PRODUCT SPECIFICATION FOR LCD MODULE

Revision: 1.0

Model No: LS0144T03-S-V1

Module Type: COG+FPC+B/L

APPROVED SIGNATURE

■ Approved Product Specification only
□ Approved Product Specification and Samples

Prepared By	Checked By	Approved By

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1. General Description

LS0144T03-S-V1 is a transmissive type a-Si TFT-LCD (amorphous silicon thin film transistor liquid crystal display) module, which is composed of a TFT-LCD panel, a driver circuit and a backlight unit. The panel size is 1.44 inch and the resolution is 128(RGB)*128, the panel can display up to 262k colors.

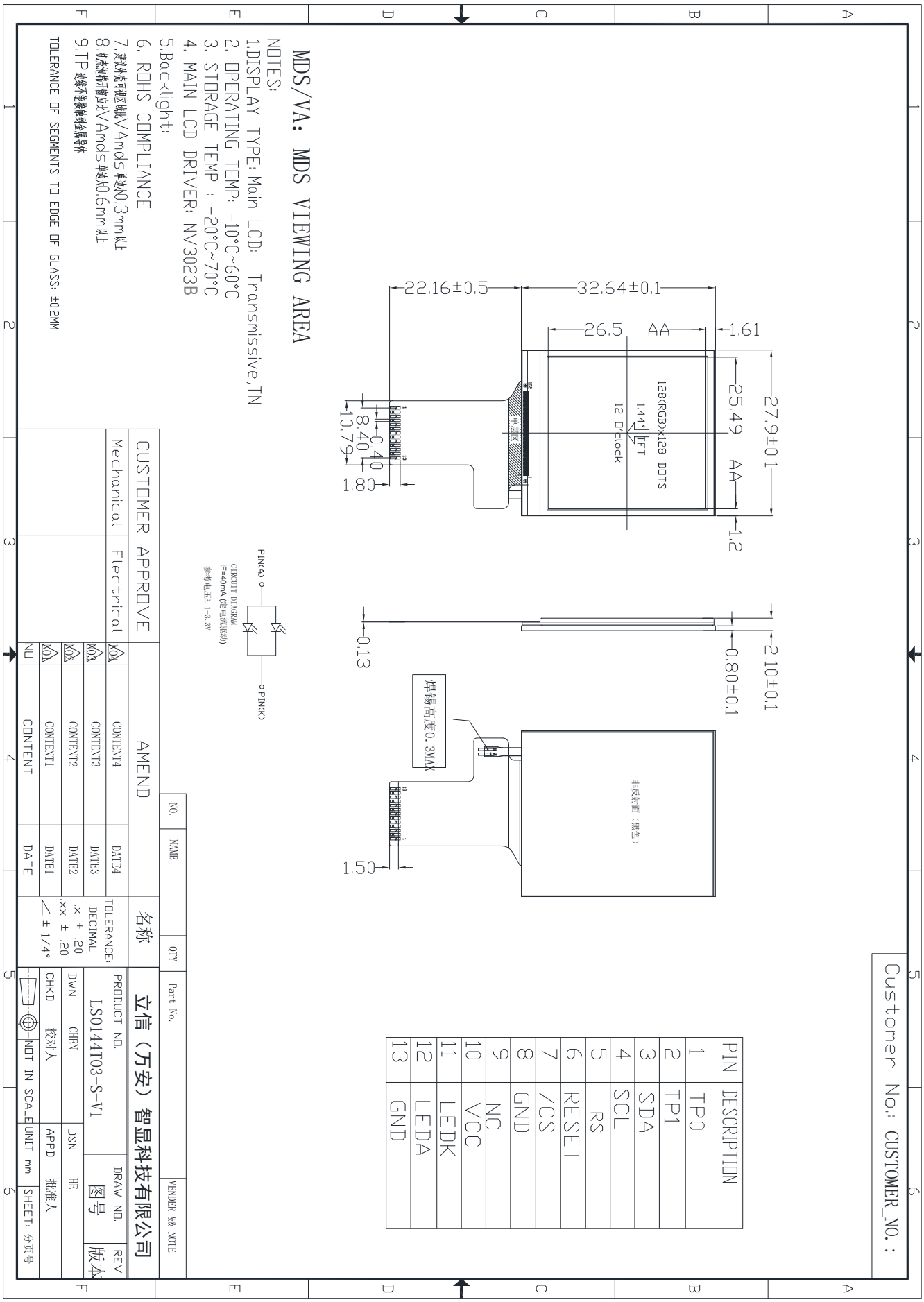
