



CUSTOMER APPROVAL SHEET

Company Name	
MODEL	C103VAN01.1
CUSTOMER APPROVED	Title : Name :

- ☐ APPROVAL FOR SPECIFICATIONS ONLY (Spec. Ver. 0.2)
- ☐ APPROVAL FOR SPECIFICATIONS AND ES SAMPLE (Spec. Ver. 0.2)
- ☐ APPROVAL FOR SPECIFICATIONS AND CS SAMPLE (Spec. Ver. 0.2)
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Product Specification

10.25" COLOR TFT-LCD MODULE

MODEL NAME: C103VAN01.1

Model Name: C103VAN01.1

Planned Lifetime: From 2016/Jan To 2019/Dec

Phase-out Control: From 2019/Apr To 2019/Dec

EOL Schedule: 2019/Apr

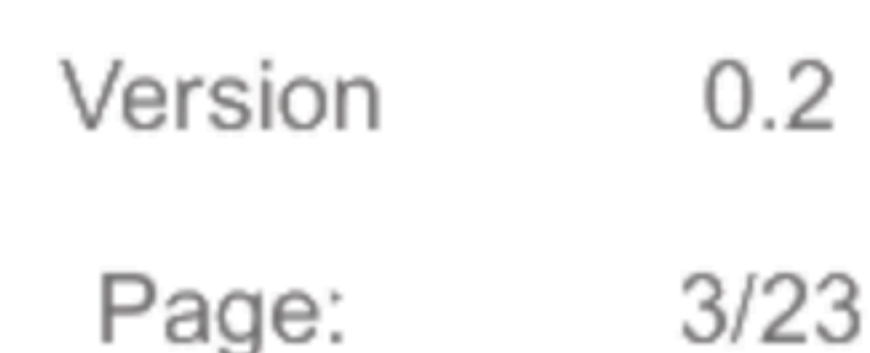
<◆>Preliminary Specification

<>Final Specification

Note: The content of this specification is subject to change.

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A. General Description

C103VAN01.1 is an a-Si & Transmissive type Thin Film Transistor Liquid crystal Display (TFT-LCD) with AHVA (Advanced Hyper View Angle) technology. This model is composed of a TFT-LCD, drivers, the FPC (flexible printed circuit), a backlight unit, and the PCBA (Printed Circuit Board Assembly)

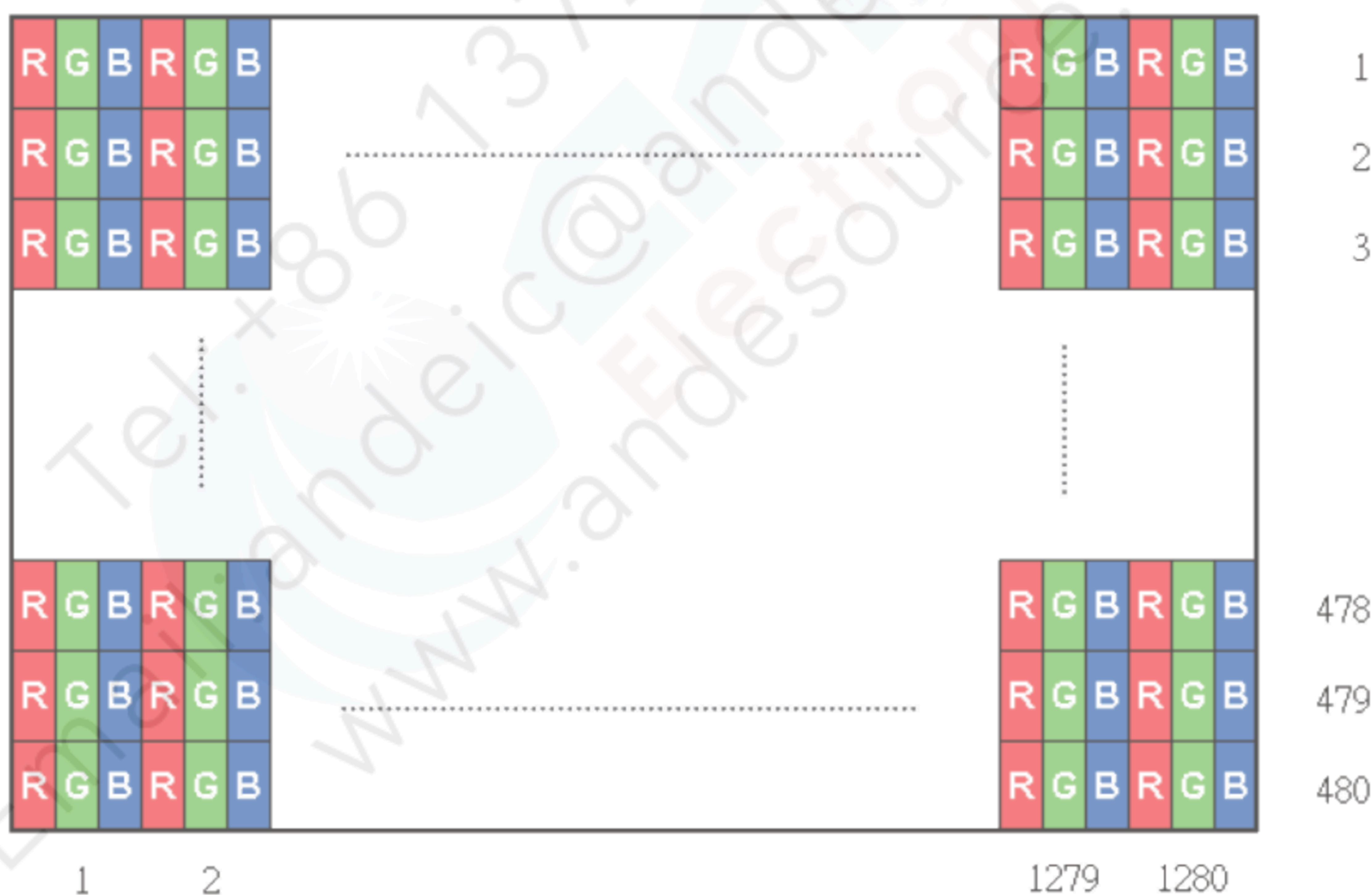
B. Features

- 10.25-inch (8:3) display
- 1280RGB x 480 resolution in RGB stripe dot arrangement
- Interfaces: LVDS
- Advanced Hyper View Angle – Normal Black wide view technology, AHVA
- RoHs compliance

C. Physical Specifications

NO.	Item	Unit	Specification	Remark
1	Display Resolution	dot	1280 (H)×480(V)	
2	Active Area	mm	243.84(H)×91.44(V)	
3	Screen Size	inch	10.25(Diagonal)	
4	Dot Pitch	mm	0.0635(H)×RGB×0.190.5(V)	
5	Color Configuration	--	R. G. B. Stripe	Note 1
6	Color Depth	--	16.7M Colors	
7	Overall Dimension	mm	260.35 x 113.73 x 8.73/16.23 w/o Boss, w BOSS	Note 2
8	Weight	g	TBD	
9	Display Mode	--	Normally Black	
10	Surface Treatment		AG · 3H	

Note 1: Below figure shows dot stripe arrangement.



