

PRODUCT SPECIFICATION

- Tentative Specification
- Preliminary Specification
- Approval Specification

MODELNAME:YH101BF4002

Version:MA01

Customer: Common

APPROVED BY

SIGNATURE

Name / Title _____

Note

Please return 1 copy for your confirmation with your signature and comments.

Approved By	Checked By	Prepared By

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1. GENERAL DESCRIPTION

1.1 DESCRIPTION

YH101BF4002 MA01 is a color active matrix thin film transistor (TFT) IPS liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. It is composed of a TFT LCD panel, Driver IC ,FPC and Backlight.

1.2 FEATURES:

No.	Item	Specification	Unit
1	Panel Size	10.1"	inch
2	Number of Pixels	1200x3(RGB) x 1920	pixels
3	Active Area	135.360(W)x216.576(H)	mm
4	Pixel Pitch	0.1128*0.1128	mm
5	OutlineDimension	228.6(W) x 143(H) x2.5(D)	mm
6	Number of Colors	16.7M	-
7	Display Mode	Normally Black	-
8	ViewingDirection	IPS	
9	Pixel Arrangement	RGB vertical stripe	-
10	Luminance (cd/m ²)	400(TYP.)	nit
11	Contrast Ratio	800(TYP.)	
12	Surface Treatment	Anti-glare	-
13	Interface	MIPI	-
14	Backlight	White LED	-
15	Operation Temperature	-10~50	°C
16	Storage Temperature	-20~60	°C
17	IC	HX8279	

2. MECHANICAL SPECIFICATION

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ROHS

Customer Name:
客户名称:

Customer's Code:
客户料号:

Approved by:
客户承认:

Approval Date:
承认日期:

DESCRIPTION
描述:

DATE
日期:

REVISOR
修改者:

10.1" BOE
1200(H)×1920(V)

易撕垫

吸码 (Label)

单面黑胶

排线位外凸 0.5mm

FRPC折弯出货

头部偏厚, 按此公差管控

*228.6±0.2
218.57±0.2 (POL)
216.58 (A, A)
2.33
(3.33)
2.6
(3.8)
(111.62)
*143±0.2
*137.8±0.2 (POL)
135.36 (A, A)
(71.48)

4.17±0.5
2.5±0.15
15.5±0.5
37.34±0.5
48.24±0.5
21.8±0.5

+0.1
2.5-0.2

8Q101C-R5DZ408-84F501 YYY/MH/DD

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Notes:

1.LED CIRCUIT DIAGRAM
8#4=32LED

2.ROHS must be complied.

3.ΔModification rev: number

4.Draft angle 1.5°

5.All radii without dimension 300.3

6.DRIVER IC:790B-1VF-227V; IP:80mA(FIX)

Unspecified Tolerances Is:±0.2

Electrical-Optical Characteristics(Ta=25°C)

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
Forward Voltage	Vf	22.4	24	25.6	V	
Forward Current	If	—	90	—	mA	
Luminous Intensity	Lv	350	400	—	cd/m ²	
Luminous Uniformity	Avg	75	—	—	%	
Color Chromaticity	X	0.26	0.29	0.32		<p>测试距离:50±5mm, 测试角度:1° 均匀性:最小最大范围±100%,测试次数:7</p>
	Y	0.27	0.30	0.33		
Operating Temperature	Topr	-10° C	—	+60° C	° C	
Storage Temperature	Tstg	-20° C	—	+70° C	° C	

MODEL NO. :
YH101MF4002 MA01

TYPE
LCM

DESIGN 设计:

CHECKED 审核:

APPROVED批准:

EDITION
版本号:

DATE 日期:

DATE 日期:

DATE 日期:

A/0

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3. PIN DESCRIPTION

PIN NO.	Symbol	Description
1	NC	No connection
2	VDD	Power Voltage for digital circuit 3.3V
3	VDD	Power Voltage for digital circuit 3.3V
4	GND	Ground
5	Reset	Global reset pin 3.3V
6	NC	No connection
7	GND	Ground
8	MIPI_0N	-MIPI differential data input
9	MIPI_0P	+MIPI differential data input
10	GND	Ground
11	MIPI_1N	-MIPI differential data input
12	MIPI_1P	+MIPI differential data input
13	GND	Ground
14	MIPI_CKN	-MIPI differential clock input
15	MIPI_CKP	+MIPI differential clock input
16	GND	Ground
17	MIPI_2N	-MIPI differential data input
18	MIPI_2P	+MIPI differential data input
19	GND	Ground
20	MIPI_3N	-MIPI differential data input
21	MIPI_3P	+MIPI differential data input
22	GND	Ground
23	NC	No connection
24	NC	No connection
25	GND	Ground
26	NC	No connection
27	PWMO	PWM control signal for LED driver(CABC)
28	NC	No connection
29	NC	No connection
30	GND	Ground

31	LED-	LED Cathode
32	LED-	LED Cathode
33	NC	No connection
34	NC	No connection
35	NC	No connection
36	NC	No connection
37	NC	No connection
38	NC	No connection
39	LED+	LED Anode
40	LED+	LED Anode

4. Absolute Max. Rating

Item	Symbol	Values		Unit
		Min.	Max.	
Power Voltage	VCC	-0.3	+5.0	V
Backlight forward current	I _{LED}	0	25	mA(For each LED)
Input Signal Voltage	V _I	-0.3	VCC	V
Operation Temperature	T _{OP}	-10	50	°C
Storage Temperature	T _{ST}	-20	60	°C

4.1 Typical Operation Conditions

Item	Symbol	Values			Unit
		Min.	Typ.	Max.	
Power Voltage	VCC	2.7	3.3	3.6	V
Current Consumption	I _{VCC}	-	--	TBD	mA
	I _{LED}	--	90		

4.2 LED Back Light Specification (24 White Chips)

Item	Symbol	Condition	Min	Typ	Max	Unit
Forward Voltage	V _f	I _f =90mA	22.4	24	25.6	
Uniformity (with L/G)	Δ B _p	I _f =90mA	75	80	-	%
Luminance for LCM	/	I _f =90mA	350	400		cd/m ²

