

MDT078400	400x1280	MIPI Interface	TFT Module
Specification			
Version: 1		Date: 29/12/2023	
Revision			
1	27/12/2023	First issue	

Display Features		 RoHS compliant	
Display Size	7.84"		
Resolution	400x1280		
Orientation	Portrait		
Appearance	RGB		
Logic Voltage	1.8V		
Interface	MIPI		
Brightness	500 cd/m ²		
Touchscreen	---		
Module Size	67.80 x 205.78 x 3.30 mm		
Operating Temperature	-20°C ~ +70°C	Created By	Checked By
Pinout	40 way FFC	CL	TSB
Pitch	0.50 mm	Box Quantity	Weight / Display
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* - For full design functionality, please use this specification in conjunction with the ST7703I display driver specification.(Provided Separately)

Display Accessories	
Part Number	Description
MBID-40FP	40 Way FFC to cable and wires. Driven by any driver board that can be wired to a 1mm pitch SHDR-40V-S-B receptacle.
MDIB-CC1	Interconnect board for standard pitch pinouts to fine pitch wires. Providing pinouts for 2.54 pinout. 1.27, 1, 0.845, 0.8, 0.7, 0.65, 0.62, 0.6, 0.5 & 0.3 pads.

Optional Variants	
Appearances	Voltage



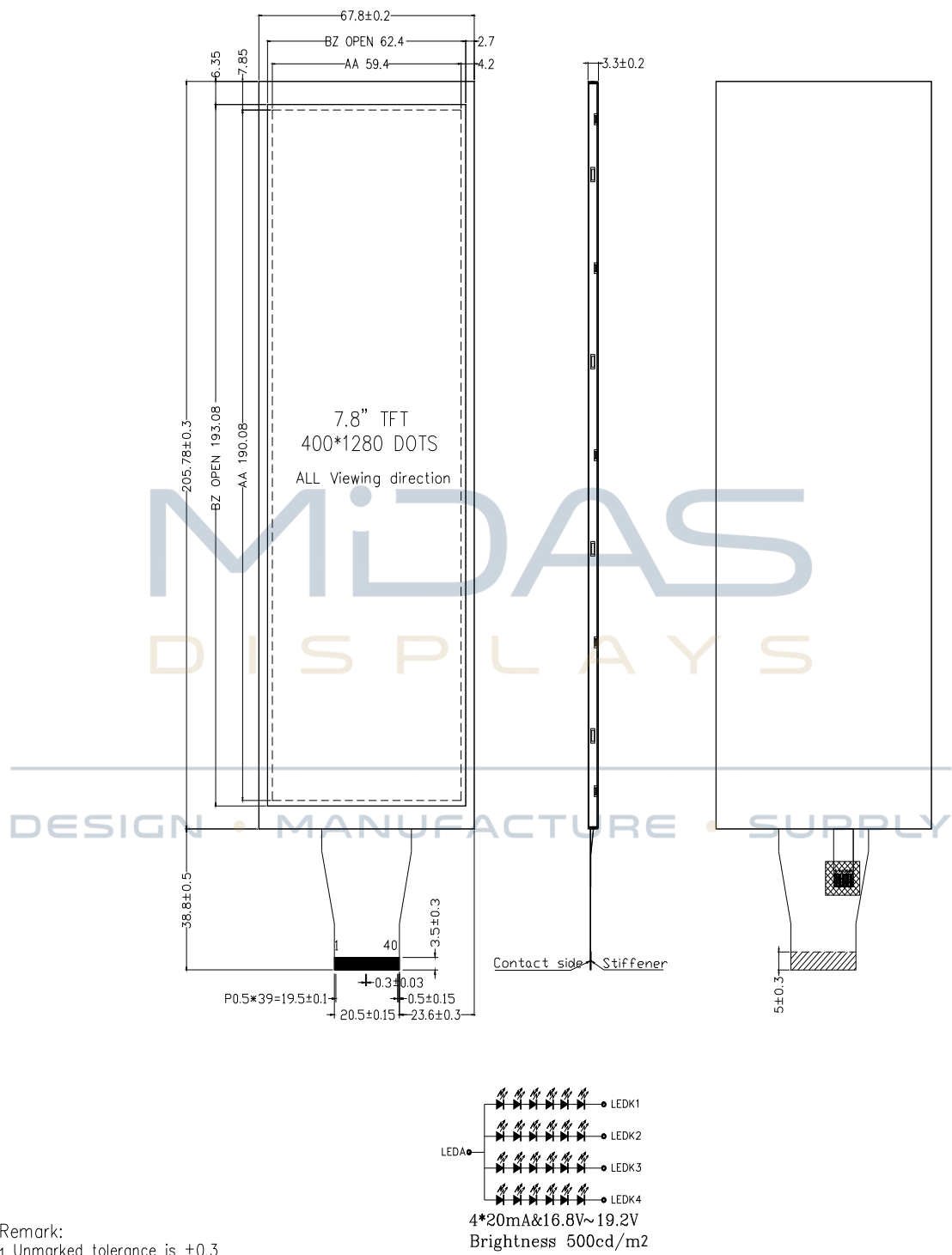
1. GENERAL SPECIFICATIONS

ITEM	STANDARD VALUE	UNIT
LCD SIZE	7.8	inch
LCD TYPE	TFT/IPS/ NORMALLY BLACK/TRANSMISSIVE	
MODULE SIZE	67.80*205.78*3.30	mm
ACTIVE AREA	59.40 *190.08	mm
PIXEL PITCH	0.0495*0.1485	μ m
NUMBER OF PIXELS	400*1280	
DRIVER IC	ST7703I	
SYSTEM INTERFACE	MIPI	
VIEWING DIRECTION	ALL	O'clock
GRAY SCALE INVERSION DIRECTION	-	O'clock
BACKLIGHT TYPE	24-CHIP WHITE LED	
TOUCH PANEL	WITHOUT	

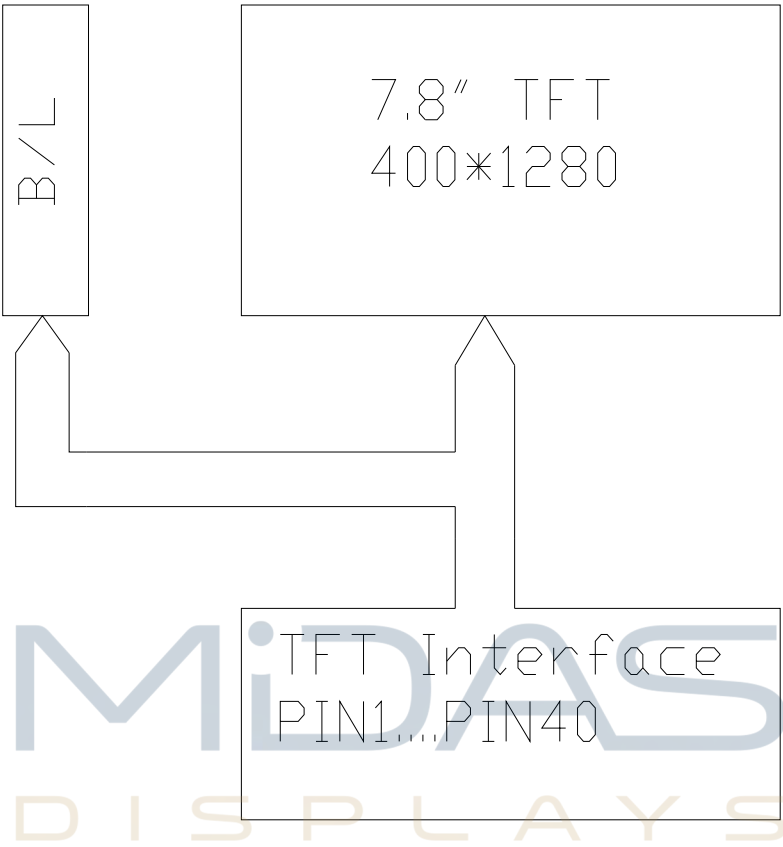
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2. EXTERNAL DIMENSIONS



