

**MODEL NO. : TM150TDSG70**
**ISSUED DATE: 2014-10-17**
**VERSION : V1.2**

- Preliminary Specification
- Final Product Specification

**Customer : \_\_\_\_\_**

Approved by	Notes

**TIANMA Confirmed :**

Prepared by	Checked by	Approved by
Rui Xu	/	Longping Deng

This technical specification is subjected to change without notice

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## 1 General Specifications

	Feature	Spec
<b>Display Spec.</b>	Size	15 inch
	Resolution	1024xRGBx768
	Technology Type	a-Si
	Pixel Configuration	RGB vertical stripe
	Pixel pitch(mm)	0.297(H) × 0.297(V)
	Display Mode	TM with Normally White
	Surface Treatment	Anti Glare
	Viewing Direction	12:00
	Gray Scale Inversion Direction	6:00
<b>Mechanical Characteristics</b>	LCM (W x H x D) (mm)	326.5(H)×253.5 (V) ×11.8 (D) (typ.)
	Active Area(mm)	304.128(W) x 228.096 (V) (typ.)
	With /Without TSP	Without TSP
	Connection Type	Socket
	Weight (g)	1000g(typ.)
	Backlight	LED backlight type Replaceable lamp holder for backlight
<b>Electrical Characteristics</b>	Interface	LVDS 1 port
	Color Depth	16.7M/262K

Note 1: Viewing direction for best image quality is different from TFT definition. There is a 180 degree shift.

Note 2: Requirements on Environmental Protection: RoHS

Note 3: LCM weight tolerance: ± 5%

## 2 Input/Output Terminals

### 2.1 LCD PINS

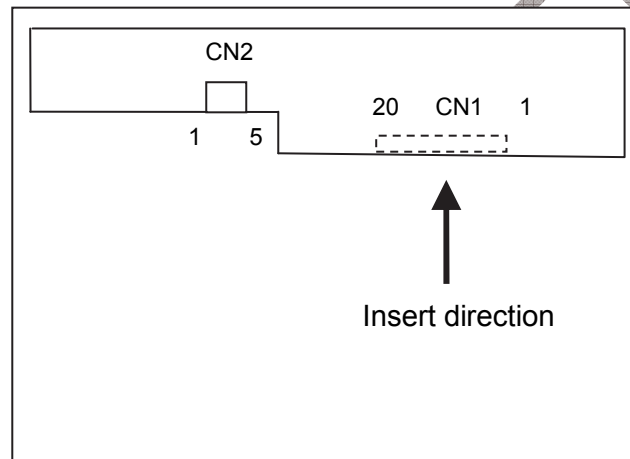
CN1 socket(Module side): 185083-20121 ( P-TWO ELECTRIC TECHNOLOGY CO., LTD.)

Pin No.	Symbol	Signal	Input data signal: 8bit	Input data signal:6bit	Remarks
1	VCC	Power supply	Power supply		
2	VCC				
3	GND	Ground	Ground		
4	REV	Selection of scan direction	High: Reverse scan Low or Open: Normal scan		
5	D0-	Pixel data	R0-R5,G0		
6	D0+				
7	GND	Ground	Ground		
8	D1-	Pixel data	G1-G5,B0-B1		
9	D1+				
10	GND	Ground	Ground		
11	D2-	Pixel data	B2-B5,DE		
12	D2+				
13	GND	Ground	Ground		
14	CLK-	Pixel clock	Pixel clock		
15	CLK+				
16	GND	Ground	Ground		
17	D3-	Pixel data	R6-R7, G6-G7, B6-B7	Ground	
18	D3+				
19	NC	Non connection	-		
20	SEL6/8	Selection of the number of colors	Low	High or Open	

**2.2 BACKLIGHT PINS**

CN2: MSB24038P5 (Produced by STM) or equivalent.

Pin	Symbol	Description
1	VDD	12V
2	GND	Ground
3	BRTC	Back light ON/OFF control: 5V-On / 0V-Off
4	PWM	PWM Luminance control
5	NC	NC

**2.3 POSITION OF PLUGS AND SOCKET**


### 3 Absolute Maximum Ratings

AGND=GND=0V, Ta = 25°C

Parameter	Symbol	Rating	Unit	Remarks
Power Supply Voltage	VCC	-0.3~+4.0	V	Ta = 25°C
Input voltage for signals	Vi	-0.3 ~ +4.0	V	Ta = 25°C
Storage temperature	Tst	-30 ~ +80	°C	Note 1
Operating temperature	Top	-20 ~ +70	°C	Note 1, 2
Absolute humidity	AH	≤ 70	g/m <sup>3</sup>	Ta > 50°C

Note1: Temperature and relative humidity range is shown in the figure below.

- (a) 90%RH Max. (Ta ≤ 40°C)
- (b) Wet-bulb temperature should be 39°C Max. (Ta > 40°C)
- (c) No condensation.

Note2: The temperature of panel display surface area should be -20°C Min and 70°C Max.

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## 4 Electrical Characteristics

### 4.1 Driving For LCD

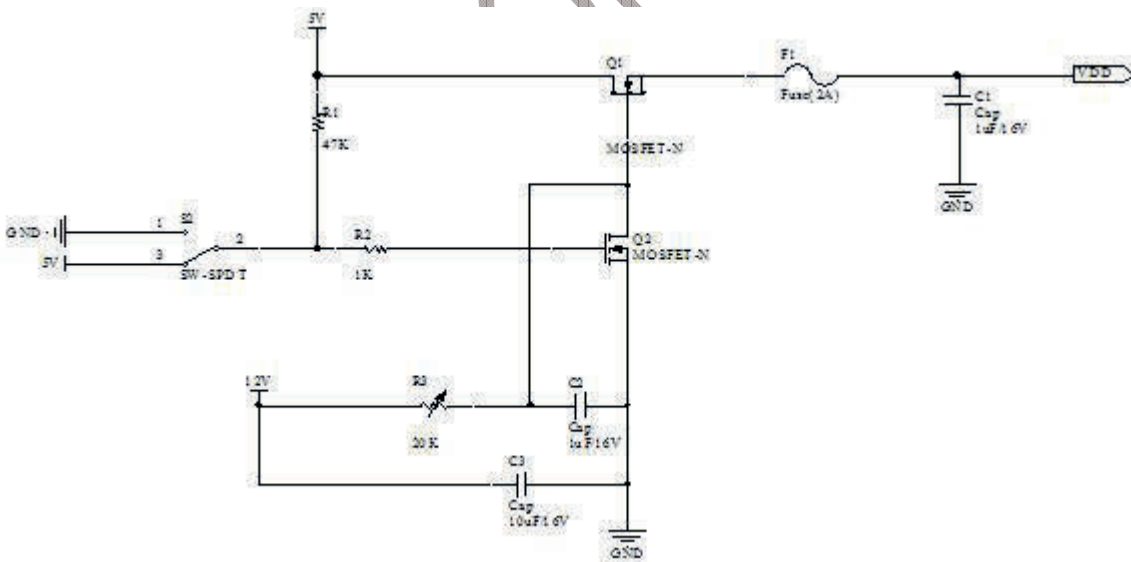
AGND=GND=0V, Ta = 25°C

Parameter	Symbol	min.	typ.	max.	Unit	Remarks
Power supply voltage	VCC	3.0	3.3	3.6	V	-
Power supply ripple	Vp-p			200mV	V	Including spike noise
Power supply current	ICC	-	(500)	(550)	mA	at VDD = 3.3V Note 1
Permissible ripple voltage	VRP	-	-	100	mV	VDD
Differential input voltage	Vid	250		450	mV	
Differential input threshold voltage for LVDS receiver	High	VTH	-	100	mV	VCM = 1.25V Note2
	Low	VTL	-100	-	mV	
Input voltage width for LVDS receiver	Vi	0	-	1.90	V	-
Terminating resistor	RT	-	100	-	Ω	-
Rush current	I <sub>rush</sub>	-	-	1.5	A	Note3
Input voltage for MSL signals	High	VFH	2.0	VCC	V	
	Low	VFL	0	0.4	V	