2. Physical Features

Display Mode	TFT-LCD Module
	Active matrix TFT, Transmissive type
Display Format	Graphic 128(RGB)×128 Dot-matrix
Input Data	4-line serial interface
Viewing Direction （Grayscale Inversion）	TN
Drive	NV3023B

3. Mechanical Specification

Item	Specification	Unit
Module size (H×V×D)	27.9 ×32.64 ×2.1	mm
Number of dots	128(RGB) ×128	pixel
Active area (H×V)	25.49×26.5	mm

4. Outline Dimension



5. Absolute Maximum Ratings

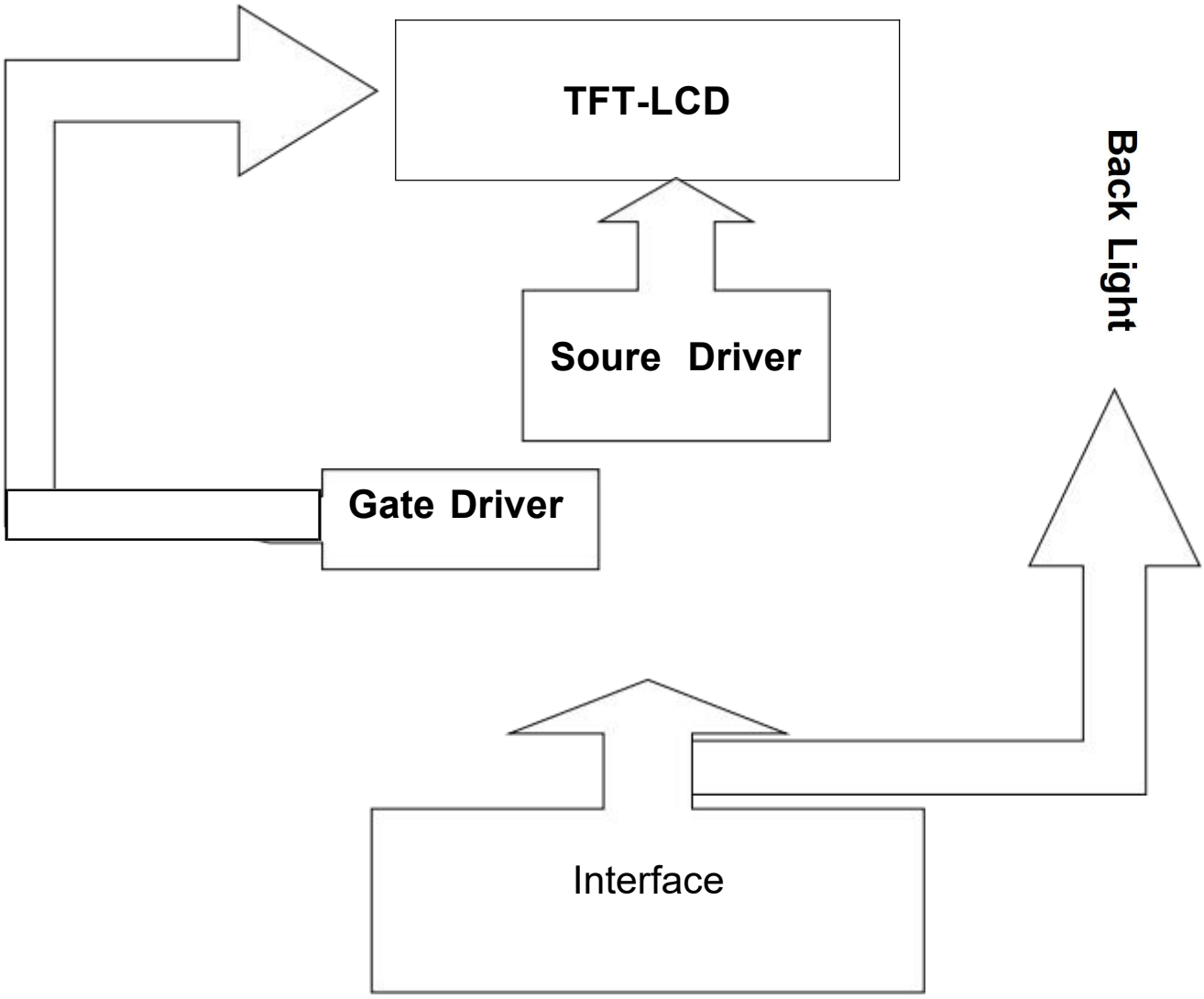
Item	Symbol	Min	Max	Unit	Remark
Supply voltage	VCC	-0.3	4.8	V	Note1 Note2
Supply voltage	IOVCC	-0.3	3.6	V	
Operating temperature	TOPR	-10	60	℃	
Storage temperature	TSTR	-20	70	℃	