3. BLOCK DIAGRAM



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4. PIN ASSIGNMENT

Pin No	Symbol	Function
1	GND	Power Ground
2	K4	Backlight Power Ground
3	K3	
4	K2	
5	K1	
6	A	Backlight Power Supply
7	D0P	Data lane0 input
8	D0N	
9	GND	Power Ground
10	D1P	Data lane1 input
11	D1N	
12	GND	Power Ground
13	CKP	CLK input
14	CKN	
15	GND	Power Ground
16	D2P	Data lane2 input
17	D2N	
18	GND	Power Ground
19	D3P	Data lane3 input
20	D3N	
21	GND	Power Ground
22	GND	
23	IOVCC	Power supply for logic circuit
24	IOVCC	
25	NC	No connection
26	RSTB	Reset pin
27	GND	Power Ground
28	NC	No connection
29	NC	
30	GND	Power Ground



31	NC	No connection
32	GND	Power Ground
33	GND	
34	NC	No connection
35	NC	
36	NC	
37	GND	Power Ground
38	VDD	Power supply
39	VDD	
40	NC	No connection



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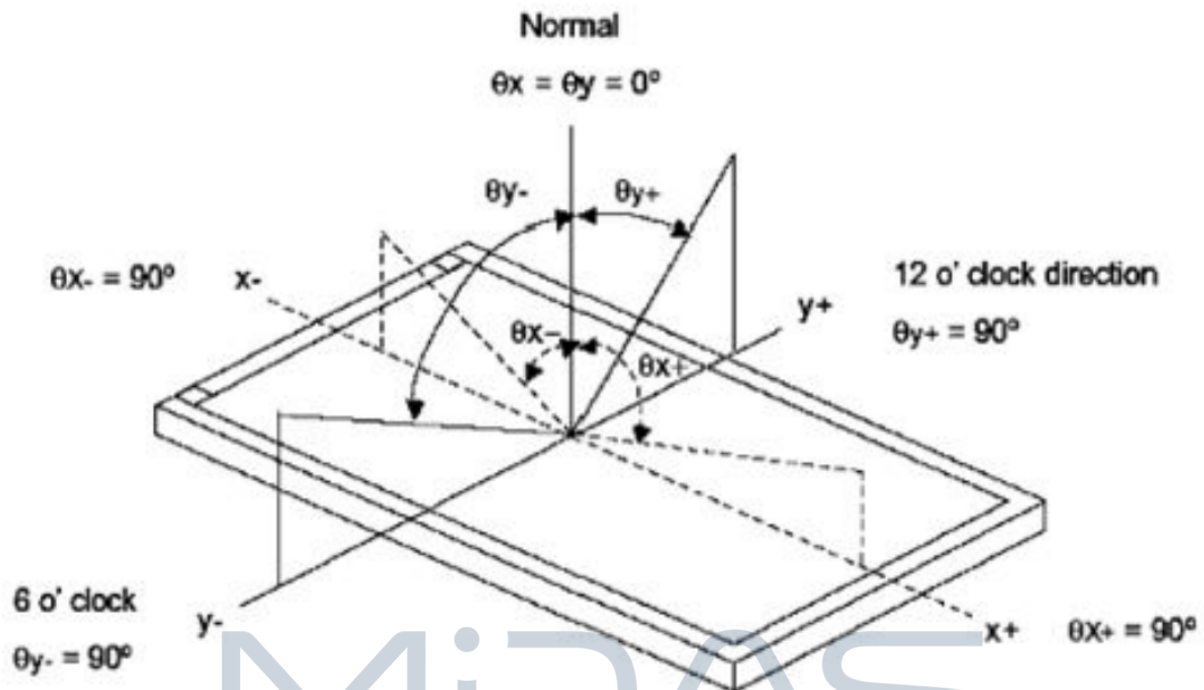


5. OPTICAL CHARACTERISTICS

Item		Symbol	Condition	Specification			Unit
				Min.	Typ.	Max.	
Luminance		L	IL =80mA	--	500	--	cd/m2
Response time		Tr+Tf	$\theta = 0^\circ$	--	30	40	ms
Contrast ratio		CR	$\theta = 0^\circ$	700	900	-	
CF Color chromaticity(CIE)		Wx	$\theta = 0^\circ$	Typ -0.03	0.295	Typ +0.03	
		Wy			0.331		
		Rx					
		Ry					
		Gx					
		Gy					
		Bx					
		By					
Viewing angle	Horizontal	θ_{-3}	CR>10	70	80	-	deg.
		θ_{+9}	CR>10	70	80	-	
	Vertical	θ_{-12}	CR>10	70	80	-	
		θ_{+16}	CR>10	70	80	-	