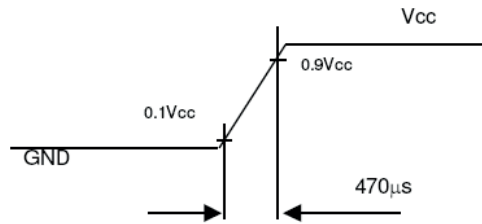
Note 1: Color bar pattern

Note 2: Common mode voltage for LVDS receiver

Note 3: Measurement Conditions:





**Vcc rising time is 470 $\mu$ s**


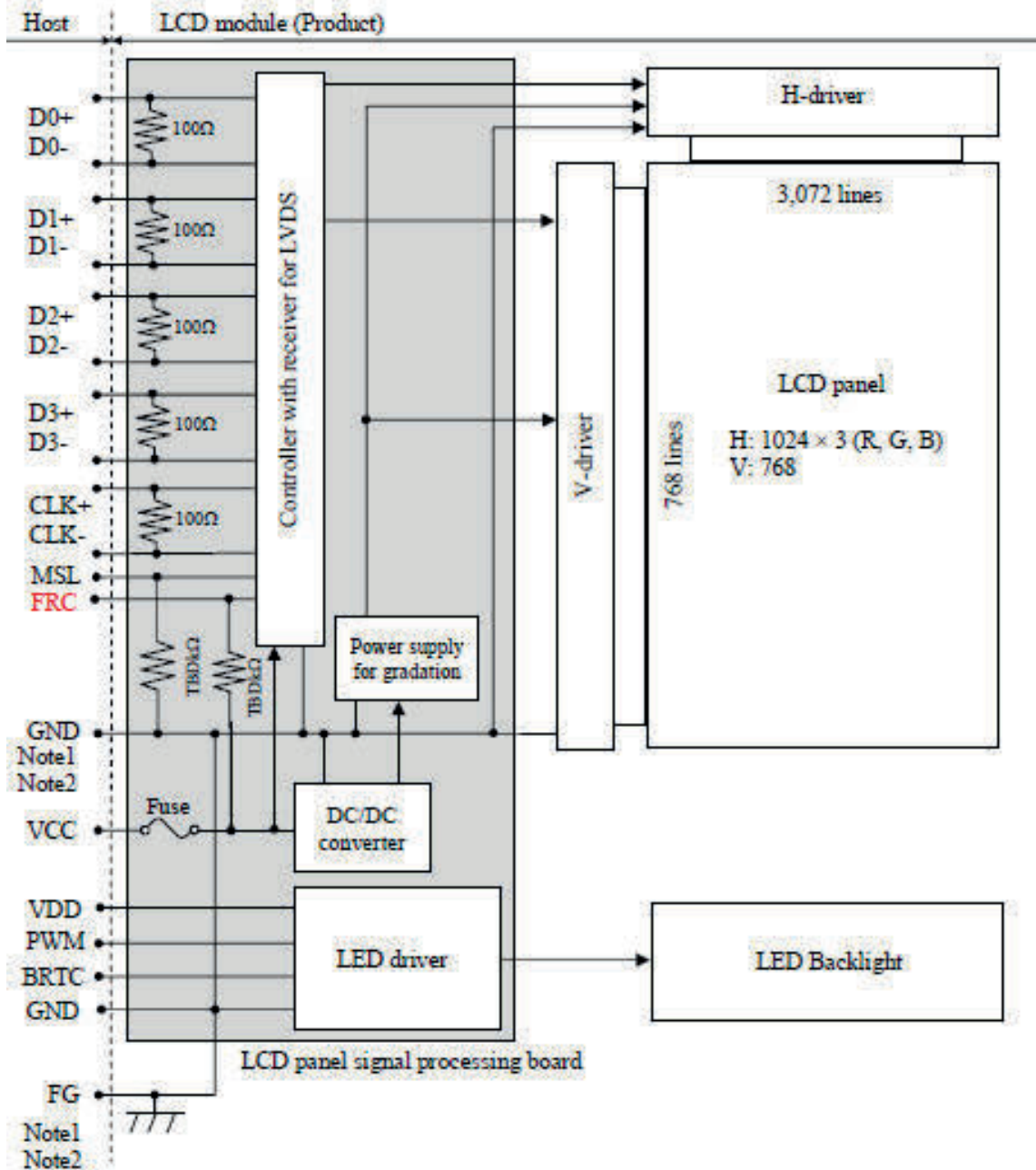
#### 4.2 Driving For Backlight

(Ta=25°C) Note1

Parameter	Symbol	min.	typ.	max.	Unit	Remarks
Power supply voltage	VDD	10.8	12.0	12.6	V	
Power supply current	IDD	-	TBD	TBD	mArms	
Light bar life time	Hr	30000	-	-	Hour	Note1
Input voltage for PWM signal	High	VDFH1	2.0	5.0	V	
	Low	VDFL1	0	0.4	V	
Input voltage for BRTC signal	High	VDFH2	2.0	5.0	V	
	Low	VDFL2	0	0.4	V	
PWM frequency	fpwm	200		(20K)	Hz	
PWM pulse width	tPWH	10			us	

Note1: The operating lifetime is mean time to half-luminance. In case the product works under room temperature environment.

