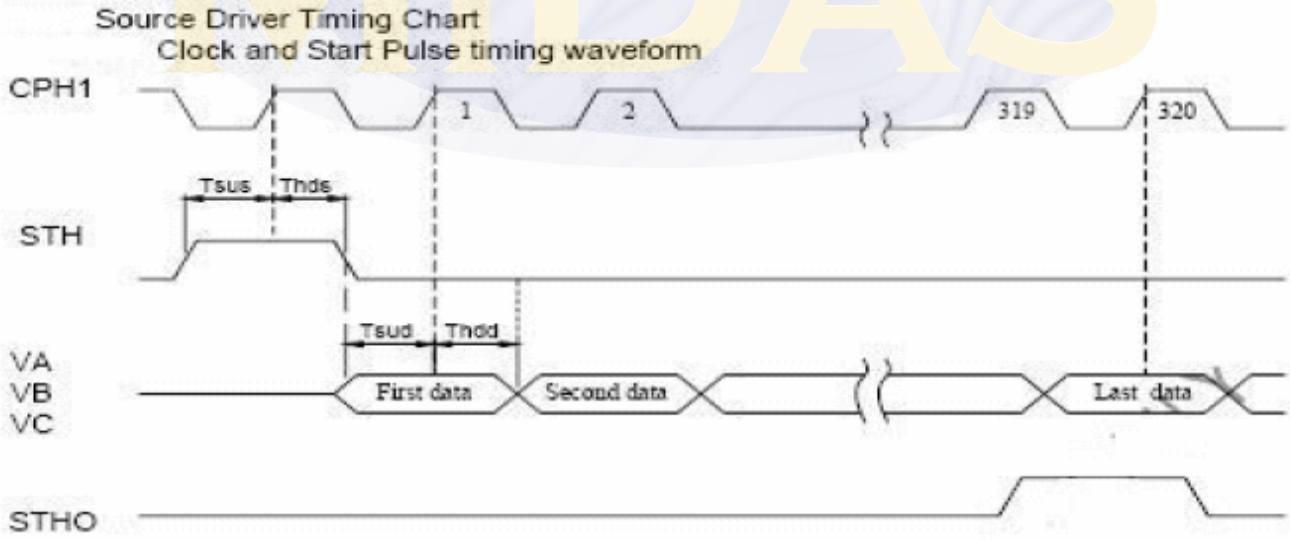


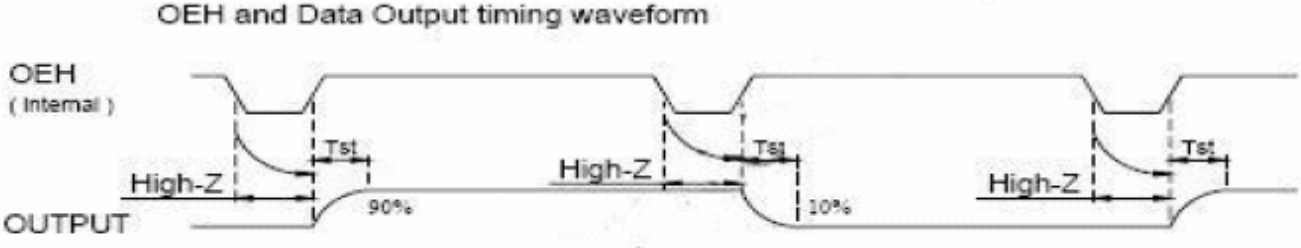
ITU-BT.601 NTSC Input Timing



ITU-BT 601 PAL Input Timing

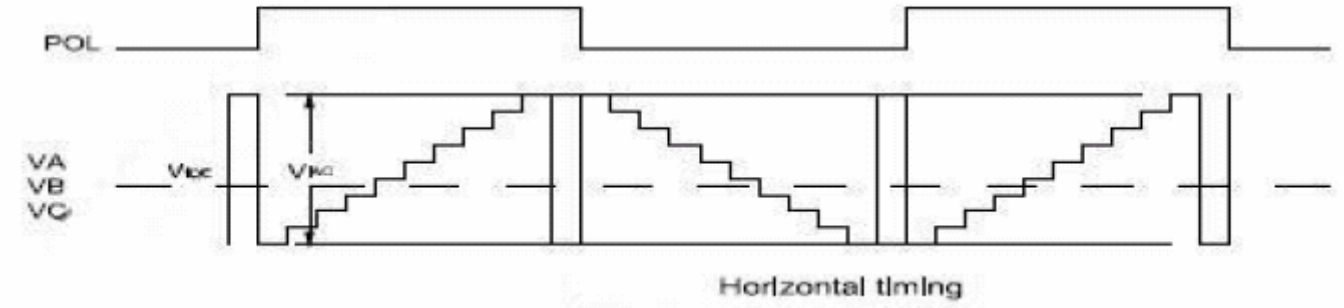
8.3.5 Source Driver Timing Chart





