

DM-TFT18-428

1.8" 296 × 220 TRANSFLECTIVE
DISPLAY PANEL - MCU

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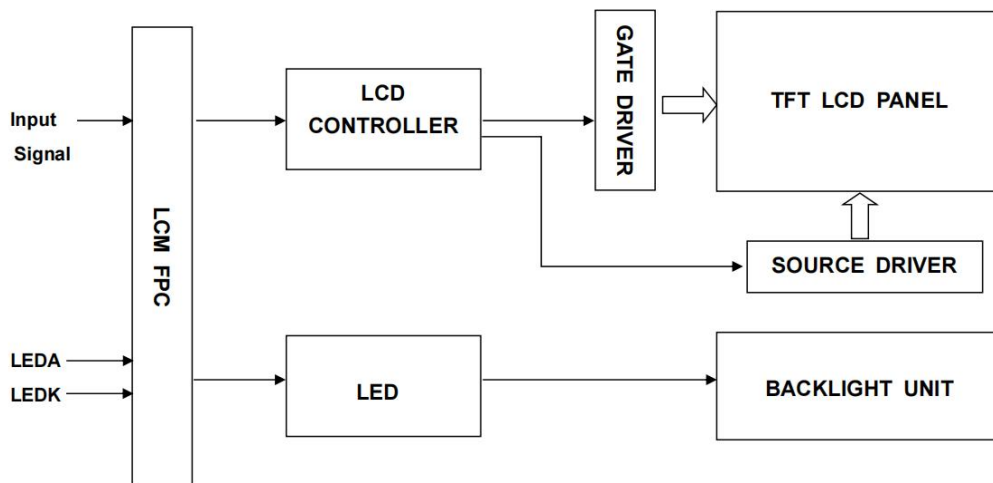
1 Revision History

Date	Changes
2022-04-27	First release

2 Main Features

Item	Specification	Unit
Diagonal Size	1.75	inch
Display Mode	Transflective/Normally Black	-
Resolution	296(RGB) x 222	pixel
Controller IC	IL9342	-
LCM Interface	16 bit MCU	-
Active Area	35.52(H)x 26.64(V)	mm
Panel Dimension	42.07 x 39.71 x 2.5	mm
Pixel Pitch	0.12(H)x 0.12(V)	mm
Color Configuration	RGB vertical stripe	-
Display Colors	65/262K	Colors
Weight	8	g
Operating temperature	-20~+70	°C
Storage temperature	-30~+80	°C

