

| Specification                                                                                                                                   |                          |                      |                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|----------------------|--------------------------------------------------|
| Part Number:                                                                                                                                    |                          | MCT101D12S1024600LML |                                                  |
| Version:                                                                                                                                        |                          | 1                    |                                                  |
| Date:                                                                                                                                           |                          | 2016/04/06           |                                                  |
| Revision                                                                                                                                        |                          |                      |                                                  |
| VERSION                                                                                                                                         | DATE                     | REVISED PAGE NO.     | Note                                             |
| 0<br>A                                                                                                                                          | 2015/06/29<br>2016/01/21 |                      | First issue<br>Modify Static<br>electricity test |
| Key Attributes                                                                                                                                  |                          | Display Accessories  |                                                  |
| TFT LCD<br>”<br>b<br>{ <sup>3</sup> D!<br>Landscape<br>RGB<br>3.3V<br>[ <sup>3</sup> 5{ Interface<br>cd/m2<br>x mm<br>- 0 ~ + 0 deg C<br>40 Way |                          | MCIB-1               |                                                  |



# Contents

1.Module Classification Information

2.Summary

3.General Specification

4.Interface

5.Contour Drawing

6.Absolute Maximum Ratings

7.Electrical Characteristics

8.Interface Timing Characteristics

9.Optical Characteristics

10.Reliability

11.Other

# Midas Active Matrix Display Part Number System

|           |          |            |          |          |          |          |               |          |          |          |          |          |
|-----------|----------|------------|----------|----------|----------|----------|---------------|----------|----------|----------|----------|----------|
| <b>MC</b> | <b>T</b> | <b>057</b> | <b>A</b> | <b>6</b> | <b>*</b> | <b>W</b> | <b>320240</b> | <b>L</b> | <b>M</b> | <b>L</b> | <b>*</b> | <b>*</b> |
| 1         | 2        | 3          | 4        | 5        | 6        | 7        | 8             | 9        | 10       | 11       | 12       | 13       |

- 1 = **MC:** Midas Components
- 2 = **T:** TFTA: Active Matrix OLED **M:** Monitor
- 3 = **Size**
- 4 = **Series**
- 5 = **Viewing Angle:** 6: 6 O'clock 12: 12 O'clock O: All Round Viewing Angle
- 6 = **Blank:** No Touch **T:** Resistive Touchscreen **C:** Capacitive Touchscreen
- 7 = **Operating Temp Range:**      **S:** 0+50Deg C      **B:** -20+60Deg C  
                                                  **W:** -20+70Deg C      **E:** -30+85Deg C  
                                                  **X:** -30+80Deg C
- 8 = **No of Pixels**
- 9 = **Orientation:** **P:** Portrait **L:** Landscape
- 10 = **Mode:** **R:** Reflective **M:** Transmissive **T:** Transflective  
**S:** Sunlight Readable (Transmissive) **W:** White on Black (Monochrome)
- 11 = **Backlight:** **Blank:** None **L:** LED **C:** CCFL
- 12 = **Blank:** No Module/board **C:** Controller board module (E-Tech)
- 13 = **Blank:** None **OB:** Optically Bonded **IPS:** In-plane switching

### 3.General Specifications

- Size: 10.1 inch
- Dot Matrix: 1024 RGB X 600 dots
- Module dimension: 235(W) x143(H) x 3.0(D) mm
- Active area: 222.72 (H) x 125.28(V) mm
- Dot pitch: 0.2175(W) x 0.2088(H) mm
- LCD type: TFT, Normally White, Transmissive
- View Direction: 12 o'clock
- Gray Scale Inversion Direction: 6 o'clock
- Backlight Type: LED, Normally White
- With /Without TP: Without TP
- Surface: Anti-Glare

\*Color tone slight changed by temperature and driving voltage.

