


|                      |            |                      |            |
|----------------------|------------|----------------------|------------|
| MC21605A6WM-FPTLW-V2 | 2 x 16     | 5mm Character Height | LCD Module |
| <b>Specification</b> |            |                      |            |
| Version: 1           |            | Date: 05/08/2021     |            |
| <b>Revision</b>      |            |                      |            |
| 1                    | 03/08/2021 | First Issue          |            |

| Display Features      |                          |  |  |              |                  |
|-----------------------|--------------------------|--|--|--------------|------------------|
| Character Count       | 2 x 16                   |  |  |              |                  |
| Appearance            | Black on White           |  |  |              |                  |
| Logic Voltage         | 5V                       |  |  |              |                  |
| Interface             | Parallel                 |  |  |              |                  |
| Font Set              | English / Scandinavian   |  |  |              |                  |
| Display Mode          | Transflective            |  |  |              |                  |
| Character Height      | 5.23mm                   |  |  |              |                  |
| LC Type               | FSTN                     |  |  |              |                  |
| Module Size           | 84.00 x 44.00 x 13.50 mm |  |  |              |                  |
| Operating Temperature | -20°C ~ +70°C            |  |  |              |                  |
| Construction          | COB                      |  |  | Box Quantity | Weight / Display |
| LED Backlight         | White                    |  |  |              |                  |

\* - For full design functionality, please use this specification in conjunction with the ST7066U + ST7065C specification. (Provided Separately)

| Display Accessories      |  |
|--------------------------|--|
| Part Number              | Description  |
| MCCMDB-16SIL             | LCD Interconnect board, can be driven from either a PC or a single Board computer with a USB output. |
| MCCBL1A16SLIP-16DILS-150 | 16 Way, Single in-line to Dual In-line connector Cable.  |
| MCCBL1A16SLIP-16SILS-150 | 16 Way, Single in-line to Single In-line connector Cable.  |

| Optional Variants |                  |         |
|-------------------|------------------|---------|
| Fonts             | Appearances      | Voltage |
| English/Japanese  | Black on Yellow/ | 3V      |
| English/Euro      | Green            | 3.3V    |
| English/Cyrillic  | White on Blue    | 5V      |
|                   | Black on RGB     |         |



## FEATURES

| AVAILABLE OPTIONS          | CHARACTERISTICS                                 |
|----------------------------|---|
| DISPLAY FORMAT             | 16Characters by 2 Lines                         |
| POLARIZER OPTIONS          | Positive Transflective                          |
| BACKLIGHT TYPE OPTIONS     | Edge Type LED Backlight (Standard version)      |
| BACKLIGHT COLOR OPTIONS    | White color                                     |
| LCD PANEL OPTIONS          | FSTN  |
| VIEWING ANGLE OPTIONS      | 6:00 (Bottom )                                  |
| TEMPERATURE RANGE OPTIONS  | -20°C ~ 70°C, Single Supply Voltage             |
| SUGGESTED DRIVING VOLTAGE  | V <sub>lcm</sub> = 5.0V V <sub>led</sub> = 5.0V |
| SUGGESTED LED DRIVING MODE | PIN15: LED+, PIN16: LED-                        |
| CONTROLLER                 | ST7066U+ST7065C                                 |
| FONT MAP CODE              | M Version                                       |
| DRIVING DUTY               | 1/16  |
| DRIVING BIAS               | 1/5   |

## MECHANICAL SPECIFICATIONS

|                       |               |    |                        |                    |    |
|-----------------------|---------------|----|------------------------|--------------------|----|
| <b>OVERALL SIZE</b>   | 84.0W x 44.0H | mm | <b>THICKNESS</b>       | max 13.5           | mm |
| <b>VIEWING AREA</b>   | 64.5W x 16.4H | mm | <b>HOLE-HOLE</b>       | 79.0/76.0W x 36.0H | mm |
| <b>CHARACTER SIZE</b> | 3.00W x 5.23H | mm | <b>CHARACTER PITCH</b> | 0.51W x 0.52H      | mm |
| <b>DOT SIZE</b>       | 0.56W x 0.61H | mm | <b>DOT PITCH</b>       | 0.05W x 0.05H      | mm |

## ABSOLUTE MAXIMUM RATINGS

| ITEM                  | SYMBOL           | CONDITION | MIN                   | TYP | MAX                  | UNIT |
|-----------------------|------------------|-----------|-----------------------|-----|----------------------|------|
| POWER SUPPLY ( LOGIC) | V <sub>dd</sub>  | 25°C      | -0.3                  | —   | 7.0                  | V    |
| POWER SUPPLY (LCD)    | V <sub>0</sub>   | 25°C      | V <sub>dd</sub> -13.5 | —   | V <sub>dd</sub> +0.3 | V    |
| INPUT VOLTAGE         | V <sub>in</sub>  | 25°C      | -0.3                  | —   | V <sub>dd</sub> +0.3 | V    |
| OPERATING TEMPERATURE | V <sub>opr</sub> | —         | -20                   | —   | 70                   | °C   |
| STORAGE TEMPERATURE   | V <sub>stg</sub> | —         | -30                   | —   | 80                   | °C   |

