

MDT039700	480x800	18BIT RGB+SPI Interface	TFT Module
Specification			
Version: 1		Date: 17/05/2020	
Revision			
1	15/05/2020	First issue	

Display Features		 RoHS compliant	
Display Size	3.97"		
Resolution	480x800		
Orientation	Portrait		
Appearance	RGB		
Logic Voltage	2.8V		
Interface	18BIT RGB+SPI		
Brightness	420 cd/m ²		
Touchscreen	---		
Module Size	57.64 x 96.00 x 2.70 mm		
Operating Temperature	-20°C ~ +70°C	Created By	Checked By
Pinout	39 way FFC	CL	TSB
Pitch	0.30mm	Box Quantity	Weight / Display
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* - For full design functionality, please use this specification in conjunction with the ILI9806E display driver specification.(Provided Separately)

Display Accessories	
Part Number	Description
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



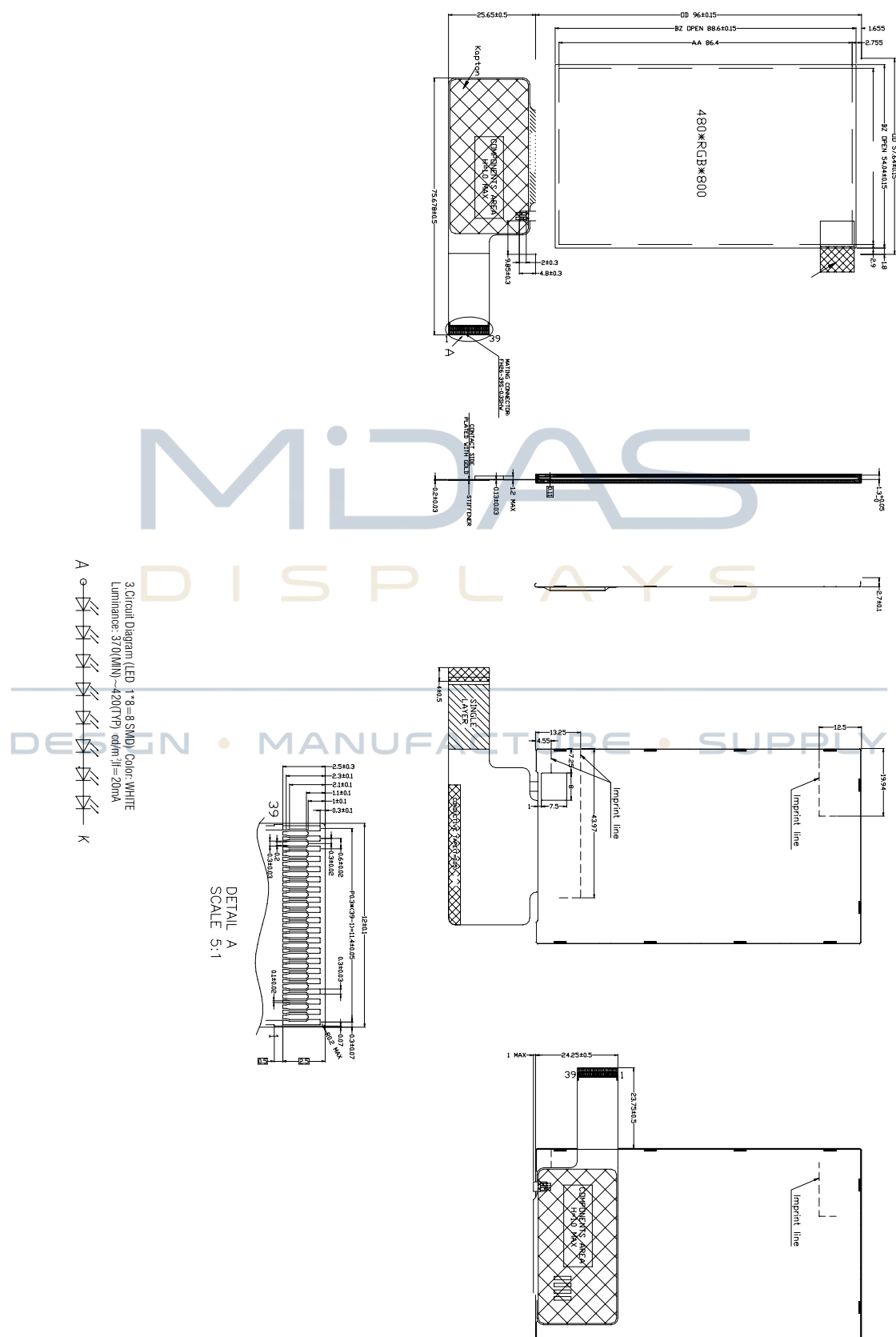
1. GENERAL SPECIFICATIONS

ITEM	STANDARD VALUE	UNIT
LCD SIZE	3.97	INCH
LCD TYPE	TFT	
MODULE SIZE(W*H*T)	57.64*96.00*2.70	MM
ACTIVE AREA(W*H)	51.84 *86.4	MM
PIXEL PITCH (W*H)	0.108*0.108	MM
NUMBER OF PIXELS	480*(RGB)*800	
DIVER IC	ILI9806E	
INTERFACE TYPE	18BIT RGB+SPI	
RECOMMEND VIEWING DIRECTION	ALL	O'CLOCK
GRAY SCALE INVERSION DIRECTION	-	O'CLOCK
COLORS	16.7 M	
BACKLIGHT TYPE	8-DIES WHITE LED	
TOUCH PANEL TYPE	WITHOUT	

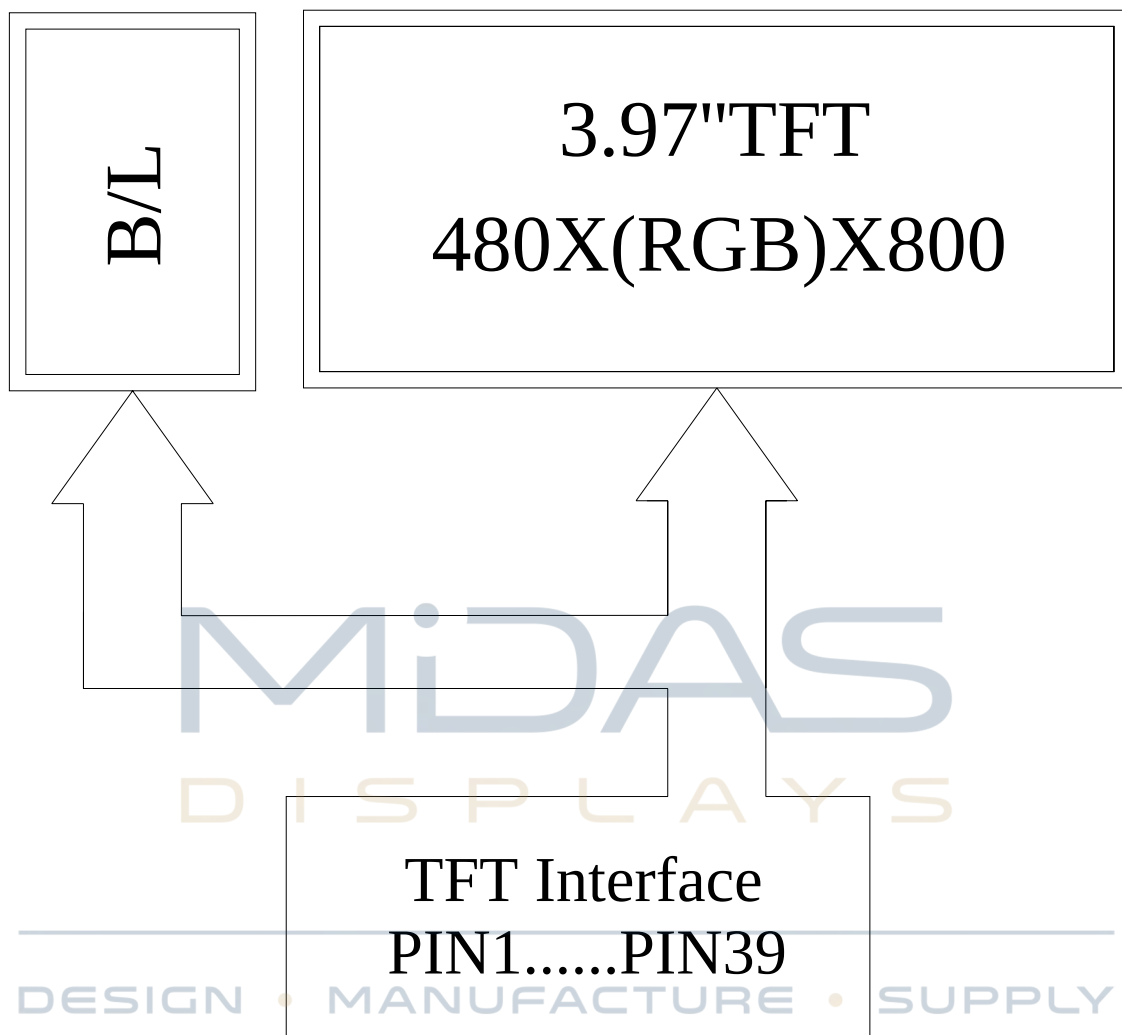
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2. EXTERNAL DIMENSIONS