Block Diagram



3 Pin Description

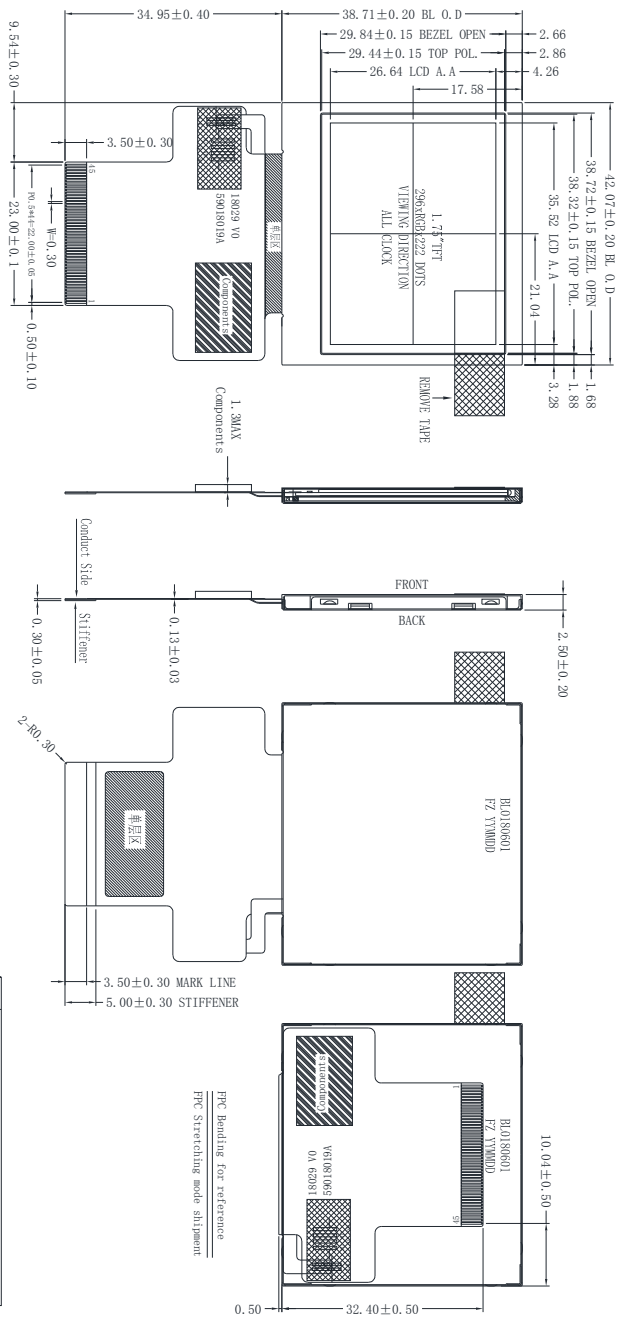
3.1 LCD Pin Description

Pin No.	Symbol	Function Description
1	GND	Ground.
2	GND	Ground.
3	IOVCC	Supply voltage for logic I/O.(1.65-3.3V).
4	VCI	Supply voltage(3.3V).
5	RESET	This signal will reset the device and must be applied to properly initialize the chip.
6	DC	-Display data/command selection pin in parallel interface. DC='1':display data. DC='0':command data. -if not used,please fix this pin at IOVCC or GND.
7	RD	6800-system:E (enable signal) 8080-system:RD (read strobe signal) Serial mode:Not used and should be connected to IOVCC or GND
8	WR	6801-system:RW (indicares read cycle when High, write cycle when Low) 8081-system:WR (write strobe signal)
9	CS	Chip select input pin ("Low" enable).
10	NC	No connection
11	NC	No connection
12	NC	No connection
13-20	DB17-DB10	Data input.
21	NC	No connection
22-29	DB08-DB01	Data input.
30	NC	No connection
31	NC	No connection
32	NC	No connection
33	NC	No connection
34	NC	No connection
35	NC	No connection
36	PS1	PS1=1,16bit 8080 parallel interface [D17:D10] [D08:D01] PS1=0,8-bit 8080 parallel interface [D17:D10]
37	NC	No connection
38	NC	No connection
39	XR(NC)	Touch panel Right Glass Terminal
40	YD(NC)	Touch panel Bottom Film Terminal
41	XL(NC)	Touch panel Left Glass Terminal
42	YU(NC)	Touch panel Top Film Terminal
43	LEDK	Cathode pin OF backlight
44	NC	No connection
45	LEDA	Anode pin of backlight

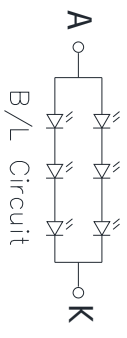
4 Mechanical Drawing

4.1 Panel Mechanical Drawing

未标注尺寸以CAD为准



- NOTES:
1. DISPLAY TYPE: 1.75", TFT-LCD,65K/262K COLORS
 2. DISPLAY MODE: NORMALLY BLACK, TRANSPARENT
 3. VIEWING DIRECTION: WIDE VIEWING
 4. LCM DRIVER IC: IL9342(G0G)
 5. LCM Interface: 8/16 Bit MCU
 6. VCI: 3.3V; LCM IOVCC: 1.8~3.3V
 7. OPERATING TEMP: -20°C TO 70°C
STORAGE TEMP: -30°C TO 80°C
 8. BACK LIGHT: LED WHITE, 6 LED, 40mA, 8.4~10.2V
 9. RoHS and REACH COMPLIANT.



NOTE:
1. If not use PIN, fix to the GND, 10VCC or NC.

Pin Name	Interface Mode
1	16-bit 8080 parallel Interface [D17:210] [008:101]
0	8-bit 8080 parallel Interface [D17:210]

101	Pin Name
2	CS0
3	10VCC
4	VCI
5	RESIST
6	DC
7	RD
8	RD
9	NC
10	NC (S2)
11	NC (S3)
12	NC (S4)
13	RD12
14	RD14
15	RD15
16	RD14
17	RD13
18	RD12
19	RD11
20	RD10
21	NC (RD9)
22	RD8
23	RD7
24	RD6
25	RD5
26	RD4
27	RD3
28	RD2
29	NC (RD0)
30	NC (RD1)
31	NC (RD2)
32	WR (RSW)
33	WR (RSW)
34	WR (RSW)
35	NC (RS0)
36	RS1
37	RS2
38	NC (RS3)
39	XR (RW)
40	XR (RW)
41	XR (RW)
42	XR (RW)
43	DM
44	W
45	DM

