



HIGHNESSTM

One of a kind

HM163FH11VL

16.3" Stretch Color TFT-LCD

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HIGHNESS MICROELECTRONICS LTD

URL: www.highnessmicro.com, Email: sales@highnessmicro.com

1.0 General Specification

Parameter	Specification	Unit
Size	16.3" (Diagonal)	Inch
Active area	408.96 (H) × 60.7(V)	mm
Number of pixels	1920(H) × 285(V)	Pixels
Pixel pitch	0.213(H) × 0.213 (V)	mm
Pixel arrangement	RGB Vertical stripe	
Display colors	16.7M(8bit)	Colors
Display mode	Normally Black	
Dimensional outline	432 (H) × 85.1(V) × 14.8(D) typ.	mm
Weight	600typ	g
Brightness (white)	800Typ.	cd/m ²
Contrast	1000:1	CR
LED Lifetime	50000	Hrs
Working Temperature	-20 ~ +70	°C
Storage Temperature	-20 ~ +70	°C

2.0 Absolute Maximum Ratings

The following are maximum values which, if exceeded, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed in Table.

[Ta =25±2 °C]

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remarks
Back-light Power Supply Voltage	HV _{DDOUT}	-	33	-	V	Ta = 25 °C Note 1&2
Back-light LED Current	I _{HVDD}	-	300	-	mA	
Back-light LED Reverse Voltage	V _R	-	-	-	V	
Power Supply Input Voltage	VCC	3.5	5	5	V	

Note:

1. The range above is maximum value not the actual operating temperature. Actual Operating temperature is no more than 40°C and temperature refers to the LCM surface temperature.
2. Manufacture is not responsible for product problems beyond the use conditions.
3. When the ambient temperature is T °C, the surface temperature of Panel cannot exceed (T+15)°C.

3.0 Electrical Specifications

3.0.1 TFT LCD Module

[Ta =25±2 °C]

Parameter	Symbol	Values			Unit	Notes
		Min	Typ	Max		
Power Supply Input Voltage	V _{DD}	4	5	5	V	Note 1
Power Supply Current	I _{DD}	-	500	1500	mA	
Power Supply inrush Current	Inrush	-	-	3	A	
LED Driver Supply Voltage	H _{VDD}		12		V	
LED Driver Supply Current	I _{HVDD}	-	1000		mA	
LED Power Consumption	P _{LED}	-	12		W	
Positive-going Input Threshold Voltage	V _{IT+}	-	-	+100	mV	Vcom = 1.2V typ.
Negative-going Input Threshold Voltage	V _{IT-}	-100	-	-	mV	
Differential input common mode voltage	V _{com}	-	1.2	-	V	V _{IH} =100mV, V _{IL} =-100mV

Notes : 1. The supply voltage is measured and specified at the interface connector of LCM.
The current draw and power consumption specified is for 5V at 25 °C
Max value at Black Pattern

3.1 Back-light Unit

Ta=25+/-2°C

Parameter		Min.	Typ.	Max.	Unit	Remarks	
Power supply voltage for B ack light		V _{LED}		33		V	
Power supply Current for B ack light		I _{LED}	-	300	-	mA	
Power supply for Back light		P _{LED}	-	10	-	W	Note 1
EN Control Level	Backlight on	V _{ENH}	2.5	-	-	V	EN logic high voltage
	Backlight off	V _{ENL}	-	-	0.8	V	EN logic low voltage
PWM Cont rol Level	PWM High L evel	V _{PML}	2.5	-	-	V	
	PWM Low Le vel	V _{PML}	-	-	0.8	V	
PWM Control Frequency		F _{PWM}	0.15	-	1	KHz	
Duty Ratio		-	5	-	100	%	

Notes : 1. Calculator Value for reference $I_{LED} \times V_{LED} = P_{LED}$

2. The LED Life-time define as the estimated time to 50% degradation of initial luminous under the condition of the ambient temperature of 25°C.

4.0 Interface Connection.

4.0.1 Electrical Interface Connection

The electronics interface connector is IS100-L30R-C23 (UJU) or equivalent

The connector interface pin assignments are listed in Table.

