

Display Elektronik GmbH

DATA
SHEET

TFT MODULE

**DEM 10801080A VMH-PW-N
(C-TOUCH)**

ROUND 5,0" TFT

Product Specification

Version: 1

21.01.2025

Contents

1. Basic Specifications	4
1.1 TFT Features	4
1.2 CTP Features	4
1.3 Mechanical Information	5
2. Block Diagram	5
3. Outline dimension	6
4. Input terminal Pin Assignment	6
4.1 TFT PIN Define	7
4.2 CTP PIN Define	9
5. LCD Optical Characteristics	10
5.1 Optical specification	10
6. Electrical Characteristics	13
6.1 Absolute Maximum Rating	13
6.2 DC Electrical Characteristics	13
6.3 LED Backlight Characteristics	14
7. TFT AC Characteristics	16
7.1 Vertical Timing	16
7.2 Horizontal Timing	17
7.3 Reset timing	18
7. POWER ON/OFF SEQUENCE	19
8. CTP Specification	20
8.1 Electrical Characteristics	20
8.1.1 Absolute Maximum Rating	20
8.1.2 DC Electrical Characteristics (Ta=25°C)	20
8.2 Default I2C Address	21
8.3 AC Electrical Characteristics	21
8.4 I2C Electrical Waveform	22
8.5 Power On/Off Sequence	22
9. LCD Module Out-Going Quality Level	23
9.1 VISUAL & FUNCTION INSPECTION STANDARD	23
9.1.1 Inspection conditions	23
9.1.3 Sampling Plan	24
9.1.4 Criteria (Visual)	24
10. Reliability Test Result	29
11. Cautions and Handling Precautions	30
11.1 Handling and Operating the Module	30
11.2 Storage and Transportation.	30

DEM 10801080A VMH-PW-N(C-TOUCH) Product Specification

1. Basic Specifications

*** Description**

This is a color active matrix TFT (Thin Film Transistor) LCD (liquid crystal display) that uses amorphous silicon TFT as a switching device. This module is composed of a transmissive type TFT-LCD Panel, driver circuit, capacitance touch panel, backlight unit. The resolution of a 5.0" TFT-LCD contains 1080xRGBx1080 Pixels, and can display up to 16.7 Million colors.

1.1 TFT Features

General Information Items	Specification	Unit	Note
	Main Panel		
Display Area (AA)	127.008 x 127.008 (5.0 Inch)	mm	-
Driver Rlement	TFT Active Matrix	-	-
Display Colors	65k / 262k / 16.7 Million	colors	-
Number of Pixels	1080 x RGB x 1080	dots	-
Pixel Arrangement	RGB Vertical Stripe	-	-
Pixel Pitch	0.1176 x 0.1176	mm	-
Viewing Angle	Free	o'clock	-
Controller IC	HX8399 (Himax)	-	-
LCM Interface	4 Lane MIPI	-	-
Display Mode	IPS, Transmissive / Normally Black	-	-
Operating Temperature	-20°C ~ +60°C	°C	-
Storage Temperature	-30°C ~ +75°C	°C	-
Module Bonding Technology	Use optical bonding between LCM and CTP	-	-

1.2 CTP Features

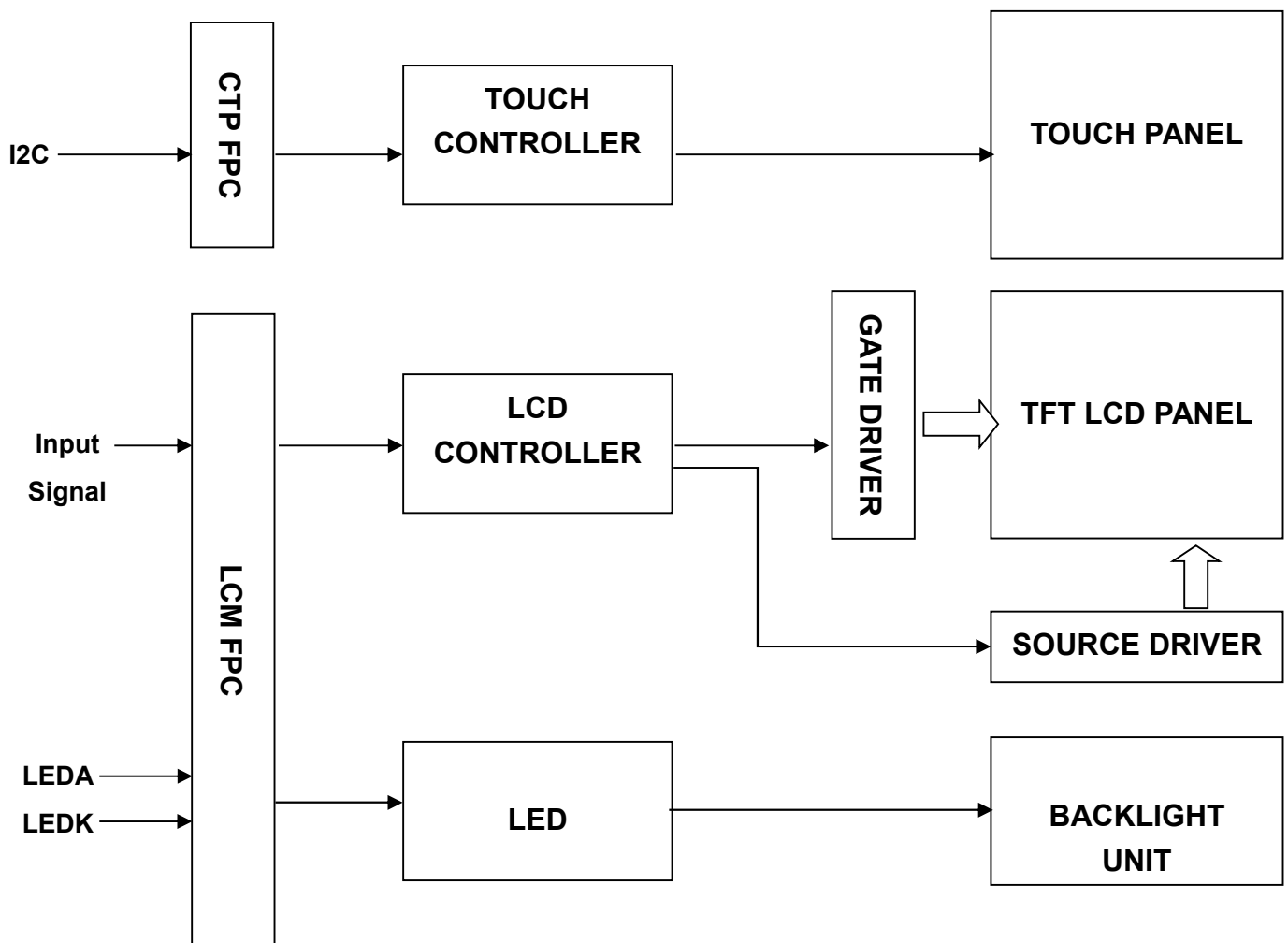
General Information Items	Specification	Unit	Note
	Main Panel		
Resolution (HxV)	1080 x 1080	-	-
Structure	G+G	-	-
Controller IC	ST1727 (Sitronix)	-	-
Interface	I2C	-	-
Slave Address	0x55 (7 Bit)	-	-
Touch Mode	Five Points	-	-
Logic Level	1.8 or 3.3	V	-