5 Optics & Electrical Characteristics

5.1 Optical Characteristics

Item	Symbol	Min	Typ	Max	Unit	Remark
View Angles TOP	$\ominus U$	-	80	-	$^{\circ}$	CR \geq 10; (1)(4)
View Angles Bottom	$\ominus D$	-	80	-	$^{\circ}$	
View Angles Right	$\ominus R$	-	80	-	$^{\circ}$	
View Angles Left	$\ominus L$	-	80	-	$^{\circ}$	
C.I.E. (White)	u' v'	0.248 0.268	0.278 0.298	0.308 0.328	-	(1)(4)
C.I.E.(Red)	u' v'	0.551 0.312	0.581 0.342	0.611 0.372	-	
C.I.E.(Green)	u' v'	0.295 0.537	0.325 0.567	0.355 0.597	-	
C.I.E.(Blue)	u' v'	0.122 0.051	0.152 0.081	0.182 0.111	-	
Color Gamut	S(%)	-	40	50	%	
Response Time Rise + Fall	Tr + Tf	-	25	50	ms	(1)(3)
Contrast Ratio	CR	200	300	-	-	(1)(2)
Reflection Ratio	R	-	7	-	%	($\theta = \phi = 0^{\circ}$)

*The data comes from the LCD specification.

Measuring Condition

Measuring surrounding : dark room

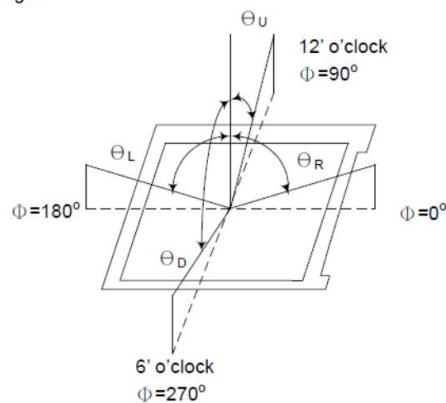
Ambient temperature : 25 \pm 2 $^{\circ}$ C

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.

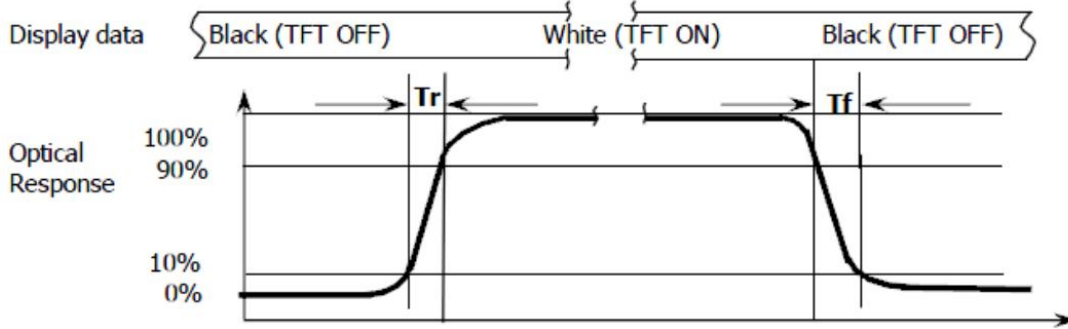
Note (1): Definition of Viewing Angle :



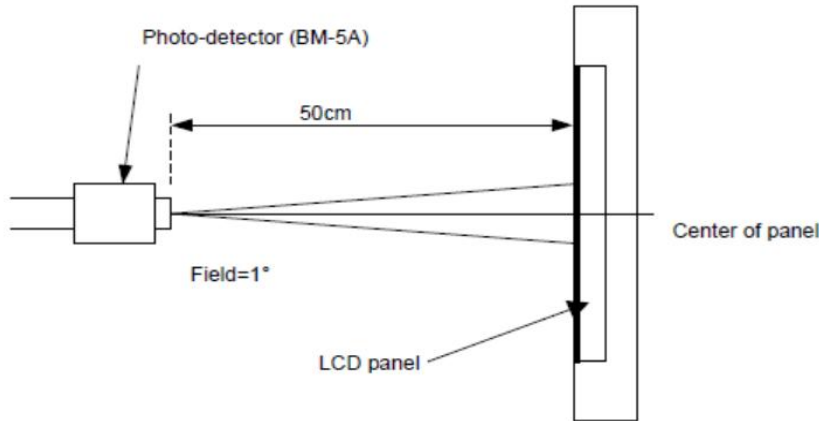
Note (2): Definition of Contrast Ratio(CR) :measured at the center point of panel

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

Note (3): Response Time



Note (4): Definition of optical measurement setup



5.2 Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Digital Supply Voltage	VCI	-0.3	5.0	V
Digital interface Supply Voltage	IOVCC	-0.3	4.0	V
Operating Temperature	TOP	-20	70	°C
Storage Temperature	TST	-30	80	°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.

