

|                         |            |                      |            |
|-------------------------|------------|----------------------|------------|
| MC21609AB6W-BNMLW3.3-V2 | 2 x 16     | 9mm 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            | White on Blue             |                                                                                      |                  |
| Logic Voltage         | 3.3V                      |                                                                                      |                  |
| Interface             | Parallel                  |                                                                                      |                  |
| Font Set              | English / Japanese        |                                                                                      |                  |
| Display Mode          | Transmissive              |                                                                                      |                  |
| Character Height      | 9.66mm                    |                                                                                      |                  |
| LC Type               | Blue STN                  |                                                                                      |                  |
| Module Size           | 122.00 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 Yellow/Green<br>Black on White |         |

## FEATURES

| AVAILABLE OPTIONS          | CHARACTERISTICS                                  |
|----------------------------|--------------------------------------------------|
| DISPLAY FORMAT             | 16 Characters by 2 Lines                         |
| POLARIZER OPTIONS          | Negative Transmissive                            |
| BACKLIGHT TYPE OPTIONS     | Edge Type LED Backlight (Long life span version) |
| BACKLIGHT COLOR OPTIONS    | White color                                      |
| LCD PANEL OPTIONS          | Blue STN                                         |
| 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   | 122.0W x 44.0H | mm | THICKNESS       | max 13.5       | mm |
| VIEWING AREA   | 99.0W x 24.0H  | mm | HOLE-HOLE       | 115.0W x 37.0H | mm |
| CHARACTER SIZE | 4.84W x 9.66H  | mm | CHARACTER PITCH | 1.16W x 0.68H  | mm |
| DOT SIZE       | 0.92W x 1.10H  | mm | DOT PITCH       | 0.06W x 0.06H  | 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   |

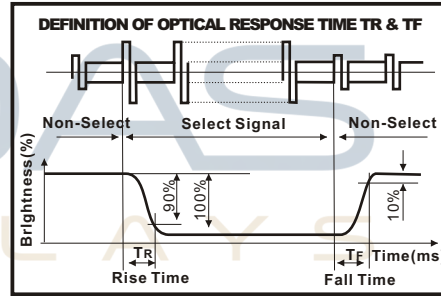
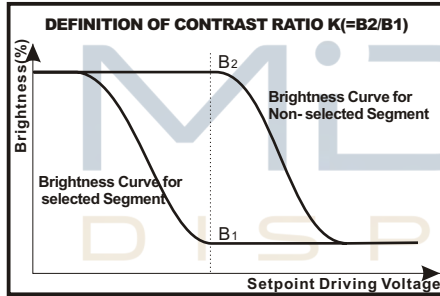
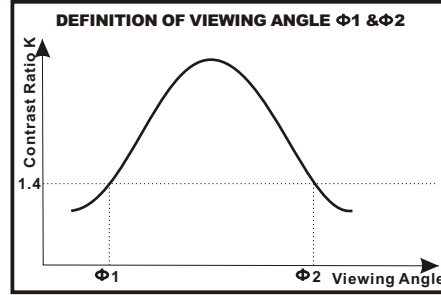
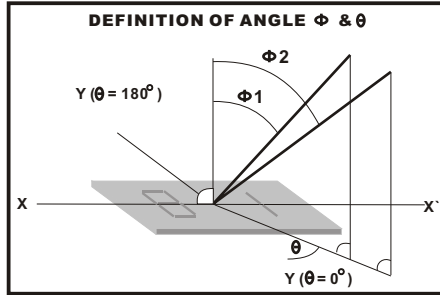
## ELECTRONIC CHARACTERISTICS

|  | 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 (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   |



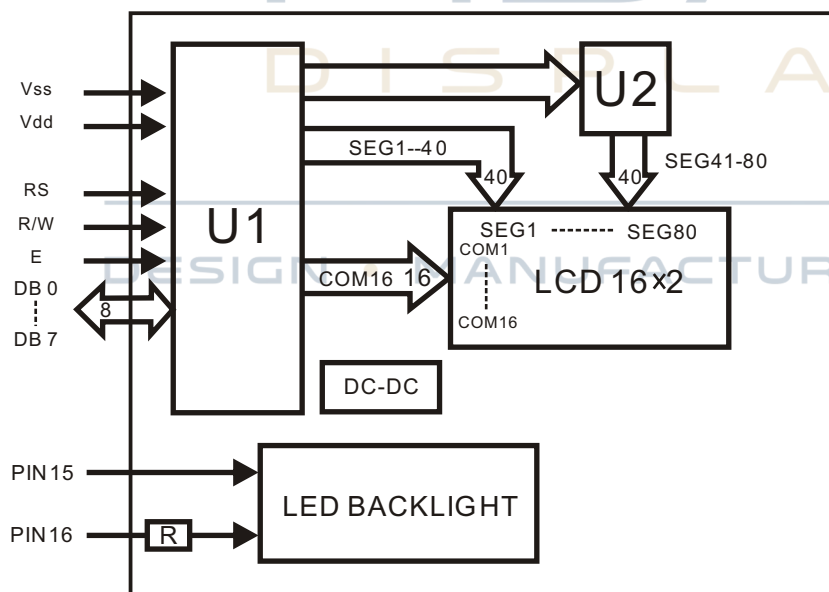
## LED CHARACTERISTICS

|  | ITEM                         | SYMBOL       | CONDITION       | MIN  | TYP | MAX  | UNIT              |
|--|------------------------------|--------------|-----------------|------|-----|------|-------------------|
|  | LED FORWARD VOLTAGE          | Vf           | 25 °C           | —    | 3.0 | —    | V                 |
|  | LED FORWARD CURRENT          | If           | 25 °C           | —    | 30  | —    | mA                |
|  | LED REVERSE CURRENT          | Ir           | 25 °C Vr=5.0V   | —    | —   | 60   | μA                |
|  | LED COLOR RANGE              | X coordinate | 25 °C If = 30mA | 0.26 | —   | 0.30 | —                 |
|  |                              | Y coordinate |                 | 0.27 | —   | 0.31 | —                 |
|  | LED BRIGHTNESS (WITHOUT LCD) | Lv           | 25 °C If = 30mA | —    | 470 | —    | cd/m <sup>2</sup> |
|  | LED BRIGHTNESS UNIFORMITY    | Lvmin/Lvmax  | 25 °C If = 30mA | 70   | —   | —    | Ratio             |
|  | LED LIFE TIME                | —            | 25 °C If = 30mA | 20K  | —   | —    | Hours             |

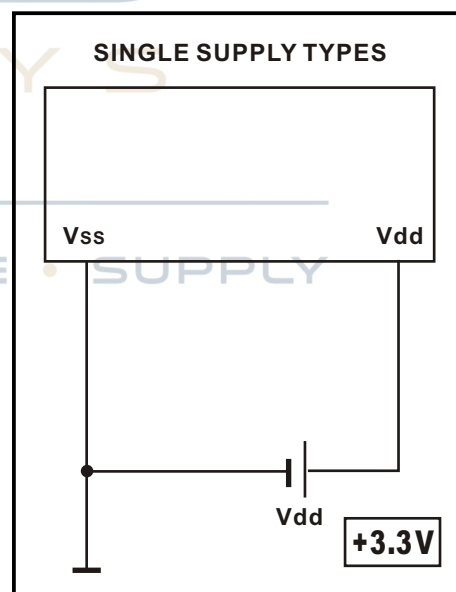
## PIN ASSIGNMENT

| 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   |         |
| 16  | LED+   | Power supply for BKL   | 3.3V    |

## 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)              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |

