

|                        |            |                      |            |
|------------------------|------------|----------------------|------------|
| MC21605A6W-FPTLW3.3-V2 | 2 x 16     | 5mm Character Height | LCD Module |
| Specification          |            |                      |            |
| Version: 1             |            | Date: 12/03/2021     |            |
| Revision               |            |                      |            |
| 1                      | 10/03/2021 | First Issue          |            |

| Display Features      |                          |  |                  |
|-----------------------|--------------------------|--------------------------------------------------------------------------------------|------------------|
| Character Count       | 2 x 16                   |                                                                                      |                  |
| Appearance            | Black on White           |                                                                                      |                  |
| Logic Voltage         | 3.3V                     |                                                                                      |                  |
| Interface             | Parallel                 |                                                                                      |                  |
| Font Set              | English / Japanese       |                                                                                      |                  |
| 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                      |                                                                                      |                  |
| LED Backlight         | White                    |                                                                                      |                  |
|                       |                          | Box Quantity                                                                         | Weight / Display |

\* - 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 |
|                   | Black on<br>Yellow/Green<br>White on Blue |         |

## FEATURES

| AVAILABLE OPTIONS          | CHARACTERISTICS                                  |
|----------------------------|--------------------------------------------------|
| DISPLAY FORMAT             | 16Characters by 2 Lines                          |
| POLARIZER OPTIONS          | Positive Transflective                           |
| BACKLIGHT TYPE OPTIONS     | Edge Type LED Backlight (Long life span 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> = 3.3V V <sub>led</sub> = 3.3V  |
| SUGGESTED LED DRIVING MODE | PIN15: LED+, PIN16:LED-                          |
| CONTROLLER                 | ST7066U+ST7065C                                  |
| FONT MAP CODE              | E Version                                        |
| DRIVING DUTY               | 1/16                                             |
| DRIVING BIAS               | 1/5                                              |

## MECHANICAL SPECIFICATIONS

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

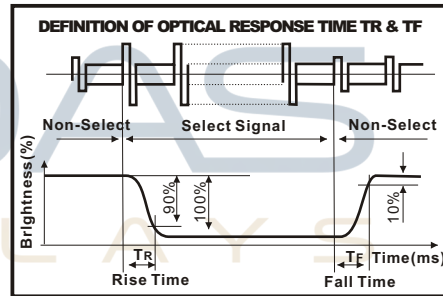
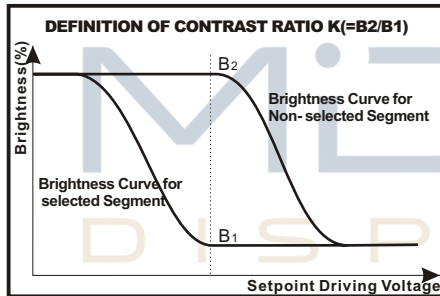
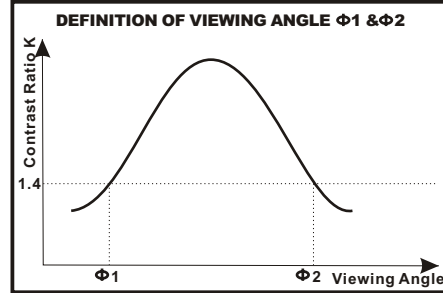
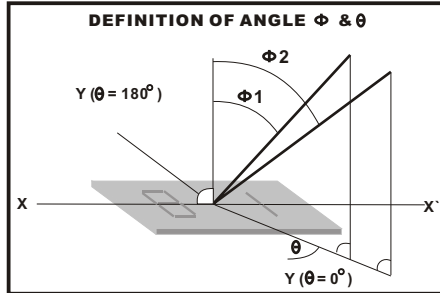
## ELECTRONIC CHARACTERISTICS\*

|  | ITEM                             | SYMBOL                                                 | CONDITION             | MIN | TYP | MAX | UNIT |
|--|----------------------------------|--------------------------------------------------------|-----------------------|-----|-----|-----|------|
|  | INPUT VOLTAGE                    | V <sub>lcm</sub> = V <sub>dd</sub>                     | —                     | —   | 3.3 | —   | V    |
|  | SUPPLY CURRENT                   | I <sub>dd</sub>                                        | V <sub>dd</sub> =3.3V | —   | 1.5 | —   | mA   |
|  | DRIVING VOLTAGE<br>FOR LCD PANEL | V <sub>lcd</sub> = (V <sub>dd</sub> - V <sub>0</sub> ) | -20°C                 | —   | —   | —   | V    |
|  |                                  |                                                        | 0°C                   | —   | —   | —   |      |
|  |                                  |                                                        | 25°C                  | —   | —   | —   |      |
|  |                                  |                                                        | 50°C                  | —   | —   | —   |      |
|  |                                  |                                                        | 70°C                  | —   | —   | —   |      |