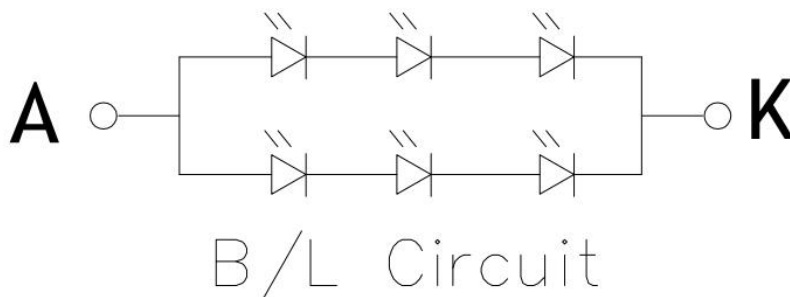
5.3 LED Backlight Characteristics

The back-light system is edge-lighting type with 6 chips LED

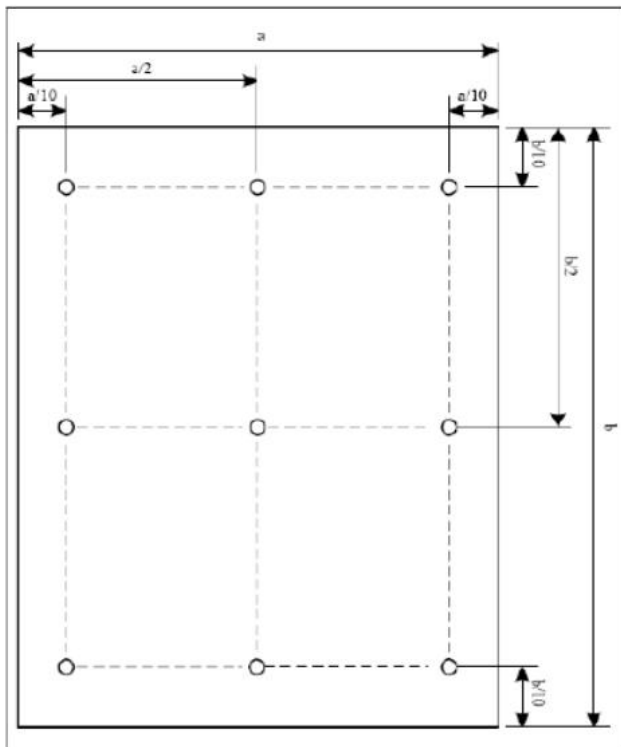
Item	Symbol	Min	Typ.	Max	Unit	Remark
Forward Current	I_F	--	40	--	mA	
Forward Voltage	V_F	--	9.6	--	V	
LED life time	Hr	--	50000	--	Hour	Note1,2
Uniformity	Avg	80	--	--	%	Note3
LCM Luminance	L_V	--	350	--	Cd/m ²	IF=100mA

Note1: LED life time (Hr) can be defined as the time in which it continues to operate under the condition: $T_a=25\pm3$ °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 $T_a=25$ °C and $I_L=100$ mA. The LED lifetime could be decreased if operating I_L is larger than 100mA. The constant current driving method is suggested.