4.3 Block Diagram



Note1: Relations between GND (Signal ground and LED driver ground) and FG (Frame ground) in  
 Note2: GND and FG must be connected to customer equipment's ground, and it is recommended that these grounds be connected together in customer equipment.

## 5 DISPLAY COLORS AND INPUT DATA INFORMATION

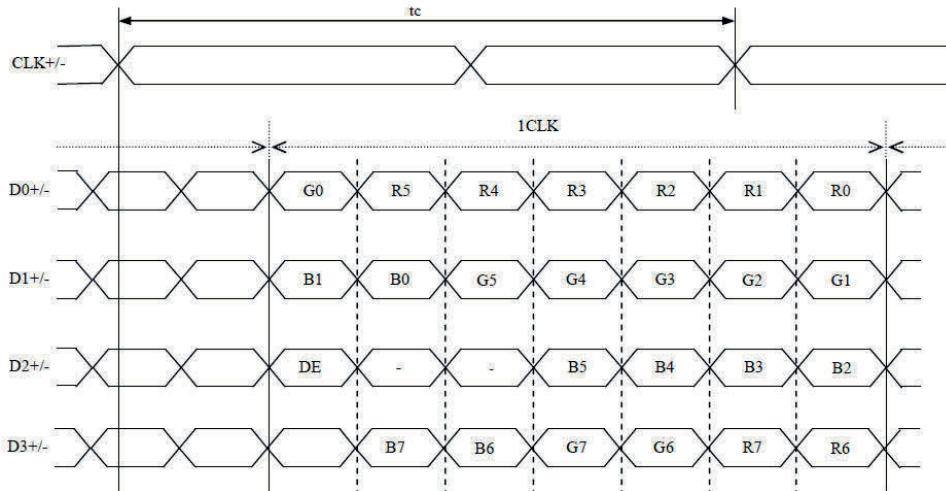
### 5.1 DISPLAY COLORS AND DATA SIGNAL

This product can display in equivalent to 16,777,216 colors in 256 scales. Also the relation between display colors and input data signals is as the following table. And it can display in equivalent to 262,144 colors in 64 scales, without data signals R7, R6, G7, G6, B7, B6 in the following table.

