



DM-TFTR50-413

5.0" 1080 × 1080 ROUND SCREEN
DISPLAY PANEL - MIPI

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1 Revision History

Date	Changes
2020-03-05	First release

2 Main Features

Item	Specification	Unit
Diagonal Size	5.0	inch
Display element	TFT active matrix	-
TFT Pixel arrangement	RGB vertical stripe	-
Display Colors	16.7M	Colors
Resolution	1080 x 1080	pixel
Controller IC	HX8399	-
Interface	1/2/3/4-LANE MIPI	-
Active Area	127.008 x 127.008	mm
Panel Dimension	136.531 x 132.208 x 1.98	mm
Pixel Pitch	0.1176 x 0.1176	mm
Weight	70	g

3 Pin Description

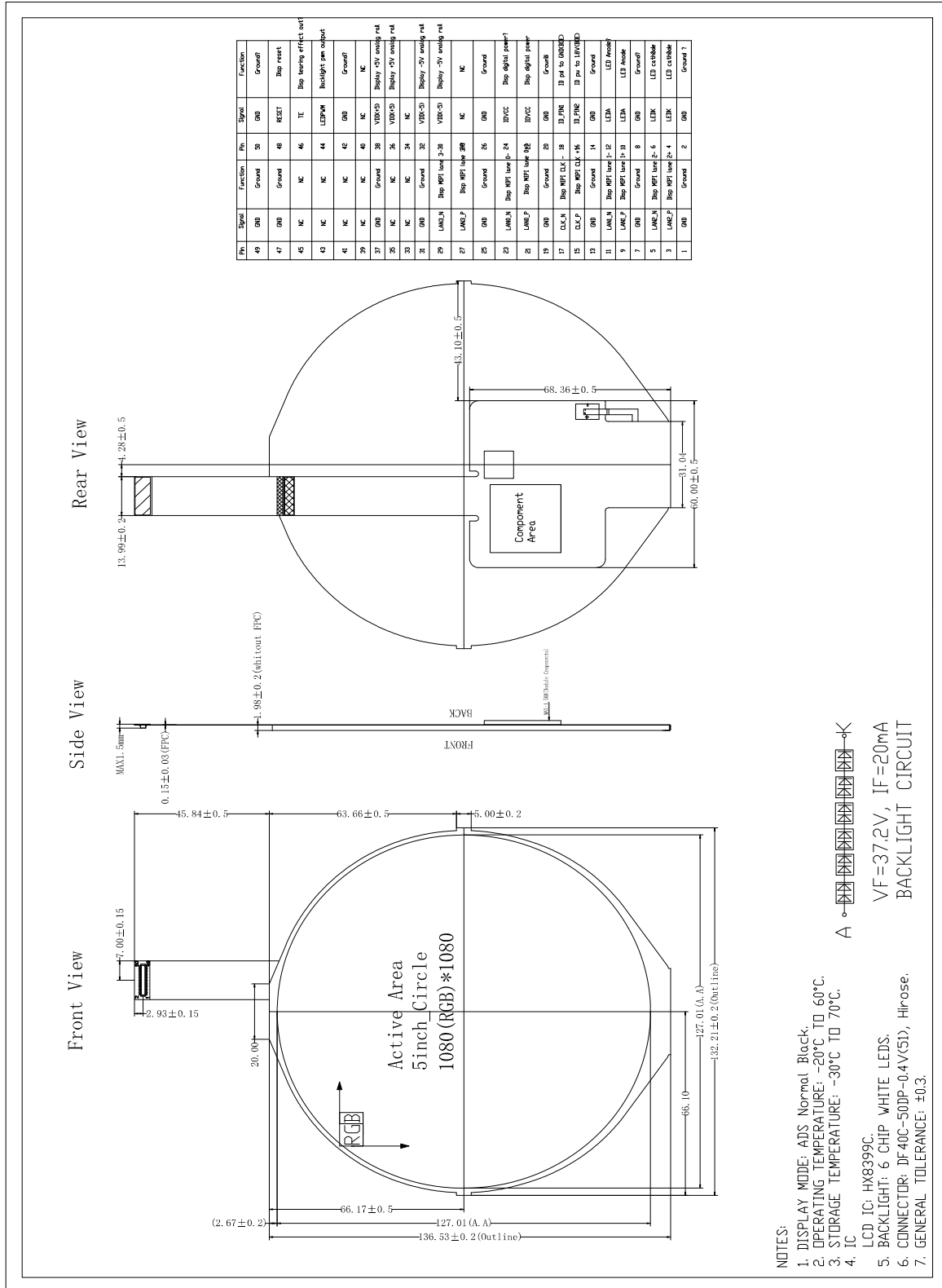
3.1 Panel Pin Description

Pin No.	Symbol	Function Description
1	GND	Ground.
2	GND	Ground.
3	LAN2_P	Disp MIPI lane2+.
4	LEDK	LED cathode.
5	LAN2_N	Disp MIPI lane2-.
6	LEDK	LED cathode.
7.	GND	Ground.
8	GND	Ground.
9	LAN1_P	Disp MIPI Blane 1+.
10	LEDA	LED Anode.
11	LAN1_N	Disp MIPI lane 1-.
12	LEDA	LED Anode.
13	GND	Ground.
14	GND	Ground.
15	CLK_P	Disp MIPICLK+.
16	ID_PIN2	ID pu to 1.8V(LCM). If not used open.
17	CLK_N	Disp MIPICLK-.
18	ID_PIN1	ID pd to GND(LCM). If not used open.
19	GND	Ground.
20	GND	Ground.
21	LAN0_P	Disp MIPI lane 0+.
22	IOVCC	Disp digital power(1.8V).
23	LAN0_N	Disp MIPI lane0-.
24	IOVCC	Disp digital power(1.8V).
25	GND	Ground.
26	GND	Ground.
27	LAN3_P	Disp MIPI lane 3+.
28	NC	NC
29	LAN3_N	Disp MIPI lane 3-.
30	VSN/VDD-	Display -5V analog rail.
31	GND	Ground.
32	VSN/VDD-	Display -5V analog rail.
33	NC	NC
34	NC	NC
35	NC	NC
36	VSP/VDD+	Disp +5V analog rail.