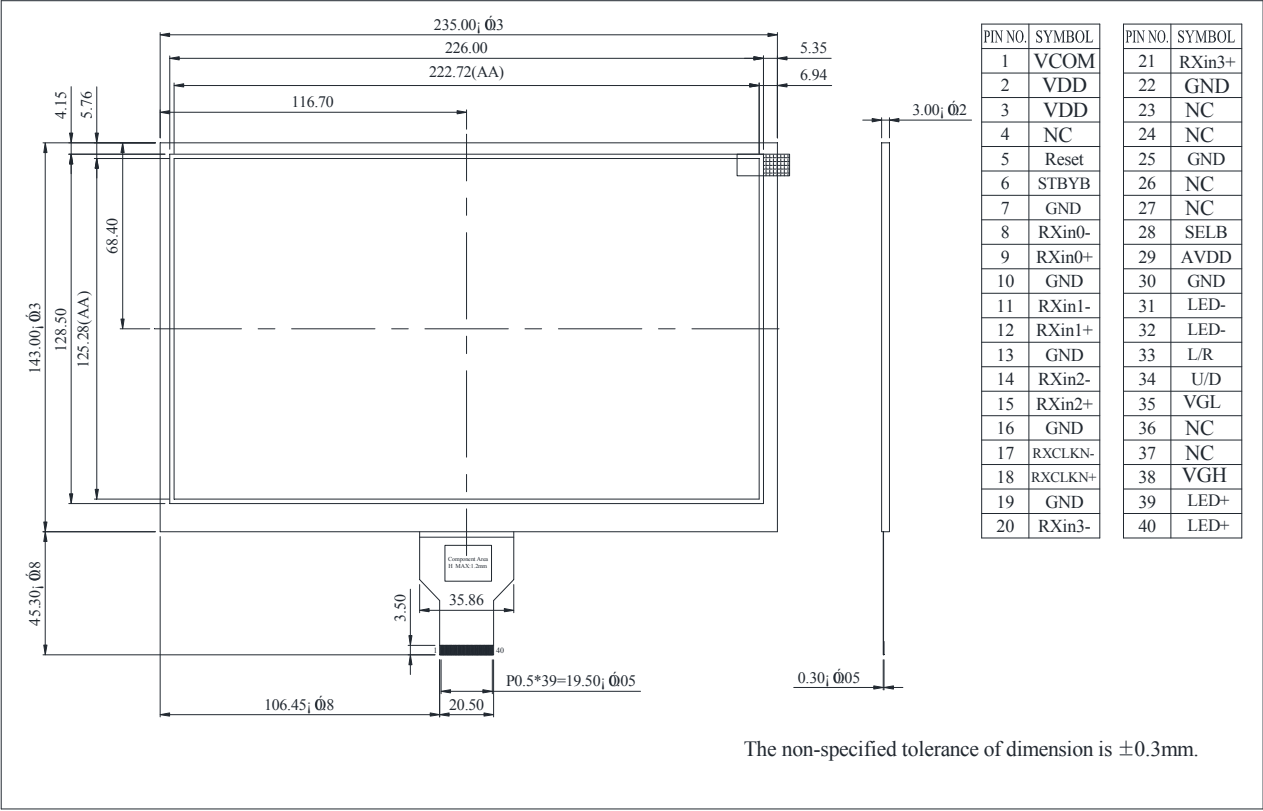
## 4.Interface

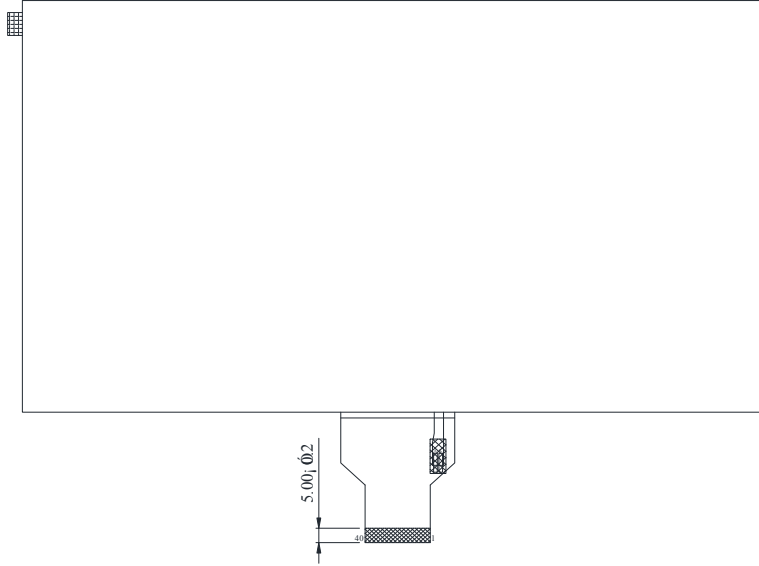
### 4.1. TFT LCD MODULE

| PinNo. | Symbol | Description                                                                                                                                                         |
|--------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | VCOM   | Common voltage                                                                                                                                                      |
| 2      | VDD    | Digital power                                                                                                                                                       |
| 3      | VDD    | Digital power                                                                                                                                                       |
| 4      | NC     | Not connect                                                                                                                                                         |
| 5      | RESET  | Global reset pin. Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability. Normally pull high. (R=10K $\Omega$ , C=1 $\mu$ F) |
| 6      | STBYB  | Standby mode, normally pull high STBYB="1", normal operation STBYB="0", timing control, source driver will turn off, all output are high-Z                          |
| 7      | GND    | Digital ground                                                                                                                                                      |
| 8      | NIND0  | Negative LVDS differential data inputs                                                                                                                              |
| 9      | PIND0  | Positive LVDS differential data inputs                                                                                                                              |
| 10     | GND    | Digital ground                                                                                                                                                      |
| 11     | NIND1  | Negative LVDS differential data inputs                                                                                                                              |
| 12     | PIND1  | Positive LVDS differential data inputs                                                                                                                              |
| 13     | GND    | Digital ground                                                                                                                                                      |
| 14     | NIND2  | Negative LVDS differential data inputs                                                                                                                              |
| 15     | PIND2  | Positive LVDS differential data inputs                                                                                                                              |
| 16     | GND    | Digital ground                                                                                                                                                      |
| 17     | NINC   | Negative LVDS differential clock inputs                                                                                                                             |
| 18     | PINC   | Positive LVDS differential clock inputs                                                                                                                             |