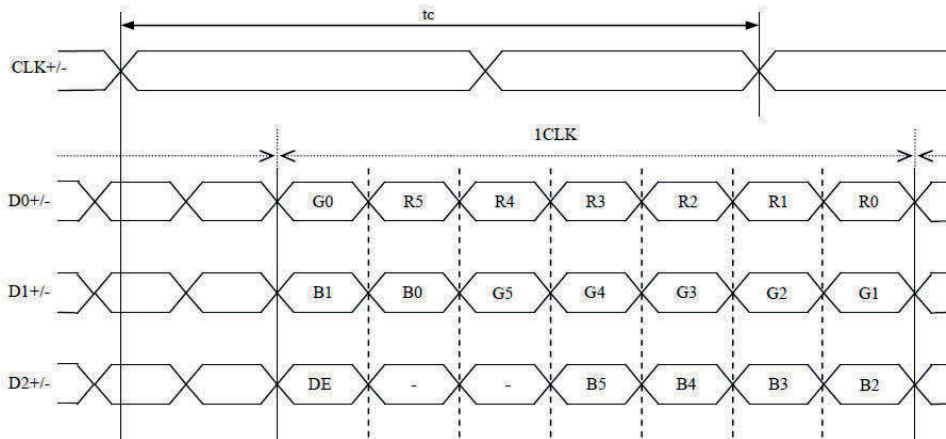
Display colors		Data signal (0:Low level · 1:High Level)																							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
Basic Color	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	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
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	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
	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 grayscale	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dark	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	↕	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Bright Red	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		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 grayscale	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	
	↕	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	
	Bright Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	
Blue grayscale	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
	↕	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
	Bright Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

5.2 DATA MAP

(1) LVDS Input data signal: 8bit



(2) LVDS Input data signal: 6bit



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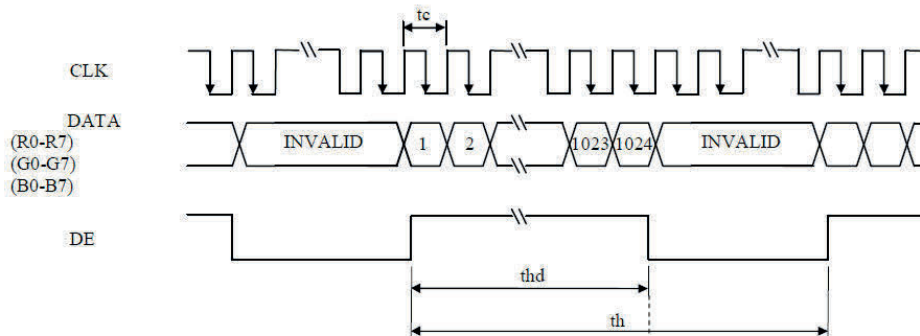
## 6 Timing Chart

### 6.1 TIMING CHARACTERISTICS

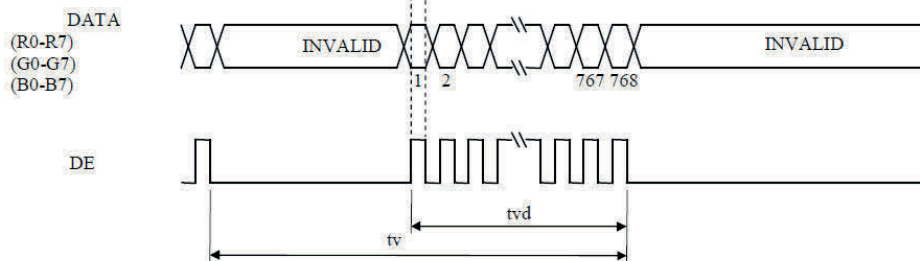
Parameter		Symbol	min.	typ.	max.	Unit	Remarks
Clock	Frequency	1/tc	52	56.88	71	MHz	17.58ns (typ.)
		tc	19.23	17.58	14.08	ns	
Horizontal signals	Cycle	th	1114	1200	1400	CLK	
	Display period	thd	1024				-
Vertical signals	Cycle	tv	778	790	845	H	60.0Hz(typ.)
	Display period	tvd	768				-

