

LMT025ENPFWA-NAN

LCD Module User Manual

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| Rev. | Descriptions | Release Date |
|------|---------------------|--------------|
| 0.1 | Preliminary release | 2022-05-17 |
| 0.2 | Minor Updata | 2022-06-09 |
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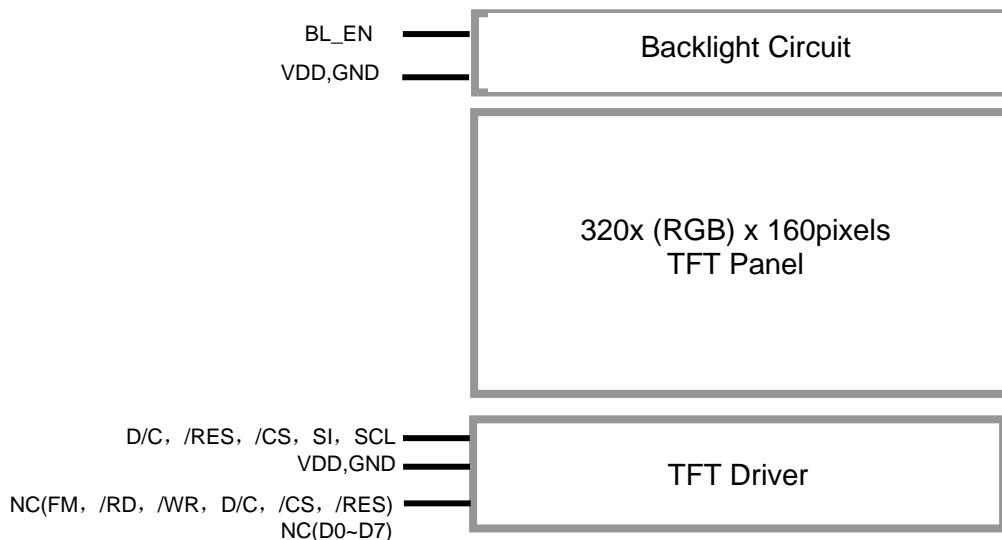
1. Basic Specifications

| | |
|-------------------------|-------------------------------|
| Screen Size(Diagonal) : | 2.5" |
| Color Depth: | 262k color |
| Number of dots : | 320x (RGB) x 160 |
| Active Area : | 56.64 x 28.32 mm |
| Dot Pitch : | 0.140 x 0.140 mm |
| Display Technology : | a-Si TFT active matrix |
| Display Mode : | SFT |
| Interface: | SPI/CUP 8bit |
| Pixel Configuration : | R.G.B. Vertical Stripe |
| Viewing Direction : | full view angle |
| Backlight Type: | White LEDs |
| Outline Dimension : | 84.0 x 38.3 x 13.0MAX mm |
| Operating Temperature : | -20 ~ +70°C (No Condensation) |
| Storage Temperature : | -30 ~ +80°C (No Condensation) |

Note:

1. For saturated color display content (eg. pure-red, pure-green, pure-blue or pure-colors-combinations).
2. For "color scales" display content.
3. Color tone may slightly change by temperature and driving condition.

1.1 Block Diagram



1.2 Terminal (K3\K5) Functions(Default)

| Pin No. | PIN Name | I/O | Descriptions |
|---------|----------|-------|--|
| 1 | GND | Power | Negative power supply ,0V |
| 2 | VDD | Power | Positive power supply |
| 3 | SI | Input | Serial in/out signal. |
| 4 | SCL | Input | Serial Clock |
| 5 | D/C | Input | Serves as command or parameter select. |
| 6 | /RES | Input | Reset Signal: /RES = L, Initialization is executed /RES = H, Normal running |
| 7 | /CS | Input | Chip Select Signal: /CS=L, enable access to the LCD module /CS=H, disable access to the LCD module |
| 8 | BLEN | Input | Backlight Driver enable signal, active High, PWM(*1) can be possible |

Note:

*1. The PWM frequency is between 200Hz and 500Hz

1.3 Terminal (K1\K2) Functions

| Pin No. | PIN Name | I/O | Descriptions |
|---------|----------|--------|---|
| 1 | NC(GND) | Power | Negative power supply ,0V |
| 2 | NC(GND) | Power | |
| 3 | NC(BLEN) | Input | Backlight Driver enable signal, active High, PWM can be possible |
| 4 | NC(VDD) | Power | Positive power supply |
| 5 | NC(VDD) | Power | |
| 6 | NC(/RD) | Input | Read enable input, active LOW |
| 7 | NC(/WR) | Input | Write enable input, active LOW |
| 8 | NC(D/C) | Input | Register Select Signal: D/C = H, Transferring the Display Data D/C = L, Transferring the Control Data |
| 9 | NC(/CS) | Input | Chip Select Signal: /CS=L, enable access to the LCD module /CS=H, disable access to the LCD module |
| 10 | NC(D0) | I/O | Data Bus |
| : | : | I/O | |
| 17 | NC(D7) | I/O | |
| 18 | NC(/RES) | Input | Reset Signal: /RES = L, Initialization is executed /RES = H, Normal running |
| 19 | NC(FM) | Output | Displaying timing frame signal |
| 20 | NC | - | NC |

Note: 4-SPI and parallel port configuration method

| Mode | Install | No install |
|--------------------|---|--------------------------|
| 4-SPI (default) | R21(100Ω, 0603*4) R1-R4,R9,R27-R34 (0Ω,0603) | R18-R20 R5-R8,R10,R36 |
| 80-8bit | R18-R20(100Ω, 0603*4) R5-R8,R10,R36(0Ω,0603) | R21 R1-R4,R9,R27-R34 |

2. Absolute Maximum Ratings

| Items | Symbol | Min. | Max. | Unit | Condition |
|-----------------------|-----------------|------|------|------|-----------|
| Supply Voltage | VDD | -0.3 | +5.3 | V | GND = 0V |
| Operating Temperature | T _{OP} | -20 | +70 | °C | - |
| Storage Temperature | T _{ST} | -30 | +80 | °C | - |

Cautions:

Any Stresses exceeding the Absolute Maximum Ratings may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