Note 2: Please refer to the drawing in page 6 for further information

D. Outline Dimension

Notes:
 1. Refer to page 10000.
 2. The length of the panel is 1000mm.
 3. The width of the panel is 600mm.
 4. The thickness of the panel is 10mm.
 5. The weight of the panel is 1.2kg.



1000mm

600mm

10mm

100mm

10mm

10mm

10mm

10mm

10mm

10mm

10mm

10mm

10mm

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10mm

E. Electrical Specifications

1. Pin Assignment

a. Main FPC

Connector= *Hirose FH28-40S-0.5SH*

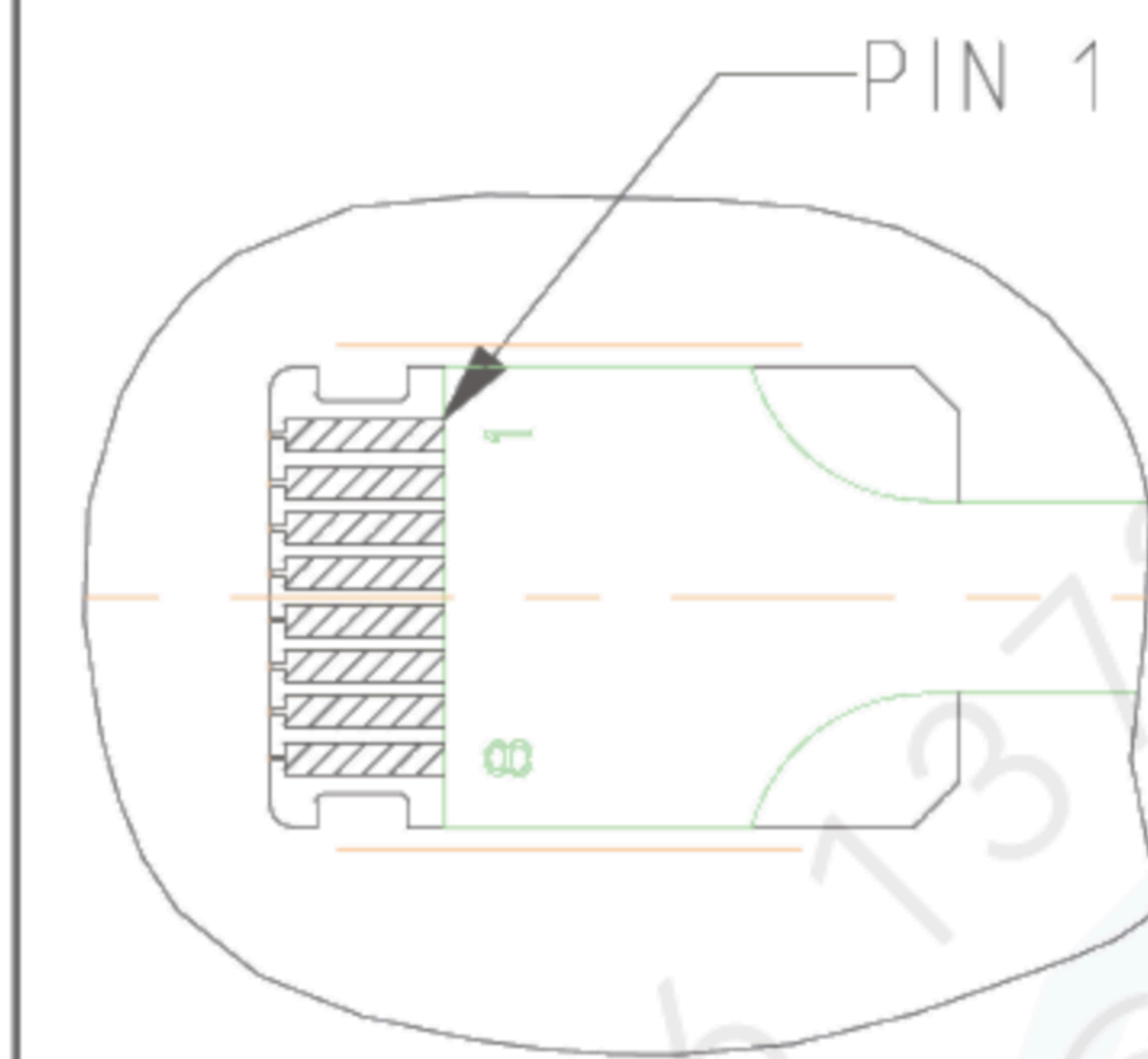
Pin No.	Symbol	I/O	Function
1	GND	G	Ground
2	DISP_ON	I	Display on/off(Black display)
3	XRES	I	Reset
4	GND	G	Ground
5	VSYNC F/B	I	Vsync Feedback
6	GND	G	Ground
7	D3_P	I	LVDS data clock+
8	D3_N	I	LVDS data clock-
9	GND	G	Ground
10	CLK_P	I	LVDS data 3+
11	CLK_N	I	LVDS data 3-
12	GND	G	Ground
13	D2_P	I	LVDS data 2+
14	D2_N	I	LVDS data 2-
15	GND	G	Ground
16	D1_P	I	LVDS data 1+
17	D1_N	I	LVDS data 1-
18	GND	G	Ground
19	D0_P	I	LVDS data 0+
20	D0_N	I	LVDS data 0-
21	GND	G	Ground
22	GND	G	Ground
23	VCC	P	Power supply(3.3V)
24	VCC	P	Power supply(3.3V)
25	GND	G	Ground
26	CS	I	Serial data chip select
27	SCLK	I	Serial data Clock
28	SDO	I	Serial data Output
29	SDI	I	Serial data Input
30	GND	G	Ground
31	GND	G	Ground
32	LRR	I	Left right rotation
33	UDR	I	Up down rotation
34	GND	G	Ground
35	GND	G	Ground
36	GND	G	Ground
37	GND	G	Ground
38	GND	G	Ground
39	GND	G	Ground
40	GND	G	Ground

b. BACK LIGHT UNIT FPC

Connector=IRISO 9664S-08Y800

No.	Pin Name	I/O	Description	Remarks
1	Anode	Vin	LED power supply voltage	
2	Anode	Vin	LED power supply voltage	
3	NC	NA	No Use	
4	NC	NA	No Use	
5	NC	NA	No Use	
6	Cathode 1	G1	Ground of string 1	
7	Cathode 2	G1	Ground of string 2	
8	Cathode 3	G1	Ground of string 3	

R: Resistance, G: GND, V_{in} : Power input
Gold finger side:



2. Absolute Maximum Ratings

Items	Symbol	Values		Unit	Condition
		Min.	Max.		
Digital Power Voltage	VDD	-0.3	5	V	Note 1
Analog Power Voltage	VDDA	-0.3	5	V	Note 1
Input Signal Voltage	Vi	-0.3	VDD	V	Note 1
Operation Temperature	Topa	-30	+85	.	
Storage Temperature	Tstg	-40	+95	.	

Note 1: Functional operation should be restricted under normal ambient temperature.