DEM 10801080A VMH-PW-N(C-TOUCH) Product Specification

1.3 Mechanical Information

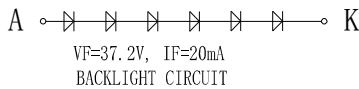
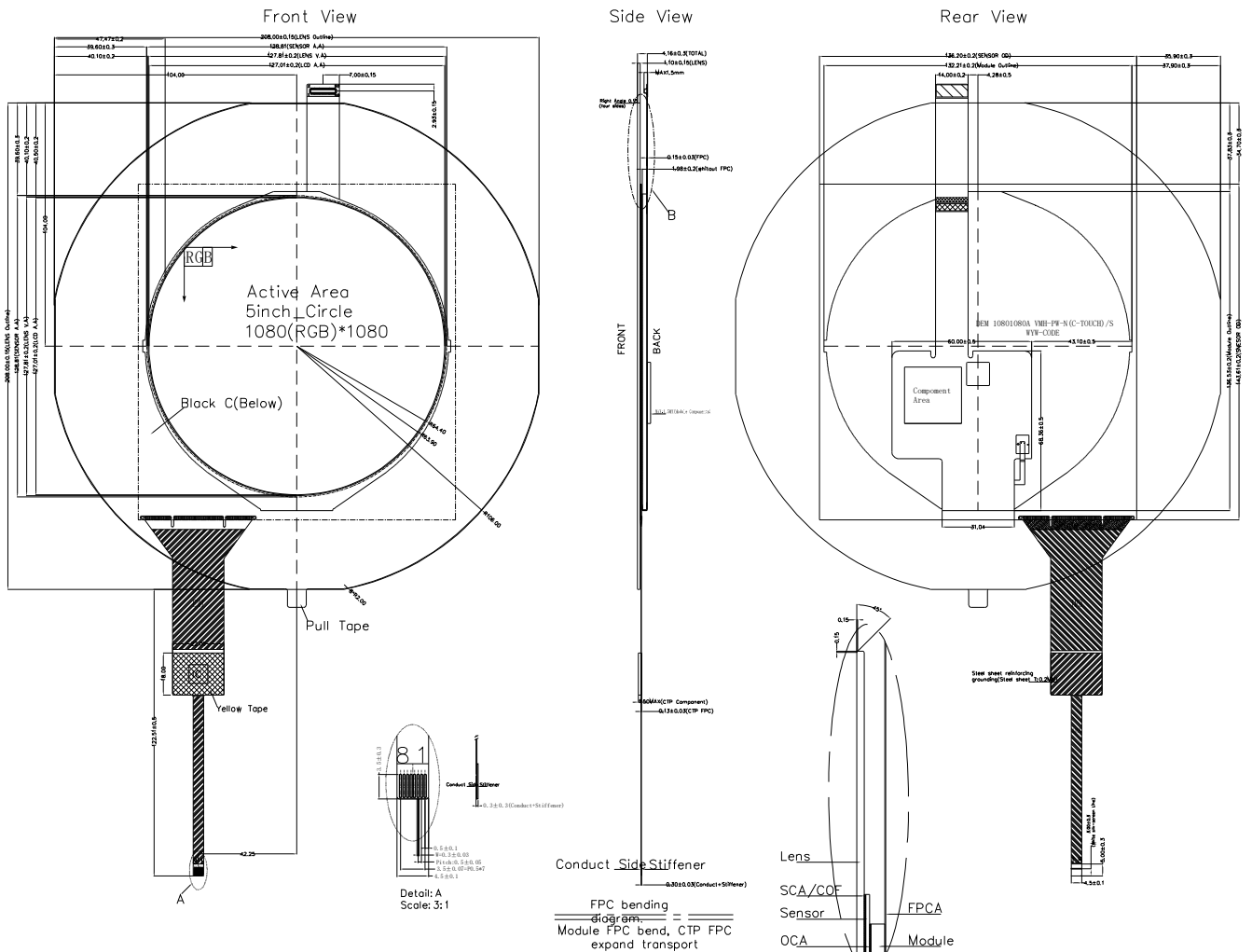
Item		Min.	Typ.	Max.	Unit	Note
Module Size	Horizontal(H)	-	208	-	mm	-
	Vertical(V)	-	208	-	mm	-
	Depth(D)	-	4.16	-	mm	-
Weight		-	TBD	-	g	-

2. Block Diagram



DEM 10801080A VMH-PW-N(C-TOUCH) Product Specification

3. Outline Dimension



- NOTE:
1. DISPLAY TYPE: 5.0", TFT-LCD, 16.7M COLORS
 2. DISPLAY MODE: ADS Normal Black
 3. VIEWING DIRECTION: ALL
 4. LCM DRIVER IC: HX339C (COG)
 5. LCM Interface: MIPI
 6. Touch and LCM Bonding Technology: Optical Bonding
 7. VDDIO: 1.8-3.3V (TYP.), VDD: +5.0V/-5.0V
 8. OPERATING TEMP: -20° C TO 60° C
 9. STORAGE TEMP: -30° C TO 75° C
 10. BACK LIGHT: LED WHITE, 6 LED, 20mA, 37.26V
 11. RoHS COMPLIANT.

FPC Logic

PIN	Logic
1	GND
2	VDDIO
3	VDD
4	SCL
5	SDA
6	INT
7	RST
8	GND

Pin	Signal	Function	Pin	Signal	Function
49	GND	Ground	50	GND	Ground
47	GND	Ground	48	RESET	Disp reset
46	NC	NC	46	TE	Disp tearing effect out
43	NC	NC	44	LEDPWM	Backlight pwm output
41	NC	NC	42	GND	Ground
39	NC	NC	40	NC	NC
37	GND	Ground	38	VDD(+5)	Display +5V analog rail
35	NC	NC	36	VDD(+5)	Display +5V analog rail
33	NC	NC	34	NC	NC
31	GND	Ground	32	VDD(-5)	Display -5V analog rail
29	LAN3_N	Disp MIPI lane 3-	30	VDD(-5)	Display -5V analog rail
27	LAN3_P	Disp MIPI lane 3+	28	NC	NC
25	GND	Ground	26	GND	Ground
23	LAN0_N	Disp MIPI lane 0-	24	IOVCC	Disp digital power
21	LAN0_P	Disp MIPI lane 0+	22	IOVCC	Disp digital power
19	GND	Ground	20	GND	Ground
17	CLK_N	Disp MIPI CLK -	18	ID_PIN1	ID pu to GND(BOE)
15	CLK_P	Disp MIPI CLK +	16	ID_PIN2	ID pu to 1.8V(BOE)
13	GND	Ground	14	GND	Ground
11	LAN1_N	Disp MIPI lane 1-	12	LEDA	LED Anode
9	LAN1_P	Disp MIPI lane 1+	10	LEDA	LED Anode
7	GND	Ground	8	GND	Ground
5	LAN2_N	Disp MIPI lane 2-	6	LEDK	LED cathode
3	LAN2_P	Disp MIPI lane 2+	4	LEDK	LED cathode
1	GND	Ground	2	GND	Ground

4. Input terminal Pin Assignment

4.1 TFT PIN Define

NOTE: Connector Model Number: DF40C-50DP-0.4V (Manufacturer: Hirose)

NO	SYMBOL	DISCRIPTION	I/O
1	GND	Ground.	P
2	GND	Ground.	P
3	LAN2_P	Display MIPI lane2+.	I
4	LEDK	LED cathode.	P
5	LAN2_N	Display MIPI lane2-.	I
6	LEDK	LED cathode.	P
7.	GND	Ground.	P
8	GND	Ground.	P
9	LAN1_P	Display MIPI Blane 1+.	I
10	LEDA	LED Anode.	P
11	LAN1_N	Display MIPI lane 1-.	I
12	LEDA	LED Anode.	P
13	GND	Ground.	P
14	GND	Ground.	P
15	CLK_P	Display MIPICLK+.	I
16	ID_PIN2	ID pu to1.8V(LCM). If not used open.	P
17	CLK_N	Display MIPICLK-.	I
18	ID_PIN1	ID pd to GND(LCM). If not used open.	P
19	GND	Ground.	P
20	GND	Ground.	P
21	LAN0_P	Display MIPI lane 0+.	I
22	IOVCC	Display digital power(1.8V).	P
23	LAN0_N	Display MIPI lane0-.	I
24	IOVCC	Display digital power(1.8V).	P
25	GND	Ground.	P

DEM 10801080A VMH-PW-N(C-TOUCH) Product Specification

26	GND	Ground.	P
27	LAN3_P	Display MIPI lane 3+.	I
28	NC	NC	--
29	LAN3_N	Display MIPI lane 3-.	I
30	VSN/VDD-	Display -5V analog rail.	P
31	GND	Ground.	P
32	VSN/VDD-	Display -5V analog rail.	P
33	NC	NC	--
34	NC	NC	--
35	NC	NC	--
36	VSP/VDD+	Display +5V analog rail.	P
37	GND	Ground.	P
38	VSP/VDD+	Display +5V analog rail .	P
39	NC	NC	--
40	NC	NC	--
41	NC	NC	--
42	GND	Ground.	P
43	NC		--
44	LEDPWM	Backlight pwm output, If not used open.	O
45	NC	NC	--
46	TE	Display tearing effect out, If not used open.	O
47	GND	Ground.	P
48	RESET	Display reset.	I
49	GND	Ground.	P
50	GND	Ground.	P

DEM 10801080A VMH-PW-N(C-TOUCH) Product Specification

4.2 CTP PIN Define

NO	SYMBOL	DISCRIPTION	I/O
1	GND	Ground.	P
2	VDDIO	I/O power supply.	P
3	VDD	Supply voltage.	P
4	SCL	I2C clock input.	I
5	SDA	I2C data input and output.	I
6	INT	External interrupt to the host.	I
7	RST	External Reset, Low is active.	I
8	GND	Ground.	P

5. LCD Optical Characteristics

5.1 Optical Specification

Item	Symbol	Condition	Min.	Typ.	Max.	Unit.	Note	
Contrast Ratio	CR	$\Theta=0$	800	1200	--		(1)(2)	
Response Time	Rising	T_{R+T_F}	--	--	40	msec	(1)(3)	
	Falling							
Color Gamut	S(%)	-	60	65	--	%		
Color Filter Chromaticity	White	W_X	-	0.2422	0.2822	0.3222	-	(1)(4)
		W_Y	-	0.2597	0.2957	0.3357		
	Red	R_X	-	0.5938	0.6338	0.6738		
		R_Y	-	0.3075	0.3475	0.3875		
	Green	G_X	-	0.2641	0.3041	0.3441		
		G_Y	-	0.5093	0.5493	0.5893		
	Blue	B_X	-	0.1064	0.1464	0.1864		
		B_Y	-	0.0126	0.0526	0.0926		
Viewing Angle	Hor.	Θ_L	CR>10	--	80	--	-	(1)(4)
		Θ_R		--	80	--		
	Ver.	Θ_U		--	80	--		
		Θ_D		--	80	--		
Option View Direction	Free							

*The data comes from the LCD specification.