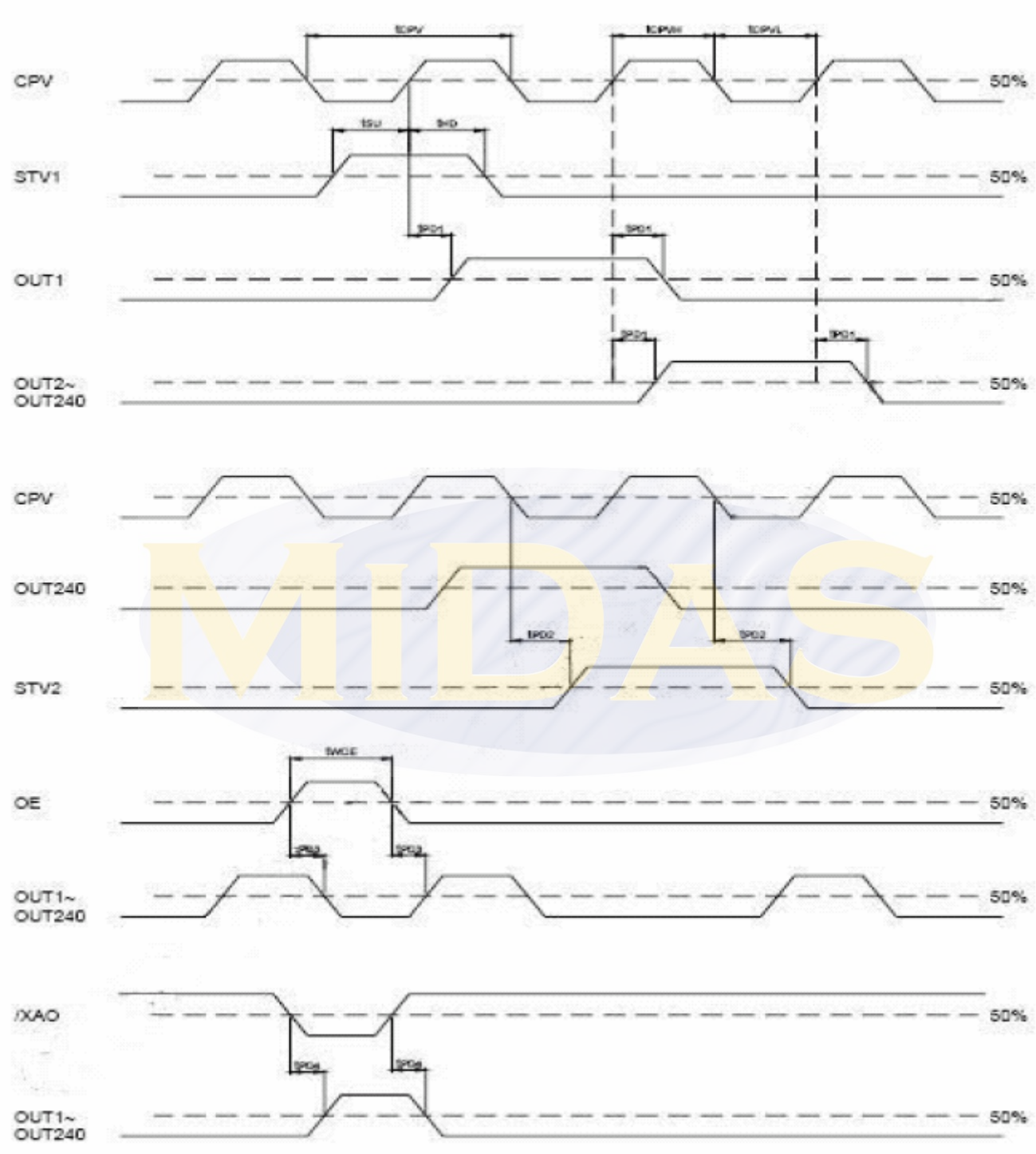
Analog video signal characteristics

PARAMETER	Symbol	Min.	Typ.	Max.	Unit
Video signal amplitude (VA, VB, VC)	V_{IAC}	-	3.81	-	V
	V_{IDC}	-	2.385	-	V