3. BLOCK DIAGRAM



4. PIN ASSIGNMENT

PIN NO.	SYMBOL	DESCRIPTION
1	NC(YU)	No connect
2	NC(XL)	No connect
3	NC(YD)	No connect
4	NC(XR)	No connect
5	LED_K	Cathode of LED back light
6	GND	Power ground
7	LED_A	Anode of LED back light
8	VDD	Power supply
9	VDD	Power supply
10	VDDIO	Power supply
11	VDDIO	Power supply
12	CS	Chip select signal input terminal, active at " L "
13	SCL	Serial clock
14	SDI	Serial data input pin
15	SDO	Serial data output pin
16	B0	Blue data
17	B1	Blue data
18	B2	Blue data
19	B3	Blue data
20	B4	Blue data
21	B5	Blue data
22	G0	Green data
23	G1	Green data
24	G2	Green data
25	G3	Green data
26	G4	Green data
27	G5	Green data
28	R0	Red data
29	R1	Red data
30	R2	Red data
31	R3	Red data
32	R4	Red data
33	R5	Red data



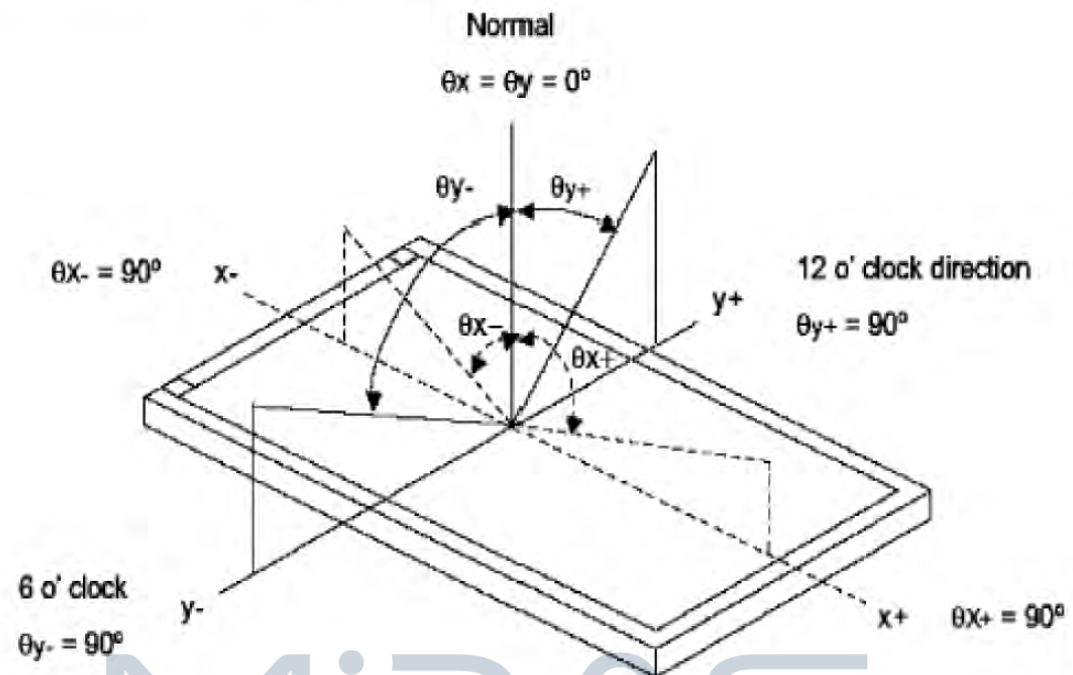
34	DEN	Data enable
35	DOTCLK	Pixel clock
36	HSYNC	Horizontal sync signal
37	VSYNC	Not connection
38	RESET	Reset pin
39	GND	Power ground