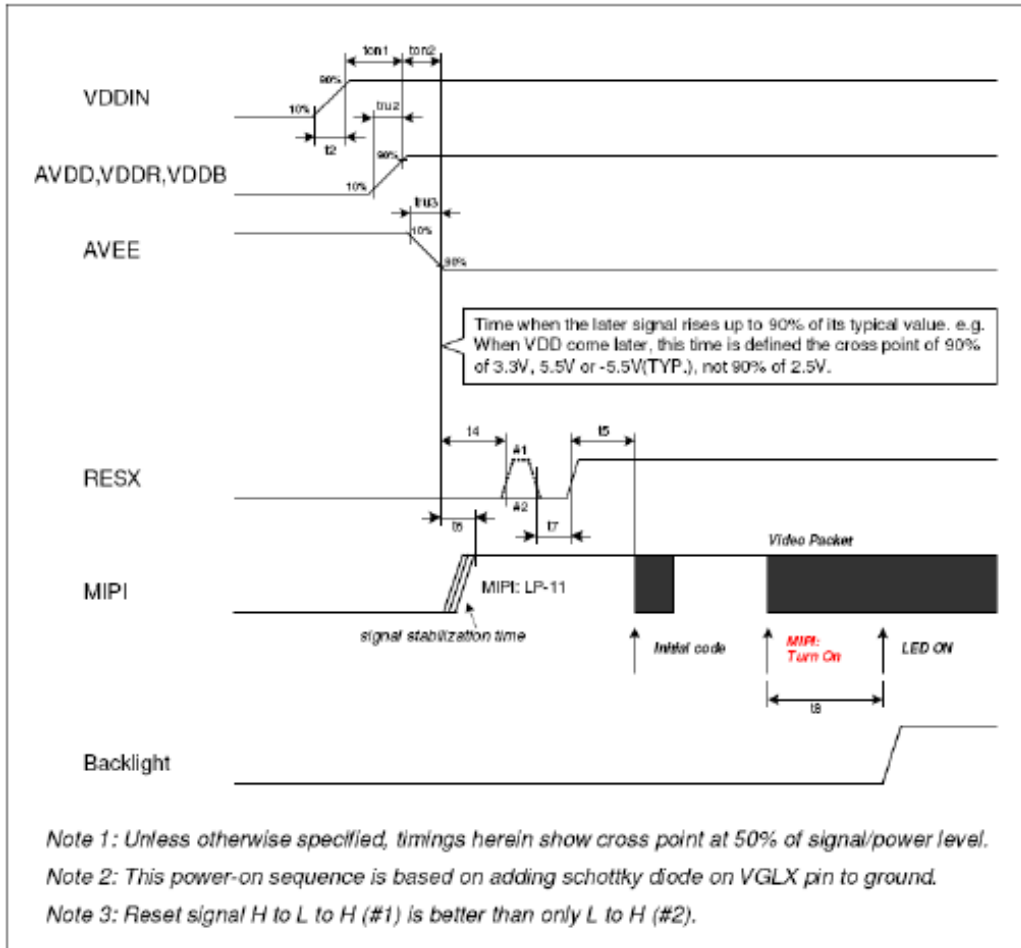
4.3 Input Timing Table

1200RGBx1920 (4 Data Lanes)

Parameter	Symbol	Min.	Typ.	Max.	Unit
MIPI data frequency	FDATA	955	999	1000	Mbps
Horizontal display area	THD	1200			pixel
HS period time	TH	1275	1341	1342	pixel
HS pulse width	THPW	1	1	1	pixel
HS back porch	THBP	32	60	60	pixel
HS front porch	THFP	42	80	81	pixel
Vertical display area	TVD	1920			H
VS period time	TV	1981	1981	1982	H
VS pulse width	TVPW	1	1	1	H
VS back porch	TVBP	25			H
VS front porch	TVFP	35	35	36	H

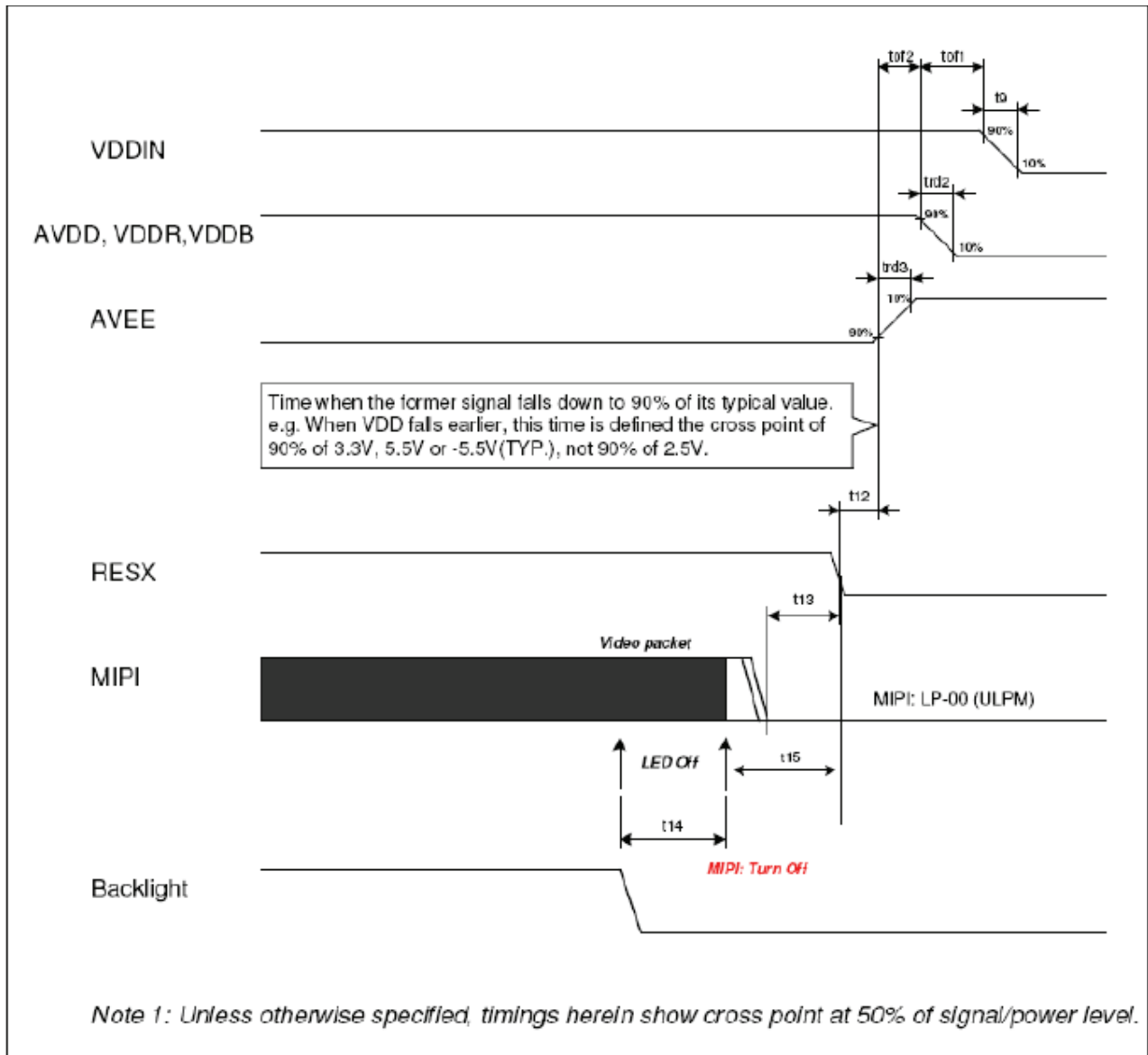
5. Signal timing diagram Power Sequence

5.1 Power on



Symbol	Value			Unit	Remark
	Min.	Typ.	Max.		
ton1		No limit		ms	
ton2		0(Note)		ms	
ton3		No limit	-	ms	
ton4		No limit	-	ms	
t2			150	μs	
tru1			150	μs	
tru2			150	μs	
tru3			150	μs	
tru4			150	μs	
t4	40	-	-	ms	
t5	120			ms	
t6	0			ms	
t7	10			μs	
t8	8			VS	Keep data more than 8 frames (VS)

5.2 Power off



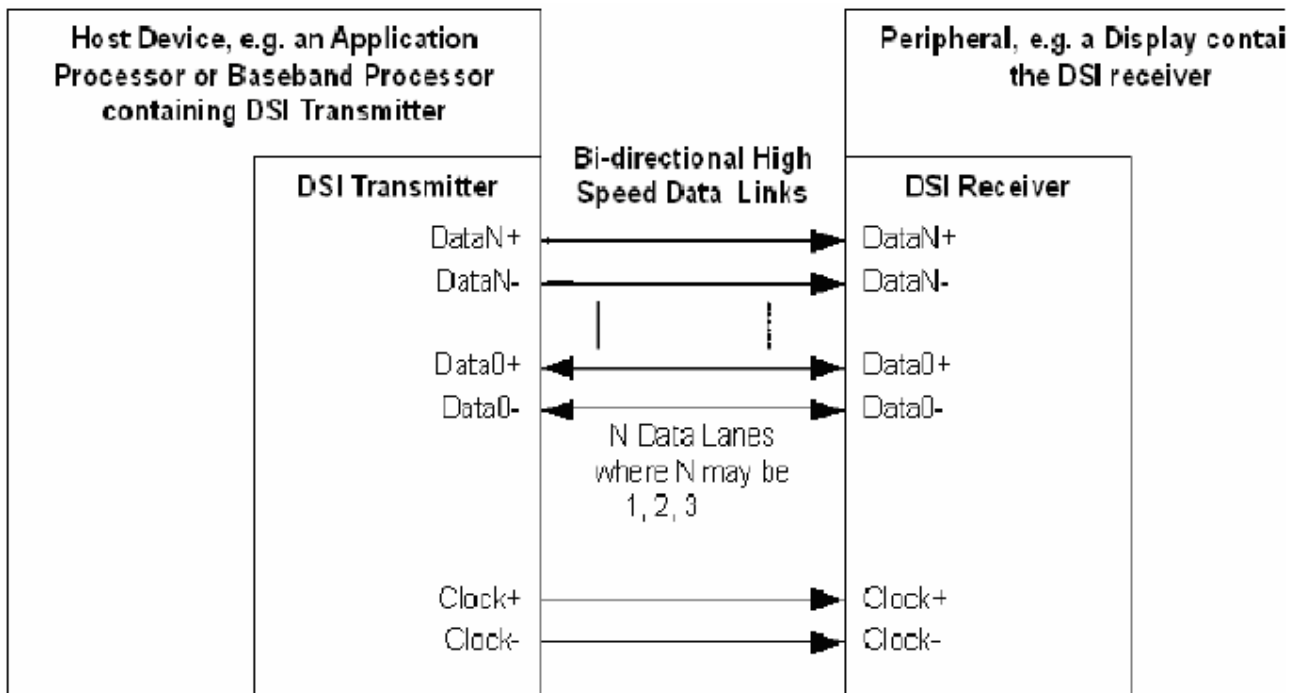
Symbol	Value			Unit	Remark
	Min.	Typ.	Max.		
t9	150			μs	
tof1		No limit		ms	
tof2		0(Note)	-	ms	
tof3		No limit	-	ms	
tof4		No limit		ms	
trd1	150			μs	
trd2	150			μs	
trd3	150			μs	
trd4	150			μs	
t12	0		-	ms	
t13	0			ms	
T14	0			ms	
T15	10			ms	

5.3 MIPI Timing characteristics

5.4 MIPI Lane Configuration

	MCU (Master)	Display Module (Slave)
Clock Lane+/-	Unidirectional Lane ■ Clock Only ■ Escape Mode(ULPS Only)	
Data Lane0+/-	Bi-directional Lane ■ Forward High-Speed ■ Bi-directional Escape Mode ■ Bi-directional LPDT	
Data Lane1+/-	Unidirectional ■ Forward High speed	
Data Lane2+/-	Unidirectional ■ Forward High speed	
Data Lane3+/-	Unidirectional ■ Forward High speed	

The connection between host device and display module is as reference.



6. MIPI AC Electrical characteristics

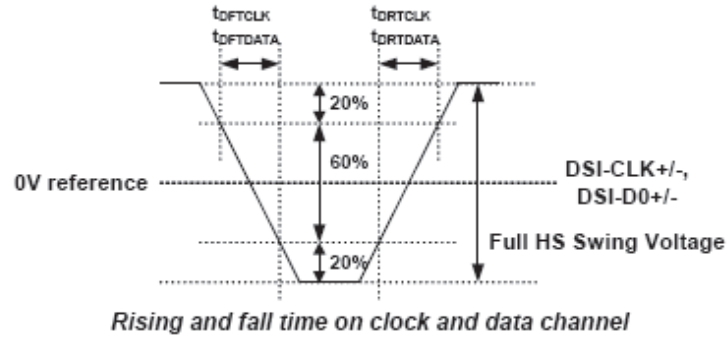
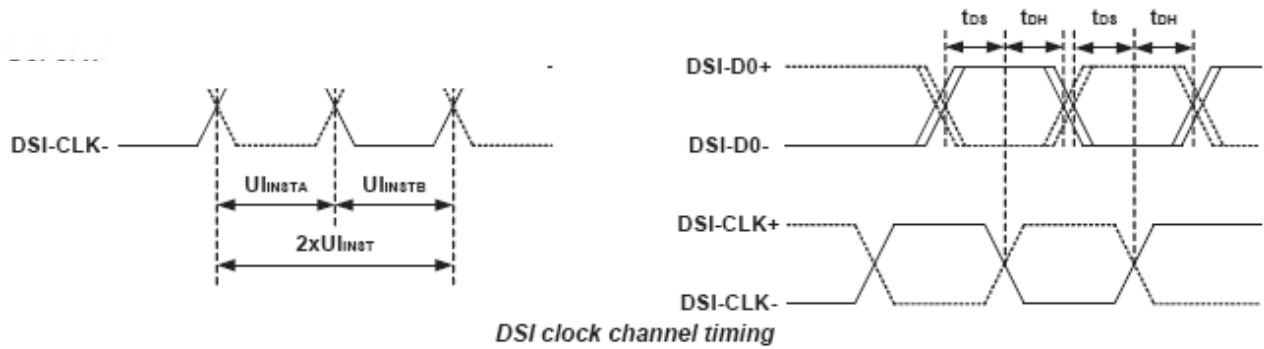
6.1 High Speed Transmission