Measuring Condition

Measuring surrounding: dark room

Ambient temperature: 25°C±2°C

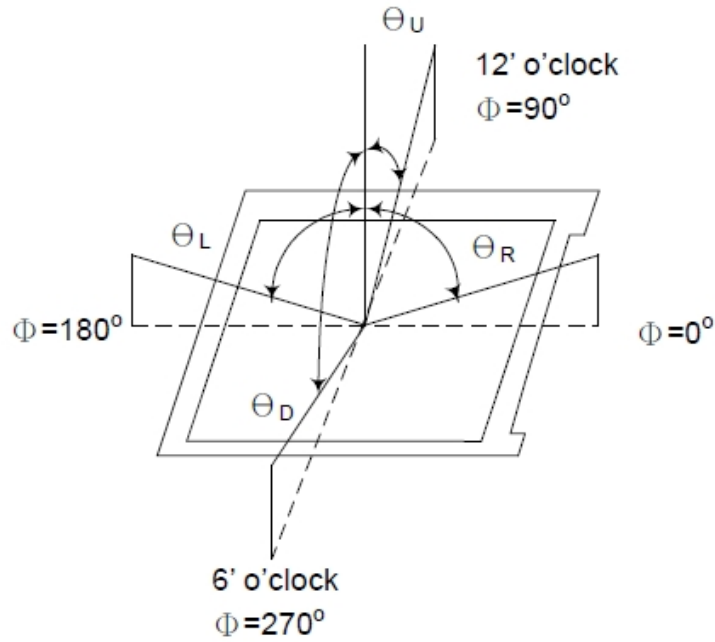
15min. warm-up time.

Measuring Equipment

FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.

DEM 10801080A VMH-PW-N(C-TOUCH) Product Specification

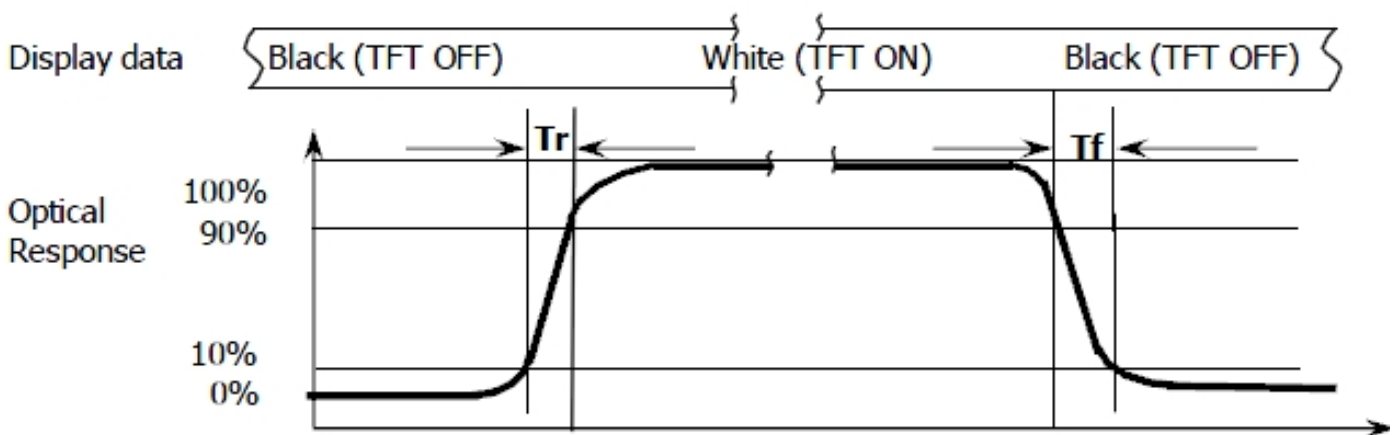
Note (1): Definition of Viewing Angle:



Note (2): Definition of Contrast Ratio(CR): measured at the center point of panel

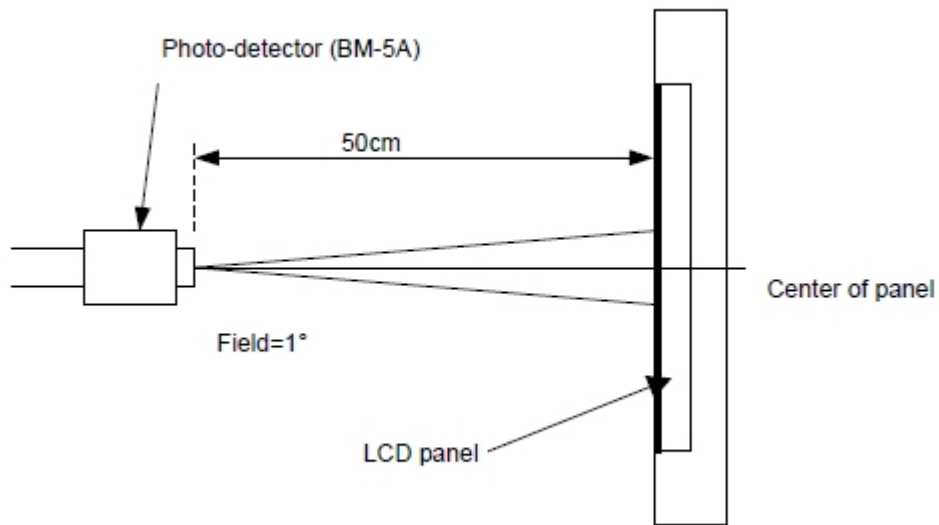
$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

Note (3): Response Time



DEM 10801080A VMH-PW-N(C-TOUCH) Product Specification

Note (4): Definition of optical measurement setup



6. Electrical Characteristics

6.1 Absolute Maximum Rating

Characteristics	Symbol	Min.	Max.	Unit	Note
Logic Power Supply Voltage	IOVCC	-0.3	3.6	V	Note1
Analog Positive Power Supply	VDD+/VSP	-0.3	+6.6	V	-
Analog Negative Power Supply	VDD-/VSN	0	-6.6	V	-
Operatng Temperature	T _{OP}	-20	+60	°C	-
Storage Temperature	T _{ST}	-30	+75	°C	-

NOTE1: 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.

6.2 DC Electrical Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply Input Voltage	IOVCC	1.65	1.8	3.3	V	--
Analog Positive Power Supply	VDD+/VSP	4.8	5.0	6.0	V	--
Analog Negative Power Supply	VDD-/VSP	-6.0	-5.0	-4.8	V	--
Normal mode Current consumption	IOIDD	--	17	34	mA	--
Low Level Input Voltage	VIL	0	--	0.3*IOVCC	V	--
High Level Input Voltage	VIH	0.7*IOVCC	--	IOVCC	V	--

DEM 10801080A VMH-PW-N(C-TOUCH) Product Specification

6.3 LED Backlight Characteristics

The backlight system is edge-lighting type with 12 chips LED

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Current	I_F	15	20	--	mA	--
Forward Voltage	V_F	--	37.2	38.4	V	--
LCM Luminance ($I_F = 20\text{mA}$)	L_V	220	270	--	cd/m ²	Note3
LED Lifetime	Hr	--	30000	--	Hour	Note1,2
Uniformity	Avg	80	--	--	%	Note3

Note1: LED life time (Hr) can be defined as the time in which it continues to operate under the condition: $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$, typical IL value indicated in the above table until the brightness becomes less than 50%.

Note 2: The "LED life time" is defined as the module brightness decrease to 50% original brightness at $T_a = 25^\circ\text{C}$ and $I_L = 20\text{mA}$. The LED lifetime could be decreased if operating I_L is larger than 20mA.