5. OPTICAL CHARACTERISTICS

ITEM		SYMBOL	CONDITIONS	SPECIFICATIONS			UNIT	NOTE
				MIN	TYP.	MAX		
Luminance		L		370	420	-	Cd/m ²	
Contrast ratio		CR	$\theta = 0^\circ$	700	900			
Response time		T _R +T _F	25°C		35		ms	
CIE COLOUR COORDINATE	RED	XR	VIEWING NORMAL ANGLE	0648	0663	0678		
		YR		0310	0.325	0.340		
	GREEN	XG		0.256	0.271	0.386		
		YG		0.579	0.594	0.609		
	BLUE	XB		0.119	0.134	0.149		
		YB		0.107	0.122	0.137		
	WHITE	XW		0.277	0.292	0.307		
		YW		0.318	0.333	0.358		
VIEWING ANGLE	Hor.	θ_{x+}	CR $\geq$ 10		85		Degree	
		θ_{x-}			85			
	Ver.	θ_{y+}			85			
		θ_{y-}			85			
Uniformity	Un			80			%	



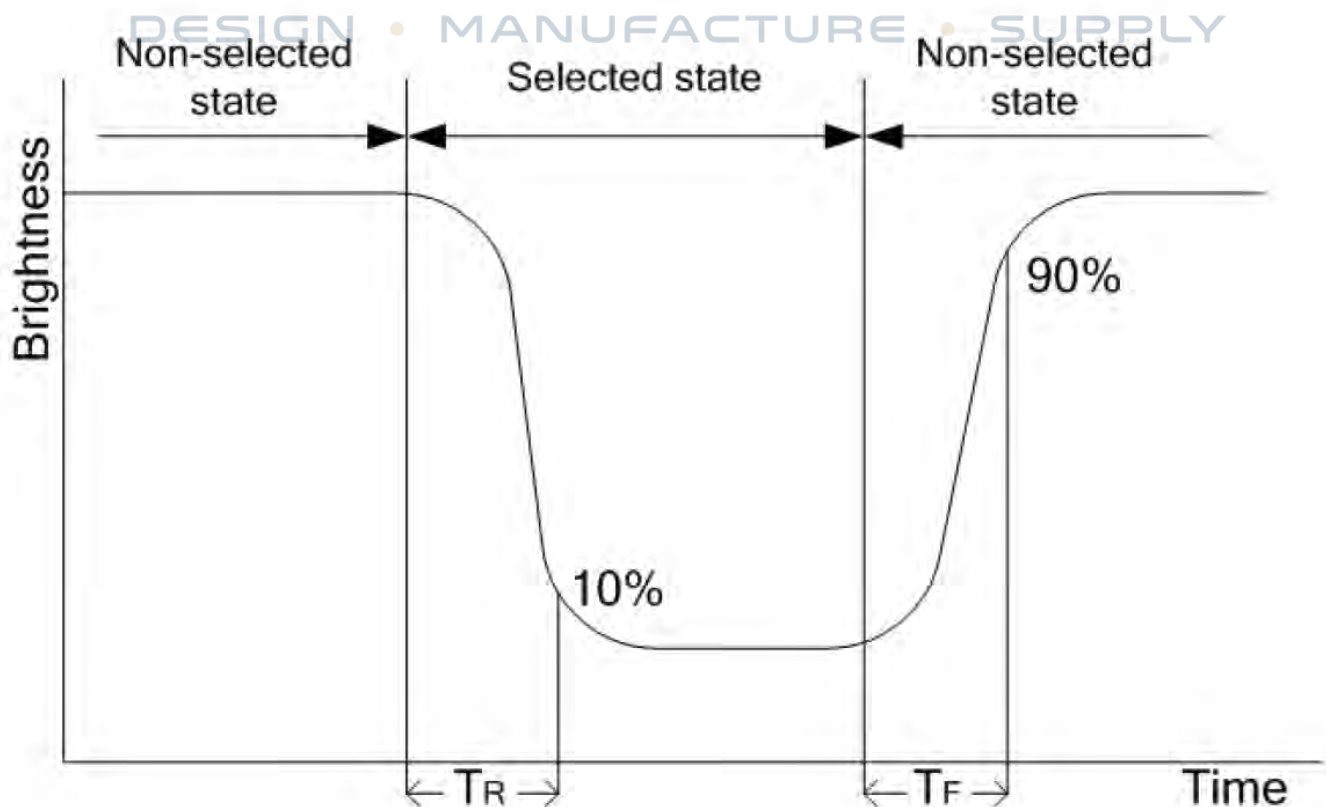
Note 1 : Definition of Viewing Angle θ_x and θ_y :



Note 2: Definition of contrast ratio CR:

$$CR = \frac{\text{Brightness of non-selected dots (white)}}{\text{Brightness of selected dots (black)}}$$

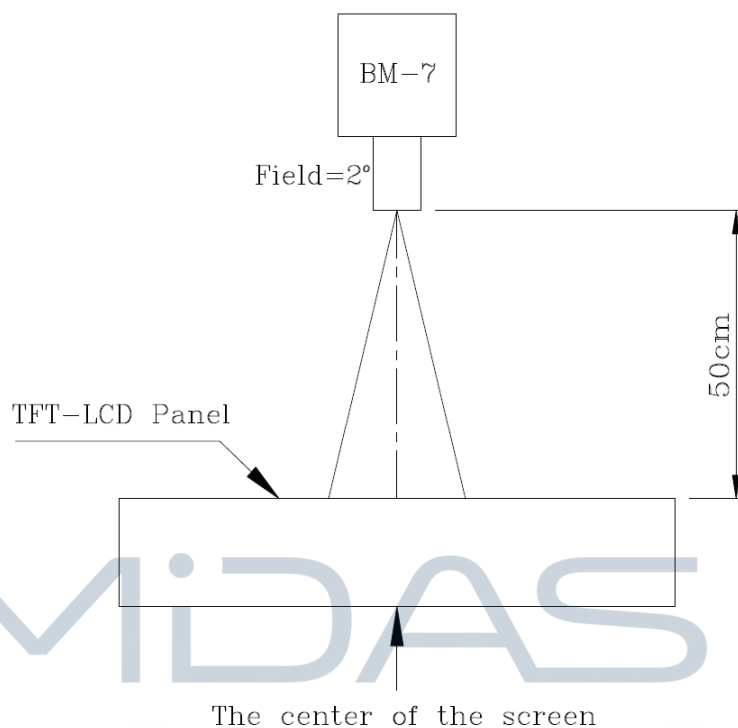
Note 3: Definition of response time (T_R , T_F)