3. DC Electrical Characteristics

The following items are measured under stable condition and suggested application circuit.

a. Power Specification

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply	VDD	3	3.3	3.6	V	
	IVDD	-	-	-	mA	
	IVDD inrush current	-	-	-	mA	
	VDDA	3	3.3	3.6	V	
	IVDDA	-	-	-	mA	
	IVDDA inrush current			-	A	

Note 1: Test pattern is the following picture .



Note 2: Best VCOM can be found between Min. to Max. range. Typical value is an average value not the best VCOM. It must be optimized according to each LCD. If the value not set optimized, it will affect optical performances. Such as gamma, flicker, image sticking. Suggested to use adjustable voltage apply to VCOM.

b. Signal DC Electrical Characteristics

□ It's the tentative list, need further modification

Parameter	Symbol	Min	Typ	Max	Unit	Remark
Input signal voltage	V_i	-0.3	-	VDD	V	
Input high level voltage	V_{IH}	0.7VDD	-	VDD	V	
Input low level voltage	V_{IL}	GND	-	0.3VDD	V	
Differential input high threshold	R_{XVTH}	0.1	-	-	V	
Differential input low threshold	R_{XVTL}	-	-	-0.1	V	
Input voltage range (singled-end)	R_{XVIN}	0.8	-	1.6	V	
Input differential voltage	$ V_{ID} $	0.2	-	0.6	V	
Differential Input Common Mode Voltage	R_{XVCM}	1.1	1.2	1.4	V	

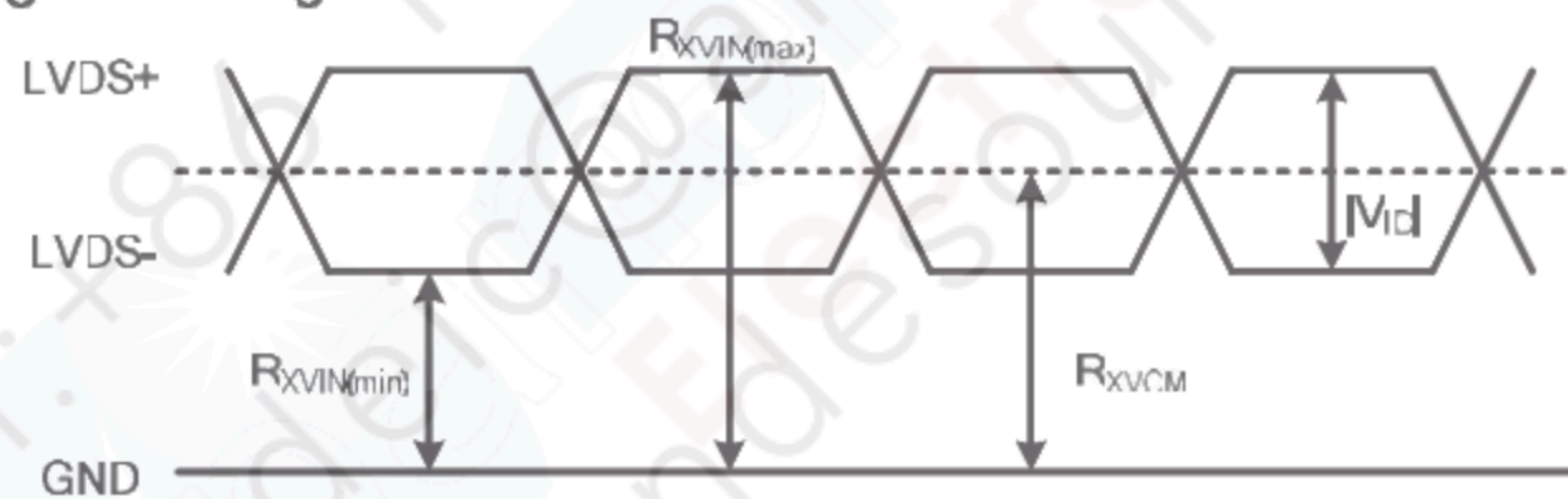
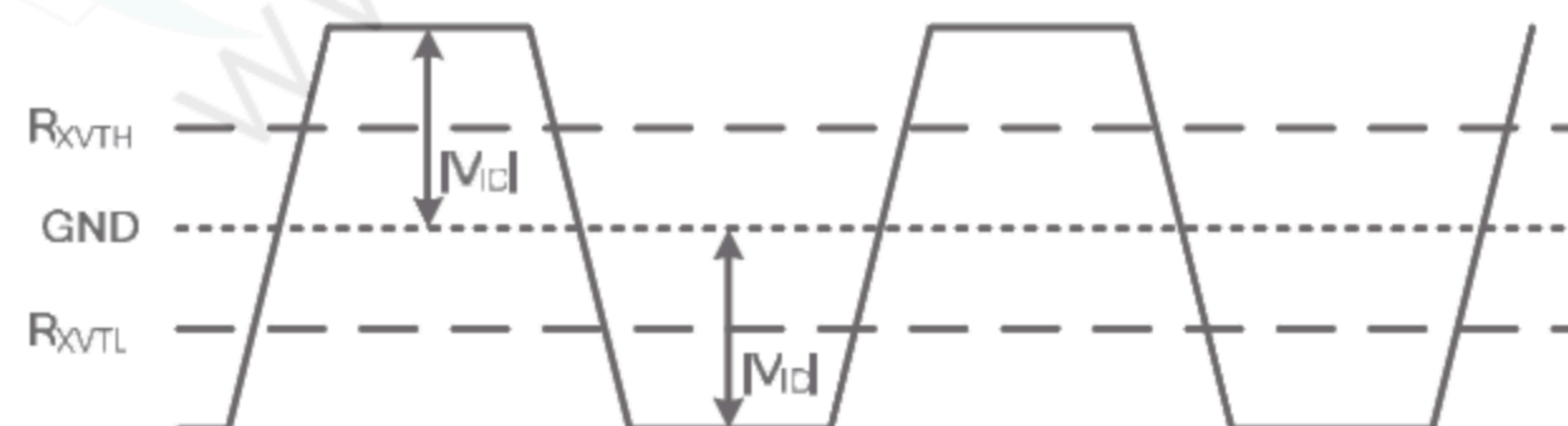
Single-end Signal

Differential Signal


Fig. 1 LVDS DC characteristics diagram

c. Backlight Driving Conditions (Note 1)

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Remark
Forward Current	I_F	at 25.	---	80	85	mA	Single serial (Note 2)
Forward Voltage	V_F	$I_F=80(\text{mA})$, at 25.	---	(27)	30.6	V	$3.4\text{V} \times 9\text{pcs} = 30.6\text{V}$ (Note 3)
LED Life Time	T_{LED}	at 25.	10,000	---	---	Hrs	Note4 (Reference)

Note 1: LED backlight has one light-bar.

Light-bar has 27 LEDs (3 strings, 9 pcs for each string).

Note 2: The LED supply power is for 3 string of LED

Note 3: Be sure your system can provide enough voltage driving capability (larger than 30.6V is recommended) to provide 80mA for each LED or the brightness is possible to be below spec.

Note 4: The LED lifetime 10,000hrs means , after normal use at 80mA, under +25 ° C, the brightness decreases to 50% of original level.