37	GND	Ground.
38	VSP/VDD+	Disp +5V analog rail .
39	NC	NC
40	NC	NC
41	NC	NC
42	GND	Ground.
43	NC	NC
44	LEDPWM	Backlight pwm output, If not used open.
45	NC	NC

46	TE	Disp tearing effect out, If not used open.
47	GND	Ground.
48	RESET	Disp reset.
49	GND	Ground.
50	GND	Ground.

4 Mechanical Drawing

4.1 Panel Mechanical Drawing



5 Optics & Electrical Characteristics

5.1 Optical Characteristics

Item	Symbol	Min	Typ	Max	Unit	Remark
View Angles	∅L	70	80	-	°	
	∅R	70	80	-	°	
	∅U	70	80	-	°	
	∅D	70	80	-	°	
C.I.E. (White)	(x)	0.276	0.306	0.336	-	CA310 (Module)
	(y)	0.288	0.318	0.348		
C.I.E(Red)	(x)	0.656	0.686	0.716	-	
	(y)	0.274	0.304	0.334		
C.I.E(Green)	(x)	0.234	0.264	0.294	-	
	(y)	0.559	0.629	0.177		
C.I.E(Blue)	(x)	0.117	0.147	0.177	-	
	(y)	0.017	0.047	0.077		
Response time	Rising	T _R +T _F	-	-	40	msec
	Faling					
Dark room Contrast Ratio	CR	800	1300	-	-	
Color Gamut	S(%)	65	70	--	%	
Option View Direction	ALL					

Note: The data comes from the LCD specification

Measuring Condition

Measuring surrounding : dark room Ambient temperature : 25±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.

5.2 Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Remark
Logic Supply Voltage for panel	IOVCC	-0.3	3.6	V	Note
Analog Positive Power Supply	V _{DD+} /V _{SP}	-0.3	+6.6	V	
Analog Negative Power Supply	V _{DD-} /V _{SN}	0	-6.6	V	
Operating Temperature	T _{OP}	-20	+60	°C	-
Storage Temperature	T _{STG}	-30	+75	°C	-

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.

5.3 DC Characteristics

Item	Symbol	Min	Typ.	Max	Unit
Logic Supply Voltage for panel	IOVCC	1.65	1.8	3.3	V
Analog Positive Power Supply	V _{DD+} /V _{SP}	4.8	5.0	6.0	V
Analog Negative Power Supply	V _{DD-} /V _{SN}	-6.0	-5.0	-4.8	V
Normal mode Current	IOIDD	-	17	34	mA
Low Level Input Voltage	V _{IL}	0	-	0.3 x IOVCC	V
High Level Input Voltage	V _{IH}	0.7 x IOVCC	-	IOVCC	V

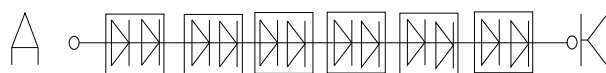
5.4 LED Backlight Characteristics

The back-light system is edge-lighting type with 4chips White LED

Parameter	Symbol	Min	Typ	Max	Unit	Remark
Forward voltage	V _F	-	37.2	38.4	V	
Forward current	I _F	15	20	-	mA	
LCM Luminance	L _V	300	350	-	cd/m ²	Note3
LED life time	Hr	-	30000	-	Hour	Note1,2
Uniformity	AVg	70	-	-	%	Note3

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

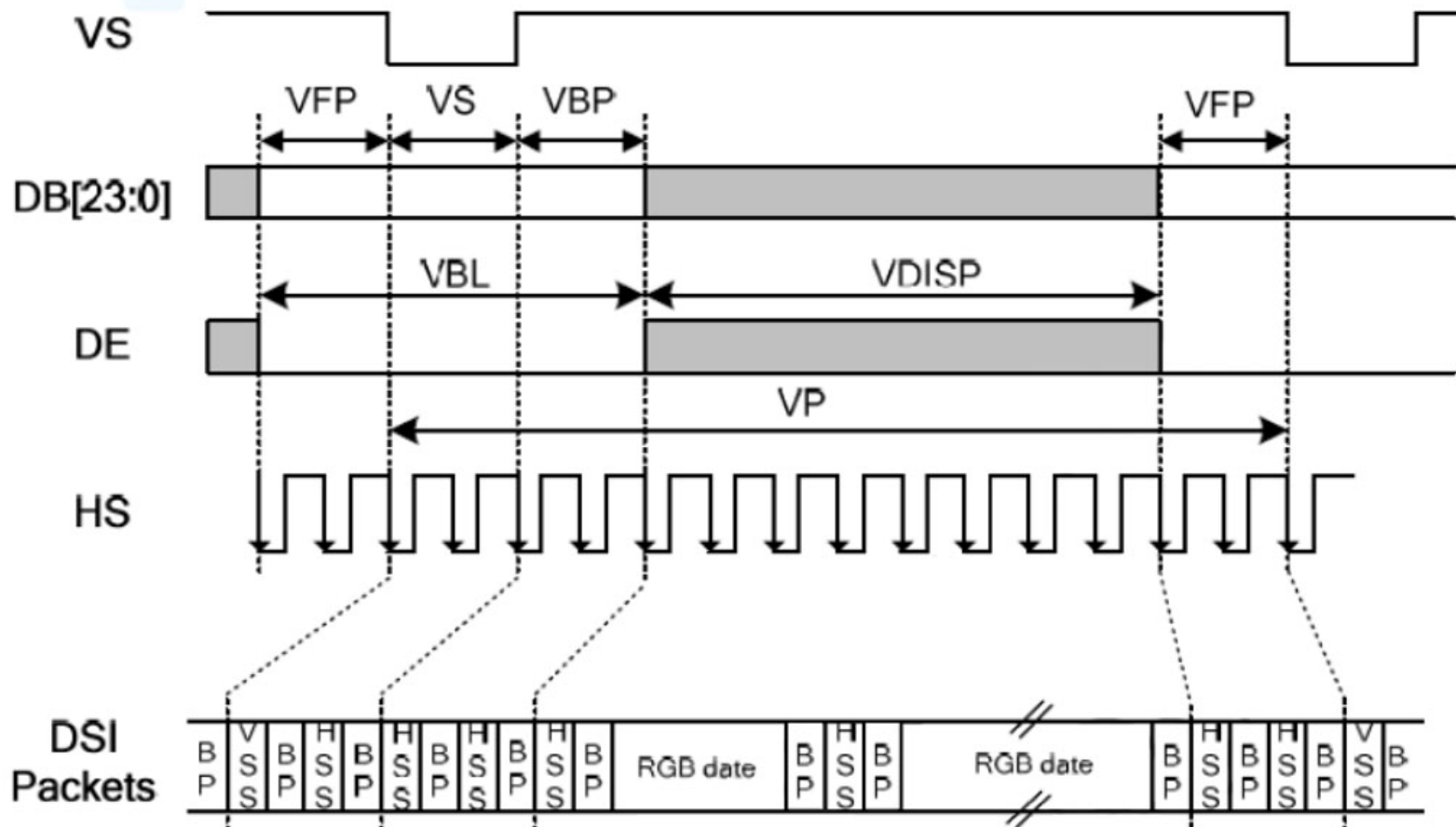
Note2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at T_a=25°C and I_L=20mA. The LED lifetime could be decreased if operating I_L is larger than 80mA. The constant current driving method is suggested.