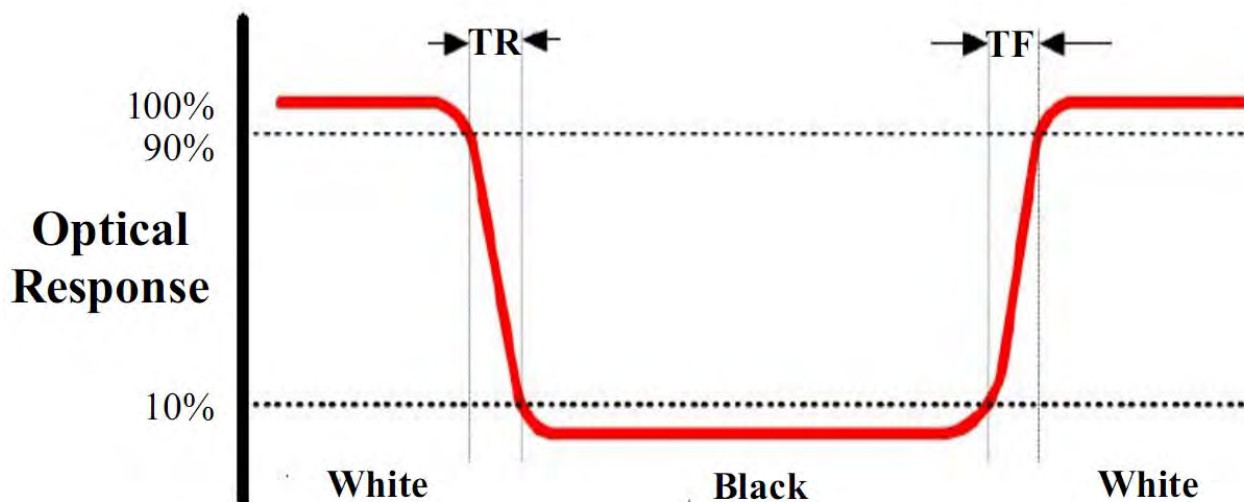
Note 1: Definition of Viewing Angle θ_x and θ_y :



Note 2: Definition of contrast ratio CR:

$$CR = \frac{\text{Luminance of white state}}{\text{Luminance of black state}}$$

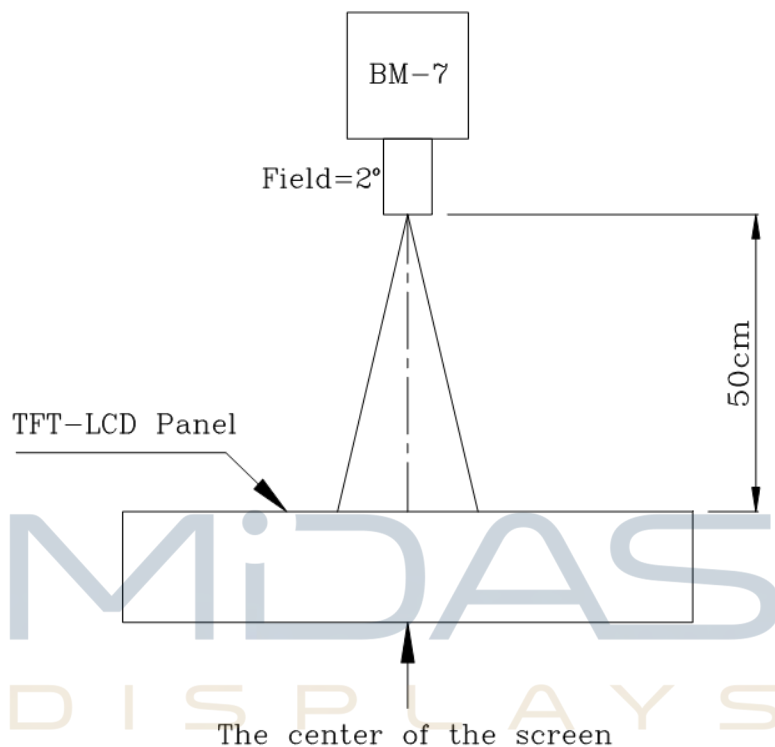
Note 3: Definition of Response Time (T_r, T_f)



