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FANNAL ELECTRONICS

FN0340D002A

Product Specification Rev.V0

BUYER	
SUPPLIER	FANNAL Electronics CO., LTD
FG-Code	FN0340D002A

☐ Preliminary Specification

☑ Approval Specification

ITEM	BUYER SIGNATURE	DATE
Quality		
R&D		
Approved		

ITEM	SUPPLIER SIGNATURE	DATE
Prepared	DONG	2023-04-28
Reviewed	XIONG	2023-04-28
Approved	JACK	2023-04-28

REVISION HISTORY

REV.	Page.	DESCRIPTION OF CHANGES	DATE	PREPARED
V0		Initial Release	2023-04-28	JACK

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1.0 General Description

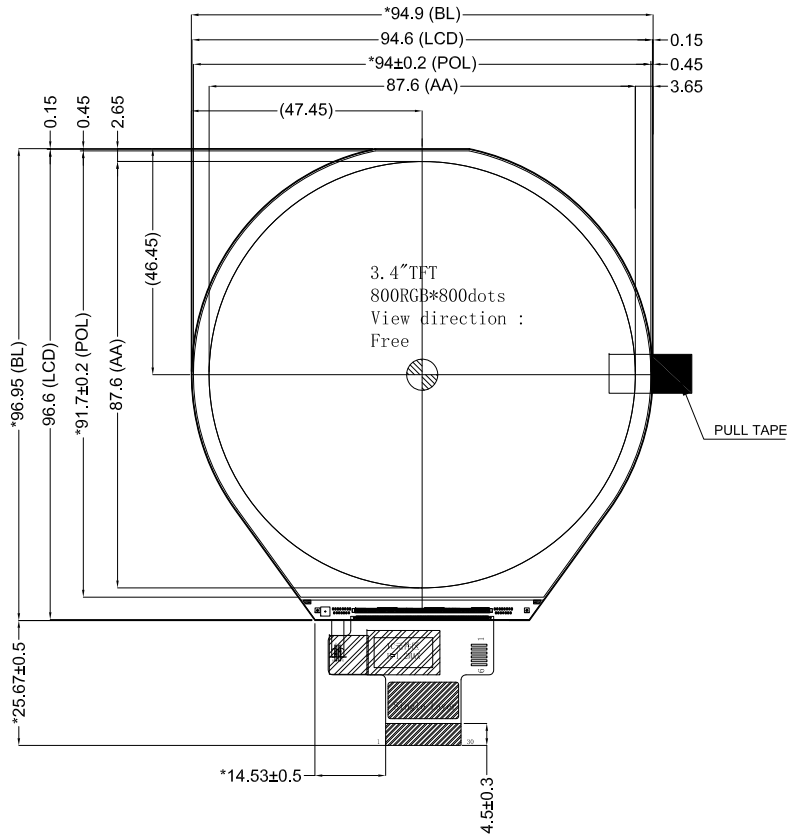
1.1 Application

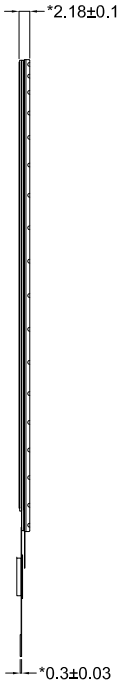
- ☑ Industrial
- ☐ Fitness equipment
- ☐ POS
- ☐ Automotive
- ☐ Rail traffic
- ☑ Digital & Consumer
- ☐ Medical
- ☐ Military-industrial
- ☐ Outdoor highlight

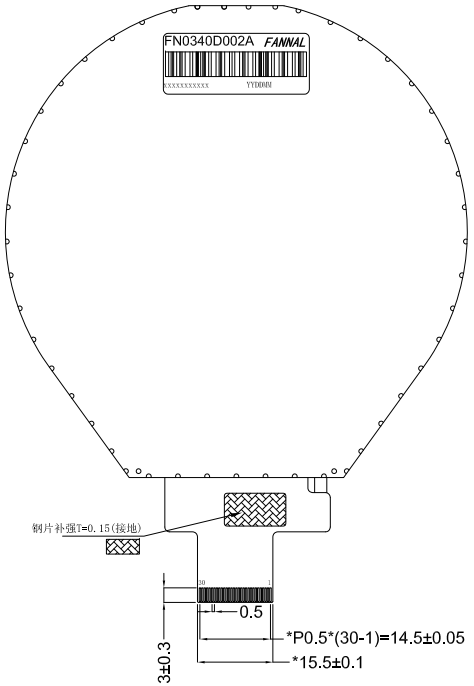
1.2 General Specification

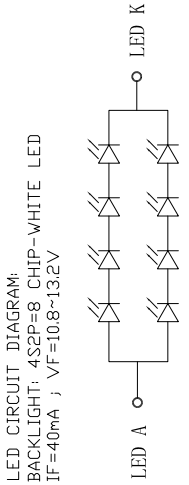
Parameter	Specification	Unit
LCD size	3.4 (Diagonal)	inch
Resolution Ratio	800(H)×800(V)	pixels
Pixel Pitch	0.1095x0.1095(V)	mm
Active Area	87.6(H)×87.6(V)	mm
Module Size	94.9(W)×96.95(H)×2.18(D)	mm
Display Mode	Normally Black	
Interface	MIPI	
Pixel arrangement	RGB-Vertical Stripe	
View Direction	ALL	
Power Supply	2.8	V
Power Consumption	0.9	W
Weight	35	g
Luminance	350 (TYP.)	cd/m²
Driver IC	FL7707N	

VER.	SYMBOL	AMENDMENT	SIGN	DATE
A		First issue	LCF	2023-04-23









LED CIRCUIT DIAGRAM:
BACKLIGHT: 4S2P=8 CHIP-WHITE LED
IF=40mA ; VF=10.8~13.2V

TOP VIEW SIDE VIEW BOTTOM VIEW

SIZE	3.4 Inch	Interface	MIPI
Resolution Ratio	800x800	Power Supply	2.8V
LCD Type	■Transmissive □Tranflective □Reflective	Connection Mode	■FPC Plug-in □FPC Soldering □Connector
Display Mode	■Normally Black □Normally White	Driver IC	FL7707N
Display Direction	□6 □12 □3 □9 ■Free	Operation Temperature	-20~+70
Contrast Ratio	1200:1	Storage Temperature	-30~+80
Luminance	350(Typ.) 300(Min.)	Environmental Requirements	■RoHS-2.0 □REACH
Uniformity	80% Min	Unmarked Tolerance	±0.2mm

PIN	SYMBOL	PIN	SYMBOL	PIN	SYMBOL	PIN	SYMBOL	PIN	SYMBOL
1	LEDA	13	DIP	25	TP_INT			1	TP_INT
2	LEDK1	14	DIN	26	TP_SDA			2	TP_SDA
3	LEDK2	15	GND	27	TP_SCL			3	TP_SCL
4	VCI	16	CLKP	28	TP_RESET			4	TP_RESET
5	IOVCC	17	CLKN	29	TP_VCI			5	TP_VCI
6	RESET	18	GND	30	TP_GND			6	TP_GND
7	NC	19	D2P						
8	NC	20	D2N						
9	GND	21	GND						
10	D0P	22	D3P						
11	D0N	23	D3N						
12	GND	24	GND						

DRAWN	LCF
CHECKED	DONG
APPROVED	
CSR APPROVED	
Customer No:	
SHEET	1 OF 1

TITLE
MODULE SPEC.

Drawing NO: FN0340D002A
Project No:

FANNAL ELECTRONICS CO., LTD

3.0 ABSOLUTE MAXIMUM RATINGS

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit.

Parameter	Symbol	Min.	Max.	Unit
Analog Operating Voltage	VCI	-0.3	6.6	V
Logic Operating Voltage	IOVCC	-0.3	5.5	V
Operating Temperature	T_{OP}	-20	70	℃
Storage Temperature	T_{ST}	-30	80	℃
Operating Ambient Humidity	H_{OP}	10	60℃ 90%RH	RH
Storage Humidity	H_{ST}	10	60℃ 90%RH	RH

NOTE: If the absolute maximum rating of even is one of the above parameters is exceeded even momentarily, the quality of the product may be degraded. Absolute maximum ratings, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the range of the absolute maximum ratings.

4.0 ELECTRICAL SPECIFICATIONS

4.1 TFT LCM Module

[Ta =25±2 ℃]

Parameter	Symbol	Min.	Typ.	Max.	Unit
Analog Operating Voltage	VCI	2.5	2.8	3.3	V
Logic Operating Voltage	IOVCC	1.65	1.8	3.3	V
Level input voltage	V_{IH}	0.7IOVCC		IOVCC	V
	V_{IL}	GND		0.3IOVCC	V
Level output voltage	V_{OH}	0.8IOVCC		IOVCC	V
	V_{OL}	GND		0.2IOVCC	V

4.2 Backlight Driving Conditions

[Ta =25±2 ℃]

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Forward Current Voltage	V_F	10.8	12.0	13.2	V	Note 1
Forward Current	If	-	40	-	mA	
Backlight Power Consumption	Wbl	-	0.48	-	W	
LED Life Time	-	30000	-	-	Hrs	Note 2

Note1: Under LCM operating, the stable forward current should be inputted. And forward voltage is for reference only.