Signal	Symbol	Parameter	MIN	TYP	MAX	Unit	Description
DSI-CLK+/-	2xUI _{INST}	Double UI instantaneous	4	-	8	ns	4 Lane (Note 2)
			3	-	8	ns	3 Lane (Note 2)
			2.352	-	8	ns	2 Lane (Note 3)
DSI-CLK+/-	UI _{INSTA} UI _{INSTB}	UI instantaneous halves (UI = UI _{INSTA} = UI _{INSTB})	2	-	4	ns	4 Lane (Note 2)
			1.5	-	4	ns	3 Lane (Note 2)
			1.176	-	4	ns	2 Lane (Note 3)
DSI-Dn+/-	t _{DS}	Data to clock setup time	0.15xUI	-	-	ps	
DSI-Dn+/-	t _{DH}	Data to clock hold time	0.15xUI	-	-	ps	
DSI-CLK+/-	t _{DRTCLK}	Differential rise time for clock	150	-	0.3xUI	ps	
DSI-Dn+/-	t _{DRTDATA}	Differential rise time for data	150	-	0.3xUI	ps	
DSI-CLK+/-	t _{DFTCLK}	Differential fall time for clock	150	-	0.3xUI	ps	
DSI-Dn+/-	t _{DFTDATA}	Differential fall time for data	150	-	0.3xUI	ps	

Note 1) Dn = D0, D1, D2 and D3.

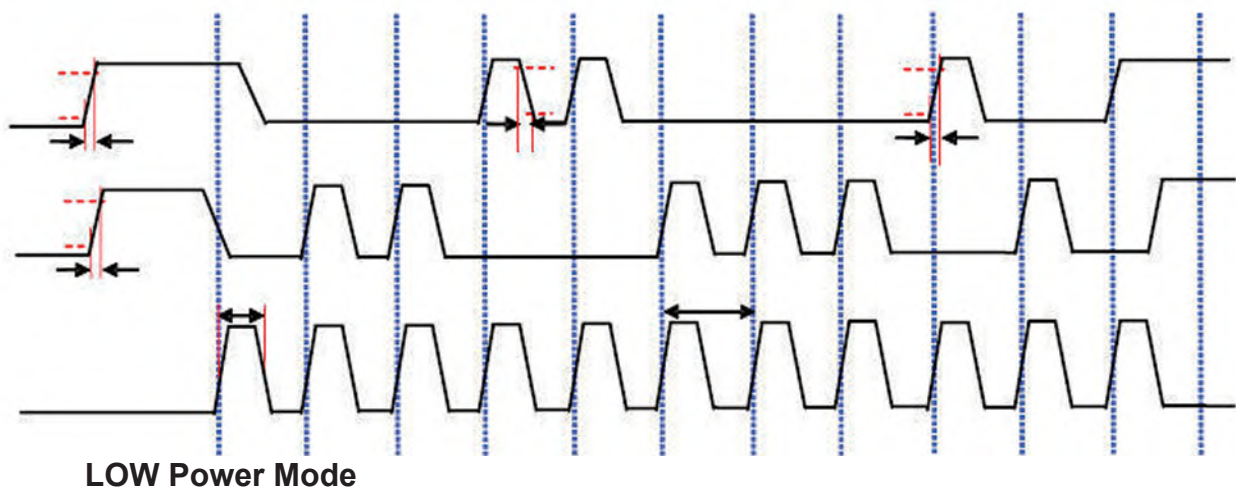
Note 2) Maximum total bit rate is 2Gbps for 24-bit data format, 1.5Gbps for 18-bit data format and 1.33Gbps for 16-bit data format in 3 lanes or 4 lanes application which support to 800RGBx 1280 resolution.

Note 3) Maximum total bit rate is 1.7Gbps for 24-bit data format, 1.275Gbps for 18-bit data format and 1.13Gbps for 16-bit data format in 2 lanes application which support to 720RGBx1280 resolution.