Pin No.	Symbol	Description	Remark
1	RxOIN0-	LVDS data input	
2	RxOIN0+	LVDS data input	
3	RxOIN1-	LVDS data input	
4	RxOIN1+	LVDS data input	
5	RxOIN2-	LVDS data input	
6	RxOIN2+	LVDS data input	
7	VSS	Ground	
8	RxOCLKIN-	LVDS clock input	
9	RxOCLKIN+	LVDS clock input	
10	RxOIN3-	LVDS data input	
11	RxOIN3+	LVDS data input	
12	RxEIN0-	LVDS data input	
13	RxEIN0+	LVDS data input	
14	VSS	Ground	
15	RxEIN1-	LVDS data input	
16	RxEIN1+	LVDS data input	
17	VSS	Ground	
18	RxEIN2-	LVDS data input	
19	RxEIN2+	LVDS data input	
20	RxECLKIN-	LVDS clock input	
21	RxECLKIN+	LVDS clock input	
22	RxEIN3-	LVDS data input	
23	RxEIN3+	LVDS data input	
24	VSS	Ground	
25	SCL	NC (I2C BUS)	
26	SDA	NC (I2C BUS)	
27	WP	NC (EEPROM write EN)	
28	VCC	Power supply(5V)	
29	VCC	Power supply(5V)	
30	VCC	Power supply(5V)	

4.0.2 Pin Assignments for the LED Connector

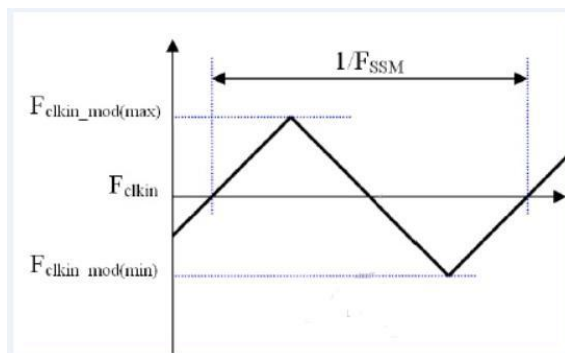
Terminal	Symbol	Functions
Pin No.	Symbol	Description
1	VLED	12V
2	GND	GND
3	Enable	5V-On / AV-Off
4	Dimming	PWM Dimming
5	NC	No Connection

5.0 Signal Timing Specification

Item	Symbols		Min	Typ	Max	Unit	Note
DCLK	Period	tCLK	9.5	-	25	ns	Note 1
	Frequency	-	40	-	105	MHz	
Hsync	Period	tHP	990	1040	-	tCLK	
	Horizontal Valid	tHV	-	960	-	tCLK	
	Horizontal Blank	tHB	30	80	-	tCLK	
	Frequency	fH	45	60	75	KHz	
Vsync	Period	tVP	1100	1125	1138	tHP	
	Vertical Valid	tVV	-	1080	-	tHP	
	Vertical Blank	tVB	30	45	58	tHP	
	Frequency	fV	45	60	75	Hz	
LVDS Receiver clock	Input spread spectrum ratio	SSr	-	1.5	2	%	Note 2
	spread spectrum modulation frequency	Fssm	-	-	100	KHZ	

Note 1: The DCLK range at last line of V-blanking should be set in 0-H-active/2.