| 19     | GND    | Digital ground                                                                                                                                                      |
| 20     | NIND3  | Negative LVDS differential data inputs                                                                                                                              |
| 21     | PIND3  | Positive LVDS differential data inputs                                                                                                                              |
| 22     | GND    | Digital ground                                                                                                                                                      |
| 23     | NC     | Not connect                                                                                                                                                         |
| 24     | NC     | Not connect                                                                                                                                                         |
| 25     | GND    | Digital ground                                                                                                                                                      |
| 26     | NC     | Not connect                                                                                                                                                         |
| 27     | NC     | Not connect                                                                                                                                                         |
| 28     | SELB   | 6-bit/8-bit input select SELB = L , 8-bit ; SELB = H , 6-bit                                                                                                        |
| 29     | AVDD   | Analog power                                                                                                                                                        |
| 30     | GND    | Digital ground                                                                                                                                                      |
| 31     | VLED-  | LED Cathode                                                                                                                                                         |
| 32     | VLED-  | LED Cathode                                                                                                                                                         |
| 33     | SHLR   | Left or right display control                                                                                                                                       |
| 34     | UPDN   | Up / down display control                                                                                                                                           |
| 35     | VGL    | Negative power for TFT                                                                                                                                              |
| 36     | NC     | Not connect                                                                                                                                                         |

|    |       |                        |
|----|-------|------------------------|
| 37 | NC    | Not connect            |
| 38 | VGH   | Positive power for TFT |
| 39 | VLED+ | LED Anode              |
| 40 | VLED+ | LED Anode              |

# 5.Contour Drawing





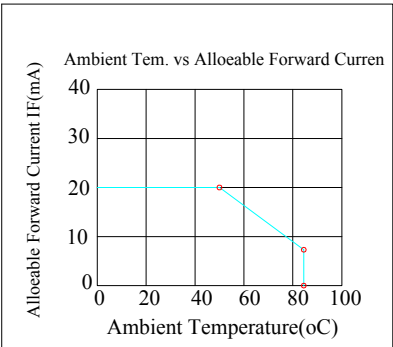
The non-specified tolerance of dimension is  $\pm 0.3\text{mm}$ .

## 6.Absolute Maximum Ratings

| Item                  | Symbol | Min | Typ | Max | Unit |
|-----------------------|--------|-----|-----|-----|------|
| Operating Temperature | TOP    | -10 | —   | +60 | □    |
| Storage Temperature   | TST    | -20 | —   | +70 | □    |

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

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



## 7. Electrical Characteristics

### 7.1. Typical Operation Conditions (At Ta = 25 °C,)

| ITEM                                 | SYMBOL | MIN      | TYP  | MAX      | UNIT | NOTE  |
|--------------------------------------|--------|----------|------|----------|------|-------|
| Digital Power Supply Voltage For LCD | VDD    | 3        | 3.3  | 3.6      | V    | -     |
| Analog Power Supply Voltage          | AVDD   | --       | 10.4 | 11       | V    | -     |
| Gate On Power Supply Voltage         | VGH    | 20       | 21   | 22       | V    | -     |
| Gate Off Power Supply Voltage        | VGL    | -8.5     | -8   | -7       | V    | -     |
| Common Power Supply Voltage          | VCOM   | --       | 3.8  | --       | V    | Note1 |
| Logic Input Voltage                  | VIH    | 0.7*DVDD | -    | DVDD     | V    | -     |
|                                      | VIL    | GND      | -    | 0.3*DVDD | V    |       |

Note1. Please adjust VCOM to make the flicker level be minimum.

### 7.2. Backlight Driving Conditions

| Parameter                             | Symbol | Min.   | Typ. | Max. | Unit | Note   |
|---------------------------------------|--------|--------|------|------|------|--------|
| Supply voltage of white LED backlight | VL     | 8.4    | 9.6  | 10.8 | V    | Note 1 |
| Current for LED backlight             | IL     | 135    | 140  | 150  | mA   |        |
| Uniformity                            | Δ      | 70     | 75   | -    | %    |        |
| LED life time                         | -      | 20,000 | -    | -    | Hr   | Note2  |

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25℃ and IL =140mA.

Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and IL =140mA. The LED lifetime could be decreased if operating IL is larger than 140mA.

## 8.Timing Characteristics

### DE mode

| Item                    | Symbol   | Values |      |      | Unit | Remark |
|-------------------------|----------|--------|------|------|------|--------|
|                         |          | Min.   | Typ. | Max. |      |        |
| Horizontal Display Area | thd      | -      | 1024 | -    | DCLK |        |
| DCLK Frequency          | fclk     | 40.8   | 51.2 | 67.2 | MHz  |        |
| One Horizontal Line     | th       | 1114   | 1344 | 1400 | DCLK |        |
| HS Blanking             | Thb+thfp | 90     | 320  | 376  | DCLK |        |
| Vertical display area   | tvd      | -      | 600  | -    | H    |        |
| VSYNC period time       | tv       | 610    | 635  | 800  | H    |        |
| VSYNC blanking          | tvb+tvfp | 10     | 85   | 200  | H    |        |

## 9.Optical Characteristics

| Item                                              | Symbol | Condition.                        | Min   | Typ.  | Max.  | Unit              | Remark            |
|---------------------------------------------------|--------|-----------------------------------|-------|-------|-------|-------------------|-------------------|
| Response time                                     | Tr     | $\theta=0^\circ$ 、 $\phi=0^\circ$ | -     | 4     | -     | .ms               | Note 3            |
|                                                   | Tf     |                                   | -     | 4     | -     | .ms               | Note 3            |
| Contrast ratio                                    | CR     | At optimized viewing angle        | -     | 600   | -     | -                 | Note 4            |
| Color Chromaticity                                | White  | $\theta=0^\circ$ 、 $\phi=0^\circ$ | 0.245 | 0.295 | 0.345 | -                 | Note 2,5          |
|                                                   |        |                                   | 0.281 | 0.331 | 0.381 | -                 |                   |
| Viewing angle<br>(Gray Scale Inversion Direction) | Hor.   | $\theta_R$                        | -     | 65    | -     | Deg.              | Note 1            |
|                                                   |        | $\theta_L$                        | -     | 65    | -     |                   |                   |
|                                                   | Ver.   | $\phi_T$                          | -     | 55    | -     |                   |                   |
|                                                   |        | $\phi_B$                          | -     | 65    | -     |                   |                   |
| Brightness                                        | -      | -                                 | 140   | 160   | -     | cd/m <sup>2</sup> | Center of display |

Ta=25±2□

Note 1: Definition of viewing angle range

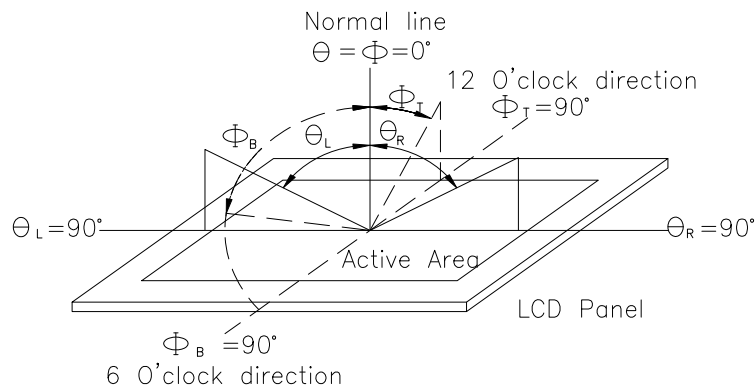


Fig. 9.1. Definition of viewing angle

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.

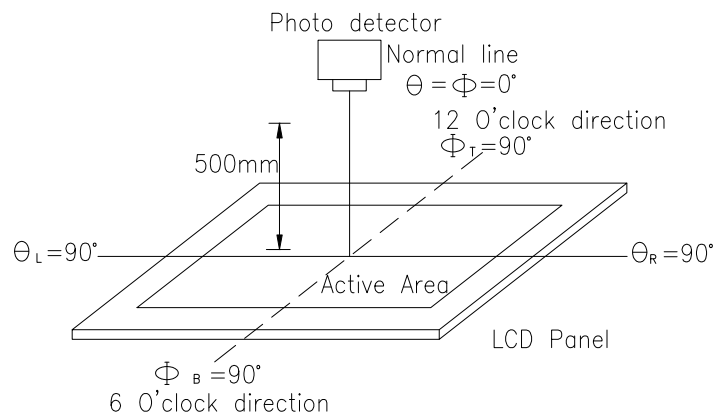
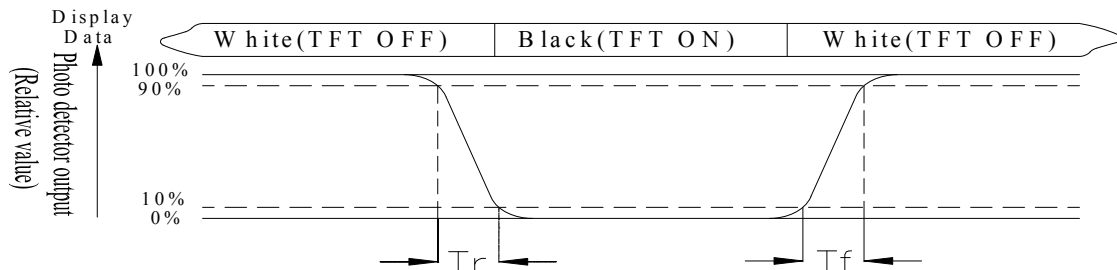


Fig. 9.2. Optical measurement system setup

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

“ $\pm$ ” means that the analog input signal swings in phase with VCOM signal.

“ $\pm$ ” 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.