


MCT050HDMI-A	800 x 480	HDMI Interface	TFT Module
Specification			
Version: 1		Date: 22/03/2018	
Revision			
1	02/01/2018	First issue.	

Display Features			
Display Size	5.0"		
Resolution	800 x 480		
VGA Size	WVGA		
Orientation	Landscape		
Appearance	RGB		
Logic Voltage	5V		
Interface	HDMI		
Brightness	500 cd/m ²		
Touchscreen	N/A		
Module Size	120.70 x 75.80 x 21.50 mm		
Operating Temperature	-20°C ~ +70°C		
Pinout	40 - Way	Box Quantity	Weight / Display
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* - For full design functionality, please use this specification in conjunction with the TFP401 specification. (Provided Separately)

Display Accessories	
Part Number	Description
MCIB-HDMI/HDMI	HDMI-to-HDMI interconnect board.
MCIC-USB	Type-A USB to Micro-B USB interconnect cable.

Optional Variants	
Appearances	Voltage
Capacitive Touch Panel Resistive Touch Panel	



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2.Summary

TFT 5.0" is a TN transmissive type color active matrix TFT liquid crystal display that use amorphous silicon TFT as switching devices. This module is a composed of a TFT_LCD module, It is usually designed for industrial application and this module follows RoHs,

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3. General Specifications

- Size: 5.0 inch
- Dot Matrix: 800 × 3(RGB) × 480 dots
- Module dimension: 120.7 x 75.8 x 21.5 (Max) mm
- Active area: 108.0 x 64.8 mm
- Dot pitch: 0.045 x 0.135 mm
- LCD type: TFT, Normally White, Transmissive
- View Direction: 12 o'clock
- Gray Scale Inversion Direction: 6 o'clock
- Aspect Ratio: 16:9
- Backlight Type: LED, Normally White
- Controller IC: TFP401
- Interface: HDMI
- With /Without TP: Without TP
- Surface: Anti-Glare

*Color tone slight changed by temperature and driving voltage.

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4.Interface

4.1. LCM PIN Definition(CON5)

Pin	Symbol	Function	Remark
1	3.3V	Raspberrry Pi:Power 3.3V	
2	5V	Raspberrry Pi:Power 5V	
3	GPIO02	Raspberrry Pi:GPIO02 / CTP_SDA (For CTP type Reserved)	
4	5V	Raspberrry Pi:Power 5V	
5	GPIO03	Raspberrry Pi:GPIO03 / CTP_SCL (For CTP type Reserved)	
6	GND	Raspberrry Pi:GND	
7	GPIO04	Raspberrry Pi:GPIO04	
8	GPIO14	Raspberrry Pi:GPIO14	
9	GND	Raspberrry Pi:GND	
10	GPIO15	Raspberrry Pi:GPIO15	
11	GPIO17	Raspberrry Pi:GPIO17 / CTP_RST (For CTP type Reserved)	
12	GPIO18	Raspberrry Pi:GPIO18	
13	GPIO27	Raspberrry Pi:GPIO27 / CTP_WAKE (For CTP type Reserved)	
14	GND	Raspberrry Pi:GND	
15	GPIO22	Raspberrry Pi:GPIO22 / CTP_INT (For CTP type Reserved)	
16	GPIO23	Raspberrry Pi:GPIO23	
17	3.3V	Raspberrry Pi:3.3V	
18	GPIO24	Raspberrry Pi:GPIO24	
19	GPIO10	Raspberrry Pi:GPIO10	
20	GND	Raspberrry Pi:GND	
21	GPIO09	Raspberrry Pi:GPIO09	
22	GPIO25	Raspberrry Pi:GPIO25	
23	GPIO11	Raspberrry Pi:GPIO11	
24	GPIO08	Raspberrry Pi:GPIO08	
25	GND	Raspberrry Pi:GND	
26	GPIO07	Raspberrry Pi:GPIO07	
27	ID_SD	Raspberrry Pi:ID_SD	
28	ID_SC	Raspberrry Pi:ID_SC	
29	GPIO05	Raspberrry Pi:GPIO05	
30	GND	Raspberrry Pi:GND	
31	GPIO06	Raspberrry Pi:GPIO06	
32	GPIO12	Raspberrry Pi:GPIO12	
33	GPIO13	Raspberrry Pi:GPIO13	
34	GND	Raspberrry Pi:GND	
35	GPIO19	Raspberrry Pi:GPIO19	
36	GPIO16	Raspberrry Pi:GPIO16	
37	GPIO26	Raspberrry Pi:GPIO26	
38	GPIO20	Raspberrry Pi:GPIO20	
39	GND	Raspberrry Pi:GND	
40	GPIO21	Raspberrry Pi:GPIO21	