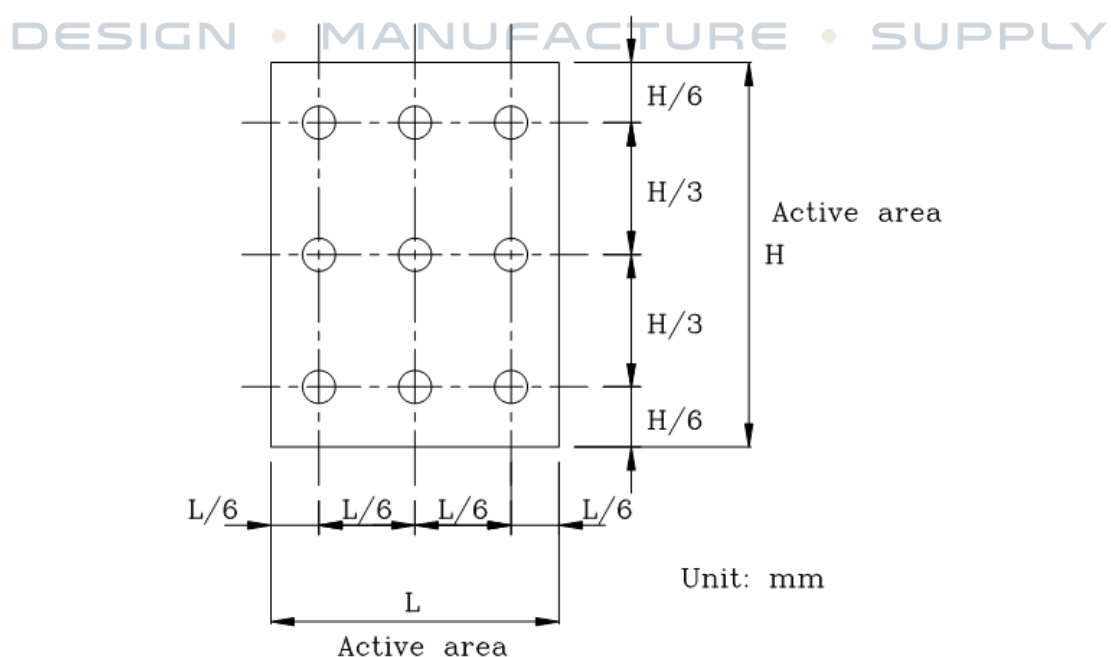
Note 4: Definition of Luminance

①The Brightness Test Equipment Setup

Field=2° (As measuring “black” image, field=2° is the best testing condition)



②The Brightness Test Point Setup



6. ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min.	Max.	Unit
Supply Voltage for analog	VCI	-0.3	+6.6	V
Input voltage for logic	IOVCC	-0.3	+5.5	V
Operating temperature	Top	-20	70	°C
Storage temperature	Tst	-30	80	°C

7. ELECTRICAL CHARACTERISTICS

Item	Symbol	Min.	Typ.	Max.	Unit	Applicable terminal
Supply Voltage for analog	VCI	2.5	2.8	6.2	V	VDD
Input voltage for logic	IOVCC	1.6	1.8	3.6	V	
Input voltage	VIL	VSS	-	0.3IOVCC	V	
	VIH	0.7IOVCC	-	IOVCC		
Input leakage current	ILKG	-1	-	+1	uA	