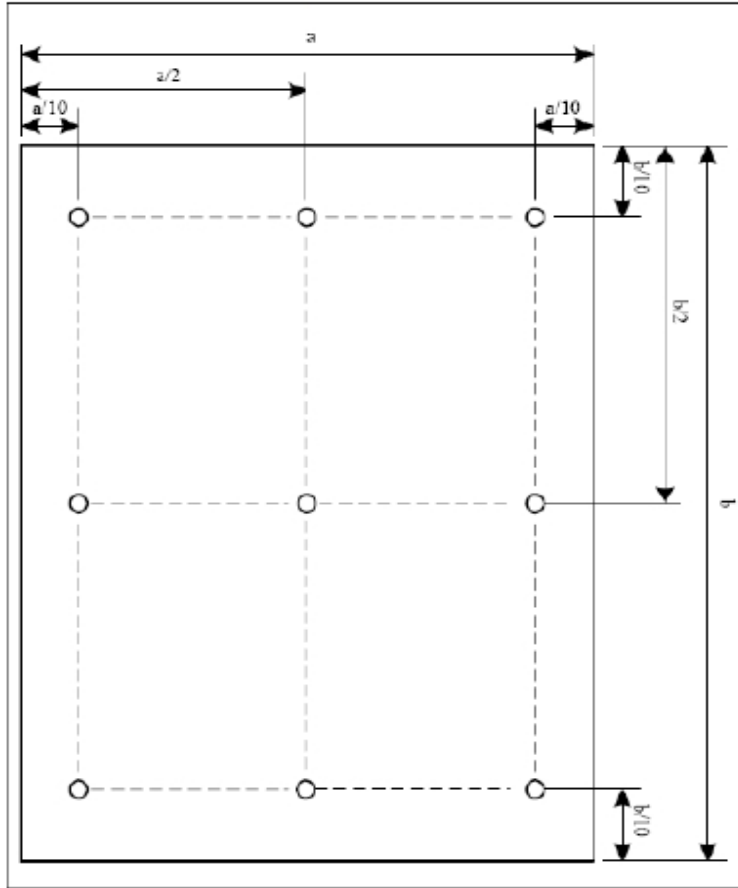
The constant current driving method is suggested.



$V_F = 37.2\text{V}$, $I_F = 20\text{mA}$
BACKLIGHT CIRCUIT

DEM 10801080A VMH-PW-N(C-TOUCH) Product Specification

Note (3) Luminance Uniformity of these 9 points is defined as below:

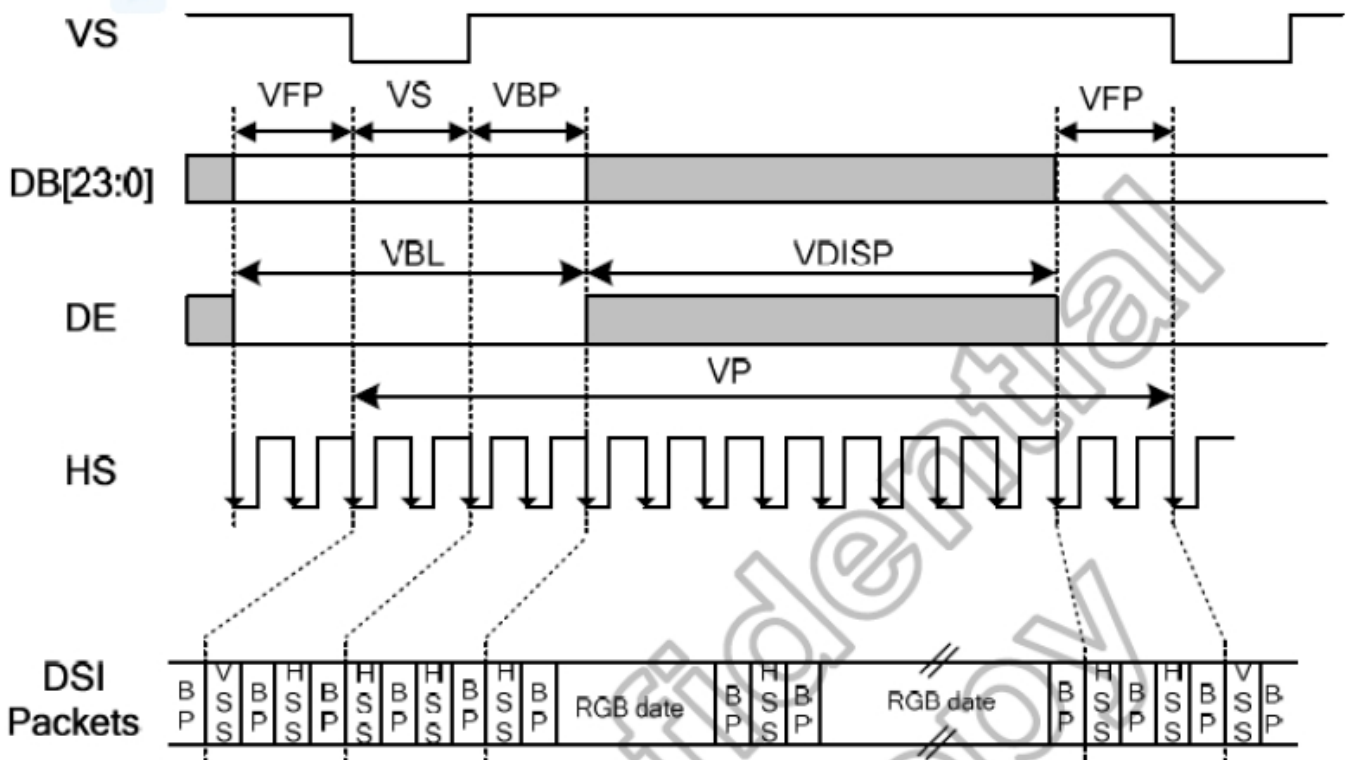


$$\text{Uniformity} = \frac{\text{minimum luminance in 9 points (1-9)}}{\text{maximum luminance in 9 points (1-9)}}$$

$$\text{Luminance} = \frac{\text{Total Luminance of 9 points}}{9}$$

7. TFT AC Characteristics

7.1 Vertical Timing



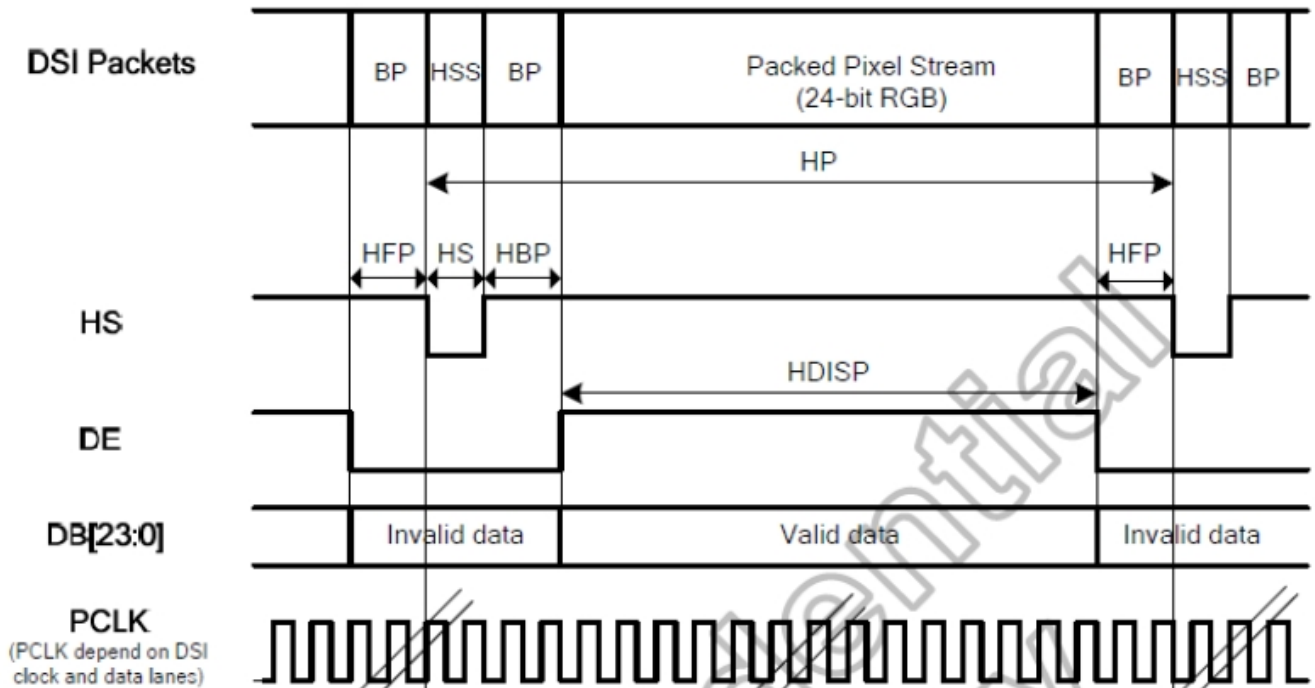
Vertical Resolution=528+8xNL (VSSA=0V, VDD1=1.8V, VDD3=2.8V, T_A=25°C)

Parameter	Symbol	Condition	Spec.			Unit
			Min.	Typ.	Max.	
Vertical cycle	VP	-	534+8xNL	-	-	Line
Vertical low pulse width	VS	-	2	-	Note ⁽¹⁾	Line
Vertical front porch	VFP	-	2	-	-	Line
Vertical back porch	VBP	-	2	-	Note ⁽¹⁾	Line
Vertical data start point	-	VS+VBP	4	-	Note ⁽¹⁾	Line
Vertical blanking period	VBL	VS+VBP+VFP	6	-	-	Line
Vertical active area	-	VDISP	-	528+8xNL	-	Line
Vertical Refresh rate	VRR	-	-	60	-	Hz

Note: (1) The VS and VBP pulse width are related to GSP and GCK timing. The GSP and GCK must be set at corresponding position for LCD normal display.