4. AC Electrical Characteristics

a. Input AC characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
VDD power on slew time	T_{POR}			15	ms	From 0V to 90% VD Note 1
GRB active pulse width	T_{GRB}	1		20	ms	VDD=3.3V

Note 1: the inrush current spec should follow VDD power on slew time min value is 1ms and max value is 15ms. Inrush current maybe out of spec. (max: 500mA)

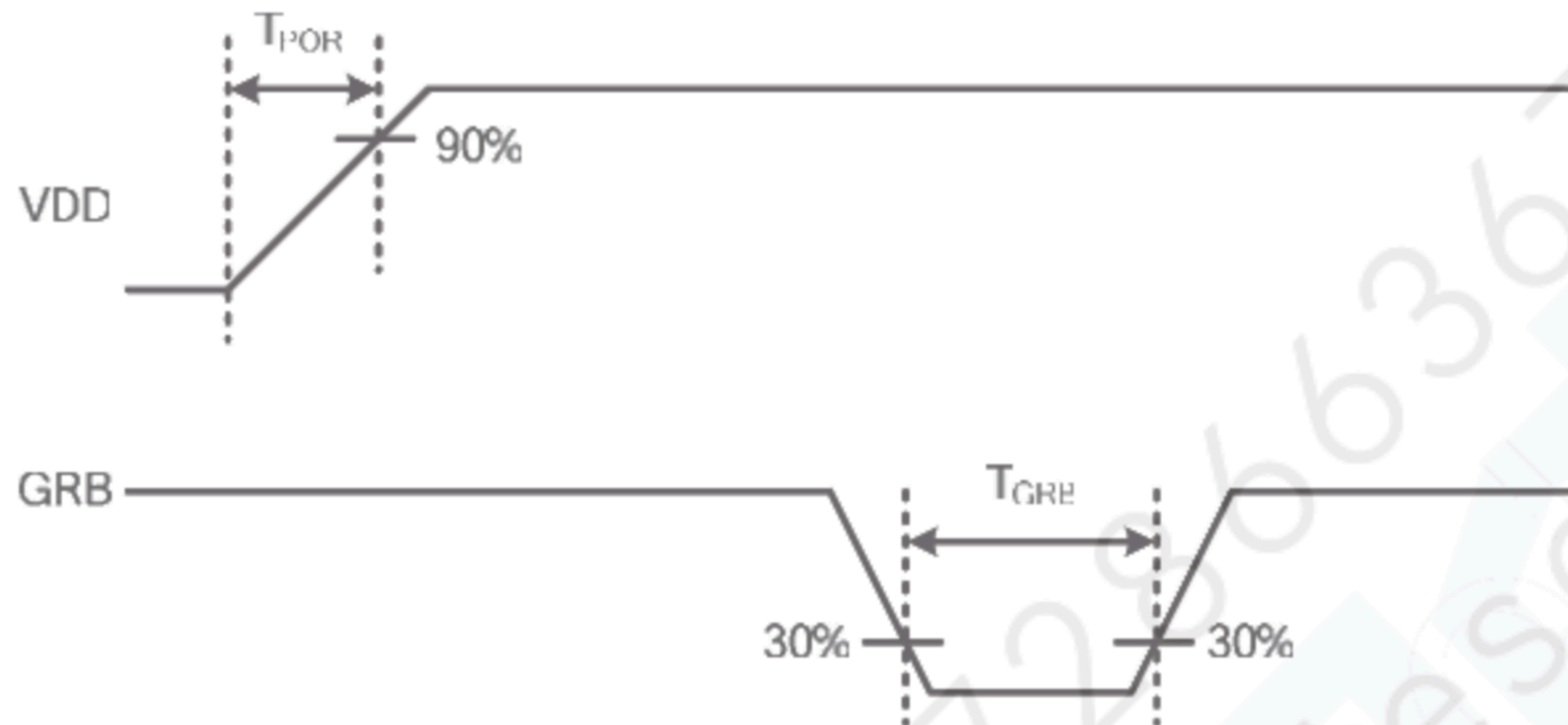


Fig. 6. VDD and GRB timing diagram

b. Differential signal AC characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Clock frequency	R_{XFCLK}	45	-	60	MHz	
Input data skew margin	T_{RSKM}	400			ps	