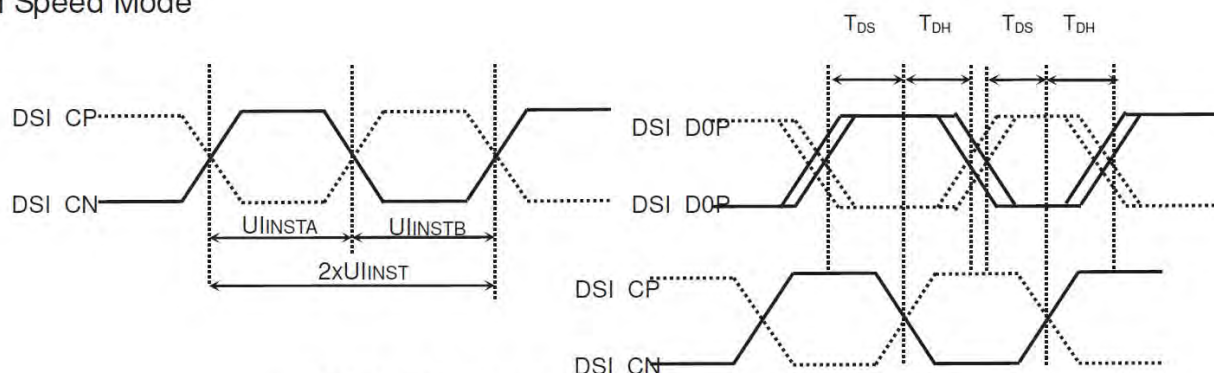
Backlight Driving conditions

Item	Symbol	values			Unit	remark
		Min.	Typ.	Max.		
Voltage for LED backlight	VF	16.8	18.0	19.2	V	
Current for LED Backlight	IL		80		mA	
Power consumption	P		1.44		W	
LED Life Time	-		35000		Hr	

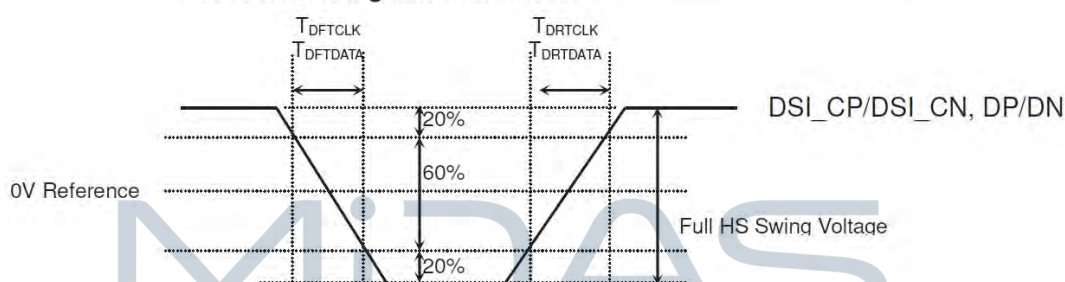


8. TIMING CHARACTERISTICS

High Speed Mode



DSI clock timing Characteristics



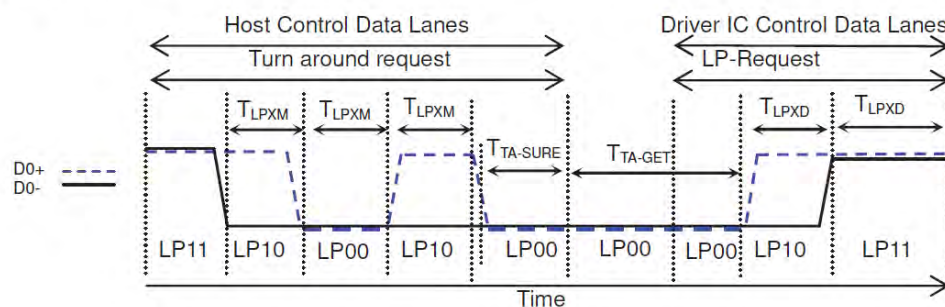
Rising and falling time on clock and data channel

(VSSA=0V, IOVCC=1.65V to 3.3V, VCI=2.5V to 3.3V, $T_A = -30$ to 70°C)