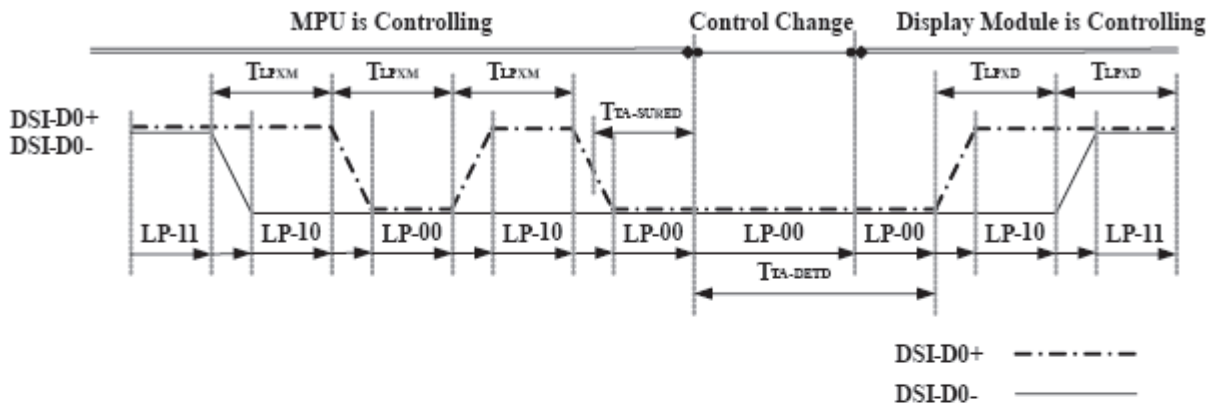


6.2 LP Transmission

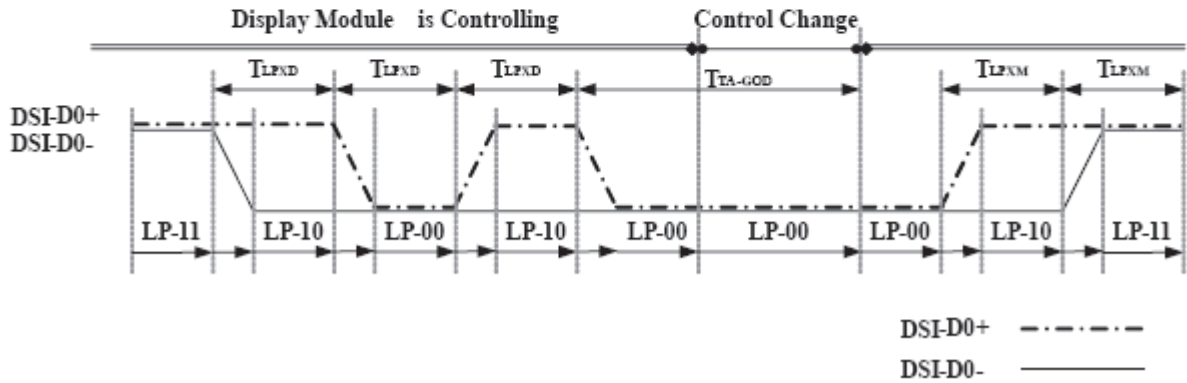
Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
DSI CLK frequency(LP)	F_{DSICLK_LP}			10	MHz	
DSI CLK Cycle Time(LP)	t_{CLKC_LP}	100			ns	
DSI Data Transfer Rate(LP)	t_{DSIR_LP}			10	Mbps	
15%-85% rise time and fall time	T_{RLP} / T_{FLP}	-	-	35	ns	
30%-85% rise time(from HS to LP)	T_{REOT}	-	-	35	ns	
Pulse width of the LP exclusive-OR clock	$t_{LP-PULSE-TX}$	50	65	-	ns	
Period of the LP exclusive-OR clock	$t_{LP-PRE-TX}$	100	130	-	ns	



Signal	Symbol	Parameter	MIN	TYP	MAX	Unit	Description
DSI-D0+/-	T_{LPXM}	Length of LP-00, LP-01, LP-10 or LP-11 periods MPU → Display Module	50	-	75	ns	Input
DSI-D0+/-	T_{LPXD}	Length of LP-00, LP-01, LP-10 or LP-11 periods Display Module → MPU	50	-	75	ns	Output
DSI-D0+/-	$T_{TA-SURED}$	Time-out before the MPU start driving	T_{LPXD}	-	$2 \times T_{LPXD}$	ns	Output
DSI-D0+/-	$T_{TA-GETD}$	Time to drive LP-00 by display module	$5 \times T_{LPXD}$	-	-	ns	Input
DSI-D0+/-	T_{TA-GOD}	Time to drive LP-00 after turnaround request - MPU	$4 \times T_{LPXD}$	-	-	ns	Output



Bus Turnaround (BAT) from MPU to display module Timing



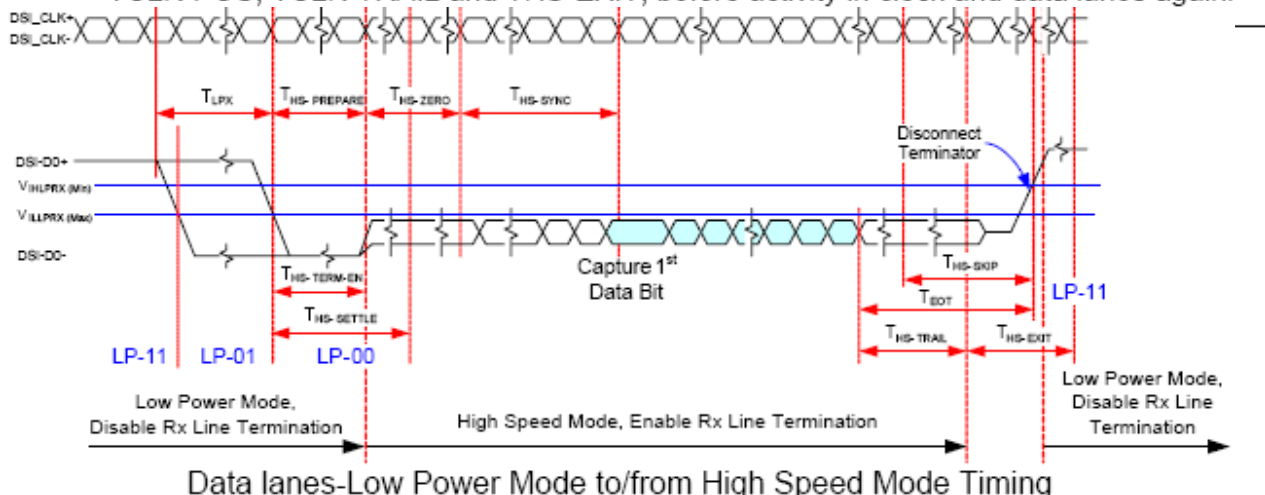
Bus Turnaround (BAT) from display module to MPU Timing

6.3 DSI Bursts

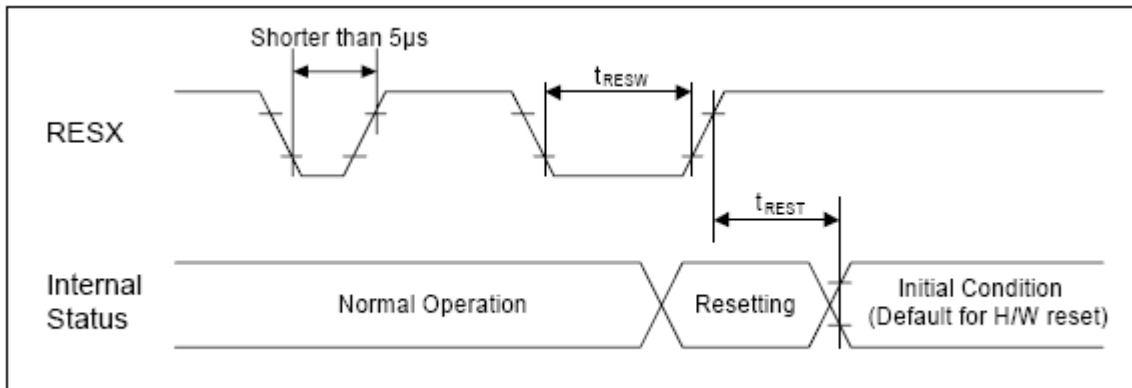
Signal	Symbol	Parameter	MIN	TYP	MAX	Unit	Description
Low Power Mode to High Speed Mode Timing							
DSI-Dn+/-	T_{LPX}	Length of any low power state period	50	-	-	ns	Input
DSI-Dn+/-	$T_{HS-PREPARE}$	Time to drive LP-00 to prepare for HS transmission	$40+4xUI$	-	$85+6xUI$	ns	Input
DSI-Dn+/-	$T_{HS-TERM-EN}$	Time to enable data receiver line termination measured from when Dn crosses V_{ILMAX}	-	-	$35+4xUI$	ns	Input
High Speed Mode to Low Power Mode Timing							
DSI-Dn+/-	$T_{HS-SKIP}$	Time-out at display module to ignore transition period of EoT	40	-	$55+4xUI$	ns	Input
DSI-Dn+/-	$T_{HS-EXIT}$	Time to drive LP-11 after HS burst	100	-	-	ns	Input
DSI-Dn+/-	$T_{HS-TRAIL}$	Time to drive flipped differential state after last payload data bit of a HS transmission burst	$60+4xUI$	-	-	ns	Input
High Speed Mode to/from Low Power Mode Timing							
DSI-CLK+/-	$T_{CLK-POS}$	Time that the MPU shall continue sending HS clock after the last associated data lane has transition to LP mode	$60+52xUI$	-	-	ns	Input
DSI-CLK+/-	$T_{CLK-TRAIL}$	Time to drive HS differential state after last payload clock bit of a HS transmission burst	60	-	-	ns	Input
DSI-CLK+/-	$T_{HS-EXIT}$	Time to drive LP-11 after HS burst	100	-	-	ns	Input
DSI-CLK+/-	$T_{CLK-PREPARE}$	Time to drive LP-00 to prepare for HS transmission	38	-	95	ns	Input
DSI-CLK+/-	$T_{CLK-TERM-EN}$	Time-out at clock lane display module to enable HS transmission	-	-	38	ns	Input