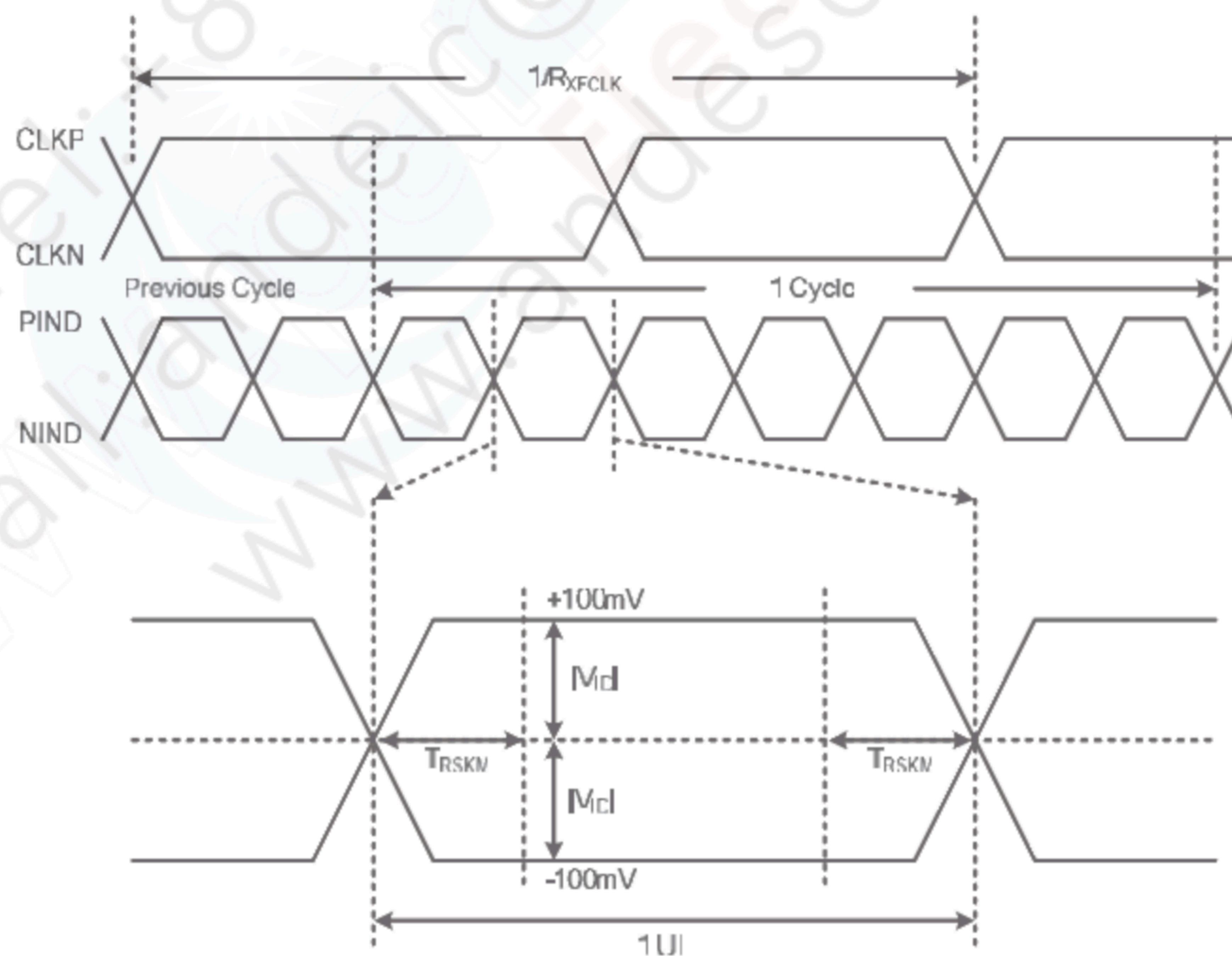


Fig. 7 LVDS AC characteristics diagram

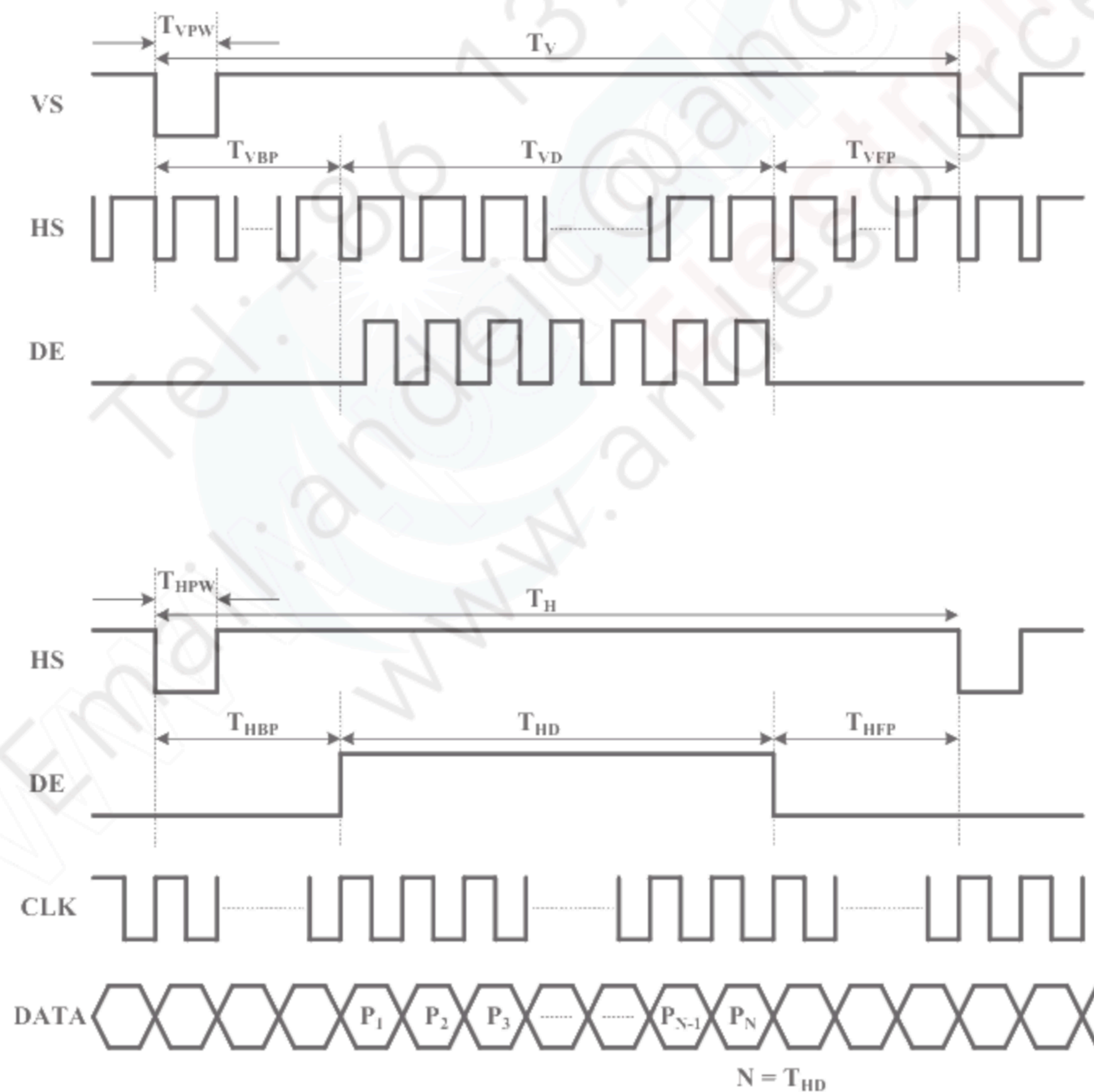
c.Differential Input Data Format

VESA Format

CLKP (TXCLKP)										
CLKN (TXCLKN)										
P/NIND0 (1XCF/N)	RC	G0	R5	R4	R3	R2	R1	RC	GC	
P/NIND1 (TX1P/N)	G1	B'	RC	G5	G4	G3	G2	G1	R1	
P/NIND2 (1X2P/N)	B2	DE	VS	HS	B5	B4	B3	B2	DE	
P/NIND3 (TX3P/N)	RE	-	E7	B6	G7	GE	R7	RE	-	