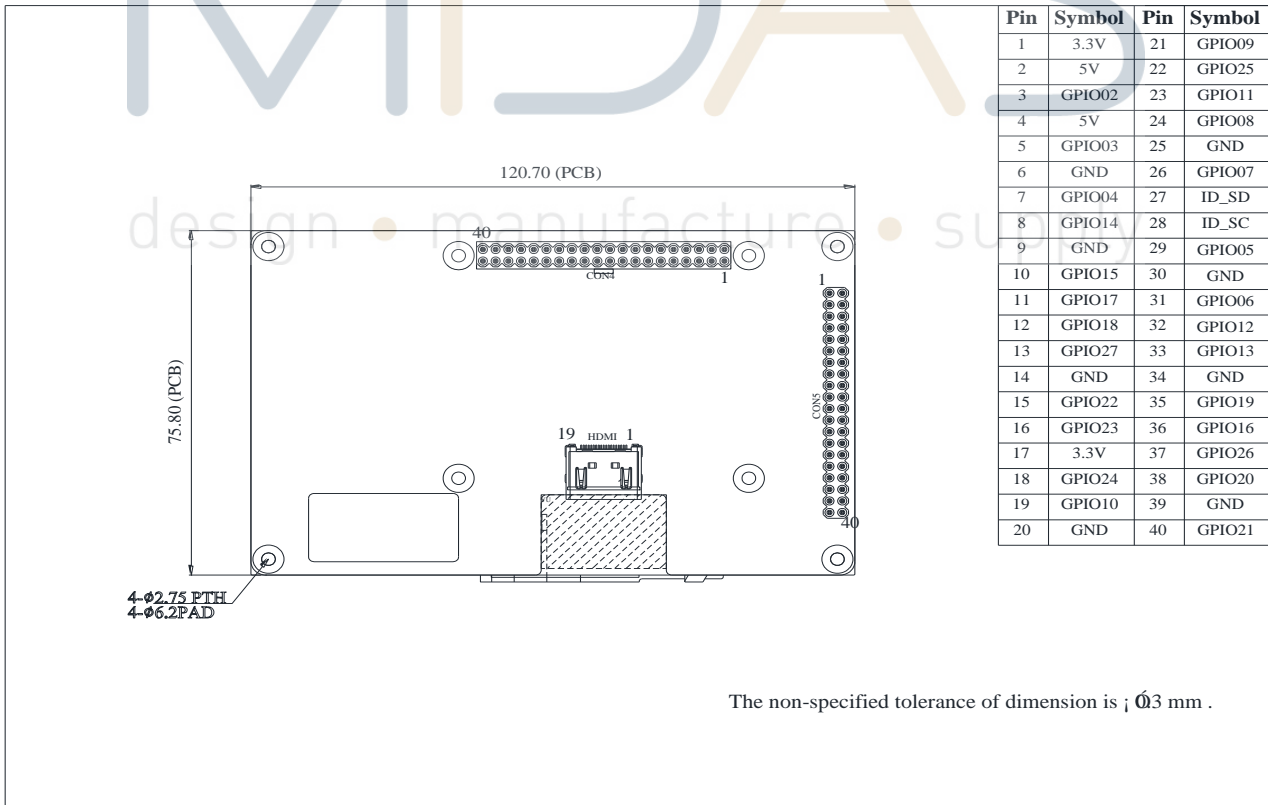
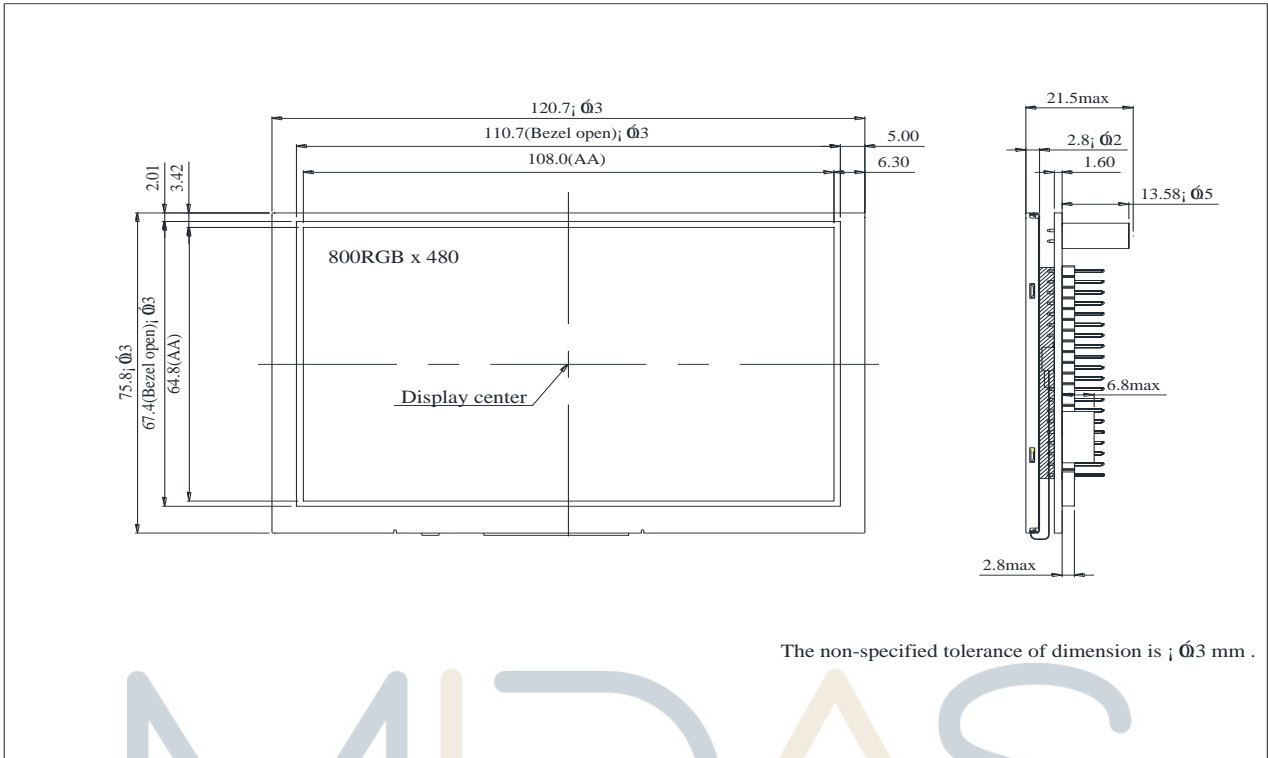
4.2. HDMI