Note 1) Dn = D0, D1, D2 and D3.

Note 2) Two HS transmission can be sent with a break as short as $T_{HS-EXIT}$ from each other in continuous clock mode. In discontinuous mode, the break is longer which account $T_{CLK-POS}$, $T_{CLK-TRAIL}$ and $T_{HS-EXIT}$, before activity in clock and data lanes again.



6.4 Reset Input Timing



Reset input timing

(VDDI=1.7~1.9V, VCI=3.0 to 3.6V, GND=0V, Ta = -30 to 70°C)

Signal	Symbol	Parameter	MIN	TYP	MAX	Unit	Description
RESX	t _{RESW}	Reset "L" pulse width (Note 1)	10	-	-	µs	
	t _{REST}	Reset complete time (Note 2)	-	-	5	ms	When reset applied during Sleep In Mode
			-	-	120	ms	When reset applied during Sleep Out Mode and Note 5

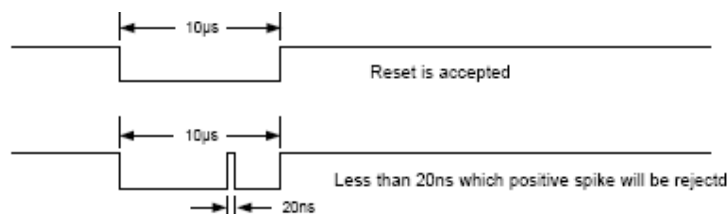
Note 1) Spike due to an electrostatic discharge on RESX line does not cause irregular system reset according to the table below.

RESX Pulse	Action
Shorter than 5µs	Reset Rejected
Longer than 10µs	Reset
Between 5µs and 10µs	Reset Start

Note 2) During the resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120 ms, when Reset Starts in Sleep Out –mode. The display remains the blank state in Sleep In–mode) and then return to Default condition for H/W reset.

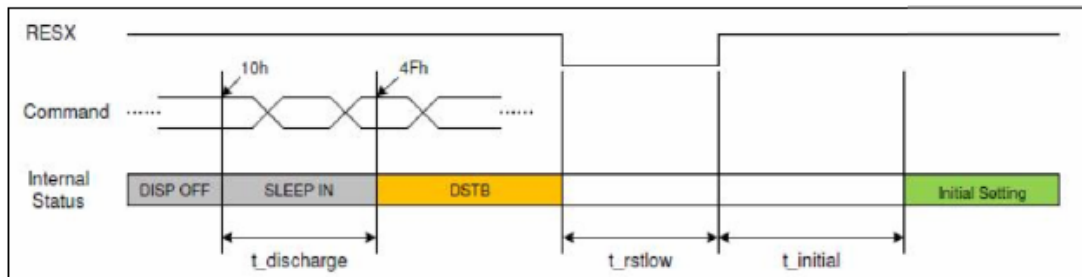
Note 3) During Reset Complete Time, values in OTP memory will be latched to internal register during this period. This loading is done every time when there is H/W reset complete time (t_{REST}) within 5ms after a rising edge of RESX.

Note 4) Spike Rejection also applies during a valid reset pulse as shown below:



Note 5) It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120msec

6.5 Deep Standby Mode Timing



(VDDI=1.7~1.9V, VCI=3.0 to 3.6V, GND=0V, Ta = -30 to 70°C)

Signal	Symbol	Parameter	MIN	TYP	MAX	Unit	Description
RESX	$t_{discharge}$	Sleep in into DSTB delay time	-	-	100	ms	
	t_{rstlow}	Reset low pulse	3	-	-	ms	
	$t_{initial}$	Reset high to initial setting delay time	-	-	120	ms	

Note 1) $t_{discharge}$ suggested delay time over 100ms.

Note 2) $t_{initial}$ suggested delay time over 120ms..

6.6 DC Characteristics for DSI HS Mode

Parameter	Symbol	Conditions	Specification			UNIT
			MIN	TYP	MAX	
Input voltage common mode range	V_{CMCLK} V_{CMDATA}	DSI-CLK+/-, DSI-Dn+/- (Note2, 3)	70	-	330	mV
Input voltage common mode variation (≤ 450 MHz)	$V_{CMRCLKL}$ $V_{CMRDATAL}$	DSI-CLK+/-, DSI-Dn+/- (Note 4)	-50	-	50	mV
Input voltage common mode variation (≥ 450 MHz)	$V_{CMRCLKM}$ $V_{CMRDATAM}$	DSI-CLK+/-, DSI-Dn+/-	-	-	100	mV
Low-level differential input voltage threshold	V_{THLCLK} $V_{THLDATA}$	DSI-CLK+/-, DSI-Dn+/-	-70	-	-	mV
High-level differential input voltage threshold	V_{THHCLK} $V_{THHDATA}$	DSI-CLK+/-, DSI-Dn+/-	-	-	70	mV
Single-ended input low voltage	V_{ILHS}	DSI-CLK+/-, DSI-Dn+/- (Note 3)	-40	-	-	mV
Single-ended input high voltage	V_{IHHS}	DSI-CLK+/-, DSI-Dn+/- (Note 3)	-	-	460	mV

Differential input termination resistor	R _{TERM}	DSI-CLK+/-, DSI-Dn+/-	80	100	125	Ω
Single-ended threshold voltage for termination enable	V _{TERM-EN}	DSI-CLK+/-, DSI-Dn+/-	-	-	450	mV
Termination capacitor	C _{TERM}	DSI-CLK+/-, DSI-Dn+/-	-	-	14	pF