Input Timing Diagram

Fig. 2. Input Timing Diagram

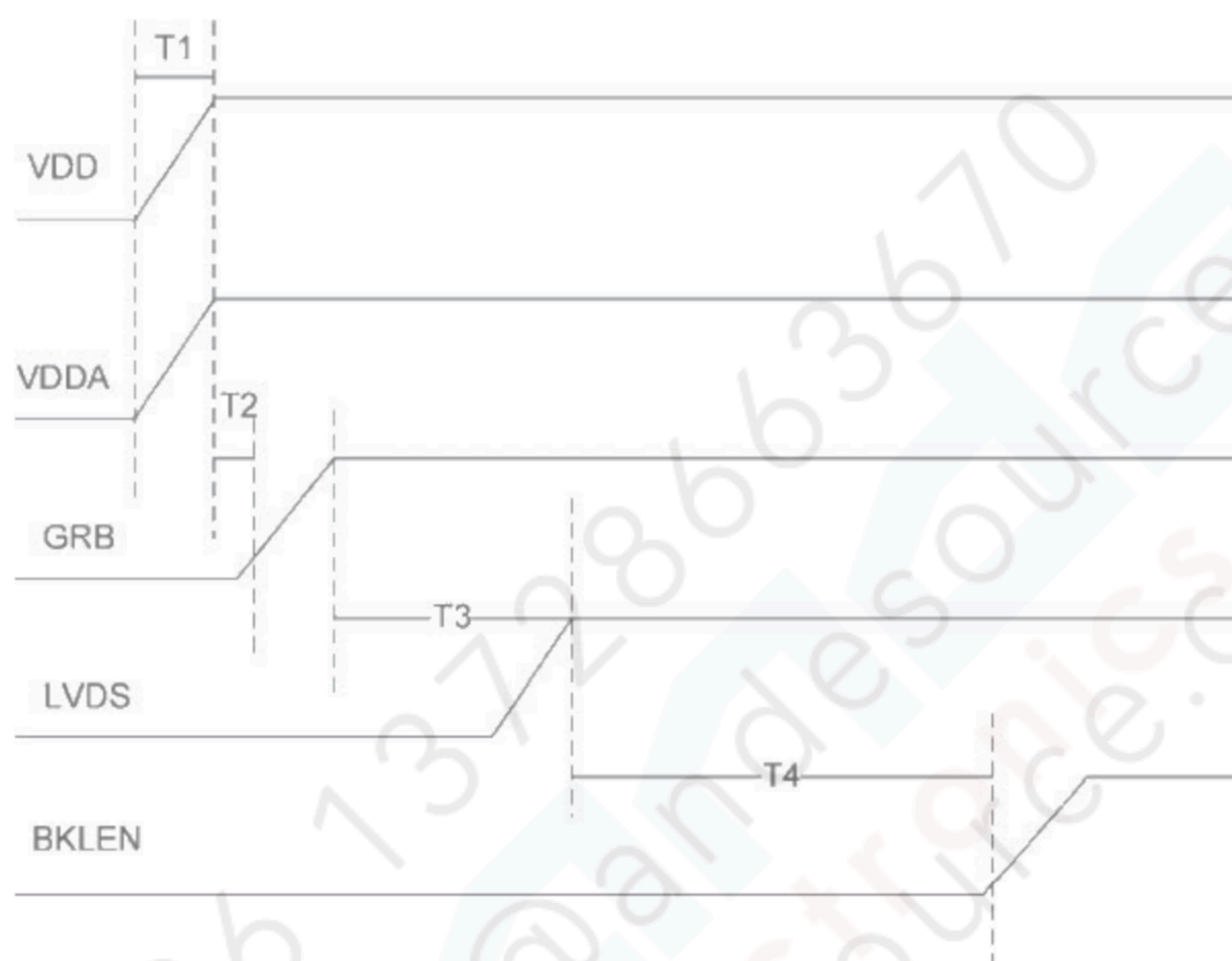


Parameter		Symbol	Min.	Typ.	Max.	Unit.	Remark
CLK Frequency		F_{CLK}	45	47	60	MHz	
HSYNC	Period	T_H	1388	1480	1528	CLK	
	Horizontal display area	T_{HD}	1280			CLK	
	Blanking	$T_{HBP} + T_{HFP}$	108	200	248	CLK	
VSYNC	Period	T_V	540	533	654	HS	
	Vertical display area	T_{VD}	480			HS	
	Blanking	$T_{VBP} + T_{VFP}$	60	53	174	HS	

Power ON / OFF timing

The LCD adopts high voltage driver IC, so it could be permanently damaged under a wrong power on/off sequence. The suggested LCD power sequence is below:

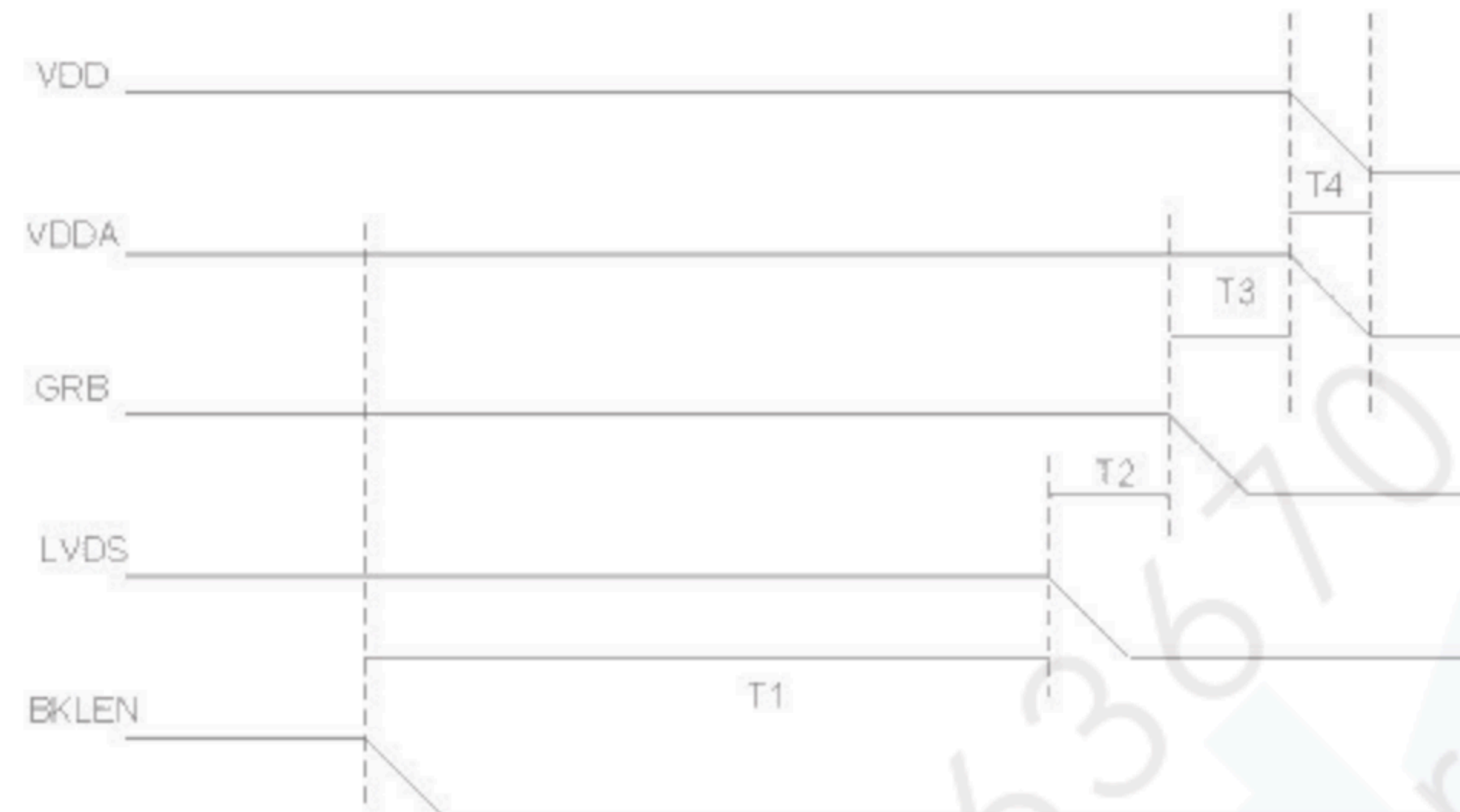
c. Power ON sequence



Power on timing:

Parameter	Value			Units
	Min.	Typ.	Max.	
T1	-	-	15	ms
T2	1	-	-	ms
T3	1	-	300	ms
T4	300	350	-	ms

d. Power Off sequence



Parameter	Value			Units
	Min.	Typ.	Max.	
T1	90	100	-	ms
T2	1	30	300-	ms
T3	1	30	40	ms
T4	50	-	-	ms

All signals must be discharge to zero voltage when power off.