Horizontal timing

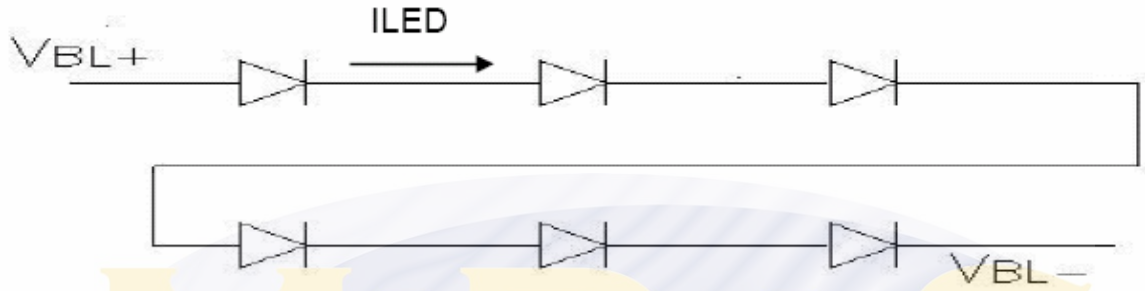
8.3.6 Gate Driver Timing Chart



9. Backlight Information

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current		-	20	-	mA	
Power Consumption		-	400	420	mW	
LED voltage	VBL+	18.6	19.8	21	V	Note 1
LED Life Time	-		(50,000)-	-	Hr	Note 2,3