Note2: Optical performance should be evaluated at Ta=25℃. if LED is driven by high current, high ambient temperature & Humidity condition. The life time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

5.0 Interface Description

Connector Name/Designation	Interface Connector/Interface Card
Type Part Number	FPC 30PIN 0.5Pitch
Mating Housing Part Number	FH28-30S-0.5SH

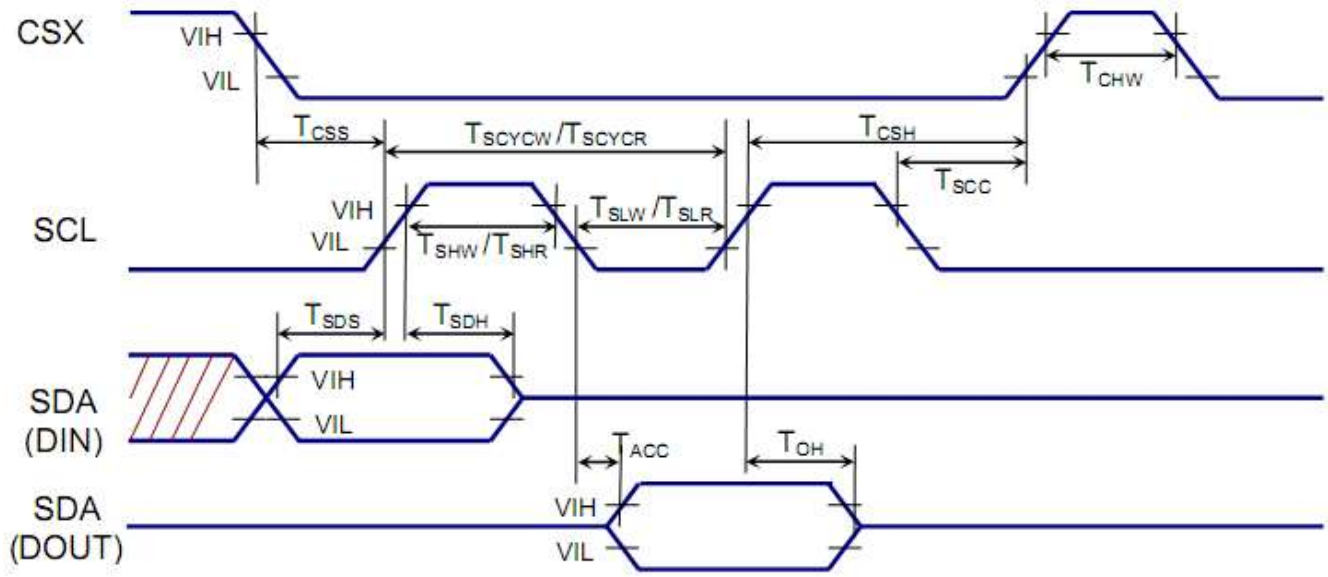
5.1 Pin assignment for LCM module

Pin No.	Symbol	Description	Note.
1	LEDA	LED Anode.	
2	LEDK1	LED Cathode.	
3	LEDK2	LED Cathode.	
4	VCI	Power Supply 2.8V.	
5	IOVCC	LCD I/O power supply 1.8V.	
6	RESET	Reset pin.	
7-8	NC	No connection.	
9	GND	Ground.	
10	D0P	MIPI DSI differential data pair (Data lane 0+).	
11	D0N	MIPI DSI differential data pair (Data lane 0-).	
12	GND	Ground.	
13	D1P	MIPI DSI differential data pair (Data lane 1+).	
14	D1N	MIPI DSI differential data pair (Data lane 1-).	
15	GND	Ground.	
16	CLKP	MIPI DSI differential clock pair+.	
17	CLKN	MIPI DSI differential clock pair-.	
18	GND	Ground.	
19	D2P	MIPI DSI differential data pair (Data lane 2+).	
20	D2N	MIPI DSI differential data pair (Data lane 2-).	
21	GND	Ground.	
22	D3P	MIPI DSI differential data pair (Data lane 3+).	
23	D3N	MIPI DSI differential data pair (Data lane 3-).	
24	GND	Ground.	

Pin No.	Symbol	Description	Note.
25	TP_INT	Touch Interrupt, No connection.	
26	TP_SDA	Touch IIC Data signal, No connection.	
27	TP_SCL	Touch IIC Clock signal, No connection.	
28	TP_RESET	Touch Reset signal, No connection.	
29	TP_VCI	Touch Power supply, No connection.	
30	TP_GND	Touch Power Ground.	

5.2 AC Characteristic

5.2.1 Serial Interface Characteristics



(VSSA=0V, IOVCC=1.8V, VCI=2.8V, TA=25℃

Signal	Symbol	Parameter	Min.	Max.	Unit	Description
CSX	tCSS	Chip select setup time (Write)	15	-	ns	-
	tCSS	Chip select setup time (Read)	60	-		
	tCSH	Chip select hold time (Write)	15	-		
	tCSH	Chip select hold time (Read)	65	-		
DCX	tAST	Address setup time	0	-	ns	-
	tAHT	Address hold time (Write/Read)	10	-		
SCL (Write)	tWC	Write cycle	66	-	ns	-
	tWRH	Control pulse “H” duration	15	-		
	tWRL	Control pulse “L” duration	15	-		
SCL (Read)	tRC	Read cycle	150	-	ns	-
	tRDH	Control pulse “H” duration	60	-		
	tRDL	Control pulse “L” duration	60	-		
SDA (Input)	tDS	Data setup time	10	-	ns	For maximum CL=30pF For minimum CL=8pF
	tDH	Data hold time	10	-		
SDA (Output)	tACC	Read access time	-	100	ns	
	tOH	Output disable time	10	-		

Note: The input signal rise time and fall time (tr, tf) is specified at 15 ns or less.
Logic high and low levels are specified as 30% and 70% of IOVCC for Input signals.

5.2.2 DSI Interface Timing Characteristics

High Speed Mode

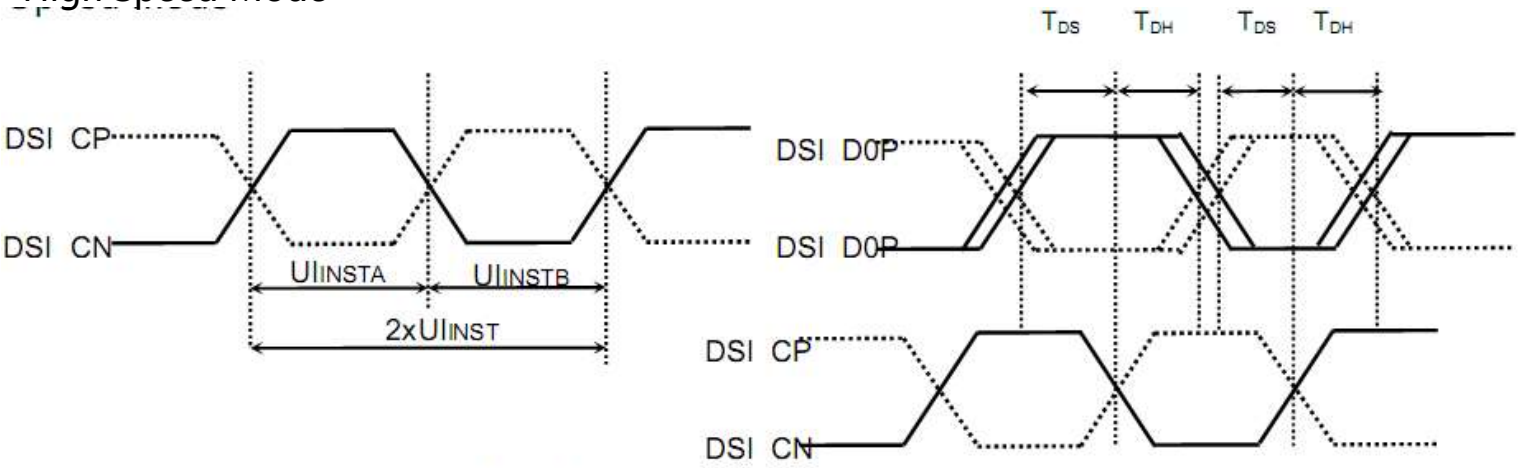
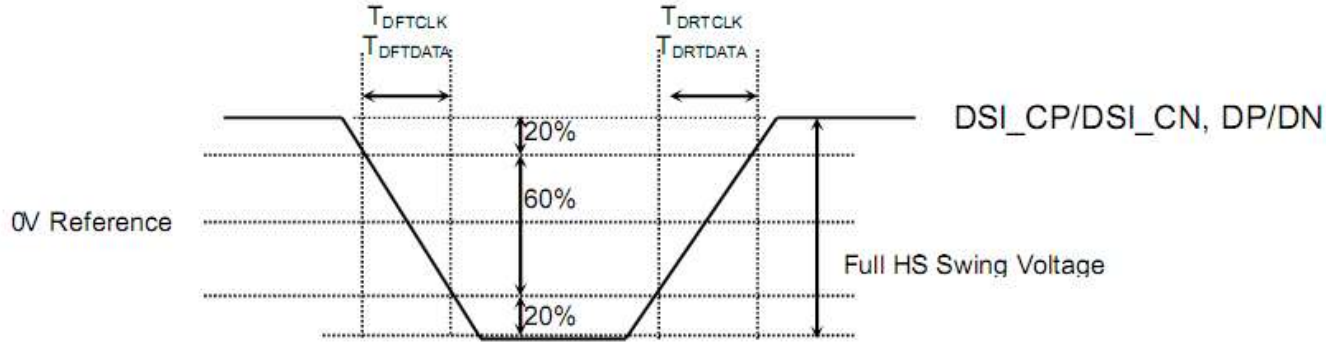