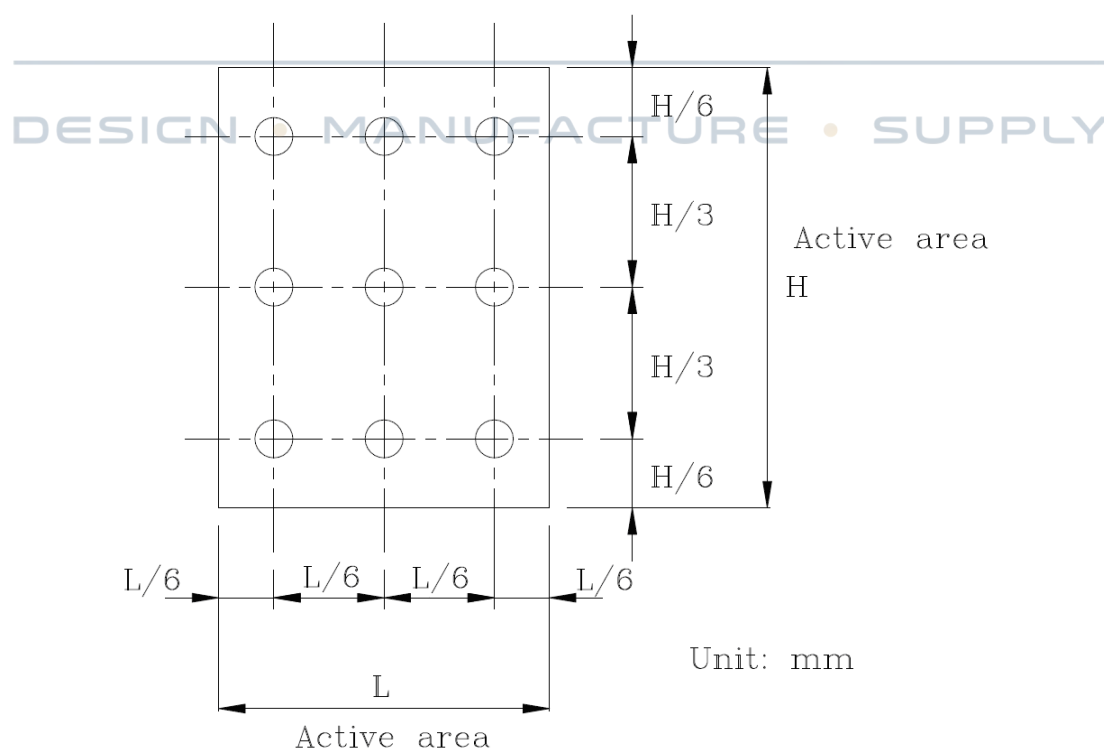
Note 4: Definition of Luminance

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
Power Supply Voltage	VDD	-0.3	4.6	V
	VDDIO	-0.3	4.6	V
Operating temperature	Top	-20	+70	°C
Storage temperature	Tst	-30	+80	°C