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



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

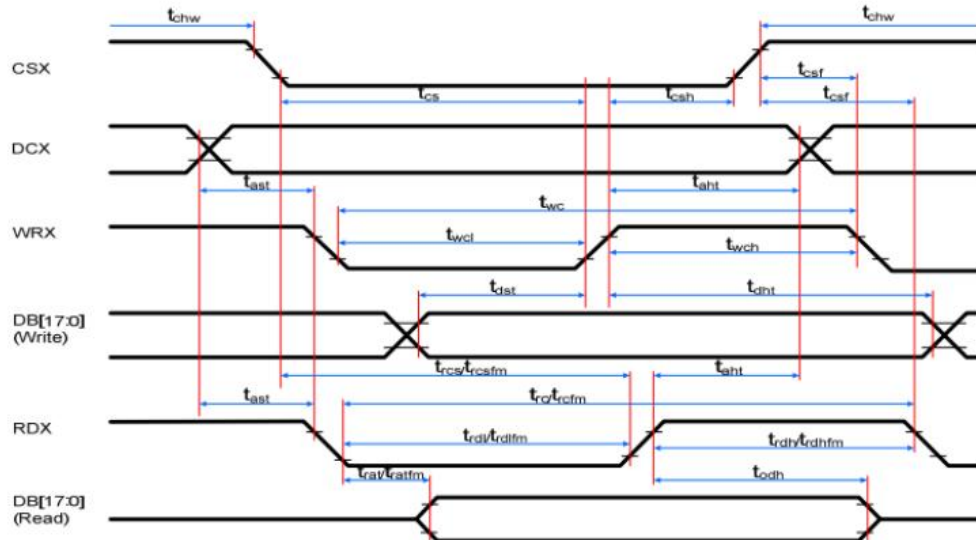
$$\text{Luminance} = \frac{\text{Total Luminance of 9 points}}{9}$$

5.4 DC Characteristics

Item	Symbol	Min	Ty p.	Max	Unit
Digital Supply Voltage	VCI	2.5	3.3	3.6	V
Digital interface supply Voltage	IOVCC	1.65	1.8	3.3	V
Level input voltage	VIL	GND-0.3	-	0.3 x IOVCC	V
	VIH	0.7 x IOVCC	-	IOVCC+0.3	V
Level Output Voltage	VOL	GND	-	GND+.4	V
	VOH	IOVCC-0.4	-	-	V
Normal mode Current	IDD	-	6	12	mA

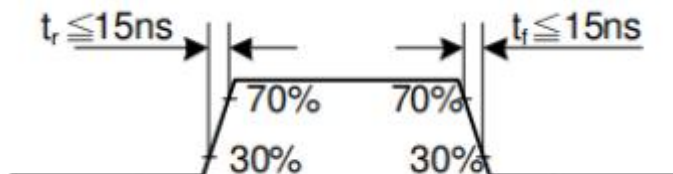
6 AC Characteristics

6.1 Parallel 8080-series Interface Timing Characteristics

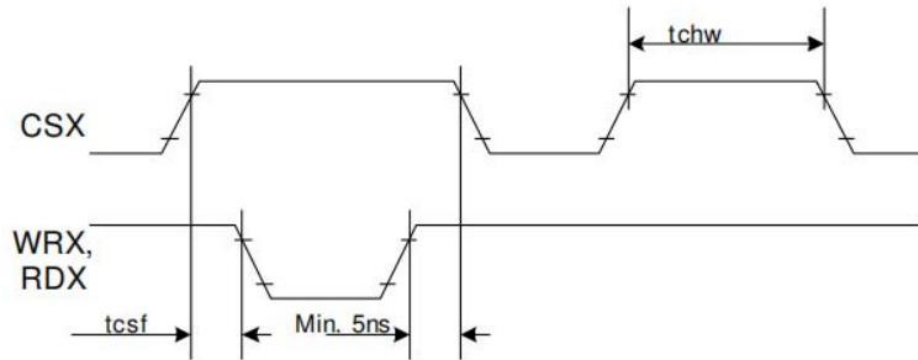


Signal	Symbol	Parameter	min	max	Unit	Description
DCX	tast	Address setup time	0	-	ns	
	taht	Address hold time (Write/Read)	10	-	ns	
CSX	tchwh	CSX "H" pulse width	0	-	ns	
	tcs	Chip Select setup time (Write)	15	-	ns	
	trcs	Chip Select setup time (Read ID)	45	-	ns	
	trcsfm	Chip Select setup time (Read FM)	355	-	ns	
WRX	tcsf	Chip Select Wait time (Write/Read)	10	-	ns	
	twc	Write cycle	66	-	ns	
	twrl	Write Control pulse L duration	15	-	ns	
RDX (FM)	twrh	Write Control pulse H duration	15	-	ns	
	trcfm	Read Cycle (FM)	450	-	ns	
	trdhfm	Read Control H duration (FM)	90	-	ns	
RDX (ID)	trdlfm	Read Control L duration (FM)	355	-	ns	
	trc	Read cycle (ID)	160	-	ns	
	trdh	Read Control pulse H duration	90	-	ns	
D[17:0], D[17:10]&D[8:1], D[17:10], D[17:9]	trdl	Read Control pulse L duration	45	-	ns	
	tdst	Write data setup time	10	-	ns	For maximum CL=30pF For minimum CL=8pF
	tdht	Write data hold time	10	-	ns	
	trat	Read access time	-	40	ns	
	tratfm	Read access time	-	340	ns	
trod	Read output disable time	20	80	ns		

Note: $T_a = -30$ to 70 °C, $IOVCC=1.65V$ to $2.8V$, $VCI=2.6V$ to $3.3V$, $GND=0V$.