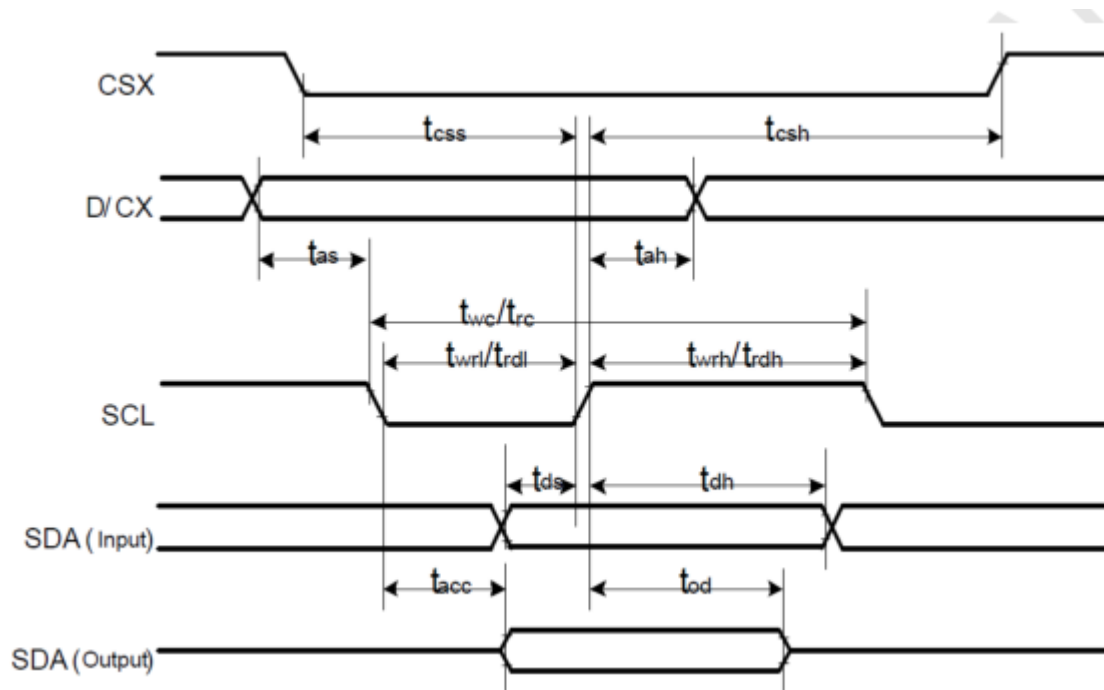
3. Electrical Characteristics

3.1 DC Characteristics

VDD=5.0V ,GND=0V, T_{OP}=25°C

| Items | Symbol | MIN. | TYP. | MAX. | Unit | Application Pin |
|---------------------|-----------------|------|------|------|------|--|
| Supply Voltage | VDD | 4.7 | 5.0 | 5.3 | V | VDD |
| Input High Voltage | V _{IH} | 2.4 | - | 3.4 | V | /RES, /CS, D/C, D0~D7, /WR, /RD, SCL, SI |
| Input Low Voltage | V _{IL} | - | - | 1.0 | V | |
| Output High Voltage | V _{OH} | 2.7 | - | 3.4 | V | D0~D7, FM |
| Output Low Voltage | V _{OL} | GND | - | 0.7 | V | |
| Operating Current | I _{DD} | - | 83.9 | - | mA | Backlight are ON |
| | I _{DD} | - | 2.86 | - | mA | Backlight are OFF |

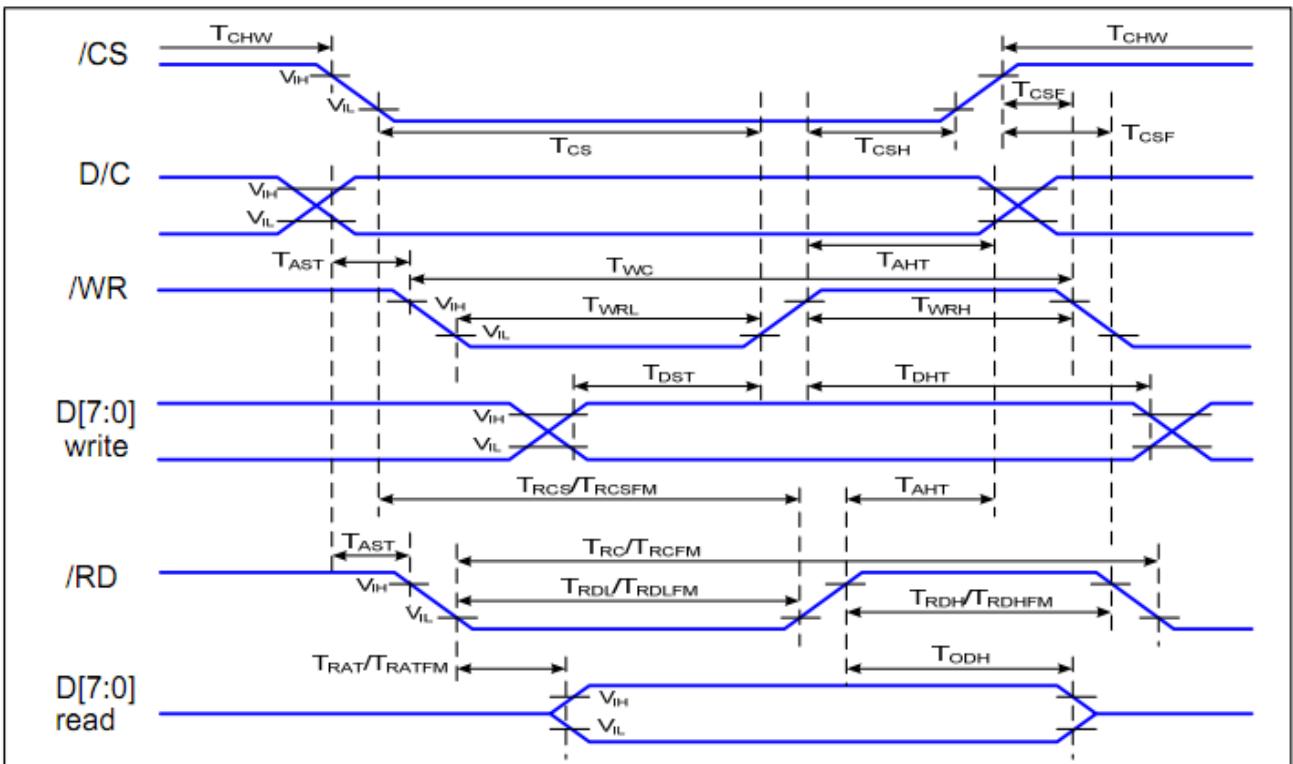
3.2 Display Serial Interface Timing Characteristics (4-line SPI system)(Default)



| Signal | Symbol | Parameter | Min | Max | Unit | Description |
|--------------|--------|------------------------------|-----|-----|------|---|
| CSX | tcss | Chip select time(Write) | 30 | - | ns | |
| | tcsh | Chip select hold time(write) | 30 | - | ns | |
| SCL | twc | Serial clock cycle (Write) | 100 | - | ns | |
| | twrh | SCL "H" pulse width (Write) | 35 | - | ns | |
| | twrl | SCL "L" pulse width (Write) | 35 | - | ns | |
| | trc | Serial clock cycle (Read) | 150 | - | ns | |
| | trdh | SCL "H" pulse width (Read) | 60 | - | ns | |
| | trdl | SCL "L" pulse width (Read) | 60 | - | ns | |
| D/CX | tas | D/CX setup time | 10 | - | | |
| | tah | D/CX hold time(Write / Read) | 10 | - | | |
| SDA (Input) | tds | Data setup time(Write) | 30 | - | ns | |
| | tdh | Data hold time(Write) | 30 | - | ns | |
| SDA (Output) | tacc | Access time(Read) | - | 50 | ns | For maximum CL=30pF For minimum CL=8pF |
| | tod | Output disable time(Read) | 15 | 50 | ns | |