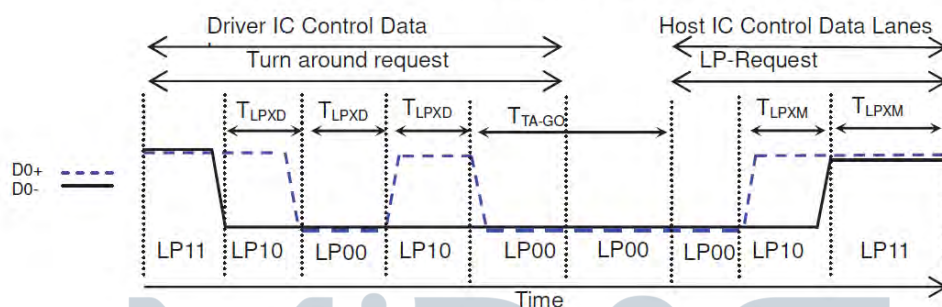
Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_CP/ DSI_CN	Double UI instantaneous	$2xU_{INST}$	TBD	-	25	ns
	UI instantaneous	U_{INSTA} U_{INSTB}	TBD	-	12.5	ns
DP/DN	Data to clock setup time	T_{DS}	$0.15xUI$	-	-	ps
	Data to clock hold time	T_{DH}	$0.15xUI$	-	-	ps
DSI_CP/ DSI_CN	Differential rise 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

DSI High Speed Mode Characteristics

Low Power Mode



BTA from HOST to Display Module Timing



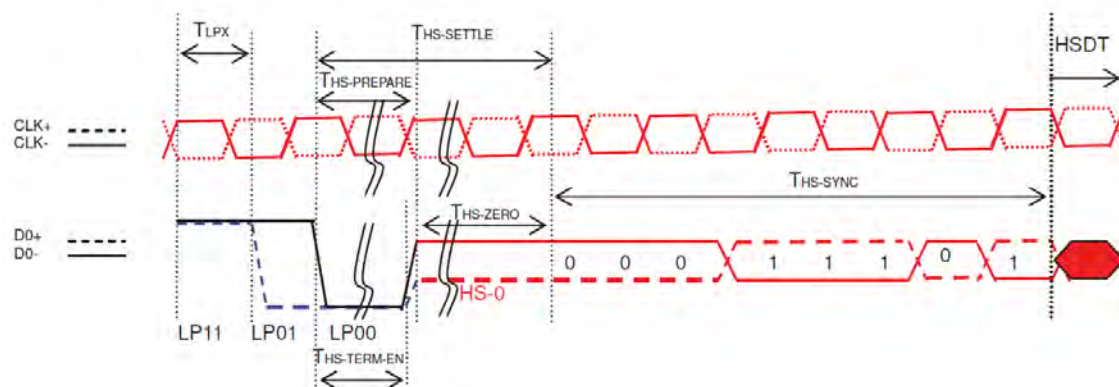
BTA from Display Module Timing to HOST

(VSSA=0V, IOVCC=1.65V to 3.3V, VCI=2.3V to 3.3V, $T_A = -30$ to 70°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}	-	$2 \times T_{LPXD}$	ns
	Time to drive LP-00 by display module	T_{TA-GET}	$5 \times T_{LPXD}$	-	-	ns
	Time to drive LP-00 after turnaround request Host	T_{TAGO}	$4 \times T_{LPXD}$	-	-	ns

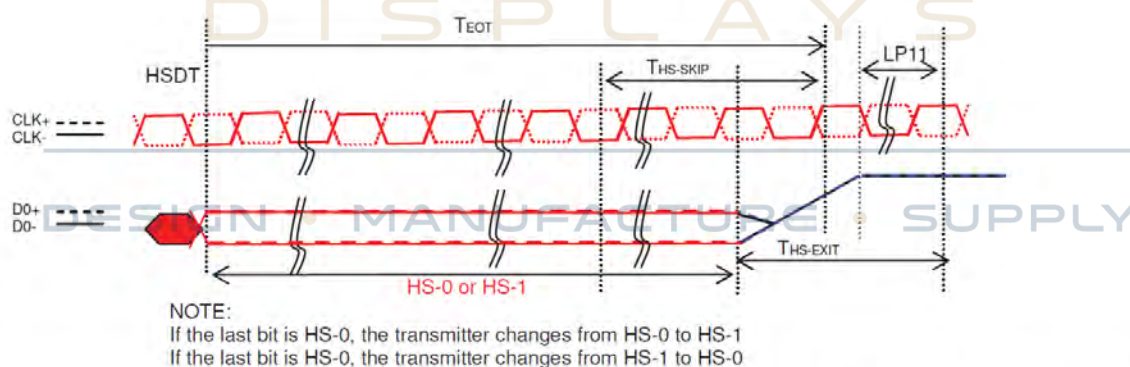
DSI Low Power Mode Characteristics

DSI BURSTS



Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
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