DEM 10801080A VMH-PW-N(C-TOUCH) Product Specification

7.2 Horizontal Timing



Horizontal Resolution=H_RES(1080/1024/960/900/800/720) (VSSA=0V, VDD1=1.8V, VDD3 = HS_VCC =2.8V, T_A=25°C)

Parameter	Symbol	Condition	Spec.			Unit
			Min.	Typ.	Max.	
HS cycle	HP	-	H_RES+66	-	-	DCK
HS low pulse width	HS	-	25	-	-	DCK
Horizontal back porch	HBP	-	25	-	-	DCK
Horizontal front porch	HFP	-	16	-	-	DCK
Horizontal data start point	-	HS+HBP	50 Note ⁽¹⁾	-	-	DCK
Horizontal blanking period	HBLK	HS+HBP+HFP	66	-	-	DCK
Horizontal active area	HDISP	-	-	H_RES	-	DCK

Note: (1) HS+HBP must larger than 50 PCLK.

7.3 Reset Timing

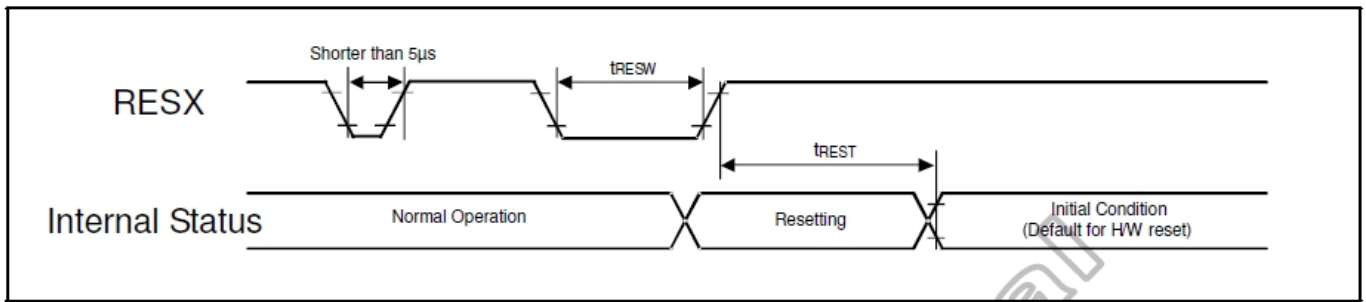


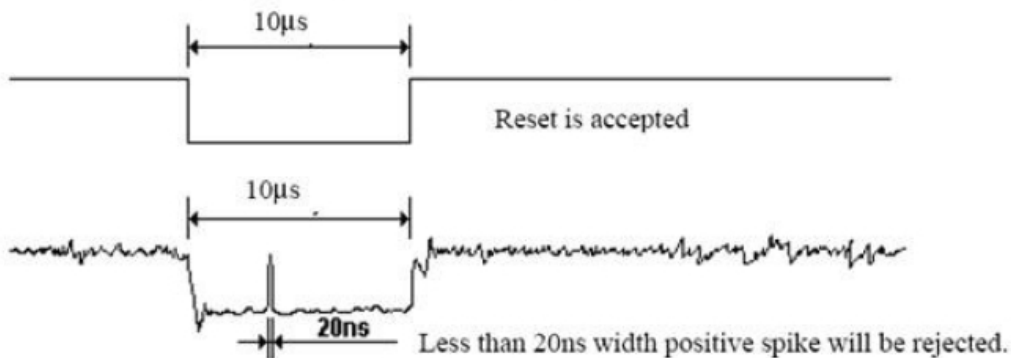
Figure 8.12: Reset input timing

Symbol	Parameter	Related pins	Spec.			Unit	Note
			Min.	Typ.	Max.		
t_{RESW}	Reset low pulse width ⁽¹⁾	RESX	10	-	-	μ s	-
t_{REST}	Reset complete time ⁽²⁾	-	-	-	50	ms	-

Note: (1) Spike due to an electrostatic discharge on RESX line does not cause irregular system reset according to the table below.

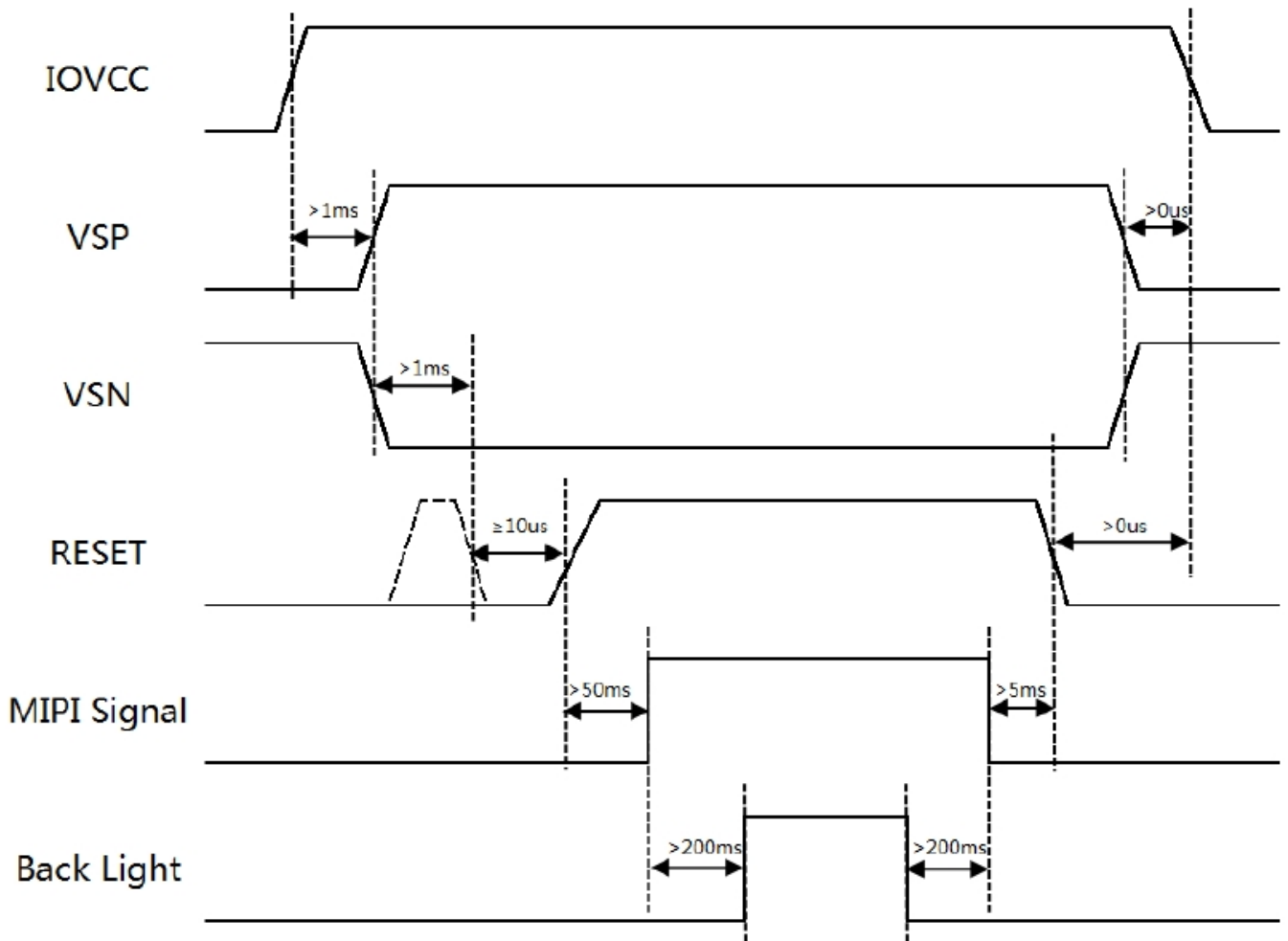
RESX Pulse	Action
Shorter than 5 μ s	Reset Rejected
Longer than 10 μ s	Reset
Between 5 μ s and 10 μ s	Reset Start