Figure 7-4: DSI clock timing Characteristics



(VSSA=0V, IOVCC=1.65V to 3.3V, VCI=2.5V to 3.3V, T_A = -40 to 85°C)

Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_CP/ DSI_CN	Double UI instantaneous	$2xU_{INST}$	4LANE：3.30 3LANE：2.85 @ VDDD=1.8V	-	25	ns
	UI instantaneous	U_{INSTA} U_{INSTB}	4LANE：1.67 3LANE：1.43 @ VDDD=1.8V	-	12.5	ns
DP/DN	Data to clock setup time	T_{DS}	0.15xUI	-	-	ps
	Data to clock hold time	T_{DH}	0.15xUI	-	-	ps
DSI_CP/ DSI_CN	Differential rise time for clock	T_{DRTCLK}	150	-	0.3UI	ps
	Differential fall time for clock	T_{DFTCLK}	150	-	0.3UI	ps
DP/DN	Differential rise time for data	$T_{DRTDATA}$	150	-	0.3UI	ps
	Differential fall time for data	$T_{DFTDATA}$	150	-	0.3UI	ps

Low Power Mode

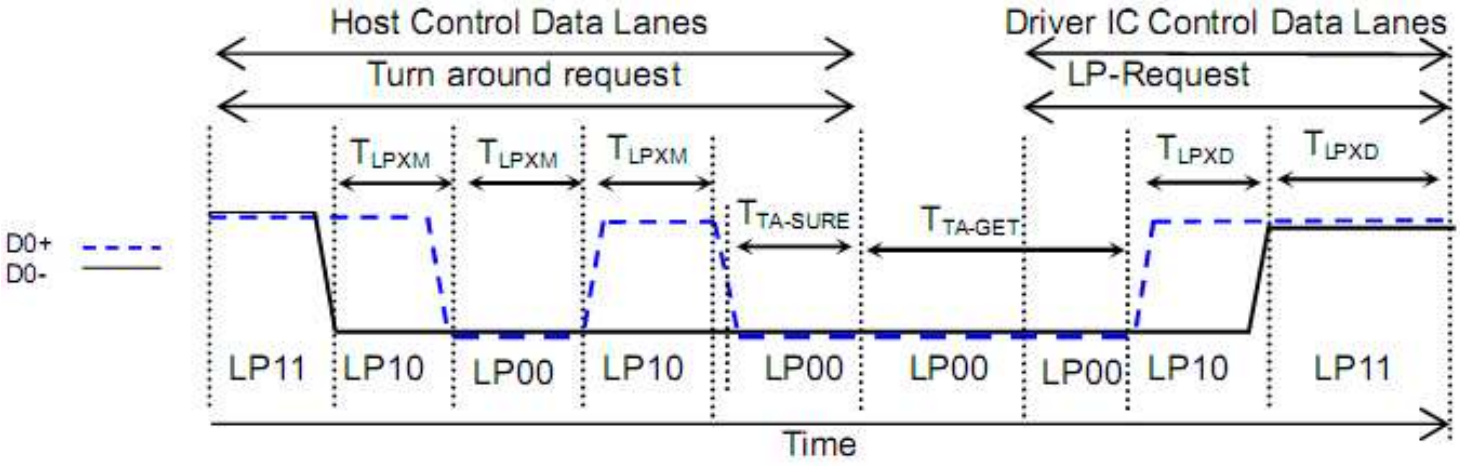
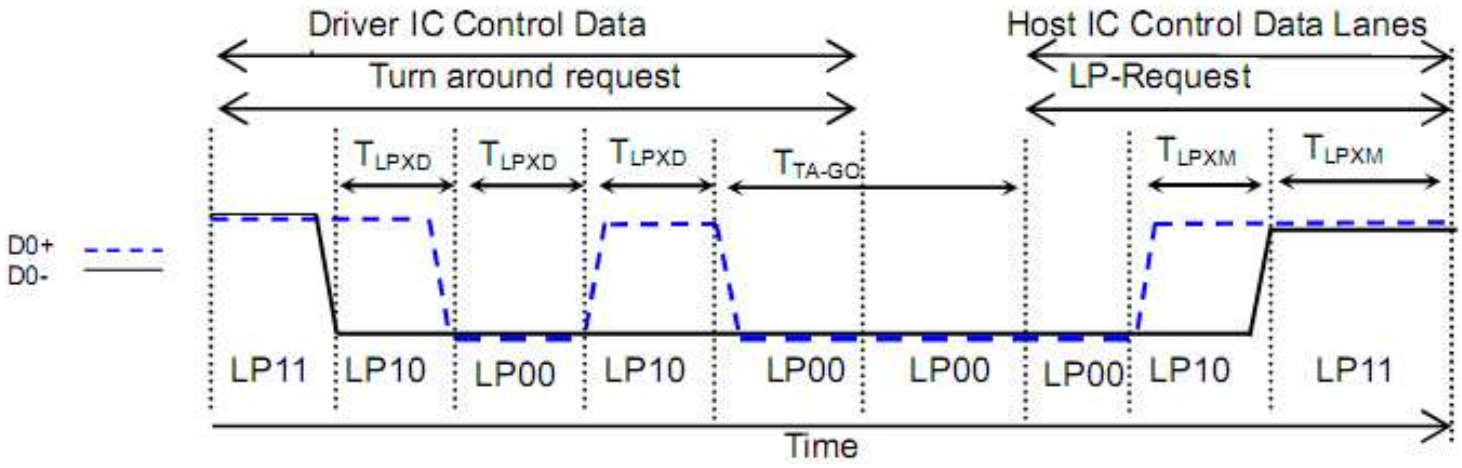


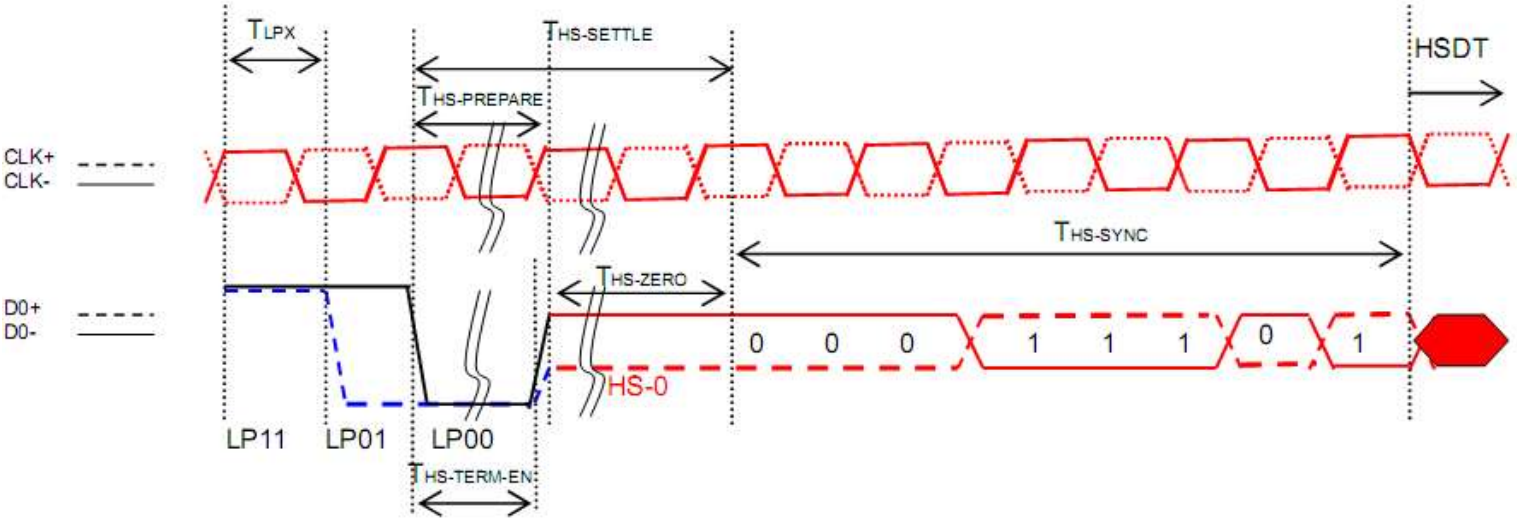
Figure 7-6: BTA from HOST to Display Module Timing