## LCD CHARACTERISTICS

FOR STN/FSTN TYPE LCD Panel ( $T_A=25^{\circ}\text{C}$ ,  $V_{lcd}=5.0V \pm 0.5V$ )

|  | 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   |



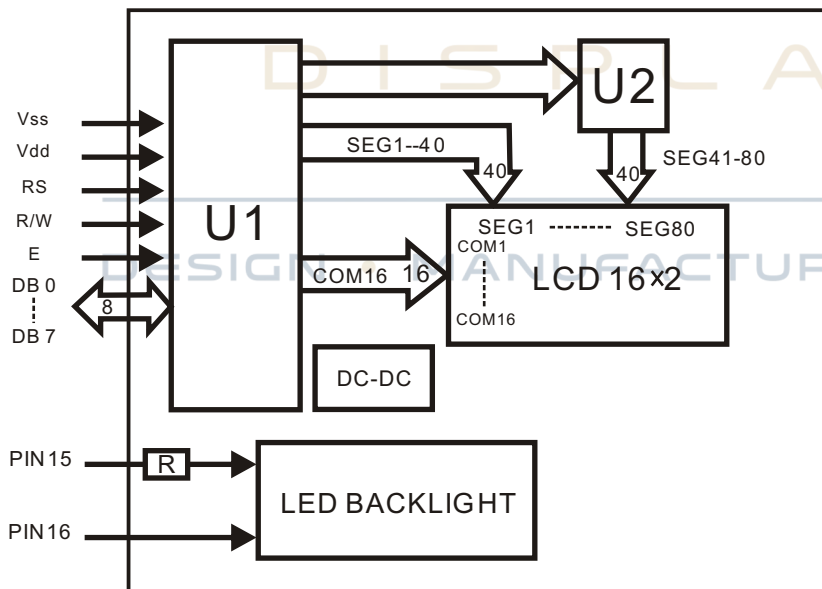
## LED CHARACTERISTICS

|  | ITEM                         | SYMBOL       | CONDITION                       | MIN  | TYP | MAX  | UNIT            |
|--|------------------------------|--------------|---------------------------------|------|-----|------|-----------------|
|  | LED FORWARD VOLTAGE          | Vf           | $25^{\circ}\text{C}$            | 2.6  | —   | 3.0  | V               |
|  | LED FORWARD CURRENT          | If           | $25^{\circ}\text{C}$            | —    | 15  | —    | mA              |
|  | LED REVERSE CURRENT          | Ir           | $25^{\circ}\text{C}$ $V_r=5.0V$ | —    | —   | 30   | $\mu\text{A}$   |
|  | LED COLOR RANGE              | X coordinate | $25^{\circ}\text{C}$ If = 15mA  | 0.26 | —   | 0.30 | —               |
|  |                              | Y coordinate |                                 | 0.27 | —   | 0.31 | —               |
|  | LED BRIGHTNESS (WITHOUT LCD) | Lv           | $25^{\circ}\text{C}$ If = 15mA  | —    | 231 | —    | $\text{cd/m}^2$ |
|  | LED BRIGHTNESS UNIFORMITY    | Lvmin/Lvmax  | $25^{\circ}\text{C}$ If = 15mA  | 70   | —   | —    | Ratio           |
|  | LED LIFE TIME                | —            | $25^{\circ}\text{C}$ If = 15mA  | 20K  | —   | —    | Hours           |

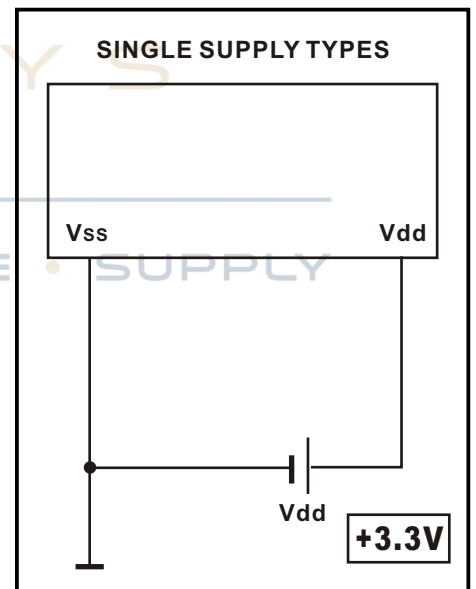
## PIN ASSIGNMENT

| PIN | SYMBOL | DESCRIPTION            | REMARKS |
|-----|--------|------------------------|---------|
| 1   | Vss    | GND                    |         |
| 2   | Vdd    | Power supply for LCM   | 3.3V    |
| 3   | NC     | No connection          |         |
| 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   | 3.3V    |
| 16  | LED-   | Power supply for BKL   |         |

## BLOCK DIAGRAM



## POWER SUPPLY DIAGRAM



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