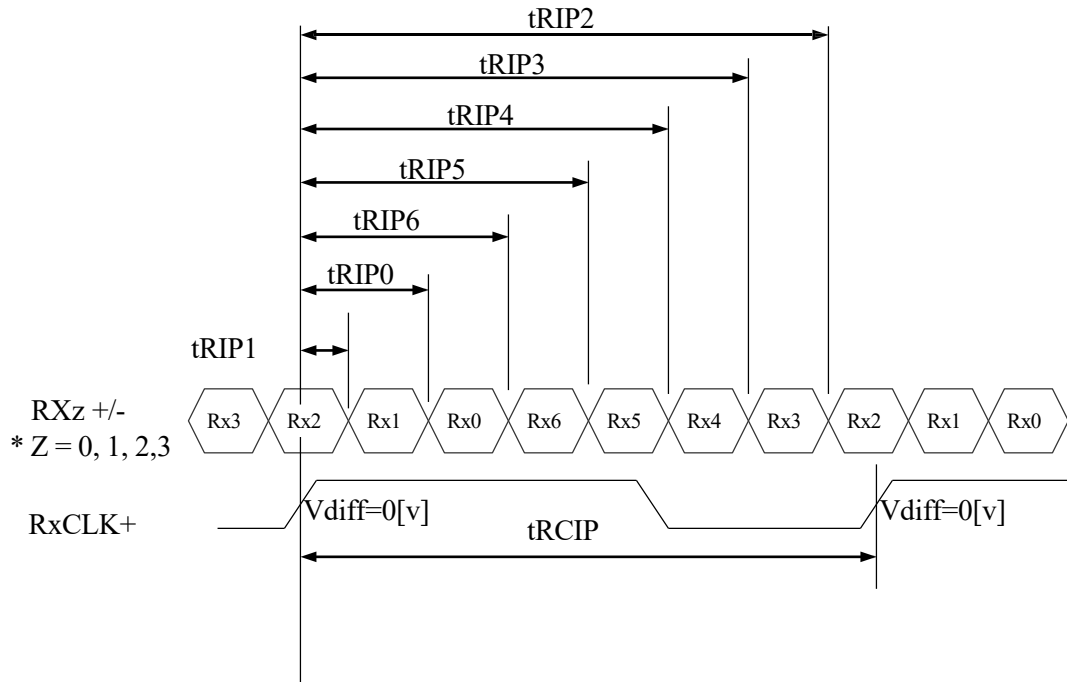
Note 2: The SSGG(spread Spectrum Clock Generator) is defined as following figure:



5.01 LVDS Rx Interface Timing Parameter

The specification of the LVDS Rx interface timing parameter is shown in the Table.

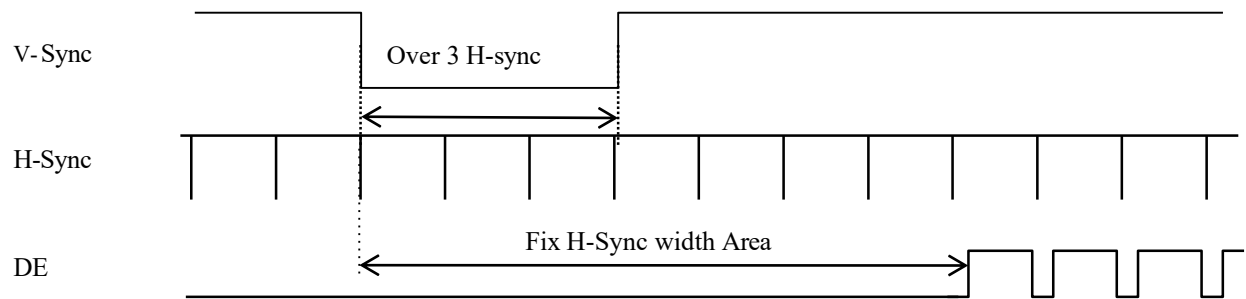
Item	Symbol	Min	Typ	Max	Unit	Remark
CLKIN Period	tRCIP	9.5	-	25	nsec	
Input Data 0	tRIP1	-0.4	0.0	0.4	nsec	
Input Data 1	tRIP0	$tRCIP/7-0.4$	$tRCIP/7$	$tRCIP/7+0.4$	nsec	
Input Data 2	tRIP6	$2 \times tRCIP/7-0.4$	$2 \times tRCIP/7$	$2 \times tRCIP/7+0.4$	nsec	
Input Data 3	tRIP5	$3 \times tRCIP/7-0.4$	$3 \times tRCIP/7$	$3 \times tRCIP/7+0.4$	nsec	
Input Data 4	tRIP4	$4 \times tRCIP/7-0.4$	$4 \times tRCIP/7$	$4 \times tRCIP/7+0.4$	nsec	
Input Data 5	tRIP3	$5 \times tRCIP/7-0.4$	$5 \times tRCIP/7$	$5 \times tRCIP/7+0.4$	nsec	
Input Data 6	tRIP2	$6 \times tRCIP/7-0.4$	$6 \times tRCIP/7$	$6 \times tRCIP/7+0.4$	nsec	



* Vdiff = (RXZ+) - (RXZ-), ..., (RXCLK+) - (RXCLK-)