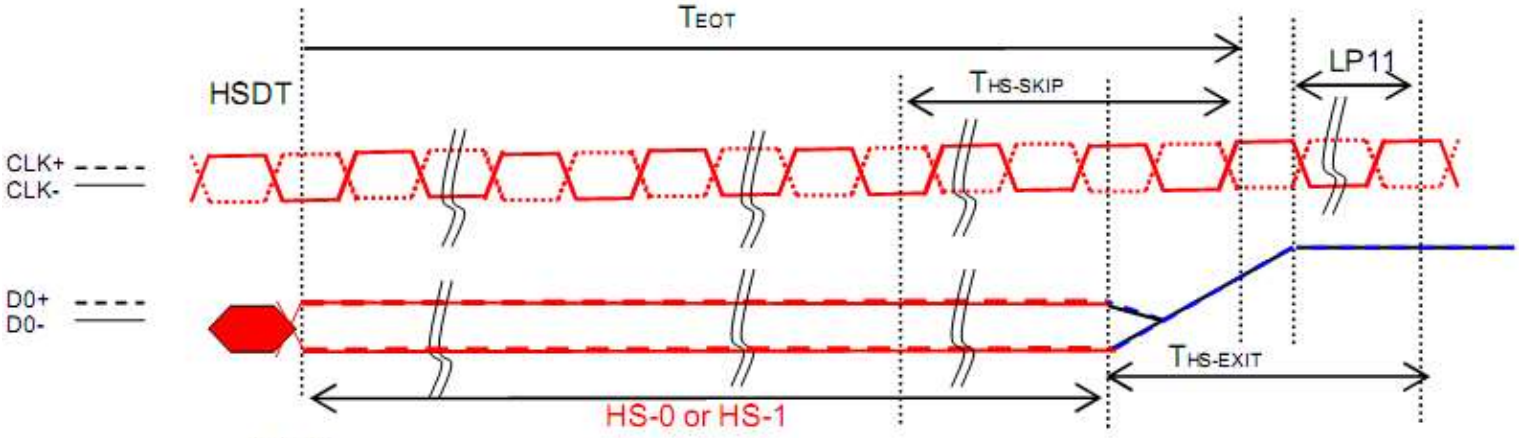
(VSSA=0V, IOVCC=1.65V to 3.3V, VCI=2.3V to 3.3V, T_A = -40 to 85°C)

Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_D0P/ DSI_D0P	Length of LP-00/LP01/LP10/LP11 Host→ Display module	T_{LPXM}	50	-	-	ns
	Length of LP-00/LP01/LP10/LP11 Display module →Host	T_{LPXD}	50	-	-	ns
	Time-out before the MPU start driver	$T_{TA-SURE}$	T_{LPXD}	-	2xT_{LPXD}	ns
	Time to drive LP-00 by display module	T_{TA-GET}	5xT_{LPXD}	-	-	ns
	Time to drive LP-00 after turnaround request Host	T_{TAGO}	4xT_{LPXD}	-	-	ns

DSI Bursts

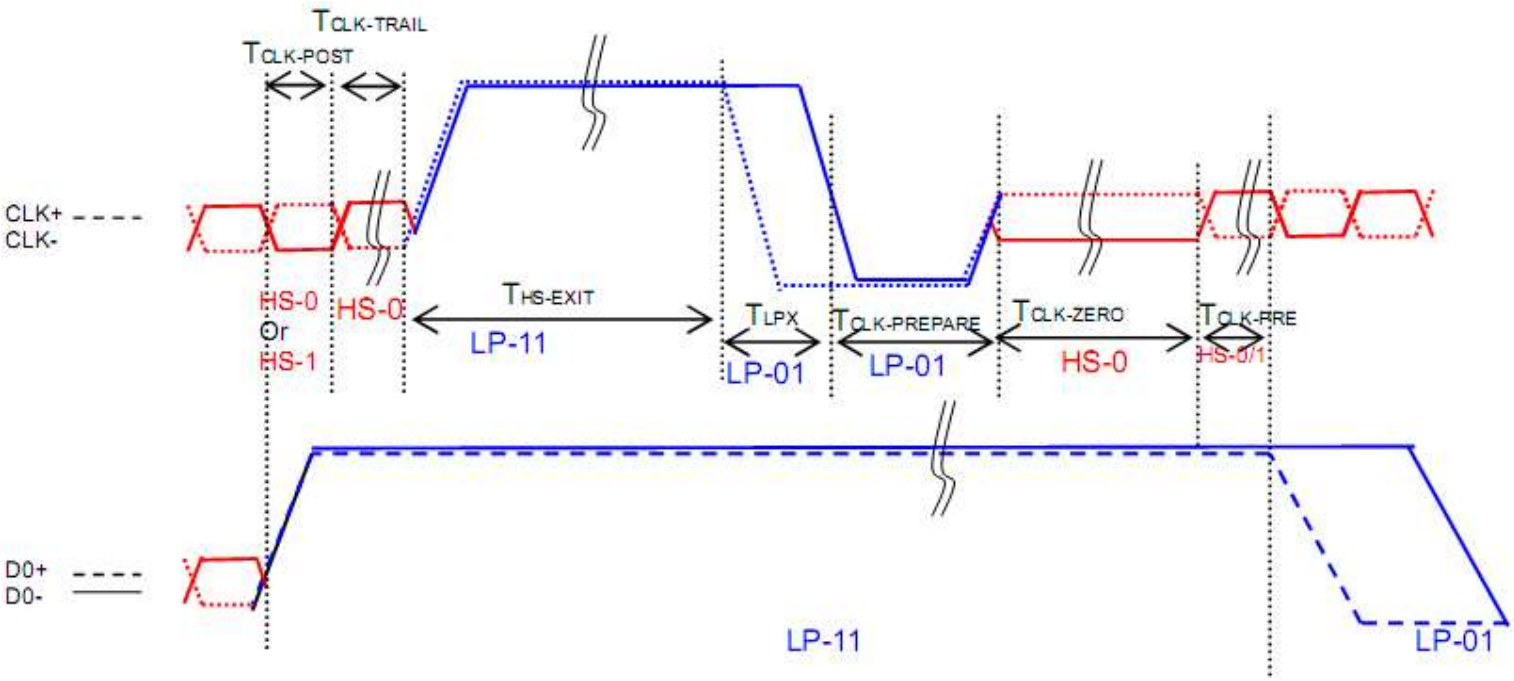


Signal	Item	Symbol	Spec. Min.	Spec. Typ.	Spec. Max.	Unit
DSI_D0P/ DSI_D0P	Length of LP-00/LP01/LP10/LP11	T_{LPX}	50	-	-	ns
	Time to Driver LP-00 to prepare for HS transmission	$T_{HS-PREPARE}$	40+4UI	-	85+6UI	ns
	Time to enable data receiver line termination	$T_{HS-TERM-EN}$	-	-	35+4xUI	ns
	Time to drive LP-00 by display module	T_{TA-GET}	5xT_{LPXD}	-	-	ns
	Time to drive LP-00 after turnaround request Host	T_{TAGO}	4xT_{LPXD}	-	-	ns



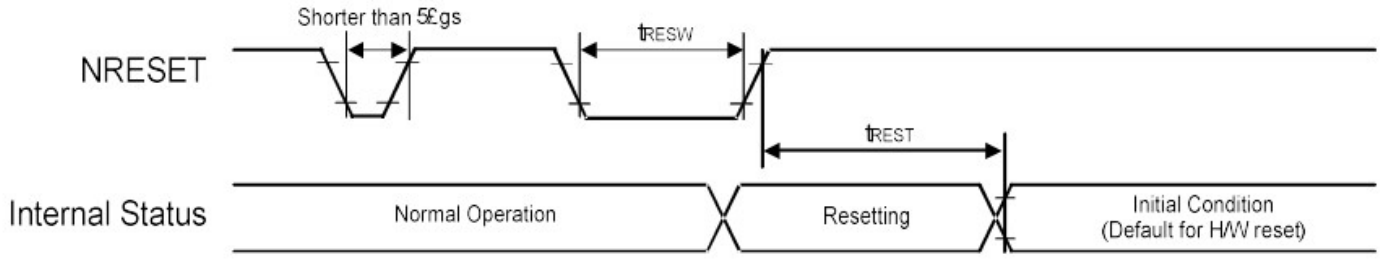
NOTE:
If the last bit is HS-0, the transmitter changes from HS-0 to HS-1
If the last bit is HS-0, the transmitter changes from HS-1 to HS-0