Pin No.	Symbol	I/O	Function	Remark
1	Rx2+	I	+LVDS Differential Data Input	
2	GND	P	Ground	
3	Rx2-	I	-LVDS Differential Data Input	
4	Rx1+	I	+LVDS Differential Data Input	
5	GND	P	Ground	
6	Rx1-	I	-LVDS Differential Data Input	
7	Rx0+	I	+LVDS Differential Data Input	
8	GND	P	Ground	
9	Rx0-	I	-LVDS Differential Data Input	
10	RxC+	I	+LVDS Differential Clock Input	
11	GND	P	Ground	
12	RxC-	I	-LVDS Differential Clock Input	
13-14	NC	-	No connection	
15	SCL	I/O	DDC(Data Display Channel) Clock	
16	SDA	I/O	DDC(Data Display Channel) Data	
17	GND	P	Ground	
18	5V	P	Power Supply	
19	Detect	I/O	Hot plug detect	

I: input, O: output, P: Power



5. Contour Drawing



Pin	Symbol	Pin	Symbol
1	3.3V	21	GPIO09
2	5V	22	GPIO25
3	GPIO02	23	GPIO11
4	5V	24	GPIO08
5	GPIO03	25	GND
6	GND	26	GPIO07
7	GPIO04	27	ID_SD
8	GPIO14	28	ID_SC
9	GND	29	GPIO05
10	GPIO15	30	GND
11	GPIO17	31	GPIO06
12	GPIO18	32	GPIO12
13	GPIO27	33	GPIO13
14	GND	34	GND
15	GPIO22	35	GPIO19
16	GPIO23	36	GPIO16
17	3.3V	37	GPIO26
18	GPIO24	38	GPIO20
19	GPIO10	39	GND
20	GND	40	GPIO21

6. Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	TOP	0	—	+70	°C
Storage Temperature	TST	0	—	+80	°C

Note: Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above

1. Temp. $\leq 60^{\circ}\text{C}$, 90% RH MAX. Temp. $> 60^{\circ}\text{C}$, Absolute humidity shall be less than 90% RH at 60°C



7. Electrical Characteristics

7.1. Operating conditions: (CON3.Pin1=GND, Pin2=VDD)

Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
Supply Voltage For LCM	VDD	—	4.9	5	5.1	V	-
Supply Current For LCM	IDD	—	—	350	380	mA	Note1

Note 1 : This value is test for VDD =5.0V , Ta=25°C only

Note 2 : Display with Raspberry pi the driver power is over USB , first make sure you have a 2A power supply, with a good quality USB cable, a thin wire power cable is no good. Make sure its 24AWG or smaller, shorter USB cables are better too.

Note3 : With regard to the resistive touch panel calibration, please refer to the datasheet of AR1100, which is in the link below:

<http://ww1.microchip.com/downloads/en/DeviceDoc/41604A.pdf>



8.DC CHARATERISTICS

Parameter	Symbol	Rating			Unit	Condition
		Min	Typ	Max		
Low level input voltage	V_{IL}	0	-	0.3VDD	V	
High level input voltage	V_{IH}	0.7VDD	-	VDD	V	

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9. Optical Characteristics

Item	Symbol	Condition.	Min	Typ.	Max.	Unit	Remark	
Response time	Tr	$\theta=0^\circ \cdot \phi=0^\circ$	-	10	20	.ms	Note 3,5	
	Tf		-	15	30	.ms		
Contrast ratio	CR	At optimized viewing angle	400	500	-	-	Note 4,5	
Color Chromaticity	White	$\theta=0^\circ \cdot \phi=0^\circ$	Wx	0.26	0.31	0.36		Note 2,6,7
			Wy	0.28	0.33	0.38		
Viewing angle (Gray Scale Inversion Direction)	Hor.	$CR \geq 10$	Θ_R	60	70	-	Deg.	Note 1
			Θ_L	60	70	-		
	Ver.		Φ_T	40	50	-		
			Φ_B	60	70	-		
Brightness	-	-	400	500	-	cd/ m ²	Center of display	

Ta=25±2°C

Note 1: Definition of viewing angle range

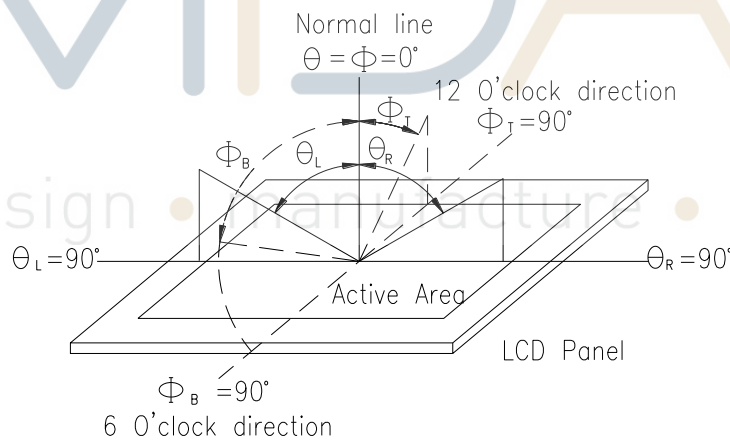


Fig. 9.1. Definition of viewing angle

Note 2: Test equipment setup:

After stabilizing and leaving the panel alone at a driven temperature for 10 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7 or BM-5 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