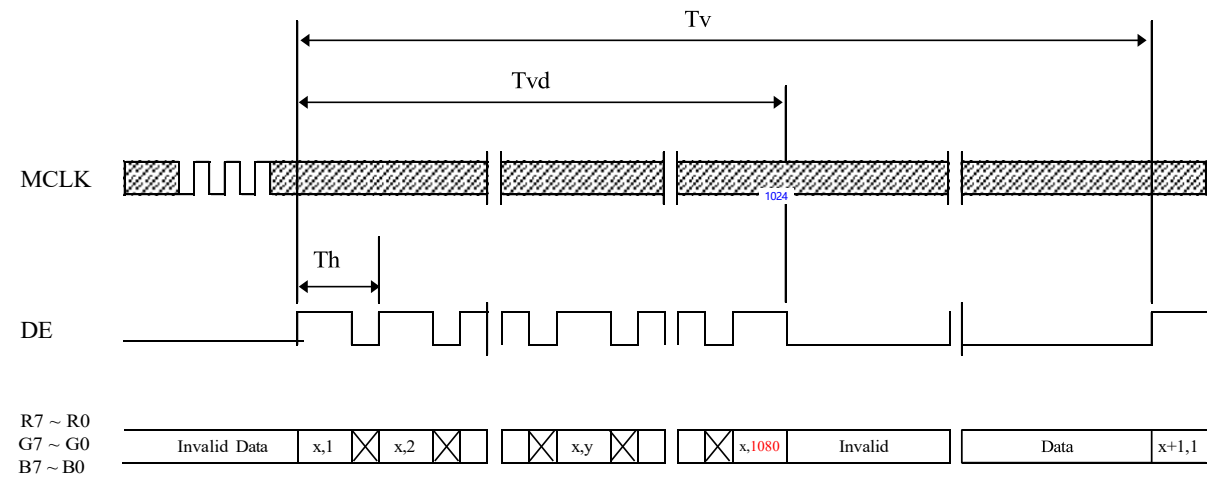
6.0 Signal Timing Waveforms of Interface Signal

6.01 Sync Timing Waveforms

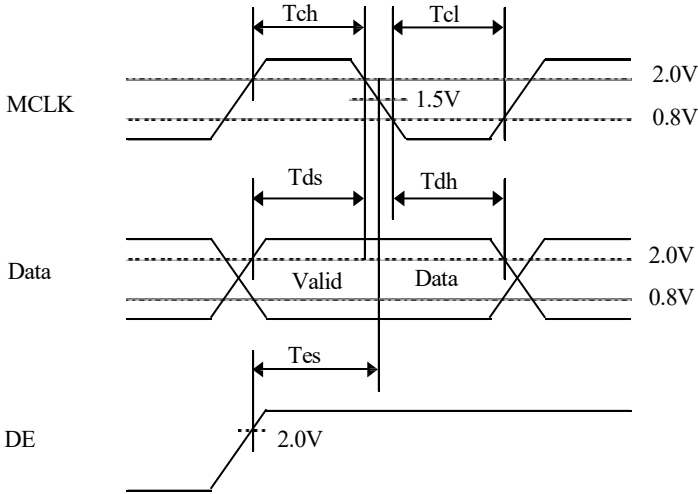
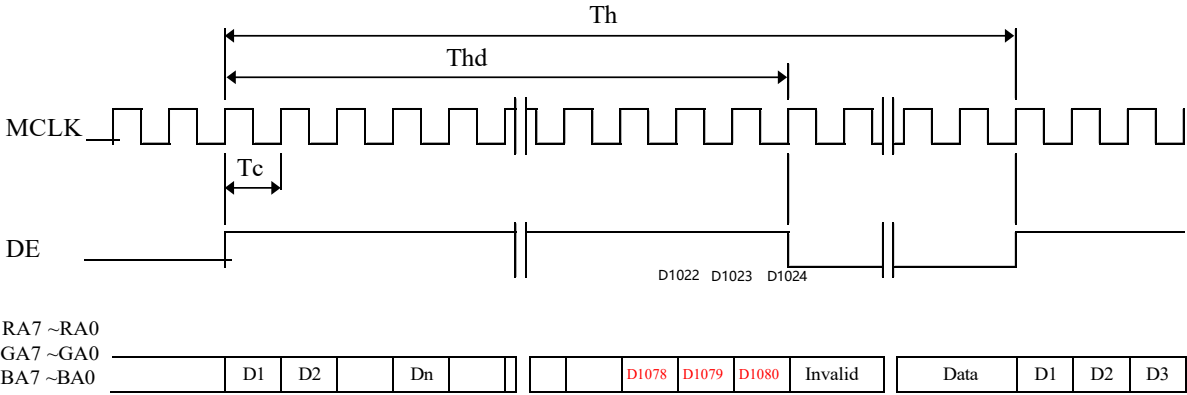