Signal	Item	Symbol	Spec. Min.	Spec. Typ.	Spec. Max.	Unit
DSI_D0P/ DSI_D0P	Time-Out at Display Module to Ignore Transition Period of EoT	$T_{HS-SKIP}$	40	-	55+4xUI	ns
	Time to Driver LP-11 after HS Burst	$T_{HS-EXIT}$	100	-	-	ns



Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_CP/ DSI_CN	Time that the MCU shall continue sending HS clock after the last associated Data Lane has transitioned to LP mode	$T_{CLK-POST}$	60+52xUI	-	-	ns
	Time to drive HS differential state after last payload clock bit of a HS transmission burst	$T_{CLK-TRAIL}$	60	-	-	ns
	Time to drive LP-11 after HS burst	$T_{HS-EXIT}$	100	-	-	ns
	Time to drive LP-00 to prepare for HS transmission	$T_{CLK-PREPARE}$	38	-	95	ns
	Time-out at Clock Lane Display Module to enable HS Termination	$T_{CLK-TERM-EN}$	-	-	38	ns
	Minimum lead HS-0 drive period before starting Clock	$T_{CLK-PREPARE}$ + $T_{CLK-ZERO}$	300	-	-	ns
	Time that the HS clock shall be driven prior to any associated data Lane beginning the transition from LP to HS mode	$T_{CLK-PRE}$	8xUI			

5.3 Reset input timing



Symbol	Parameter	Related Pins	Spec. Min.	Spec. Typ.	Spec. Max.	Note	Unit
tRESW	Reset low pulse width(1)	NRESET	10	-	-	-	μs
tREST	Reset complete time(2)					When reset applied during SLPIN mode	ms
		-	120	-	-	When reset applied during SLPOUT mode	ms

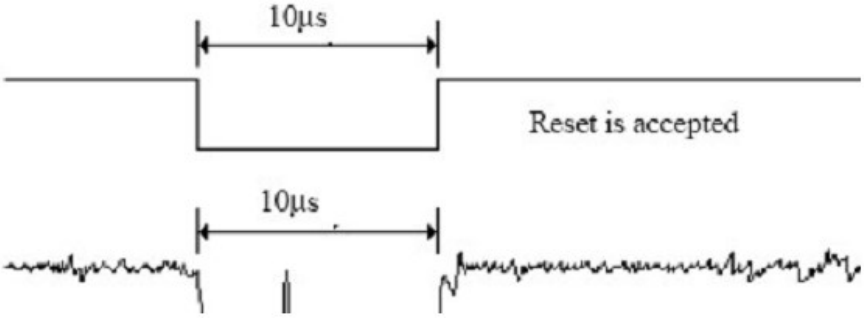
Note: (1) Spike due to an electrostatic discharge on NRESET line does not cause irregular system reset a ccording to the following table.

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

(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.

(3) During Reset Complete Time, ID and VCOM value in OTP will be latched to internal register during t his period. This loading is done every time when there is H/W reset complete time (tREST) within 15m s after a rising edge of NRESET.

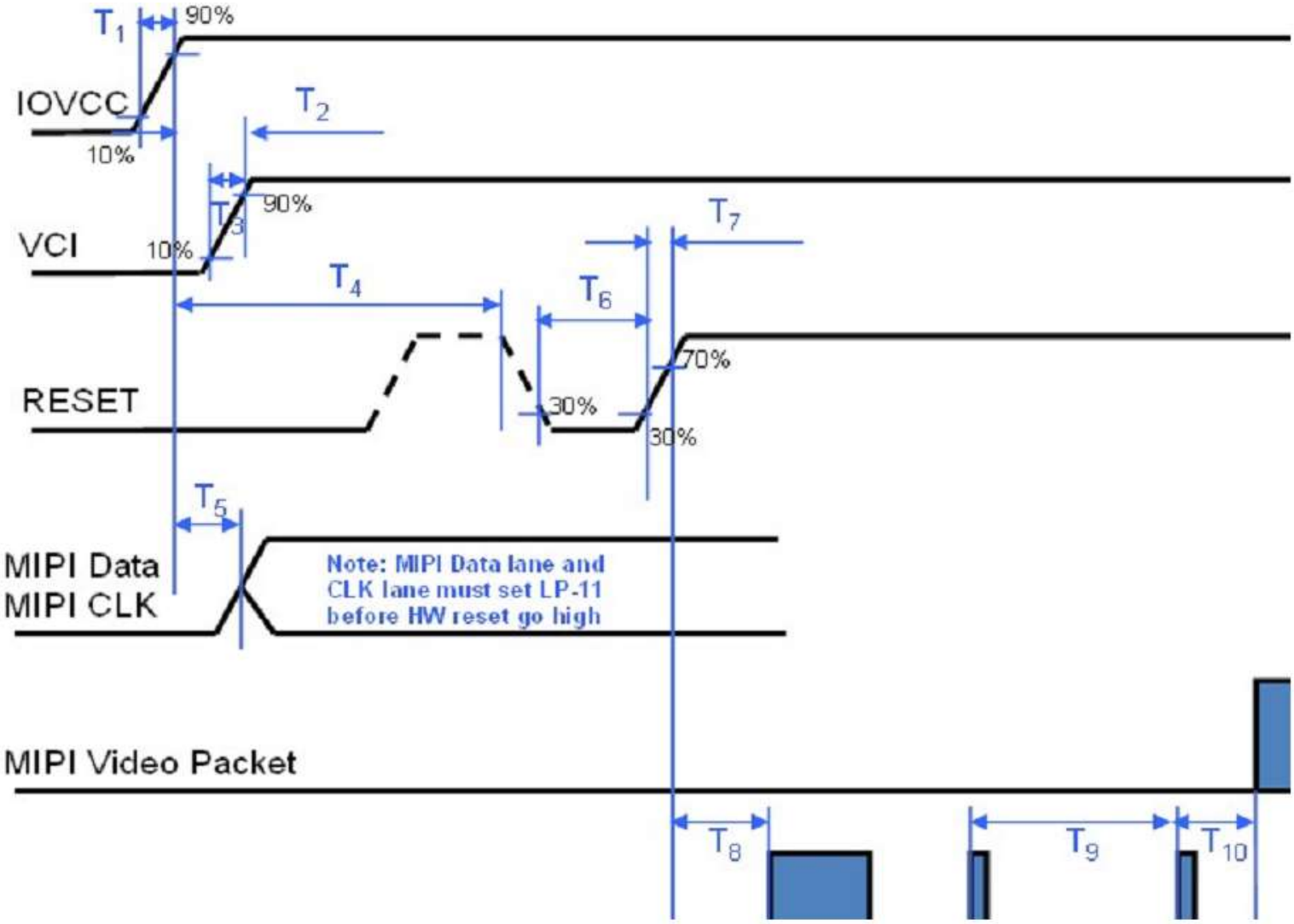
(4) Spike Rejection also applies during a valid reset pulse as shown as below:



(5) It is necessary to wait 15msec after releasing NRESET before sending commands. Also Sleep Out com mand cannot be sent for 120msec.