Note: VSS=0V, Ta=25°C

3.3 8080 Mode System Bus Timing



| Singal | Symbol | Parameter | Min. | MAX. | Unit | Description |
|-------------|--------------------|------------------------------------|------|------|------|--|
| D/C | T _{AST} | Address setup time | 0 | - | ns | |
| | T _{AHT} | Address hold time (Write/Read) | 10 | - | ns | |
| /CS | T _{CHW} | CSX "H" pulse width | 0 | - | ns | |
| | T _{CS} | Chip Select setup time (Write) | 15 | - | ns | |
| | T _{RCS} | Chip Select setup time (Read ID) | 45 | - | ns | |
| | T _{RCSFM} | Chip Select setup time (Read FM) | 355 | - | ns | |
| | T _{CSF} | Chip Select Wait time (Write/Read) | 10 | - | ns | |
| /WR | T _{WC} | Write cycle | 66 | - | ns | |
| | T _{WRH} | Write Control pulse H duration | 15 | - | ns | |
| | T _{WRL} | Write Control pulse L duration | 15 | - | ns | |
| /RD (FM) | T _{RCFM} | Read Cycle (FM) | 450 | - | ns | |
| | T _{RDHFM} | Read Control H duration (FM) | 90 | - | ns | |
| | T _{RDLFM} | Read Control L duration (FM) | 355 | - | ns | |
| /RD (ID) | T _{RC} | Read cycle (ID) | 160 | - | ns | |
| | T _{RDH} | Read Control pulse H duration | 90 | - | ns | |
| | T _{RDL} | Read Control pulse L duration | 45 | - | ns | |
| D[7:0] | T _{DST} | Write data setup time | 10 | - | ns | For maximum CL=30pF For minimum CL=8pF |
| | T _{DHT} | Write data hold time | 10 | - | ns | |
| | T _{RAT} | Read access time | - | 40 | ns | |
| | T _{RATFM} | Read access time | - | 340 | ns | |
| | T _{ROD} | Read output disable time | 20 | 80 | ns | |

Note: GND=0V, TOP=25°C

3.4 Reset Timing

During power off, if LCD is in the Sleep Out mode, VCI and IOVCC must be powered down minimum 120msec after RESX has been released.

During power off, if LCD is in the Sleep In mode, IOVCC or VCI can be powered down minimum 0msec after RESX has been released.

4. Display Commands

| Regulative Command Set | | | | | | | | | | | | | |
|---|------|-----|-----|-------|-----------|-----------|----|----|-----------|-----------|----|----|-----|
| Command Function | D/CX | RDX | WRX | D17-8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | Hex |
| No Operation | 0 | 1 | ↑ | XX | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00h |
| Software Reset | 0 | 1 | ↑ | XX | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 01h |
| Read Display Identification Information | 0 | 1 | ↑ | XX | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 04h |
| | 1 | ↑ | 1 | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | ↑ | 1 | XX | ID1 [7:0] | | | | | | | E3 | |
| | 1 | ↑ | 1 | XX | ID2 [7:0] | | | | | | | 00 | |
| | 1 | ↑ | 1 | XX | ID3 [7:0] | | | | | | | 00 | |
| Read Display Status | 0 | 1 | ↑ | XX | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 09h |
| | 1 | ↑ | 1 | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | ↑ | 1 | XX | D [31:25] | | | | | | | X | 00 |
| | 1 | ↑ | 1 | XX | X | D [22:20] | | | D [19:16] | | | | 61 |
| | 1 | ↑ | 1 | XX | X | X | X | X | X | D [10:8] | | | 00 |
| | 1 | ↑ | 1 | XX | D [7:5] | | | X | X | X | X | X | 00 |
| Read Display Power Mode | 0 | 1 | ↑ | XX | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0Ah |
| | 1 | ↑ | 1 | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | ↑ | 1 | XX | D [7:2] | | | | | | | 0 | 0 |
| Read Display MADCTL | 0 | 1 | ↑ | XX | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0Bh |
| | 1 | ↑ | 1 | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | ↑ | 1 | XX | D [7:2] | | | | | | | 0 | 0 |
| Read Display Pixel Format | 0 | 1 | ↑ | XX | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0Ch |
| | 1 | ↑ | 1 | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | ↑ | 1 | XX | X | DPI [2:0] | | | X | DBI [2:0] | | | 06 |
| Read Display Image Format | 0 | 1 | ↑ | XX | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0Dh |
| | 1 | ↑ | 1 | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | ↑ | 1 | XX | X | X | X | X | X | D [2:0] | | | 00 |
| Read Display Signal Mode | 0 | 1 | ↑ | XX | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0Eh |
| | 1 | ↑ | 1 | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | ↑ | 1 | XX | D [7:2] | | | | | | | 0 | 0 |
| Read Display Self-Diagnostic Result | 0 | 1 | ↑ | XX | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0Fh |
| | 1 | ↑ | 1 | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | ↑ | 1 | XX | D [7:6] | | | X | X | X | X | X | 00 |
| Enter Sleep Mode | 0 | 1 | ↑ | XX | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 10h |
| Sleep OUT | 0 | 1 | ↑ | XX | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 11h |
| Partial Mode ON | 0 | 1 | ↑ | XX | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 12h |
| Normal Display Mode ON | 0 | 1 | ↑ | XX | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 13h |
| Display Inversion OFF | 0 | 1 | ↑ | XX | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 20h |
| Display Inversion ON | 0 | 1 | ↑ | XX | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 21h |
| Gamma Set | 0 | 1 | ↑ | XX | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 26h |
| | 1 | 1 | ↑ | XX | GC [7:0] | | | | | | | 01 | |
| Display OFF | 0 | 1 | ↑ | XX | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 28h |
| Display ON | 0 | 1 | ↑ | XX | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 29h |
| Column Address Set | 0 | 1 | ↑ | XX | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 2Ah |
| | 1 | 1 | ↑ | XX | SC [15:8] | | | | | | | XX | |
| | 1 | 1 | ↑ | XX | SC [7:0] | | | | | | | XX | |
| | 1 | 1 | ↑ | XX | EC [15:8] | | | | | | | XX | |
| | 1 | 1 | ↑ | XX | EC [7:0] | | | | | | | XX | |
| Page Address Set | 0 | 1 | ↑ | XX | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 2Bh |
| | 1 | 1 | ↑ | XX | SP [15:8] | | | | | | | XX | |
| | 1 | 1 | ↑ | XX | SP [7:0] | | | | | | | XX | |
| | 1 | 1 | ↑ | XX | EP [15:8] | | | | | | | XX | |
| | 1 | 1 | ↑ | XX | EP [7:0] | | | | | | | XX | |