F. Optical specifications (Note 1, 2)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Response	Tr+Tf	$\theta=0^\circ$, 25°C	-		40	ms	Note 3
		$\theta=0^\circ$, 0°C	-		80		
		$\theta=0^\circ$, -20°C	-		200		
		$\theta=0^\circ$, -30°C	-		400		
Contrast ratio	CR	$\theta=0^\circ$	800		-		Note 4, 5, 6
Viewing Angle Top Bottom Left Right		CR. 10	70 70 70 70	80 80 80 80	- - - -	deg.	Note 7, 8
Brightness	Y_L	$\theta=0^\circ$	600		-	cd/m ²	Note 1,2,9
White Chromaticity	X	$\theta=0^\circ$	0.278 Tentative	0.318 Tentative	0.358 Tentative		Note 8
	Y	$\theta=0^\circ$	0.281 Tentative	0.321 Tentative	0.361 Tentative		
Red Chromaticity	X	$\theta=0^\circ$	0.61 Tentative	0.65 Tentative	0.69 Tentative		
	Y	$\theta=0^\circ$	0.267 Tentative	0.307 Tentative	0.347 Tentative		
Green Chromaticity	X	$\theta=0^\circ$	0.263 Tentative	0.303 Tentative	0.343 Tentative		
	Y	$\theta=0^\circ$	0.614 Tentative	0.654 Tentative	0.694 Tentative		
Blue Chromaticity	X	$\theta=0^\circ$	0.107 Tentative	0.147 Tentative	0.187 Tentative		
	Y	$\theta=0^\circ$	0.041 Tentative	0.081 Tentative	0.121 Tentative		
Uniformity of white pattern	Uw	$\theta=0^\circ$	80%				Note 10

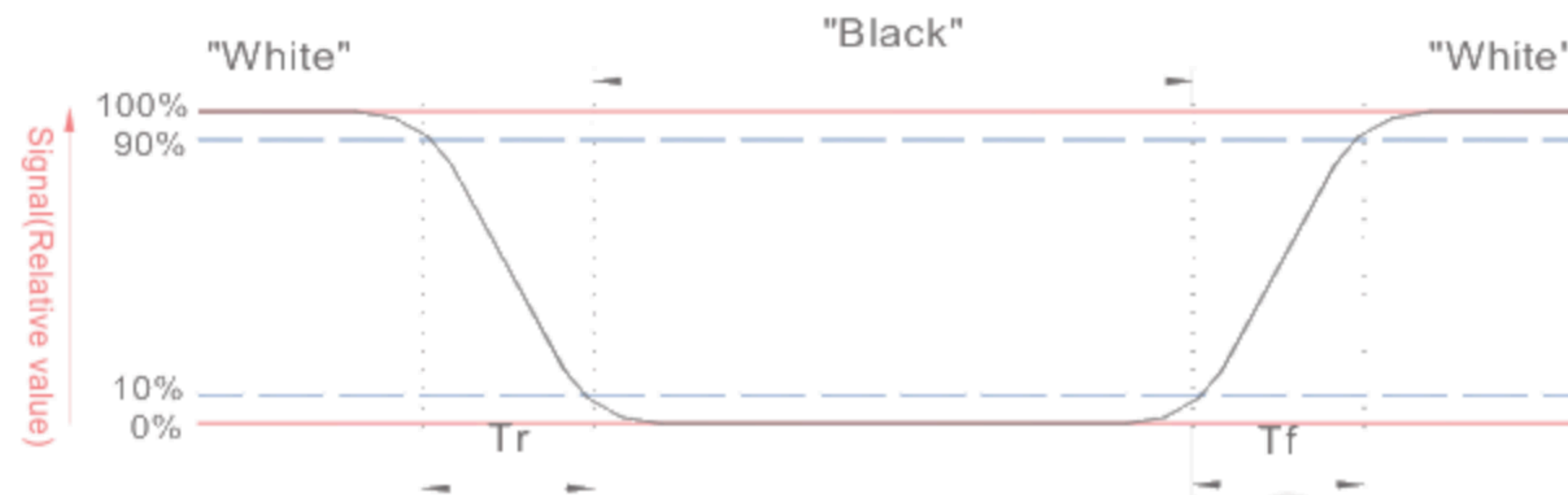
PS. Regarding Color Chromaticity, will be updated after real sample out.

Note 1: Measurement should be performed in the dark room, optical ambient temperature =25°C, and backlight current $I_L=80$ mA

Note 2: To be measured on the center area of panel with a field angle of 1°by Topcon luminance meter SR-3, after 10 minutes operation.

Note 3: Definition of response time:

The output signals of photo detector are measured when the input signals are changed from “black” to “white”(falling time) and from “white” to “black”(rising time), respectively.



Note 4. From liquid crystal characteristics, response time will become slower and the color of panel will become darker when ambient temperature is below 25. .

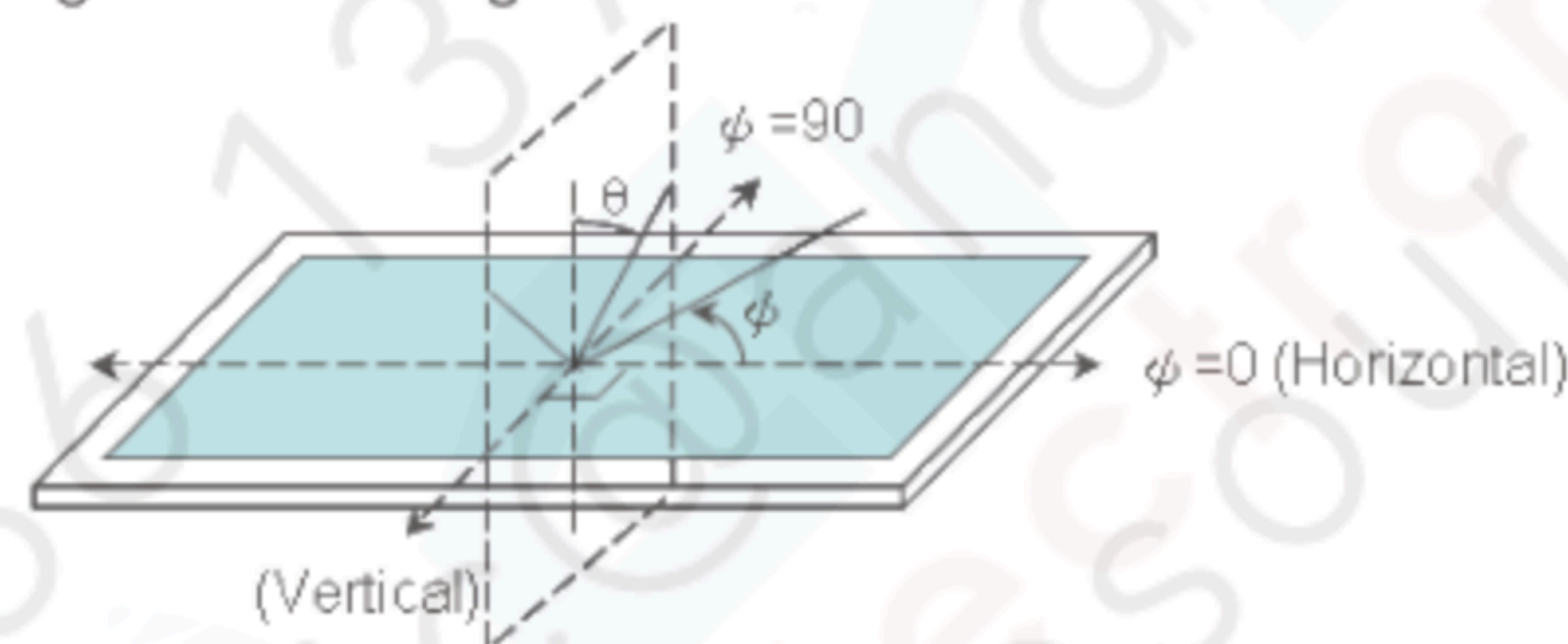
Note 5. Contrast ratio is calculated with the following formula.