## ELECTRONIC CHARACTERISTICS \*

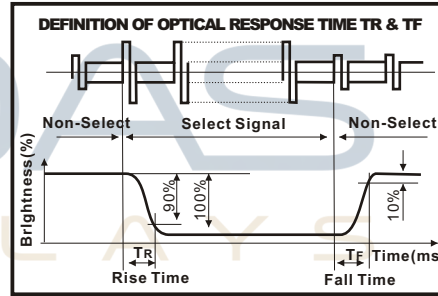
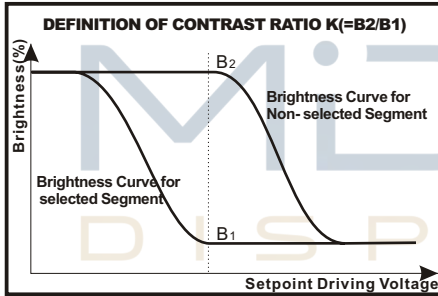
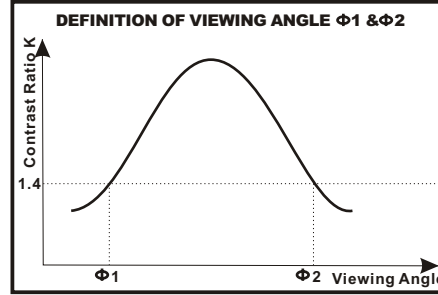
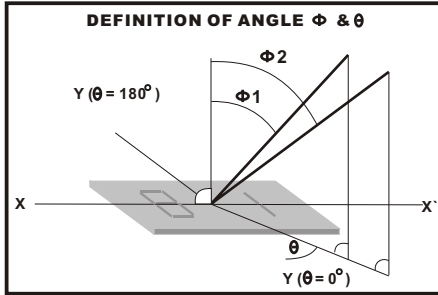
|  | ITEM                          | SYMBOL   | CONDITION           | MIN  | TYP  | MAX  | UNIT |
|--|-------------------------------|--|---------------------|------|------|------|------|
|  | INPUT VOLTAGE                 | V <sub>dd</sub>  | —                   | —    | 5.0  | —    | V    |
|  | SUPPLY CURRENT                | I <sub>dd</sub>  | V <sub>dd</sub> =5V | —    | 1.5  | —    | mA   |
|  | DRIVING VOLTAGE FOR LCD PANEL | V <sub>lcd</sub> = (V <sub>dd</sub> - V <sub>0</sub> ) | -20°C               | 4.45 | —    | 4.90 | V    |
|  |                               |  | 0°C                 | 4.35 | —    | 4.85 |      |
|  |                               |  | 25°C                | 4.25 | 4.50 | 4.80 |      |
|  |                               |  | 50°C                | 4.15 | —    | 4.70 |      |
|  |                               |  | 70°C                | 4.05 | —    | 4.60 |      |



## LCD CHARACTERISTICS

**FOR STN/FSTN TYPE LCD Panel (TA=25 °C, Vlcd=5.0V ± 0.5V)**

|  | ITEM                | SYMBOL            | CONDITION | MIN | TYP | MAX | UNIT |
|--|---------------------|-------------------|-----------|-----|-----|-----|------|
|  | VIEWING ANGLE       | $\Phi 2 - \Phi 1$ | K=4       | 40  | —   | —   | deg  |
|  |                     | $\theta$          |           | 60  |     |     |      |
|  | CONTRAST RATIO      | K                 | —         | 6   | —   | —   | —    |
|  | RESPONSE TIME(RISE) | TR                | —         | —   | 150 | 250 | ms   |
|  | RESPONSE TIME(FALL) | TF                | —         | —   | 150 | 250 | ms   |