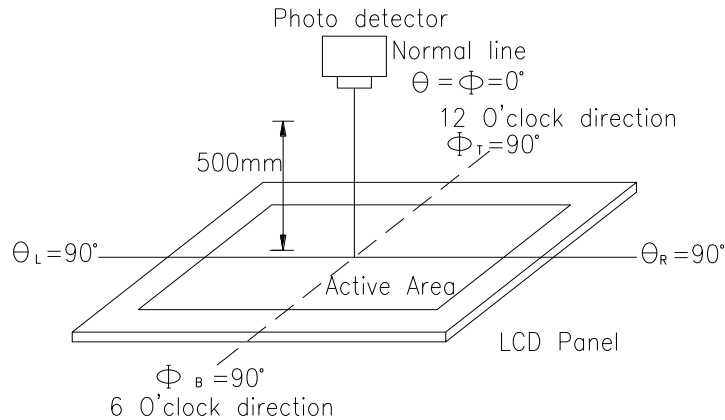
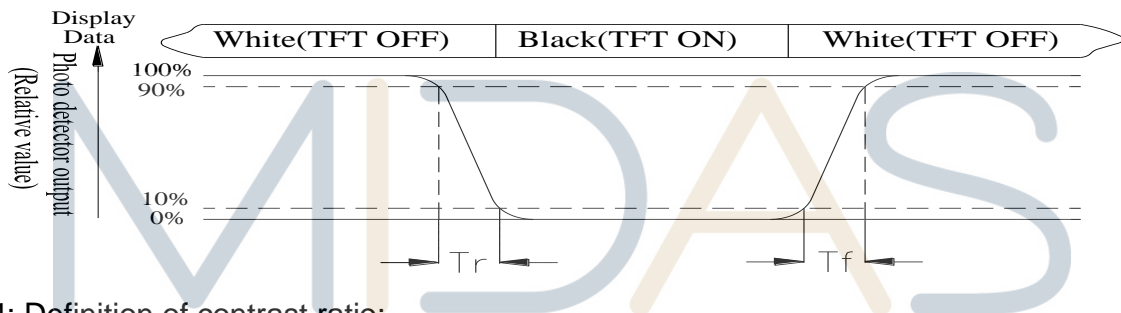


Fig. 9.2. Optical measurement system setup

Note 3: Definition of Response time:

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time, T_r , is the time between photo detector output intensity changed from 90% to 10%. And fall time, T_f , is the time between photo detector output intensity changed from 10% to 90%



Note 4: Definition of contrast ratio:

The contrast ratio is defined as the following expression.

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: White $V_i = V_{i50} \pm 1.5V$

Black $V_i = V_{i50} \pm 2.0V$

“±” means that the analog input signal swings in phase with VCOM signal.

“±” means that the analog input signal swings out of phase with VCOM signal.

The 100% transmission is defined as the transmission of LCD panel when all the input terminals of module are electrically opened.

Note 6: Definition of color chromaticity (CIE 1931)

Color coordinates measured at the center point of LCD

Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

10. Reliability

Content of Reliability Test (Wide temperature, 0°C~70°C)

Environmental Test			
Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80°C 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	0°C 200hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70°C 200hrs	—
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	0°C 200hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 60°C, 90%RH max	60°C, 90%RH 96hrs	1,2
Thermal shock resistance	The sample should be allowed stand the following 10 cycles of operation <div style="text-align: center;"> <p>0°C 25°C 70°C</p> <p>30min 5min 30min</p> <p>1 cycle</p> </div>	0°C/70°C 10 cycles	—
Vibration test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude : 1.5mm Vibration Frequency : 10~55Hz One cycle 60 seconds to 3 directions of X,Y,Z for Each 15 minutes	3
Static electricity test	Endurance test applying the electric stress to the terminal.	VS=±600V(contact) , ±800v(air), RS=330Ω CS=150pF 10 times	—

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 test chamber.