- (2) During Reset Complete Time, OTP will be latched to internal register during this period. This loading is done every time when there is H/W reset complete time (t_{REST}) within 5ms after a rising edge of RESX.
- (3) Spike Rejection also applies during a valid reset pulse as shown below:



7. POWER ON/OFF SEQUENCE

Power on/off Sequence



8. CTP Specification**8.1 Electrical Characteristics****8.1.1 Absolute Maximum Rating**

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	VDD	-0.3	6	V	-
I/O Power Supply	VDDIO	-0.3	6	V	-
Operating Temperature	T _{OP}	-20	+60	°C	-
Storage Temperature	T _{ST}	-30	+75	°C	-

8.1.2 DC Electrical Characteristics (Ta=25°C)

(Ambient Temperature: 25°C, VDD=3.3V, VDDIO=1.8V or VDDIO=VDD)

Item	Min.	Typ.	Max.	Unit	Note
Power Supply Voltage/VDD	3.0	3.3	3.6	V	-
I/O Power Supply/VDDIO	1.6	1.8/3.3	3.6	V	-
Operating Current	--	16.1	24	mA	-
Idle Current	--	8.1	12.2	mA	-
Power Down Current	--	--	20	uA	-
Input High Voltage	0.85*VDDIO	--	--	V	-
Input Low Voltage	--	--	0.15*VDDIO	V	-
Input Pull Up Resistor	50	--	60	kOhm	-
Output Driving Current	6	--	--	mA	-
Output Sinking Current	10	--	--	mA	-
Low Voltage Reset	--	--	2.3	V	-

DEM 10801080A VMH-PW-N(C-TOUCH) Product Specification

8.2 Default I2C Address

I2C address is default to **0x55** (7-bits address) for Sitronix Touch IC. If the I2C address is conflict with another I2C device's address on same bus, user can change I2C address by TTK PC Utility.

8.3 AC Electrical Characteristics

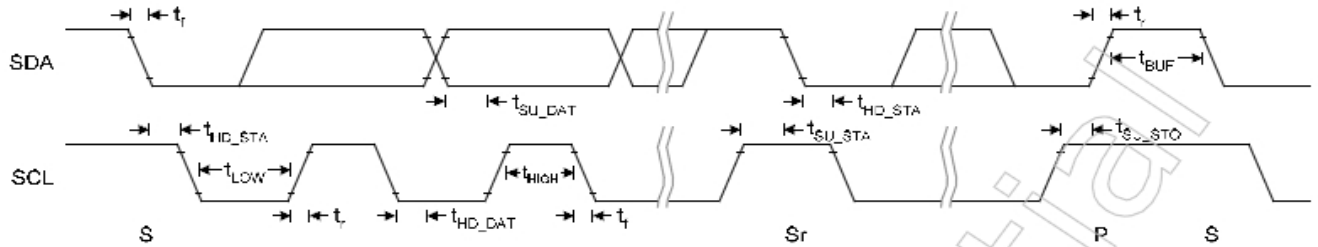


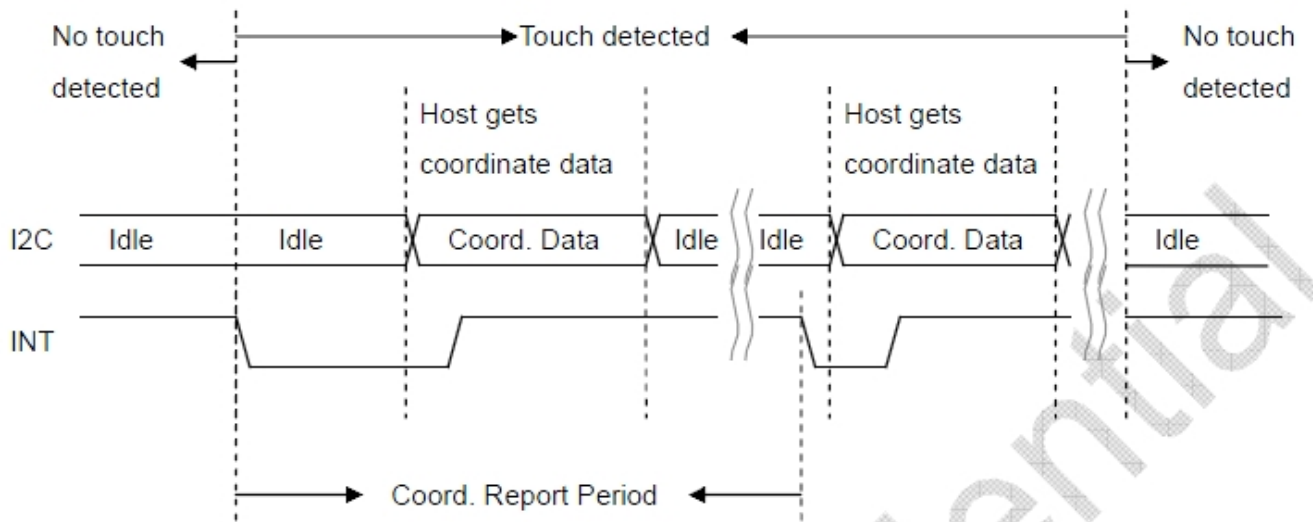
Figure 5-1 I2C Fast Mode Timing

Table 5-3 I2C Fast Mode Timing Characteristic

Conditions: VDD = 3.3V, GND = 0V, T_A = 25°C

Symbol	Parameter	Rating			Unit
		Min.	Typ	Max.	
f _{SCL}	SCL clock frequency	0	-	400	kHz
t _{LOW}	Low period of the SCL clock	1.3	-	-	us
t _{HIGH}	High period of the SCL clock	0.6	-	-	us
t _f	Signal falling time	-	-	300	ns
t _r	Signal rising time	-	-	300	ns
t _{SU_STA}	Set up time for a repeated START condition	0.6	-	-	us
t _{HD_STA}	Hold time (repeated) START condition. After this period, the first clock pulse is generated	0.6	-	-	us
t _{SU_DAT}	Data set up time	100	-	-	ns
t _{HD_DAT}	Data hold time	0	-	0.9	us
t _{SU_STO}	Set up time for STOP condition	0.6	-	-	us
t _{BUF}	Bus free time between a STOP and START condition	1.3	-	-	us
C _b	Capacitive load for each bus line	-	-	400	pF

8.4 I2C Electrical Waveform



8.5 Power On/Off Sequence

RESET pin should be held low before power on and power off. During power on, after both VDD and IOVDD reach normal voltage, RESET pin needs to be held low for 5ms to ensure internal block stable.

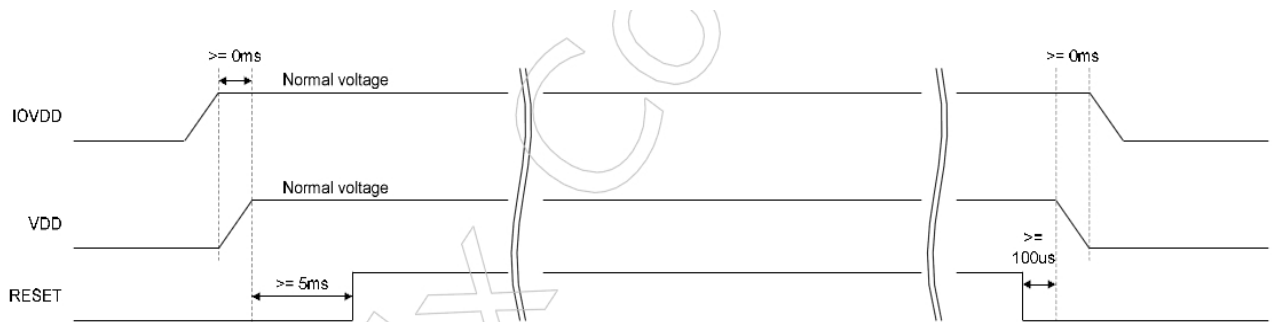


Figure 3-2 Power On/Off Sequence

Master can reset ST1727 through RESET pin. RESET pin is low active and needs hold low for 1us to take effect.

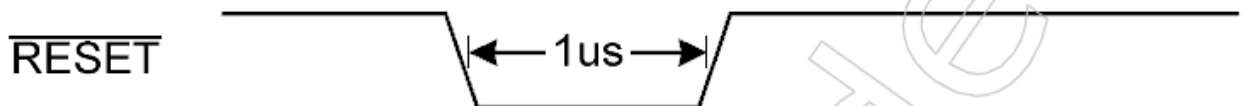


Figure 3-1 $\overline{\text{RESET}}$ Pin Low Pulse Width

9. LCD Module Out-Going Quality Level

9.1 VISUAL & FUNCTION INSPECTION STANDARD

9.1.1 Inspection Conditions

Inspection performed under the following conditions is recommended.