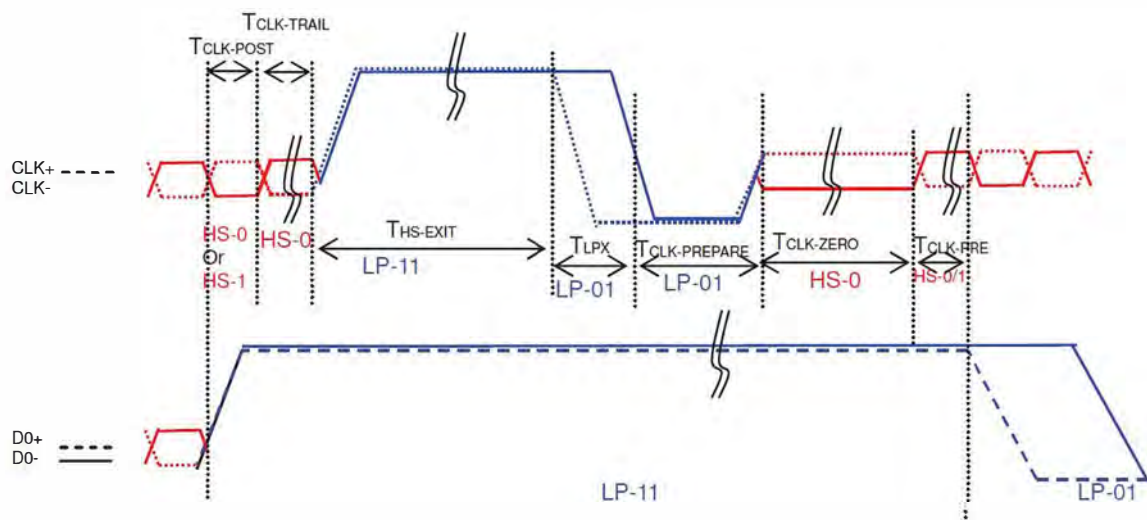
DSI Low Power Mode to High Speed Mode Timing



Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
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

DSI Low Power Mode to High Speed Mode Timing





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	$T_{CLK-PRE}$	$8xUI$			

Clock Lanes High Speed Mode to/from Low Power Mode Timing

9. RELIABILITY TEST

NO.	TEST ITEM	CONDITIONS	
1	HIGH TEMPERATURE STORAGE	$T_A=+80^{\circ}C$	240H
2	LOW TEMPERATURE STORAGE	$T_A=-30^{\circ}C$	240H
3	HIGH TEMPERATURE OPERATION	$T_A=+70^{\circ}C$	240H
4	LOW TEMPERATURE OPERATION	$T_A=-20^{\circ}C$	240H
5	HIGH TEMPERATURE AND HIGH HUMIDITY OPERATION	$+60^{\circ}C, 90\%RH$	240H

10. LCD MODULES HANDLING PRECAUTIONS

- The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.
- If the display panel is damaged and the liquid crystal substance inside it leaks out, do not get any in your mouth. If the substance come into contact with your skin or clothes promptly wash it off using soap and water.
- Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.
- The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarize carefully.
- To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
 - Be sure to ground the body when handling the LCD module.
 - Tools required for assembly, such as soldering irons, must be properly grounded.
 - To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.
 - The LCD module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.
- Storage precautions
When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps. Keep the modules in bags designed to prevent static electricity charging under low temperature / normal humidity conditions (avoid high temperature / high humidity and low temperatures below 0°C). Whenever possible, the LCD modules should be stored in the same conditions in which they were shipped from our company.

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11. OTHERS

- Liquid crystals solidify at low temperature (below the storage temperature range) leading to defective orientation of liquid crystal or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subjected to a strong shock at a low temperature.
- If the LCD modules have been operating for a long time showing the same display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. Abnormal operating status can be resumed to be normal condition by suspending use for some time. It should be noted that this phenomena does not adversely affect performance reliability.
- To minimize the performance degradation of the LCD modules resulting from caused by static electricity, etc. exercise care to avoid holding the following sections when handling the modules:
 - Exposed area of the printed circuit board
 - Terminal electrode sections.