### 6.2 INPUT SIGNAL TIMING CHART

#### Horizontal timing



#### Vertical timing



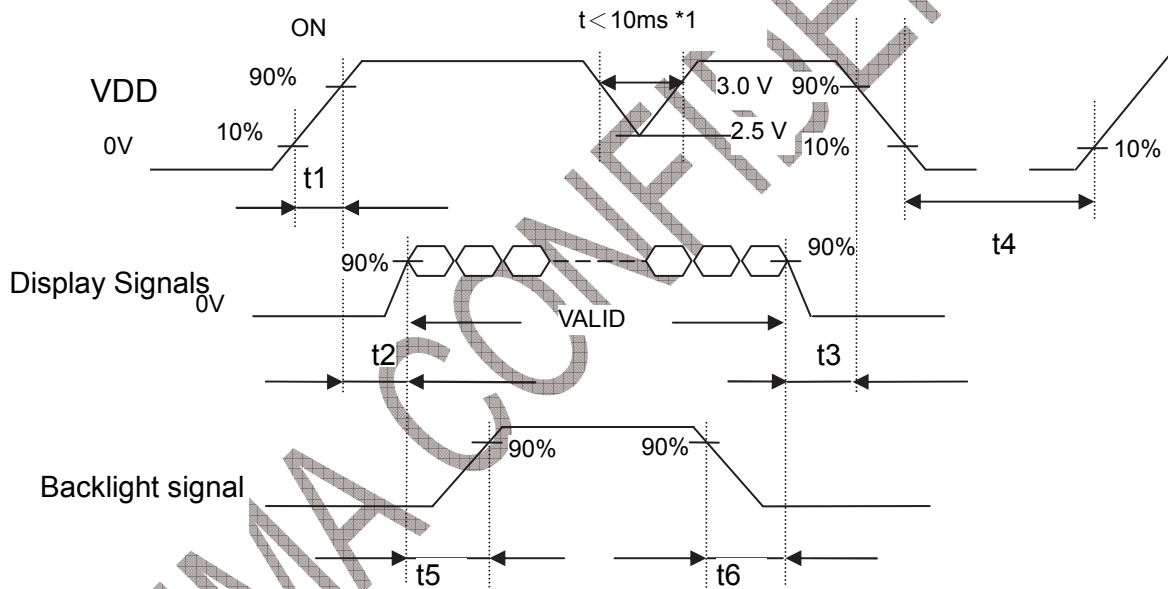
### 6.3 PIXEL DATA ALIGNMENT OF DISPLAY IMAGE

The following chart is the coordinates of per pixel

D(1,1) R   G   B			D(1,1)	D(2,1)	D(3,1)	...	D(1024,1)
			D(1,2)	D(2,2)	D(3,2)	...	D(1024,2)
			D(1,3)	D(2,3)	D(3,3)	...	D(1024,3)
			⋮	⋮	⋮	...	⋮
			D(1,768)	D(2,768)	D(3,768)	...	D(1024,768)
			⋮	⋮	⋮	...	⋮

### 6.4 POWER SUPPLY VOLTAGE SEQUENCE

#### 6.4.1 The sequence of backlight and power



**Timing Specifications:**

- t1 :0.5ms<t1 <10ms;
- t2 :0.5 ms<t2 <50ms;
- t3 :0ms<t3 <50ms;
- t4 :t4 >1000ms;
- t5 :t5 >200ms;
- t6 :t6 >200ms;

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