BACKLIGHT CIRCUIT

6 Signal Timing Specification

6.1 Vertical Timing

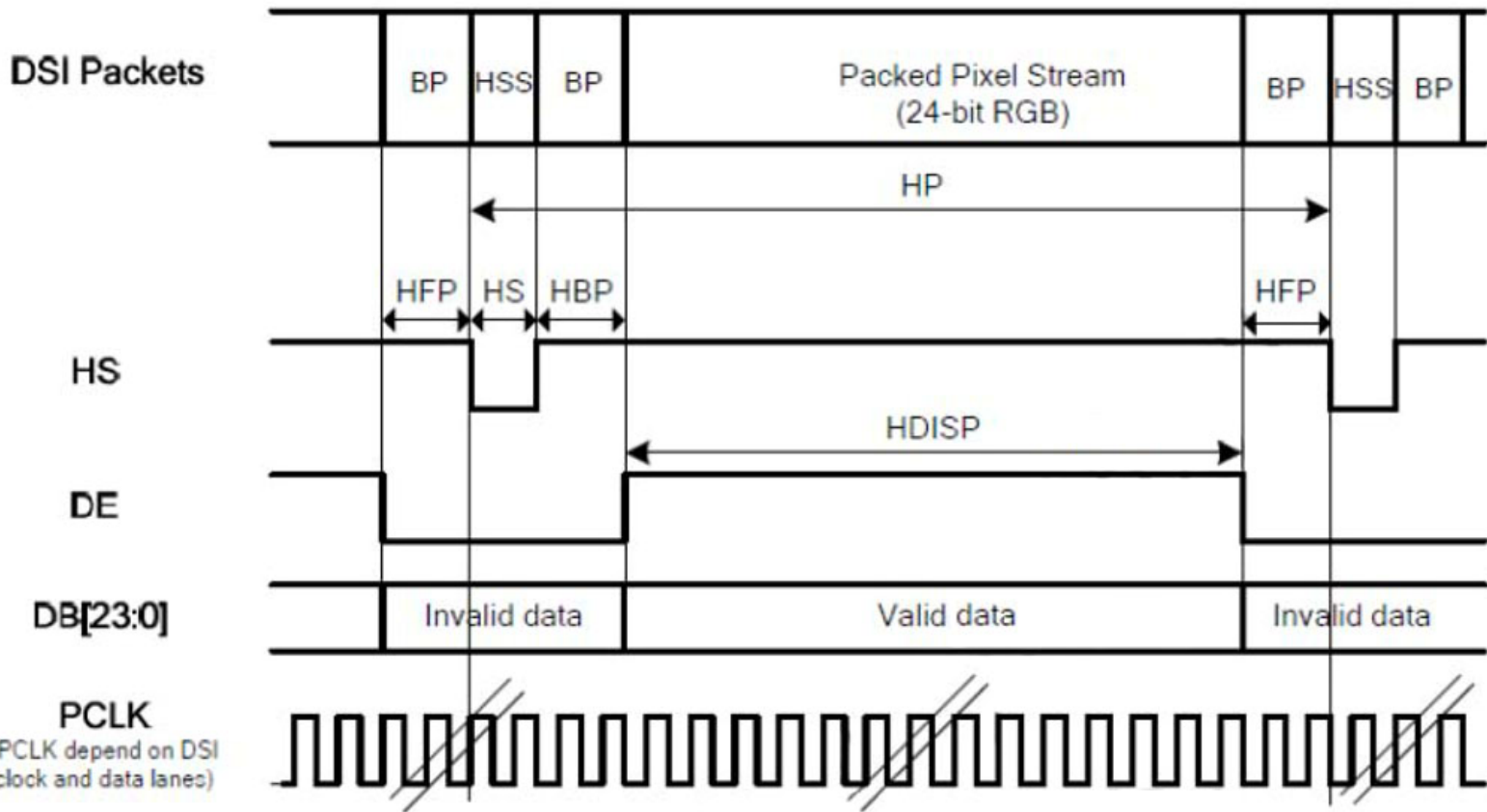


Vertical Resolution=528+8xNL(VSSA=0V, VDD1=1.8V, VDD3=2.8V, T_A=25°C)

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

Note: The VS and VBP pulse width are related to GSP and GCK timing. The GSP and GCK must be set at corresponding position foLCD normal display.