| | | | | | | | | | | | | | |
|----------------------------------|---|---|---|----|------------|-----------|----|----|-----|-----------|---------|---------|-----|
| Memory Write | 0 | 1 | ↑ | XX | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 2Ch |
| | 1 | 1 | ↑ | | D [17:0] | | | | | | | | XX |
| Color SET | 0 | 1 | ↑ | XX | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 2Dh |
| | 1 | 1 | ↑ | XX | R00 [5:0] | | | | | | | | XX |
| | 1 | 1 | ↑ | XX | Rnn [5:0] | | | | | | | | XX |
| | 1 | 1 | ↑ | XX | R31 [5:0] | | | | | | | | XX |
| | 1 | 1 | ↑ | XX | G00 [5:0] | | | | | | | | XX |
| | 1 | 1 | ↑ | XX | Gnn [5:0] | | | | | | | | XX |
| | 1 | 1 | ↑ | XX | G63 [5:0] | | | | | | | | XX |
| | 1 | 1 | ↑ | XX | B00 [5:0] | | | | | | | | XX |
| | 1 | 1 | ↑ | XX | Bnn [5:0] | | | | | | | | XX |
| | 1 | 1 | ↑ | XX | B31 [5:0] | | | | | | | | XX |
| Memory Read | 0 | 1 | ↑ | XX | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 2Eh |
| | 1 | ↑ | 1 | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | ↑ | 1 | | D [17:0] | | | | | | | | XX |
| Partial Area | 0 | 1 | ↑ | XX | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 30h |
| | 1 | 1 | ↑ | XX | SR [15:8] | | | | | | | | 00 |
| | 1 | 1 | ↑ | XX | SR [7:0] | | | | | | | | 00 |
| | 1 | 1 | ↑ | XX | ER [15:8] | | | | | | | | 00 |
| | 1 | 1 | ↑ | XX | ER [7:0] | | | | | | | | EF |
| Vertical Scrolling Definition | 0 | 1 | ↑ | XX | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 33h |
| | 1 | 1 | ↑ | XX | TFA [15:8] | | | | | | | | 00 |
| | 1 | 1 | ↑ | XX | TFA [7:0] | | | | | | | | 00 |
| | 1 | 1 | ↑ | XX | VSA [15:8] | | | | | | | | 00 |
| | 1 | 1 | ↑ | XX | VSA [7:0] | | | | | | | | F0 |
| | 1 | 1 | ↑ | XX | BFA [15:8] | | | | | | | | 00 |
| | 1 | 1 | ↑ | XX | BFA [7:0] | | | | | | | | 00 |
| Tearing Effect Line OFF | 0 | 1 | ↑ | XX | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 34h |
| Tearing Effect Line ON | 0 | 1 | ↑ | XX | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 35h |
| | 1 | 1 | ↑ | XX | X | X | X | X | X | X | X | M | 00 |
| Memory Access Control | 0 | 1 | ↑ | XX | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 36h |
| | 1 | 1 | ↑ | XX | MY | MX | MV | ML | BGR | MH | X | X | 00 |
| Vertical Scrolling Start Address | 0 | 1 | ↑ | XX | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 37h |
| | 1 | 1 | ↑ | XX | VSP [15:8] | | | | | | | | 00 |
| | 1 | 1 | ↑ | XX | VSP [7:0] | | | | | | | | 00 |
| Idle Mode OFF | 0 | 1 | ↑ | XX | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 38h |
| Idle Mode ON | 0 | 1 | ↑ | XX | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 39h |
| Pixel Format Set | 0 | 1 | ↑ | XX | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 3Ah |
| | 1 | 1 | ↑ | XX | X | DPI [2:0] | | | X | DBI [2:0] | | | 66 |
| Set Tear Scanline | 0 | 1 | ↑ | XX | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 44h |
| | 1 | 1 | ↑ | XX | X | X | X | X | X | X | X | STS [8] | 00 |
| | 1 | 1 | ↑ | XX | STS [7:0] | | | | | | | | 00 |
| Get Scanline | 0 | 1 | ↑ | XX | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 45h |
| | 1 | ↑ | 1 | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | ↑ | 1 | XX | X | X | X | X | X | X | GTS [9] | GTS [8] | 00 |
| | 1 | ↑ | 1 | XX | GTS [7:0] | | | | | | | | 00 |
| Write Display Brightness | 0 | 1 | ↑ | XX | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 51h |
| | 1 | 1 | ↑ | XX | DBV [7:0] | | | | | | | | 00 |

| | | | | | | | | | | | | | |
|--|---|---|---|----|-----------------------------------|----|-------|---|----|----|---------|---|-----|
| Read Display Brightness | 0 | 1 | ↑ | XX | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 52h |
| | 1 | ↑ | 1 | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | ↑ | 1 | XX | DBV [7:0] | | | | | | | | 00 |
| Write CTRL Display | 0 | 1 | ↑ | XX | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 53h |
| | 1 | 1 | ↑ | XX | X | X | BCTRL | X | DD | BL | X | X | 00 |
| Read CTRL Display | 0 | 1 | ↑ | XX | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 54h |
| | 1 | ↑ | 1 | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | ↑ | 1 | XX | X | X | BCTRL | X | DD | BL | X | X | 00 |
| Write Content Adaptive Brightness Control | 0 | 1 | ↑ | XX | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 55h |
| | 1 | 1 | ↑ | XX | X | X | X | X | X | X | C [1:0] | | 00 |
| Read Content Adaptive Brightness Control | 0 | 1 | ↑ | XX | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 56h |
| | 1 | ↑ | 1 | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | ↑ | 1 | XX | X | X | X | X | X | X | C [1:0] | | 00 |
| Write CABC Minimum Brightness | 0 | 1 | ↑ | XX | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 5Eh |
| | 1 | 1 | ↑ | XX | CMB [7:0] | | | | | | | | 00 |
| Read CABC Minimum Brightness | 0 | 1 | ↑ | XX | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 5Fh |
| | 1 | ↑ | 1 | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | ↑ | 1 | XX | CMB [7:0] | | | | | | | | 00 |
| Read Automatic Brightness Control Self-Diagnostic Result | 0 | 1 | ↑ | XX | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 68H |
| | 1 | ↑ | 1 | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | ↑ | 1 | XX | D7 | D6 | X | X | X | X | X | X | 00 |
| Read ID1 | 0 | 1 | ↑ | XX | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | DAh |
| | 1 | ↑ | 1 | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | ↑ | 1 | XX | Module's Manufacture [7:0] | | | | | | | | E3 |
| Read ID2 | 0 | 1 | ↑ | XX | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | DBh |
| | 1 | ↑ | 1 | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | ↑ | 1 | XX | LCD Module / Driver Version [7:0] | | | | | | | | XX |
| Read ID3 | 0 | 1 | ↑ | XX | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | DCh |
| | 1 | ↑ | 1 | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | ↑ | 1 | XX | LCD Module / Driver ID [7:0] | | | | | | | | XX |