6. Electrical Characteristics

Item		Symbol	Rating			Unit	Remark
			Min	Typ	Max		
Supply voltage		VCC	2.4	2.75	4.8	V	Note1
Supply voltage		IOVCC	1.65	1.8	3.6	V	
Input Voltage	L level	VIL	0	---	0.3*IOVCC	V	
	H level	VIH	0.7*IOVCC	---	IOVCC	V	

7. Module Function Description

7-1. Block Diagram Of LCM



7-2. Pin Description

PIN NO.	Symbol	I/O	Description
1	NC		
2	NC		
3	SDA	I/O	Serial input/output data.
4	SCL	I	Clock signa.
5	RS	I	Data/command selection pin in 4-line serial interface.
6	RESET	I	This signal will reset the device and it must be applied to properly initialize the chip.
7	CS	I	Chip selection signal.
8	GND	P	Ground .
9	NC		
10	VCC	P	Power supply for analog circuit blocks
11	LEDK	P	Backlight LED cathode pin.
12	LEDA	P	Backlight LED Anode pin.
13	GND	P	Ground .

7-3 Timing Characteristics

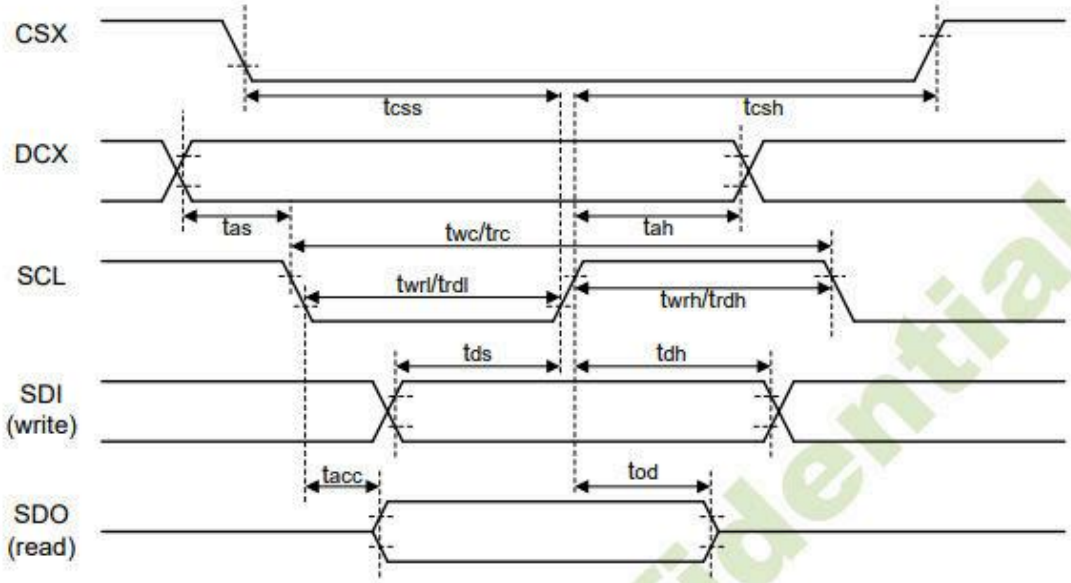


Figure. 10.4 4-line Serial Interface Timing Characteristics

Signal	Symbol	Parameter	Min.	Max.	Unit	Description
CSX	tcss	Chip select setup time (Write)	15		ns	
	tcsh	Chip select setup time (Write)	15		ns	
	tcss	Chip select hold time (Read)	60		ns	
	tcsh	Chip select hold time (Read)	65		ns	
DCX	tas	Address setup time	10		ns	
	tah	Address hold time (Write/Read)	10		ns	
SCL (write)	twc	Write cycle	16		ns	
	twrh	Control pulse "H" duration	7		ns	
	twrl	Control pulse "L" duration	7		ns	
SCL (read)	trc	Read cycle	150		ns	
	trdh	Control pulse "H" duration	60		ns	
	trdl	Control pulse "L" duration	60		ns	
SDI/SDO (write)	tds	Data setup time	7		ns	
	tdt	Data hold time	7		ns	
SDI/SDO (read)	tracc	Read access time	-	50	ns	
	tod	Output disable time	15	50	ns	

2.4 Reset Input Timing

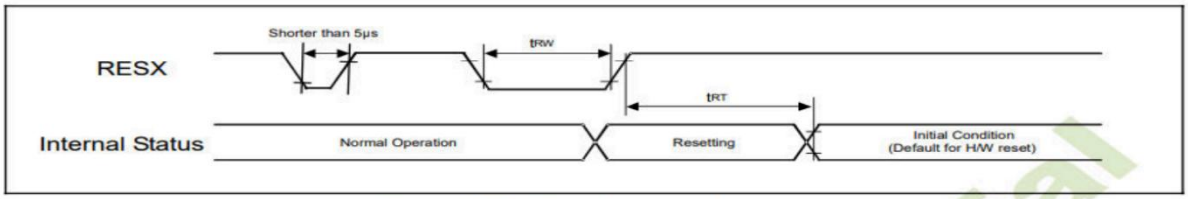


Figure. 10.5 Reset input timings

Symbol	Parameter	Related pins	Min.	Max.	Unit
t_{RW}	Reset pulse width(2)	RESX	10	-	μs
t_{RT}	Reset complete time(3)	-	-	5 (Note 5)	ms
		-	-	120 (Note 6, 7)	ms