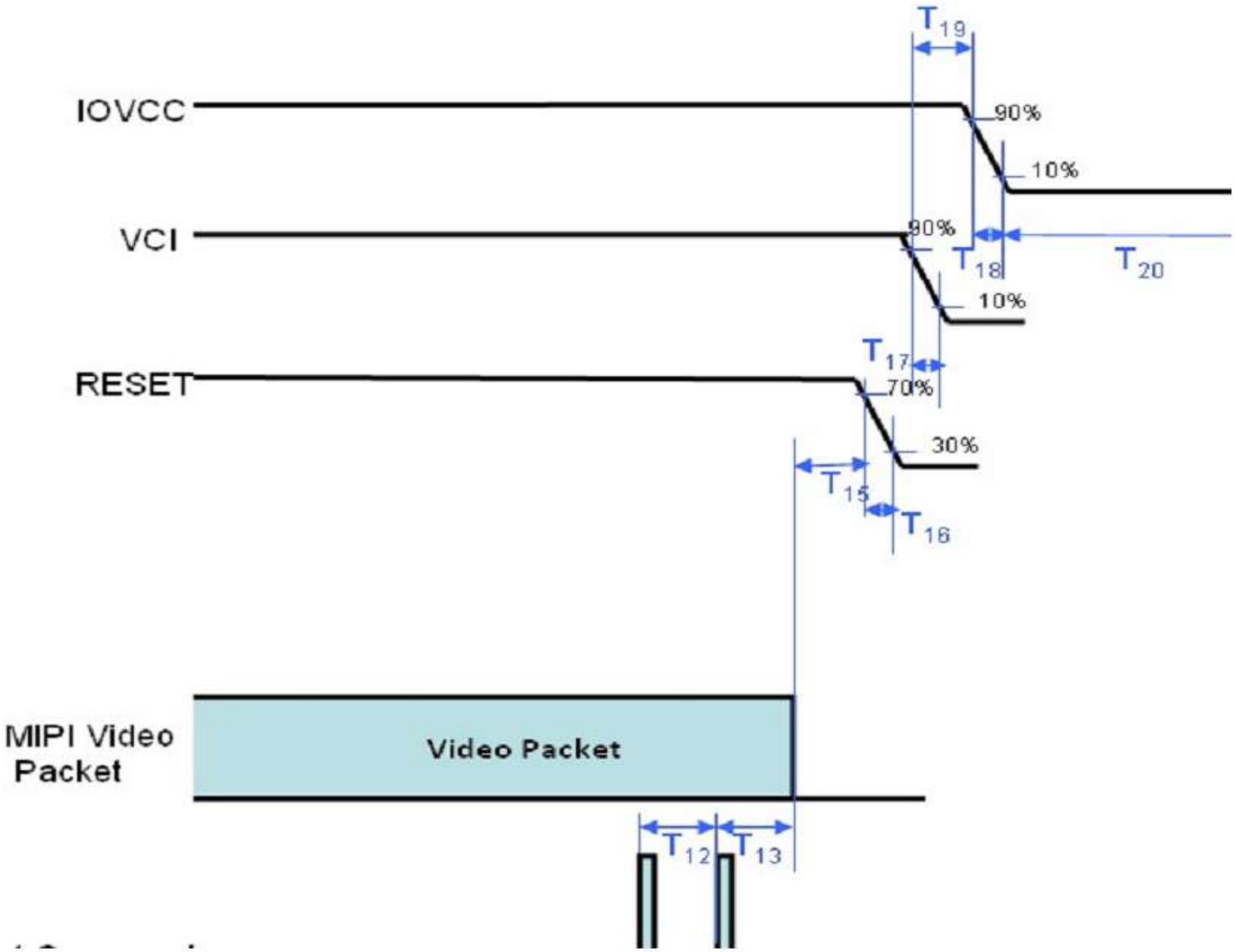
5.4 DSI Power On/Off Timing

5.4.1 Power On Timing of External Power IC



	Min.	Typ.	Max.	Unit
T1	0.01	-	10	ms
T2		No Limit		ms
T3	0.01	-	10	ms
T4	1	-	-	ms
T5	1	-	-	ms
T6	10	-	-	us
T7		No Limit		ns
T8	15	-	-	ms
T9	120	-	-	ms
T10		No Limit		ms
T11	100	150	-	ms

5.4.2 Power ff Timing of External Power IC



	Min.	Typ.	Max.	Unit
T12	2	-	-	Frame
T13	2	-	-	Frame
T14	40	100	-	ms
T15	10	-	-	ms
T16	No Limit			ms
T17	No Limit			ms
T18	No Limit			ms
T19	No Limit			ms
T20	100			ms

6.0 OPTICAL SPECIFICATIONS

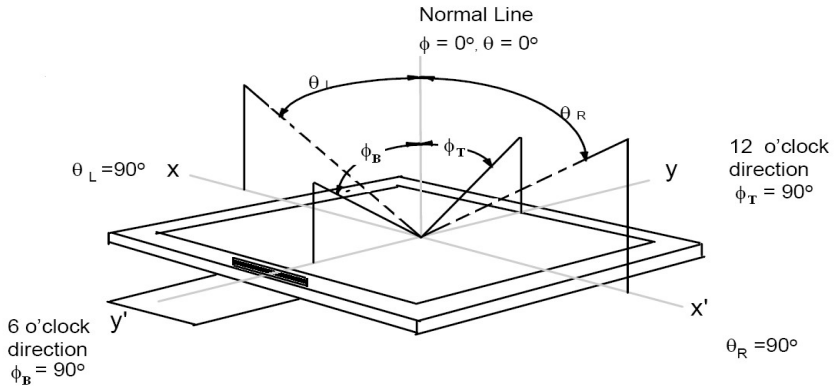
6.1 Overview

The test of optical specifications shall be measured in a dark room (ambient luminance ≤1lux and temperature = 25±2℃) with the equipment of Luminance meter system (Goniometer system and TOPCON BM-5) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and Φ equal to 0°. We refer to θØ=0 (=θ3) as the 3 o'clock direction (the "right"), θØ=90 (= θ12) as the 12 o'clock direction ("upward"), θØ=180 (= θ9) as the 9 o'clock direction ("left") and θØ=270(= θ6) as the 6 o'clock direction ("bottom"). While scanning θ and/or Ø, the center of the measuring spot on the display surface shall stay fixed.

6.2 Optical Specifications

Item	Symbol	Condition	Min	Typ.	Max	Unit	Note
Viewing Angle	θL	Cr≥10	80	85	-	deg	Note 1
	θ_R		80	85	-		
	ψ_T		80	85	-		
	ψ_B		80	85	-		
Contrast Ratio	Cr	θ=0° FF=0°	1000	1200	-	-	Note 2
Response Time	Tr+Tf		--	30	35	ms	Note 3
Color Coordinate of CIE1931	Wx	θ=0°	0.259	0.289	0.319	-	Note 4
	Wy		0.292	0.322	0.352		
	Rx		0.623	0.653	0.683		
	Ry		0.310	0.340	0.370		
	Gx		0.291	0.321	0.351		
	Gy		0.585	0.615	0.645		
	Bx		0.116	0.146	0.176		
	By		0.045	0.075	0.105		
Uniformity	U		80	--	--	%	Note 5
Color Gamut			65	70	--	%	
Luminance	L		300	350	--	cd/m²	Note 6

Note 1:**The definition of Viewing Angle**
Refer to the graph below marked by θ and Φ.



Note2:**ThedefinitionofContrastRatio**

$$\text{Contrast Ratio(CR)} = \frac{\text{Luminance When LCD is at “White” state}}{\text{Luminance When LCD is at “Black” state}}$$

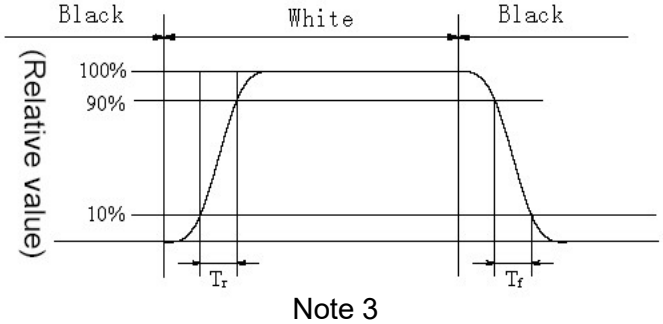
(Contrast Ratio is measured in optimum common electrode voltage)

Note3:**DefinitionofResponse time.**(Test LCD using RD80S or similar equipments):
The output sign also photo detector are measured when the input sign also are changed from “black ” to “white” (Voltage falling time)and from “white” to “black” (Voltage rising time), respectively . The response time is defined as the time interval between the 10% and 90% of amplitudes . Refer to fi gures below.

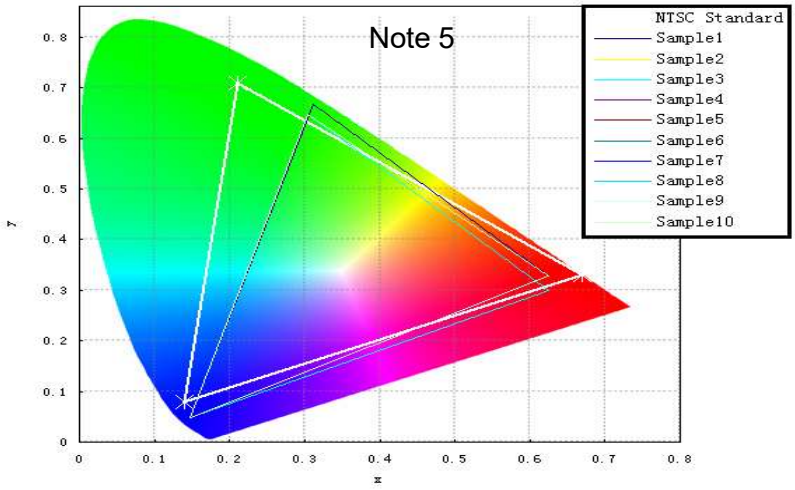
Note 4: Color Coordinates of CIE 1931
The test condition is at ILED=20mA and measured on the surface of LCD module at 25℃.
Measurement equipment:CS2000 or similar equipments
The Color Coordinate (CIE 1931) is the measurement of the center of the display shown in below figure.

Note 5: Definition of Color of CIE Coordinate and NTSC Ratio.

$$S = \frac{\text{area of RGB triangle}}{\text{area of NTSC triangle}} \times 100\%$$



Note 3



7.0 RELIABLITY TEST

The Reliability test items and its conditions are shown in below.