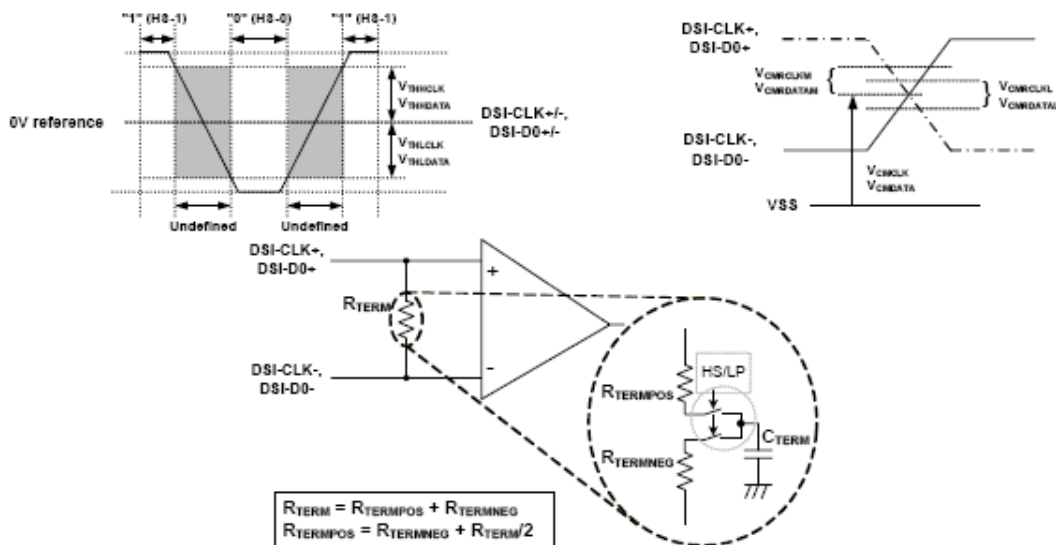
Note 1) VDDI=1.7~1.9V, VCI=3.0 to 3.6V, GND=0V, Ta=-30 to 70 °C (to +85 °C no damage).

Note 2) Includes 50mV (-50mV to 50mV) ground difference.

Note 3) Without VCMRCLKM / VCMRDATA M .

Note 4) Without 50mV (-50mV to 50mV) ground difference.

Note 5) Dn=D0, D1, D2 and D3.



Differential voltage range, termination resistor and Common mode voltage

7. Optical Specifications

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR≥ 10)	θ _L	Φ=180° (9 o'clock)	-	80	-	degree	Note 1
	θ _R	Φ=0°(3 o'clock)	-	80	-		
	θ _T	Φ=90° (12 o'clock)	-	80	-		
	θ _B	Φ=270° (6 o'clock)	-	80	-		
Response time Rise+Fall	T _{RT}	Normal θ=Φ=0°	-	20	30	msec	Note 3
Contrast ratio	CR		600	800	-	-	Note 4
Color chromaticity	W _X		0.272	0.302	0.332	-	Note 2
	W _Y		0.291	0.321	0.351	-	Note 5 Note 6
Luminance	L		220	250	-	-	Note 6
Luminance uniformity	Y _U		70	75	-	%	Note 6,7

Note 1: Definition of viewing angle range

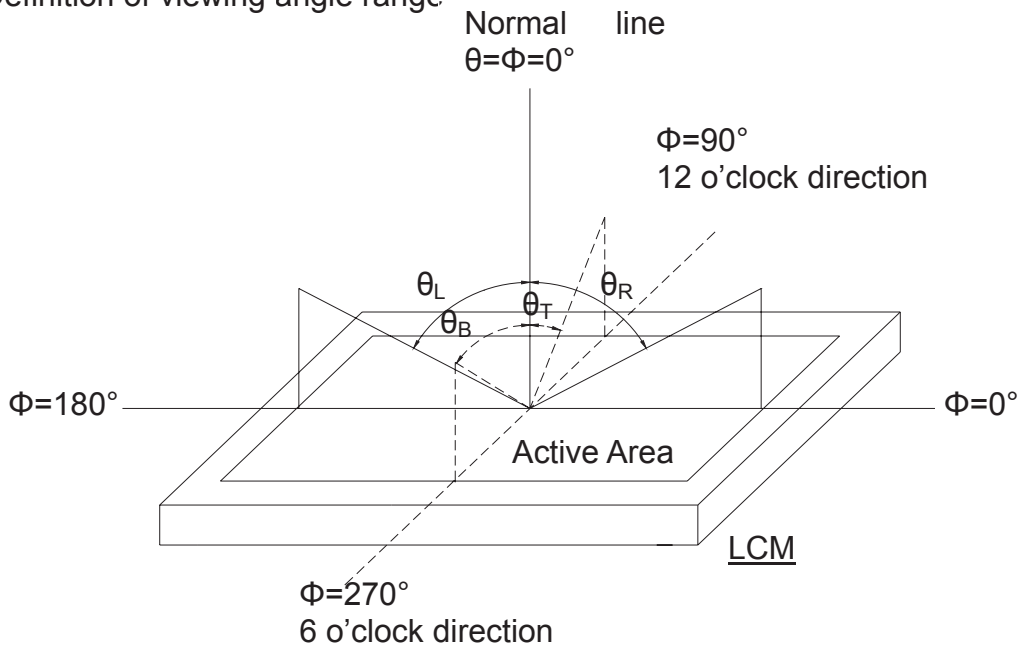


Fig. 4-1 Definition of viewing angle

Note 2: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Viewing angle is measured by ELDIM-EZ contrast/Height :1.2mm ,Response time is measured by Photo detector TOPCON BM-5A, other items are measured by BM-7A/Field of view: 1° /Height: 500mm.)