| Extended Command Set | | | | | | | | | | | | | |
|---------------------------------|------|-----|-----|-------|-------------|-----------|----|------------|------|------|------------|-----|-----|
| Command Function | D/CX | RDX | WRX | D17-8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | Hex |
| RGB Interface Signal Control | 0 | 1 | ↑ | XX | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | B0h |
| | 1 | 1 | ↑ | XX | ByPass_MODE | RCM [1:0] | | X | VSPL | HSPL | DPL | EPL | 40 |
| Frame Control (In Normal Mode) | 0 | 1 | ↑ | XX | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | B1h |
| | 1 | 1 | ↑ | XX | X | X | X | X | X | X | DIVA [1:0] | | 00 |
| | 1 | 1 | ↑ | XX | X | X | X | RTNA [4:0] | | | | 1C | |
| Frame Control (In Idle Mode) | 0 | 1 | ↑ | XX | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | B2h |
| | 1 | 1 | ↑ | XX | X | X | X | X | X | X | DIVB [1:0] | | 00 |
| | 1 | 1 | ↑ | XX | X | X | X | RTNB [4:0] | | | | 1C | |
| Frame Control (In Partial Mode) | 0 | 1 | ↑ | XX | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | B3h |
| | 1 | 1 | ↑ | XX | X | X | X | X | X | X | DIVC [1:0] | | 00 |
| | 1 | 1 | ↑ | XX | X | X | X | RTNC [4:0] | | | | 1C | |
| Display Inversion Control | 0 | 1 | ↑ | XX | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | B4h |
| | 1 | 1 | ↑ | XX | X | X | X | X | X | X | DINV [1:0] | | 00 |
| Blanking Porch Control | 0 | 1 | ↑ | XX | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | B5h |
| | 1 | 1 | ↑ | XX | 0 | VFP [6:0] | | | | | | 02 | |
| | 1 | 1 | ↑ | XX | 0 | VBP [6:0] | | | | | | 02 | |
| | 1 | 1 | ↑ | XX | 0 | HFP [6:0] | | | | | | 0A | |
| | | | | XX | 0 | HBP [6:0] | | | | | | 14 | |

| | | | | | | | | | | | | | |
|--------------------------|---|---|---|----|---|---|---|---|---|---|---|---|-----|
| Display Function Control | 0 | 1 | ↑ | XX | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | B6h |
|--------------------------|---|---|---|----|---|---|---|---|---|---|---|---|-----|

| | | | | | | | | | | | | | |
|---------------------------------------|---|---|---|----|----------------|------------|-------------|--------------|---------------|------------|----------|---------------|-----|
| | 1 | 1 | ↑ | XX | X | X | X | X | PTG [1:0] | PT [1:0] | | 0A | |
| | 1 | 1 | ↑ | XX | REV | GS | SS | SM | ISC [3:0] | | | 80 | |
| | 1 | 1 | ↑ | XX | X | X | NL [5:0] | | | | | 1D | |
| | 1 | 1 | ↑ | XX | X | X | PCDIV [5:0] | | | | | 04 | |
| Entry Mode Set | 0 | 1 | ↑ | XX | 1 | 0 | 1 | 1 | 0 | 1 | 1 | B7h | |
| | 1 | 1 | ↑ | XX | X | X | X | X | X | GON | DTE | GAS | 07 |
| Backlight Control 1 | 0 | 1 | ↑ | XX | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | B8h |
| | 1 | 1 | ↑ | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | 1 | ↑ | XX | X | X | X | X | TH_UI [3:0] | | | 0B | |
| Backlight Control 2 | 0 | 1 | ↑ | XX | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | B9h |
| | 1 | 1 | ↑ | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | 1 | ↑ | XX | TH_MV [3:0] | | | TH_ST [3:0] | | | BB | | |
| Backlight Control 3 | 0 | 1 | ↑ | XX | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | BAh |
| | 1 | 1 | ↑ | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | 1 | ↑ | XX | X | X | X | X | DTH_UI [3:0] | | | 04 | |
| Backlight Control 4 | 0 | 1 | ↑ | XX | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | BBh |
| | 1 | 1 | ↑ | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | 1 | ↑ | XX | DTH_MV [3:0] | | | DTH_ST [3:0] | | | A8 | | |
| Backlight Control 5 | 0 | 1 | ↑ | XX | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | BCh |
| | 1 | 1 | ↑ | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | 1 | ↑ | XX | DIM2 [3:0] | | | X | DIM1 [2:0] | | 43 | | |
| Backlight Control 6 | 0 | 1 | ↑ | XX | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | BDh |
| | 1 | 1 | ↑ | XX | | | | | | LEDONR | LEDONPOL | LEDPW MOPL | 00 |
| Backlight Control 7 | 0 | 1 | ↑ | XX | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | BEh |
| | 1 | 1 | ↑ | XX | PWM_DIV[7:0] | | | | | | | D0 | |
| Power Control 1 | 0 | 1 | ↑ | XX | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | C0h |
| | 1 | 1 | ↑ | XX | X | X | X | VRH1 [4:0] | | | | 09 | |
| | 1 | 1 | ↑ | XX | X | X | X | VRH2 [4:0] | | | | 09 | |
| Power Control 2 | 0 | 1 | ↑ | XX | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | C1h |
| | 1 | 1 | ↑ | XX | 0 | VC[2:0] | | | 0 | BT [2:0] | | 00 | |
| Power Control 3 (For Normal Mode) | 0 | 1 | ↑ | XX | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | C2h |
| | 1 | 1 | ↑ | XX | 1 | DCA1 [2:0] | | | 0 | DCA0 [2:0] | | B2 | |
| Power Control 4 (For Idle Mode) | 0 | 1 | ↑ | XX | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | C3h |
| | 1 | 1 | ↑ | XX | 1 | DCB1 [2:0] | | | 0 | DCB0 [2:0] | | B2 | |
| Power Control 5 (For Partial Mode) | 0 | 1 | ↑ | XX | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | C4h |
| | 1 | 1 | ↑ | XX | 1 | DCC1 [2:0] | | | 0 | DCC0 [2:0] | | B2 | |
| VCOM Control 1 | 0 | 1 | ↑ | XX | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | C5h |
| | 1 | 1 | ↑ | XX | nVM | VCM[6:0] | | | | | F2 | | |
| Get GPIO0-7 Status | 0 | 1 | ↑ | XX | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | C6h |
| | 1 | ↑ | 1 | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | ↑ | 1 | XX | GPI [7:0] | | | | | | | 00 | |
| Set GPIO0-7 Status | 0 | 1 | ↑ | XX | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | C7h |
| | 1 | 1 | ↑ | XX | GPO[7:0] | | | | | | | 00 | |
| | 1 | 1 | ↑ | XX | X | X | X | X | X | X | IE | OE B | 02 |
| Set EXTC | 0 | 1 | ↑ | XX | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | C8h |
| | 1 | 1 | ↑ | XX | EXTC1[7:0] | | | | | | | FF | |
| | 1 | 1 | ↑ | XX | EXTC2[7:0] | | | | | | | 93 | |
| | 1 | 1 | ↑ | XX | EXTC3[7:0] | | | | | | | 42 | |
| NV Memory Write | 0 | 1 | ↑ | XX | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | D0h |
| | 1 | 1 | ↑ | XX | X | X | X | X | PGM_ADR [3:0] | | | 00 | |
| | 1 | 1 | ↑ | XX | PGM_DATA [7:0] | | | | | | | XX | |
| NV Memory Protection Key | 0 | 1 | ↑ | XX | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | D1h |
| | 1 | 1 | ↑ | XX | KEY [23:16] | | | | | | | 55 | |
| | 1 | ↓ | ↑ | XX | KEY [15:8] | | | | | | | AA | |
| | 1 | ↓ | ↑ | XX | KEY [7:0] | | | | | | | 66 | |