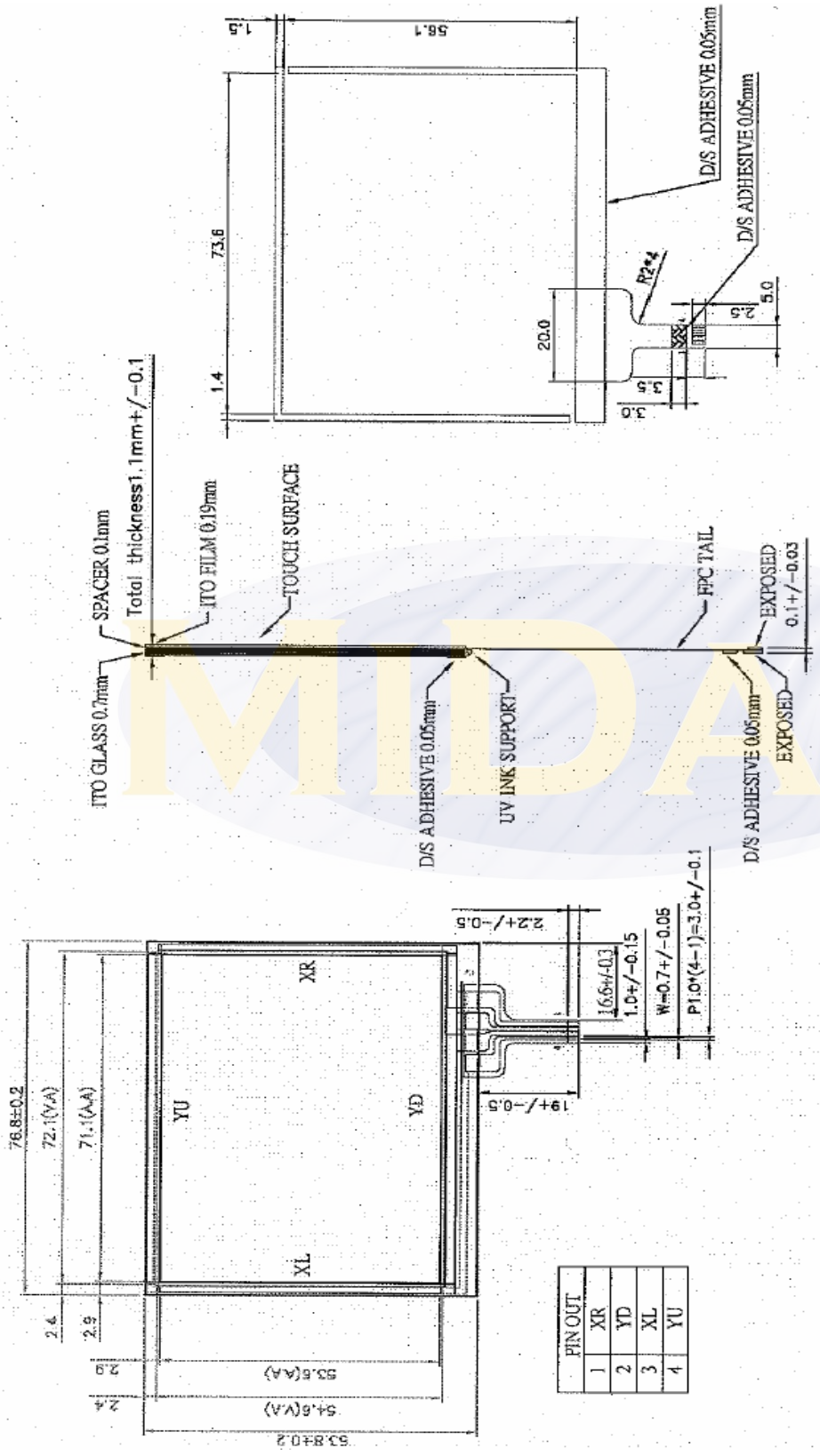
Note 1 : There are 1 Groups LED



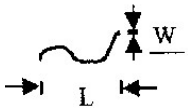
Note 2 : Ta = 25 _

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

10. Touch panel information

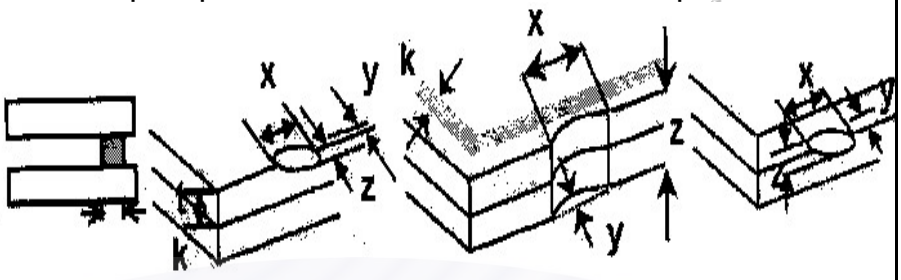


11. Inspection specification

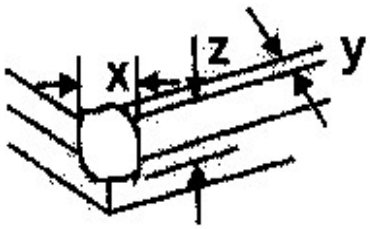
<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>AQL</th></tr>
<tr><td>01</td><td>Electrical Testing</td><td>1.1 Missing vertical, horizontal segment, segment contrast defect.
1.2 Missing character, dot or icon.
1.3 Display malfunction.
1.4 No function or no display.
1.5 Current consumption exceeds product specifications.
1.6 LCD viewing angle defect.
1.7 Mixed product types.
1.8 Contrast defect.</td><td>0.65</td></tr>
<tr><td>02</td><td>Black or white spots on LCD (display only)</td><td>2.1 White and black spots on display ≦0.25mm, no more than three white or black spots present.
2.2 Densely spaced: No more than two spots or lines within 3mm</td><td>2.5</td></tr>
<tr><td rowspan="2">03</td><td rowspan="2">LCD black spots, white spots, contamination (non-display)</td><td>3.1 Round type : As following drawing
Φ=(x + y) / 2</td><td>2.5</td></tr>
<tr><td>3.2 Line type : (As following drawing)
 

<table>
<tr><th>Length</th><th>Width</th><th>Acceptable Q TY</th></tr>
<tr><td>---</td><td>W≦0.02</td><td>Accept no dense</td></tr>
<tr><td>L≦3.0</td><td>0.02＜W≦0.03</td><td rowspan="2">2</td></tr>
<tr><td>L≦2.5</td><td>0.03＜W≦0.05</td></tr>
<tr><td>---</td><td>0.05＜W</td><td>As round type</td></tr>
</table></td><td>2.5</td></tr>
<tr><td>04</td><td>Polarizer bubbles</td><td>If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction.
<table>
<tr><th>Size Φ</th><th>Acceptable Q TY</th></tr>
<tr><td>Φ≦0.20</td><td>Accept no dense</td></tr>
<tr><td>0.20＜Φ≦0.50</td><td>3</td></tr>
<tr><td>0.50＜Φ≦1.00</td><td>2</td></tr>
<tr><td>1.00＜Φ</td><td>0</td></tr>
<tr><td>Total Q TY</td><td>3</td></tr>
</table></td><td>2.5</td></tr>
</table>