6.2 Horizontal Timing

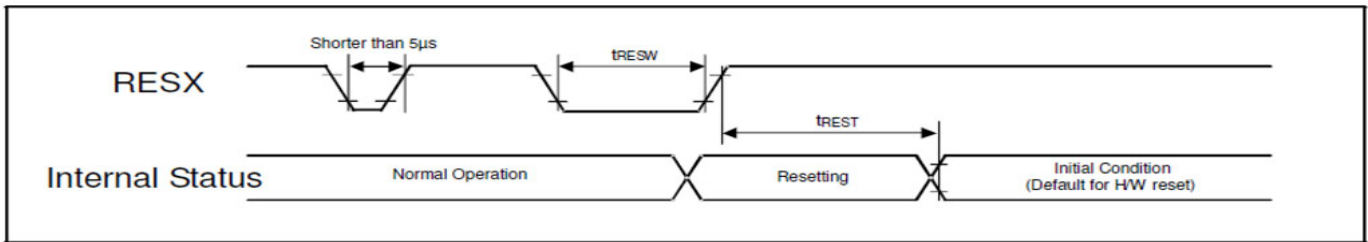


Horizontal Resolution=H_RES(1080/1024/960/900/800/720)(VSSA=0V, VDD1=1.8V, VDD3=HS_VCC=2.8V, TA=25°C)

Parameter	Symbol	Min	Type	Max	Unit	Remark
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	-	50 Note	-	-	DCK	HS+HBP
Horizontal blanking period	HBLK	66	-	-	DCK	HS+HBP+HFP
Horizontal active area	HDISP	-	H RES	-	DCK	

6.3 RESET Timing

Reset input timing



Timing Parameters

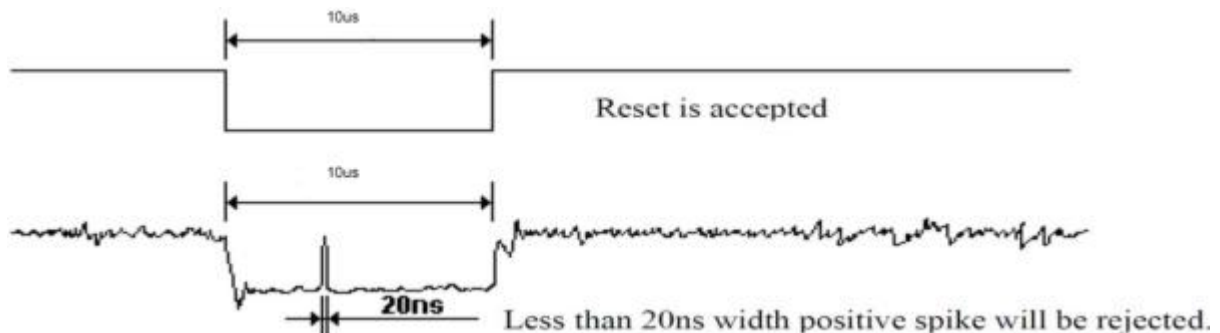
Symbol	Parameter	Related Pins	Min	Typ	Max	Unit
t_{RESW}	*1) Reset low pulse width	RESX	10	-	-	μs
t_{REST}	*2) Reset complete time	-	-	-	50	ms

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 $5\mu s$	Reset Rejected
Longer than $10\mu s$	Reset
Between $5\mu s$ and $10\mu s$	Reset Starts