| | | | | | | | | | | | | | |
|------------------------------|---|---|----|----|------------------|------------|------------|---------------|-------------------|---------------|-----------|--------|-----|
| NV Memory Status Read | 0 | 1 | ↑ | XX | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | D2h |
| | 1 | ↑ | ↓ | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | ↑ | ↓ | XX | MADCTL_CNT [1:0] | | | ID3_CNT [1:0] | ID2_CNT [1:0] | ID1_CNT [1:0] | | | XX |
| | 1 | ↑ | ↓ | XX | BUSY | X | X | X | X | VMF_CNT [2:0] | | | XX |
| Read ID4 | 0 | 1 | ↑ | XX | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | D3h |
| | 1 | ↑ | ↓ | XX | X | X | X | X | X | X | X | X | XX |
| | 1 | ↑ | ↓ | XX | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00 |
| | 1 | ↑ | ↓ | XX | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 93 |
| | 1 | ↑ | ↓ | XX | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 42 |
| Get External Register by SPI | 0 | 1 | ↑ | XX | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | D9h |
| | 1 | 1 | ↑ | XX | X | X | X | ENSPi | SPI_EXT_ORD [3:0] | | | 00 | |
| Positive Gamma Correction | 0 | 1 | ↑ | XX | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | E0h |
| | 1 | 1 | ↑ | XX | X | X | X | X | VP0 [3:0] | | | 00 | |
| | 1 | 1 | ↑ | XX | X | X | VP1 [5:0] | | | | | 05 | |
| | 1 | 1 | ↑ | XX | X | X | VP2 [5:0] | | | | | 08 | |
| | 1 | 1 | ↑ | XX | X | X | X | X | VP4 [3:0] | | | 04 | |
| | 1 | 1 | ↑ | XX | X | X | VP6 [4:0] | | | | 13 | | |
| | 1 | 1 | ↑ | XX | X | X | X | X | VP13 [3:0] | | | 0A | |
| | 1 | 1 | ↑ | XX | X | VP20 [6:0] | | | | | 34 | | |
| | 1 | 1 | ↑ | XX | VP36 [3:0] | | | VP27 [3:0] | | | 8A | | |
| | 1 | 1 | ↑ | XX | X | VP43 [6:0] | | | | | 46 | | |
| | 1 | 1 | ↑ | XX | X | X | X | X | VP50 [3:0] | | | 07 | |
| | 1 | 1 | ↑ | XX | X | X | VP57 [4:0] | | | | 0E | | |
| | 1 | 1 | ↑ | XX | X | X | X | X | VP59 [3:0] | | | 0A | |
| | 1 | 1 | ↑ | XX | X | X | VP61 [5:0] | | | | | 1B | |
| | 1 | 1 | ↑ | XX | X | X | VP62 [5:0] | | | | | 1D | |
| Negative Gamma CorrectionE | 0 | 1 | ↑ | XX | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | E1h |
| | 1 | 1 | ↑ | XX | X | X | X | X | VN0 [4:0] | | | 00 | |
| | 1 | 1 | ↑ | XX | X | X | VN1 [5:0] | | | | | 22 | |
| | 1 | 1 | ↑ | XX | X | X | VN2 [5:0] | | | | | 25 | |
| | 1 | 1 | ↑ | XX | X | X | X | X | VN4 [3:0] | | | 04 | |
| | 1 | 1 | ↑ | XX | X | X | VN6 [4:0] | | | | 0F | | |
| | 1 | 1 | ↑ | XX | X | X | X | X | VN13 [3:0] | | | 06 | |
| | 1 | 1 | ↑ | XX | X | VN20 [6:0] | | | | | 38 | | |
| | 1 | 1 | ↑ | XX | VN36 [3:0] | | | VN27 [3:0] | | | 56 | | |
| | 1 | 1 | ↑ | XX | X | VN43 [6:0] | | | | | 4B | | |
| | 1 | 1 | ↑ | XX | X | X | X | X | VN50 [3:0] | | | 05 | |
| | 1 | 1 | ↑ | XX | X | X | VN57 [4:0] | | | | 0C | | |
| | 1 | 1 | ↑ | XX | X | X | X | X | VN59 [3:0] | | | 0A | |
| | 1 | 1 | ↑ | XX | X | X | VN61 [5:0] | | | | | 37 | |
| | 1 | 1 | ↑ | XX | X | X | VN62 [5:0] | | | | | 3A | |
| 1 | 1 | ↑ | XX | X | X | X | X | VN63 [4:0] | | | 0F | | |
| Digital Gamma Control 1 | 0 | 1 | ↑ | XX | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | E2h |
| 1 st Parameter | 1 | 1 | ↑ | XX | RCA0 [3:0] | | | BCA0 [3:0] | | | XX | | |
| : | 1 | 1 | ↑ | XX | RCAx [3:0] | | | BCAx [3:0] | | | XX | | |
| 16 th Parameter | 1 | 1 | ↑ | XX | RCA15 [3:0] | | | BCA15 [3:0] | | | XX | | |
| Digital Gamma Control 2 | 0 | 1 | ↑ | XX | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | E3h |
| 1 st Parameter | 1 | 1 | ↑ | XX | RFA0 [3:0] | | | BFA0 [3:0] | | | XX | | |
| : | 1 | 1 | ↑ | XX | RFAx [3:0] | | | BFAx [3:0] | | | XX | | |
| 64 th Parameter | 1 | 1 | ↑ | XX | RFA63 [3:0] | | | BFA63 [3:0] | | | XX | | |
| Interface Control | 0 | 1 | ↑ | XX | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | F6h |
| | 1 | 1 | ↑ | XX | MY_EOR | MX_EOR | MV_EOR | X | BGR_EOR | X | X | WEMODE | 01 |
| | 1 | 1 | ↑ | XX | X | X | EPF [1:0] | | X | X | MDT [1:0] | | 00 |
| | 1 | 1 | ↑ | XX | X | X | ENDIAN | X | DM [1:0] | RM | RIM | 00 | |

Note: For more information and details please refer to LCD controller (ILI9342C) datasheet.