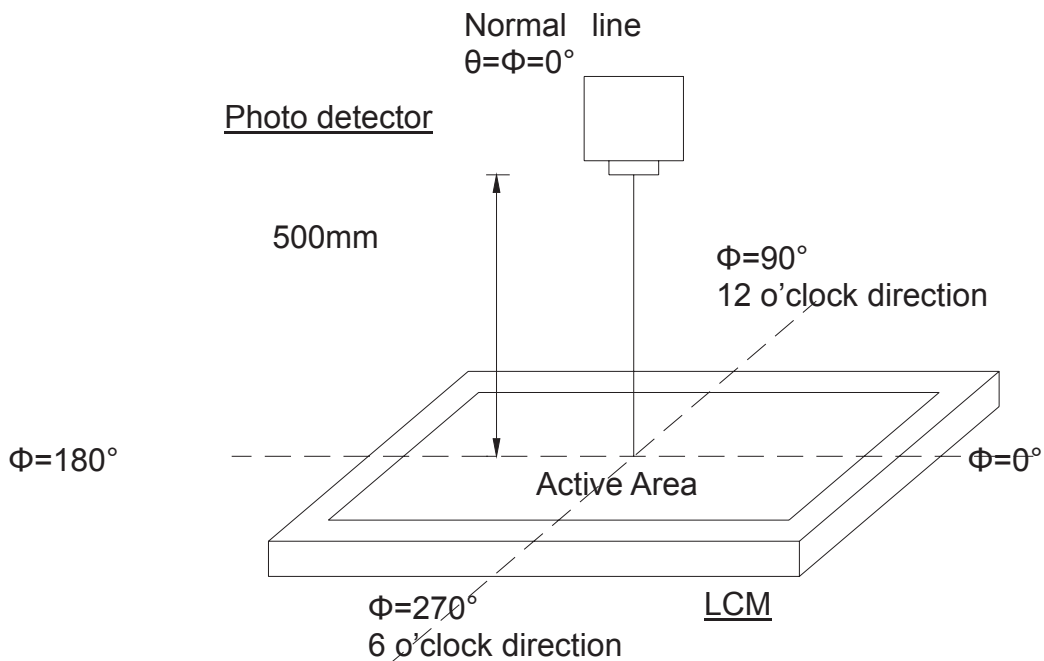


Fig. 4-2 Optical measurement system setup

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

detector output intensity changed from 10% to 90%.

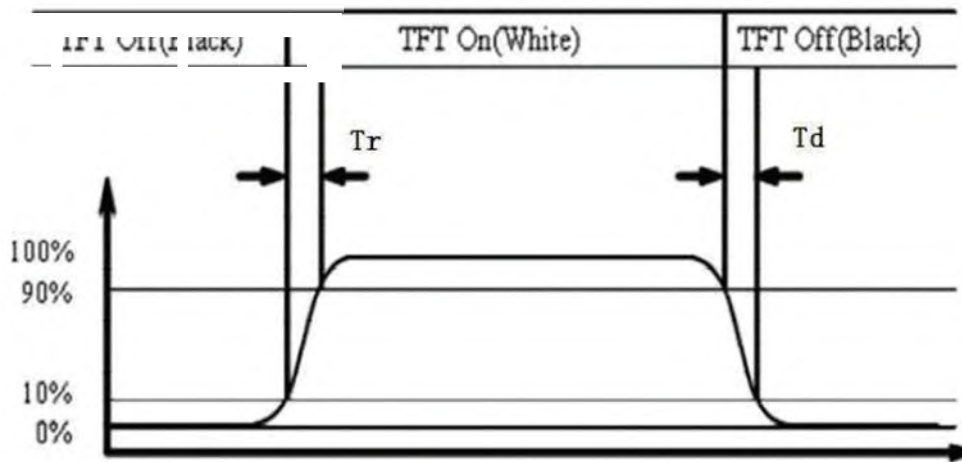


Fig. 4-3 Definition of response time

Note 4: Definition of contrast ratio

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

Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is $I_{LED}=140\text{mA}$.

Note 7: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer to Fig. 4-4).Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (Yu)} = \frac{B_{min}}{B_{max}}$$

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

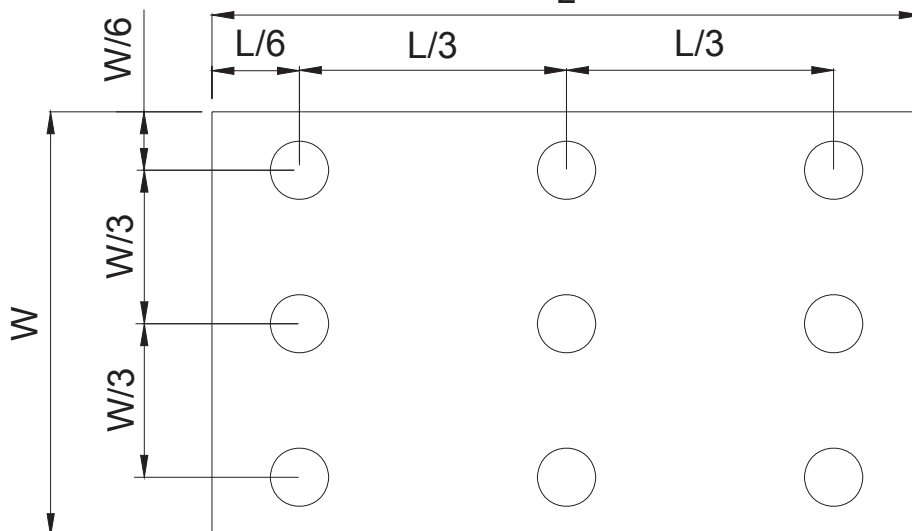


Fig. 4-4 Definition of measuring points

B_{max} : The measured maximum luminance of all measurement position.

B_{min} : The measured minimum luminance of all measurement position.

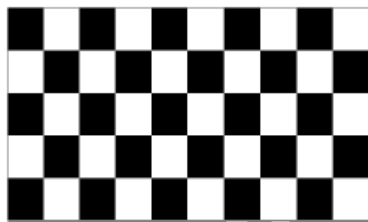
8.0 RELIABILITY SPECIFICATION

8.0.1 TEMPERATURE AND HUMIDITY

Test Item	Test Condition	Remark
High Temperature Storage	Ta=60°C; 72hrs	IEC60068-2-1: 2007 GB2423.2-2008
Low Temperature Storage	Ta=-20°C; 72hrs	IEC60068-2-1: 2007 GB2423.1-2008
High Temperature Operation	Ta=50°C; 72hrs	IEC60068-2-1: 2007 GB2423.2-2008
Low Temperature Operation	Ta=-10°C; 72hrs	IEC60068-2-1: 2007 GB2423.1-2008
High Temperature High Humidity Operation	Ta=50°C, 90%RH, 72Hrs(no condensation)	IEC60068-2-78: 2001 GB/T2423.3-2006
Thermal Shock	-20°C(0.5h) ~ 60°C(0.5h) / 10cycles	Start with cold temperature , End with high temperature, IEC60068-2-14:1984,GB2423.22-2002
Image Sticking	25°C ; 2hrs	Note1

Note1:Condition of image sticking test :25°C ±2°C

Operation with test pattern sustained for 2hrs,then change to gray pattern immediately.after5 mins,themura must be disappeared completely



(a) Test Pattern (chess board Pattern)



(b) Gray Pattern

8.0.2 ESD

Test item	Conditions	Remark	
Electro Static Discharge Test (non-operation)	150pF, 330Ω, Contact:±3KV,Air:±8KV	1	IEC61000-4-2: 2001 GB/T17626.2-2006
	200pF, 0Ω, ±200V contact test	2	

Note: Measure point :

1. LCD glass and metal bezel
2. IF connector pins