$$\text{Contrast ratio} = \frac{\text{Photo detector output when LCD is at "White" state}}{\text{Photo detector output when LCD is at "Black" state}}$$

Note 6. When "White" state, R[7:0]=G[7:0]=B[7:0]=11111111

When "Black" state, R[7:0]=G[7:0]=B[7:0]=00000000

Note 7. Definition of viewing angle: refer to figure as below.



Note 8. The viewing angles are measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

Note 9. Brightness is measured at the center of the display with white pattern in 80mA

Note 10. Luminance Uniformity is defined as following within the 9 measurements (L1~L9),

$$\text{Luminance Uniformity(\%)} = \frac{\text{Minimum luminance(brightness)}}{\text{Maximum luminance(brightness)}}$$



G. Reliability Test Items (Note 2)

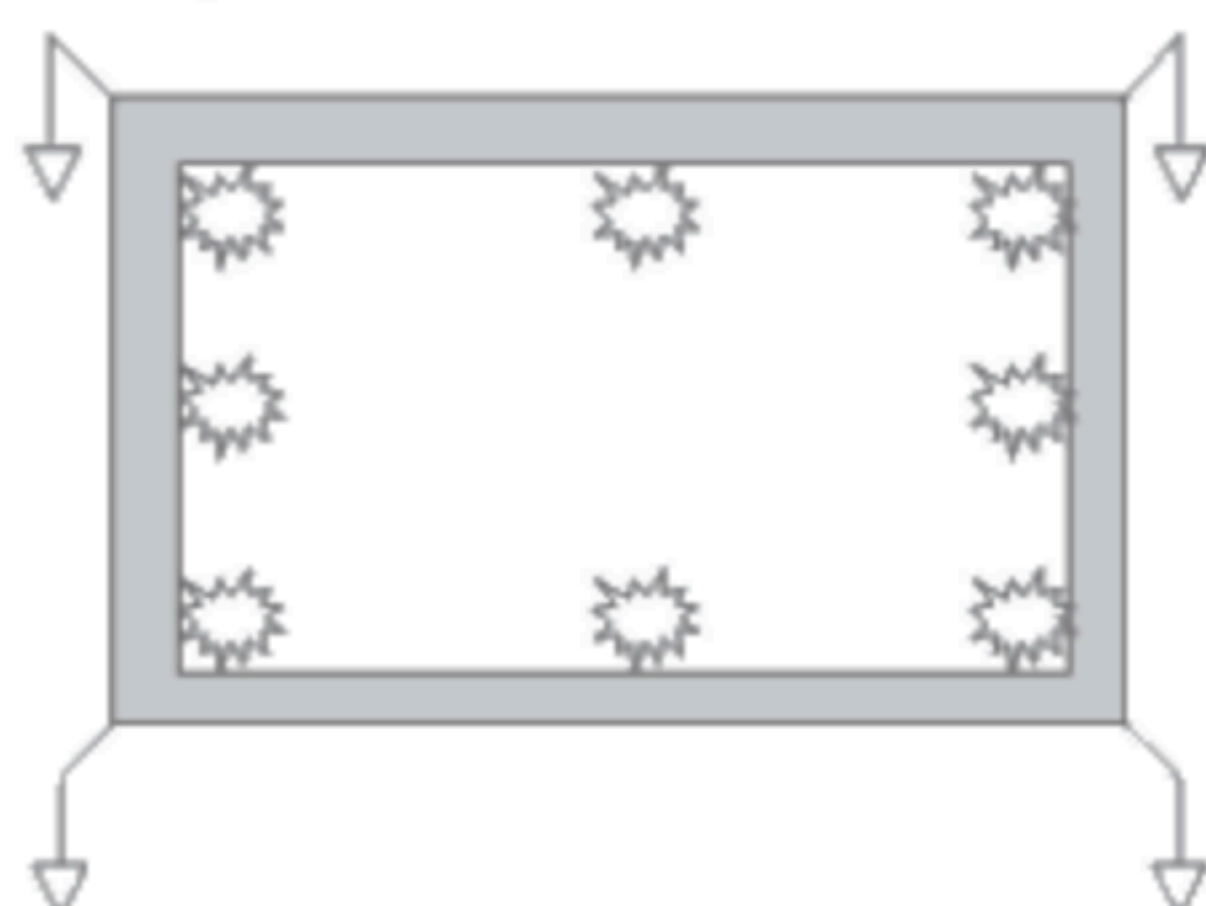
No.	Test items	Conditions		Remark
1	High temperature storage	Ta= 95	240Hrs	Note1
2	Low temperature storage	Ta= -40	240Hrs	
3	High temperature operation	Ta= 85	240Hrs	
4	Low temperature operation	Ta= --30	240Hrs	Note1, 3
5	High temperature and high humidity	Ta= 60 , 90% RH	240Hrs	Operation
6	Heat shock	-30 ~85 /100 cycles 1Hrs/cycle		Non-operation
7	Electrostatic discharge	Contact = ± 8 kV, class B (R=330Ω,C=150pF) Air = ± 15 kV, class B (R=330Ω,C=150pF) 1 times for each point.		Operation (Note 4)
8	Vibration	Frequency range	8~33.3Hz	JIS D1601,A10 Condition A
		Stoke	1.3mm	
		Sweep	2.9G, 33.3~400Hz	
		Cycle	15min.	
		2 hours for each direction of X, Z 4 hours for Y direction		
9	Mechanical shock	100G, 6ms, ±X,±Y,±Z 3 times for each direction		
10	Vibration (with carton)	Random vibration: 0.015G ² /Hz from 5~200Hz -6dB/Octave from 200~500Hz		IEC 68-34
11	Drop (with carton)	Height: 60cm 1 corner, 3 edges, 6 surfaces		

Note 1: Ta: Ambient temperature.

Note 2: In the standard condition, there is not display function NG issue occurred. All the cosmetic specification is judged before the reliability stress.

Note 3: Short time operation between -40 . ~-30 . doesn't provide full performance but a correct image on the LCD. The LCD is guaranteed to suffer no permanent damage.

Note 4: Test techniques follow IEC61000-4-2 standard. Test points and pattern as below.



H. Packing Form