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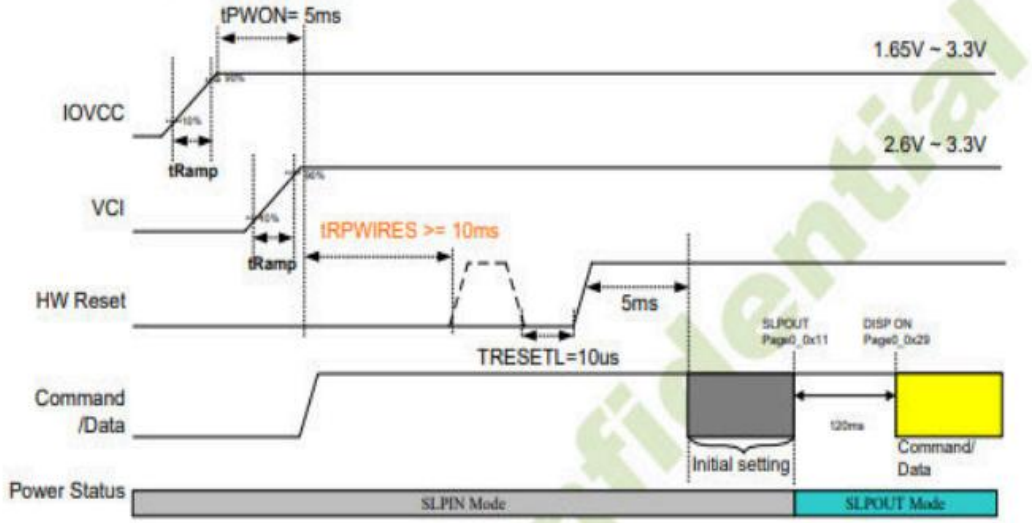
2.5 Power on/off sequence

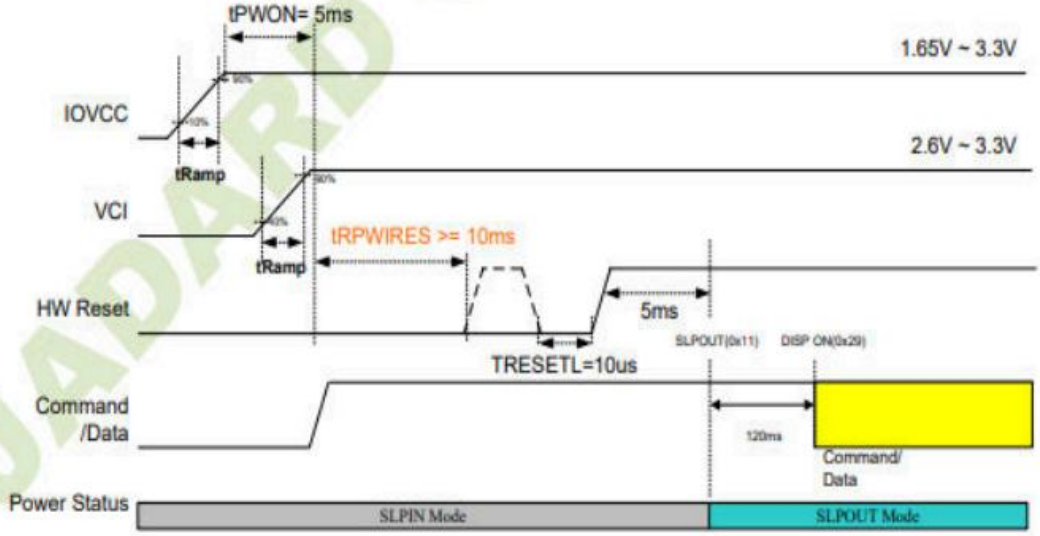
Internal DC/DC power mode IOVCC=VCCH=1.65V ~ 3.3V, VCI=VCIP=2.6V ~ 3.3V. Option1: Host send initial setting than SLPOUT and DISP ON.