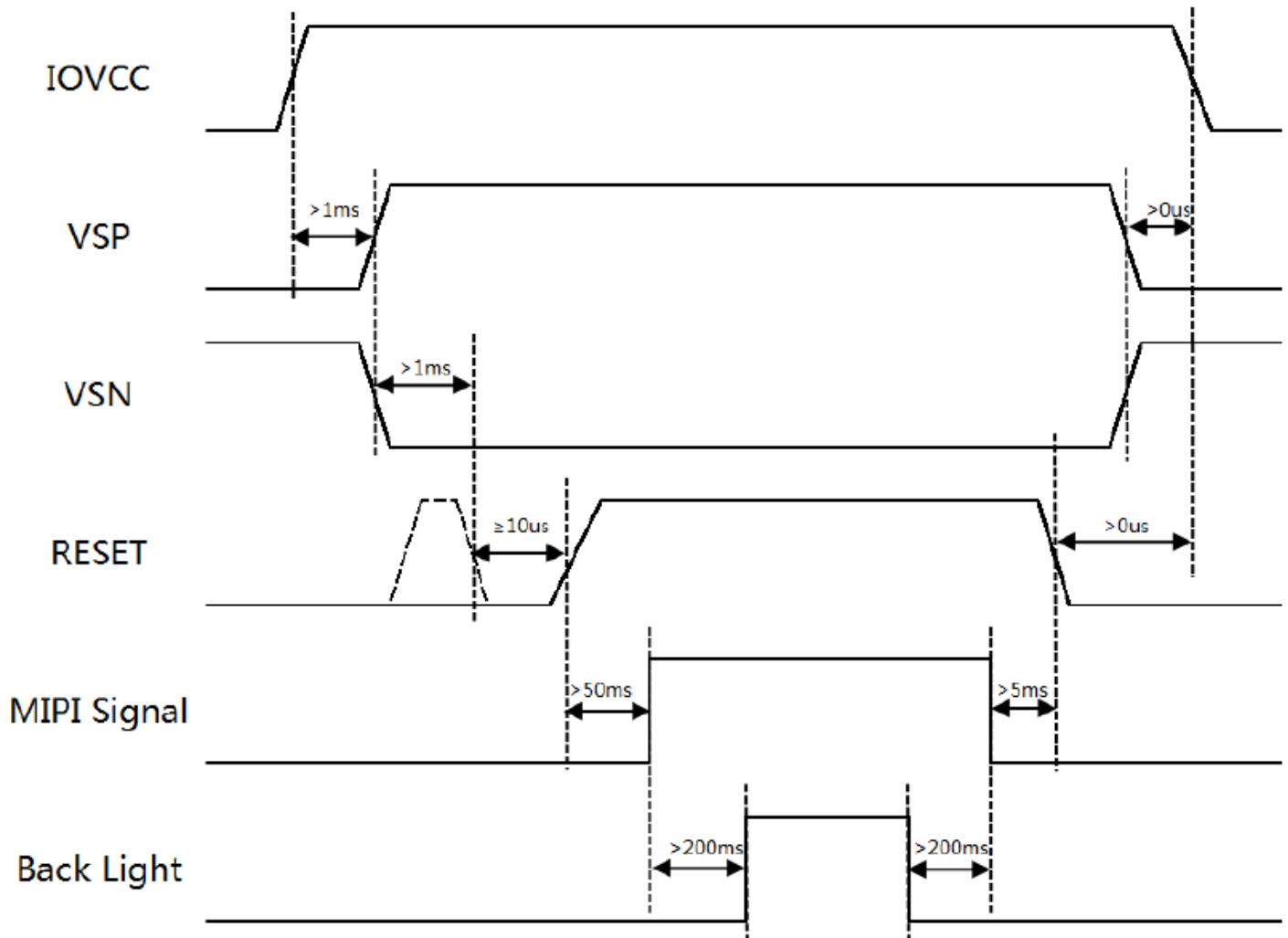
Note 2: During Reset Complete Time, OTP will be latched to internal register during this period. This loading is done every time when there is HW reset complete time (t_{REST}) within 5ms after a rising edge of RESX.

Note 3: Spike Rejection also applies during a valid reset pulse as shown below:



7 Power ON/OFF Sequence

Power on/off Sequence



8 Reliability

Test Item	Content of Test	Test Condition	Note
High Temperature Storage	Endurance test applying the high storage temperature for a long time.	75°C 96hrs	2
Low Temperature Storage	Endurance test applying the high storage temperature for a long time.	-30°C 96hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	60°C 96hrs	-
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20 °C 96hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 60°C,90%RH max, for 96hrs under no-load condition excluding the polarizer. Then taking it out and drying it at normal temperature.	60°C,90%RH 96hrs	1,2
Thermal Shock Resistance	The sample should be allowed stand the following 10 cycles of operation	-10°C/60°C 20 cycles	-

Note1: No dew condensation to be observed.

Note2: The function test shall be conducted after 4 hours storage at the normal. Temperature and humidity after remove from the rest chamber.

9 Warranty and Conditions

<http://www.displaymodule.com/pages/faq> HYPERLINK

"http://www.displaymodule.com/pages/faq"