7. ELECTRICAL CHARACTERISTICS

7.1 ELECTRICAL CHARACTERISTICS

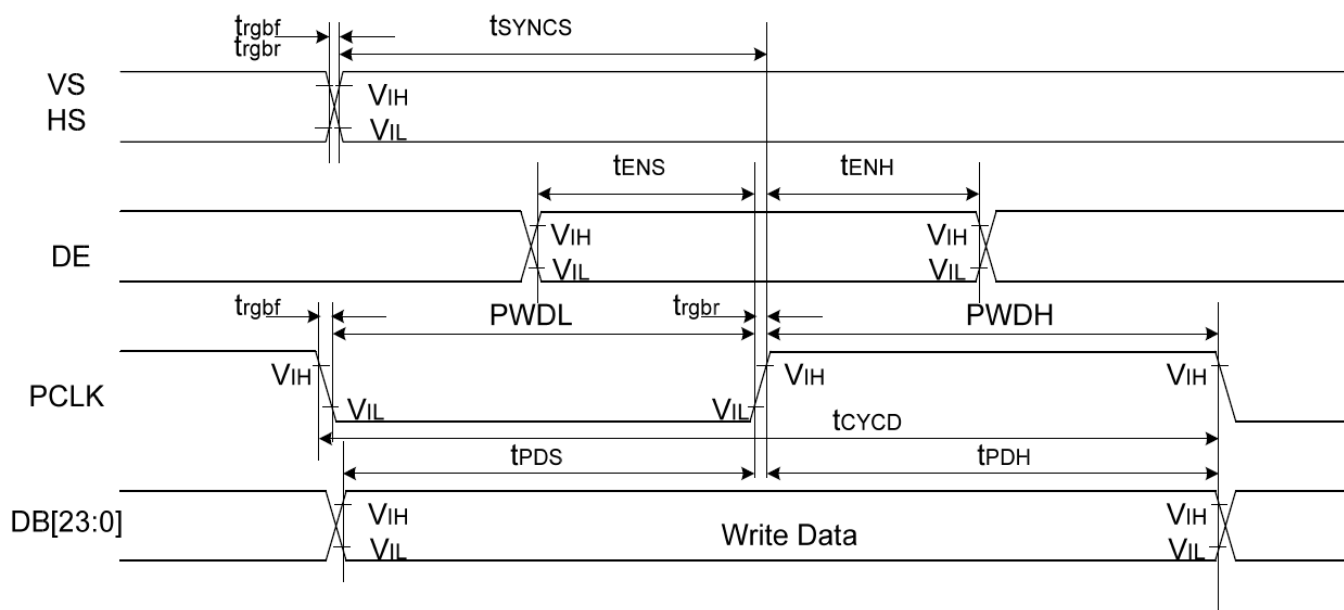
ITEM	SYMBOL	MIN	TYP.	MAX	UNIT
Power Supply	VDD	2.5	2.8	3.6	V
	VDDIO	1.65	1.8	3.6	V
	VGH	12		18	V
	VGL	-13.5		-6.0	V
	VCOM	-2.0		0	V
Input voltage	Vil	GND	-	0.3VDD	V
	Vih	0.7VDD	-	VDD	V

7.2 BLACKLIGHT DRIVING CONDITIONS

ITEM	SYMBOL	SPECIFICATIONS			UNIT	REMARK
		MIN	TYP.	MAX		
Supply Voltage	Vf				V	
Supply Current	IL		20		mA	
Power consumption	P		1.92		W	
LED Life Time					Hr	