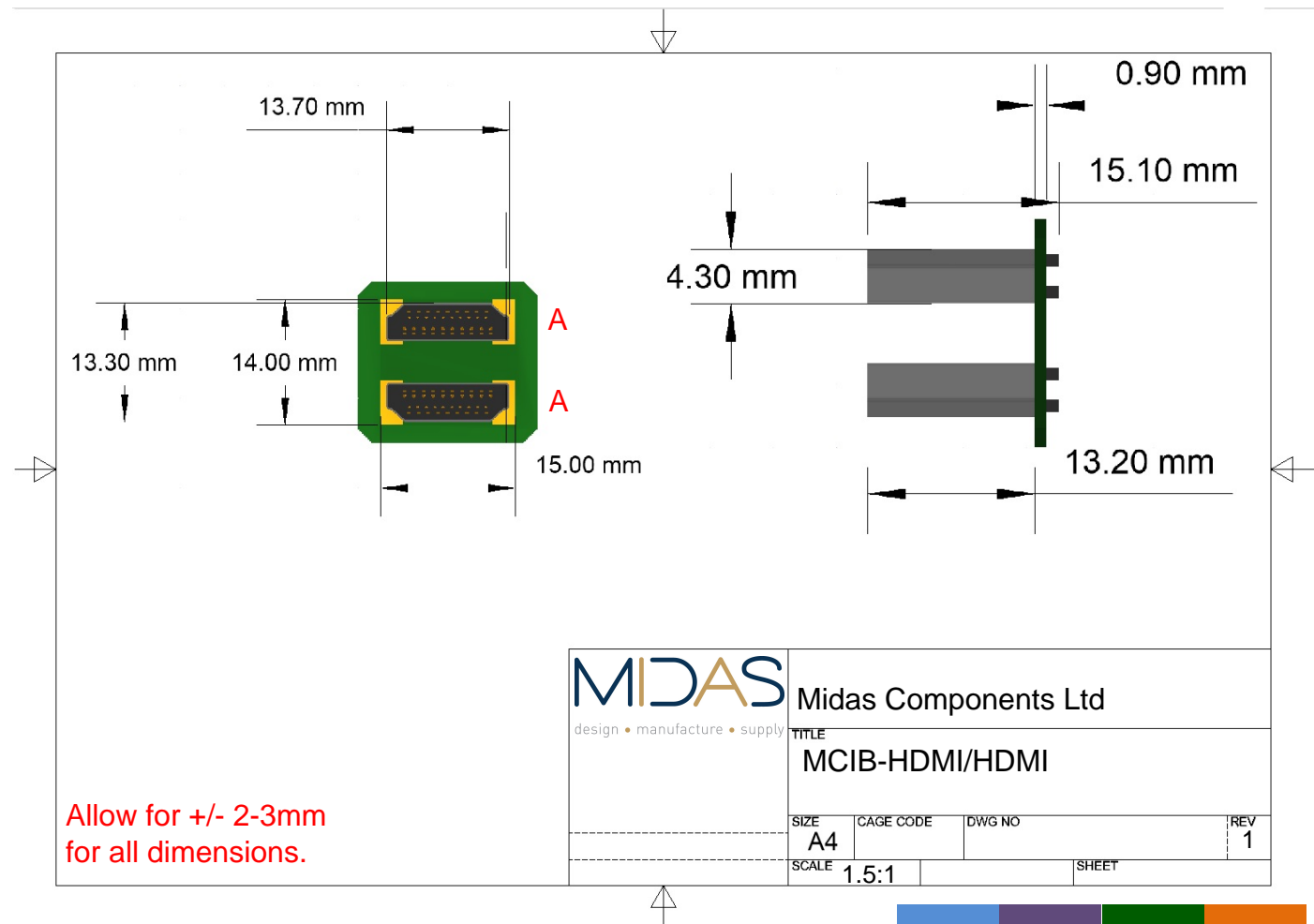
Note3: The packing have to including into the vibration testing.



MCIB-HDMI/HDMI		Interconnect Board	
Specification			
Version: 1		Date: 16/04/2018	
Revision			
1	16/04/2018	First Release.	

Compatible Displays	
Part Number	Description
MCT050HDMI-A-RTP	5" HDMI TFT. Resistive and Capacitive touch, respectively.
MCT050HDMI-A-CTP	
MCT070HDMI-B-RTP	7" HDMI TFT. Resistive and Capacitive touch, respectively.
MCT070HDMI-B-CTP	
MCT101HDMI-A-RTP	10.1" HDMI TFT. Resistive and Capacitive touch, respectively.
MCT101HDMI-A-CTP	

Interconnect Board Description	
	Description
A	Male HDMI Connector



MCIC-USB		Interconnect Cable
Specification		
Version: 1		Date: 16/04/2018
Revision		
1	16/04/2018	First Release.

Compatible Displays	
Part Number	Description
MCT050HDMI-A-RTP	5" HDMI TFT. Resistive and Capacitive touch, respectively.
MCT050HDMI-A-CTP	
MCT070HDMI-B-RTP	7" HDMI TFT. Resistive and Capacitive touch, respectively.
MCT070HDMI-B-CTP	
MCT101HDMI-A-RTP	10.1" HDMI TFT. Resistive and Capacitive touch, respectively.
MCT101HDMI-A-CTP	

Cable Descriptions	
	Description
A	Type-A USB Connector.
B	Micro-B USB Connector.