- 1) Need over 3 H-Sync during V-Sync Low
- 2) Fix H-Sync width from V-Sync falling edge to first rising edge

6.02 Vertical Timing Waveforms

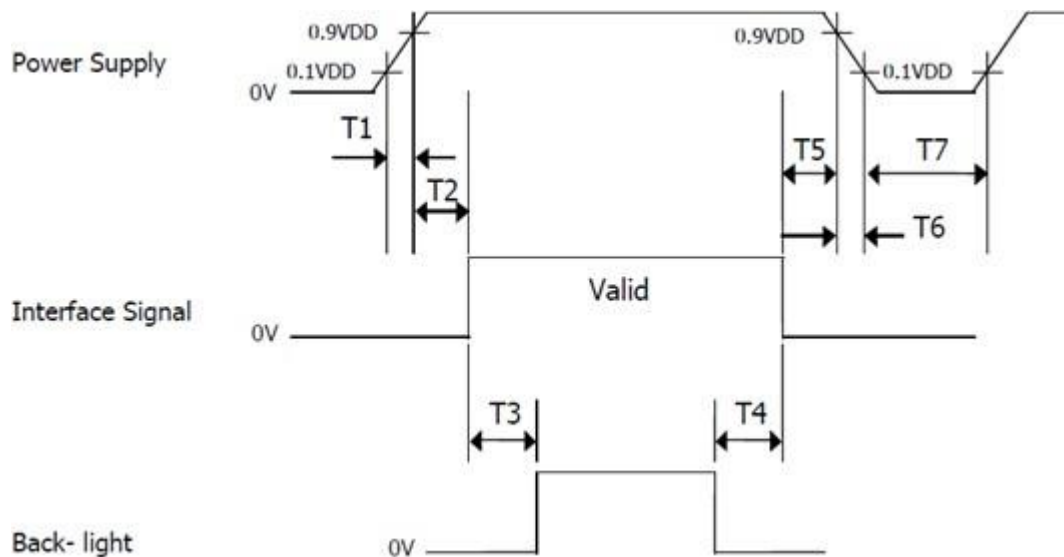


6.03 Horizontal Timing Waveforms



7.0 Power Sequence

To prevent a latch-up or DC operation of the LCD module, the power on/off sequence shall be as shown in below



Parameter	Values			Units
	Min	Typ	Max	
T1	0.5	-	10	ms
T2	0	-	50	ms
T3	300	-	-	ms
T4	500	-	-	ms
T5	0	-	50	ms
T6	0	-	10	ms

8.0 Optical Specification

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit
Viewing Angle Range	Horizontal	Θ_3	CR > 10	80	85	-	Deg.
		Θ_9		80	85	-	Deg.
	Vertical	Θ_{12}		80	85	-	Deg.
		Θ_6		80	85	-	Deg.
Luminance Contrast Ratio		CR	$\Theta = 0^\circ$	800	1000	-	
Luminance of White	Center	Y_w	$\Theta = 0^\circ$	640	800	-	cd/m ²
White Luminance uniformity	9 Points	$\Delta Y9$	$\Theta = 0^\circ$	75	85	-	%
Color Gamut	NTSC	CIE1931	$\Theta = 0^\circ$	65	70	-	%
Reproduction of Color	White	W_x	$\Theta = 0^\circ$	Typ -0.05	0.286	Typ -0.05	
		W_y			0.296		
Response Time (Rising + Falling)		T_{RT}	$T_a = 25^\circ C$ $\Theta = 0^\circ$	-	30	35	ms