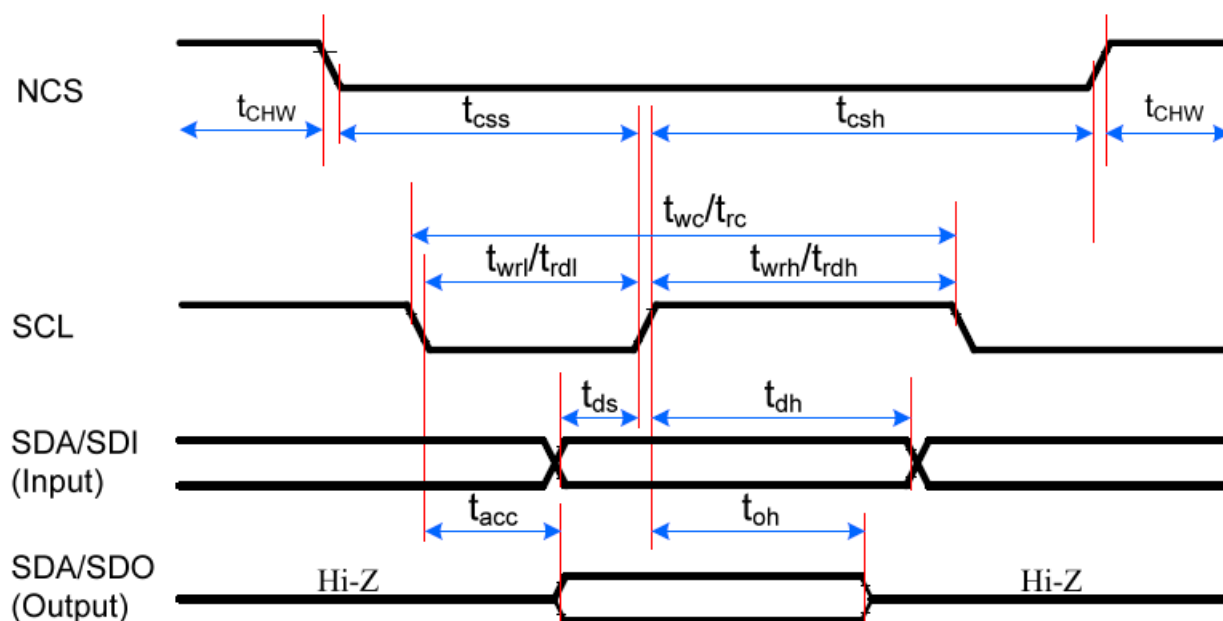
7.3 Parallel RGB Mode Characteristics



Signal	Symbol	Parameter	min	max	Unit	Description
VS/ HS	t_{SYNCS}	VS/HS setup time	5	-	ns	24/18/16-bit bus RGB interface mode
	t_{SYNCH}	VS/HS hold time	5	-	ns	
DE	t_{ENS}	DE setup time	5	-	ns	
	t_{ENH}	DE hold time	5	-	ns	
DB[23:0]	t_{POS}	Data setup time	5	-	ns	
	t_{PDH}	Data hold time	5	-	ns	
PCLK	$PWDH$	PCLK high-level period	13	-	ns	
	$PWDL$	PCLK low-level period	13	-	ns	
	t_{CYCD}	PCLK cycle time	28	-	ns	
	t_{rgbr}, t_{rgbf}	PCLK,HS,VS rise/fall time	-	15	ns	

Note: $T_a = -30$ to 70 °C, $IOVCC=1.65V$ to $3.6V$, $VCI=2.5V$ to $3.6V$, $DGND=0V$

7.4 SPI MODE



Signal	Symbol	Parameter	min	max	Unit	Description
CSX	t_{css}	Chip select time (Write)	15	-	ns	
	t_{csh}	Chip select hold time (Read)	15	-	ns	
	t_{CHW}	CS "H" pulse width	40	-	ns	
SCL	t_{wc}	Serial clock cycle (Write)	30	-	ns	
	t_{wrh}	SCL "H" pulse width (Write)	10	-	ns	
	t_{wrl}	SCL "L" pulse width (Write)	10	-	ns	
	t_{rc}	Serial clock cycle (Read)	150	-	ns	
	t_{rdh}	SCL "H" pulse width (Read)	60	-	ns	
	t_{rdl}	SCL "L" pulse width (Read)	60	-	ns	
SDA/SDO (Output)	t_{acc}	Access time (Read)	10	100	ns	For maximum CL=30pF
	t_{oh}	Output disable time (Read)	15	100	ns	For minimum CL=8pF
SDA/SDI (Input)	t_{ds}	Data setup time (Write)	10	-	ns	
	t_{dh}	Data hold time (Write)	10	-	ns	

Note:

1. $T_a = -30$ to $70\text{ }^{\circ}\text{C}$, $\text{IOVCC}=1.65\text{V}$ to 3.6V , $\text{VCI}=2.5\text{V}$ to 3.6V , $T=10\pm 0.5\text{ns}$.
2. Does not include signal rise and fall times.

8. RELIABILITY TEST

NO.	TEST ITEM	CONDITIONS
1	HIGH TEMPERATURE STORAGE	TA=80℃, 240H
2	LOW TEMPERATURE STORAGE	TA=-30℃, 240H
3	HIGH TEMPERATURE OPERATION	TA=70℃, 240H
4	LOW TEMPERATURE OPERATION	TA=-20℃, 240H
5	HIGH TEMPERATURE AND HIGH HUMIDITY OPERATION	+60℃, 90%RH, 240H
6	THERMAL SHOCK	-40℃↔+85℃ (0.5Hr) , 100 cycles

MIDAS
DISPLAYS

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9. 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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10. 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.