No	Test Items	Conditions	Testing standard
1	High temperature storage Test	Ta=+80℃, 240 hours	IEC60068-2-1:2007 GB2423.2-2008
2	Low temperature storage Test	Ta=-30℃, 240 hours	IEC60068-2-1:2007 GB2423.1-2008
3	High temperature operation Test	Ta=+70℃, 240 hours	IEC60068-2-1:2007 GB2423.2-2008
4	Low temperature operation Test	Ta=-20℃, 240 hours	IEC60068-2-1:2007 GB2423.1-2008
5	High temperature & humidity (storage Test)	Ta=+60℃, 90%RH max, 240 hours	IEC60068-2-78:2001 GB/T2423.3-2006
6	Thermal shock Test	-30℃ 30min~80℃ 30min, Change time:5min 20cycle	Start with cold temperature End with high temperature IEC60068-2-14:1984,GB2423.22-2002
7	Vibration Test	Frequency range:10Hz-55Hz Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z (6 hours for total)	IEC60068-2-6 GB/T17626.2
8	Mechanical shock	Half Sine Wave 100G 6ms,+X,+Y,+Z 3times for each direction	IEC60068-2-27 GB/T2423.5
9	Dropping Test	Height: 60 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32:1990 GB/T2423.8-1995
10	ESD Test	C=150pF, R=330 Ω, 5 points/panel Air:±8KV, 5 times; Contact: ±4KV, 5times; (Environment:15℃~35℃，30%~60%RH,86Kpa~106Kpa)	IEC61000-4-2:2001 GB/T17626.2-2006 Class C

Notes:

1、Maximum acceleration 20g，1g=9.8m/s²

2、Maximum amplitude 5mm

3、Maximum acceleration =0.002 x F² (frequency Hz) x D (amplitude p-pmm)

- **8.0 Precautions**
- Please pay attention to the followings when you use this TFT LCD Panel.
- **8.1 Mounting Precautions**
- (1) Use fingerstalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.
- (2) You must mount a module using specified mounting holes (Details refer to the drawings).
- (3) Please make sure to avoid external forces applied to the Source PCB or FPC and D-IC during the process of handling or assembling. If not, It causes panel damage or malfunction.
- (4) Note that polarizers are very fragile and could be easily damaged. Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment.
- (5) Do not pull or fold the source D-IC which connect the source PCB or FPC and the panel.
- Do not pull or fold the LED wire.
- (6) After removing the protective film, when the surface becomes dusty, please wipe gently with absorbent cotton or other soft materials like chamois soaks with alcohol or purified water.
- Do not strong polar solvent because they cause chemical damage to the polarizer.
- (7) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.
- (8) Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.
- (9) Since the LCD is made of glass, do not apply strong mechanical impact or static load onto it. Handling with care since shock, vibration, and careless handling may seriously affect the product. If it f alls from a high place or receives a strong shock, the glass may be broken.
- (10) Do not disassemble the module.
- (11) To determine the optimum mounting angle, refer to the viewing angle range in the specification for each model.
- (12) If the customer's set presses the main parts of the LCD, the LCD may show the abnormal display. But this phenomenon does not mean the malfunction of the LCD and should be pressed by the way of mutual agreement.
- (13)Do not drop water or any chemicals onto the LCD’s surface.

8.2 Operating Precautions

- (1) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
- (2) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimized the interference.
- (3) The electrochemical reaction caused by DC voltage will lead to LCD degradation, so DC drive should be avoided.
- (4) The LCD modules use C-MOS LSI drivers, so customers are recommended that any unused input terminal would be connected to Vdd or Vss, do not input any signals before power is turn on, and ground you body, work/assembly area, assembly equipments to protect against static electricity.
- (5) Do not exceed the absolute maximum rating value. (supply voltage variation, input voltage variation, variation in part contents and environmental temperature, and so on) Otherwise the Module may be damaged.
- (6) Design the length of cable to connect between the connector for back-light and the converter as short as possible and the shorter cable shall be connected directly.
The longer cable between that of back-light and that of converter may cause the luminance of LED to lower and need a higher startup voltage(Vs).
- (7) Connectors are precise devices for connecting PCB and transmitting electrical signals. Operators should insert and unplug MDL in parallel when assembling MDL.
- (8) Do not connect or disconnect the cable to/ from the module at the "Power On" condition.
- (9) When the module is operating, do not lose CLK, ENAB signals. If any one these signals is lost, the LCD panel would be damaged.
- (10) Obey the supply voltage sequence. If wrong sequence is applied, the module would be damaged.
- (11) Do not re-adjust variable resistor or switch etc.
- (12) For the Q/Single/OC Product, If the LED designed side view, LED bar should be putted in the L ong/short side；Otherwise, its reliability and function may not be guaranteed.

注:
①(1)涉及到Pol相关条目适用于OC/MDL出货产品，
②(6)(7)涉及到connector相关适用于OC/MDL出货产品
③ (12) 涉及到客户进行BLU设计，LED Bar位置需要避开GOA位置；

8.3 Electrostatic Discharge Control

- (1) Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wrist band etc. And don’t touch interface pin directly. Keep products as far away from static electricity as possible.
- (2) Avoid the use work clothing made of synthetic fibers. We recommend cotton clothing or other conductivity-treated fibers.

8.4 Precautions for Strong Light Exposure

It is not allowed to store or run directly in strong light or in high temperature and humidity for a long ti me; Strong light exposure causes degradation of polarizer and color filter.

8.5 Storage Precautions

When storing modules as spares for a long time, the following precautions are necessary.

•(1) The polarizer surface should not come in contact with any other object.
It is recommended that they be stored in the container in which they were shipped.
Temperature : 5 ~ 40 ℃

•(2) Humidity : 35 ~ 75 %RH

•(3) Period : 6 months

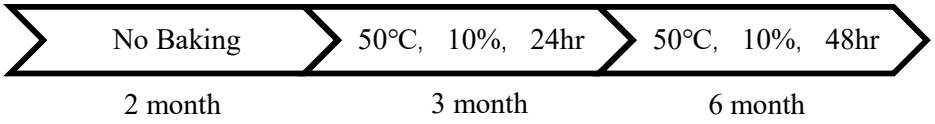
•(4) Control of ventilation and temperature is necessary.

•(5) Please make sure to protect the product from strong light exposure, water or moisture.
Be careful for condensation.

•(6) Store in a polyethylene bag with sealed so as not to enter fresh air outside in it.

•(7)Do not store the LCD near organic solvents or corrosive gasses.

•(8) Please keep the Modules/OC/FOG at a circumstance shown below Fig.



8.6 Precautions for Protection Film

• (1) Remove the protective film slowly, keeping the removing direction approximate 30-degree not vertical from panel surface, If possible, under ESD control device like ion blower, and th e humidity of working room should be kept over 50%RH to reduce the risk of static charge.

• (2) In handling the LCD, wear non-charged material gloves. And the conducting wrist to the earth and the conducting shoes to the earth are necessary.

8.7 Appropriate Condition for Display

•(1) Normal operating condition
- Temperature: 0 ~ 40℃
- Operating Ambient Humidity : 10 ~ 90 %
- Display pattern: dynamic pattern (Real display)
- Suitable operating time: under 12 hours a day.

•(2) Special operating condition

If the product will be used in extreme conditions such as high temperature, humidity, display patterns or 7*24hrs operation time etc.., It is strongly recommended to contact us for Application engineering advi ce. Otherwise, its reliability and function may not be guaranteed.

•(3)Black image or moving image is strongly recommended as a screen save.

- (4) Lifetime in this spec. is guaranteed only when commercial display is used according to operating usages.
- (5) Please contact us in advance when you display the same pattern for a long time.
- (6) If the Module keeps displaying the same pattern for a long period of time, the image may be "sticked" or "turn off" to the screen. To avoid image sticking, it is recommended to use a screen saver.
- (7) Do not exceed the absolute maximum rating value. (supply voltage variation, input voltage variation, variation in part contents and environmental temperature, and so on) Otherwise the Module may be damaged.
- (8) Dew drop atmosphere should be avoided.
- (9) The storage room should be equipped with a good ventilation facility and avoid to expose to corrosive gas , which has a temperature controlling system.
- (10) The LCD should be avoided to expose to corrosive gas for long time, ,the LCD may be affected by the gas as SO2 ,H2S etc.
- (11) When expose to drastic fluctuation of temperature (hot to cold or cold to hot) ,the LCD may be affected; Specifically, drastic temperature fluctuation from cold to hot ,produces dew on the LCD's surface which may affect the operation of the polarizer and the LCD.
- (12) Response time will be extremely delayed at lower temperature than the operating temperature range and on the other hand at higher temperature LCD may turn black at temperature above its operational range. However those phenomena do not mean malfunction or out of order with the LCD. The LCD will revert to normal operation once the temperature returns to the recommended temperature range for normal operation

8.8 Others

A. LC Leak

- If the liquid crystal material leaks from the panel, it is recommended to wash the LC with acetone or ethanol and then burn it.
- In case of contact with hands, skin or clothes, it has to be washed away thoroughly with soap.
- If LC in mouth, mouth need to be washed, drink plenty of water to induce vomiting and follow medical advice.
- If LC touch eyes, eyes need to be washed with running water at least 15 minutes.