Power on sequence



Option2: Host only send SLPOUT and DISP ON

Power on sequence



	Min	Typ	Max
Power up tRamp for VCI/IOVCC	0.2mS		20mS

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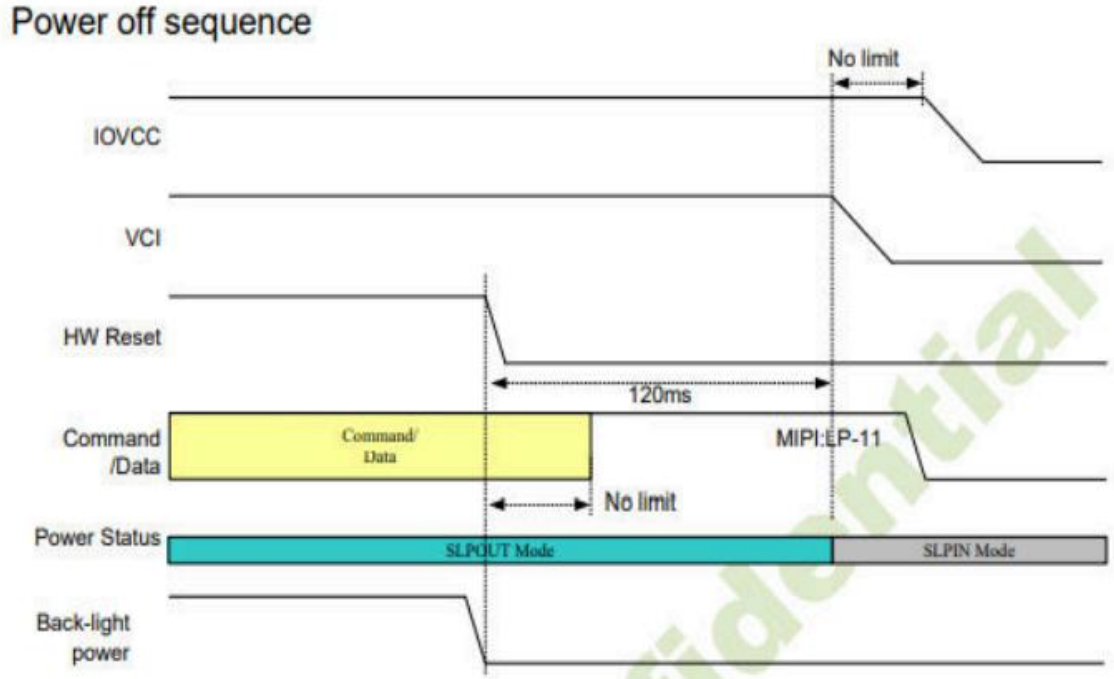
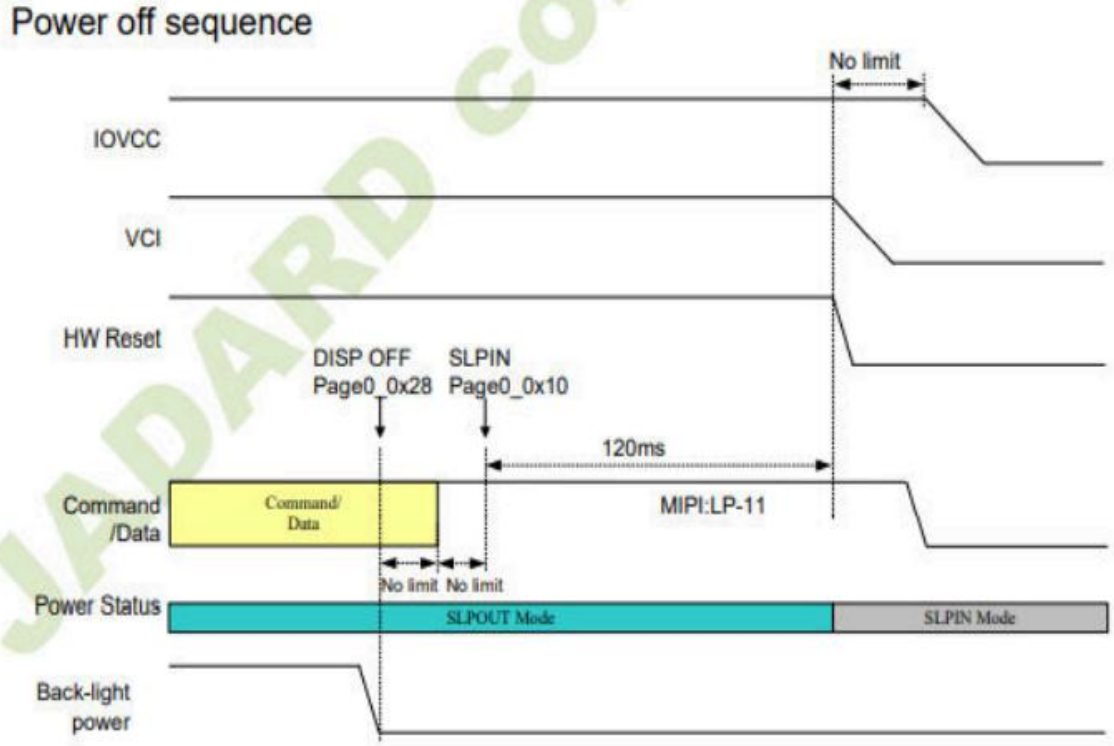
Power Off Option1:



Power Off Option2:



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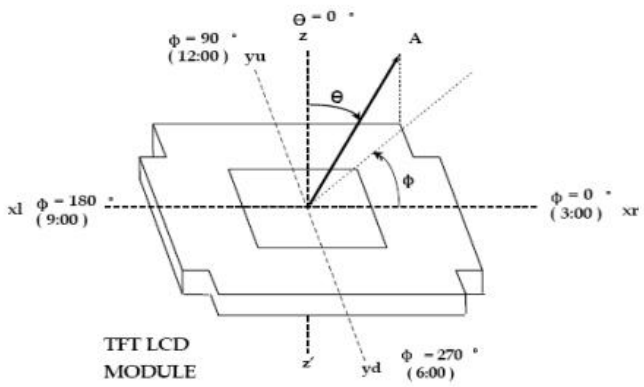
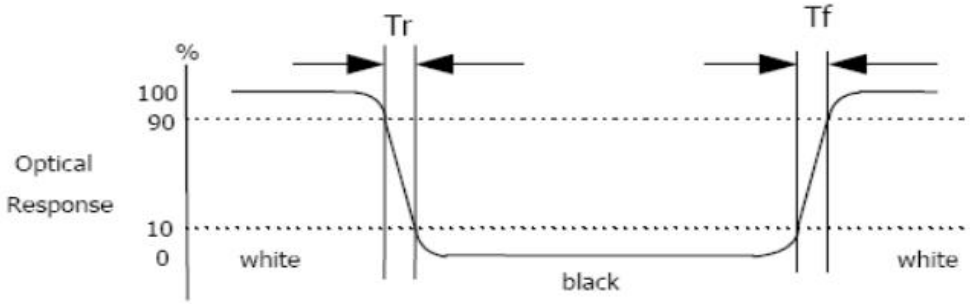
8. Electro-Optical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle	3:00	θ_L	CR≧10	-	60	-	°	Note3.2.1
	6:00	θ_R		-	60	-	°	
	9:00	θ_T		-	60	-	°	
	12:00	θ_B		-	60	-	°	
Response Time		Ton+Toff	θ=Φ=0°	-	-	32	ms	Note3.2.2
Contrast Ratio		CR	θ=Φ=0°	400	600	-		Note3.2.3
Luminance		L	θ=Φ=0°	220	240	-	cd/㎡	With CG
Reproduction of colo	White	W_x	Normal θ=Φ=0°	-0.03	TBD	+0.03		With C light
		W_y			TBD			
	Red	R_x			TBD			
		R_y			TBD			
	Green	G_x			TBD			
		G_y			TBD			
	Blue	B_x			TBD			
		B_y			TBD			
Uniformity 均匀度		U_L	θ=Φ=0°	80		-	%	
NTSC 色饱和度		%	θ=Φ=0°	45	50		%	



Viewing angle is the angle at which the contrast ratio is greater than 10.The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface.



Response time is the time required for the display to transition from white to black (Rising time, Tr) and from black to white (Falling time, Tf) for additional information.

Contrast Ratio (CR) is defined mathematically as:

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

Surface luminance is the center point across the LCD surface 500mm from the surface with all pixels displaying white.

9.Records Of Version

Version	Revise Date	Page	Content
00	2023-12-5	ALL	New released