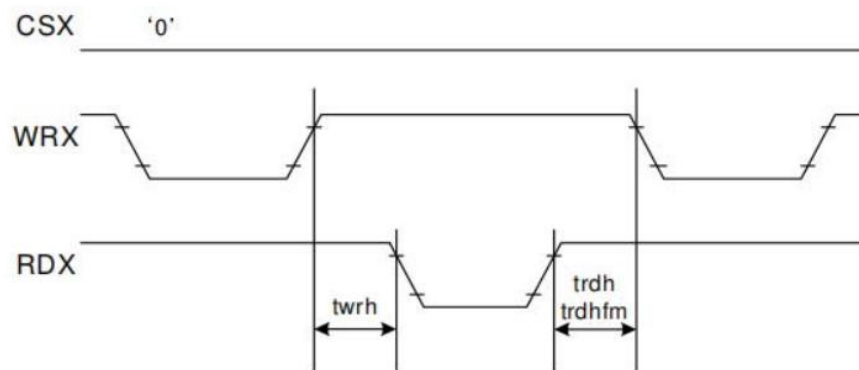


CSX timings :



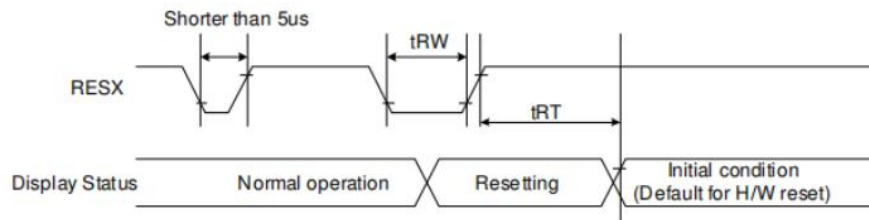
Note: Logic high and low levels are specified as 30% and 70% of IOVCC for Input signals.

Write to read or read to write timings:



Note: Logic high and low levels are specified as 30% and 70% of IOVCC for Input signals.

6.2 Reset Timing Characteristics



Signal	Symbol	Parameter	Min	Max	Unit
RESX	tRW	Reset pulse duration	10		uS
	tRT	Reset cancel		5 (note 1,5)	mS
				120 (note 1,6,7)	mS

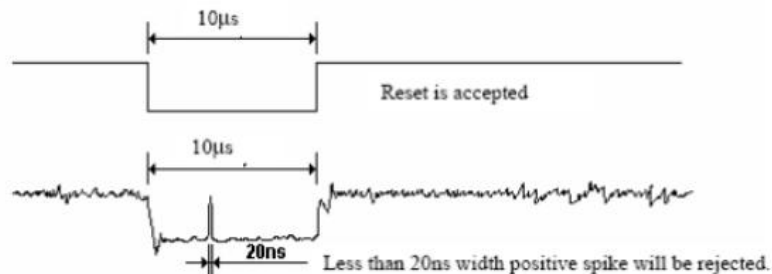
Note 1: The reset cancel includes also required time for loading ID bytes, VCOM setting and other settings from NV memory to registers. This loading is done every time when there is HW reset cancel time (tRT) within 5 ms after a rising edge of RESX.

Note 2: 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 5us	Reset Rejected
Longer than 10us	Reset
Between 5us and 10us	Reset starts

Note 3: 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 Hardware Reset.

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



Note 5: When Reset applied during Sleep In Mode.

Note 6: When Reset applied during Sleep Out Mode.

Note 7: It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120msec.

7 Reliability

Test Item	Content of Test	Test Condition	Note
High Temperature Storage	Endurance test applying the high storage temperature for a long time.	70°C 240hrs	2
Low Temperature Storage	Endurance test applying the high storage temperature for a long time.	-30°C 240hrs	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 240hrs	-
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20 °C 240hrs	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 16hrs	1,2
Thermal Shock Resistance	The sample should be allowed stand the following 10 cycles of operation	-30°C/70°C 50 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.

8 Warranty and Conditions

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

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