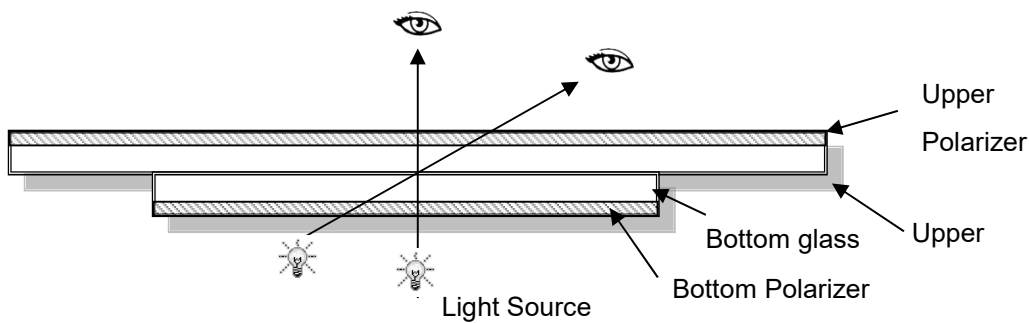
Temperature: 25°C±5°C

Humidity: 65%±10%RH

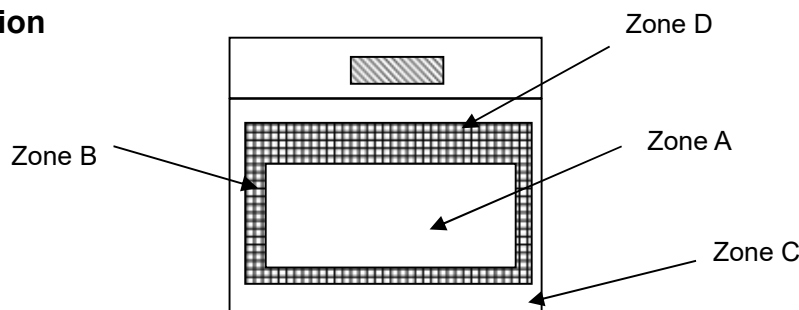
Viewing Angle: Normal Viewing Angle.

Illumination: Single fluorescent lamp (300 to 700Lux)

Viewing distance: 30-50cm



9.1.2 Definition



Zone A : Effective Viewing Area(Character or Digit can be seen)

Zone B : Viewing Area except Zone A

Zone C Cover (Zone A+Zone B) which can not be seen after assembly by customer .)

Zone D : IC Bonding Area

Note: As a general rule ,visual defects in Zone C can be ignored when it doesn't effect product function or appearance after assembly by customer

DEM 10801080A VMH-PW-N(C-TOUCH) Product Specification

9.1.3 Sampling Plan

According to GB/T 2828.1-2012, normal inspection, Class II

AQL:

Major Defect	Minor Defect
0.65	1.5

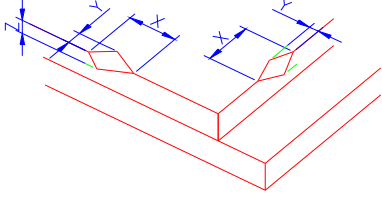
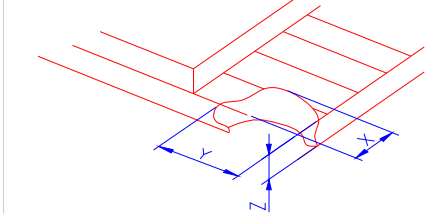
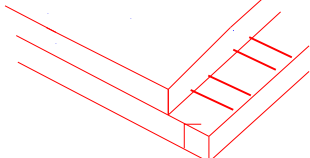
LCD: Liquid Crystal Display, TP: Touch Panel , LCM: Liquid Crystal Module

No	Items to be inspected	Criteria	Classification of defects
1	Functional defects	1) No display, Open or miss line 2) Display abnormally, Short 3) Backlight no lighting, abnormal lighting. 4) TP no function	Major
2	Missing	Missing component	
3	Outline dimension	Overall outline dimension beyond the drawing is not allowed	
4	Color tone	Color unevenness, refer to limited sample	Minor
5	Spot Line defect	Light dot , Dim spot , Polarizer Bubble ; Polarizer accidented spot.	
6	Soldering appearance	Good soldering , Peeling off is not allowed.	
7	LCD/Polarizer/TP	Black/White spot/line, scratch, crack, etc.	

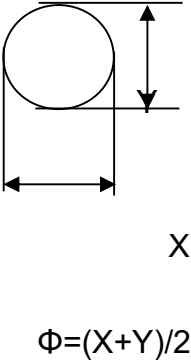
9.1.4 Criteria (Visual)

Number	Items	Criteria(mm)
--------	-------	--------------

DEM 10801080A VMH-PW-N(C-TOUCH) Product Specification

<p>1.0 LCD Crack/Broken</p> <p>NOTE: X: Length Y: Width Z: Height L: Length of ITO, T: Height of LCD</p>	<p>(1) The edge of LCD broken</p>	 <p>A 3D perspective diagram showing a corner of the LCD assembly where the top layer is broken. Blue dimension lines indicate X (length of the broken edge), Y (width of the broken edge), and Z (height of the broken edge).</p> <table border="1" data-bbox="751 448 1452 593"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>≤3.0mm</td> <td><Inner border line of the seal</td> <td>≤T</td> </tr> </tbody> </table>	X	Y	Z	≤3.0mm	<Inner border line of the seal	≤T
X	Y	Z						
≤3.0mm	<Inner border line of the seal	≤T						
	<p>(2) LCD corner broken</p>	 <p>A 3D perspective diagram showing a corner of the LCD assembly where the top layer is broken. Blue dimension lines indicate X (length of the broken edge), Y (width of the broken edge), and Z (height of the broken edge).</p> <table border="1" data-bbox="810 902 1393 999"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>≤3.0mm</td> <td>≤L</td> <td>≤T</td> </tr> </tbody> </table>	X	Y	Z	≤3.0mm	≤L	≤T
X	Y	Z						
≤3.0mm	≤L	≤T						
	<p>(3) LCD crack</p>	 <p>A 3D perspective diagram showing a crack in the LCD assembly.</p> <p>Crack Not allowed</p>						

DEM 10801080A VMH-PW-N(C-TOUCH) Product Specification

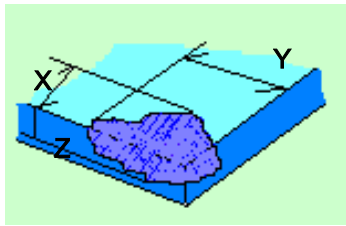
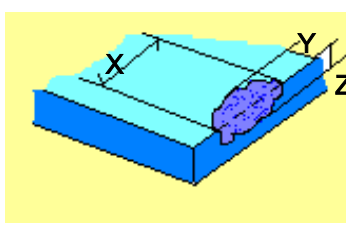
2.0	Spot defect	 <p style="text-align: center;">$\Phi = (X+Y)/2$</p>	① light dot (LCD/TP/Polarizer black/white spot , light dot, pinhole, dent, stain)			
	Zone		Acceptable Qty			
	Size (mm)		A	B	C	
	$\Phi \leq 0.10$		Ignore			Ignore
	$0.10 < \Phi \leq 0.25$		4(distance $\geq 10\text{mm}$)			
$0.25 < \Phi \leq 0.35$	3					
$\Phi > 0.4$	0					
		② Dim spot (LCD/TP/Polarizer dim dot, light leakage, dark spot)				
Zone		Acceptable Qty				
Size (mm)	A	B	C			
$\Phi \leq 0.1$	Ignore			Ignore		
$0.10 < \Phi \leq 0.25$	4(distance $\geq 10\text{mm}$)					
$0.25 < \Phi \leq 0.35$	3					
$\Phi > 0.4$	0					
		③ Polarizer accidented spot				
Zone		Acceptable Qty				
Size (mm)	A	B	C			
$\Phi \leq 0.2$	Ignore			Ignore		
$0.3 < \Phi \leq 0.5$	3(distance $\geq 10\text{mm}$)					
$\Phi > 0.5$	0					
		④ Pixel bad points (light dot, Dim dot, color dot)				
Zone		Acceptable Qty				
Size (mm)	A	B	C			
$\Phi \leq 0.15$	Ignore			Ignore		
$0.2 < \Phi \leq 0.3$	2(distance $\geq 10\text{mm}$)					
$\Phi > 0.4$	0					
		⑤ Polarizer Bubble				
Zone		Acceptable Qty				
Size (mm)	A	B	C			
$\Phi \leq 0.2$	Ignore			Ignore		
$0.3 < \Phi \leq 0.4$	4(distance $\geq 10\text{mm}$)					
$0.4 < \Phi \leq 0.5$	3					
$\Phi > 0.5$	0					

DEM 10801080A VMH-PW-N(C-TOUCH) Product Specification

3.0	Line defect (LCD/TP /Polarizer backlight black/white line, scratch, stain)	Width(mm)	Length(m m)	Acceptable Qty		
				A	B	C
		$\Phi \leq 0.05$	Ignore	Ignore		
		$0.05 < W \leq 0.06$	$L \leq 4.0$	$N \leq 3$		
		$0.07 < W \leq 0.08$	$L \leq 3.0$	$N \leq 2$		
		$0.08 < W$	Define as spot defect			
4.0	Electronic Com ponents SMT	Not allow missing parts, solderless connection, cold solder joint, mis match, The positive and negative polarity opposite				
5.0	Display color& Brightness	<p>1. Color: Measuring the color coordinates, The measurement standar d according to the datasheet or samples.</p> <p>2. Brightness: Measuring the brightness of White screen, The measu rement standard according to the datasheet or Samples.</p>				
6.0	LCD Mura	By 5% ND filter invisible.				