5. Optical Characteristics

| Item | Symbol | Condition | Min | Typ | Max | Unit | Remark |
|----------------|------------|--------------------|--------------------|--------|-------|-------------------|----------|
| View Angles | θT | $CR \geq 10$ | 70 | 80 | - | Degree | Note 2,3 |
| | θB | | 70 | 80 | - | | |
| | θL | | 70 | 80 | - | | |
| | θR | | 70 | 80 | - | | |
| Contrast Ratio | CR | $\theta = 0^\circ$ | 600 | 800 | - | | Note 3 |
| Response Time | T_{ON} | 25°C | - | 30 | 40 | ms | Note 4 |
| | T_{OFF} | | | | | | |
| Chromaticity | White | x | Backlight is on | 0.252 | 0.302 | 0.352 | Note 1,5 |
| | | y | | 0.265 | 0.315 | 0.365 | |
| | Red | x | | 0.575 | 0.625 | 0.675 | Note 1,5 |
| | | y | | 0.271 | 0.321 | 0.371 | |
| | Green | x | | 0.275 | 0.325 | 0.375 | Note 1,5 |
| | | y | | 0.577 | 0.627 | 0.677 | |
| | Blue | x | | 0.107 | 0.157 | 0.207 | Note 1,5 |
| | | y | | -0.005 | 0.045 | 0.095 | |
| Uniformity | U | - | 75 | 80 | - | % | Note 6 |
| NTSC | | - | 65 | 70 | - | % | Note 5 |
| Luminance | L | - | 250 | 300 | - | cd/m ² | Note 7 |

Test Conditions:

1. I_{LED A} = 20mA (every LED), and the ambient temperature is 25°C.
2. The test systems refer to Note 1 and Note 2.

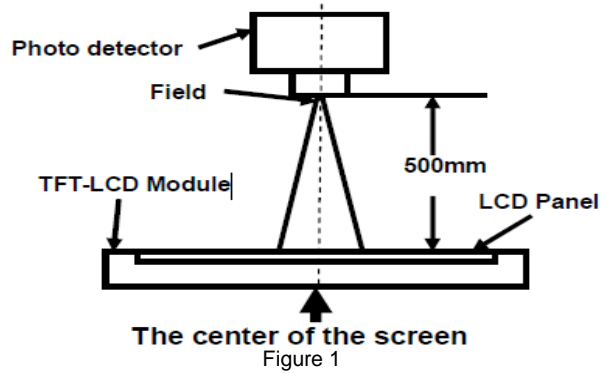
Note 1: : reference Figure1

The optical characteristics should be measured in dark room. After 5 Minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.

Measuring condition:

- Measuring surroundings: Dark room
- Measuring temperature: Ta=25°C.
- Adjust operating voltage to get optimum contrast at the center of the display.

Measured value at the center point of LCD panel after more than 5 minutes while backlight turning on.



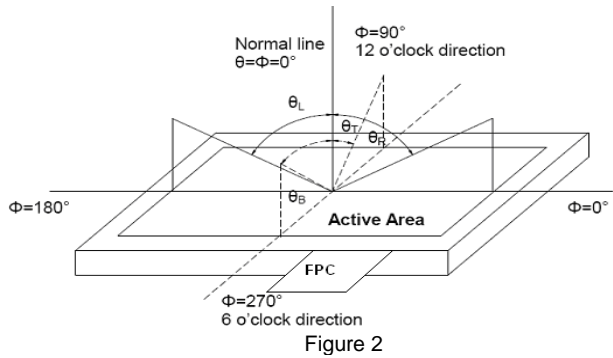
Note 2: reference Figure2

The luminance uniformity is calculated by using following formula.

$$\Delta Bp = Bp (\text{Min.}) / Bp (\text{Max.}) \times 100 (\%)$$

Bp (Max.) = Maximum brightness in 9 measured spots

Bp (Min.) = Minimum brightness in 9 measured spots.



Note 3: reference Figure3

The definition of contrast ratio:

$$\text{ContrastRatio(CR)} = \frac{\text{Luminance When LCD is at "White" state}}{\text{Luminance When LCD is at "Black" state}}$$

(Contrast Ratio is measured in optimum common electrode voltage)

“White state “: The state is that the LCD should drive by Vwhite. “Black state “: The state is that the LCD should drive by Vblack. Vwhite: TBD V Vblack: TBD V.

Note 4: Definition of Response time

The response time is defined as the LCD optical switching time interval between “White” state and

“Black” state. Rise time (TON) is the time between photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is the time between photo detector output intensity changed from 10% to 90%.

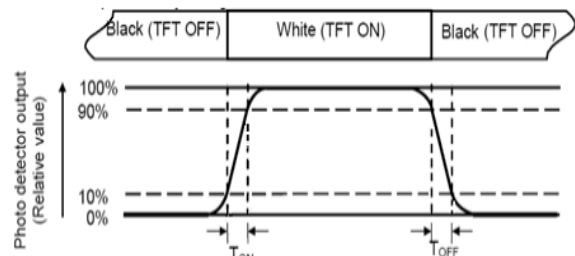


Figure 3

Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: Definition of Luminance Uniformity Figure4

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity (U) = Lmin/ Lmax

L-----Active area diameter,

W----- Active area width

Lmax: The measured Maximum luminance of all measurement position.

Lmin: The measured Minimum luminance of all measurement position.

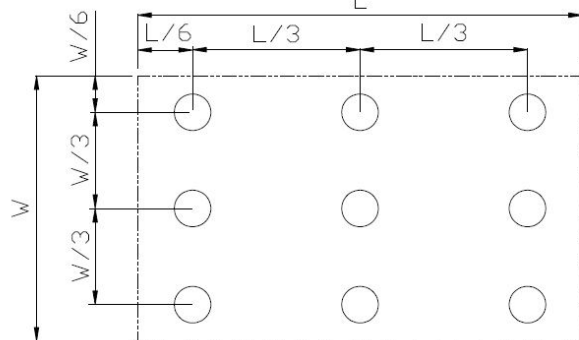


Figure 4

Note 7: Definition of Luminance:

Measure the luminance of white state at center point.

6. LCD Module Design and Handling Precautions

- Please ensure V0, VCOM is adjustable, to enable LCD module get the best contrast ratio under different temperatures, view angles and positions.
- Normally display quality should be judged under the best contrast ratio within viewable area. Unexpected display pattern may come out under abnormal contrast ratio.
- Never operate the LCD module exceed the absolute maximum ratings.
- Never apply signal to the LCD module without power supply.
- Keep signal line as short as possible to reduce external noise interference.
- IC chip (e.g. TAB or COG) is sensitive to light. Strong light might cause malfunction. Light sealing structure casing is recommended.
- Make sure there is enough space (with cushion) between case and LCD panel, to prevent external force passed on to the panel; otherwise that may cause damage to the LCD and degrade its display result.
- Avoid showing a display pattern on screen for a long time (continuous ON segment).
- LCD module reliability may be reduced by temperature shock.
- When storing and operating LCD module, avoid exposure to direct sunlight, high humidity, high or low temperature. They may damage or degrade the LCD module.
- Never leave LCD module in extreme condition (max./min storage/operate temperature) for more than 48hr.
- Recommend LCD module storage conditions is 0 C~40 C <80%RH.
- LCD module should be stored in the room without acid, alkali and harmful gas.
- Avoid dropping & violent shocking during transportation, and no excessive pressure press, moisture and sunlight.
- LCD module can be easily damaged by static electricity. Please maintain an optimum anti-static working environment to protect the LCD module.(eg. ground the soldering irons properly)
- Be sure to ground the body when handling LCD module.
- Only hold LCD module by its sides. Never hold LCD module by applying force on the heat seal or TAB.
- When soldering, control the temperature and duration avoid damaging the backlight guide or diffuser which might degrade the display result such as uneven display.
- Never let LCD module contact with corrosive liquids, which might cause damage to the backlight guide or the electric circuit of LCD module.
- Only clean LCD with a soft dry cloth, Isopropyl Alcohol or Ethyl Alcohol. Other solvents (e.g. water) may damage the LCD.
- Never add force to components of LCD module. It may cause invisible damage or degrade the module's reliability.
- When mounting LCD module, please make sure it is free from twisting, warping and bending.