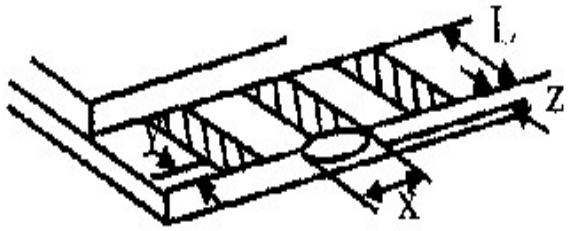
<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>AQL</th></tr>
<tr><td>05</td><td>Scratches</td><td>Follow NO.3 black spots, bright spots, contamination</td><td></td></tr>
<tr><td>06</td><td>Chipped glass</td><td>Symbols Define:
x: Chip length y: Chip width z: Chip thickness
k: Seal width t: Glass thickness a: OLED side length
L: Electrode pad length:

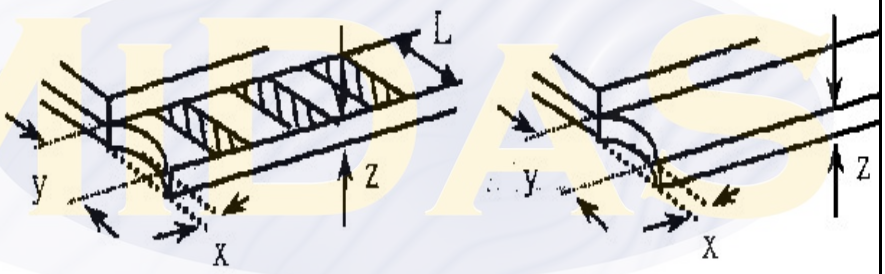
6.1 General glass chip :
6.1.1 Chip on panel surface and crack between panels:
 

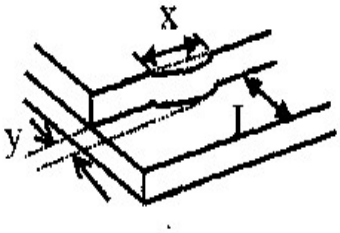
<table><tr><th>z: Chip thickness</th><th>y: Chip width</th><th>x: Chip length</th></tr><tr><td>Z≦1/2t</td><td>Not over viewing area</td><td>x≦1/8a</td></tr><tr><td>1/2t＜z≦2t</td><td>Not exceed 1/3k</td><td>x≦1/8a</td></tr></table>⊙If there are 2 or more chips, x is total length of each chip.

6.1.2 Corner crack:
 

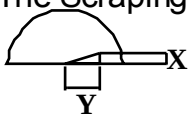
<table><tr><th>z: Chip thickness</th><th>y: Chip width</th><th>x: Chip length</th></tr><tr><td>Z≦1/2t</td><td>Not over viewing area</td><td>x≦1/8a</td></tr><tr><td>1/2t＜z≦2t</td><td>Not exceed 1/3k</td><td>x≦1/8a</td></tr></table>⊙If there are 2 or more chips, x is the total length of each chip.</td><td>2.5</td></tr>
</table>

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>AQL</th></tr>
<tr><td>06</td><td>Glass crack</td><td>
Symbols :
x: Chip length y: Chip width z: Chip thickness
k: Seal width t: Glass thickness a: OLED side length
L: Electrode pad length
6.2 Protrusion over terminal :
6.2.1 Chip on electrode pad :


<table>
<tr><th>y: Chip width</th><th>x: Chip length</th><th>z: Chip thickness</th></tr>
<tr><td>y≦0.5mm</td><td>x≦1/8a</td><td>0 ＜ z≦ t</td></tr>
</table>
6.2.2 Non-conductive portion:


<table>
<tr><th>y: Chip width</th><th>x: Chip length</th><th>z: Chip thickness</th></tr>
<tr><td>y≦ L</td><td>x≦1/8a</td><td>0 ＜ z≦ t</td></tr>
</table>
⊙If the chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications.
⊙If the product will be heat sealed by the customer, the alignment mark not be damaged.
6.2.3 Substrate protuberance and internal crack.


<table>
<tr><th>y: width</th><th>x: length</th></tr>
<tr><td>y≦1/3L</td><td>x ≦ a</td></tr>
</table>
</td><td>2.5</td></tr>
</table>

NO	Item	Criterion	AQL
07	Cracked glass	The OLED with extensive crack is not acceptable.	2.5
08	Bezel	8.1 Bezel may not have rust, be deformed or have fingerprints, stains or other contamination. 8.2 Bezel must comply with job specifications.	2.5 0.65
9	PCB、COB	9.1 COB seal may not have pinholes larger than 0.2mm or contamination. 9.2 COB seal surface may not have pinholes through to the IC. 9.3 The height of the COB should not exceed the height indicated in the assembly diagram. 9.4 There may not be more than 2mm of sealant outside the seal area on the PCB. And there should be no more than three places. 9.5 No oxidation or contamination PCB terminals. 9.6 Parts on PCB must be the same as on the production characteristic chart. There should be no wrong parts, missing parts or excess parts. 9.7 The jumper on the PCB should conform to the product characteristic chart. 9.8 If solder gets on bezel tab pads, zebra pad or screw hold pad, make sure it is smoothed down. 9.9 The Scraping testing standard for Copper Coating of PCB  **X * Y<=2mm²**	2.5 2.5 0.65 2.5 2.5 0.65 0.65 2.5 2.5
10	Soldering	10.1 No un-melted solder paste may be present on the PCB. 10.2 No cold solder joints, missing solder connections, oxidation or icide. 10.3 No residue or solder balls on PCB. 10.4 No short circuits in components on PCB.	2.5 2.5 2.5 0.65

NO	Item	Criterion	AQL
12	General appearance	12.1 No oxidation, contamination, curves or, bends on interface Pin (OLB) of TCP. 12.2 No cracks on interface pin (OLB) of TCP. 12.3 No contamination, solder residue or solder balls on product. 12.4 The IC on the TCP may not be damaged, circuits. 12.5 The uppermost edge of the protective strip on the interface pin must be present or look as if it causes the interface pin to sever. 12.6 The residual rosin or tin oil of soldering (component or chip component) is not burned into brown or black color. 12.7 Sealant on top of the ITO circuit has not hardened. 12.8 Pin type must match type in specification sheet. 12.9 LCD pin loose or missing pins. 12.10 Product packaging must the same as specified on packaging specification sheet. 12.11 Product dimension and structure must conform to product specification sheet.	2.5 0.65 2.5 2.5 2.5 2.5 2.5 0.65 0.65 0.65 0.65

12. Precautions in use of LCD Modules

1. Avoid applying excessive shocks to the module or making any alterations or modifications to it.
2. Don’t make extra holes on the printed circuit board, modify its shape or change the components of LCD module.
3. Don’t disassemble the LCM.
4. Don’t operate it above the absolute maximum rating.
5. Don’t drop, bend or twist LCM.
6. Soldering: only to the I/O terminals.
7. Storage: please storage in anti-static electricity container and clean environment.

13. Material List of Components for RoHs

1. Midas hereby declares that all of or part of products, including, but not limited to, the LCM, accessories or packages, manufactured and/or delivered to your company (including your subsidiaries and affiliated company) directly or indirectly by our company (including our subsidiaries or affiliated companies) do not intentionally contain any of the substances listed in all applicable EU directives and regulations, including the following substances.

   Exhibit A：The Harmful Material List

Material	(Cd)	(Pb)	(Hg)	(Cr6+)	PBBs	PBDEs
Limited Value	100 ppm	1000 ppm	1000 ppm	1000 ppm	1000 ppm	1000 ppm
Above limited value is set up according to RoHS.						

2. Process for RoHS requirement：
   (1) Use the Sn/Ag/Cu soldering surface; the surface of Pb-free solder is rougher than we used before.
   (2) Heat-resistance temp.：
   Reflow：250℃, 30 seconds Max.；
   Connector soldering wave or hand soldering：320℃, 10 seconds max.
   (3) Temp. curve of reflow, max. Temp.：235±5℃；
   Recommended customer's soldering temp. of connector：280℃, 3 seconds.