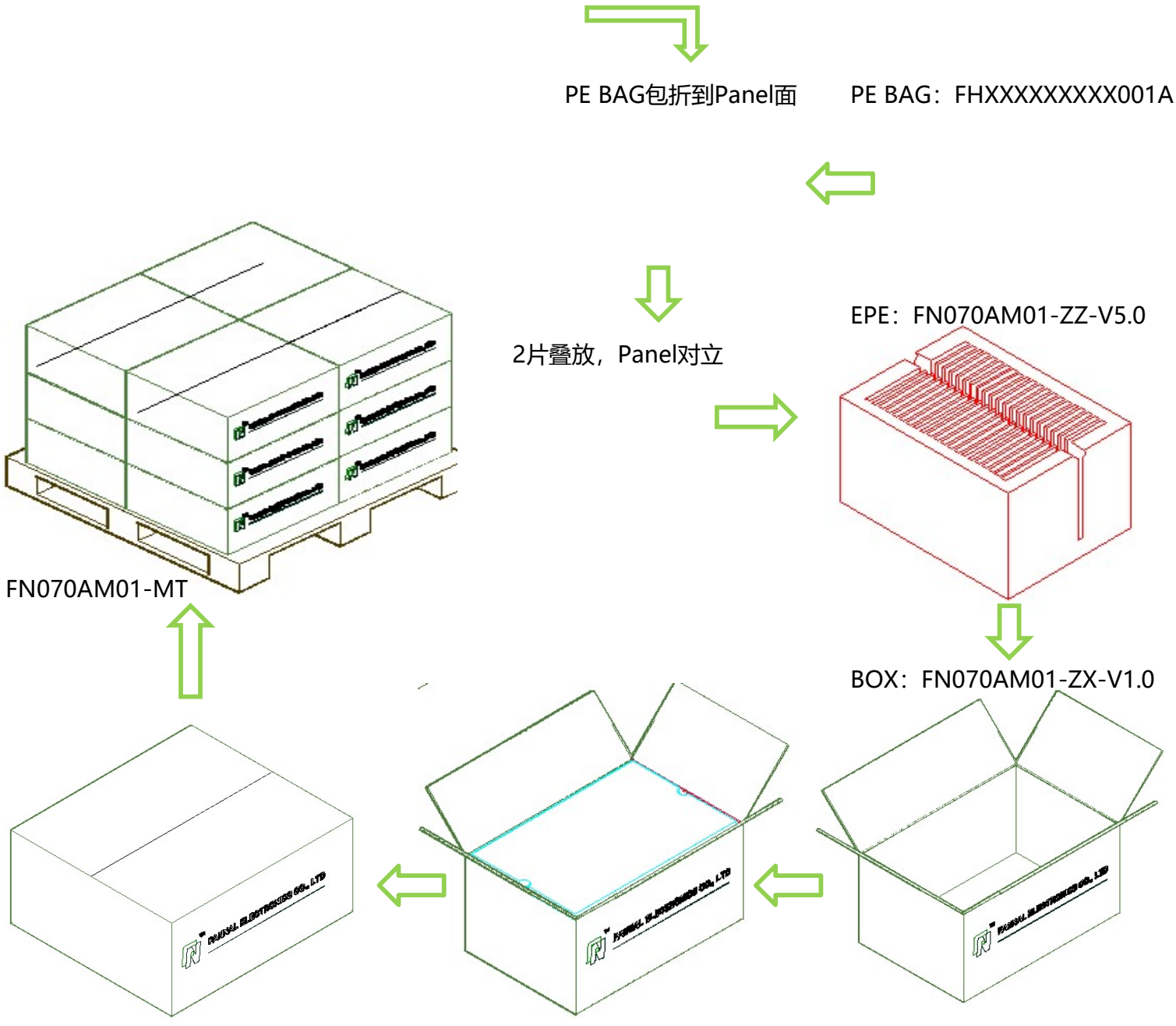
B. Rework

- When returning the module for repair or etc., Please pack the module not to be broken. We recommend to use the original shipping packages.

C. In order to prevent potential problems, flicker should be adjusted by optimizing the Vcom value in customer LCM Line (适用于Q/Single/OC出货产品)

9.0 PACKING INFORMATION

LCM MODEL	LCM Qty. in the Box	Carton Size(mm)	LCM Qty. in the Pallet
TBD			

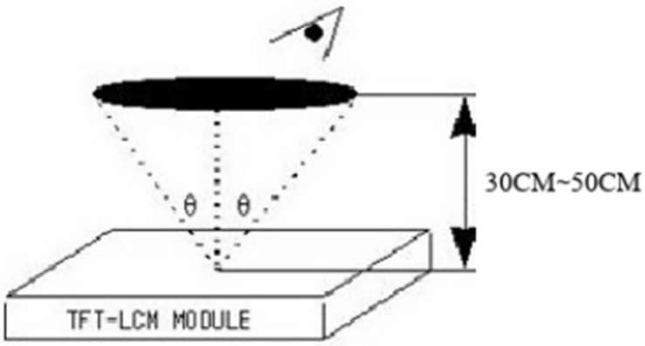


10.0 VISUAL INSPECTION CRITERIA FOR ALL CUSTMERS

10.1 Sampling Method

Unless otherwise agreed upon in writing, the sampling insepction shall be applied to t he Customers incoming inspection.

10.1.1 Lot size：1 pallet per same model
10.1.2 Sampling type：Random sampling
10.1.3 Inspection level：II
10.1.4 Sampling table：MIL-STD-105E



10.2 Inspection Environment

10.2.1 Ambient conditions
a. Ambient Temperature:25±3℃
b. Relative Humidity:65±20%RH
c. Ambient Illumination:300-700LUX(Normal:500LUX)

10.2.2 Viewing Distance
The distance between the LCM and the inspector's eyes shall be at least 30cm-50cm

10.2.3 Viewing Angle
performing in front of the panel
[Vertical]：±25degree
[Horizontal]：±40degree

10.2.4 Inspection Area:
Display Area(Active Area)

10.3 Definitions

10.3.1 Dark / Bright Spots
Points on display which appear dark/bright and usually result form the contamination.
These defects do not vary in size or intensity(contrast)when contrast is varied.
10.3.2 Dark / Bright Lines
Lines on display which appear dark/bright and usually result from the contamination.
10.3.3 Polarizer Scratch
Lines on display which are seen across a darker background and do not vary in size.
10.3.4 Polarizer Dent
White spots on display which appear againse a darker backgound and do not vary in size.
103.5 Bright Dot Defects
Dots(sub-pixels)on display which appear bright in the display area and visible throug h the 5%ND filter at Black Pattern.

10.3.6 Dark Dot Defects

Dots(sub-pixels)on display which appear dark in the display area at R.G.B Color Pattern.

10.3.7 Line Defects

All line defects on display which appear brigh/dark such as vertical,horizontal,or cross lines.

10.3.8 Mura

Mura on display which appears darker/brighter against background birghtness on parts of display area.

10.3.9 BM Defects

Bright(white)Points on display which are off BM(Black Matrix).

10.3.10 Visual Inspection

Inspection for LCM when the unit turns on.

10.3.11 Appearance Inspection

External inspection for LCM when the unit turns off.

10.3.12 Other

Defects which cannot be classified into the above defect definitions.

Note 1: Bright& Dark dots are not smaller than a sub-pixel(Dots smaller than a sub-pixel are not counted as defect dots)

10.4 Inspectin Criteria

Refer to 《TFT LCM general inspection standard》

10.5 Verification

The supplier can verify the defective LCMs to segregate the responsibilities at customer's facility or can request the Customer to ship the defective LCMs to assigned place for verification

This verificatin result shall be agreed mutually buy the Customer and Supplier. This result can be corrected/changed after detail failure analysis at Supplier's facilities.

10.6 Supplier Induced Defects

All of the Supplier induced defective LCMs shall be returned to the Supplier for repair or replacement.

Bfore return the defective LCMs, the Customer needs Supplier's confirmatin with RMA Number.

All of the returned LCMs shall be returned to the Customer within agreed time period.

10.7 Customer Induced Defects

The Customer can return the custmoer induced defective LCMs to the Supplier for repair.

The repair cost for Customer induced defective LCMs shall be agreed with both parties, Customer and Supplier.

10.8 Warranty Period

In-warranty period is Eighteen(18)Months from manufacturing month of LCM

Note：

a. Eighteen months are composed of twelfth months in-warranty period and sixth months distribution period

b. The manufacturing Month is on the LCMs as Supplier's serial No.

10.9 Repair Warranty

Repair warranty is Twelve(12)Months from repaired month for repaired LCMs

Note：a. The Label for repair will be added after repairing.

10.10 Warranty avoidance

The warranty will be avoided in cases of below:

a. When the warranty period is expired.

b. The Customer induced defective LCMs.

c. When the LCMs were repaired by 3rd party without Suppolier's approval.

d.When the LCMs were treated like Disassemble and Rework by the Customer and/or Customer's representatives without Supplier's approval.

10.11 Others

If any problems arise with the LCMs supplied by supplier, the customer and supplier will coopeate and make ettorts to solve it with mutual contidence and respect