7.0	CTP Related	CTP Cover sensor accidented black/white spot	Size Φ (mm)	Acceptable Qty			
				A	B	C	
			$\Phi \leq 0.1$	Ignore			
			$0.15 < \Phi \leq 0.25$	4 (distance $\geq 10\text{mm}$)			
			$0.25 < \Phi \leq 0.35$	3			
		$\Phi > 0.4$	0				
		CTP Cover scratch	Width(mm)	Ignore(mm)	Acceptable Qty		
					A	B	C
			$\Phi \leq 0.05$	Ignore	Ignore		
			$0.05 < W \leq 0.06$	$L \leq 4.0$	$N \leq 3$		
$0.07 < W \leq 0.08$	$L \leq 3.0$		$N \leq 2$				
	$0.08 < W$	Define as spot defect					

DEM 10801080A VMH-PW-N(C-TOUCH) Product Specification

		CTP Cover Pinhole/ Lack of ink	<table border="1"> <thead> <tr> <th>Zone Size (mm)</th> <th>Acceptable Qty</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.2$</td> <td>C</td> </tr> <tr> <td>$0.2 < \Phi \leq 0.3$</td> <td>Ignore</td> </tr> <tr> <td>$0.3 < \Phi \leq 0.4$</td> <td>4 (distance ≥ 10mm)</td> </tr> <tr> <td>$\Phi > 0.4$</td> <td>3</td> </tr> <tr> <td></td> <td>0</td> </tr> </tbody> </table>		Zone Size (mm)	Acceptable Qty	$\Phi \leq 0.2$	C	$0.2 < \Phi \leq 0.3$	Ignore	$0.3 < \Phi \leq 0.4$	4 (distance ≥ 10 mm)	$\Phi > 0.4$	3		0			
			Zone Size (mm)	Acceptable Qty															
			$\Phi \leq 0.2$	C															
			$0.2 < \Phi \leq 0.3$	Ignore															
			$0.3 < \Phi \leq 0.4$	4 (distance ≥ 10 mm)															
$\Phi > 0.4$	3																		
	0																		
CTP Bonding bubble/ accidented spot	<table border="1"> <thead> <tr> <th rowspan="2">Size Φ(mm)</th> <th colspan="2">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.1$</td> <td colspan="2">Ignore</td> </tr> <tr> <td>$0.15 < \Phi \leq 0.2$</td> <td colspan="2">2 (distance ≥ 10mm)</td> </tr> <tr> <td>$0.2 < \Phi \leq 0.25$</td> <td colspan="2">2</td> </tr> <tr> <td>$\Phi > 0.25$</td> <td colspan="2">0</td> </tr> </tbody> </table>		Size Φ (mm)	Acceptable Qty		A	B	$\Phi \leq 0.1$	Ignore		$0.15 < \Phi \leq 0.2$	2 (distance ≥ 10 mm)		$0.2 < \Phi \leq 0.25$	2		$\Phi > 0.25$	0	
	Size Φ (mm)	Acceptable Qty																	
		A	B																
	$\Phi \leq 0.1$	Ignore																	
	$0.15 < \Phi \leq 0.2$	2 (distance ≥ 10 mm)																	
$0.2 < \Phi \leq 0.25$	2																		
$\Phi > 0.25$	0																		
Assembly deflection	beyond the edge of backlight ≤ 0.2 mm																		
TP cover broken	<table border="1"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>$X \leq 0.5$mm</td> <td>$Y \leq 0.5$mm</td> <td>$Z < \text{cover thickness}$ s</td> </tr> </tbody> </table>	X	Y	Z	$X \leq 0.5$ mm	$Y \leq 0.5$ mm	$Z < \text{cover thickness}$ s												
X	Y	Z																	
$X \leq 0.5$ mm	$Y \leq 0.5$ mm	$Z < \text{cover thickness}$ s																	
X : length Y : width Z : height	* Circuitry broken is not allowed.																		
TP cover broken	<table border="1"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>$X \leq 0.3$mm</td> <td>$Y \leq 0.3$mm</td> <td>$Z < \text{LCD thickness}$</td> </tr> </tbody> </table>	X	Y	Z	$X \leq 0.3$ mm	$Y \leq 0.3$ mm	$Z < \text{LCD thickness}$												
X	Y	Z																	
$X \leq 0.3$ mm	$Y \leq 0.3$ mm	$Z < \text{LCD thickness}$																	
X : length Y : width Z : height	* Circuitry broken is not allowed.																		

Criteria (functional items)

Number	Items	Criteria (mm)
1	No display	Not allowed
2	Missing segment	Not allowed
3	Short	Not allowed
4	Backlight no lighting	Not allowed
5	TP no function	Not allowed

10. Reliability Test Result

Item	Condition	Inspection after test
High Temperature Operating	60°C,96h	Inspection after 2~4hours storage at room temperature, the sample shall be free from defects: 1. Air bubble in the LCD; 2. Non-display; 3. Missing segments/line; 4. Glass crack; 5. Current IDD is twice higher than initial value.
Low Temperature Operating	-20°C, 96h	
High Temperature Storage	75°C, 96h	
Low Temperature Storage	-30°C, 96h	
High Temperature & High Humidity Operating	+60°C, 90% RH ,96h	
Thermal Shock (Non-operation)	-30°C, 30 min ↔ 75°C, 30 min, Change time: 5min 20CYC.	
ESD test	C=150pF, R=330, 5points/panel Air:±8kV, 5times; Contact:±6kV, 5 times; (Environment: 15°C~35°C, 30%~60%).	
Vibration (Non-operation)	Frequency range: 10~55Hz, Stroke:1.5mm Sweep: 10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z. (6 hours for total) (Package	
Box Drop Test	1 Corner 3 Edges 6 faces,80cm(MEDIUM BOX)	

Remark:

1. The test samples should be applied to only one test item.
2. Sample size for each test item is 5~10pcs.
3. For Damp Proof Test, Pure water (Resistance > 10MΩ) should be used.
4. In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.
5. Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.

11. Cautions and Handling Precautions

11.1 Handling and Operating the Module

- (1) When the module is assembled, it should be attached to the system firmly.
Do not warp or twist the module during assembly work.
- (2) Protect the module from physical shock or any force. In addition to damage, this may cause improper operation or damage to the module and back-light unit.
- (3) Note that polarizer is very fragile and could be easily damaged. Do not press or scratch the surface.
- (4) Do not allow drops of water or chemicals to remain on the display surface.
If you have the droplets for a long time, staining and discoloration may occur.
- (5) If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.
- (6) The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane.
Do not use ketene type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.
- (7) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs, or clothes, it must be washed away thoroughly with soap.
- (8) Protect the module from static; it may cause damage to the CMOS ICs.
- (9) Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.
- (10) Do not disassemble the module.
- (11) Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.
- (12) Pins of I/F connector shall not be touched directly with bare hands.
- (13) Do not connect, disconnect the module in the "Power ON" condition.

11.2 Storage and Transportation.

- (1) Do not leave the panel in high temperature, and high humidity for a long time.
It is highly recommended to store the module with temperature from 0 to 35 °C and relative humidity of less than 70%
- (2) Do not store the TFT-LCD module in direct sunlight.
- (3) The module shall be stored in a dark place. When storing the modules for a long time, be sure to adopt effective measures for protecting the modules from strong ultraviolet radiation, sunlight, or fluorescent light.
- (4) It is recommended that the modules should be stored under a condition where no condensation is allowed.
Formation of dewdrops may cause an abnormal operation or a failure of the module.
In particular, the greatest possible care should be taken to prevent any module from being operated where condensation has occurred inside.
- (5) This panel has its circuitry FPC on the bottom side and should be handled carefully in order not to be stressed.