- Do not add excessive force on surface of LCD, which may cause the display color change abnormally.
- LCD panel is made with glass. Any mechanical shock (e.g. dropping from high place) will damage the LCD module.
- Protective film is attached on LCD screen. Be careful when peeling off this protective film, since static electricity may be generated.
- Polarizer on LCD gets scratched easily. If possible, do not remove LCD protective film until the last step of installation.
- When peeling off protective film from LCD, static charge may cause abnormal display pattern. The symptom is normal, and it will turn back to normal in a short while.

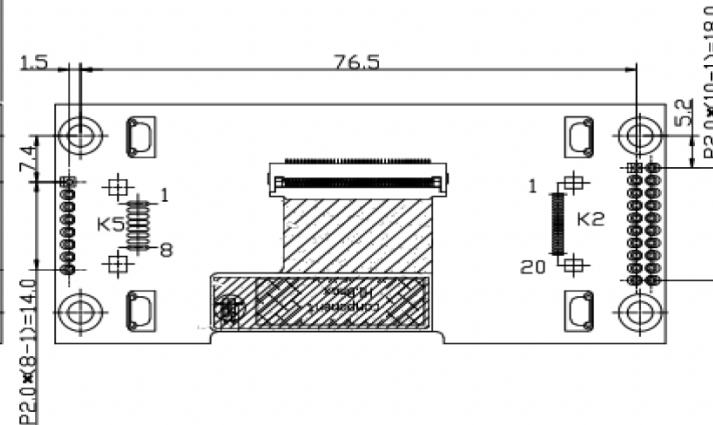
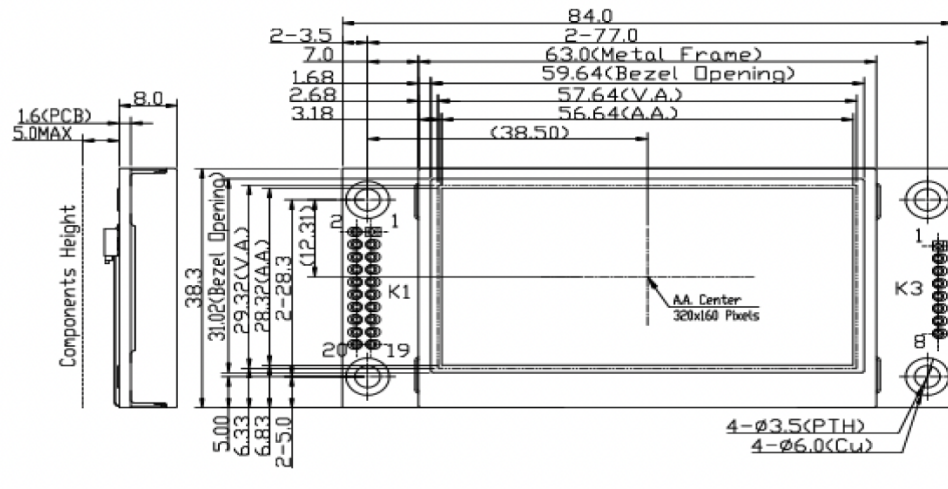
- LCD panel has sharp edges, please handle with care.
- Never attempt to disassemble or rework LCD module.
- If display panel is damaged and liquid crystal substance leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes promptly wash it off using soap and water.

Warranty

This product has been manufactured to our company's specifications as a part for use in your company's general electronic products. It is guaranteed to perform according to delivery specifications. For any other use apart from general electronic equipment, we cannot take responsibility if the product is used in medical devices, nuclear power control equipment, aerospace equipment, fire and security systems, or any other applications in which there is a direct risk to human life and where extremely high levels of reliability are required. If the product is to be used in any of the above applications, we will need to enter into a separate product liability agreement.

- We cannot accept responsibility for any defect, which may arise from additional manufacturing of the product (including disassembly and reassembly), after product delivery.
- We cannot accept responsibility for any defect, which may arise after the application of strong external force to the product.
- We cannot accept responsibility for any defect, which may arise due to the application of static electricity after the product has passed our company's acceptance inspection procedures.
- When the product is in CCFL models, CCFL service life and brightness will vary according to the performance of the inverter used, leaks, etc. We cannot accept responsibility for product performance, reliability, or defect, which may arise.
- We cannot accept responsibility for intellectual property of a third part, which may arise through the application of our product to our assembly with exception to those issues relating directly to the structure or method of manufacturing of our product.

7. Outline Drawing



| Terminal K3\K5 | |
|----------------|----------|
| No. | Pin Name |
| 1 | GND |
| 2 | VDD |
| 3 | SI |
| 4 | SCL |
| 5 | D/C |
| 6 | /RES |
| 7 | /CS |
| 8 | BLEN |

| Terminal K1\K2 | |
|----------------|----------|
| No. | Pin Name |
| 1 | NC<GND> |
| 2 | NC<GND> |
| 3 | NC<BLEN> |
| 4 | NC<VDD> |
| 5 | NC<VDD> |
| 6 | NC</RD> |
| 7 | NC</WR> |
| 8 | NC<D/C> |
| 9 | NC</CS> |
| 10 | NC<D0> |
| 11 | NC<D1> |
| 12 | NC<D2> |
| 13 | NC<D3> |
| 14 | NC<D4> |
| 15 | NC<D5> |
| 16 | NC<D6> |
| 17 | NC<D7> |
| 18 | NC</RES> |
| 19 | NC<FM> |
| 20 | NC |

- Note:
- *1. LCD Display Type: TFT.Transmissive(Full View)
 - *2. Pixel Arrangement: RGB-STRIPE
 - *3. Color Depth : 262k Colors
 - *4. Operating Voltage : 5.0V
 - *5. Backlight: White LED
 - *6. Interface: SPI/MCU_8bits
 - *7. Operating Temperature : -20°C~70°C
 - *8. Storage Temperature : -30°C~80°C
 - *9. Unmarked Tolerance : ≤150,±0.3; >150,±0.5

| | | | | |
|----------|---------------|------------------------------|------------|----------------|
| A | | | | |
| Rev | Note | | | Date |
| Dwg | Title | LMT025ENPFWA-NAN Outline Dwg | | |
| Dwg No. | MK-007659-1-1 | Date | 2022-04-19 | |
| Scale | 1/1 | Tol. | mm | Paper Size A3 |
| Approved | | Checked | | Drawn HeYichen |