## LED CHARACTERISTICS

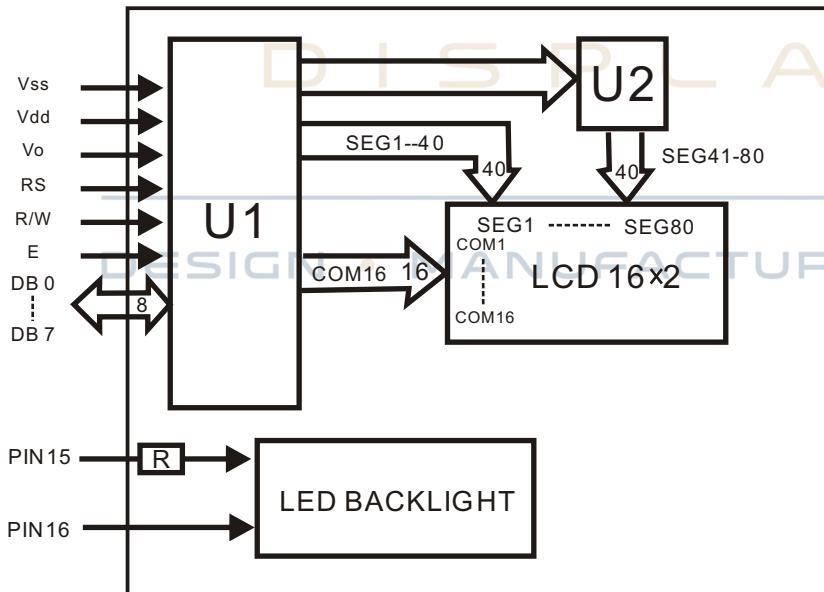
|  | ITEM                         | SYMBOL       | CONDITION       | MIN  | TYP | MAX  | UNIT              |
|--|------------------------------|--------------|-----------------|------|-----|------|-------------------|
|  | LED FORWARD VOLTAGE          | Vf           | 25 °C           | 2.8  | —   | 3.1  | V                 |
|  | LED FORWARD CURRENT          | If           | 25 °C           | —    | 15  | —    | mA                |
|  | LED REVERSE CURRENT          | Ir           | 25 °C Vr=5.0V   | —    | —   | 10   | μA                |
|  | LED COLOR RANGE              | X coordinate | 25 °C If = 15mA | 0.26 | —   | 0.30 | —                 |
|  |                              | Y coordinate |                 | 0.27 | —   | 0.31 | —                 |
|  | LED BRIGHTNESS (WITHOUT LCD) | Lv           | 25 °C If = 15mA | —    | 240 | —    | cd/m <sup>2</sup> |
|  | LED BRIGHTNESS UNIFORMITY    | Lvmin/Lvmax  | 25 °C If = 15mA | 70   | —   | —    | Ratio             |
|  | LED LIFE TIME                | —            | 25 °C If = 15mA | 9K   | —   | —    | Hours             |



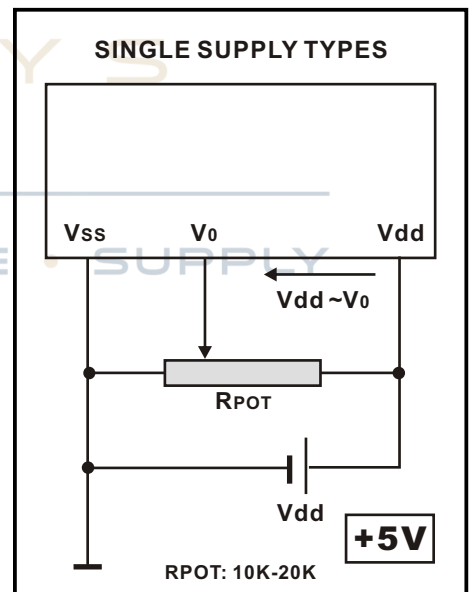
**PIN ASSIGNMENT**

| PIN | SYMBOL | DESCRIPTION            | REMARKS |
|-----|--------|------------------------|---------|
| 1   | Vss    | GND                    |         |
| 2   | Vdd    | Power supply for LCM   | 5.0V    |
| 3   | V0     | Contrast Adjust        |         |
| 4   | RS     | Register Select Signal |         |
| 5   | R/W    | Data Read / Write      |         |
| 6   | E      | Enable Signal          |         |
| 7   | DB0    | Data bus line          |         |
| 8   | DB1    | Data bus line          |         |
| 9   | DB2    | Data bus line          |         |
| 10  | DB3    | Data bus line          |         |
| 11  | DB4    | Data bus line          |         |
| 12  | DB5    | Data bus line          |         |
| 13  | DB6    | Data bus line          |         |
| 14  | DB7    | Data bus line          |         |
| 15  | LED+   | Power supply for BKL   | 5.0V    |
| 16  | LED-   | Power supply for BKL   |         |

**BLOCK DIAGRAM**



**POWER SUPPLY DIAGRAM**



| Upper<br>4bit<br>Lower<br>4bit | LLLL             | LLLH | LLHL | LLHH | LHLL | LHLH | LHHL | LHHH | HLLL | HLLH | HLHL | HLHH | HHLL | HHLH | HHHL | HHHH |
|--------------------------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| LLLL                           | CG<br>RAM<br>(1) |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| LLLH                           | (2)              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| LLHL                           | (3)              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| LLHH                           | (4)              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| LHLL                           | (5)              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| LHLH                           | (6)              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| LHHL                           | (7)              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| LHHH                           | (8)              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| HLLL                           | (1)              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| HLLH                           | (2)              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| HLHL                           | (3)              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| HLHH                           | (4)              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| HHLL                           | (5)              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| HHLH                           | (6)              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| HHHL                           | (7)              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| HHHH                           | (8)              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |



